BULLETIN 271B, VOL. 1
NAVSHIPS 93789

TELETYPE model 28 THE LEADERSHIP LINE

TECHNICAL MANUAL
MODEL 28
REPERFORATOR TRANSMITTER SETS
AND
TAPE RELAY EQUIPMENT GROUPS
TRANSMITTING, MONITORING, RECEIVING

SECTIONS

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2. INSTALLATION
3. OPERATOR'S SECTION
4. PRINCIPLES OF OPERATION
5. ADJUSTMENTS AND LUBRICATION
6. SERVICE AND REPAIR

TELETYPE®
CORPORATION
5555 TOUHY AVENUE, SKOKIE, ILLINOIS

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CROSS REFERENCE
AN NOMENCLATURE TO TELETYPE CODES
REPERFORATOR-TRANSMITTER SETS, TELETYPEWRITER

AN NOMENCLATURE		TELETYPE CODES	REPERFORATOR TRANSMITTER SET AN/UGC-14	REPERFORATOR TRANSMITTER SET AN/UGC-17	REPERFORATOR TRANSMITTER SET AN/UGC-31
CABINET, ELECTRICAL EQUIPMENT	CY-3058/UG	LBAC222BR	1		
CABINET, ELECTRICAL EQUIPMENT	CY-3683/UG	LBAC238BR		1	
CABINET, ELECTRICAL EQUIPMENT	CY-4702/UG	LBAC253BR			1
REEL ASSEMBLY, TAPE	RL-217/UG	LTHS205BZ	2	2	2
BASE UNIT, TELETYPEWRITER	MT-2424/UG	LRXB17	2		2
BASE UNIT, TELETYPEWRITER	MT-2773/UG	LRXB27		2	
DISTRIBUTOR-TRANSMITTER, TELETYPEWRITER	TT-313/UG	LAXD7	2		2
DISTRIBUTOR-TRANSMITTER, TELETYPEWRITER	TT-376/UG	LAXD8		2	
REPERFORATOR, TELETYPEWRITER	TT-314/UG	LPR34BWA	2	2	
REPERFORATOR, TELETYPEWRITER	TT-493/UG	LPR34BRP			2
MOTOR, ALTERNATING CURRENT	PD-84/U	LMU11	2	2	2
RELAY, ARMATURE	RE-861/UG	RY34	2	2	2
*END ENCLOSURES - SET OF PARTS	–	161999BR			
**MODIFICATION KIT	–	194267			

*1 SET REQUIRED FOR INDIVIDUAL CABINET INSTALLATION.
1 SET REQUIRED FOR CABINETS INSTALLED IN BANKS.

**NOTE: The 194267 Modification Kit is used to modify AN/UGC-17 Reperforator Transmitter Set to 7.42 Unit Code and 60, 75 and 100 wpm both transmitting and receiving.

ABOVE FIGURES ARE QUANTITIES PER SET.

CROSS-REFERENCE
AN NOMENCLATURE TO TELETYPE CODES
DISTRIBUTOR-TRANSMITTER SETS, TELETYPEWRITERS

AN NOMENCLATURE				TELETYPE CODES	DISTRIBUTOR-TRANSMITTER SET, TELETYPEWRITERS TT-310/UG	DISTRIBUTOR-TRANSMITTER SET, TELETYPEWRITER AN/GGT-3	DISTRIBUTOR-TRANSMITTER SET, TELETYPEWRITER AN/GGT-4
CABINET, ELECTRICAL EQUIPMENT	CY-3059/UG			LBAC223BR	1		
CABINET, ELECTRICAL EQUIPMENT	CY-4706/GG			LBAC256BR		1	1
BASE UNIT, TELETYPEWRITER	MT-2420/UG			LMXB205BR	1		
BASE UNIT, TELETYPEWRITER	MT-2421/UG			LMXB206BR	1		
BASE UNIT, TELETYPEWRITER	MT-3299/UG			LMXB207BR		1	1
BASE UNIT, TELETYPEWRITER	MT-3493/GG			LMXB209BR		1	1
DISTRIBUTOR-TRANSMITTER TELETYPEWRITER	TT-312/UG			LBXD16	3	3	3
DISTRIBUTOR-TRANSMITTER TELETYPEWRITER	TT-311/UG			LXD11	3		
DISTRIBUTOR-TRANSMITTER TELETYPEWRITER	TT-496/GG			LXD31		3	3
MOTOR, ALTERNATING CURRENT	PD17A/U			LMU3	2	2	2
MODIFICATION KIT TO ADD TAPE DEFLECTOR	–			172697	3	3	3
*END ENCLOSURES	–			161999BR			
GEAR SETS	UNIT CODE	SPEED: WORDS PER MINUTE	SPEED: BAUDS				
173589 (LBXD)	7.00	107	75.0		1	1	1
173592 (LBXD)	7.00	65	45.5		1		1
173595 (LXD)	7.50	100	75.0		1	1	1
173598 (LXD)	7.50	60.6	45.5		1		1

NOTE: The governed type (PD-18A/U) (LMU41) Motor, Alternating Current, is used in some installations.

*1 SET REQUIRED FOR INDIVIDUAL CABINET INSTALLATION.
*1 SET REQUIRED FOR CABINETS INSTALLED IN BANKS.

ABOVE FIGURES ARE QUANTITIES PER SET.

CROSS-REFERENCE
AN NOMENCLATURE TO TELETYPE CODES
REPERFORATOR SETS, TELETYPEWRITERS

AN NOMENCLATURE		TELETYPE CODES	REPERFORATOR SET, TELETYPEWRITER TT-309/UG	REPERFORATOR SET, TELETYPEWRITER AN/GGR-2	REPERFORATOR SET, TELETYPEWRITER AN/GGR-2A	REPERFORATOR SET, TELETYPEWRITER TT-309A/UG
CABINET, ELECTRICAL EQUIPMENT	CY-3060/UG	LBAC224BR	1			
CABINET, ELECTRICAL EQUIPMENT	CY-4705/GG	LBAC257BR		1	1	
CABINET, ELECTRICAL EQUIPMENT	CY-4790/UG	LBAC259BR				1
BASE UNIT, TELETYPEWRITER	MT-2423/UG	LMRB203BZ	2	2	2	2
REPERFORATOR, TELETYPEWRITER	TT-317/UG	LPR37BWA	6			
REPERFORATOR, TELETYPEWRITER	TT-495/GG	LPR37BRP		6	6	6
MOTOR, ALTERNATING CURRENT	PD-67/U	LMU12	2	2	2	2
REELING MACHINE, TAPE MOTOR DRIVEN	RL-216/UG	TW-15	2	2	2	2
SPROCKET	–	161510			6	
*END ENCLOSURES	–	161999BR				

NOTE: The governed type (PD-77/AU) (LMU39) Motor, Alternating Current, is used in some installations.

*1 SET REQUIRED FOR INDIVIDUAL CABINET INSTALLATIONS.
*1 SET REQUIRED FOR CABINET INSTALLATIONS IN BANKS.

ABOVE FIGURES ARE QUANTITIES PER SET.

CROSS-REFERENCE
AN NOMENCLATURE TO TELETYPE CODES
REPERFORATOR SETS, TELETYPEWRITERS

AN NOMENCLATURE		TELETYPE CODES	REPERFORATOR SET, TELETYPEWRITER TT-308/UG	REPERFORATOR SET, TELETYPEWRITER AN/GGR-1	REPERFORATOR SET, TELETYPEWRITER AN/GGR-1A	REPERFORATOR SET, TELETYPEWRITER TT-308A/UG
CABINET, ELECTRICAL EQUIPMENT	CY-3061/UG	LBAC225BR	1			
CABINET, ELECTRICAL EQUIPMENT	CY-4704/GG	LBAC254BR		1	1	
CABINET, ELECTRICAL EQUIPMENT	CY-4789/UG	LBAC260BR				1
BASE UNIT, TELETYPEWRITER	MT-2423/UG	LMRB203BZ	2			2
REPERFORATOR, TELETYPEWRITER	TT-315/UG	LPR35BWA	6			
REPERFORATOR, TELETYPEWRITER	TT-494/GG	LPR35BRP		6	6	6
MOTOR, ALTERNATING CURRENT	PD67/U	LMU 12	2	2	2	2
SPROCKET	–	161510			6	
*END ENCLOSURES	–	161999BR				
BASE UNIT, TELETYPEWRITER	MT-3492/GG	LMRB207BZ		2	2	

NOTE: The governed type (PD-77/AU) (LMU39) Motor, Alternating Current, is used in some installations.

*1 SET REQUIRED FOR INDIVIDUAL CABINET INSTALLATION.
*1 SET REQUIRED FOR CABINET INSTALLED IN BANKS.

ABOVE FIGURES ARE QUANTITIES PER SET.

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FOLLOWING LUBRICATION INSTRUCTION PERTAIN TO ALL CABINETS.

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TABLE 1-1. MODEL 28 EQUIPMENT

DESCRIPTION	TELETYPE CODES	REPERFORATOR TRANSMITTER SET	REPERFORATOR TRANSMITTER SET	TRANSMITTER GROUP	TYPING REPERFORATOR MONITOR GROUP	TYPING REPERFORATOR RECEIVING GROUP	TRANSMITTER RERUN CART GROUP
Cabinet	LBAC222BR		X				
Cabinet	LBAC223BR			X			
Cabinet	LBAC224BR				X		
Cabinet	LBAC225BR					X	
Cabinet	LBAC238BR	X					
Cabinet	LBAC253BR		X				
Cabinet	LBAC254BR					X	
Cabinet	LBAC256BR			X			
Cabinet	LBAC257BR				X		
Cabinet	LBAC259BR				X		
Cabinet	LBAC260BR					X	
Tape Handling Stand	LTHS205BZ	X	X				
Base, Reperforator Transmitter	LRXB17		X				
Base, Reperforator Transmitter	LRXB27	X					
Base, Multiple Transmitter	LMXB205BR			X			
Base, Multiple Transmitter	LMXB206BR			X			
Base, Multiple Transmitter	LMXB207BR			X			
Base, Multiple Transmitter	LMXB209BR			X			
Base, Multiple Reperforator	LMRB203BZ				X		
Base, Transmitter Distributor	LXDB9						X
Transmitter Distributor	LAXD7		X				
Transmitter Distributor	LAXD8	X					
Transmitter Distributor	LBXD16			X			
Transmitter Distributor	LXD11			X			X
Transmitter Distributor	LXD31			X			
Typing Reperforator	LPR34BRP		X				
Typing Reperforator	LPR34BWA	X	X				
Typing Reperforator	LPR35BRP					X	
Typing Reperforator	LPR35BWA					X	
Typing Reperforator	LPR37BRP				X		
Typing Reperforator	LPR37BWA				X		
Motor, Synchronous	LMU3			X			X
Motor, Synchronous	LMU11	X	X				
Motor, Synchronous	LMU12				X	X	

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TABLE 1-1. MODEL 28 EQUIPMENT

DESCRIPTION	TELETYPE CODE	REPERFORATOR TRANSMITTER SET	REPERFORATOR TRANSMITTER SET	TRANSMITTER GROUP	TYPING REPERFORATOR MONITOR GROUP	TYPING REPERFORATOR RECEIVING GROUP	TRANSMITTER RERUN CART GROUP
Relay, Line	RY34	X	X				
Cover	LXDC200BR						X
Table	LT200BR						X
Dolly	173861						X
Deflector for LXD11	172679			X			
Tape Winder	TW15				X		
Speed Indicator	104986			X	X	X	X
End Enclosures	161999BR	X	X	X	X	X	
*Modification Kit	194267	X					
Sprocket	161510				X	X	
Drive Parts, 45.5 Baud (LBXD)	173592			X			
Drive Parts, 75.0 Baud (LBXD)	173589			X			
Drive Parts, 45.5 Baud (LXD)	173598			X			
Drive Parts, 75.0 Baud (LXD)	173595			X			
Drive Parts, 45.5 Baud (LPR)	173584				X	X	
Drive Parts, 75.0 Baud (LPR)	Part of LMRB203BZ				X	X	
*The 194267 Modification Kit is used to modify Reperforator Transmitter Set to 7.42 Unit Code and 60, 75 and 100 WPM both transmitting and receiving.							
Base, Multiple Reperforator	LMRB207BZ					X	
Motor, Governed	LMU39				X	X	
Motor, Governed	LMU41			X			X
Motor, Governed	LMU4			X			X
Motor, Governed	LMU14				X	X	

SECTION 1

DESCRIPTION

1-1. INTRODUCTION

a. This manual consists of three volumes covering the general description, installation, operation, principles of operations, adjustments, parts and wiring diagrams for the following listed groups:

(1) Model 28 Typing Reperforator Transmitter Group.

(2) Model 28 Transmitter Group.

(3) Model 28 Typing Reperforator Monitor Group.

(4) Model 28 Typing Reperforator Receiving Group.

(5) Model 28 Transmitter Distributor Rerun Cart Group.

b. Volume 1, includes six sections: Section 1, is a brief physical and functional description of the equipment. Section 2 contains installation instructions. Operation is covered in Section 3. Section 4 explains the principles of operation to aid in performing maintenance and in locating troubles. Section 5 covers adjustments and lubrication. Section 6 covers service and repair which includes preventive maintenance, trouble shooting, disassembly and reassembly.

c. Volume 2, contains parts ordering information and exploded views of major assemblies with replaceable parts called out by part numbers.

d. Volume 3, contains associated wiring diagrams for the five groups.

e. Table 1-1 is a breakdown of components associated with each group.

1-2. GENERAL (Figure 1-1)

a. The early design Teletype Model 28 Reperforator Transmitter Group is basically a mechanical relay or storing device for printing telegraph intelligence. The Group provides for fully automatic perforation, storage and retransmission of an entire message on tape, including the last character received.

b. The basic components of the Group are the Reperforator Transmitter Set consisting of the Typing Reperforator (LPR34BWA), Pivoted Transmitter Distributor (LAXD7), Base (LRXB17), Motor Unit (LMU11), which makes up an assembly that mounts on a Tape Handling Stand (LTHS205BZ). The Tape Handling Stand provides a Tape Supply Reel, Intermediate Tape Storage Bin, Chad Disposal Bin, and a Tape Winder for transmitted tape. The Model 28 Universal Apparatus Cabinet (LBAC222BR) provides the necessary electrical control facilities to operate the two Reperforator Transmitter Sets mounted in the cabinet according to customers requirements. Two Line Relays (RY34) are provided for the two sending lines.

c. The basic components of a later design Model 28 Reperforator Transmitter Group are similar to the early design group except that new style features have been included.

(1) The cabinet (LBAC238BR) is similar to cabinet (LBAC222BR), except a decorative dome handle and a larger glass area in door have been included.

(2) The base (LRXB27) is similar to base (LRXB17), except base includes gear shift mechanisms (45.5, 50, 75 Baud 7.00 unit code) input and output.

(3) The Transmitter Distributor (LAXD8) is the same as Transmitter Distributor (LAXD7), except it is driven from a gear shift mechanism on Base (LRXB27) instead of directly from a cross shaft on base.

(4) The 194267 Modification Kit is used to modify this later design Reperforator Transmitter Group from 45.5, 50, 75 Baud 7.00 unit code, input and output, to 7.42 unit code 60, 75, 100 words-per-minute both transmitting and receiving.

d. The basic components of another variation of the Model 28 Reperforator Transmitter Group are similar to the early design group, except the LBAC222BR Cabinet equipped with electronic keyers and "U" type relays, has been replaced by the LBAC253BR Cabinet equipped with selector magnet drivers and "wire spring" type relays.

1-3. GENERAL (Figure 1-2)

a. The Teletype Model 28 Transmitter Group transmits from perforated tape to the outgoing signal lines at 75.0 Baud. This group provides message numbering, wiring and electrical control facilities to operate three multiple mounted Transmitter Distributor Units (LBXD16) and three multiple mounted Transmitter Distributor Units (LXD11).

b. The basic components of the Group are the two Multiple Transmitter Distributor sets;

one of the sets consists of three Transmitter Distributors (LXD11), Multiple Transmitter Distributor Base (LMXB206BR), Motor (LMU3), Drive Parts (173595 for 75.0 Baud or 173598 for 45.5 Baud), and three Tape Deflector Modification Kits (172679), and the other set consists of three Transmitter Distributors (LBXD16), Multiple Transmitter Distributor Base (LMXB205BR), Motor (LMU3), Drive Parts (173589 for 75.0 Baud or 173592 for 45.5 Baud). The Cabinet (LBAC223BR) provides message numbering, wiring and electrical control facilities to operate the two Multiple Transmitter Distributor Sets.

c. The basic components of another variation of the Model 28 Transmitter Group (Figure 1-2A) are similar to the components covered in Paragraphs 1-3.a. and 1-3.b. except that the LXD11 Transmitter Distributors are replaced by the LXD31 Transmitter Distributors; the LMXB206BR Multiple Transmitter Distributor Base is replaced by the LMXB209BR Multiple Transmitter Distributor Base; the LMXB205BR Multiple Transmitter Distributor Base is replaced by the LMXB207BR Multiple Transmitter Distributor Base; and the LBAC223BR Cabinet is replaced by the LBAC256BR Cabinet.

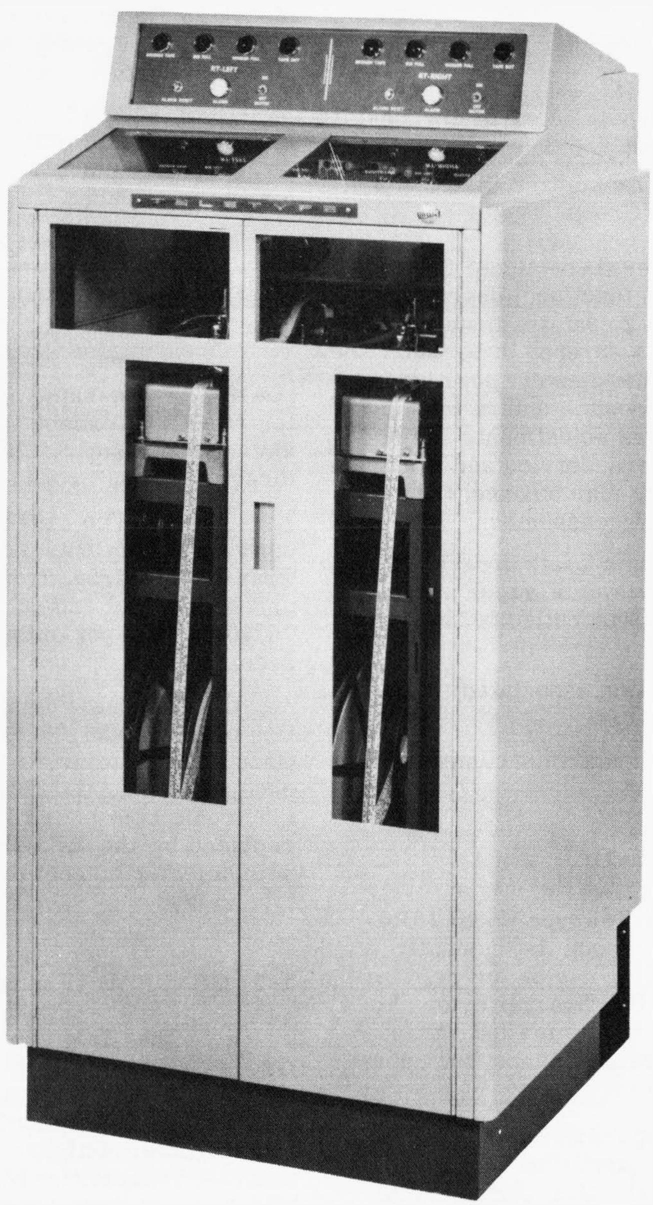


Figure 1-1. Model 28 Reperforator Transmitter Group

(1) The major differences are:

(a) The LBAC256BR Cabinet has sliding shelves.

(b) The LXD31 is like the LXD11 except changes have been made in the wiring.

(c) The LMXB209BR is like the LMXB206BR except has separable connections to cabinet wiring.

(d) The LMXB207BR is like the LMXB205BR except has separable connections to cabinet wiring.

1-4. GENERAL (Figure 1-3)

a. The Teletype Model 28 Typing Reperforator Monitor Group records the messages in the form of fully perforated tape and characters printed on the tape sent out by the transmitter distributors. The tape from the reperforator is wound by the tape winders from which a full reel of tape can be conveniently removed for storage. The group provides wiring and electrical control facilities to operate two Model 28 Multiple Typing Reperforator Sets and two Model 28 Tape Winder Sets.

b. The basic components of the Group are the two Multiple Reperforator Sets; one of the

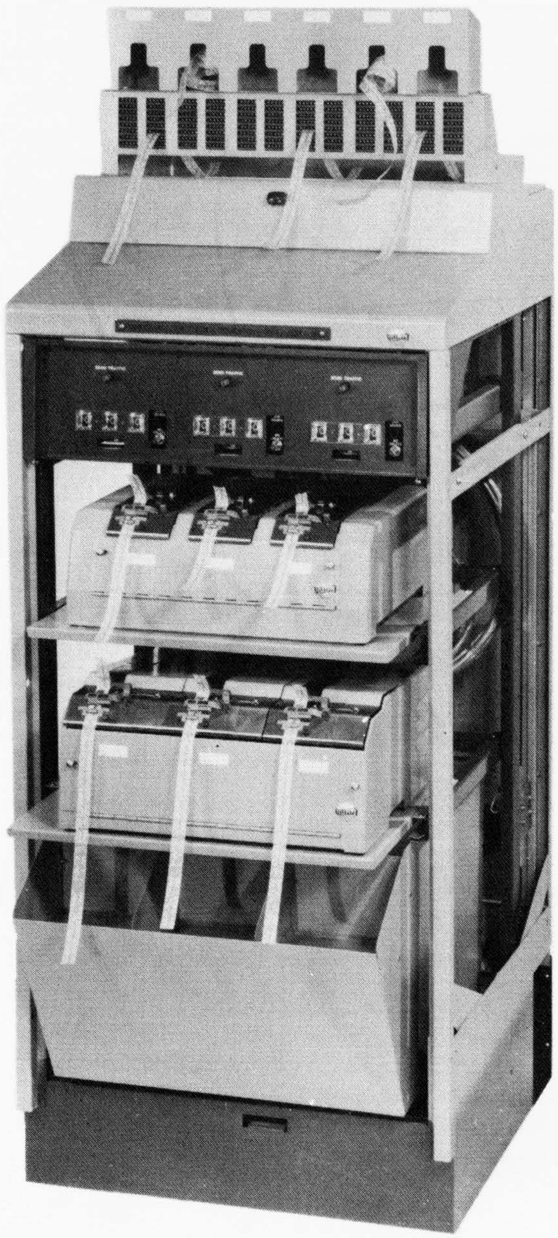


Figure 1-2. Model 28 Transmitter Group

Figure 1-2A. Model 28 Transmitter Group (LBAC256BR Cabinet Equipped with Sliding Shelves) identical sets consists of three typing Reperforators (LPR37BWA), Multiple Typing Reperforator Base (LMRB203BZ), Motor (LMU12), and Drive Parts (173584 for 45.5 Bauds or 164336 for 75.0 Bauds). Two Multiple Tape Winder Sets (TW15), and the Universal Cabinet (LBAC224BR) providesthe necessarywiring and control facilities to operate the components of the Group.

c. The basic components of another variation of the Model 28 Typing Reperforator Monitor Group are similar to the components covered in Paragraphs 1-4.a. and 1-4.b. except the LBAC224BR Cabinet equipped with six single vacuum tube drivers is replaced by the LBAC257BR Cabinet equipped with six 177010 selector magnet drivers (Figure 1-3A).

d. The basic components of another variation of the Model 28 Typing Reperforator Monitor Group are similar to the components covered in Paragraphs 1-4.a. and 1-4.b. except the LBAC224BR Cabinet equipped with six single vacuum tube drivers is replaced by the

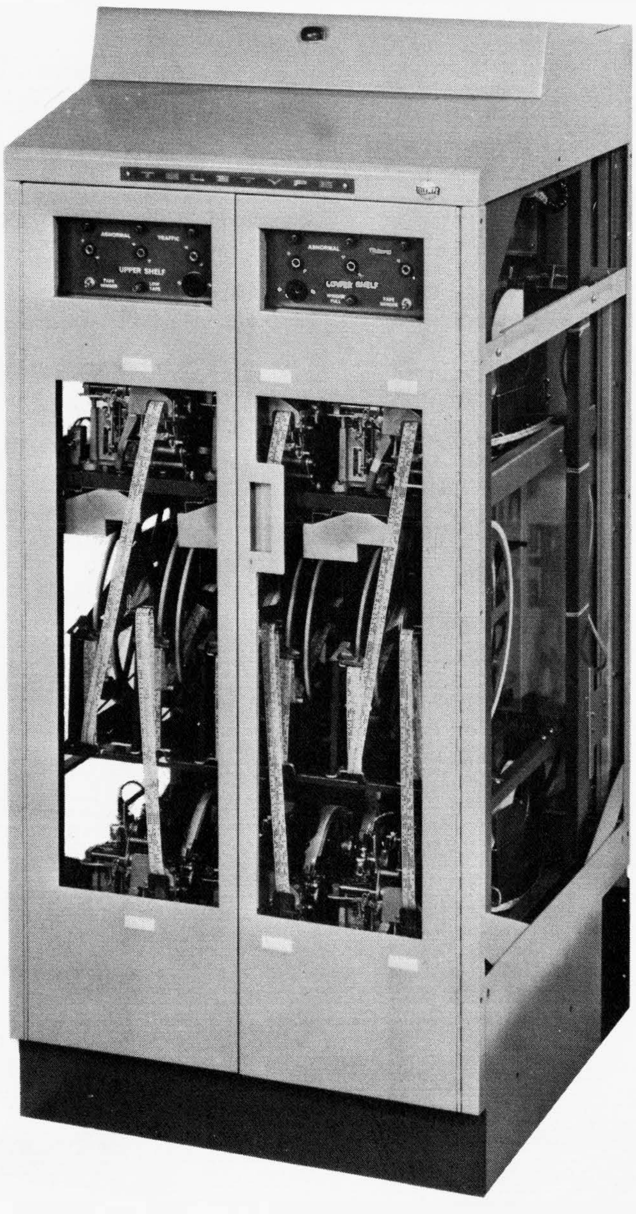


Figure 1-3. Model 28 Typing Reperforator Monitor Group

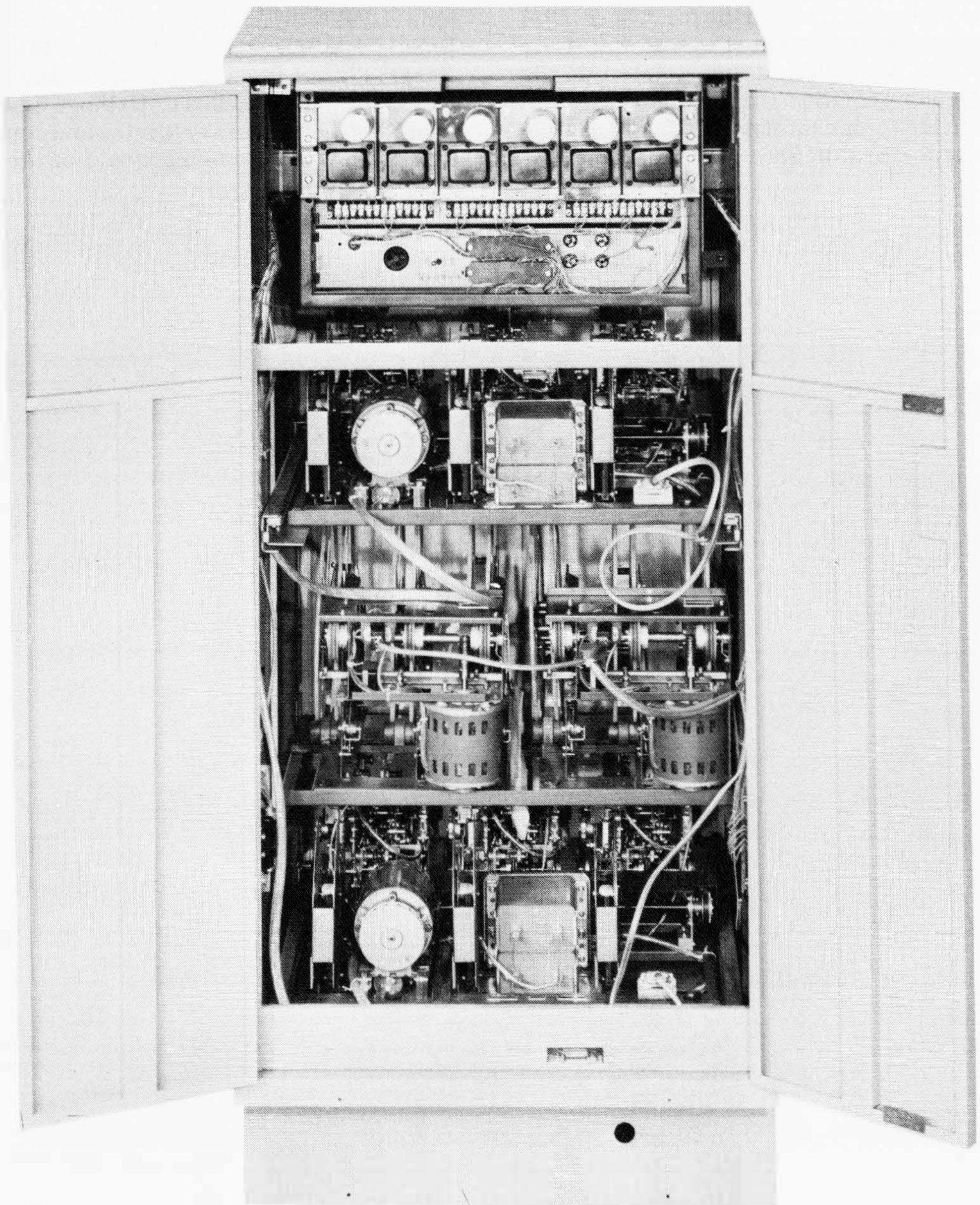


Figure 1-3A. Model 28 Typing Reperforator Monitor Group (Rear View) (LBAC257BR Cabinet Equipped with the 177010 Selector Magnet Drivers)

LBAC259BR Cabinet equipped with six double tube 309863 voltage input selector magnet drivers (Figure 1-3B).

1-5. GENERAL (Figure 1-4)

a. The Teletype Model 28 Typing Reperforator Receiving Group receives messages from six separate incoming lines in the form of 5 level start-stop signals and converts them into fully perforated tape with characters printed on the tape. The Group provides wiring and electrical control facilities to operate two Model 28 Multiple Typing Reperforator Sets. Slots in the cabinet provide a convenient tearing edge for the tape at the end of the message. Tape holders and tape bins are mounted on the front doors and tape clips are mounted on the top of the cabinet.

b. The basic components of the Group are the two Multiple Typing Reperforator Sets, one of the Sets consists of three Typing Reperforators (LPR35BWA), Multiple Typing Reperforator Base (LMRB203BZ), Motor (LMU14), Drive Parts (173584 for 45.5 Bauds or 164336 for 75.0 Bauds). The Universal Cabinet (LBAC225BR) provides the necessary wiring and control facilities to operate the components of the Group.

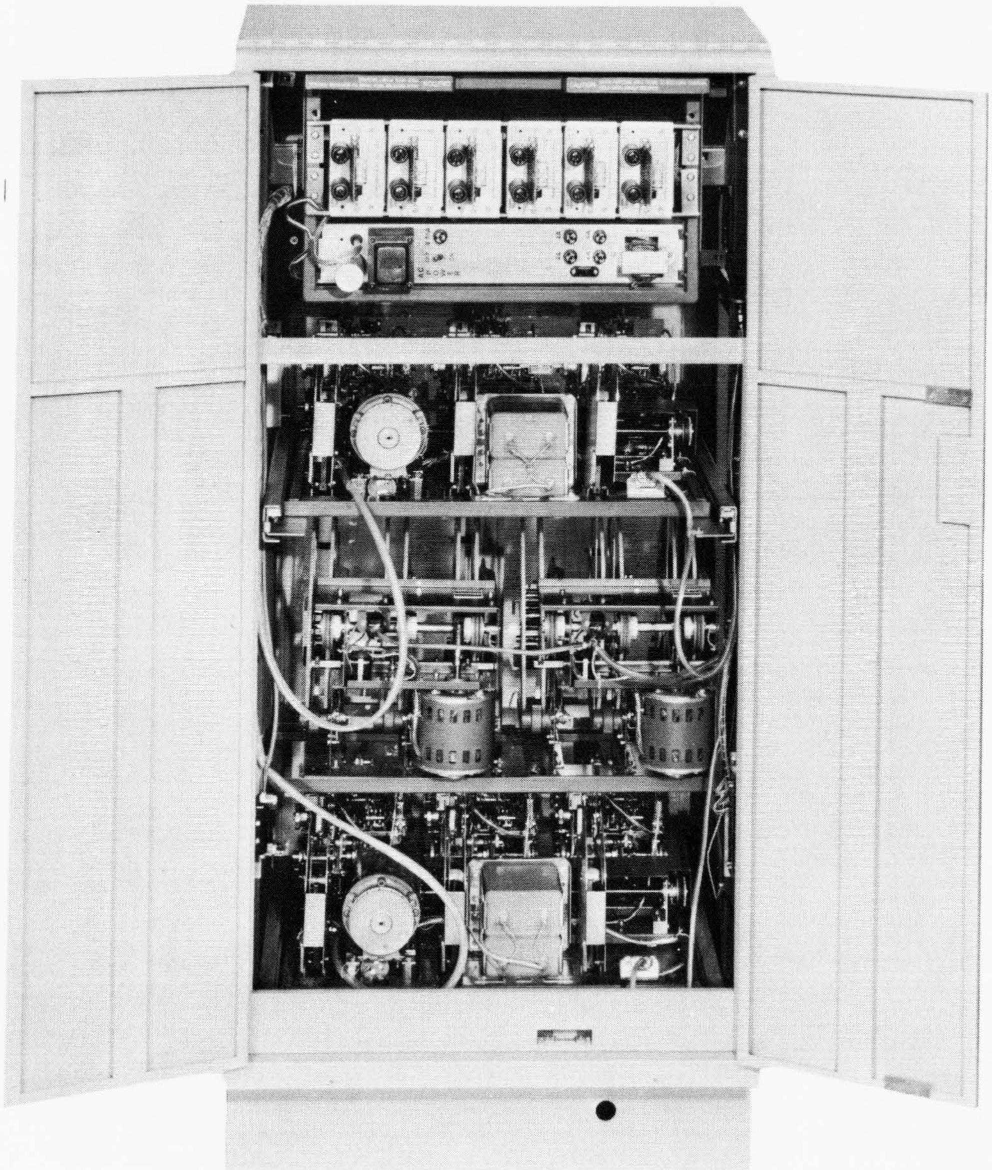


Figure 1-3B. Model 28 Typing Reperforator Monitor Group (Rear View) (LBAC259BR Cabinet Equipped with the 309863 Voltage Input Selector Magnet Drivers)

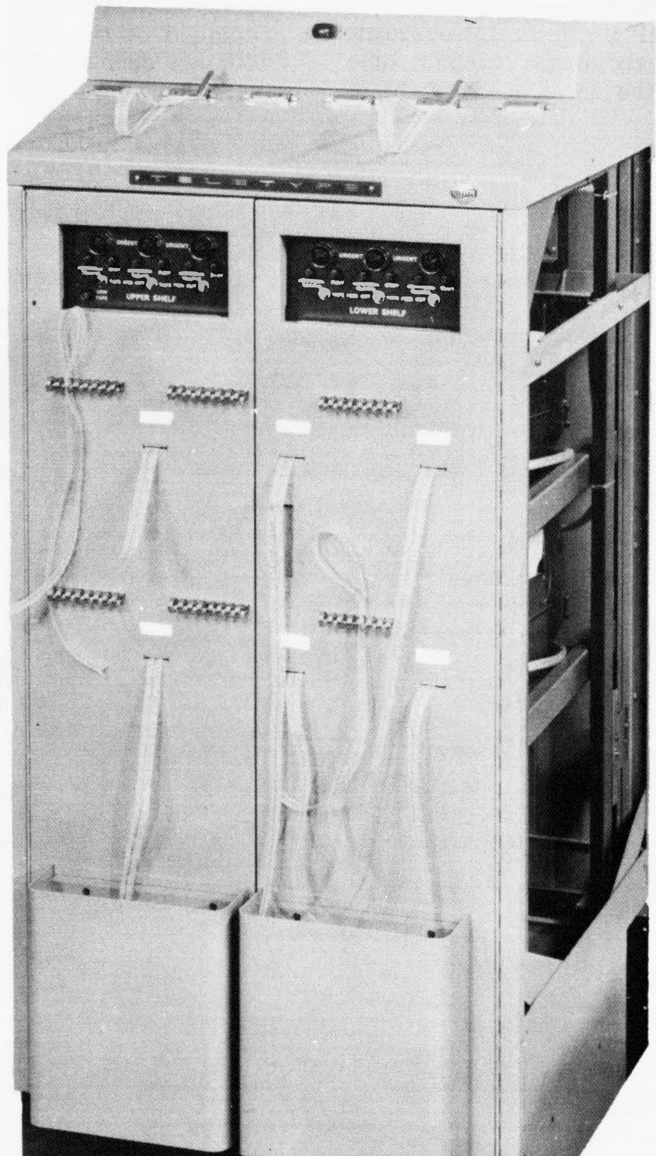


Figure 1-4. Model 28 Typing Reperforator Receiving Group

c. The Speed Indicator (104986) is used for setting the correct motor speed.

d. The basic components of another variation of the Model 28 Typing Reperforator Receiving Group (Figure 1-4A) are similar to the components covered in Paragraphs 1-5.a.b. and c. except the LMRB203BZ Multiple Reperforator Base is replaced by the LMRB207BZ Base; the LPR35BWA Typing Reperforator Unit is replaced by the LPR35BRP Unit; the LBAC225BR Cabinet equipped with six single vacuum tube drivers is replaced by the LBAC254BR Cabinet equipped with six Selector Magnet Drivers (Figure 1-4B).

e. The basic components of another variation of the Model 28 Typing Reperforator Receiving Group (Figure 1-4C) are similar to the components covered in Paragraphs 1-5.a.b. and c. except the LPR35BWA Typing Reperforator Unit is replaced by the LPR35BRP Typing Reperforator Unit; the LBAC225BR Cabinet equipped with six single vacuum tube drivers is replaced by the LBAC260BR Cabinet equipped with six double tube 309863 voltage input selector magnet drivers (Figure 1-4D).

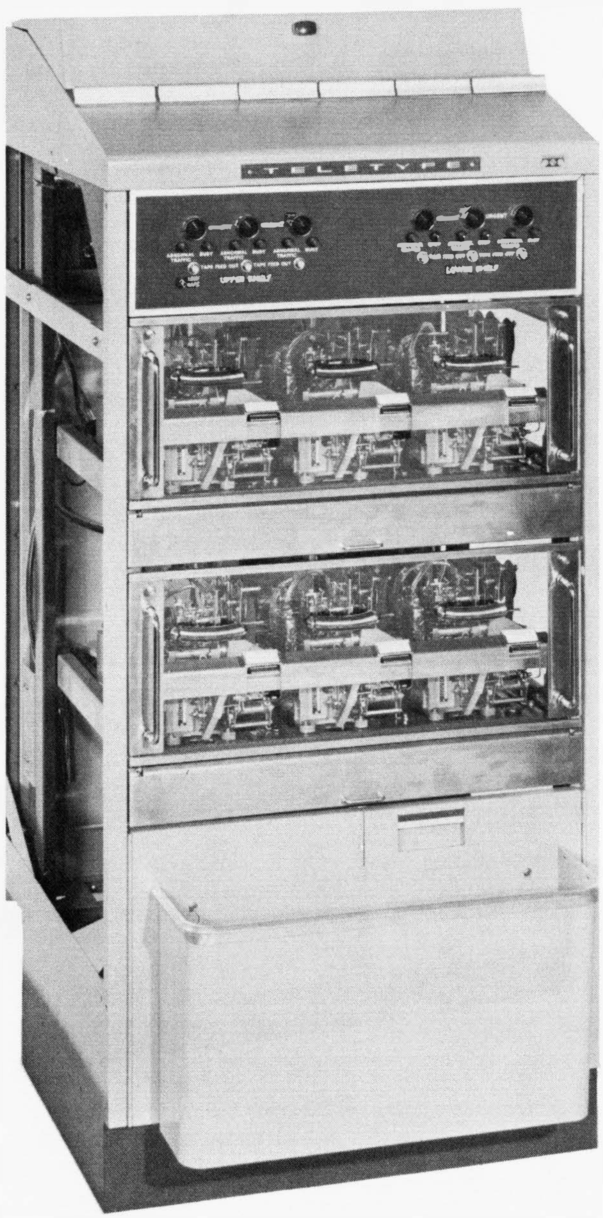


Figure 1-4A. Model 28 Typing Reperforator Receiving Group (Another Variation) (LBAC254BR Cabinet)

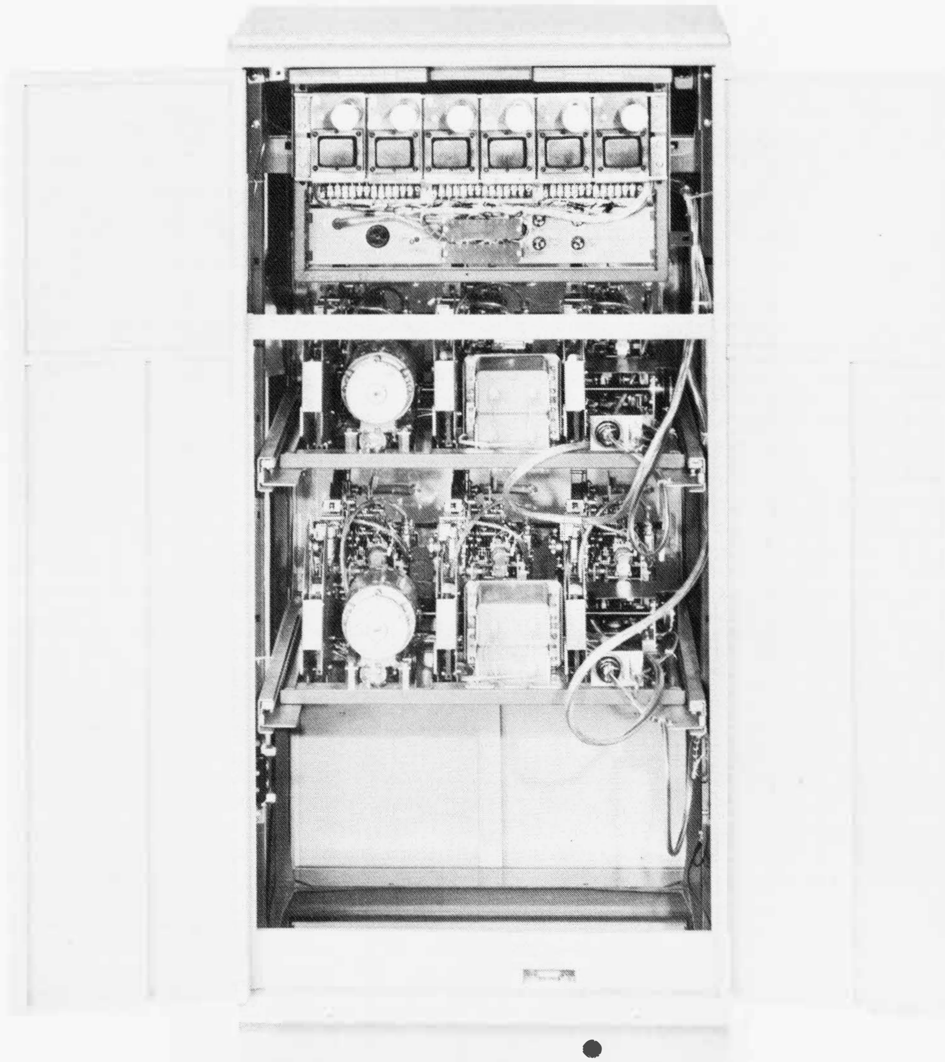


Figure 1-4B. Model 28 Typing Reperforator Receiving Group (Rear View) (LBAC254BR Cabinet) Equipment with the 177010 Selector Magnet Drivers)

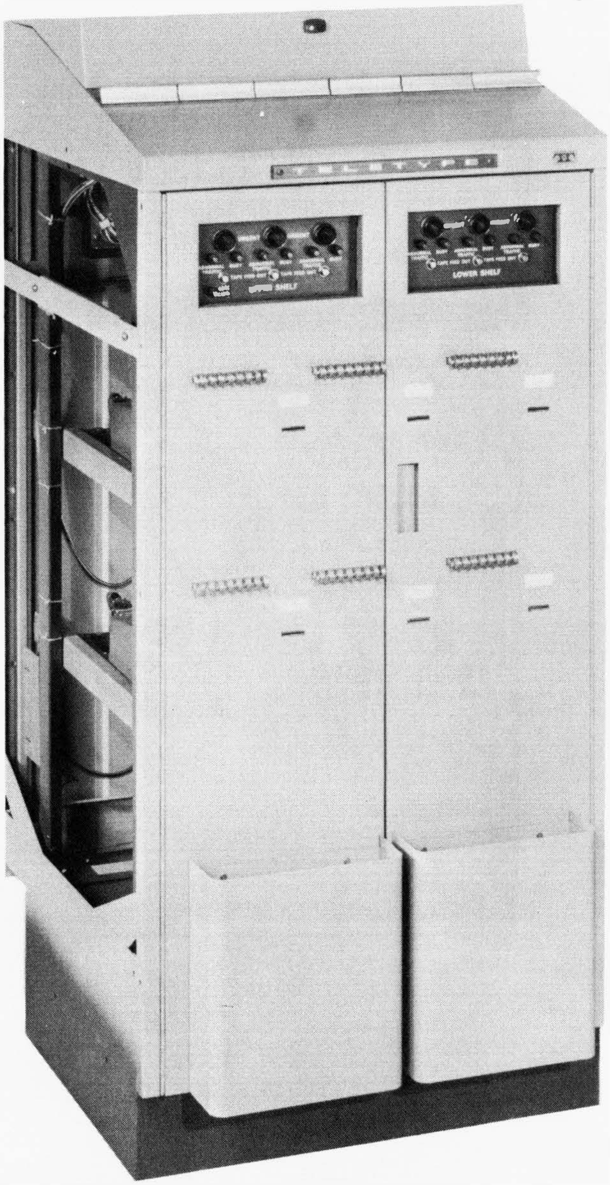


Figure 1-4C. Model 28 Typing Reperforator Receiving Group (Another Variation - LBAC260BR Cabinet)

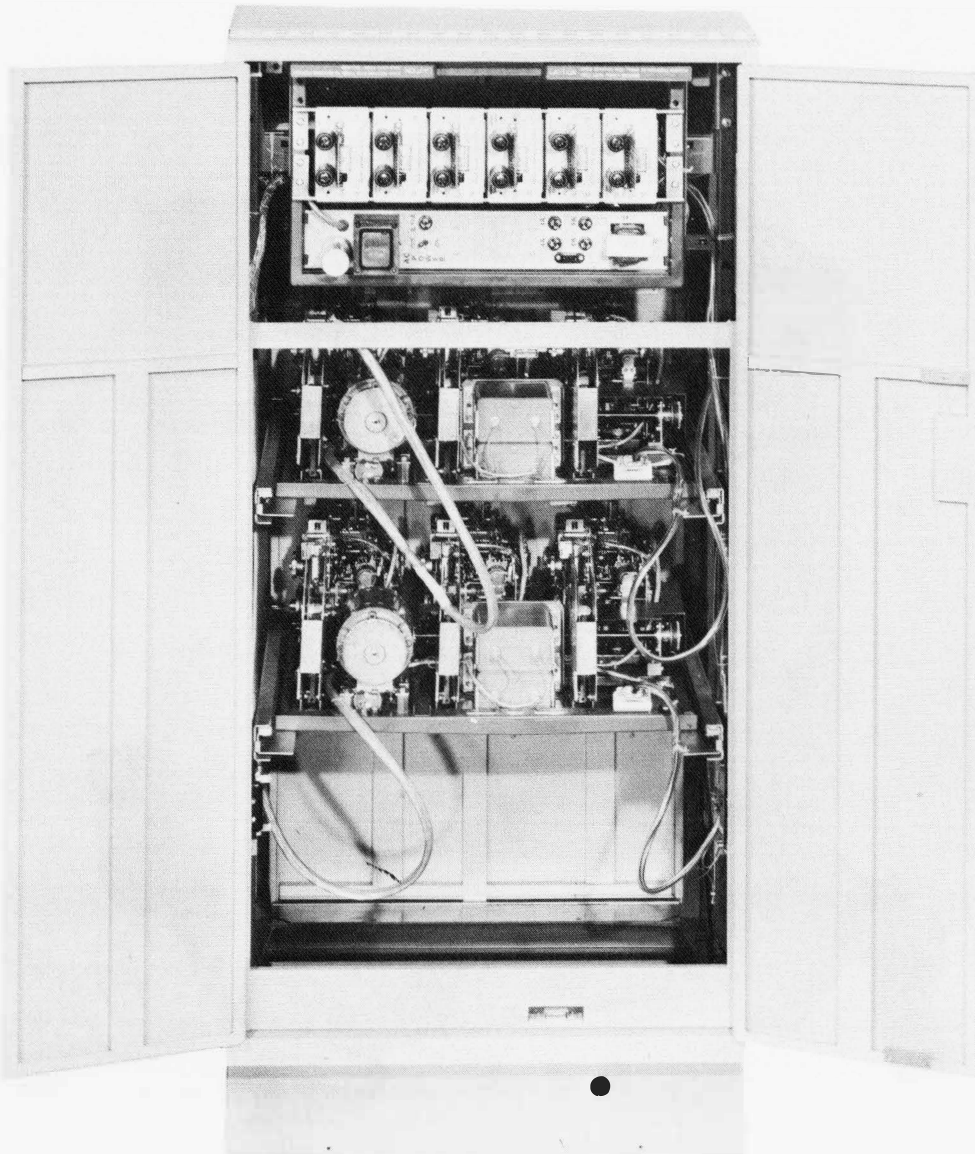


Figure 1-4D. Model 28 Typing Reperforator Receiving Group (Rear View) (LBAC260BR Cabinet Equipped with the 309863 Voltage Input Selector Magnet Drivers)

Figure 1-5. Model 28 Transmitter Distributor Rerun Cart Group

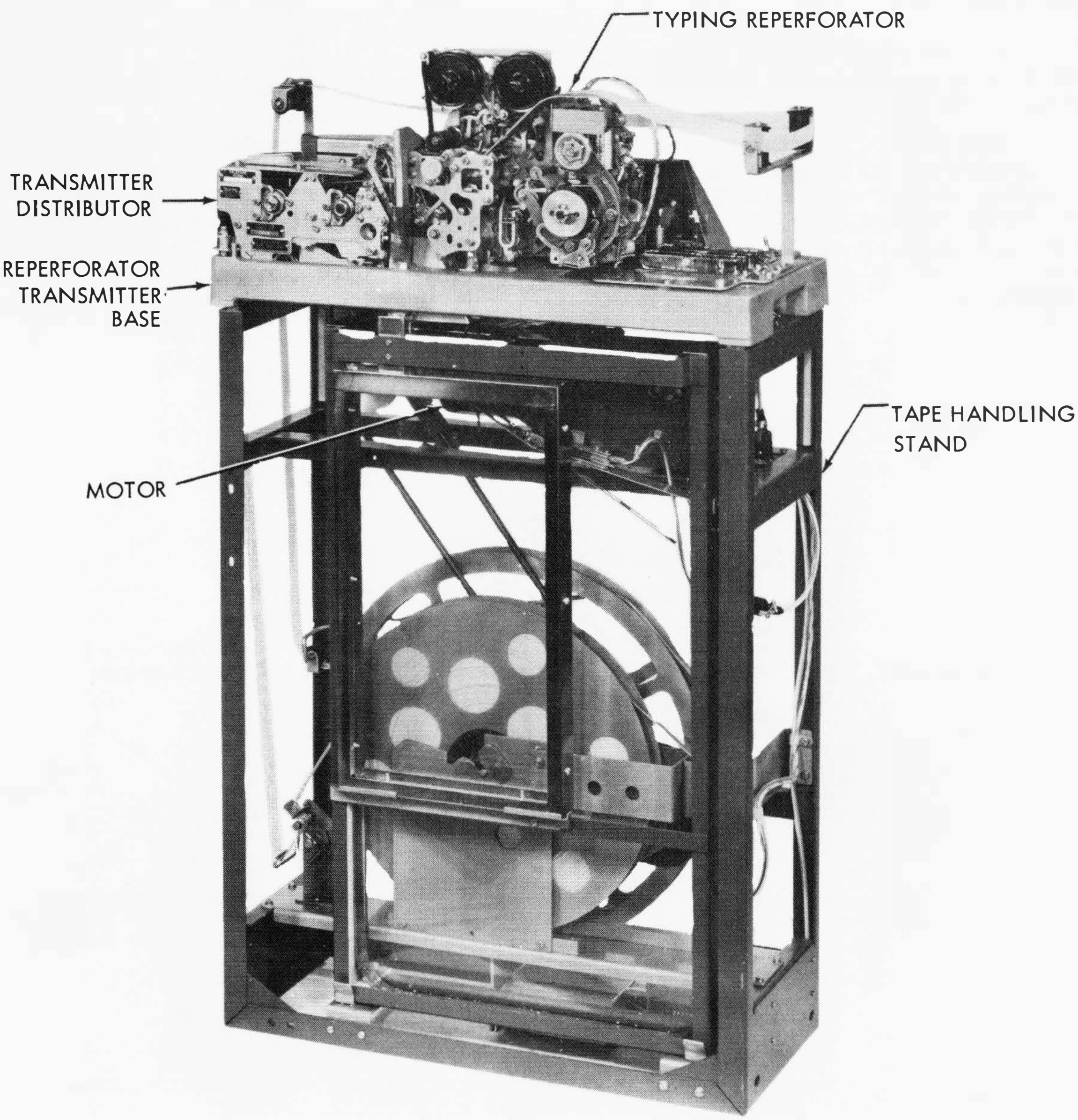


Figure 1-6. Model 28 Reperforator Transmitter Set

1-6. GENERAL (Figure 1-5)

a. The Teletype Model 28 Transmitter Distributor Rerun Cart Group is an auxiliary means of retransmitting messages. The line, A.C. and D.C. power cordsfrom this Group plug into one of six line jacks, A.C. and D.C. receptacles on the control panel of the Monitor Group. The message that is to be retransmitted is unreeled from the storage reel of the Monitor Group and placed into the position on the Transmitter Distributor of the Rerun Group for retransmission to the distant station.

b. The basic components of this Group are the Transmitter Distributor (LXD11), Base (LXDB9), Cover (LXDC200BR), Motor (LMU4), Table (LT200BR), Dolly (173861), Drive Parts (173595 Gears for 75.0 Bauds or 173598 Gears for 45.5 Bauds).

1-7. DESCRIPTION OF MAJOR COMPONENTS MODEL 28 REPERFORATOR TRANSMITTER DISTRIBUTOR GROUP

a. The Model 28 Reperforator Transmitter Distributor Set (Figure 1-6) consists of the Typing Reperforator (LPR34BWA or LPR34BRP), Pivoted Transmitter Distributor (LAXD7 or LAXD8). Base (LRXB17 or LRXB27), Motor Unit (LMU11) and Tape Handling Stand (LTHS205BZ).

b. The Model 28 Typing Reperforator (LPR34BWA or LPR34BRP) (Figures 1-7 and 1-8) is an electro-mechanical unit which records information on tape both as printed characters and as combinations of code perforations. The information is received from a signal line in the form of an electrical signalling code which is translated into the necessary mechanical motions to type and perforate the information. The code and feed holes are fully perforated. The printed characters simplify tape handling by eliminating the necessity of reading the code perforations. The characters perforated in the tape are six positions in advance of the printed characters. This should be considered when severing the tape or inserting it in a transmitter distributor. The end of the tape should include all the printed characters in the message, and the first printed character of the message must

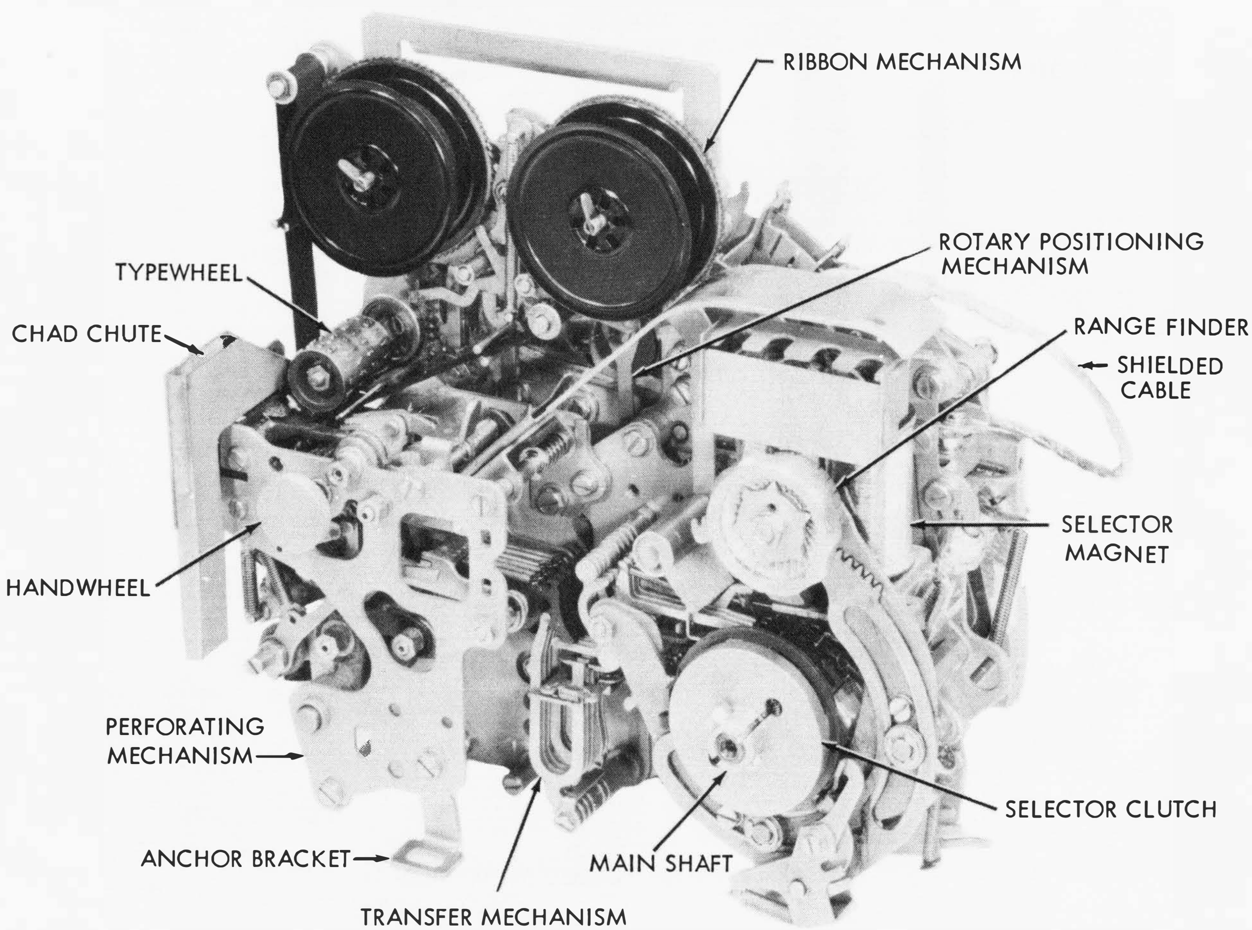


Figure 1-7. Model 28 Typing Reperforator (LPR34) (Front View)

be preceded by at least six sets of code perforations in order to transmit the entire message.

(1) Code signals are applied to a magnet associated with a selector mechanism which interprets the signals and controls the motion involved in printing a character and perforating the tape. Means are provided for orienting the selector mechanism to the incoming signals. Motive power is provided by a motor unit and drive mechanism.

(2) A 36-point receptacle for connection of circuits is located at the upper rear section of reperforator unit.

c. The Model 28 Pivoted Transmitter Distributor (LAXD7) (Figures 1-9 and 1-10) or (LAXD8) consists of a casting, two side plates onto which all the mechanisms mount, a cover plate, a pivoted yoke, which houses the feed wheel, feed pawl, feed wheel detent, five sensing pins plus the tape out pin, top plate and lid which guide the sensing pins and tape respectively. Mounted in front of the yoke is a tape deflector and along its side the last character switch. A tape depressor and the cam sleeve oil reservoir are mounted to the cross-bar between the two side plates. Two shafts are located within the unit: (1) the sensing shaft, (2) the distributor shaft. Each rotate at the same speed through an idler gear connected to the drive gears on the clutch. The distributor shaft includes an outboard gear which is connected through the intermediate gear assembly to the drive motor pinion. The reader contact assembly is mounted under the sensing shaft

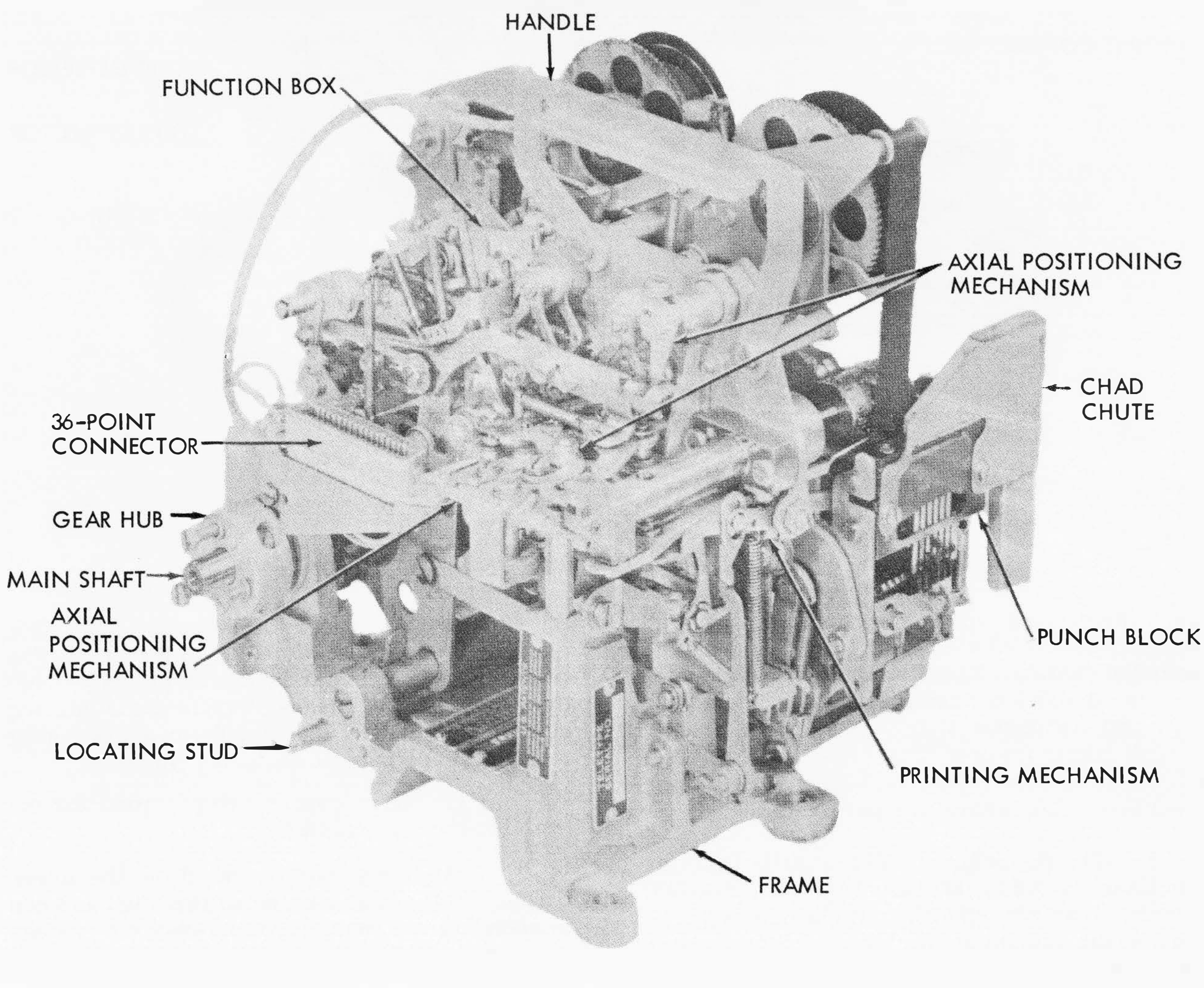


Figure 1-8. Model 28 Typing Reperforator (LPR34) (Rear View)

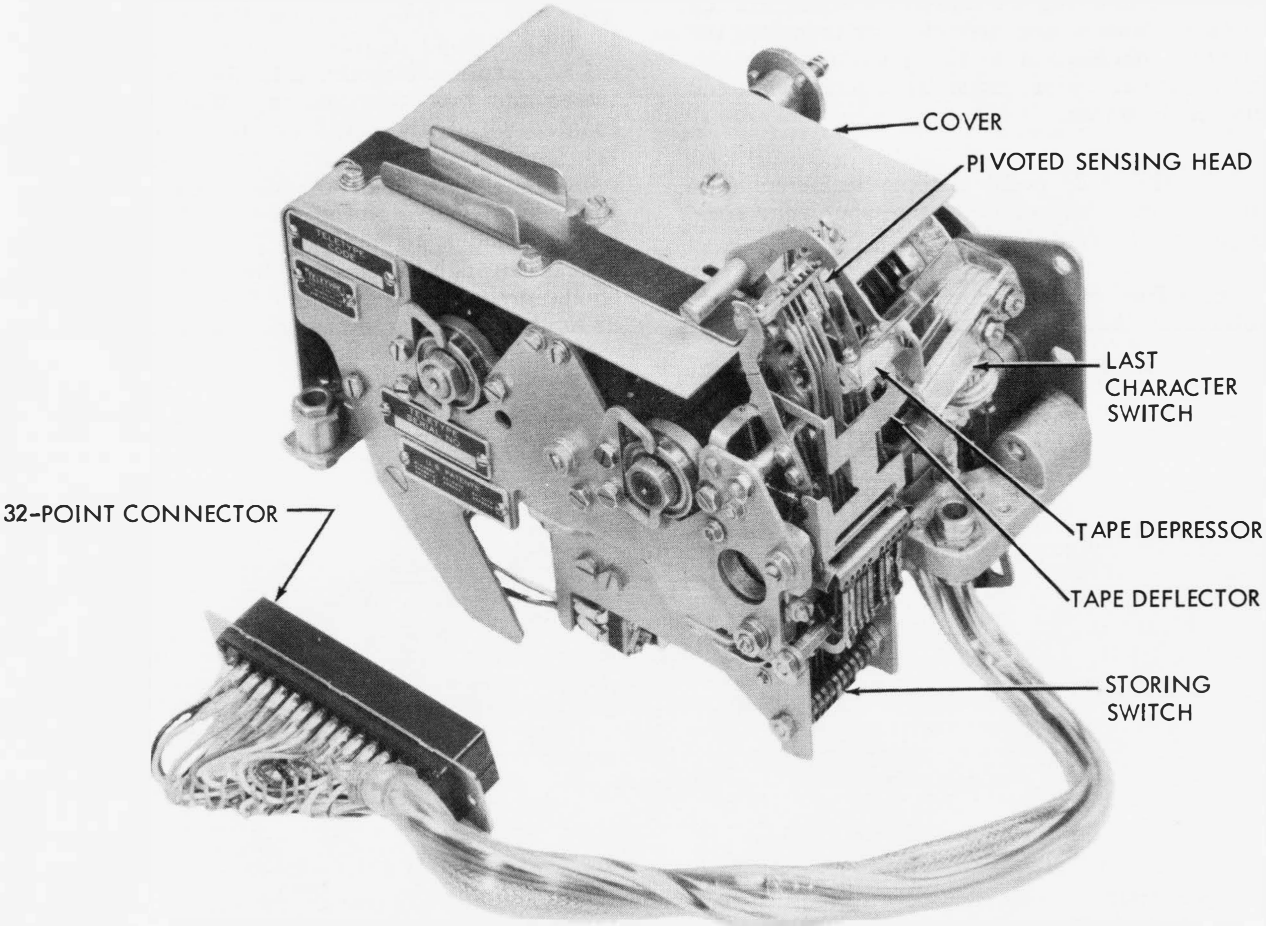


Figure 1-9. Model 28 Pivoted Transmitter Distributor (LAXD7)

below the casting, and its contacts are operated by their associated mechanism which is mounted above the casting. The distributor contact block is mounted above the casting near the distributor shaft and its contacts are operated indirectly through cam followers. The sensing mechanism will climb up a taut tape up to the reperforator to sense the last character perforated.

d. The Reperforator Transmitter Distributor Base (LRXB17) (Figure 1-11) or (LRXB27) consists of an aluminum casting which has provisions for mounting the motor, reperforator and pivoted transmitter units, tape winder drive, gear shift mechanisms, tape routing rollers and electrical cable assemblies. A gear shift mechanism at the reperforator and transmitter distributor provides speeds of either 420.9524 RPM (45.5 Baud) or 693.8775 RPM (75.0 Baud). The transmitter distributor is driven directly from the cross shaft by means of right angle gearing at 642.8571 RPM (75.0 Baud), or a gear shift mechanism on base at 45.5, 50, 75 Baud.

(1) Gear covers are provided for the gear bracket assemblies.

(2) Legs are provided on the lower corners of the base casting so that the base can be placed on the bench for maintenance purposes in its normal upright position or on any of its four sides.

(3) Recessed handles have been provided to lift the Reperforator Transmitter Dis-

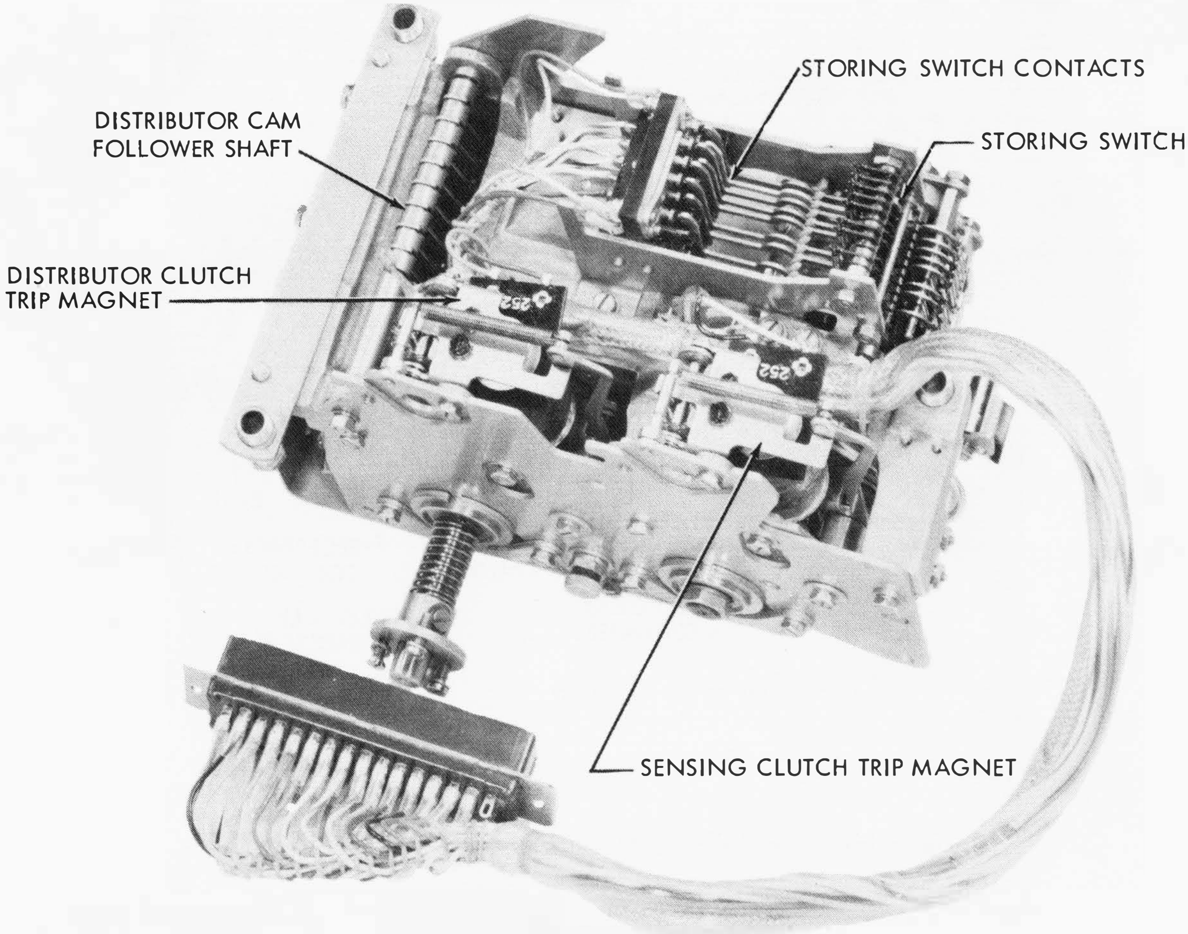


Figure 1-10. Model 28 Pivoted Transmitter Distributor (LAXD7)

tributor Set to and from the cabinet rails.

(4) Locating studs (fixed and eccentric) are provided on the upper surface of the base for the reperforator and transmitter units.

(5) A tape chute is provided to direct tape from the reperforator into the intermediate tape storage bin and out of the bin to the pivoted transmitter.

(6) A chad chute is provided to direct chad from the reperforator into a chad bin which is mounted on the intermediate tape storage bin.

e. Mechanical motion to operate the Set is produced by a two-pole, single phase Synchronous Motor Unit (LMU11) (Figure 1-12) which develops 1/12 horsepower at 3600 revolutions per minute. The motor rests in the cradle of a mounting bracket and is held in place by a strap at each end. The cradle is isolated from the motor by resilient mounts which reduce vibration. A small fan is mounted at each end of a rotor within the end bells, and a combination fan and handwheel rides on the end of the shaft. A start relay, a starting capacitor and a thermal cut out switch are contained in the upper compartment. The rotation of the shaft is counterclockwise as viewed from the handwheel end. The end bells have been rotated 180 degrees which permits the oilers to be above the motor shaft when the motor is installed in an inverted position.

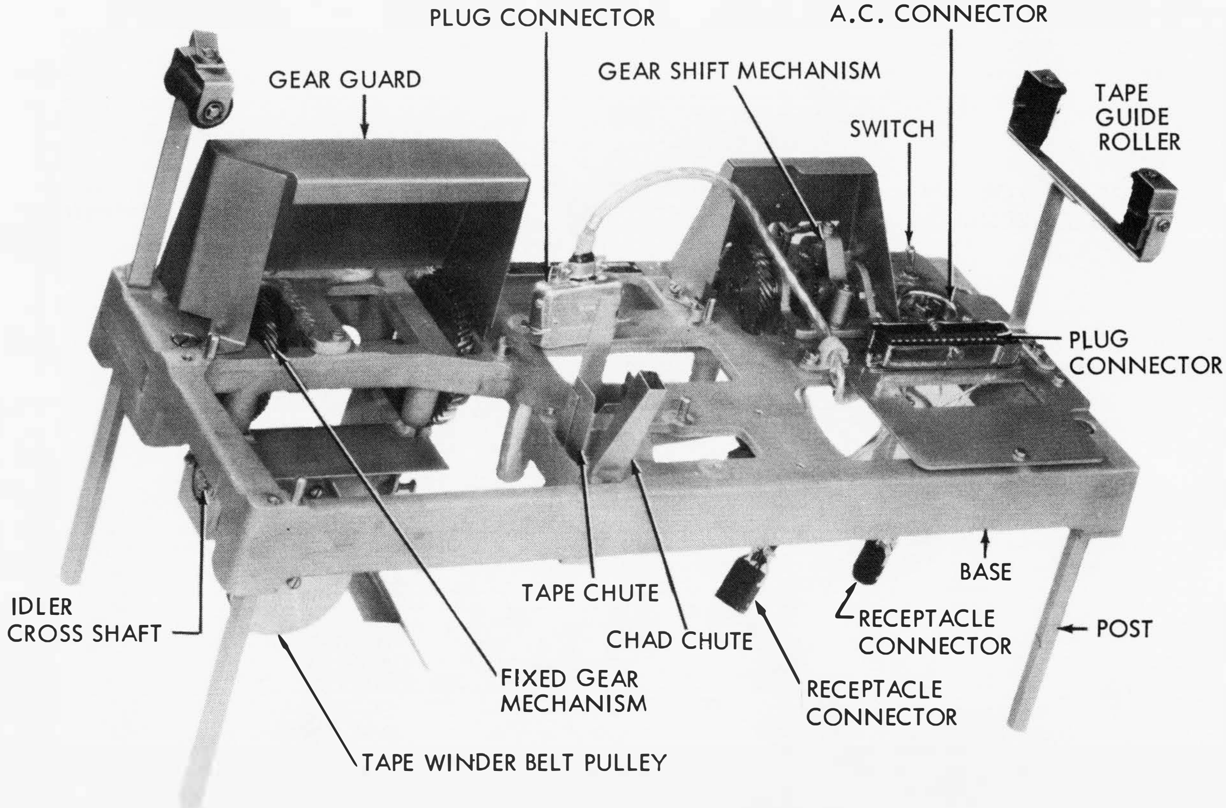


Figure 1-11. Model 28 Reperforator Transmitter Base (LRXB17)

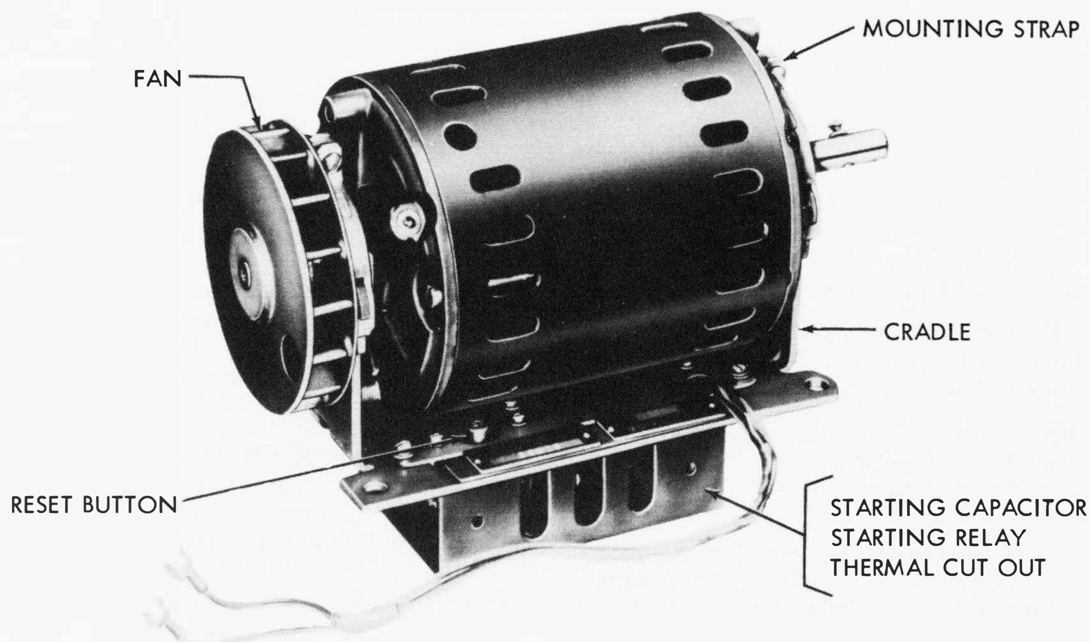


Figure 1-12. Model 28 A.C. Synchronous Motor

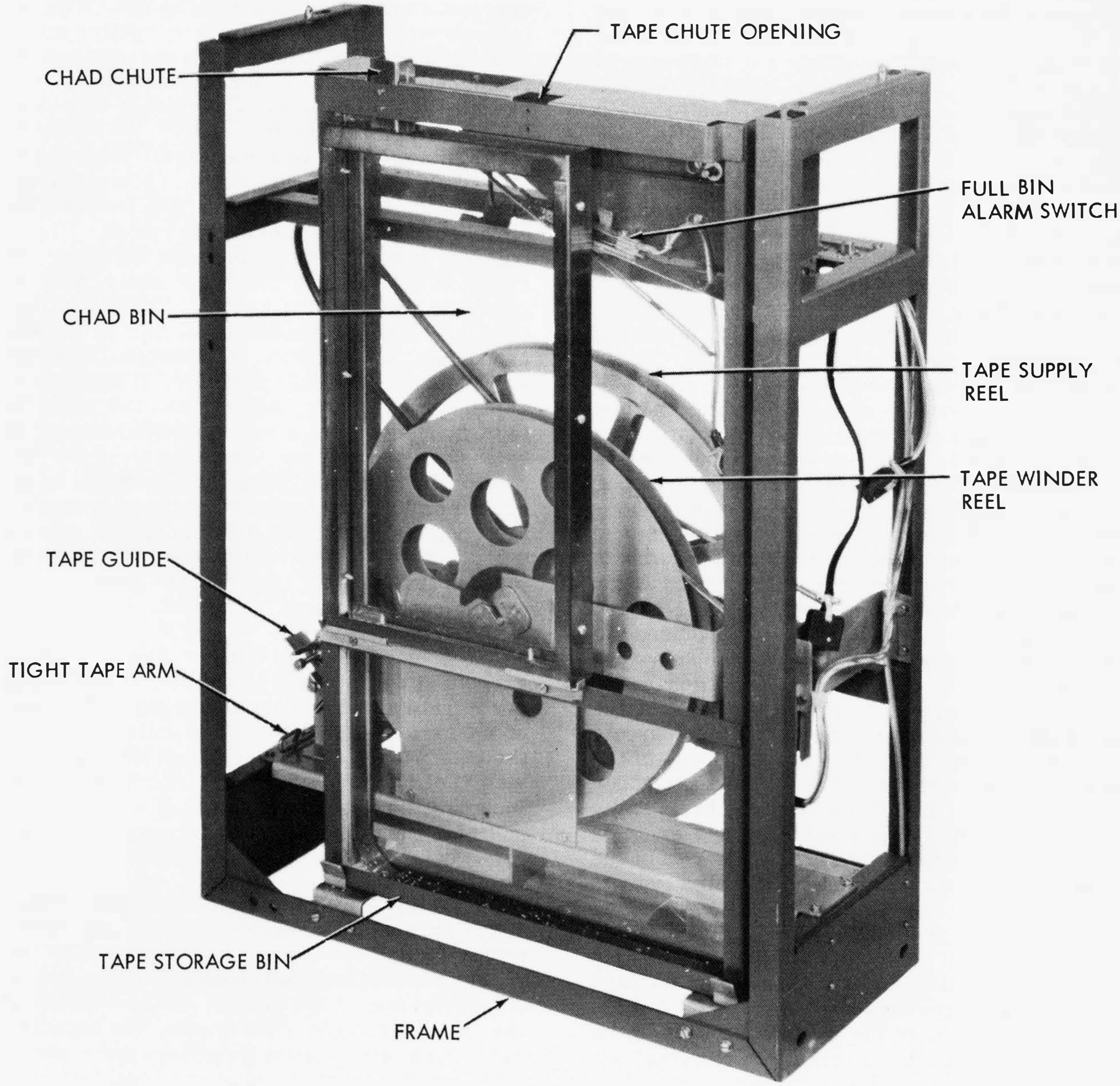


Figure 1-13. Model 28 Tape Handling Stand (LTHS205BZ) (Front View)

CAUTION

If motor becomes blocked for several seconds, thermal cut out switch will break circuit. Allow motor to cool at least 5 minutes before depressing red reset button.

f. The Tape Handling Stand (LTHS205BZ) (Figure 1-13) frame consists basically of four uprights of angular steel with the necessary cross members to provide rigidity and facilities for mounting tape winder, tape supply reel, intermediate tape storage bin, chad disposal bin and base.

(1) Two locating pins are provided on the upper cross members, for mounting the base. The base is secured to the cross members with three captive screws and speed grip floating nut retainers which snap into holes provided in the cross members.

(2) The Tape Supply Reel (Figure 1-14) rests in two V-block bearings for convenient removal and accommodates tape rolls of 3000 feet in length. The core of the tape reel is threaded for removal of either side plate for replacement of tape rolls. It was desired to keep the tension on the tape to a practicable minimum to avoid elongation of the tape feed holes or erratic code hole-feed hole relationship. The portion of the core which bears the weight of the tape roll has been provided with ball bearings and turns independently of the side plates; either the reel core may turn (on ball bearings) or the side plates may turn (on V-block bearings), or both may turn. Thus, it is not necessary to accelerate the side plates during tape feed, lessening the tension on the tape. This is of particular value when the tape supply becomes low. However, in the event of a snagging, binding, or rubbing of the tape roll against the side plates, the plates are free to turn, preventing undue tension of the tape. The tape supply reel is provided with a brake which keeps the tape under a constant slight tension to prevent overrunning and possible tangling of the tape. The brake takes the form of a bent rod arm which extends over and rests upon the tape roll and is pivoted in such a way that the weight of the arm provides the necessary braking force. The brake serves to retard the motion of the tape roll and not that of the retaining wheel, relieving the tape of the shock of accelerating the reel. The tape unreels from the top of the roll toward the end of the arm and is passed through a retainer and under a roller as it is directed toward the base. When the tape becomes taut the roller and arm are lifted upward slightly, relieving the roll of the braking force. Consequently the roll revolves and causes the tape to become slack, lowering the roller and arm and restoring the braking force. In actual steady state operation the arm provides a continued frictional drag on the tape roll and thus keeps the tape under constant slight tension. Attached to the pivot end of the brake arm is an adjustable bracket which actuates a double-throw switch which in turn operates tight tape (optional) and low tape supply alarms. Should the tape become abnormally taut, the tape arm will rise and the switch will close the tight tape alarm circuit. When the tape roll reaches some predetermined low level the tape arm will close the other side of the switch and actuates the low tape alarm circuit. The alarm signal wires are connected to the reperforator cable through a plug and receptacle.

(3) The Intermediate Tape Storage Bin (Figure 1-13) is utilized for the temporary storage of perforated tape for subsequent transmission. It is comprised of two parallel safety glass walls, appropriately framed with a wood and metal frame. The bottom of the bin is located in the tape handling stand frame by two brackets and the top is secured with spring clip catches to permit easy removal. The upper cross member of the bin frame forms the handle. The bin is provided with a motor driven tape puller which pulls the perforated tape into the bin overcoming resistance due to static charges on the tape. The capacity of the bin is 50 to 160 feet of tape perforated with a random message (or the standard "Quick Brown Fox" test message). Attached to the side of the tape storage bin is a bracket and chad chute. A separate bin that will temporarily store chad punched from 3000 feet of 5 level (random message) tape fits under the chute and rests on the bracket. The chad chute may be placed in one of two positions. In this application the chad chute must be placed in the left hand position. A device is incorporated which will indicate a bin full condition. It consists of a leaf spring switch that is actuated when the tape, upon reaching a full condition, causes an extention lever to close the contacts. Four extension lever spring holes are provided to increase or decrease the force required to operate the contacts. Since the full bin alarm contact will not remain closed continuously, it is recommended that a holding type relay be incorporated to give constant alarm indication.

(4) The Tape Winder (Figure 1-13) is capable of winding tape at the rate of 200 words per minute and shall have a capacity of 1000 feet of perforated tape. A belt and pulley driven by the tape winder drive mounted on the base provide the mechanical motion to the tape winder. Incoming tape is passed through a loop in the end of a tight tape arm and through a chad depressor before passing on to the tape reel.

(5) The Tape Handling Stand (Figure 1-14) frame also serves to mount the motor power factor correction capacitors. The two capacitors are mounted beneath the tape winder assembly; one to the bottom of the winder and the other to the side of the frame. The capacitor cable runs up one of the frame legs and connects with the base through a plug and receptacle.

(6) A take-up reel warning device consisting of a leaf spring switch and extension lever that rides the tape and take-up reel.

g. The Model 28 Universal Cabinet (LBAC222BR) (Figures 1-15 and 1-16) or (LBAC238BR) or (LBAC253BR) accommodates two Reperforator Transmitter Sets. The control panel which is part of the cabinet features on-off switches, tape warning lights and other facilities, for external control of equipment within the cabinet. Two vertically hinged doors at the front and rear provide accessibility into the cabinet. Magnetic door latches facilitate smooth opening and closing of cabinet doors. With cabinet dome open the relay rack can be raised upward and locked in position allowing convenient accessibility to the rack from the front of the cabinet. Individual rubber base mountings for each Reperforator Transmitter Set provides smooth vibrationless operation. Extension metal slide rails allow sets to be pulled out through front of the cabinet for all around accessibility. A cable raceway with removeable cover is provided at bottom rear of cabinet. Shatter resistant windows allow viewing of internal operation. Inner frame construction minimizes radiation of normal operation sounds outside cabinet walls.

h. Two Line Relays (RY34) are provided for the two sending lines.

i. The 161999BR Modification Kits provide End Enclosures (Figure 1-1) for the cabinet.

j. The 194267 Modification Kit is used to modify Reperforator Set equipped with LRXB27 to 7.42 unit code and 60, 75 and 100 Words-Per-Minute both transmitting and receiving.

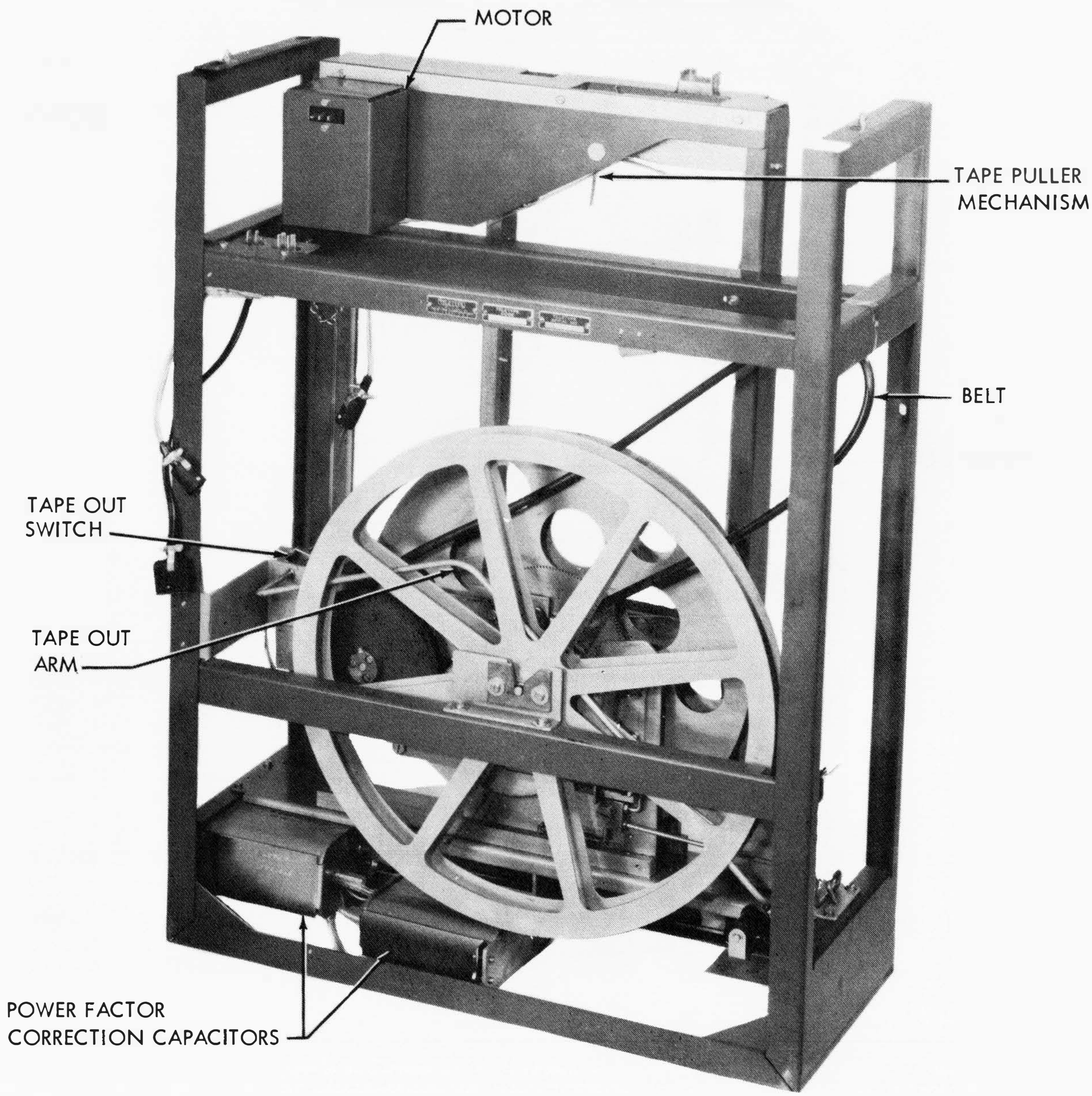


Figure 1-14. Model 28 Tape Handling Stand (LTHS205BZ) (Rear View)

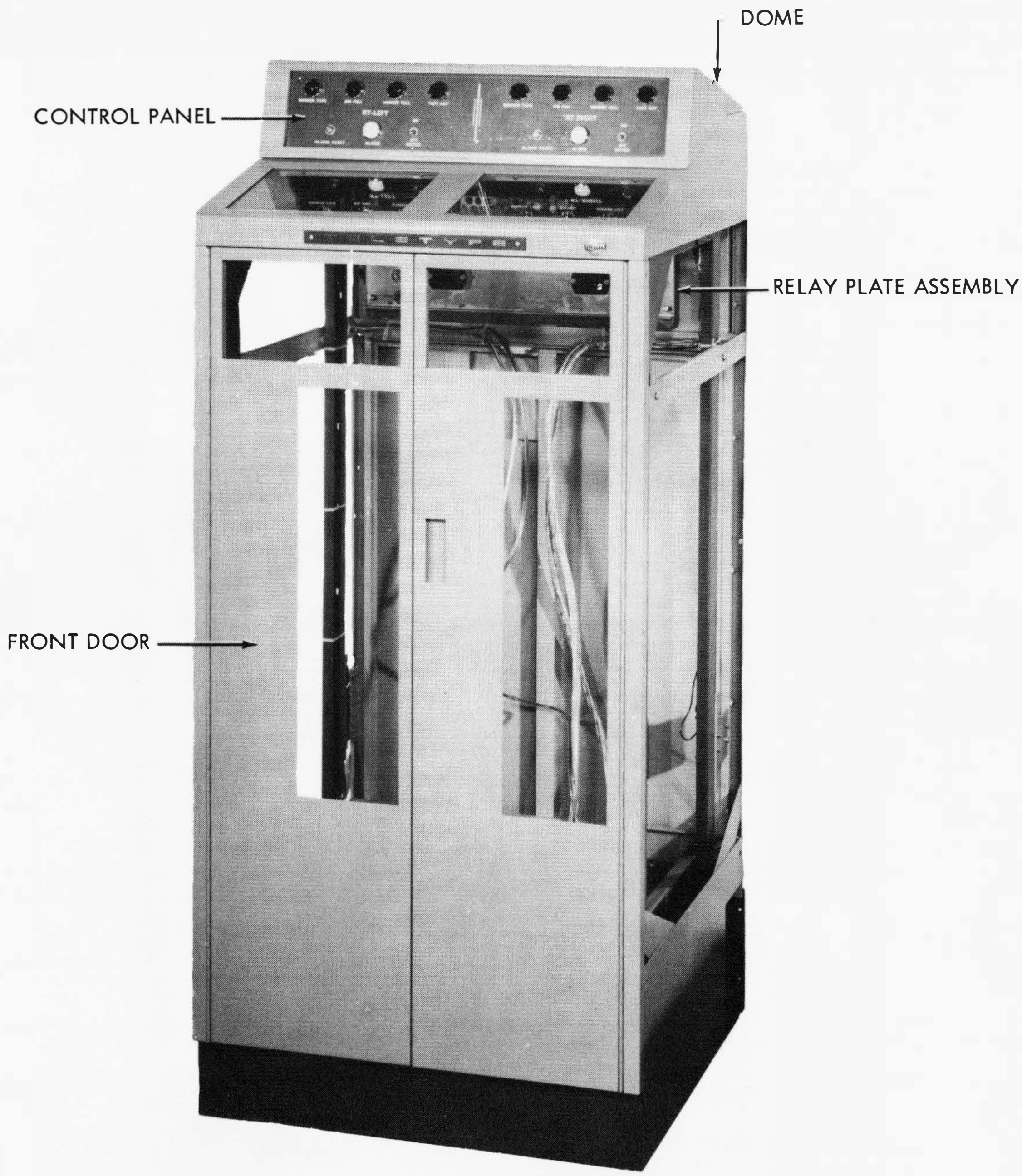


Figure 1-15. Model 28 Universal Cabinet (LBAC222BR)

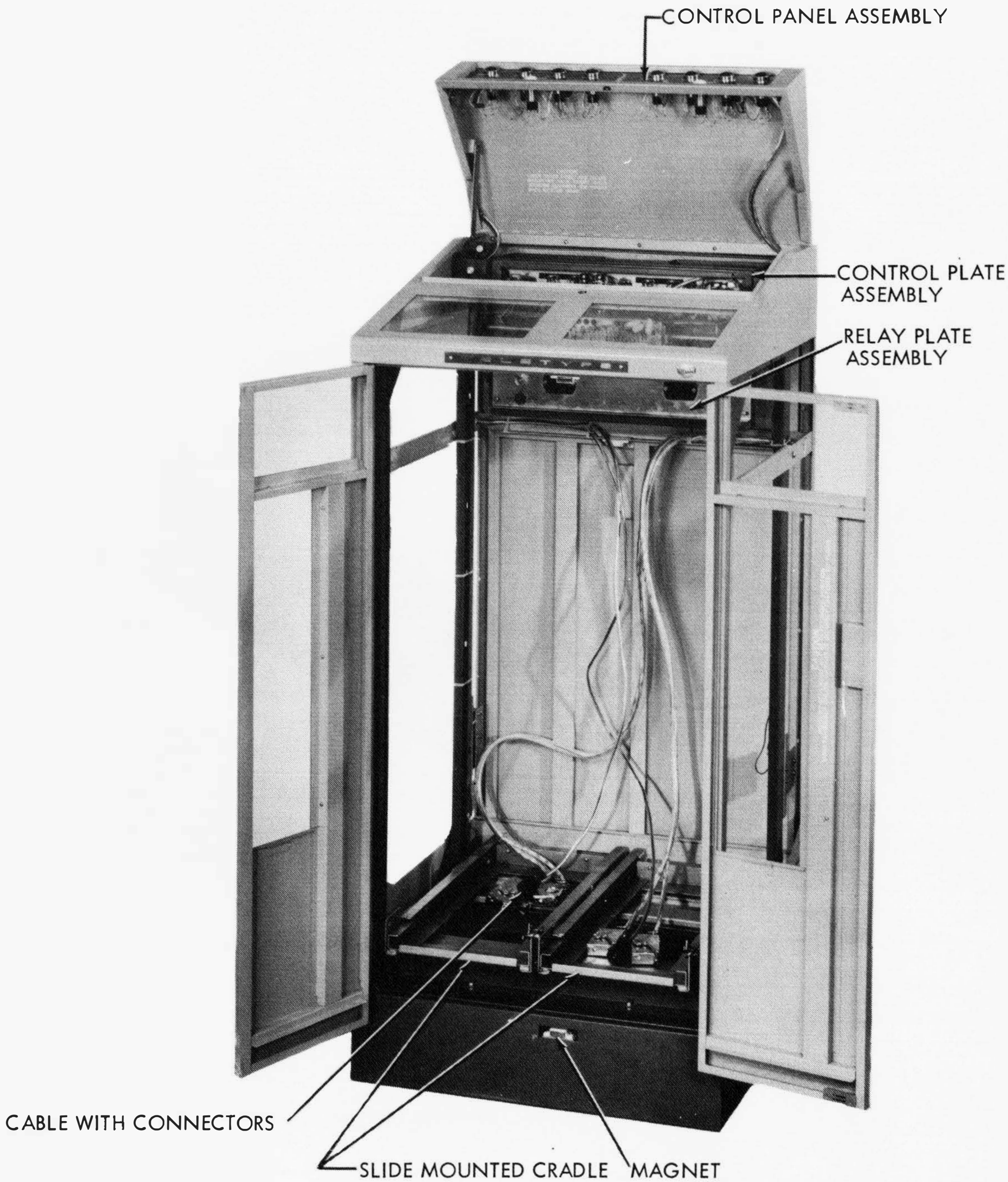


Figure 1-16. Model 28 Universal Cabinet (LBA222BR) (Front Doors and Dome Open)

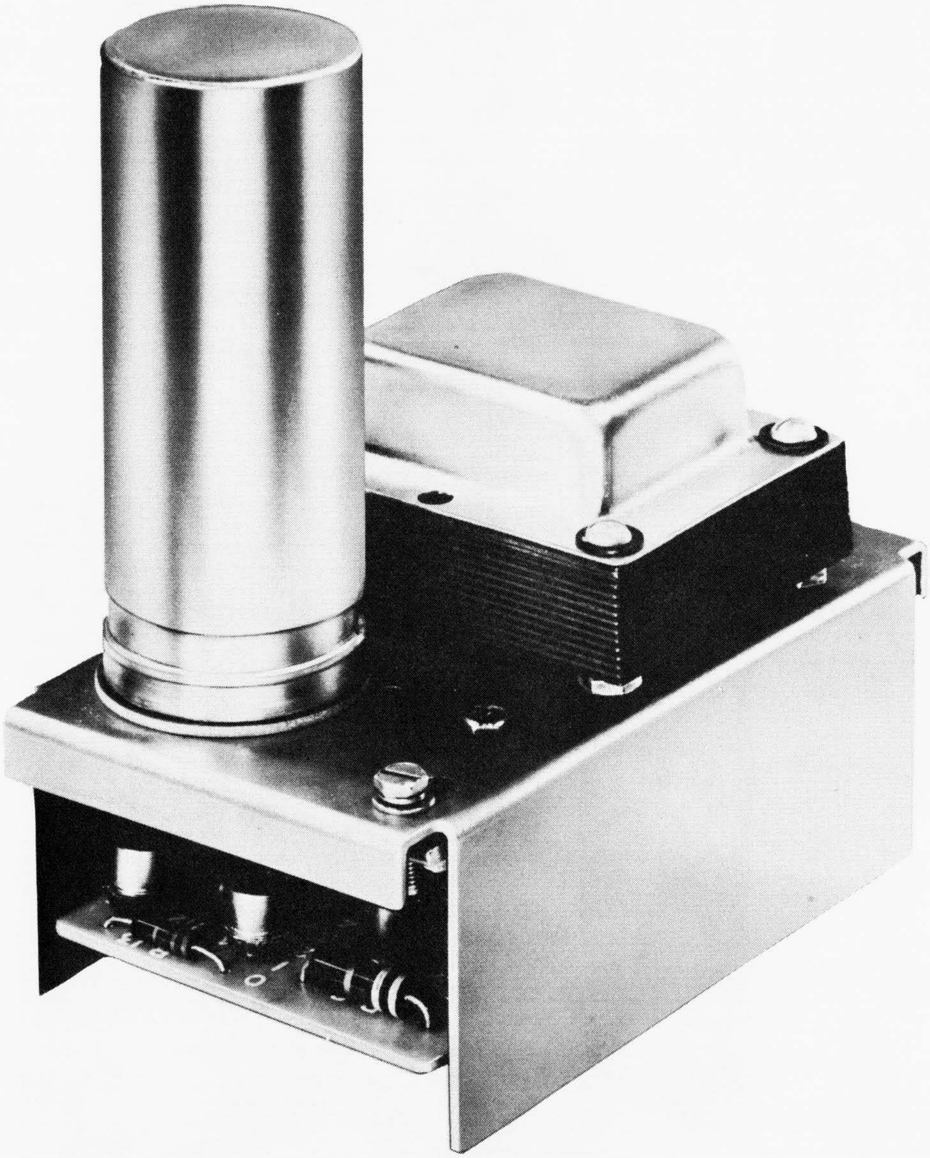


Figure 1-16A. Selector Magnet Driver (177010)

k. ELECTRONIC KEYER (Figure 4-39) (For applicable group)

(1) Two Electronic Keyers are used, one keyer for each receiving loop. There are two receiving loops in the Reperforator Transmitter Group.

(2) The function of the electronic keyer is to repeat signals from a 60 volt DC polar signal line to selector magnets of the receiving unit in a local neutral loop. The electronic keyer utilizes a 6005 tetrode vacuum tube (or equivalent) and presents a high impedance load to the keying circuit.

(3) When in the "mark" condition, a positive pulse arriving from the signal line is applied directly to the 6005 control grid. The pulse overcomes the bias on the grid and allows current to flow in the plate circuit energizing the selector magnets and attracting the selector armature. The keyer is designed to supply 30 to 35 milliampere current to the selector coils wired in series with the plate.

(4) When in the "space" condition, a negative pulse arriving from the signal line is applied directly to the 6005 control grid driving the tube into cut-off. With no current flow through the tube, the selector magnets de-energize and release the selector armature.

l. ELECTRONIC SELECTOR-MAGNET DRIVER (Figure 1-16A) (For applicable group)

(1) Two 177010 Selector Magnet Drivers are used, one driver for each receiving loop. There are two receiving loops in the Reperforator Transmitting Group.

(2) The Selector Magnet Driver is a solid state device which couples a signal line to a receiving selector magnet and repeats the line signals to operate selector mechanism. It is designed specifically to drive a single selector magnet. When used in place of a line relay or electronic keyer to drive the selector magnets, it will provide improved operation, greater reliability and reduced maintenance. However, it is not intended as a general purpose driver for all types of selectors, nor as a replacement for relays in general. The driver includes a DC power supply and an etched circuit card which are mounted on a small chassis. The power supply consists of an isolation transformer, a full wave rectifier and a single-capacitor filter. Various electrical components including five transistors are mounted on the circuit card which is supported by three posts. Power and signal cables equipped with spade lugs provide for electrical connections to the Driver.

(3) With different strapping arrangements, the Driver will accept neutral signals of either 0.020 or 0.060 ampere or polar signals of up to 0.030 ampere. The output is 0.060 ampere regardless of input.

(4) The Driver may be strapped so that when used in conjunction with external contacts, the selector does not receive (is blinded to) certain incoming message and does receive (is unblinded to) others.

(5) Strapping arrangements can be changed by removing and/or soldering bare wire between terminal posts on the circuit card. The posts are accessible so that the card need not be removed for this procedure.

(6) Since its input is essentially resistive rather than inductive, the Driver permits the inclusion of additional receiving units on a teletypewriter loop without introducing signal distortion.

(7) The Driver can be mounted in any vacant position on the electrical service assembly.

(8) Technical Data as follows: Dimensions (overall)

Length - 4-3/4 inches
Width - 2-7/8 inches
Height - 5-1/4 inches

Electrical

Power source - 117 v ac ±10%
50 - 60 cps

Maximum Power Consumption - 12 watts

Input Signals - 0.020 or 0.060 ampere ±10% neutral or up to 0.030 ampere polar

Output Signals - 0.060 ampere

Signalling Speed - Up to 200 wpm

Wiring Diagram - 4445 WD

Environmental Requirements

Operating Temperatures - $0^{o}C$ ($+32^{o}F$) to $+65^{o}C$ ($+149^{o}F$) at specified power and input requirements.

Storage Temperature - Maximum ($+185^{o}F$)

1-8. DESCRIPTION OF MAJOR COMPONENTS MODEL 28 TRANSMITTER DISTRIBUTOR GROUP

a. The basic components of the Group are the two Multiple Transmitter Distributor Sets; one of the sets (Figure 1-17) consists of three Transmitter Distributor (LXD11), Multiple Transmitter Distributor Base (LMXB206BR), Motor (LMU3), Drive Parts (173595 for 75.0 Baud or 173598 for 45.5 Baud), and three Tape Deflector Modification Kits (172679), and the other set (Figure 1-18) consists of three Transmitter Distributors (LBXD16), Multiple Transmitter Distributor Base (LMXB205BR, Motor (LMU3), Drive Parts (173589 for 75.0 Baud or 173592 for 45.5 Baud).

(1) The basic components of another variation of the Multiple Transmitter Distributor Sets are similar to the sets described in Paragraph 1-8.a. except the LMXB206BR Multiple Transmitter Base is replaced by the LMXB 209BR Multiple Transmitter Base; the LMXB 205BR Multiple Transmitter Base is replaced by the LMXB207BR Multiple Transmitter Base. These later design bases have separable connections to the cabinet wiring. The LXD11 Transmitter Distributors have been replaced by the LXD31 Transmitter Distributors.

b. The Model 28 Transmitter Distributor (Single Contact) (Figure 1-19) provides means for translating code combinations, perforated in a paper tape, into electrical pulses and transmitting these pulses in the form of a five unit, start-stop permutation code to one or more stations. The unit will accept a five level tape either chadless or fully perforated. The tape may be

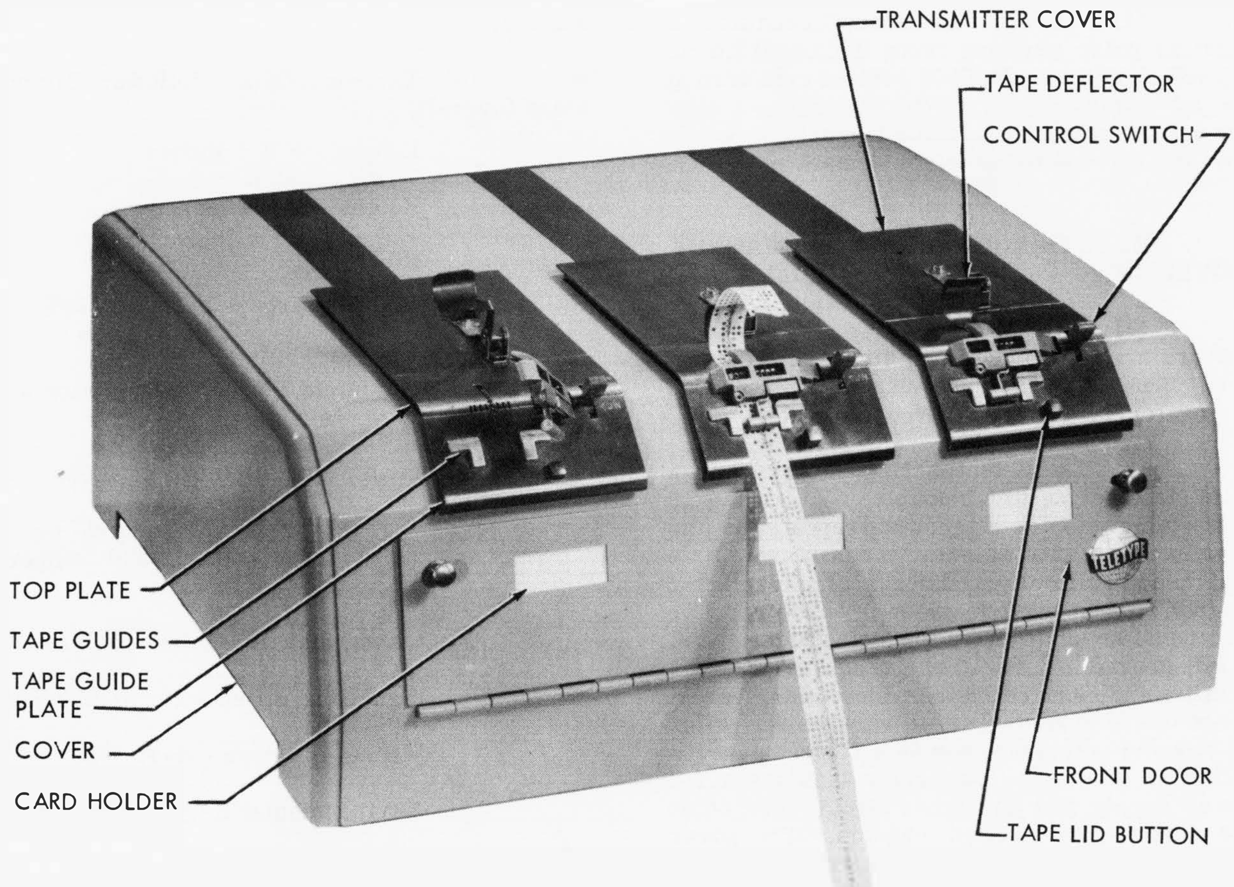


Figure 1-17. Model 28 Multiple Transmitter Distributor Set (With LXD11 Transmitter Distributor)

inserted without lifting the tape lid by moving the start-stop lever to the free wheeling position. The design of the unit includes all steel internal expansion clutch, sensing pins located in line with the axis of the feed wheel, longer travel of the sensing pins, increased number of feed pins engaging the feed holes in the tape and minimum maintenance. The unit is so arranged so that the components are readily accessible for adjustment or replacement.

(1) The mechanism of the transmitter distributor are supported between three vertical plates (front, center and rear) which are separated a fixed distance by spacers or tie bars. The cam shaft is located in the lower right section of the unit with the outer race of each ball bearing clamped to the respective front and rear plate. Motive power to the shaft is controlled by the clutch located on the rear end of the shaft and the clutch trip magnet assembly attached to the rear plate. As the clutch trip magnet is energized, the clutch mechanism is allowed to engage the outer drum that is rotating continuously transmitting its motion to the cam shaft. The top of the unit is enclosed by three formed

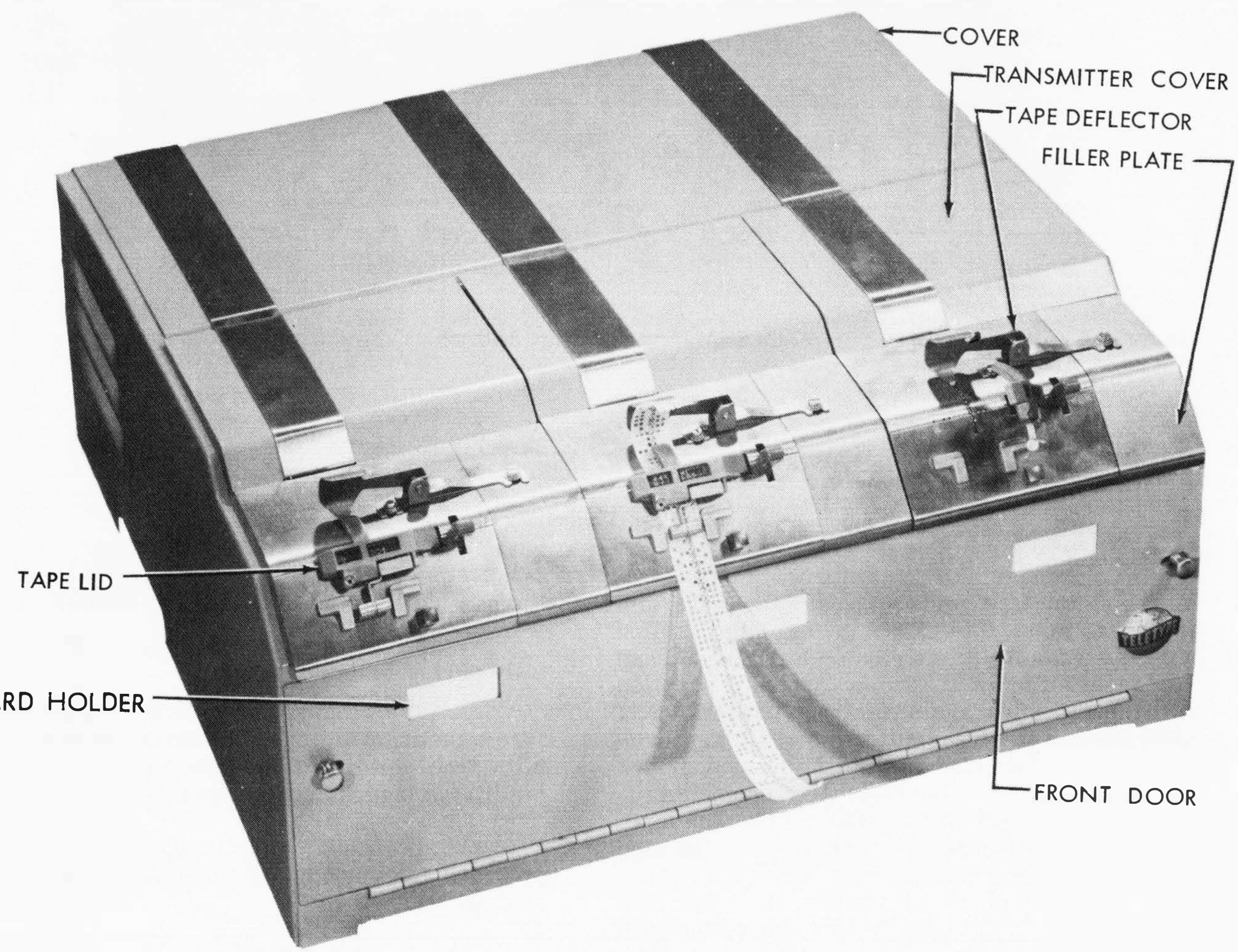


Figure 1-18. Model 28 Transmitter Distributor Set (With LBXD16 Transmitter Distributor)

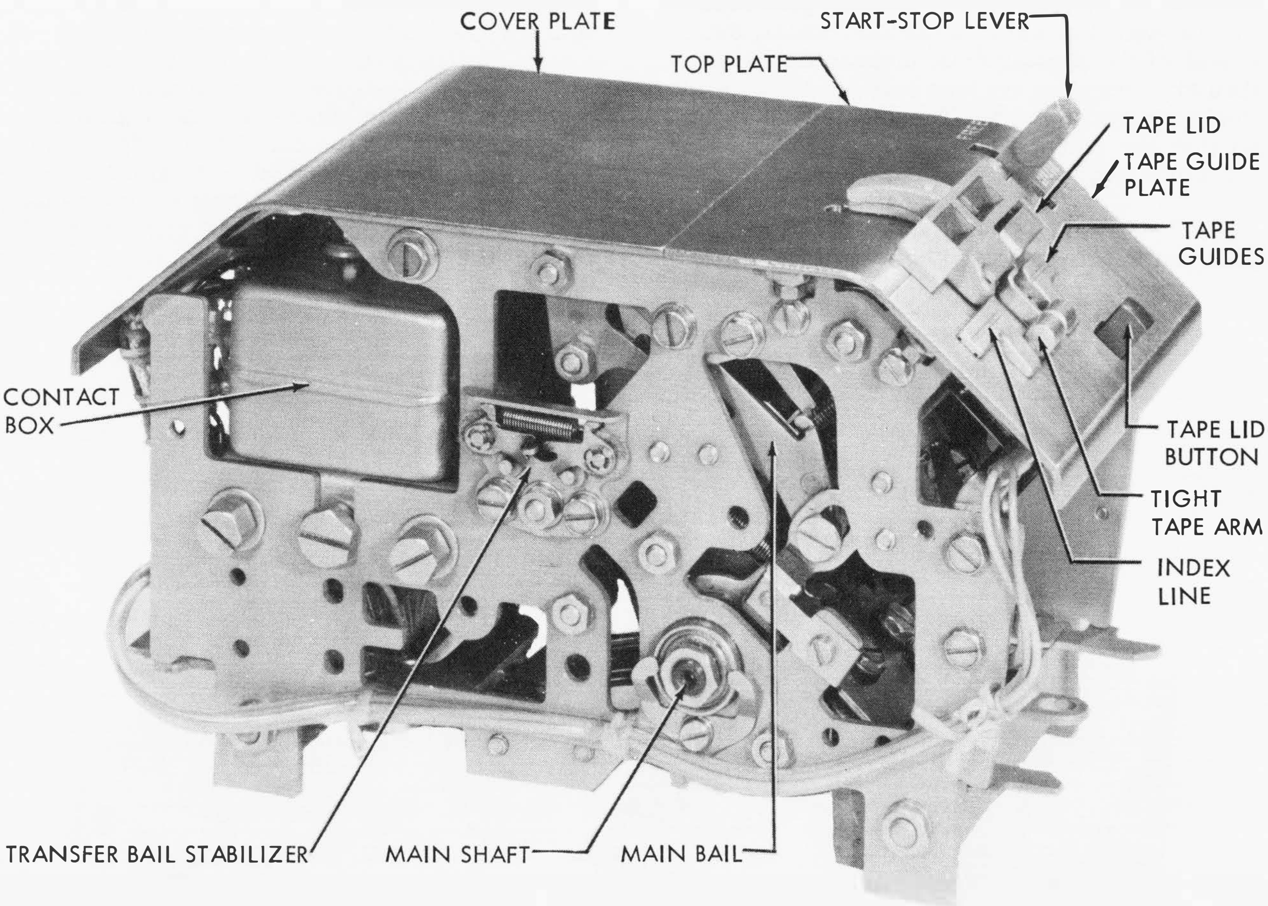


Figure 1-19. Model 28 Transmitter Distributor (LXD11)

plates -- the tape guide plate, the top plate, and the cover plate. The 156608 cover plate supplied with the transmitter distributor is discarded and replaced with the 163756 cover plate supplied with the multiple transmitter base (LMXB206BR). With tape in the transmitter distributor, movement of the start-stop lever to the right operates contacts to energize the clutch trip magnet which releases the main bail and the clutch. The main bail causes the sensing fingers to sense the tape perforations and initiates the tape feed operation. The clutch is engaged to start the cam shaft rotating. Transfer levers associated with the sensing pins cause the transfer bail to be shifted to the right or left in accordance with the intelligence sensed. The transfer bail in turn moves the signal generator toggle link and contacts to their marking or spacing position. Thus the perforations for each character in the tape are read and pulses, number 1 through 5, are generated sequentially. The tape is advanced to the next character and the cycle repeated.

(2) Accommodates either chadless or fully perforated tape.

(3) A control lever with start, stop and free wheeling positions. The latter position permits free wheeling of the tape feed wheel which facilitates insertion or removal of tape.

(4) A pair of adjustable guides are provided for aligning and locating tape over the feed wheel.

(5) An index line has been scored in the tape guides 0.600" (six characters) ahead of the sensing pins to aid in aligning tape start positions.

(6) A tight tape device on the tape lid stops transmission if the tape becomes taut or tangled.

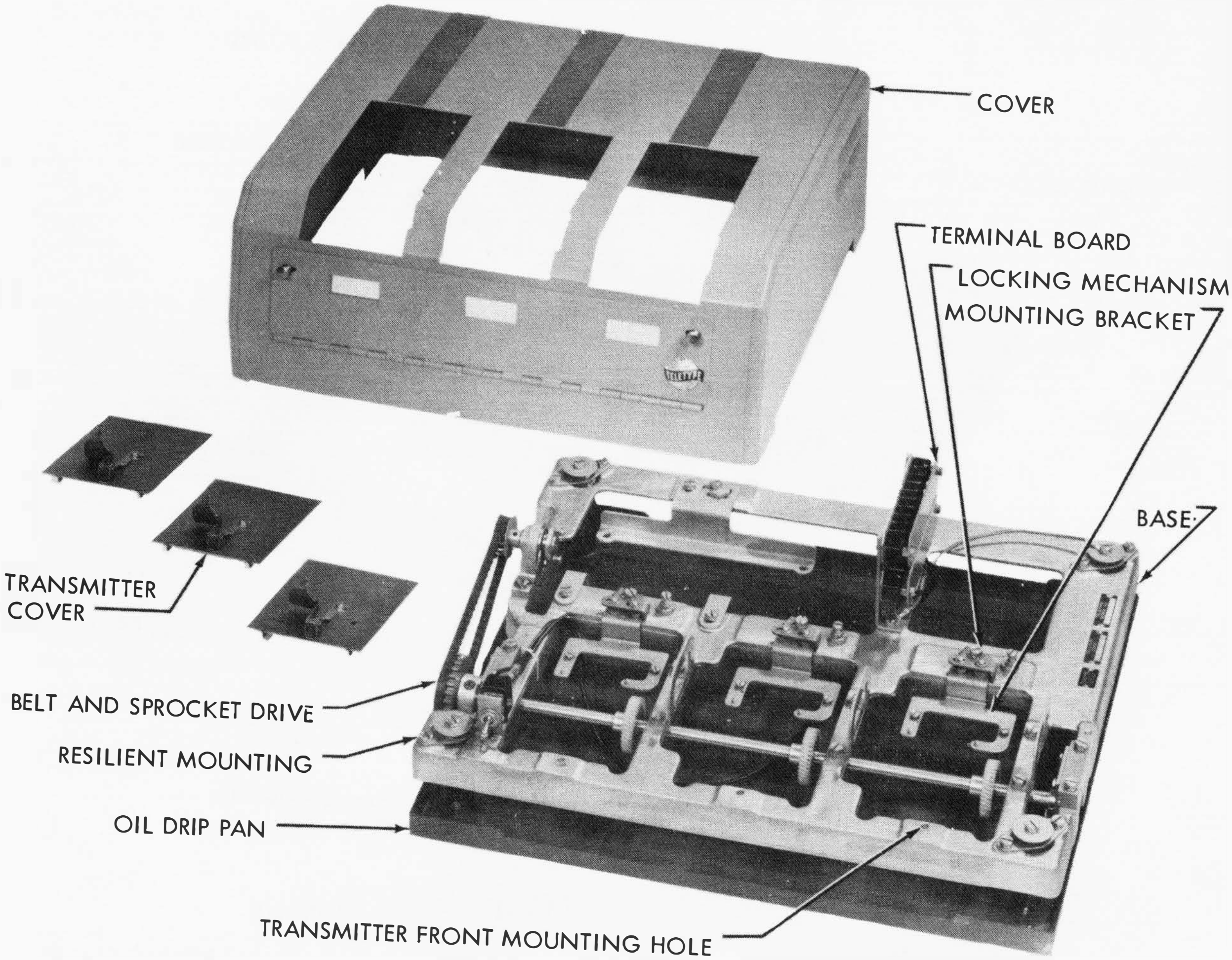


Figure 1-20. Model 28 Multiple Transmitter Distributor Base (LMXB206BR)

(7) A tape-out pin located to the right of the sensing pins stops transmission if there is no tape in the sensing head. (The pin is normally advanced 4 characters from the sensing pins. However, it may be placed in line with them.)

(8) A spring loaded tape lid that snaps open when the red tape lid button is depressed.

(9) A quick disconnect 36 terminal connector plug which aligns with its mate on the base and facilitates making electrical connections as well as simplifying handling during servicing.

(10) Approximate dimensions of Transmitter Distributor:

Width	7-1/2 inches
Depth	3-5/8 inches
Height	5 inches
Weight	7 pounds

(11) The control circuit (clutch trip magnet) is capable of operating from 115 volts A.C. ± 10% and 120 volts D.C. ± 10% or 50 volts D.C. ± 10% with suitable external resistance.

(12) The signalling code is the five-unit, start-stop polar code and consists of (+) battery for the marking pulse and (-) battery for the spacing pulse. The marking (+) battery being routed to the LXD11 marking contact and swinger, to the LBXD16 distributor stop contact and out to the distant station's keyer or polar line relay to ground. The transmission pattern for a complete character consists of a start pulse (always spacing) five code pulses (any one of which may be either marking or spacing) and a stop pulse (always marking). The start and stop pulses are necessary to keep the receiving apparatus in synchronism with the transmitter. The LXD31 is wired for a negative (-) marking signal.

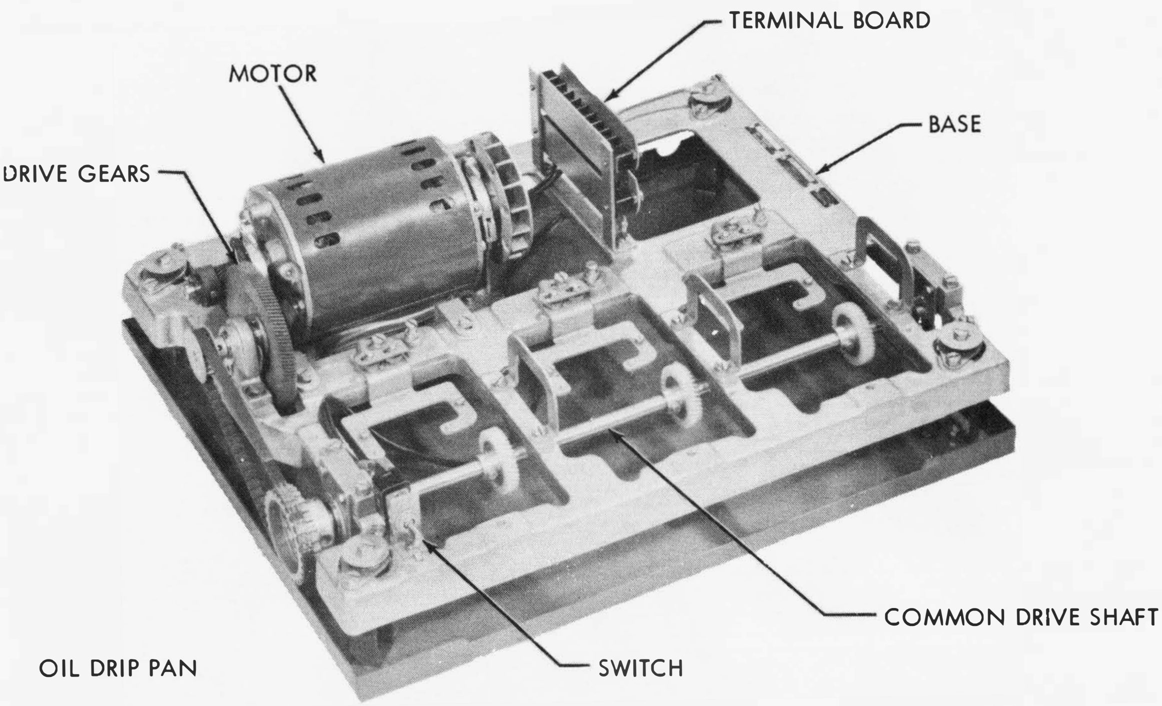


Figure 1-21. Model 28 Multiple Transmitter Distributor Base (LMXB206BR Without Cover; With Motor and Drive Gears)

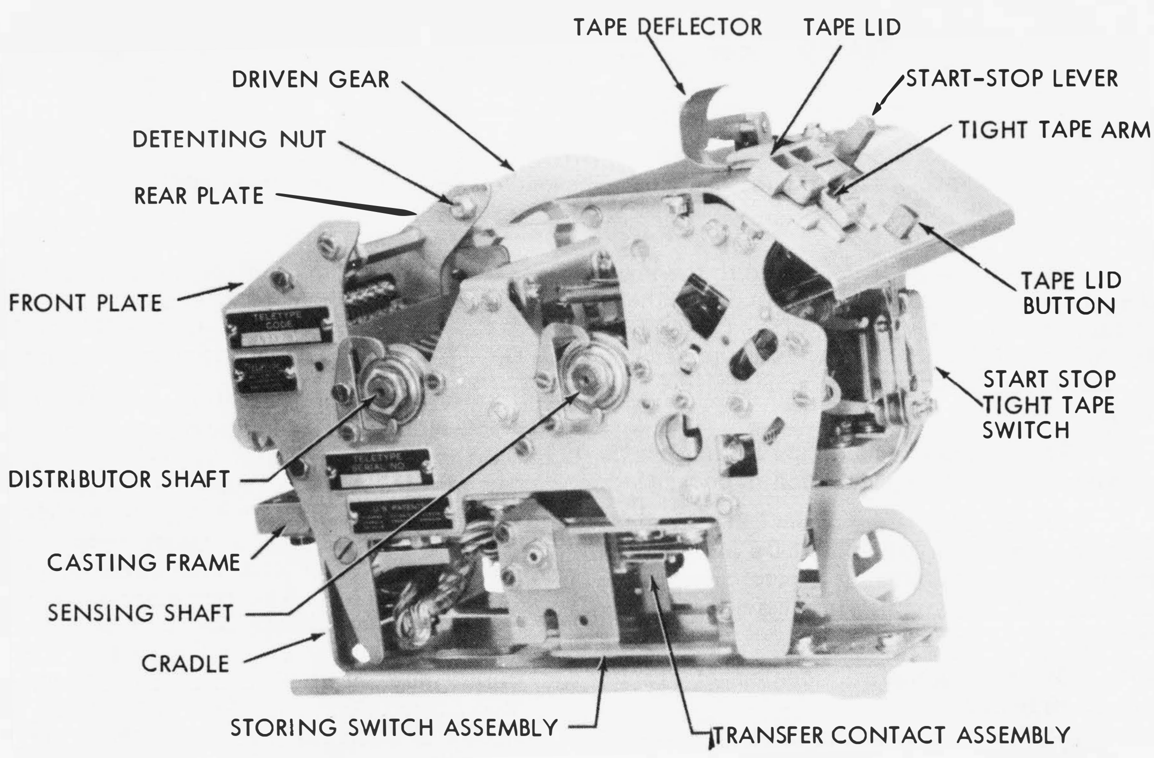


Figure 1-22. Model 28 Transmitter Distributor (LBXD16) (Front View)

(13) The 172679 Modification Kit (Figure 1-17) is installed on the Transmitter Distributor (LXD11) or (LXD31) and provides a tape deflector that may be positioned so as to deflect the tape back toward the operator.

c. Mechanical motion to operate the Multiple Transmitter Distributor Set is produced by a two pole, single phase, Synchronous Motor Unit (LMU3) (Figure 1-12) which develops 1/20 horsepower at 3600 revolutions per minute. The motor rests in the cradle of a mounting bracket and is held in place by a strap at each end. The cradle is isolated from the motor by resilient mounts which reduce vibration. Two fans are mounted at each end of a rotor within the end bells, and combination fan and handwheel rides on the left end of the shaft. A start relay, a starting capacitor and a thermal-cutout switch are contained in a lower compartment. The switch will turn off the motor if an overload should exist long enough to overheat the winding. The switch may be closed by pushing a reset button.

d. The Multiple Transmitter Distributor Base (LMXB206BR) (Figure 1-20) or LMXB 209BR provides mounting facilities for three transmitter distributors (LXD11 or LXD31), motor unit (LMU3) and drive parts for operating speed of 75.0 Bauds. A common driving shaft, intermediate gears and motor unit (Figure 1-21), provide the motion to the three transmitter distributors.

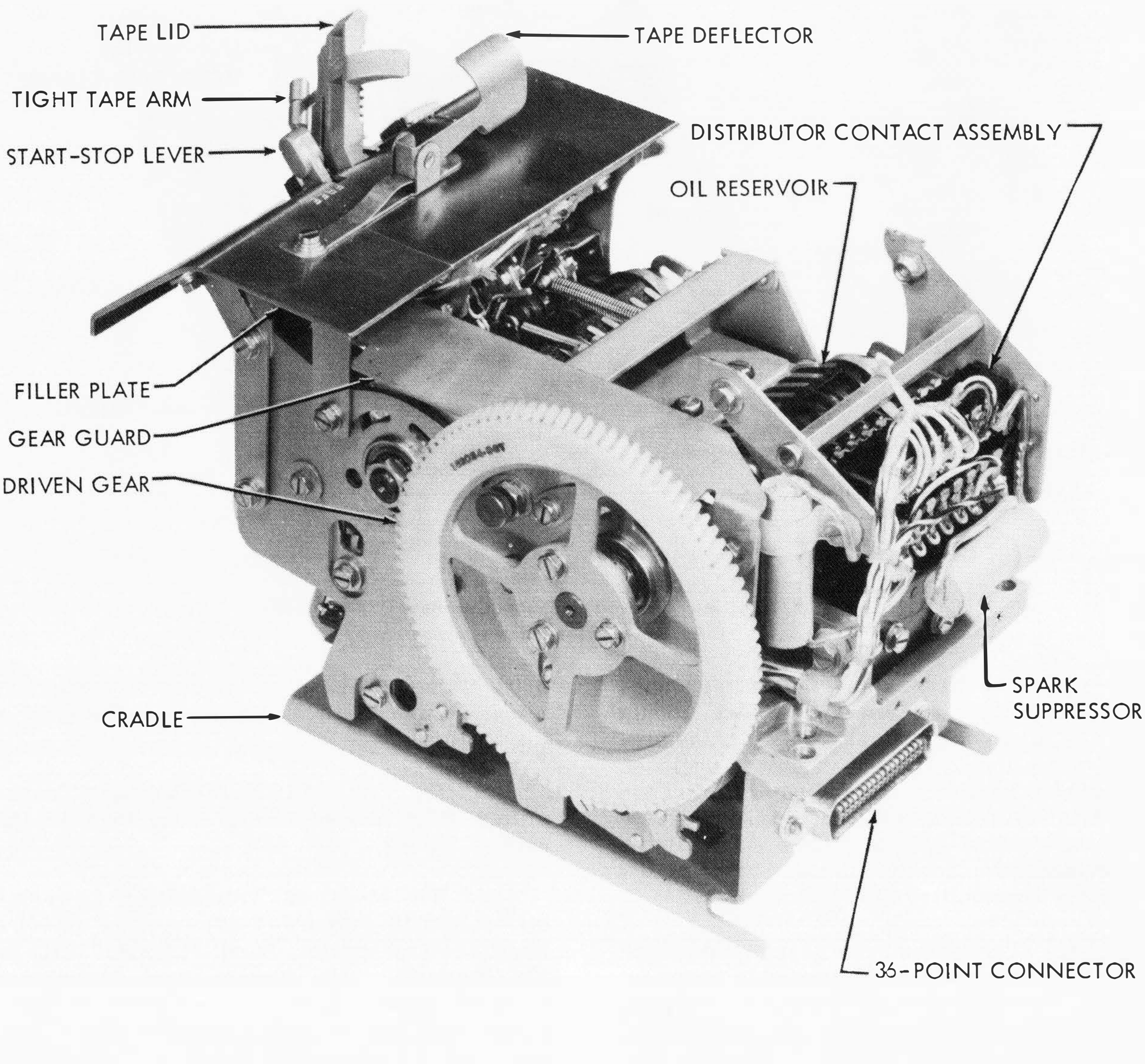


Figure 1-23. Model 28 Transmitter Distributor (LBXD16) (Rear View)

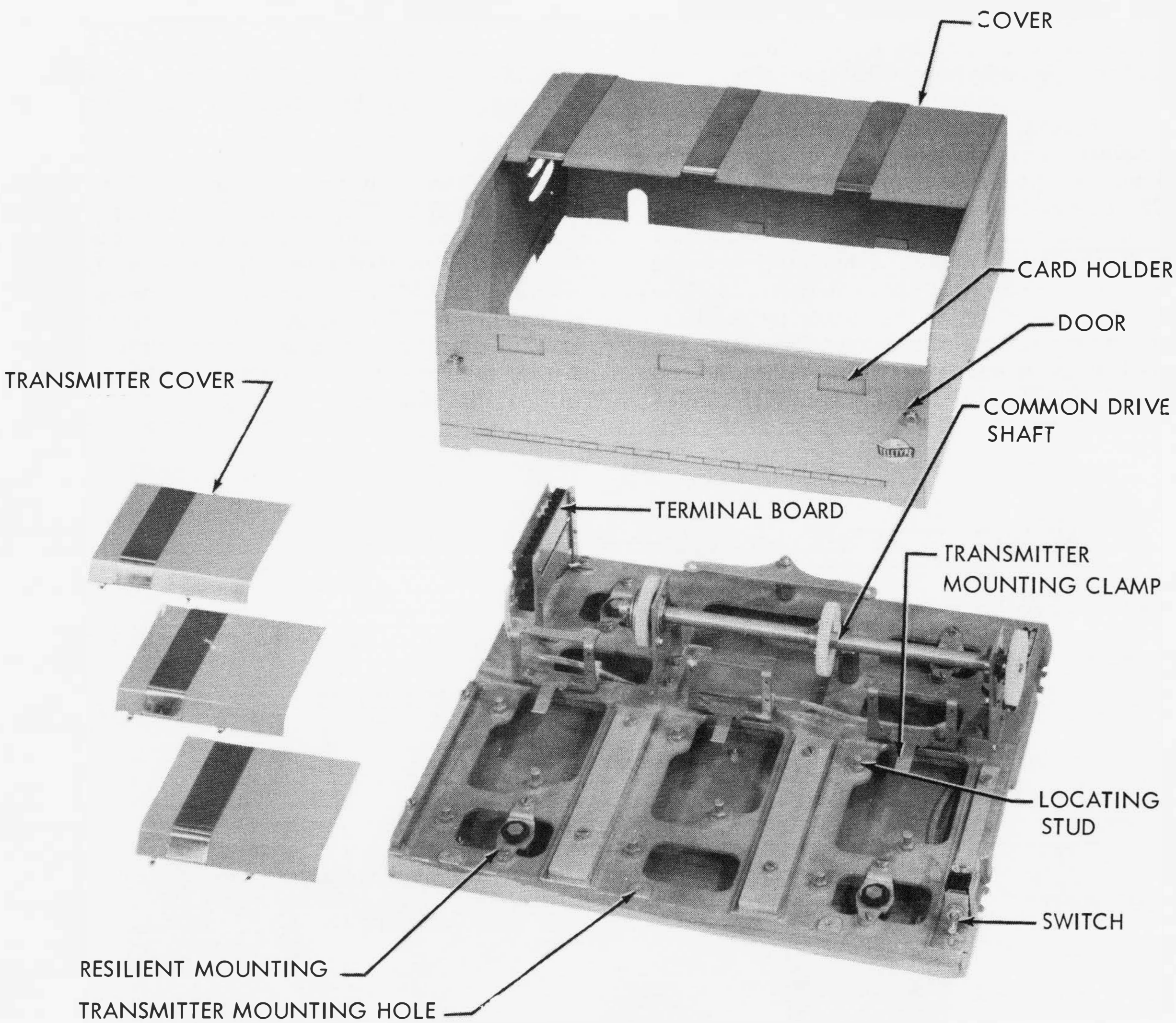


Figure 1-24. Multiple Transmitter Distributor Base (LMXB205BR)

(1) The base is assembled to its sub-base (oil pan) by means of resilient mounts (Figure 1-20) which aid in preventing transmission of vibrations. The entire unit is enclosed in a cover having a front hinged panel for access to the transmitter distributor mounting screw and motor control switch. Three cover plates are provided to replace the standard cover plates used on the transmitter distributor units.

(2) Three connector receptacles which are part of the cabinet cable assembly mount on the base and mate with the plugs of the transmitter distributors when they are mounted on the base. The individual transmitter distributors are mounted in place by a locking device at the rear and a single screw at the front. Power is brought into the base and connected to the terminal strip located on the base to the right of the motor.

(3) The LMXB209BR Multiple Transmitter Base has separable connectors to the cabinet wiring.

e. The Model 28 Transmitter Distributor (LBXD16) (Figure 1-22) mounts on the Multiple Transmitter Base (LMXB205BR or LMXB207BR). The Transmitter Distributor consists of two side frames held apart by separators and two intermediate side plates onto which all the mechanism mount, a top plate and a tape guide plate. Mounted on the tape guide plate are the red tape lid release button and two adjustable tape guides. Each tape guide is scored with an index line 6 characters ahead of the sensing pins. Mounted on the tape guide plate but overhanging the top plate and the tape guide plate is the tape lid. Mounted along side of the tape lid is a gray-green control lever. The tape sensing pins extend through slots in the top plate. The feed wheel pins extend through a slot in the top plate and a slot in the tape guide plate. The tape out pin also extends through the tape guide plate and tape lid. Two shafts are located within the unit: (1) The sensing shaft (2) the distributor shaft. Each rotate at the same speed through an idler gear connected to the drive gears on the clutch. The distributor shaft includes an outboard gear which is connected through the intermediate gear assembly to the drive motor pinion (Figure 1-23).

(1) The distributor shaft auxiliary contact controls the sensing shaft clutch release magnet electrically when the unit is so operated. However, each shaft may be energized independently of the other by external means. A start-stop control lever, tape out pin and tight tape arm control the distributor clutch release magnet electrically. The unit is capable of "single wire" or "multiple wire" output and multiple wire input to the distributor contacts for sequential distribution. Signal output is arranged for "neutral" or "polar" operation. The operation sequence is such that the reading cycle occurs after feeding and the last character sensed is stored for subsequent transmission.

(2) The operating speed of the transmitter distributor is 106 WPM (7.00 unit, single cycle). The unit shall have a feed read sensing cycle and distribute sense sequence. The distributor cam sleeve has a start cam lobe for use with polar operation and the auxiliary cams are designed to meet the specific requirements of the customer.

(3) Auxiliary contacts "A" and "B" operated from the sensing cam sleeve for controlling external circuits.

(4) Auxiliary distributor contact operated from the distributor cam sleeve for controlling the sensing cam.

(5) The distributor clutch trip magnets operate at .050 amperes, 110-120 volts, D.C.

(6) Transfer type code reading contacts are used in the reader portion of the transmitter distributor.

(7) Arc suppressors are connected across the distributor auxiliary contact and across the signal line.

(8) Tape deflector is provided and may be positioned to deflect the tape back toward the operator.

(9) A quick disconnect 36 terminal connector plug which aligns with its mate on the base and facilitates making electrical connection as well as simplifying handling during servicing.

f. The Multiple Transmitter Base (LMXB205BR) (Figure 1-24) or (LMXB207BR) provides mounting facilities for three transmitter distributors (LBXD16), motor unit (LMU3) and drive parts for operating speed of 75.0 bauds. A common driving shaft, intermediate gears and motor unit, provide motion to the three transmitter distributors.

(1) The base is assembled to its sub-base (oil pan) by means of resilient mounts, which aid in preventing transmission of vibrations. The entire unit is enclosed in a cover having a front hinged panel for access to the transmitter distributor mounting screw and motor control switch. Three cover plates are provided for the transmitter distributor units.

(2) Three connector receptacles which are part of the cabinet cable assembly mount on the base and mate with the plugs of the transmitter distributors when they are mounted on the base. The individual transmitter distributors are mounted in place by a locating plate and a single screw at the front. Power is brought to the base and connected to the terminal strip located on the base to the left of the motor.

(3) The LMXB207BR Multiple Transmitter Base has separable connectors to the cabinet wiring (Figure 1-24A).

g. The Model 28 Universal Cabinet (LBAC223BR Figure 1-25 or LBAC256BR Figure 1-2A) accommodates two Multiple Transmitter Distributor Sets and allows front and rear accessibility to the associated apparatus and electrical components. The cabinet provides a tape grid, figure 8 tape container, tape bins, a pivoting type relay rack, control plate assembly control panel drawer assembly, cable assemblies, terminal blocks, terminal strip for customer ground, capacitor mounting brackets, arc suppressors, tandem message identification modules and the necessary electrical control facilities to operate two 3 gang transmitter distributor sets together with three numbering modules. The transmitter distributors LXD11 or LXD31 and LBXD16 operate in tandem. The LBAC256BR Cabinet has sliding shelves.

(1) The Model 28 Message Identification Module 173520 (Figures 1-26 and 1-27) consists of the following:

(a) Base Assembly - 173562

1. The base assembly provides the means of automatically identifying each message transmitted from two transmitter distributors (LBXD16 and LXD11 or LXD31) or a single transmitting channel. The base assembly accomplishes this function by use of a stepping switch (173576) which stores the desired identifying codes and two relays 173577 and 173829 which provide for tandem operation between the two transmitter distributors.

2. The stepping switch contains 8 levels, a set of self-interrupter, and off normal contacts. Three (A, B and C) switching levels are used for controls, the remaining five (D, E, F, G and H) levels are used for storing the identifying codes, and the counter assembly number codes. An external transmitter distributor (LBXD16) transmitter distributor shaft is utilized to transmit these stored codes sequentially over the carrier channels. The auxiliary contact on the distributor is used for synchronization between the stepping switch and transmitter.

3. In addition to the above, the base assembly also mounts a message identification deletion switch (173581) and abnormal traffic lamp (173931). The deletion switch when operated prevents the base assembly from carrying out its identifying sequence. The abnormal traffic lamp is operated by customer 120 volts, D.C. circuitry.

(b) Numbering Assembly - 173580

1. The numbering assembly provides the means of counting and storing the number of messages (up to 999) transmitted from a transmitting channel and gives a visual indication of the number counted and its corresponding five wire bandot code. The numbering assembly accomplishes this by use of a pair of counter magnets (265M), associated armature feed pawl linkage (173557) and three code drums (with associated transfer type reading contacts). In addition to the above, the assembly also mounts two switching type connectors which permits ready changability of two identifying codes generated by the base assembly.

(c) The module is 2-3/4 inches in height, 6-1/2 inches in width, and 12-5/16 inches in depth.

h. The 161999BR Modification Kit provides for End Enclosures (Figure 1-1) for the cabinet.

1-9. DESCRIPTION OF MAJOR COMPONENTS MODEL 28 TYPING REPERFORATOR MONITOR GROUP

a. The basic components of the group are the two Multiple Typing Reperforator Sets; one

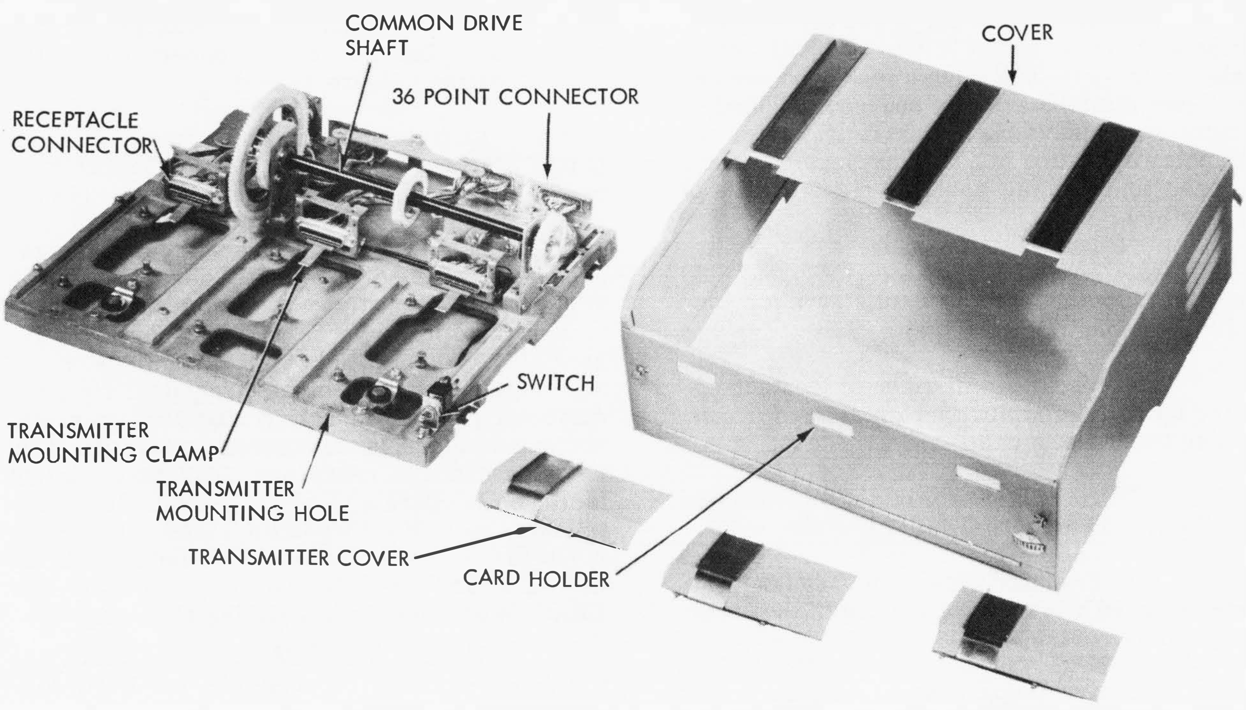


Figure 1-24A. Model 28 Multiple Transmitter Distributor Cover and Base (Latest Design)

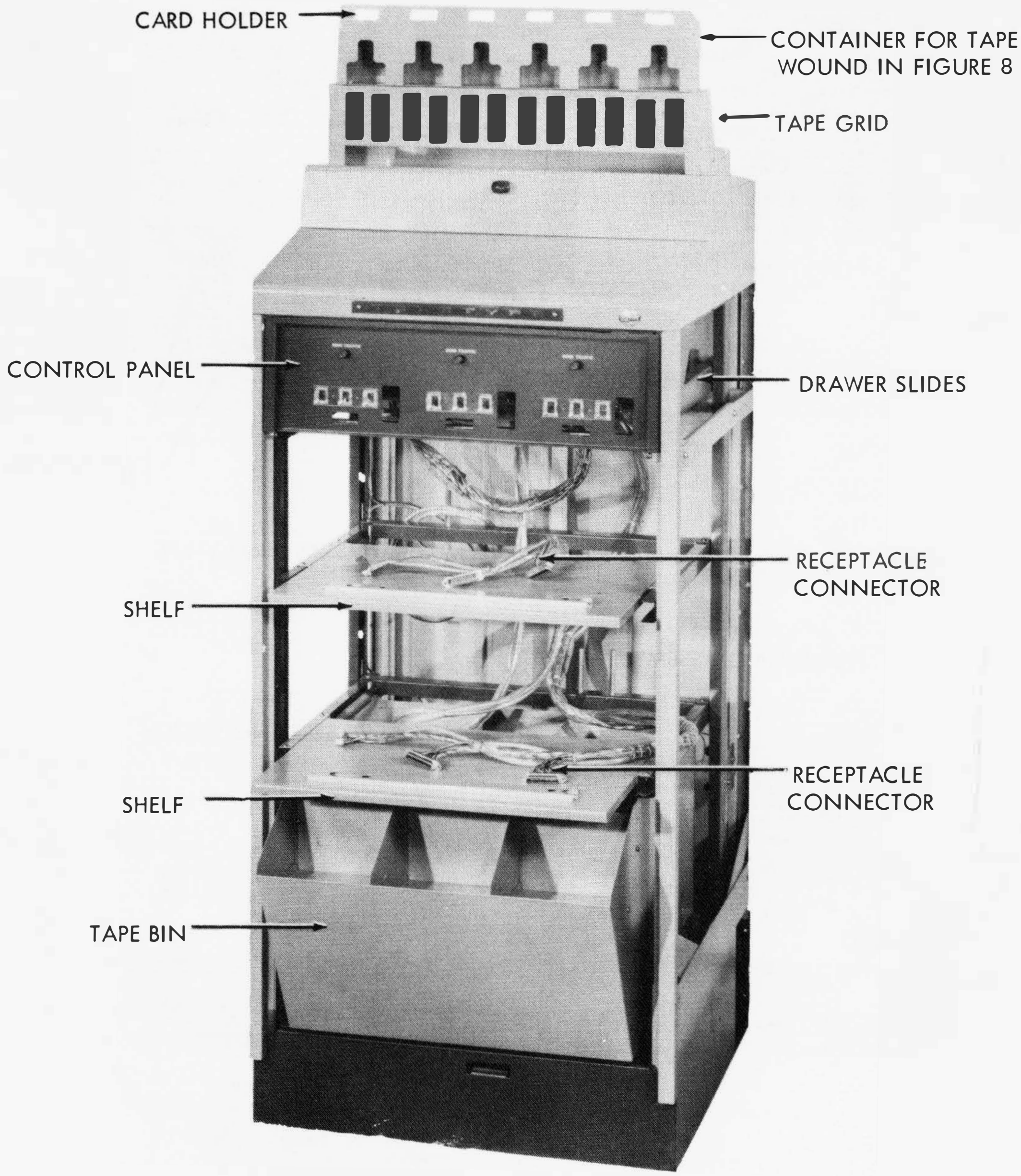


Figure 1-25. Model 28 Universal Cabinet (LBAC223BR)

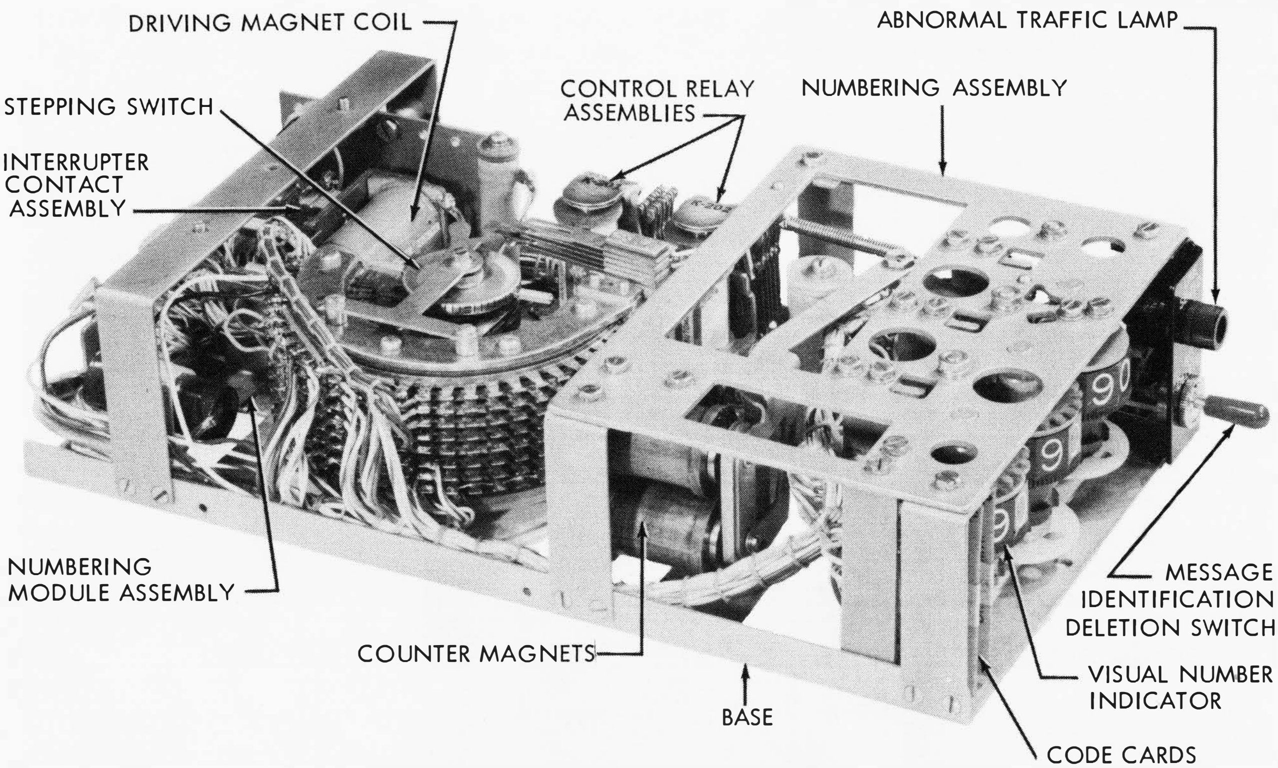


Figure 1-26. Model 28 Message Identification Module (173520) (Front View)

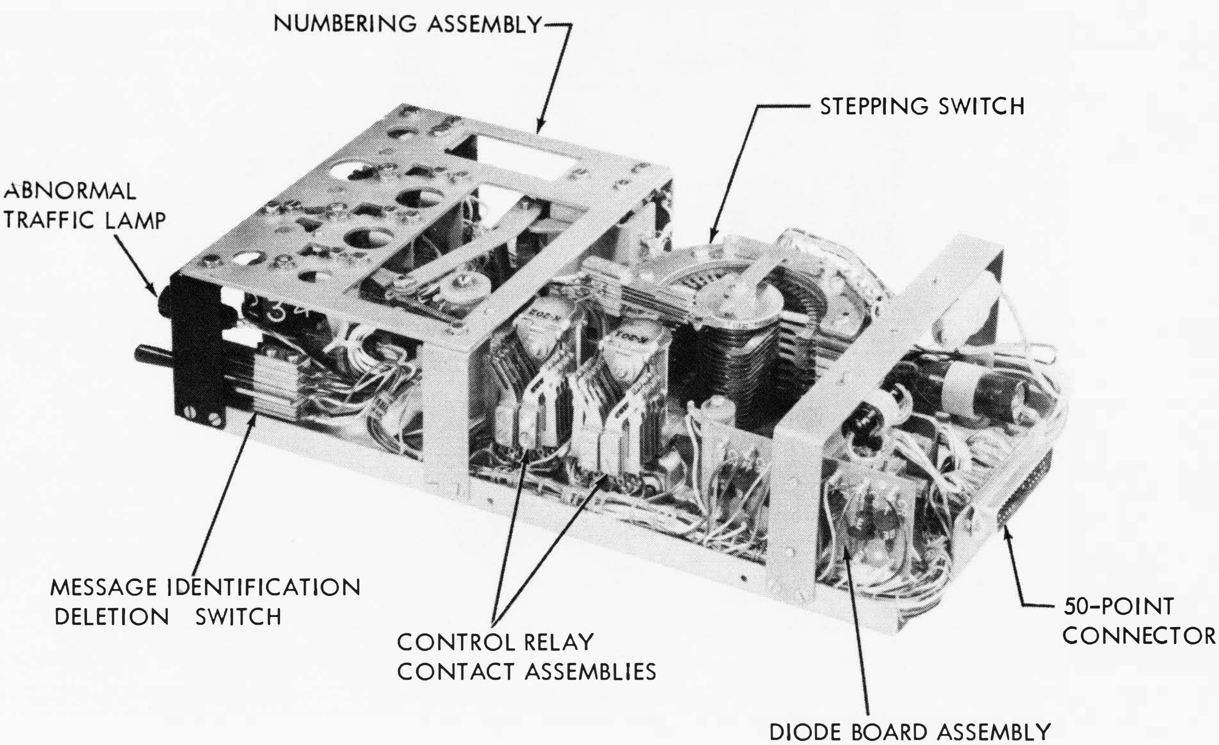


Figure 1-27. Model 28 Message Identification Module (173520) (Rear View)

of the identical sets (Figure 1-28) consists of three Typing Reperforators (LPR37BWA or LPR37BRP) Multiple Typing Reperforator Base (LMRB203BZ), Motor (LMU12) and Drive Parts (173584 for 45.5 Bauds or 164336 for 75.0 Bauds).

b. Typing Reperforator (LPR37BWA) (Figures 1-29 and 1-30) or (LPR37BRP).

(1) Reference Paragraph 1-7.b.(1), (2).

c. The Teletype Model 28 Multiple Typing Reperforator Base (LMRB203BZ) (Figure 1-31) provides mounting facilities for three Typing Reperforators (LPR37BWA), a Motor Unit (LMU12) and Drive Parts (164336) for operating speed of 75.0 Bauds. A common driving shaft, belt and sprocket drive parts gear set and motor unit provide the motion for the three typing reperforator units.

(1) The base provides tape containers, chad disposal facilities, motor power factor correction capacitors, electrical wiring and connector for operating the low tape alarm lamp and motor unit.

d. Synchronous Motor Unit (LMU12) (Figure 1-12).

(1) Reference Paragraph 1-7.e. except that motor mounts in upright position with oilers in end bells located above the motor shaft.

e. The Multiple Tape Winder (Figure 1-32 and 1-33) is a complete unit consisting of tape reels and a structure on which are mounted the power and driving mechanism, a tape tension device, a clutch engage and disengage device, rollers for the tape reel engagement and a contact arrangement to provide for a full reel alarm. The unit is for general application with a capacity of 1000 feet of fully perforated tape or 1000 feet of chadless tape per reel and is adaptable for tape widths of 11/16, 7/8 inch and 1 inch. The tape reel rotates when its rim engages the drive wheel.

(1) The winder has four vibration mounts. The six terminal plug mates with the cabinet cable receptacle.

(2) A 115 volt A.C. 50/60 cycle, single phase, induction, 35 millihorsepower motor rotating at 1725 RPM, a gear set and a common driving shaft provide the motion to the three rim driven reels.

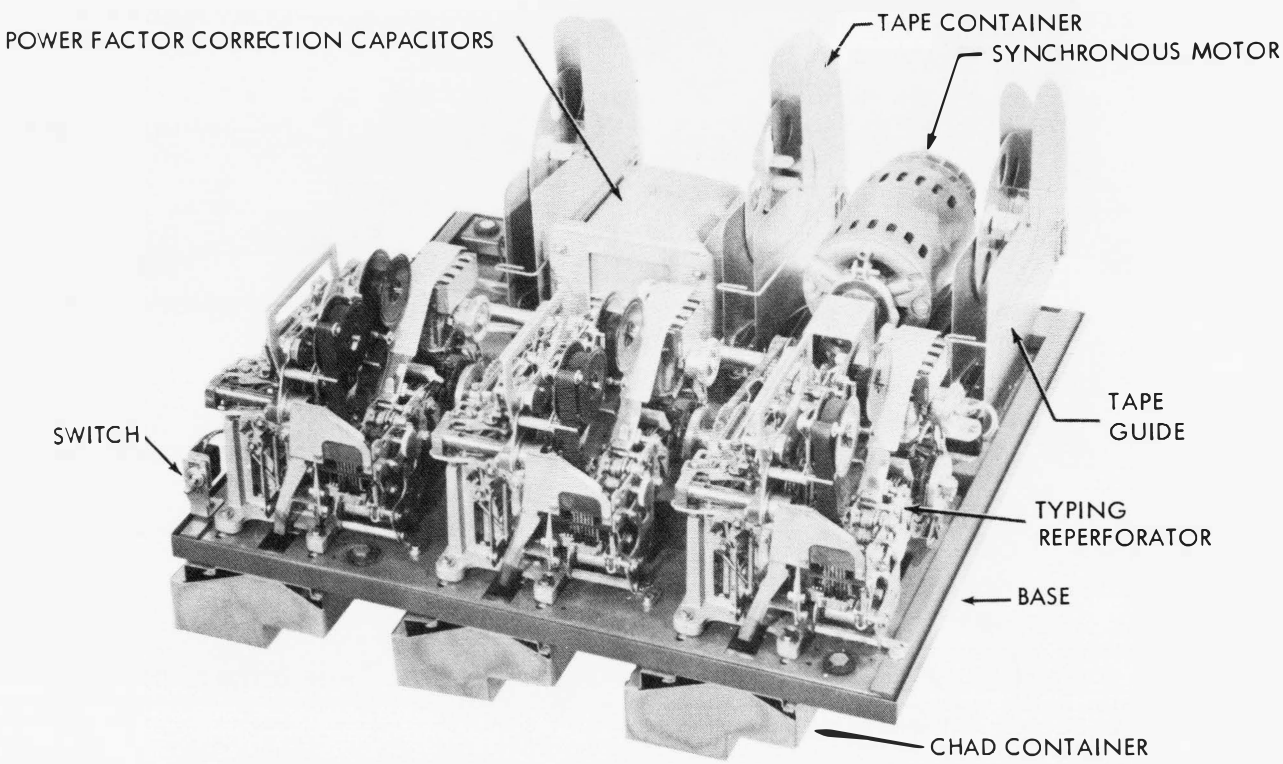


Figure 1-28. Model 28 Multiple Typing Reperforator Set

f. The Model 28 Universal Cabinet (LBAC 224BR) (Figure 1-34) accommodates two Multiple Reperforator Sets and two Multiple Tape Winder Sets. The control panel which is part of the cabinet mounts six "Abnormal Traffic" amber neon lamps, six "Abnormal Traffic" jacks, a "Winder Full" clear neon lamp, a "Low Tape" clear neon lamp, a 110 volt A.C. and 60 volt D.C. receptacle and a power switch for each tape winder. The cabinet provides electrical and control facilities consisting of an electronic keyer plate assembly containing six polar to neutral signal line converters, the control plate assembly contains the D.C. power supply for the electronic keyer as well as fuses for the cabinet equipment, 5.5 volt A.C. transformers for the tube heaters and a main A.C. power switch. Two vertically hinged doors at the front and rear provide accessibility into the cabinet. Magnetic door latches facilitate smooth opening and closing of cabinet doors. With the cabinet dome open the rack assembly can be raised and locked in position allowing convenient accessibility to the rack from the front of the cabinet. Channel assemblies accept the slides which are part of the two Multiple Typing Reperforator bases and provides mounting facilities for the two Multiple Tape Winder Sets.

(1) The Model 28 Universal Cabinet (LBAC257BR Figure 1-3A) is similar to the cabinet (LBAC224BR) covered in Paragraph 1-9.f. except that it is equipped with six 177010 selector magnet drivers in place of the six single vacuum tube keyers. (See Paragraph 1-7.1. and k. for description of the electronic keyer and the selector magnet driver.)

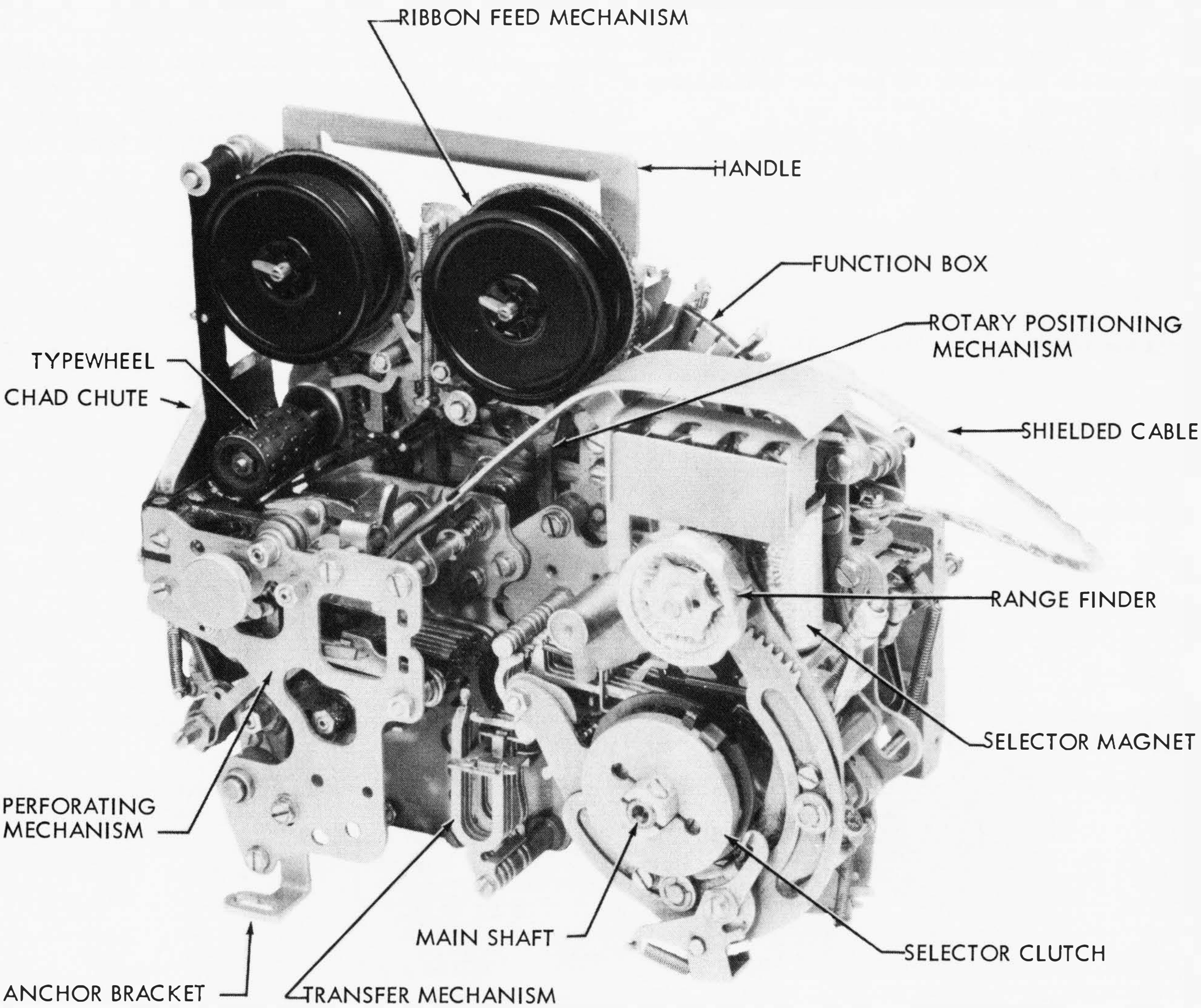


Figure 1-29. Model 28 Typing Reperforator (LPR37BWA) (Front View)

(2) The Model 28 Universal Cabinet (LBAC259BR Figure 1-3B) is similar to the cabinet (LBAC224BR) covered in Paragraph 1-9.f. except that it is equipped with six double tube 309863 voltage input selector magnet drivers in place of the six single vacuum tube drivers.

(a) The control plate assembly contains the filament transformers, D.C. power supply, fuses for cabinet equipment, A.C. convenience receptacle, main A.C. power switch.

(b) The control panel contains six "Abnormal Traffic" jacks, a "Winder Full" lamp, a low tape lamp, a 115 volt A.C. and a power switch for each tape winder.

(c) Cable assemblies for interconnecting the various units and components.

(d) The incoming signal line for each of the reperforators is connected to the appropriate terminal block terminal (see associated wiring diagram in Volume 3 of this Manual). The wiring is shielded from the terminal block to the 309863 selector magnet driver. In the selector magnet driver the polar input signal (minus one to minus six volts mark, zero volts space) is converted into a 30 milliampere signal loop for the selector magnets of the reperforators. Refer to Section 4 of this Manual for detailed description of the selector magnet driver. The leads to reperforator connector are shielded.

(e) An "Abnormal Traffic" amber neon lamp is provided for each of the six reperforators. Wiring is provided from the cabinet terminal board to the lamp on the control

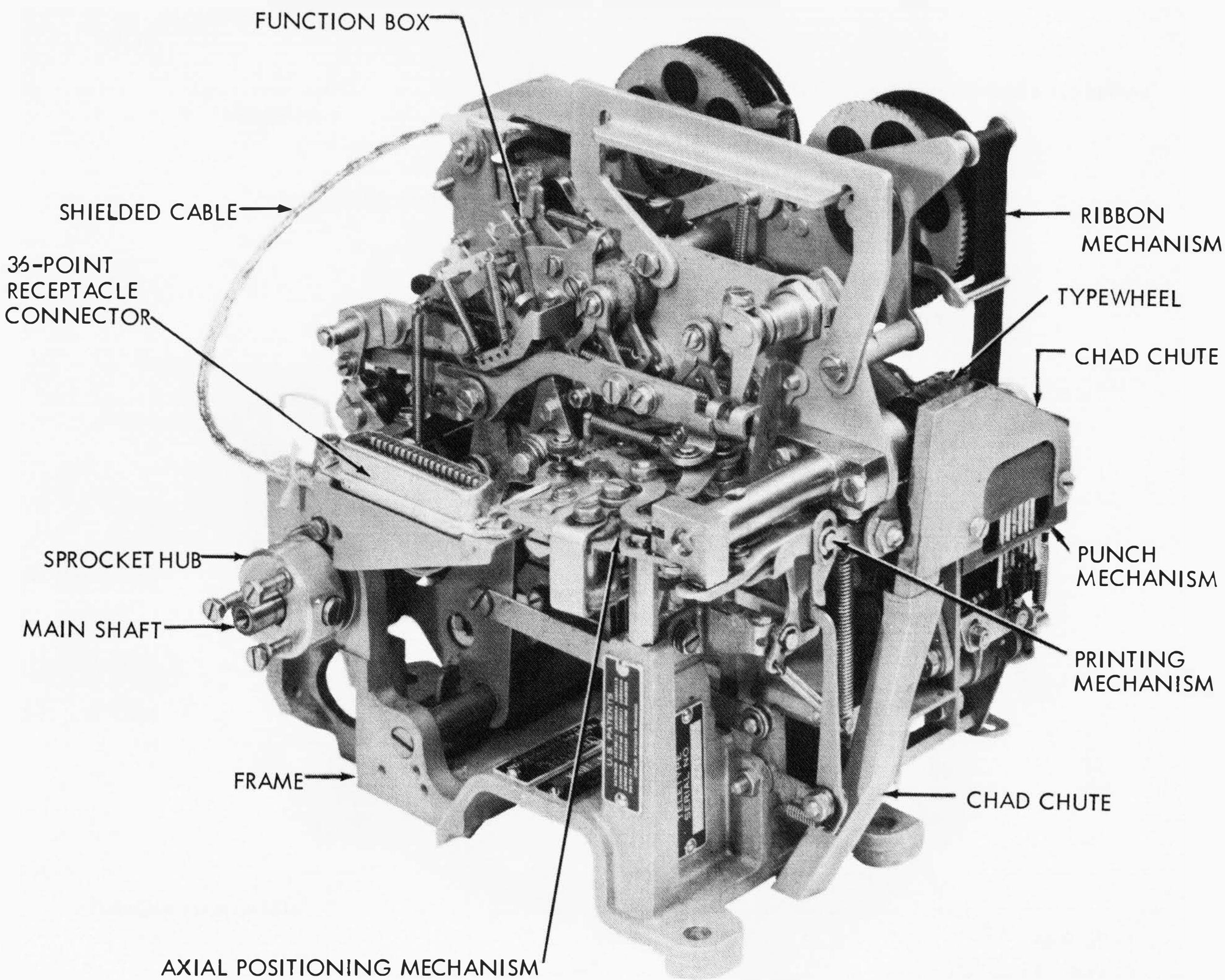


Figure 1-30. Model 28 Typing Reperforator (LPR37BWA) (Rear View)

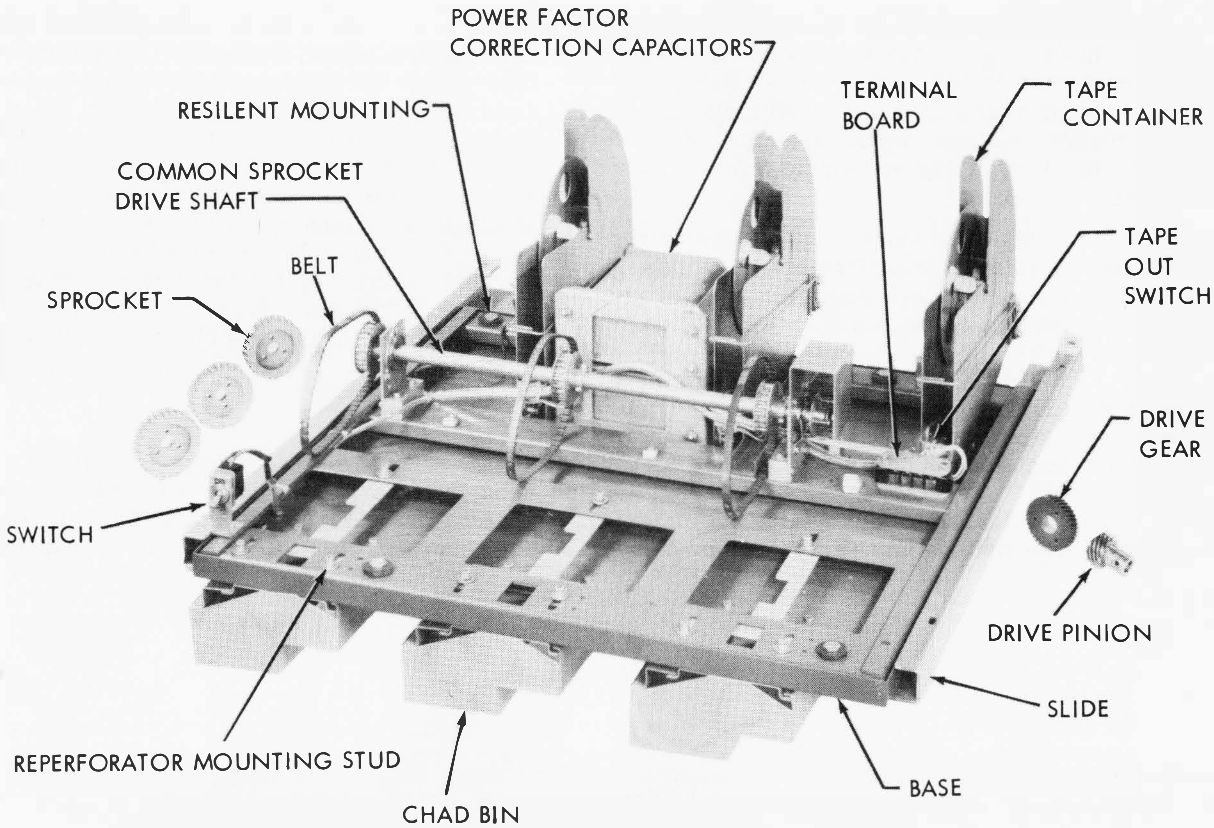


Figure 1-31. Model 28 Multiple Typing Reperforator Base (LMRB203BZ)

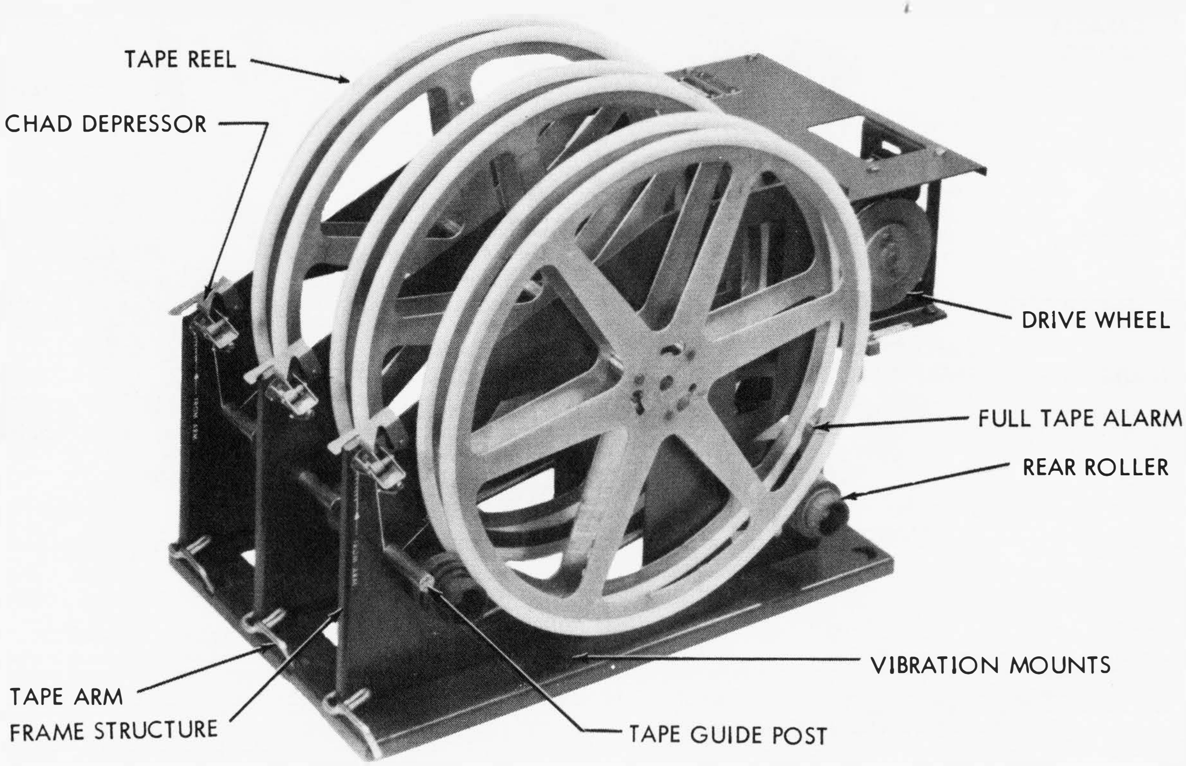


Figure 1-32. Multiple Tape Winder (TW15) (Front View)

panel. The customer provides power and control for these lamps. An "Abnormal Traffic" jack for each of the reperforator circuits.

(f) The "Winder Full" clear neon lamp is lighted when any of the six winder tape reel switches close.

(g) The "Tape Out" clear neon lamp is lighted when any of the six tape out contacts on the reperforators close.

(h) The control panel provides a 115 volt A.C. convenience outlet and a D.C. convenience outlet.

(i) The control plate assembly provides a rectifier for the local selector magnet current and tube biasing current for the selector magnet drivers, two filament transformers to provide tube filament current for the selector magnet drivers, fuses for cabinet equipment, a main A.C. power switch, and terminal blocks for interconnecting components.

1-10. DESCRIPTION OF MAJOR COMPONENTS MODEL 28 TYPING REPERFORATOR RECEIVING GROUP

a. The basic components of the Group are the two Multiple Typing Reperforator Sets; one of the identical sets (Figure 1-35) consists of the three Typing Reperforators (LPR35BWA), Multiple Typing Reperforator Base (LMRB203BZ), Motor (LMU14) and Drive Parts (173584 for 45.5 Bauds or 164336 for 75.0 Bauds).

(1) The basic components of another variation of the Receiving Group Multiple Typing Reperforator Set are similar to the set described in Paragraph 1-10.a. above except:

(a) The three Typing Reperforators (LPR35BWA) are replaced by three Typing Reperforators (LPR35BRP).

(b) The Multiple Typing Reperforator Base (LMRB203BZ) is replaced by the Multiple Typing Reperforator Base (LMRB 207BZ).

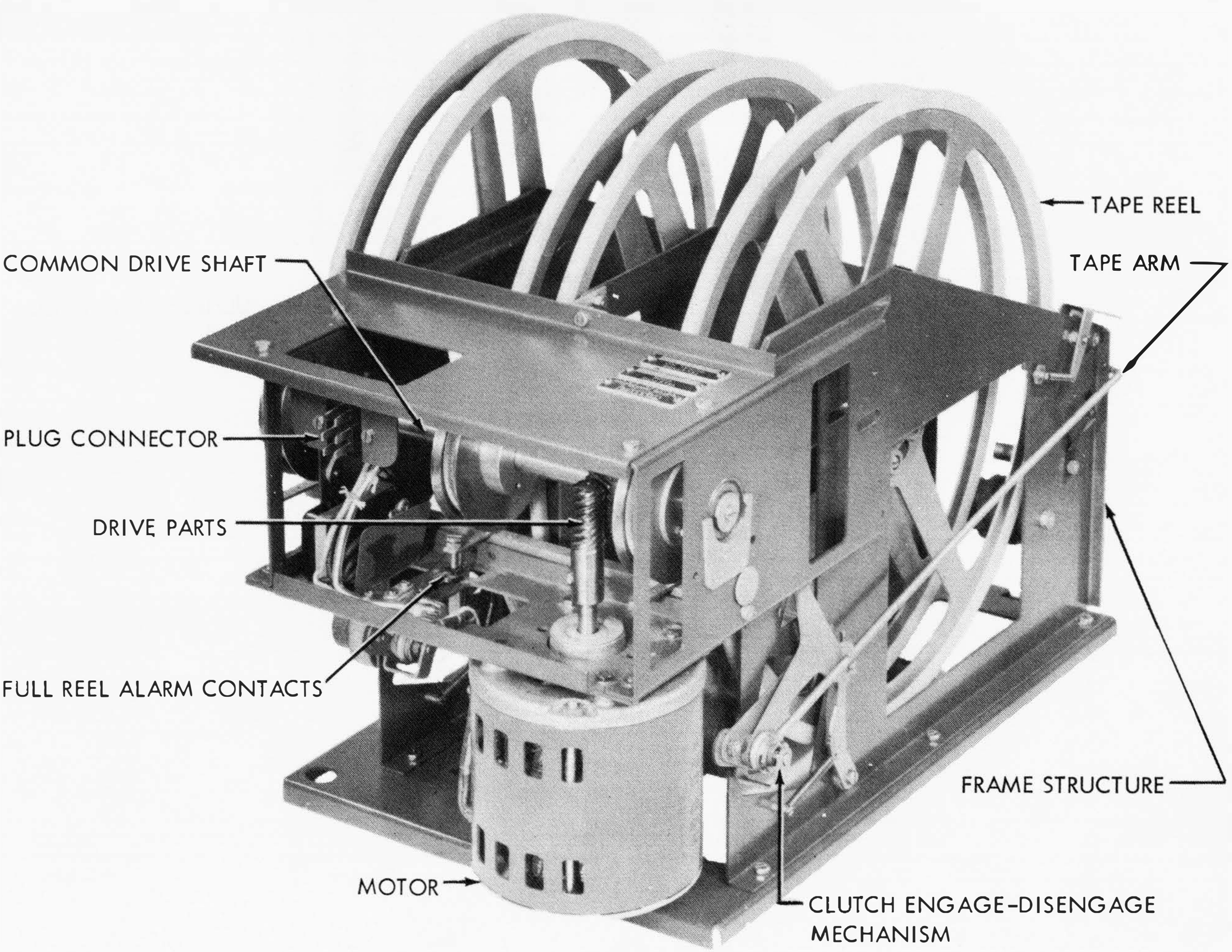


Figure 1-33. Multiple Tape Winder (TW15) (Rear View)

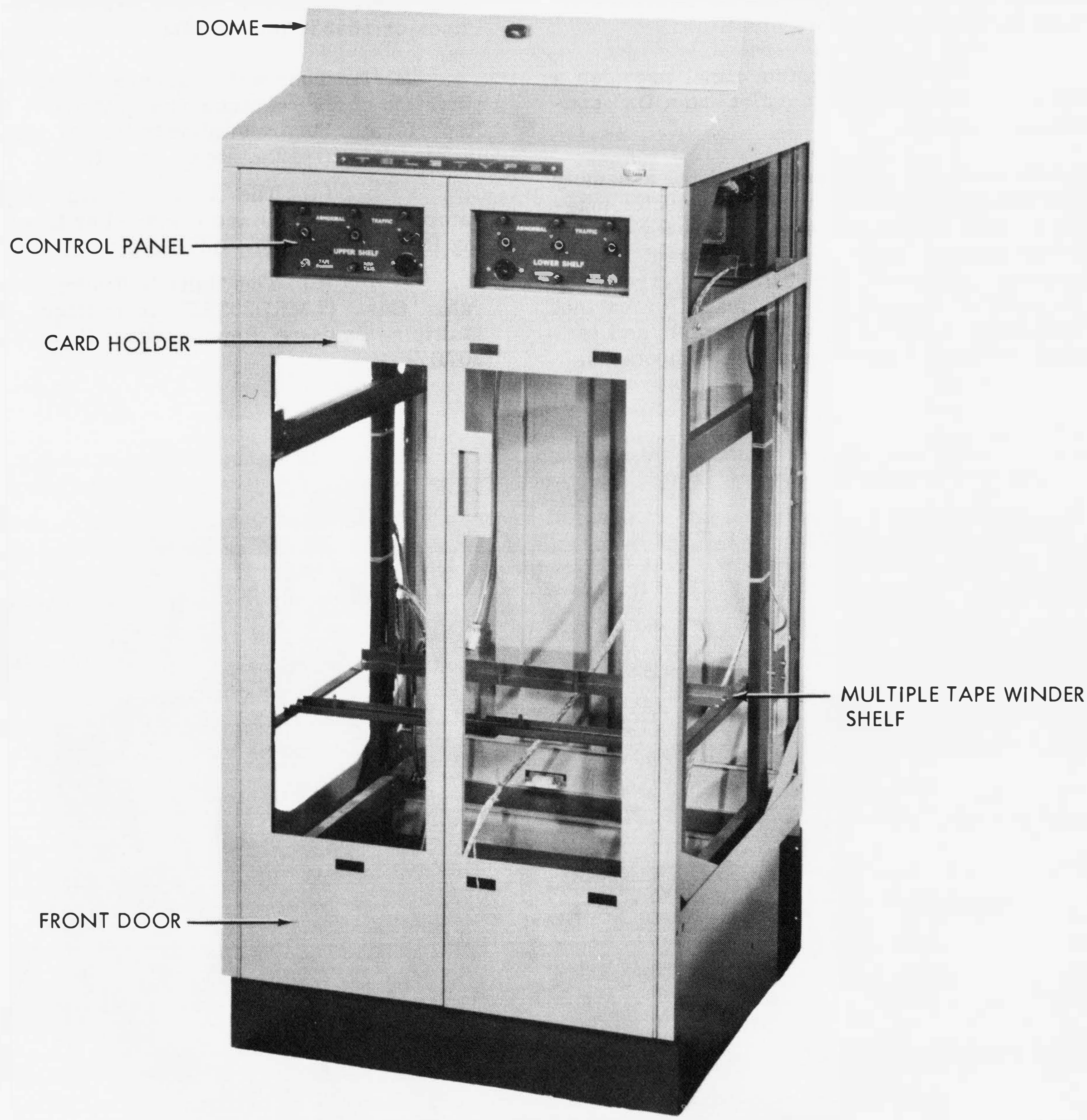


Figure 1-34. Model 28 Universal Cabinet (LBAC224BR)

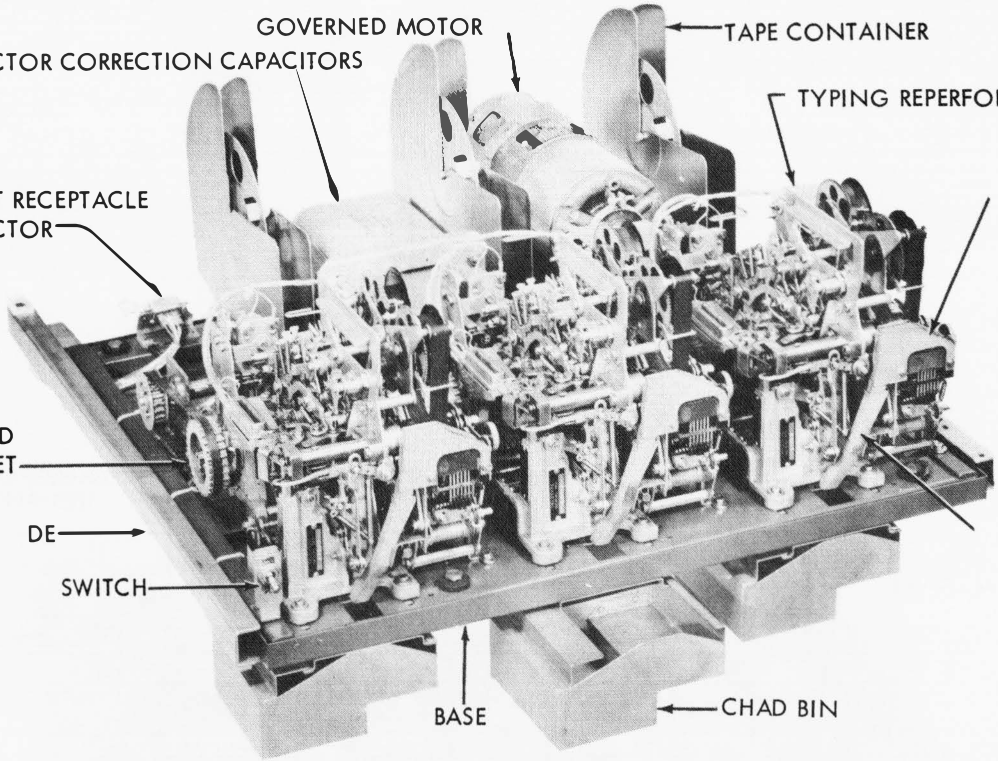


Figure 1-35. Model 28 Multiple Typing Reperforator Set

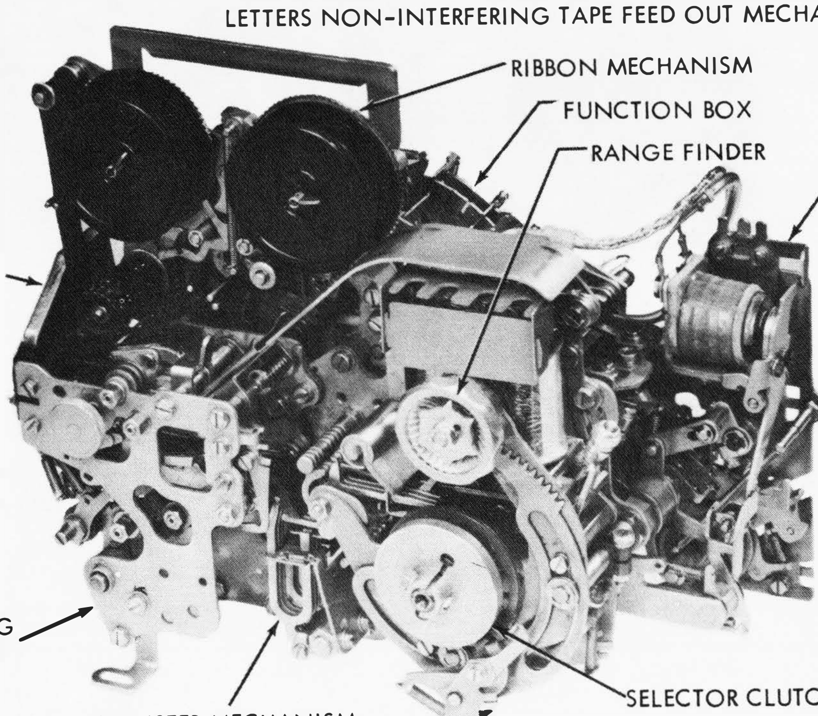


Figure 1-36. Model 28 Typing Reperforator (LPR35BWA)

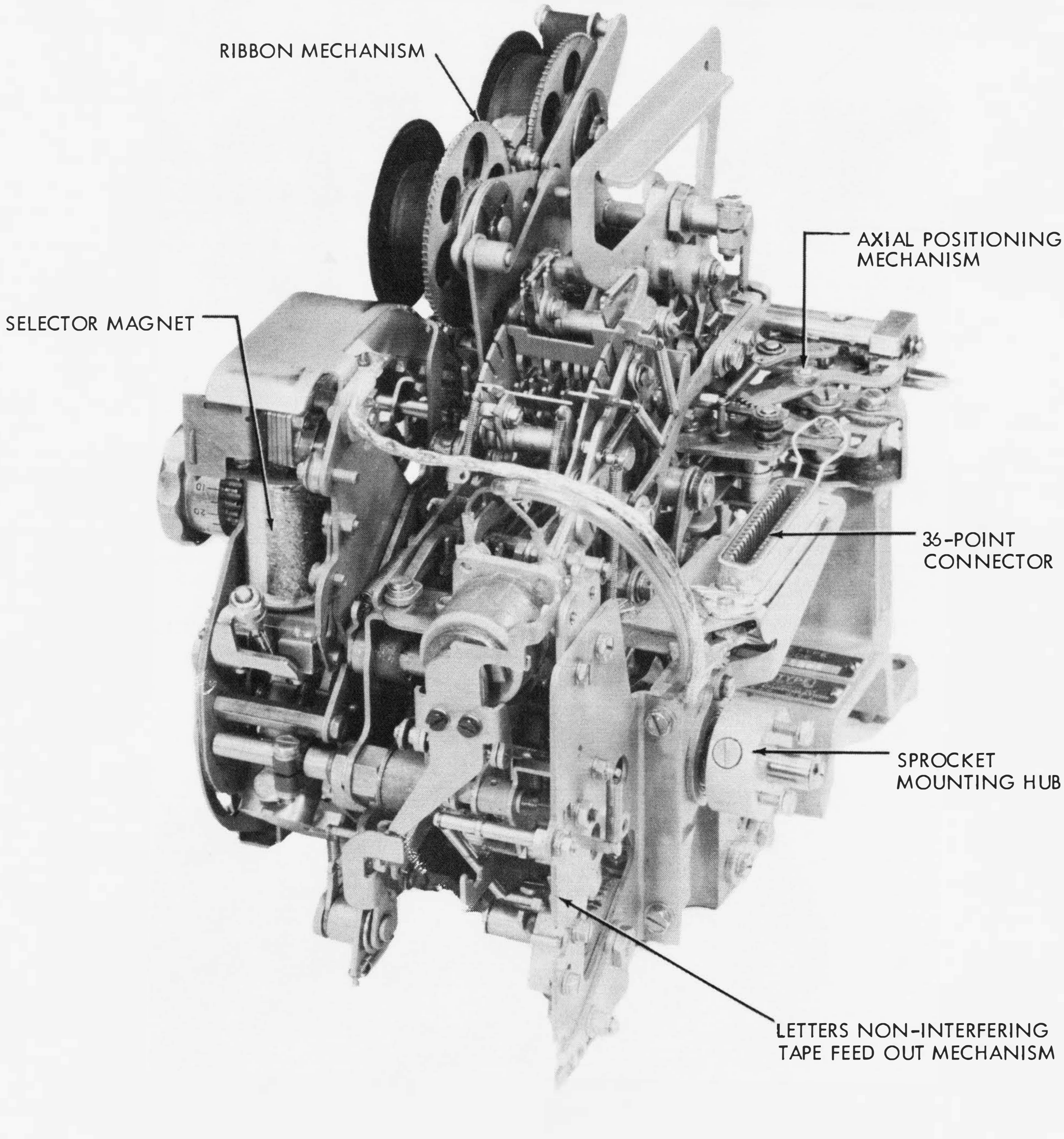


Figure 1-37. Model 28 Typing Reperforator (LPR35BWA) (Rear View)

b. Typing Reperforator (LPR35BWA) (Figures 1-36, 1-37 and 1-38), (LPR35BRP)

(1) Reference Paragraph 1-7.b.(1), (2).

(2) The Remote Control Non-Interfering Tape Feed-Out Mechanism insures that a predetermined length of "letters" tape is perforated at the end of each message. The operator actuates the feeding out of "letters" tape at the end of a message by operating the tape feed out button which closes the circuit and energizes the mechanism start magnet. After feeding out a predetermined, but adjustable, length of "letters" tape, the mechanism stops, re-cycles, and remains inoperative until the operator initiates another feed-out cycle. Should a message be received during any part of the feed-out cycle, the mechanisms stops and does not interfere with or cause loss of any portion of the incoming message. Length of "letters" tape feed-out is adjustable in increments of .600 inches up to a maximum of eighteen inches. The mechanism has a non-repeat latch which allows it to be activated only once. This prevents possible interference with an incoming message and also prevents starting a second feed-out cycle if the start magnet is held energized throughout the feed-out cycle.

(3) The start magnet shall operate on 115 volt A.C. ± 10%, 120 volt D.C. ± 10% with a

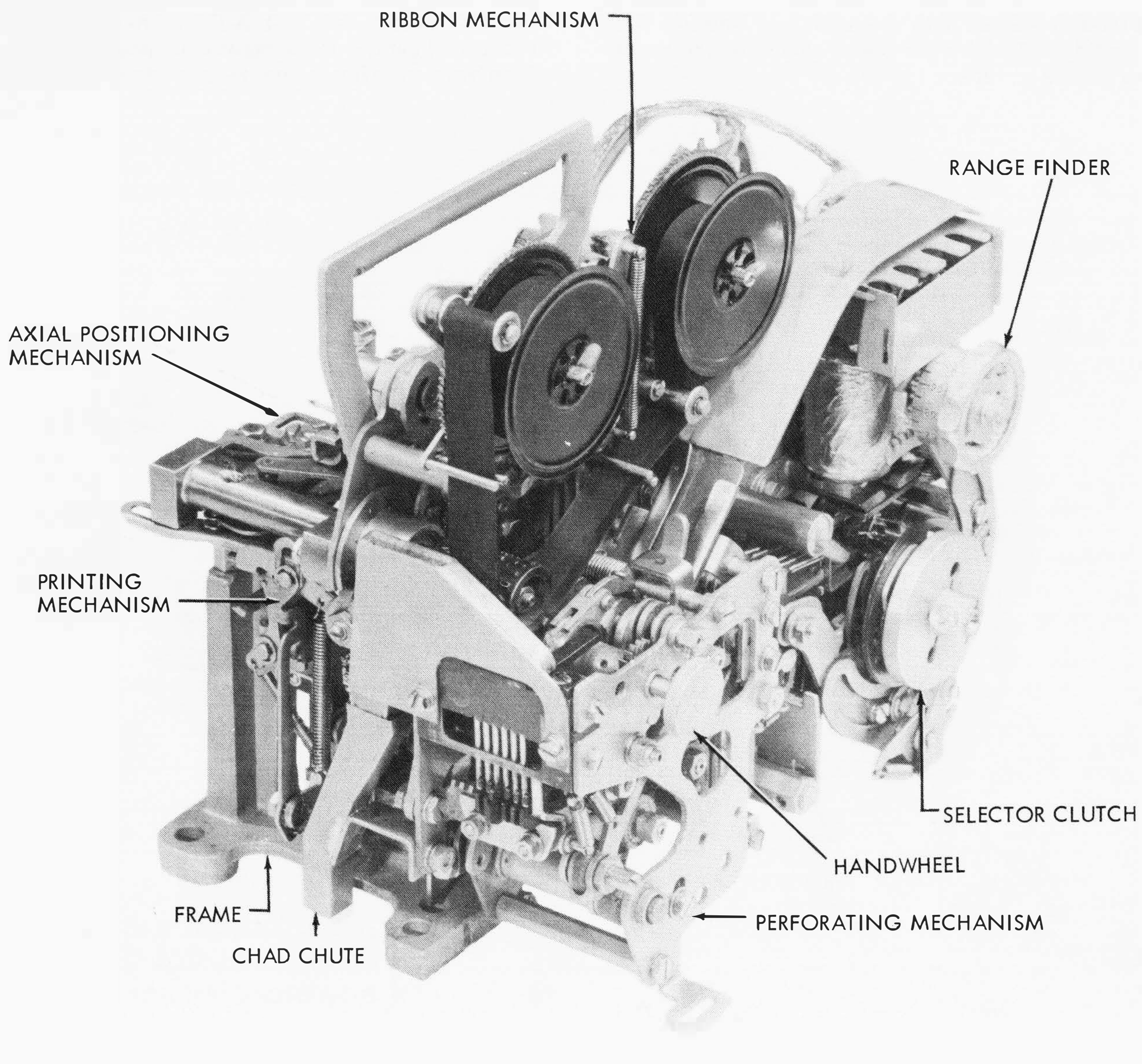


Figure 1-38. Model 28 Typing Reperforator (LPR35BWA) (Left Side View)

1350 ohms series resistance, and 48 volt D.C. ±10% with a 350 ohms series resistance.

c. Model 28 Typing Reperforator Base (LMRB203BZ) (Figure 1-31) (LMRB207BZ).

Reference Paragraph 1-9.c.(1), since the same information applies except that three Typing Reperforators (LPR35BWA or LPR35BRP), and Motor (LMU14 or LMU12) are used with the Receiving Group.

d. The 1/15 hp, 115 volt, 50-60 cycle A.C. Governed Motor (LMU14) (Figure 1-39) which runs at a governed 3600 RPM. A combined governor and fan are mounted on a motor shaft, which is supported on ball bearings.

(1) An electromechanical governor is wired in series with the armature and two field windings. Targets for speed checking are marked on the governor cover.

(2) The entire motor is shielded to minimize radio interference. A shielded compartment on the underside of the motor houses the governor resistor and capacitor, as well as an electrical noise suppressor across the power leads.

e. The Model 28 Universal Cabinet (LBAC 225BR) (Figure 1-40 and 1-41) accommodates two Multiple Reperforator Sets. The control panel mounts six "Urgent" incandescent lamps, six "Abnormal Traffic" amber neon lamps, six "Busy" amber neon lamps and a "Low-Tape" clear neon lamp. The cabinet provides electrical and control facilities consisting of an electronic keyer plate assembly containing six polar to neutral signal line converters, the control plate assembly contains the D.C. power supply for the electronic keyer as well as fuses for the cabinet equipment, 5.5 volt A.C. transformer for the tube heaters and a main A.C. power switch. Two vertically hinged doors at the front and rear

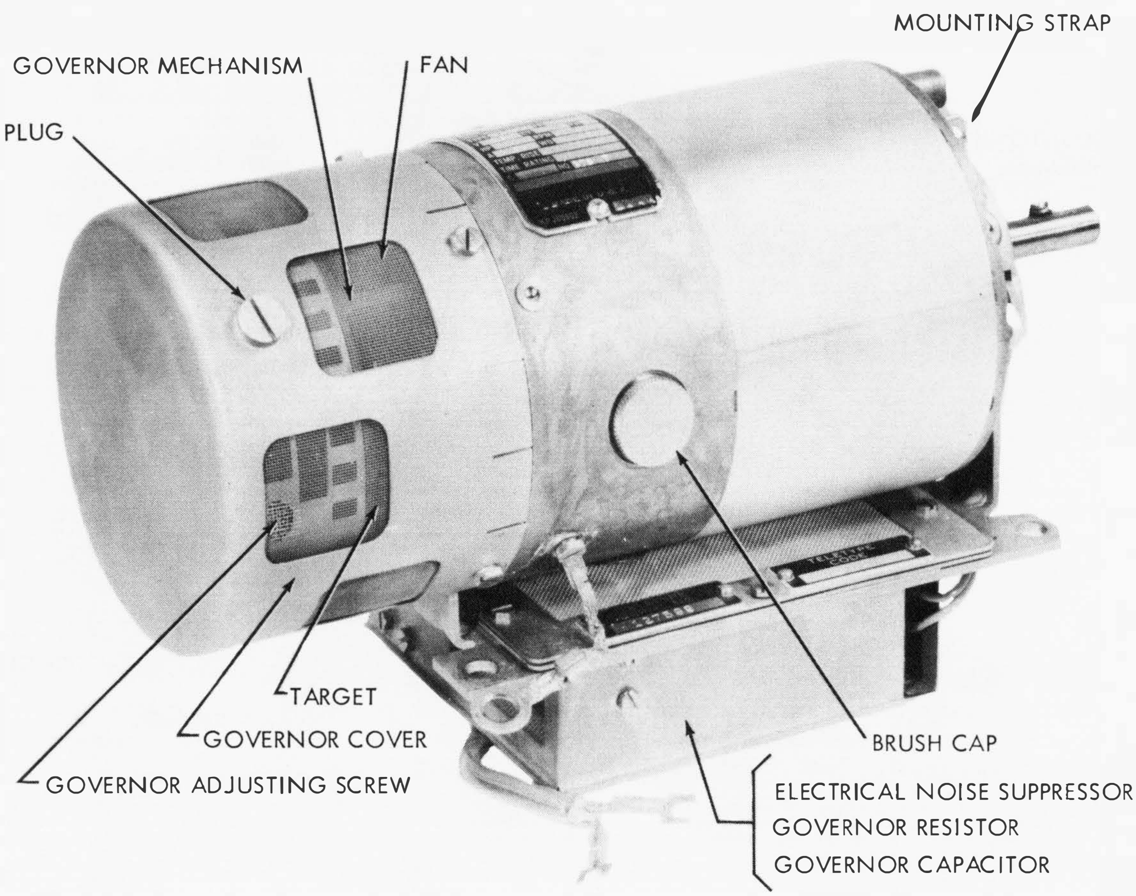


Figure 1-39. Model 28 A.C. Governed Motor

provide accessibility into the cabinet. Magnetic door latches facilitate smooth opening and closing of the cabinet doors. With the cabinet dome open the rack assembly can be raised and locked in position allowing convenient accessibility to the rack from the front of the cabinet. Channel assemblies accept the slides which are part of the two Multiple Typing Reperforator Bases.

(1) The Model 28 Universal Cabinet (LBAC254BR Figures 1-4A and 1-4B) is similar to the Cabinet (LBAC225BR) described in Paragraph 1-10.e. above except it has:

(a) Pull-out drawers with plexiglass windows for viewing reperforator operation instead of front hinged doors.

(b) Six 177010 selector magnet drivers in place of the six vacuum tube keyers. (See Paragraphs 1-7.1. and k. for description of the electronic keyer and the selector magnet driver.)

(2) The Model 28 Universal Cabinet (LBAC260BR Figures 1-4C and 1-4D) is similar to the Cabinet (LBAC225BR) described in Paragraph 1-10.e. above except it has:

(a) Six double tube 309863 selector magnet drivers one for each typing reperforator in place of the six single vacuum tube keyers. Power supplies, control switches and lamps are also provided with the cabinet.

(b) Shielded selector magnet leads and shielded leads for the input signal. The shields of the leads are connected together and grounded to the negative side of the D.C. power supply. The shield and power circuits and the control and signal circuits are run in separate cables as much as it is practicable.

(c) A 115 Volt A.C. plus or minus ten per cent 60 cycle only power input is required. The incoming signal line for each of the reperforators is connected to the appropriate terminal block. (See associated wiring diagram in Volume 3 of this Manual.) In the selector magnet driver the polar input signal (-1 to -6 volts mark, zero volts space) is converted into a 30 milliamperes signal loop for the selector magnets of the reperforators. Refer to Section 4 of this Manual, for a detailed description of the selector magnet driver. The selector magnet driver is a high input impedance device limiting the current drain on the signal line to approximately twelve microamperes per driver. The signal shall be 7.00 unit code at speeds up to 107 words per minute (642 operation per minute).

(d) The control plate assembly mounts on the 19 inch relay rack assembly in the upper rear portion of the cabinet. The control plate assembly contains the D.C. power supply for the selector magnet drivers, 2 filament transformers to provide tube filament current for the selector magnet drivers, 3 fuses for cabinet equipment, and a main A.C. power switch.

(e) The six selector magnet drivers are mounted on two 179551 brackets mounted on the 19 inch relay rack in the upper rear portion of the cabinet.

(f) The control panel contains six "Abnormal Traffic" amber neon lamps, six "Urgent" incandescent lamps, six "Busy" amber neon lamps, a "Low Tape" clear neon lamp, and six "Tape Feed-Out" switches. Power and controls for the lamps are to be supplied by the customer. Power for the tape feed-out circuit is also to be supplied by the customer (120 Volts D.C.).

(g) The tape out lamp is lighted when any of the six tape contacts on the reperforator bases closes.

1-11. DESCRIPTION OF MAJOR COMPONENTS MODEL 28 TRANSMITTER DISTRIBUTOR RE-RUN CART GROUP

a. The basic components of the Group are the Transmitter Distributor (LXD11), Base (LXDB9), Cover (LXDC200BR), Motor (LMU4), Table (LT200BR), Dolly (173861), Drive Parts (173595 Gears for 75.0 Bauds or 173598 Gears for 45.5 Bauds).

b. Transmitter Distributor (LXD11) (Figure 1-19).

(1) Reference Paragraph 1-8.b.(1) to (12).

c. The basic function of the Model 28 Transmitter Distributor Base (LXDB9) (Figure 1-42) shall be to provide mounting facilities (Figure 1-43) for the Transmitter Distributor,

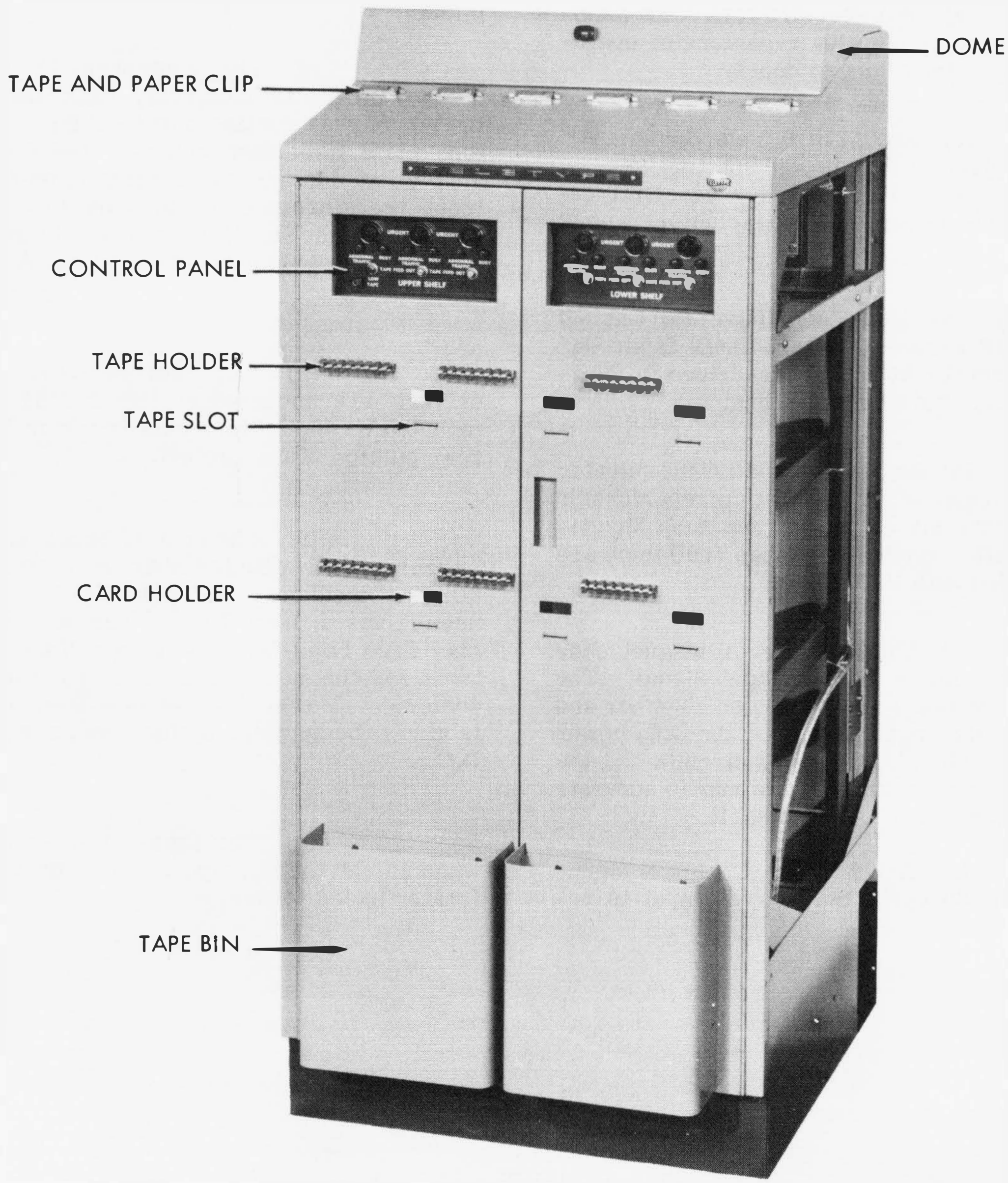


Figure 1-40. Model 28 Universal Cabinet (LBAC225BR)

Motor Unit, Drive Parts, and terminal facilities for signal and control lines.

(1) The base consists of a drip pan, four rubber feet, three mounting studs, three vibration mounts, two plates, an intermediate shaft assembly, two angle bars, a power switch, a connector receptacle, two terminal blocks, three cable assemblies for external connection to motor power, control, and signal facilities. The rubber foot is located under each corner of the drip pan to prevent scratching of any surface on which the unit is placed. Vibration mounts are placed on three studs secured to the drip pan. One plate fits over the two forward vibration mounts and another fits over the rear ones. These plates are secured to the mounting studs. The intermediate shaft assembly is secured on the forward plate. At the outside edges of the plate are attached two angle bars, each bar ap-

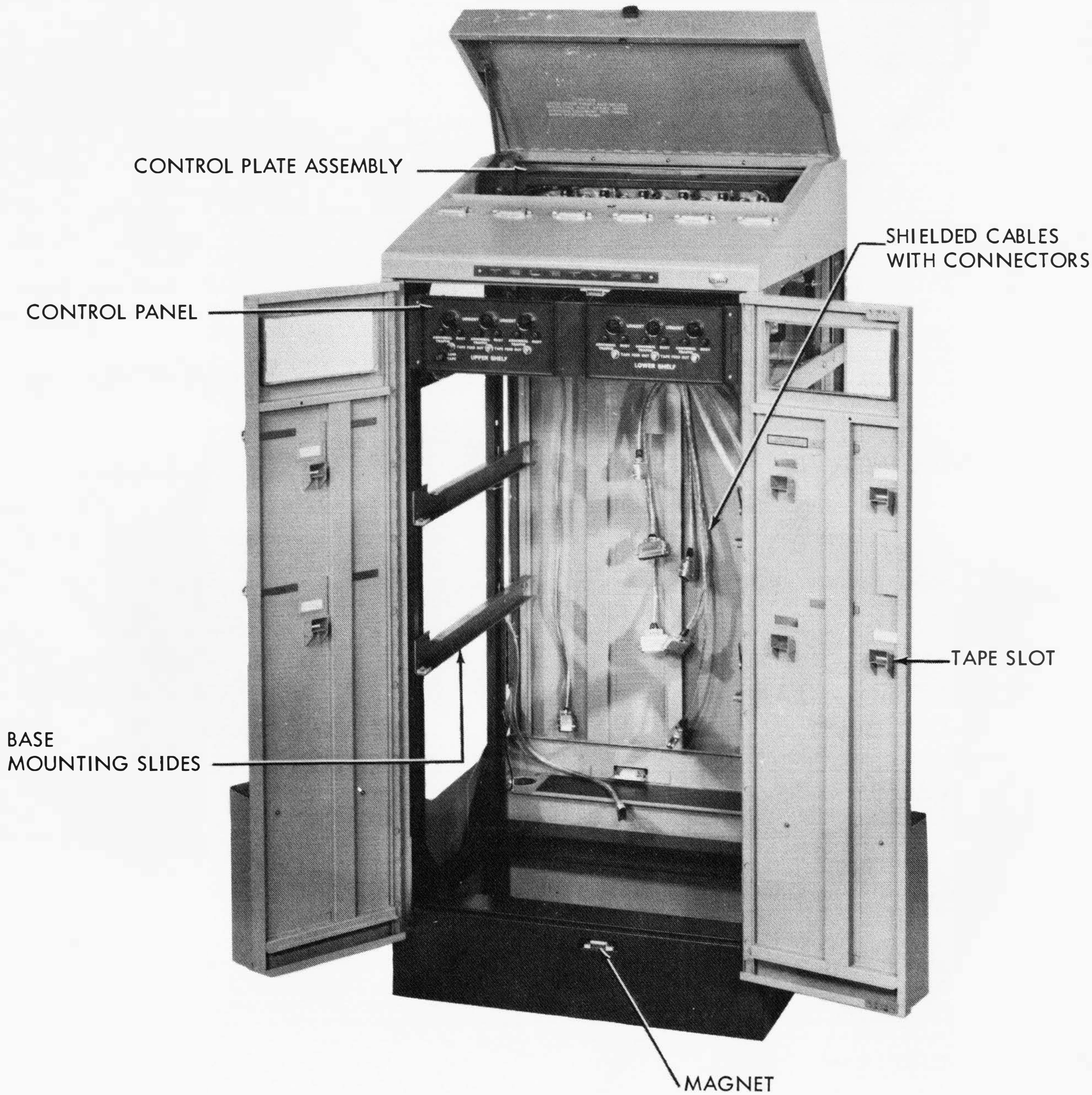


Figure 1-41. Model 28 Universal Cabinet (LBAC225BR) (Front Door and Dome Open)

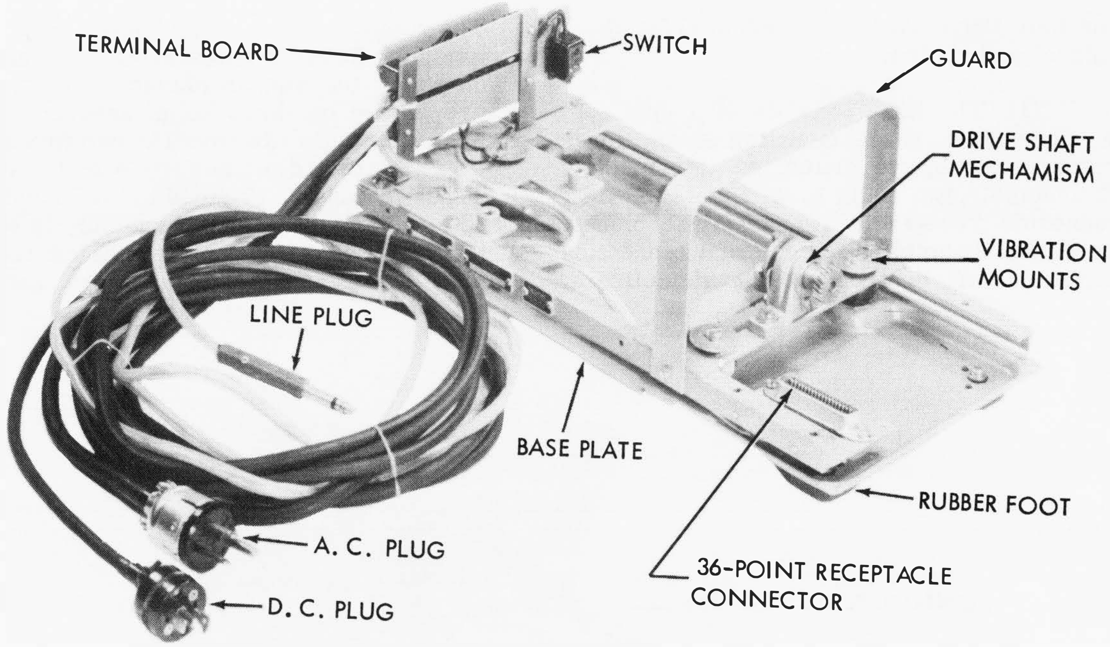


Figure 1-42. Model 28 Transmitter Distributor Base (LXDB9)

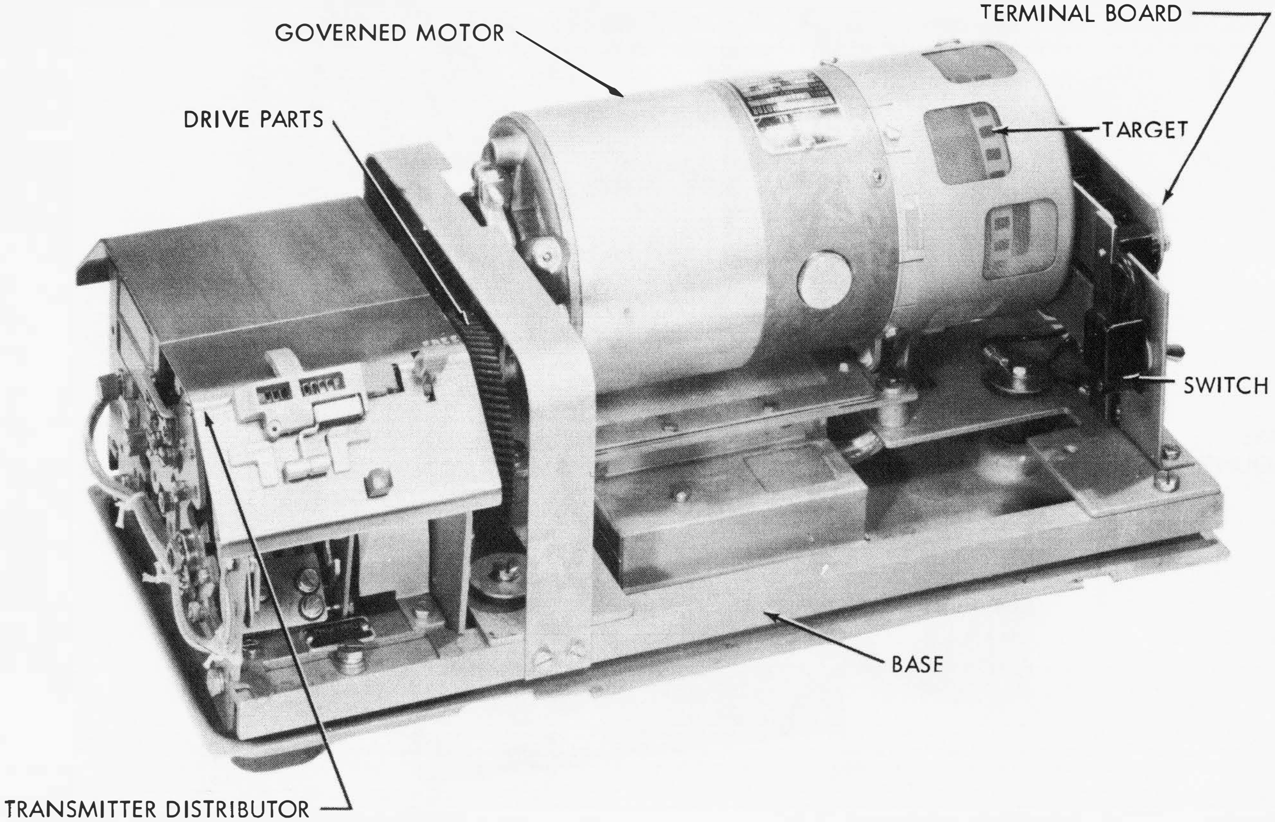


Figure. 1-43. Model 28 Transmitter Distributor Base W/O Cover (LXDB9).
(With Transmitter Distributor (LXD11), Governed Motor (LMU14), and Drive Parts)

proximately the length of the plate. On the rear plate is mounted a switch and two terminal blocks. Secured to the front portion of the left angle bar is a connector bracket. A multi-terminal connector receptacle is mounted on the bracket.

d. The Cover (LXDC200BR) (Figure 1-44) rests in position over the motor and intermediate gear train. An opening in the cover allows access to the motor switch. A front panel snaps into position in front of the transmitter.

e. The Motor (LMU4) (Figure 1-39).

(1) Reference Paragraph 1-10.d.(1), (2), except that this is a 1/20 hp, 115 volt, 50-60 cycle A.C. Governed Motor.

f. Drive Parts

(1) Gears (163595) for 75.0 Bauds.

(2) Gears (173598) for 45.5 Bauds.

g. The Model 28 Table (LT200BR) (Figure 1-45) provides mounting facilities for the Transmitter Distributor Set. It is constructed basically of sheet metal. The top of the table is gray desk-top linoleum cemented to a sound deadened steel subtop. The edges of the linoleum are protected by stainless steel moulding. A 2-1/2 inch cable-entry hole is located at the rear center of the top. A lower compartment accommodates the electrical service unit or other accessories. A nine-point terminal board for external electrical connections is mounted on the rear panel inside the compartment. A door covers the compartment and is held in its closed position by quarter-turn fastners.

h. The Dolly (173861) (Figure 1-46) is a frame of welded rectangular steel tube construction. It mounts a rubber wheeled caster at each of its four corners and has four brackets, one welded diagonally across each corner behind the casters, to support the LT200BR Table. The cabinet recesses down into the frame and rests on brackets. The rear casters on the frame are fixed while those at the front swivel 360 degrees for maneuverability. The frame is approximately 23-3/4 inches wide across the front, 24 inches deep and 5-5/8 inches high. The table when resting in the frame, is raised about 1-1/4 inches off the floor.

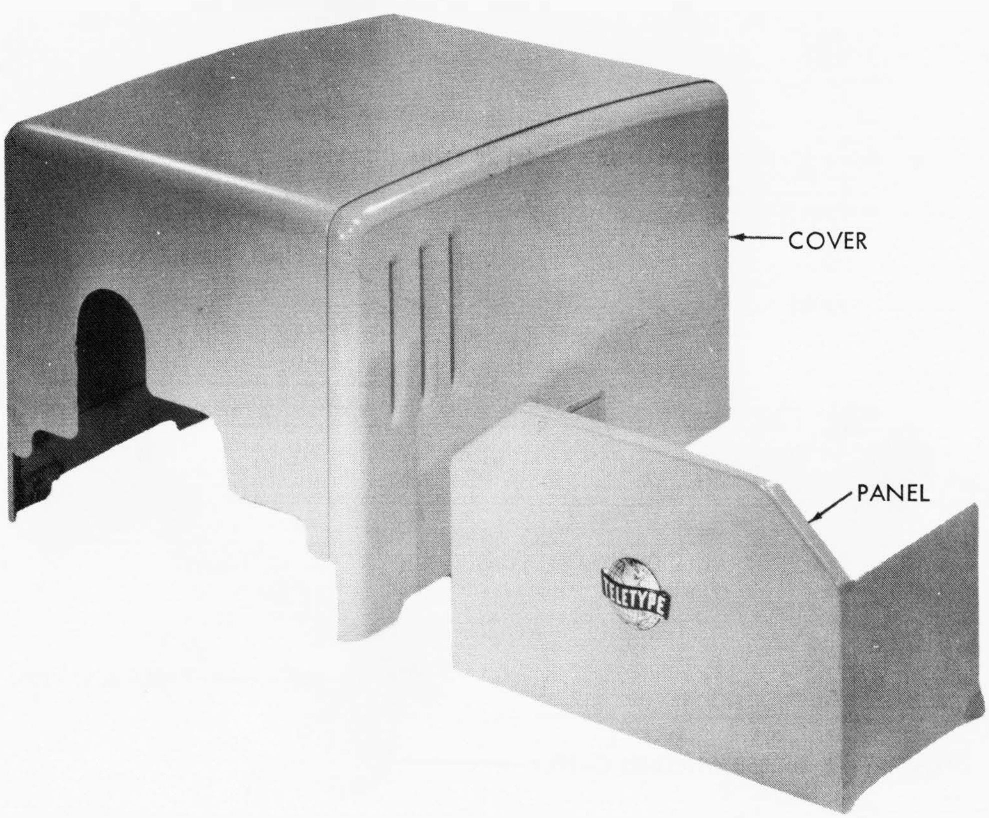


Figure 1-44. Model 28 Transmitter Distributor Set Cover (LXDC200BR)

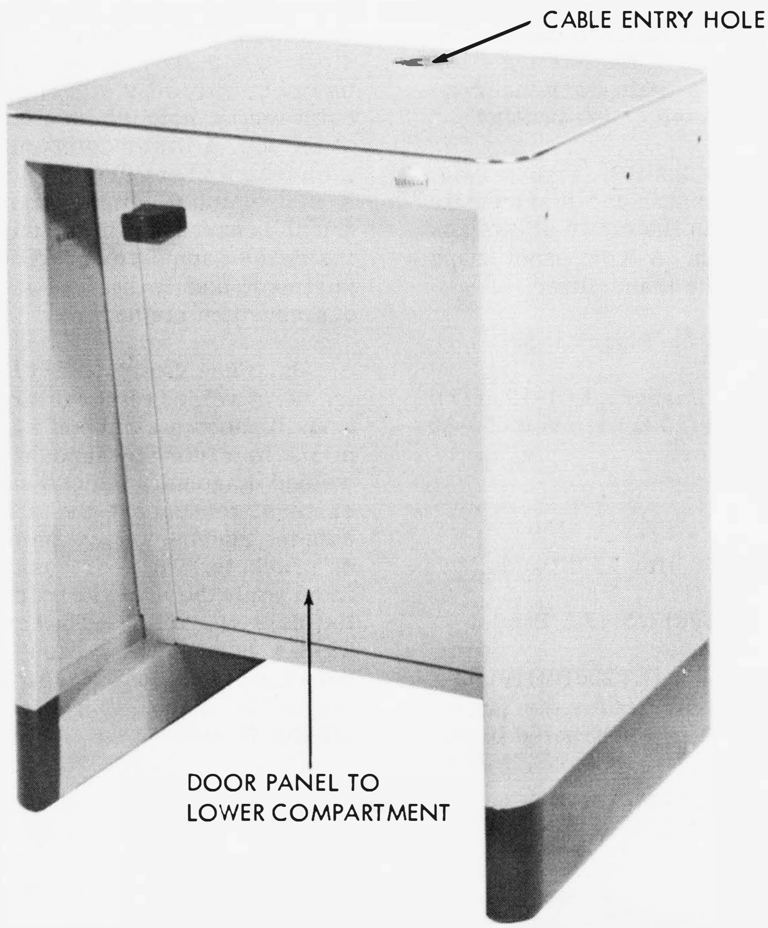


Figure 1-45. Model 28 Table (LT200BR)

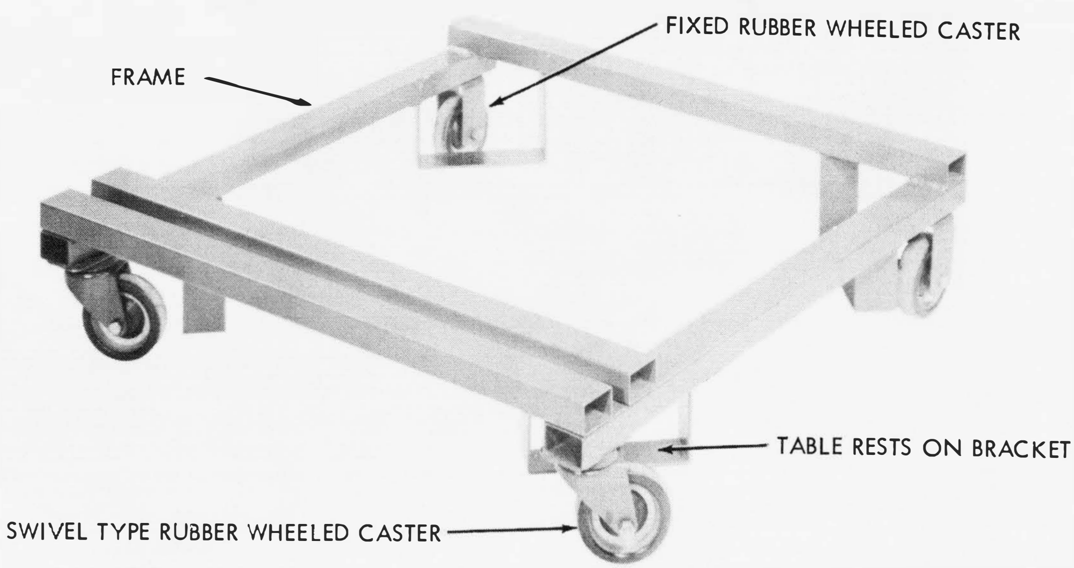


Figure 1-46. The Model 28 Dolly (173861)

SECTION 2

INSTALLATION

2-1. INTRODUCTION

a. The purpose of this section is to provide instructions for the installation of the equipment covered in this manual. The order of presentation of the equipment will be as follows:

(1) Model 28 Reperforator Transmitter Group (Figure 1-1).

(2) Model 28 Transmitter Group (Figure 1-2).

(3) Model 28 Monitor Group (Figure 1-3).

(4) Model 28 Receiving Group (Figure 1-4).

(5) Model 28 Rerun Cart Group (Figure 1-5).

b. The installation procedures in this section require the performance of several operations to install each component of the five groups. It is recommended that the components be installed in the order of presentation in this section.

c. The equipment is packed for maximum protection. However, due caution must be taken in unpacking and handling it to prevent damage and ensure personal safety. All containers are clearly marked as to their contents. In unpacking, observe all caution labels and instructions. All small boxes, bags and loose parts should be kept with their associated apparatus until used in the installation.

2-2. MODEL 28 REPERFORATOR TRANSMITTER GROUP

a. General - The Model 28 Reperforator Transmitter Group consists of the following main component assemblies:

(1) One LBAC222BR Universal Cabinet, or one LBAC238BR Cabinet, or one LBAC253BR Cabinet (Figure 1-15).

(2) Two Reperforator Transmitter Sets (Figure 1-6).

(3) Two Relays (RY34) (Figure 1-1).

The cabinet provides the necessary electrical control, wiring and mounting facilities for operation of the two Reperforator Transmitter (RT) Sets.

(4) Dimensions of the Reperforator Transmitter Set are:

(a) Height - 59-1/4 inches.

(b) Width without side panels - 25-1/2 inches.

(c) Width with side panels installed - 27-1/2 inches.

(d) Depth - 26-1/4 inches.

(e) Clearance needed to open front or rear doors - 12-1/4 inches.

(f) Clearance needed to extend Reperforator Transmitter Set outside the confines of the cabinet for servicing - 20 inches.

b. LBAC222BR OR LBAC238BR OR LBAC253BR CABINET INSTALLATION

(1) There is one cardboard carton and one muslin bag secured to the inner frame of the cabinet. The carton contains the 161731 Cover Plate, 161752 Duct Channel, and 161987 Duct Plate, which attach to the cabinet. The bag contains four 8185 screws and 174456 nut plates for bank installation.

(2) Remove the carton and bag from inside the cabinet, and set the cabinet in place. The cabinet assembly should rest firmly on all four of its metal pads to eliminate rocking motion. If one of the pads does not contact the floor, a shim (not provided) should be placed under the pad.

(3) Remove the four spacers and associated mounting hardware that secured the inner and outer structures during shipment (see Figure 2-1). Also, remove the stud which locks the right side of the pivoted-type rack frame at the top rear of the cabinet. Remove the contents of the carton and install in the following order:

(a) The 161731 cover plate is mounted on the bottom base section of the outer frame structure with the two 115594 speed nuts and 1253 screws.

(b) Where rear access to the cabinet is anticipated, place the six 115594 speed nuts over the appropriate mounting holes in the outer frame and duct channel. Secure the plate and channel to the frame using the 1253 screws.

(c) When the cabinet is to be flush mounted against a wall, place the six 115594 speed nuts over the appropriate mounting holes in the duct channel and duct plate. Working from inside the cabinet secure the duct plate and channel to the frame using the 1253 screws.

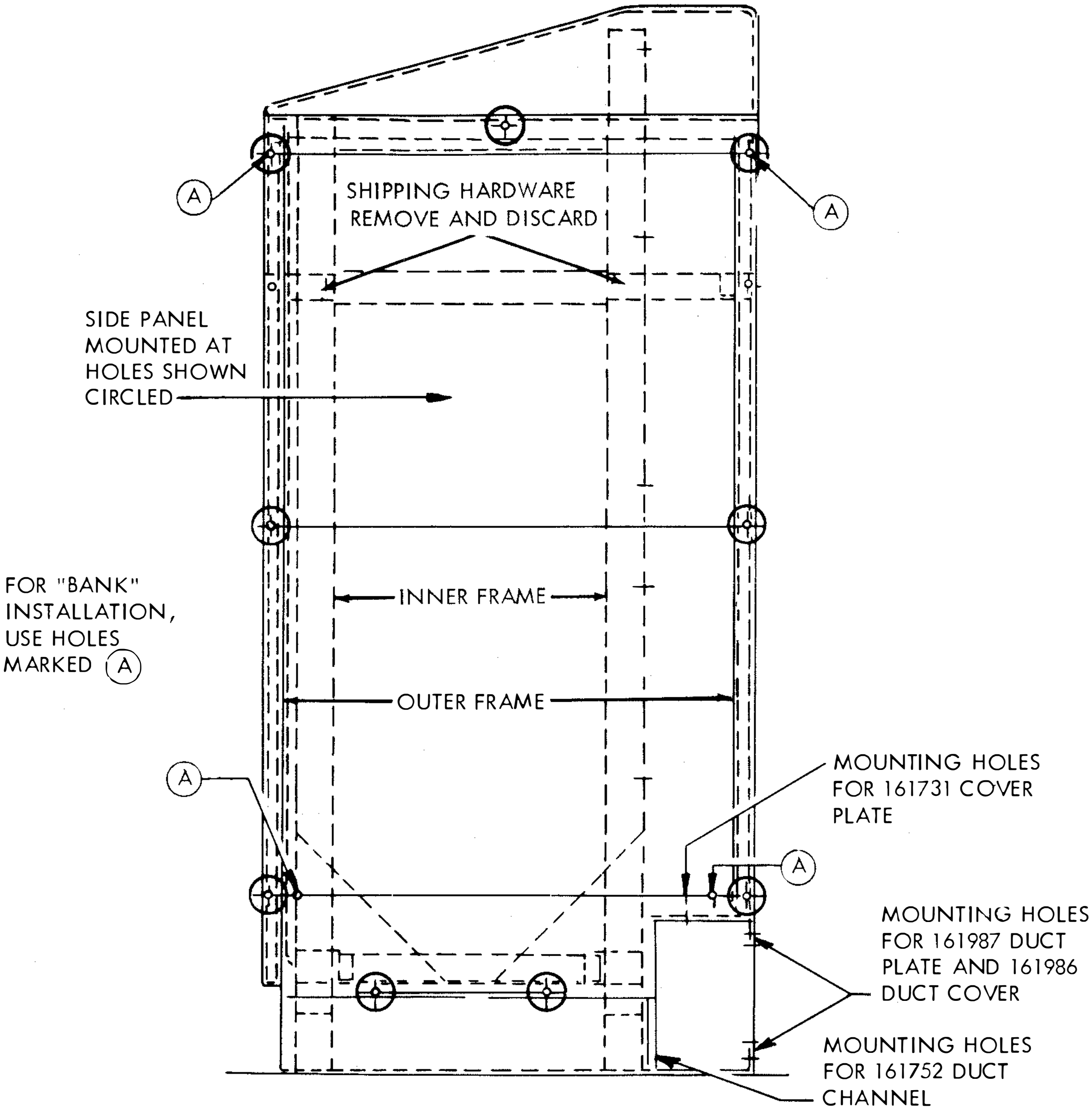


Figure 2-1. Universal Cabinet Installation

This allows a cabinet to be removed from a "bank" without disturbing station cabling.

(d) When installed in "banks," the cabinets are bolted together, through holes provided in the outer structure (see Figure 2-1), by the four 8185 screws and 174456 nut plates contained in the muslin bag tied to the cabinet inner frame.

c. INSTALLATION OF END ENCLOSURES - When cabinets are "bank mounted," end enclosures are used only on the outermost cabinets. Whether mounted in "banks" or singly, installation procedure is as follows:

(1) Remove and discard shipping hardware, and make sure cabinet rests firmly on its metal pads as explained in Paragraph 2-2.b.(2) and (3).

(2) Mount the 161731 cover plate, 161752 duct channel, and 161987 duct plate as outlined in Paragraphs 2-2.b.(3)(a), (b), and (c).

(3) Cabinets to be installed in "banks" should be bolted together using the holes indicated in Figure 2-1 and four 8185 screws and 174456 nut plates.

(4) Secure the 161753 Left-Side Panel and/or the 161754 Right-Side Panel to the cabinet (use the holes indicated in Figure 2-1) with the 2449 lock washers, 92146 nuts and 103081 screws as required.

(5) Secure the 161986 duct cover (or covers) to the cabinet using 1253 screws and 115594 speed nuts as required. See Figure 2-1.

d. REPERFORATOR TRANSMITTER (RT) SET INSTALLATION (Figure 1-6).

(1) GENERAL - The Reperforator Transmitter Set (RT) consists of an LAXD7 or LAXD8 Pivoted Head Transmitter Distributor, LPR34BWA or LPR34BRP Typing Reperforator, LMU11 Motor Unit, LRXB17 or LRXB27 Base, and LTHS205BZ Tape Handling Stand. Each of the above units is packed in a separate container.

(2) INSTALLATION - Inspect each carton for identification of contents. Carefully remove the contents and install in the following order.

(a) MOTOR UNIT

1. Remove the 158710 pinion from the bag attached to the base. Install the pinion on the motor shaft (with tooth end toward the motor) using the screw and lock washer on the motor shaft.

2. Place the base on end (the end with the single tape roller). Remove four each of 106047 screw (1/4-32 x 1/2 Hex.), 2449 lock washer and 76081 washer from the bag attached to the base. Remove the oil shield from the base. Mount the motor unit (friction tight for later adjustment) on the underside of the base.

3. Make the IDLER GEAR MOTOR PINION MESH adjustment according to instructions given in Section 5, Adjustments and Lubrication.

4. Reinstall the oil shield and center it between the motor shaft and the tape winder drive belt and pulley according to the OIL SHIELD adjustment given in Section 5.

5. Connect the motor leads to terminals 1 and 2 of the motor terminal board.

(b) TYPING REPERFORATOR POSITIONING (Figures 1-7 and 1-8).

1. Turn both of the 150952 eccentrics (one is for the reperforator and the other is for the transmitter) on the base so that the high part is toward the rear of the base; do not tighten their mounting screws.

2. Remove the following parts from the bag attached to the base: One each of 151631 screw, 2191 lock washer, 125015 washer; two each of 1163 screw, 110743 lock washer; three each of 74805 screw, 2669 lock washer, 3438 washer.

CAUTION

Loosen the 151630 screw that secures the 156184 mounting bracket to the reperforator unit.

3. Before placing the reperforator on the base, thread the cable (with connector) through the hole in the base (just to the left of the 158743 Mounting Plate for the connectors) keeping the cable toward the rear edge of the slot so as to be behind the part of the reperforator which projects at that point.

4. Start the three 74805 screws, with the 2669 lock washers and 3438 washers, through the frame mounting holes into the tapped holes in the base; do not tighten. If necessary, bend the upper extension of the tape chute (on the base) to clear the reperforator. Start the 151631 screw, with the 2191 lock washer and 125015 washer, through the 156184 mounting bracket into the proper tapped hole in the base; do not tighten. Hold the reperforator against its two 159233 locating studs and tighten the three 74805 screws. Hold the mounting bracket so that it rests squarely against the reperforator and base and tighten the screw that secures the mounting bracket to the base. Tighten the screw that secures the mounting bracket to the reperforator. Check gear play.

5. Position the eccentric so that it bears against the reperforator and tighten its mounting screw. The eccentric is for locating purposes when the unit is reinstalled.

6. Remove shield from connector and insert the connector through the rear slot of the connector mounting plate.

CAUTION

Match the Figure 1 designation on the shield with terminal 1 on the connector and secure both to the plate using the two 1163 screws and 110743 lock washers.

7. Mount the 170807 chad chute to the base using the two 151685 screws, 110743 lock washers, and 151880 nuts. The chad chute and mounting hardware are found in a bag tied to the base.

(c) TRANSMITTER DISTRIBUTOR POSITIONING (Figures 1-9 and 1-10).

1. Remove the following parts from the bag attached to the base; three each of 86850 screw, 2669 lock washer, 117535 washer.

2. Remove the transmitter gear cover from the base. Before placing the transmitter distributor on the base, loosen the locknut on the height adjusting bushings to approximate center of their adjustment; do not tighten lock nuts.

3. Insert the three 86850 screws, with the 2669 lock washers and 117535 washers attached, into the bushings. Thread the cable (with connector) through the hole in the base. Place the transmitter distributor on the base and secure friction tight for later adjustment.

(d) ADJUSTMENTS - The following adjustments must be performed at time of installation. For specific adjustment instructions, refer to the proper adjustment in Section 5 of this manual - Adjustment and Lubrication. Perform adjustments in the following order:

1. VERTICAL ALIGHMENT OF PIVOTED SENSING HEAD AND PUNCH.

2. TRANSMITTER DRIVING AND DISTRIBUTOR SHAFT DRIVEN GEAR MESH.

3. HORIZONTAL ALIGNMENT OF PIVOTED SENSING HEAD AND PUNCH.

4. LAST CHARACTER CONTACT SWITCH.

5. TAPE GUIDE BRACKET.

6. REAR TAPE GUIDE ROLLER.

7. CODE HOLE - SENSING PIN ALIGNMENT - FINAL CHECK.

(e) TRANSMITTER DISTRIBUTOR CONNECTOR AND CABLE CLAMP INSTALLATION (Figure 2-2).

1. Remove the following parts from one of the bags attached to the base: two each of 1163 screw, 110743 lock washer.

2. Remove shield from connector and insert the connector through the front slot of the connector mounting plate.

CAUTION

Match the Figure 1 designation on the shield with terminal 1 on the connector and secure both to the plate using the two 1163 screws and 110743 lock washers.

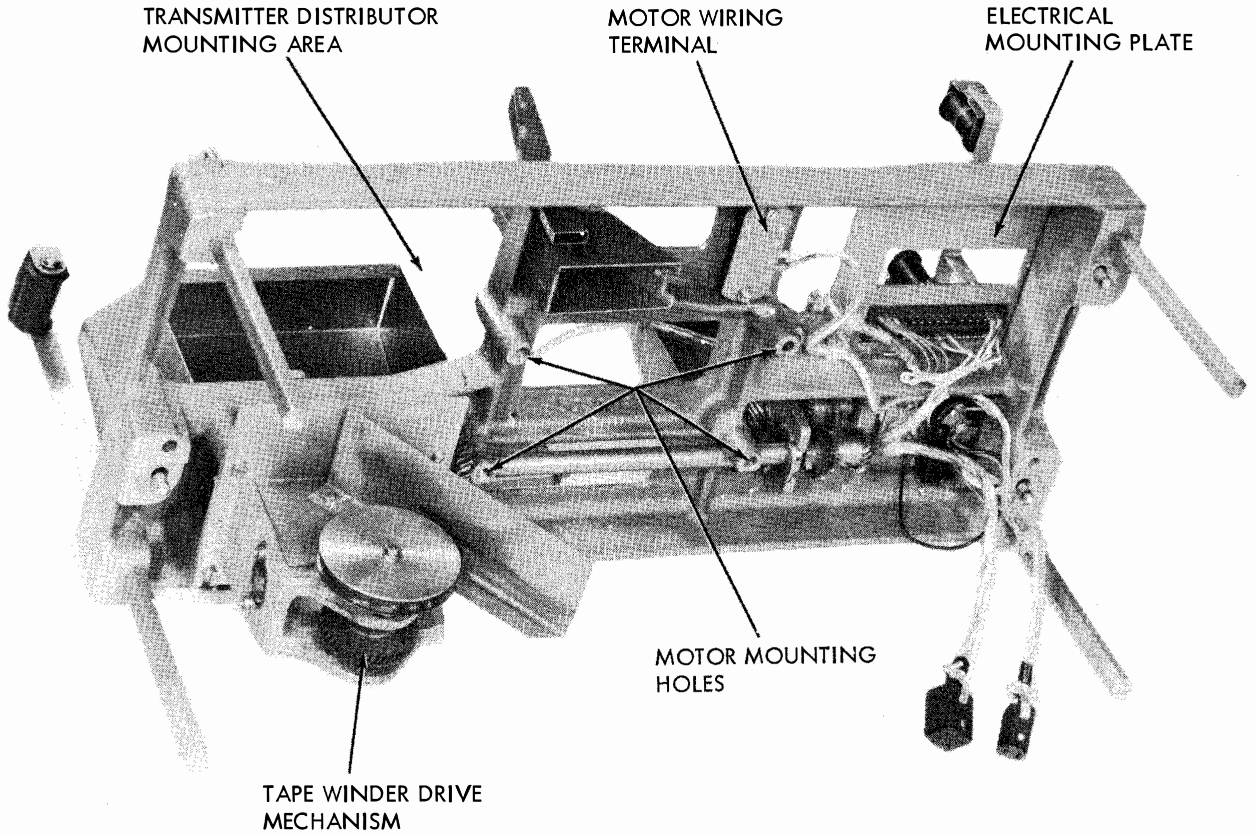


Figure 2-2. Base (LRXB17) (Bottom View)

3. Remove the following parts from one of the bags attached to the base (the cable clamps are self-identified by size): One 121242 Cable Clamp (1/8), one 121245 Cable Clamp (5/16), two 121247 Cable Clamps (7/16), two 151630 screws, three 2191 lock washers, three 7002 washers, one 3606 nut.

4. Route cables and install cable clamps as shown in Figures 2-2 and 2-3. Existing mounting screws are used in some cases.

(f) INSTALLING ASSEMBLED (RT) UNIT AND TAPE STORAGE BIN (Figure 4-4 and 4-31).

1. Lower the reperforator transmitter (RT) unit onto the tape handling stand, utilizing the four base legs as guides within the angular vertical members of the tape handling stand frame, and locating the base casting on the two locating studs mounted on the tape handling stand frame.

2. Tighten the three captive base mounting screws.

3. There should be a clearance of 1/8" to 1/4" between the tape guard and the tape chute as gauged by eye. To adjust, position the tape guard with its mounting screws loosened. (See TAPE GUARD adjustment Section 5).

4. Unhook the tape supply arm and tape winder drive belt from the bracket and install the belt over the tape winder drive pulley located on the base.

5. Snap the tape storage bin in place on the tape handling stand by means of

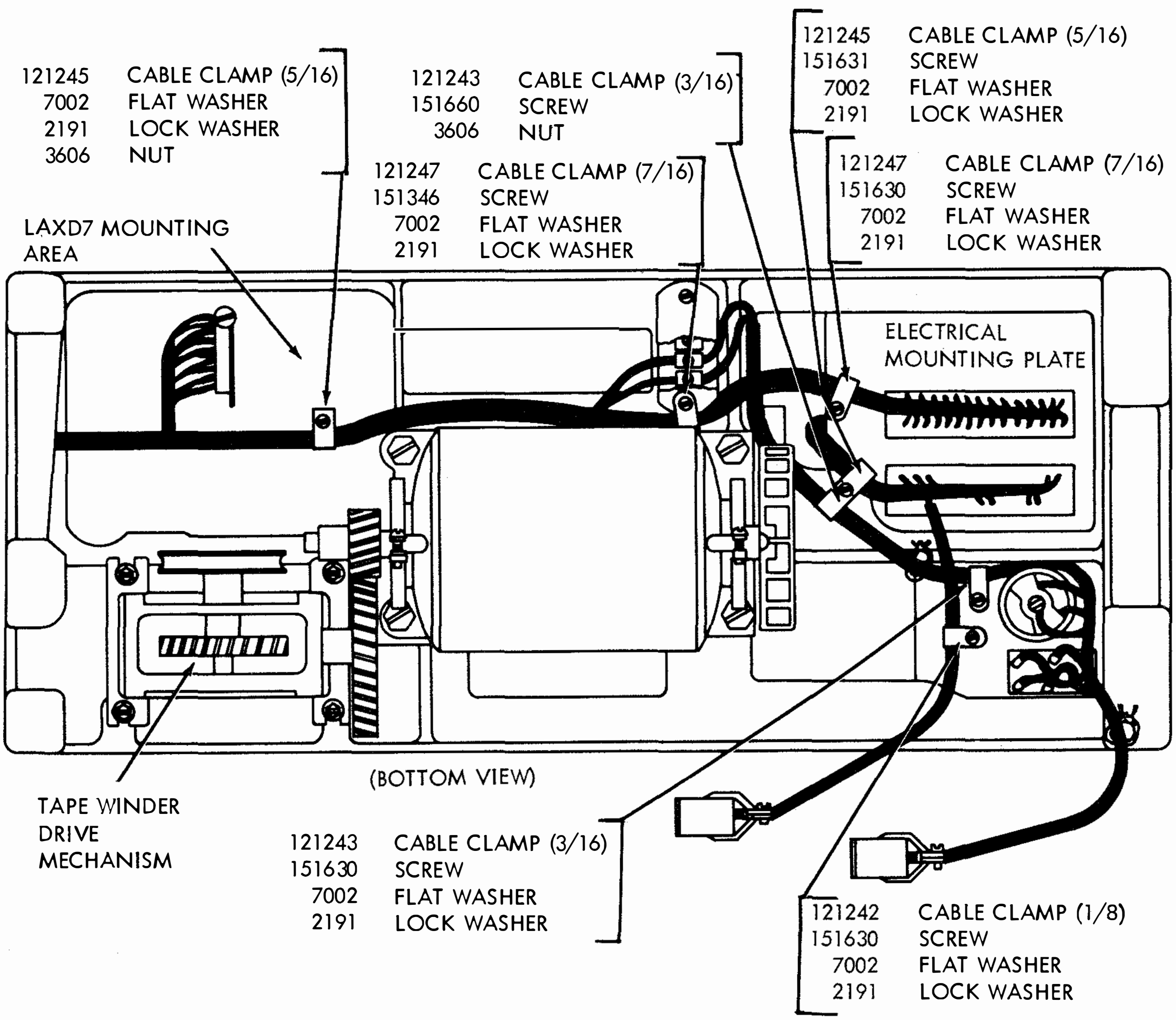


Figure 2-3. Base (LRXB17) (Cable Routing)

two detent springs on the stand. The motor on the bin should be up and toward the inside of the stand. Hook the safety chain on the bin to the stand (in hole provided).

6. Plug in all connectors. Remove any lacing which prevents coupling of connectors.

7. Secure all cords and cables where necessary to keep them away from moving parts and to reduce possibility of leads breaking off.

CAUTION

Shut motor off when changing operating speed on sets equipped with variable speed drive.

(g) TAPE ROUTING - For tape routing information refer to Section 3, Paragraph 3-2.d.(1)(a).

(3) INSTALLING REPERFORATOR TRANSMITTER SETS INTO CABINET (Figure 1-16).

CAUTION

When installing reperforator transmitter sets in the cabinet or when servicing the sets, both sets must not extend out of the cabinet simultaneously.

(a) Install each set in the cabinet as follows:

1. Pull out either the left or right tray in the cabinet after first depressing its latch lever.

2. Place the set on the tray so that the transmitter is toward the front of the cabinet.

(b) If the cabinet is so located that its rear doors may be opened, the cable connectors may be plugged in after the sets are in the cabinet. However, if the rear doors cannot be opened, the connectors should be plugged in before each of the sets is pushed into cabinet.

e. ELECTRICAL CONNECTIONS LBAC253BR CABINET

(1) GENERAL - Refer to associated wiring diagram in Volume 3, of this Manual which shows the positions, within the cabinet of the terminal boards discussed in this paragraph. Terminal boards TD and TE are accessible through the open hinged top cover from the front of the cabinet. Terminal boards M and P are in the lower rear of the cabinet. (RT is an abbreviation for Reperforator Transmitter.)

(2) AC Power Input - The AC power line should be connected to the M terminal board as follows:

(a) Terminal number 1 - ground side of power line.

(b) Terminal number 2 - live side of the power line.

(c) Terminal number 3 - office ground.

(3) Signal Ground - signal ground line shall be connected to the P terminal board.

(4) 48 Volts DC - The 48 volt DC power line shall be connected to the TD terminal board as follows:

(a) The plus side to terminal number 15.

(b) The negative side to terminal number 16.

(5) Receiving Signal Lines - The polar receiving lines shall be connected as follows:

(a) For the left RT use terminal board TD with:

1. The line connections plus or minus lead to terminal number 1.

2. The ground return lead to terminal number 2.

(b) For the right RT use terminal board TE with:

1. The line connection plus or minus lead to terminal number 1.

2. The ground return lead to terminal number 2.

(6) Sending Signal Lines - The sending signal lines shall be connected, based on the following cabinet connections:

(a) For the left RT, on terminal board TD.

1. Mark side (M) of line relay goes to terminal number 3.

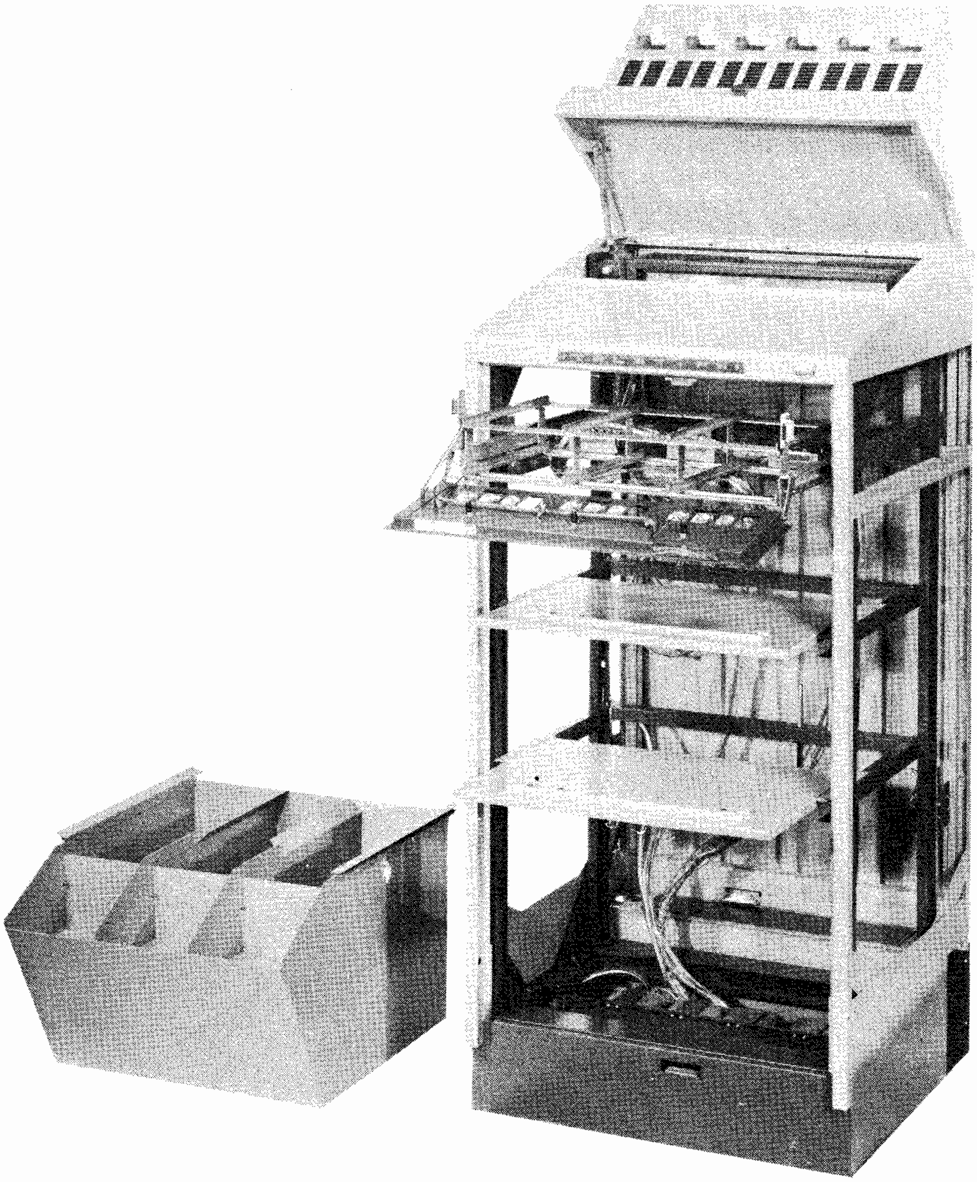


Figure 2-4. Model 28 Universal Cabinet (LBAC223BR) (Without Numbering Module)

2. Swinger (T) of line relay goes to terminal number 4.

3. Spacing side (S) of line relay goes to terminal number 5.

(b) For the right RT, on terminal board TE.

1. Mark side (M) of the line relay goes to terminal number 3.

2. Armature (T) of line relay goes to terminal number 4.

3. Spacing side (S) of line relay goes to terminal number 5.

(c) Shield connections for signal lines can be made to the terminals 13 and 14 of the TD terminal board.

(7) Sync Pulse Input - The synchronizing pulse input lines shall be connected as follows:

(a) For the left RT, connect terminals 6 and 7 of TD terminal board.

(b) For the right RT, connect to terminals 6 and 7 of the TE terminal board.

(c) Adjust the current values of the sync pulse by setting the rheostat R1 for the left RT and R11 for the right RT. The sync pulse current value shall be 0.020 amperes minimum to 0.050 amperes maximum.

(8) Read Back Connections - Contacts of the read back relay are brought out as follows:

(a) For the left RT, on terminal board TD.

1. Normally open - terminal number 8.

2. Common - terminal number 9.

3. Normally closed - terminal number 10.

(b) For the right RT, on terminal board TE.

1. Normally open - terminal number 8.

2. Common - terminal number 9.

3. Normally closed - terminal number 10.

(9) Alarm Relay Connections - Contacts of the alarm relays are brought out as follows:

(a) For the left RT, terminals number 11 and 12 of terminal board TD.

(b) For the right RT, terminals number 11 and 12 of terminal board TE.

(10) On the LRXB base of the RT set, check the position of the connector shells relative to the insert. The "1" stamped on the end of the shell should be diametrically opposed to the "1" marked on the connector insert. To correct, remove the screws that secure the connector inserts and shells to the base and perform the necessary reversal.

(11) Connect the cabinet cables to the RT sets with:

(a) A, BC and BD cables going to the right set.

(12) Line Relays - Mount the two line relays (RY34) into the two sockets on the SMD and LR Panel Assembly.

2-3. MODEL 28 TRANSMITTING GROUP

a. GENERAL - The Model 28 Transmitting Group consists of the following main component assemblies:

(1) One LBAC223BR Universal Cabinet (Figure 2-4) or one LBAC256 Cabinet (Figure 1-2A).

(2) One Multiple Transmitter Distributor Set (Figure 1-17) equipped with three LXD11 Transmitter Distributors or three LXD31 Transmitter Distributors.

(3) One Multiple Transmitter Distributor Set (Figure 1-18) equipped with three LBXD16 Transmitter Distributors.

The cabinet provides the necessary electrical control, wiring, and mounting facilities for operation of the two Multiple Transmitter Distributor Sets.

b. LBAC223BR OR LBAC256BR CABINET INSTALLATION

(1) There are two cardboard cartons and one bag secured to the inner frame of the cabinet. One carton contains the 161731 cover plate, 161752 duct channel, and 161987 duct plate which attach to the cabinet. One carton contains the 173478 and 173479 Modification

Kits which provide a tape grid and tape container for the cabinet. The bag contains mounting hardware for "bank" installation.

(2) Remove the cartons and bag from inside the cabinet, and set the cabinet in place, according to instructions given in Paragraph 2-2.b.(2).

(3) Remove the four spacers and associated mounting hardware that secured the inner and outer structures during shipment (see Figure 2-1). Also, remove the stud which locks the right side of the pivoted - type rack frame at the top rear of the cabinet. Inspect the previously removed cartons for identification of contents. Remove and install contents in the following order.

(a) COVER PLATE AND DUCT PARTS (Figure 2-4). See Paragraph 2-2.b.(3) (a), (b), and (c).

(b) END ENCLOSURES - See Paragraph 2-2.c.

(c) MODIFICATION KITS 173478 and 173479 (Refer to Figure 2-5).

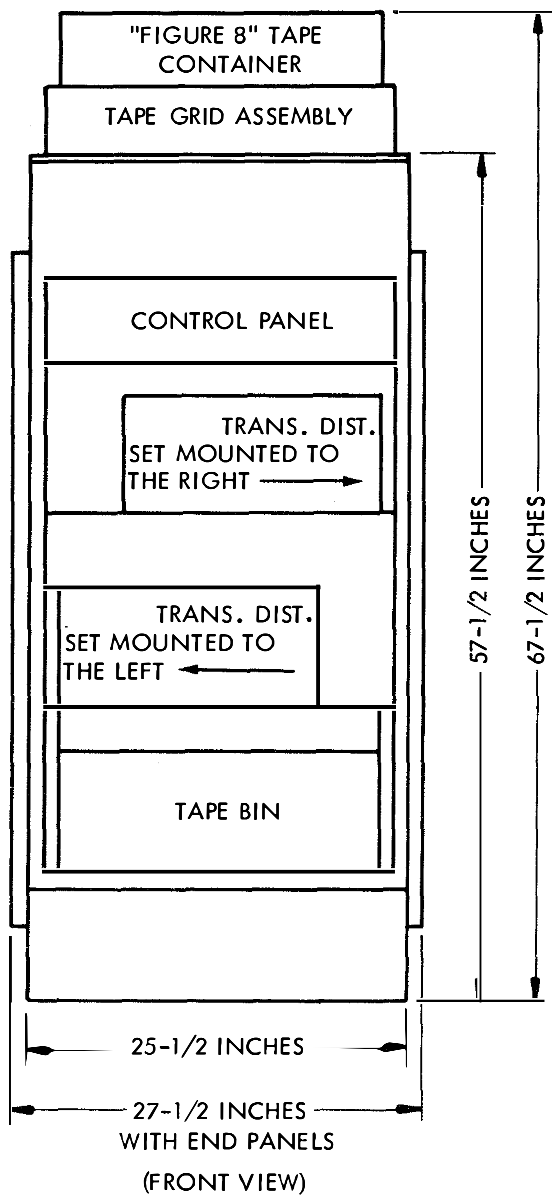


Figure 2-4A. Transmitter Group Installation (With Sliding Shelves)

1. Mount the 173423 and 173439 Tape Grid Assembly and Railing, respectively, to the dome of the cabinet with the seven 151631 screws, 2191 lock washers, and 3598 nuts.

2. On top of the 173423 Tape Grid Assembly mount the 173437 Tape Container using the two 151631 screws, 7002 flat washers, 2191 lock washers, and 3598 nuts.

(d) For "bank" installation, see Paragraph 2-2.b.(3)(d).

(e) The sliding shelves (on applicable transmitter group) for mounting the multiple transmitter distributor bases are not fastened in place and are not interchangeable. The sliding shelf for the upper base mounts the base to the right whereas the shelf for the lower base mounts the base to the left. See Figures 2-4A and 2-4B.

(f) Signal line connections for the transmitter group are to be made as shown in the associated wiring diagrams in Volume 3, of this Manual.

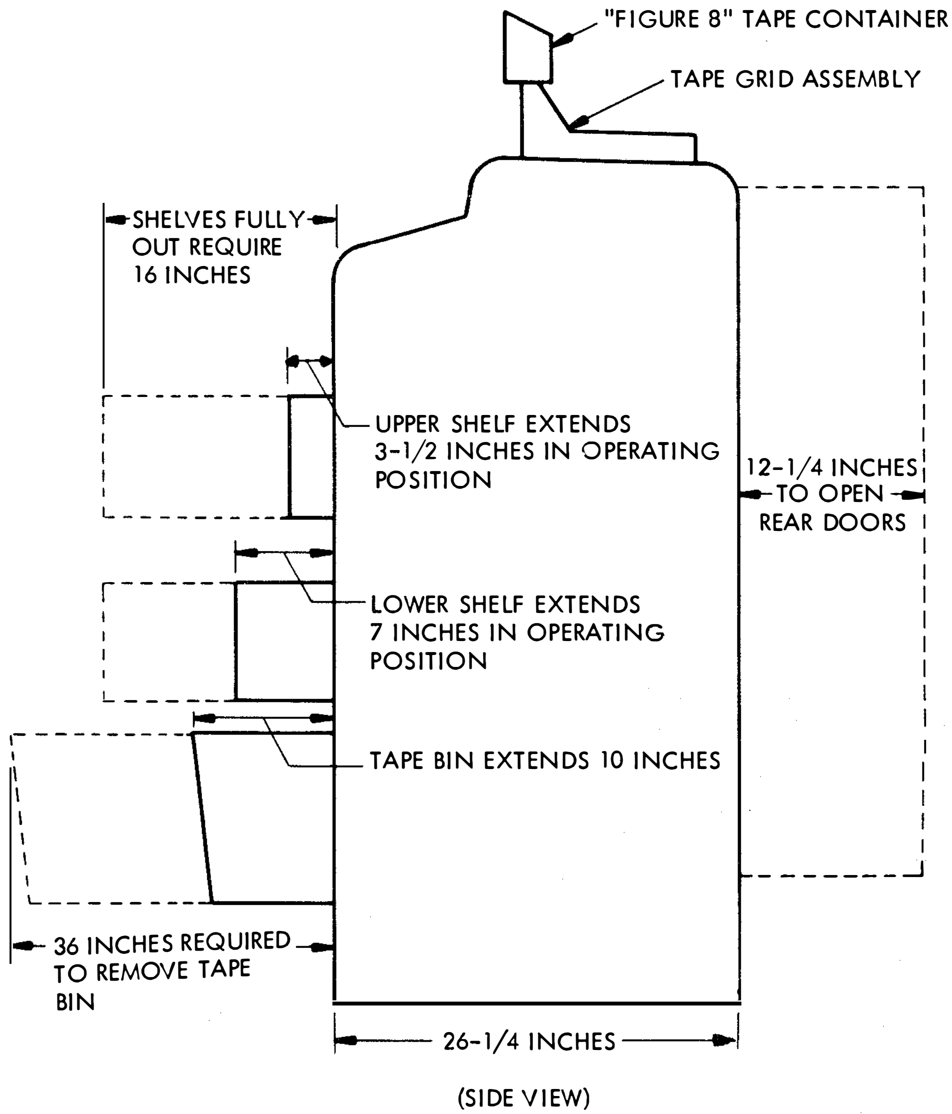


Figure 2-4B. Transmitter Group Installation (With Sliding Shelves)

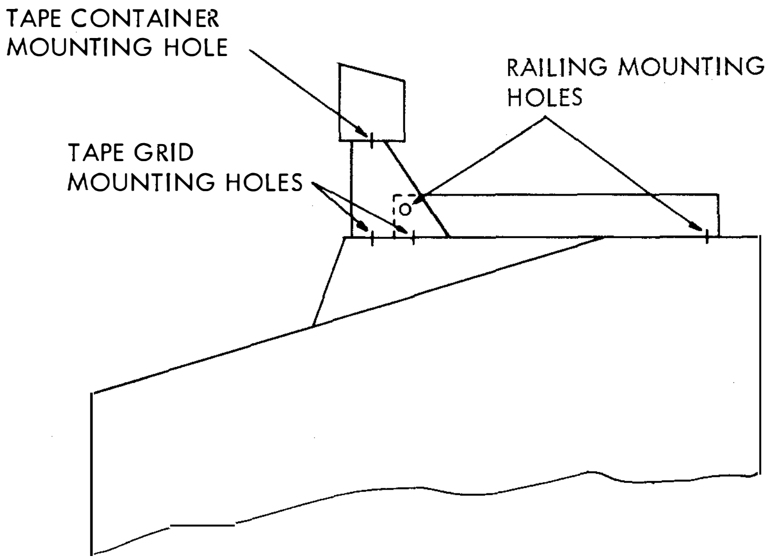


Figure 2-5. Tape Grid and Tape Container

c. MULTIPLE TRANSMITTER DISTRIBUTOR (LXD11) SET INSTALLATION (Figure 1-17).

(1) This Multiple Transmitter Distributor consists of an LMXB206 Base, LMU3 Motor Unit, three LXD11 Transmitter Distributors, 173595 (75.0 Baud) Drive Parts, and 173598 (45.5 Baud) Drive Parts. The LMXB206 Base (Figure 1-20) is shipped in one cardboard carton which contains cover assembly and the base. The drive parts are packed in bags and tied to the base. The LMU3 Motor Unit (Figure 1-12) and each LXD11 Transmitter Distributor (Figure 1-19) come packed in separate cartons.

(2) Inspect each carton for identification of contents. Carefully remove the contents and install in the following order (refer to Figure 1-20).

(a) MOTOR UNIT - Mount the motor unit on the brackets provided on the base, with the shaft of the motor extending to the left. Align the mounting holes - re-position one motor mounting bracket if necessary - secure the motor using four screws and lock washers contained in the muslin bag tied to the base. Connect the two black motor leads to the terminal block per applicable wiring diagram.

(b) BELT TENSION

1. Loosen the mounting screws to friction tight on the intermediate shaft mounting bracket. Place the timing belt, found in muslin bag, over the sprocket on the intermediate shaft, then slide it over the sprocket on the counter shaft engaging the teeth. Rotate the motor by hand a few times to seat the belt properly.

2. Place a spring scale perpendicular to the belt half way between the two sprockets and push down with a force of 5 ounces.

The belt should deflect approximately 1/4 inch away from a straight edge placed across the top of the two sprockets. To adjust: Position the intermediate shaft bracket to meet the requirement. Tighten the two intermediate shaft bracket screws.

NOTE

To perform this adjustment when the speed change gears are in place on the motor and intermediate shaft, it will be necessary to loosen the motor mounting bracket screws and eccentric locking screw and move the motor unit toward the rear in order to provide room for adjusting the intermediate shaft bracket. Following adjustment of the intermediate bracket, readjustment of the speed change gears will be required. (See following paragraph.)

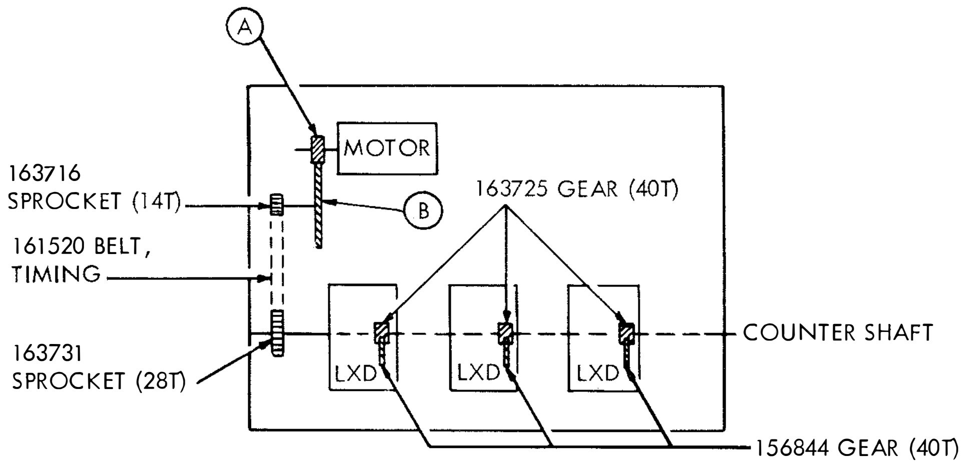
(c) SPEED CHANGE GEARS

1. Remove the screw from the motor shaft and discard it. Select the pinion gear from the speed change gear set to be used (see Figure 2-6). Place the retainer in position over the hub of the pinion and slide the pinion assembly onto the motor shaft with its hub to the left. Align the mounting holes in the pinion hub with the tapped holes in the motor shaft and insert and secure the gear with the two 156806 posts.

2. Install the large mating speed change gear on the mounting plate of the intermediate shaft, using the two screws supplied in the plate. Mesh the gears and tighten the screws.

3. Loosen to friction tight the four motor mounting bracket screws and loosen the eccentric locking screw. There should be barely perceptible backlash between the gears at their closest point. To adjust: Position the eccentric on the rear motor mounting bracket to meet the requirement. Tighten the four motor mounting bracket screws and the eccentric locking screw.

(d) The LMXB206 is supplied with the counter shaft gears mounted in position and under normal circumstances will not require disassembly. The three Transmitter Distributors will operate at the same speed as determined by the set of speed change gears at the motor and intermediate shaft. The counter shaft gears mesh directly with the LXD11 gears.



GEAR SET NO.	W.P.M.	(A) GEAR NO.	(B) GEAR NO.	UNIT CODE
173598	65 (45.5 BAUD)	173600-26T	173599-120T	7.00
173595	106 (75.0 BAUD)	173597-30T	173596-84T	7.00
156658	60 (45.5 BAUD)	156627-18T	156626-88T	7.42
156728	75 (56.9 BAUD)	156725-24T	156726-94T	7.42
156659	100 (74.2 BAUD)	156629-24T	156628-72T	7.42

Figure 2-6. Multiple Transmitter Distributor Gear Set Arrangement (LXD11) and(LXD31)

(e) TRANSMITTER DISTRIBUTOR POSITIONING

1. With the LXD11 locking device on the base pushed to the left and the positioning eccentric locking screw loose, place an LXD11 Transmitter Distributor successively in each of the three mounting positions on the LMX206 Base. The positioning procedure is the same in each case. Engage the multiple connector plug on the LXD11 with the receptacle on the base and mesh the gear on the LXD11 with the driving gear on the counter shaft. Hold the Transmitter Distributor against its positioning eccentric. There should be barely perceptible backlash at the point of minimum clearance between the gears. Check at several points on the circumference of the gears. To adjust, position the eccentric. Be sure the LXD11 is against the eccentric when checking the backlash. Tighten the eccentric locking screw.

2. Additional adjusting range, if necessary, may be had by repositioning the counter shaft assembly. Remove the LXD11 Units. Loosen the two screws in the right and left counter shaft bracket mounting bars on the base. Move the counter shaft assembly forward or to the rear as required, keeping the bracket assemblies parallel so as not to bind or place a strain on the counter shaft. Tighten the mounting screws. All prior adjustments will require resetting.

(3) INSTALLING MULTIPLE SET INTO CABINET

(a) Place the multiple mounted set, without cover, on the upper shelf of the cabinet (Figure 1-2).

(b) For cable routing and clamping, see Figure 2-7. Cable clamps, mounting screws, washers, and lock washers are found in a bag attached to the base.

(c) Wire in accordance with the applicable wiring diagram furnished with the equipment.

(4) DUST COVER - Remove LXD11 Units from the base. Place the dust cover over the base with the hinged panel to the front.

(5) TO INSTALL TRANSMITTER DISTRIBUTORS

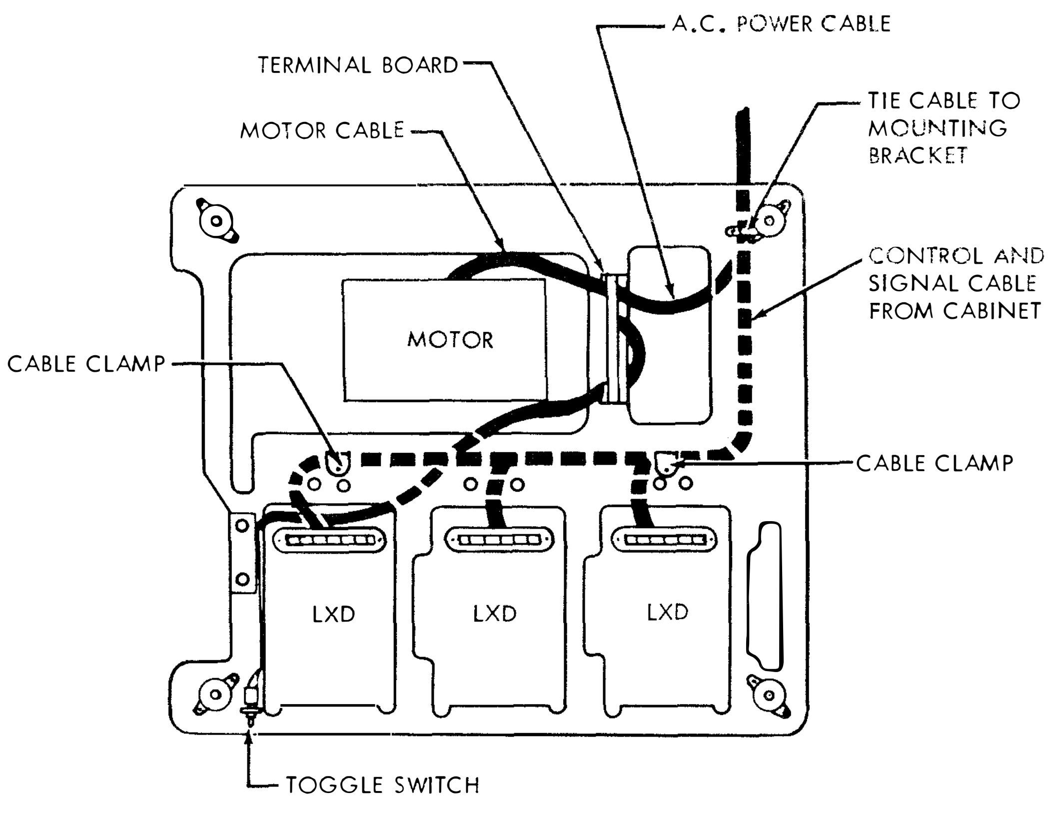


Figure 2-7. Multiple Transmitter Distributor Cable Routing (LXD11)

(a) Remove the standard LXD11 cover plates from the Transmitter Distributors by lifting up the left end of cover plate to disengage the detents then slide the plate to the left to disengage spring plate.

(b) Install the three cover plate assemblies, supplied with the base, on their respective LXD Units. Each cover plate should be adjusted after installation according to instructions, "REPLACING AND POSITIONING COVER PLATE", given in Section 5, Adjustments and Lubrication (adjustments pertaining to the deflector mounting bracket and deflector spring are also found in the same section). Following adjustments, snap the covers off carefully and tighten the adjusting screws.

(c) Open the hinged panel on the front of the LMXB206 base dust cover. Move all LXD11 locking devices on the base to the left. With the cover plates removed, insert the three LXD11 Units, one at a time, down through the top openings in the dust cover and position them into their mating connectors. Hold the units down and against their eccentric stops and slide the locking device toward the right to secure the units at the rear. Secure the LXD11 Units at the front by installing the screw, flat washer and lockwasher, from the muslin bag, through the front center mounting extension of each Transmitter Distributor after aligning the mounting hole with the tapped hole in the base. Access for installing the screws is through the open hinged panel of the cover.

(d) Reinstall cover plate assemblies on their respective LXD11 Units. The cover plates should align uniformly with each other. Note that the LXD11 Units must be removed before the LMXB206 base dust cover can be taken off.

d. MULTIPLE TRANSMITTER DISTRIBUTOR (LBXD16) SET INSTALLATION (Figure 1-18)

(1) This Multiple Distributor Set consists of an LMXB205 Base, LMU3 Motor Unit, three LBXD16 Transmitter Distributors, 173589 (75.0 Baud) Drive Parts, and 173592 (45.5 Baud) Drive Parts. The LMXB205 Base (Figure 1-24) is shipped in two cardboard cartons, one for the cover assembly and the other for the base itself. The drive parts are packed in bags and tied to the base. The LMU3 Motor Unit (Figure 1-12), and each LBXD16 Transmitter Distributor (Figure 1-22) come packed in separate cartons.

(2) Inspect each carton for identification of contents. Carefully remove the contents and install in the following order (refer to Figure 1-24).

(a) MOTOR UNIT (Figure 1-24)

1. Remove the 156805 pinion retainer and two 156806 posts from the bar attached to the base. Remove the screw from the motor shaft and discard it. Secure the pinion to the motor shaft using the 156805 pinion retainer and the two 156806 posts.

2. Remove the 161569 plate, two 104124 screws and two 2449 lock washers from the bag attached to the base. Assemble the 161569 plate to the side of the motor on which the name plates are located (with the center hole of the plate toward the rear) using the screws and lock washers.

3. Remove the 156334 stud from the bag attached to the base and screw it into the single post at the rear of the base.

4. The incoming cable to the base should be installed prior to installation of the motor unit. For cable routing and clamping see Figure 2-8. Cable clamps, mounting screws, washers, and lock washers are found in a bag attached to the base.

5. Mount the motor unit on the base using the two 104124 screws and two 2449 lock washers remaining in the bag. Use the 125224 nut and the third 2449 lock washer to fasten the motor unit to the 156334 stud.

(b) TRANSMITTER DISTRIBUTOR POSITIONING - Place a transmitter distributor unit in the left mounting position of the base. Loosen (friction tight) the two 151630 screws which hold the locating plate to the cradle and the 151724 screw which holds the cradle to the base. Adjust the gear mesh of the transmitter distributor unit by placing a screw driver in the pry point. The gears should have a barely perceptible amount of backlash at the closest point. Remove the unit from the left position and place it in the right position and check the gear mesh. If incorrect, loosen the four 85471 countershaft assembly mounting screws and position the countershaft until the unit gear mesh is correct in both positions. Refine if necessary. Tighten the counter shaft assembly mounting screws and check for binds. Adjust the gear mesh for each of the other transmitter distributor units to be used in one of the mounting positions.

(c) SPEED CHANGE GEARS

1. Assemble the parts found in the bag attached to the shaft as follows, and as shown on Figures 2-9 and 2-10. Place the 163765 retaining ring on the shaft (to the right of and adjacent to the left bearing). Place a 112864

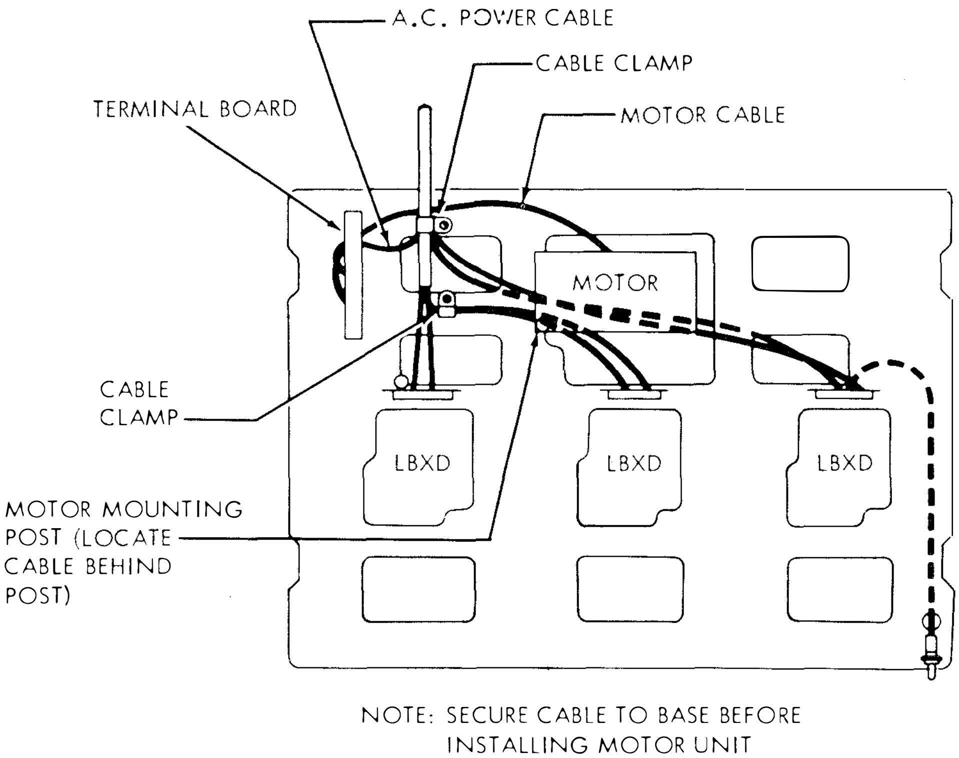


Figure 2-8. Multiple Transmitter Distributor Cable Routing (LBXD16)

washer on left side of bearing. Place the 161570 nut plate in the counterbore of 162033 gear. On the other side of the gear, place the 161564 spacer, appropriate driven gear and 161563 gear hub. Secure these parts (friction tight) using three 153839 screws and 2191 lock washers. Place the gear assembly on the shaft so that the 162033 gear is to the right of the driven gear; tighten the three screws. Secure the hub to the shaft (friction tight) using a 151659 screw, 2191 lock washer and 150432 washer. Next to the 161563 hub place a 112864 washer and secure the pile-up of parts using the 151631 screw, 2191 lock washer and 111427 washer. Tighten the gear hub mounting screw. This assembly procedure must be followed to insure clamping inner race of bearing.

2. Adjust the gear mesh by running the stud in the motor unit mounting post up or down as required. The gears should have a barely perceptible amount of backlash at closest point. Tighten the nut on the stud while holding the stud in position.

(3) INSTALLING MULTIPLE SET INTO CABINET

(a) Place the multiple mounted set, without cover, on the lower shelf of the cabinet (Figure 1-2).

(b) Wire in accordance with the applicable wiring diagram furnished with the equipment. Refer to Figure 2-8 for cable routing.

(4) DUST COVER - Remove the LBXD 16 units from the base. Place the dust cover over the base with the hinged panel to the front.

(5) TO INSTALL TRANSMITTER DISTRIBUTORS

(a) The profile of the 162209 filler plate assembly should be matched to that of the tape guide and top plates so that the common edges bear against each other. Place a straight edge across the top and filler plates. Measuring at two places (straight edge at front of plates and rear of plates), a 0.010 inch round wire gauge should not enter under the straight edge. Gauge within 1/8 inch on each side of the common edges. To adjust, loosen the three screws securing the filler plate brackets and the two nuts securing the filler plate to friction tightness; position the plate and brackets to meet the requirements. Tighten the screws and nuts.

(b) Lower the hinged door on the dust cover and slide the LBXD16 units on the base.

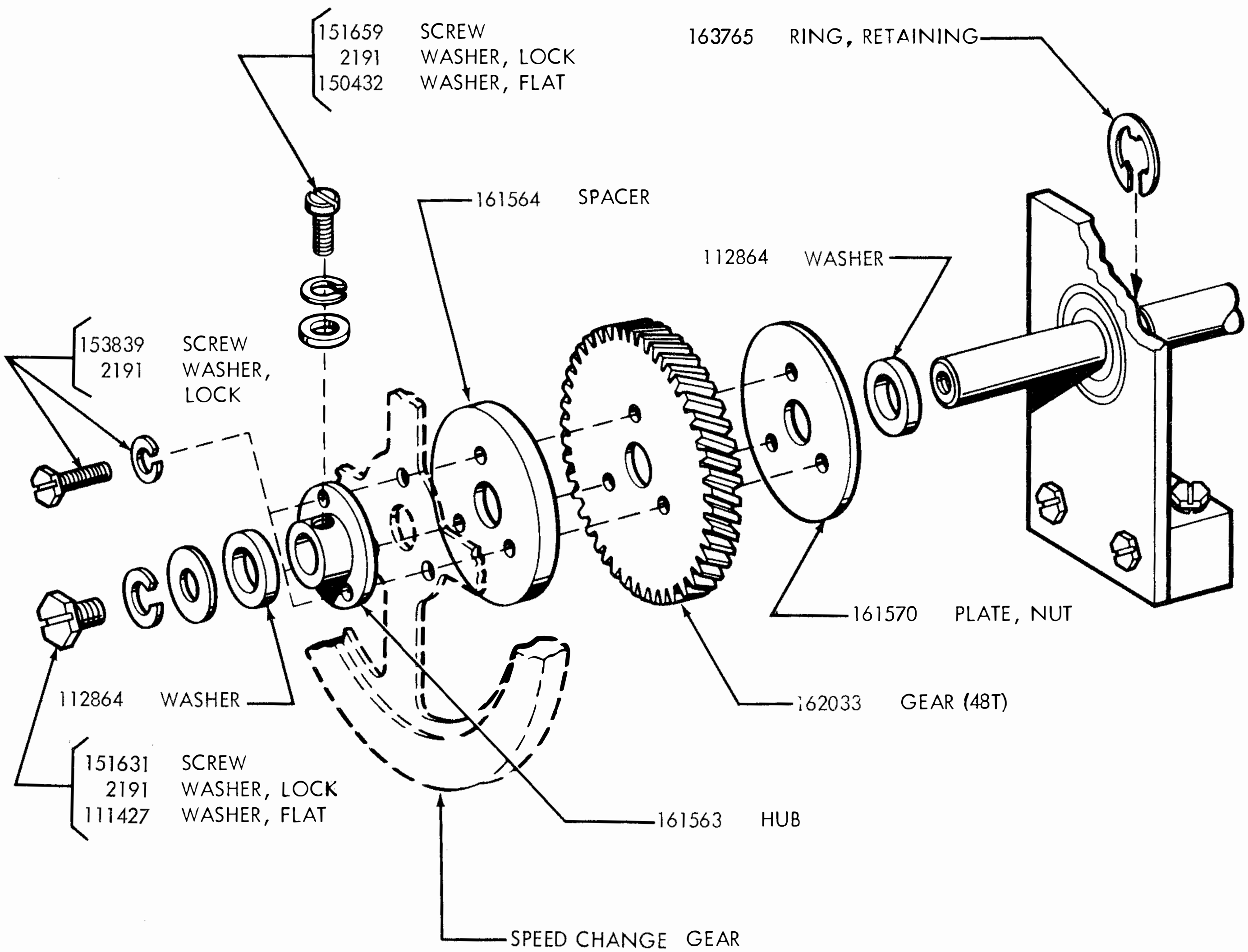
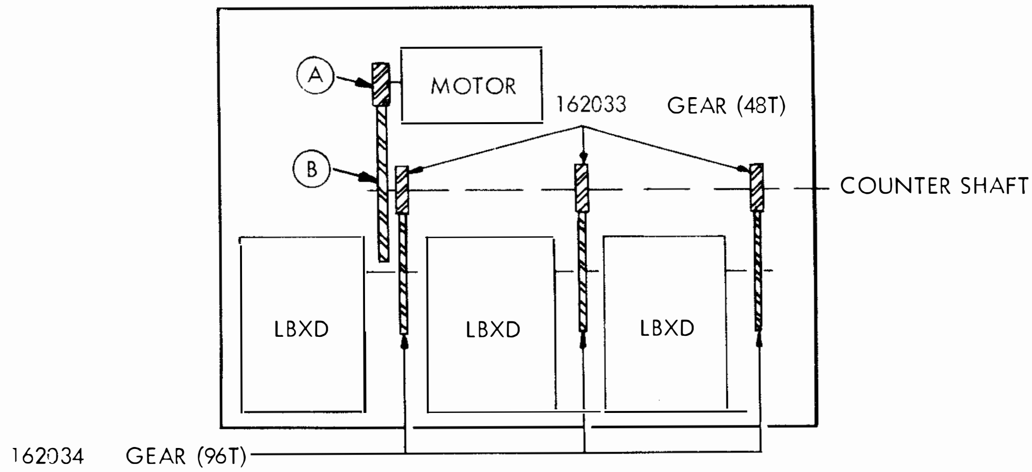


Figure 2-9. Multiple Transmitter Distributor Speed Change Gear Installation (LBXD16)

Fig. 2-9



GEAR SET NO.	W.P.M.	(A) GEAR NO.	(B) GEAR NO.	UNIT CODE
173592	65 (45.5 BAUD)	173594-39T	173593-180T	7.00
173589	106 (75.0 BAUD)	173591-45T	173590-126T	7.00

Figure 2-10. Multiple Transmitter Distributor Gear Set Arrangement (LBXD16)

(c) The three 162425 cover plate assemblies, when installed on their respective transmitter distributor units on the base, should be mutually flush (horizontal) and the right edge of the cover plates should be held flush against their top plate edges by detent action. To adjust, loosen the 156782 special nuts on the transmitter distributor unit side plates, by means of their 151630 screws, and locate them to their extreme right position; tighten the screws. Refine if necessary.

(d) The left side of the 162425 cover plate assembly, when installed on the associated transmitter distributor unit, should be in line with the left side of the top plate. To adjust, loosen (friction tight) the four 3598 nuts on the cover plate assembly and position the cover plate. Remove the cover plate being careful not to disturb the adjustment; tighten the nuts.

(e) Secure the LBXD16 on to the base by means of its locking screw.

2-4. MODEL 28 MONITOR GROUP

a. GENERAL - The Model 28 Monitor Group consists of the following main component assemblies:

(1) One LBAC224BR Cabinet (Figure 1-34) or one LBAC257BR Cabinet (Figure 1-3A) or one LBAC259BR Cabinet (Figure 1-3B).

(a) The above cabinets are similar except the LBAC224BR is equipped with single vacuum tube electronic keyers; the LBAC257BR is equipped with selector magnet drivers; and the LBAC259BR is equipped with the double tube 309863 Voltage Input Selector Magnet Drivers.

(2) Two Multiple Typing Reperforator (LPR37BWA) Sets (Figure 1-28) or two Multiple Typing Reperforator (LPR37BRP) Sets.

(3) Two Multiple Tape Winder (TW15) Sets (Figure 1-32). The cabinet provides the necessary electrical control, wiring and mounting facilities for operation of the two multiple Typing Reperforator Sets, and Tape Winder Sets.

b. LBAC224BR OR LBAC257BR OR LBAC259BR CABINET INSTALLATION

(1) There is one cardboard carton and three muslin bags secured to the inner frame of the cabinet. The carton contains the 161731 cover plate, 161752 duct channel, and 161987 duct plate which attach to the cabinet. One bag holds the necessary cable clamps for cable mounting and the second bag contains three tape guides (with rollers) which mount on the tape winders. Mounting hardware for "bank" installation of cabinets is contained in the final bag.

(2) Remove the carton and three bags from inside the cabinet, and set the cabinet in place. The cabinet assembly should rest firmly on all four of its metal pads to eliminate rock-

ing motion. If one of the pads does not contact the floor, a shim (not provided) should be placed under the pad.

(3) Remove shipping hardware and install contents of carton as directed in Paragraph 2-2.b.(3).

(4) For installation of end enclosures, see Paragraph 2-2.c.

c. MULTIPLE TYPING REPERFORATOR (LPR37BWA OR LPR37BRP) SET INSTALLATION (Figure 1-28)

(1) The Multiple Typing Reperforator Sets consist of an LMRB203BZ Base, three LPR37BWA Typing Reperforators, an LMU12 Motor Unit, 173584 (45.5 Baud) Drive Parts, and 164336 (75.0 Baud) Drive Parts. The drive parts are placed in a muslin bag and tied to the base. Also tied to the base (in a bag) is the Chad Disposal (173484) Modification Kit. The base, reperforators, and motor are packed in separate cartons.

(2) Inspect each carton for identification of contents. Carefully remove the contents and install in the following order.

(a) MOTOR UNITS AND GEAR SETS (Figure 1-31)

1. Remove the gear guard from the base. Retain the guard and its mounting parts.

2. Install the desired motor pinion on the motor shaft using the screw and lock washer in the motor shaft.

3. Remove the 156334 Stud from the bag attached to the base and screw it loosely into the motor mounting post to the immediate rear of the driven gear location.

4. Remove the 156344 adjusting bracket, four 156936 screws and four 2449 lock washers from the bag attached to the base. Mount the adjusting bracket to the gear end of the motor unit (the center hole in the bracket to extend beyond the motor mounting plate) using two of the screws and lockwashers. Place the motor unit with bracket over the three motor mounting posts (the hole in the adjusting bracket to pass over the stud installed in paragraph above). Secure the fan end of the motor unit using the two remaining screws and lock washers.

5. Remove the 125224 nut and 2449 lock washer from the bag attached to the base and put them on the stud holding the adjusting bracket (do not tighten).

6. Discard spacer and install gear using mounting hardware furnished with the gear hub. With gear hub mounting screw friction tight, tighten screw at right end of shaft first and then tighten gear hub mounting screw.

(b) BELT AND SPROCKET DRIVE INSTALLATION (Figure 2-11)

1. The unit, as supplied, is equipped for 75.0 Baud operation. If 45.5 Baud operation is desired, the 173584 Drive Parts must be installed in place of the existing 164336 Drive Parts. Proceed as follows.

2. BELT AND SPROCKET DRIVE DISASSEMBLY

a. Remove the 161687 gear guard by removing the two 151630 screws and 2191 lock washers. Retain all of the removed parts.

b. Remove left timing belt.

c. Remove and retain screw, lock washer, and washer from the left end of the 161506 shaft.

d. Remove the 151721 screw, 2191 lock washer, 7002 flat washer, and 3598 nut from the sprocket hubs. Slide the left sprocket assembly to the left and off the 161506 shaft.

e. Remove the left 162216 retainer from the 161506 shaft.

f. Remove the two 151631 screws and 2191 lock washers that mount the 161513 clamp and 161514 plate to the 161507 bearing mounting plate. Retain parts removed.

g. Slide the 161520 timing belts off the center and right sprockets.

h. Remove and retain the 151721 screw, 2191 lock washer, and 7002 flat washer from the center and right sprocket hubs.

i. Move the shaft assembly partly through the right 161507 bearing plate and then move the two timing belts and sprockets assemblies to the left until they slide off the left end of the 161506 shaft.

3. BELT AND SPROCKET REASSEMBLY.

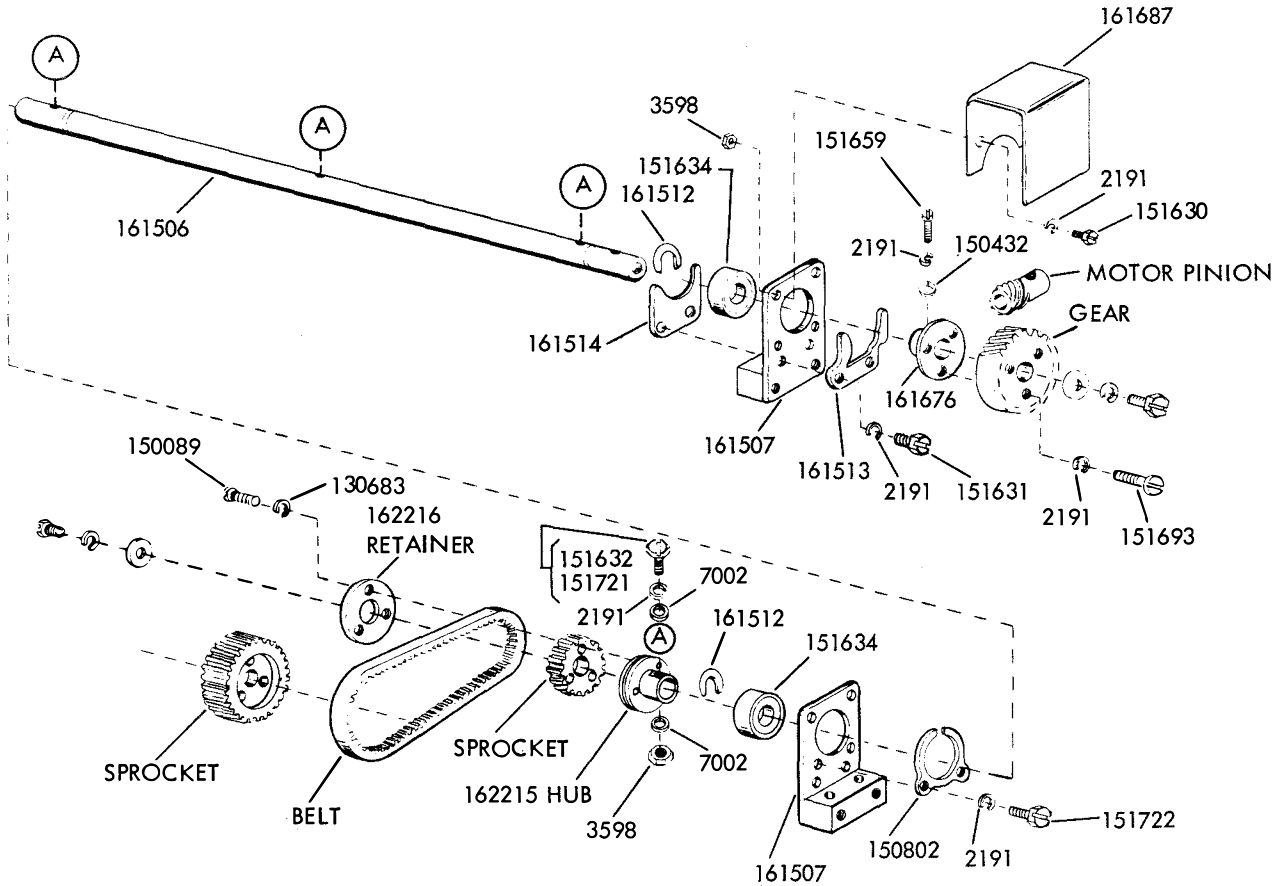


Figure 2-11. Belt and Sprocket Drive Installation

NOTE

Use the reverse procedure in reassembling the 45.5 Baud sprocket assemblies and timing belts.

a. Assemble the three sprocket assemblies (161511 retainer, 161510 sprocket, and 161509 hub) with the three 150089 screws and 130683 lock washers. It will be easier to slide the sprocket or gear assemblies on to the shaft if their three assembly screws are friction tight. Slide the right and center sprocket assemblies on to the shaft with the hub end to the right. Tighten the three (3) sprocket assembly screws.

b. Secure each sprocket assembly to the 161506 shaft with the 151632 screw, 2191 lock washer, two 7002 flat washers and 3598 nut.

c. Replace the right and center (161520) timing belts with the 162222 timing belts.

d. Insert the 161506 shaft through the left 151634 bearing.

e. Replace the left 163765 retaining ring.

f. Replace the left sprocket assembly and timing belt (use a 162222 timing belt).

g. Replace the 161513 clamp, 161514 plate to the right 161507 bearing mounting plate using the two (2) retained 151631 screws and 2191 lock washers.

h. When replacing the screw, lock washer, and flat washer, at the left end of the 161506 shaft leave the mounting screw that secures the adjacent sprocket assembly to the shaft friction tight. Tighten the screw at the left end of the shaft first. This will take up the end play of the 151634 bearing between the 161512 retaining ring and the sprocket hub at the left end of the shaft. Secure the left sprocket assembly to the shaft by tightening the mounting screw.

i. The 173583 sprocket is secured to the hub of the typing reperforator unit. The hub, sprocket mounting screws, and lock washers are part of the typing reperforator unit.

j. The timing belts may require readjusting. Refer to Paragraph 2-4.c.(2)(d).

(c) REPERFORATOR UNITS (Figures 1-28, 1-29, and 1-30)

1. Mount a 164279 Chad Chute to the punch block of each of the reperforator units using two 151152 screws, 3640 lock washers and 104807 washers (if the punch block has a 0.012" offset on the chute mounting surface, place two 90560 washers between the chad chute and the punch block; discard the 90560 washers if the mounting surface is flat). See Figure 2-12. Position each chute (by means of its slotted mounting holes) so that it is flush with the top of the punch block; tighten the screws.

2. Secure a 172967 Chad Chute to the front plate of each of the reperforator units using a 151630 screw, 7002 washer, 2191 lockwasher and 3598 nut. See Figure 2-12. Position each chute (by means of its enlarged mounting hole) for maximum clearance between the chute and the reperforator unit casting; tighten the screw.

3. Slide each 164343 Chad Container onto its retaining rail bracket located under the LMRB203BZ Base. See Figure 2-12.

4. Remove one 151632 screw, three 151631 screws, four 2191 lock washers, three 76461 washers and one 125015 washer from the bag attached to the base. Place the reperforator unit over its mounting studs on the base. Loosen (friction tight) the screw which secures the anchor bracket ("L" shaped) to the reperforator unit. Start the three 151631 screws (with 2191 lock washers and 76461 washers attached) into the proper tapped studs in the "T" plate; do not tighten. Start the 151632 screw

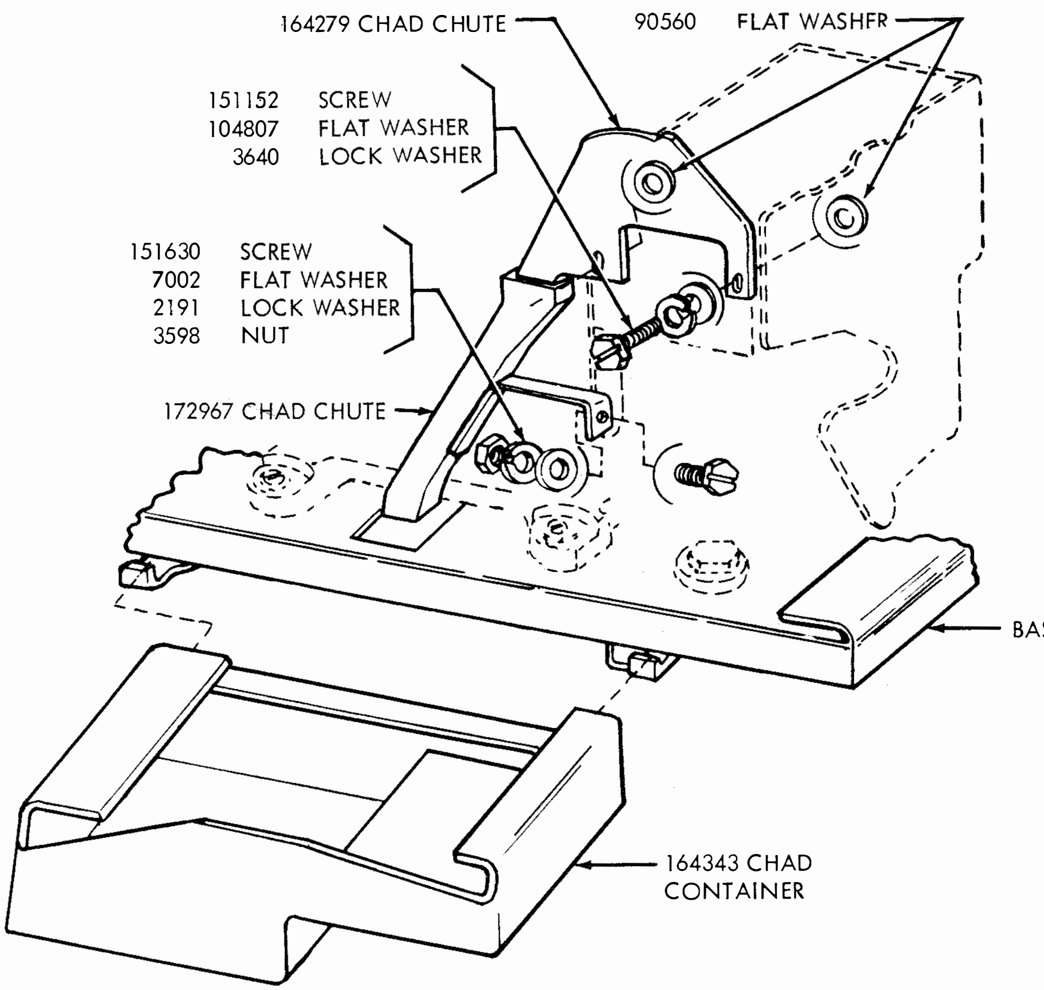


Figure 2-12. Chad Disposal Chutes and Containers

(with 2191 lock washer and 125015 washer attached) through the "L" bracket into the proper tapped hole in the base; do not tighten.

(d) TIMING BELT ADJUSTMENT- A pressure of 7 to 9 ozs. applied at the center of the span should deflect the belt 3/32" to 5/32 "

CAUTION

Belt should not be tight. To adjust, position the reperforator unit. Tighten the three mounting screws. Press the anchor bracket against the base plate and tighten the screw holding the bracket to the reperforator unit. Tighten the screw holding the bracket to the base. Do Not lubricate timing belt or sprockets.

(e) GEAR ADJUSTMENT - The gears should have a barely perceptible amount of backlash at closest point. To adjust, position the stud in the motor mounting post; tighten the nut on the stud while holding the stud in position. Apply a light film of grease (use standardized lubricant) to the gears. Replace the gear guard removed in Paragraph 2-4.c.(1).

(f) INSTALLING BASES INTO CABINET (Figure 4-59)

1. Apply light film of "Lubriplate" grease to the mating rails and channels of the base and cabinet. Slide the base into the mating channels located in the cabinet.

2. Route the cabinet cable to the base, along the right side of the right tape container and then to the left along the rear of each reperforator unit. Plug in the connectors. Secure the cable behind each reperforator unit using appropriate size cable clamps found in the bag attached to the cabinet frame and 151631 screws, 2191 lock washers and 7002 washers furnished with the base. The cable should also be secured to the right tape container using a 7002 washer (furnished with the base) and appropriate size cable clamp (furnished with the cabinet). The cable clamp should be mounted under the upper tape guide mounting screw and should be positioned so as to make the cable rise up and backward from the base.

d. TAPE WINDER INSTALLATION

(1) The tape winder is packed in two cartons; the winder in one and the three tape reels in the other. Unpack by cutting the sealed edges, being careful not to mar the finish. Observe all caution labels and instructions.

(2) When the two tape winders are installed, tape reel positions number 2, 4, and 6 require the 173953 Guide w/Roller (found in bag attached to cabinet frame). Install the guide w/roller under the spring post and as shown in Figure 2-13. The lock washer for the spring post should remain on the left side of the tape winder frame. Tighten the nut.

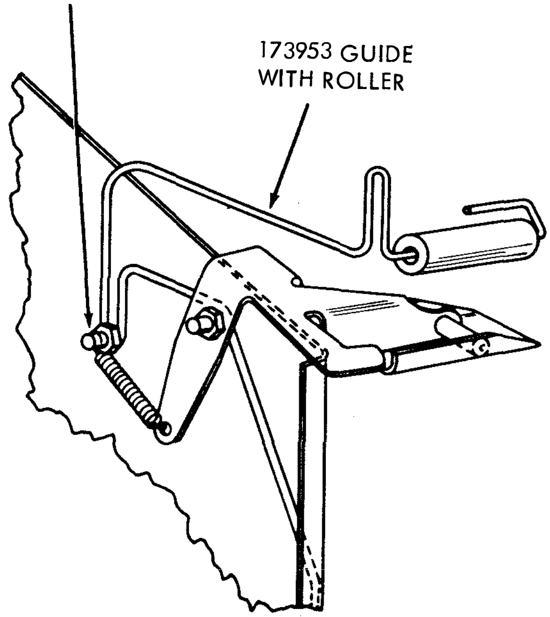


Figure 2-13. Tape Guide

(3) Place the tape winders on the studs provided on the cabinet frame. Disregard any mounting hardware furnished with the winders.

(4) TAPE PATH - Place the reel core into the roll of tape and place both into the tape container so that the tape comes off the top of the roll. Thread the tape through the tape guide and into the tape entry chute on the reperforator unit. Position and/or reform the tape guide, as necessary, so that the tape flows freely; tighten the screws. See Figure 4-59 for applicable tape paths between the reperforator units and the tape winders.

2-5. MODEL 28 RECEIVING GROUP

a. GENERAL - The Model 28 Receiving Group consists of the following main component assemblies.

(1) One LBAC225BR (Figure 1-40) or LBAC254 Cabinet (Figure 1-4A).

(2) Two Multiple Typing Reperforator (LPR35BWA or LPR35BRP) Sets (Figure 1-35).

NOTE

The cabinet provides the necessary electrical control, wiring, and mounting facilities for operation of the two Multiple Typing Reperforator Sets.

b. LBAC225BR, LBAC254BR AND LBAC260BR (Figures 1-4C and 1-4D) CABINET INSTALLATION

(1) There are two cardboard cartons and two muslin bags secured to the inner frame of the cabinet. One carton contains the 161731 cover plate, 161752 duct channel, and 161987 duct plate which attach to the cabinet. The other carton contains the two tape bins which mount on the front doors. The bags contain the necessary cable clamps for cable mounting, and mounting hardware for "bank" installation of cabinets.

(a) Remove the cartons and bags from the cabinet and set the cabinet in place according to instructions given in Paragraph 2-2.b.(3).

(b) Remove shipping hardware and install contents of carton as directed in Paragraph 2-2.b.(3).

(c) For installation of end enclosures, see Paragraph 2-2.c.

(2) FRONT ENCLOSURE INSTALLATION (Figures 2-14 and 2-15) (For applicable group)

(a) Assemble the 176504 right bracket, 176505 left bracket and 176506 strip using the four 98725 screws, 7002 flat washers, 2191 lockwashers, and two 176579 nut plates.

(b) Mount this assembly to the multiple typing reperforator base rails using the four 151632 screws, 2191 lockwashers, 7002 flat washers, and two 176519 nut plates (see Figure 2-14).

(c) Assemble the 176578 handle to the 176503 front plate with the two 3599 nuts and 110743 lockwashers.

(d) Assemble the 176575 right bracket to the 176503 front plate using the two 7002 flat washers, 2191 lockwashers, and 3598 nuts.

(e) Mount this assembly on the pivot of the 176504 right bracket, and then assemble the remaining 176576 left bracket to the 176505 left bracket by means of the two 7002 flat washers, 2191 lockwashers, and 3598 nuts.

(f) Mount the 126255 bumper to the 176575 and 176576 brackets.

(g) Install the 176521 panel assembly to the 176504 and 176505 brackets.

(h) The following parts added to the front panel assemblies will prevent tapes catching in the panel openings and tape jamming behind the front panels.

1. Install a 304522 strip on the edge of the front panel assemblies (Figures 2-14 and 2-15), and one 304522 strip on the top edge of the lower front panel assembly.

2. Install a 304523 strip on the top edge toward the rear of the left and right front door assemblies.

3. Install one 198071 guide smooth side toward the front and opening down in each of the tape exit holes on the front panels.

(i) Refer to Section 5, Adjustments and Lubrication, for adjustment procedures.

c. MULTIPLE TYPING REPERFORATOR SET INSTALLATION (Figure 1-35)

(1) The Multiple Typing Reperforator Sets consist of an LMRB203BZ Base, three LPR35BWA Typing Reperforators, an LMU14 Motor Unit, 164336 (75.0 Baud) Drive Parts, and 173584 (45.5 Baud) Drive Parts. The drive parts are placed in a muslin bag and tied to the base. Also tied to the base (in a bag) is the chad disposal (164341) Modification Kit. The base, reperforators, and motor are packed in separate cartons.

(a) The Multiple Typing Reperforator Sets used with the later design group consists of an LMRB207BZ Base (with separable connectors), three LPR35BRP Typing Reperforators, and LMU12 Motor Unit.

(2) Inspect each carton for identification of contents. Carefully remove the contents and install in the following order:

(a) MOTOR UNITS, GEAR SETS, BELT AND SPROCKET DRIVE MODIFICATION KITS (Figures 1-31 and 1-35) - Refer to Paragraph 2-4.c.(2)(a).

(b) REPERFORATOR UNITS (Figures 1-35, 1-36, and 1-37) - Refer to Paragraph 2-4.c.(2)(c).

(c) TIMING BELT ADJUSTMENT - Refer to Paragraph 2-4.c.(2)(d).

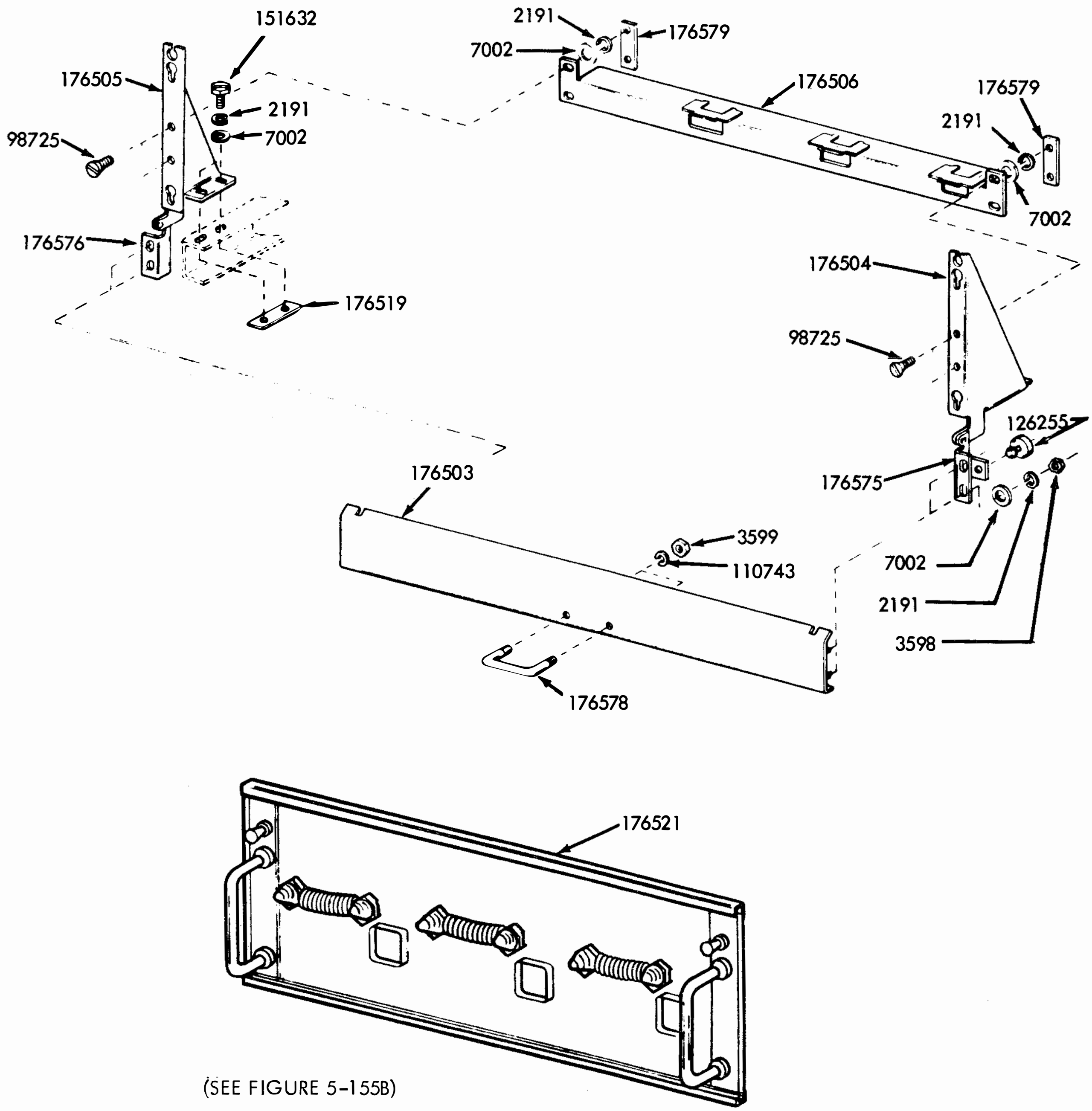


Figure 2-14. Front Enclosure Installation

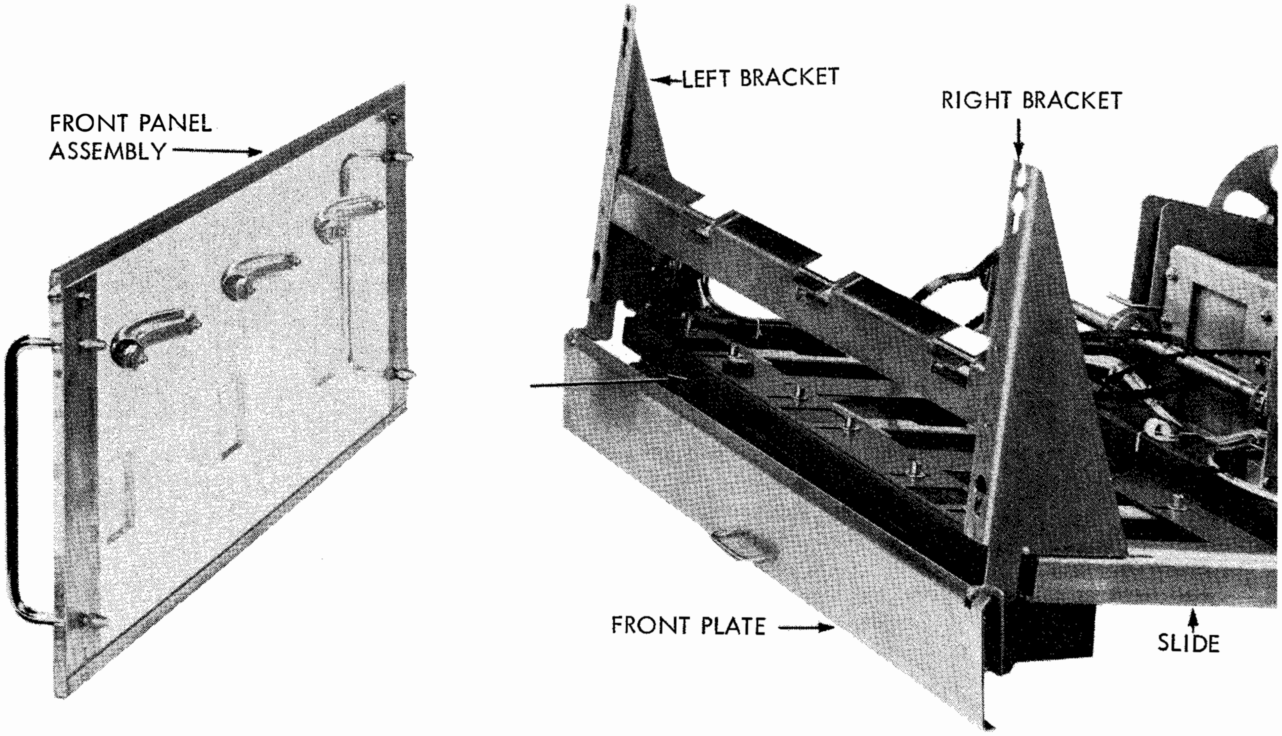


Figure 2-15. Front Enclosure Assembly

(d) GEAR ADJUSTMENT - Refer to Paragraph 2-4.c.(2)(e).

(e) INSTALLING BASES INTO CABINET (Figure 4-60) - Refer to Paragraph 2-4.c.(2)(f).

(f) Mount the two tape bins (found packed in cardboard carton secured to cabinet inner frame) on the front doors of the cabinet (see Figure 1-40).

2-6. MODEL 28 RERUN CART GROUP

a. GENERAL - The Model 28 Rerun Cart Group consists of the following main component assemblies:

(1) One LT200BR Table (Figure 1-45)

(2) One 173861 Dolly (Figure 1-46)

(3) One Transmitter Distributor (LXD 11) Set (Figure 1-5)

NOTE

The table, which provides mounting facilities for the set, is cradled in the dolly making the entire group portable.

b. LT200BR TABLE INSTALLATION

(1) Unpack the table from its carton being careful not to damage the table finish. Observe all caution labels and instructions. Muslin cloth bags and small loose parts should be kept with the unit until used in the installation (discard any hardware not used).

(2) Open one, or both, knock-out holes in the rear corners of the lower compartment.

(3) Unpack the 173861 Dolly, and place the table in the dolly.

c. TRANSMITTER DISTRIBUTOR SET INSTALLATION

(1) The Transmitter Distributor Set consists of an LXD11 Transmitter Distributor, LXDB9 Base, LXDC200BR Cover, LMU4 Motor Unit, 173595 (75.0 Baud) Drive Parts, and 173598 (45.5 Baud) Drive Parts. The drive parts are packed in a muslin bag and tied to the base. The base, cover, motor, and transmitter distributor are packed in separate cartons.

(2) Inspect each carton for identification of contents. Carefully remove the contents and install in the following order.

(a) MOTOR UNITS AND GEAR SETS (Figure 1-42 and 1-43)

1. Place the 156805 pinion retainer over the pinion shoulder. With the two 156806 posts, secure the desired pinion gear (173597 for 75.0 Baud or 173599 for 45.5 Baud) to the motor shaft. The retainer, posts, and gears are in muslin bags tied to the base.

2. Place the two disks (found in a muslin bag) on the driven intermediate gear (173596 for 75.0 Baud or 173600 for 45.5 Baud) using two 151631 screws and 2191 lock washers. Place the 156808 disk in back of the gear (relative to its mounted position). The concave side of the disk should face the gear. Remove the drive shaft assembly, and secure the intermediate gear to the drive shaft using the remaining 151631 screws and 2191 lock washers. Replace the drive shaft assembly and secure the intermediate gear to the drive shaft using the remaining 151631 screws and 2191 lock washers. Replace the drive shaft assembly and secure friction tight.

3. Secure the motor unit to the base using four 104124 screws and 2322 lock washers. Position the drive shaft assembly to allow some backlash (0.003" max.) between the motor pinion and intermediate gears. Tighten drive shaft assembly.

(b) TRANSMITTER DISTRIBUTOR (Figures 1-42 and 1-43)

1. Mount the transmitter distributor to the base using the three 6810 screws, 2669 lock washers, and 111516 flat washers. Make sure the electrical connector on the base mates with the connector on the LXD11.

2. Position the LXD11 unit on the base to allow some backlash (0.003" max.) between the intermediate driving gear and the LXD11 mainshaft driven gear. Secure the unit to the base.

(c) LXDC200 Cover (Figure 1-44)

1. Slide the larger cover over the motor unit and gear guard. The cover is guided into position by means of four cover guides mounted on the cover.

2. The other coverpiece snaps into place around the LXD11 Unit.

3. Place the Transmitter Distributor Set on the table.

SECTION 3

OPERATOR'S SECTION

3-1. INTRODUCTION

a. The purpose of this section will be to provide the necessary information required to understand and operate the equipment included in this manual. The following groups of equipment will be discussed:

(1) Model 28 Reperforator Transmitter Group

(2) Model 28 Transmitting Group

(3) Model 28 Monitor Group

(4) Model 28 Receiving Group

(5) Model 28 Rerun Cart Group

b. The above five groups of equipment are all electro-mechanical in nature, each being designed to perform a specific function or group of functions as part of an overall system.

3-2. MODEL 28 REPERFORATOR TRANSMITTER GROUP

a. GENERAL - The Model 28 Reperforator Transmitter Group is made up of two Reperforator Transmitter (RT) Sets (Figure 1-6) mounted in a common cabinet (LBAC222BR) or LBAC238BR or LBAC253BR. Besides providing mounting facilities for the two sets, the cabinet also houses the electrical control apparatus necessary to operate the equipment. (Figure 4-36). Each reperforator transmitter set consists of a typing reperforator (LPR34BWA or LPR34BRP), pivoted head transmitter distributor (LAXD7 or LAXD8), motor unit (LMU11), and base (LRXB17 or LRXB27), mounted on a tape handling stand (LTHS205BZ). The sets mount on a sliding rail assembly, and may be pulled forward for maintenance or servicing purposes. In addition to supporting the above components, the stand provides tape supply and storage facilities, chad disposal fixtures, and electromechanical devices to actuate alarm lamps located on the cabinet dome. (Figure 1-1).

b. SUMMARY OF OPERATION - An incoming message is received by a typing reperforator, the message being recorded on paper tape in the form of fully-perforated code holes and, simultaneously, printed characters. The tape is directed, from the reperforator, into an intermediate tape storage bin on the tape handling stand where it is stored for subsequent transmission by the transmitter distributor. Upon reception of an external stepping pulse the transmitter distributor is allowed to transmit and read the stored message tape up to an including the last perforated character of a given message on the tape. Not only does the external stepping pulse initiate operation, but it also allows continuous operation of the transmitter distributor during reception of the stepping signal. The tape, after transmission, is stored on the tape winder reel on the tape handling stand.

c. CONTROL PANEL - Mounted on the cabinet dome is a control panel (Figure 1-1). The panel is divided into two sections, RT-LEFT and RT-RIGHT, each section containing the alarm lamp indicators, ALARM RESET button, and motor ON-OFF switch for one reperforator transmitter (RT) set. There are a total of five alarm lamps for each RT set in the cabinet, they are labeled as follows:

1.	BROKEN TAPE	(RED or AMBER)
2.	BIN FULL	(RED or AMBER)
3.	WINDER FULL	(RED or AMBER)
4.	TAPE OUT	(RED)
5.	ALARM	(WHITE)

The alarm system is so wired that if any one of the "red" or "amber" alarm lamps is lighted the "white" ALARM lamp will light. The ALARM lamp acts as a general alarm and will not extinguish (even through a given "red" or "amber" alarm), until the ALARM RESET button is depressed. Refer to TABLE 3-1 and Figure 3-1 for a listing of the operating controls and alarms on the Reperforator Transmitter Group.

d. OPERATING PROCEDURE

(1) TAPE AND RIBBON ROUTING

(a) TAPE ROUTING - For routing of tape on Reperforator Transmitter Set, refer to Figure 3-2. To thread the tape onto the tape winder reel, fold the end of the tape and insert it into the slot in the right-hand reel core. Assemble the two halves of the reel by aligning the guide pin with the guide hole. Lock the reel by means of the locking plate in the right half of the reel.

(b) RIBBON ROUTING - For routing of ribbon on typing reperforator, refer to Figure 3-3. Open the ribbon spool toggles.

Table 3-1. Reperforator Transmitter Group
Operating Controls and Alarms

Item	Control or Alarm	Purpose	Remarks
1	BROKEN TAPE alarm lamp (RED) or (AMBER)	Indicates broken tape condition.	Alarm switch actuated by 6TH sensing pin on transmitter distributor.
2	BIN FULL alarm lamp (RED) or (AMBER)	Indicates full condition of intermediate tape storage bin.	Alarm switch actuated by tape in storage bin.
3	WINDER FULL alarm lamp (RED) or (AMBER)	Indicates full condition of tape winder reel.	Alarm switch actuated by reel full tape arm.
4	TAPE OUT alarm lamp (RED)	Indicates tape-out condition of tape supply reel.	Alarm switch actuated by brake arm (tape-out arm).
5	ALARM RESET button	Allows resetting of alarm circuit to normal condition.	Operating button de-energizes alarm circuit locking relay.
6	ALARM lamp (WHITE)	Provides positive alarm indication.	Operated whenever any of the RED or AMBER alarm lamps are energized.
7	Motor ON-OFF Switch	Supplies 115 volt A.C. to operate motors.	Controls only motor operation. Wired in series with RT set Power Switch (see Item 9).
8	Main POWER Switch	Supplies 115 volt A.C. to 120 volt D.C. and 5.5 volt A.C. control circuit power and alarm supplies, and also to motor circuits.	Located on lower electrical control rack panel. Accessible when front doors are opened.
9	RT set POWER Switch	Supplies 115 volt A.C. to operate motors.	Wired in series with Motor ON-OFF switch (see Item 7). Located on RT set base, and is accessible when set is pulled out of cabinet, or from rear of cabinet when set is in place. Normally left in ON position.

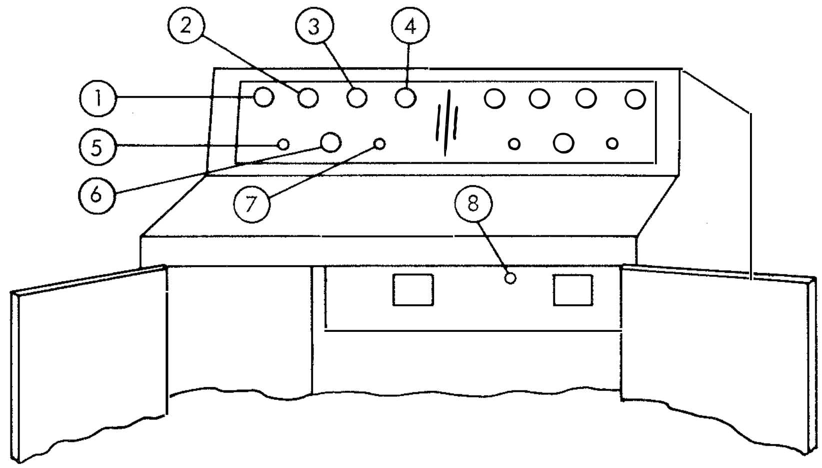


Figure 3-1. Reperforator Transmitter Group Operating Controls and Alarm

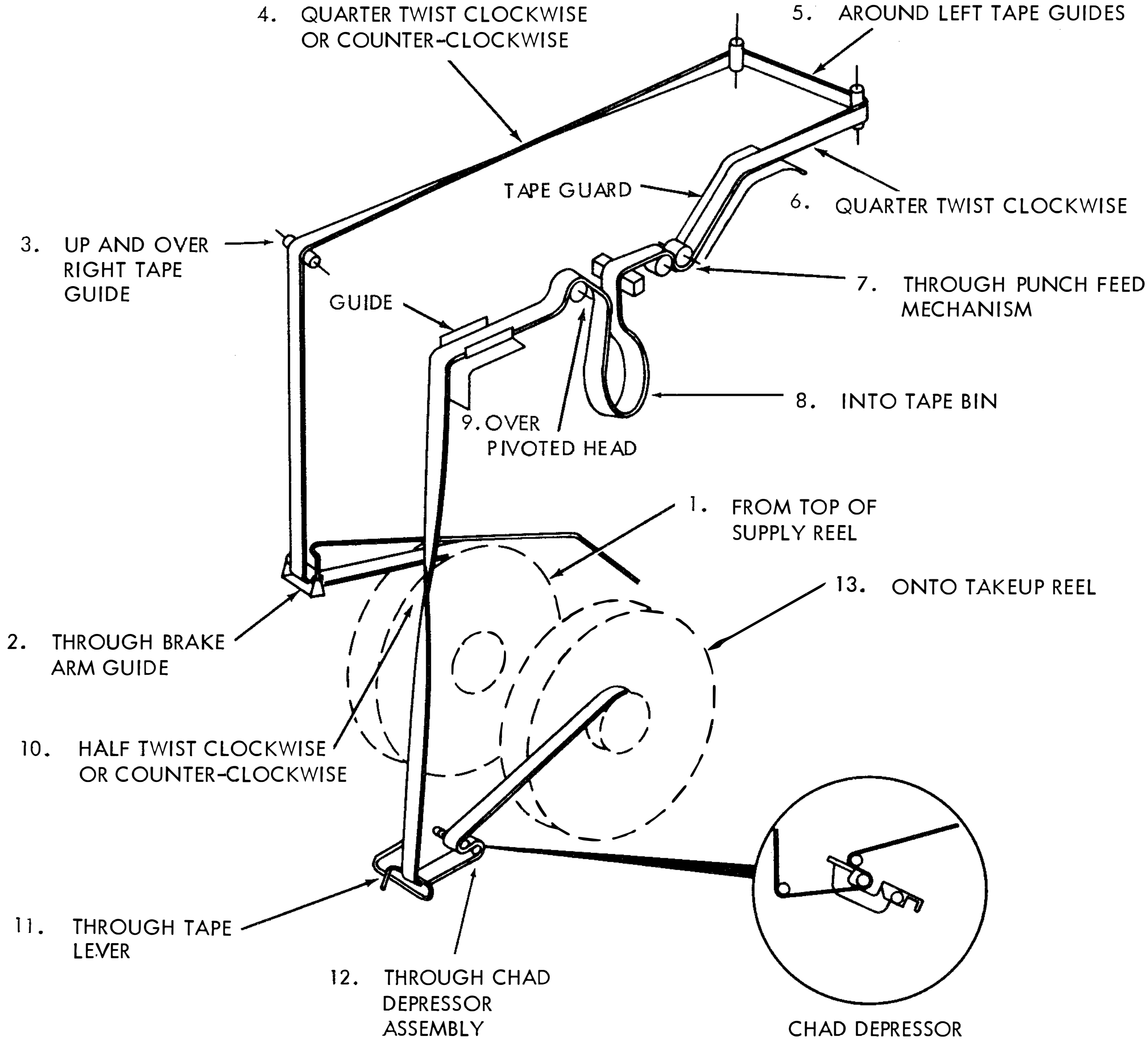


Figure 3-2. Reperforator Transmitter Set Tape Routing

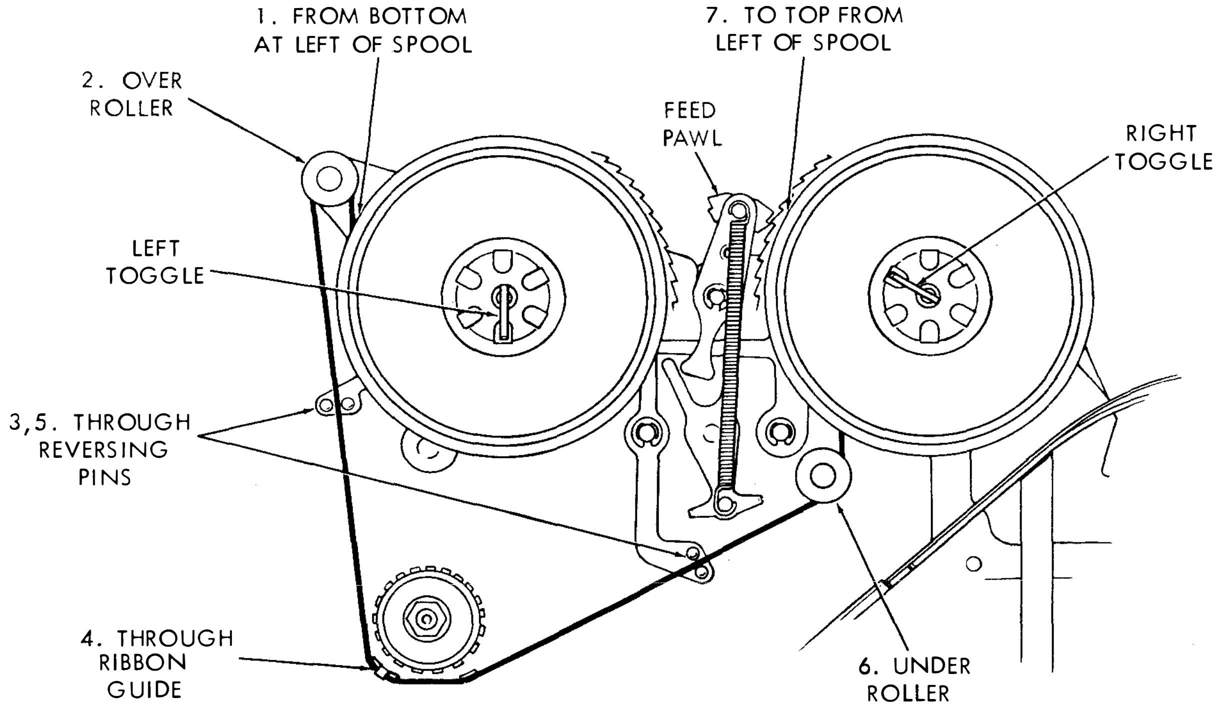


Figure 3-3. Path of Ribbon in Typing Reperforators

Thread a new ribbon to an empty spool, and insert the spools on the shafts. The path of the ribbon is down to the left off the top of the right spool, under the right roller, to the left through pins on a rear reversing arm, through the ribbon guide under the typewheel, up through pins on a front reversing arm, over a left roller, and down to the right on the bottom of the left spool. Make certain that the ribbon remains in the guide slots and that both reversing eyelets are between the ribbon spools and the reverse levers. Roll up any slack in the ribbon on the spool on which ribbon is being wound.

(2) CHAD DISPOSAL - Whenever a new roll of tape is installed, the chad bin, mounted on the side of the intermediate storage bin, should be emptied.

CAUTION

Failure to empty the chad bin can result in equipment failure due to chad backing up in the chad chutes and fouling the punch mechanism.

(3) STARTING OPERATION

(a) Place Reperforator Transmitter Set POWER ON-OFF switch to ON position. Switch is accessible when set is pulled out of cabinet, or from rear of cabinet when set is in place (see Figure 4-36). This switch may be left in this position at all times, even when equipment is de-energized.

(b) Place main POWER ON-OFF switch to ON position. The switch is accessible when the front doors are opened, and is located at the rear of the cabinet on the lower electrical control rack panel between the 34RY relays (Figure 3-1). If alarms should light, depress ALARM RESET button on control panel to reset alarm circuit to normal condition.

(c) Place MOTOR ON-OFF switch on control panel to ON position.

(4) STOPPING OPERATION

To stop operation of equipment place MOTOR ON-OFF switch to OFF position. Although this breaks the power line to the motor circuits, the control and alarm circuit power supplies are still energized and will remain energized until the main POWER ON-OFF switch is placed in the OFF position. It is, therefore, possible to place the equipment in a "ready" condition, power applied to the control circuitry but motors off.

3-3. MODEL 28 TRANSMITTING GROUP

a. GENERAL - The Model 28 Transmitting Group consists of two Multiple Transmitter Distributor (TD) Sets (Figure 1-2), and a Message Numbering Module mounted in a common cabinet (LBAC223BR or LBAC256BR). The LBAC223BR cabinet (Figure 1-2) provides two fixed shelves for mounting the sets, and the LBAC256BR cabinet (Figure 1-2A) provides two sliding shelves for mounting the sets. The cabinets also provide the necessary electrical control apparatus for operation of the equipment. In addition to the above, the cabinets also provide collection and storage facilities for tape transmitted - or to be transmitted by the equipment. The Multiple TD Sets, although similar in appearance and operation, consist of different equipment. Refer to TABLE 3-2 for a listing of the components included in either set.

NOTE

In discussing the two sets, the terms UPPER-TD (upper transmitter distributor) and LOWER-TD (lower transmitter distributor) will be used to aid in distinguishing between the units.

Table 3-2. Multiple TD Sets in Transmitter Group

Set	Transmitter Distributors	Motor Unit	Base
UPPER-TD	LXD11	LMU3	LMXB206BR
LOWER-TD	LBXD16	LMU3	LMXB205BR
UPPER-TD	LXD31	LMU3	LMXB209BR
LOWER-TD	LBXD16	LMU3	LMXB207BR

b. SUMMARY OF OPERATION

(1) TANDEM TRANSMISSION

(a) The message identification control circuit, SEND TRAFFIC lamp, and transmitter magnets are all de-energized when in an idle or stop position. When an operator loads a tape to be transmitted in a LOWER-TD unit and places it in RUN position, a relay type "flip-flop" control circuit is completed. The control circuit will then advance the message numbering mechanism one unit, and set up the system for "normal transmission" operation (message identification switch must be in NO DELETE position).

(b) Upon reception of an external operating pulse the SEND TRAFFIC lamp, associated with its respective channel, will light. The control circuit will then proceed to automatically transmit a fourteen character identification sequence -- (LTR) ZCZCABCD (FIG) 000 (LTR) -- for the message to be transmitted. After transmission of the identifying sequence, the LOWER-TD is allowed to read and transmit its message.

(c) Wired in series on the same line as the LOWER-TD is an UPPER-TD. If loaded with tape, the UPPER-TD will transmit its message tape after the associated LOWER-TD completes its transmission. Before actual transmission of the UPPER-TD message tape, a new fourteen character identifying sequence will be transmitted (the code is exactly the same as the previous sequence, except that the number portion of the sequence is increased by one unit).

(d) While the UPPER-TD is transmitting its message, the LOWER-TD may again be loaded with a message tape for transmission upon completion of the UPPER-TD transmission. Before transmission of the new message, the control circuit, again, automatically transmits another identification sequence and (assuming continued reception of the external operating pulse) will allow the LOWER-TD to read and transmit its message. This tandem type operation will continue until interrupted (1) by the operator or (2) by the absence of the external operating pulse.

(2) MESSAGE IDENTIFICATION DELETE - To operate the message identification deletion feature, both the UPPER and LOWER transmitters should be in an idle condition (i.e. no tape installed). Operating the deletion switch, located on the control panel below the ABNORMAL TRAFFIC lamp, to the down or "delete" position conditions the control circuit to omit transmission of the normal identification sequence when a tape is inserted in a LOWER-TD. As soon as the tape begins to move, the switch should be returned to the NO DELETE (up) position in order to return the control circuit to a normal transmission (tandem) condition.

c. CONTROL PANEL - Mounted on the cabinet front is a control panel (Figure 1-2). The panel provides mounting, viewing, and access facilities for three SEND TRAFFIC lamps, three numbering modules, three ABNORMAL TRAFFIC lamps, three NO DELETE switches, and three identification card holders. The control panel is hinged at the bottom, and swings down for access to the knurled knobs on the counter drums for number resetting purposes. Refer to Table 3-3 and Figure 3-4 for a listing of the operating controls and alarms on the Transmitting Group.

d. OPERATING PROCEDURE

(1) LOADING TRANSMITTERS WITH TAPE - Both the UPPER and LOWER TD units are loaded in the same manner (see Figure 3-5). Place the start-stop switch to the STOP position. Depress the red button to raise the tape lid. Place the tape feed perforations on the teeth of the feed wheel with the first code to be transmitted directly over the sensing pins. When placed in the transmitter, the printed characters should be up, and three code holes should be to

Table 3-3. Transmitting Group Operating Controls and Alarms

Item	Control or Alarm	Purpose	Remarks
1	Identification Card Holder	Provides mounting facilities for an identification card.	Provides means for transmitter channel identification.
2	Numbering Module	Provides visual indication of message number.	Number in view is same as number transmitted.
3	SEND TRAFFIC alarm lamp (AMBER)	Indicates transmission of message from transmitter.	Will light upon reception of external operating pulse.
4	ABNORMAL TRAFFIC alarm lamp (CLEAR)	Indicates an abnormal line condition.	Wired by customer.
5	NO - DELETE switch	Allows deletion of identification sequence from transmission.	Operated to "delete" position (down) only when both transmitters are in "idle" condition. Will prevent normal transmission if left in "delete" position.
6	Main POWER ON-OFF switch	Supplies 115 volt A.C. power to all transmitting group circuits.	Located on electrical control rack panel. Accessible from rear of cabinet, or when dome is raised and rack is rotated to a horizontal position.

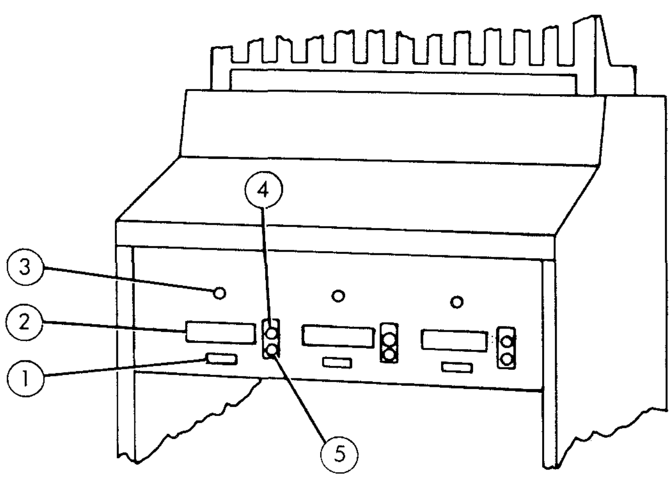


Figure 3-4. Transmitter Group Operating Controls and Alarms

the left of the feed wheel. Hold the tape flat, and close the tape lid. If it is desired to utilize the tape deflector, make sure it is down before the tape lid is closed.

(2) STARTING OPERATION

(a) Place the main POWER ON-OFF switch to the ON position. The switch is

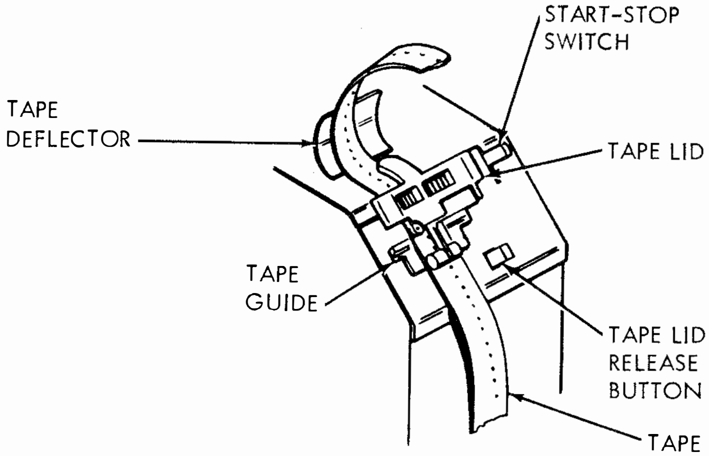


Figure 3-5. Path of Tape in Transmitter Distributor

accessible when the rear doors are opened, or by raising the dome and swinging the control relay rack to the horizontal position (see Figures 4-50 and 4-54).

(b) First load the LOWER-TD with tape, and place it in the RUN position. The UPPER-TD may then be loaded with tape and also placed in the RUN position. Messages will be transmitted in tandem fashion as long as tapes are loaded into the transmitters and the external operating pulse is being received.

(3) STOPPING OPERATION - To stop operation of the equipment, place the start-stop switches on the transmitter distributors in the STOP position. The transmitting group is now in "idle" condition, the control circuit being supplied with power. Operating the main POWER ON-OFF switch to the OFF position disconnects 115 volt A.C. from all power supply circuits and places the equipment in a stop condition.

e. TRANSMITTING CIRCUIT (LBAC256BR CABINET)- The LBAC256BR Transmitting Cabinet when equipped with LXD31 Transmitter Distributors mounted on a LMXB209BR Base and LBXD16 Transmitter Distributors mounted on a LMXB207BR Base, is a later design Transmitting Group of the Torn Tape System. The Transmitting Group can operate as an originating station or as a message switching station and provides facilities for the transmission of messages from perforated tape, to the outgoing signal lines, at predetermined speeds. Station identification codes and the message number may be automatically transmitted preceding each message.

(1) The later design Transmitting Group is arranged for the following mode of operation:

(a) A LXD31 Transmitter Distributor and a LBXD16 Transmitter Distributor on one signal line, transmitting messages on an alternate first come-first served basis and served by one message identification and numbering module.

(b) Polar signal line.

(c) Externally pulsed control circuit. Option (Z).

(d) Free running control circuit. Option (Y).

(2) The later design Transmitting Group provides wiring and electrical control facilities to provide operation of:

(a) Three of the arrangements described in previous Paragraph 3-3.e.(1).

(b) Three message identification and numbering modules.

(c) Three message identification Delete switches.

(d) Three send traffic lamps and three abnormal traffic lamps.

(3) A control panel is provided which contains:

(a) Terminal blocks for use by the customer in connecting Polar signal line battery, outgoing signal line and 120 volts DC battery supply.

(b) AC Power switch, fuses and receptacle.

Table 3-4. Monitor Group Operating Controls and Alarms

Item	Control or Alarm	Purpose	Remarks
1	ABNORMAL TRAFFIC alarm lamp (AMBER)	Indicates an abnormal line condition.	Wired by customer.
2	ABNORMAL TRAFFIC jacks	To make a signal line available for transmission from Rerun Cart Group.	Wired by customer.
3	LOW TAPE alarm lamp (CLEAR)	Indicates a low tape condition on one of the typing reperforator supply reels.	The exact unit running out of tape is identified by red colored tape coming out of reperforator.
4	TAPE WINDER switch	To supply 115 volt A.C. to tape winder motors.	Switch on UPPER SHELF section controls left tape winder set, while that on LOWER SHELF controls right set.
5	Identification Card Holders	Provide mounting facilities for an identification card.	Provides means for monitor channel identification.
6	WINDER FULL lamp (AMBER)	Indicates full condition of one of the tape winder reels.	Specific reel becoming full is determined by a visual inspection of the reels.
7	115 volt A.C. power receptacle	Provides 115 volt A.C. power to Rerun Cart Group.	
8	60 volt D.C. power receptacle	Provides 60 volt D.C. power to Rerun Cart Group.	
9	POWER ON-OFF switches	Supplies 115 volt A.C. to multiple typing reperforator set motor units.	Two switches, one mounted on each base and located at the left front corner of the base. Accessible when front doors are opened.
10	Main POWER ON-OFF switch	Supplies 115 volt A.C. to all Monitor Group circuits.	Located on lower electrical control rack panel. Accessible via rear doors, or when dome is raised and rack is swung to a horizontal position.

(c) Current limiting resistors for use in operating the transmitter and distributor clutch magnets from the 120 volts DC supply.

(4) In addition this Transmitting Group features the following:

(a) Two multiple transmitter bases mounted on sliding shelves.

(b) Three LXD31 Transmitter Distributors and three LBXD16 Transmitter Distributors that accept chadless or fully perforated tape (11/16 inch or 7/8 inch wide).

(c) Manually operated message identification delete switches.

(d) Tape grid to hold message tapes.

(e) Tape storage bin for both "ready" and "transmitted" tapes.

(f) Power factor correctors.

(g) Channel identification card holders.

(h) Two motors (synchronous or governed).

(i) Front, rear and top accessibility.

(j) Shielded signal cables.

(k) End enclosure for the cabinet.

(5) The Message Identification Module is of an electromechanical design and its function are as follows:

(a) To provide a means of automatically transmitting eleven identifying characters and the message number (000-999) to the line, immediately preceding the message.

(b) Provide a means of deleting the identification and numbering sequence.

(6) The module consists of the following:

(a) A mechanical counter capable of counting up to 999 and storing the telegraph baudot code associated with the numbers counted; in addition, providing a visual indication of the numbers counted.

(b) An electromechanical stepping switch that is capable of storing a minimum of 14 (five level) baudot codes.

(c) Necessary relays, and associated circuitry for providing tandem operation of two transmitter-distributors and message identification deletion.

(7) Insertion of a tape in a transmitter results in completing a flip-flop circuit between a stepping switch, the transmitter-distributor clutch magnet and auxiliary contact. The stepping switch stores a five level baudot code and the distributor transmits the code sequentially. An electromechanical counter is actuated and registers the number of messages and stores the associated baudot code on three code reading contact assemblies. These stored number codes will also be transmitted by the distributor. Upon completion of transmitting the identifying code (LTR) ZCZC ABCD (FIG) 123 (LTR) the transmitter is connected in series with the same signal line and can be loaded with a message tape while the first transmitter is operating. Upon completion of the first transmitter operation, the second transmitter message tape will automatically be preceded by an identifying code (LTR) ZCZC ABCD (FIG) 124 (LTR) and be transmitted.

(a) The entire message identification sequence can be omitted from the transmitted text by operation of the Message Identification Delete switch.

(8) The electrical control facilities are located at the rear of the cabinet on an electrical control rack. The electrical rack mounts on a swivel mechanism, and can be rotated to a horizontal position for maintenance purposes when the dome is opened. Captive screws are provided to secure the rack in the horizontal or vertical position.

(a) Four power factor correction capacitors are mounted at the bottom of the cabinet.

3-4. MODEL 28 MONITOR GROUP

a. GENERAL - The Model 28 Monitor Group consists of two Multiple Typing Reperforator Sets and two Multiple Tape Winder Sets (TW15) mounted in a common cabinet (LBAC224BR or LBAC257BR or LBAC259BR). The cabinet, besides providing mounting facilities for the above equipment, also houses the necessary electrical control apparatus for its operation (Figure 1-3). Each of the multiple reperforator sets is composed of three typing reperforators (LPR37BWA or LPR37BRP) and a motor unit (LMU12), mounted on a common base (LMRB203BZ). The two reperforator sets are located, one above and one below the tape winders, on the cabinets UPPER SHELF and

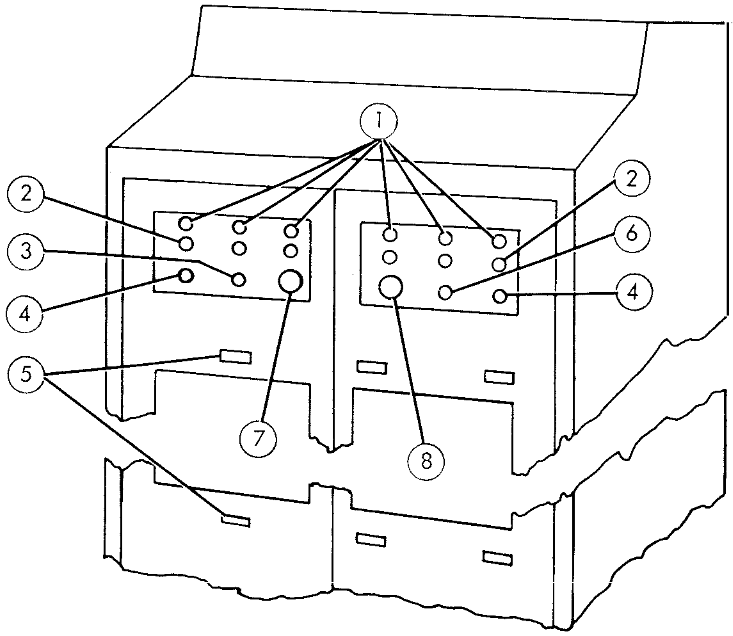


Figure 3-6. Monitor Group Operating Controls and Alarms

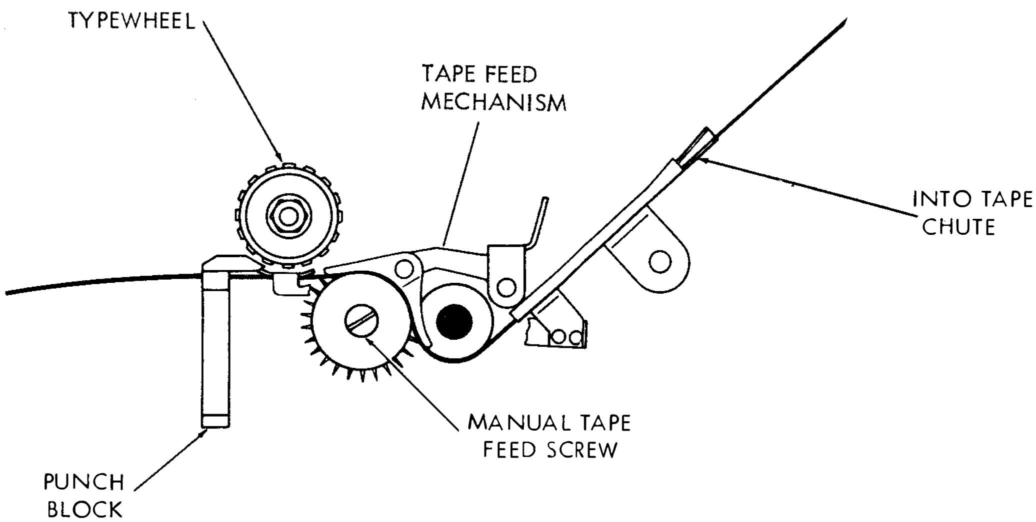


Figure 3-7. Path of Tape in Typing Reperforator

LOWER SHELF. The reperforator sets mount on sliding rails, and may be pulled forward for maintenance or servicing. Tape supply and chad disposal facilities, mounted on the bases, are provided for each typing reperforator (Figure 1-28).

b. SUMMARY OF OPERATION - Incoming messages, from six separate lines, are received by the typing reperforators, one on each line. The reperforators convert the incoming signal code and store the message on paper tape in the form of code perforations and printed characters. After perforation, the tape is automatically wound on a tape winder.

c. CONTROL PANEL - The control panel, located at the front of the cabinet, is divided into two sections - UPPER SHELF and LOWER SHELF (Figure 1-3). Mounted on the control panel are six ABNORMAL TRAFFIC lamps, six ABNORMAL TRAFFIC jacks, two TAPE WINDER switches, a LOW TAPE lamp, a WINDER FULL lamp, a 115 volt A.C. power receptacle, and a 60 volt D.C. power receptacle. Refer to Table 3-4 and Figure 3-6 for a listing of the operating controls and alarms on the monitor group.

d. OPERATING PROCEDURE

(1) TAPE AND RIBBON ROUTING

(a) TAPE ROUTING (Figure 4-59)

1. Tape routing for the UPPER and LOWER SHELF reperforator sets is basically the same. Tape feeds forward from off the top of a tape supply roll and through the tape guide fastened to the side of the supply reel container (Figure 1-28). From the tape guide the tape is fed into the tape chute of the reperforator, through the tape feed mechanism, and through the punch block. (Figure 3-7).

2. From the punch block the tape is fed down (UPPER SHELF reperforators) to the left and through a tape winder tape arm (Figures 4-59 and 1-32). The end of the tape is threaded about six inches through any one post on the center of the tape winder reel and wound two or more turns to secure it. The tape is then brought under the post and up between the backstop and chad depressor (Figure 1-32).

3. The only variation for routing tape on the LOWER reperforators is that after passing through the punch block, the tape is directed up to the right and over a tape guide roller attached to a tape winder supporting frame.

(b) RIBBON ROUTING - Ribbon routing for these reperforators is identical to that for the LPR34BWA units and is covered in paragraph 3-2d.(1)(b).

(2) CHAD DISPOSAL (Figure 1-28) - Each reperforator unit is supplied with disposal facilities for chad. When a fresh roll of tape is placed into the tape supply container for a reperforator, the chad container associated with the reperforator should be emptied.

CAUTION

Failure to empty the chad container can result in equipment failure due to chad backing up in the chad chutes and fouling the punch mechanism.

(3) STARTING OPERATION

(a) Place main POWER ON-OFF switch to the ON position. The switch is accessible when the rear cabinet doors are opened, or by raising the dome and rotating the control rack to its horizontal position.

(b) Place the multiple reperforator set POWER ON-OFF switches to the ON position. The switches are located at the left corner of the bases, and are accessible when the front doors are opened.

(c) Place the TAPE WINDER switches to their ON position.

(4) STOPPING OPERATION - To stop operation, operate the above power switches to their OFF position.

3-5. MODEL 28 RECEIVING GROUP

a. GENERAL - The Model 28 Receiving Group consists of two multiple typing reperforator sets mounted in a common cabinet (LBAC225BR) (Figure 4-60), or (LBAC254BR Figure 1-4A), or (LBAC260BR Figure 1-4B). Each set is comprised of three typing reperforators (LPR35BWA or LPR35BRP) and a motor unit (LMU12 or LMU14) mounted on a multiple base (LMRB203BZ) Figure 1-35 or (LMRB 207BZ). The cabinet provides, in addition, the electrical control facilities necessary to operate the sets. Chad disposal and tape supply facilities (Figure 1-35) are furnished for each typing reperforator.

b. SUMMARY OF OPERATION - Incoming messages, from six separate lines, are received by the typing reperforators, one on each line. The reperforators convert the incoming signal code and store the message on paper tape in the form of code perforations and printed characters. After perforation, the tapes exit from slots in the front cabinet doors. Completed messages are torn off and placed in one of the spring tape holders for subsequent transmission.

c. CONTROL PANEL - The control panel (Figure 1-4), located on the cabinet front, is divided into two sections - UPPER SHELF and LOWER SHELF. Mounted on each section of the control panel are three URGENT lamps, three TAPE FEED OUT buttons, three ABNORMAL TRAFFIC lamps and three BUSY lamps. In addition, a LOW TAPE lamp is located in the lower left corner of the UPPER SHELF section. Refer to Table 3-5 and Figure 3-8 for a listing of the operating controls and alarms on the receiving group.

d. OPERATING PROCEDURE

(1) TAPE AND RIBBON ROUTING

(a) TAPE ROUTING - Tape routing for these reperforator sets is essentially the same as for those used in the Monitor Group (Paragraph 3-4.d.(1)(a)1., and Figure 1-35). After coming through the punch block, the tape is directed through the appropriate slot in the front doors of the cabinet (Figure 1-4).

(b) RIBBON ROUTING - Ribbon routing for these reperforators is identical to that for the LPR34BWA units and is covered in Paragraph 3-2.d.(1)(b).

(2) CHAD DISPOSAL (Figure 1-35). Refer to Paragraph 3-4.d.(2).

Table 3-5. Receiving Group Operating Controls and Alarms

Item	Control or Alarm	Purpose	Remarks
1	URGENT alarm lamps (RED)	Indicates an emergency line condition.	Wired by customer.
2	BUSY alarm lamp (AMBER)	Indicates a busy line condition.	Wired by customer.
3	ABNORMAL TRAFFIC alarm lamps (AMBER)	Indicates abnormal line condition.	Wired by customer.
4	TAPE FEED OUT buttons	Initiates automatic letters tape feed out mechanism on typing reperforators.	Feeds out a predetermined length of tape at the end of a message (when depressed) perforated with the LETTERS code combination.
5	LOW TAPE alarm lamp (AMBER)	Indicates a low tape condition on one of the typing reperforator supply reels.	The exact unit running out of tape is identified by red colored tape coming out of reperforator.
6	Main POWER ON-OFF switch	Supplies 115 volt A.C. to all Receiving Group circuits.	Located on lower electrical control rack panel. Accessible via rear doors, or when dome is raised and rack swung to a horizontal position.
7	POWER ON-OFF	Supplies 115 volt A.C. to multiple typing reperforator set motor units.	Two switches, one mounted on each base and located at the left front corner of the base. Accessible when front doors are opened.

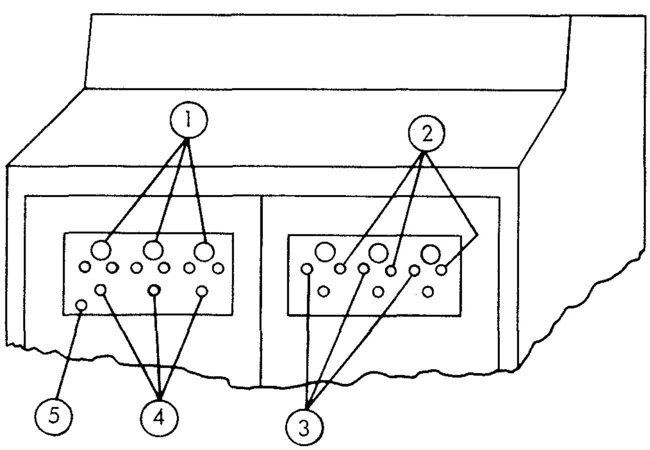


Figure 3-8. Receiving Group Operating Controls and Alarms

(3) STARTING OPERATION

(a) Place main POWER ON-OFF switch to the ON position. The switch is accessible when the rear cabinet doors are opened, or by raising the dome and rotating the control rack to its horizontal position.

(b) Place the multiple reperforator set POWER ON-OFF switches to the ON position. The switches are located at the left corner of the bases, and are accessible when the front doors are opened.

(4) STOPPING OPERATION - To stop operation, operate the above power switches to their OFF positions.

3-6. RERUN CART GROUP

a. GENERAL - The Rerun Cart Group consists of a transmitter distributor (LXD11) and Motor Unit (LMU4) mounted on a base (LXDB 9) (Figures 1-43 and 1-44), and enclosed by a two piece cover (LXDC200BR) assembly. One section of the cover assembly slides over the motor units, and the other snaps into place around the transmitter distributor. When assembled, the above unit sits on a table (LT200BR) which, in turn, sets in a dolly (173861) (see Figure 1-5). Connected to the base are three 8 foot cables (Figure 1-42) terminated in two different polarized plugs and a three circuit plug. These plugs mate with their respective receptacles on the control panel of the Monitor Group Cabinet (refer to Table 3-4, Figure 3-6, and Figure 1-3) from which power and signal line facilities are supplied to the Rerun Cart Group.

b. OPERATING PROCEDURE

(1) TAPE LOADING - Refer to Paragraph 3-3.d.(1).

(2) STARTING OPERATION

(a) Insert the three male plugs (one on each 8 foot cable assembly) into their respective mating connectors on the Monitor Group Control Panel.

(b) The main POWER ON-OFF switch of the Monitor Group must be in the ON position. If it is not, refer to Paragraph 3-4. d.(3)(a).

(c) Place the POWER ON-OFF switch on the Rerun Cart Group base to the ON position. The switch is located at the right rear corner of the base when the group is viewed from the front (see Figure 1-5).

(3) STOPPING OPERATION - Place the POWER ON-OFF switch of the Rerun Cart Group to the OFF position, and remove the plugs from the control panel receptacles.

SECTION 4

PRINCIPLES OF OPERATION

4-1. GENERAL

a. This section covers the operating principles and circuit descriptions of the Model 28 Reperforator Transmitter Group, Transmitting Group, Monitor Group, Receive Group, and Rerun Cart Group. The groups provide complete facilities for the reception, storage, and transmission of messages over radio or wire channels connecting two or more stations equipped with compatible units.

b. The signals transmitted and received by these teletypewriters are of polar type, direct current, 7.00 unit or 7.42 unit start-stop pattern. Gearing changes can adapt the equipment to 390 operations per minute (45.5 baud) or 643 operations per minute (75.0 baud). The equipment is wired for operation on 0.035 ampere line current. A transformer and rectifier supply furnishes current for operation of the selector unit magnets through an electronic keyer. The selector magnet curcuits are closed loops with a separate electronic keyer required for each unit in the groups equipped with a selector magnet. All signal leads are shielded, and all shielding is insulated from the equipment frame.

c. The sets are driven by synchronous or governed motors depending upon the source of power. Synchronous motors require a power supply of 115 volts (plus or minus 10 per cent) 60 cycles, single phase alternating current. To avoid loss in receiving margin with this type motor, the frequency regulation must be within plus or minus one-half cycle. Governed motors require a like power supply, except that the frequency may be from 50 to 60 cycles.

4-2. SIGNALING CODE

a. The various components of the teletypewriter operate on the principle of electromechanical conversion of message characters (see Figure 4-1), in terms of a signal code.

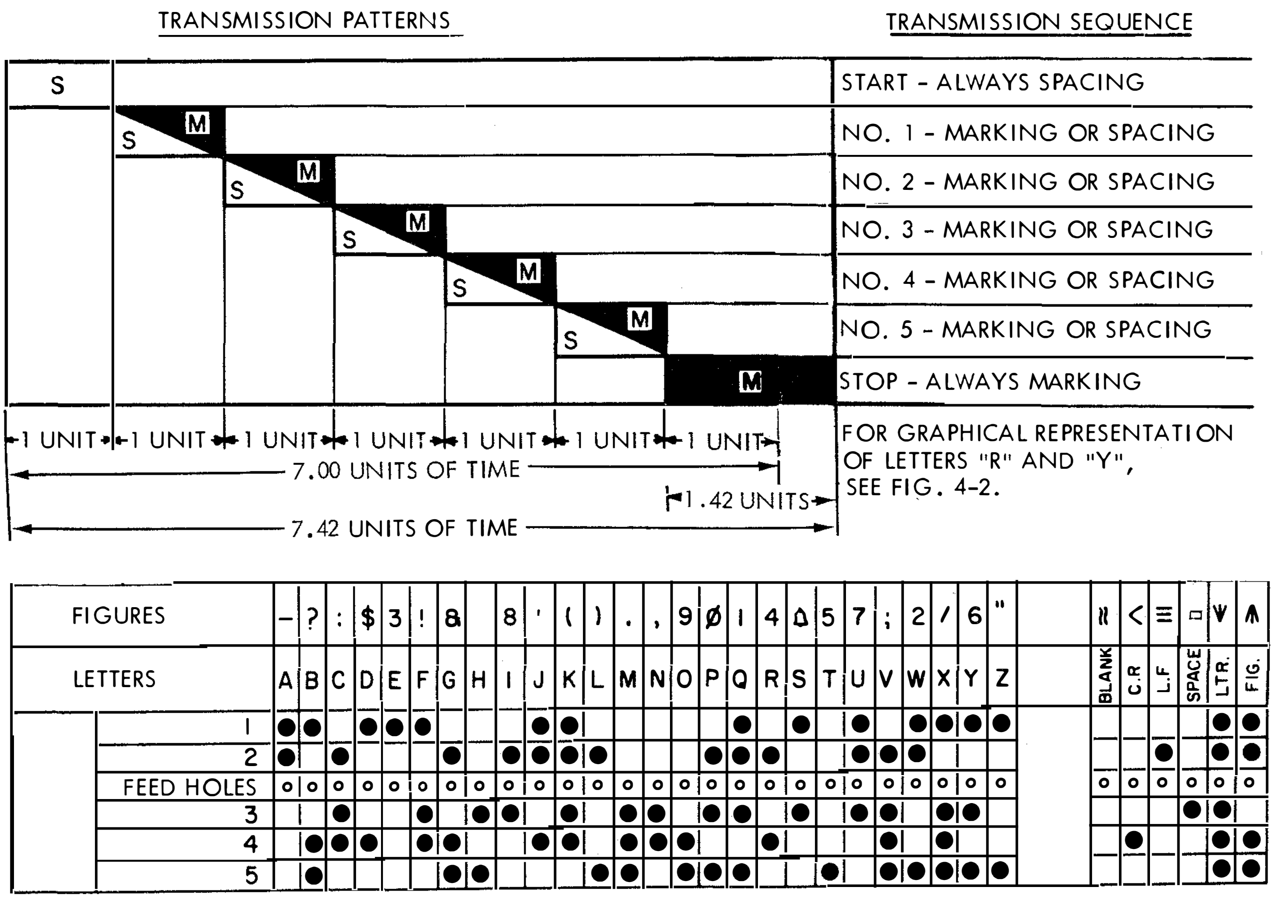


Figure 4-1. Signal Code

Teletypewriter equipment utilizes the Baudot code, a five-unit start-stop signaling code, in which each character or function is represented by a combination of marking current and spacing current time intervals. In a polar signal circuit, intervals during which current flows in a positive direction in the signal circuit are referred to as "marking" elements, and intervals during which current flows in the opposite direction as "spacing" elements. Every combination includes five elements that carry the intelligence, each of which may be either marking or spacing. The intelligence elements are preceded by a start element (always spacing) and are followed by a stop element (always marking). Thus each combination consists of 7.00 or 7.42 units of time (referred to as a 7.00 or 7.42 unit transmission pattern). The start and stop elements provide for mechanical synchronization between the transmitting and receiving equipment. A graphic illustration of the marking and spacing element in each sequence may be found in Fig. 4-2, Code Repersentation of the Letters R and Y. All five elements are marked in the letters code. The blank code is comprised of five spacing elements.

b. The total number of permutations of a five unit code is two to the fifth power, or 32. In order to transmit more than 32 characters and functions, a letters-figures shift operation is designed into the equipment, permitting each permutation, excluding those used to shift and unshift the apparatus, to represent two characters or functions.

c. The sets employ the 7.00 or 7.42 unit transmission pattern (see Figure 4-1). The signaling frequency is expressed in dot cycles per second. One cycle consists of a positive current pulse followed by a negative current pulse. The equipment speed in baud is equal to twice the frequency. Speed in words per minute is roughly equivalent to one-sixth the operations per minute.

4-3. MODEL 28 REPERFORATOR TRANSMITTER GROUP

a. GENERAL - The Model 28 Reperforator Transmitter Group (Figure 1-1) is an electromechanical device designed to provide fully automatic perforation, storage, and retransmission of an entire message on tape. The group consists of two Reperforator Transmitter (RT) Sets (Figure 1-6) mounted in an LBAC222BR or LBAC238BR or LBAC253BR Universal Cabinet (Figure 4-3). The components which make up an RT set are a LPR34BWA or LPR34BRP Typing Reperforator, LAXD7 or LAXD8 Pivoted Transmitter Distributor, LRXB17 or LRXB27 Base, LMU11 Motor Unit, and a LTHS205BZ Tape Handling Stand. The necessary electrical control facilities to operate the RT Sets are provided in the LBAC222BR or LBAC238BR or LBAC253BR Cabinet. All equipment signal leads are shielded, and all shielding is insulated from the equipment frames.

b. LPR34BWA TYPING REPERFORATOR (Figures 1-7 and 1-8)

(1) GENERAL

(a) The LPR34BWA or LPR34BRP typing reperforator operates from a single main drive shaft driven through a gear and shaft mechanism by the LMU11 Motor Unit through a power switch located on the base. The motor drives the gear shaft mechanism, at which point the operating speed (for the LPR34BWA or LPR 34BRP corresponding to the incoming transmission speed is determined.

(b) The typing reperforator operates in response to a line signal. The signaling

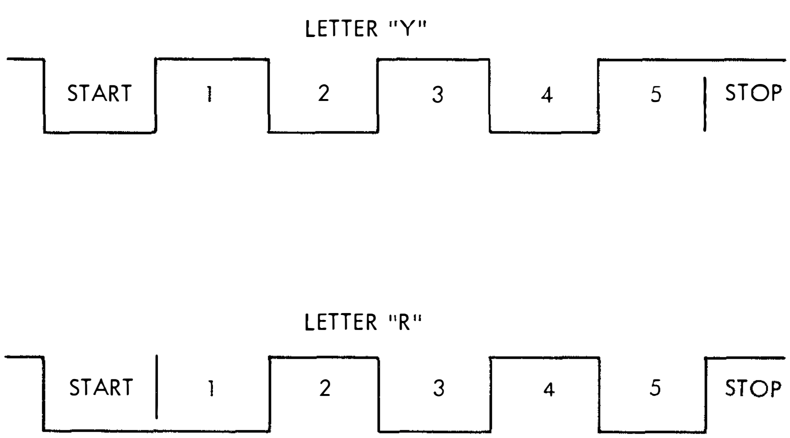


Figure 4-2. Code Representation of the Letters "R" and "Y"

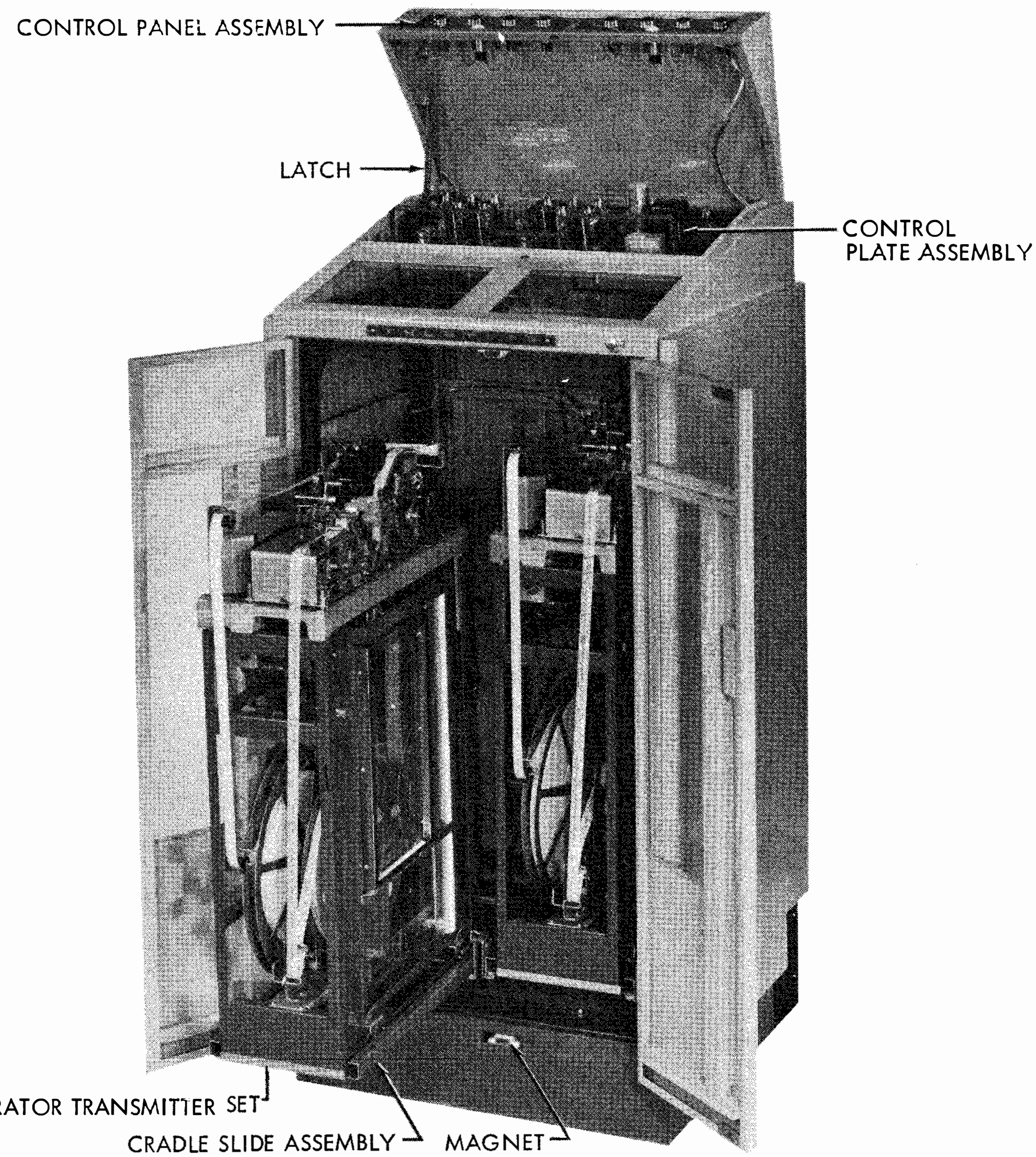


Figure 4-3. Model 28 Reperforator Transmitter Group (Slide Mounted Cradle Allows RT Set to be Pulled Out Through Front of Cabinet)

code combinations are applied to the selecting mechanism through an electronic keyer located in the cabinet. The start pulse of each code combination causes the selector magnet armature to trip the selecting cam-clutch. Driven by the main shaft, the cam-clutch begins its cycle and imparts timed motion to the selector, which converts the code combinations into corresponding mechanical arrangements. Near the end of each selecting cycle, the selecting cam-clutch trips the function cam-clutch and permits the punch slides of the perforator to receive the arrangements from the selector. The selecting cam-clutch is then disengaged by the stop pulse of the code and remains inoperative until the next start pulse is received.

(c) The punch slides distribute intelligence from the selector in the form of mechanical arrangements to the punch block and to the transfer mechanism. The transfer mechanism, in turn, carries the information to the function box and the axial and rotary positioning mechanisms. At the receipt of the letters or figures code combination, the function box causes the rotary mechanism to shift the typewheel so that the proper characters are selected. The ribbon feed mechanism supplies the ink,

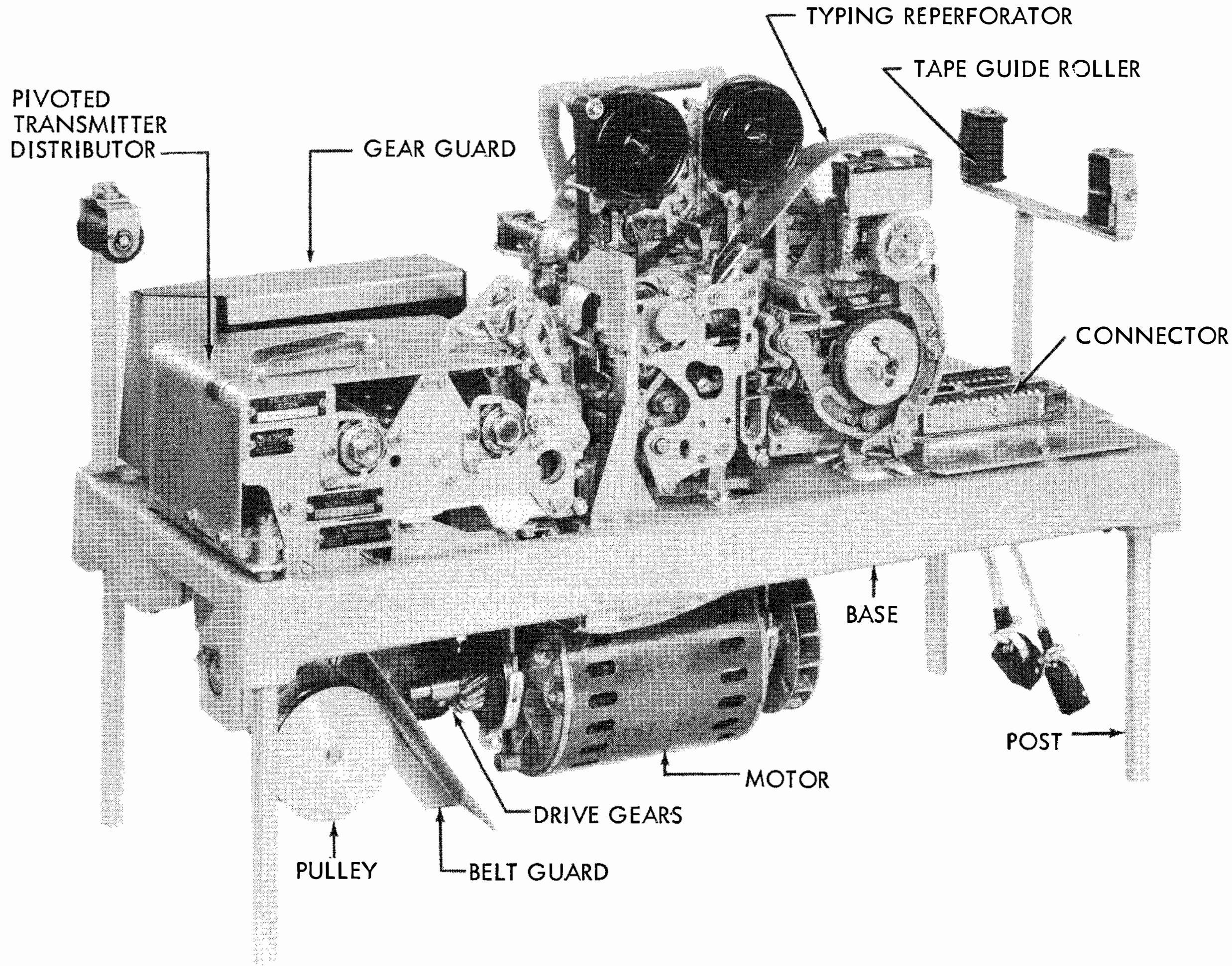


Figure 4-4. Base (LRXB17)(With Typing Reperforator, Pivoted Transmitter Distributor and Motor

and the printing mechanism provides the impact to print the selected characters.

(d) The reperforator main bail assembly, driven by the rocker bail, imparts motion to the tape feed parts, which advance the tape and the punch slides. The punch slides, having received the intelligence from the selector, cause pins in the punch block to perforate combinations of holes corresponding to the code combinations, and to perforate a feed hole.

(2) SELECTING MECHANISM

(a) The selecting mechanism consists of the selector magnet coil and armature, a selector cam-clutch, and the associated levers, arms, bails, and slides necessary to convert the electrical elements of the start-stop code to the mechanical arrangements which govern the characters to be printed and the functions to be performed.

(b) The selector cam-clutch comprises, from right to left (Figure 4-5): the clutch, stop arm bail cam, the fifth, fourth, and third selector lever cams, the cam for the spacing and marking lock levers, the second and first selector lever cams, the push lever reset bail cam, and the function clutch trip cam.

(c) During the time in which a closed line circuit (marking) condition exists, the selector magnet coils are energized and hold the selector armature against the selector magnet pole pieces. In this stop position, the selector armature blocks the start lever (Figure 4-6). While the signal for any character or function is being received, the start (spacing) element releases the selector armature which, under

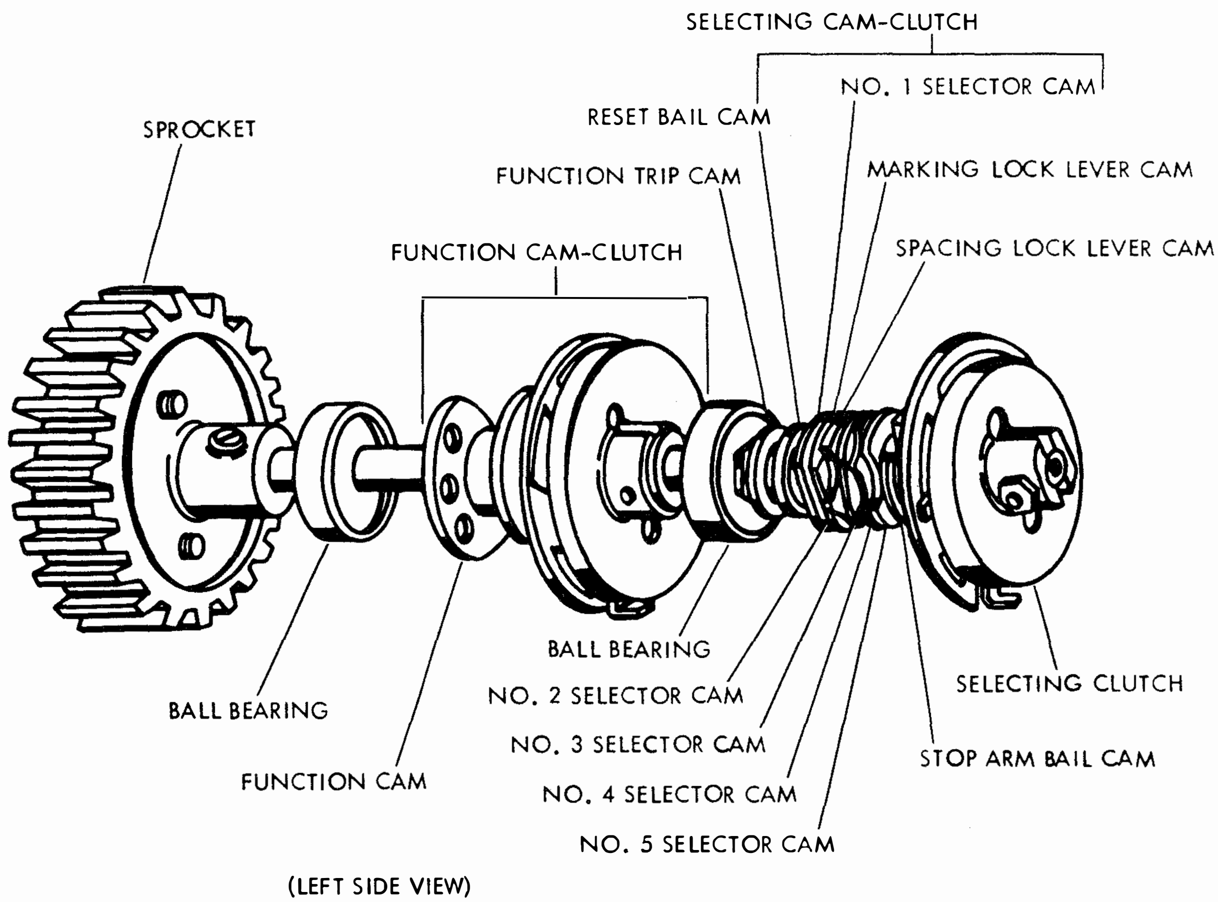


Figure 4-5. Typing Reperforator Main Shaft

the tension of its spring, moves away from the magnet cores and thus unlatches the start lever. The start lever turns clockwise under the tension of its spring, to move the stop arm bail into the indent of its cam. As the stop arm bail rotates about its pivot point, the attached stop arm is moved out of engagement with the clutch shoe lever. The selector cam-clutch engages and begins to rotate. The stop arm bail immediately rides to the high point of its cam where it remains to hold the start lever away from the selector armature during the signaling time. When the stop element at the end of signal is received, the selector armature is pulled up to block the start lever. Thus, the stop arm bail is prevented from dropping onto the low part of its cam (stop position of cam-clutch), and the attached stop arm is held so as to stop the clutch shoe lever. The selector clutch one-stop cam disk, upon which the latch lever rides, has an indent at its stop position. When the clutch shoe lever strikes the stop arm, the inertia of the cam disk assembly causes it to continue to turn until its lug makes contact with the lug on the clutch shoe lever. At this point, the latch lever drops into the indent in the cam disk, and the clutch is held disengaged until the next start element is received.

(d) The series of five selecting levers, a marking lock lever, and a spacing lock lever ride their respective cams on the selector cam-clutch. As the marking and spacing signal elements are applied to the selector magnet, the selector cam-clutch rotates and actuates the selector levers. When a spacing impulse is received, the marking lock lever is blocked by the end of the armature and the spacing lock lever swings toward the right (right end view) above the armature and locks it in the spacing position until the next signal transition is due. Extensions on the marking lock lever prevent the selector levers from following their cams (Figure 4-7). When a marking element of the signal is received, the spacing lock lever is blocked by the end of the armature and the marking lock lever swings to the right below the armature to lock it in the marking position until the next signal transition is due. During this marking condition, the selector levers are not blocked by the marking lock lever extensions but are permitted to move against their respective cams. The selecting lever that is opposite the indent in its cam, while the armature maintains a marking condition, swings to the right or selected position momentarily. Each selecting lever has an associated push lever which drops

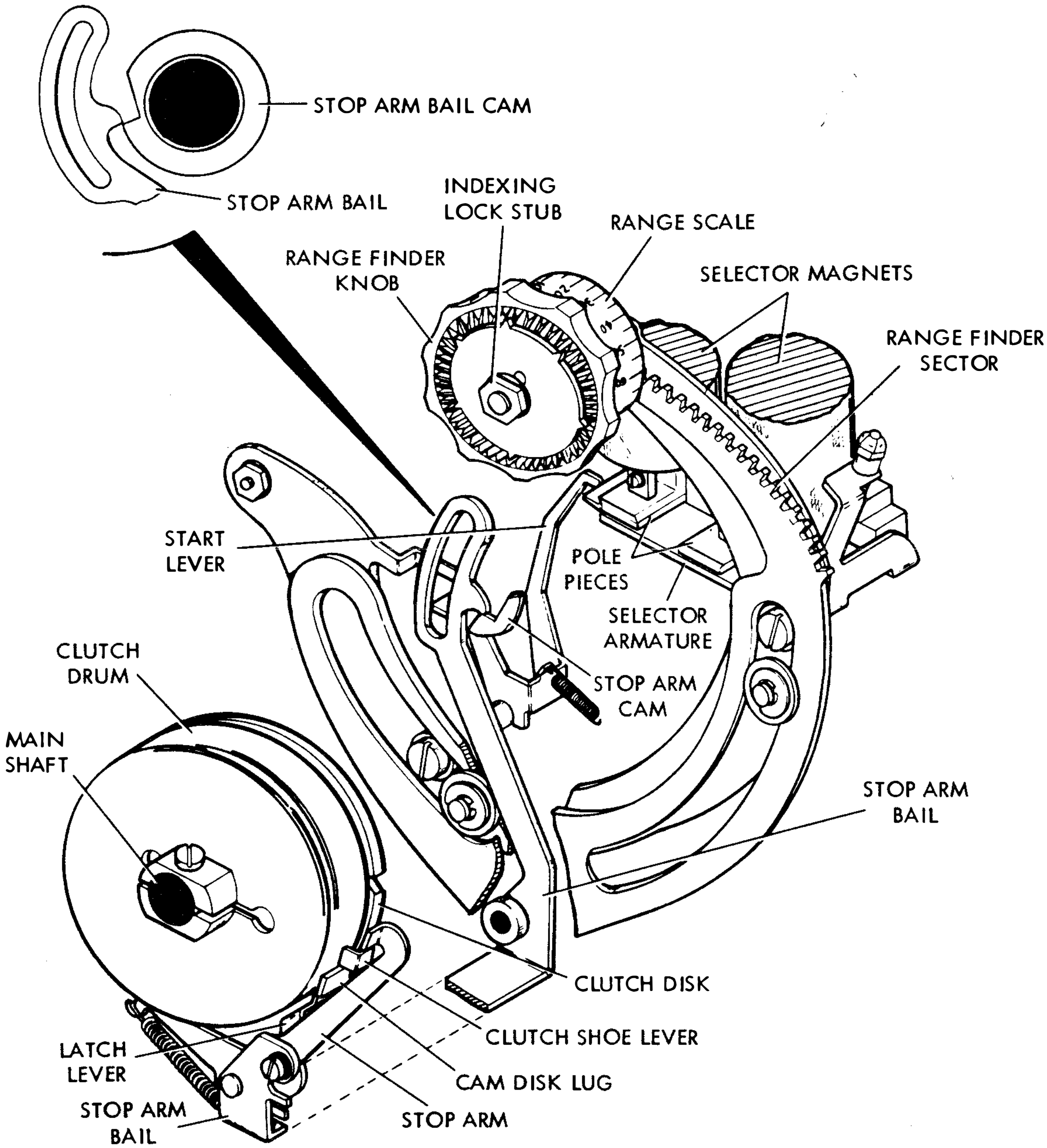


Figure 4-6. Range Finder and Selector Cam Clutch Assembly

into a notch on the top of the selecting lever when it falls into its cam indent. As the selector cam-clutch turns, each selecting lever together with its latched push lever is moved toward the left and held there until all five code impulses have been received. The selected push levers, in moving to the left, rotate associated punch slide latches counterclockwise (Figure 4-7). Just before the fifth push lever is selected, the selecting cam, through the function trip assembly, causes the perforator reset bail to release the punch slides. The unselected latches retain their associated slides to the right, while the selected latches permit their slides to move to the left under spring tension. During the latter part of the function cycle, the reset bail returns the punch slides to their unselected position (paragraph 4-3b(7)(b)2). The latches, under spring tension, return to their unselected position when the selected push levers are repositioned at the beginning of the next cycle.

(3) ORIENTATION

(a) For optimum performance, the selecting mechanism should be adjusted to sample the signaling code elements at the most favorable time. To determine this adjustment,

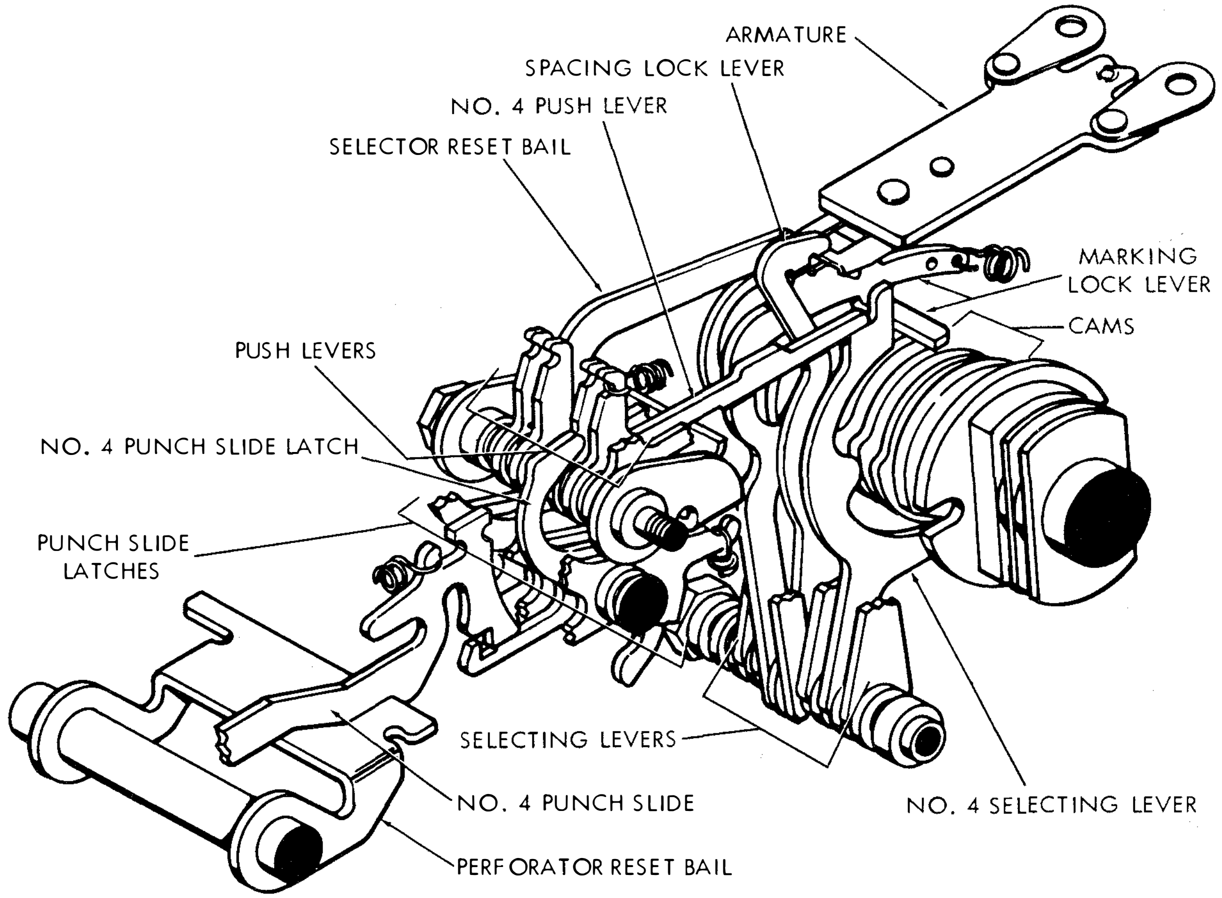


Figure 4-7. Selecting Mechanism

the operating margins are established through the range finder, which provides a means of varying the time of sampling.

(b) When the range finder knob (Figure 4-6) is pushed inward and rotated, its attached range gear moves the range finder sector (which mounts the stop arm bail, stop arm and latch lever), either clockwise or counterclockwise about the selector cam-clutch. This changes the angular position at which the selector cam-clutch stops with respect to the selecting levers. When an optimum setting is obtained, the range finder knob is released. Its inner teeth engage the teeth of the indexing lock stud to lock the range finder mechanism in position. The setting may be read on the range scale opposite the fixed index mark.

(4) MOTION FOR TYPING AND PERFORATING

(a) GENERAL - The main shaft rotates at a constant speed in a fixed gear ratio which will accommodate an input at operating speeds of 106 or 65 WPM (75 or 45.5 Baud). The motion is distributed to the mechanisms concerned with typing and perforation by the function mechanism, which is comprised of a cam-clutch, a clutch trip assembly (Figure 4-8) and a rocker bail (Figure 4-9).

(b) FUNCTION CAM-CLUTCH AND CLUTCH TRIP ASSEMBLY

1. The main trip lever is rotated counterclockwise by the selector cam clutch when the function trip cam raises the follower lever near the end of the selecting cycle. Immediately, the lower part of the function trip cam allows the follower lever to return to its unoperated position, and the main trip lever is free to move under the clutch release when the trip shaft raises the release. A reset bail trip lever attached to the main trip lever lowers the reperforator reset bail and releases the punch slides. An upper arm of the main trip lever moves out of the way of the clutch release, which falls against a downstop and rotates a trip shaft counterclockwise. Immediately the trip lever latch allows the main trip lever to return toward its unoperated position, the upper arm moving down against the clutch release. When the trip shaft is rotated by the release, it moves the clutch trip lever out of engagement with the clutch shoe lever. The clutch engages (see Paragraph 4-3b(1)(b)) to begin the function cycle.

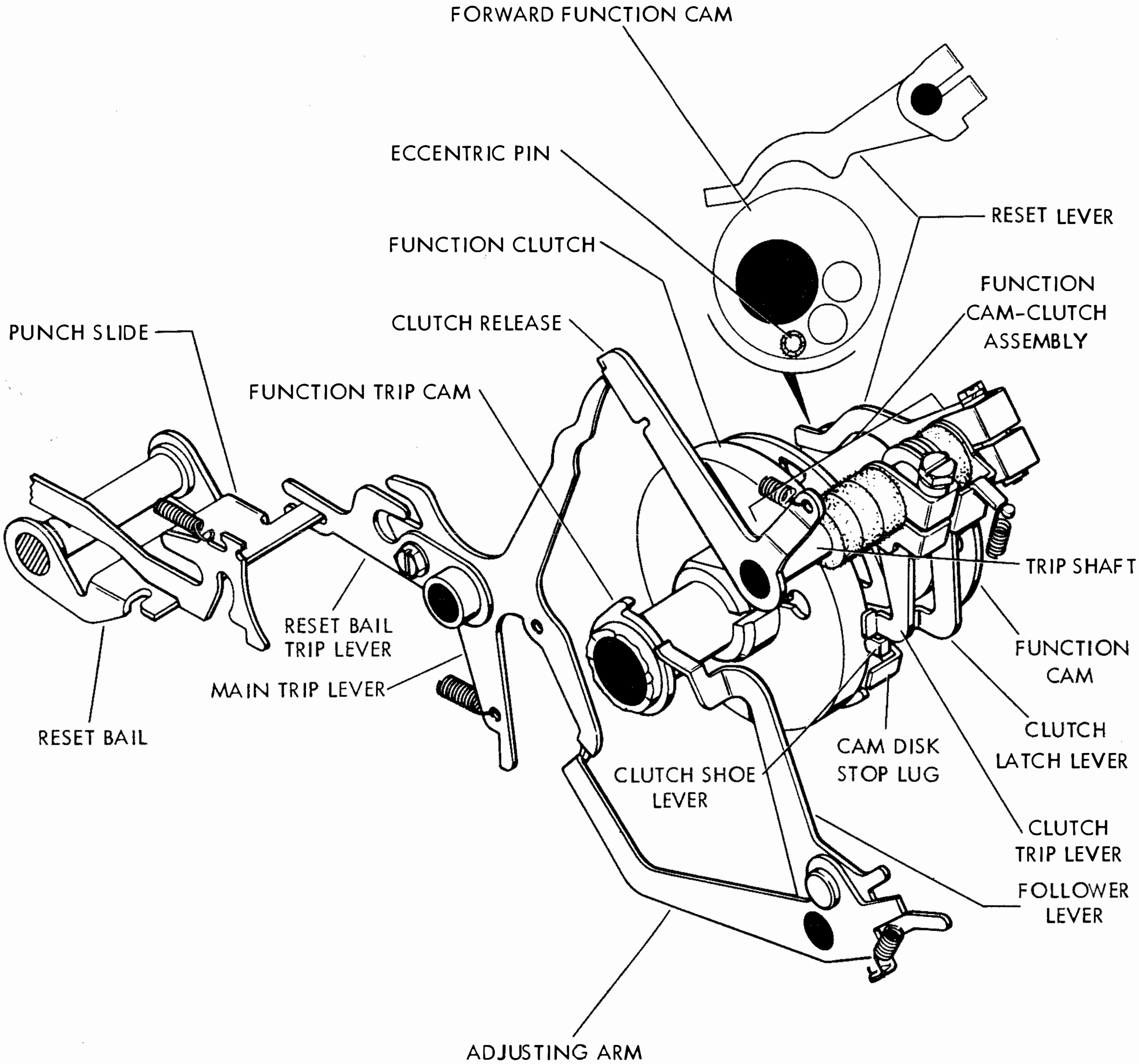


Figure 4-8. Typing Reperforator Function Cam - Clutch and Clutch Trip Assembly

2. About midway through the function cycle, an eccentric pin on the function cam lifts a reset arm, which rotates the trip shaft clockwise. The clutch release is moved upward, allowing the main trip lever to rotate fully clockwise, raising the reset bail. The eccentric pin then moves out from under the reset arm, and the clutch release is permitted to return to its unoperated position against the main trip lever. When the cam-clutch assembly completes its cycle, the clutch shoe lever strikes the trip lever, and the clutch is disengaged.

(c) THE ROCKER BAIL ASSEMBLY (Figure 4-9) - The rocker bail distributes motion received from the function cam-clutch to the following:

1. Perforator.

2. Function Box.

3. Push bars of the axial and rotary positioning mechanisms.

4. Oscillating assembly.

5. Corrector mechanism.

6. Printing mechanism.

7. Ribbon feed mechanism.

The bail is shown in its home position. Each function cycle, the function cams bear against

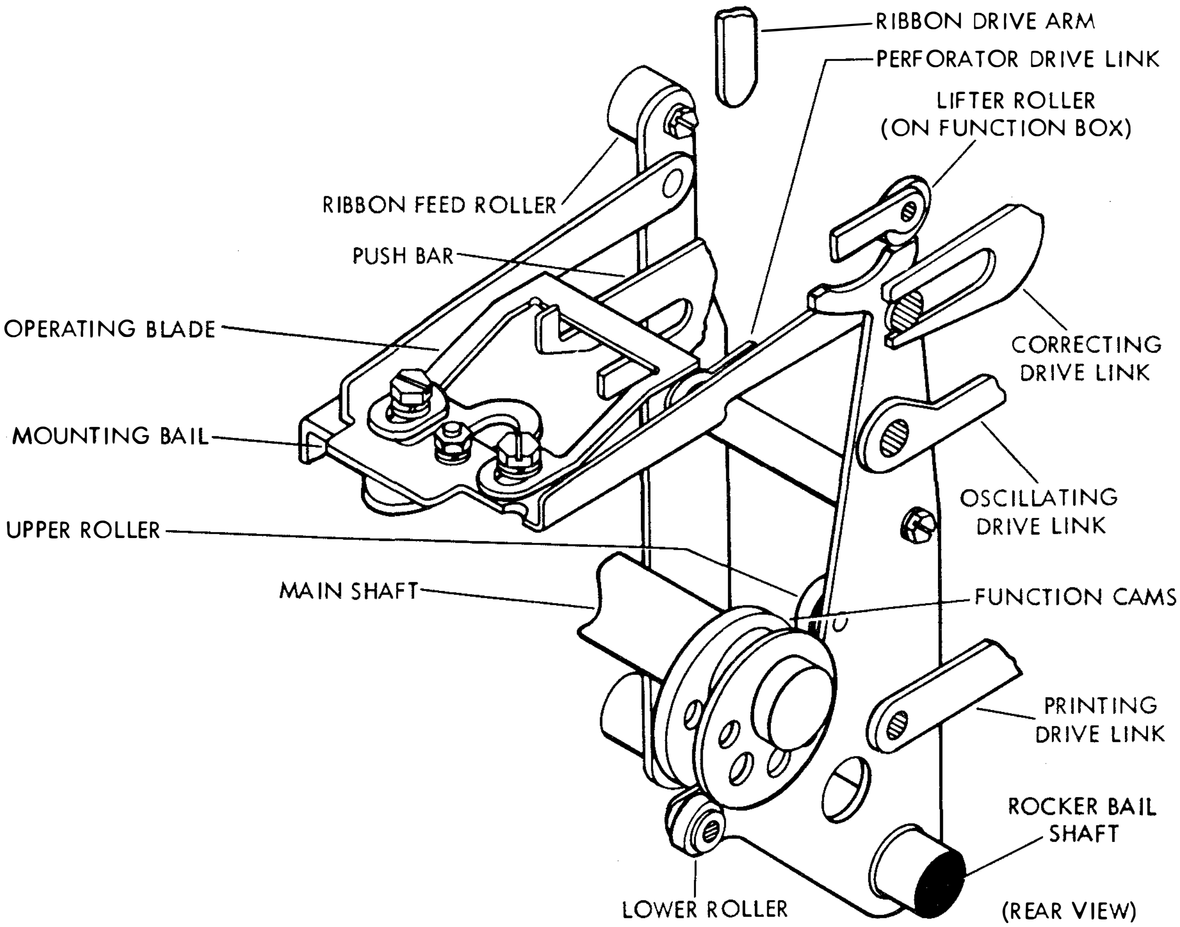


Figure 4-9. Rocker Bail Assembly

rollers and cause the bail to rock to the left (as viewed from the front of Figure 4-9) during the first part of the cycle and then back to the home position during the latter part of the cycle.

(5) TRANSFER (See Figure 4-10.) - Near the end of each selecting cycle, the transfer mechanism moves the input intelligence in the form of a mechanical arrangement from the punch slides to the function box and positioning mechanisms. Included in the mechanism are five linkages, each of which is associated with a punch slide. A linkage consists of a transfer lever, a pulse beam and a bell crank. Since the linkages are similar, the No. 4 linkage is shown in its entirety in Figure 4-10 is typical.

(a) The linkages associated with the unselected punch slides remain in their unselected position as shown in Figure 4-7. However, the selected slides, in moving to the left, pivot the associated transfer levers, which in turn move corresponding pulse beams clockwise (as viewed from above). The selected beams allow associated bell cranks under spring tension to pivot counterclockwise, and lift attached push bars. The push bars control the positioning mechanism. In the period of the last half of the function cycle, the selected slides are moved back to the right and return the linkages to their unselected positions.

(b) Slotted upper arms of the bell cranks extend up into the function box, but are not operative in the typing reperforator. An additional bell crank, not associated with a transfer linkage, is specifically concerned with the letters-figures shift.

(6) SELECTOR AND FUNCTION CLUTCH OPERATION

(a) When the selector clutch stop arm or the function clutch trip lever is tripped, the clutch shoes engage a serrated surface on the inside of the clutch drum. Since the clutch shoes are mounted on a plate that is part of the cam assembly (selector or function cam), the cam rotates upon engagement of the clutch.

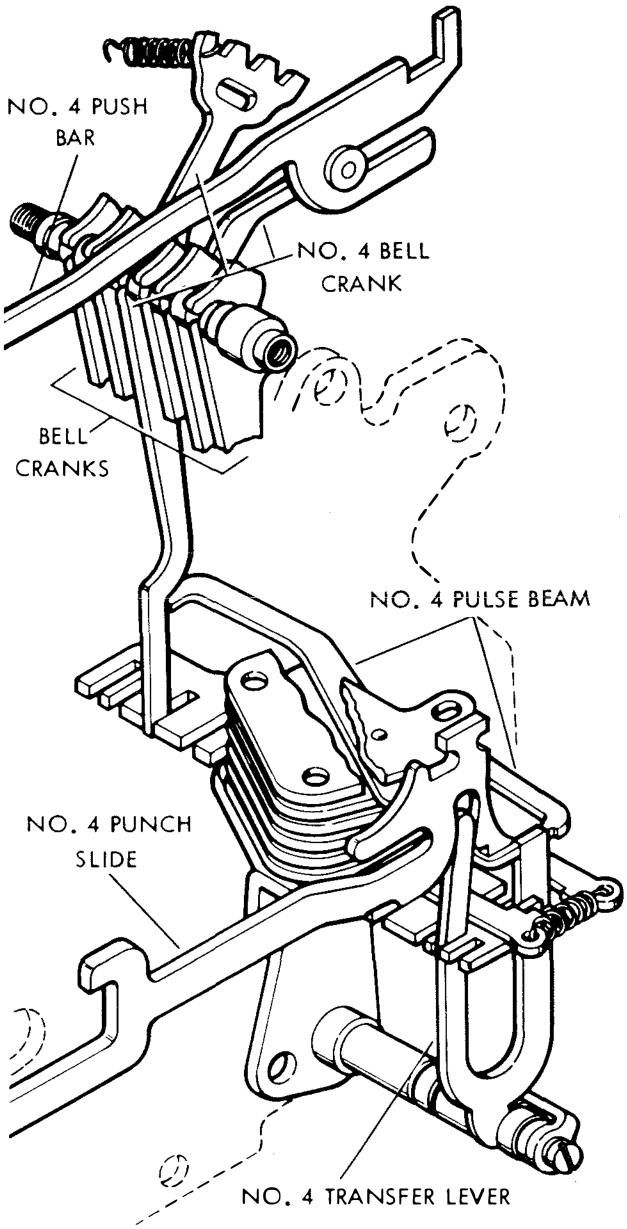


Figure 4-10. Transfer Mechanism

(b) Figure 4-11 shows a clutch disengaged. Disengagement is caused by bringing together lug A on the cam clutch disk and the lower end of clutch shoe lever B. The upper end of lever B pivots about its ear C and allows its other ear D to move toward the right. The upper spring then pulls the two shoes together and away from the drum.

(c) Figure 4-12 shows the same clutch engaged. This is accomplished by releasing the lower end of lever B. The upper end of lever B pivots about its ear C (which bears against the upper end of the secondary shoe) and moves its ear D, and the upper end of the primary shoe, toward the left until the shoe makes contact with the drum at point E. As the drum turns counterclockwise, it drives the primary shoe downward, so that it again makes contact with the drum, this time at point F. There, the combined forces acting on the primary shoe cause it to push against the secondary shoe at point G. The lower end of the secondary shoe then bears against the drum at point H. The revolving drum acts to drive this shoe upward so that it again makes contact with the drum at point I. Since the forces involved are multiplied at each of the preceding steps, the final force developed at point I is very great. This force is applied to the lug J on the clutch-cam disk to cause it to turn in step with the drum. The cam disk is a part of the selector assembly, which rotates upon engagement of the clutch.

(7) TAPE PERFORATING AND FEEDING

(a) GENERAL - The perforator mechanism punches feed holes, advances the tape and perforates combinations of code holes corresponding to the code combinations received from the selector. Intelligence is received from the selector by the punch slides, which select proper pins in a punch block assembly (Figure 4-13). Motion from the rocker bail is distributed to the pins and the tape feeding parts by a main bail assembly, which includes a toggle bail, a toggle shaft, a slide post, toggle links, drag links, and the punch slide reset bail.

(b) PERFORATING

1. As described in paragraph 4-3b(4)(b)1, near the end of the selecting cycle, the reset bail is lowered and releases the five punch slides (Figure 4-13). The selected slides move to the left, and the unselected slides are retained to the right by their latches. In the selected position, a projection of each slide extends over the slide post. Since a feed hole is perforated every operation, the punch slide associated with the feed-hole punch pin is designed so that it is always in a selected position. During the first part of the function cycle, the rocker bail moves to the left and, by means of a drive link and rocker arm, rotates the toggle shaft and bail counterclockwise. Toggle links attached to the front and rear of the bail lift the slide post and move the reset bail to the left. The selected slides are carried upward by the post and force the associated pins through the tape. The slides pivot about the same point as the drag links, and thus become an integral part of the main bail assembly during the perforating stroke. Approximately midway through the function cycle, the function trip assembly lifts the reset bail.

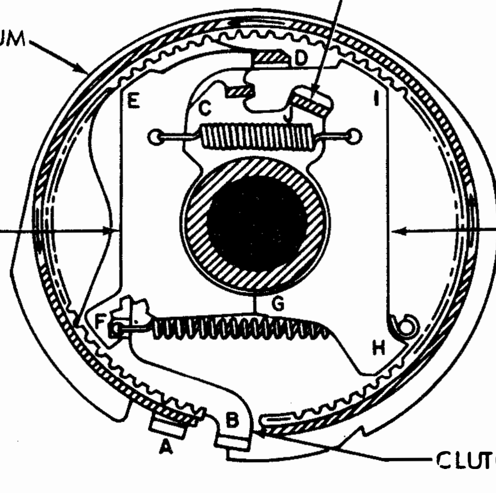


Figure 4-11. Clutch Disengaged

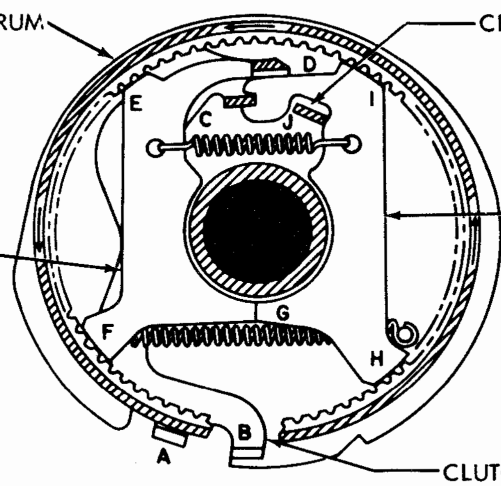


Figure 4-12. Clutch Engaged

2. During the last half of the cycle, the toggle bail is rotated clockwise pulling the slide post down and lowering the selected punch slides. The punch slides, which engage notches in their respective punch pins, pull the punch pins down below the tape. The main bail assembly and the selected punch slides and their associated punch pins move as a unit during the perforating stroke. The opening in the die block above the tape, through which the pins protrude, are circular so that the entire hole is punched.

3. A chad chute, mounted on the reperforator punch block, mates with a chute on the base, and carries the chad punched from the tape into a chad container on the tape handling stand.

(c) FEEDING - Tape feeding is accomplished after perforation during the last half of each function cycle. The tape is threaded down through a tape guide and then up between a feed wheel and die wheel (Figure 4-13). A feed pawl driven by the toggle bail acts upon a ratchet and rotates the feed wheel, which, by means of sharp pins and a slot in the die wheel, advances the tape one character at a time. A detent with a roller that rides on the ratchet holds the feed wheel and tape in position during perforation. The detent and feed pawl springs are so positioned that the pressure of the detent on the ratchet is high during the first half of the cycle, so as to hold the tape in position during perforation, but is low during idling and the last half of the cycle, to facilitate tape threading and

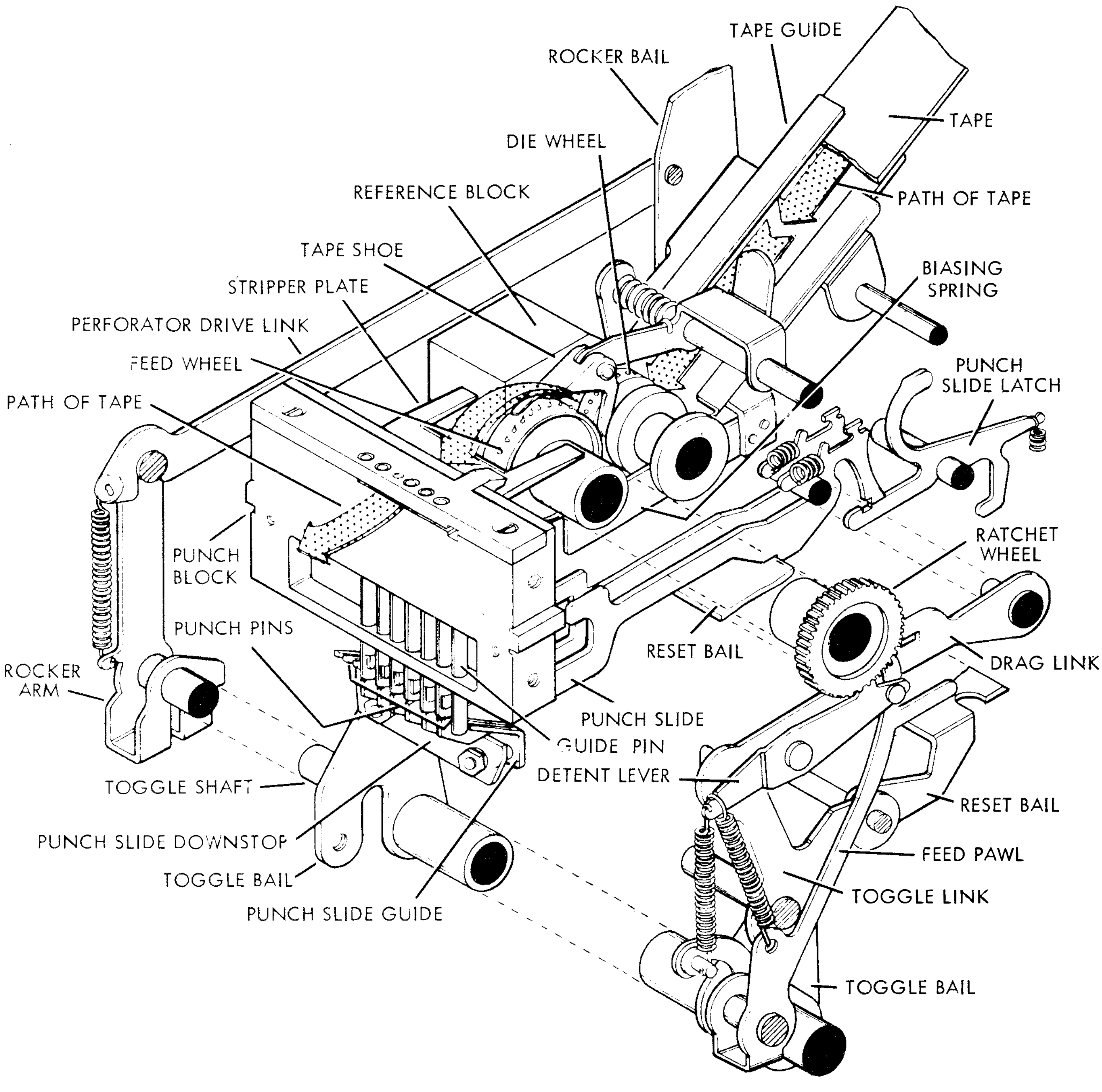


Figure 4-13. Reperforator Mechanism

feeding. A tape shoe retains the tape on the feed wheel, and a guide spring holds it back against a reference block so that the feed holes are punched a uniform distance from the edge. The tape is stripped from the feed wheel by a stripper plate, passes into the punch block where it is printed and perforated, and finally emerges at the left. A guide spring, by holding the tape back against a reference surface on the block, maintains a uniform relationship between the code perforations and the edge of the tape.

(8) TYPING

(a) GENERAL - The characters used to type the input intelligence (letters, figures and symbols representing various functions) are embossed on the cylindrical surface of the metal typewheel. The typewheel furnished with the typing reperforator will print standard communications symbols. During the function cycle, the rotary and axial positioning mechanisms (Figures 4-14 and 4-15), having received

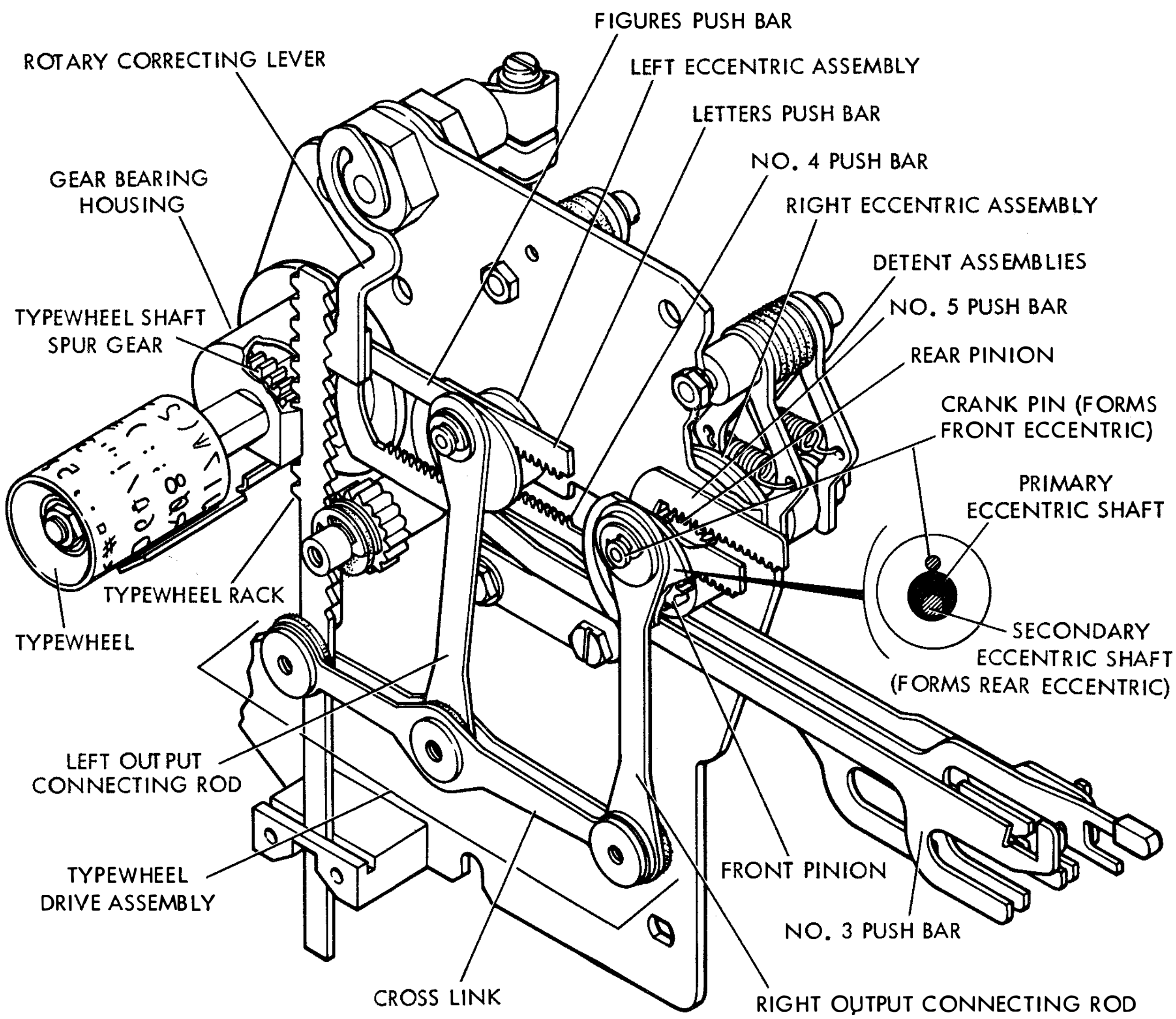


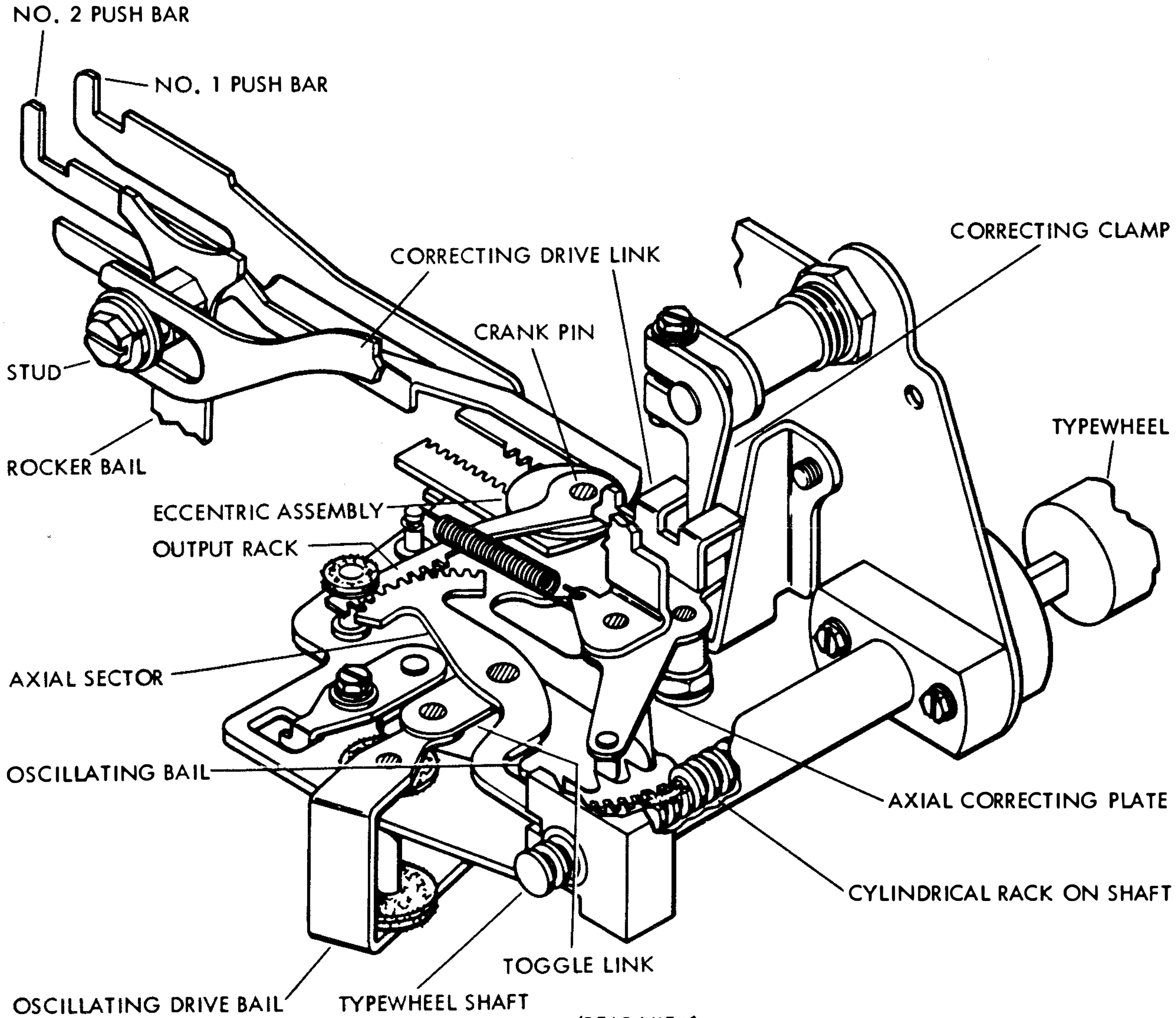
Figure 4-14. Rotary Positioning Mechanism

the intelligence from the transfer mechanism, position the wheel so that the character represented by the input code permutation is selected. Following typewheel positioning, the correcting mechanism accurately aligns the selected character. Then the printing mechanism (Figure 4-16), by means of a printing hammer, drives the tape and inked ribbon against the wheel and imprints the character. A ribbon feed mechanism (Figure 4-17) advances the ribbon and reverses its direction of feed when one of two ribbon spools is depleted. Near the end of the function cycle, the axial positioning mechanism retracts the typewheel and ribbon guide so that the last printed character is visible. The letters or figures code combination sets up an arrangement in the transfer mechanism which permits the function box (Figure 4-18) to operate and cause the rotary positioning mechanism to shift the typewheel through 180 degrees of rotation.

(b) TYPEWHEEL POSITIONING

1. GENERAL

a. A typical typewheel character arrangement is shown in Figure 4-19, in which the wheel's cylindrical surface is shown rolled out into a plane. There are 16 longitudinal rows, each of which is made up of four characters numbered 0 to 4 from front to rear. The surface is divided into two sections, a letters and a figures section, each containing eight rows. The fifth row counterclockwise from the division line in both sections is numbered 0, and there are four rows in one direction from 0, numbered



(REAR VIEW)

Figure 4-15. Axial Positioning Mechanism

1 to 4 and designated as counterclockwise rows, and three rows in the other, numbered 1 to 3 and designated as clockwise rows. It should be noted that the clockwise and counterclockwise modifiers refer to the direction of rotation of the wheel to select the rows, and not to their position on the wheel.

b. Each printing operation (excluding those devoted to the letters-figures shift) begins and ends with the typewheel in the home position of the section containing the character to be printed. (For example, with No. 0 character of the No. 0 row in the figures or letters section at the point of contact. Actually inasmuch as the wheel is retracted to show the last printed character, the No. 0 character is slightly to the rear, but for this discussion it will be assumed that it is at the point of contact.) During the printing operation, the axial and rotary positioning mechanisms, transferring separate but simultaneous motions to the wheel, position it so that the character represented by the keyboard input code combination is at the point of contact of the hammer at the time of printing. The rotary mechanism, which is controlled by the No. 3, 4, and 5 selecting elements of the code, revolves the wheel, so as to select the proper row. The axial mechanism, which is governed by the No. 1 and 2 elements, moves it forward and rearward along its axis so as to select the proper character in the row. The letters-figures shift, which consists of rotating the wheel eight rows from the home position of

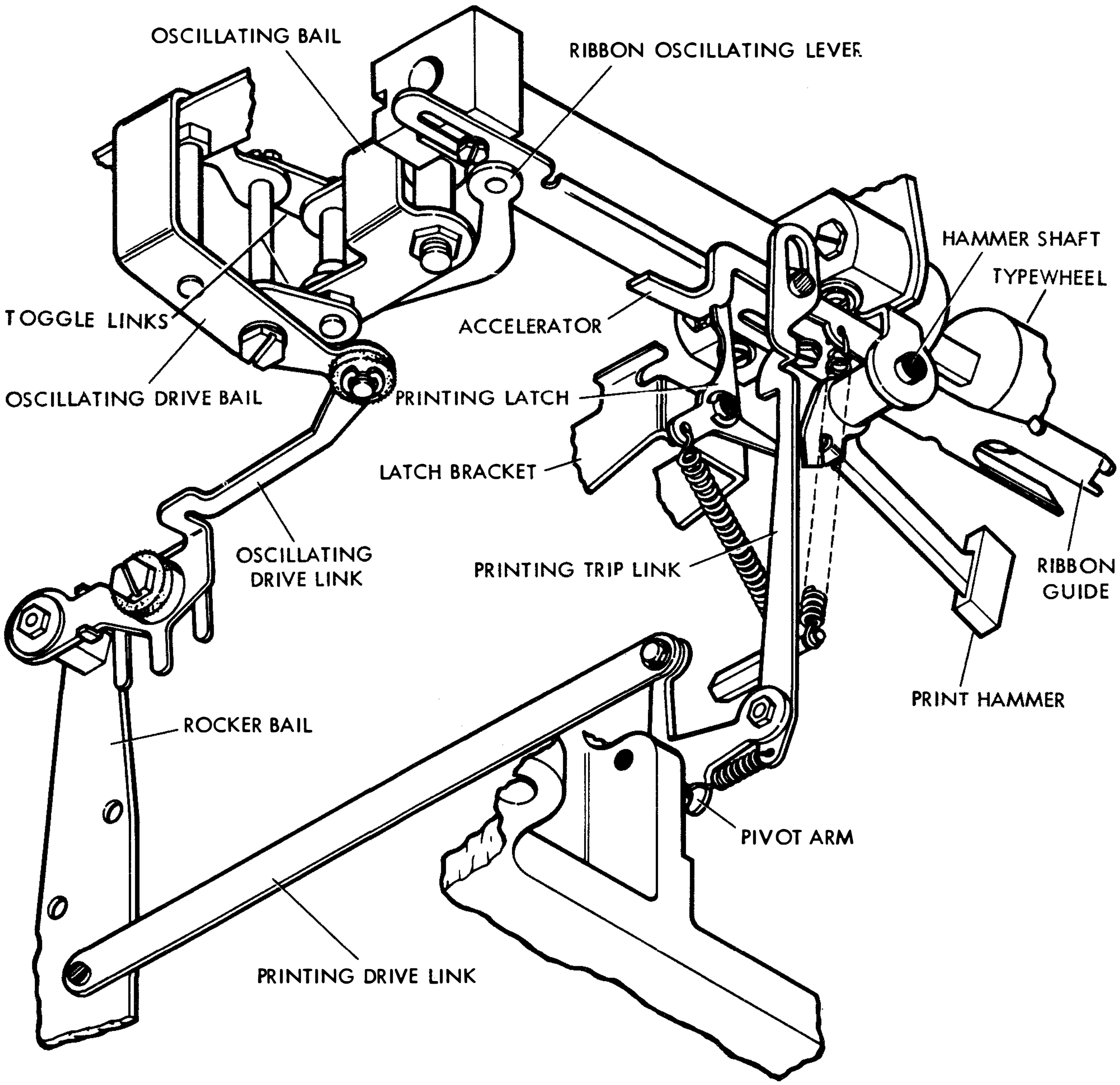


Figure 4-16. Printing Mechanism

one section to that of the other, requires a separate operation of the equipment and results in the printing of the letters or figures symbol.

c. To illustrate the above, if the typewheel is in the figures condition, as shown in Figure 4-19, and the numeral "5" is to be printed, there is no movement of the wheel during the printing operation, because "5" is already at the point of contact of the hammer. If, however, the letter "I" is to be printed, the keyboard code for letters must first be received to shift the typewheel eight rows to the letters home position. Then, during the next operation, the typewheel is rotated three rows counterclockwise and moved forward two characters, so that "I" is at the point of contact with the hammer. Printing takes place, and the typewheel is then returned to the letters home position.

2. ROTARY POSITIONING (See Figures 4-14 and 4-20.) - The rotary positioning mechanism revolves the typewheel so that the row containing the character to be printed is aligned with the print hammer at the time of printing

a. Mounted on the front plate, the rotary positioning mechanism includes two eccentric assemblies. Each assembly includes a primary shaft, a section of which is formed into a pinion. A secondary shaft mounted

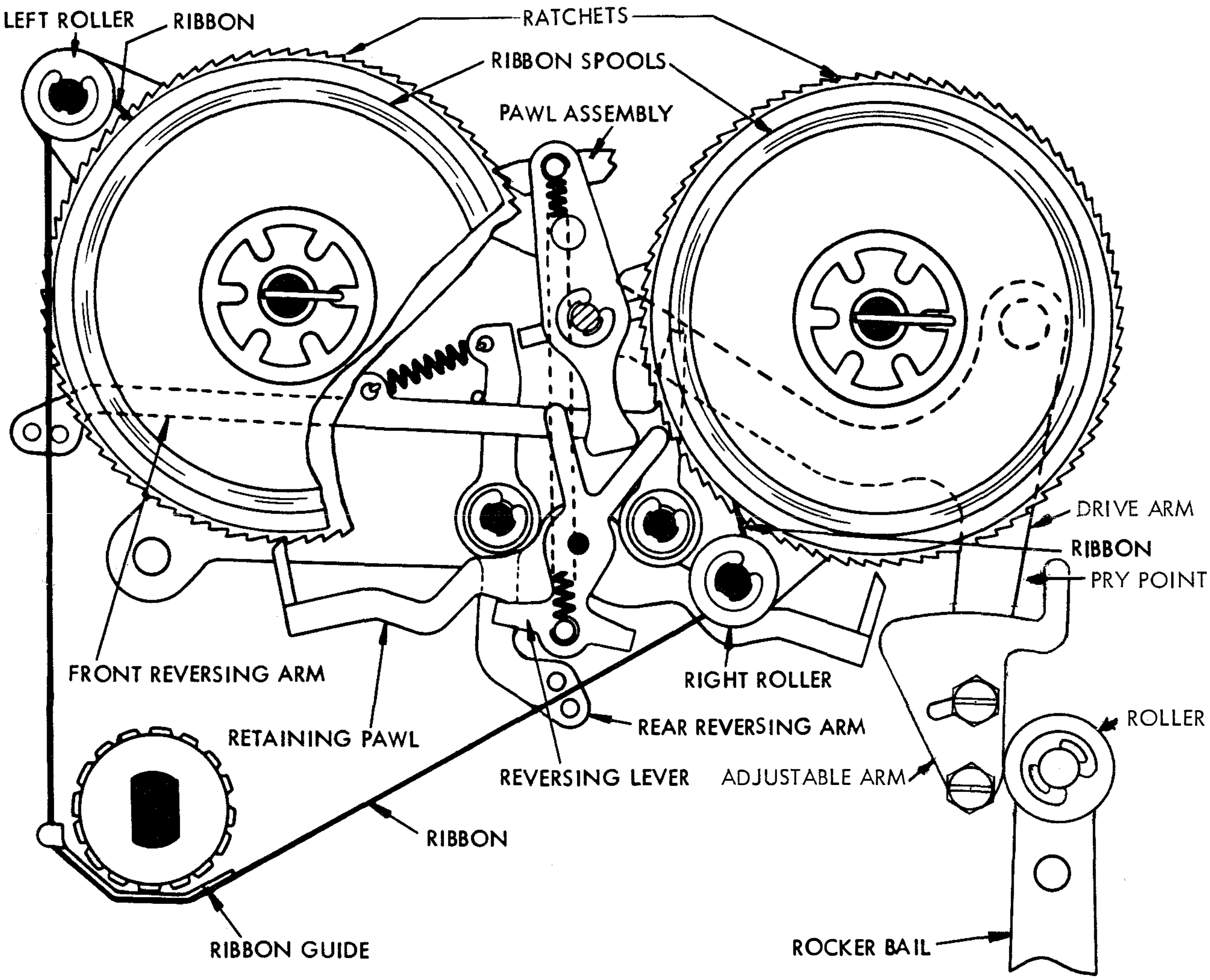


Figure 4-17. Ribbon Feed Mechanism

in the primary and offset from its center, forms an eccentric, referred to as the rear eccentric. A portion of the secondary shaft is also a pinion, and a crank pin mounted on its disk-like forward surface forms a secondary, or front, eccentric. Each of the four pinions of the two eccentric assemblies is engaged by the rack of a push bar; the No. 3 bar engages the rear pinion, and the No. 5 engages the right pinion. The left front pinion is engaged by both the letters and figures push bar.

b. The eccentric assemblies are linked to a typewheel shaft by a drive assembly as shown in Figure 4-14. The typewheel is secured to the front of the shaft, which is supported by a bearing housing mounted at the left rear of the front plate (Figure 4-15). A spur gear which meshes with the typewheel rack rides on the shaft in a bearing housing. The shaft is free to move axially in the housing and through the spur gear, but flats in the shaft circumference which bear against flats in the gear ensure its rotating when the gear rotates in response to movements of the typewheel rack.

c. When, in response to a marking pulse a push bar is lifted by its bell crank (paragraph 4-3b(5)(a) the rocker bail operating blade (see Figure 4-9 and 4-20) engages a slot in the bar and moves it to the left during the first part of the function cycle. The bar, by means of its rack and mating pinion, rotates the associated eccentric one half revolution where it is locked in position by a detent assembly while printing takes place. When the bail rocks back to the right during the latter part of the cycle, it returns the bar and eccentric to their home positions, where the eccentric is again detented. (The preceding does not

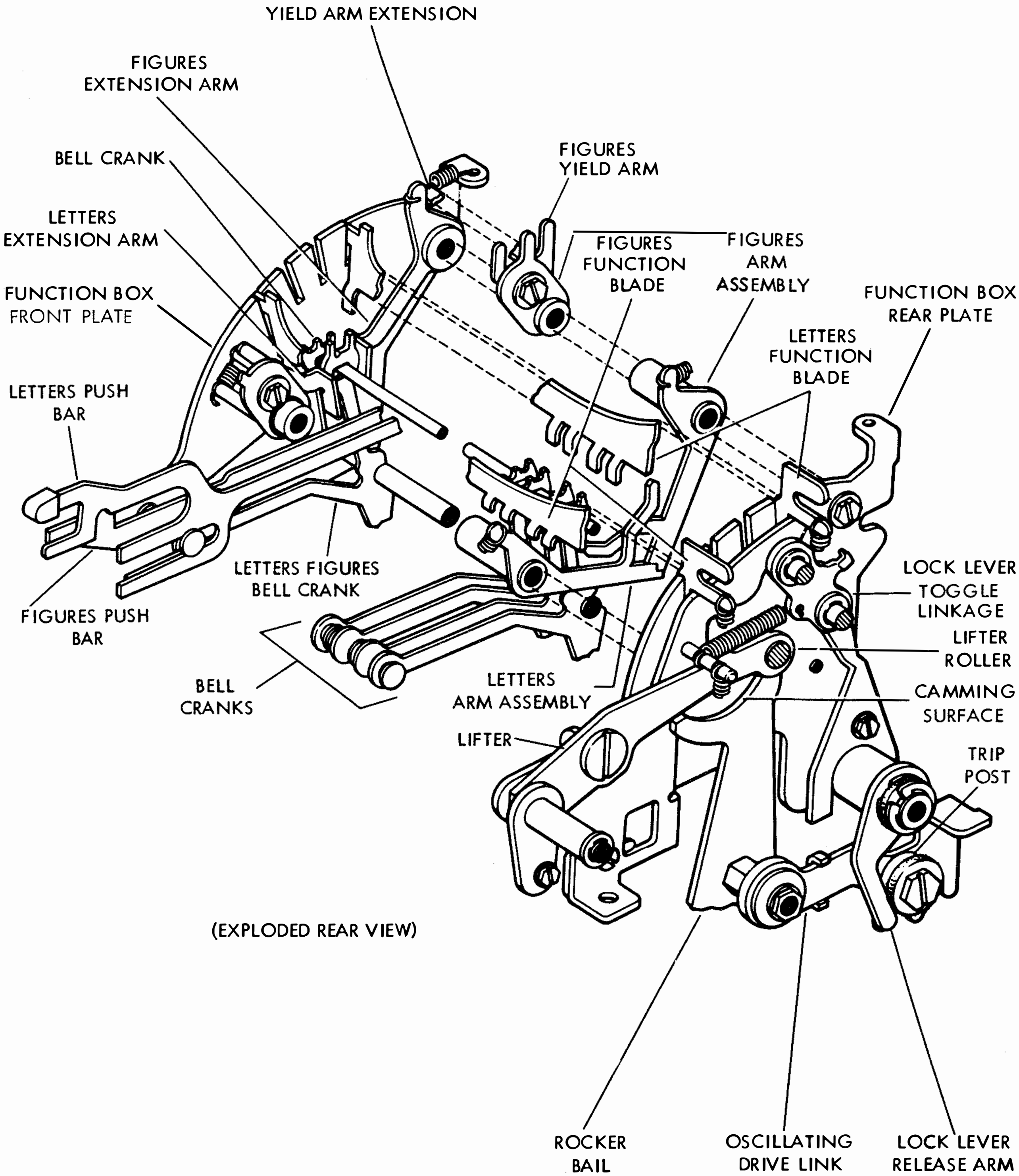


Figure 4-18. Function Box

apply to the No. 5 push bar, which is designed so that it is selected (moved to the left) on spacing rather than marking, nor to the left-front eccentric, which affects the letters-figures shift, and whose operation is covered in paragraph 4-3b(8)(b)5.). In both assemblies one half revolution of the rear eccentric results in its maximum vertical displacement, which is transferred through the front eccentric to a crank pin. Similarly, one half revolution of the front eccentric results in its maximum displacement being transferred to the crank pin. If both eccentrics

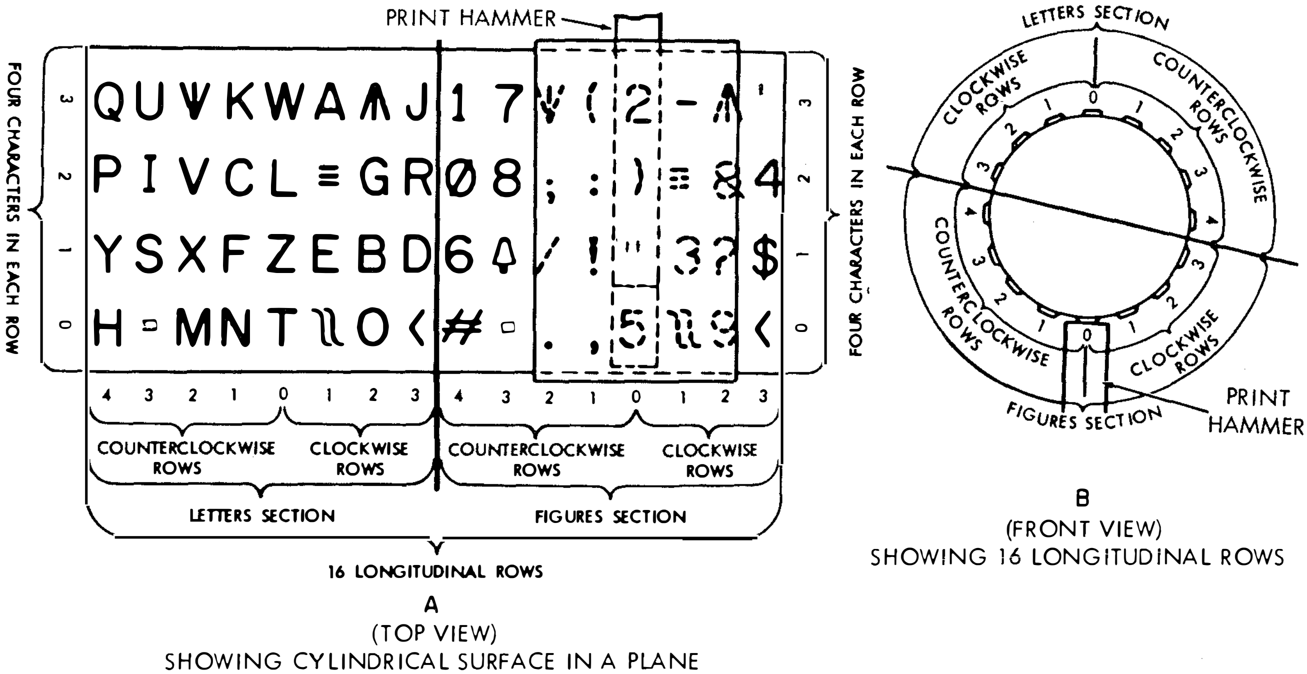


Figure 4-19. Typical Typewheel Character Arrangement

are rotated, the displacement of the crank pin is equal to the algebraic sum of the two displacements which may be in either the same or opposite directions. Both assemblies are so designed that, taking the displacement of the rear eccentric to be one unit, the displacement of the front eccentric is four units. Four permutations are thus available: zero (neither eccentric displaced), one (rear eccentric displaced), four (front eccentric displaced), and three or five units, depending on how the assembly is set up (both eccentrics displaced).

d. In the right assembly, the home position of the rear eccentric is down, and the home position of the front eccentric is up (Figure 4-20). Thus, their displacements are in opposite directions (up for the rear and down for the front), and their aggregate displacement is three units downward. Any displacement occuring in the right assembly is imparted to the typewheel rack in equal quantity, but opposite direction. For example, if the No. 5 push bar is selected, it causes the right rear eccentric to be displaced, and one unit of upward motion is transferred through a right output connecting rod to the right end of a cross link (Figure 4-14). The cross link pivots about a left output connecting rod, and at its left end imparts one unit of downward displacement to the typewheel rack. The rack rotates the spur gear, shaft, and typewheel one row of characters clockwise from the home position, and the No. 1 clockwise row (Figure 4-19) is presented to the print hammer at the time of printing. On its right stroke, the No. 5 push bar returns the eccentric and the typewheel to their home positions. In a similar manner, selection of the No. 3 push bar results in a four unit downward displacement of the right front eccentric, and a four-row counterclockwise rotation of the typewheel. Selection of both the three and five type bars results in a three-row counterclockwise rotation of the typewheel.

e. The home position of the left rear eccentric is up, and any displacement appearing in the left assembly is transferred to the typewheel rack in double quantity in the same direction. When the No. 5 push bar is selected, the left rear eccentric is displaced one unit downward. This movement is conveyed through the left output connecting rod to the approximate mid-point of the cross link. The cross link pivots about the right output connecting rod, and its left end imparts two units of downward movement to the typewheel rack, which rotates the typewheel two rows clockwise from its home position.

f. When both eccentric assemblies are displaced, the motion occuring in the typewheel rack is equal to the algebraic sum of the motions resulting from each assembly. For example, three units of upward displacement from the right assembly and two units of downward displacement from the left assembly occur as one unit (3-2 = 1) of upward displacement in the rack, and a counterclockwise rotation of one row in the typewheel. If neither the No. 3, 4, nor 5 push bar is selected, the mechanism remains inactive and printing takes place in the No. 0 row. Excluding the left front eccentric, which is used only for the letters-figures shift, there are eight premutations available in the other three eccentrics, making it possible to select any of the eight rows in a given section (Figure 4-19).

3. AXIAL POSITIONING (See Figures 4-15, 4-16, and 4-20.) The function of the axial positioning mechanism is to position the typewheel so that the proper character in the selected row is aligned with the hammer at the time of printing, and to retract the typewheel and ribbon guide at the end of the function cycle, so that the last typed character is visible.

a. The axial positioning mechanism mounts on an axial bracket supported by the frame and the front plate and includes an eccentric assembly similar to those of the rotary positioning mechanism (Figures 4-15 and 4-20). Two eccentrics -- a lower, whose pinion is driven by the No. 1 push bar, and an upper, whose pinion is driven by the No. 2 push bar -- rotate in a horizontal plane in bearing housings attached to the bracket. The eccentric assembly is linked to the typewheel shaft by an axial output rack and sector, as shown in Figure 4-15.

b. The selection of either the No. 1 or No. 2 push bar results in the maximum displacement toward the rear of the associated eccentric, and the eccentrics are so designed that, taking the displacement of the lower to be one unit, that of the upper is two units. Again, four permutations are available at the crank pin: zero (neither eccentric displaced), one (lower eccentric displaced), two (upper eccentric displaced) and three (both eccentrics displaced).

c. If during a function cycle neither push bar is selected, no motion occurs in the axial positioning mechanism, with the exception of that resulting from the oscillating assembly (paragraph 4-3b(8)(b)3.d. below),

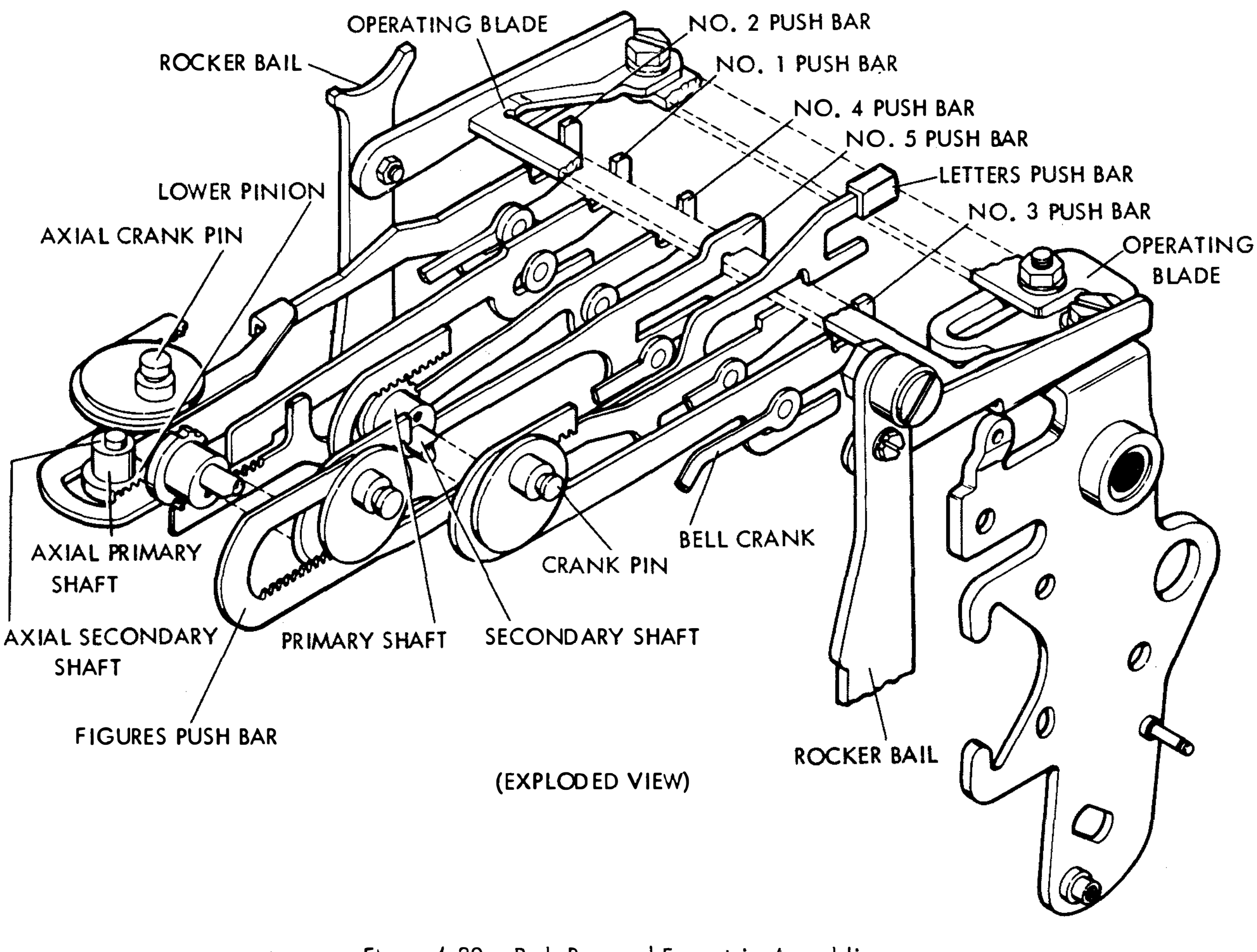


Figure 4-20. Push Bars and Eccentric Assemblies

and the No. 0 character of the selected row is aligned with the hammer at the time of printing (Figure 4-19). On the other hand, if the No. 1 push bar is selected, it causes the lower eccentric to revolve, and one unit of displacement to be transformed by the crank pin to the axial output rack. The rack moves to the rear and passes the motion to the axial sector, which pivots counterclockwise (as viewed from above.) The right end of the sector, by means of a cylindrical rack in the typewheel shaft, moves the typewheel one character forward from its home position. The No. 1 character is printed, and, when the push bar reverts to its unselected position, it returns the axial linkage and typewheel to their home positions. If the No. 2 push bar is selected, the No. 2 character is printed, and if both push bars are selected, the No. 3 character is printed. The cylindrical rack has no lead, and the shaft can thus be rotated while being moved axially.

d. With each cycle of the function clutch, an oscillating drive link transfers from the rocker bail an unselected motion to an oscillating drive bail (Figures 4-15 and 4-16). This movement is passed by toggle links to the oscillating bail and the sector pivot. The effect of this action is to introduce a separate motion to the sector, tending to cause it to pivot about the teeth on the output rack. During the fore part of the function cycle, if no axial push bar is selected, the end of the sector is moved forward slightly and positions the No. 0 character for printing. At the end of any cycle, the sector retracts the typewheel slightly, so that the last printed character is visible. Concurrent with the above operation, a ribbon oscillating lever is made to pivot about its left end, and with each cycle project and retract the ribbon guide, which would obstruct the view of the character (Figure 4-16).

4. CORRECTION (See Figure 4-14 and 4-15).

a. After the typewheel has been positioned by the axial and rotary positioning mechanisms, the selected character is more accurately aligned for printing by the correcting mechanism, which compensates for any play and backlash in the positioning linkages. Each function cycle, the rocker bail transfers motion through a correcting drive link to a correcting clamp and shaft (Figure 4-15). The shaft pivots a rotary correcting lever (Figure 4-14), which is equipped with an indention that engages a tooth in a typewheel rack. There is a tooth in the rack for each row of characters (16 in all), and they are so correlated with the typewheel that when a tooth is engaged by the corrector, its row is accurately aligned with the print hammer. Axial correction, which is accomplished simultaneously, is similar to rotary correction. The drive link rotates an axial correcting plate counterclockwise (as viewed from the top), and a roller mounted on the plate engages a notch in the axial sector (Figure 4-15). Thus, the typewheel is accurately aligned in both fields of motion just before printing takes place. During the latter part of the function cycle, a correcting drive link spring returns the correcting mechanism to its home position.

b. Since the rocker bail is the source of motion for both the push bars and the positioning mechanisms, corrections must take place at a point near enough to the extreme travel of the bail that it does not interfere with the movement of the typewheel rack or axial sector. In addition, because the rocker bail controls the tripping of the print hammer, which occurs very late in the bail's stroke, it becomes necessary to utilize the time between the tripping of the hammer and its striking the paper to accomplish correction. The delay in actuating the correcting mechanism is effected by allowing a drive stud on the rocker bail to slide in an elongated slot in the correcting drive link during the early part of the cycle.

5. LETTERS-FIGURES SHIFT (See Figures 4-14 and 4-18). The purpose of the letters-figures shift is to rotate the typewheel from the home position in one section to that of the other section (Figure 4-19). It is accomplished through a function box mechanism, which is made up of a number of parts assemblies mounted on two plates located at the upper rear of the typing reperforator (Figure 4-18).

a. When the unit is in the letters condition, as shown in Figures 4-14 and 4-18, and the figures code combination (1M, 2M, 3S, 4M, 5M) is received, the transfer mechanism sets up the figures arrangement in the bell cranks during the keyboard input cycle. Then, as the rocker bail moves from its home position during the first part of the function cycle, a lifter roller under spring pressure follows a camming surface on the rear arm of the bail (Figure 4-18), and the lifter allows letters and figures function blades to move down and, by means of tines on their lower surface, feel for an opening in the slotted upper arms of the bell cranks.

b. The slot arrangement of the No. 1, 2, 4, and 5 bell cranks are identical and permit the entry of both function blades, when all are selected. However, on receipt of the figures code combination, the No. 3 bell crank permits entry of the figures blade, while blocking the letters blade. In moving all the way down, the figures blade encounters a projection of a figures arm assembly, and causes the arm assemblies to shift from their letters to figures position. A yield arm extension attached to the figures arm assembly pivots a figures extension arm away from the letters-figures bell crank. A letters extension arm, under spring tension, rotates the bell crank clockwise (Figure 4-18), and the bell crank lifts the letters and figures push bars. As the bail reaches its extreme position, the lifter is cammed up and raises the function blades.

c. While the letters-figures bell crank is being positioned by the function box, the No. 1, 2, and 4 push bars are selected, the typewheel is moved two rows clockwise and three characters forward, and the figures symbol is printed. On its return stroke, the rocker bail operating blade encounters a shoulder on the figures push bar (which was lifted as described above) and moves the bar to the right, as viewed from the front in Figures 4-14 and 4-20. The common pinion moves the letters push bar to the left, and the left front eccentric shifts from its up to down position. Since the typewheel has been displaced two rows clockwise during the first part of the cycle, it is rotated six more rows to the figures home position (see Paragraph 4-3b(8)(b)2.,e.). As the bail returns to its home position during the last half of the cycle, a lock lever toggle linkage (Figure 4-18) prevents the lifter roller from following its camming surface, and the lifter holds the function blades up, so they do not drop into the bell cranks. As the bail nears its home position, a trip post riding on the oscillating drive link strikes a lock release arm, buckling the toggle linkage and permitting the lifter roller to again fall on the bail camming surface.

d. In a manner similar to that described above, when the letters code combination (1M, 2M, 3M, 4M, 5M) is received, the function box causes the letters-figures bell crank to lower the letters and figures push bars. The typewheel is rotated two rows counterclockwise during the first part of the cycle, and six more rows to the letters home position during the first part of the cycle, and the letters push bar is moved to the right. The preliminary two-row rotation of the typewheel, which is made possible by selecting the No. 5 push bar on spacing rather than marking, provides less throw and smoother operation than would be possible if the complete eight-row displacement were made during the latter part of the cycle. Each operation, the lifter permits the function blades to move down and feel for an opening, but, except for the shift operations, they are blocked by slotted arms of the bell cranks.

(c) PRINTING (See Figure 4-16)

1. After the typewheel has been positioned and corrected, the printing mechanism supplies the impact which drives the paper and ribbon against the selected character. It accomplished this operation by means of a print hammer, which is mounted on a shaft supported by a bracket attached to the typewheel bearing housing. In its unoperated condition, as illustrated in Figure 4-16, the hammer is held against an accelerator by a relatively weak spring. The accelerator is mounted on the hammer shaft, and is retained by a printing latch in its upper position, against the tension of a relatively strong spring.

2. The rocker bail, during the fore part of the function cycle, moves a printing drive link to the right (as viewed from the rear in Figure 4-16) and causes a pivot arm to rotate clockwise. The arm lowers a trip link, which slides in an elongated slot. Near the end of the rocker bail's travel, the trip link pivots the latch, which releases the accelerator. Under the spring tension, the accelerator snaps down and impels the hammer upward. The face of the hammer drives the tape and inked ribbon up against the typewheel and imprints the selected character on the tape. The accelerator does not follow the hammer through the complete printing stroke. Near the end of its travel, the accelerator encounters a projection on a latch bracket, and inertia carries the hammer the rest of the way. As the rocker bail returns to its home position, it causes the trip link to move up, release the latch, and return the accelerator to its latched position.

(d) RIBBON FEEDING (See Figure 4-17)

1. The characters are typed in ink supplied by an inked ribbon, which is held between the tape and the typewheel by a guide and advanced by the ribbon feed mechanism (Figure 4-17). The path of the ribbon is down to the left off the top of a right spool, under a right roller, to the left through pins on a reversing arm, through the guide, up through pins on a front reversing arm, over a left roller and down to the right on the bottom of a left spool.

2. Each function cycle, as the rocker bail nears the end of its left travel, a roller mounted on its forward arm pivots a drive arm clockwise. The drive arm lifts a feed pawl, which advances the ribbon by rotating a ratchet and ribbon spool one tooth. A retaining pawl, under spring tension, detents the ratchet, while the feed pawl, during the latter part of the function cycle, is lowered so as to engage the next tooth. Each operation, the ribbon is advanced in this manner until the ribbon feed mechanism is reversed.

3. When a spool is almost depleted, an eyelet in the ribbon encounters pins

on a reversing arm. The stress applied through the ribbon as it is rolled on the other spool pivots the arm. As the pawl assembly is lowered at the end of the next operation, an extension strikes the reversing arm, and the pawl is shifted to the other ratchet. The pawl's rounded lower extension pivots a reversing lever, which shifts the retaining pawl, so that it engages the opposite direction until again reversed.

c. LAXD7 OR LAXD8 PIVOTED TRANSMITTER DISTRIBUTOR (Figures 1-9 and 1-10)

(1) GENERAL

(a) The LAXD7 or LAXD8 two-shaft pivoted head transmitter distributor is used in Reperforator Transmitter Sets, and is mounted on the LRXB17 or LRXB27 base with its associated LPR34BWA typing reperforator. The unit is designed to sense code combinations, perforated in a tape or received from an external multi-wire input, and convert them into electrical code pulses for distribution over a signal circuit. Provision is made for either single wire or multiple wire output. The pivoted reading head is capable of either reading loose tape, or climbing up taut tape to read the last character perforated by the LPR34BWA. All electrical wiring terminates in a 32 point female connector supplied with the unit.

(b) In the following description of the sequence of operations of the LAXD7 or LAXD8, the equipment is assumed to be operating under normal conditions as follows:

1. Tape inserted in the tape lid and tape lid closed.

2. Sensing clutch trip magnet circuit connected in series with the #2 auxiliary distributor contact.

3. Distributor clutch trip magnet operated by an external stepping pulse.

4. Storing switch contacts distributor contacts connected in series with the signal line.

5. Transmitter - distributor in idle line condition with pivoted sensing head against the punch block.

(2) GEARING - The distributor shaft assembly mounts two gears; the rear gear meshes with the intermediate gear train on the base and is driven from a motor. The clutch drum gear, through an idler gear, drives the sensing clutch drum gear to rotate the sensing and the distributor shafts at the same speed.

(3) SUMMARY OF OPERATION

(a) Tape feeds from the reperforator, moving the pivoted sensing head away from the punch block. This actuates the last character switch and prepares the circuit for normal transmission. The subsequent stepping pulse then trips the distributor clutch trip magnet causing rotation of the distributor cam sleeve which in turn initiates the reader cycle.

(b) The sensing cam rotates to advance the tape, strip the previous stored character, sense the code perforations in the tape, and store the sensed character in the storing switch for subsequent transmission upon receipt of another stepping pulse.

(c) The stepping pulse initiates the distributor cycle. The distributor shaft rotates to actuate the distributor contacts and distribute a pattern of code pulses over the signal line which correspond to the code combination stored in the storing switch, i.e., the previously sensed character.

(d) In continuous transmission, the distributor cam will have started its next cycle controlling the actions of the sensing cam. These actions will continue until the distributor clutch trip magnet circuit is interrupted by the last character switch.

(4) DISTRIBUTOR SHAFT

(a) CLUTCH TRIP (Figure 4-21) - As the distributor clutch trip magnet is energized, its armature and armature extension bail are attracted to the magnet core, releasing the latching extension of the lower trip lever. The lower trip lever and the upper trip lever pivot on their shaft and the upper trip lever releases the clutch shoe lever from the stop lug on the clutch cam disk.

(b) CLUTCH ENGAGEMENT (Figure 4-12) - See Paragraph 4-3b.(6)(c).

(c) CLUTCH RESET (Figure 4-21)

1. As the distributor cam sleeve starts its rotation, the reset extension of the lower trip lever rides to the peak of its cam to place the upper trip lever in the path of the clutch shoe lever.

2. Should the magnet remain energized, the armature will remain attracted to the magnet core and the armature extension bail will be prevented from latching the lower trip lever. Then, as the cam continues to rotate, the reset extension of the lower trip lever will ride to the low part of its cam and permit the

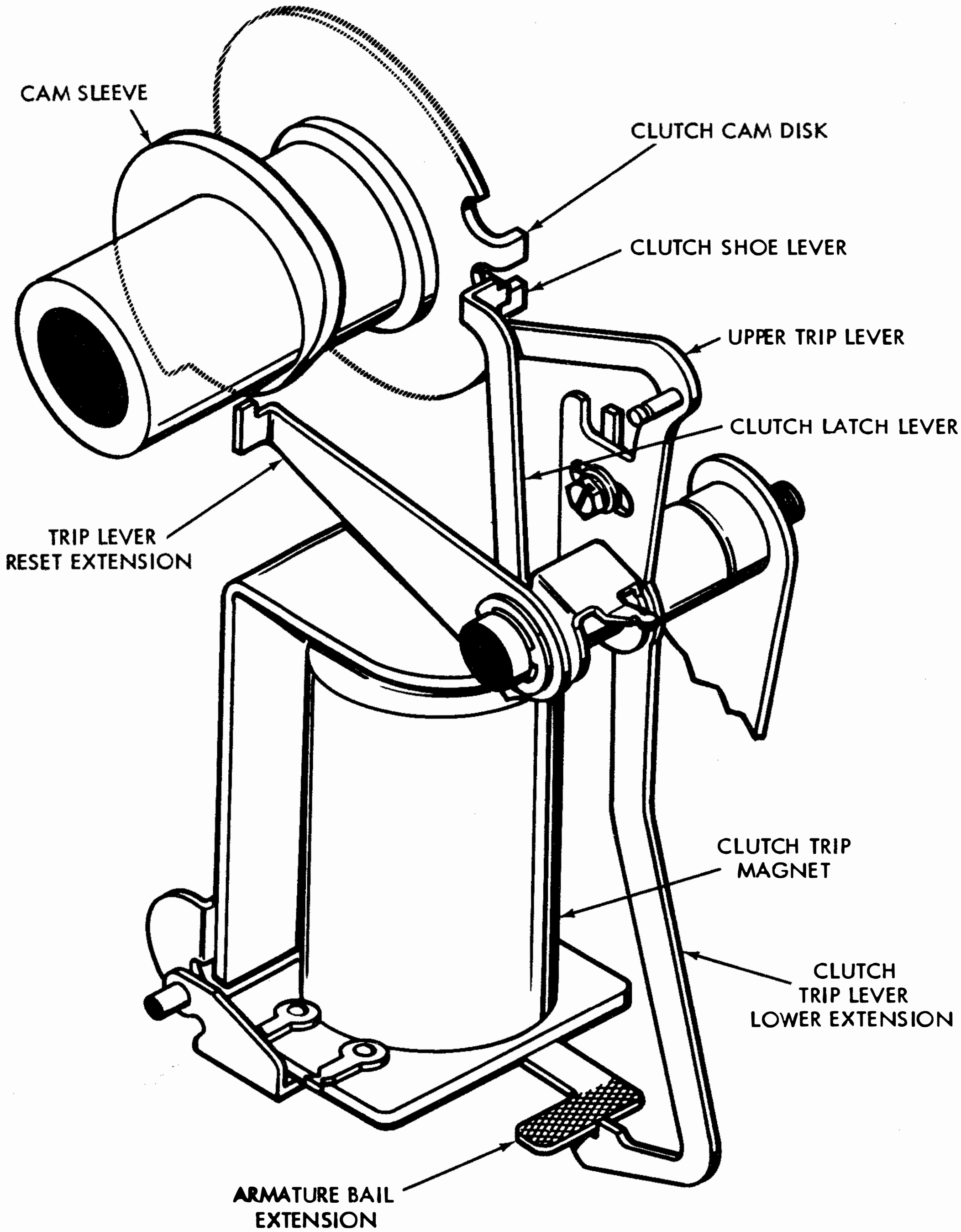


Figure 4-21. Clutch Trip Mechanism

upper trip lever to pivot out of the path of the clutch shoe lever. The cam will continue to rotate, until the trip magnet is no longer energized.

3. When the clutch trip magnet circuit is interrupted, the armature and armature extension bail will be released. Then, as the reset extension of the lower trip lever rides to the high part of its cam, the latching extension will be latched by the armature extension bail to hold the upper trip lever in the path of the clutch shoe lever. As the clutch shoe lever strikes the upper trip lever, the inertia of the clutch will cause it to rotate a slight additional amount and permit the clutch latch lever to fall into the notch in the cam disk. In this position, the clutch shoe lever is held in proximity to the stop lug on the clutch cam disk.

(d) CLUTCH DISENGAGEMENT (Figure 4-11) - See Paragraph 4-3b.(6)(b).

(e) DISTRIBUTOR CONTACTS - The contacts of the storing switch assembly will have been arranged in conformance with the code combination of the last character sensed by the sensing mechanism. Then, as the distributor cam sleeve continues its rotation, the cam follower levers will be actuated by their cams to open and close the distributor contacts for measured intervals of time. Operation of the distributor contacts (in series with the storing switch contacts) will generate a signal pattern corresponding to the code combination of the previously sensed character.

(f) AUXILIARY CONTACTS (Figure 4-22) - The distributor cam actuates the following auxiliary contacts through action of cam follower levers. The contacts are operated for each cycle of the sensing cam as follows:

1. An auxiliary #1 contact closes at 350 degrees and opens at 40 degrees.

2. An auxiliary #2 contact closes at 72 degrees and opens at 138 degrees.

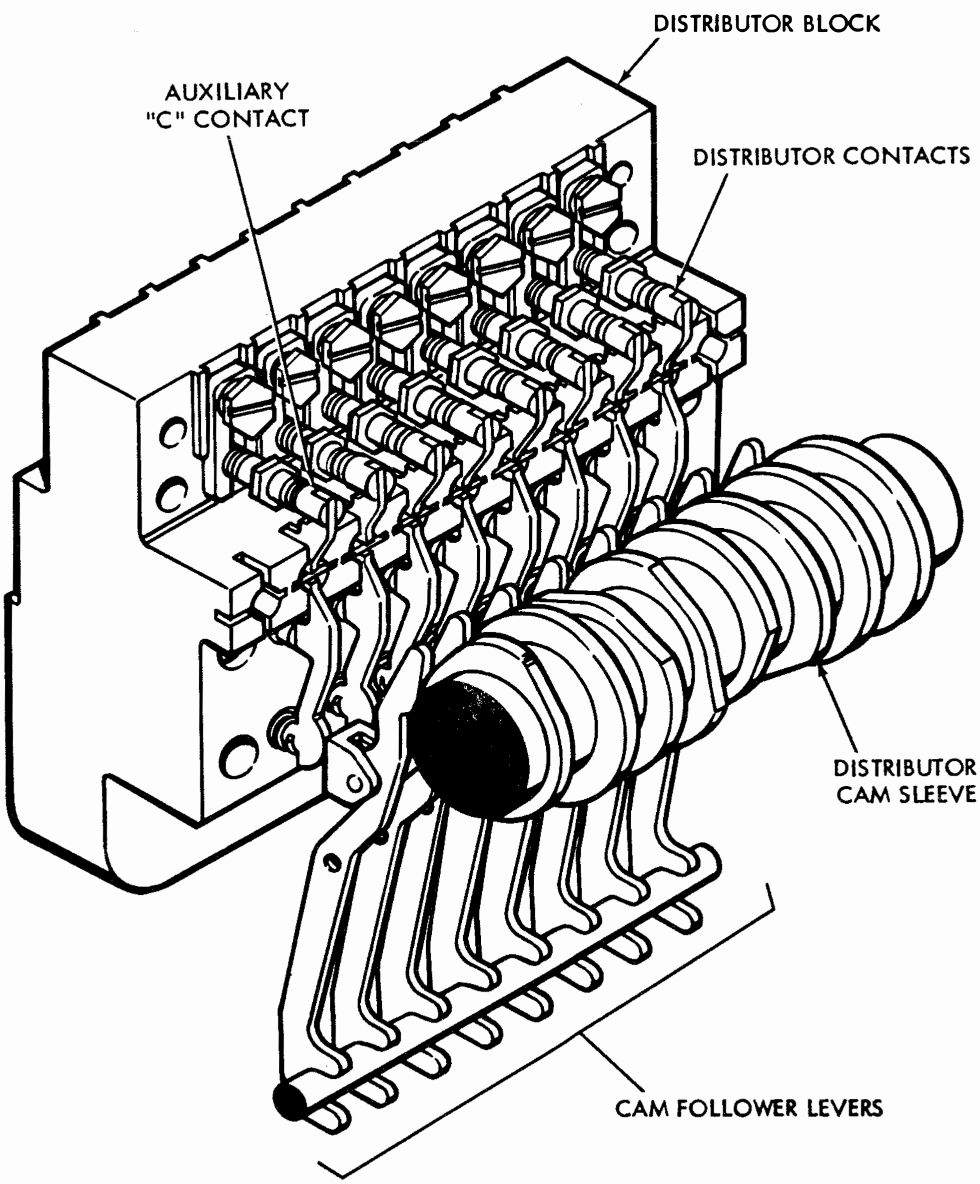


Figure 4-22. Distributor Mechanism

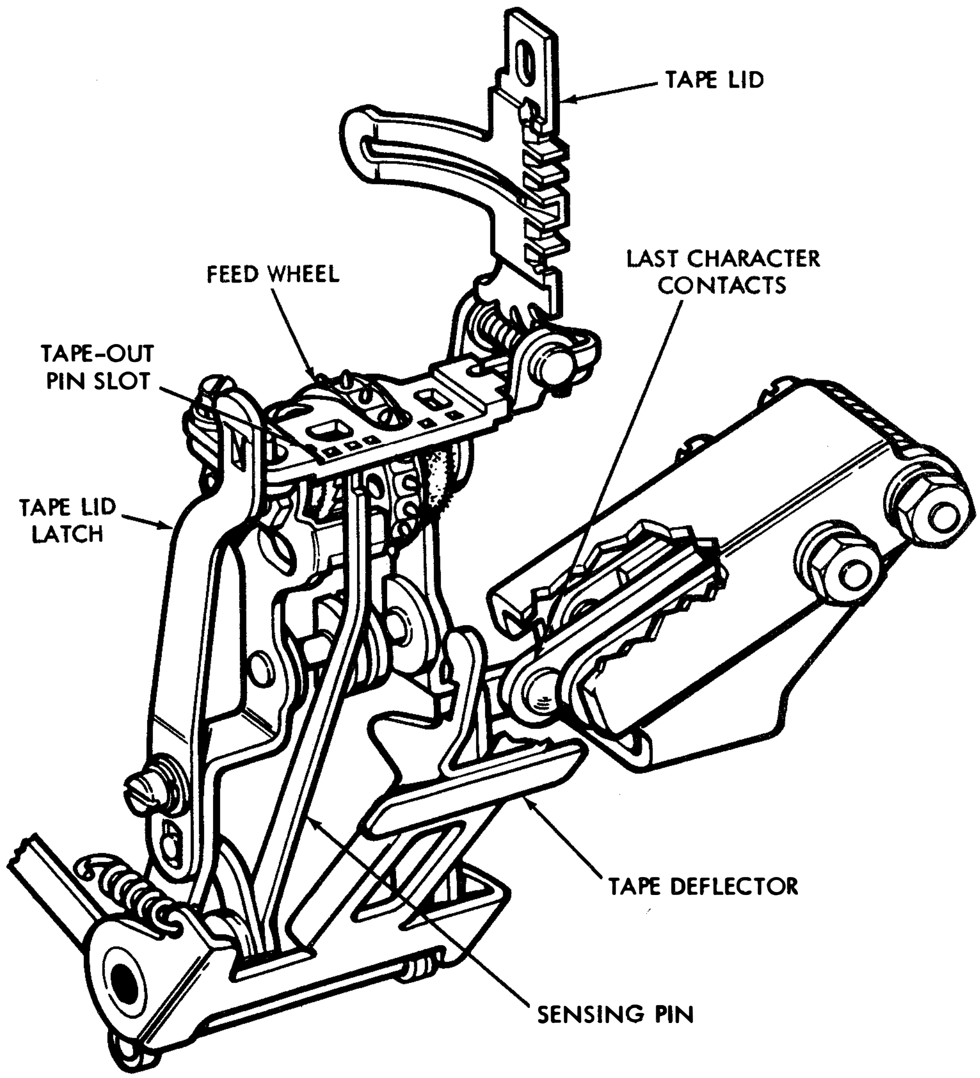


Figure 4-23. Pivoted Sensing Head

(5) PIVOTED SENSING MECHANISM

(a) SENSING CLUTCH TRIP

1. LAST CHARACTER SWITCH (Figure 4-23) - As tape feeds from the reperforator, it moves the pivoted sensing head away from the punch block. An extension on the yoke actuates the last character switch contacts, and prepares the circuit for normal transmission. The stepping pulse causes the distributor shaft to rotate which closes the sensing clutch trip contacts and initiates the reader cycle.

2. CLUTCH TRIP ACTION (Figure 4-21) - As the sensing clutch trip magnet is energized, its armature and armature extension bail are attracted to the magnet core, thus releasing the latching extension of the lower trip lever. The lower trip lever and the upper trip lever pivot on their shaft and the upper trip lever releases the clutch shoe lever from the stop lug on the clutch cam disk.

(b) CLUTCH ENGAGEMENT (Figure 4-12) - See Paragraph 4-3b.(6)(c).

(c) CLUTCH RESET (Figure 4-21)

1. As the sensing cam sleeve starts its rotation, the reset extension of the lower trip lever rides to the peak of its cam to place the upper trip lever in the path of the clutch shoe lever.

2. Should the magnet remain energized, the armature will remain attracted to the magnet core and the armature extension

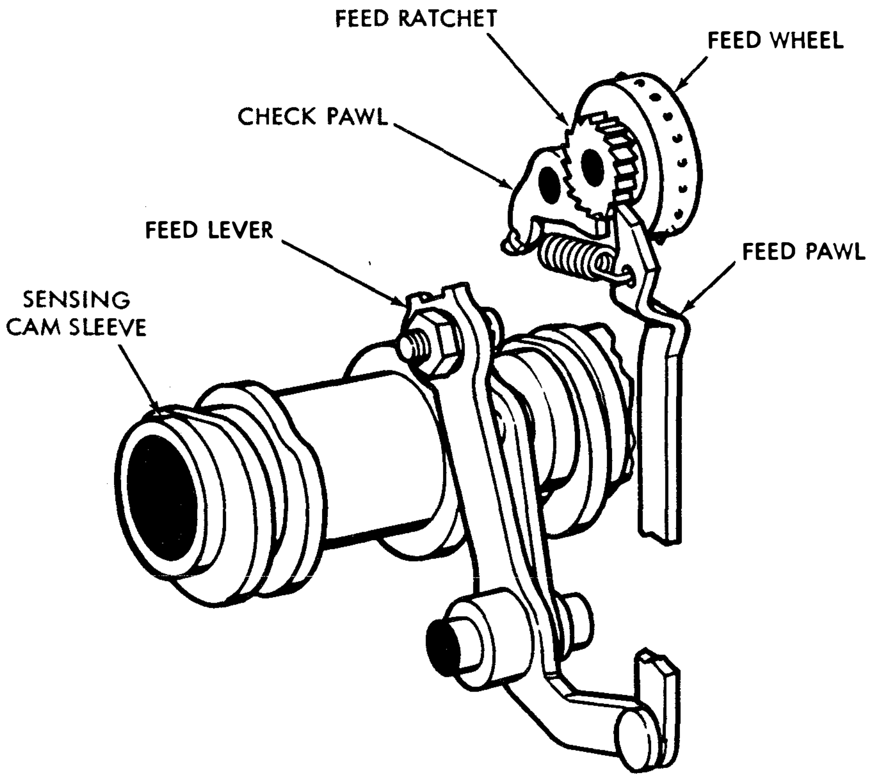


Figure 4-24. Tape Feed Mechanism

bail will be prevented from latching the lower trip lever. Then, as the cam continues to rotate, the reset extension of the lower trip lever will ride to the lower part of its cam and permit the upper trip lever to pivot out of the path of the clutch shoe lever. The cam will continue to rotate thus until the trip magnet is no longer energized.

3. When the clutch trip magnet circuit is interrupted, the armature and armature extension bail will be released. Then, as the reset extension of the lower trip lever rides to the high part of its cam, the latching extension will be latched by the armature extension bail to hold the upper trip lever in the path of the clutch shoe lever. As the clutch shoe lever strikes the upper trip lever, the inertia of the clutch will cause it to rotate a slight additional amount and permit the clutch latch lever to fall into the notch in the cam disk. In this position the clutch shoe is held in proximity to the stop lug on the clutch cam disk.

(d) CLUTCH DISENGAGEMENT - See Paragraph 4-3b.(6)(b)

(e) TAPE FEED (Figure 4-24) - As the sensing cam sleeve rotates, a roller on the feed lever rides to the high part of its cam, moving the feed pawl down. The feed pawl in its lowest position engages the next tooth on the feed ratchet. (The check pawl rests in the hollow between two of the feed ratchet teeth during the downward stroke of the feed pawl holding the ratchet in position.) As the sensing cam continues to rotate, the feed lever roller rides to the low of its cam through spring action, which allows the feed pawl to move upward one tooth on the ratchet. The upward position of the feed pawl is governed by a bent ear on the yoke which wedges the feed pawl between the ratchet and the bent ear.

(f) TAPE SENSING (Figure 4-25) - At the start of the sensing cam sleeve rotation, the sensing pins are in their downward position, withdrawn from the tape, and the storing switch contacts are arranged in accordance with the code combination of the previous sensed character.

1. PUSHER BAIL (Figure 4-26) - As the pusher bail roller rides to the peak of its cam, it moves the pusher levers to the right, stripping any previously selected pusher levers from the shoulders of their sensing pins. Then, as the pusher bail roller rides to the indent of its own cam, the pusher bail is withdrawn from the pusher levers to permit the levers to rest against their sensing pins.

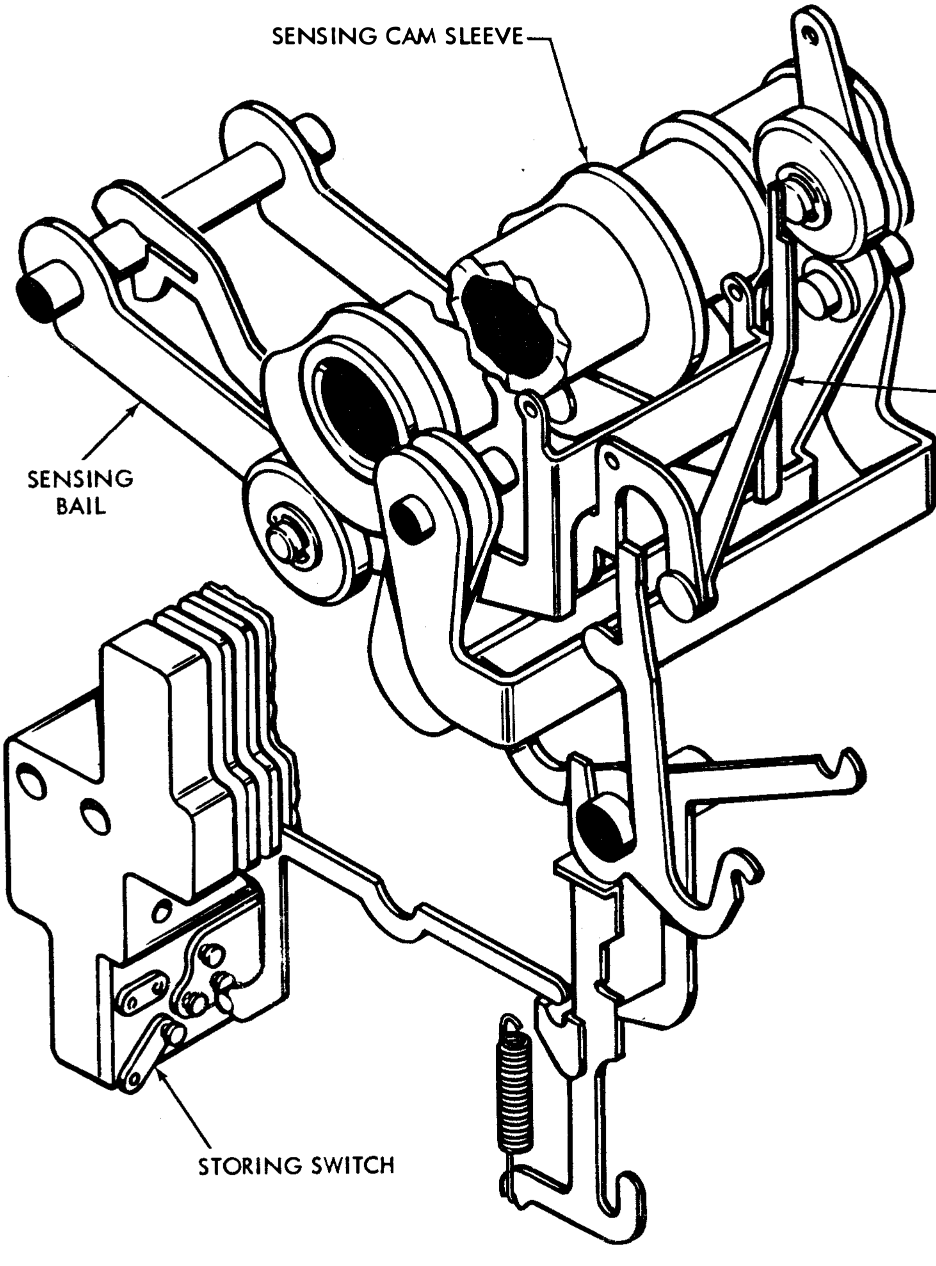


Figure 4-25. Tape Sensing

2. SENSING BAIL (Figure 4-27) - The sensing bail rollers move into the indent of their cams and the right end of the sensing bail rises to permit the sensing pins to rise and sense the code perforations in the tape. If the code level sensed by a pin is not perforated, travel of the pin is blocked by the tape and the pusher lever remains to the right of its sensing pin. If the code level is perforated, the pin is free to rise through the perforation sufficiently to permit the top of the pusher lever to drop under the shoulder of the sensing pin. Further rotation of the sensing cam sleeve will move the sensing bail rollers to the peak of their cams and start the right end of the sensing bail, the sensing pins and the selected pusher levers moving downward.

3. LATCH BAIL (Figure 4-28) - As the latch bail roller rides to the peak of its cam, the lower end of the latch bail will be moved to the left to actuate the latch levers. The lower end of the latch levers are moved to the right to release any previously latched slides and the slides will start to rise under the tension of their springs. If its pusher lever has not been selected, the slide is free to rise to its unoperated position. If its pusher lever has been

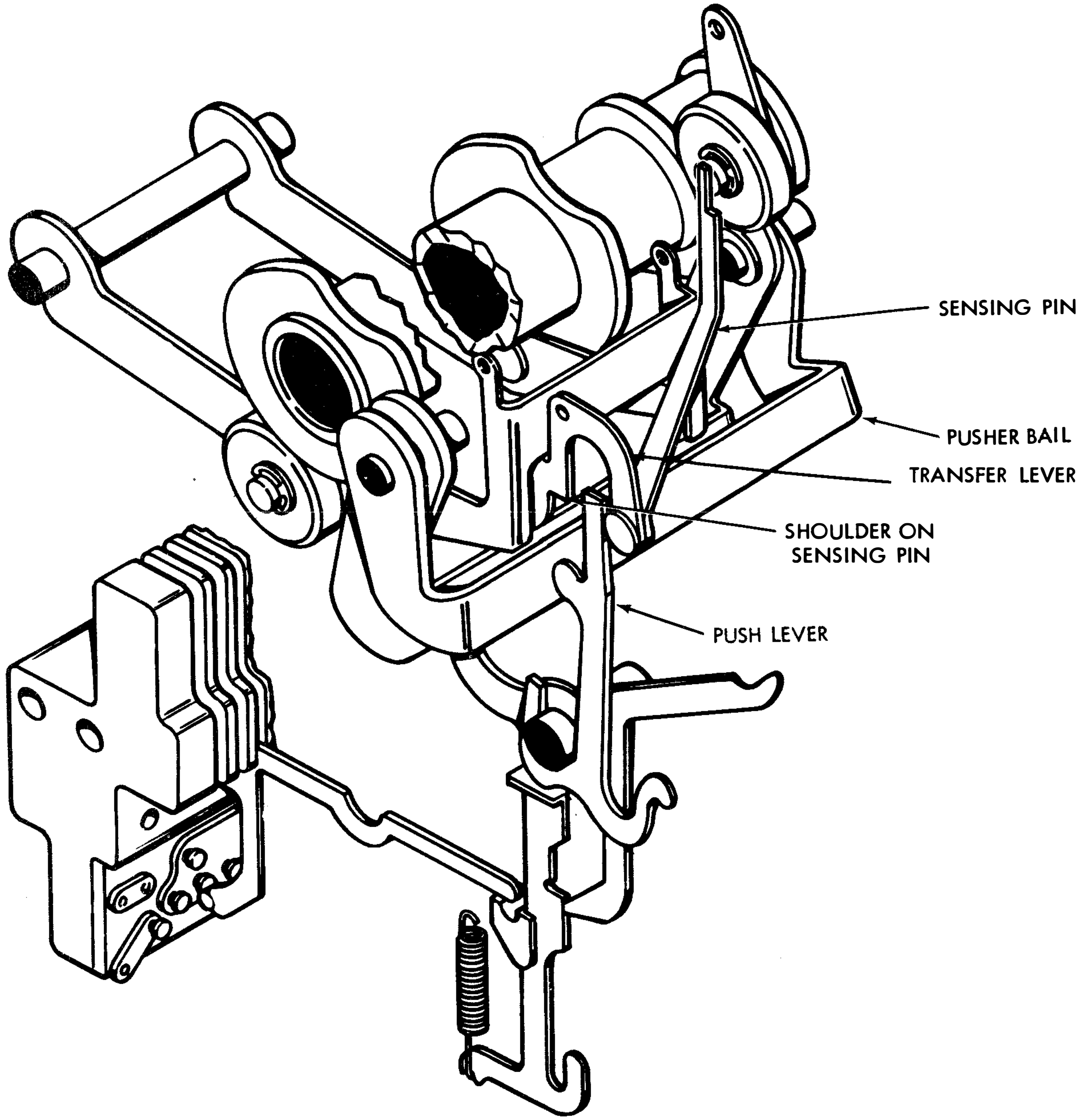


Figure 4-26. Pusher Bail

selected, and moved downward by the sensing bail, the pusher lever will hold the slide down. Then, as the latch bail roller rides to the indent of its cam, the lower end of the latch bail will move to the right, permitting the latch levers to latch the slides in their operated position.

4. STORING SWITCH (Figure 4-29) - In its unoperated or upward position, the slide holds the contact lever upward and the contact open. In its downward position, the slide permits the contact lever to move downward and close the contact. Thus, the code combination of the sensed character is stored in an arrangement of the storing switch contacts, and, on the next cycle of the distributor cam sleeve, will be transmitted sequentially over the signal circuit.

(g) AUXILIARY CONTACTS (Figure 4-30) - The sensing cam actuates the following auxiliary contacts through the action of the auxiliary lever, the pusher levers, contact lever slides, and contact lever extensions on the storing switch. The contacts are operated for each cycle of the sensing cam as follows:

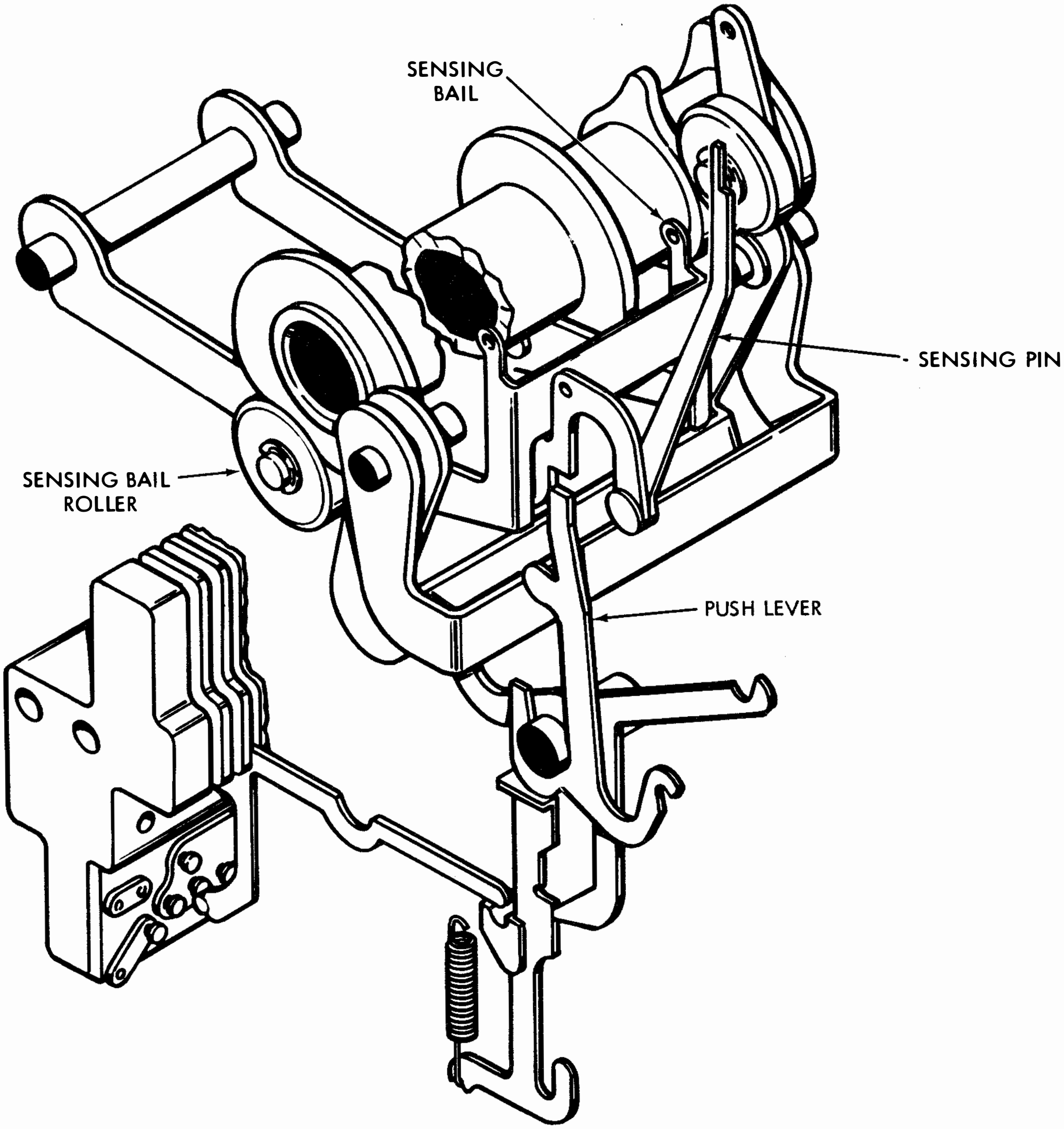


Figure 4-27. Sensing Bail

1. An auxiliary "A" contact closes at 232 degrees and opens at 294 degrees.

2. An auxiliary "B" contact closes at 340 degrees and opens at 240 degrees.

(6) STOP MECHANISMS

(a) TAPE-OUT PIN (Figure 4-23)

1. Stopping the action occurs when the tape out (6th) pin senses that there is no tape in the reader head and the sixth pin rises through action of its spring to its fully extended position. The sensing pin through its pusher closes its contact which then remains latched.

2. Depending upon customer requirements the tape out contact may either (1) operate a warning device or (2) through a relay open the sensing clutch trip magnet circuit, (3) or both. If the latter (2) or (3) were chosen, the clutch trip magnet would no longer be energized, the armature releases permitting the armature extension to pivot out of its position of blocking the clutch trip lever latch. The clutch trip lever latches the clutch trip bail. The clutch bail in being latched permits the clutch trip lever to block the stop lug on the clutch. The inertia causes it to rotate far enough after being blocked to fall into the notch on the clutch cam disk.

3. Because of the latching of the tape out contact it will be necessary upon resumption of operation to sense tape at least one time in order to open the contacts. If a relay has been used for stopping the unit it will be necessary to provide a manual reset.

4. Similarly stopping the unit can be completed through the last character switch. When tape stops feeding from the punch, the pivoted head climbs up the tape and after reading the last character, an extension on the yoke actuates the last character switch, opening the sensing clutch trip magnet circuit if it is wired in series.

(b) LAST CHARACTER CONTACT (Figure 4-23) - Stopping the unit can also be accomplished through the last character contact. When tape stops feeding from the punch, the pivoted head climbs up the tape and after reading the last character, an extension on the yoke actuates the last character switch, by opening the switch contacts and stopping normal transmission.

d. LRXB17 OR LRXB27 BASE (Figures 1-11 and 404)

(1) GENERAL - The LRXB17 or LRXB 27 Base, as part of the Reperforator Transmit-

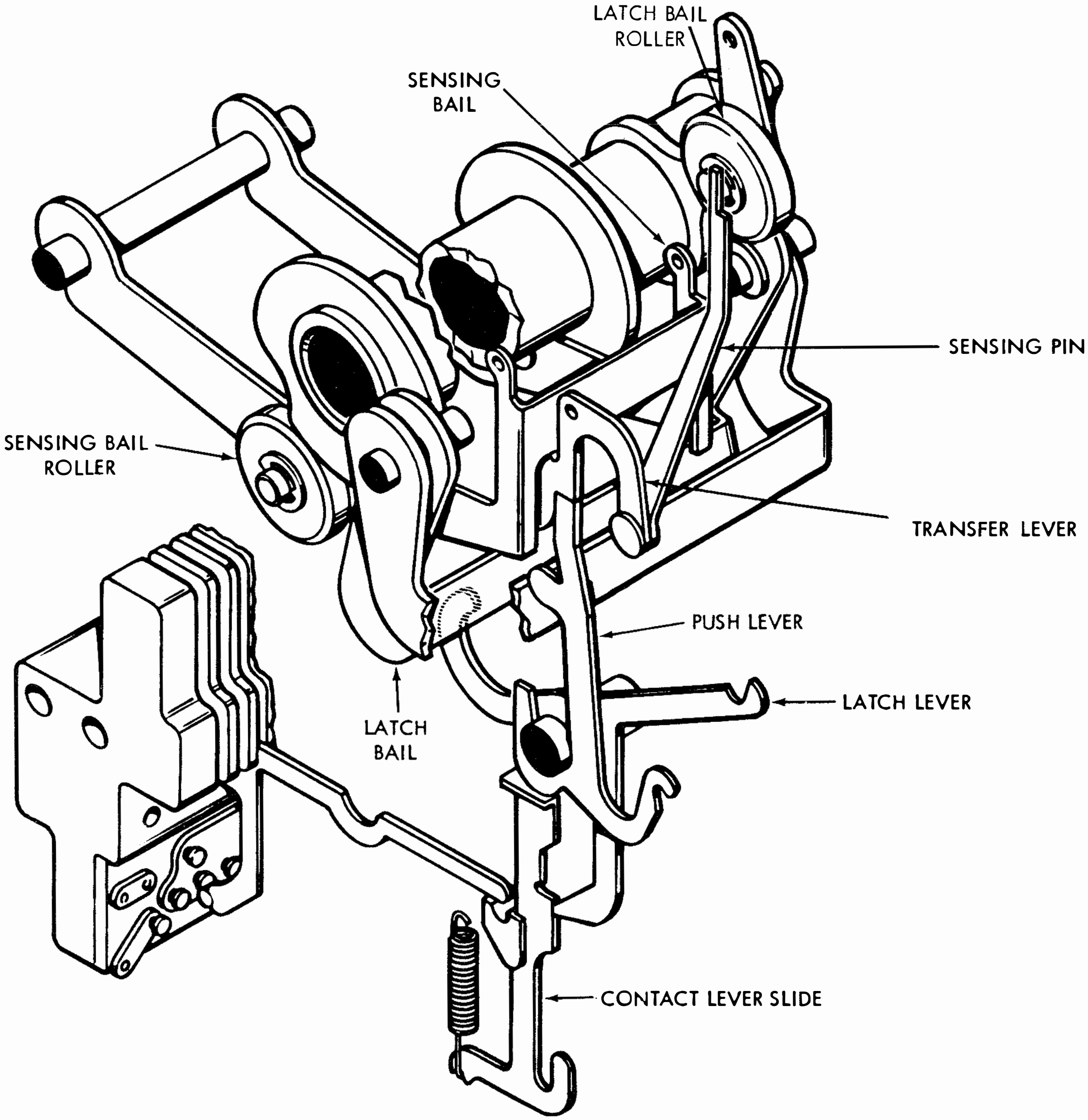


Figure 4-28. Latch Bail

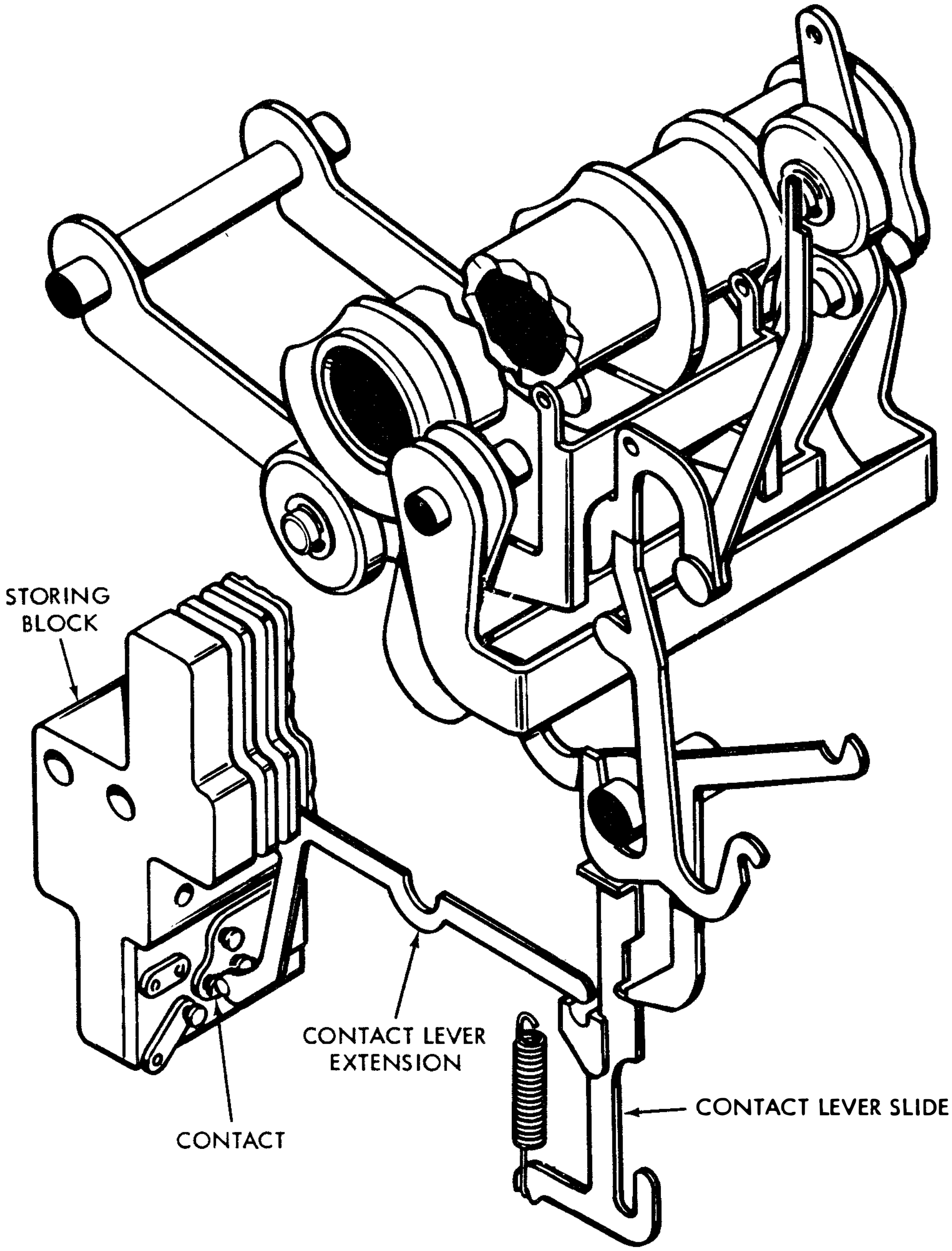


Figure 4-29. Storing Switch

ter set, is mounted on the LTHS205BZ Tape Handling Stand. Two locating pins are provided to position the base on the stand, and three captive screws to secure it. The base provides mounting facilities, motor driven power, and electrical facilities for the LPR34BWA or LPR 34BRP Typing Reperforator and LAXD7 or LAXD8 Pivoted Transmitter Distributor units. A power take-off for the tape winder mechanism on the LTHS205BZ, and a gear shift mechanism to select the operating speed of the LPR34BWA or LPR34BRP are also provided. Recessed handles, cast as an integral part of the base, are located at the sides to lift the unit from the tape handling stand (see Figure 1-6). Legs are provided on the base to facilitate maintenance. Gear covers, to protect personnel and to contain oil splatter, mount on the top surface of the base above the gear bracket assemblies.

(2) ELECTRICAL FACILITIES - Two 32 point plugs for signal and control wiring, a 3 point power plug, and a motor "on-off" switch are mounted on an electrical mounting plate located on top of the base to the right. A terminal board is mounted under the base, and provides connection facilities for the motor wiring. All signal leads are shielded, and all shielding is insulated from the equipment frame.

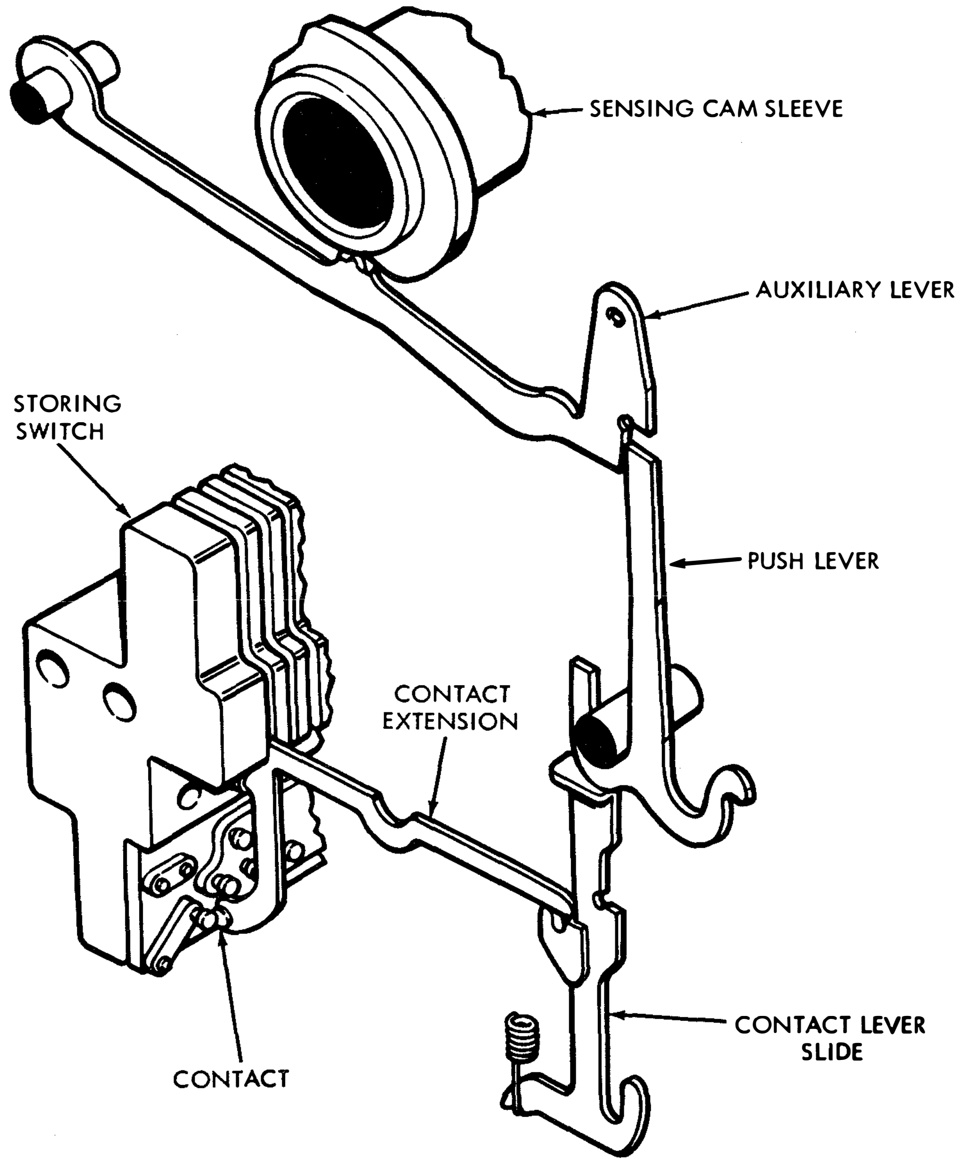


Figure 4-30. Auxiliary Contacts

(3) MOTOR MOUNTING AND GEARING - The LMU11 motor unit mounts on four posts protruding from the lower surface of the base. Power is transmitted through a pinion and idler to the tape winder drive mechanism. The idler gear is located outside of the tape winder drive casting, its shaft supported by two ball bearings. On the same shaft, within the casting, is a worm gear which transmits power to a worm wheel on a ball bearing cross shaft (also within the casting). This cross shaft drives the tape winder drive pulley at 270 RPM. The idler and cross shafts rotate at 1200 RPM. The main cross shaft extends parallel to the idler shaft and is supported by two ball bearings, one in each gear bracket casting.

(4) GEAR SHIFT MECHANISM - Located on the cross shaft and within the gear shift casting is the gear shift driving cluster. Above and within the casting is the mating cluster of the driven gears. There are two gears in the cluster to provide for 45.5 and 75.0 Baud operation. Shifting of gears is accomplished by means of an arm extending over the upper cluster. On the arm is mounted a roller that rides between the gears. The arm is pivoted about a vertical pin and is located in one of the speed positions by means of a spring biased pin at the opposite end. The pin seats itself in one of three holes in a locating plate. Power for the reperforator is taken off the end of the upper gear cluster shaft. The difference between sending and receiving speeds is accomplished at this point. The speed is reduced from 3600 RPM at the motor to 693.8775 or 420.9524 RPM at the reperforator (75.0 or 45.5 Baud). The LRXB17 utilizes a gear shift for the reperforator only; the trans-

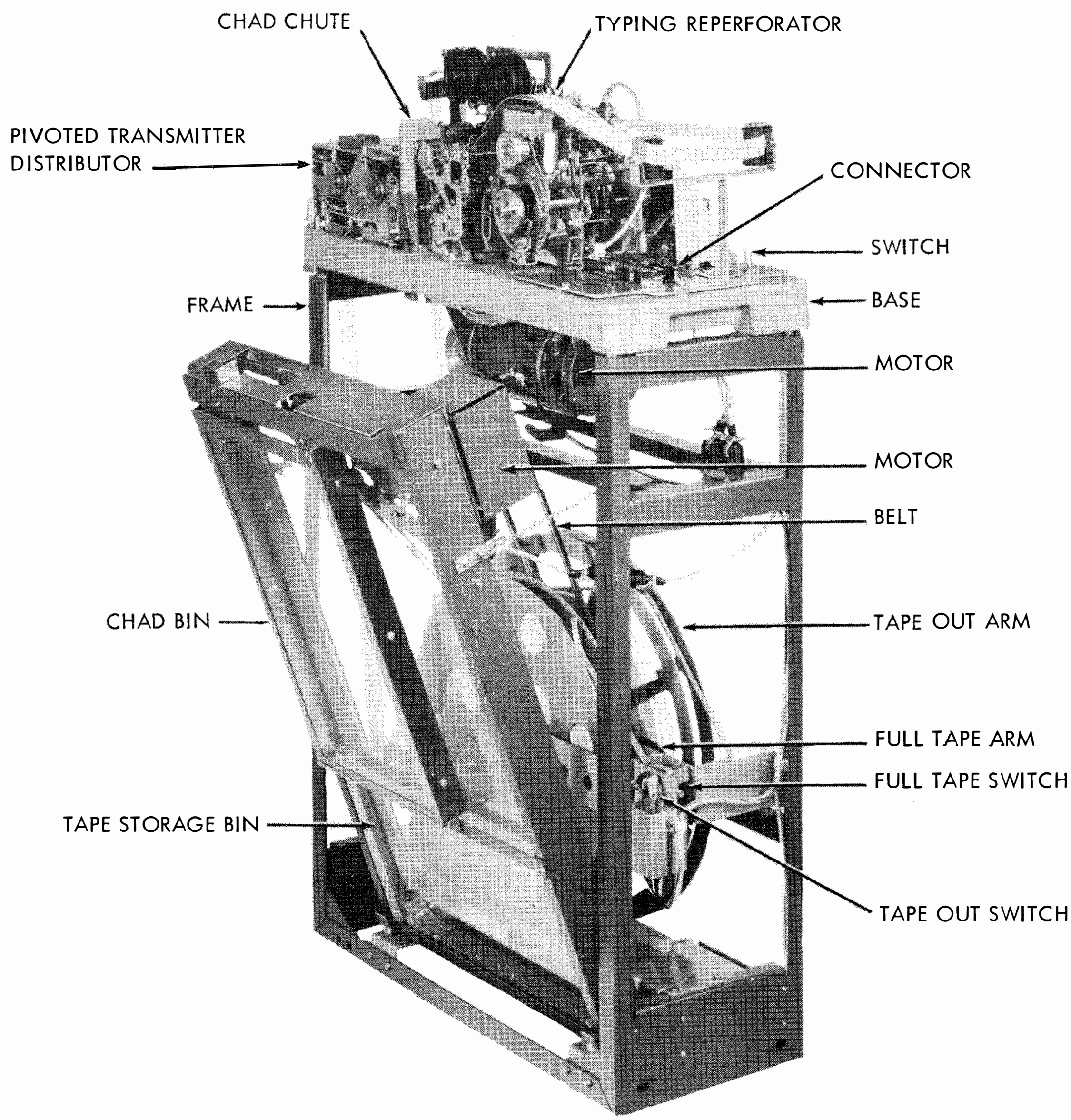


Figure 4-31. Model 28 Reperforator Transmitter (Bins Open)

mitter-distributor is driven directly from the cross shaft through right angle gearing at 75.0 Baud. The LRXB27 is similar to LRXB17 except it includes a gear shift mechanism (45.5, 50, 75 Baud 7.00 unit code) input and output.

(5) CHAD AND TAPE CHUTES

(a) A chad chute, located left of center near the front edge of the base, is provided to direct chad from the reperforator into a chad bin mounted on the intermediate tape storage bin (Figures 1-11 and 1-6). The chad chute mates with the chad chute mounted on the reperforator punch block (Figure 4-4), and the chad chute mounted on the tape storage bin (Figure 4-31) when the bin is locked in position on the stand.

(b) A tape chute, located directly behind the chad chute, directs perforated tape from the reperforator into the intermediate tape storage bin, and out of the bin to the pivoted transmitter distributor.

e. LMU11 SYNCHRONOUS MOTOR UNIT

(1) GENERAL - The LMU11 Synchronous Motor Unit (Figure 1-12) is for use with single phase, 115 volt (plus or minus 10 per cent) alternating current, at a frequency of 60 cycles per second (plus or minus 0.75 per cent). The LMU11 is a 1/12 horsepower, 3600 RPM, two pole, wound stator ball bearing motor with a squirrel cage type rotor. The stator has two

windings, a main operating winding and an auxiliary starting winding. The auxiliary winding is wired in series with a 170 mfd electrolytic capacitor and a current operated motor starting relay. Normal starting current is 12.0 amperes, running current 2.7 amperes, and rated torque 23.4 ounce inches. The motor mounts below the LRXB17 or LRXB27 base on four posts protruding from the lower surface (see Paragraph 4-3. d. (3) and Figure 4-4).

(2) OPERATION

(a) The initial starting current causes the relay to pull up, and its contacts to close the auxiliary winding circuit. As the rotor gains speed, the current flowing through the motor, and through the relay coil, decreases. When a predetermined current value is reached, the relay armature is released, the relay contacts are opened, and the auxiliary winding circuit is disconnected from the line. The rotor continues to accelerate until it reaches synchronous speed (3600 RPM). The motor is wired in such a manner that the rotor revolves counterclockwise when viewed from the fan end.

(b) The starting relay and capacitor, together with a thermal cut-out switch, are mounted in a compartment above the motor. The thermal cut-out switch is in series with both the main and the auxiliary motor windings. If excessive current is drawn by the motor for any reason, the thermal cut-out switch will open the circuit preventing overheating and possible damage to the motor. The switch may be manually reset, if tripped, by depressing the red button which projects upward through the compartment mounting plate. Allow the motor to cool at least 5 minutes before manually depressing the red button.

(c) There are two fans located within the motor housing, one at each end of the rotor. These draw cooling air through the slots in the end bells and exhaust it through the slots in the motor housing. The end bells have rubber vibration mounts by means of which the motor sets in the ends of its mounting bracket. The rubber mounts are held in the bracket by mounting straps. The motor shaft has a tapped hole for use in fastening the intermediate shaft driving helical gear. All end play is taken up by a conical shaped spring, which bears against the outer race of one of the ball bearings.

f. LTHS205BZ TAPE HANDLING STAND

(1) GENERAL

(a) The function of the LTHS205BZ Tape Handling Stand (Figure 1-13) is to provide mounting facilities for the LRXB17 or LRXB27 Base, tape supply and storage facilities, provision for collection of chad from fully perforated tape, and a tape winder for transmitted tape. This unit - together with the previously discussed LPR34BWA, LAXD7 or LAXD8, LRXB17 or LRXB27, and LMU11 - makes up a complete Reperforator Transmitter Set.

(b) The tape handling stand frame consists of four uprights of angular steel, with the necessary cross members to provide rigidity and facilities for mounting the tape winder, tape supply reel, intermediate tape storage bin, chad disposal bin, and base. The LRXB17 or LRXB 27 Base is positioned on the stand by means of two locating pins, and is secured with three captive screws. Signal, control and power wiring for the stand (and for the entire RT Set) terminates at the appropriate receptacle on the electrical mounting plate on the base (see Par. 4-3.d.(2).

(2) OPERATION

(a) TAPE WINDER

1. The tape winder is located immediately behind the tape storage bin on the lower shelf of the tape handling stand (Figure 1-6). The winder has a capacity of 1000 feet of fully perforated tape, and is capable of winding the tape at a speed of 200 WPM. Power to operate the tape winder is transmitted from the LMU11 through the tape winder drive mechanism on the base, and then via a belt drive to the winder (see Paragraph 4-3.d.(3)).

2. The tape winder uses a friction type clutch composed of two felt friction disks, a stop cam, friction spring, and capstan nut (Figure 4-32). The intermediate gear drives the clutch shaft through the friction clutch. Incoming tape passes through a loop in the end of a tight tape arm and through a chad depressor before passing onto the tape winder reel (Figure 4-33). The chad depressor serves to apply a constant tension to the tape to insure compact winding. When the incoming tape becomes slack, the tight tape arm is lowered. The tight tape arm, in turn, pulls the stop lever down, moving the stop lug away from the stop cam, permitting rotation of the shaft and intermediate gear (Figure 4-34). The rotation of the intermediate gear and pinion, which meshes with the reel gear, causes the reel to wind tape and take up the slack. As slack is taken up, the tight tape arm raises permitting the stop lever to be raised (under spring tension) moving the stop lug into engagement with the stop cam, causing reel rotation to cease. These operations are repeated cyclically as tape is supplied to the winder.

3. A take-up reel full warning device is provided, consisting of a leaf spring switch and an extension lever which rides the

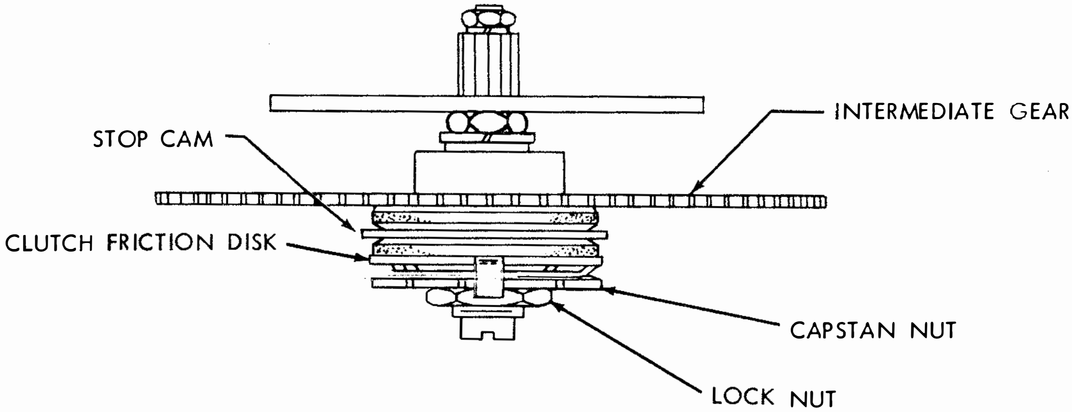


Figure 4-32. Friction Type Clutch

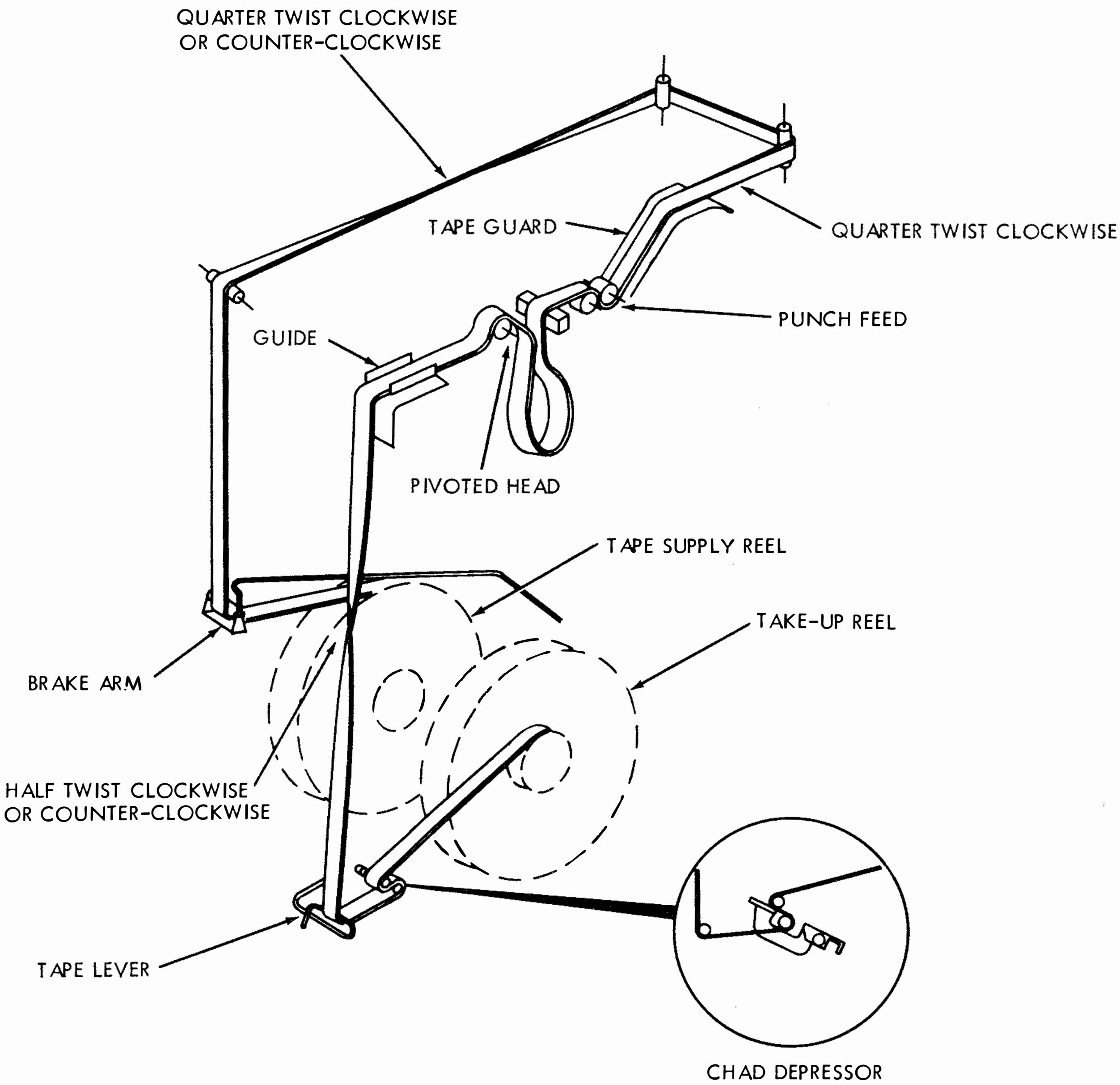


Figure 4-33. Chad Depressor and Tape Routing

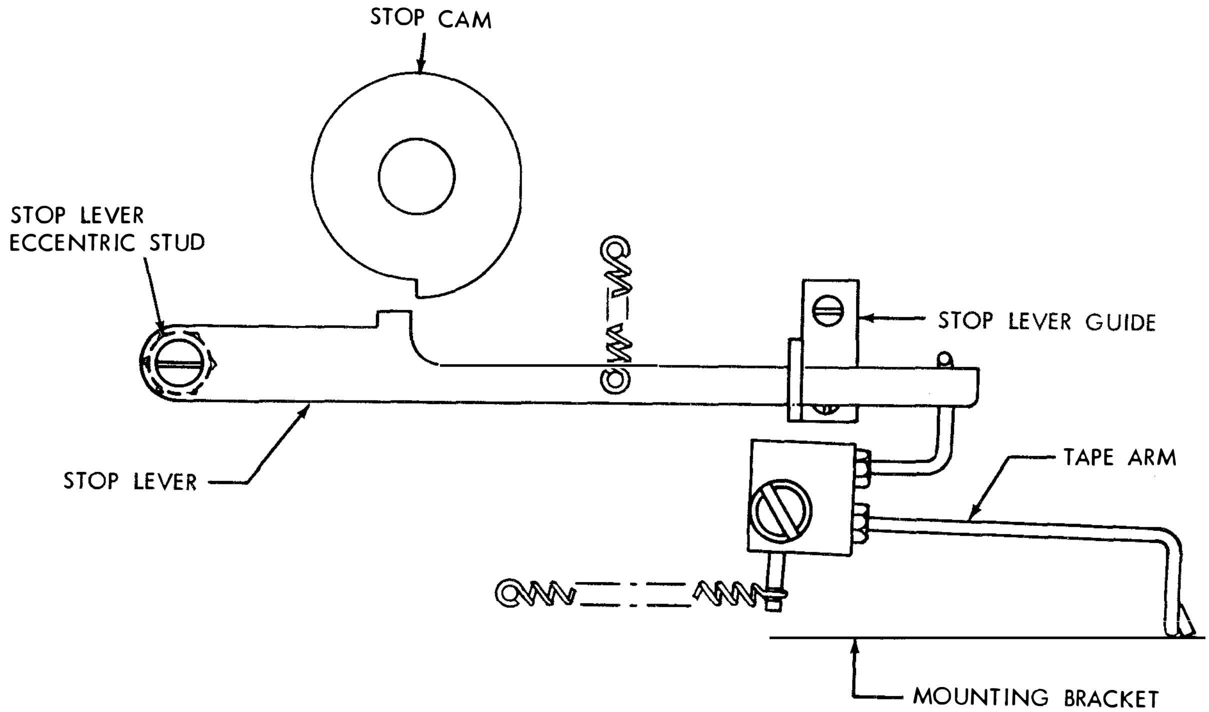


Figure 4-34. Tape Winder Control Mechanism

tape on the take-up reel (Figure 4-31). When closed, the switch causes the alarm circuit in the LBAC222BA Cabinet to energize.

(b) TAPE SUPPLY REEL

1. The tape supply reel mounts directly behind the tape winder and has a capacity for 3000 feet of unperforated tape. The reel rests in two V-block bearings and is easily removed. The core of the tape reel is threaded for removal of either side plate for tape roll replacement. In order to minimize the tension on the tape, that portion of the core which bears the weight of the tape roll turns independently of the side plates. Therefore, either the reel core may turn (on ball bearings), or both may turn. This makes it unnecessary to accelerate the side plates during tape feed and lessens tension on the tape.

2. The tape supply reel is provided with a brake to keep the tape under a slight constant tension and prevent overrunning or possible tangling of the tape. The brake takes the form of a bent rod arm extending over and resting upon the tape supply roll, pivoted in such a way that the weight of the arm provides the necessary braking force. The brake retards motion of the tape roll but not of the retaining reel, relieving the tape of the shock of accelerating the reel. The tape unwinds from the top of the roll toward the end of the arm and is passed through a retainer and under a roller as it is directed up toward the base (Figure 4-33). When the tape becomes taut the roller and arm are lifted slightly, relieving the roll of the braking force. The roll revolves causing the tape to become slack, lowering the arm and restoring the braking force. In actual steady state operation, the arm provides a continued frictional drag on the tape roll and keeps the tape under constant tension.

3. Attached to the pivot end of the brake arm is an adjustable bracket which actuates a double-throw switch. The switch operates tight tape (optional) and low tape supply alarms (Figure 4-35). The alarm signal wires are connected to the reperforator cable through a plug and receptacle.

(c) INTERMEDIATE TAPE STORAGE AND CHAD DISPOSAL BINS

1. The intermediate tape storage bin is utilized for temporary storage of perforated tape for subsequent transmission. It is comprised of two parallel safety glass walls enclosed in a wood and metal frame. The bin locates in the tape handling stand by two brackets at the bottom, and is secured at the top with a spring clip. The upper cross-member of the bin forms a handle. A motor driven tape puller is provided to pull the perforated tape into the bin overcoming resistance due to static charges on the tape. Bin capacity is 50 to 100 feet of perforated tape.

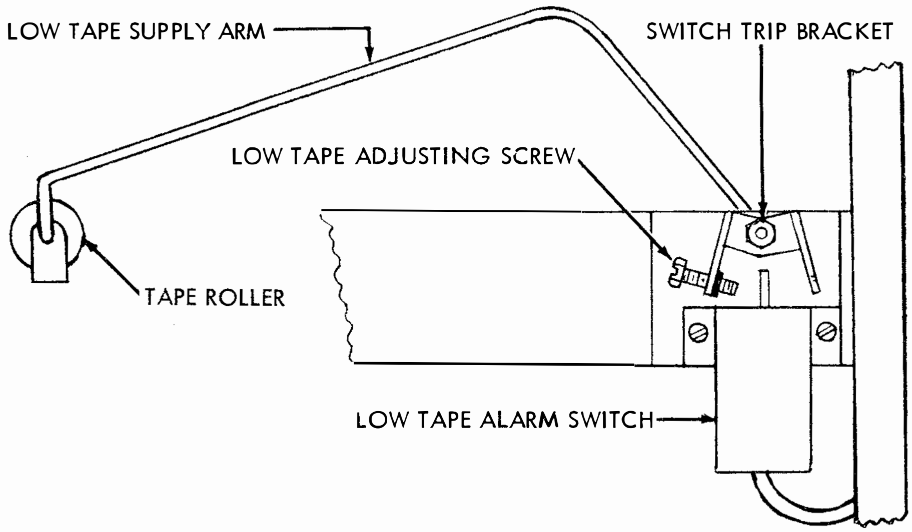


Figure 4-35. Low Tape Supply Alarm

2. Attached to the side of the tape bin is a bracket and chad chute. A chad bin, capable of holding chad punched from 3000 feet of 5 level (random message) tape, fits under the chute and rests on the bracket. The chad chute, which may mount in one of two positions on the tape bin frame, is placed in the left position as shown in Figure 4-31.

3. A bin full alarm switch is mounted in the upper right corner of the tape storage bin (Figure 1-6). The switch is actuated when the tape, upon reaching a full condition, causes an extension lever to close the contacts. Four extension lever spring holes are provided to increase or decrease the force required to operate the contacts. Since the alarm contact will not remain closed continuously, a holding type relay is provided in the LBAC222BR or LBAC 238BR Cabinet to give constant alarm indication.

g. LBAC222BR OR LBAC238BR UNIVERSAL CABINET

(1) GENERAL - The LBAC222BR or LBAC238BR Universal Cabinet provides mounting facilities for two Reperforator Transmitter (RT) Sets, and electrical control facilities to operate the sets (Figures 4-3 and 4-36). The cabinet consists of separate inner and outer structures to minimize the transmission of mechanical noise to the outer shell by the apparatus. All equipment mounts on the inner structure, the outer shell serving as a dust and noise enclosure. Separate slide mounted cradles are provided for each RT set so that the sets may be withdrawn from the front of the cabinet for servicing and maintenance. A raceway is provided at the bottom rear of the cabinet to contain station cabling. The raceway may be fastened in place from inside the cabinet for "against the wall" applications. Provisions for grounding the various units to the cabinet and for attaching an external ground to the cabinet are provided.

(2) DOORS AND PANELS

(a) DOORS - Four doors are provided on the cabinet, two at the rear and two in front. The rear doors are all metal, extend the full height of the cabinet, and allow access to both RT sets and electrical control circuitry (Figure 4-36). The front doors, also full height, are provided with glass windows to permit observation of the RT Sets, and of the amount of tape in the tape storage bins and on the tape supply and winder reels (Figure 1-1). A recessed handle is provided on each right hand door to facilitate opening. When closing, the left door is shut first. Then the right door is shut, and extends over the lip of the left door to hold it closed. Each pair of doors is held shut by two magnetic catches as shown in Figures 4-3 and 4-36.

(b) PANELS - Immediately above the front doors is a sloping panel extending back toward the cabinet dome. The sloped surface makes a convenient writing surface for the operator, and is provided with windows for maximum visibility of the RT Sets to permit the reading of the last character perforated (Figure 1-1). Although side panels are supplied with the cabinet, they may or may not be used depending on the equipment arrangement in a given location. It is possible to mount a series of LBAC222BR or LBAC238BR cabinets (or a combination of similar cabinets such as the LBAC222 or 238, 223, 224, 225) side by side, end enclosures being used on the outside cabinet only.

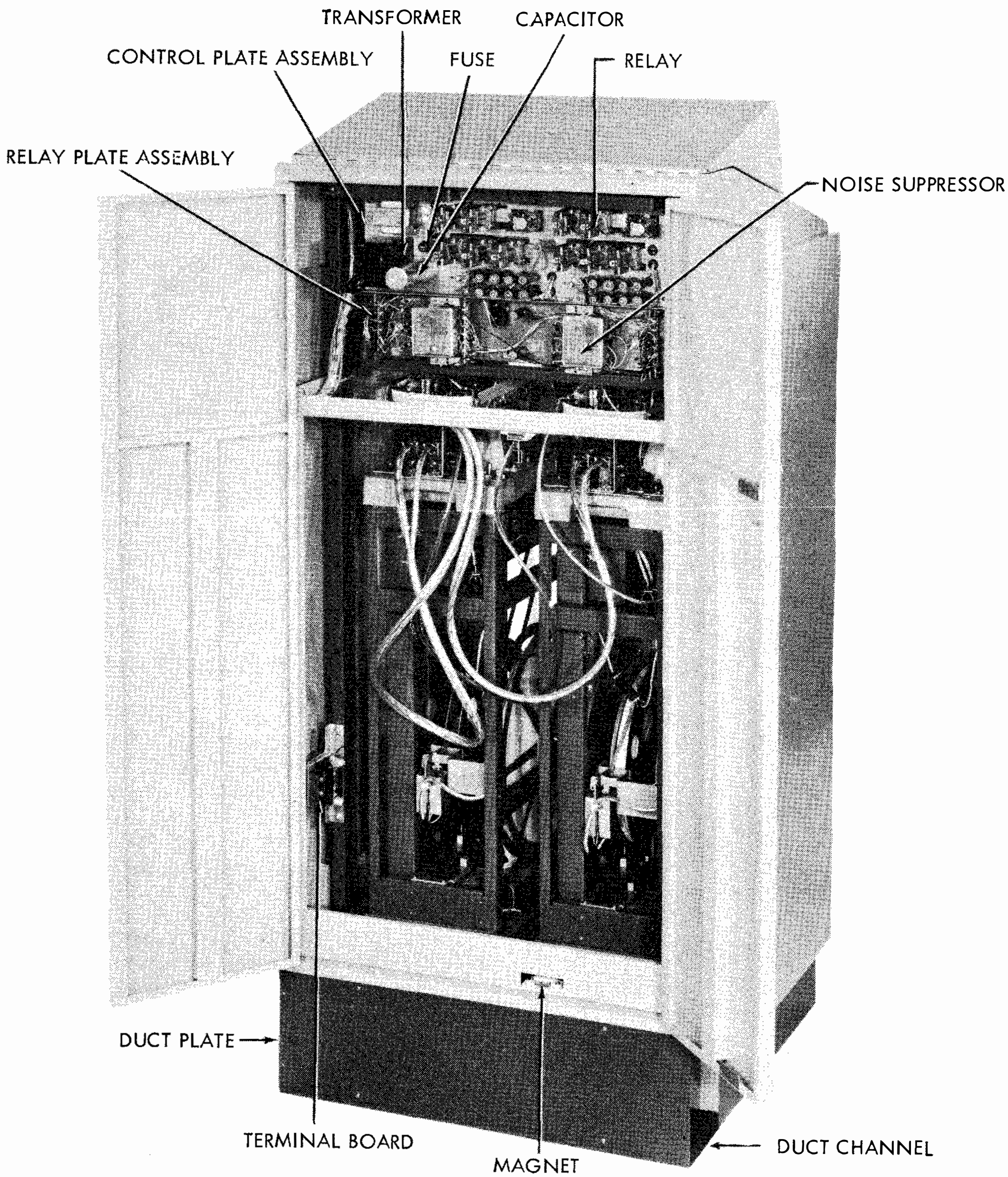


Figure 4-36. Model 28 Reperforator Transmitter Group (Rear View)

(3) DOME (Figure 4-3) - At the top rear of the cabinet (immediately behind the sloping glass windows) is a hinged dome which mounts a control panel and provides access to the electrical control rack. The dome is hinged across the full length of the cabinet back, and is held in the closed position by means of a captive screw located at the top center of the sloping panel. The screw is accessible when the front doors are opened. A locking slide support, located at the left rear corner of the cabinet, holds the dome open.

(4) ELECTRICAL CONTROL RACK

(a) GENERAL - The electrical control rack is located at the top rear of the cabinet, and is accessible via the rear doors (Figure 4-36) or the dome (Figure 4-3). The rack mounts on a swivel mechanism, and can be rotated to a horizontal position for maintenance purposes when the dome is opened. Captive screws located at the top left of the rack (Figure 1-16) secure the rack in either its vertical or horizontal position.

(b) CIRCUIT FEATURES - The basic function of the control rack is to provide wiring and electrical control facilities for operation of two RT Sets. For convenience, the control circuitry can be divided into the following groups:

1. A power supply to provide for operation of alarm and clutch magnet circuitry.

2. A relay group to control the associated LAXD7 clutch magnets. The relays operate from a 20 ma., 60 volt neutral stepping pulse of 20 ± 2 milliseconds or 30 ± 5 milliseconds duration. The pulse is to be supplied from an external unit.

3. A relay group to provide positive read-back indication of the presence or absence of the stepping pulse for presentation at a remote location.

4. An electronic keyer for each receive line of the LPR34BWA typing reperforators.

5. A RY34 sending line relay for each send line. Current required for the operation of the bias and operating windings of the sending line relay is supplied internally.

(c) CONTROL CIRCUIT OPERATION (Refer to Figure 4-37 during the following discussion)

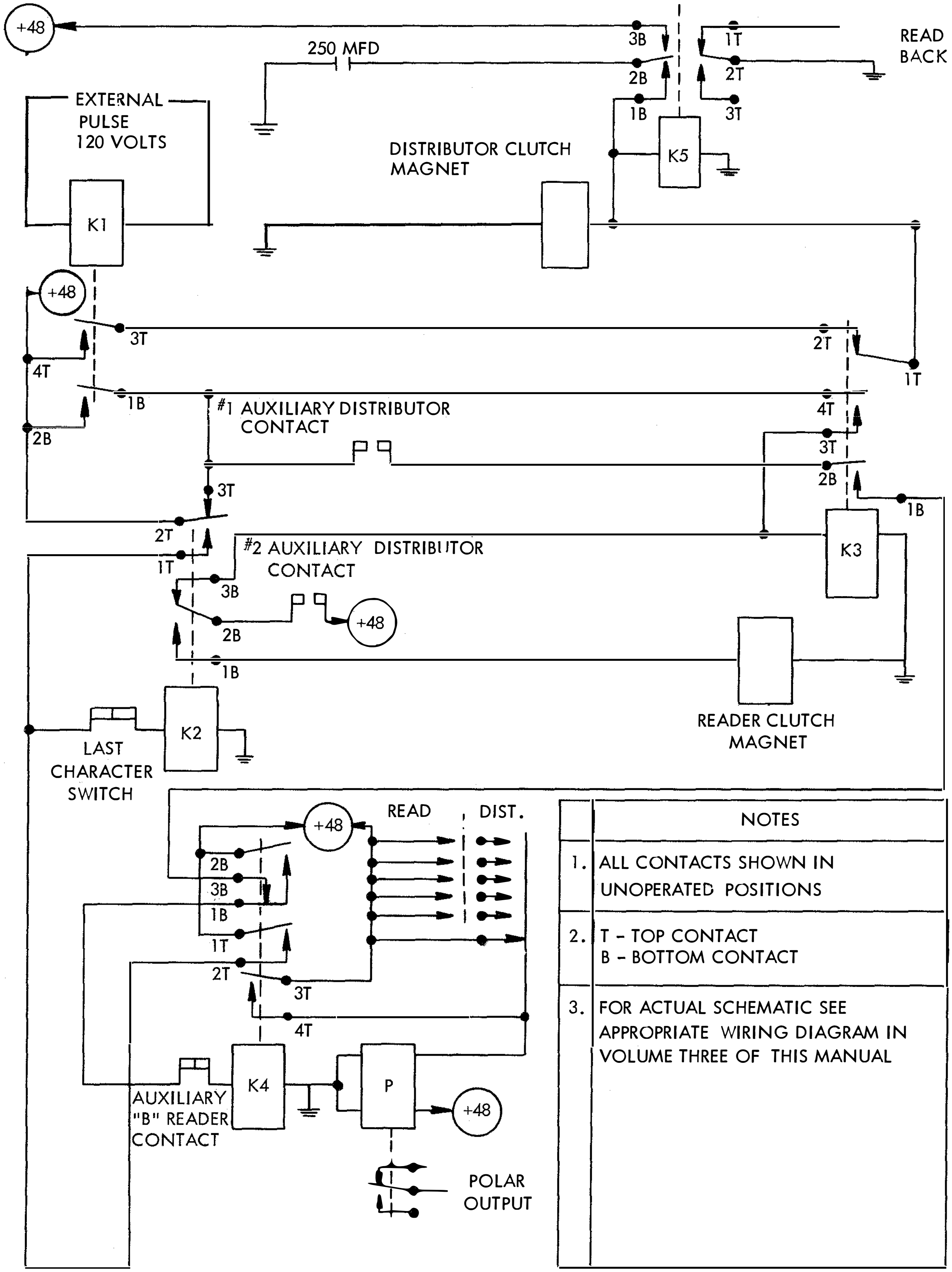
1. NORMAL TRANSMISSION - An external pulse energizes relay K1, allowing current to flow through contacts K1 (4T-3T) and K3 (2T-1T) energizing the distributor clutch trip magnet. This causes rotation of the distributor cam sleeve allowing transmission of the stored character in the reader. Rotation of the distributor cam sleeve closes the number 2 auxiliary contact in the distributor block assembly, allowing the reader clutch trip magnet to operate through contacts K2(1B-2B). Relay K2 was previously operated through K4(1T-2T) and the "last character" contact (see Paragraph 4-3.g.(4)(c)2.d.), and is held operated through its own holding contacts. It will remain in an operated condition until the pivoted sensing head reads the last character perforated, opening the "last character" contacts. This will set the relay system up to transmit the last character as described in paragraph 4-3.g.(4)(c)2. Operation of the reader clutch trip magnet initiates the reader cycle, allowing the next character in the tape to be sensed and stored for subsequent transmission upon reception of another pulse. Thus, normal transmission consists of transmission of the previously sensed and stored character, followed by sensing and storing the next character in the tape.

2. "LAST - FIRST" CHARACTER SEQUENCE

a. When the "last character" contact is opened as a result of the pivoted head reading the last character perforated (i.e. the final character in a message), the control system will be set up to transmit the last character upon receipt of the next stepping pulse. After the last character is transmitted, the control system will automatically short the transmitter-distributor contacts. Shorting the transmitter-distributor contacts prevents retransmission of the last character (which would be transmitted as the first character), when the reperforator again begins to perforate a new message in the tape. (Although the last character has been transmitted, it is still stored in the distributor block, and will remain stored until a new character takes its place). In effect, the system prevents transmission of the last character from the previous message as the first character of the next message.

b. When the "last character" contact is opened by the pivoted head reading the last character perforated, relay K2 is de-energized. This transfers the number 2 auxiliary distributor contact pulse from the reader clutch trip magnet circuit to the K3 relay locking circuit. Reception of the next incoming pulse energizes the distributor clutch magnet through contacts K1(4T-3T) and K3(2T-1T), allowing transmission of the last character read (i.e. the final character of the message). Rotation of the distributor cam sleeve initiates the number 2 auxiliary contact pulse which, in turn, operates relay K3 through contacts K2(3B-2B). Relay K3 is locked through contacts K3 (4T-3T) and K2(3T-2T). With K3 operated, the stepping pulse path to the distributor clutch magnet is opened, preventing operation of the distributor.

c. Following the "last character" transmitting cycle, relay K3 is energized and locked, K2 and K4 are de-energized, and the number 1 auxiliary distributor contact and auxiliary B reader contact are closed. At this point K4 is energized through the auxiliary B contacts, K4(1B-3B), K3(1B-2B), the number 1 auxiliary contact, and K2(2T-3T) to battery. Relay K4 locks through the auxiliary B contact



	NOTES
1.	ALL CONTACTS SHOWN IN UNOPERATED POSITIONS
2.	T - TOP CONTACT B - BOTTOM CONTACT
3.	FOR ACTUAL SCHEMATIC SEE APPROPRIATE WIRING DIAGRAM IN VOLUME THREE OF THIS MANUAL

Figure 4-37. Reperforator Transmitter Group Simplified Control Circuit Diagram

and K4(1B-2B) to battery. Contacts K4(3T-4T) are effectively shorting the transmitter-distributor contacts to prevent re-transmission of the last character (see Paragraph 4-3g.(4)(c) 2.a.).

d. Depending on the condition of the "last character" contact, relay K2 may be energized. Assume the "last character" contact to be opened, the sensing head having read the last character. When the reperforator begins to perforate a new message the pivoted head will move away from the punch block, and the "last character" contact will close. Relay K2 will energize through K4(1T-2T) to battery, preparing the circuit for normal transmission by removing the locking battery across relay K3. If the "last character" contact closes during reception of a stepping pulse, relay K2 will still be energized, and K3 will remain energized through K1(1B-2B) to battery for the duration of the pulse. This maintains proper relationship between the start of the stepping pulse and the start of the distributor cycle-regardless of when the "last character" contact closes.

e. The next stepping pulse will then trip the distributor clutch trip magnet. Transmission of the stored last character is prevented by the short across the transmitter-distributor contacts through K4(3T-4T). The short is maintained until the number five distributor pulse, after which the auxiliary B contact opens causing relay K4 to de-energize. The cycle for handling the "last-first" character sequence is now completed, and the control circuitry returns to normal transmission condition (i.e., relay K2 energized and locked, relays K3 and K4 de-energized).

4. POSITIVE READBACK - Relay K5 provides for positive readback indication of the existence or absence of the stepping pulse at the distributor clutch magnet. During normal transmission, K5 is energized whenever the distributor clutch trip magnet is energized, and readback indication of the existence of the stepping pulse is presented via K5(2T-3T) to a remote location. After "last character" transmission, relay K3 will energize (see Paragraph 4-3g.(4)(c)2.b.) opening the stepping pulse circuit to K5 and the distributor clutch magnet. K5, which was connected to battery through K3 (1T-2T) and K1(3T-4T), will not immediately de-energize. Due to the discharge of the 250 mfd capacitor through K5(1B-2B) and the K5 winding, the relay will be held operated for 150 milliseconds, after which time K5 will de-energize. The correct readback indication (i.e., no stepping pulse) is initiated via contacts K5(1T-2T) to a remote location, and the 250 mfd capacitor is allowed to recharge through contacts K5 (2B-3B) to battery.

(d) ALARM CIRCUIT OPERATION (Figure 4-38)

1. The alarm lamps are located on the control panel of the cabinet dome. Power for their operation is furnished by a 5.5 volt A. C. step-down transformer located on the control relay rack.

2. Closure of any of the four alarm contacts will energize and lock relay K6 through its respective parallel alarm circuit, energizing the general alarm lamp and the correct malfunction lamp. Provision is made to extend the general alarm to a remote location through a normally open contact on relay K6.

3. To reset the alarm relay, an alarm reset switch is provided. Operation of the switch de-energizes the relay locking circuit, de-activating the affected alarm lamps.

NOTE: The individual alarm lamps will not necessarily remain lit continuously, depending upon unit conditions. The general alarm lamp will, however, remain lit until the alarm reset switch is actuated.

(e) ELECTRONIC KEYER OPERATION (Figure 4-39)

1. The function of the electronic keyer is to repeat signals from a 60 volt D.C. polar signal line to selector magnets of the receiving unit in a local neutral loop. The electronic keyer utilizes a 6005 tetrode vacuum tube (or equivalent) and presents a high impedance load to the keying circuit.

2. When in "mark" condition, a positive pulse arriving from the signal line is applied directly to the 6005 control grid. The pulse overcomes the bias on the grid and allows current to flow in the plate circuit energizing the selector magnets and attracting the selector armature. The keyer is designed to supply 30 to 35 milliamperes current to the selector coils wired in series with the plate.

3. When in "space" condition, a negative pulse arriving from the signal line is applied directly to the 6005 control grid driving the tube into cut-off. With no current flow through the tube, the selector magnets de-energize and release the selector armature.

(f) 34RY POLAR RELAY - The 34RY relay is a four-winding, two position, permanent magnet polar relay. Each winding on these relays terminate at a separate pair of pins on the base. The relay is located on the electrical control rack in the LBAC222BR, LBAC238BR or LBAC253BR cabinet. It has eleven banana type

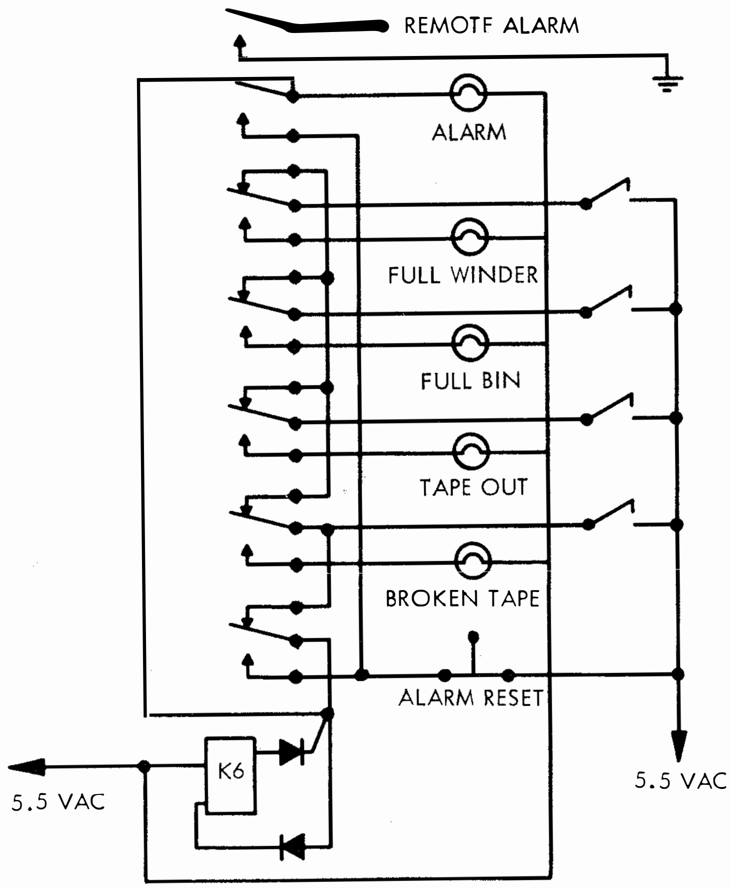


Figure 4-38. Alarm Relay Circuit

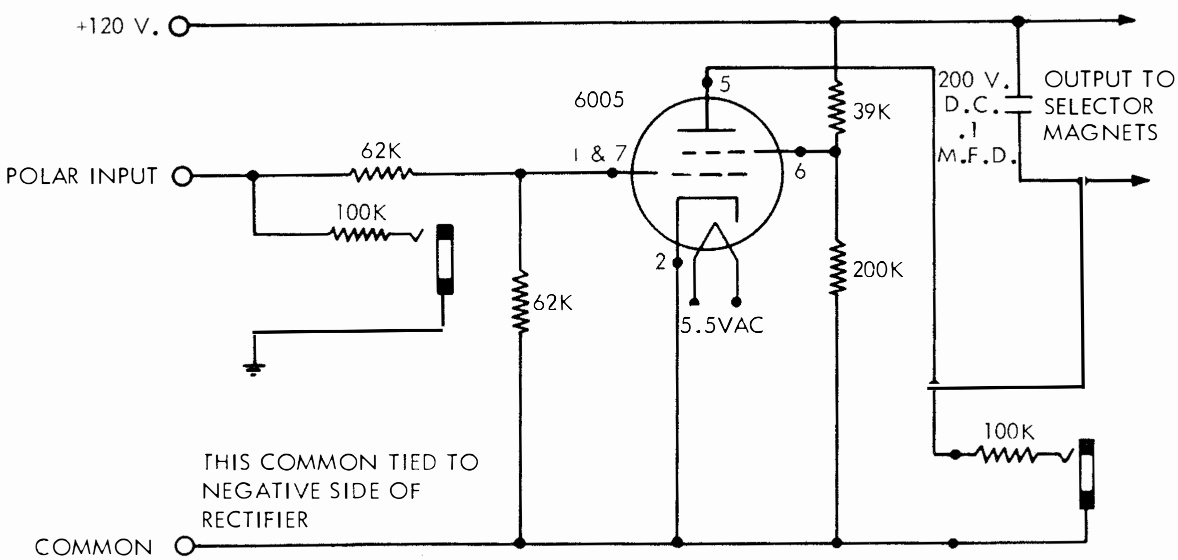


Figure 4-39. Line Keyer Circuit

TABLE 4-1. COIL CHARACTERISTICS

Relay	Winding	Total No. of Turns	D.C. Resistance	A.C. (60 CY.) Resistance	Inductance 60 Cycles
34RY	(D) - (U) Down-Up	2800	139 Ohms	155 Ohms	0.5 Henry
	D - U Down-Up	2800	139 Ohms	155 Ohms	0.5 Henry
	A - A' Accelerating Winding	1400	101 Ohms	105 Ohms	0.125 Henry
	O - O' Opposing Winding	1400	101 Ohms	105 Ohms	0.125 Henry

terminals, and requires an appropriate socket or jack that may be either flush or surface mounted. The 34RY relay is equipped with long life tungsten carbide contacts. These contacts have a higher contact resistance, particularly at low pressures, than other commonly used contact materials. It is important, therefore, that a relatively high contact pressure be maintained for most applications. See Table 4-1 for coil characteristics.

h. LBAC253BR REPERFORATOR - TRANSMITTER CABINET (Figure 4-39A)

(1) GENERAL - The LBAC253BR and associated equipment will receive incoming signals on two separate lines, change these signals into punched message tapes, read the punched tape and retransmit the messages under the control of external synchronizing equipment.

(a) The receiving functions are separated from the sending functions.

(b) Refer to associated wiring diagram in Volume 3, of this Manual.

(2) SELECTOR MAGNET DRIVER (Figure 4-39B) - GENERAL - Since the major portion of the receiving circuitry is that of the selector magnet driver a description of the selector magnet driver will suffice for both. Refer to portion of wiring diagram designated FS-1.

(a) Input Connections - Of the two input line leads, the one whose potential is negative with respect to the other during a MARKING line condition should be connected to the junction of R1 and R3. The remaining lead should be connected to the junction of R3 and CR5. Although the unit will not be damaged by reversing the input leads, provided the rated limits are not exceeded, its operation will be impaired.

(b) Bias Varistors - The varistors designated as CR1 through CR5 are also called "Click Reducers". They are simply two diffused junction silicon diodes mounted in opposite directions side by side. The device has a forward diode characteristic in either direction and thus its voltage drop varies slightly with current. At 0.100 ampere, the units have a voltage drop of about 0.8 volts each. They are used in this circuit to develop the transistor bias voltages and low voltage references that set the input switching level. Stabistors (CR6, 7 and 13) have characteristics similar to varistors but pass current in only one direction.

(c) Input Circuit - For neutral operation, no line current flows during the SPACING condition. Thus, input resistor(s), R3 and/or R2, connect the base of Q1 to the positive side of the driver's power supply. Internal current flowing through varistors CR3, CR4, and CR5 places a negative potential of 2.4 volts on the emitter of Q1 keeping it turned "OFF". As MARKING current begins to flow in the input line, a negative potential is developed across the input resistor(s). Q1 remains "OFF" until this current exceeds its mid point value of .010 ampere for .020 ampere operation, or .030 ampere for .060 ampere operation. This mid current value is detected when the input current develops a negative voltage slightly greater than 2.4 at the base of Q1, causing it to go into conduction. When the input returns to SPACE, Q1 turns "OFF" as the MARKING current drops below its mid point value. For .020 ampere operation, R2 is disconnected and R3 alone is left in the input circuit. For .060 ampere operation, R2 is placed in parallel with R3. For polar operation, R3 alone is left in the circuit and CR3, CR4, and CR5 are shunted. Q1 then goes into conduction as soon as the input current rises slightly above zero amperes toward the final MARKING current value.

(d) Switching Circuit - Transistors Q2 and Q3 form a "flip-flop" trigger circuit. For MARKING conditions, Q2 is non-conducting and Q3 is conducting. For SPACING conditions, Q2 conducts and Q3 is non-conducting. The change from one state to the other occurs at the mid point value of the input current and is instantaneous regardless of the slope, or time rate of change of the input current.

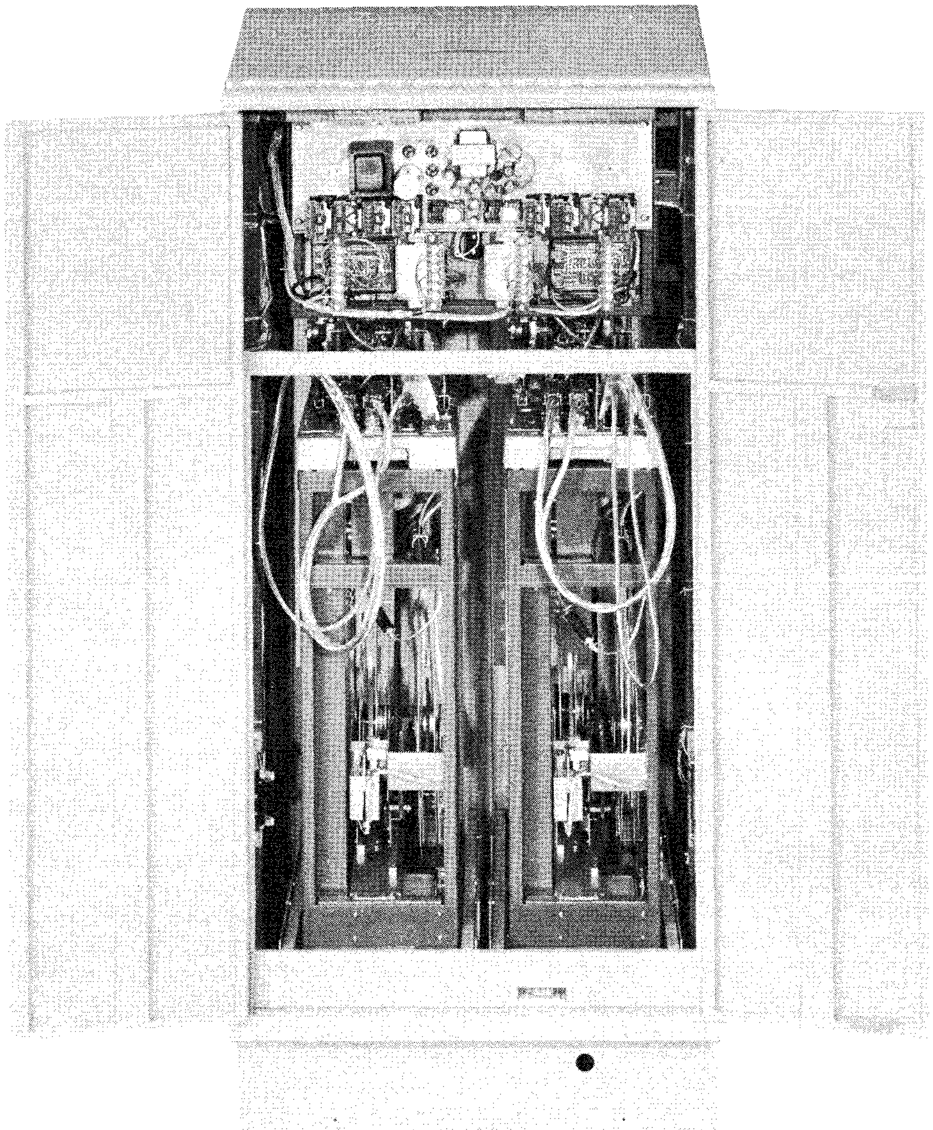


Figure 4-39A. Model 28 Reperforator Transmitter Group (Rear View) (LBAC253BR Cabinet)

(e) Output Circuit - Transistors Q4 and Q5 control the current flowing through the selector magnet coil. During the SPACE-to-MARK transition, Q5 conducts momentarily placing the full supply potential across the coil. This causes the current to rise rapidly to the desired value of .060A. As the current starts to rise above this value, Q4 goes into conduction causing Q5 to stop conducting. This places R10 in series with the coil so that its current is now limited to a final value of .060A. During the MARK-to-SPACE transition, transistor Q2 and diode CR9 provide a controlled discharge circuit for the selector magnet coil. The energy stored in the coil is rapidly dissipated without generating any high reverse voltage transients which could damage Q3 when it is not conducting.

(f) Input Protection - Resistor R1 samples the current flowing into the base of Q1. If the current exceeds a predetermined safe value of around 0.100A, the voltage developed across R1 and the base to emitter junction of Q1 exceeds the forward drop of CR1 and CR2, and the majority of any excess current is shunted through them and around Q1. This protects the transistor from high current surges. Since the varistors are bi-directional, the input is protected for excess currents of either polarity.

(g) Power Supply - The unit contains its own power supply to furnish the DC needed for circuit operation. The power supply is conventional, using an isolation transformer, full wave rectifier circuit, and a single capaci-

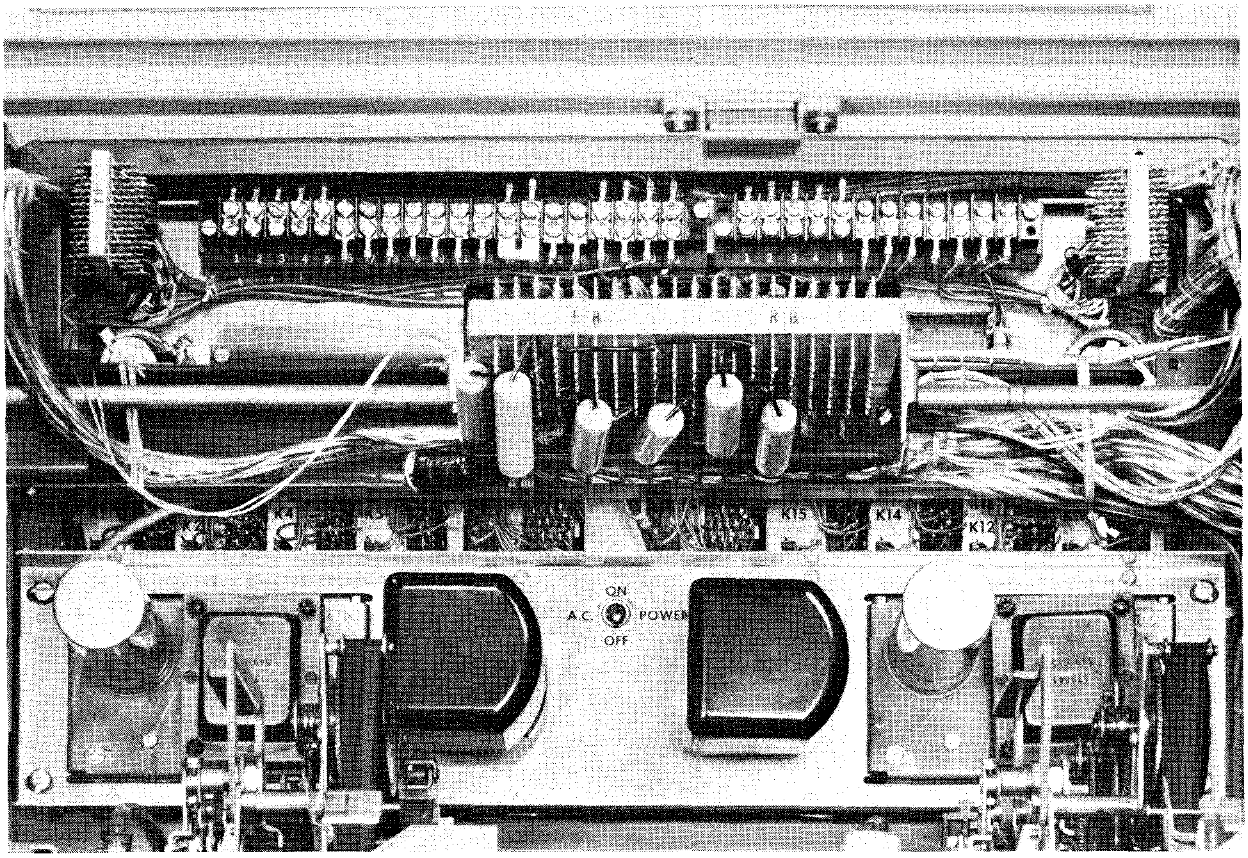


Figure 4-39B. Model 28 Reperforator Transmitter Group (Front View of Electrical Service Assembly Equipped with Selector Magnet Drivers) (LBAC253BR Cabinet)

tor filter. The DC voltage is nominally 40 volts. The voltage is selected so as to provide a safety factor against transistor breakdown under the most unfavorable circumstances of high temperature, high line voltage, and maximum line signalling frequency.

NOTE

The actual potential of the positive side of the DC supply is dependent on where the signal line circuit is grounded, and may have almost any value, relative to the local earth ground, in the range of +120 volts to -120 volts. Line surges due to lightning, etc., may cause even higher momentarily voltage surges.

(h) SPACING conditions

1. When the input is SPACING, transistors Q1, Q3 and Q5 are all turned "off" (non-conducting), and transistors Q2 and Q4 are turned full "on" (conducting into saturation).

2. With Q1 turned "off", the base of Q2 is driven negative with respect to its emitter through resistors R4 and R5, and resistors R7 and R8. This turns Q2 full "on". Since Q2 is in saturation, the voltage drop from emitter to collector is very small, less than 0.1 volt. The output of Q2 is applied to the base of Q3 through germanium diode CR11. The current flowthrough CR11 and R6 develops a maximum drop of 0.4 volt across CR11. This places a potential on the base of Q3 which is at most 0.5 volt negative with respect to the emitter of Q2. R12 causes sufficient current to flow through stabistor CR7 so that a voltage drop of at least 0.6 volt is developed across CR7. The emitter of Q3 is now more negative than its base, back biasing Q3 and keeping it turned "off". In addition, the relative positive potential on the collector of Q2 back biases diode CR10 so that no current flows through the selector magnet coil, CR8, and R4 to the negative supply voltage. Therefore, no current flows through the selector magnet coil during the SPACING condition.

3. The collector of Q2 is also connected to the emitter of Q4 and to one side of CR13. R9 places a negative potential on the base of Q4 with respect to its emitter so that the transistor goes into saturation. The 0.1 volt drop across Q4 is applied to the base of Q5. The emitter of Q5 is at least 0.55 volt more negative than the emitter of Q4 due to the drop developed across CR13 by the current flow through CR13 and R13. This places a back bias of 0.45 volt across Q5 causing it to remain cut-off.

(i) MARKING Condition

1. When the input is MARKING, transistors Q1, Q3, and Q4 are turned "on" (conducting into saturation), and transistors Q2 and Q5 are turned "off" (non-conducting).

2. With Q1 turned "on", current flows from its collector to the negative supply voltage through resistors R4 and R5, and resistors R7 and R8. The current flow through CR6 develops at least 0.65 volt across it which is applied to the emitter of Q2. The base of Q2 is connected directly to the collector of Q1 and is about 0.1 volt negative with respect to the emitter of Q1. This places a back bias of 0.55 volt on transistor Q2, turning it "off".

3. Since Q2 is cut-off, it no longer applies a back bias through CR11 to the base of Q3. Instead, the negative supply voltage is applied through R6 causing Q3 to go into conduction. Current flows from the collector of Q3 through CR8 and R4 to the negative supply voltage. It also flows through diode CR10 and the selector magnet coil to the emitter of Q4 and one side of CR13. The voltage drop across Q3, CR10, and the selector magnet coil (almost 5 volts total) back biases diode CR11 since the base of Q3 is only about 0.4 volt negative with respect to its emitter. Q2 is unaffected since it is cut-off and its collector is negative with respect to its base.

4. Transistors Q4 and Q5 are respectively kept "on" and kept "off" in the same manner as described for the SPACING condition.

(j) SPACE-to-MARK Transition

1. During the SPACING condition, Q4 was conducting into saturation, consequently its base is no more than 0.6 volt negative with respect to its emitter. As the input goes from SPACE to MARK, transistors Q1 and Q3 turn "on", and Q2 turns "off". The inductive reactance of the selector magnet coil opposes this sudden change and initially opposes any current flow through it from the collector of Q3. This prevents any current flow through CR13 and Q4 (which was "on" during the SPACING condition), therefore the emitter of Q4 goes toward the negative supply potential. Capacitor C1 holds the base of Q4 at its previous potential during conduction. This is now positive with respect to the emitter and thus Q4 becomes cut-off and only Q5 conducts. The value of R11 is small, and since Q5 is kept in saturation, the full supply potential is essentially placed across the selector magnet coil. The current through the coil is now rising toward a final value which would be limited only by the very low resistance of the coil and R11, assuming the power supply could meet the demand. This final value would be very much higher than the .060 ampere desired. This latter value is thus reached very quickly allowing for a fast selector magnet armature pick-up. The voltage on the base of Q4 now drops exponentially toward the negative supply potential as C1 discharges through R9. The voltage divider network of R7 and R8 places a potential about 10 volts more positive than the negative supply voltage on the anode of CR12 which causes it to be normally back biased. However, during the SPACE-to-MARK transition period, the base voltage of Q4 now drops just below the divider voltage value, and CR12 becomes forward biased clamping the base to this value. As current begins to flow through the selector magnet coil, the emitter of Q4 drops from its negative supply value until it becomes more positive than the base of Q4 and Q4 turns "on". This causes the collector to take on nearly the same potential as the emitter and thus turn "off" Q5. CR12 once again becomes back biased, and base current to Q4 is supplied through R9 as before. Resistor R10 is now inserted in series with the selector magnet coil limiting its current to the desired holding value of .060 ampere. Resistors R9 and R13 are essentially in parallel with R10 and also aid in determining the current flow through the selector magnet coil.

2. The voltage divider network of R7 and R8 determines the value of current at which Q5 turns "off" and Q4 turns "on". The closer the voltage value on the anode of CR12 approaches the negative supply voltage, the sooner Q5 turns "off". Current through the divider network always flows to the positive side of the voltage supply, either through the collector of Q1 or the base of Q2. CR12 is always back biased except for the brief period described above during the SPACE-to-MARK transition.

(k) MARK-to-SPACE Transition

1. As the input goes from MARK to SPACE, Q1 and Q3 turn "off" and Q2 turns "on". Q4 remains in conduction deriving its current from Q2. Q5 remains turned "off".

2. In turning "off", Q3 no longer supplies current to the selector magnet coil. The coil resists this change by developing a negative voltage transient at its normally positive end in an attempt to keep the current flowing. This transient is passed by CR10, blocked by CR8, and blocked by CR9 until it exceeds the negative voltage supply value at which time CR9 conducts. CR9 protects the voltage rating of Q3 from being exceeded by this transient clamping it to about -40 volts. Transistor Q2 holds the normally negative end of the coil at near positive supply potential when Q3 turns "off". This places a constant potential of about 35 volts across the coil.

(l) Trigger Circuit Action

1. The rapid switching circuit of Q2 and Q3 incorporates positive feed back. Q2 effects the switching of Q3 by having the former's collector connected to the latter's base. Q3 then feeds back from its collector to the base of Q2 through CR8, controlling the resistor network of R4 and R5.

2. As Q1 turns "on" (for MARKING) it begins to turn Q2 "off", which in turn causes Q3 to begin to conduct. The collector of Q3 drives the junction of R4 and R5 positive through CR8 and C3, thus supplying less base current to Q2 causing it to turn "off" even more. The opposite effect takes place when the line goes SPACING. This snap action removes any point of indecision and prevents the unit from being damaged by locking up at an intermediate point or going into oscillation as the input switching level is crossed.

(m) External Noise Reduction

1. Capacitor C4 Filters out much of the high frequency noise of the input signal without adding any significant distortion to the signal.

2. Capacitor C5 Filters out noise picked up on the lead from the selector magnet coils to TP4. Under certain conditions noise on this line has the effect of turning Q4 "on" (and Q5 "off") before the selector current has reached .060 ampere. The time for the selector pull-up is thus increased, adding distortion to the signal.

(n) Special Modes of Operation

1. The units are designed to operate with their inputs in series, in accordance with conventional telegraph procedure. Paralleling the input circuits of several units is not recommended since the first unit to turn ON for a MARK will hold the input voltage at its threshold value. The input will not be able then to rise further to turn on the remaining units.

2. When additional considerations make parallel input operation desirable, however, as in hub circuit operation, added circuitry must be provided to isolate the input circuits of the various units from each other.

3. Shorting across the input terminals to generate a SPACING condition is possible. This places CR1 and CR2 in parallel with CR3, CR4, and CR5. However, since CR1 and CR2 have a lower total voltage drop, all the current flows through them to the emitter of Q1 instead of through CR3, CR4, and CR5.

(o) Selector Magnet Connections - The circuit design is based on connecting the two selector magnet coils in parallel (aiding) in order to reduce the required DC voltage, and reduce the overall self-induced voltage when the current is increasing or decreasing. Operation with the coils in series will not harm the unit, but will cause a considerable loss of signal margin and is definitely not recommended.

(p) Input Resistance - The input resistance of the selector-magnet driver, as seen by the signal line, is not a constant value, but depends on the polarity and magnitude of the input current. For .060 ampere operation, the input resistors of the 124 and 249 ohms are paralleled to give effectively 83 ohms. This is the value of input resistance seen so long as line current is below the input switching level. i.e., the value that causes Q1 to turn ON (nominally .030 ampere). As soon as Q1 turns ON, the voltage across the 83 ohms stays constant at approximately 2.9 volts, even though the current is increasing, due to the clamping action of Q1 and "click reducers" CR3, CR4, and CR5. This appears as a decreasing input resistance, and at .060 ampere the input looks like 2.9/.06 or about 48 ohms (a little more than half the value of the input resistor). The corresponding resistance for .020 ampere operation at full current is 145 ohms.

1. This variation in input resistance can lead to discrepancies between the computed and actually required values of signal line series resistance.

2. For example, assume a ten-station loop, .060 ampere operation, 120 volt line battery, and ignore the resistance of the signal line. An ohmeter or bridge measurement of line resistance would show 83 times 10 or 830 ohms of series resistance in the signal line. The battery station, in order to supply .060 ampere apparently requires $\frac{120}{.060}$ - 830 or 1170 ohms

of series resistance. But since the marking line resistance is only approximately half the no current value, or 480 ohms, the value of marking current resulting is $\frac{120}{1170 + 480}$ or .073 ampere. The proper series resistance is $\frac{120}{.060}$ -480 or 1520 ohms. If line resistance is checked with line current of reversed polarity as in polar operation, a similar discrepancy would be observed since Q1 would not conduct when polarity is reversed, giving an apparently higher value of line resistance. As a consequence, it is somewhat difficult to obtain the same value of current for MARK as for SPACE on polar circuits, unless currents of each polarity are set independently of each other.

3. With the input strapping arranged for polar operation, input resistance on MARK looks like

$$R1 + \frac{0.4 \text{ volt}}{.030 \text{ ampere}} = 10 + 13.3 = 23.3 \text{ ohms.}$$

The switching level is

$$\frac{0.4 \text{ volt}}{249 \text{ ohms}} = .0016 \text{ amperes.}$$

4. Input resistance on SPACE is 1.6 volts across CR1 and CR2, divided by .030 ampere operating current, or 53 ohms.

i. TRANSMITTER-DISTRIBUTOR

(1) The Transmitter-Distributor used in the Reperforator-Transmitter Set (RT) has the following characteristics:

(a) A pivoted reading head permitting the reading head to climb up the tape and read the last character punched when the reperforator goes idle.

(b) Separate clutches and driving shafts for the reader and for the distributor permitting independent control of both.

(c) The reading contacts associated with the reading portion of the transmitter-distributor retain the last character read until a new character is sensed, therefore, when the reperforator goes idle, the last character read by the transmitter-distributor remains in storage.

(d) The reading cycle advances the tape first then reads the tape.

j. EXTERNAL PULSE CONTROL

(1) The retransmission of the message tape is under the control of external synchronizing equipment.

(a) Refer to designation FS-3 on associated wiring diagram in Volume 3, of this manual.

(2) The external control pulse assumes a 120 V DC source, 20 to 30 milliseconds pulse length and a minimum interval between pulses of 110 milliseconds.

(3) Current limiting resistors are included to limit the current values of the pulses from 20 milliamperes to 50 milliamperes. Contact protection is not included.

(4) The pulse is applied to the winding of relay K1 (K11) and the relay follows the pulse.

k. FIRST SYNCHRONOUS PULSE AFTER POWER IS SWITCHED TO ON

(1) This description starts with the initial turn-on which assumes the following:

(a) Refer to designations FS-4 and FS-5 on associated wiring diagram in Volume 3, of this Manual.

(b) The AC power and DC power are switched on.

(c) All relays are in their unenergized position.

(d) The reperforator has punched a message tape or at least enough of the tape so that the "last character" contacts of the transmitter-distributor are closed, indicating that tape is available for processing.

(2) The external equipment initiates its first synchronizing (sync.) pulse causing relay K1 (K11) to energize for the duration of the pulse.

(3) K1 (K11) in operating and releasing:

(a) Closes contact number 6 which does nothing at this time.

(b) Closed contact number 4 which completes the operating path to relay K5 (K15) (See Paragraph 9) and the distributor clutch magnet thru the closed contact number 10 of relay K3 (K13).

(4) The distributor clutch magnet, in energizing, permits the distributor cam shaft to rotate. The rotation of the shaft causes:

(a) The character stored in the reading contacts to be distributed.

(b) Distributor Auxiliary Contact I to open (approx. 12 milliseconds after rotation starts) and close (approx. 4 milliseconds before rotation stops). Aux I does nothing at this time. (Times given above and below are based on 107 WPM).

(c) Distributor Auxiliary Contact II to close (approx. 18 milliseconds after rotation starts) for approx. 20 milliseconds. Closure of Aux II completes the operating path to relay K3 (K13) thru the closed contact number 5 of K2 (K12).

(5) K3 (K13) in operating:

(a) Locks itself operated thru its closed contact number 8 and thru the closed contact number 3 of K2 (K12).

(b) Opens the operating path to the distributor clutch magnet and K5 (K15).

(c) Closes its contact number 12 which causes K4 (K14) to operate thru the closed contacts of distributor Aux I, transmitter Aux B and K4 (K14) contact number 6.

(6) K4 (K14) in operating:

(a) Locks itself operated thru its early-make-break contact number 6 and the closed Aux B.

(b) Closes its contact number 10 (FS-2) which places a blind across the distributor contacts. FS-2 is a designation on the associated wiring diagram in Volume 3, of this Manual.

(c) Closes its contact number 4 which completes the operating path to relay K2 (K12) thru the transmitter-distributor "last character" contact.

(7) Relay K2 (K12) in operating:

(a) Locks itself operated thru its contact number 1 and the TRANSMITTER-DISTRIBUTOR "last character" contact.

(b) Transfers its contact number 5, preparing the operate path for the transmitter clutch magnet.

(c) Opens its contact number 3 causing K3 (K13) to release.

(8) K3 (K13) is releasing:

(a) Opens its contact number 8 which does nothing at this time.

(b) Opens its contact number 12 which does nothing at this time.

(c) Closes its contact number 10 which prepares the operating paths of K5 (K15) and the distributor clutch magnet.

(9) By this time the distributor shaft has completed its revolution and stops. Relays K1 (K11) and K3 (K13) are released. Relays K2 (12) and K4 (K14) are still operated.

l. SECOND SYNCHRONOUS PULSE AFTER POWER IS SWITCHED TO ON

(1) At this point, the sensing contacts have still stored in them the character sent on the first pulse (Paragraph k.). The desired sequence of events on the second pulse is not to distribute the stored character but to advance the tape, sense and store the new character. The above holds true also for the first pulse following the closure of the "last character" contact of the transmitter-distributor (follows Paragraph 4-3.n.(8)).

(a) Refer to designations FS-4 and FS-5 on associated wiring diagrams in Volume 3, of this Manual.

(2) The external equipment initiates its second synchronous pulse causing relay K1 (K11) to operate for the duration of the pulse.

(3) Relay K1 (K11) in operating and releasing.

(a) Closes its number 6 contact which does nothing at this time.

(b) Closes its number 4 contact which completes the operating path to K5 (K15) and the distributor clutch magnet thru the closed contact number 10 of K3 (K13).

(4) The distributor clutch magnet, in energizing, permits the distributor cam shaft to rotate. The rotation of the shaft causes:

(a) The distributor contacts to operate but since contact number 10 of K4 (K14) is still closed no transmission is made.

(b) Aux I to open and close, which does nothing at this time because K4 (K14) is still locked operated.

(c) Aux II to close and open, completing the operate path to the transmitter clutch magnet thru the transferred contact number 5 of operated K2 (K12).

(5) Operation of the transmitter clutch magnet causes the transmitter shaft to rotate which in turn causes:

(a) The tape to read, the character stored in the sensing contacts and the tape to advance one character.

(b) Transmitter Aux B to open and close the lock path of K4 (K14) long enough to release K4 (K14).

(6) Relay K4 (K14) in releasing:

(a) Transfers its contact number 6 removing its lock path.

(b) Open its contact number 10 removing the blind across the distributor contacts.

(c) Opens its contact number 4 which does nothing at this time because K2 (K12) is locked operated by contact number 1 of K2 (K12).

(7) By this time both shafts have completed their revolution (the distributor shaft completed its revolution before the transmitter shaft). Relays K1 (K11), K3 (K13) and K4 (K14) are unoperated. Relay K2 (K12) is operated. The circuit is now ready for normal transmission.

m. NORMAL TRANSMISSION - Receipt of each sync pulse now causes the circuit to respond as described in Paragraph 4-3.l. except, since the blind is removed from the distributor contacts, each character sensed will be transmitted.

n. LAST CHARACTER (TIGHT TAPE)

(1) Assume the reperforator has been idle, the transmitter-distributor has read all the characters in the available tape except the last character.

(2) On receipt of the sync pulse, the circuit operates in the normal manner except for the following:

(3) The pivoted sensing head, in climbing up the tape to read the last character, opens the "last character" contact of the transmitter-distributor.

(4) Opening the "last character" contact cause K2 (K12) to release.

(5) Relay K2 (K12) in releasing:

(a) Opens its contact number 1 thereby opening its lock path.

(b) Closes its contact number 3 preparing the lock path for K3 (K13).

(c) Transfer its contact number 5 from the transmitter clutch magnet circuit to the K3 (K13) operating circuit.

(6) By this time both shafts are at rest, all relays are released except K5 (K15). (See Paragraph 4-3.o.)

(7) On receipt of the next sync pulse the circuit operates as explained in Paragraph 4-3.k. except K3 (K13) does not release since K2 (K12) is released.

(8) Since K3 (K13) is now operated, the circuit can no longer respond to the sync pulses until the reperforator punches more tape and permits the pivoted head of the transmitter-distributor to swing away from the punch block of the reperforator and close the "last character" contact of the transmitter-distributor.

(9) The circuit now follows Paragraphs 4-3.l. and m.

o. SYNCHRONOUS PULSE READBACK

(1) Relay K5 (K15) is pulsed thru the same operating circuit that pulses the distributor clutch magnet.

(a) Refer to designations FS-3 and FS-4 on associated wiring diagram in Volume 3, of this manual.

(2) K5 (K15) has a release time of 130 to 275 milliseconds, when its secondary winding is shorted by its own contact number 10, therefore at the normal sync pulsing interval of 110 milliseconds K5 (K15) will not release.

NOTE

Normally the buffer spring on this relay is not required and the operating lug is bent back to prevent contact with the actuating card. If it is desired to shorten the release interval, the buffer spring may be used.

(3) Transfer contacts of K5 (K15) are connected to a terminal board for use in the external sync pulsing equipment.

p. ALARM CIRCUITS

(1) General - Each Reperforator Transmitter set has its own alarm circuit. Each alarm circuit has a general alarm lamp, a pair of contacts for external use and four alarm

situations each with an indicating lamp. The alarm situations provided are:

(a) Transmitter Distributor tape out.

(b) Low tape supply.

(c) Tape Bin full.

(d) Tape Winder full.

NOTE

The alarm circuits are only indicating types and do not disable the operating circuits.

(2) Refer to designation FS-6 on associated wiring diagram in Volume 3, of this Manual.

(3) Alarm Relay - The alarm relay K6 (K16) is a DC type with self-contained diodes. The diodes rectify AC and permit the relay to operate on 5.5 volts AC.

(4) Alarm - Since all four alarm situations operate in the same manner only one, "WINDER FULL", will be described.

(a) The "WINDER FULL" contact is caused to close. In closing, the circuit to relay K6 (K16) and the ALARM lamp is completed thru transfer contacts 3T-4T-5T.

(b) K6 (K16) in operating, locks itself operated thru its contacts 1B-2B and the ALARM RESET SWITCH.

(c) K6 (K16), in operating, also transfers contacts 3T-4T-5T from the relay operating circuit to the "WINDER FULL" lamp circuit.

(d) The transfer of circuits causes the "WINDER FULL" contacts to operate the "WINDER FULL" lamp.

(e) The "WINDER FULL" lamp can be extinguished only by removing the alarm situation.

(f) The "ALARM" lamp can be extinguished only by removing the alarm situation and operating the ALARM RESET switch which will cause K6 (K16) to release.

(5) ALARM CONTACTS - When an alarm situation occurs, and after relay K6 (K16) operates, the alarm contacts operate only the alarm indicating lamp. Should the alarm situation right itself the alarm indicating lamp will extinguish but the general alarm lamp will remain lit until the relay circuit is reset.

4-4. MODEL 28 TRANSMITTER GROUP

a. GENERAL - The Model 28 Transmitter Group consists of three LXD11 Transmitter Distributors mounted on a LMXB206BR Multiple Base, three LBXD16 Transmitter Distributors mounted on a LMXB205BR Multiple Base, and two LMU3 Motor Units - one for each Multiple Transmitter Distributor Set. The above units mount in a LBAC223BR Universal Cabinet which provides message numbering, wiring and electrical control facilities for operation of the Multiple Transmitter Distributor Sets. Operating speeds of the transmitter distributors are 106 or 65 WPM (75 or 45.5 Baud) depending on the gear set used.

(1) A later design Model 28 Transmitter Group consists of three LXD31 Transmitter Distributors mounted on the LMXB209BR Multiple Base, three LBXD16 Transmitter Distributors mounted on the LMXB207BR Multiple Base, and two LMU3 Motor Units - one for each Multiple Transmitter Distributor Set. The above units mount in the LBAC256BR Cabinet which is equipped with sliding shelves. See above Paragraph 4-4.a. for additional information applicable to this group.

b. LXD11 AND LXD31 TRANSMITTER DISTRIBUTORS

(1) GENERAL

(a) The LXD11 Transmitter Distributor used in the Model 28 Transmitter Group is mounted on the LMXB206BR Multiple Base. A main shaft and cam clutch assembly operate a sensing mechanism, transfer mechanisms, and a signal generator (Figure 4-40). Signal and DC control facilities are furnished to the LXD11 by a cable assembly from the LBAC223BR cabinet. Both radio frequency filtering and arc suppressors are connected across the mark and space contacts of the signal generator. All signal leads are shielded, and all shielding is insulated from the equipment frame.

1. The LXD31 Transmitter Distributor used in the later design Model 28 Transmitter Group is mounted on the LMXB209 BR Multiple Base. Signal and DC control facilities are furnished to the LXD31 by a cable assembly from the LBAC256BR Cabinet. See above paragraph 4-4.b.(1)(a) which contains additional information applicable to this group.

(b) In the following description of the sequence of operations of the Model 28 Transmitter Distributor, the LXD11 or LXD31 is assumed to be operating under the following normal conditions:

1. External portions of the transmitter-distributor circuits completed (i.e. correct source of operating potential across both control circuit and signal generating circuit).

2. Start-stop lever in its off (center) position.

3. Driving motor running and the LXD11 or the LXD31 in the idle line condition (clutch disengaged and main shaft stationary).

4. Tape in the transmitter-distributor guide plate with the lid closed.

(b) In the following description of the sequence of operations of the Model 28 Transmitter Distributor, the LXD11 is assumed to be operating under the following normal conditions:

1. External portions of the transmitter-distributor circuits completed (i.e. correct source of operating potential across both control circuit and signal generating circuit).

2. Start-stop lever in its off (center) position.

3. Driving motor running and the LXD11 in the idle line condition (clutch disengaged and main shaft stationary).

4. Tape in the transmitter-distributor guide plate with the lid closed.

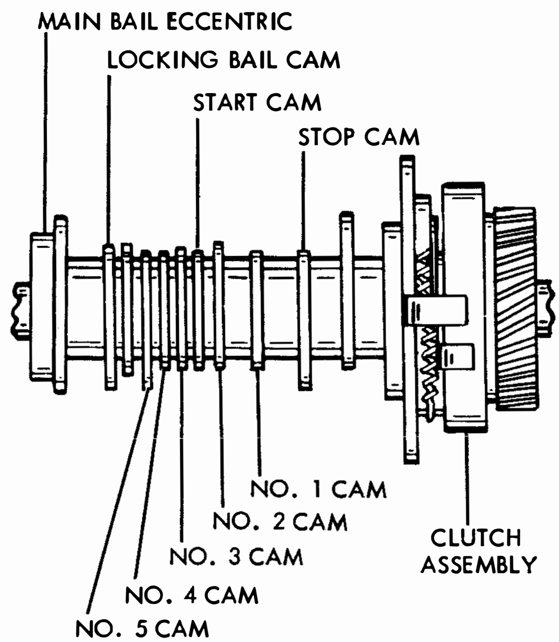


Figure 4-40. Cam-Clutch Main Shaft

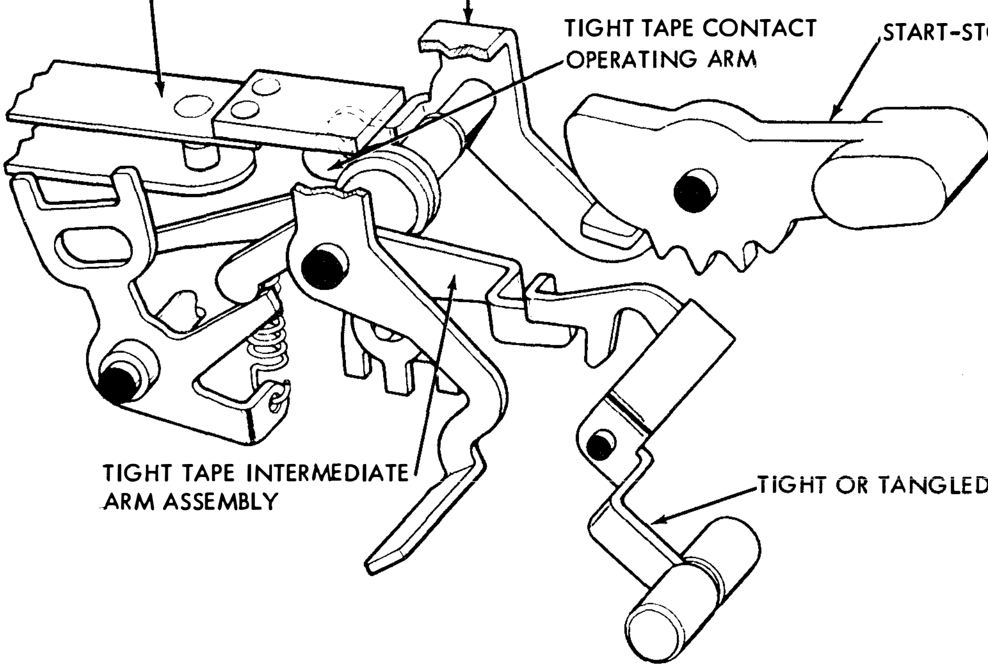


Figure 4-41. Start-Stop Lever and Tight Tape Switch Mechanism

(2) OPERATING SEQUENCE

(a) Place the start-stop lever to its right(RUN) position (Figure 4-41). The camming surface of the start-stop lever allows the start bail to move upward. As the bail pivots on its mounting, the left extension of the bail moves away from the bakelite portion of the swinger of the start-stop tight tape contact assembly. The contact is closed and will complete the clutch trip magnet circuit when the LXD11 or LXD31 control relay (located in the transmitter group control system) energizes. When energized, the clutch magnet pulls the armature up and the armature bail extension cams the main bail latch about its pivot post to release the main bail.

(b) The main bail swings upward due to the tension of the main bail spring and initiates the following actions:

1. The feed pawl is raised one tooth on the feed wheel ratchet. Figure 4-42.

2. The clutch trip lever moves away from its latch when the eccentric post on the spring biased main bail cams the clutch trip bail; the trip bail in turn moves the clutch trip lever. (The eccentric on the main bail rides in the slot of the clutch trip bail so that when the main bail is released the clutch tripbail is also released by the interconnection. Figure 4-43).

3. The sensing fingers, responding to the action of their springs, follow the main bail in its upward travel to sense the tape in the tape guide plate. If one or more of the sensing fingers encounter a perforation in the tape the fingers will extend through the perforations until the projections on the sensing fingers strike the bottom of the main bail spacer post. The sensing fingers that extend through the tape move their associated transfer levers upward so that they are brought above the line of action of the blade on the locking bail. If any of the sensing fingers do not sense a perforation in the tape the associated transfer levers remain stationary and their extensions remain below the line of action of the locking blade on the locking bail (Figure 4-44).

(c) During the movement of the main bail, the clutch trip bail pivots on its axis and pushes the clutch trip lever away from the shoe release lever to engage the clutch and start the main shaft rotating (Figure 4-43).

(d) As the cam sleeve continues its rotation, the high part of the locking bail cam

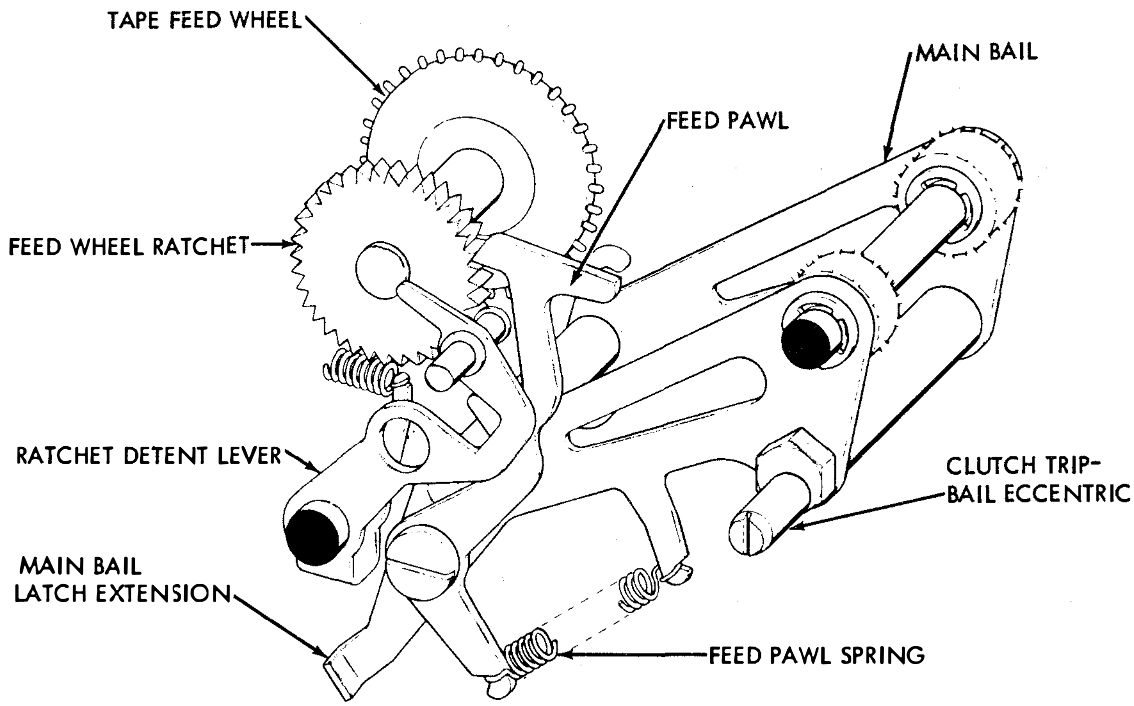


Figure 4-42. Tape Feed Mechanism

moves away from the locking bail and permits the locking bail to be pulled upward by its spring. In its upward travel, the locking blade of the bail is positioned between the lower extensions of the selected transfer levers and locks them in position (Figure 4-45).

(e) Further rotation of the main shaft moves the lobe of the start cam into position and shifts its transfer lever downward. Since the start transfer lever has no sensing finger, the lever is always in the spacing position. The start transfer lever's upper finger hooks the upper side of the transfer bail and causes it to move clockwise.

NOTE

All transfer levers except the start and stop are arranged to move in two directions. The forked end of these five levers can be moved from the spacing position to the marking position by the associated sensing levers. The transfer levers are also moved downward and to the right in a sequence that is timed to actuate the transfer bail in accordance with the 7.00 unit transmission pattern. (See Figure 4-1).

The transfer bail extention moves the signal generator toggle link which causes the toggle to open the marking contact and close the spacing contact in the signal generator contact assembly (Figure 4-44). The extension, in moving to the spacing position, forces the marking latch on the stabilizer (Figure 4-46) out of its way and continues its travel far enough to let the spacing latch fall into the latching position simulating a detent action.

(f) As the shaft rotates further, the cam for the first pulse moves its transfer lever downward and toward the right. Depending on the position of the transfer lever finger (upper fork engaging bail - spacing; lower fork engaging bail - marking), the transfer bail is rotated if the pulse to be transmitted is not the same as the preceding pulse. If the preceding pulse is the same no action occurs because the bail has been previously rotated. If the preceding pulse was different, the extension on the transfer bail moves the toggle link and causes the toggle to open the closed contact and close the open contact.

(g) The second, third, fourth and fifth pulses are generated in the same manner as the first. The action is repeated as each cam moves its associated transfer lever, in sequence, as described in Paragraph 4-4.b.(2) (f).

(h) The stop pulse cam follows the fifth pulse cam as the main shaft is completing its cycle. Again the action is the same as that for the first pulse, except that, since the stop pulse has no sensing finger and its transfer lever is blocked, its lower finger always hooks the transfer bail resulting in a marking pulse on the completion of each character.

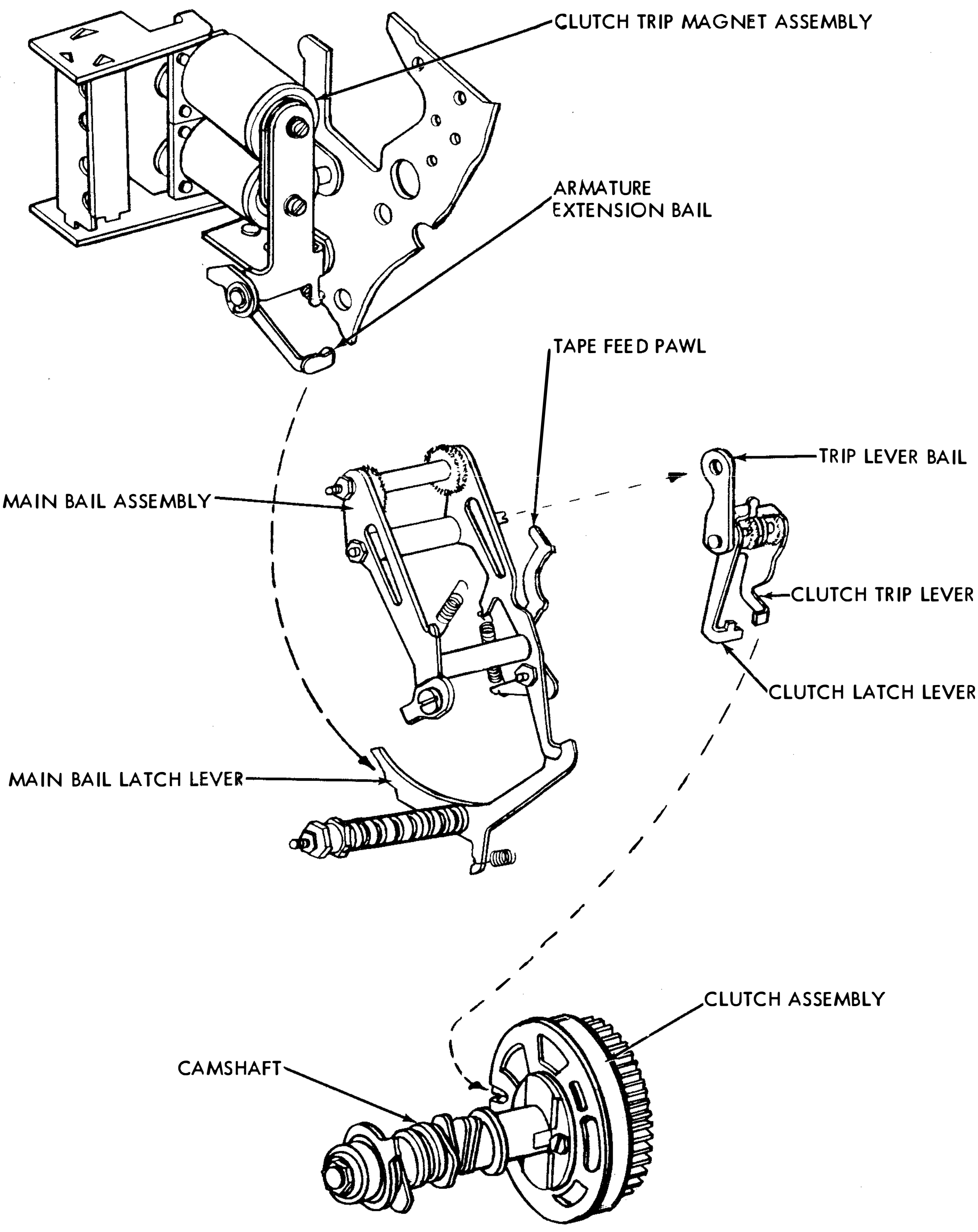


Figure 4-43. Control Mechanism

(i) As the cam for the first pulse starts its action, the drive arm eccentric (Figure 4-47) starts to cam the drive arm downward. The drive arm pulls on the eccentric stud of the main bail causing the main bail to pivot downward to complete the operations initiated when the main bail was originally released (Paragraphs 4-4.b.(2)(a) and (b).

1. The main bail in pivoting downward withdraws the sensing fingers that are extended.

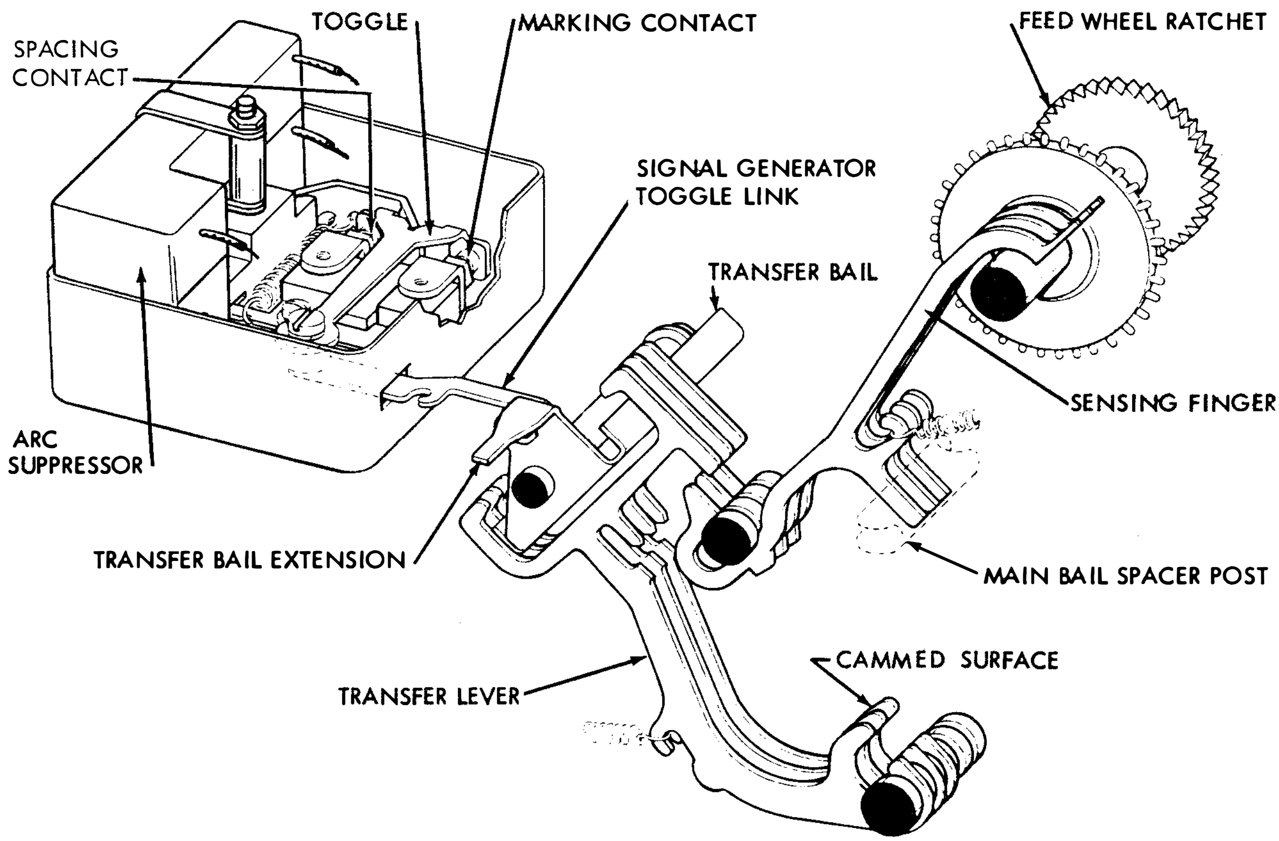


Figure 4-44. Transfer Lever and Signal Generator Mechanism

2. It pulls down on the tape feed pawl advancing the tape to the next set of perforations.

3. The main bail is moved to its latching position; however, it does not latch since tape is still in the tape head and the latch is held in the nonlatching position by the armature bail extension.

(j) The tape feed pawl advances the tape feed ratchet one tooth against the action of the ratchet detent roller. The tape feed ratchet is part of the tape feed wheel. The tape feed wheel advances the tape one character. The ratchet detent roller bears between two teeth on the ratchet and serves to hold the feed wheel and tape in position during the sensing portion of the operating cycle (Figure 4-42).

(k) Since the clutch trip bail does not latch, the drive arm moves again to its upper position. In so doing, repetition occurs when the main bail swings upward and the main shaft starts to rotate, until the unit runs out of tape.

(3) STOPPING THE ACTION

(a) The code sensing fingers cannot differentiate between a no tape condition and a "LETTERS" combination; therefore, the unit operates as if five perforations were sensed and goes through the actions previously described. However, the tape out sensing pin feature senses that there is no tape in the tape guide plate. (Figure 4-48). The tape-out pin moves upward to lift the swinger of the tape-out contact assembly, breaking the LXD11 or LXD31 control relay circuit which, by virtue of its associated contacts, opens the clutch trip magnet circuit.

(b) The clutch trip magnet deenergizes, releasing its armature. This permits the armature extension to pivot out of its blocking position and allow the main bail latch to be moved by its spring (Figure 4-43).

(c) As the main bail is latched the clutch trip lever blocks the clutch shoe lever. When the clutch is blocked the inertia of the mechanism causes the clutch to rotate far enough to permit its latch to fall into the notch on the clutch cam disk.

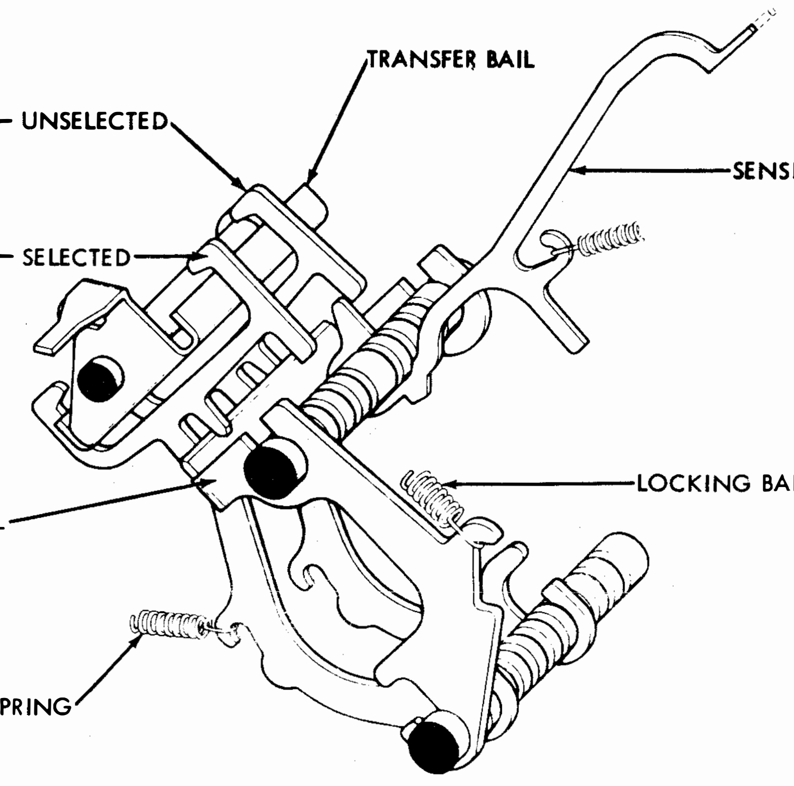


Figure 4-45. Sensing, Locking and Transfer Lever Mechanism

(4) CLUTCH OPERATION

(a) CLUTCH ENGAGEMENT (Figure 4-12) - See Paragraph 4-3.b.(6)(c).

(b) CLUTCH DISENGAGEMENT (Figure 4-11) - See Paragraph 4-3.b.(6)(b).

(5) TAPE LID OPERATION

(a) When the tape lid button is pressed, the shaft portion of the button presses against the tape lid plunger bail extension causing the bail to pivot. The bail, in pivoting, moves its latching extension from under the tape lid latching post permitting the post to swing downward under action of its spring. Since the latching post is mounted on the tape lid behind the pivot point and below the tape guide plate it causes the main part of the tape lid to swing upward (open) when the post swings downward (Figure 4-49).

(b) The tape lid is closed manually by pressing it against the tape position. When the tape lid is closed, the latching post swings up and cams the latching extension out of its way until it passes the end of the extension which then is pulled under the post, by spring action, latching the post and tape lid.

(c) TAPE DEFLECTOR (Figure 1-17) - A tape deflector, mounted immediately behind the tape lid, deflects the transmitted tape

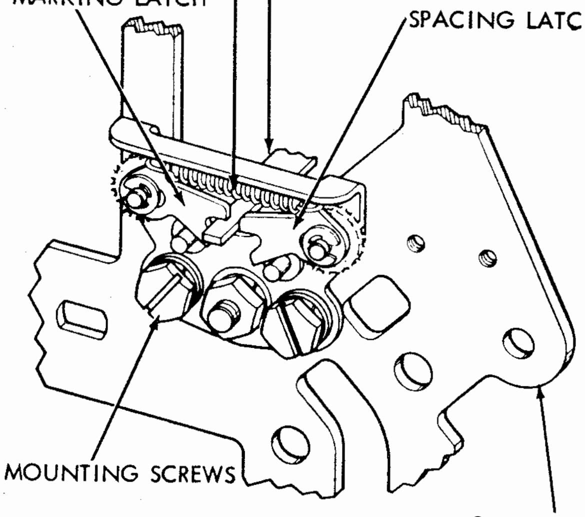


Figure 4-46. Transfer Bail Stabilizer

back toward the operator when in the down position. To allow straight line tape travel, the deflector may be rotated up on its pivot so as not to interfere with tape travel.

(6) START-STOP LEVER

(a) TO START TRANSMISSION - See Paragraph 4-4.b.(2)(a).

(b) TO STOP TRANSMISSION - When the control lever is pushed to its center or stop position, the cam surface of the lever cams the control lever bail causing the bail to pivot. As the bail pivots, its extension cams the swinger pad upward on the start-stop contact assembly opening the contacts. This breaks the circuit to the clutch magnet assembly causing the armature to be released to its unattracted position (Figure 4-41).

(c) FREE WHEELING (Figure 4-48) - The control lever is operated the same as in Paragraph 4-4.b.(6)(b) except that the lever is pushed to the extreme left position and the extension on the start-stop bail pushes the feed pawl and the ratchet detent roller away from the feed ratchet allowing the feed wheel to rotate freely. The bail extension also cams the intermediate bail extension arm which rotates the intermediate bail. The intermediate bail, in rotating, permits the spring loaded tape-out pin depressor bail to follow. The depressor bail, with its operating mechanism, is mounted on a bracket. The bracket is, in turn, mounted on the front plate. The result of this camming action is the depressing of the tape-out sensing pin to a flush or below flush condition relative to the tape guide plate. This permits free passage of the tape under the tape lid.

(7) TIGHT TAPE ARM - Tight or tangled tape raises the tight tape bail arm (Figure 4-44). The bail pivots and its extension cams the tight tape intermediate arm assembly on which is secured the tight tape arm. When

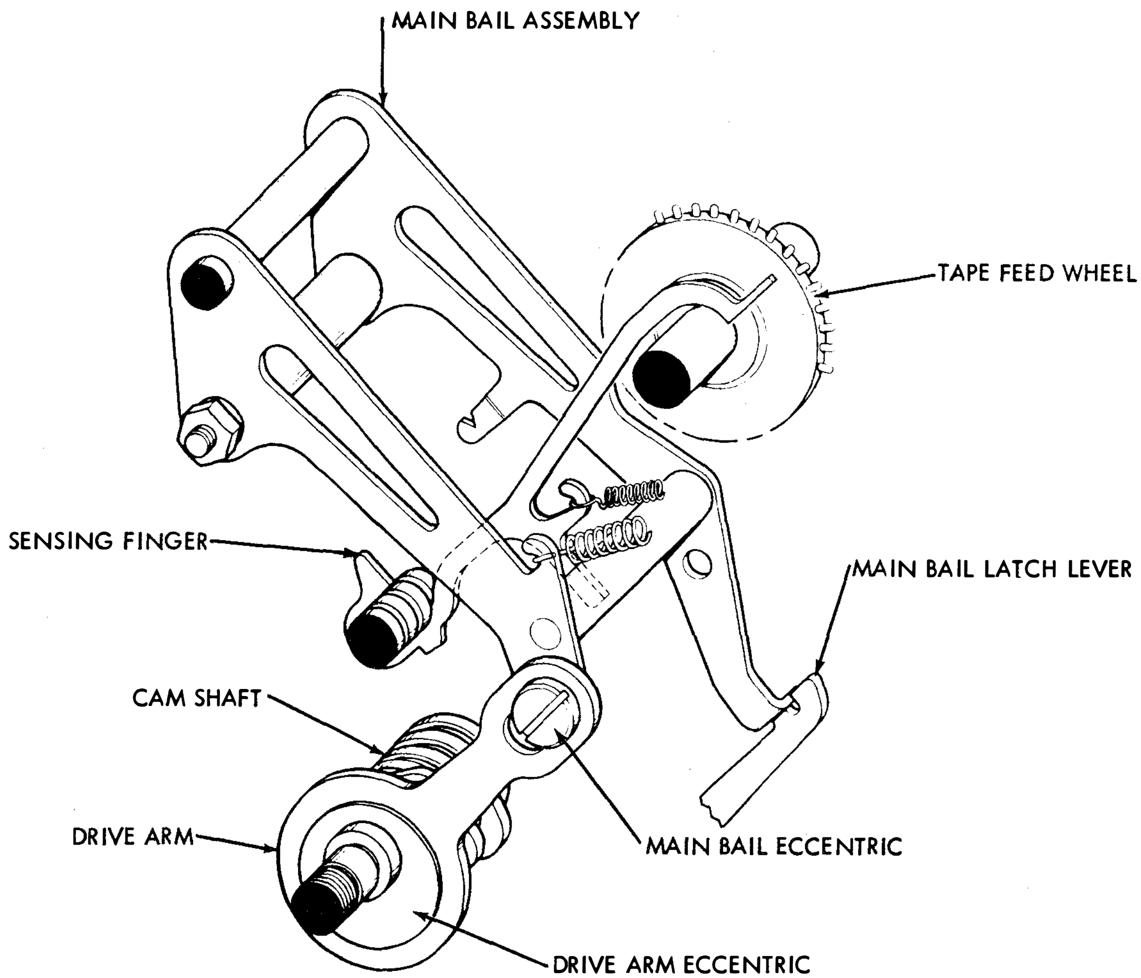


Figure 4-47. Main Bail and Drive Arm Mechanism

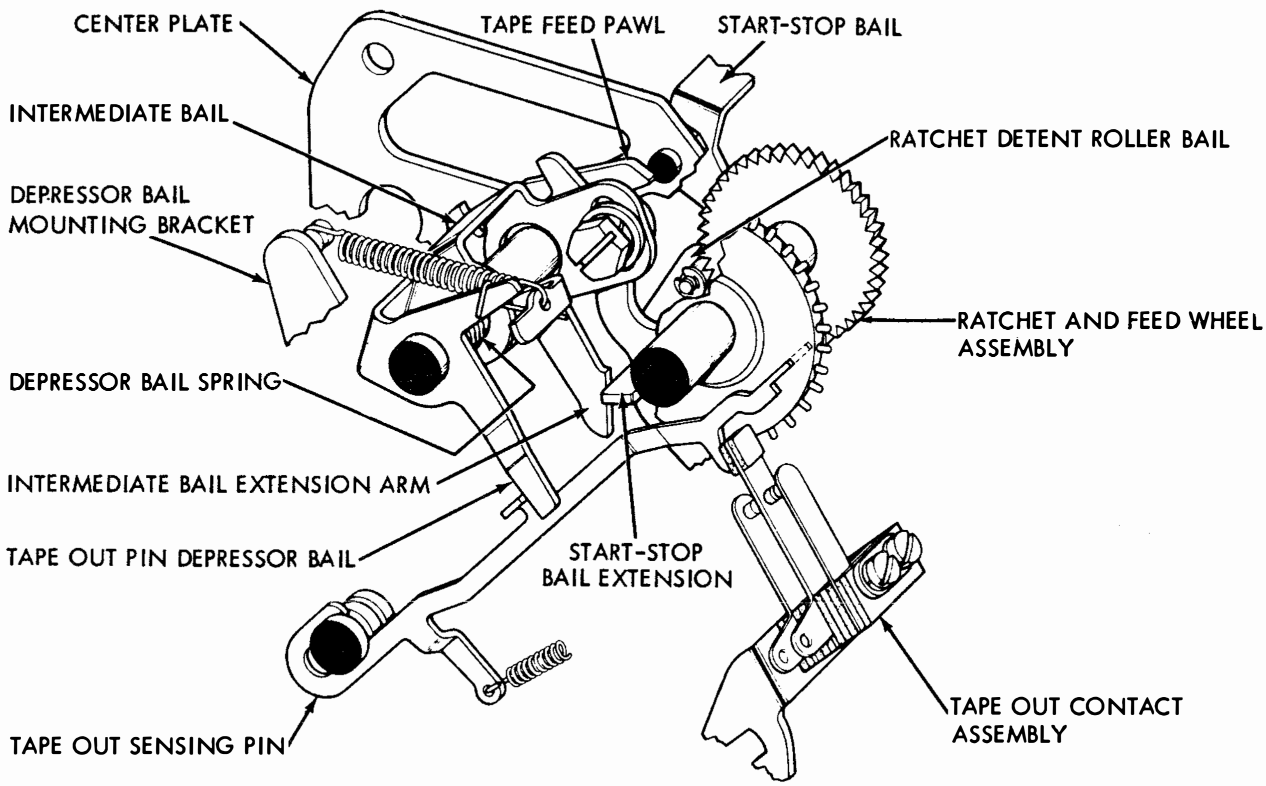


Figure 4-48. Free Wheeling and Tape-Out Mechanism

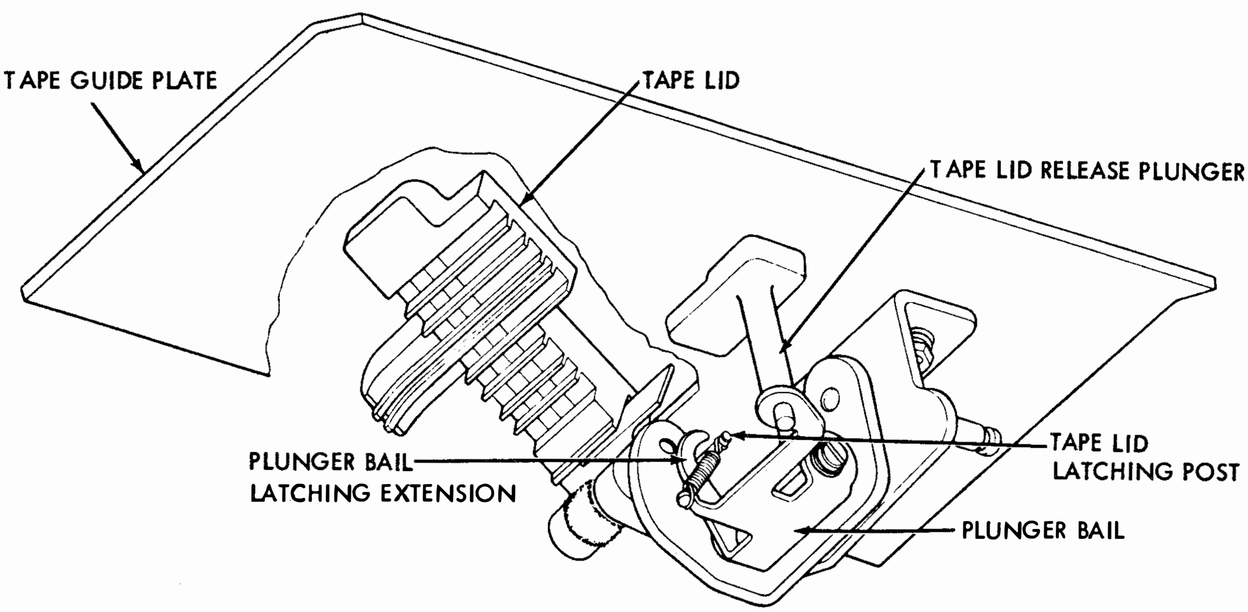


Figure 4-49. Tape Lid Mechanism (Bottom View)

the arm assembly is cammed, the associated tight tape arm lifts the swinger of the start-stop, tight tape contact assembly upwards and opens the clutch trip magnet circuit. Transmission stops.

(8) TAPE-OUT SENSING PIN (Figure 4-49) - The tape-out sensing pin is located on the tape guide plate to the right and slightly forward of the five tape sensing fingers. With the tape-out pin in the depressed position, the swinger on the tape-out contact assembly is released and its contacts closed. The unit will then transmit if the start-stop tight tape contacts are closed. Therefore, when tape is in the unit with the tape lid closed, the tape holds

the tape out sensing pin in the depressed position and allows the unit to run. When no tape is sensed the spring loaded sensing pin travels upward and into a hole provided in the tape lid. An extension on the pin engages the swinger on the tape out contact assembly pushing the swinger up opening its contacts. This interrupts the LXD11 control relay circuit which, by virtue of its associated contacts, opens the clutch trip magnet circuit so that transmission ceases.

(9) ELECTRICAL CIRCUITS - The electrical circuits in the transmitter distributor are the clutch trip magnet circuit and the signal circuit. The clutch trip magnet circuit consists of the clutch trip magnet coils wired in series with the start-stop tight tape contacts, and the tape-out contacts wired in series with the LXD11 control relay in the transmitter group control system (Figure 4-55). The signal generator circuit consists of the transmitter signal generator contacts wired for polar operation.

c. LMXB206BR AND LMXB209BR MULTIPLE BASE UNITS

(1) GENERAL - The basic function of the LMXB206BR is to provide mounting and common drive facilities for three LXD11 Transmitter Distributor. The LXD11's are driven by a common cross-shaft from a LMU3 synchronous motor unit mounted at the rear of the base. Power is transmitted to the cross-shaft via an intermediate gear set and belt and sprocket arrangement at the left of the base. Operating speeds of 106 or 65 WPM (75 or 45.5 Baud) are possible, depending on the gear set used.

(a) The basic function of the LMXB209BR is to provide mounting and common drive facilities for three LXD31 Transmitter Distributors. See above Paragraph 4-4.c.(1) for additional information applicable to this base.

(2) ELECTRICAL FACILITIES - Three 36 point receptacles (furnished with the LBAC 223BR cabinet) are mounted on the base, one in each LXD11 mounting position (Figures 1-25 and 1-21). The receptacles mate with the LXD11 plugs, and furnish the units with control and signal line facilities. An AC power switch for motor operation is located at the front left corner of the base.

(a) The three 36 point receptacles (furnished with the LBAC256BR Cabinet) are the separable type that mate with the plug on the inter-connecting cable, mounted on the LMXB 209BR Multiple Base. The receptacles at the other end of the inter-connecting cable mate with the LXD31 Transmitter Distributor plugs. An AC power switch for motor operation is located at the front left corner of the base.

(3) ENCLOSURE - The base is resiliently mounted on a sub-base (oil pan), and is enclosed with a dust cover (Figure 1-20). The cover consists of a front hinged panel for removal of the LXD11 units (Figure 4-50), unit covers, tape deflectors, and tape wear strips. The enclosure and base, with LXD11 units, mount on the upper shelf of the LBAC223BR cabinet immediately below the message identification module.

(a) The same enclosure information in Paragraph 4-4.c.(3) above applies to the enclosure and base (LMXB209BR) with LXD31 units which mount on the upper shelf of the LBAC256BR Cabinet.

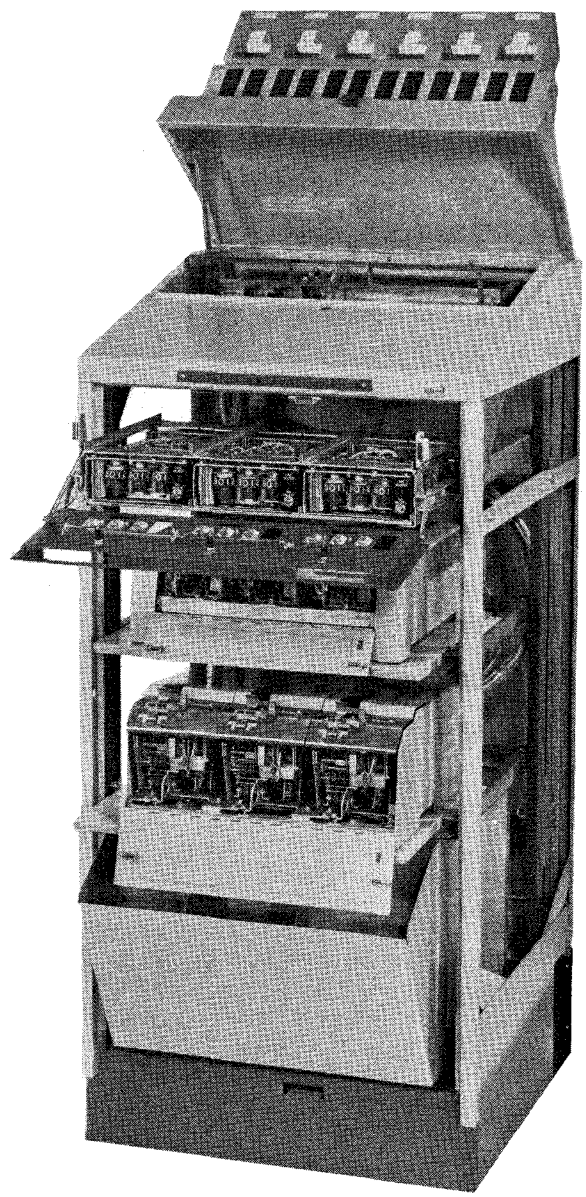


Figure 4-50. Model 28 Transmitter Group (Doors and Dome Open)

(4) LXD11 MOUNTING - Mounting the LXD11 units is accomplished by opening the hinged panel on front of the base cover. Move all the LXD11 locking devices (Figure 1-21) to the left, and, with the LXD11 cover plates removed, position the units onto their mating electrical connector on the base. Holding the units down and against their eccentric stops, slide the locking device to the right to secure the units at the rear. The units are secured at the front with a screw which fastens the front center mounting extensions (Figure 4-45) of each LXD11 to the base by means of a tapped hole in the base (Figure 1-21).

(a) LXD31 MOUNTING - See above Paragraph 4-4.c.(4) for information applicable to this unit.

d. LBXD16 TRANSMITTER DISTRIBUTOR

(1) GENERAL

(a) The LBXD16 Transmitter Distributor used in the Model 28 Transmitter Group is mounted on the LMXB205BR or the LMXB207BR Multiple Base. The unit is designed to sense code combinations perforated in a tape or received from an external multi-wire input, and convert them into electrical code pulses for distribution over a signal circuit. Arc suppressors are connected across the distributor auxiliary contacts and the signal line. All electrical wiring terminates in a 36 point plug connector mounted on the rear of the unit (Figure 1-23). The unit is capable of operating at speeds up to 106 WPM (7:00 unit code) with gear changes only. All signal leads are shielded, and all shielding is insulated from the equipment frame.

(b) The LBXD16 is a two-shaft transmitter distributor. The distributor shaft auxiliary "C" contact controls the sensing shaft clutch release magnet electrically when the control system stepping switch is in its 15th position. Rotation of the distributor shaft is controlled by means of an external pulse fed via the stepping switch (3rd level) and the contacts of the LBXD16 control relay, to the distributor clutch magnet (Figure 4-55). A start-stop control lever, tape-out pin, and tight tape arm control the distributor clutch release magnet electrically. The unit is capable of "single wire" or "multiple wire" output and "multiple wire" input to the distributor contacts for sequential distribution. Signal out is arranged for "neutral" or "polar" operation. The operation sequence is such that the reading cycle occurs after tape feeding, and the last character sensed is stored for subsequent transmission.

(c) In the following description of the sequence of operation, the LBXD16 is assumed to be operating under the following normal conditions:

1. Current applied to the distributor and sensing clutch trip magnet circuits and the motor power circuit at the base connector terminals.

2. Motor toggle switch in its "on" position.

3. Tape inserted in the transmitter, tape lid closed, and the start-stop lever in its right or run position.

4. Distributor clutch trip magnet and start-stop switch connected in series.

5. Sensing clutch trip magnet and auxiliary "C" contact connected in series via position 15 on the 2nd level of the stepping switch in the transmitter group control system (Figure 4-55).

6. Storing switch contacts and distributor contacts connected in series with the signal line.

(2) SUMMARY OF OPERATION

(a) As the distributor clutch trip magnet is energized, the clutch will trip and the cam will start rotating.

(b) The auxiliary "C" contact will close to energize the sensing clutch trip magnet and the distributor contacts will operate to distribute a pattern of code pulses over the signal line (corresponding to the combination stored in the storing switch from the previously sensed character).

(c) The sensing clutch and cam sleeve will start their rotation to advance the tape, sense the tape, store the sensed character in the storing switch, and operate auxiliary contacts "A" and "B".

(d) In continuous transmission, the distributor cam will have started its next cycle while the actions controlled by the sensing cam sleeve are taking place. These motions will continue until the distributor clutch trip magnet circuit is interrupted (as by the exhaustion of tape or by moving the start-stop lever to the stop position) whereupon, the distributor clutch will dis-engage and the transmitter will idle.

(3) GEARING - The distributor shaft assembly mounts two gears; the rear gear meshes with the intermediate gear train on the base and is driven from the motor. The clutch drum gear, through an idler gear, drives the sensing clutch drum gear to rotate the sensing and the distributor shafts at the same speed.

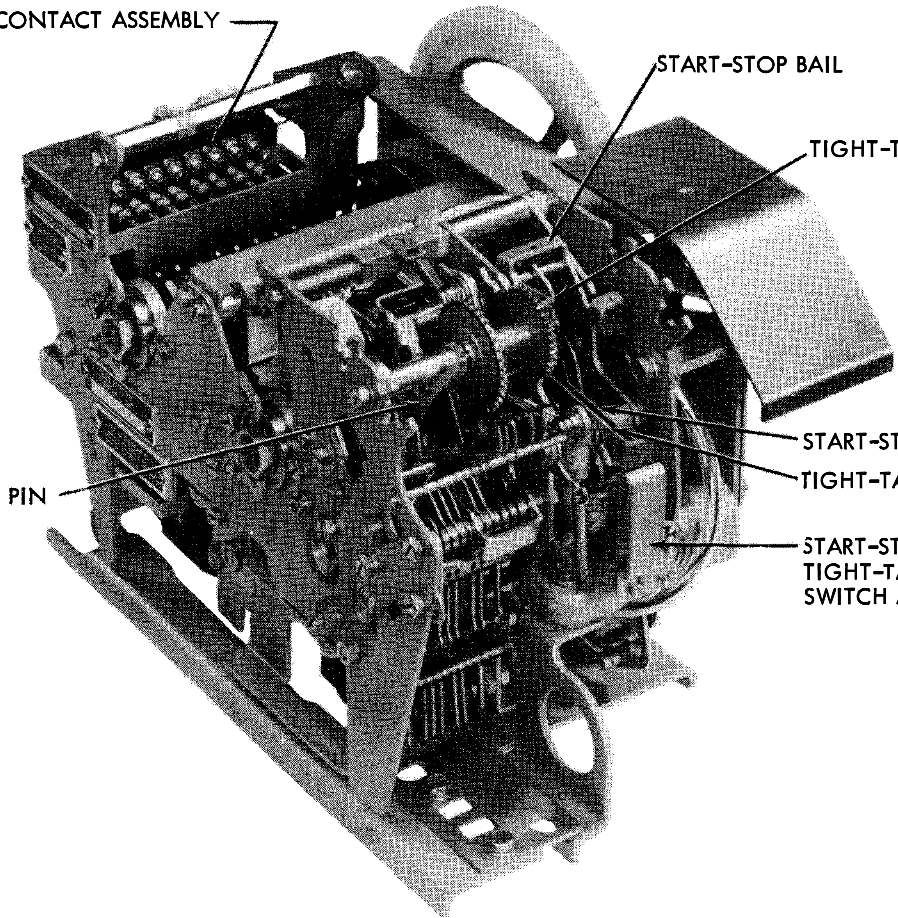


Figure 4-51. Model 28 Transmitter Distributor (LBXD16)
(Cover, Top and Tape Plates Removed)

(4) DISTRIBUTOR SHAFT

(a) CLUTCH TRIP (Figure 4-21) - See Paragraph 4-3.c.(4)(a).

(b) CLUTCH ENGAGEMENT (Figure 4-12) - See Paragraph 4-3.b.(6)(c).

(c) CLUTCH RESET (Figure 4-22) - See Paragraph 4-3.c.(4)(c).

(d) CLUTCH DISENGAGEMENT (Figure 4-11) - See Paragraph 4-3.b.(6)(b).

(e) CAM SLEEVE (Figure 4-22).

1. AUXILIARY "C" CONTACT - Shortly after the distributor cam sleeve starts to rotate, an auxiliary "C" cam follower lever will ride into its cam indent. In so doing, it will release its rocker to permit the auxiliary "C" contact to close and complete the sensing clutch trip magnet circuit. The "C" contact opens at 340 degrees and closes at 40 degrees.

2. DISTRIBUTOR CONTACTS (Figure 4-51) - See Paragraph 4-3.c.(4)(e).

(5) SENSING SHAFT

(a) CLUTCH OPERATION - As the sensing clutch trip magnet is energized, the sensing clutch will operate in a manner similar to that of the distributor clutch (as described in Paragraphs 4-4.d.(4)(a) through (d) causing the sensing cam sleeve to rotate.

(b) TAPE FEEDING (Figure 4-52) - As the sensing cam sleeve rotates, a roller on the rear feed lever rides to the high part of its cam moving the lower extension of the front feed lever downward. The feed levers actuate a feed pawl assembly which then engages a tooth on the feed wheel to rotate the feed wheel one space. As the feed wheel rotates, the detent lever roller will rest in the hollow between two teeth and hold the feed wheel in position. With the continued rotation of the sensing cam

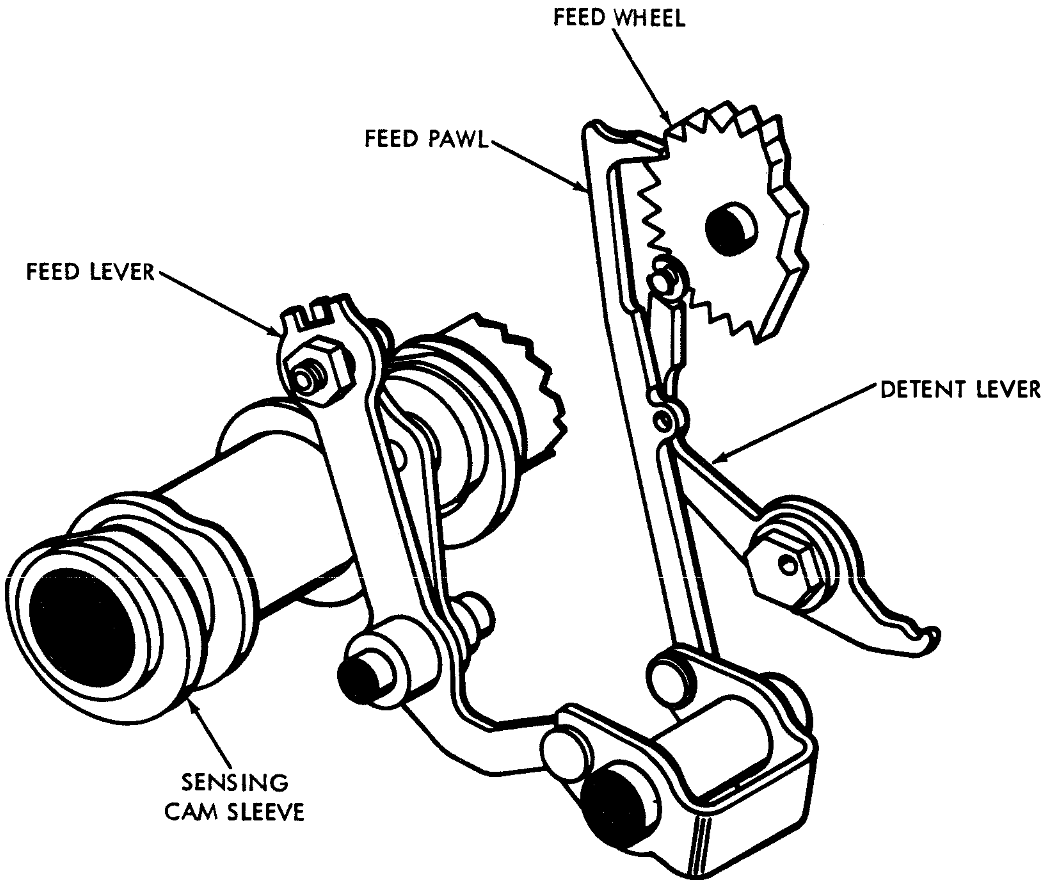


Figure 4-52. Tape Feed Mechanism - Fixed Reader

sleeve, the feed lever roller rides to the low part of its cam and the feed pawl rises to move past the next tooth where it is in position for the next cycle.

(c) TAPE SENSING (Figure 4-25) - See Paragraph 4-3.c.(5)(f). For appropriate storing switch and slide assembly refer to Figure 4-53.

1. PUSHER BAIL (Figure 4-26) - See Paragraph 4-3.c.(5)(f)1. For appropriate storing switch and slide assembly refer to Figure 4-53.

2. SENSING BAIL (Figure 4-27) - See Paragraph 4-3.c.(5)(f)2. For appropriate storing switch and slide assembly refer to Figure 4-53.

3. LATCH BAIL (Figure 4-28) - See Paragraph 4-3.c.(5)(f)3. For appropriate storing switch and slide assembly refer to Figure 4-53.

4. STORING SWITCH (Figure 4-53) - In its unselected or upward position, the storing switch slide lifts the swinger of the storing switch up, closing the normally open (spacing) contact. In the selected or downward position, the slide does not operate the swinger and the normally closed (marking) contact remains closed. Thus, the code combination of the sensed character is stored in an arrangement of the storing switch contacts, and, on the next cycle of the distributor cam sleeve, will be transmitted sequentially over the signal circuit.

(d) AUXILIARY CONTACTS (Figure 4-30) - With the rotation of the sensing cam sleeve, auxiliary levers "A" and "B" follow their cams to actuate pusher levers, slides, and the contact swingers of the storing switch assembly. For appropriate storing switch and slide assembly refer to Figure 4-53. These contacts are operated for each cycle of the sensing cam sleeve as follows:

1. An auxiliary contact "A" shall open at 60 degrees and close at 312 degrees.

2. An auxiliary contact "B" shall open at 320 degrees and close at 66 degrees.

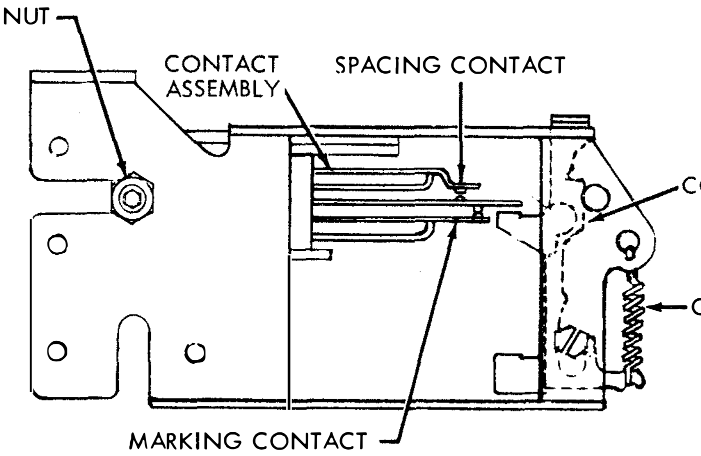


Figure 4-53. Storing Switch Assembly (With Transfer Type Contacts)

(6) CONTROLS

(a) START-STOP LEVER

1. RUN (Figure 4-51) - When the start-stop lever is moved to the right or "run" position, the start-stop lever bail is released, and, in pivoting, releases the start-stop switch bail. The start-stop switch bail releases the start-stop switch plunger to complete the distributor clutch trip magnet circuit and energize the magnet.

2. STOP (Figure 4-51) - When the start-stop lever is moved to the center or "stop" position, the lever cams the start-stop lever bail which transfers its motion to the start-stop switch latch bail which, in turn, operates the start-stop switch bail to actuate the start-stop switch plunger. Actuation of the switch opens the distributor clutch trip magnet circuit to de-energize the magnet and stop the rotation of the distributor cam sleeve.

3. FREE-WHEELING - When the start-stop lever is moved to the left or the "free-wheeling" position, the lever cams the bail an additional distance and an extension of the bail disengages the feed pawl and detent lever from the feed wheel to permit the wheel to rotate freely. In addition, the start-stop lever bail extension operates an extension of the tape-out pin depressor bail to depress the tape-out pin and permit the free passage of tape under the tape lid.

(b) TAPE-OUT (Figure 4-51) - The normally closed contacts of the tape-out switch are in series with the LBXD16 control relay. With tape in the transmitter, the tape-out pin is held depressed and away from the contact swinger pad to energize the control relay and permit operation. As the end of the tape passes over the tape-out pin, the pin rises to actuate the switch plunger and interrupt the control relay magnet circuit. Through operation of the LBXD16 control relays associated contacts, the pulsing circuit to the distributor clutch magnet is opened, stopping transmission.

(c) TAPE LID OPERATION - See Paragraph 4-4.b.(5).

(d) TAPE DEFLECTOR (Figure 1-18) - A tape deflector, mounted immediately behind the tape lid, deflects the transmitted tape back toward the operator when in the down or operated position. To allow straight line tape travel, the deflector may be rotated to the right on its hinge so as not to interfere with tape travel.

e. LMXB205BR AND LMXB207BR MULTIPLE BASES

(1) GENERAL - The basic function of the LMXB205BR and LMXB207BR Multiple Bases is to provide mounting and common drive facilities for three LBXD16 Transmitter Distributors. The LBXD16's are driven by a common cross-shaft from a LMU3 synchronous motor unit mounted at the rear of the base. Power is transmitted to the cross shaft via a intermediate gear set at the left end of the cross-shaft (Figure 1-24). Operating speeds of 106 or 65 WPM (75 or 45.5 Baud) are possible, depending on the gear set used. The LMXB207BR Multiple Base is equipped with an inter-connecting cable with separable connectors at both ends of the cable.

(2) ELECTRICAL FACILITIES - Three 36 point receptacles (furnished with LBAC223BR cabinet) are mounted on the base, one in each LBXD16 mounting position (Figures 1-25 and

1-24). The receptacles mate with the LBXD16 plugs (Figure 1-23), and furnish the units with control and signal line facilities. An AC power switch for motor operation is located at the front right corner of the base.

(a) The three 36 point receptacles (furnished with the LBAC256BR cabinet) mate with the 36 point plug connectors on the ends of the base inter-connecting cables.

(3) ENCLOSURE - The base is resiliently mounted on a sub-base (oil pan), and is enclosed with a dust cover (Figure 1-24). The cover consists of a front hinged panel for removal of the LBXD16 units (Figure 4-50), unit covers, and tape wear strips. The enclosure and base, with LBXD units, mount on the lower shelf of the LBAC223BR or LBAC256BR cabinet immediately above the tape bins.

(4) LBXD16 MOUNTING - Mounting the LBXD16 units is accomplished by opening the hinged panel on front of the base cover. The unit is guided onto and from the base by studs, posts, and bars mounted on the base (Figure 1-24). The studs, posts, and bars guide and hold the LBXD16 unit cradle so that accurate gear engagement is insured, and the electrical connectors on the base and transmitter distributor mate properly. The units are secured at the front by a clamp screw which extends through the LBXD16 cradle and threads into a tapped hole in the base (Figure 1-24).

f. LMU3 SYNCHRONOUS MOTOR UNIT - The LMU3 motor unit is similar in electrical and mechanical design to the LMU11 (refer to Paragraph 4-3.e.(1). The motor is rated at 1/20 horsepower, and has a 43 mfd electrolytic capacitor wired in series with the starting winding. Normal starting current is 8.0 amperes, running current 2.0 amperes, and rated torque 14.0 inch ounces. Theory of operation of this motor unit is identical to that of the LMU11, and is explained in Paragraph 4-3.e.(2).

NOTE

If in place of an LMU3 synchronous motor an LMU4 governed motor is used, refer to paragraph 4-7.d. for information, and 4-6.d. for operating theory on the LMU4 governed motor.

g. LBAC223BR AND LBAC256BR UNIVERSAL CABINETS

(1) GENERAL - The LBAC223BR Universal cabinet provides mounting facilities for two multiple transmitter distributor sets, and the necessary wiring and electrical control facilities for their operation (see Figure 4-50). The cabinet assembly consists of separate inner and outer structures to minimize mechanical transmission of noise to the outer shelf. All equipment mounts to the inner structure, the outer shell serving as a dust and noise enclosure. A race-way is provided at the bottom rear of the cabinet to contain station cable mounting. The race-way may be fastened in place from the inside of the cabinet for "against the wall" applications. A tandem message identification module is located above the LXD11 Multiple Transmitter Distributor Set.

(a) The same information in the above Paragraph 4-4.g.(1) applies to the later design LBAC256BR Cabinet, except the cabinet is equipped with sliding shelves. The Multiple Transmitter Distributor Set equipped with LXD31 Transmitter Distributors is used with this cabinet.

(2) DOORS AND PANELS

(a) DOORS - Two full length doors are provided at the rear of the cabinet for accessibility to both apparatus and electrical wiring. A recessed handle is provided in the right hand door to facilitate opening. Two magnetic catches serve to hold the doors closed (see Figure 4-54).

(b) PANELS - Although side panels are supplied with the cabinet, they may or may not be used depending on the equipment arrangement in a given location. It is possible to mount a series of LBAC223BR cabinets (or a combination of similar cabinets such as the LBAC223, 224, 225) side by side, end enclosures being used on the outside cabinets only. The inclined panel directly above the numbering module serves both as a dust cover for the equipment, and a writing surface for the operator.

(3) DOME AND TAPE BIN

(a) DOME - Mounted immediately behind the inclined panel at the front of the cabinet is the cabinet dome. The dome is hinged across the full length of the cabinet back and opens to allow access to the electrical control rack, on which the main POWER ON-OFF switch is located. The dome is supported in the raised position by a sliding lock arm located at the left rear corner of the cabinet. Mounted on top of the cabinet dome (Figure 1-25) is a tape grid on which prepared torn tapes are placed prior to transmission. Above the tape grid is a tape container which provides storage space for long prepared torn tapes wound in a normal figure eight pattern. When closed, the dome is secured by a captive screw located centrally in the inclined top panel in line with the front edge of the dome.

(b) TAPE BIN - A tape storage bin - to collect spent tape and to store tape to be transmitted is located at the bottom of the cabinet below the LBXD16 Multiple Transmitter Distributor Set (Figure 1-2). The bin is divided into three compartments to facilitate locating of transmitted tape, and pulls forward for access to the rear bins.

(4) MODEL 28 MESSAGE IDENTIFICATION MODULES

(a) GENERAL - Three Model 28 Message Identification Modules are mounted in a sliding frame assembly above the LXD11 or LXD31 Multiple Transmitter Distributor Set. Each module provides a means of automatically dispatching 11 identifying codes and 3 sequential numbers for 999 messages transmitted in tandem fashion from associated LBXD16 and LXD11 or LBXD16 and LXD31 transmitter-distributors. The module consists of two basic assemblies, a Base Assembly and Numbering Assembly (see Figures 1-26 and 1-27).

(b) BASE ASSEMBLY - The base assembly provides the means for automatically identifying each message transmitted from the LBXD16 and LXD11 or LBXD16 and LXD31 transmitter-distributors on a common channel. To accomplish this, a stepping switch for storing the identifying code and two relays to provide for tandem operation are utilized. The stepping switch contains 8 levels, a set of self-interrupter contacts, and off-normal contacts (see Figures 1-26 and 1-27). Three of the switching levels (A, B, and C) are used for D.C. controls, and the remaining 5 levels (D, E, F, G, and H) are used for storage of the identifying and counter assembly number codes (Figures 4-55 and 4-56). An external LBXD16 transmitter distributor shaft is used for sequential transmission of the stored codes, the auxiliary contact on the distributor being utilized for synchronization between the stepping switch and the transmitter. The base assembly also mounts a MESSAGE IDENTIFICATION DELETE switch and ABNORMAL TRAFFIC lamp. When operated, the delete switch prevents the base assembly from carrying out its identifying sequence. The ABNORMAL TRAFFIC lamp is operated by customer 120 volt D.C. circuitry.

(c) NUMBERING ASSEMBLY - The numbering assembly provides the means of counting and storing the number of messages (up to 999) transmitted from a transmitting channel, stores the baudot code associated with the numbers counted, and gives a visual indication of the number counted. To accomplish this, a pair of counter magnets, associated armature feed pawl linkage, and three code drums with transfer type code reading contacts are used (see Figure 1-26). In addition, the assembly also mounts two switching type connectors (SW204 and 205, Figure 4-56) which accept a universal code card (Figure 4-57), and permit ready changeability of two identifying codes generated by the base assembly.

(5) CONTROL SYSTEM OPERATION

(a) SUMMARY OF OPERATION

1. Inserting a tape in an LBXD16 transmitter completes a flip-flop circuit between a stepping switch, the transmitter's distributor clutch magnet, and the auxiliary "C" contact. The stepping switch stores a 5 wire baudot code, and the distributor will transmit it sequentially. An electro-mechanical counter is actuated which registers the message number and stores the associated baudot code on three code reading contact assemblies. The stored number codes are also transmitted by the distributor.

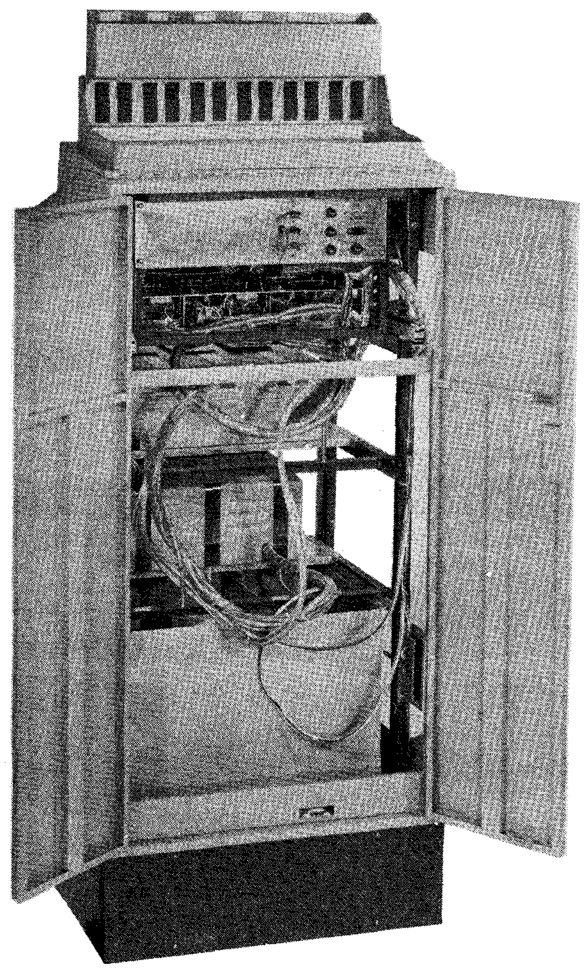


Figure 4-54. Model 28 Transmitter Group (Doors Open) (Rear View)

2. Upon completion of transmitting the identifying code (LTR) ZCZCABCD (FIG.) 000 (LTR), the transmitter is permitted to read its message tape. While the LBXD16 transmitter is operating, an LXD11 transmitter - wired in series on the same channel - can be loaded with a message tape. When the LBXD transmission ceases, the LXD11 message tape will be automatically transmitted after its identifying code, (LTR) ZCZCABCD (FIG.) 001 (LTR), has been transmitted. If desired, the entire message identification sequence can be omitted from the transmission by operation of the message identification delete switch.

NOTE

The identifying code transmitted will differ with each message as follows:

(LTR) ZCZCABCD (FIG.) 000 (LTR)

(LTR) ZCZCABCD (FIG.) 001 (LTR)

Through

(LTR)ZCZCABCD(FIG.) 999 (LTR)

The three number sequence following (FIG.) increases by one for each transmitted message when the message identification switch is in the NO DELETE position.

(b) SIGNAL LINE CIRCUIT (Figure 4-56)

1. The signal line circuit consists of a series circuit with the marking battery being routed to the LXD11 marking contact and swinger, to the LBXD16 distributor stop contact and out to the distant station's keyer or polar line relay to ground.

2. The distributor contacts 1, 2, 3, 4, and 5 are connected directly to the SW206 stepping switches D, E, F, G and H levels, respectively. Mark and space signal line battery are connected to these levels so as to conform to the following baudot code sequence.

STEP	CODE
1	Customer Option
2	Z
3	C
4	Z
5	C
6	Customer Option
7	Customer Option
8	Customer Option
9	Customer Option
10	Figures
11	Any No. from 0 to 9
12	Any No. from 0 to 9
13	Any No. from 0 to 9
14	Letters
15	Message Text

3. As noted above, the 6th, 7th, 8th and 9th positions are reserved for customer options. The 1st, 6th and 7th position codes must be wired by the customer to the stepping switch, however, the 8th and 9th codes are established by use of universal code cards and associated shorting type connector switch. The code cards are visually separated with a mark and space battery side. If mark battery for a particular code is desired the mark tine is broken off and conversely if space battery is desired, a space tine is broken off (see Figure 4-57). The 11th, 12th, and 13th positions are connected to the swingers of three, five unit transfer type code reading contact assemblies. The normally open and closed contacts are wired to space and marking signal line battery, respectively. The counter drums operate the contact swingers in such a manner that the baudot code of the number counted is transferred to the code reading contact swingers.

4. Due to the above electrical connections the distributor contacts have mark or spacing battery applied to them from the first to 14th position of the SW206 Stepping Switch. The distributor will then transmit each position sequentially to the distant station due to the rotation of the distributor cam.

5. The five levels (D, E, F, G and H) on the 15th position of the SW206 Stepping Switch are connected to the swingers of the LBXD16 Code Reading Contact Swingers. As in the case of the counter contacts, the reading contacts normally open and closed contacts are connected to the marking (plus) and spacing (minus) signal line battery. If the LBXD16 is transmitting, the baudot codes on the tape are transferred through a mechanical linkage to the code reading contact swingers and resultant voltages are applied to the distributor contacts which will then distribute them sequentially to the distant station.

(c) EXTERNAL PULSING CONTROL CIRCUIT (Figures 4-55 and 4-56A)

1. NORMAL OPERATION - The message identification control circuit and transmitter magnets are all de-energized when in the idle or stop position. The stepping switch, when idle, has its wipers in the home or zero position. When the operator places the LBXD transmitter start lever to the free wheeling position, inserts a tape in the transmitting head, and places the bat handle in the start position, the tape out contact and start contacts are closed. Positive battery is then passed through the K201 LBXD control relay, via the LBXD tape out contact, the K202 normally closed contact, the CR201 diode, the normally closed off normal contacts, and LBXD start contacts to

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NOTES

┼ NORMALLY CLOSED CONTACT
─✕─ NORMALLY OPEN CONTACT
TRANSFER CONTACT
ALL COMPONENTS SHOWN IN THEIR NORMAL POSITION WHEN SENDING APPARATUS IS IN IDLE, STOP, OR HOME POSITION.
CIRCUIT SHOWN IS ONE OF THREE IDENTICAL TRANSMITTING CHANNELS - RIGHT, CENTER, AND LEFT.
FOR FREE RUNNING OPERATION OF TRANSMITTERS, REMOVE STRAP ACROSS AUXILIARY "B" READER CONTACTS.
R - REAR CONTACTS F - FRONT CONTACTS
FOR ACTUAL SCHEMATIC SEE APPROPRIATE WIRING DIAGRAM IN VOLUME THREE OF THIS MANUAL

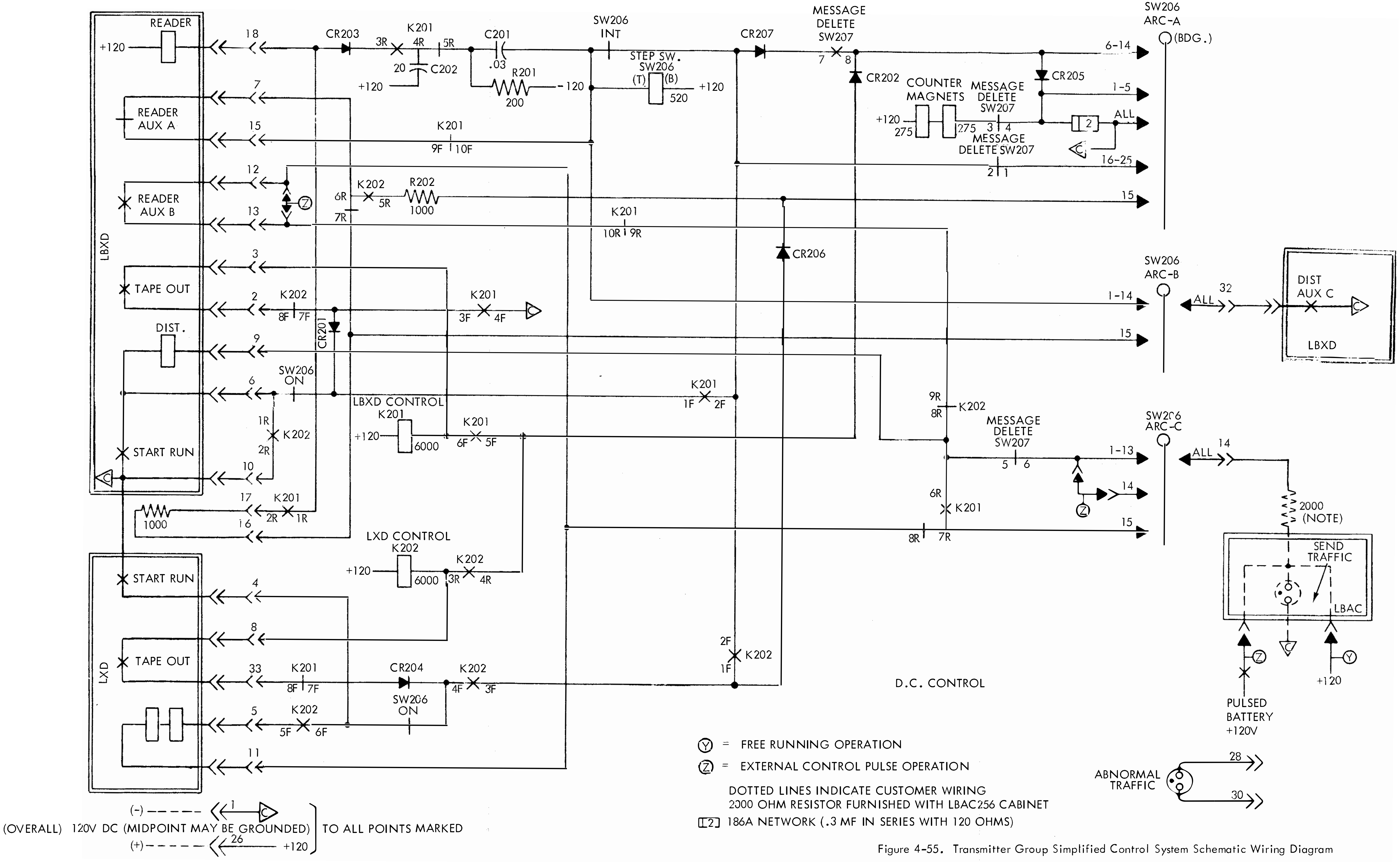

Figure 4-55. Transmitter Group Simplified Control System Schematic Wiring Diagram

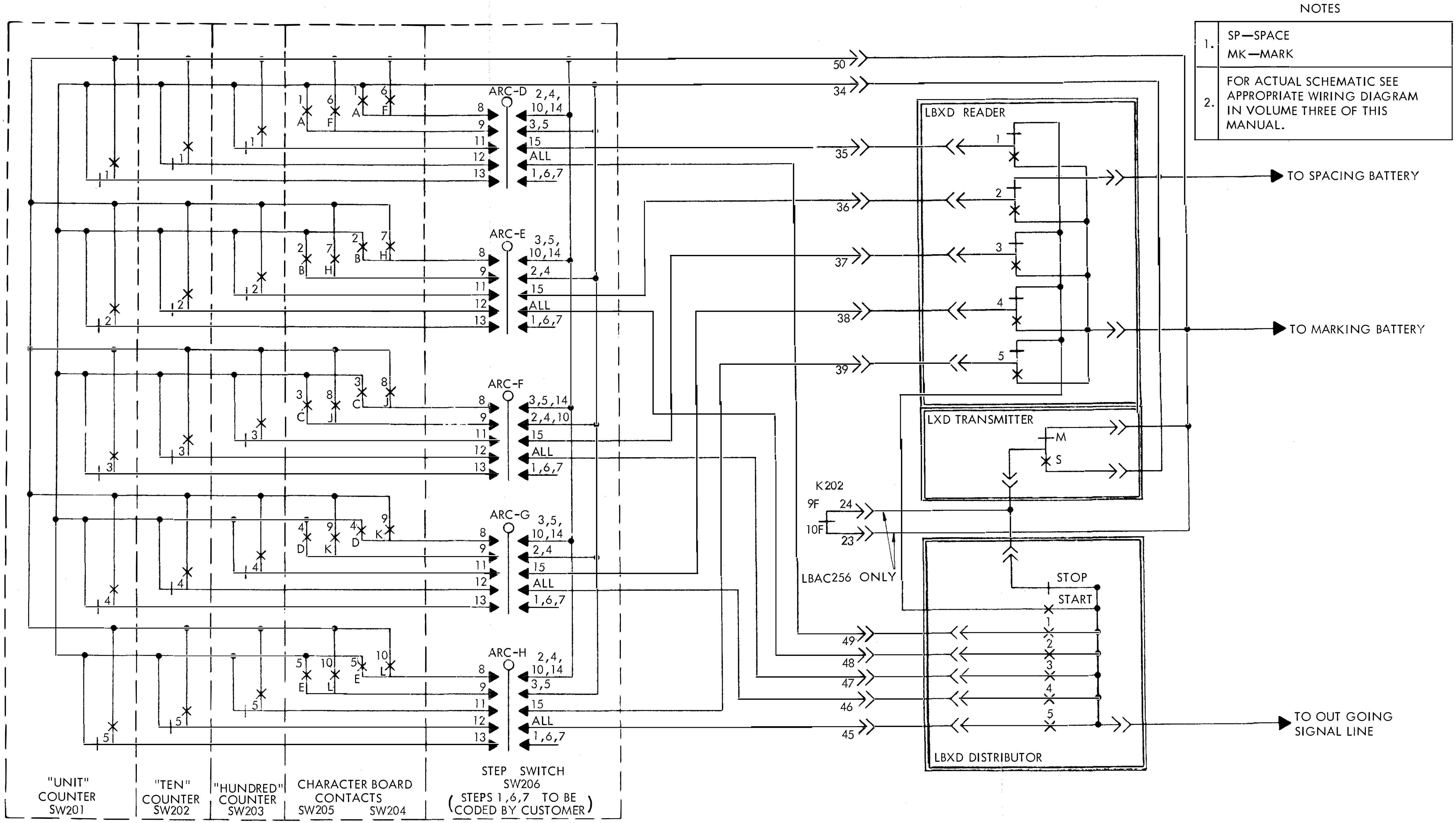

Figure 4-56. Transmitter Group Simplified Signal Line Circuit

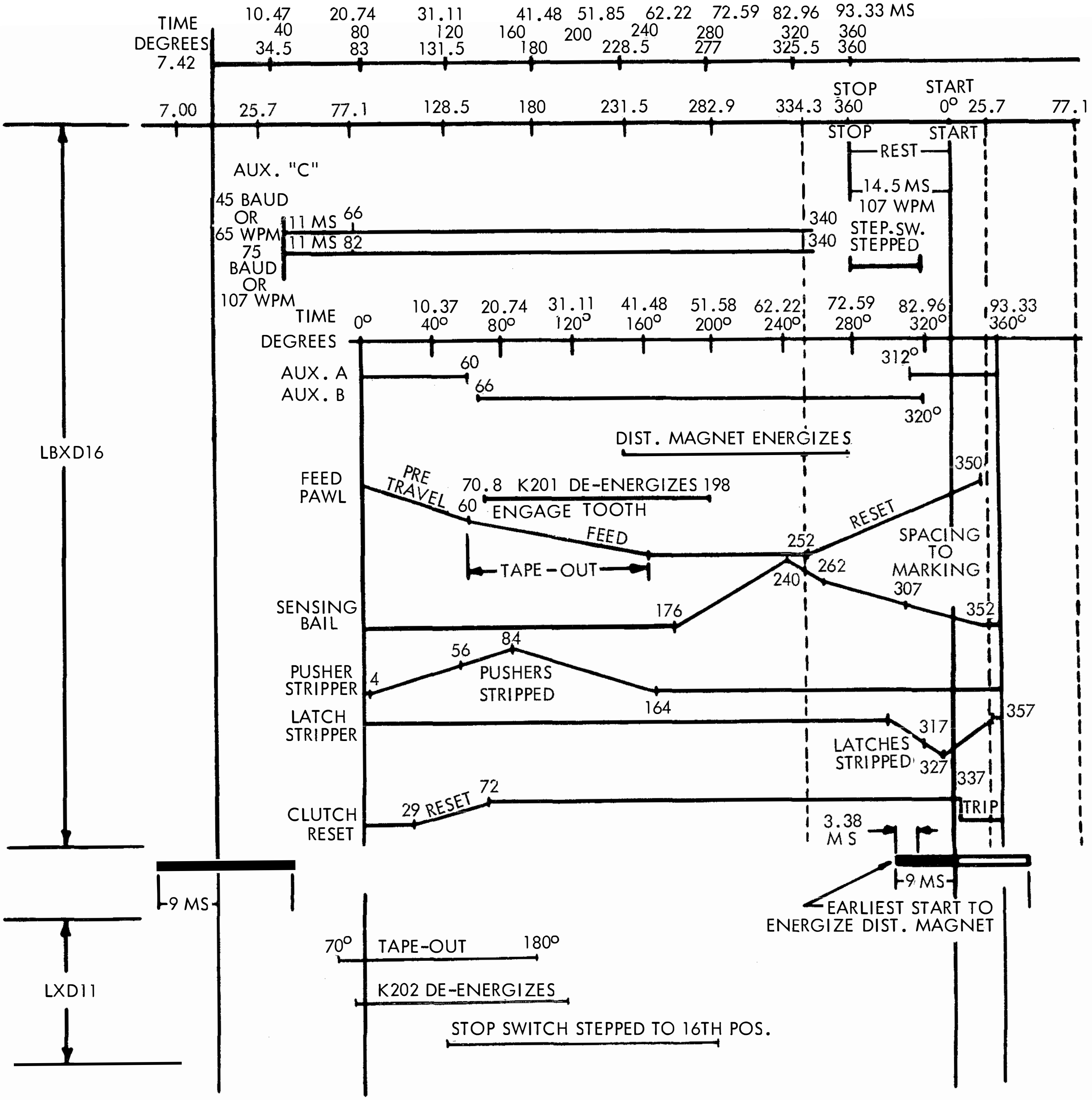

Figure 4-56A. Approximate Timing Relationships

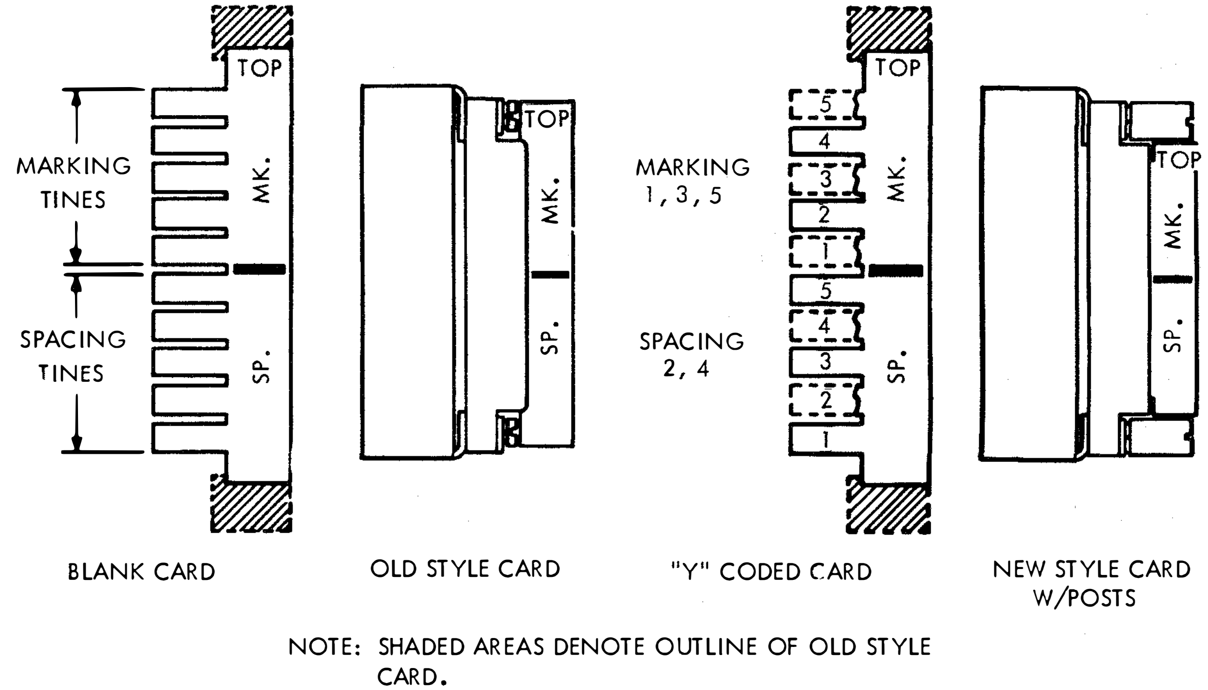

Figure 4-57. Universal Code Card

Negative battery. Energizing the K201 Control Relay causes positive battery to be routed through the stepping switch to ground, via the stepping switch normally closed interrupting contacts, the normally open K201 Contacts, and the energizing circuit for the K201 Control Relay, as explained above. Energizing the stepping switch results in the switch opening its own normally closed interrupting contacts, thereby breaking its energizing circuit and stepping (de-energizing) itself to the No. 1 position.

2. POSITION 1 - When K201 operated capacitor C202 discharged through the CR203 Diode, and the reader clutch magnet to positive battery, this discharge is sufficient to energize the reader clutch magnet to enable the reader shaft to rotate once, thereby erasing the last stored character and read and store the 2nd character from the sensing pins (the character (LTRS) immediately above the sensing pins is discarded as this character position was sensed and read on the previous message.) The C202 capacitor will not recharge due to the blocking diode CR203. K201 must de-energize (tape-out) to charge the capacitor. When the stepping switch steps to the No. 1 position its 3rd level connects the operating external pulse to the LBXD distributor magnet, while the 1st level places negative battery on the counter magnets M201 and M202, resulting in completing the energizing circuit. The counter magnet, when energizing, pulls the armature extension feed pawl forward so that the feed pawl leaves its backstop and engages a tooth on the 1 unit (right) counter drum ratchet. In addition, the off normal switch is open, thereby, permanently breaking the original energizing circuit for the stepping switch. After the first operating pulse is received by the distributor magnet and routed to negative battery upon the closure of the LBXD start lever switch, the LBXD distributor shaft starts to rotate and proceeds to sequentially transmit the five level code which is permanently wired to the first position on the 4th, 5th, 6th, 7th and 8th levels of the stepping switch.

3. POSITIONS 2 THROUGH 5 - As the distributor rotates, it causes its Auxiliary C contact (which is now connected to the stepping switch via the first position step on the second lever), to close. As the distributor completes the sequential transmission of the five code pulses, the Auxiliary C contact is opened, thereby causing the stepping switch to de-energize and step to the 2nd position prior to the next incoming external operating pulse. The 2nd external pulse is now received by the distributor magnet which again rotates and sequentially transmits the 2nd five unit code stored by the stepping switch and during the course of transmission energizes the stepping switch when the

Auxiliary C contact closes. The distributor Auxiliary C contact opens once more and causes the stepping relay to de-energize and step into 3rd position prior to the 3rd incoming operating pulse.

4. POSITIONS 6 THROUGH 10 - When the stepping switch is stepped to the 6th position the counter magnet energization circuit is broken by the blocking CR205 Diode, as the armature returns to its de-energized position its feed pawl feeds the 1 unit (right) counter drum ratchet one tooth, (which corresponds to one digit on the drum's face.) The feed pawl then locks the ratchet into position by jamming its back stop and the ratchet. When the 1 unit code drum moves into the 0 zero position the one unit counter disk (at the base of the counter drum) notch engages its mating spur gear tooth and rotates the spur gear assembly one tooth, which results in rotating the 10 unit counter drum to its next position. An identical feeding takes place on the 100 unit drum when the 10 unit drum moves to the "0" position. All drums may be manually reset by simply turning the counting drum's knurled disk to the left.

CAUTION

(When changing numbers always change drums in the following order: one, ten and 100 units.)

One leaf spring detent lever keeps the counting drum positioned on the counter drum shaft. The drums cannot be turned to the right due to the jamming action of the spring detent arm against the drum and the detent post. Five transfer type code reading contacts ride on each counter drum's cams. The peaks of the cams represent a spacing code which cause the contact swingers to move against the normally open contacts. Valleys of the cam represent a marking code where the contact swingers rest on their normally closed contact leaf. These upper and lower dwells (space and mark) correspond to the baudot code of the numerical figure showing on the front of the drum face. The stepping switch 11th position is connected to the 100 unit code reading contact swingers and the 12th and 13th positions are connected to the ten and one unit drums, respectively.

5. POSITIONS 11 THROUGH 15 - The stepping switch when arriving at the 11, 12 and 13 positions simply connect the respective contact swingers to the distributor contacts for distribution on the carrier channel. This sequence of operation continues to the 14th position of the stepping switch. When the 14th operating pulse is received by the magnet, the distributor rotates and transmits as described previously. However, closure and opening of the Auxiliary C contact results in stepping the switch to the 15th position at which time the Auxiliary contact is now connected to the LBXD reading magnet, and thereby results in transmission of the message tape in the normal distribute-read cycle as the 4th, 5th, 6th, 7th and 8th levels of the stepping switch are now connected to the LBXD reading contacts.

6. TANDEM OPERATION - The LXD transmitter may be loaded with a message tape, however, due to the energization of the control relay K201 and the opening of the normally closed off normal switch and K201 contacts, the LXD control relay K202 cannot energize. When tape-out occurs on the LBXD, the K201 energization circuit is broken, and the normally closed contact on the K201 relay in the zeroizing circuit of the step switch now closes and awaits the closure of the reader Auxiliary A contact. The LBXD reader magnet circuit is immediately broken by the normally open K201 contact. The reader Auxiliary A contact is timed to close after the distributor Auxiliary C has opened. The next incoming external pulse is then routed through the normally closed contact of K201 and K202 through the distributor magnet and through the LBXD start contact to negative battery. The distributor now starts to rotate and reads the last stored character on the reader and the distributor Auxiliary C contact closes and energizes the stepping switch through the normally closed K201 and 202 contacts and the now closed reader Auxiliary A contact. As the distributor completes transmission of the last stored character the Auxiliary C contact opens causing the stepping switch to step to the 16th position which disconnects the external pulse from the LBXD distributor magnet and places ground on the stepping switch via the stepping switch interrupting contacts, and through the 16th position on the first level of the stepping switch. This circuit is made continually through the 25th step, causing the stepping switch to zeroize to the home position. The energizing circuit to K202 LXD control relay is then closed via the CR204 diode, the K201 normally closed contact and the LXD tape out and start contacts. Energization of the LXD control relay K202, completes the energization circuit of the stepping unit (as described above) when the stepping switch reaches the home position, causing the stepping switch to step to the No. 1 position. Once again the incoming external operating pulse is sent through the distributor magnet where again the codes on the first to 14th level are transmitted as previously described. When the 14th incoming operating pulse is received by the distributor and the distributor again starts to rotate, it transmits the last wired character on the stepping switch and the distributor Auxiliary C contact steps the switch to the 15th position. The incoming operating pulse is then routed through

the LXD clutch magnets, LXD start contacts, and K202 normally open contacts. The LXD now receives the external operating pulse and transmits its loaded tape message. At the 15th step the stepping magnet receives an energizing pulse via its interrupter and normally open K202 contacts and the CR206 diode. The stepping switch magnet is held energized by its holding circuit through the R202, 100 ohm resistor. The LBXD may be loaded with a message tape, however, the LBXD control energizing circuit is broken by virtue of the normally closed step switch off-normal contacts, and K202 contacts being open. Upon sensing tape out, the holding path of relay K202 is opened. K202 releases and the holding circuit to the step switch is broken. This results in the stepping switch magnet releasing and stepping to the 16th position prior to the next incoming operating pulse. As previously described, the stepping switch now homes itself by virtue of its zeroizing circuit to the home position. If the LBXD has been loaded with a tape, the step and transmit sequence will again start and proceed as previously described.

7. MESSAGE IDENTIFICATION DELETION - When both transmitters are idle (i.e. no tape installed) the operator, pushes the message deletion switch downward (Delete) places the transmitter start lever into the free wheeling position, inserts the message tape, and then places the transmitter start lever to the start position. When the control relay operates the stepping switch will step itself to the 15th step (message reading step) by virtue of the step magnet interrupting circuit through the number delete switch normally open contacts and the 1st through 14th steps on the 1st level of the stepping switch. Operation of the message identification deleting switch also results in breaking the counter magnet circuit and the external pulsing circuit from the distributor clutch magnet through the 1st 14 steps. When the operator sees the tape moving, the delete switch should be returned upward to its unoperated position. Upon completion of transmitting the last read character the stepping switch is stepped to the 16th position and zeroizes itself to the home position as originally explained, however, if the delete switch is left in the delete position the switch will not zeroize due to the message delete switch keeping the zeroizing circuit open. Before normal transmission can commence the delete switch must be returned to its normal position.

(d) FREE RUNNING CONTROL CIRCUIT - The free running theory of operation is identical to external pulsing with exception of the last character read out of the LBXD. When tape out is sensed K201 de-energizes while the reader auxiliary "B" contact is closed, resulting in battery being furnished to the distributor magnet during the remaining closure time of the auxiliary "B" contact. Therefore, the distributor rotates one more cycle, distributing the last character and by operation of the distributor auxiliary C contact steps the switch to the 16th position. The LXD circuit is identical to that previously described.

h. LBAC256BR TRANSMITTING CABINET (Refer to appropriate wiring diagram in Volume 3, of this Manual).

(1) MESSAGE TRANSMISSION - EXTERNALLY PULSED CONTROL CIRCUIT (OPTION Z)

(a) POLAR OPERATION - Spacing - battery must be connected to T.B.A.-1, Marking battery to T.B.A.-2, and outgoing line to T.B.A.-3.

(b) For control circuit operation, positive 120 volts DC battery must be connected to T.B.A.-5 and negative 120 volts DC battery must be connected to T.B.A.-4.

(c) The following connections must be made for external control of the LXD and the LBXD transmitter-distributor.

1. Connect positive 120 volts DC through the external control contacts to T.B.A.-6.

2. Connect Step Switch, level C - position 13 to position 14.

3. Connect T.S.C. Section C - terminal 12 to 13.

(d) The LBXD transmitter distributor operation is controlled by relay K202.

(2) START OPERATION (LOWER TRANSMITTER)

(a) When a message tape is placed in the head of the lower transmitter (LBXD) and the START switch is operated to the RUN position, negative battery will be connected to the winding of relay K201 via closed TAPE OUT contacts, normally closed 8F-7F contacts of relay K202, diode CR201, Step Switch Off Normal Contacts 1-2, and closed contacts of the START switch, and relay K201 will operate.

(b) Relay K201 in operating now permits the negative battery on the START switch contacts to be applied through the Step Switch Off Normal contacts 1-2, through 1F and 2F contacts of relay K201, through the normally closed Step Switch Interrupter contacts 2-3 to the Step Switch magnet which energizes. The

Step Switch magnet, in energizing, causes its Interrupter contacts to open, the magnet will de-energize and the Step Switch will step to its first position.

(c) When K201 relay operated, capacitor C202 discharged through K201 contacts 3R-4R and the reader clutch magnet, causing the reader shaft to rotate once, erasing the last character (stored from the previous message) and reading and storing the character above the sensing pins of this message. Capacitor C202 will not recharge due to the blocking action of the CR203 diode until after the K201 relay releases at the end of the message and negative battery is applied through resistor R201 and K201 relay contacts 5R-4R.

(d) Relay K201 is held operated by two holding circuits. One holding circuit applies negative battery to the relay via the TAPE OUT contacts, contacts 8F and 7F of Relay K202 and 3F and 4F contacts Relay K201. This circuit is used for sensing "tape out" during tape transmission. The second holding circuit assures circuit continuity during the message numbering and identification cycle. Negative battery is applied to the K201 relay via its own 6F and 5F contacts, DIODES CR202 and CR205, the first through 5th positions on Step Switch level A and then directly via the 6th through 14th positions on this same level.

(3) START OPERATION (UPPER TRANSMITTER)

(a) When a message tape is placed in the head of the upper transmitter (LXD) and the START switch is operated to the RUN position negative battery will be connected to the winding of relay K202 via closed TAPE OUT contacts, normally closed 8F-7F contacts of relay K201, DIODE CR204, Step Switch Off Normal contacts 3-4 and closed contacts of the START switch. K202 relay now operates.

(b) Relay K202 in operating now permits the negative battery on the START switch contacts to be applied through Step Switch Off Normal contacts 4-3, contacts 4F-3F and 1F-2F of relay K202, normally closed Step Switch Interrupter contacts 2-3 to the Step Switch magnet which energizes. The Step Switch magnet in energizing causes its Interrupter contacts to open, the magnet will de-energize and the Step Switch will step to its first position.

(c) Relay K202 is held operated by two holding circuits, one holding circuit applies ground to the relay via closed TAPE-OUT contacts, closed contacts 8F-7F of relay K201, diode CR204, contacts 4F-3F of relay K202, CR206, and the 15th position of level A of the Step Switch. This circuit is used for sensing "tape out" during tape transmission. The second holding circuit assures circuit continuity during the message numbering and identification cycle. Negative battery is applied to the K202 relay via its own 4R-3R contacts DIODES CR202, and CR205 the first through 5th positions on Step Switch level A and then directly via the 6th through 14th positions on this same level.

(4) MESSAGE IDENTIFICATION MODULE

(a) There are three Model 173520 Message Identification Modules mounted in a sliding frame assembly above the Multiple Transmitter-Distributor Sets. Each module provides a means of automatically dispatching 11 identifying codes and 3 sequential numbers for transmission of 999 messages. Each module consists of two basic assemblies, a base assembly and numbering assembly.

(b) BASE ASSEMBLY - The base assembly provides the means for automatically identifying each message transmitted from one transmitter (single transmitter operation) or two transmitters (tandem transmitter operation). To accomplish this, a stepping switch for storing the identifying code and two relays to provide for tandem operation are utilized. The stepping switch contains 8 levels, a set of self-interrupter contacts, and off-normal contacts. Three of the switching levels (A, B and C) are used for controls, and the remaining 5 levels (D, E, F, G and H) are used for storage of the identifying and counter assembly number codes. The LBXD transmitter-distributor is used for sequential transmission of the stored codes, the auxiliary contact on the distributor being utilized for synchronization between the stepping switch and the transmitter. The base assembly also mounts a MESSAGE IDENTIFICATION DELETE (M.I.D.) switch and ABNORMAL TRAFFIC lamp. When operated, the M.I.D. switch prevents the base assembly from carrying out its identifying sequence. The ABNORMAL TRAFFIC lamp may be operated by external circuitry when the signal line is seized by a remote location.

(c) NUMBERING ASSEMBLY - The numbering assembly provides the means for counting and storing the number of messages (up to 999) transmitted from a transmitting channel, storing the baudot code associated with the numbers counted, and giving visual indication of the number counted. To accomplish this, a pair of countermagnets, associated armature feed pawl linkage, and three code drums with transfer type code reading contacts are used. In addition, the assembly also mounts two switching type connectors (SW204 and SW205) which accept a universal code card and permit ready changeability of two identifying codes generated by the base assembly.

(d) Message Identification Control Circuit Operation

1. Inserting a tape in a transmitter-distributor completes a relay flip-flop circuit between a stepping switch and the transmitter's distributor clutch magnet. The stepping switch stores a 5 level baudot code, and the distributor will transmit it sequentially. An electromechanical counter is actuated which registers the message number and stores the associated code on three code reading contact assemblies. The stored number codes are also transmitted by the distributor.

2. Upon completion of transmitting the identifying code (LTR) ZCZCABCD (FIG) 000 (LTR), the transmitter is permitted to read its message tape. If desired, the entire message identification sequence can be omitted from the transmission by operation of the M.I.D. switch.

NOTE

The identifying code transmitted will differ with each message as follows:

(LTR) ZCZCABCD (FIG) 000 (LTR)
(LTR) ZCZCABCD (FIG) 001 (LTR)
through
(LTR) ZCZCABCD (FIG) 999 (LTR)

The three number sequence following (FIG) increases by one for each transmitted message unless the message identification switch is operated to the DELETE position.

3. The distributor contacts (1, 2, 3, 4 and 5) are connected to the SW206 stepping switch's D, E, F, G and H levels, respectively. Mark and space signal line battery are connected to these levels so as to conform to the following code sequence.

STEP	CODE
1	LTR (customer option)
2	Z
3	C
4	Z
5	C
6	A (customer option)
7	B (customer option)
8	C (customer option)
9	D (customer option)
10	FIG
11	1 (any number 0 to 9)
12	2 (any number 0 to 9)
13	3 (any number 0 to 9)
14	LTR
15	MESSAGE TEXT

As noted, the 1st, 6th, 7th, 8th and 9th position codes are reserved for customer options. The 1st, 6th and 7th position codes must be wired by the customer; however, the 8th and 9th codes are established by use of universal code cards and associated shorting type connector switches (SW204 and 205). The code cards are visually separated with a mark and space battery side. If mark battery for a particular code is desired, the mark tine is broken off; conversely if space battery is desired, a space tine is broken off.

4. For method of coding the universal code cards and the step switch refer to Note 204 (7092WD-D3).

5. The 11th, 12th, and 13th positions of the stepping switch are connected to the swingers of three, five unit transfer type code reading contact assemblies operated by counter drums on the numbering assembly. These transfer the baudot code of the number counted to the code reading contacts of the distributor. The normally open and closed contacts of the contact assemblies are wired, respectively, to space and mark signal line battery.

6. Due to the above electrical connections, the distributor contacts have mark or space battery applied to them from the 1st to 14th position of the stepping switch. The distributor will then transmit each position sequentially to the distant station upon rotation of the distributor cam.

(e) MESSAGE TAPE TRANSMISSION (LBXD) - The five levels (D, E, F, G, and H) on the 15th position of the stepping switch are connected to the swingers of the transmitter code reading contacts. As in the case of the counter assemblies, the transmitter code reading contacts are connected to marking and spacing signal line battery, respectively. If the transmitter-distributor is transmitting, the baudot codes on the tape are transferred through a mechanical linkage to the code reading contact swingers. The resultant voltages are applied to the distributor contacts, from which they will be sequentially transmitted to the distant station.

(f) MESSAGE TAPE TRANSMISSION (LXD) - The signal generator of the LXD is connected in series with the line when relay K202 is operated.

(5) MESSAGE IDENTIFICATION AND NUMBERING

(a) When the Step Switch steps to its first position positive battery is applied through the external pulser via the C level of the Step Switch and the M.I.D. (Message Identification Delete) SW207 switch contacts 5-6, to the distributor clutch magnet of the lower transmitter-distributor (LBXD). This causes the distributor cam to rotate and the five level code wired to the D, E, F, G and H levels of the Step Switch will be sent to the line via the distributor. As the distributor cam rotates, its auxiliary "C" contacts will close and apply negative battery directly through level B of the Step Switch, to the Step Switch magnet which energizes. After transmission of the fifth pulse the Aux "C" contacts will open allowing the Step Switch magnet to de-energize and the Step Switch will step to the second position. The above step - transmit - step operation will continue, to the 15th step to complete transmission of the message identification and numbering sequence. The characters sent to the line on positions one through seven, ten and fourteen are dependent upon the wiring of levels D, E, F, G and H of the Step Switch. The characters sent to the line on positions eight and nine are dependent upon the coding of the universal code cards in SW204 and 205 connectors and the characters sent to the line on positions eleven, twelve, and thirteen are dependent upon the settings of the code reading contacts of the counter as explained below.

(b) When the Step Switch stepped to the first position negative battery was applied through level A of the Step Switch to the counter magnets which energized. The counter magnet pulls the armature extension feed pawl forward so that the feed pawl leaves its backstop and engages a tooth on the 1 unit counter drum ratchet. When the Step Switch steps to the sixth position negative battery is removed from the counter magnets and they de-energize. As the armature returns to its de-energized position, its feed pawl feeds the 1 unit counter drum ratchet one tooth (one digit) and locks the ratchet into position. When the 1 unit counter has made a complete revolution and moves again into the 0 position, the 1 unit counter disk notch (at the base of the counter drum) engages its mating spur gear tooth resulting in rotation of the 10 unit counter drum to its next position. An identical feeding takes place on the 100 unit drum when the 10 unit drum moves to the 0 position. All drums may be reset by simply turning the counting drums knurled disk to the left. When resetting numbers, drums should be changed in the following order: One, ten and one hundred units.

(c) One leaf spring detent lever keeps the counting drum positioned on the counter drum shaft. The drums cannot be turned to the right due to the jamming action of the spring detent arm against the drum and the detent post. Five transfer type code reading contacts ride on each counter camming surface. The peaks of the cams represent a spacing code, and the valleys a marking code. These upper and lower dwells (space and mark) correspond to the baudot code of the numerical figure showing on the front of the drum face. The code is transferred to the D, E, F, G and H levels of the Stepping Switch via the swingers of the transfer type code reading contacts. The 11th position of the Step Switch is connected to the 100 unit code reading contact, the 12th position of the Step Switch is connected to the 10 unit code reading contacts and the 13th position connects to the 1 unit code reading contacts. The Step Switch when arriving at these positions connects the respective contact swingers to the distributor contacts for transmission on the line.

(6) MESSAGE TRANSMISSION

(a) After the transmission of the fourteenth character, of the message identification sequence, the distributor AUX C contacts open and cause the Step Switch to step to its 15th position due to action as described in Paragraph 4-4.h.(5)(a).

(b) LBXD operation - When the Step Switch is on position 15 the code levels are connected to the transmitter reading contacts as explained in Paragraph 4-4.h.(4)(e) and battery is applied to the distributor clutch magnet through level C of the Step Switch and contacts 6R-7R of relay K201. The distributor operates and the character stored in the reader contacts is transmitted. The reader clutch magnets are now connected to the distributor AUX C contacts through 1R-2R contacts of relay K201, resistor R2-, and position 15 level B of the Step Switch, so that each time the distributor AUX C contacts operate, the reader clutch magnets are energized the reader shaft turns, the tape advances, the next character is sensed and stored. This results in the transmission of the message tape in the normal "distribute-read" cycle operation.

(c) LXD operation - When the Step Switch is on position 15 the LXD clutch magnet will be operated from battery applied through level C of the Step Switch, through contacts 7R-8R of relay K201, through 5F-6F of relay K202 and the START switch contacts. The LXD will operate and the message will be transmitted.

(d) The above processes will continue until the Tape Out contacts open and release the control relay (K201 or K202) which opens the clutch magnet paths and transmission stops.

(7) STEP SWITCH HOMING CIRCUIT

(a) LBXD operation - At the end of the message tape the TAPE OUT contacts open and cause the release of relay K201. Relay

K201 in releasing, opens the operate path of the reader clutch magnet and the reader stops. The release of relay K201 contacts 10F-9F connects the Step Switch magnet to the distributor AUX C contacts, via 10F-9F contacts of K201, reader AUX A contacts, contacts 6R-7R of K202 and Step Switch level B, position 15. This path is routed through the reader AUX A contacts to insure that the Step Switch will not step while the reader is sensing and storing the last character of the message tape. When the distributor AUX C contacts operate during the distribution of the last character, the Step Switch will step to position 16. In this position battery is supplied to the Step Switch magnet from level A positions 16 to 25 through SW207 switch contacts 1-2, and through the Step Switch interrupter contacts. The Step Switch now homes on a self-interrupted basis to its normal position (pos. 26).

(b) LXD operation - During message tape transmission from the LXD the Step Switch is held on position 15 by holding current supplied to its magnet through K201 relay contacts 10F-9F, reader AUX A contacts, K202 relay contacts 6R-5R and R202 resistor, to battery on position 15, level A of the Step Switch. At the end of the message the TAPE OUT contacts open and cause release of relay K202 the hold path is opened through relay K202 contacts 6R-5R, the Step Switch magnet de-energizes and the Step Switch steps to position 16 where it homes as explained in Paragraph 4-4.h.(7).

(c) When the Step Switch is in its home position its Off Normal Contacts 1-2 and 3-4 close and the circuit is ready for its next operation.

(8) DELETION OF MESSAGE IDENTIFICATION AND NUMBER

(a) To delete the message identification sequence preceding the transmission of a message, the operator must place the Message Identification Delete (M.I.D.) switch in the delete position before loading the transmitter with tape. The M.I.D. Switch should not be operated while the step switch is in the process of identifying a message.

(b) When the M.I.D. switch is operated to the delete position, a message tape is loaded in the transmitter and the Start Switch is operated to the run position the control relay (K201 and K202) will become operated and the Step Switch will step to pos. 1 as described previously, and a continuous stepping circuit to the 15th step of the step switch is completed. Positive battery is routed through the Step Switch magnet, its normally closed Interrupter Contacts, diode CR207, closed M.I.D. switch contacts 7-8, diode CR205 the first through fourteenth steps of A level of the Step Switch, to negative battery. Operation of the Interrupter Contacts step the Step Switch to position 15.

(c) During the above stepping operation the Distributor clutch magnet operating circuit via level C of the step switch, and the counter magnet operating circuit are broken, respectively by contacts 5-6 and 3-4 of the M.I.D. switch. The homing circuit of the Step switch is also broken by contacts 1-2 of the M.I.D. switch. This assures that the next message is not transmitted without identification should the M.I.D. switch be left in the DELETE position.

(d) When the Step Switch arrives at position 15 normal operation of the transmitter or transmitter-distributor occurs and the message is transmitted to the line as explained previously. Note the M.I.D. switch may now be returned to its normal position.

(e) At the end of the message when TAPE-OUT occurs the Step Switch steps to pos. 16 as described previously.

(f) If the M.I.D. switch is still in the DELETE position the homing path of the Step Switch as described previously in 7 is broken through 1-2 contacts of the M.I.D. switch. No further message transmission is possible until the M.I.D. switch is returned to its normal position. When it is returned to normal the Step Switch homing circuit is completed, the step switch homes and normal operation may be resumed.

(9) MESSAGE TRANSMISSION - FREE RUNNING OPERATION (OPTION Y)

(a) For free running operation of the transmitter and the transmitter-distributor connections must be made as described in Paragraphs 4-4.h.(1)(a)(b).

(b) The connections described in 4-4.h.(1)(c) must be disconnected.

(c) Positive 120 V DC must be connected to T.B.A.-6, this can be done by strapping T.B.A.-6 to T.B.A.-5.

(d) The circuit operation is identical to that described under the external pulsed control circuit except for the following:

1. The clutch magnets will now be free running, that is they are no longer dependent upon the external control pulse.

2. The removal of the strap between positions 13 and 14 of level C of the Step Switch is made so that the distributor clutch magnet will release immediately after the 14th character is transmitted.

3. After a message has been sent from the LBXD, the TAPE OUT contacts open and cause the release of relay K201. K201 relay releases while the reader AUX B contacts are closed and the Step Switch is on position 15. During this time battery is furnished from level C of the Step Switch, through K201 relay contacts 7R-8R, the reader AUX B contacts, K201 contacts 10R-9R and relay K202 contacts 9R-8R to the distributors magnet. The distributor now operates once more to transmit the last character of the message and as its AUX C contacts operate, the Step Switch will step to position 16 and then to its home position as explained in Paragraphs 4-4.h.(7)(a)(b).

(10) SEND TRAFFIC LAMP

(a) Option Z - The Send Traffic Lamp will follow the operation of the external pulse contacts.

(b) Option Y - The Send Traffic Lamp will be lighted steadily.

(11) MISCELLANEOUS

(a) When a LXD is removed from its base for maintenance its associated LBXD may be used for sending messages, as the signal line circuit of the LXD is shunted through released contacts 9F and 10F of relay K202.

(b) When a LBXD is removed from its base its associated signal line will be opened and no messages may be sent from the associated LXD. The line may be closed by connecting a temporary strap between T.S.C. terminals S-6 and S-21. With this strap in place messages, without the identification and numbering sequence, may be sent from the LXD by procedure explained in Paragraphs 4-4.h.(8)(a) to (f), if a temporary strap is also connected between T.S.C. terminals C-7 and C-15.

4-5. MODEL 28 MONITOR GROUP

a. GENERAL - The Model 28 Monitor Group consists of two Multiple Typing Reperforator Sets and two TW15 Tape Winder Sets mounted in a LBAC224BR or LBAC257BR or LBAC259BR Universal Cabinet. Each Multiple Typing Reperforator Set consists of three LPR37BWA or LPR37BRP Typing Reperforators mounted on a LMRB203BZ Multiple Base and driven by an LMU12 Motor Unit. The purpose of the monitor group is to record messages on tape in both fully-perforated 5 level baudot code, and printed form. All signal leads are shielded, and all shielding is insulated from the equipment frames and cabinet ground.

b. LPR37BWA or LPR37BRP TYPING REPERFORATORS (Figure 1-30 and 1-31)

(1) GENERAL - The LPR37BWA or LPR37BRP Typing Reperforator, mounted on the LMRB203BZ base operates from a sprocket and belt arrangement on the cross shaft, and is driven by an intermediate gear and a pinion on the motor unit. The LPR37BWA or LPR37BRP is almost identical in appearance to the LPR 34BWA (Figures 1-7 and 1-8) with only minor differences in the main casting, the addition of a locating stud, different shaped anchor brackets, and different chad chutes.

(2) OPERATION - Since LPR37BWA, LPR37BRP, LPR34BWA and LPR34BRP operate identically, reference can be made to Paragraph 4-3.b. for LPR37BWA and LPR37BRP operating theory.

(3) CHAD CHUTE - The LPR37BWA or LPR37BRP chad chute extends from the reperforator punch block to the left and down the front of the unit. The chute serves to carry the chad perforated from the tape into its chad container mounted under the LMRB203BZ base.

c. LMRB203BZ MULTIPLE BASE

(1) GENERAL - The LMRB203BZ Multiple Base provides mounting facilities for three LPR37BWA or LPR37BRP Typing Reperforators and a LMU12 Motor Unit. Power is transmitted from the motor unit to the typing reperforator by a pinion gear which drives an intermediate gear mounted to a cross shaft. Three sprockets and drive belts, mounted on the cross shaft, line up with and drive an associated sprocket on a typing reperforator. Operating speeds of 106 WPM or 65 WPM (75 or 45.5 Baud) are available, depending on the gear and sprocket set used. Three chad containers, one for each reperforator, mount on rail brackets located under the base near the front edge.

CAUTION

When replenishing the tape supply on any of the reperforators, be sure to empty the associated chad container. Failure to do so may result in equipment failure due to chad backing up the chad chute and fouling the punch mechanism.

(2) ELECTRICAL FACILITIES - Located at the left front corner of the base is an ON-OFF power switch to control the motor operation. A four point terminal board located in front of the right tape supply container, and a fourteen point connection at the left rear of the base (Figure 4-58) provide wiring facilities for the motor units A.C. power lines and for the low tape alarm switches on each of the tape supply containers. Power factor corrections capacitors, where required, are mounted to a bracket located near the center of the base between two tape supply containers (see Figure 1-31).

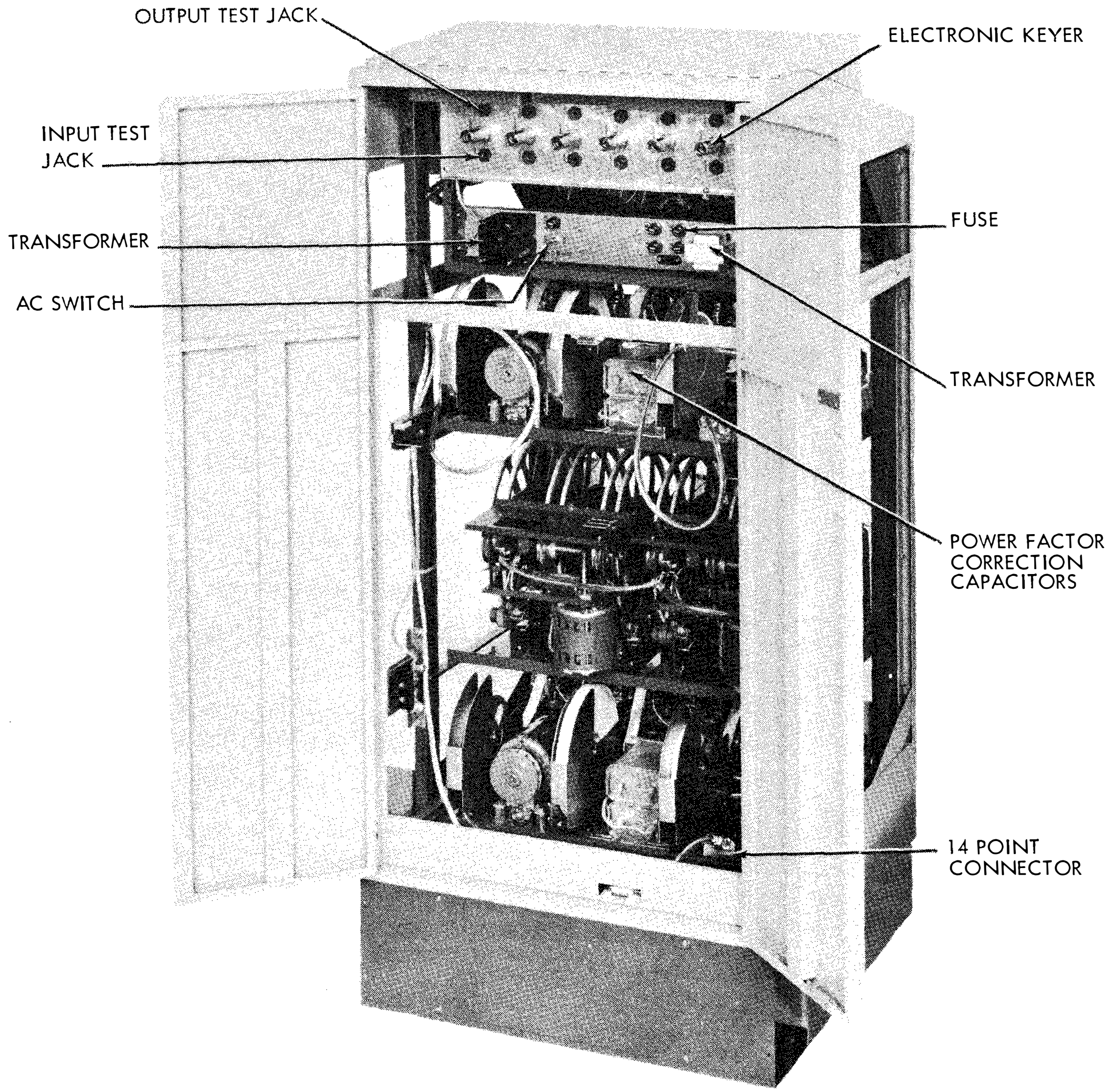

Figure 4-58. Model 28 Typing Reperforator Monitor Group (Rear Doors Open)

(3) REPERFORATOR MOUNTING - Each Typing Reperforator is located on the base by means of three tapped mounting studs in a "T" plate (see Figure 1-31). The "T" plate, which moves forward and back in guide slots, provides a means for adjusting the timing belt tension on each reperforator. The reperforator is secured by tightening the three mounting screws, and the screw holding the anchor bracket (Figure 1-28) to the base.

d. LMU12 MOTOR UNIT

(1) The LMU12 Motor Unit is a 1/12 horsepower, 3600 RPM, two pole, wound stator ball bearing motor with a squirrel cage type rotor. The stator has two windings, a main operating winding and an auxiliary starting winding. The auxiliary winding is wired in series with a 170 MFD electrolytic capacitor and a current operated motor starting relay. Normal starting current is 12.0 amperes, and rated torque 23.4 ounce inches.

(2) For theory of operation, refer to Paragraph 4-3.e.(2).

NOTE

If in place of an LMU12 synchronous motor a LMU14 governed motor is used, refer to Paragraph 4-6.d. for information and operating theory on the LMU14 governed motor.

e. TW15 TAPE WINDER

(1) GENERAL - The two TW15 Tape Winders mount side by side on two cross members in the LBAC224BR or LBAC257BR Cabinet. They are located on the cross members by eight locating studs, four for each tape winder, and are held in position by their own weight on resilient rubber mounts. The TW15 is a self contained unit, consisting of a driving mechanism, tape tension device, clutch engage - disengage mechanism, rollers for tape reel engagement, and a full reel alarm switch to operate a WINDER FULL lamp on the lower shelf control panel. Each of the tape reels has a capacity for 1000 feet of chadless tape.

(2) OPERATION

(a) A drive wheel, with two garter springs for added friction, mounts rigidly on the motor shaft and rotates continuously (there is one drive wheel associated with each tape reel, all drive wheels mounted on a common shaft as shown in Figure 1-33). Power is transmitted to the drive shaft through a gearing arrangement driven by a 35 milli-horse power induction motor mounted at the rear of the tape winder (Figure 1-33). Each tape reel is positioned on two fiber rollers (Figure 1-32) and rotates when its rim engages the drive wheel. The tape reel rim is placed in or out of engagement with the drive wheel by the position of the rear roller. The rear roller is mounted on an arm that is part of the clutch engage-disengage mechanism (Figure 1-33). The position of this arm (up or down) is determined indirectly from the flow of tape looped through the tape arm. When the tape arm is near the bottom of its travel or moving up, the tape reel rotates. When the tape arm is latched in the up position or moving down, the tape reel will not rotate.

(b) The end of the tape is threaded about six inches through any one or more posts at the center of the reel, and is then wound two or more turns manually to secure the tape to the reel. The tape is then brought under the posts, up between the backstop and chad depressor, and on to the tape arm (Figure 1-32). When mounted in the LBAC224BR or LBAC257BR cabinet, the reels servicing the lower three reperforators have an additional tape guide roller in the tape path. After passing the tape under the tape arm, it is then brought up and over the tape guide roller immediately above the chad depressor to complete the path to the reperforator (Figure 4-59). Lifting the tape arm manually to its latched position disengages the reel from the drive wheel and allows rapid unwinding of tape.

(c) Each tape winder assembly is furnished with a set of full reel contacts mounted on the rear shelf of the unit (Figure 1-33). The contacts may be operated by any one of the three (one for each reel) full reel sensing arms. These arms are mounted on a common shaft, and have equal effect on the full reel contacts.

f. LBAC224BR OR LBAC257BR OR LBAC259BR UNIVERSAL CABINET

(1) GENERAL - The LBAC224BR or LBAC257BR or LBAC259BR Universal Cabinet provides mounting facilities for two Model 28 Multiple Typing Reperforator Sets, two TW15 TAPE WINDERS, and the electrical control facilities to operate the units (Figure 4-58). The cabinet consists of a separate inner and outer structures to minimize the transmission of mechanical noise to the outer shell by the apparatus. All equipment mounts on the inner structure, the outer shell servicing as a dust and noise enclosure. A raceway is provided at the bottom rear of the cabinet to contain station cabling. The raceway may be fastened in place from inside the cabinet for "against the wall" applications. Provisions for grounding the various units to the cabinet and for attaching an external ground to the cabinet are furnished.

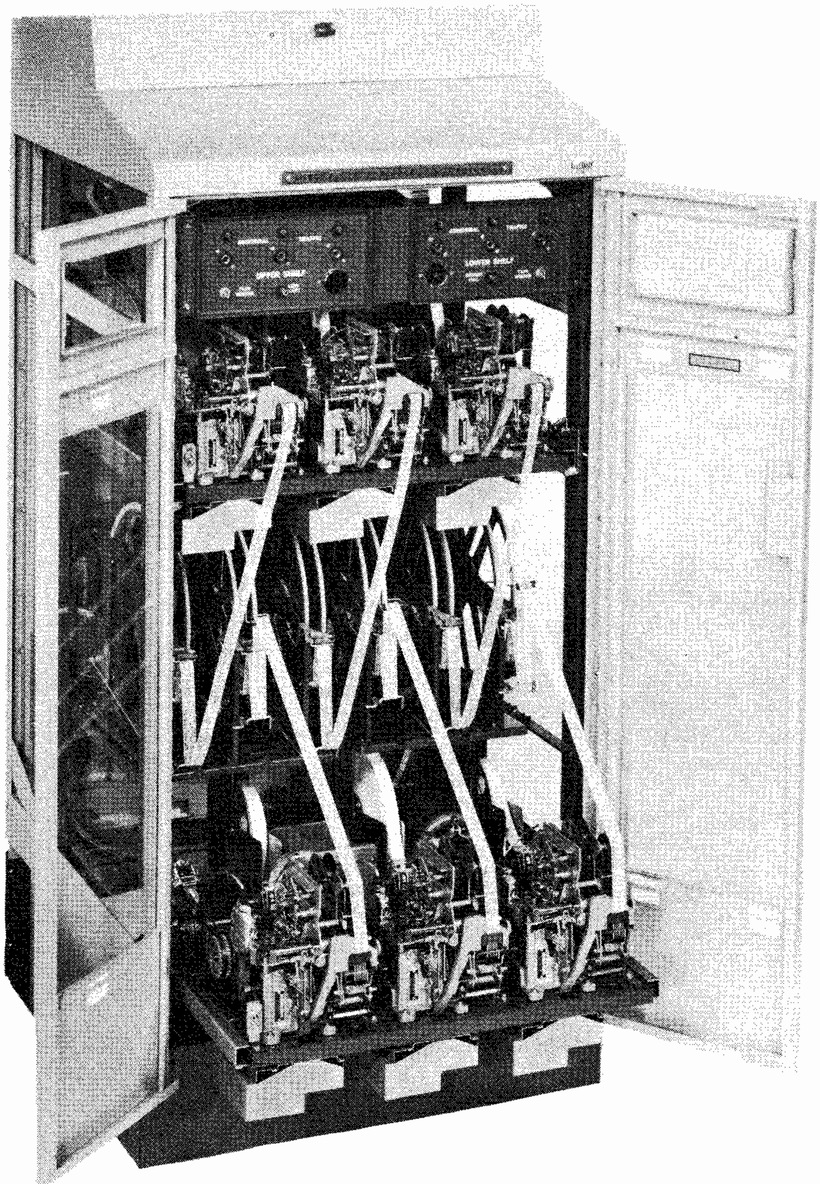

Figure 4-59. Model 28 Typing Reperforator Monitor Group (Front Doors Open)

(2) DOORS AND PANELS

(a) DOORS - Four doors are provided on the cabinet, two at the rear and two in front. The rear doors are all metal, extend the full length of the cabinet, and allow access to the typing reperforators, tape winders, and electrical control rack (Figure 4-58). The front doors, also full length, are provided with glass windows to permit observation of the reperforators and of the amount of tape in the tape supply and winder reels. A recessed handle is provided on each right hand door to facilitate opening. When closing, the left door is shut first. Then the right door is shut, and extends over the lip of the left door to hold it closed. Each pair of doors is held shut by two magnetic catches as shown in Figures 4-58 and 4-59.

(b) PANELS - Immediately above the front doors is a sloping panel extending back toward the cabinet dome. The sloped surface makes a convenient writing surface for the operator. Although side panels are supplied with the cabinet, they may or may not be used, depending on the equipment arrangement in a given location. It is possible to mount a series of LBAC224BR cabinets (or a combination of similar cabinets such as LBAC222, 223, 225) side by side, end enclosures being used on the outside cabinets only.

(3) DOME (Figure 1-34) - At the top rear of the cabinet, immediately behind the sloping panel is a hinged dome which provides access to the electrical control rack. The dome is hinged across the full length of the cabinet back, and is held in the closed position by means of a captive screw located at the top center of the sloping panel. The screw is accessible when the front doors are opened. A locking slide support, located at the left rear corner of the cabinet, holds the dome opened.

(4) ELECTRICAL CONTROL RACK

(a) GENERAL - The electrical control rack is located at the top rear of the cabinet, and is accessible via the rear doors (Figure 4-58) or the dome. The rack mounts on a swivel mechanism, and can be rotated to a horizontal position for maintenance purposes when the dome is opened. Captive screws located at the top left of the rack secure the rack in either its vertical or horizontal position.

(b) CIRCUIT FEATURES - The basic functions of the control rack is to provide wiring and electrical control facilities to operate two Model 28 Multiple Typing Reperforator Sets and two TW15 Multiple Tape Winder Sets. The control circuitry includes the following:

1. An electronic keyer assembly containing six polar to neutral signal line converters.

2. A D.C. power supply assembly to provide the necessary operating potentials for the electronic keyers, a 5.5 VAC transformer for filament supply, the necessary equipment fuses, and a main A.C. POWER SWITCH.

3. The control panel (Figure 1-34) on the front of the unit, is divided into two sections (UPPER SHELF and LOWER SHELF) and mounts six ABNORMAL TRAFFIC amber neon lamps, six ABNORMAL TRAFFIC jacks, a WINDER FULL amber neon lamp, a LOW TAPE neon lamp, a 110 volt A. C. receptacle, a 60 volt D.C. polarized receptacle, and a power switch for each tape winder. Operating power for lamps and receptacles is furnished from the control rack.

4. Wiring from the ABNORMAL TRAFFIC lamps and jacks is brought to a common terminal board. All connections beyond this point are made by the customer.

5. All signal line circuits are shielded, the shield wires being brought out to a common cabinet termination. The signal shields are insulated from cabinet and equipment frames.

(c) ALARM CIRCUIT OPERATION

1. The TAPE OUT and WINDER FULL neon lamps are located on the front control panel and require 110 volt A.C. for their operation.

2. Six TAPE OUT switches, one for each reperforator, are wired in a paralled arrangement in series with the TAPE OUT neon lamp across the 110 volt A. C. power line (see appropriate wiring diagram). Closure of any one of the switches will complete the circuit to the neon lamp causing it to light.

3. Two winder full switches, one for each TW15 Multiple Tape Winder are wired in a paralled arrangement in series with the WINDER FULL neon lamp across the 110 volt A. C. power line (see appropriate wiring diagram). Closure of either switch completes the lamp circuit causing it to light.

(d) ELECTRONIC KEYER OPERATION - Refer to Paragraph 4-3.g.(4)(e) for electronic keyer operating theory.

(5) Refer to Paragraph 1-7.1. and 4-3.h. since the same information concerning the Selector Magnet Driver applies.

(6) The LBAC259BR Cabinet has six double tube 309863 Voltage Input Selector Magnet Drivers.

(a) The 309863 Voltage Input Selector Magnet Driver is a vacuum tube device which converts a voltage varying input signal of zero to plus 6 volts spacing, minus 1 to minus 6 volts DC marking to approximately 30 milliamperes marking in order to drive a series connected Model 28 Selector Coil Assembly. Unlike standard 20 or 60 milliampere signalling where the driver is placed in series with the signal line, it is required that this voltage be placed across the signal line.

1. The Driver provides a current waveform to the selector coils.

2. Output current corresponding to a marking input voltage of -1 to -6 volts is nominally 30 milliamperes.

3. Marking voltage at the input to the device may vary between -1 to -6 volts without any appreciable variation in selector coil current.

4. Input resistance to the driver is .450 megohms minimum, thus facilitating simultaneous operation of many such units before appreciable loading of the signal source occurs. If a spacing voltage greater than zero is used, input resistance is reduced. (The maximum number of drivers shunting one signal line is dependent on the source impedance.)

5. All external connections to the driver are made at a terminal block.

6. Test points are provided on both the circuit card and the terminal block for ease in monitoring the signal waveform at various stages in the driver.

7. The unit is capable of operation at speeds from 60 to 107 words per minute, 7.00 unit code.

8. A special feature is incorporated into the design to lock up the selector magnet armature should the signal line go spacing for any prolonged length of time.

(b) Because of the high input resistance and high sensitivity of the unit, the signal line must be shielded and an electrical connection be made between the chassis and protective ground to minimize stray pick up by the device.

1. An external power supply delivering 120 Volt DC plus or minus 10 per cent, 8 watts and 6.3 volts AC plus or minus 10 per cent, 5 watts is required to operate the driver.

2. The unit is designed to operate in an ambient temperature at 150 degrees Fahrenheit; storage temperature should not exceed 185 degrees Fahrenheit.

3. Because vacuum tube circuitry is used, a warm-up time of approximately 15 seconds is required before normal operation of the driver is reached.

(7) THEORY OF OPERATION OF THE 309863 VOLTAGE INPUT SELECTOR MAGNET DRIVER

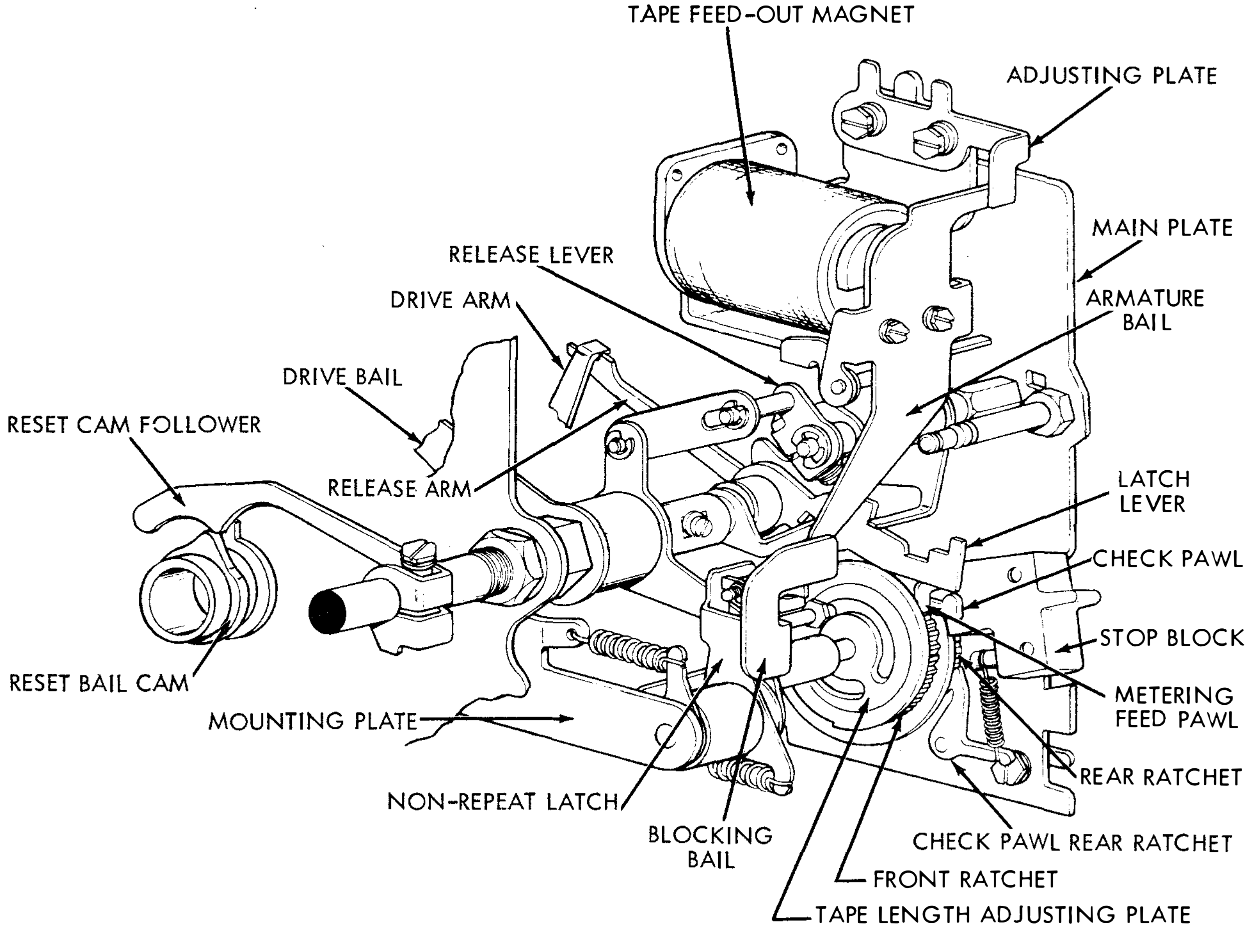

Figure 4-60. Non-Interferring Letters Tape Feed-Out Mechanism

(a) Refer to associated wiring diagrams in Volume 3, of this Manual.

(b) All voltages in the following paragraphs are referred to circuit common.

(c) Marking Condition:

1. When input voltage (terminals D1 and D2) becomes -1 volt, the plate voltage of V1 rises, charging coupling capacitor C2. The negative control grid voltage of V2 is removed and the tube turns on.

2. Steady state magnet current as determined by the screen voltage of V2 is approximately 30 milliamperes. This screen grid voltage is established through the use of the voltage divider network comprised of R3 and R4.

3. The magnitude of the V1 plate voltage swing is determined by R1 and the V1 screen grid voltage. This screen voltage is established through the use of a voltage divider comprised of R2 and R6.

(d) Spacing Condition:

1. When input voltage goes to zero, the plate voltage of V1 decreases, discharging the coupling capacitor C2. The current establishes a negative voltage across R5 and consequently across the control grid of V2, thus biasing V2 to cut-off. With V2 cut-off, current through the selector magnet assembly ceases. Since the current through C2 varies exponentially with time (time constant dependent on C2, R1 and R5), the control grid voltage of V2 will also vary exponentially with time and ultimately will become zero. With zero control grid voltage, V2 will conduct and the selector armature will pull up (mark hold feature).

2. The discharge current through capacitor C2 will maintain a negative bias voltage on V2 to keep the selector magnet armature open during the transmission of "blank."

4-6. MODEL 28 RECEIVING GROUP

a. GENERAL - The Model 28 Receiving Group is an electromechanical device designed to receive messages on six separate signal lines, and convert them into fully perforated tape with characters printed on the tape. The group consists of two Model 28 Multiple Typing Reperforator Sets mounted in a LBAC225BR or LBAC254BR or LBAC260BR Universal Cabinet. Each set consists of three LPR35BWA or LPR35BRP Typing Reperforators mounted on a LMRB203BZ or LMRB207BZ Base, and driven by an LMU12 or LMU14 Motor Unit. The necessary electrical control facilities to operate the sets are provided in the LBAC225BR or LBAC 254BR or LBAC260BR Cabinet.

b. LPR35BWA AND LPR35BRP TYPING REPERFORATORS (Figures 1-36, 1-37 and 1-38)

(1) The LPR35BWA or LPR35BRP Typing Reperforator operates from a sprocket and belt arrangement mounted on the LMRB 203BZ or LMRB207BZ Base cross shaft. The cross shaft is driven by a LMU12 or LMU14 Motor Unit via a pinion and intermediate gear arrangement. Operating speeds of 106 WPM (75 Baud) or 65 WPM (45.5 Baud) are available, depending on the gear and sprocket set used.

(2) Operating theory for the LPR 35BWA or LPR35BRP reperforator is identical to that for the LPR34BWA covered in Paragraph 4-3.b. The LPR35BWA and LPR35BRP reperforator has a non-interfering letters tape feed-out mechanism which the LPR34BWA reperforator does not have. The chad chute assembly for the LPR35BWA or LPR35BRP is identical to that of the LPR37BWA (see Paragraph 4-5.).

(3) NON - INTERFERING LETTERS TAPE FEED - OUT (Figures 1-36, 1-37 and 4-60) - The non-interfering letters tape feed-out mechanism provides a means of feeding a predetermined length (up to 18 inches) of "letters" perforated tape at the end of message by remote control. The letters tape feed-out operation can be initiated by means of the TAPE FEED-OUT button on the control panel of the LBAC225BR or LBAC254BR or LBAC260BR cabinet following a one second time delay at the end of message. The feed-out is adjustable in steps of 0.6 inch. If a message is received during any part of a tape feed-out cycle, the mechanism will stop and the incoming message will be received without interference. A non-repeat latch prevents successive tape feed-out operations from being initiated until the first feed-out sequence has been completed. At the end of a feed-out cycle the mechanism stops and remains inactive until the operator starts another cycle.

(a) INITIATION MECHANISM - The feed-out operation is initiated by a pulse (120 volt D. C. ± 10% with 2000 ohms series resistance) from a tape feed-out button. The pulse is applied to a feed-out magnet when the typing reperforator is in an idling condition. When the magnet is energized, the armature bail moves the blocking bail out of engagement with the drive bail assembly. The drive bail, which is spring loaded, falls into the indent of its cam and the connecting link positions the release lever on the lower step of the latch lever. If the start magnet is held energized longer than one cycle the non-repeat latch prevents the drive bail from again falling into the indent of its cam. The non-repeat latch is delayed one cycle by the spring loaded blocking latch on the drive bail. As the drive bail reaches the indent of its cam the blocking latch rides over the non-repeat latch. The drive bail then reaches the high part of its cam and the non-repeat latch falls into engagement with the drive bail. When the start magnet is de-energized the spring loaded blocking bail again engages the drive bail and simultaneously disengages the non-repeat latch.

(b) METERING MECHANISM - When the drive bail positions the release levers on the lower step of the latch lever as described above, metering takes place. The release lever has now permitted the check pawl and feed pawl to engage two adjacent ratchets. One of the ratchets is fed continually by the feed pawl. This ratchet has a deeper notch at every sixth tooth so that the pawl engages the second ratchet on every sixth feed cycle. After the second ratchet has rotated an amount equivalent to two teeth, a follower riding a cam attached to the ratchet drops off its peak unblocking the tripping mechanism. After a predetermined length of tape has been fed as measured by the second ratchet, the latch lever is actuated as it would be by the selector cam on receipt of a message, and the tripping mechanism is blocked preventing further feeding. Simultaneously, the feed pawls are lifted off the ratchets and the ratchets return to their zero position.

(c) TRIPPING MECHANISM - A bail that follows a cam attached to the reperforator main shaft engages the clutch trip lever and punch slide latches. When the bail cam follower enters the detent of its cam the bail operates the function clutch trip lever and punch slide latches initiating a "letters" cycle of the punch. Each time the reperforator main shaft rotates one revolution a letter cycle is initiated, provided the bail is not blocked by the latch lever. If an incoming message trips the latch lever, the letters punching cycle is immediately blocked from any further operation.

(d) STORAGE MECHANISM - The purpose of the storage mechanism is to hold the reset bail in engagement with the slides until the slides are fully reset so that they may recognize the first character set up in the punch slide latches by the selector. This mechanism consists of a latch that is operated by a link attached to the punch slide reset bail toggle. During reception of an incoming message, the toggle mechanism pushes the latch out of the way of the reset bail prior to its being stripped by the clutch trip lever.

c. LMRB203BZ MULTIPLE BASE - This base is identical to the base used in the Model 28 Monitor Group to mount three LPR37BWA typing reperforators instead of three LPR35 BWA typing reperforators. For information concerning physical description, electrical facilities, and reperforator mounting refer to Paragraph 4-5.c.

(1) The LMRB207BZ base is similar to the LMRB203BZ base described above except it has a separate power connector and an extra terminal board. Three LPR35BRP Typing Reperforators mount on this base.

d. LMU14 GOVERNED MOTOR UNIT (Figure 1-39) - The series governed motor is for use with single phase, 115 volt AC (plus or minus 10 per cent) at a frequency of 50 to 60 cycles per second.

(1) Motor Unit LMU14 is a 1/15 horsepower, 3600 RPM ball bearing motor which depends on an electromechanical governor for its speed regulation. The armature is wired in series with two field windings, and the governor contacts. A 250 ohm, 40 watt resistor and 0.5 mfd capacitor are connected in parallel with the governor contacts. When the contacts are closed, the resistor is shorted out. When the contacts are open, the resistor is in series with the motor to limit it operating current and reduce its speed. The capacitor serves as a spark suppressor for the governor contacts. Normal starting current is 4.0 amperes, running current 2.9 amperes, and rated torque 18.7 ounce inches.

(2) The combination fan and governor is mounted on one end of the motor shaft. The fan draws cooling air through the motor housing which also serves as a mounting plate for the governor slip rings and for the governor contact mechanism (mounted on opposite sides of the fan). Connections to the two slip rings, which are wired to the governor contacts, are made by means of two brushes mounted on the ends of the motor housing. Normally the governor contact spring holds the governor contact against the contact screw. When the motor shaft exceeds a predetermined speed, the centrifugal force developed on the governor contact briefly overcomes the pull of the governor spring, and the governor contact leaves the contact screw until the motor slows down. The tension on the contact spring may be adjusted to maintain the motor speed at 3600 RPM.

(3) Means are provided to compare the motor speed with a standard when making the contact spring tension adjustment. An aluminum cover fits against the side of the fan and encloses the governor contact mechanism. The outside of the cover is finished in white, with four black stripes equally spaced about its periphery. This serves as a target and should appear to stand almost still at 3600 RPM, when viewed through the moving shutter of 120 vibrations per second tuning fork.

NOTE

The six spot target and thirty-five spot rows serve as targets when using an 87.6 cps tuning fork. The six spot target is used to approach an on-speed setting, and the thirty-five spot is used to arrive at an accurate setting.

(4) The two motor brushes are protected by 0.5 mfd capacitors connected between the brushes and the grounded frame of the motor. These tend to by-pass any electrical noise created by the brushes as they make and break contact with the various segments of the armature commutator. The motor is wired in such a manner that the armature rotates counterclockwise when viewed from the governor end.

(5) The method of mounting the series motor is similar to the method of mounting the synchronous motor. Refer to Paragraph 2-4.c.(2)(c). The housing provided on the underside of the mounting bracket contains both the 250 ohm resistor and 0.5 mfd capacitor in the governor circuit, as well as an electrical noise suppressor.

(6) The purpose of the electrical noise suppressor in the motor input circuit is to prevent any radio interference which may be generated by the motor from being radiated by the motor power leads. To prevent this disturbance from being radiated directly from any of the motor components or wiring, the entire AC motor is enclosed by grounded metal housings with screened openings. The screening permits the circulation of cooling air through the motor and across the governor resistor. It also permits the target to be viewed when checking the motor speed. A threaded plug in the governor shield housing may be removed to permit the insertion of a screwdriver for adjustment of the motor speed. Access to the compartment on the underside of the motor may be gained by removing a screw and lock washer and sliding the bottom cover plate aside.

NOTE

If in place of an LMU14 governed motor a LMU12 synchronous motor is used, refer to Paragraph 4-5.d. for information, and 4-3.e(2) for operating theory on the LMU12 synchronous motor.

(7) Motor Unit LMU39 is similar to the LMU14 motor unit except the motor cradle has been redesigned to improve heat transfer from the governor resistor to associated mounting base. The governor resistor is mounted to an aluminum plate with bracket which acts as a heat sink to dissipate the heat generated. Some of this heat is transferred into the base to which the motor is mounted for further dissipation.

e. LBAC225BR UNIVERSAL CABINET (Figure 1-40)

(1) GENERAL - The LBAC225BR Universal Cabinet provides mounting facilities for two Multiple Typing Reperforator Sets, and electrical control facilities to operate the sets (Figures 4-61 and 4-62). The cabinet consists of separate inner and outer structures to minimize the transmission of mechanical noise to the outer shell by the apparatus. All equipment mounts on the inner structure, the outer shell serving as a dust and noise enclosure. Each reperforator set is mounted on slide rails so that the sets may be withdrawn from the front of the cabinet for servicing and maintenance. A raceway is provided at the bottom rear of the cabinet to contain station cabling. The raceway may be fastened in place from inside the cabinet for "against the wall" applications. Provisions for grounding the various units to the cabinet and for attaching an external ground to the cabinet are provided.

(2) DOORS AND PANELS

(a) DOORS - Four doors are provided on the cabinet, two at the rear and two in front. The rear doors are all metal, extend the full height of the cabinet, and allow access to the reperforator sets and the electrical control rack (Figure 4-62). The front doors, also full height, have six slots which provide an exit for perforated tape from the LPR35BWA reperforators (Figure 1-4). Above each slot is a card holder (Figure 1-40) to provide a means for reperforator identification. At the top of the front doors are two cutouts to allow access to the control panel when the doors are closed. Six spring type tape holders are mounted on the doors to hold message tapes (torn from the incoming tape) for retransmission. At the bottom of each door is a bin to catch and temporarily store incoming tape.

(b) PANELS - Immediately above the front doors is a sloping panel extending back toward the cabinet dome. The sloped surface makes a convenient writing surface for the operator, and is provided with six paper or tape clip type holders (Figure 1-40). Although side panels are supplied with the cabinet, they may or may not be used depending on the equipment arrangement in a given location. It is possible to mount a series of LBAC225BR cabinets (or a combination of similar cabinets such as LBAC 222, 223, 224, 225) side by side, end enclosures being used on the outside cabinets only.

(3) DOME - At the top rear of the cabinet, immediately behind the tape clips, is a hinged cabinet dome. When opened, the dome provides access to the electrical control rack.

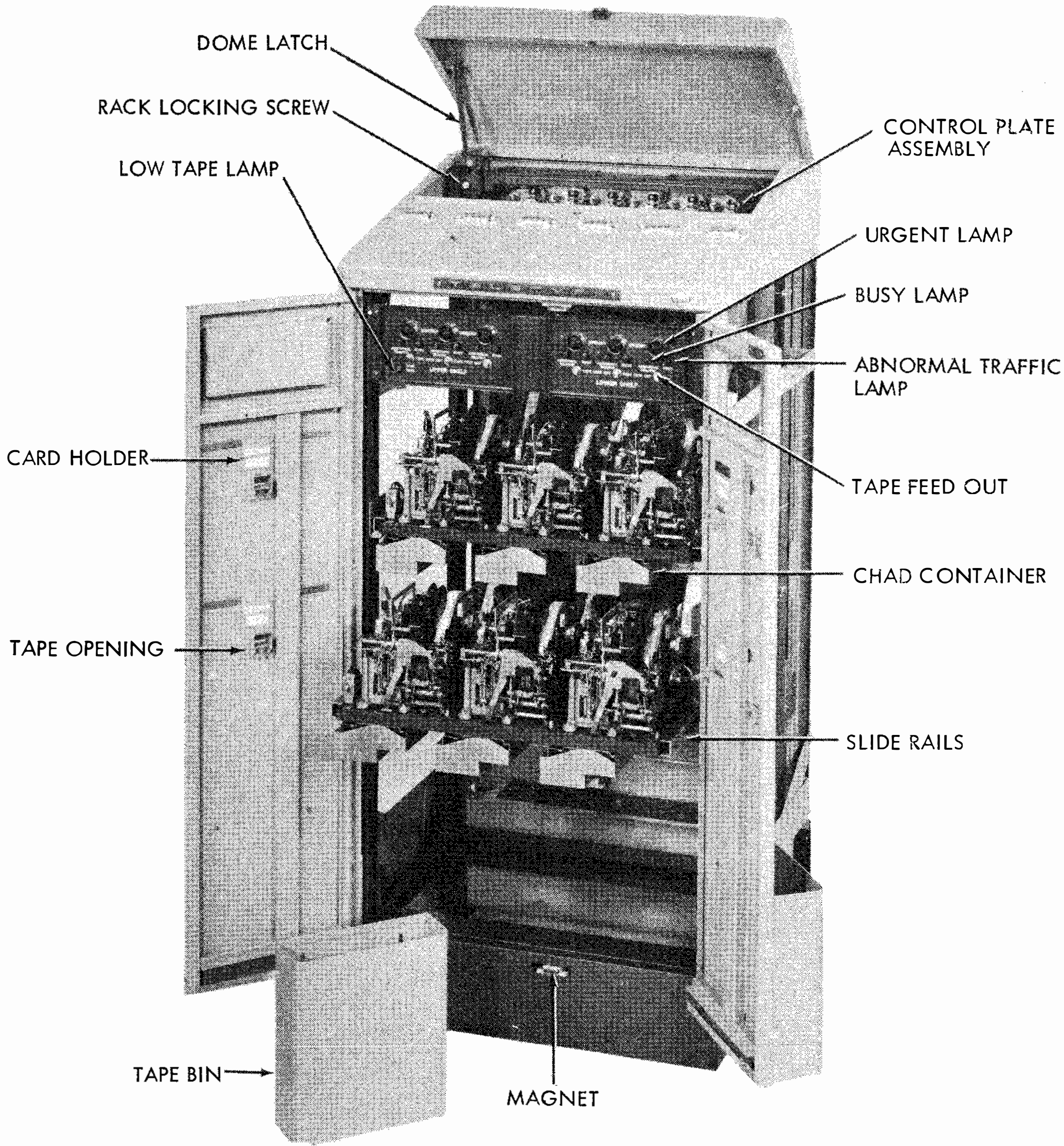

Figure 4-61. Model 28 Typing Reperforator Receiving Group (Doors and Dome Open)

The dome is hinged across the full length of the cabinet back, and is held in the closed position by means of a captive screw located at the top center of the sloping panel (Figure 4-61). The screw is accessible when the front doors are opened. A locking slide support, located at the left rear corner of the cabinet, holds the dome opened.

(4) ELECTRICAL CONTROL RACK

(a) GENERAL - The electrical control rack for the LBAC225BR cabinet is almost identical to that for the LBAC224BR cabinet used in the Model 28 Monitor Group. For information concerning physical mounting features, electronic keyer operations, TAPE-OUT alarm operation, and D.C. power supply facilities refer to Paragraph 4-5.f.(4).

(b) ALARM AND CONTROL CIRCUITS

(1) The front control panel is divided into an UPPER SHELF and LOWER SHELF section, and provides mounting facilities for six red URGENT lamps, six ABNORMAL TRAFFIC amber neon lamps, six BUSY amber neon lamps, six TAPE FEED-OUT switches, and one LOW TAPE neon alarm lamp (see Figure 4-61). Wir-

ing for the ABNORMAL TRAFFIC, BUSY, and URGENT lamps is brought to a common terminal board. Connections beyond this point are completed by the customer.

(2) Each TAPE FEED-OUT switch is wired in series with a tape feed out magnet on the reperforators. The six "switch-magnet" series circuits are then wired in parallel across the 120 volt D.C. line. On either section of the control panel the left button operates the left reperforator, the center button operates the center reperforator, and the right reperforator is operated by the right button.

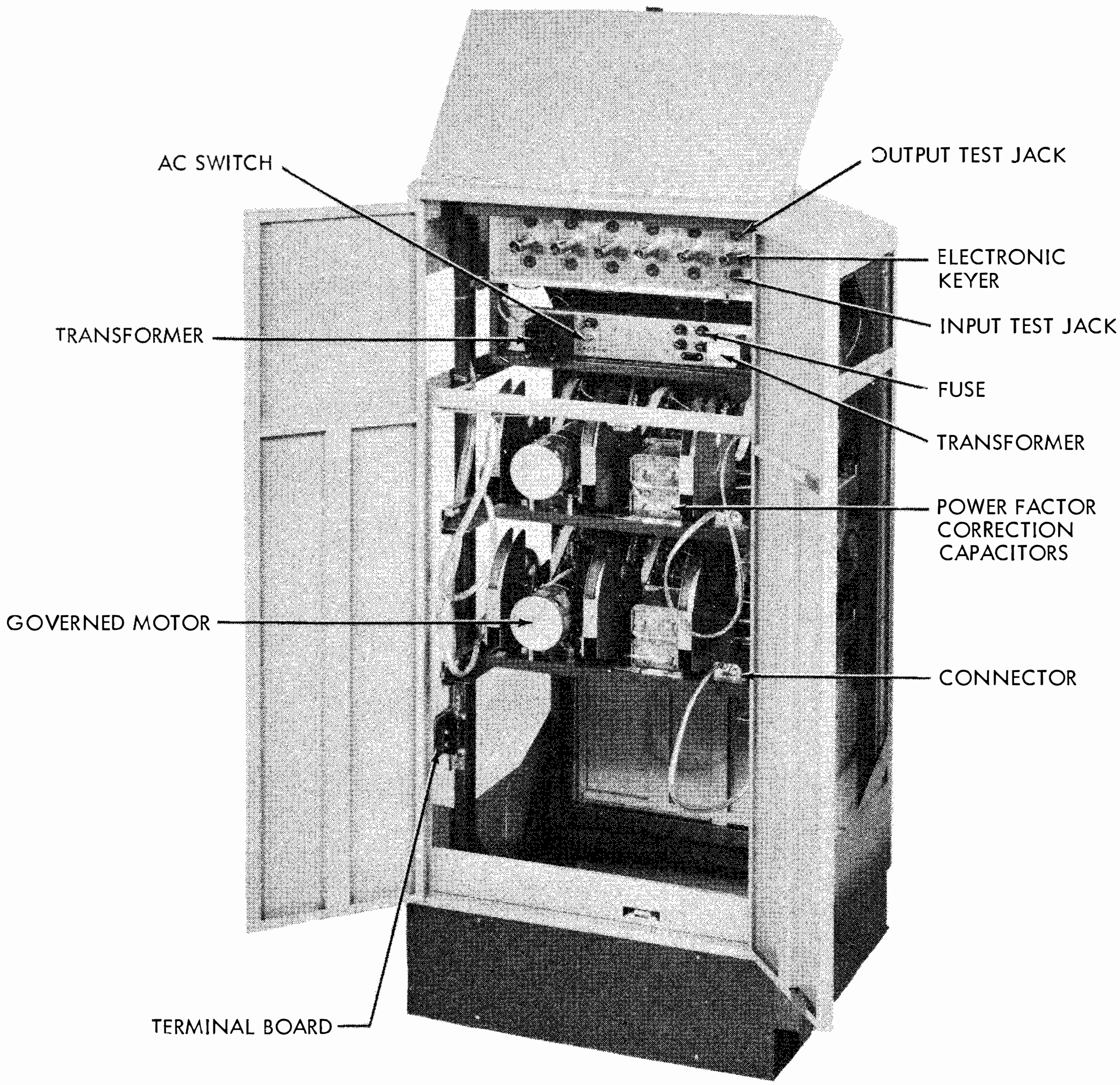

Figure 4-62. Model 28 Typing Reperforator Receiving Group (Rear Doors Open)

f. LBAC254BR UNIVERSAL CABINET

(1) GENERAL - The receiving cabinet provides mounting facilities for two multiple typing reperforator sets and the electrical control facilities to operate the sets. The cabinet consists of separate inner and outer structures to minimize the transmission of mechanical noise to the outer shell by the apparatus. All equipment mounts on the inner structures, the outer shell serving as a dust and noise enclosure. Each reperforator is mounted on slide rails so that the sets may be withdrawn from the front of the cabinet for servicing and maintenance. A raceway is provided at the bottom rear of the cabinet to contain station cabling. The raceway may be fastened in place from inside the cabinet for "against the wall" applications. Provisions for grounding the various units to the cabinet and for attaching an external ground to the cabinet are provided.

(2) DOORS, PANELS, AND DRAWERS

(a) DOORS - Four doors are provided on the cabinet, two at the rear and two in front. The rear doors are all metal, extend the full length of the cabinet, and allow access to the typing reperforators and electrical control rack. The front doors, located below the reperforator drawers, allow access to a storage area and provide a mounting surface for two tape bins. A recessed handle is provided on each right hand door to facilitate opening. Magnetic catches serve to hold each pair of doors closed.

(b) END ENCLOSURES - Refer to Paragraph 4-6.e.(2)(b).

(c) FRONT CONTROL PANEL - The front control panel mounts six "URGENT" incandescent lamps, six "ABNORMAL TRAFFIC" amber neon lamps, six "BUSY" amber neon lamps, six "TAPE FEED-OUT" pushbutton switches and a "LOW TAPE" clear neon lamp. It also mounts forty screw terminals marked as the "T" terminal strip for the customers use in wiring to the lamps just mentioned.

(d) DOME - Refer to Paragraph 4-6.e.(3).

(e) TYPING REPERFORATOR DRAWER FRONT ENCLOSURE - Each typing reperforator set is mounted in a drawer assembly which pulls forward to permit access to the reperforators for servicing. To remove the front panel assembly from the drawer, grasp the two vertical handles near the top and push the spring loaded thumb screws above each handle in (use thumbs to push screws). Holding the thumb screws in, simultaneously pull forward and lift up on the handles to clear the four guides from their respective slots on the right and left brackets. When fully perforated tape typing reperforators are used, the hinged door below the front panel assembly provides access to the chad containers mounted below the multiple base.

(3) ELECTRICAL CONTROL FACILITIES

(a) GENERAL - Located at the rear of the cabinet on an electrical control rack are the electrical control facilities to operate the typing reperforators. The electrical control rack mounts on a swivel mechanism, and can be rotated to a horizontal position for maintenance purposes when the dome is opened. Captive screws are provided to secure the rack in a horizontal or vertical position. Mounted on the control rack are fuses, an AC power switch, convenience receptacle, selector magnet drivers for control of the reperforator signal circuits and terminal board facilities for cabinet wiring. See Volume 3 of this manual for the actual and schematic wiring diagram of the signal line and power circuits.

g. The LBAC260BR Cabinet has six double tube 309863 Voltage Input Selector Magnet Driver Assemblies, one for each typing reperforator, power supplies, control switches, lamps, and provides wiring and electrical control facilities to operate two Model 28 Multiple Typing Reperforator Sets. The cabinet provides shielded selector magnet leads, and shielded leads for the input signal. The shields of the leads are connected together and grounded to the negative side of the DC power supply. The shield and power supply ground are separate from the cabinet or AC ground. The AC power circuits, the control and signal circuits are run in separate cable as much as is practicable.

(1) The power input required is 115 Volts AC plus or minus 10 per cent 60 cycle only power input. The input signal for the reperforator shall be mark -1 to -6 volts and space zero volts. The selector magnet driver is a high input impedance device limiting the current drain on the signal line to approximately 12 microamperes per driver. The signal shall be 7.00 unit code at speeds up to 107 words per minute (642 operations per minute).

(2) The control plate assembly mounts on the 19 inch relay rack assembly in the upper rear portion of the cabinet. It provides a rectifier for the local selector magnet current and tube biasing current for the selector magnet drivers, two filament transformers to provide tube filament current for the selector magnet drivers, fuses for cabinet equipment, a main

AC power switch, and terminal blocks for interconnecting components.

(3) Six 309863 Selector Magnet Drivers are mounted on two 179551 Brackets mounted on the 19 inch relay rack in the upper rear portion of the cabinet.

(4) The control panel contains six "Abnormal Traffic" amber neon lamps, six "Urgent" incandescent lamps, six "Busy" amber neon lamps, a "Low Tape" clear neon lamp, and six "Tape Feed Out" switches. Power and controls for the lamps are to be supplied by the customer. Power for the tape feed circuit is also to be supplied by the customer (120 Volts DC). The tape out lamp is lighted when any of the six tape contacts on the reperforator bases closes.

(5) Refer to Paragraph 4-5.f.(7) for theory of operation, of the 309863 Voltage Input Selector Magnet Driver.

4-7. MODEL 28 TRANSMITTER DISTRIBUTOR RERUN CART GROUP

a. GENERAL - The Model 28 Rerun Cart Group is an electro-mechanical system designed to serve as an auxiliary means of retransmitting messages. The group consists of an LXD11 Transmitter Distributor mounted on an LXDB9 Base, and driven by an LMU4 Motor Unit (Figure 1-43). A LXDC200BR Cover Assembly covers the motor unit (Figure 1-44). The base sits on a LT200BR Table (Figure 1-45) which, in turn, sets on a 173861 Dolly (Figure 1-46).

b. LXD11 TRANSMITTER DISTRIBUTOR - The LXD11 Transmitter Distributor mounts on the LXDB9 Base, and receives its operating power from a drive shaft assembly driven through an intermediate and pinion gear arrangement by a LMU4 Motor Unit (see Figures 1-42 and 1-43). Signal and D.C. control facilities are furnished to the LXD11 through two male connector plugs and a three circuit plug which mate with their respective receptacles on the control panel of the LBAC224BR Cabinet (Model 28 Monitor Group). Both radio frequency filtering and arc suppressors are connected across the mark and space contacts of the signal generator. All signal leads are shielded, and all shielding is insulated from the equipment frame. For a discussion of the operating theory for this unit, refer to Paragraph 4-4.b.

c. LXDB9 BASE AND LXDC200BR COVER ASSEMBLY

(1) LXDB9 BASE

(a) The LXDB9 Base provides mounting facilities, motor driven power, and electrical facilities for an LXD11 Transmitter Distributor. Four rubber feet are attached to the corners of the base drip pan to prevent scratching the LT200BR Table top. The base mounts to the drip pan by means of three vibration mounts (see Figure 1-42). The intermediate drive shaft assembly is located on the cross plate under the gear guard. The operating speed of the LXD11 is determined by the intermediate and gear set used. Speeds of 106 WPM or 65 WPM (75 or 45.5 Baud) are possible.

(b) Signal, D.C. control, and A.C. power facilities are furnished to the base via three 8 foot electrical cable assemblies. The cable wiring terminates at two 9 point terminal blocks mounted on the base. An ON-OFF motor power switch is located along side the terminal blocks. Further cabling connects the terminal blocks with a 36 point connector to furnish the LXD11 with signal and control facilities (see Figure 1-42).

(c) The opposite ends of the three cable assemblies terminate in two male connector plugs and a 3-circuit plug. When mated with their respective receptacles on the LBAC224BR Cabinet (Model 28 Monitor Group), the two male connectors furnish 110 volt A.C. and 120 volt D.C. to the LXDB9 Base. The 3-circuit plug provides the LXD11 with a signal line on which to transmit (if its mating plug is properly wired).

(2) LXDC200BR COVER ASSEMBLY- The LXDC200BR Cover Assembly provides a dust and noise enclosure for both the motor unit and LXD11. The cover assembly is furnished in two pieces. One piece, a five sided cover with a cutout for gear clearance (Figure 1-44), fits over the motor unit and gear guard and is held in position on the base by means of four cover guides. The second piece, a three sided cover, snaps in place around the LXD11 Transmitter Distributor.

d. LMU4 GOVERNED MOTOR UNIT - The LMU4 Motor Unit is similar in electrical and mechanical design to the LMU14, but is rated at 1/20 horsepower. Normal starting current is 2.0 amperes, running current 1.6 amperes, and rated torque 14.0 ounce inches. For operating theory of this unit, refer to Paragraph 4-6.d.

(1) Motor Unit LMU41 is similar to the LMU4 motor unit except the motor cradle has been redesigned to improve heat transfer from the governor resistor to associated mounting base. The governor resistor is mounted to an aluminum plate with bracket which acts as a

heat sink to dissipate the heat generated. Some of this heat is transferred into the base to which the motor is mounted for further dissipation.

NOTE

If in place of an LMU4 governed motor, a LMU3 synchronous motor is used, refer to Paragraph 4-4.f. for information, and 4-3.e.(2) for operating theory on the LMU3 synchronous motor.

e. LT200BR TABLE AND 173861 DOLLY

(1) LT200BR Table (Figure 1-45) - The function of the LT200BR Table is to provide mounting facilities for the LXD11 Transmitter Distributor and LMU4 Motor Unit on the LXDB9 Base. A 2-1/2" cable entry hole is located near the rear and slightly to the left of center of the top. The table top is all linoleum, and has a stainless steel moulding to protect the linoleum edges. The lower compartment is provided to house associated equipment or accessories. A door covers the compartment and is held in closed position by quarter-turn fasteners.

(2) 173861 Dolly (Figure 1-46) - The 173861 Dolly is, basically, a frame of welded rectangular steel tube construction. Four rubber wheeled casters, one at each corner, make the unit mobile. Four brackets, one welded diagonally across each corner, serve to support a LT200BR Table which recesses down into the frame and rests on the brackets. When set on the dolly, the LT200BR Table is raised about 1-1/4" off the floor.

SECTION 5
ADJUSTMENTS AND LUBRICATION

5-1. INTRODUCTION

a. This section contains adjustments and lubrication information for the basic components of the five groups covered in this manual.

b. It is assumed that the elements depicted in the illustrations which appear throughout the bulletin are being viewed from a position in front of the equipment, unless the illustrations are specifically labeled otherwise. In the line drawings, pivot points are shown by circles or ellipses that are solid black to indicate fixed points and cross-hatched to indicate floating points. References in the text to "left" or "right" designate the viewers left or right as he faces the front of the equipment.

CAUTION

Improperly adjusted equipment may be seriously damaged in a matter of seconds if operated under power.

5-2. ADJUSTMENTS

a. GENERAL

(1) In the adjustments and spring tensions covered in this section, location of clearances, position of parts and point and angle of scale applications are illustrated by drawings. Requirements and procedures are set forth in the texts that accompany the drawings. The sequence of the adjustments is that which should be followed when complete readjustment of any of the components is undertaken. The letters of the alphabet in parenthesis which precede the texts indicate the sequence to be followed on the individual pages. A procedure should be read all the way through before making the adjustment or testing the spring tension.

(2) Tools required to make the adjustments and test the spring tensions are not supplied with the equipment, but are listed in Teletype Bulletin 1124B. If parts are removed, all adjustments which the removal of these parts might facilitate should be made before the parts are replaced. When a part mounted on shims is removed, the number of shims at each mounting screw should be noted so that identical pile ups can be made when the part is replaced. Unless it is specifically stated to the contrary, after an adjustment has been made, all nuts and screws that were loosened should be tightened.

(3) The spring tensions given in this bulletin are indications, not exact values, and should be checked with Teletype scales in the positions shown in the drawings. Springs which do not meet the requirements and for which there are no adjusting procedures should be discarded and replaced by new springs.

(4) All contact points should meet squarely. Smaller points should fall wholly within the circumference of larger mating points. Points that are the same size should not be out of alignment more than 25 percent of the point diameter. Avoid sharp kinks or bends in the contact springs.

b. MANUAL SELECTION OF CHARACTERS OR FUNCTIONS

(1) The viewer is facing the front of the typing reperforator unit when the selecting mechanism is on his right and the perforator mechanism is on his left. The unit is in its unoperated, or stop, condition when it is not under power and both clutches are disengaged. It is in idling condition when it is under power and the clutches are disengaged (steady marking of signal line). The unit is in the letters condition when the typewheel rack is in its upper position, the numerals appear on the top half of the typewheel and the letters push bar is in its extreme right position. The unit is in the figures condition when the typewheel rack is in its lower position, the letters appear on the top half of the typewheel and the figures push bar is in its extreme right position. The unit can be placed in the letters or figures condition by selecting the letters or figures code combinations (see paragraph (3) below).

(2) When fully disengaged, either of the two steel clutches on the typing reperforator unit are latched in their stop position between a trip lever (or stop arm), which bears against a shoe lever, and a latch lever which seats in a notch in a clutch cam disk. The main shaft will then turn freely without the clutch shoes dragging. When the clutch is engaged, or tripped, the shoe lever and a cam disk stop lug are moved apart, and the clutch shoes are wedged against the drum so that the clutch turns in unison with the shaft.

NOTE

If the shaft is turned by hand, the clutch will not fully disengage upon reaching its stop position. Where a procedure calls for disengagement, rotate the clutch to its stop position, apply a screwdriver to the cam disk stop lug and turn the disk in the normal direction of shaft rotation until the latch lever seats in its notch in the disk.

(3) To Manually Operate the Typing Reperforator Unit. Attach an armature clip to the selecting mechanism as follows: carefully place the flat-formed portion of the clip over the armature between the pole pieces, lock the extruded projection under the armature and hook the clip's other end over the bakelite guard. The spring pressure of the clip will hold the armature in its marking (attracted) position. Rotate the main shaft counterclockwise until the clutches reach their stop position. Fully disengage the clutches as instructed in paragraph (2) above. Release the armature momentarily to allow the selecting clutch to engage. Turn the main shaft slowly until all push levers have fallen to the left of their selecting levers. Strip the push levers corresponding to the spacing elements of the code combination to be processed from their selecting levers and allow them to move to the right. The push levers and selecting levers are numbered in succession 1 to 5 from rear to front. The main shaft can then be rotated until the required condition is set up or the character or function to be selected is cleared through the unit.

(4) TRANSMITTER DISTRIBUTOR

(a) When rotating either the sensing or distributor shaft by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve the drag on the clutch and permit the main shaft to rotate freely, apply pressure on a lug of the clutch disk with a screwdriver to cause it to engage its latch lever and thus disengage the internal expansion clutch shoes from dragging on the clutch drum.

(b) When the requirement calls for the clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latch lever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum.

(c) Covers may be removed for inspection and minor repair of the unit, however, when more extensive maintenance is to be undertaken, it is recommended that the unit be removed from its sub-base to disconnect the power and to permit the unit to be inverted.

(d) All contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25% of the contact diameter. Avoid sharp kinks or bends in the contact springs.

c. ALPHABETICAL INDEX: ADJUSTMENTS AND SPRING TENSIONS

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TRANSMITTER DISTRIBUTOR BASE (LXDB) (PARAGRAPH 5-2.l.)

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d. TYPING REPERFORATOR UNIT

NOTE
TO FACILITATE ADJUSTMENTS, REMOVE TYPING REPERFORATOR FROM BASE

NOTE
FOLLOWING ADJUSTMENTS PERTAIN TO LPR34BWA, LPR35BWA, AND LPR37BWA, TYPING REPERFORATORS UNLESS OTHERWISE SPECIFIED.

CLUTCH SHOE LEVER

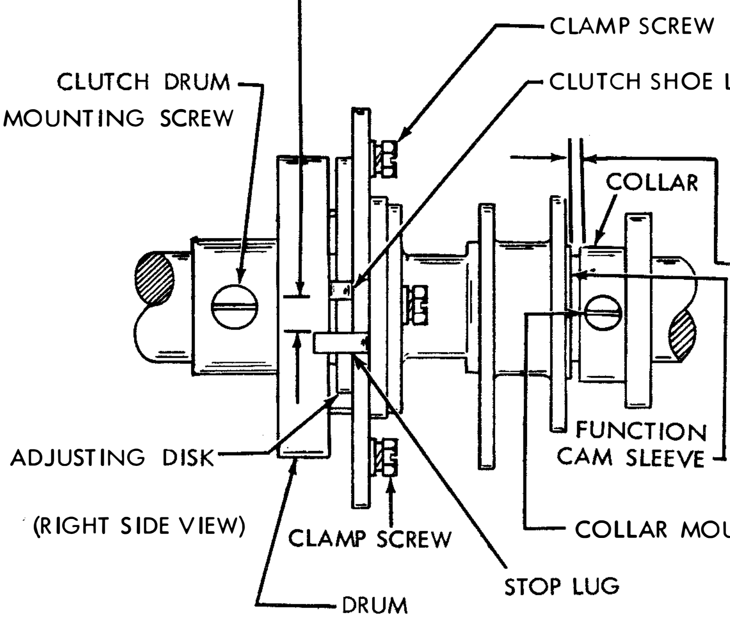
TO CHECK
(1) DISENGAGE CLUTCH. MEASURE CLEARANCE.
(2) ALIGN HEAD OF CLUTCH DRUM MOUNTING SCREW WITH STOP LUG. ENGAGE CLUTCH. MANUALLY PRESS SHOE LEVER AND STOP LUG TOGETHER AND ALLOW TO SNAP APART. MEASURE CLEARANCE.

REQUIREMENT
CLEARANCE BETWEEN SHOE LEVER AND STOP LUG:
MIN. 0.055 INCH----MAX. 0.085 INCH
GREATER WHEN CLUTCH ENGAGED (2) THAN WHEN DISENGAGED (1).

TO ADJUST
ENGAGE WRENCH OR SCREWDRIVER WITH LUG ON ADJUSTING DISK. ROTATE DISK WITH CLAMP SCREWS LOOSENED.

NOTE:
AFTER MAKING ADJUSTMENT, DISENGAGE CLUTCH. REMOVE DRUM MOUNTING SCREW. ROTATE DRUM IN NORMAL DIRECTION AND CHECK TO SEE IF IT DRAGS ON SHOE. IF IT DOES REFINE ADJUSTMENT.

THIS ADJUSTMENT SHOULD BE MADE FOR BOTH SELECTING AND FUNCTION CLUTCHES.



FUNCTION CLUTCH DRUM END PLAY

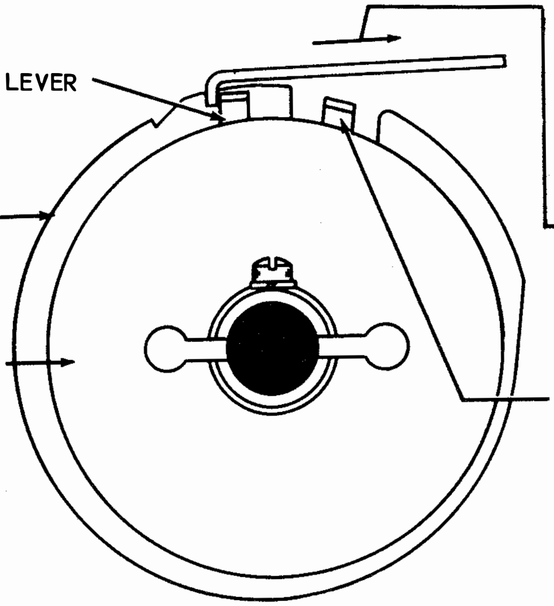
REQUIREMENT
WITH FUNCTION CLUTCH DISENGAGED:
MIN. SOME----MAX. 0.015 INCH,
WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MAXIMUM.

TO ADJUST
WITH ITS MOUNTING SCREW LOOSENED, MOVE DRUM TO EXTREME FRONT POSITION. TIGHTEN DRUM MOUNTING SCREW. POSITION COLLAR WITH MOUNTING SCREW LOOSENED.

(RIGHT SIDE VIEW)

Figure 5-1. Typing Reperforator, Selecting and Function Clutch Mechanisms

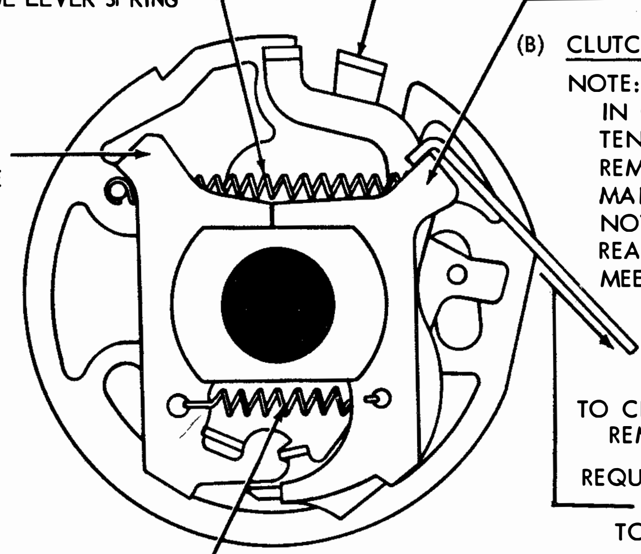
NOTE:
THESE SPRING TENSIONS APPLY TO BOTH CLUTCHES.



(A)
<u>CLUTCH SHOE LEVER SPRING</u>

TO CHECK
ENGAGE CLUTCH. HOLD CAM DISK TO PREVENT ITS TURNING.

REQUIREMENT
MIN. 15 OZS.----MAX. 20 OZS. TO PULL SHOE LEVER IN CONTACT WITH STOP LUG.



(B) <u>CLUTCH SHOE SPRING</u>

NOTE:
IN ORDER TO CHECK THIS SPRING TENSION, IT IS NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SHAFT. THEREFORE, IT SHOULD NOT BE CHECKED UNLESS THERE IS REASON TO BELIEVE IT WILL NOT MEET ITS REQUIREMENT.

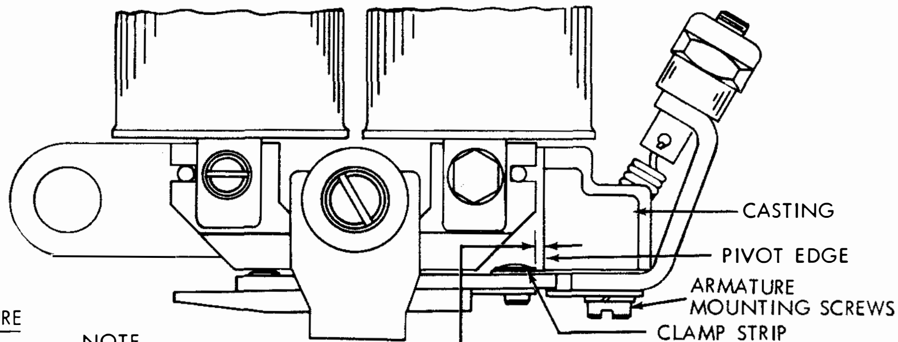
TO CHECK
REMOVE CLUTCH FROM DRUM.

REQUIREMENT
MIN. 3 OZS.------MAX. 5 OZS. TO START PRIMARY SHOE MOVING.

Figure 5-2. Typing Reperforator, Clutch Assemblies

NOTE

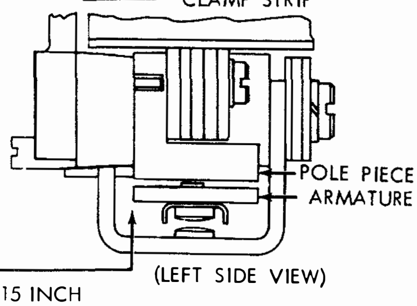
TO FACILITATE MAKING THE FOLLOWING ADJUSTMENTS, REMOVE THE RANGE FINDER AND SELECTOR MAGNET ASSEMBLIES. TO INSURE BETTER OPERATION, PULL A PIECE OF BOND PAPER BETWEEN THE ARMATURE AND THE POLE PIECES TO REMOVE ANY OIL OR FOREIGN MATTER THAT MAY BE PRESENT. MAKE CERTAIN THAT NO LINT OR PIECES OF PAPER REMAIN BETWEEN THE POLE PIECES AND ARMATURE.



SELECTOR ARMATURE

NOTE

THESE REQUIREMENTS NEED NOT BE MADE NOR CHECKED IF THE SELECTOR MAGNET BRACKET AND RECEIVING MARGIN REQUIREMENTS ARE MET.

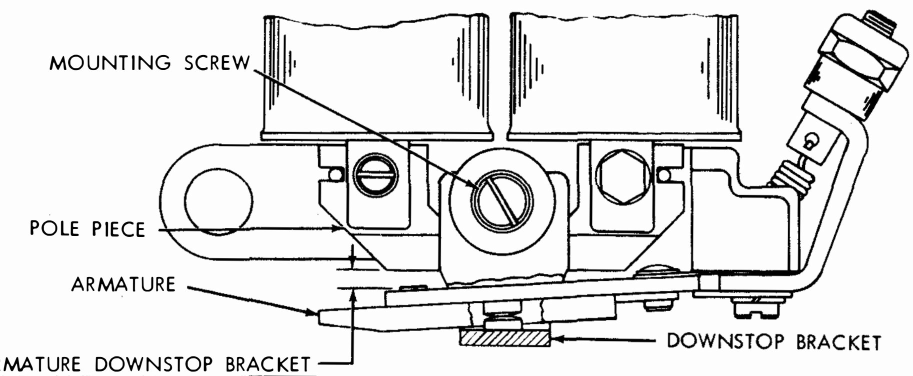


(1) REQUIREMENT
 CLEARANCE
 MIN. 0.025 INCH
 MAX. 0.045 INCH
 BETWEEN ARMATURE CLAMP STRIP AND MAGNET BRACKET CASTING.

(2) REQUIREMENT
 OUTER EDGE OF ARMATURE SHOULD BE FLUSH WITHIN 0.015 INCH WITH OUTER EDGE OF POLE PIECES.

(3) REQUIREMENT
 START LEVER SHALL DROP FREELY INTO ARMATURE EXTENSION SLOT.

TO ADJUST
 POSITION ARMATURE SPRING ADJUSTING NUT TO HOLD ARMATURE FIRMLY AGAINST PIVOT EDGE OF CASTING. POSITION ARMATURE WITH MOUNTING SCREWS LOOSENED.



SELECTOR ARMATURE DOWNSTOP BRACKET

REQUIREMENT
 REMOVE OIL SHIELD. WITH MAGNET DE-ENERGIZED, LOCK LEVERS ON HIGH PART OF THEIR CAM, AND ARMATURE RESTING AGAINST ITS DOWNSTOP, CLEARANCE BETWEEN END OF ARMATURE AND LEFT EDGE OF LEFT POLE PIECE.
 MIN. 0.025 INCH
 MAX. 0.030 INCH

TO ADJUST
 POSITION DOWNSTOP BRACKET WITH MOUNTING SCREW LOOSENED.

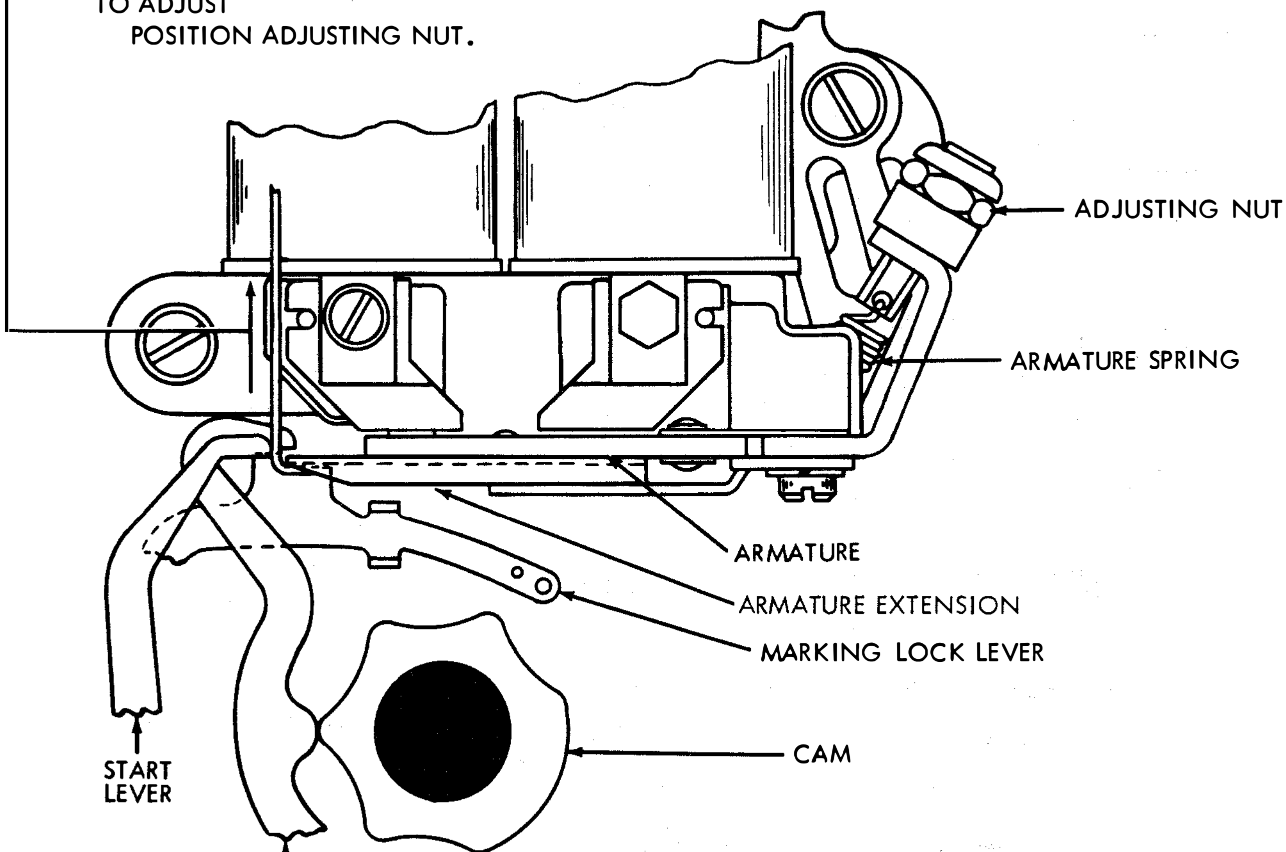
Figure 5-3. Typing Reperforator, Selector Armature

SELECTOR ARMATURE SPRING
(FOR UNITS EMPLOYING SELECTOR ARMATURE WITH SINGLE ANTI-FREEZE BUTTON ONLY).
REQUIREMENT (PRELIMINARY)
WITH LOCKING LEVERS AND START LEVER ON HIGH PART OF THEIR CAMS, SCALE APPLIED AS NEARLY VERTICAL AS POSSIBLE UNDER END OF ARMATURE EXTENSION. IT SHALL REQUIRE THE FOLLOWING TENSIONS TO MOVE ARMATURE TO MARKING POSITION:

0.035 AMPERES
MIN. 1-1/2 OZS. --- MAX. 2 OZS.

NOTE
THIS SPRING CAN BE ADJUSTED FOR MAXIMUM SELECTOR PERFORMANCE ONLY WHEN PRINTER IS CONNECTED TO THE SPECIFIC CIRCUIT OVER WHICH IT IS TO OPERATE UNDER SERVICE CONDITIONS. SINCE THERE ARE SEVERAL OPERATING SPEEDS AND SINCE CIRCUITS VARY WIDELY, IT IS IMPOSSIBLE TO ADJUST SPRING FOR MAXIMUM PERFORMANCE AT THE FACTORY. THE FOREGOING SPRING TENSION REQUIREMENT IS GIVEN TO PERMIT OPERATION PRIOR TO MEASUREMENT OF RECEIVING MARGINS. READJUSTMENT MADE TO OBTAIN SATISFACTORY RECEIVING MARGIN SHOULD NOT BE DISTURBED IN ORDER TO MEET REQUIREMENTS OF THIS ADJUSTMENT.

TO ADJUST
POSITION ADJUSTING NUT.



REQUIREMENT (FINAL)
SEE SELECTOR RECEIVING MARGIN ADJUSTMENT FIGURE 5-9.

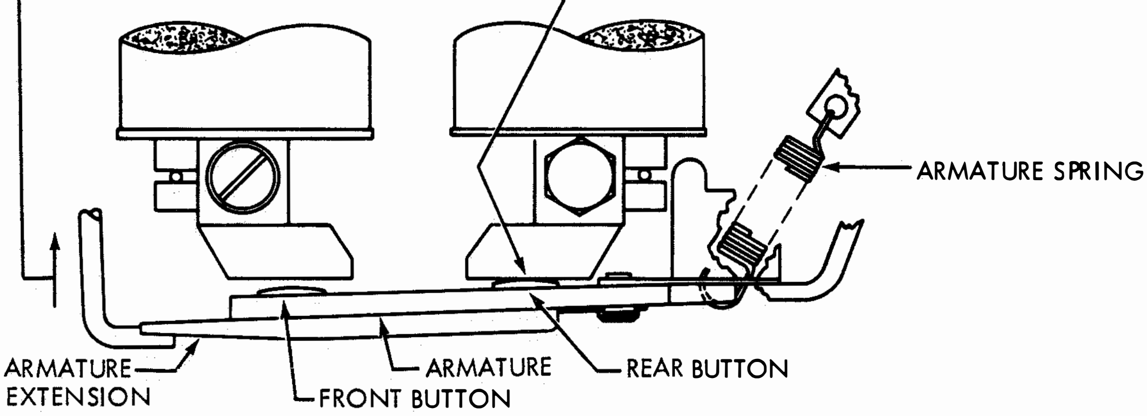
Figure 5-4. Typing Reperforator, Selector Spring Tensions

SELECTOR ARMATURE SPRING

(FOR UNITS EMPLOYING SELECTOR ARMATURE WITH TWO ANTI-FREEZE BUTTONS ONLY).
REQUIREMENT (PRELIMINARY)
WITH LOCKING LEVERS AND START LEVER ON HIGH PART OF THEIR CAMS, SCALE APPLIED AS NEARLY VERTICAL AS POSSIBLE UNDER END OF ARMATURE EXTENSION. IT SHALL REQUIRE APPROXIMATELY THE FOLLOWING TENSIONS TO MOVE THE REAR ANTI-FREEZE BUTTON AGAINST THE MAGNET CORE:

0.035 AMPERES
APPROXIMATELY 5/8 OZ.

TO ADJUST
POSITION ADJUSTING NUT.



SELECTOR ARMATURE SPRING
REQUIREMENT (FINAL)
WHEN A DISTORTION TEST SET IS AVAILABLE, THE SELECTOR ARMATURE SPRING TENSION SHOULD BE REFINED, IF NECESSARY, TO OBTAIN SATISFACTORY RECEIVING MARGINS. THE FRONT ANTI-FREEZE BUTTON MUST CONTACT THE MAGNET CORE WHEN THE MAGNET COILS ARE ENERGIZED.

(SEE SELECTOR RECEIVING MARGIN ADJUSTMENT FIGURE 5-9)

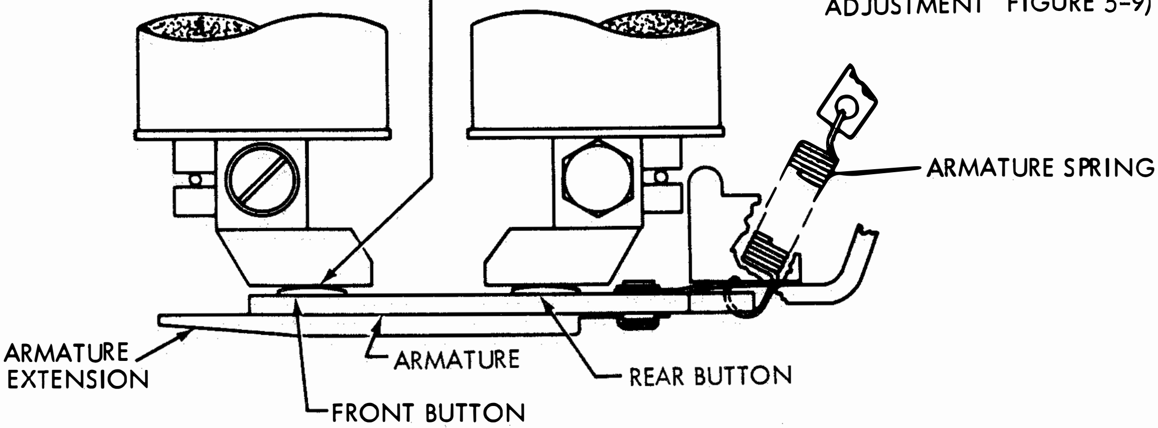
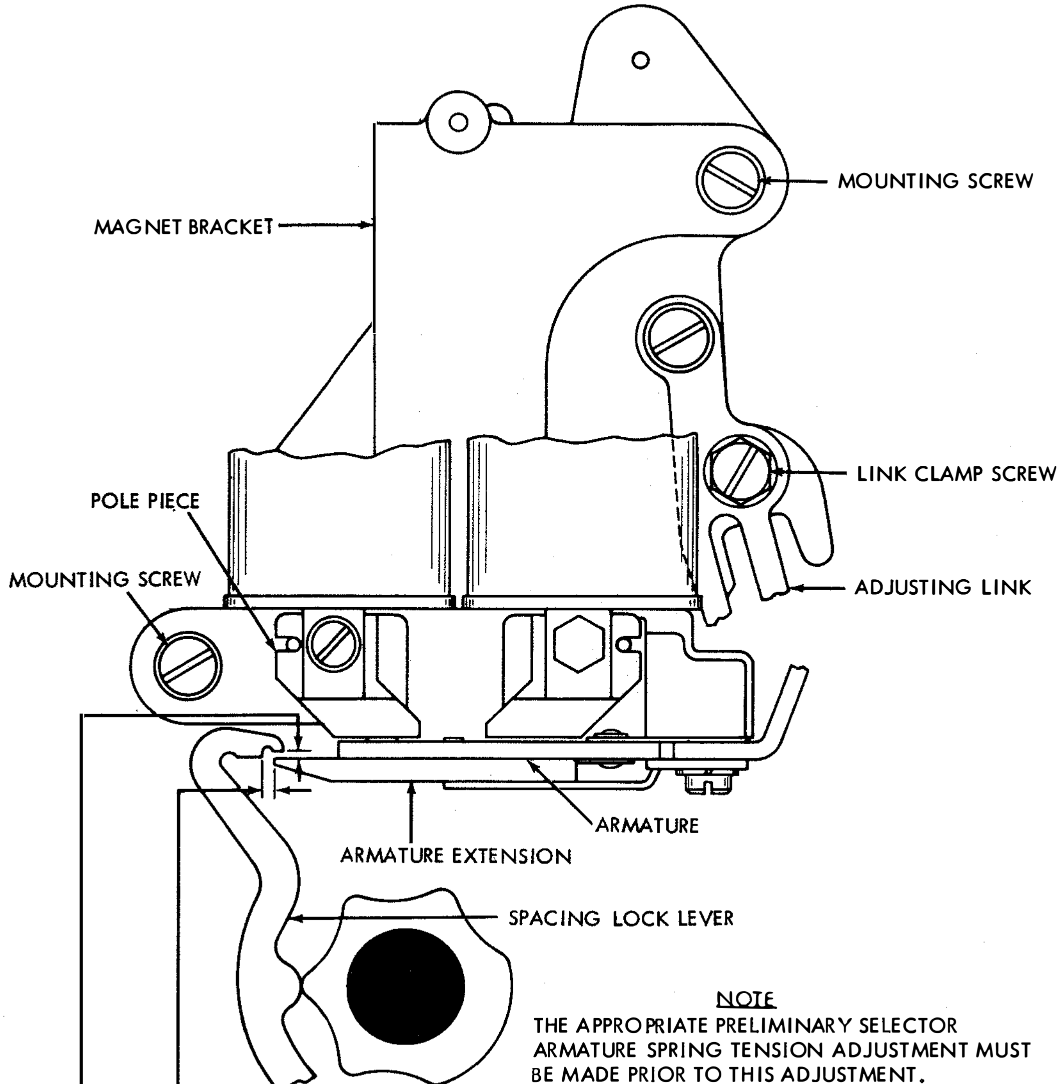


Figure 5-5. Typing Reperforator, Selector Spring Tensions



NOTE
THE APPROPRIATE PRELIMINARY SELECTOR ARMATURE SPRING TENSION ADJUSTMENT MUST BE MADE PRIOR TO THIS ADJUSTMENT.

SELECTOR MAGNET BRACKET

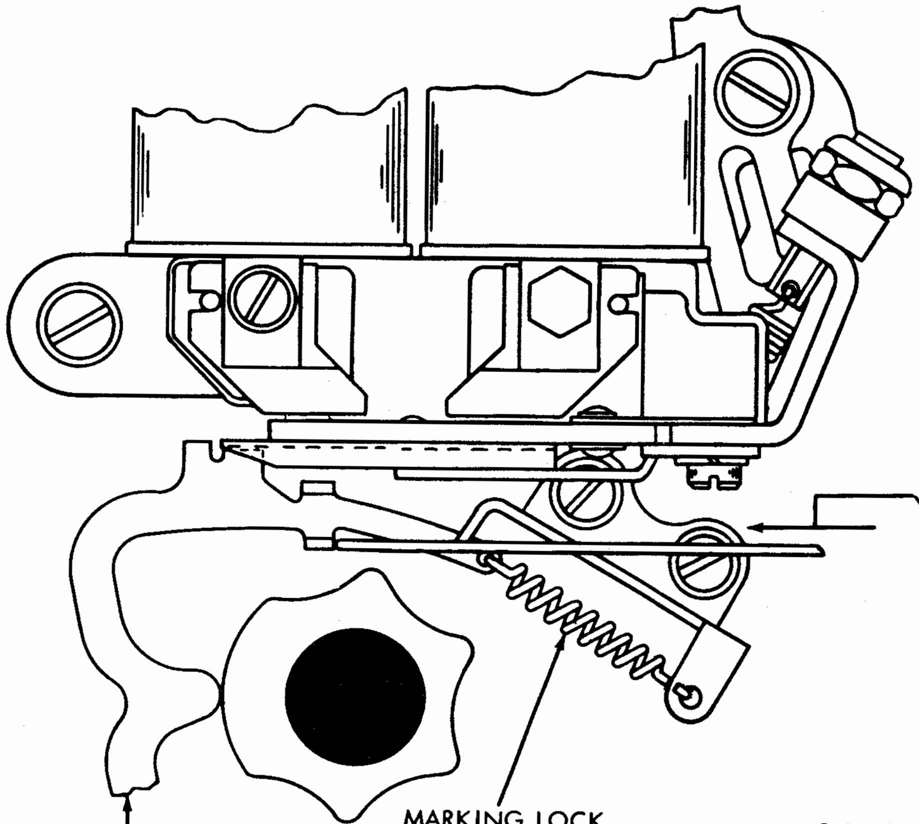
(1) REQUIREMENT
SPACING LOCK LEVER ON HIGH PART OF CAM.
ARMATURE IN CONTACT WITH POLE PIECE.
CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND SHOULDER ON SPACING LOCK LEVER.
MIN. 0.020 INCH
MAX. 0.035 INCH

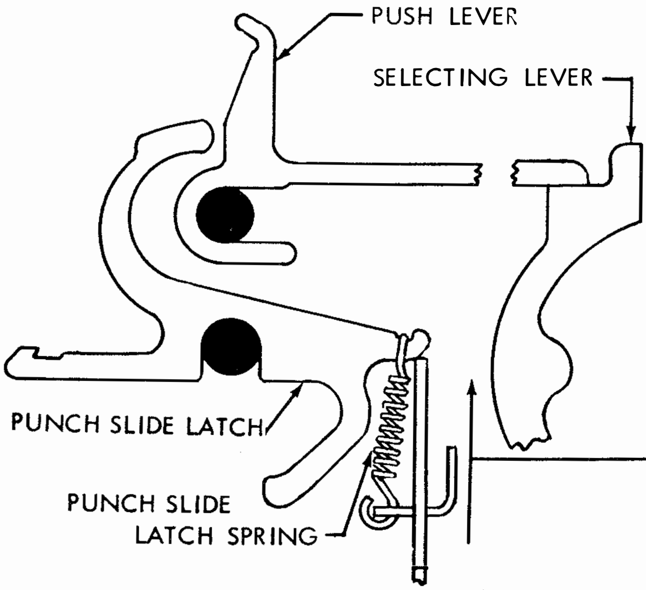
TO ADJUST
LOOSEN TWO MAGNET BRACKET MOUNTING SCREWS AND ADJUSTING LINK CLAMP SCREW. POSITION MAGNET BRACKET BY MEANS OF ADJUSTING LINK AND TIGHTEN LINK CLAMP SCREW ONLY.

(2) REQUIREMENT
SPACING LOCK LEVER ON HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. SOME CLEARANCE BETWEEN UPPER SURFACE OF ARMATURE EXTENSION AND LOWER SURFACE OF SPACING LOCK LEVER WHEN LOCK LEVER IS HELD DOWNWARD.
MAX. 0.003 INCH

TO ADJUST
POSITION UPPER END OF MAGNET BRACKET. TIGHTEN TWO MAGNET BRACKET MOUNTING SCREWS. RECHECK REQUIREMENT (1).

Figure 5-6. Typing Reperforator, Selector Magnet Bracket





MARKING LOCK LEVER SPRING

REQUIREMENT

LETTERS COMBINATION SELECTED, MAIN SHAFT ROTATED UNTIL SELECTOR CLUTCH IS DISENGAGED. PUSH SCALE APPLIED TO LOWER EXTENSION OF LOCK LEVER.
MIN. 1-1/2 OZS.
MAX. 3 OZS.
TO START LEVER MOVING.

PUNCH SLIDE LATCH SPRINGS

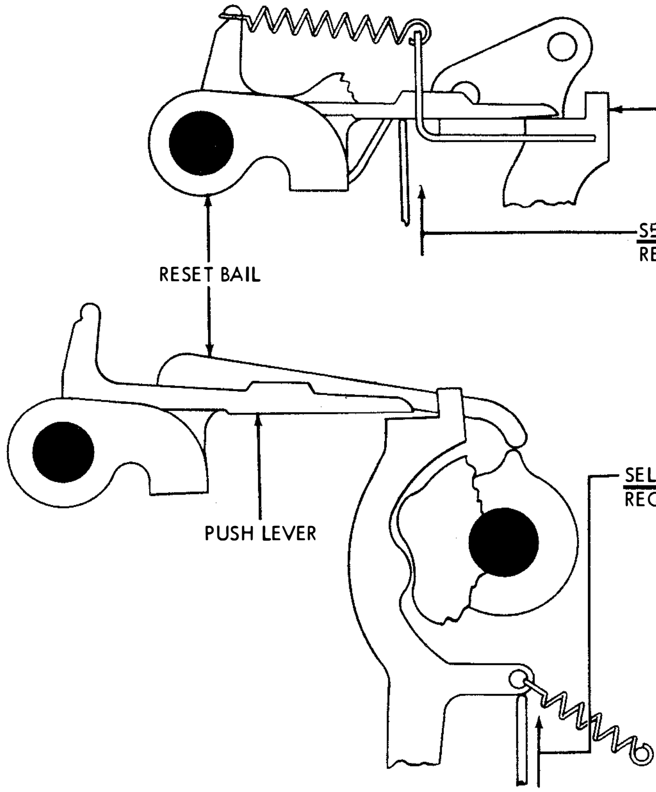
TO CHECK

SELECT LETTERS CODE COMBINATION (12345). POSITION ROCKER BAIL TO EXTREME LEFT. STRIP PUSH LEVERS FROM SELECTING LEVERS.

REQUIREMENT

MIN. 1-1/2 OZS. --- MAX. 3 OZS.
TO START LATCH MOVING.

Figure 5-6A. Typing Reperforator, Selector Spring Tension



SELECTOR PUSH LEVER SPRING

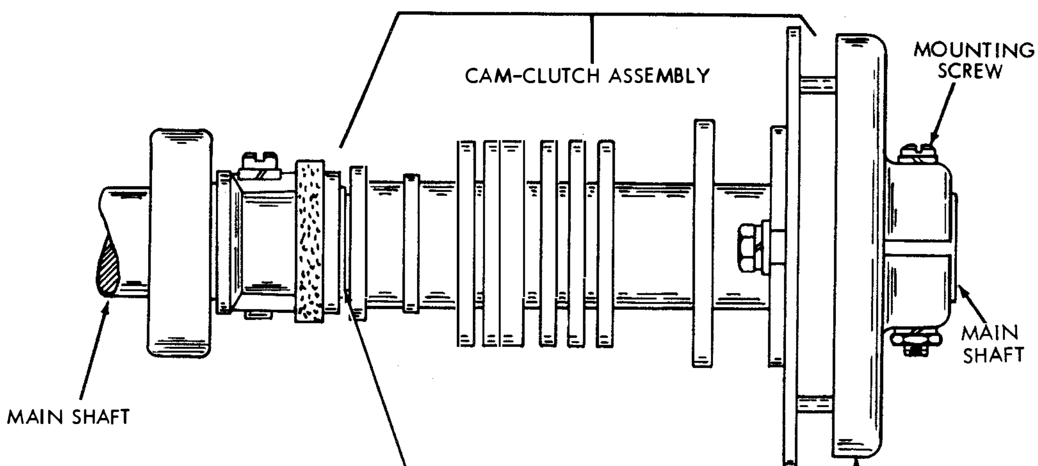
REQUIREMENT

PUSH LEVER IN SPACING POSITION
MIN. 3/4 OZ.
MAX. 1-1/2 OZS.
TO MOVE PUSH LEVER FROM SELECTOR LEVER. CHECK FIVE SPRINGS.

SELECTOR LEVER SPRING

REQUIREMENT

TYPING UNIT UPSIDE DOWN.
RESET BAIL ON PEAK OF ITS CAM.
MIN. 1-1/4 OZS.
MAX. 2-1/2 OZS.
TO START EACH LEVER MOVING.
CHECK FIVE SPRINGS. IF NECESSARY, UNHOOK START LEVER SPRING TO CHECK NO. 4 SELECTOR LEVER SPRING.



SELECTOR CLUTCH DRUM END PLAY

REQUIREMENT

CLUTCH LATCHED IN STOP POSITION. CLUTCH DRUM SHOULD BE AGAINST SHOULDER ON MAIN SHAFT.
MIN. SOME --- MAX. 0.010 INCH

TO ADJUST

POSITION CLUTCH DRUM WITH MOUNTING SCREW LOOSENED.

Figure 5-6B. Typing Reperforator, Selector Cam Clutch

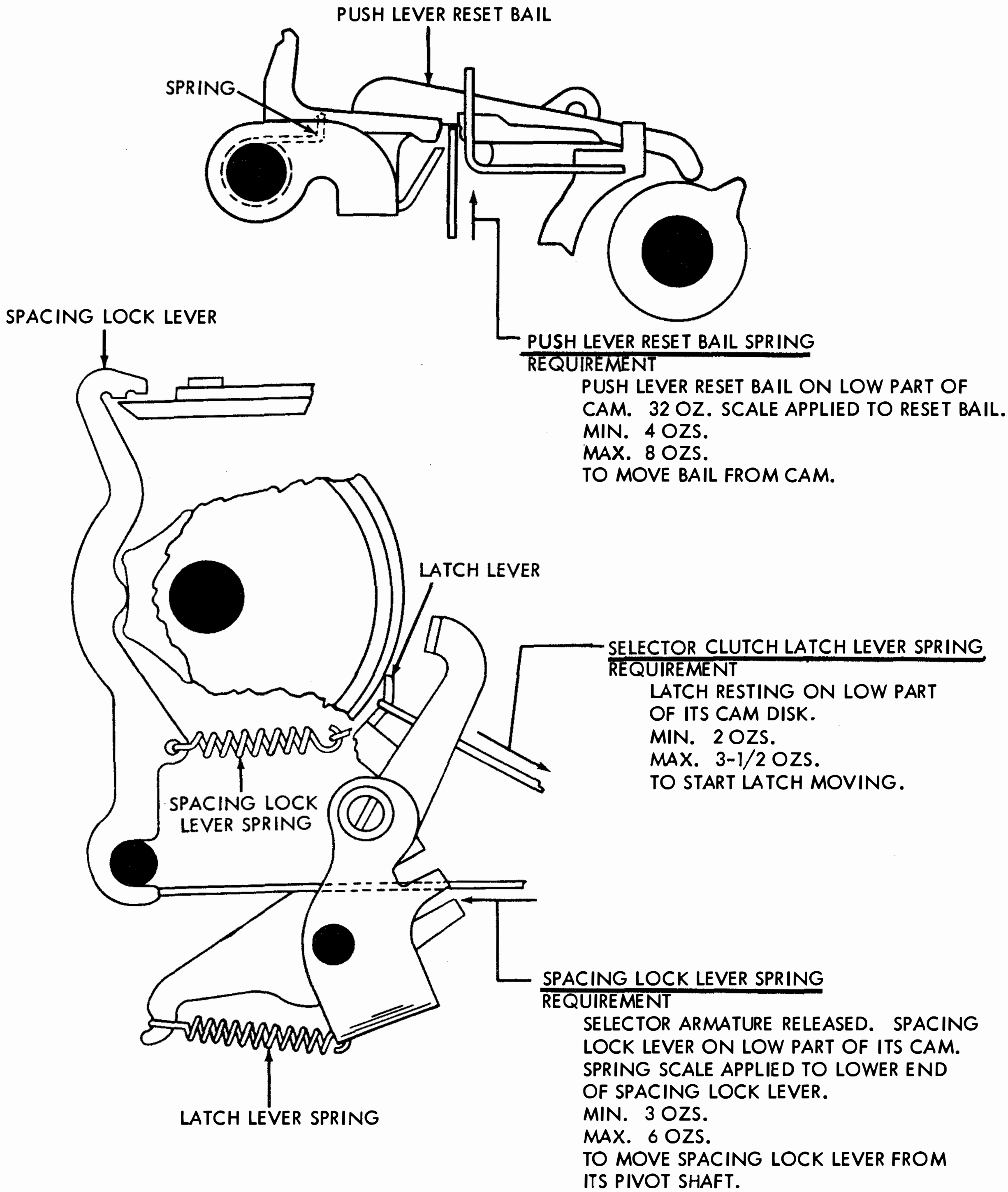
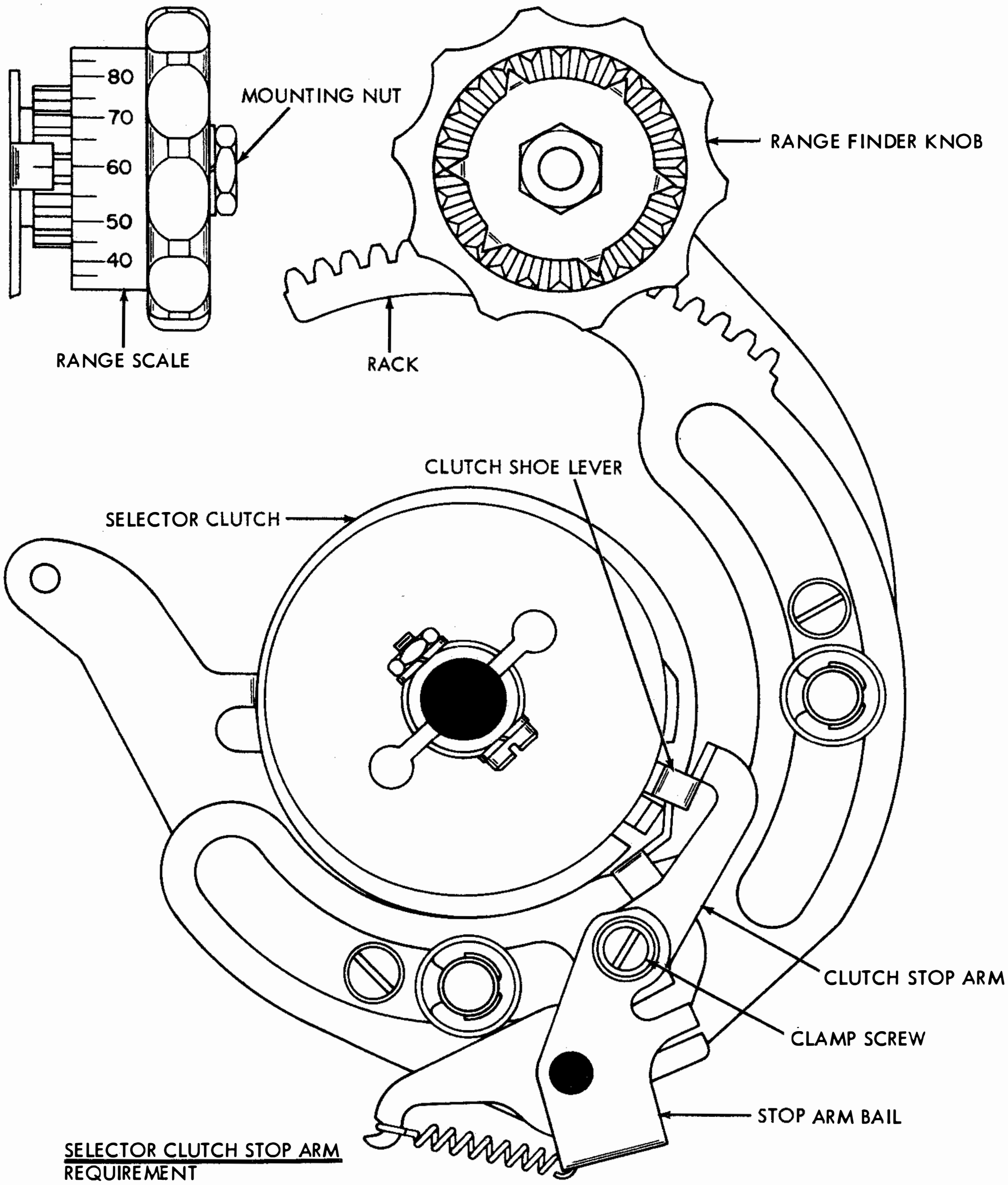


Figure 5-7. Typing Reperforator, Selector Clutch Spring Tensions

NOTE: REPLACE RANGE FINDER AND SELECTOR MAGNET ASSEMBLY.

RANGE FINDER KNOB PHASING
REQUIREMENT
WITH RANGE FINDER KNOB TURNED TO EITHER END OF RACK, ZERO MARK ON SCALE SHOULD BE WITHIN 3 POINTS OF SCRIBED LINE ON RANGE FINDER PLATE.
TO ADJUST
REMOVE MOUNTING NUT, DISENGAGE KNOB FROM RACK AND POSITION KNOB. RE-ENGAGE KNOB WITH RACK AND REPLACE MOUNTING NUT.



SELECTOR CLUTCH STOP ARM
REQUIREMENT
RANGE SCALE SET AT 60. SELECTOR CLUTCH DISENGAGED. ARMATURE IN MARKING POSITION. CLUTCH STOP ARM SHOULD ENGAGE CLUTCH SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF SHOE LEVER.
TO ADJUST
POSITION STOP ARM ON STOP ARM BAIL WITH CLAMP SCREW LOOSENED.

Figure 5-8. Typing Reperforator, Range Finder Mechanism

START LEVER SPRING

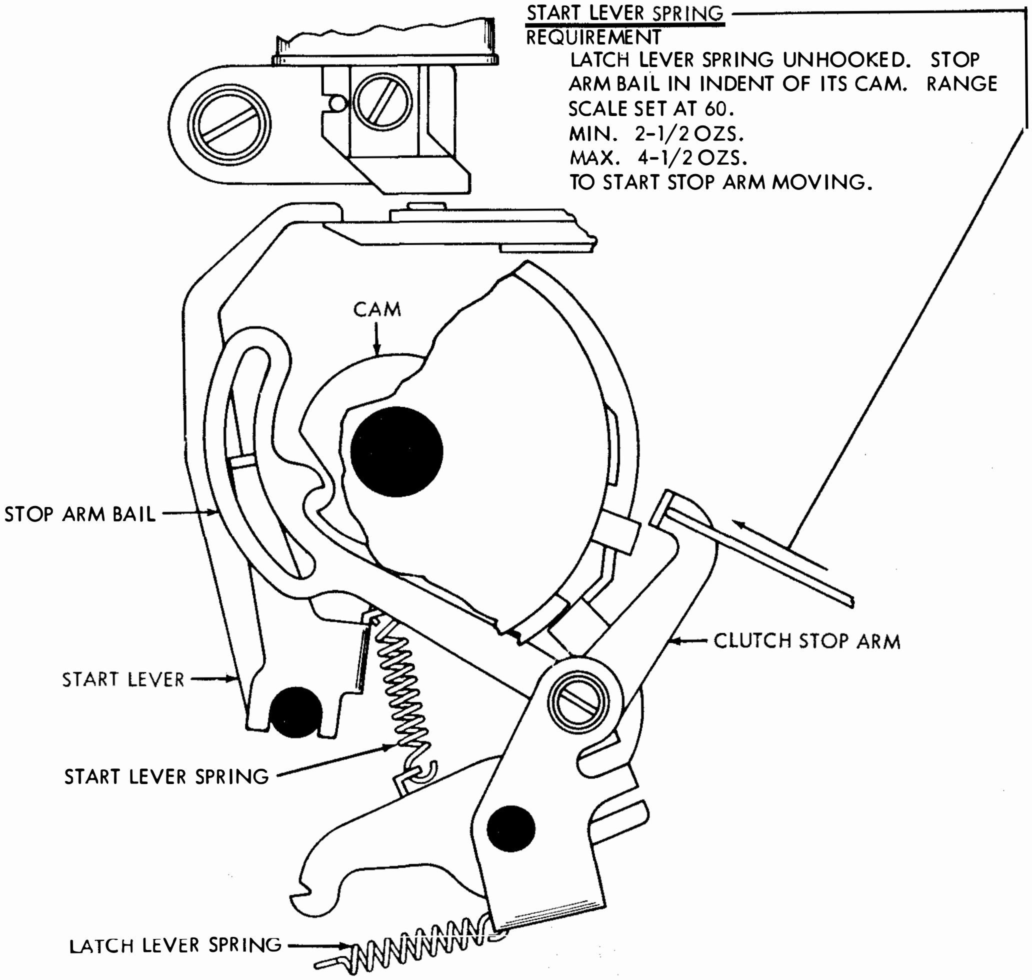
REQUIREMENT

LATCH LEVER SPRING UNHOOKED. STOP ARM BAIL IN INDENT OF ITS CAM. RANGE SCALE SET AT 60.

MIN. 2-1/2 OZS.

MAX. 4-1/2 OZS.

TO START STOP ARM MOVING.



SELECTOR RECEIVING MARGIN

REQUIREMENT (FOR UNITS EMPLOYING ARMATURE WITH ONE ANTI-FREEZE BUTTON)

WHEN A SIGNAL DISTORTION TEST SET IS USED FOR DETERMINING THE RECEIVING MARGINS OF THE SELECTOR, AND WHERE THE CONDITION OF THE COMPONENTS IS EQUIVALENT TO THAT OF NEW EQUIPMENT, THE RANGE AND DISTORTION TOLERANCES BELOW SHOULD BE MET.

REQUIREMENT (FOR UNITS EMPLOYING ARMATURE WITH TWO ANTI-FREEZE BUTTONS)

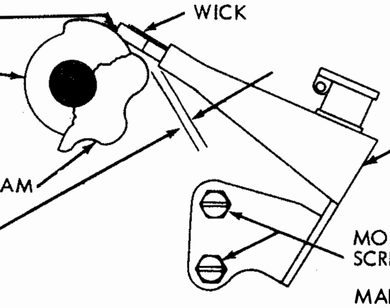
WHEN A DISTORTION TEST SET IS AVAILABLE, THE SELECTOR ARMATURE SPRING TENSION SHOULD BE REFINED, IF NECESSARY, TO OBTAIN SATISFACTORY RECEIVING MARGINS. THE FRONT ANTI-FREEZE BUTTON MUST CONTACT THE MAGNET CORE WHEN THE MAGNET COILS ARE ENERGIZED.

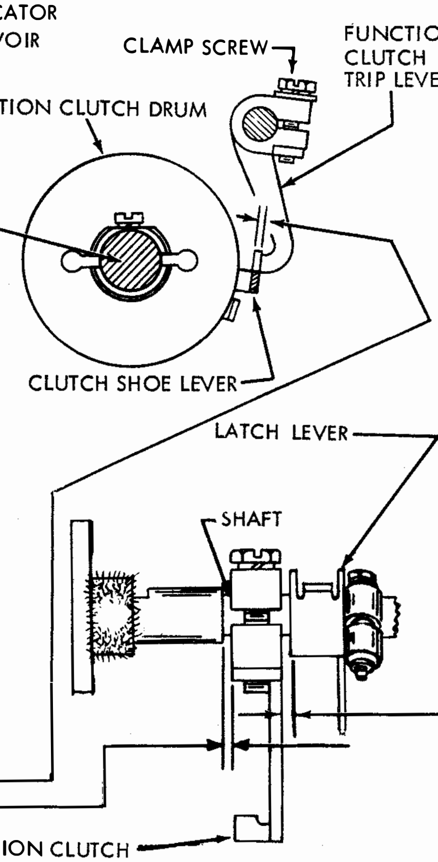
SELECTOR RECEIVING MARGIN MINIMUM REQUIREMENTS

CURRENT	SPEED IN BAUDS	POINTS RANGE WITH ZERO DISTORTION	PERCENTAGE OF MARKING AND SPACING BIAS TOLERATED	END DISTORTION TOLERATED WITH SCALE AT BIAS OPTIMUM SETTING
0.035 AMP. (WINDINGS SERIES)	45.5 (65 W.P.M.) 75.0 (106 W.P.M.)	72	40	35

TO ADJUST: REFINE THE SELECTOR ARMATURE SPRING (SEE FIGURES 5-4 AND 5-5)

Figure 5-9. Typing Reperforator, Selector Clutch Mechanism





(A)
SELECTOR CAM LUBRICATOR

REQUIREMENT
- LUBRICATOR TUBE SHOULD CLEAR HIGH PART OF LOCK LEVER CAM:
  MIN. 0.020 INCH
- HIGH PART OF SELECTOR LEVER CAMS SHOULD TOUCH LUBRICATOR WICK, BUT SHOULD NOT RAISE IT MORE THAN 1/32 INCH.
- THERE SHOULD BE SOME CLEARANCE BETWEEN MARKING LOCK LEVER SPRING AND RESERVOIR.

TO ADJUST
- POSITION LUBRICATOR WITH MOUNTING SCREWS LOOSENED.

(B)
FUNCTION CLUTCH TRIP LEVER

REQUIREMENT
(1) WITH RELEASE RESTING ON MAIN TRIP LEVER (SEE BELOW), FUNCTION CLUTCH TRIP LEVER SHOULD ENGAGE FULL THICKNESS OF SHOE LEVER.
(2) MIN. SOME --- MAX. 0.010 INCH END PLAY IN TRIP LEVER.

TO ADJUST
- POSITION TRIP LEVER ON ITS SHAFT WITH CLAMP SCREW LOOSENED.

(C)
RESET ARM

TO CHECK
- TRIP FUNCTION CLUTCH AND POSITION MAIN SHAFT SO THAT RESET ARM IS HELD IN ITS HIGHEST POSITION BY CAM PIN.

REQUIREMENT
(1) CLEARANCE BETWEEN RELEASE AND MAIN TRIP LEVER:
MIN. 0.005 INCH --- MAX. 0.030 INCH
(2) LATCH LEVER END PLAY:
MIN. SOME --- MAX. 0.010 INCH
(3) CLEARANCE BETWEEN RELEASE LEVER AND FUNCTION CAM:
MIN. SOME

TO ADJUST
- POSITION RESET ARM WITH CLAMP SCREW LOOSENED.

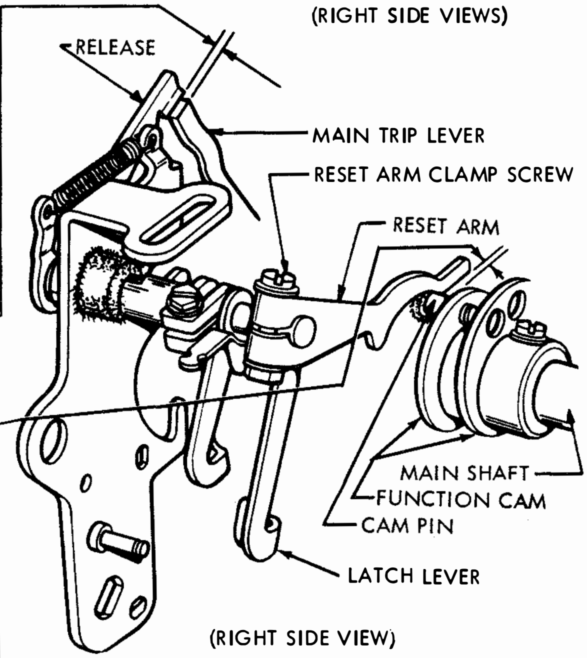
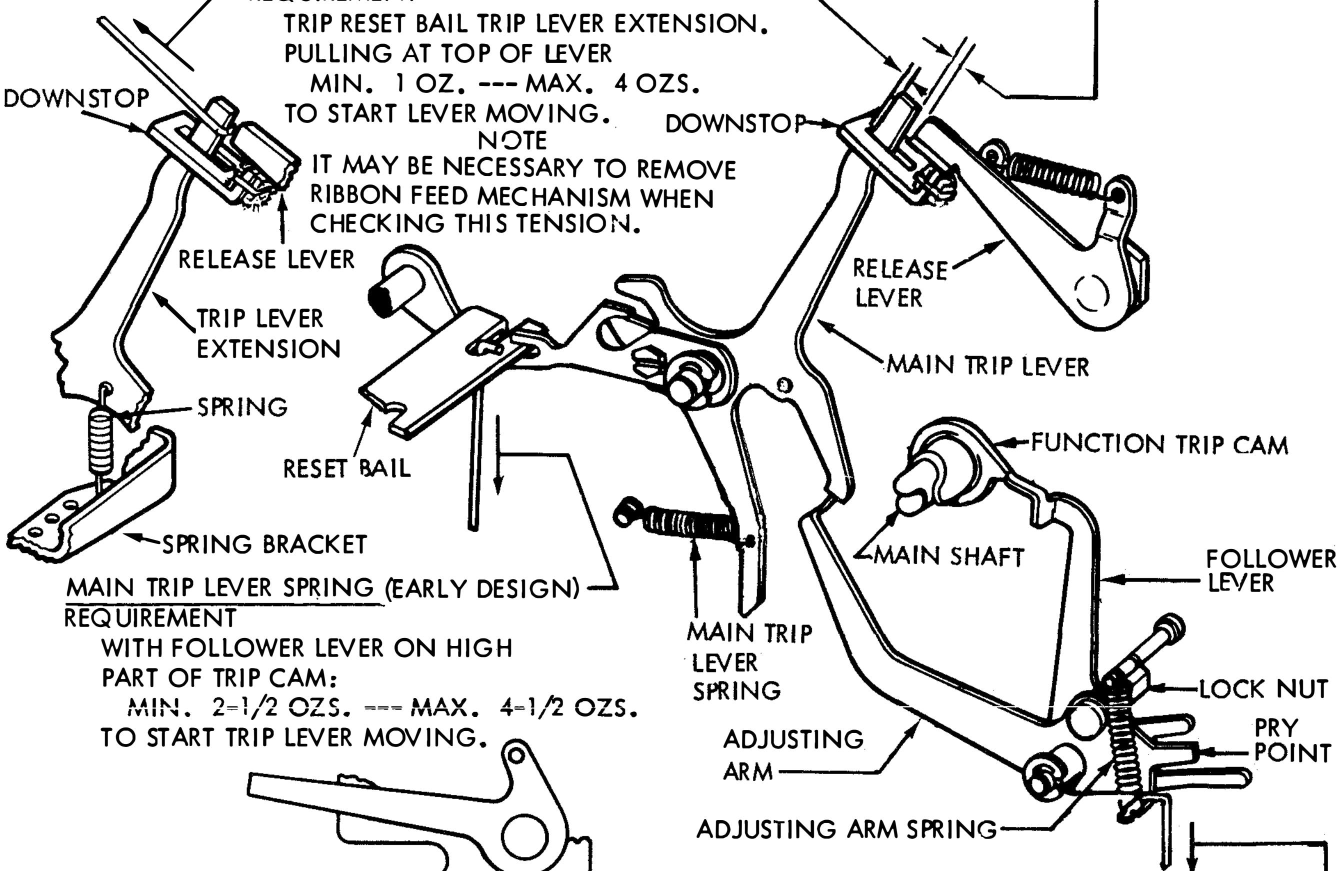


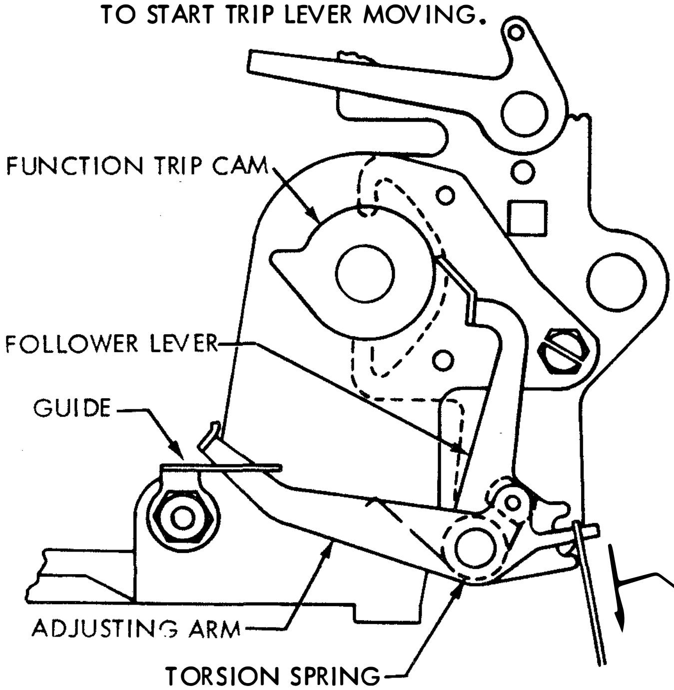
Figure 5-10. Typing Reperforator, Selecting and Function Mechanisms

(A) FOLLOWER LEVER*
REQUIREMENT
WITH FOLLOWER LEVER ON HIGH PART OF CAM:
(1) CLEARANCE BETWEEN RELEASE AND MAIN TRIP LEVER:
MIN. 0.010 INCH --- MAX. 0.030 INCH
(2) SOME CLEARANCE BETWEEN MAIN TRIP LEVER AND DOWNSTOP BRACKET.
TO ADJUST
BY MEANS OF PRY POINT, POSITION ADJUSTING ARM ON FOLLOWER LEVER WITH LOCK NUT LOOSENED.

(C) MAIN TRIP LEVER SPRING (LATEST DESIGN)
REQUIREMENT
TRIP RESET BAIL TRIP LEVER EXTENSION. PULLING AT TOP OF LEVER
MIN. 1 OZ. --- MAX. 4 OZS.
TO START LEVER MOVING.
NOTE
IT MAY BE NECESSARY TO REMOVE RIBBON FEED MECHANISM WHEN CHECKING THIS TENSION.



MAIN TRIP LEVER SPRING (EARLY DESIGN)
REQUIREMENT
WITH FOLLOWER LEVER ON HIGH PART OF TRIP CAM:
MIN. 2-1/2 OZS. --- MAX. 4-1/2 OZS.
TO START TRIP LEVER MOVING.



(B) ADJUSTING ARM SPRING
REQUIREMENT (EARLIER DESIGN)
WITH FOLLOWER LEVER ON HIGH PART OF TRIP CAM AND MAIN TRIP LEVER HELD AWAY FROM ADJUSTING ARM:
MIN. 2-1/2 OZS. --- MAX. 4 OZS.
TO START ADJUSTING LEVER MOVING.

(D) ADJUSTING ARM TORSION SPRING
(LATEST DESIGN)
WITH FOLLOWER LEVER ON LOW PART OF TRIP CAM AND MAIN TRIP LEVER HELD AWAY FROM ADJUSTING ARM
MIN. 1 OZ. --- MAX. 4 OZS.
TO START ADJUSTING LEVER MOVING.

Figure 5-11. Typing Reperforator, Function and Selecting Mechanisms

ROCKER BAIL

REQUIREMENT

WITH ROCKER BAIL POSITIONED TO ITS EXTREME LEFT AND UPPER ROLLER IN CONTACT WITH FUNCTION CAM:

MIN. SOME --- MAX. 0.004 INCH CLEARANCE BETWEEN CAM AND LOWER ROLLER AT POINT OF LEAST CLEARANCE.

TO ADJUST

POSITION LOWER ROLLER MOUNTING SCREW IN ELONGATED SLOT WITH LOCK NUT LOOSENED. CHECK THROUGHOUT A COMPLETE REVOLUTION FOR BINDS.

ROCKER BAIL GUIDE BRACKET

REQUIREMENT

(1) ROCKER BAIL ROLLERS SHOULD ENGAGE FULL THICKNESS OF FUNCTION CAM.

(2) LIFTER ROLLER IN FULL ENGAGEMENT WITH ROCKER BAIL CAMMING SURFACE. (SEE FIGURE 5-30).

TO ADJUST

POSITION ROCKER BAIL AND GUIDE BRACKET WITH GUIDE BRACKET MOUNTING SCREWS LOOSENED.

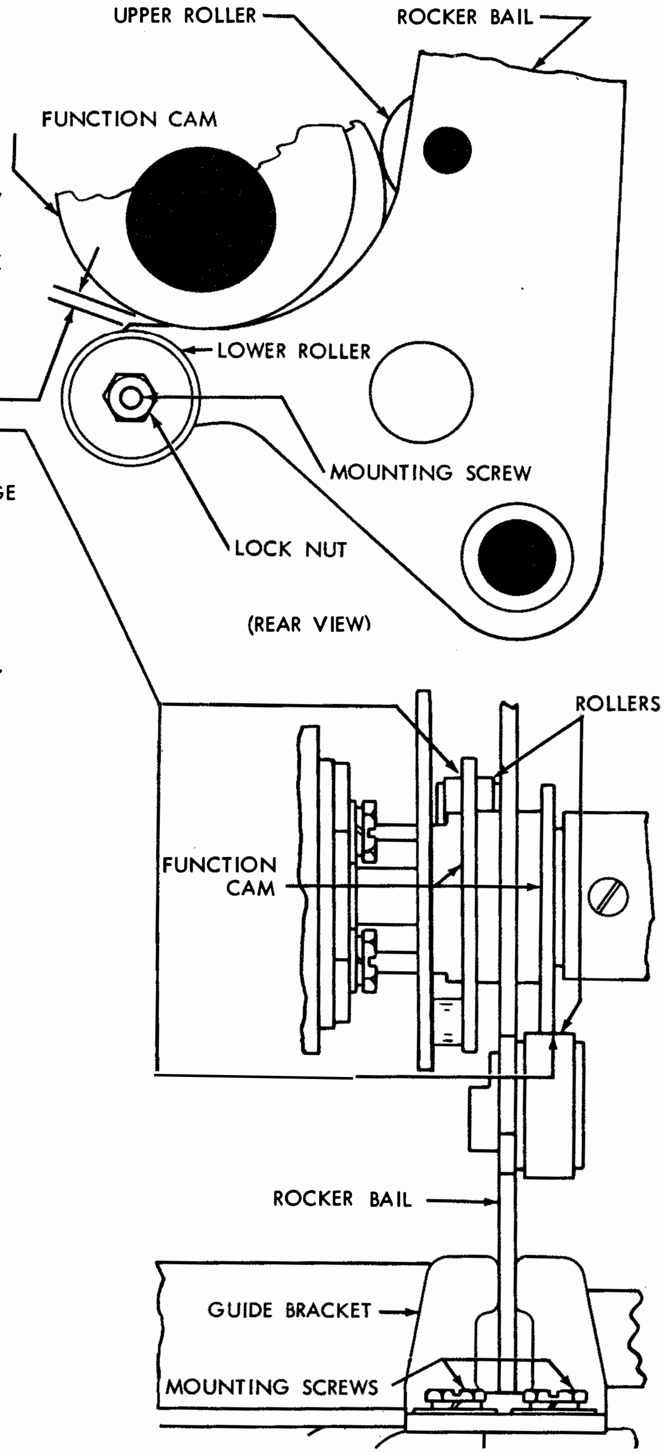


Figure 5-12. Typing Reperforator, Function Mechanism

PERFORATOR POSITION

(1) TO CHECK

SELECT LETTERS CODE COMBINATION (12345). ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS.

REQUIREMENT

CLEARANCE BETWEEN PUNCH SLIDE AND PUNCH SLIDE LATCH:

MIN. 0.020 INCH --- MAX. 0.030 INCH

AT SLIDE WHERE CLEARANCE IS LEAST.

TO ADJUST

LOOSEN PERFORATOR MOUNTING SCREWS, ADJUSTING CLAMP LOCK SCREW, ADJUSTING CLAMP PIVOT SCREW AND ANCHOR BRACKET SCREW UNTIL FRICTION TIGHT. PLACE TIP OF SCREW DRIVER BETWEEN SCREW AND RIM OF PRY HOLE AND PRY PERFORATOR UP OR DOWN. TIGHTEN ONLY ADJUSTING CLAMP LOCK SCREW.

(2) TO CHECK

SELECT "V" CODE COMBINATION (-2345). TRIP FUNCTION CLUTCH AND MOVE ROCKER BAIL TO EXTREME LEFT.

REQUIREMENT

CLEARANCE BETWEEN TOP OF THE REAR LEG OF STRIPPER PLATFORM AND TYPE-WHEEL FIGURE "5" WHEN UNIT IS IN THE STOP POSITION.

MIN. 0.075 INCH --- MAX. 0.095 INCH

TO ADJUST

REMOVE RIBBON FROM CARRIER (FIGURE 5-40). POSITION PERFORATOR WITH TWO MOUNTING SCREWS, ADJUSTING CLAMP PIVOT SCREW AND ANCHOR BRACKET SCREW LOOSENED. CHECK RESET BAIL TRIP LEVER REQUIREMENT (FIGURE 5-17) FOR SOME CLEARANCE AND ADJUST IF NECESSARY.

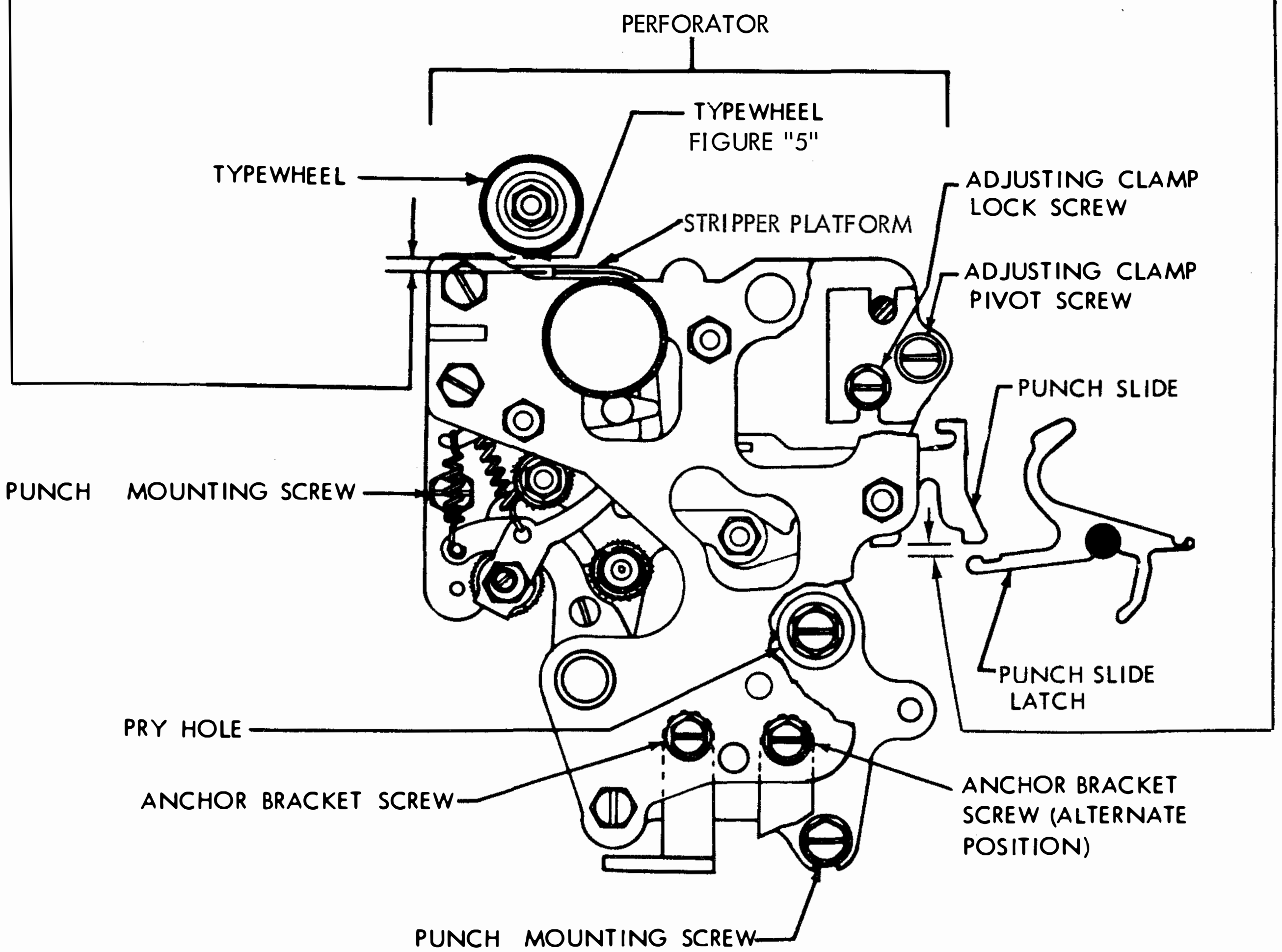
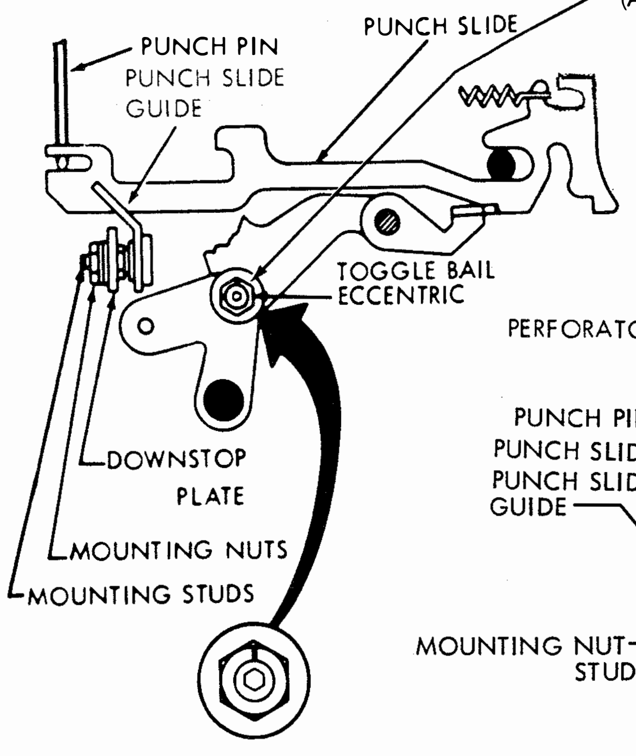


Figure 5-13. Typing Reperforator, Punch Mechanism

NOTE

BEFORE PROCEEDING WITH THE PUNCH MECHANISM ADJUSTMENTS, CHECK THE ROCKER BAIL CAM FOLLOWER ROLLER ADJUSTMENT AND LOOSEN THE PUNCH SLIDE DOWNSTOP MOUNTING NUT AND GUIDE MOUNTING STUD.



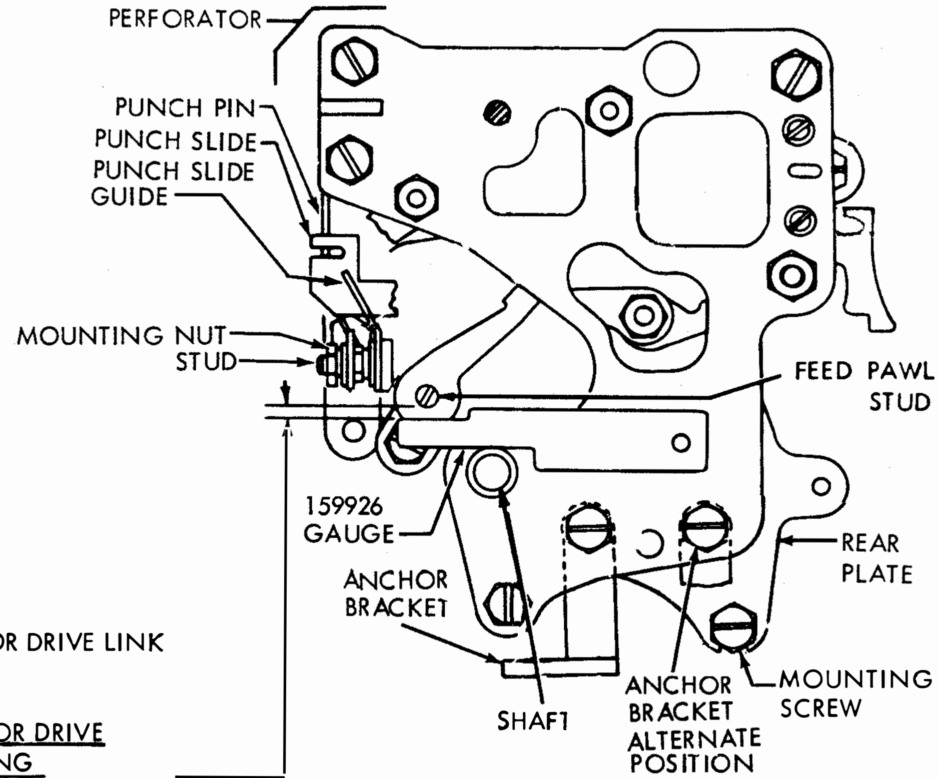
(A) TOGGLE BAIL ECCENTRIC (PRELIMINARY)

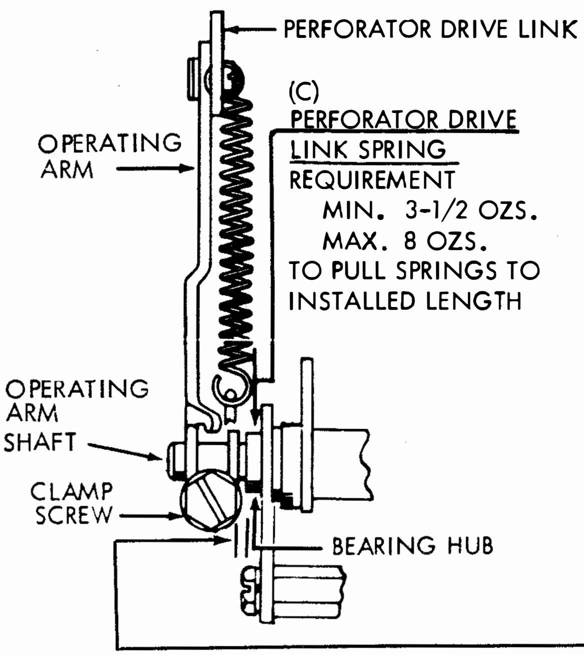
REQUIREMENT

THE INDENT (HIGH SIDE OF ECCENTRIC) SHALL BE IN ITS UPPERMOST POSITION.

TO ADJUST

WITH THE TOGGLE ECCENTRIC SHAFT LOCK NUT FRICTION TIGHT POSITION ECCENTRIC.





(C) PERFORATOR DRIVE LINK SPRING

REQUIREMENT

MIN. 3-1/2 OZS.
MAX. 8 OZS.
TO PULL SPRINGS TO INSTALLED LENGTH

(B) TOGGLE OPERATING ARM

(1) REQUIREMENT

TRIP FUNCTION CLUTCH AND ROTATE MAIN SHAFT UNTIL THE UPPER ROCKER BAIL ROLLER IS ON HIGH PART OF ITS CAM.
MIN. SOME --- MAX. 0.009 INCH CLEARANCE BETWEEN FEED PAWL STUD AND THE 159926 GAUGE.

(2) CLEARANCE BETWEEN ARM AND OSCILLATING SHAFT BEARING HUB.
MIN. 0.002 INCH --- MAX. 0.015 INCH WITH PLAY TAKEN UP IN DIRECTION TO MAKE CLEARANCE MAXIMUM.

TO ADJUST

WITH LOCKSCREW FRICTION TIGHT, POSITION TOGGLE BAIL AND OPERATING ARM.

Figure 5-14. Typing Reperforator, Punch Mechanism

(A) PUNCH PIN PENETRATION

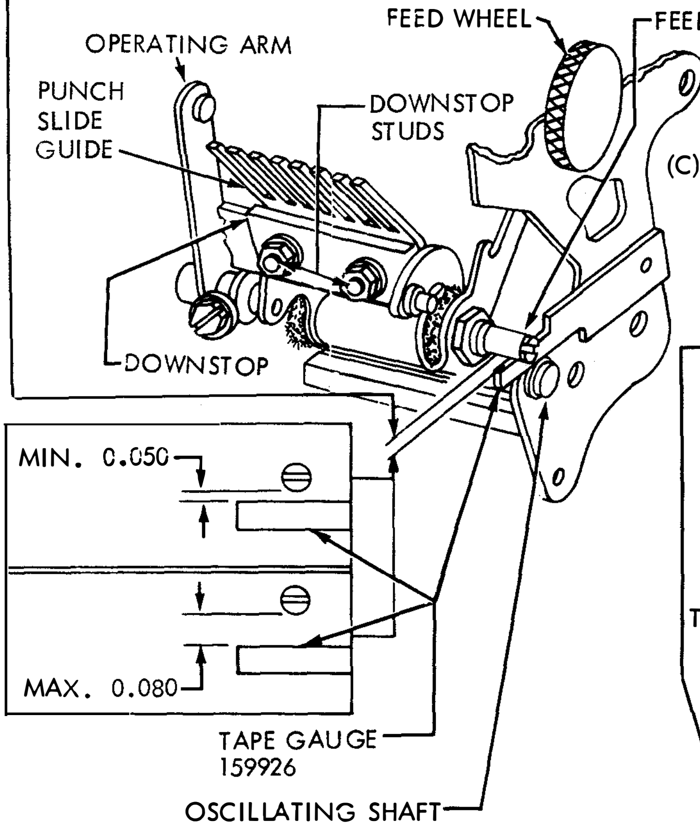
REQUIREMENT

(1) WITH THE LETTERS COMBINATION SELECTED, FUNCTION CLUTCH ENGAGED. ROTATE MAIN SHAFT UNTIL ALL PUNCH PINS ARE INTO OR ABOVE THE TAPE APERTURE IN PUNCH BLOCK. WITH THE 159926 GAUGE IN POSITION
MIN. 0.050 INCH
CLEARANCE BETWEEN FEED PAWL STUD AND THE GAUGE.

(2) WITH LETTERS COMBINATION SELECTED, FUNCTION CLUTCH ENGAGED. ROTATE MAIN SHAFT UNTIL ALL PUNCH PINS HAVE CLEARED THE PUNCH BLOCK. WITH THE 159926 GAUGE IN POSITION
MAX. 0.080 INCH
CLEARANCE BETWEEN FEED PAWL STUD AND GAUGE.

TO ADJUST

REFINE THE TOGGLE BAIL ECCENTRIC ADJUSTMENT KEEPING THE INDENT TO THE RIGHT OF A VERTICAL CENTERLINE THROUGH THE SHAFT.



(C) PUNCH SLIDE DOWNSTOP POSITION

REQUIREMENT

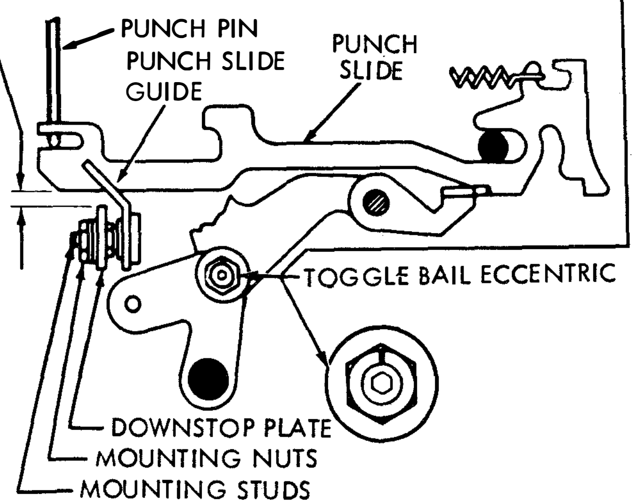
WITH FUNCTION CLUTCH DISENGAGED AND LATCHED. PLAY TAKEN UP TOWARD THE TOP, CLEARANCE BETWEEN BOTH THE FRONT AND REAR PUNCH SLIDES AND THE DOWNSTOP PLATE
MIN. SOME --- MAX. 0.008 INCH
ALL OTHER PUNCH SLIDES SHALL HAVE SOME CLEARANCE.

NOTE

TO CHECK FOR SOME CLEARANCE, PLACE UNIT IN STOP POSITION, TRIP FUNCTION TRIP MECHANISM AND LATCHES, THE PUNCH SLIDES SHALL MOVE FULLY TO THEIR OPERATED POSITION.

TO ADJUST

WITH UNIT IN STOP POSITION, LOOSEN THE TWO DOWNSTOP PLATE MOUNTING LOCK NUTS AND LOCATE THE DOWNSTOP PLATE TO MEET THE REQUIREMENT.



(B) PUNCH SLIDE GUIDE

REQUIREMENT

THE PUNCH SLIDES SHOULD ALIGN WITH THEIR CORRESPONDING PUNCH PINS AND BE FREE OF BINDS AFTER TIGHTENING THE GUIDE MOUNTING STUDS. EACH PUNCH SLIDE SHOULD RETURN FREELY AFTER BEING PUSHED IN NOT MORE THAN 1/16 INCH.

TO ADJUST

POSITION THE GUIDE WITH ITS MOUNTING STUDS FRICTION TIGHT.

Figure 5-15. Typing Reperforator, Punch Mechanism

RESET BAIL TRIP LEVER

REQUIREMENT

(1) MANUALLY SELECT THE BLANK COMBINATION. MANUALLY ROTATE RESET BAIL TRIP LEVER. THE PUNCH SLIDE RESET BAIL SHALL TRIP BEFORE THE FUNCTION CLUTCH IS TRIPPED.

(2) WITH FUNCTION AND SELECTOR CLUTCHES DIS-ENGAGED AND LATCHED, THE PUNCH SLIDE RESET BAIL SHALL FULLY ENGAGE THE PUNCH SLIDE LATCHING SURFACE WHEN PLAY IN PARTS IS TAKEN UP IN DIRECTION TO MAKE THE ENGAGEMENT THE LEAST.

TO ADJUST

(1) WITH TRIP LEVER EXTENSION LOCK SCREW FRICTION TIGHT AND LETTERS COMBINATION SELECTED, POSITION RESET BAIL AGAINST PUNCH SLIDES. TAKE UP PLAY BETWEEN RESET BAIL AND TRIP LEVER IN A COUNTER CLOCKWISE DIRECTION. POSITION TRIP LEVER BY MEANS OF ITS PRY POINT.

(2) RECHECK REQUIREMENT (1) ABOVE AND REFINE ADJUSTMENT IF NECESSARY.

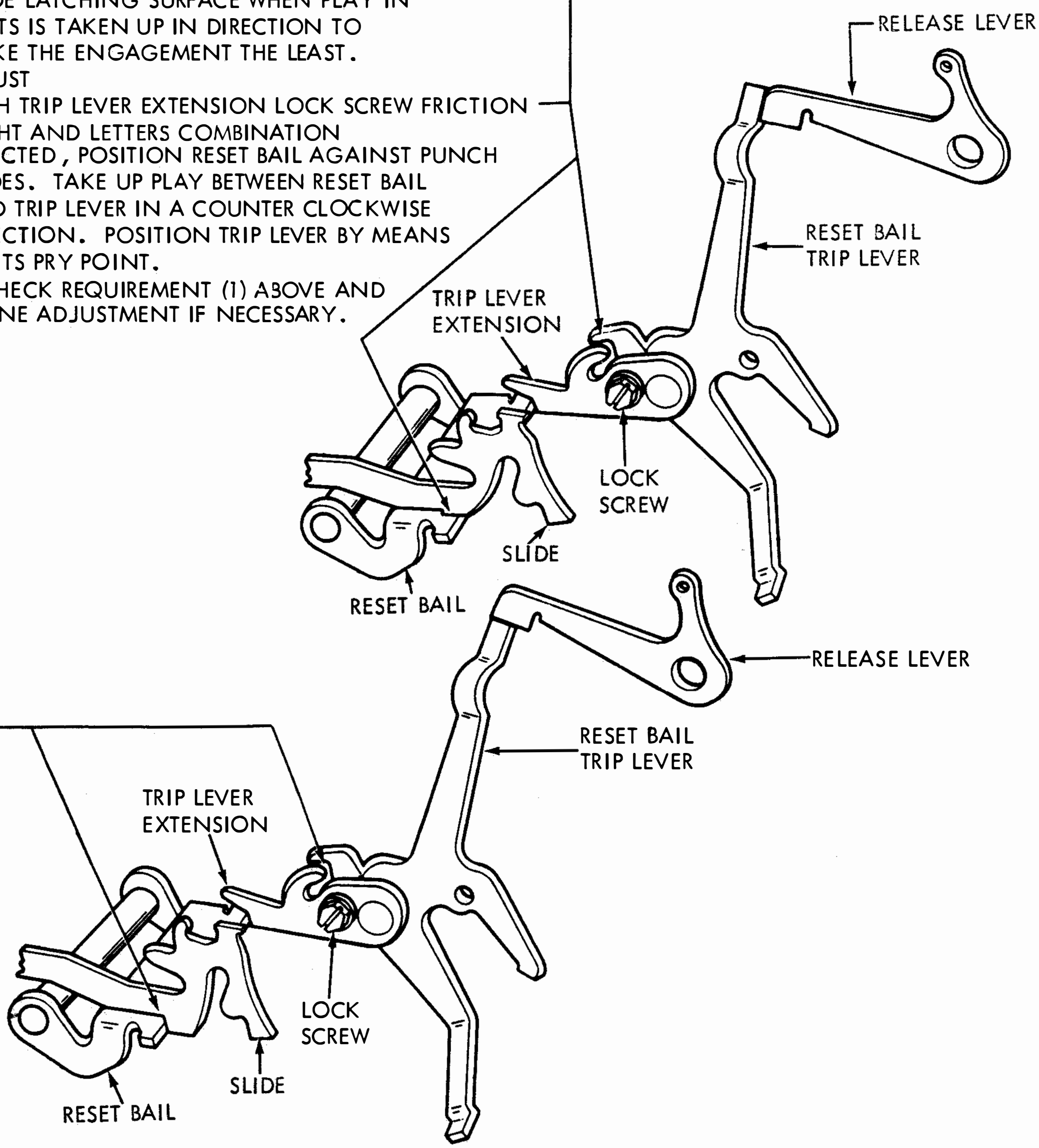
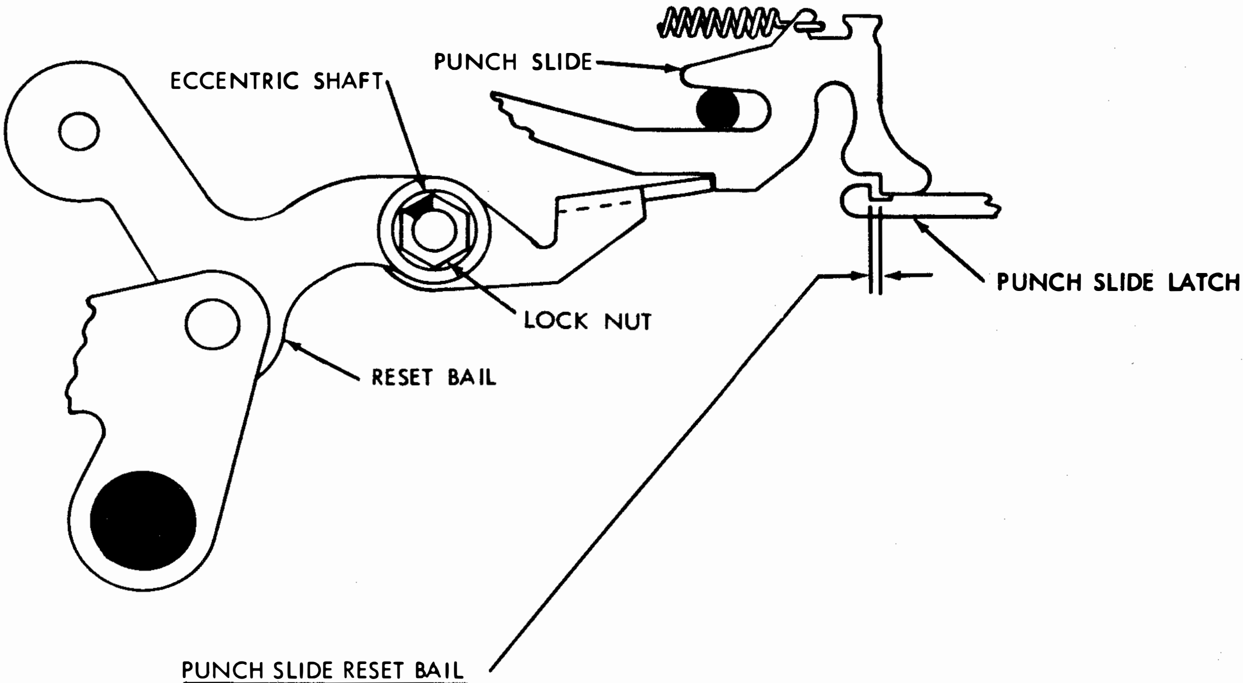


Figure 5-16. Typing Reperforator, Reset Bail Trip Lever



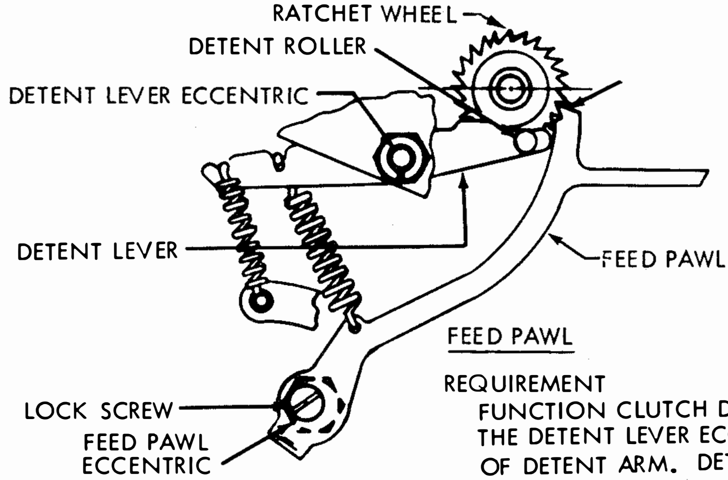
PUNCH SLIDE RESET BAIL

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. CLEARANCE AT PUNCH SLIDE LATCH CLOSEST TO PUNCH SLIDE:
MIN. 0.005 INCH ---- MAX. 0.015 INCH

TO ADJUST
ROTATE THE RESET BAIL ECCENTRIC SHAFT WITH ITS LOCK NUT LOOSENED. KEEP THE INDENTATION IN THE ECCENTRIC SHAFT HIGH AND TO THE LEFT OF A VERTICAL CENTERLINE THROUGH THE SHAFT.

NOTE

THIS ADJUSTMENT AND LATERAL FEED WHEEL ADJUSTMENT ARE INTER-RELATED AND SHALL BE PERFORMED TOGETHER.



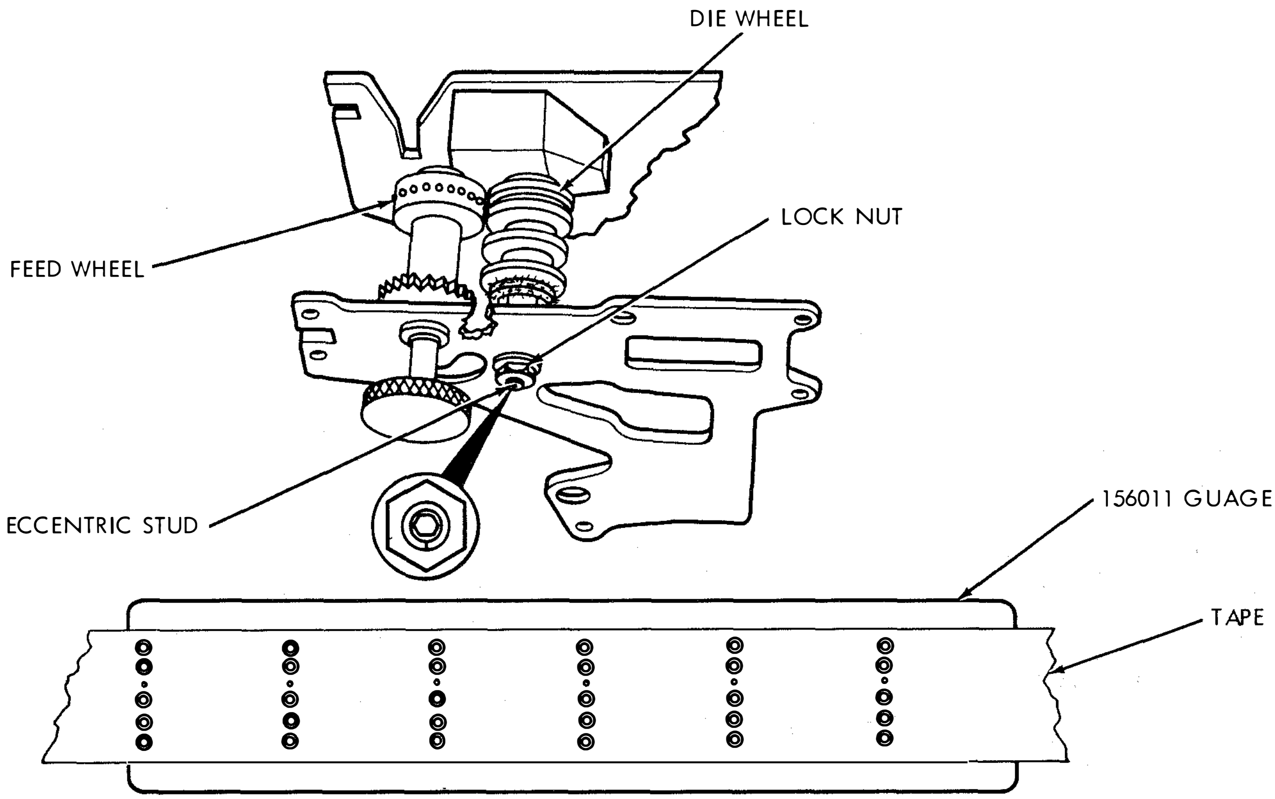
FEED PAWL

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. THE INDENT OF THE DETENT LEVER ECCENTRIC AT RIGHT ANGLE TO CENTER LINE OF DETENT ARM. DETENT ROLLER IN ENGAGEMENT WITH FEED WHEEL RATCHET, AND HIGH SIDE OF FEED PAWL ECCENTRIC TO RIGHT OF ITS LOCKING SCREW. THE FEED PAWL SHALL ENGAGE THE FIRST TOOTH BELOW HORIZONTAL CENTER LINE OF RATCHET WHEEL WITH NO PERCEPTIBLE CLEARANCE.

TO ADJUST
ROTATE THE FEED PAWL ECCENTRIC WITH LOCK SCREW LOOSENED.

Figure 5-17. Typing Reperforator, Punch Slide Reset Bail and Feed Pawl

NOTE
BEFORE PROCEEDING WITH THE FOLLOWING ADJUSTMENT CHECK BOTH TAPE GUIDE SPRING TENSIONS (FIGURE 5-20).



FEED HOLE SPACING

(1) REQUIREMENT

WITH A PIECE OF TAPE PERFORATED WITH SIX SERIES OF 9 BLANK CODE COMBINATIONS FOLLOWED BY A LETTERS COMBINATION PLACED OVER THE SMOOTH SIDE OF THE 156011 TAPE GAUGE SO THAT THE CIRCULAR PORTION OF THE FIRST NUMBER 2 CODE HOLE IN THE TAPE IS CONCENTRIC WITH THE FIRST HOLE OF THE TAPE GAUGE, THE NEXT FOUR HOLES IN THE TAPE GAUGE SHOULD BE VISIBLE THROUGH THE NUMBER 2 CODE HOLES IN THE TAPE AND THE CIRCULAR PORTION OF THE LAST (SIXTH) NUMBER 2 CODE HOLE IN THE TAPE SHALL BE ENTIRELY WITHIN THE 0.086 DIAMETER HOLE OF THE TAPE GAUGE.

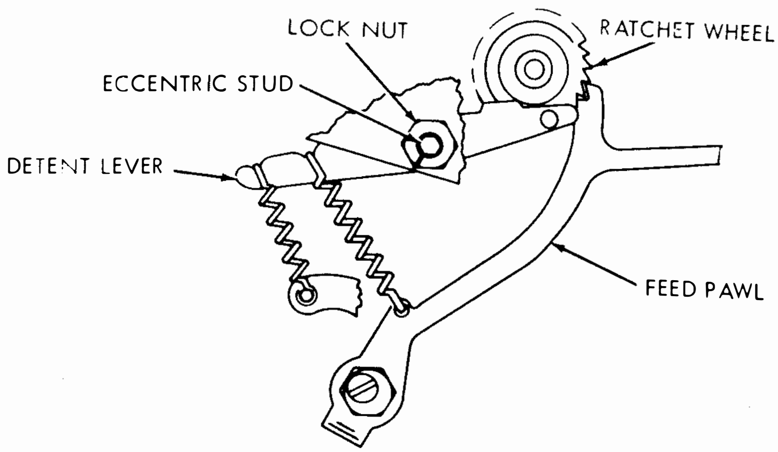
(2) REQUIREMENT

WITH TAPE SHOE HELD AWAY FROM FEED WHEEL, FEED PAWL AND DETENT DISENGAGED AND TAPE REMOVED, FEED WHEEL SHOULD ROTATE FREELY.

TO ADJUST

WITH TAPE REMOVED FROM THE PUNCH MECHANISM, LOOSEN THE ECCENTRIC LOCK NUT AND ROTATE THE DIE WHEEL ECCENTRIC SHAFT UNTIL IT BINDS AGAINST THE FEED WHEEL. BACK OFF THE ECCENTRIC UNTIL THE DIE WHEEL IS JUST FREE. KEEP THE INDENT OF THE ECCENTRIC BELOW THE HORIZONTAL CENTERLINE OF THE STUD. REFINE ADJUSTMENT FOR REQUIREMENT (1), IF NECESSARY, BY MOVING THE DIE WHEEL TOWARD THE FEED WHEEL TO DECREASE THE CHARACTER SPACING AND AWAY FROM THE FEED WHEEL TO INCREASE THE CHARACTER SPACING.

Figure 5-18. Typing Reperforator, Feed Hole Spacing



<u>FEED HOLE LATERAL ALIGNMENT</u> (DETENT)

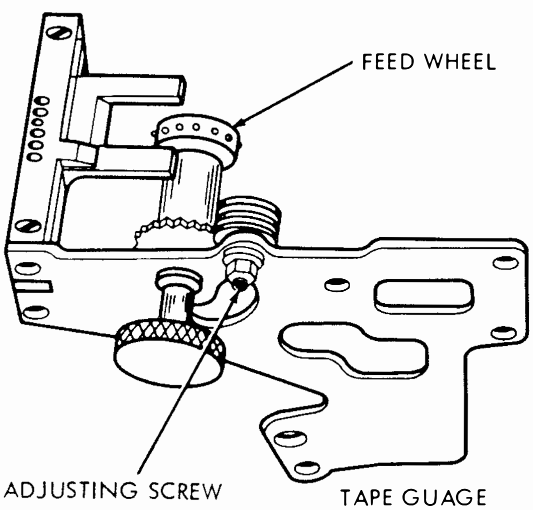
(1) <u>REQUIREMENT</u>

WHEN A PIECE OF TAPE IS PERFORATED WITH A SERIES OF BLANK CODE COMBINATIONS THE INDENTATIONS OF THE FEED WHEEL SHALL BE FULLY PUNCHED OUT.

TO ADJUST

<u>RIGHT OR LEFT</u>, ROTATE THE DETENT LEVER <u>ECCENTRIC STUD</u> CLOCKWISE TO MOVE THE FEED WHEEL PERFORATION TOWARDS THE LEADING EDGE OF THE CODE HOLES, AND COUNTERCLOCKWISE TO MOVE THE FEED WHEEL PERFORATIONS TOWARD THE TRAILING EDGE OF THE CODE HOLES. REFINE THE FEED PAWL ADJUSTMENT.

<u>FRONT TO REAR</u>, LOOSEN THE LOCK NUT ON THE ADJUSTING SCREW AND TURN THE SCREW CLOCKWISE TO MOVE TAPE TOWARD REFERENCE EDGE (REAR), AND COUNTERCLOCKWISE TO MOVE THE TAPE AWAY FROM REFERENCE EDGE (FRONT).



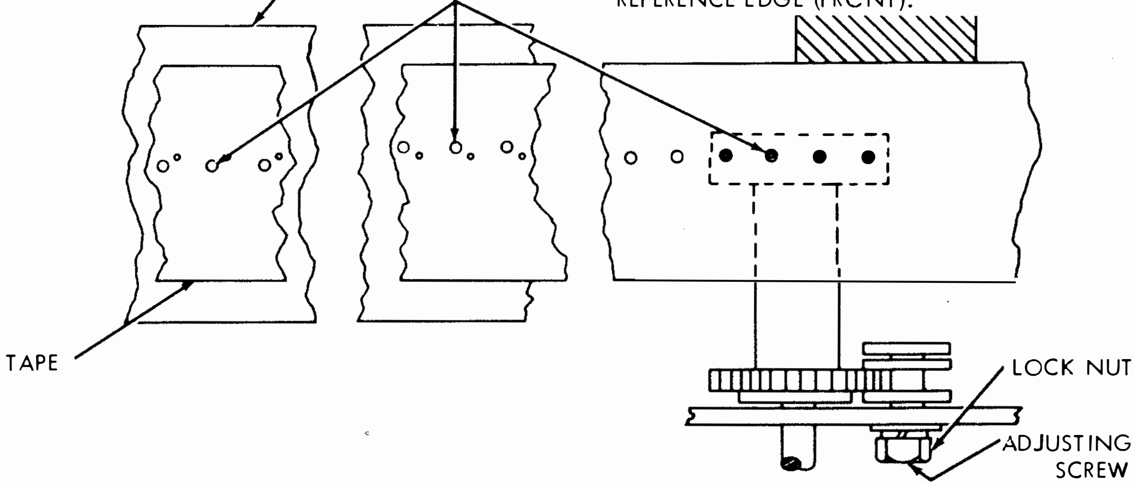
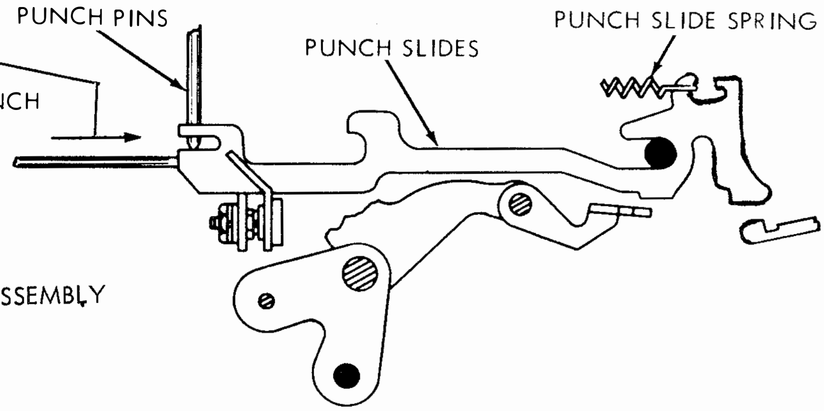


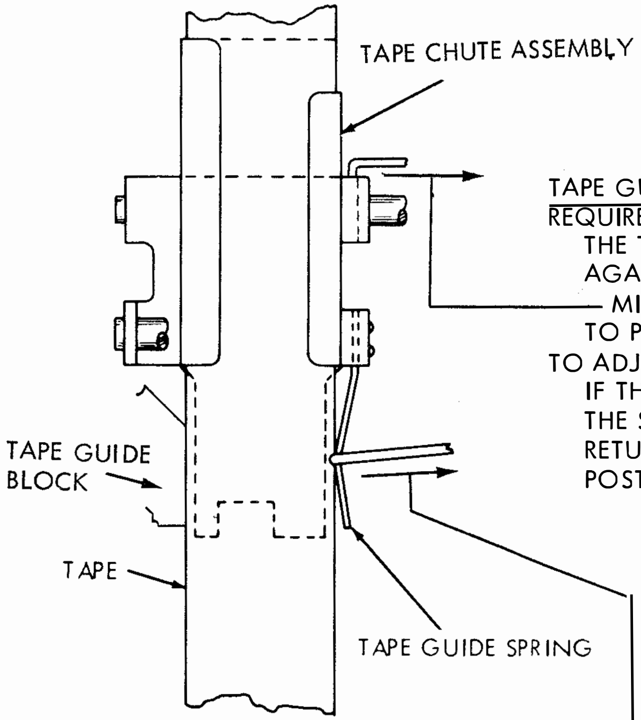
Figure 5-19. Typing Reperforator, Detent Lever and Feed Hole Lateral Alignment



PUNCH SLIDE SPRING

REQUIREMENT

LETTERS COMBINATION SET UP AND PUNCH SLIDES IN SELECTED POSITION.
MIN. 2-1/4 OZS.
MAX. 3-1/4 OZS.
TO START EACH SLIDE MOVING



TAPE GUIDE ASSEMBLY SPRING

REQUIREMENT

THE TAPE GUIDE ASSEMBLY SHALL BE FREE TO RETURN TO REST AGAINST THE TAPE GUIDE BLOCK AFTER A
MIN. 16 OZS.
TO PULL THE TAPE GUIDE ASSEMBLY AWAY FROM THE BLOCK.

TO ADJUST

IF THE SPRING DOES NOT MEET THE REQUIREMENT, REPLACE THE SPRING. IF THE TAPE GUIDE ASSEMBLY IS NOT FREE TO RETURN, REPOSITION THE TAPE GUIDE ASSEMBLY MOUNTING POST TO FREE THE TAPE GUIDE ASSEMBLY.

TAPE GUIDE SPRING (TAPE CHUTE)

REQUIREMENT

CLUTCH DISENGAGED AND TAPE THREADED THROUGH THE PUNCH ASSEMBLY, IT SHOULD REQUIRE
MIN. 1-1/4 OZS. --- MAX. 2-1/4 OZS.
TO JUST MOVE THE SPRING AWAY FROM THE TAPE.

TO ADJUST

BEND THE SPRING.

TAPE GUIDE SPRING (PUNCH BLOCK)

(1) REQUIREMENT

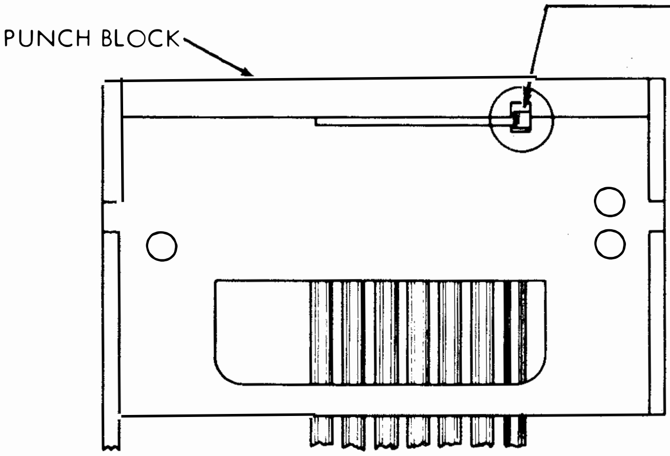
WITH TAPE REMOVED FROM THE PUNCH BLOCK THE TAPE GUIDE SPRING SHOULD REST AGAINST THE CLEARANCE SLOT IN THE BLOCK IN A SYMETRICAL MANNER.

(2) REQUIREMENT

WITH TAPE IN THE PUNCH BLOCK AND THE REPERFORATOR OPERATING UNDER POWER, THE SPRING SHOULD NOT DISTORT THE EDGE OF THE TAPE.

TO ADJUST

BEND THE SPRING AND POSITION IT WITH ITS MOUNTING SCREW LOOSENED.



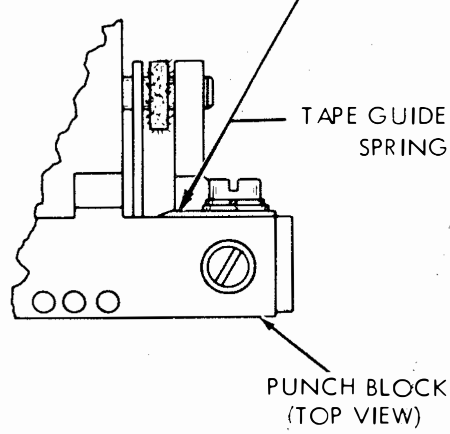


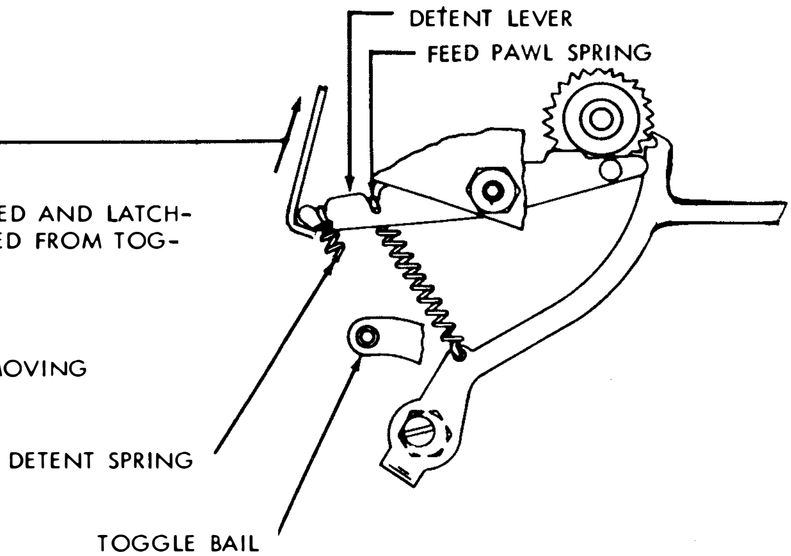
Figure 5-20. Typing Reperforator, Punch Mechanism

FEED PAWL SPRING

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. DETENT SPRING UNHOOKED FROM TOGGLE BAIL

MIN. 3 OZS.
MAX. 4-1/2 OZS.

TO START THE DETENT LEVER MOVING



DETENT LEVER SPRING

REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. FEED PAWL SPRING UNHOOKED.

MIN. 7 OZS.
MAX. 10 OZS.

TO START THE DETENT LEVER MOVING.

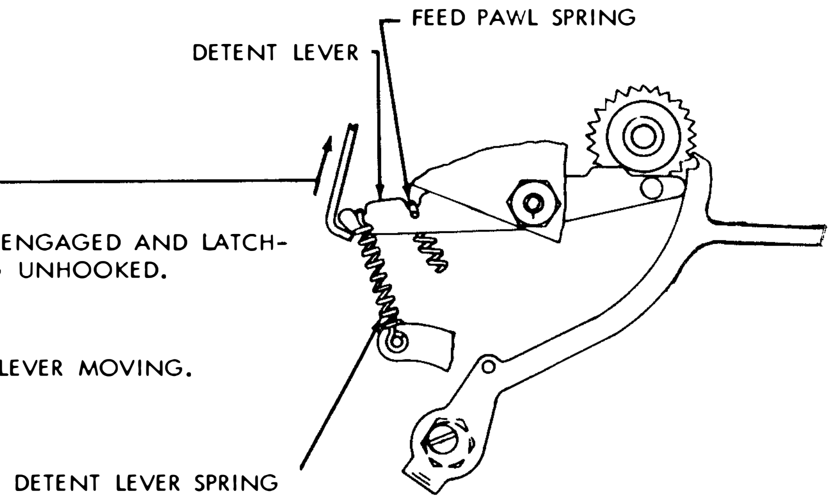
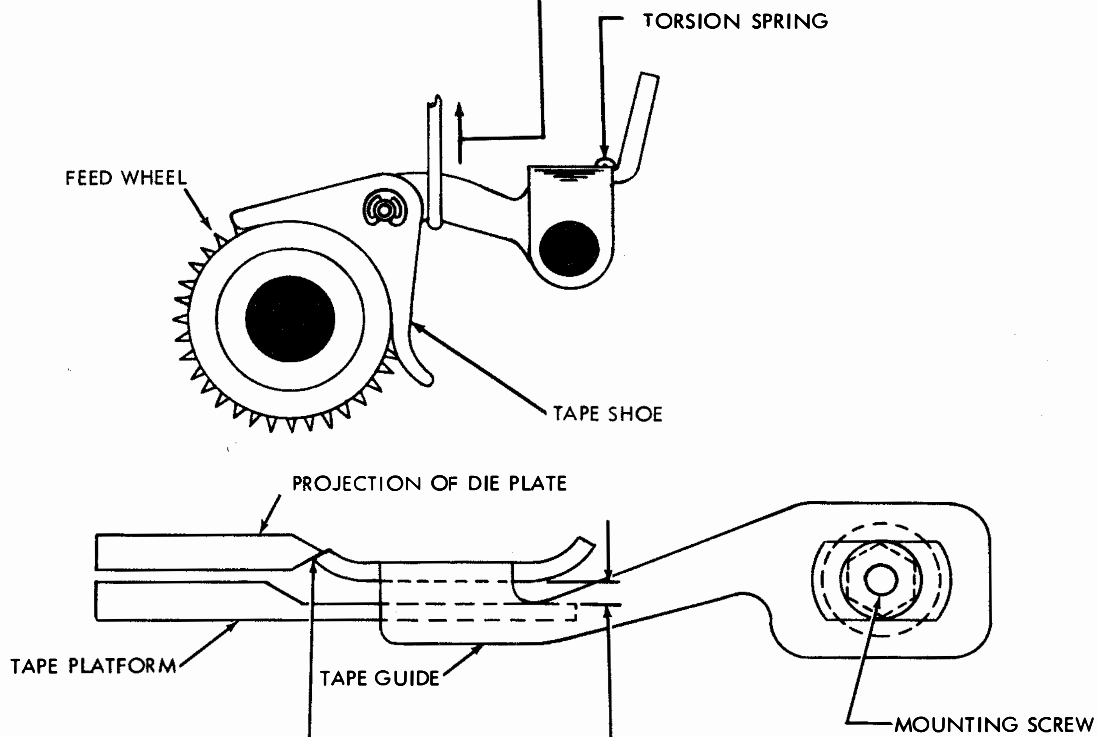


Figure 5-21. Typing Reperforator, Tape Feed Mechanism

TAPE SHOE TORSION SPRING

REQUIREMENT
MIN. 13 OZS.
MAX. 18 OZS.
TO MOVE TAPE SHOE FROM FEED WHEEL



TAPE GUIDE

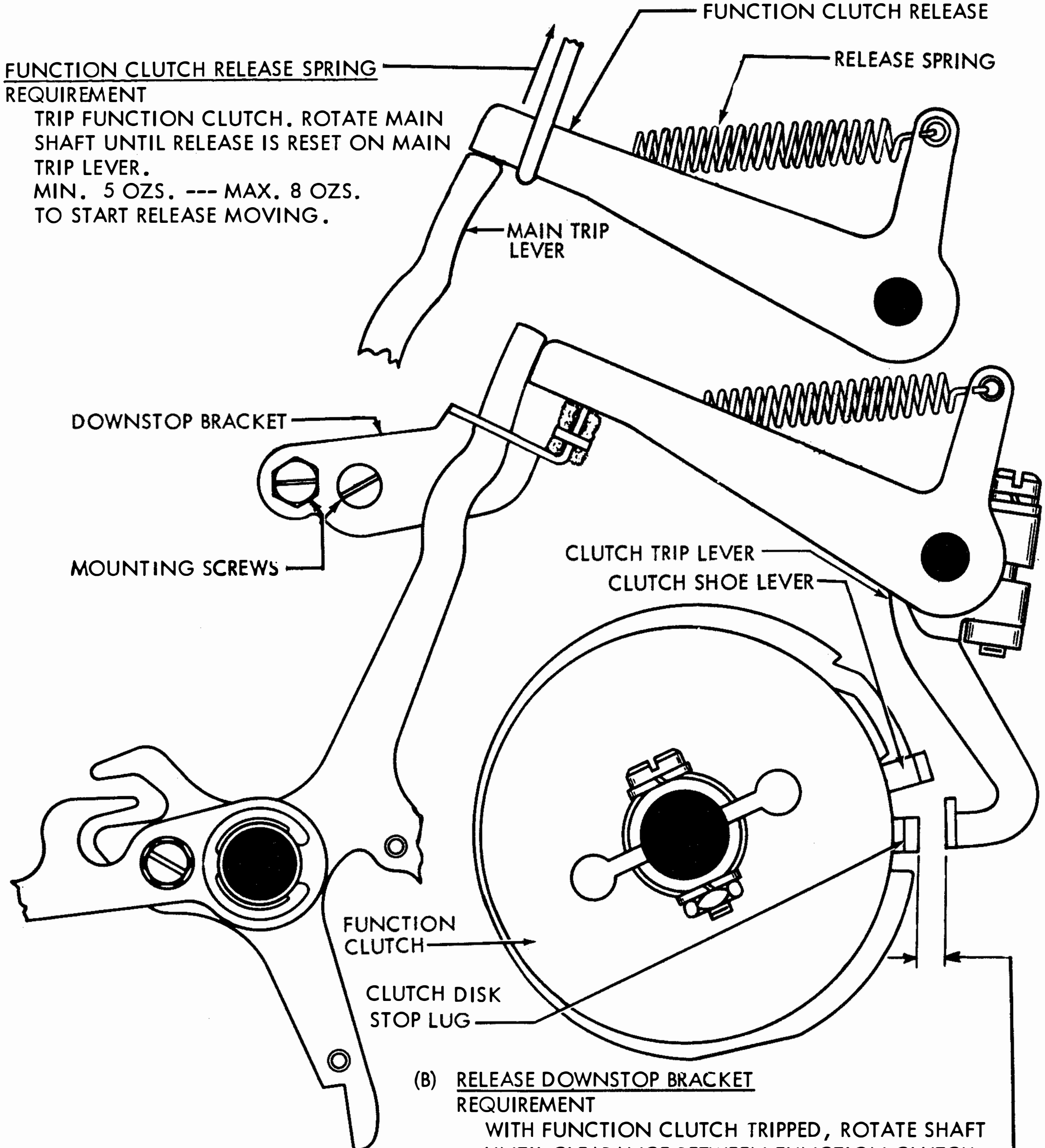
REQUIREMENT
WITH TAPE GUIDE UNDER AND IN CONTACT WITH V-SHAPED PROJECTION OF DIE PLATE: *
MIN. 0.008 INCH----MAX. 0.015 INCH
CLEARANCE BETWEEN GUIDE AND TAPE PLATFORM.

TO ADJUST
WITH MOUNTING SCREW FRICTION TIGHT, PLACE 0.010 INCH FLAT GAUGE BETWEEN GUIDE AND TAPE PLATFORM. PRESS GUIDE DOWN AND TO LEFT. TIGHTEN MOUNTING SCREW, KEEPING FEED WHEEL ADJUSTING SCREW (FIGURE 5-18) STATIONARY BY MEANS OF ALLEN WRENCH.

* GUIDE IS CONSIDERED "IN CONTACT" WITH PROJECTION WHEN 0.0015 INCH GAUGE CANNOT BE INSERTED BETWEEN THEM.

Figure 5-22. Typing Reperforator, Feed Wheel and Tape Guide

(A) FUNCTION CLUTCH RELEASE SPRING
REQUIREMENT
TRIP FUNCTION CLUTCH. ROTATE MAIN SHAFT UNTIL RELEASE IS RESET ON MAIN TRIP LEVER.
MIN. 5 OZS. --- MAX. 8 OZS.
TO START RELEASE MOVING.



(B) RELEASE DOWNSTOP BRACKET
REQUIREMENT
WITH FUNCTION CLUTCH TRIPPED, ROTATE SHAFT UNTIL CLEARANCE BETWEEN FUNCTION CLUTCH DISK STOP LUG AND CLUTCH STOP LEVER IS AT A MINIMUM. RELEASE RESTING AGAINST DOWN-STOP BRACKET. CLEARANCE BETWEEN FUNCTION CLUTCH DISK STOP LUG AND STOP LEVER:
MIN. 0.002 INCH --- MAX. 0.045 INCH
TO ADJUST
REMOVE TAPE GUARD. WITH DOWNSTOP BRACKET MOUNTING SCREWS FRICTION TIGHT POSITION BRACKET. RECHECK FOR SOME CLEARANCE BETWEEN TRIP LEVER EXTENSION AND LEFT END OF SLOT IN RELEASE LEVER DOWNSTOP BRACKET.

Figure 5-23. Typing Reperforator, Function Mechanism

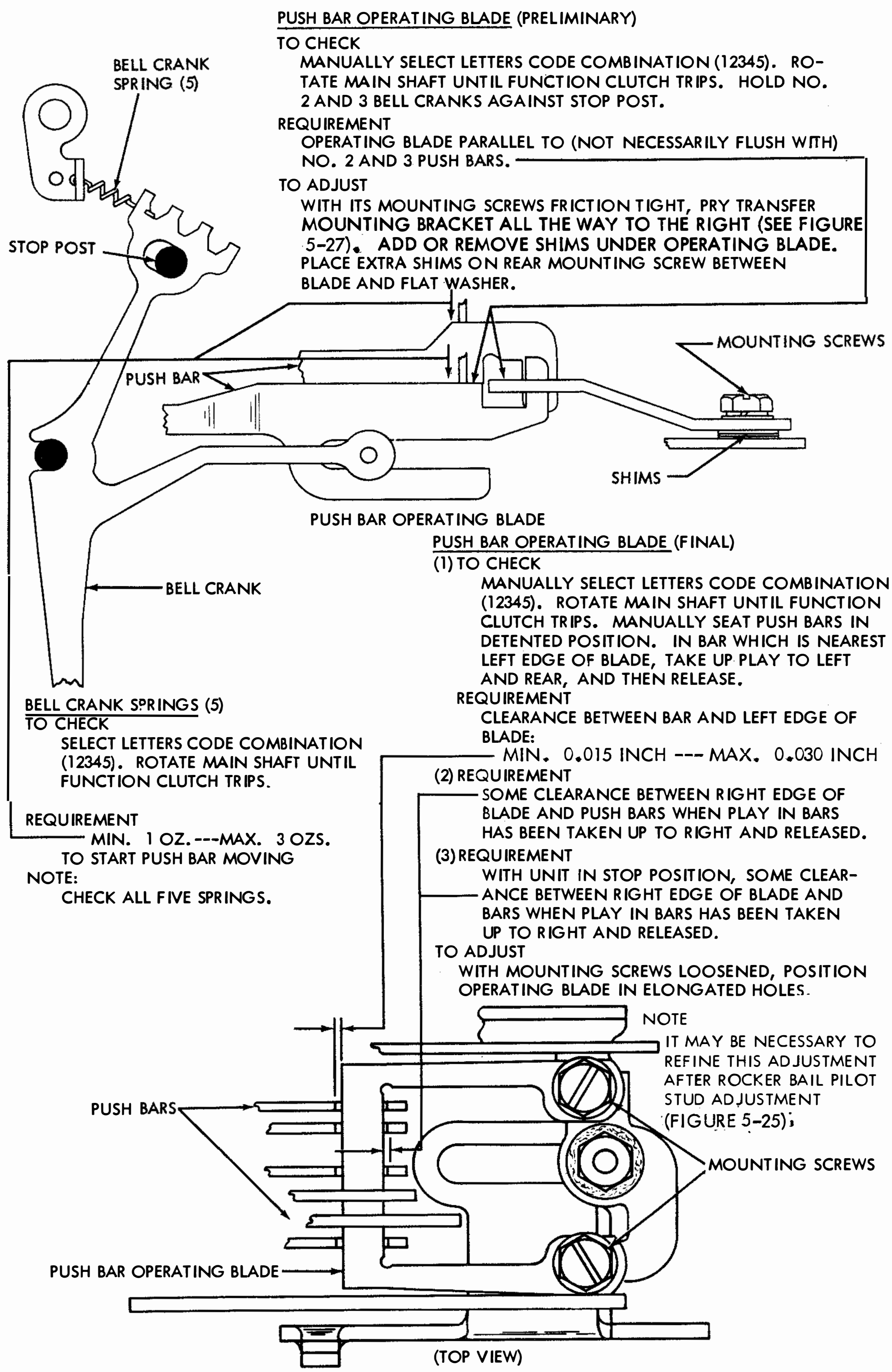
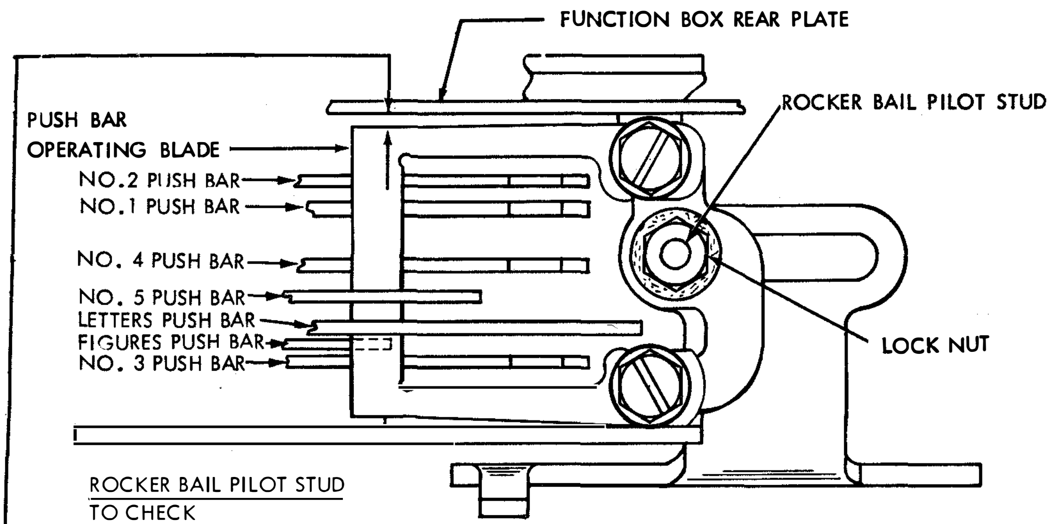


Figure 5-24. Typing Reperforator, Function Mechanism



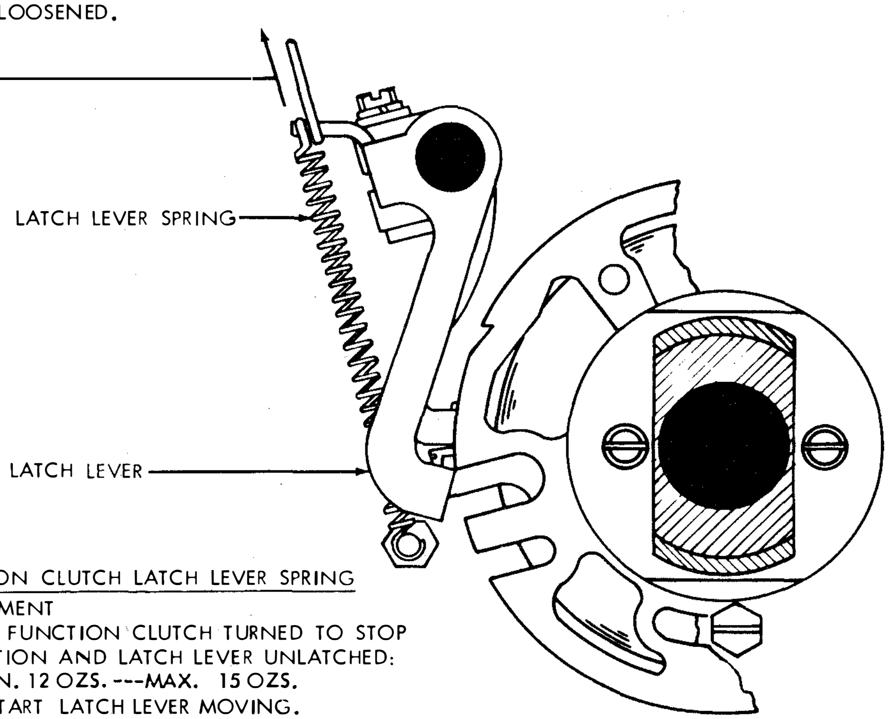
(TOP VIEW)

ROCKER BAIL PILOT STUD

TO CHECK
SELECT BLANK COMBINATION. POSITION ROCKER BAIL THROUGH A COMPLETE CYCLE TO INSURE THE CLEARANCE IS A MINIMUM.

REQUIREMENT
CLEARANCE BETWEEN FUNCTION BOX REAR PLATE AND PUSH BAR OPERATING BLADE:
MIN. 0.005 INCH --- MAX. 0.020 INCH
AT A POINT IN THE CYCLE AND WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MINIMUM.

TO ADJUST
POSITION ROCKER BAIL PILOT STUD IN ELONGATED HOLE WITH LOCK NUT LOOSENED.



FUNCTION CLUTCH LATCH LEVER SPRING

REQUIREMENT
WITH FUNCTION CLUTCH TURNED TO STOP POSITION AND LATCH LEVER UNLATCHED:
MIN. 12 OZS. --- MAX. 15 OZS.
TO START LATCH LEVER MOVING.

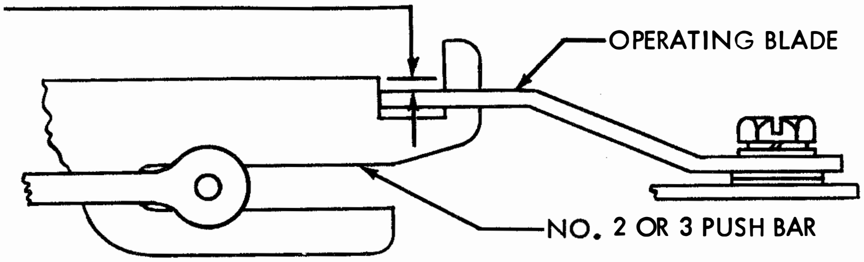
(REAR VIEW)

Figure 5-25. Typing Reperforator, Function Mechanism

FUNCTION BOX

REQUIREMENT

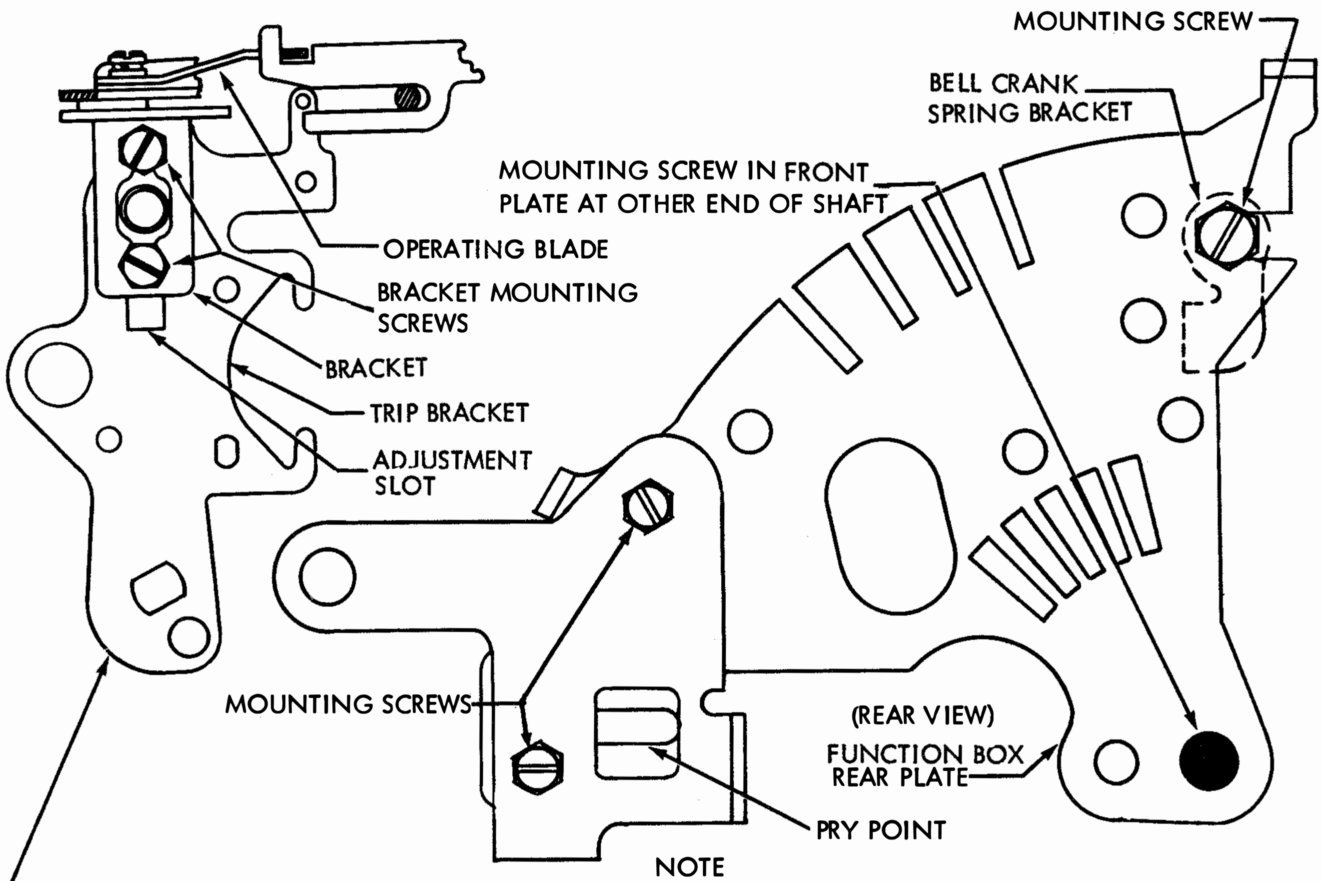
MANUALLY SELECT LETTERS CODE COMBINATION (12345). ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS, AND PUNCH SLIDES ARE DISENGAGED FROM LATCHES. THE TOP OF THE OPERATING BLADE SHALL BE FLUSH --- MAX. 0.020 INCH



BELOW THE TOPS OF THE NO. 2 AND 3 PUSH BARS. TAKE UP PLAY IN PUSHBARS IN A DOWNWARD DIRECTION THEN RELEASE.

TO ADJUST

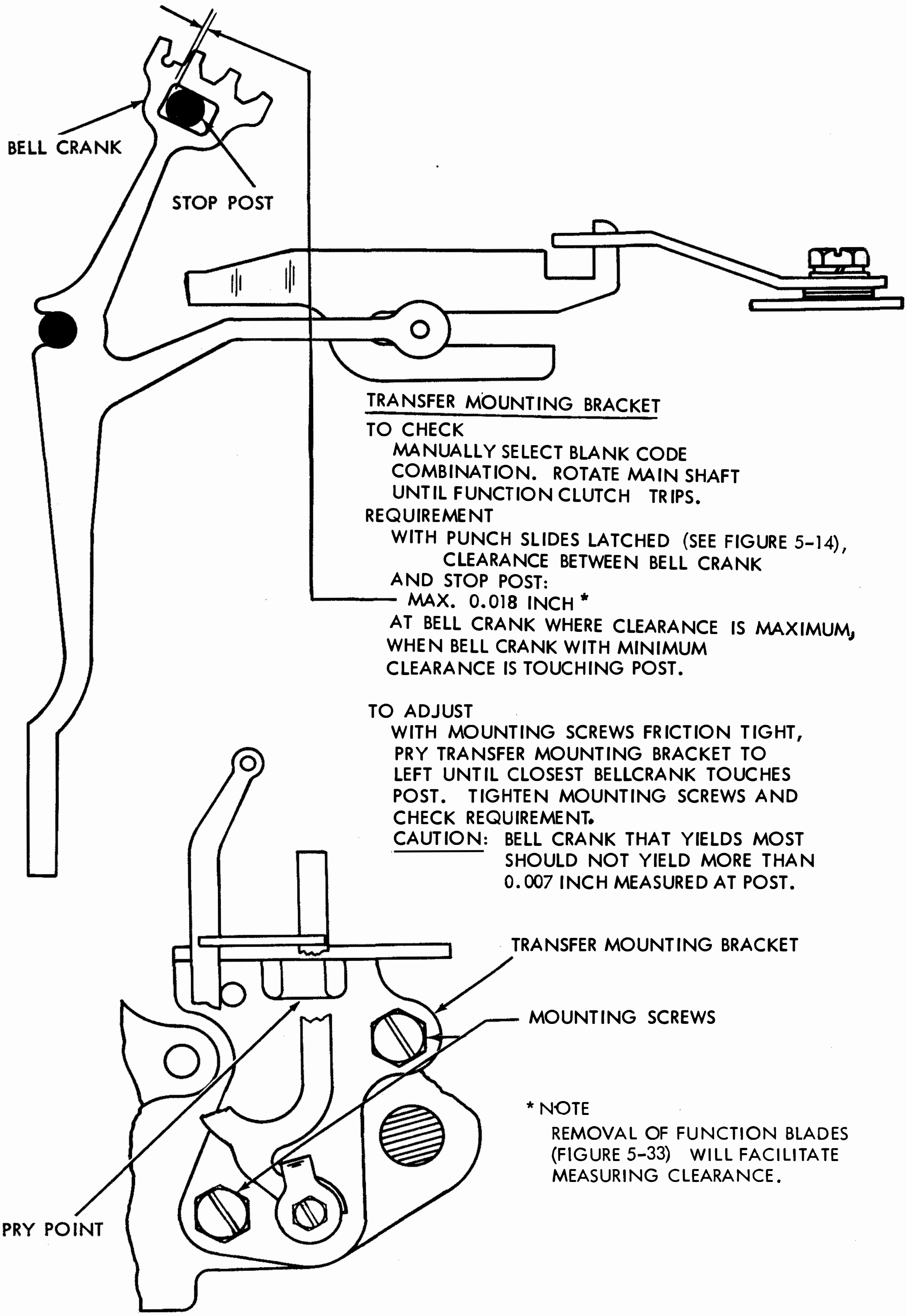
WITH THREE MOUNTING SCREWS IN REAR PLATE AND ONE MOUNTING SCREW IN FRONT PLATE LOOSENED, POSITION FUNCTION BOX BY MEANS OF PRY POINT. CHECK POSITION OF BELL CRANK SPRING BRACKET.



NOTE

ON UNITS EQUIPPED WITH TWO-PIECE TRIP BRACKET, SET ABOVE ADJUSTMENT IN CENTER OF ITS RANGE AND TIGHTEN SCREWS. LOOSEN TWO SCREWS WHICH MOUNT GUIDE TO BRACKET AND POSITION GUIDE TO MEET ABOVE REQUIREMENT.

Figure 5-26. Typing Reperforator, Function Box Mechanism



TRANSFER MOUNTING BRACKET

TO CHECK
MANUALLY SELECT BLANK CODE COMBINATION. ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH TRIPS.

REQUIREMENT
WITH PUNCH SLIDES LATCHED (SEE FIGURE 5-14), CLEARANCE BETWEEN BELL CRANK AND STOP POST:
MAX. 0.018 INCH *
AT BELL CRANK WHERE CLEARANCE IS MAXIMUM, WHEN BELL CRANK WITH MINIMUM CLEARANCE IS TOUCHING POST.

TO ADJUST
WITH MOUNTING SCREWS FRICTION TIGHT, PRY TRANSFER MOUNTING BRACKET TO LEFT UNTIL CLOSEST BELLCRANK TOUCHES POST. TIGHTEN MOUNTING SCREWS AND CHECK REQUIREMENT.
CAUTION: BELL CRANK THAT YIELDS MOST SHOULD NOT YIELD MORE THAN 0.007 INCH MEASURED AT POST.

* NOTE
REMOVAL OF FUNCTION BLADES (FIGURE 5-33) WILL FACILITATE MEASURING CLEARANCE.

Figure 5-27. Typing Reperforator, Transfer Mechanism

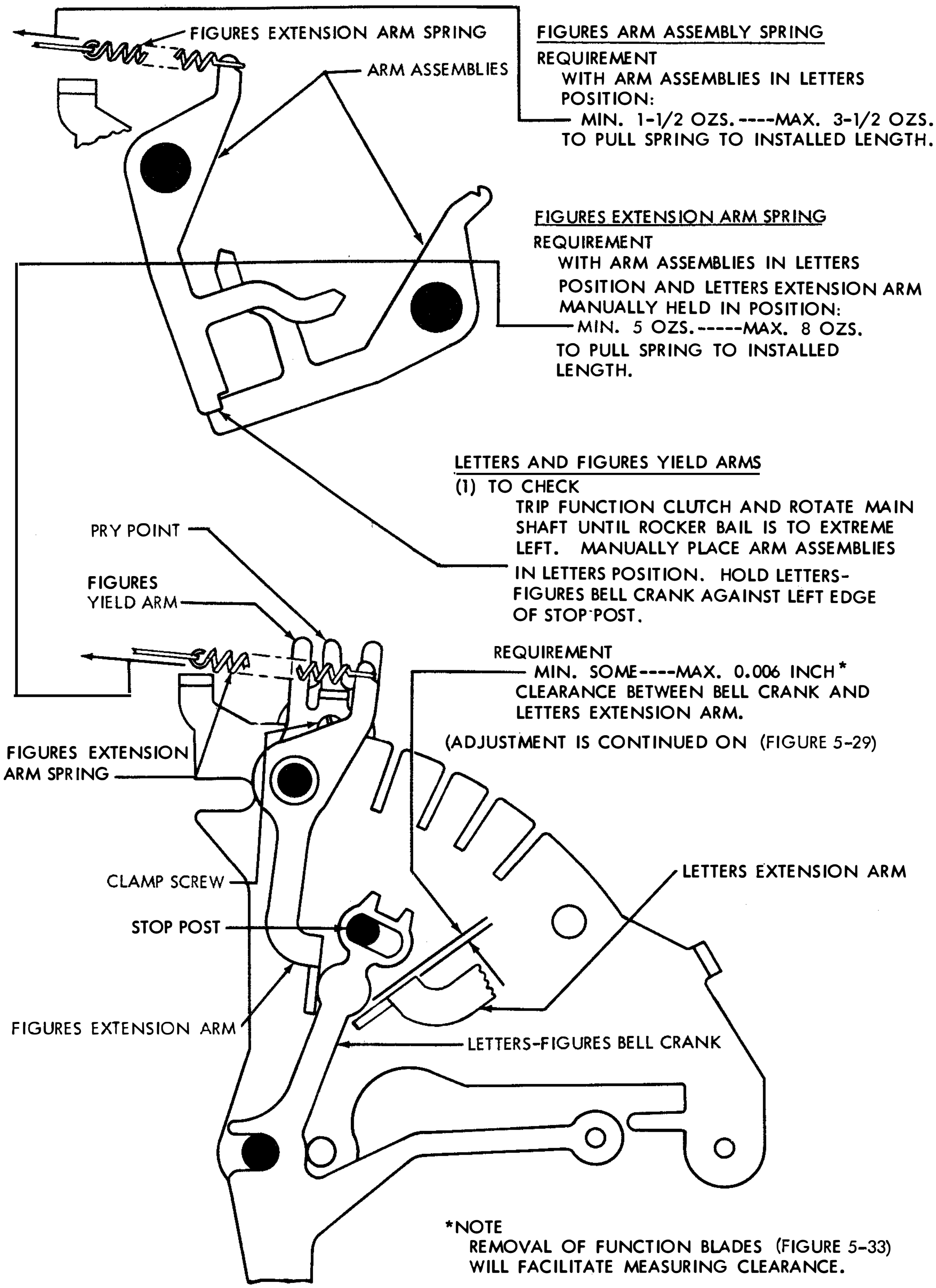
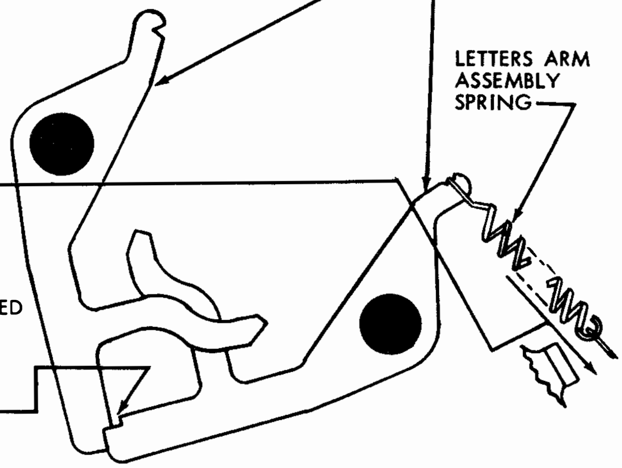


Figure 5-28. Typing Reperforator, Function Box Mechanism



LETTERS ARM ASSEMBLY SPRING

REQUIREMENT
WITH ARM ASSEMBLIES IN FIGURES POSITION:
MIN. 1-1/2 OZS.----MAX. 3-1/2 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

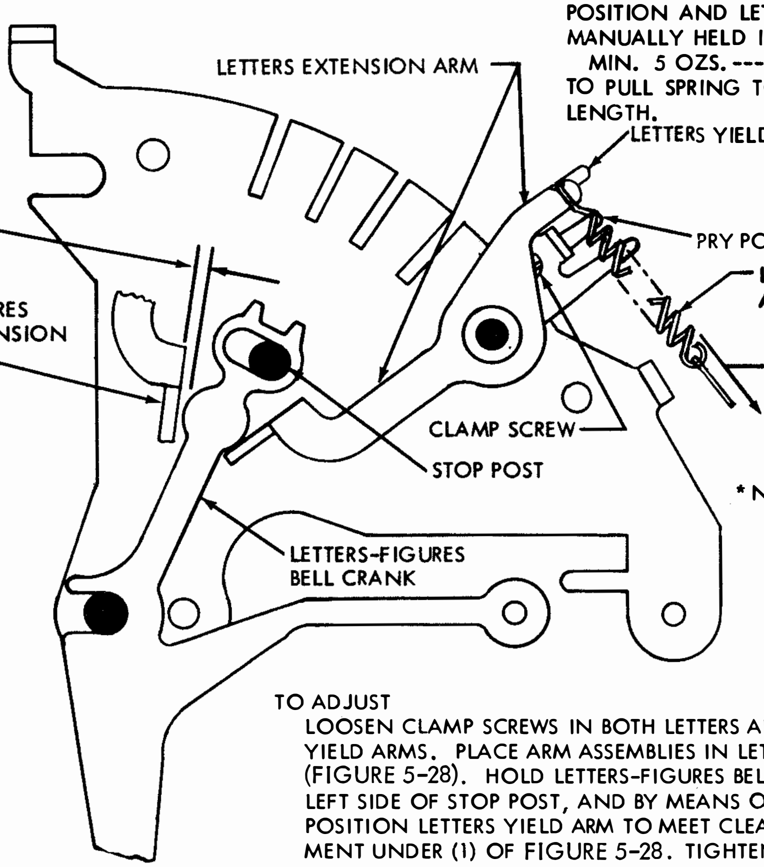
LETTERS AND FIGURES YIELD ARMS (CONTINUED FROM FIGURE 5-28)

(2) TO CHECK
MANUALLY PLACE ARM ASSEMBLIES IN FIGURES POSITION.

REQUIREMENT
MIN. SOME----MAX. 0.006 INCH*
CLEARANCE BETWEEN BELL CRANK AND FIGURES EXTENSION ARM.

LETTERS EXTENSION ARM SPRING

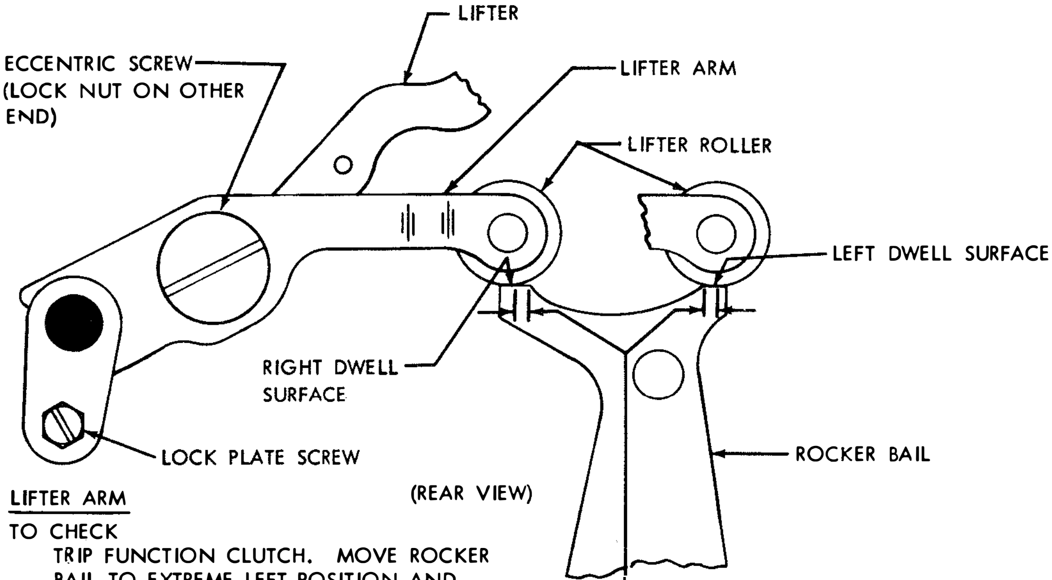
REQUIREMENT
WITH ARM ASSEMBLIES IN FIGURES POSITION AND LETTERS EXTENSION ARM MANUALLY HELD IN POSITION
MIN. 5 OZS.----MAX. 8 OZS.
TO PULL SPRING TO INSTALLED LENGTH.



* NOTE:
REMOVAL OF FUNCTION BLADES (FIGURE 5-30) WILL FACILITATE MEASURING CLEARANCE.

TO ADJUST
LOOSEN CLAMP SCREWS IN BOTH LETTERS AND FIGURES YIELD ARMS. PLACE ARM ASSEMBLIES IN LETTERS POSITION (FIGURE 5-28). HOLD LETTERS-FIGURES BELL CRANK AGAINST LEFT SIDE OF STOP POST, AND BY MEANS OF PRY POINT, POSITION LETTERS YIELD ARM TO MEET CLEARANCE REQUIREMENT UNDER (1) OF FIGURE 5-28. TIGHTEN LETTERS YIELD ARM CLAMP SCREW.
PLACE ARM ASSEMBLIES IN FIGURES POSITION. HOLD LETTERS-FIGURES BELL CRANK AGAINST RIGHT SIDE OF STOP POST, AND BY MEANS OF PRY POINT POSITION FIGURES YIELD ARM (FIGURE 5-28) TO MEET REQUIREMENT UNDER (2) ABOVE. TIGHTEN FIGURES YIELD ARM CLAMP SCREW.
CAUTION: ARM ASSEMBLIES MAY CHANGE POSITION DURING ADJUSTMENT. AS TIGHTENING OF SCREWS MAY AFFECT ADJUSTMENT, RECHECK REQUIREMENTS.

Figure 5-29. Typing Reperforator, Function Box Mechanism



LIFTER ARM

TO CHECK

TRIP FUNCTION CLUTCH. MOVE ROCKER BAIL TO EXTREME LEFT POSITION AND OBSERVE TRAVEL OF LIFTER ROLLER ON RIGHT DWELL SURFACE. MOVE ROCKER BAIL TO EXTREME RIGHT POSITION AND OBSERVE TRAVEL OF ROLLER ON LEFT DWELL SURFACE.

REQUIREMENT

APPROXIMATELY EQUAL TRAVEL ON EACH DWELL SURFACE.

TO ADJUST

LOOSEN LOCK PLATE SCREW UNTIL FRICTION TIGHT. WITH ECCENTRIC SCREW LOCK NUT FRICTION TIGHT, POSITION LIFTER ARM ON LIFTER. TIGHTEN LOCK PLATE SCREW. DO NOT TIGHTEN LOCK NUT.

LIFTER ARM ECCENTRIC SCREW

REQUIREMENT

(1) WITH FUNCTION CLUTCH DISENGAGED; CLEARANCE BETWEEN CLOSEST PROJECTION OF BELL CRANKS AND ASSOCIATED LETTERS OR FIGURES FUNCTION BLADE PROJECTION:
MIN. 0.008 INCH----MAX. 0.020 INCH

(2) FOR FUNCTION BLADES OTHER THAN LETTERS OR FIGURES IF UNIT IS SO EQUIPPED:
MIN. 0.005 INCH

TO ADJUST

POSITION LIFTER ARM ECCENTRIC SCREW WITH LOCK NUT LOOSENED.

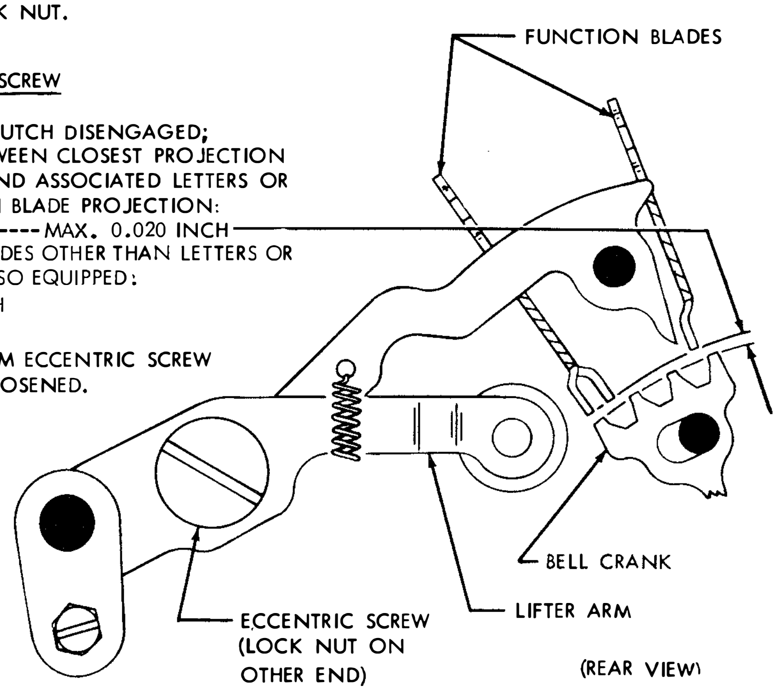
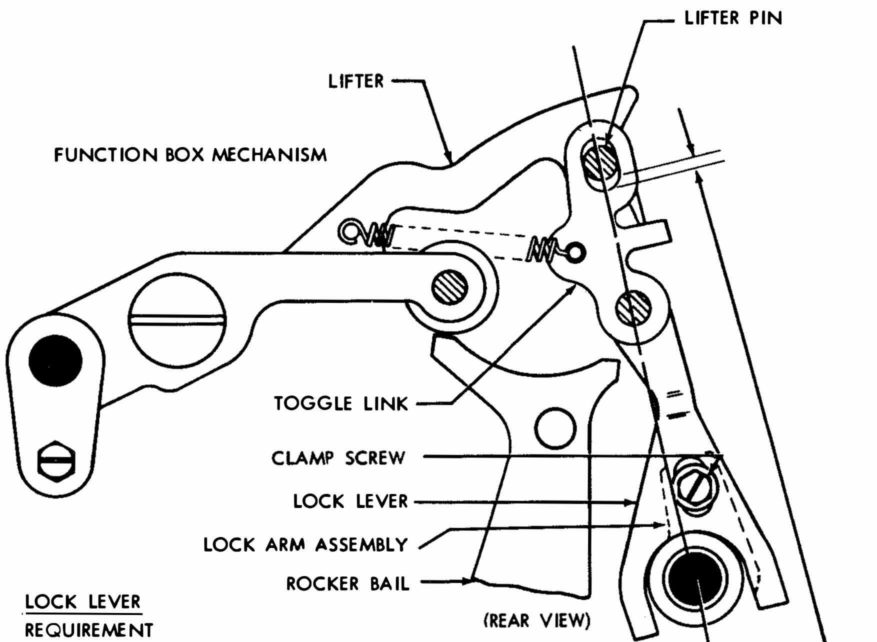


Figure 5-30. Typing Reperforator, Function Box Mechanism



LOCK LEVER

REQUIREMENT

(1) WITH LETTERS CODE COMBINATION (12345) SELECTED AND ROCKER BAIL TO EXTREME LEFT, TOGGLE LINKAGE SHOULD MOVE THROUGH POINT WHERE TOGGLE LINK AND LOCK LEVER ARE IN STRAIGHT LINE WITHOUT RAISING LIFTER.

(2) WITH TOGGLE LINK AND LOCK LEVER IN STRAIGHT LINE, CLEARANCE BETWEEN TOGGLE LINK AND LIFTER PIN (WITH RETAINING RING REMOVED):

MIN. SOME ----MAX. 0.015 INCH

TO ADJUST

POSITION LOCK LEVER ON LOCK ARM ASSEMBLY WITH CLAMP SCREW FRICTION TIGHT.

NOTE:

TO AVOID INTERFERENCE WITH LOCK LEVER, IT MAY BE NECESSARY TO MOVE HIGH PART OF CORRECTING DRIVE LINK ECCENTRIC BUSHING (SEE FIGURE 5-37) ABOVE HORIZONTAL CENTER LINE.

NO. 5 PULSE BEAM SPRING

REQUIREMENT

MIN. 10 OZS.---MAX. 15 OZS. TO PULL SPRING TO LENGTH OF 7/16 INCH.

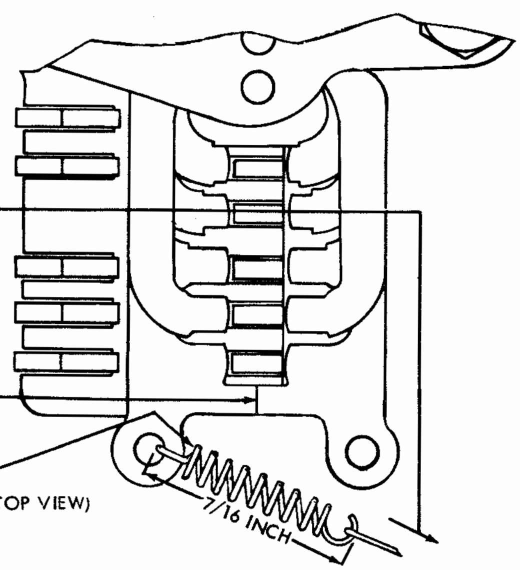


Figure 5-31. Typing Reperforator, Function Box and Transfer Mechanisms

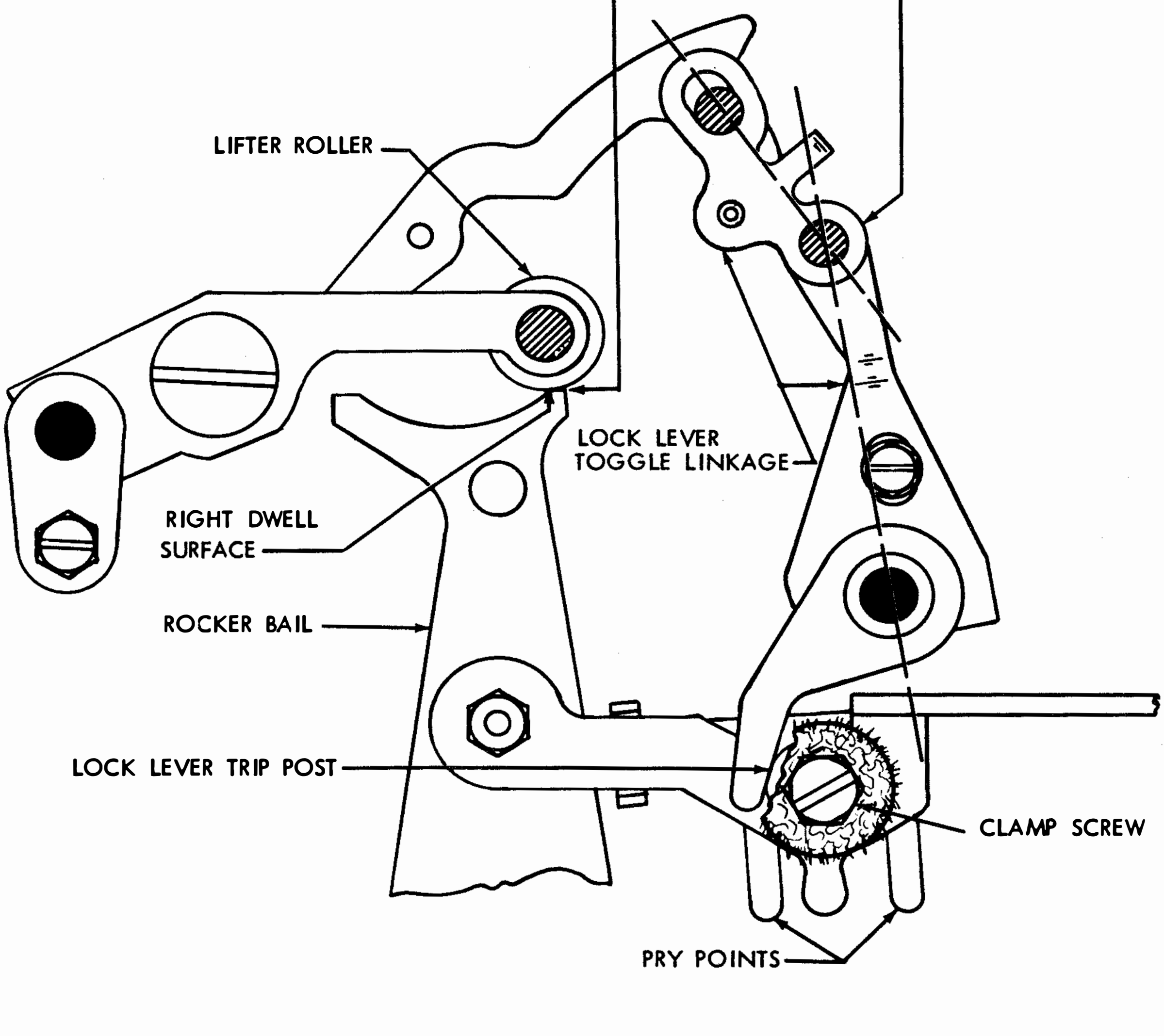
LOCK LEVER TRIP POST

REQUIREMENT

AS ROCKER BAIL APPROACHES EXTREME RIGHT POSITION, LOCK LEVER TOGGLE LINKAGE SHOULD BREAK AND LIFTER ROLLER SHOULD DROP ONTO RIGHT DWELL SURFACE.

TO ADJUST

BY MEANS OF PRY POINTS, POSITION LOCK LEVER TRIP POST WITH CLAMP SCREW LOOSENED.



(REAR VIEW)

Figure 5-32. Typing Reperforator, Lock Lever Trip Post

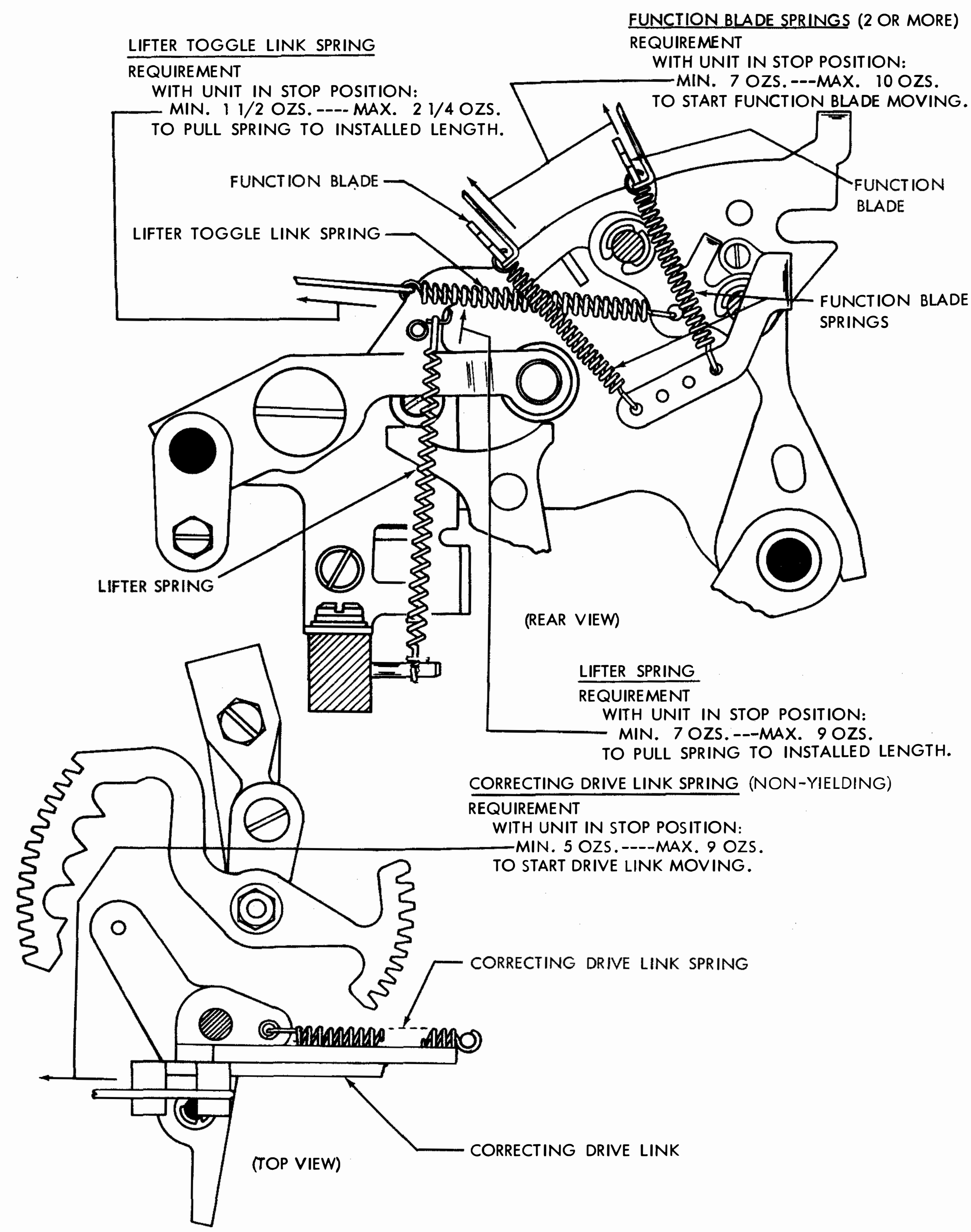


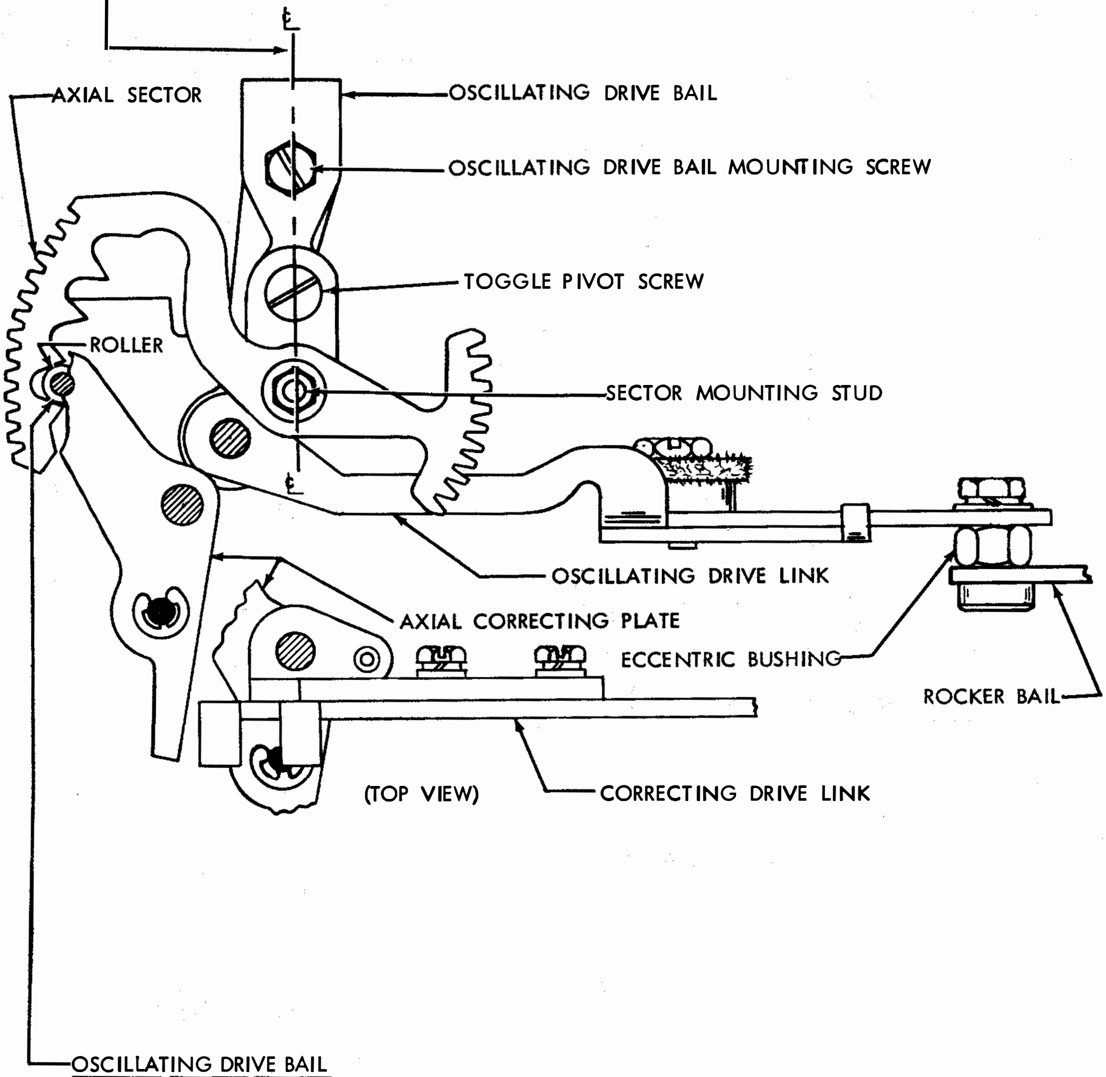
Figure 5-33. Typing Reperforator, Function Box and Correcting Mechanisms

OSCILLATING DRIVE LINK

TO CHECK
POSITION ROCKER BAIL TO ITS EXTREME LEFT.

REQUIREMENT
SECTOR MOUNTING STUD, TOGGLE PIVOT SCREW AND OSCILLATING DRIVE BAIL MOUNTING SCREW SHOULD APPROXIMATELY LINE UP.

TO ADJUST
POSITION OSCILLATING DRIVE LINK BY MEANS OF ITS ECCENTRIC BUSHING.



OSCILLATING DRIVE BAIL

REQUIREMENT
WITH "BLANK" COMBINATION SELECTED, ROTATE MAIN SHAFT, TAKING UP AXIAL PLAY IN TYPE WHEEL SHAFT TOWARD FRONT OF UNIT, THE AXIAL CORRECTOR ROLLER SHALL ENTER THE FIRST NOTCH OF THE SECTOR CENTRALLY.

TO ADJUST
LOOSEN OSCILLATING BAIL ADJUSTING SCREW. SELECT "BLANK" COMBINATION. POSITION OSCILLATING BAIL BY MEANS OF ITS ELONGATED MOUNTING HOLE SO CORRECTOR ROLLER ENTERS FIRST NOTCH OF SECTOR WHEN ROCKER BAIL MOVES TO ITS EXTREME LEFT POSITION. HOLD CORRECTOR ROLLER FIRMLY IN FIRST NOTCH AND TAKE UP PLAY IN OSCILLATING BAIL LINKAGE BY APPLYING A FORCE TO OSCILLATING BAIL TOWARD REAR OF UNIT. TIGHTEN THE OSCILLATING BAIL ADJUSTING SCREW.

Figure 5-34. Typing Reperforator, Axial Positioning Mechanism

AXIAL SECTOR ALIGNMENT

REQUIREMENT

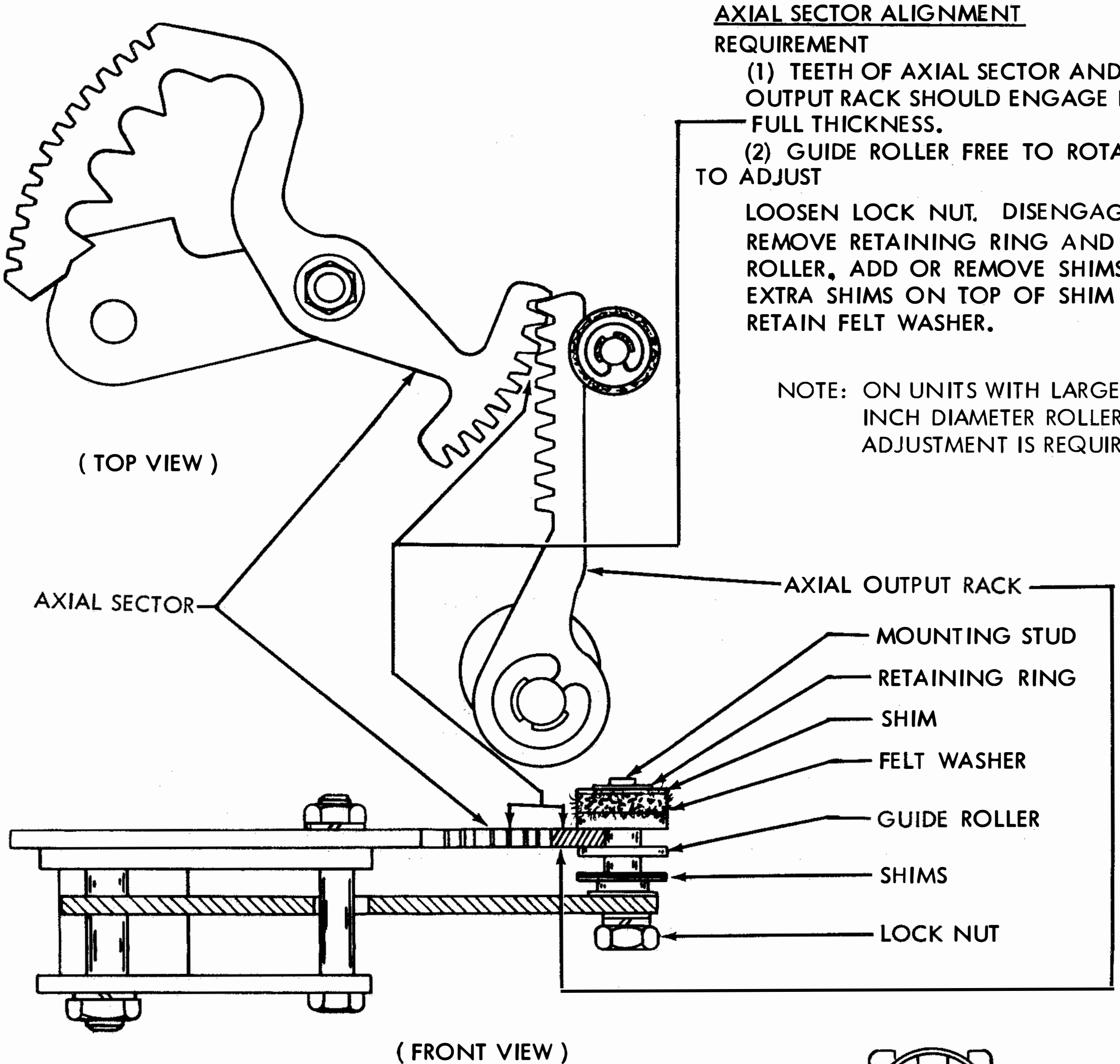
(1) TEETH OF AXIAL SECTOR AND AXIAL OUTPUT RACK SHOULD ENGAGE BY THEIR FULL THICKNESS.

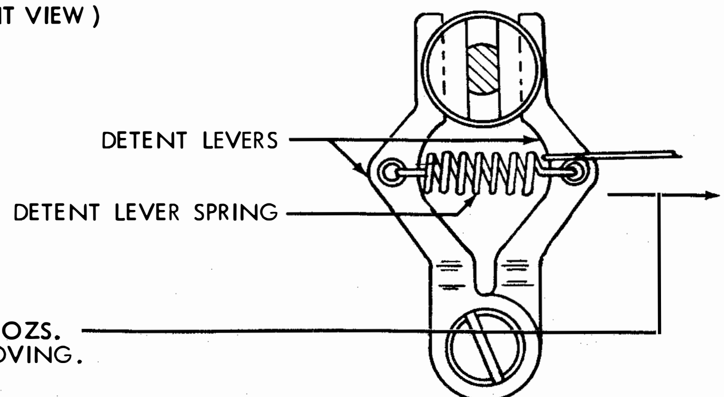
(2) GUIDE ROLLER FREE TO ROTATE.

TO ADJUST

LOOSEN LOCK NUT. DISENGAGE RACK. REMOVE RETAINING RING AND GUIDE ROLLER, ADD OR REMOVE SHIMS. PLACE EXTRA SHIMS ON TOP OF SHIM USED TO RETAIN FELT WASHER.

NOTE: ON UNITS WITH LARGER 0.594 INCH DIAMETER ROLLER NO ADJUSTMENT IS REQUIRED.





ECCENTRIC SHAFT

DETENT LEVER SPRINGS (6)

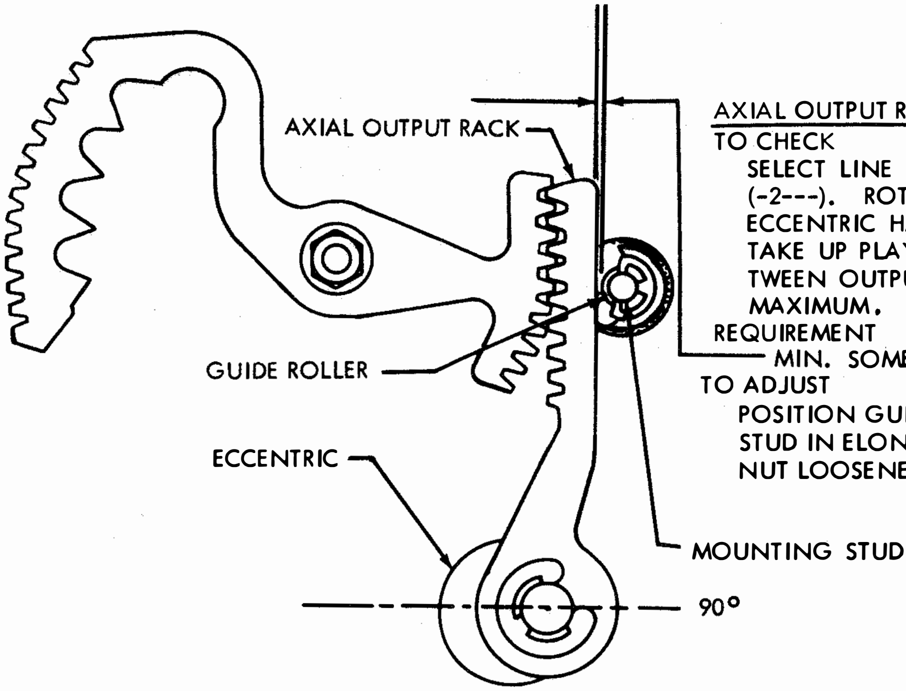
MIN. 7 OZS.---MAX. 10 OZS.
TO START DETENT LEVER MOVING.

NOTE:

CHECK ALL 6 SPRINGS. THERE ARE TWO ON THE AXIAL POSITIONING MECHANISM AND FOUR ON THE ROTARY POSITIONING MECHANISM.

(TOP VIEW OF SPRINGS ON AXIAL POSITIONING MECHANISM)

Figure 5-35. Typing Reperforator, Axial Positioning Mechanism



AXIAL OUTPUT RACK GUIDE ROLLER

TO CHECK

SELECT LINE FEED CODE COMBINATION (-2---). ROTATE MAIN SHAFT UNTIL ECCENTRIC HAS ROTATED 90 DEGREES. TAKE UP PLAY TO MAKE CLEARANCE BETWEEN OUTPUT RACK AND GUIDE ROLLER MAXIMUM.

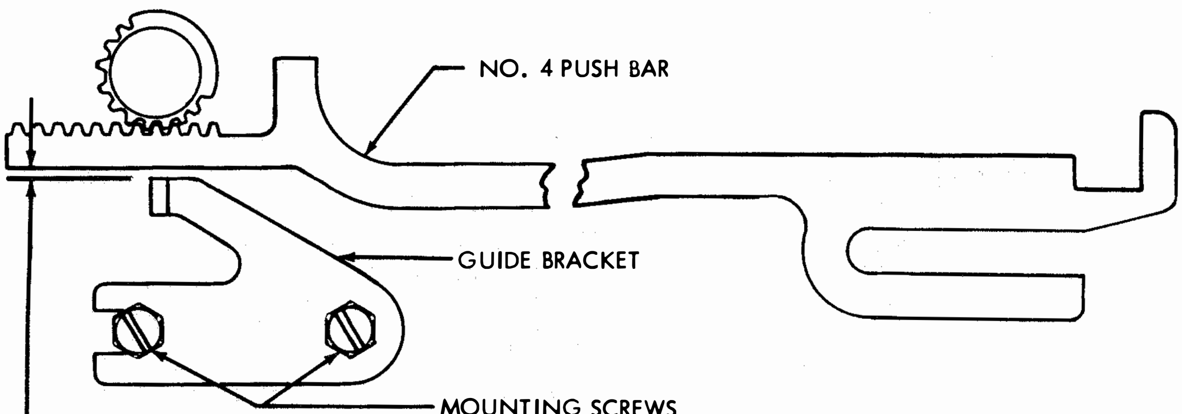
REQUIREMENT

MIN. SOME---------MAX. 0.008 INCH

TO ADJUST

POSITION GUIDE ROLLER MOUNTING STUD IN ELONGATED HOLE WITH LOCK NUT LOOSENED.

(TOP VIEW)



PUSH BAR GUIDE BRACKET

TO CHECK

MANUALLY SELECT CARRIAGE RETURN CODE COMBINATION (---4-). ROTATE MAIN SHAFT SO THAT NO. 4 PUSH BAR MOVES THROUGH COMPLETE RANGE OF TRAVEL.

REQUIREMENT

WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MAXIMUM:

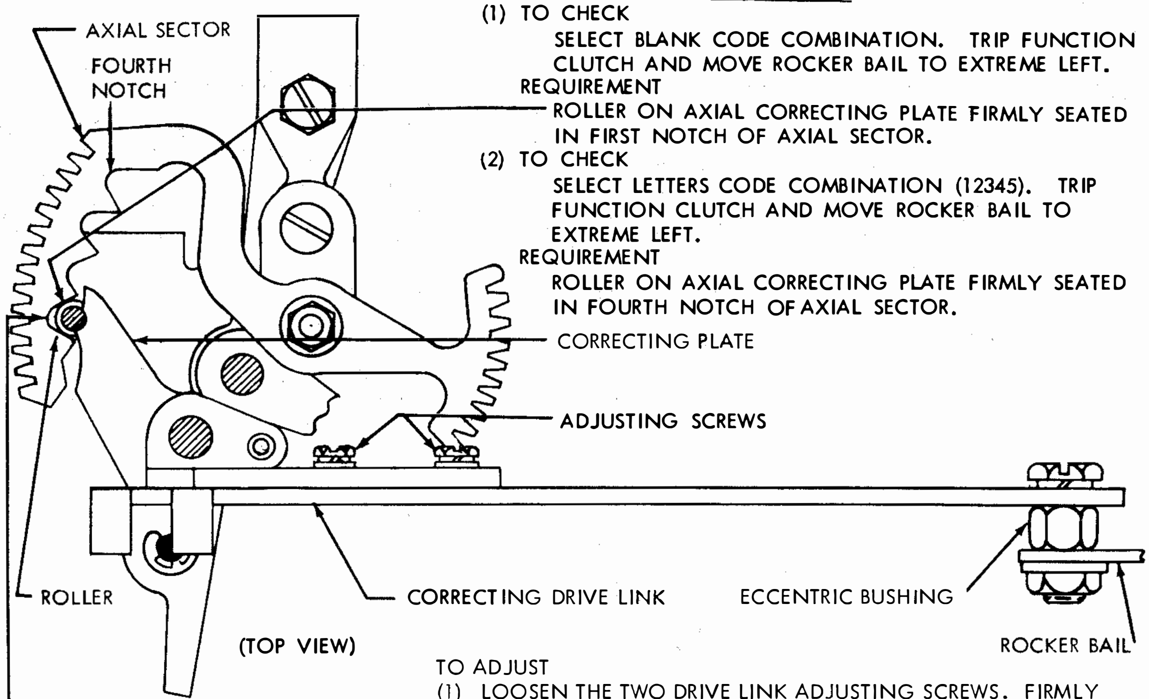
MIN. SOME----MAX. 0.008 INCH

BETWEEN NO. 4 PUSH BAR AND GUIDE BRACKET THROUGHOUT COMPLETE TRAVEL OF BAR.

TO ADJUST

POSITION GUIDE BRACKET WITH MOUNTING SCREWS LOOSENED.

Figure 5-36. Typing Reperforator, Axial and Rotary Positioning Mechanisms



AXIAL CORRECTOR (NON-YIELDING)

(1) TO CHECK

SELECT BLANK CODE COMBINATION. TRIP FUNCTION CLUTCH AND MOVE ROCKER BAIL TO EXTREME LEFT.

REQUIREMENT

ROLLER ON AXIAL CORRECTING PLATE FIRMLY SEATED IN FIRST NOTCH OF AXIAL SECTOR.

(2) TO CHECK

SELECT LETTERS CODE COMBINATION (12345). TRIP FUNCTION CLUTCH AND MOVE ROCKER BAIL TO EXTREME LEFT.

REQUIREMENT

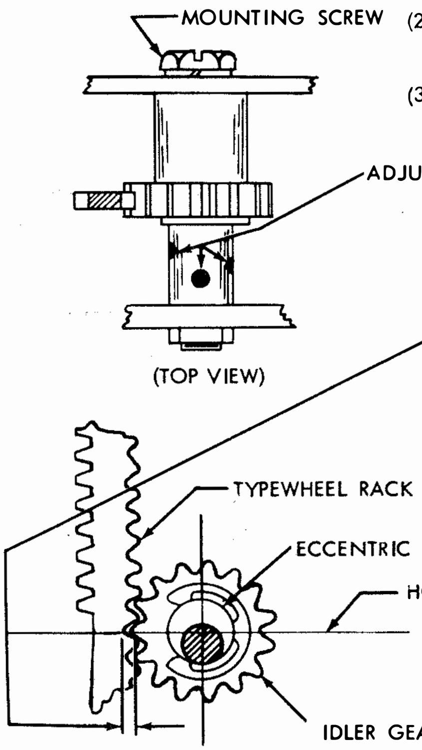
ROLLER ON AXIAL CORRECTING PLATE FIRMLY SEATED IN FOURTH NOTCH OF AXIAL SECTOR.

TO ADJUST

(1) LOOSEN THE TWO DRIVE LINK ADJUSTING SCREWS. FIRMLY SEAT THE AXIAL CORRECTOR ROLLER INTO THE FIRST NOTCH OF THE SECTOR BY MANUALLY APPLYING AND HOLDING THIS POSITION FOR THE NEXT PART OF THE ADJUSTMENT.

(2) APPLY A MANUAL PRESSURE ON THE DRIVE LINK SUCH THAT THE SLOT IN THE LINK WILL BOTTOM AGAINST THE BUSHING OF THE ROCKER BAIL.

(3) MAINTAINING PRESSURE AT THESE TWO PLACES. TIGHTEN ADJUSTING SCREWS.



IDLER GEAR ECCENTRIC SHAFT

REQUIREMENT

WITH UNIT IN LETTERS CONDITION AND FUNCTION CLUTCH DISENGAGED;

MIN. SOME ----- MAX. 0.015 INCH

CLEARANCE BETWEEN TYPEWHEEL RACK TOOTH AND IDLER GEAR TOOTH.

TO ADJUST

WITH MOUNTING SCREW LOOSENED, POSITION IDLER GEAR ECCENTRIC SHAFT BY MEANS OF THREE ADJUSTING HOLES. CHECK RACK THROUGHOUT ITS TRAVEL FOR BINDS.

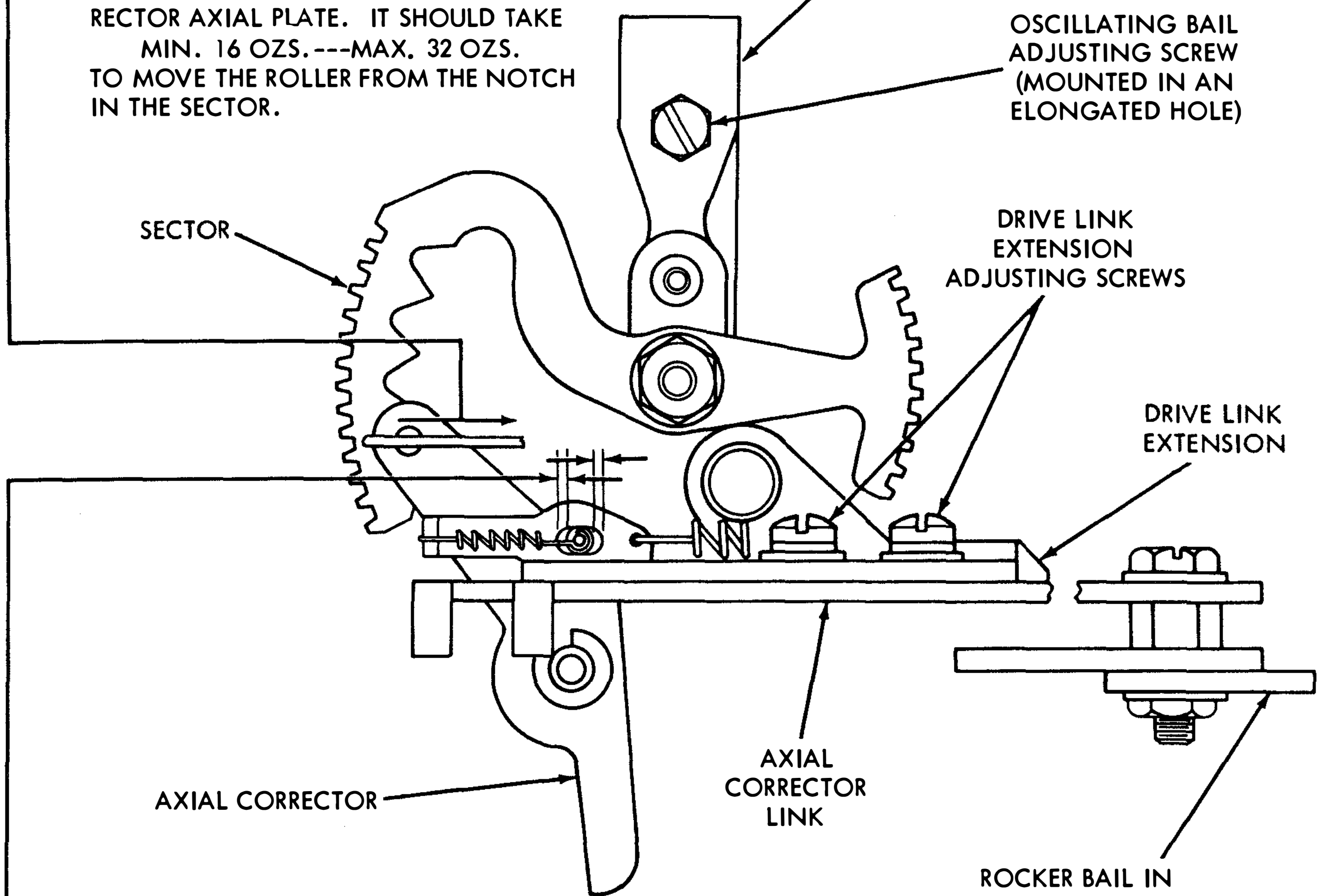
Figure 5-37. Typing Reperforator, Correcting Mechanism

CORRECTOR DRIVE LINK (YIELDING)
EXTENSION SPRING

REQUIREMENT
WITH ALL SPACING CODE COMBINATION SELECTED, THE FUNCTION CLUTCH TRIPPED, AND THE ROCKER BAIL IN ITS EXTREME LEFT POSITION, PLACE A 32 OZS. SPRING HOOK ON THE END OF THE CORRECTOR AXIAL PLATE. IT SHOULD TAKE

MIN. 16 OZS.---MAX. 32 OZS.

TO MOVE THE ROLLER FROM THE NOTCH IN THE SECTOR.



AXIAL CORRECTOR (YIELDING)

REQUIREMENT
WITH ALL SPACING CODE COMBINATION SELECTED, FUNCTION CLUTCH TRIPPED AND ROCKER BAIL IN ITS EXTREME LEFT POSITION THE AXIAL CORRECTOR ROLLER SHOULD SEAT IN THE FIRST SECTOR NOTCH AND THERE SHOULD BE

MIN. 0.005 INCH

BETWEEN THE ENDS OF THE SLOT AND THE SPRING POST. CHECK BOTH SIDES AND CHECK SEATING IN FOURTH NOTCH (LETTERS SELECTION). TURN THE TRU ARC FASTENING THE DRIVE LINK EXTENSION TO THE CORRECTOR PLATE TO CHECK THE MINIMUM REQUIREMENT.

TO ADJUST
LOOSEN TWO DRIVE LINK ADJUSTING SCREWS. POSITION DRIVE LINK TO MEET THE REQUIREMENT AND RETIGHTEN THE SCREWS.

Fig. 5-37A. Typing Reperforator, Correcting Mechanism

ROTARY CORRECTING LEVER

(1) TO CHECK

LOOSEN CORRECTING CLAMP ADJUSTING SCREW. WITH UNIT IN FIGURES CONDITION, SELECT NO. 9 CODE COMBINATION (---45). TRIP FUNCTION CLUTCH AND POSITION ROCKER BAIL TO EXTREME LEFT. MANUALLY SEAT ROTARY CORRECTING LEVER IN TYPE WHEEL RACK.

REQUIREMENT

SECOND TOOTH FROM TOP OF RACK SEATED BETWEEN LOBES OF CORRECTING LEVER.

TO ADJUST

LOOSEN ECCENTRIC BUSHING LOCK NUT. WITH CLAMP ADJUSTING SCREW LOOSENED AND CORRECTING LEVER PIVOT TO RIGHT OF CENTER LINE, POSITION CORRECTING LEVER. TIGHTEN BUSHING LOCK NUT. DO NOT TIGHTEN CLAMP ADJUSTING SCREW AT THIS TIME.

(2) TO CHECK

IN A MANNER SIMILAR TO THAT DESCRIBED ABOVE CHECK ENGAGEMENT OF FIFTH TOOTH (--34- CODE COMBINATION SELECTED IN FIGURES CONDITION), NINTH TOOTH (---4- CODE COMBINATION SELECTED IN LETTERS CONDITION) AND SIXTEENTH TOOTH (--3-5 CODE COMBINATION SELECTED IN LETTERS CONDITION).

TO ADJUST

REFINE ADJUSTMENT UNDER (1) ABOVE.

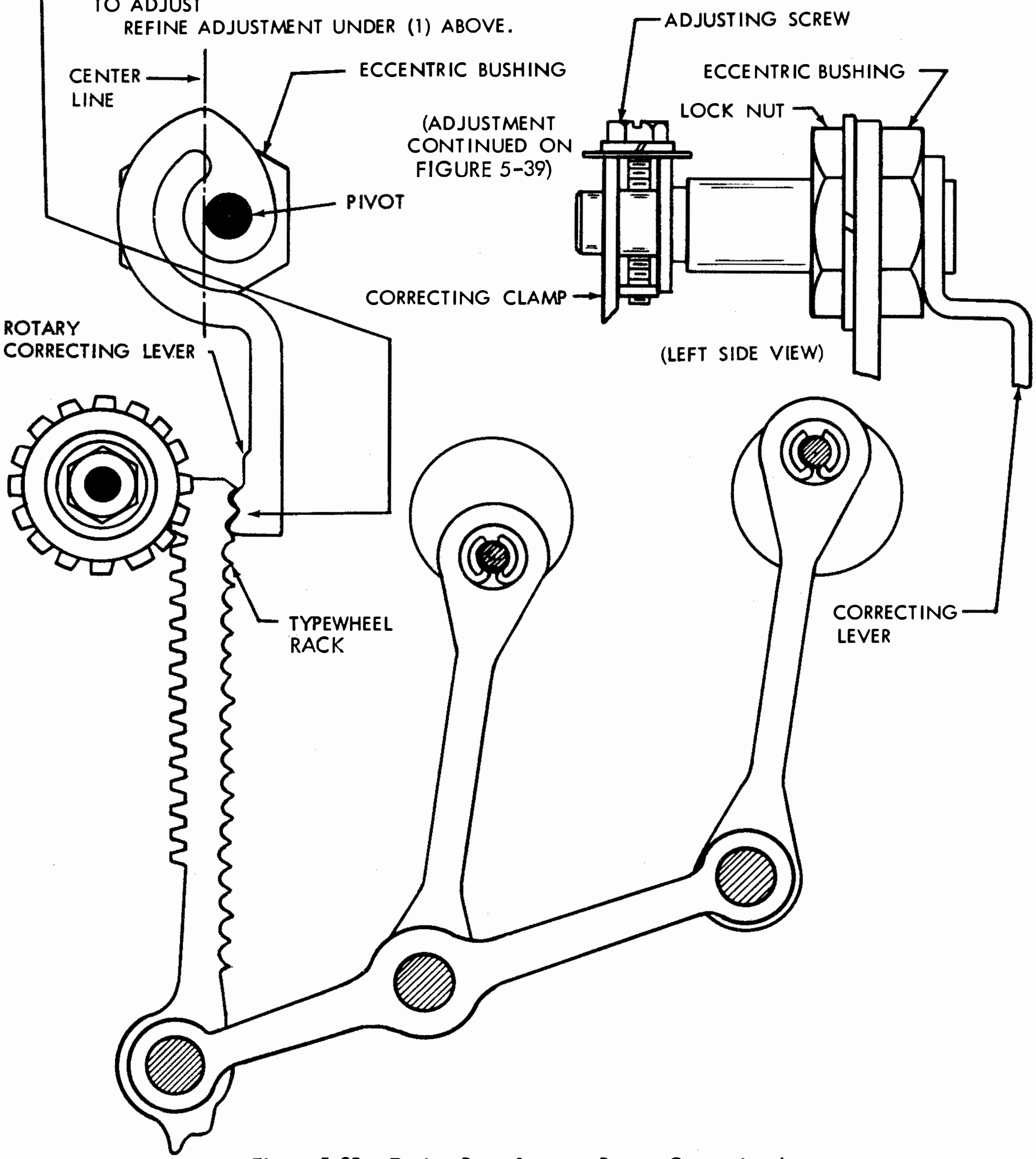
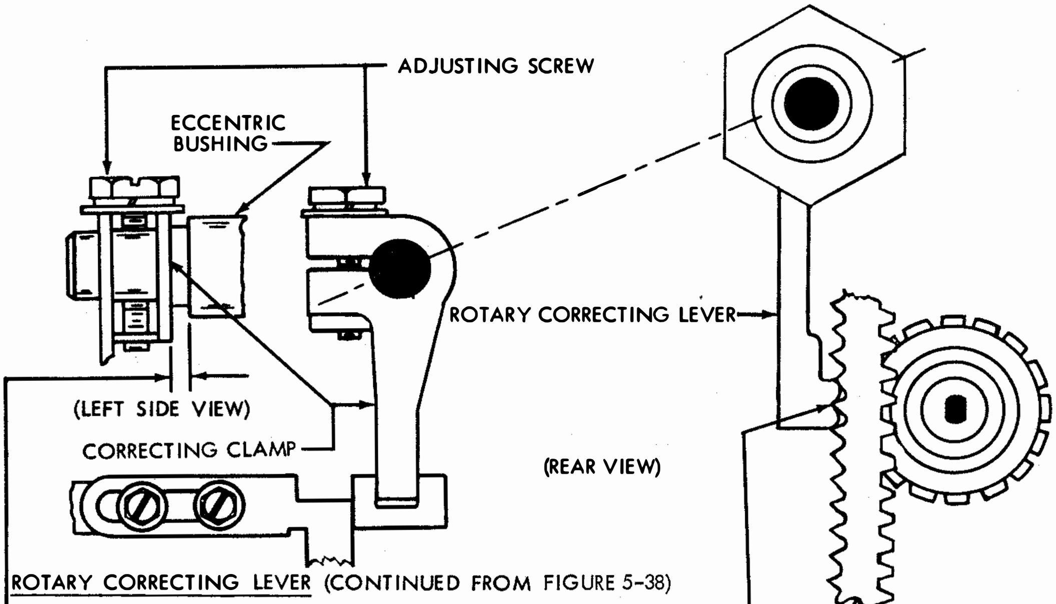


Figure 5-38. Typing Reperforator, Rotary Correcting Lever



ROTARY CORRECTING LEVER (CONTINUED FROM FIGURE 5-38)

(3) TO CHECK

WITH UNIT IN LETTERS CONDITION, SELECT LETTERS CODE COMBINATION (12345). POSITION ROCKER BAIL TO EXTREME LEFT. MANUALLY SEAT CORRECTING LEVER IN RACK.

REQUIREMENT

A. LOBES OF ROTARY CORRECTING LEVER FIRMLY SEATED IN TYPEWHEEL RACK.

B. END PLAY BETWEEN CORRECTING CLAMP AND ECCENTRIC BUSHING:
MIN. SOME----MAX. 0.006 INCH

TO ADJUST

WITH CORRECTING CLAMP ADJUSTING SCREW LOOSENED, TRIP FUNCTION CLUTCH AND ROTATE MAIN SHAFT UNTIL ROLLER ON AXIAL CORRECTING PLATE APPROACHES SEATED POSITION IN NOTCH OF AXIAL SECTOR. WHEN CLEARANCE BETWEEN ROLLER AND SECTOR IS
MIN. SOME----MAX. 0.005 INCH
POSITION CORRECTING LEVER FINGER-TIGHT AGAINST RACK. TIGHTEN CORRECTING CLAMP ADJUSTING SCREW.

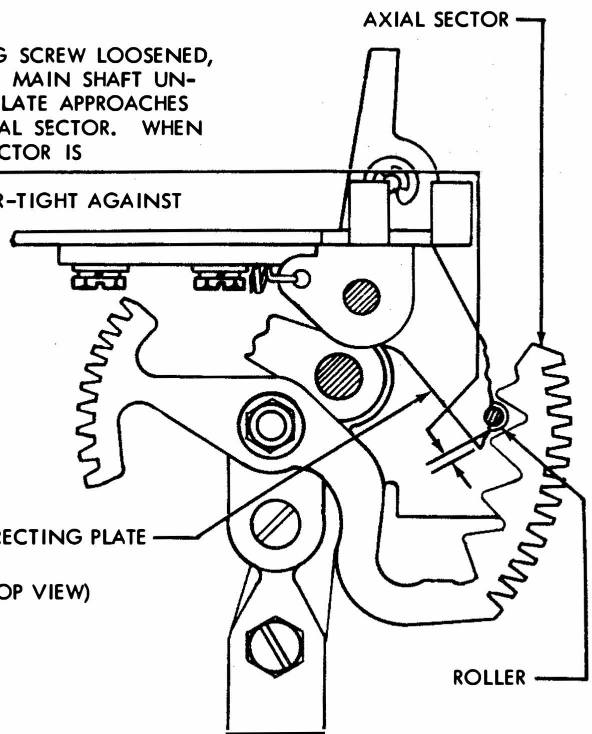
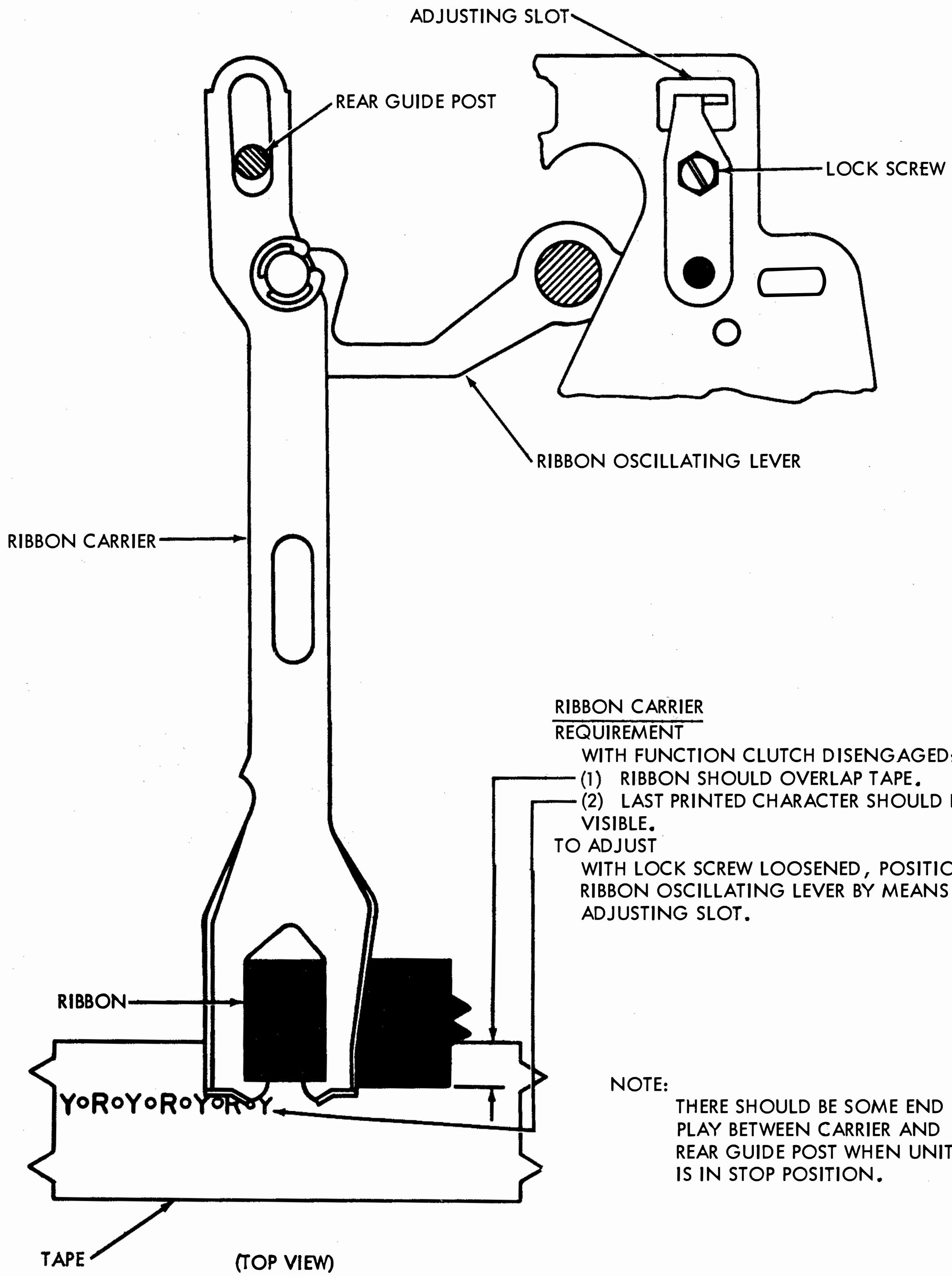


Figure 5-39. Typing Reperforator, Rotary Correcting Lever



RIBBON CARRIER

REQUIREMENT

WITH FUNCTION CLUTCH DISENGAGED:
(1) RIBBON SHOULD OVERLAP TAPE.
(2) LAST PRINTED CHARACTER SHOULD BE VISIBLE.

TO ADJUST

WITH LOCK SCREW LOOSENED, POSITION RIBBON OSCILLATING LEVER BY MEANS OF ADJUSTING SLOT.

NOTE:

THERE SHOULD BE SOME END PLAY BETWEEN CARRIER AND REAR GUIDE POST WHEN UNIT IS IN STOP POSITION.

Figure 5-40. Typing Reperforator, Ribbon Oscillating Mechanism

PRINTING TRIP LINK

TO CHECK

TRIP FUNCTION CLUTCH AND POSITION ROCKER BAIL TO EXTREME LEFT. MANUALLY LIFT ACCELERATOR SO THAT LATCHING SURFACES OF PRINTING LATCH AND ACCELERATOR ARE EVEN.

REQUIREMENT

MIN. SOME --- MAX. 0.015 INCH
CLEARANCE BETWEEN ACCELERATOR AND LATCH.

TO ADJUST

WITH LOCK NUT LOOSENED, POSITION PRINTING TRIP LINK BY MEANS OF ECCENTRIC MOUNTING SCREW. KEEP HIGH PART OF SCREW TO LEFT OF CENTER LINE.

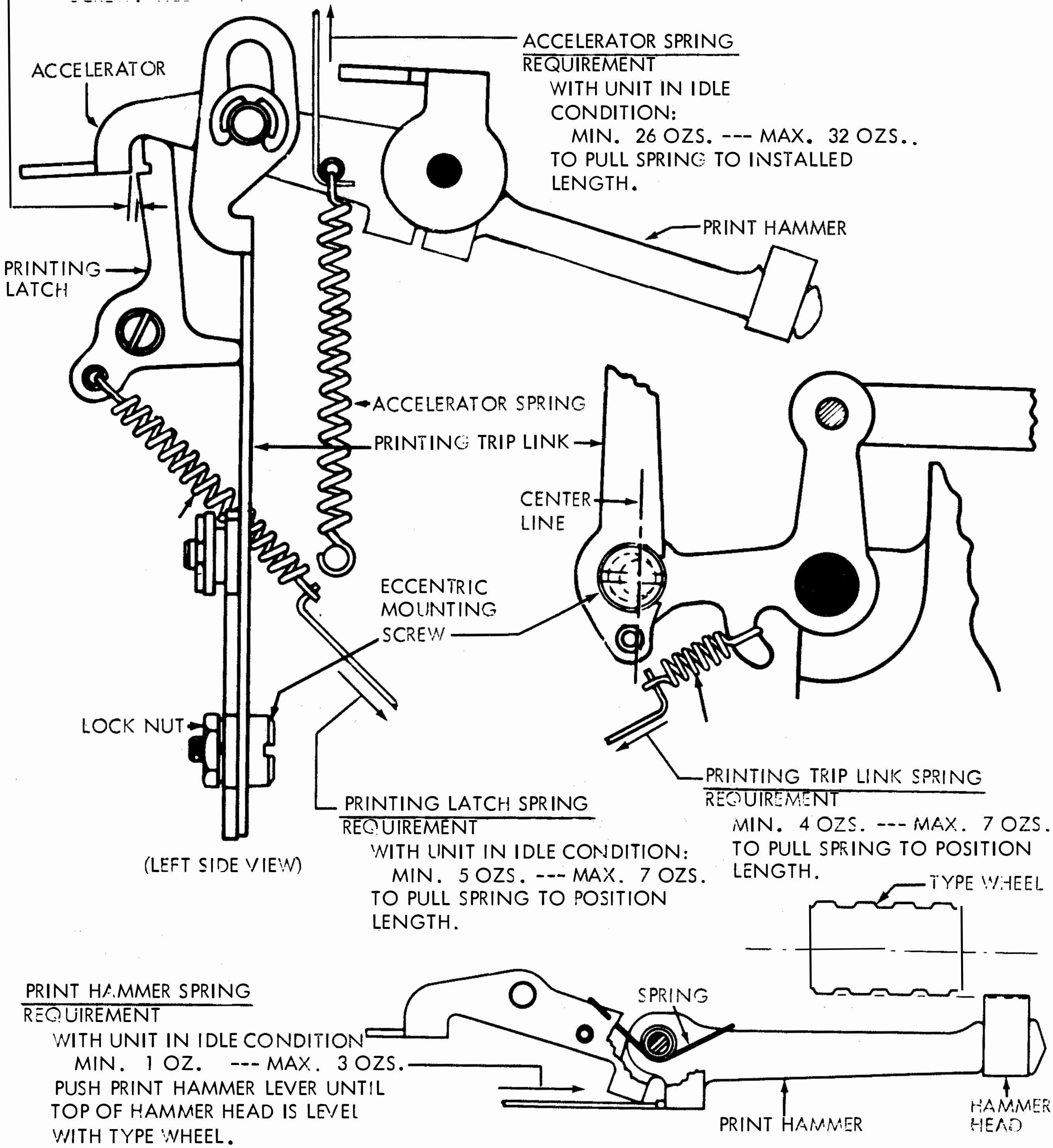


Figure 5-41. Typing Reperforator, Printing Mechanism

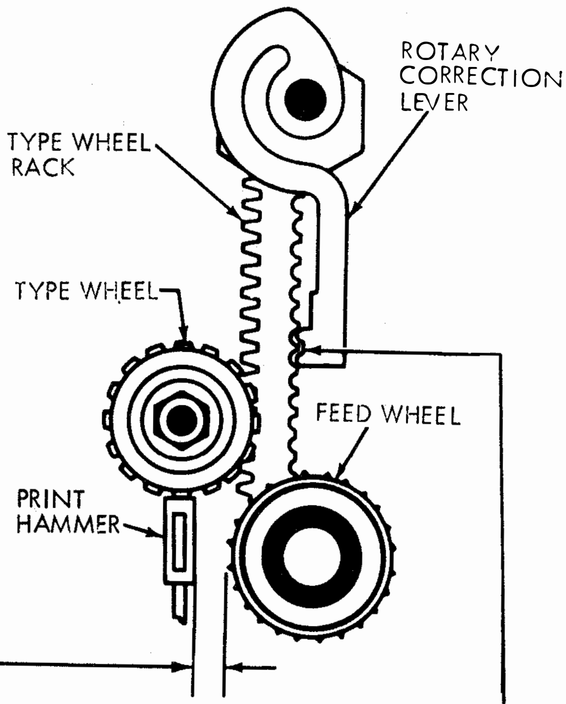
PRINT HAMMER (PRELIMINARY)

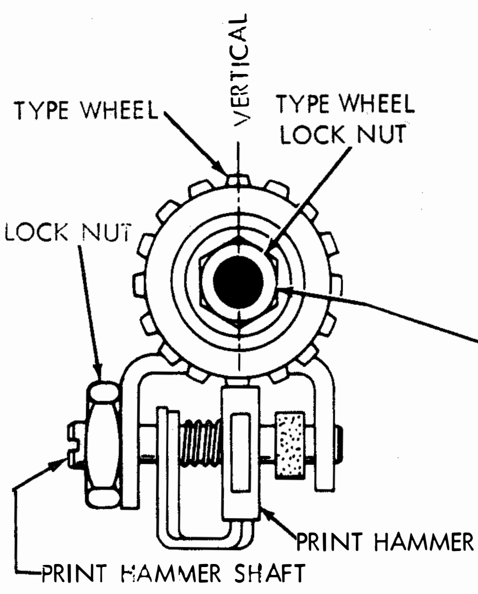
REQUIREMENT

POSITION PRINT HAMMER
MIN. 0.030 INCH --- MAX. 0.040 INCH
FROM THE PIN POINTS ON THE FEED WHEEL.

TO ADJUST

WITH THE PRINT HAMMER SHAFT LOCK NUT LOOSE POSITION THE PRINT HAMMER BY TURNING THE SHAFT CLOCKWISE TO MOVE PRINT HAMMER TOWARD THE FEED WHEEL AND COUNTER CLOCK-WISE TO MOVE THE PRINT HAMMER AWAY FROM THE FEED WHEEL.





FRONT VIEW

TYPE WHEEL POSITIONING AND PRINT HAMMER (FINAL)

REQUIREMENT

WITH "M" CODE COMBINATION (--345) SELECTED, AND ROCKER BAIL IN ITS EXTREME LEFT POSITION CHECK THAT THE ROTARY CORRECTOR IS FIRMLY SEATED IN THE TYPE WHEEL RACK. THE TYPE WHEEL AND PRINT HAMMER ALIGNMENT COULD BE SUCH THAT A FULL CHARACTER IS PRINTED UNIFORMLY BETWEEN THE FEED HOLES.

TO ADJUST

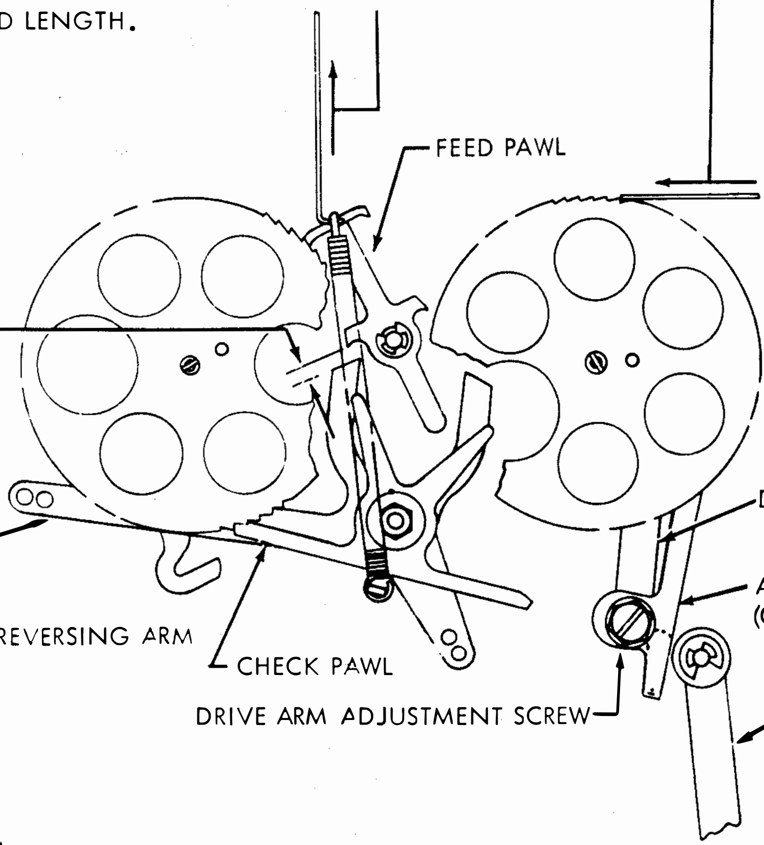
WITH TYPEWHEEL LOCK NUT LOOSE POSITION THE TYPE WHEEL. IF NECESSARY, REFINE THE PRINT HAMMER ADJUSTMENT MAKING CERTAIN THE PRINT HAMMER HEAD DOES NOT COME IN CONTACT WITH THE FEED WHEEL.

Figure 5-42. Typing Reperforator, Printing Mechanism

LATEST DESIGN (FOR EARLIER DESIGN SEE (FIGURES 5-44, 5-45 AND 5-46)

RATCHET WHEEL TORQUE SPRING
REQUIREMENT
MIN. 1 OZS. --- MAX. 3 OZS.
APPLIED TANGENTIALLY TO THE RATCHET WHEEL TO START IT TO ROTATE.

FEED PAWL SPRING
REQUIREMENT
WITH ROCKER BAIL TO EXTREME RIGHT:
MIN. 4 OZS. --- MAX. 6 OZS.
TO PULL FEED PAWL SPRING TO INSTALLED LENGTH.



DRIVE ARM
TO CHECK
POSITION ROCKER BAIL TO EXTREME LEFT. HOLD THE RIBBON REVERSING ARM UNDER LOWER REVERSING EXTENSION OF FEED PAWL.
REQUIREMENT
(1) CLEARANCE BETWEEN BLOCKING EDGE OF RIBBON REVERSE ARM AND REVERSING EXTENSION OF FEED PAWL:
MIN. SOME
(2) CLEARANCE SHALL NOT BE SO GREAT AS TO ALLOW FEED PAWL TO FEED MORE THAN TWO TEETH AT A TIME.
(3) FEED PAWL DETENTED IN BOTH ITS RIGHT AND LEFT POSITION.
TO ADJUST
POSITION DRIVE ARM ADJUSTABLE EXTENSION LEVER WITH ITS MOUNTING SCREW LOOSENED.

Figure 5-43. Typing Reperforator, Ribbon Feed Mechanism Latest Design

LATEST DESIGN (FOR EARLIER DESIGN SEE (FIGURES 5-44, 5-45 AND 5-46)

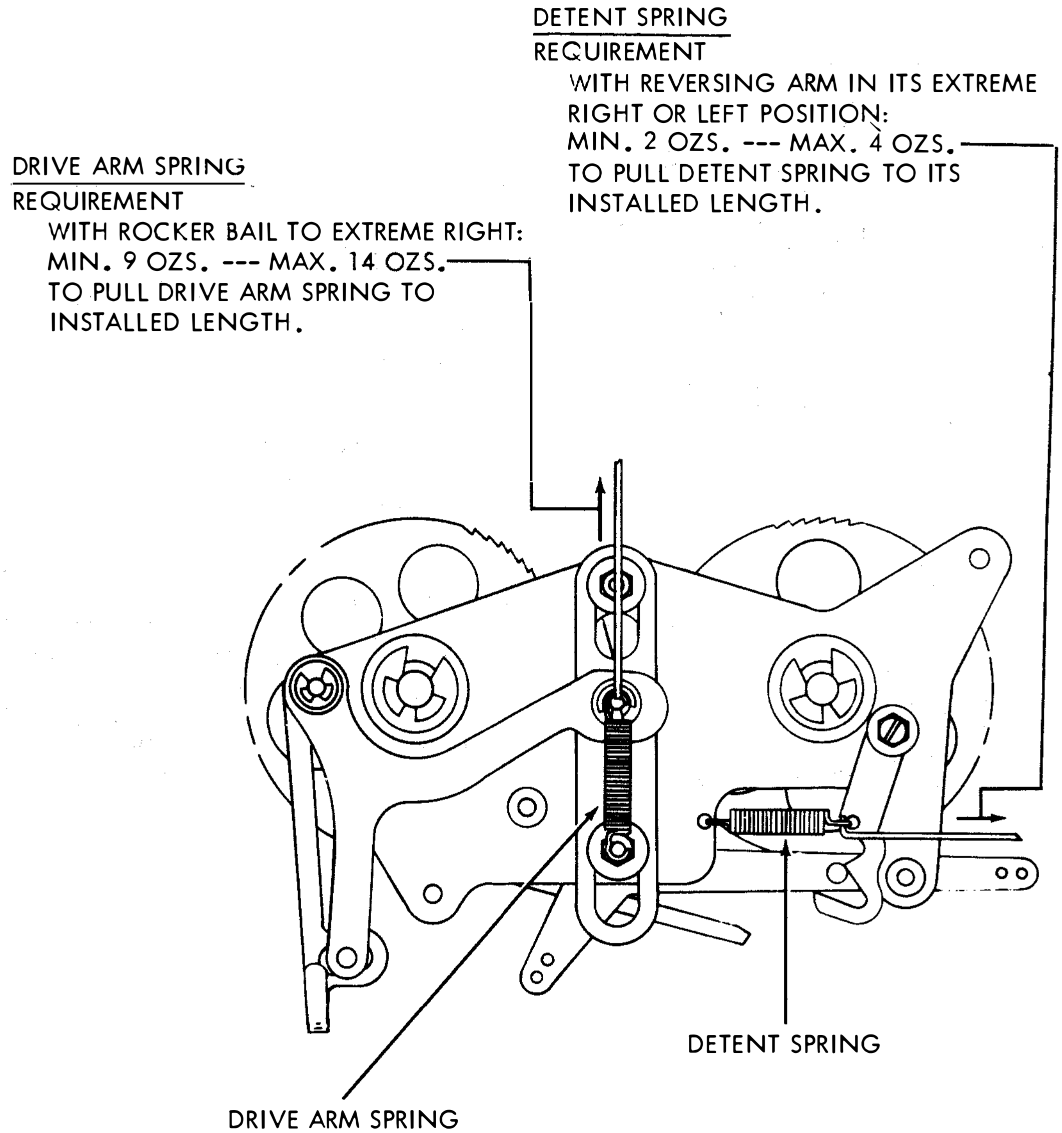
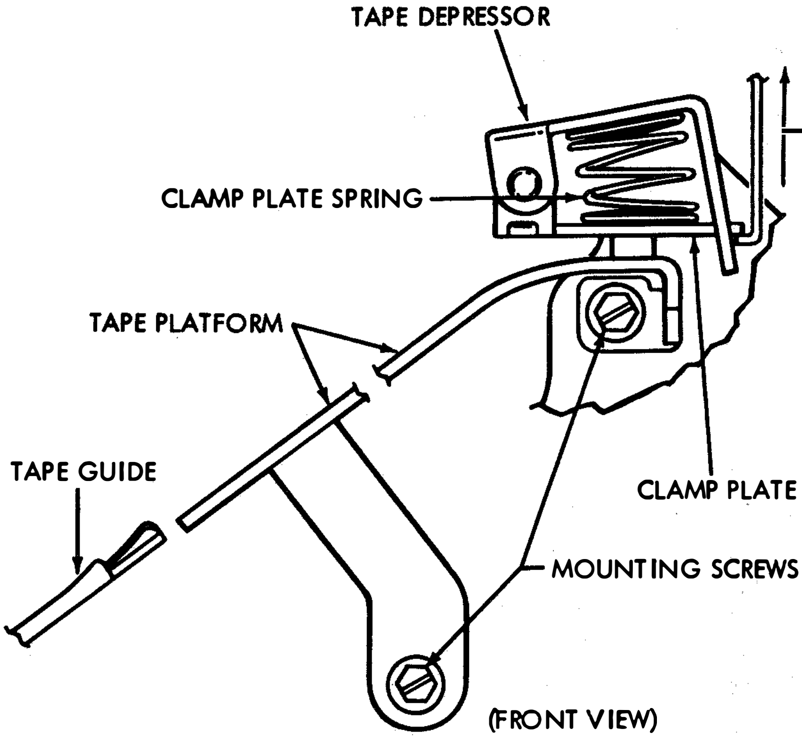


Figure 5-43A. Typing Reperforator, Ribbon Feed Mechanism Latest Design



TAPE PLATFORM
REQUIREMENT
TOP SURFACE OF TAPE PLATFORM SHOULD BE FLUSH WITH TOP SURFACE OF TAPE GUIDE.

TO ADJUST
WITH TAPE PLATFORM MOUNTING SCREWS LOOSENED, POSITION TAPE PLATFORM.

CLAMP PLATE SPRING
REQUIREMENT
FUNCTION CLUTCH DISENGAGED AND LATCHED. CLAMP PLATE SPRING BOWED TO THE RIGHT.
MIN. 18 OZS.---MAX. 24 OZS.
TO MOVE CLAMP PLATE FROM BOTTOM OF SLOT IN TAPE DEPRESSOR.

Figure 5-43B. Typing Reperforator, Tape Depressor Mechanism

CHAD CHUTE ASSEMBLY (MULTIPLE REPERFORATOR SET)

REQUIREMENT

(1) CHAD CHUTE SHOULD BE FLUSH WITH TOP OF PUNCH BLOCK.

(2) CHAD CHUTE ASSEMBLY SHOULD BE ADJUSTED SO CLEARANCE IS MAXIMUM IN ALL DIRECTIONS BETWEEN EACH CHAD CHUTE AND REPERFORATOR CASTING.

(3) POSITION TAPE GUIDE IN ITS MOUNTING SLOTS SO THAT TOP OF ROLLER IS PARALLEL TO AND ABOVE THE TAPE EXIT OF THE PUNCH BLOCK.

TO ADJUST

WITH MOUNTING SCREWS FRICTION TIGHT POSITION CHAD CHUTE AND CHAD CHUTE ASSEMBLY BY MEANS OF ELONGATED SLOTS.

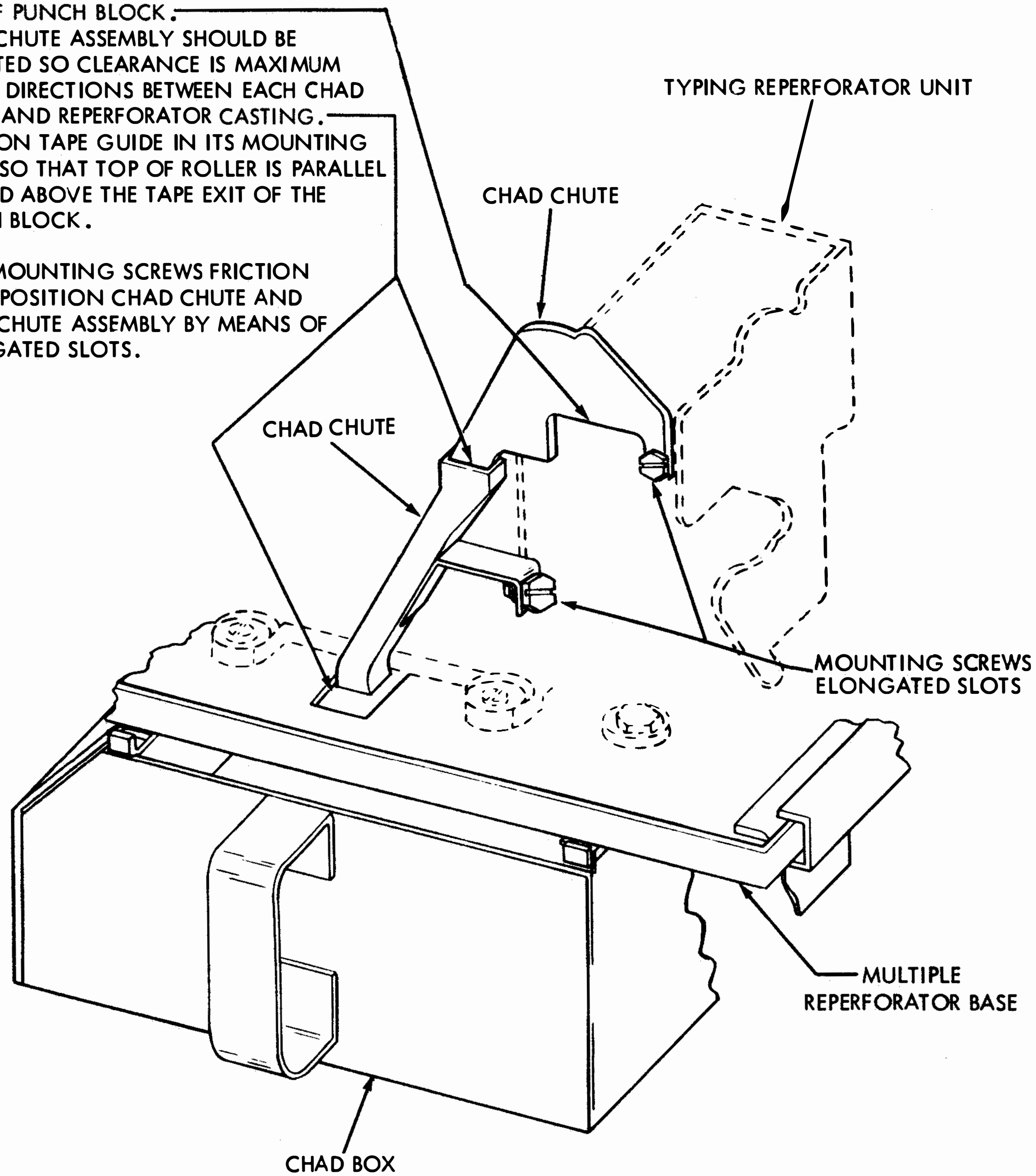
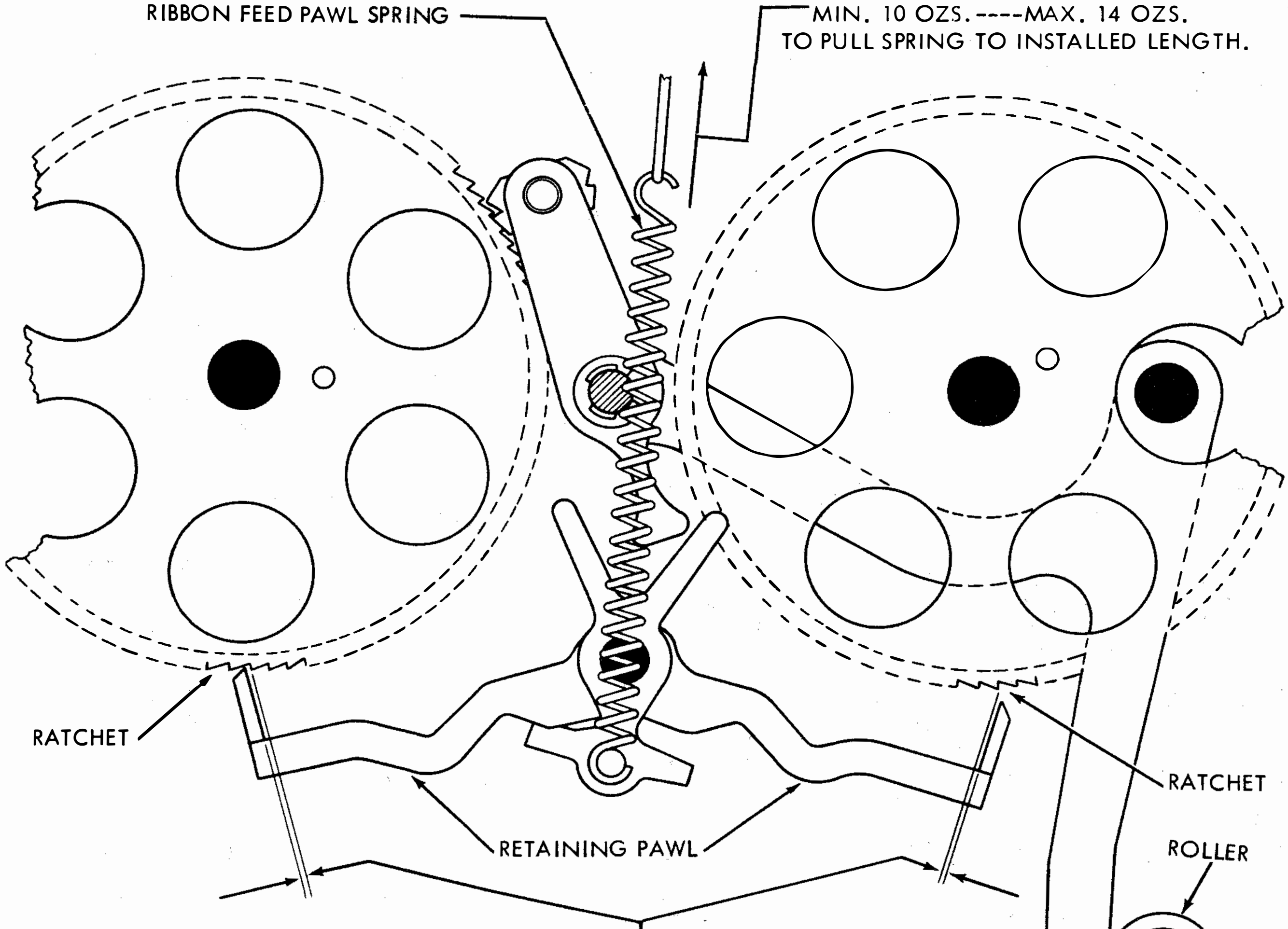


Figure 5-43C. Typing Reperforator, Chad Chute Assembly

EARLY DESIGN
(FOR LATEST DESIGN SEE FIGURES 5-43 AND 5-43A)

RIBBON FEED PAWL SPRING

REQUIREMENT
WITH ROCKER BAIL TO EXTREME LEFT:
MIN. 10 OZS.----MAX. 14 OZS.
TO PULL SPRING TO INSTALLED LENGTH.



RIBBON FEED ECCENTRIC STUD

REQUIREMENT
(1) WITH ROCKER BAIL TO EXTREME LEFT, THERE SHOULD BE
MIN. 0.015 INCH---MAX. 0.025 INCH
BETWEEN RETAINING PAWL AND RATCHET TOOTH ON SIDE WHERE CLEARANCE IS LEAST.

TO ADJUST
(1) UNITS EQUIPPED WITH ECCENTRIC STUD: POSITION STUD WITH LOCK NUT LOOSENED.
(2) UNITS EQUIPPED WITH ADJUSTABLE ARM: BY MEANS OF PRY POINT, POSITION ADJUSTABLE ARM WITH MOUNTING SCREWS FRICTION TIGHT.

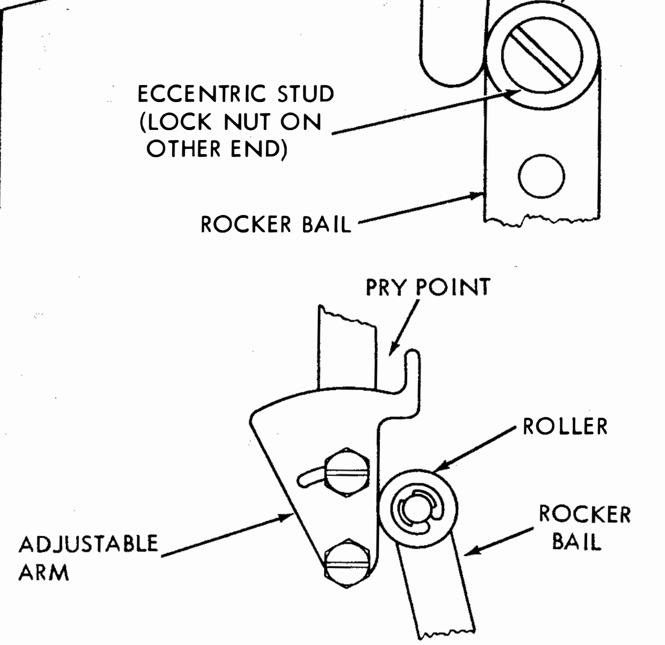


Figure 5-44. Typing Reperforator, Ribbon Feed Mechanism Early Design

EARLY DESIGN
(FOR LATEST DESIGN SEE FIGURES 5-43 AND 5-43A)

RIBBON FEED DRIVE ARM SPRING

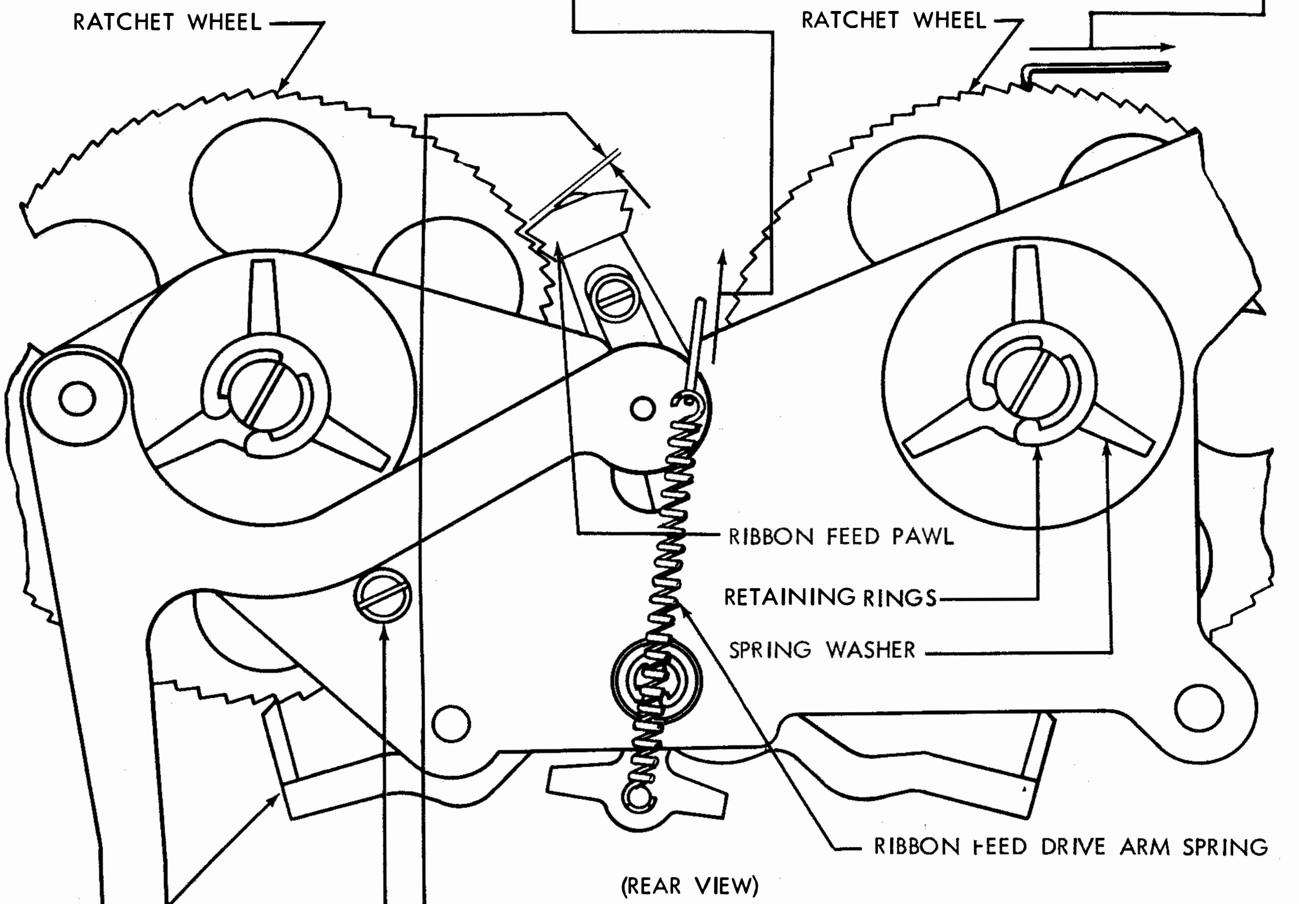
REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. 3 OZS. ----MAX. 5 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

RIBBON RATCHET WHEEL SPRING WASHERS

REQUIREMENT
WITH FEED PAWL AND RETAINING PAWL SHIFTED TO OPPOSITE RATCHET WHEEL:
MIN. 1 OZ. ----MAX. 2 1/2 OZS.
TO START WHEEL TURNING.

TO ADJUST
REMOVE RETAINING RINGAND BEND SPRING WASHER.

NOTE:
MAKE THIS ADJUSTMENT FOR BOTH RATCHET WHEELS.



(REAR VIEW)

RIBBON FEED PAWL DOWNSTOP ECCENTRIC

TO CHECK
DISENGAGE FUNCTION CLUTCH. TAKE UP BACKLASH IN RATCHET WHEEL SO THAT CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH IS AT MINIMUM. MEASURE CLEARANCE. REPEAT FOR OTHER RATCHET WHEEL.

REQUIREMENT
(1) CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH:
MIN. .020 INCH ---- MAX. 0.040 INCH
ON SIDE WHERE CLEARANCE IS LEAST.
(2) PAWL SHOULD FEED ONE TOOTH AT A TIME.

TO ADJUST
POSITION DOWNSTOP ECCENTRIC WITH LOCK NUT LOOSENED

Figure 5-45. Typing Reperforator, Ribbon Feed Mechanism Early Design

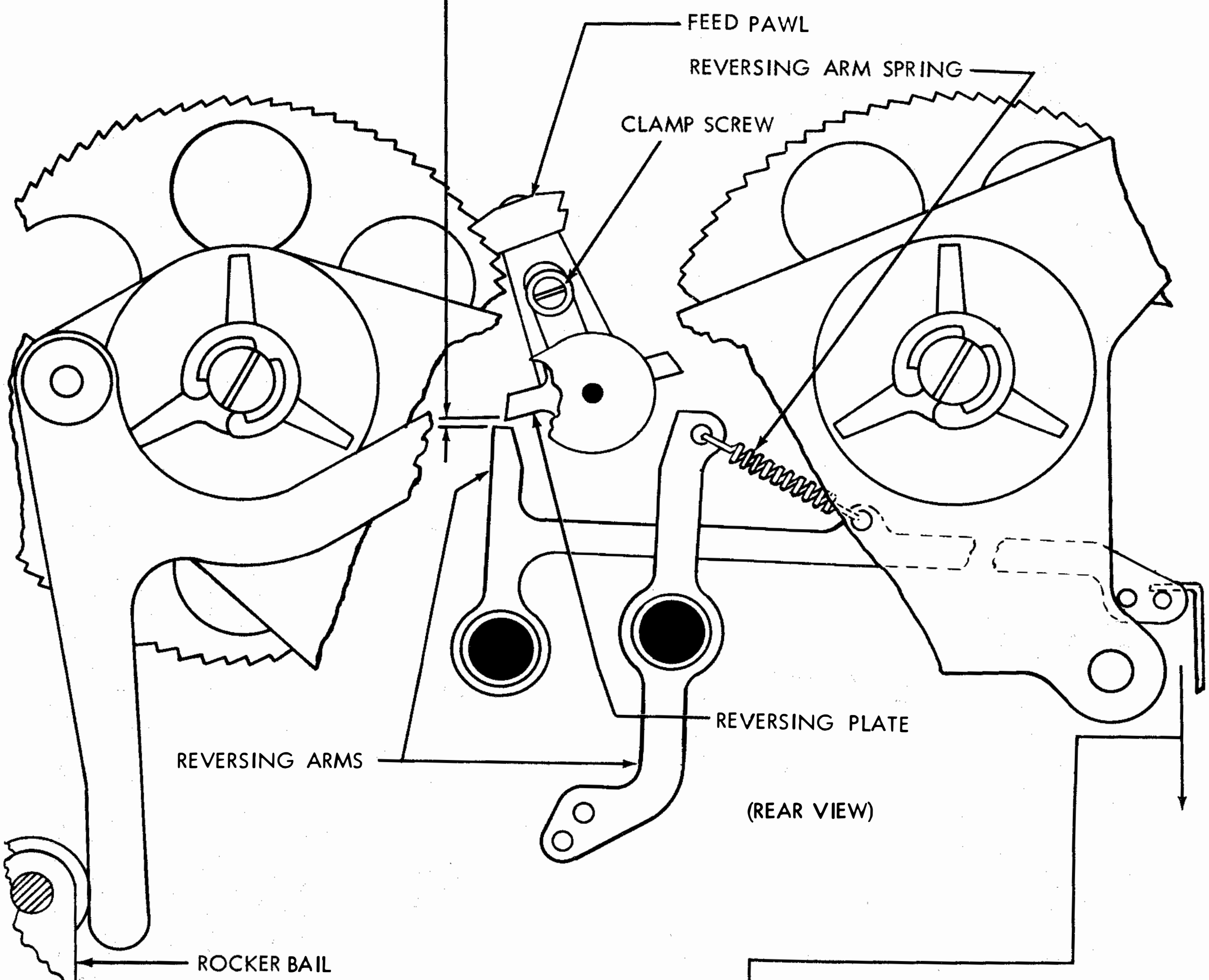
EARLY DESIGN
(FOR LATEST DESIGN SEE
FIGURES 5-43 AND 5-43A)

RIBBON REVERSING PLATE

TO CHECK
POSITION ROCKER BAIL TO EXTREME LEFT.
HOLD REVERSING ARM UNDER REVERSING PLATE AND MEASURE CLEARANCE.
WITH FEED PAWL AGAINST OTHER RATCHET, REPEAT PROCEDURE FOR OTHER REVERSING ARM.

REQUIREMENT
CLEARANCE BETWEEN REVERSING ARM AND REVERSING PLATE:
MIN. 0.010 INCH---MAX. 0.020 INCH
AT REVERSING ARM WHERE CLEARANCE IS LEAST.

TO ADJUST
POSITION REVERSING PLATE WITH CLAMP SCREW LOOSENED.



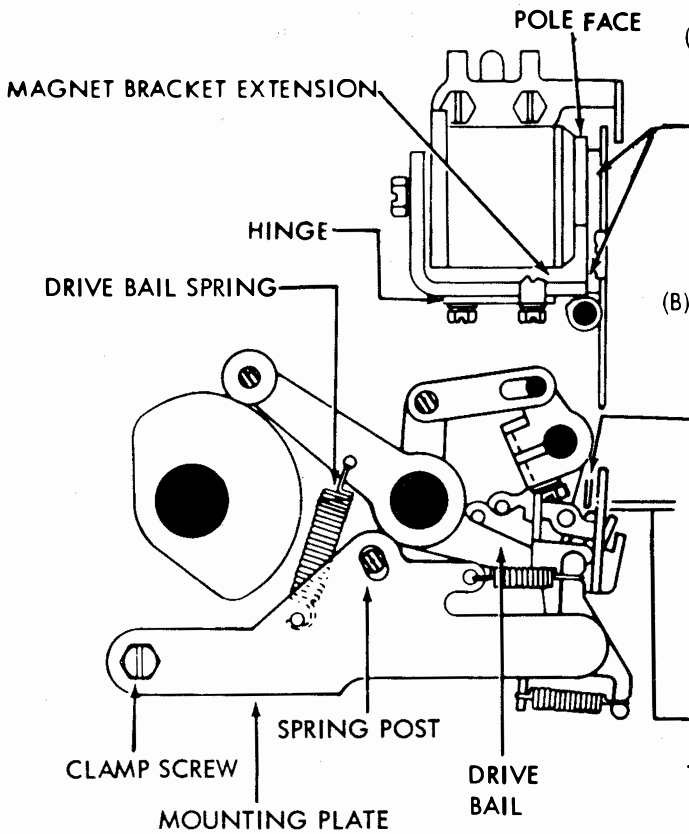
RIBBON FEED REVERSING ARM SPRING

REQUIREMENT
WITH FEED PAWL IN HIGHEST POSITION:
MIN. 10 GRAMS ----- MAX. 30 GRAMS
TO START REVERSING ARM MOVING.

Figure 5-46. Typing Reperforator, Ribbon Feed Mechanism Early Design

5-2.d.(1) TYPING REPERFORATOR

NOTE
FOLLOWING ADJUSTMENTS PERTAIN TO THE LPR35BWA TYPING REPERFORATOR ONLY.



(A) ARMATURE HINGE
REQUIREMENT
WITH ARMATURE MANUALLY OPERATED. IT SHALL BE FLUSH AGAINST POLE FACE AND MAGNET BRACKET EXTENSION.
TO ADJUST
LOOSEN ARMATURE HINGE BRACKET MOUNTING SCREWS, POSITION ARMATURE AND TIGHTEN SCREWS.

(B) DRIVE BAIL SPRING
REQUIREMENT
ROTATE MAIN SHAFT UNTIL DRIVE BAIL IS ON HIGH PART OF ITS CAM.
MIN. 20 OZS. --- MAX. 28 OZS.
TO START THE DRIVE BAIL MOVING.

(C) MOUNTING PLATE
REQUIREMENT
WITH ARMATURE IN UNOPERATED POSITION. ROTATE MAIN SHAFT UNTIL DRIVE BAIL IS ON HIGH PART OF ITS CAM. CLEARANCE BETWEEN THE BLOCKING BAIL AND DRIVE BAIL SURFACE.
MIN. 0.006 INCH
MAX. 0.015 INCH
TO ADJUST
POSITION BLOCKING BAIL WITH MOUNTING PLATE CLAMP SCREW AND SPRING POST FRICTION TIGHT.

(D) MAGNET ASSEMBLY
REQUIREMENT
WITH ARMATURE HELD IN OPERATED POSITION, ROTATE MAIN SHAFT UNTIL DRIVE BAIL ROLLER IS ON HIGH PART OF ITS CAM. CLEARANCE BETWEEN BLOCKING BAIL AND RIGHT EDGE OF DRIVE BAIL.
MIN. 0.005 INCH
MAX. 0.015 INCH
TO ADJUST
POSITION MAGNET ASSEMBLY, ARMATURE HELD AGAINST MAGNET POLE PIECE WITH MAGNET BRACKET MOUNTING SCREWS FRICTION TIGHT.

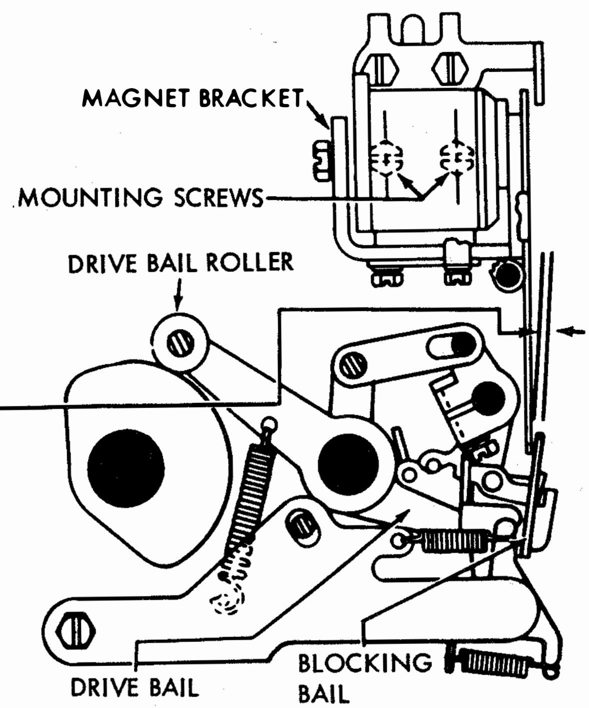
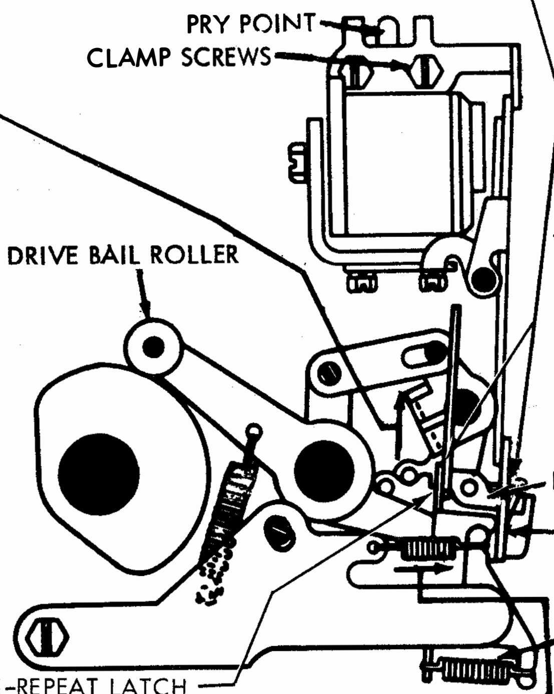
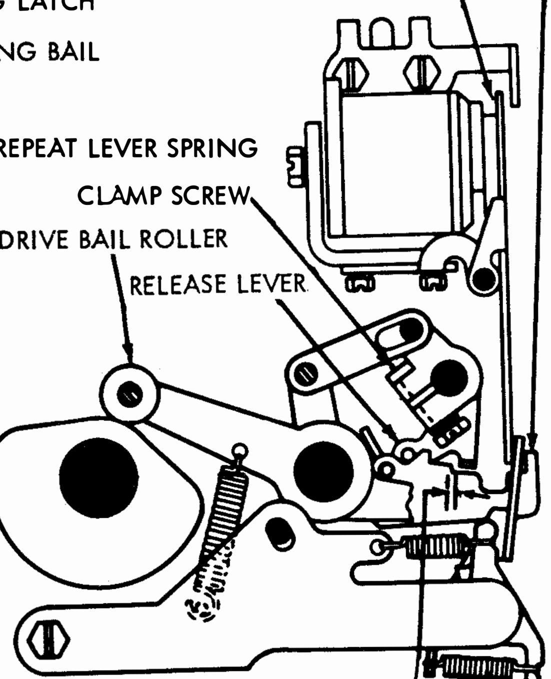


Figure 5-47. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism

(A)
BLOCKING LATCH TORSION SPRING
REQUIREMENT
WITH ARMATURE IN UNOPERATED POSITION AND DRIVE BAIL ROLLER ON HIGH PART OF ITS CAM.
MIN. 15 GRAMS --- MAX. 40 GRAMS TO START BLOCKING LATCH MOVING.

(B) ARMATURE BACKSTOP
REQUIREMENT
WITH ARMATURE IN UNOPERATED POSITION, ROTATE MAINSHAFT UNTIL DRIVE BAIL ROLLER IS ON HIGH PART OF ITS CAM.
MIN. SOME --- MAX. 0.006 INCH
CLEARANCE BETWEEN THE BLOCKING LATCH AND NONREPEAT LEVER. THE DRIVE BAIL SHOULD ENGAGE THE BLOCKING BAIL BY AT LEAST 2/3 OF ITS THICKNESS.
TO ADJUST
WITH THE ARMATURE BACKSTOP MOUNTING SCREWS FRICTION TIGHT, POSITION BY MEANS OF PRY POINT.



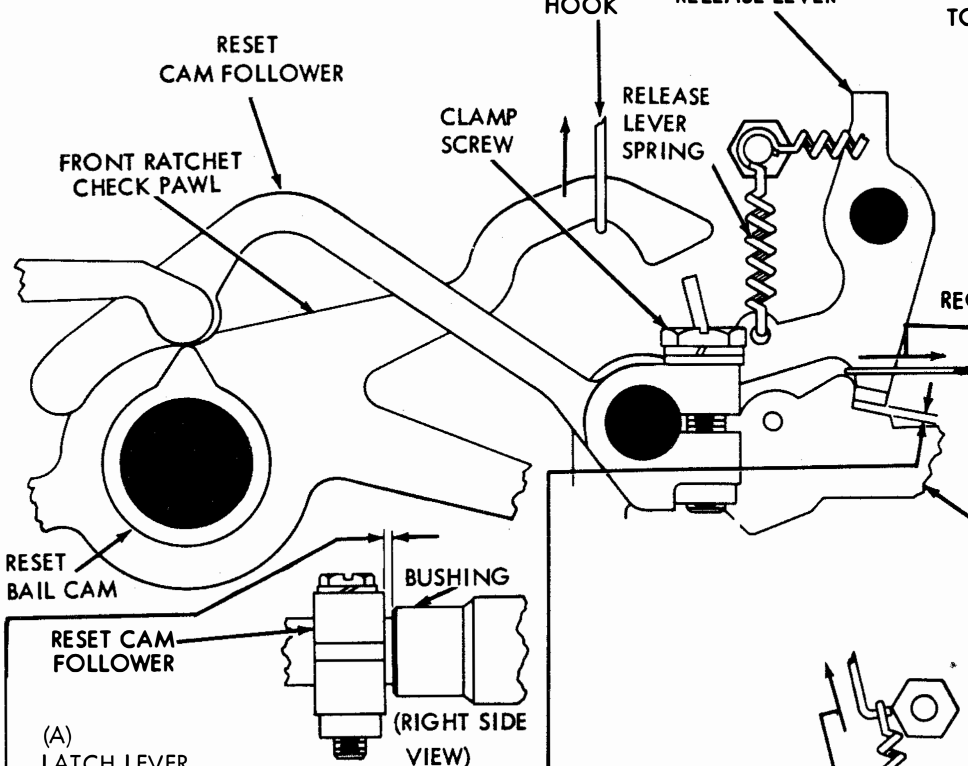


(C)
NON-REPEAT LEVER SPRING
REQUIREMENT
WITH ARMATURE IN UNOPERATED POSITION AND DRIVE BAIL ROLLER ON HIGH PART OF ITS CAM
MIN. 6 OZS. --- MAX. 9 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(D)
BLOCKING BAIL SPRING
REQUIREMENT
WITH ARMATURE IN UNOPERATED POSITION AND DRIVE BAIL ROLLER ON HIGH PART OF ITS CAM.
MIN. 3 OZS. --- MAX. 5 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(E)
RELEASE LEVER
REQUIREMENT
WITH ARMATURE IN OPERATED POSITION. ROTATE MAIN SHAFT UNTIL DRIVE BAIL ROLLER IS IN INDENT OF ITS CAM. CLEARANCE BETWEEN RELEASE LEVER AND LATCH LEVER.
MIN. 0.010 INCH
MAX. 0.025 INCH
TO ADJUST
WITH CLAMP SCREW FRICTION TIGHT POSITION RELEASE LEVER.

Figure 5-48. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism



(C) **RELEASE LEVER SPRING**

TO CHECK

TRIP SELECTOR CLUTCH. ROTATE MAIN SHAFT UNTIL RESET CAM FOLLOWER IS ON PEAK OF RESET BAIL CAM. WITH SPRING HOOK, HOLD FRONT RATCHET CHECK PAWL AWAY FROM RELEASE LEVER.

REQUIREMENT

MIN. 5 OZS.--- MAX. 7 OZS. TO START RELEASE LEVER MOVING.

(A)

LATCH LEVER

TO CHECK

TRIP SELECTOR CLUTCH. ROTATE MAIN SHAFT UNTIL RESET CAM FOLLOWER IS ON PEAK OF RESET BAIL CAM WHERE THE CLEARANCE IS AT A MINIMUM.

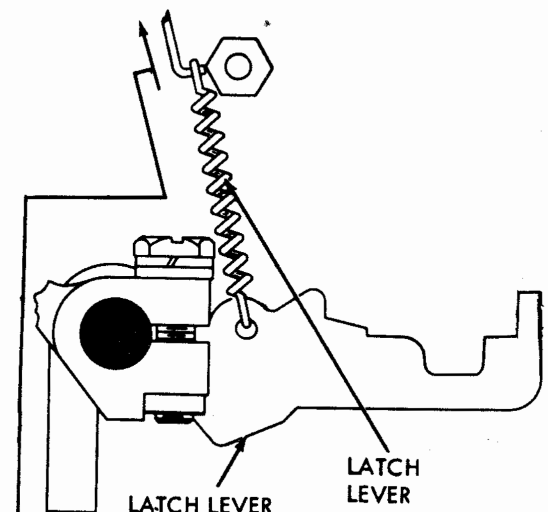
REQUIREMENT

(1) MIN. 0.018 INCH --- MAX. 0.028 INCH BETWEEN RELEASE LEVER AND LATCH LEVER.

(2) MIN. SOME --- MAX. 0.008 INCH END PLAY BETWEEN CAM FOLLOWER AND BUSHING.

TO ADJUST

POSITION LATCH LEVER WITH CLAMP SCREW ON RESET CAM FOLLOWER LOOSENED.



LATCH LEVER SPRING

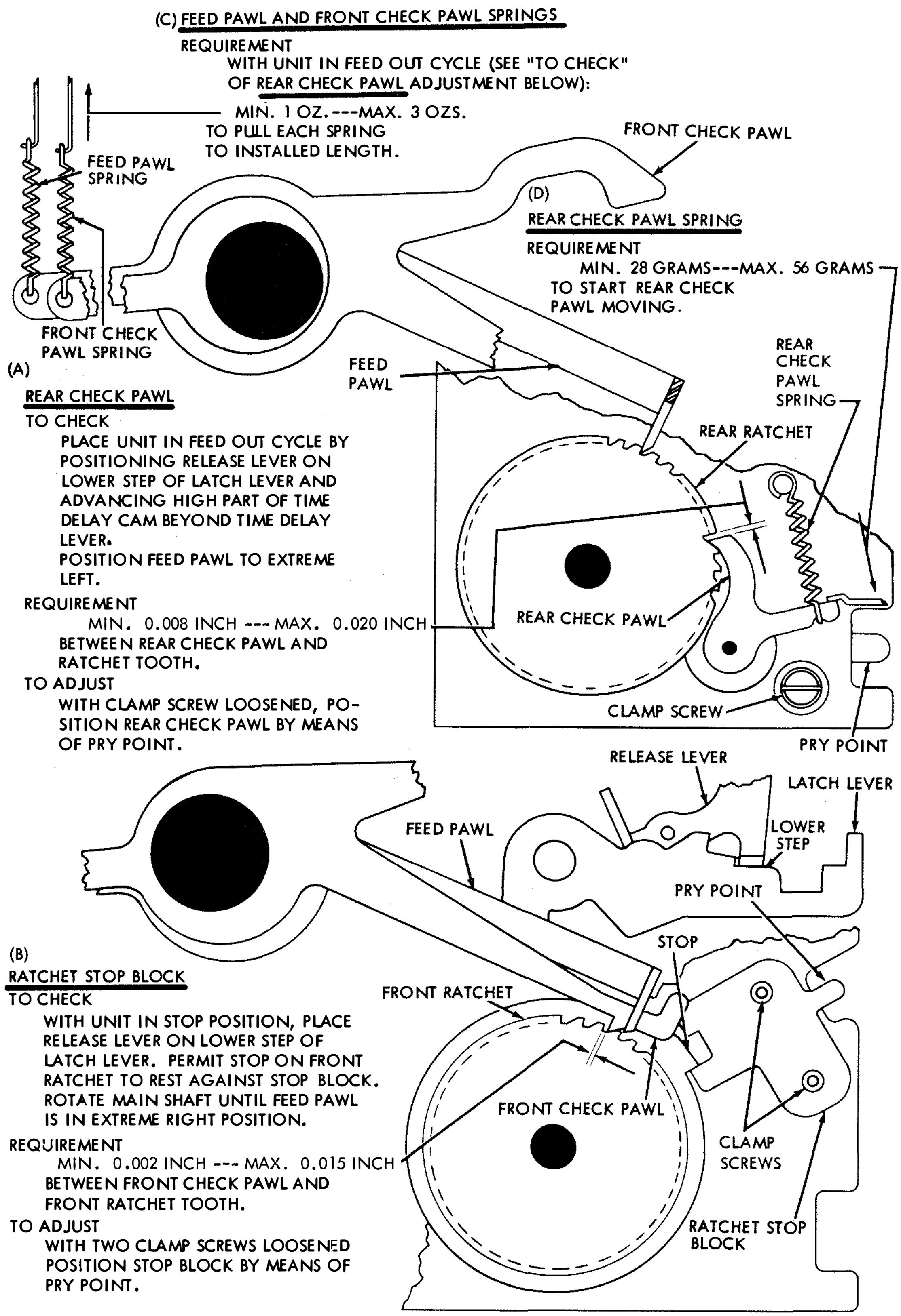
TO CHECK

TRIP SELECTOR CLUTCH. ROTATE MAIN SHAFT UNTIL RESET CAM FOLLOWER IS ON PEAK OF RESET BAIL CAM.

REQUIREMENT

MIN. 2 OZS.---MAX. 4 OZS. TO PULL SPRING TO INSTALLED LENGTH.

Figure 5-49. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism



(C) FEED PAWL AND FRONT CHECK PAWL SPRINGS

REQUIREMENT

WITH UNIT IN FEED OUT CYCLE (SEE "TO CHECK" OF REAR CHECK PAWL ADJUSTMENT BELOW):

MIN. 1 OZ.---MAX. 3 OZS. TO PULL EACH SPRING TO INSTALLED LENGTH.

(D) REAR CHECK PAWL SPRING

REQUIREMENT

MIN. 28 GRAMS---MAX. 56 GRAMS TO START REAR CHECK PAWL MOVING.

(A) REAR CHECK PAWL

TO CHECK

PLACE UNIT IN FEED OUT CYCLE BY POSITIONING RELEASE LEVER ON LOWER STEP OF LATCH LEVER AND ADVANCING HIGH PART OF TIME DELAY CAM BEYOND TIME DELAY LEVER.

POSITION FEED PAWL TO EXTREME LEFT.

REQUIREMENT

MIN. 0.008 INCH --- MAX. 0.020 INCH BETWEEN REAR CHECK PAWL AND RATCHET TOOTH.

TO ADJUST

WITH CLAMP SCREW LOOSENED, POSITION REAR CHECK PAWL BY MEANS OF PRY POINT.

(B) RATCHET STOP BLOCK

TO CHECK

WITH UNIT IN STOP POSITION, PLACE RELEASE LEVER ON LOWER STEP OF LATCH LEVER. PERMIT STOP ON FRONT RATCHET TO REST AGAINST STOP BLOCK. ROTATE MAIN SHAFT UNTIL FEED PAWL IS IN EXTREME RIGHT POSITION.

REQUIREMENT

MIN. 0.002 INCH --- MAX. 0.015 INCH BETWEEN FRONT CHECK PAWL AND FRONT RATCHET TOOTH.

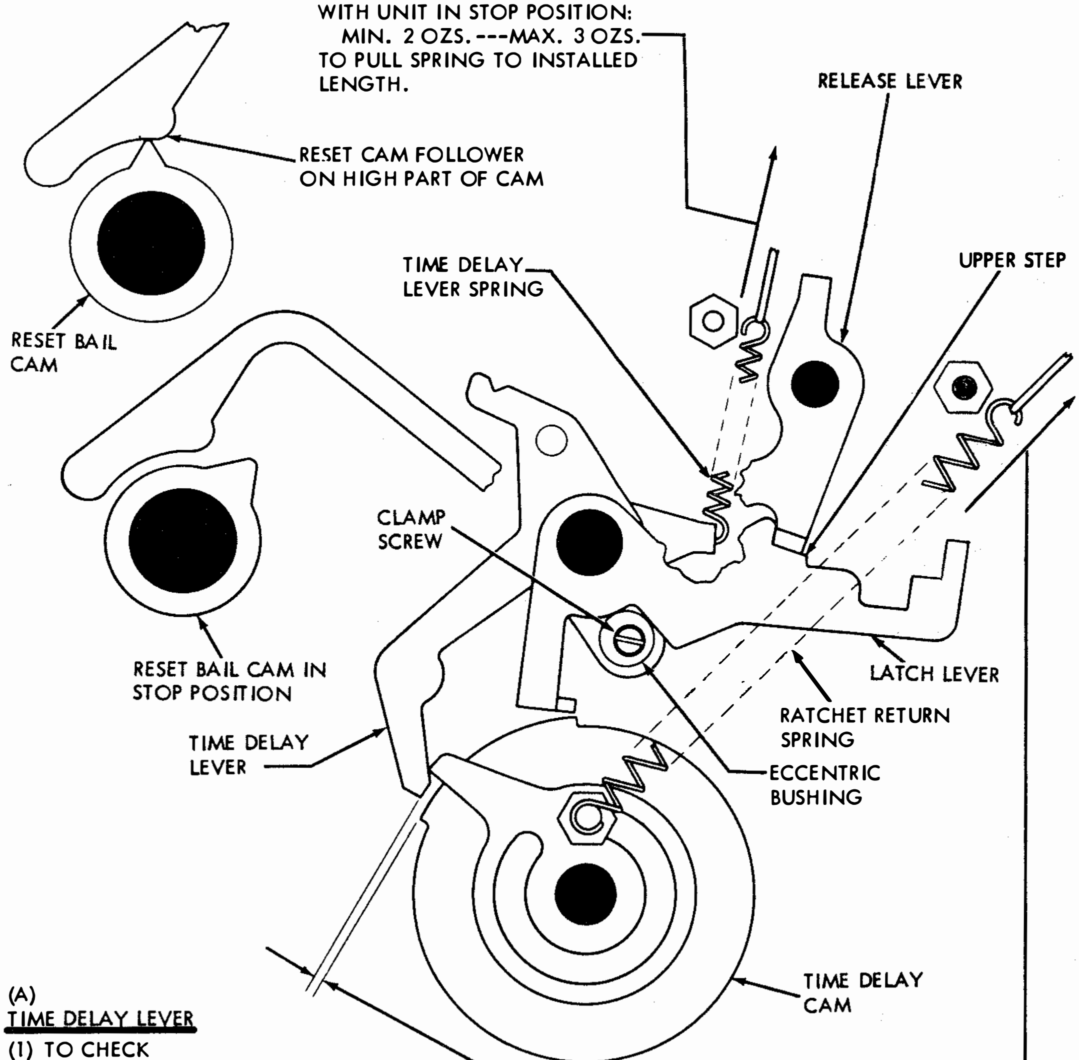
TO ADJUST

WITH TWO CLAMP SCREWS LOOSENED POSITION STOP BLOCK BY MEANS OF PRY POINT.

Figure 5-50. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism

(B) TIME DELAY LEVER SPRING

REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. 2 OZS.---MAX. 3 OZS.
TO PULL SPRING TO INSTALLED LENGTH.



(A)
TIME DELAY LEVER

(1) TO CHECK
TRIP SECLECTOR CLUTCH AND ROTATE MAIN SHAFT UNTIL RESET CAM FOLLOWER IS ON HIGH PART OF RESET BAIL CAM.

REQUIREMENT
MIN. 0.040 INCH---MAX. 0.060 INCH
CLEARANCE BETWEEN TIME DELAY LEVER AND HIGH PART OF TIME DELAY CAM.

(2) REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. SOME
CLEARANCE BETWEEN TIME DELAY LEVER AND HIGH PART OF TIME DELAY CAM.

TO ADJUST
WITH CLAMP SCREW LOOSENED, POSITION ECCENTRIC BUSHING.

(C) RATCHET RETURN SPRING

REQUIREMENT
WITH UNIT IN STOP POSITION:
MIN. 5 OZS.---MAX. 7 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

Figure 5-51. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism

(A) RELEASE ARM

(1) REQUIREMENT

WITH UNIT IN THE FEED-OUT CYCLE, RATCHETS ADVANCED BEYOND THE TIME DELAY. CLEARANCE BETWEEN THE DRIVE ARM AND UPPER SURFACE OF RELEASE ARM:

MIN. 0.010 INCH

MAX. 0.030 INCH

POSITION CAM SO SURFACES ARE IN LINE.

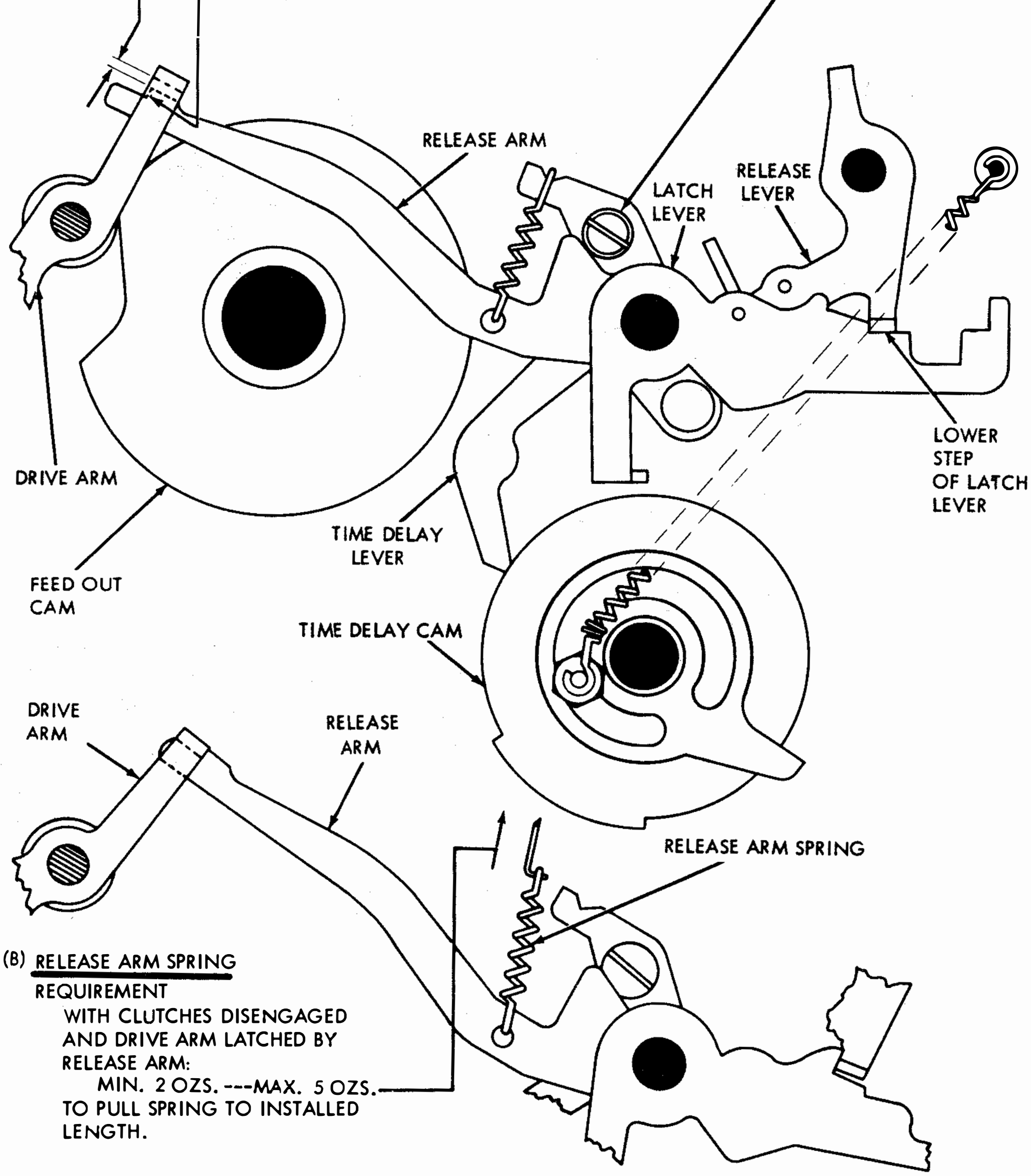
(2) REQUIREMENT

WITH UNIT IN STOP POSITION THE SURFACE OF THE DRIVE BAIL THAT DOES NOT ENGAGE THE RELEASE ARM SHALL NOT EXCEED:

MAX. 0.015 INCH

TO ADJUST

WITH CLAMP NUT FRICTION TIGHT, POSITION RELEASE ARM BY MEANS OF ECCENTRIC SCREW ON TIME DELAY LEVER.



(B) RELEASE ARM SPRING

REQUIREMENT

WITH CLUTCHES DISENGAGED AND DRIVE ARM LATCHED BY RELEASE ARM:

MIN. 2 OZS. ---MAX. 5 OZS.

TO PULL SPRING TO INSTALLED LENGTH.

Figure 5-52. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism

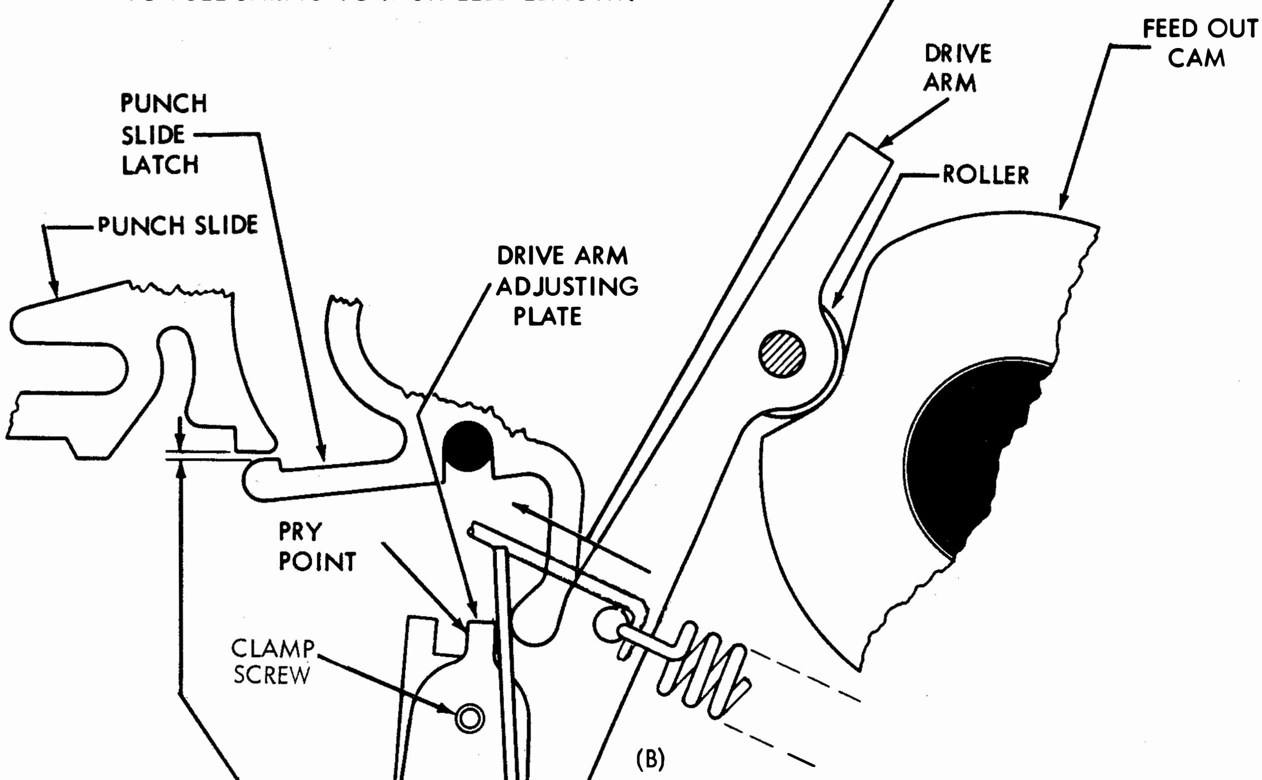
(A) DRIVE ARM SPRING

REQUIREMENT

WITH UNIT IN FEED-OUT CYCLE AND DRIVE ARM ROLLER HELD FIRMLY AGAINST ITS CAM INDENT.

MIN. 42 OZS. --- MAX. 50 OZS.

TO PULL SPRING TO INSTALLED LENGTH.



(B)

DRIVE ARM ADJUSTING PLATE

TO CHECK

SET UP BLANK CODE COMBINATION (-----) IN SELECTOR. PLACE UNIT IN FEED OUT CYCLE BY POSITIONING RELEASE LEVER ON LOWER STEP OF LATCH LEVER AND ADVANCING HIGH PART OF TIME DELAY CAM BEYOND TIME DELAY LEVER RO-TATE MAIN SHAFT UNTIL DRIVE ARM ROLLER IS ON LOW PART OF FEED OUT CAM. MAKE SURE THAT RESET BAIL IS IN LOWER POSITION.

REQUIREMENT

MIN. 0.010 INCH---MAX. 0.030 INCH BETWEEN PUNCH SLIDE AND PUNCH SLIDE LATCH AT SLIDE WHERE CLEARANCE IS LEAST.

TO ADJUST

WITH CLAMP SCREW LOOSENED, POSITION DRIVE ARM ADJUSTING PLATE BY MEANS OF PRY POINT.

Figure 5-53. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism

(A) FOLLOWER LEVER

REQUIREMENT

WITH FOLLOWER LEVER ON HIGH PART OF TRIP CAM:

(1) MIN. 0.010 INCH---MAX. 0.030 INCH BETWEEN RELEASE AND MAIN TRIP LEVER.

(2) SOME CLEARANCE BETWEEN MAIN TRIP LEVER AND DOWNSTOP BRACKET.

TO ADJUST

WITH LOCK NUT LOOSENED, POSITION ADJUSTING ARM BY MEANS OF PRY POINT.

(B) ADJUSTING LEVER

TO CHECK

PLACE UNIT IN FEED OUT CYCLE BY POSITIONING RELEASE LEVER ON LOWER STEP OF LATCH LEVER AND ADVANCING HIGH PART OF TIME DELAY CAM BEYOND TIME DELAY LEVER.

POSITION MAIN SHAFT SO THAT DRIVE ARM ROLLER IS ON LOW PART OF FEED OUT CAM.

REQUIREMENT

(1) MIN. 0.010 INCH---MAX. 0.030 INCH BETWEEN RELEASE AND MAIN TRIP LEVER.

(2) SOME CLEARANCE BETWEEN MAIN TRIP LEVER AND DOWNSTOP BRACKET.

TO ADJUST

LOOSEN THE CLAMP SCREW ON THE ADJUSTING LEVER AND POSITION MAKING SURE THE ADJUSTING LEVER RIDES FULLY ON THE SLIDE TRIP LEVER.

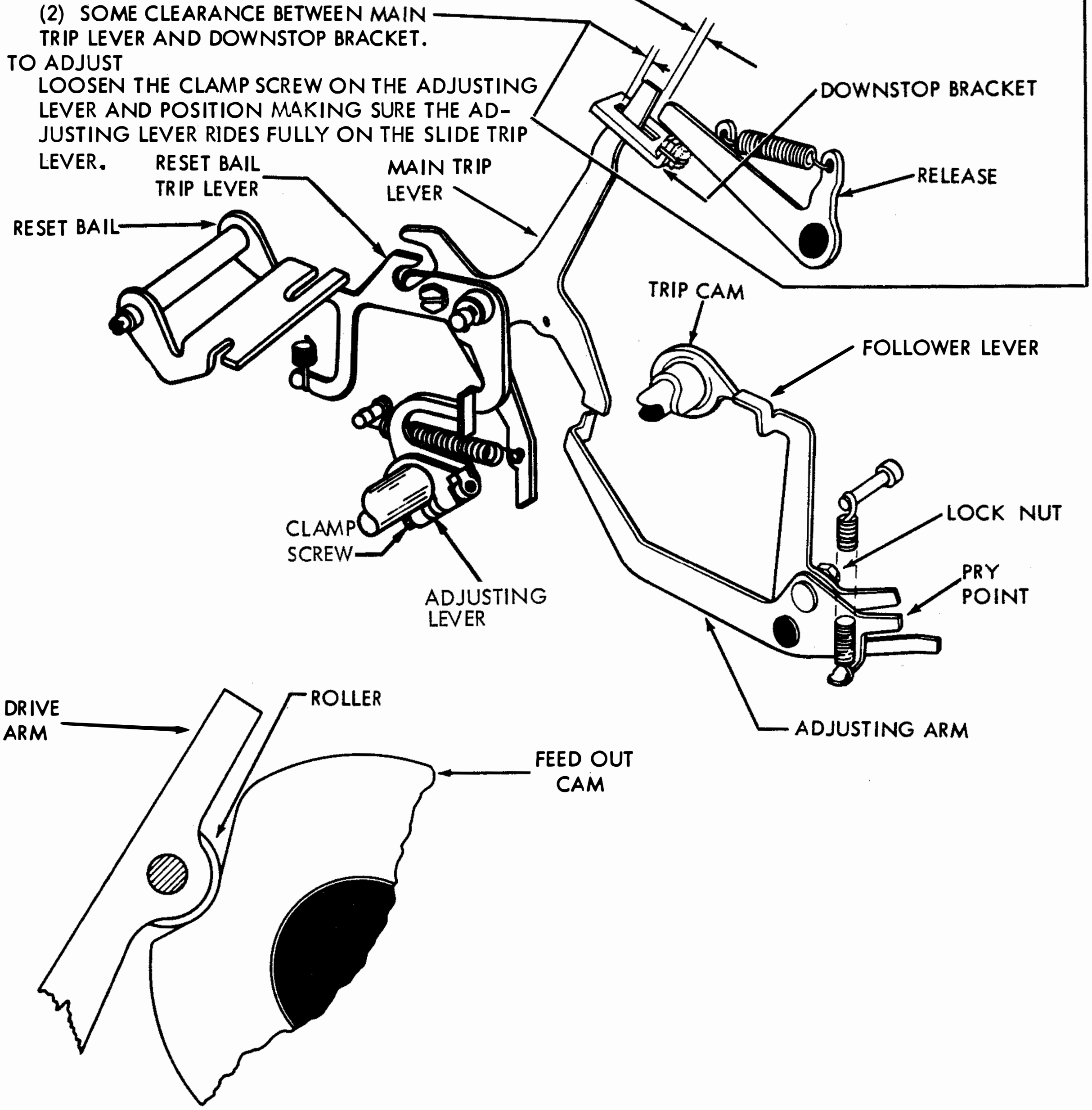
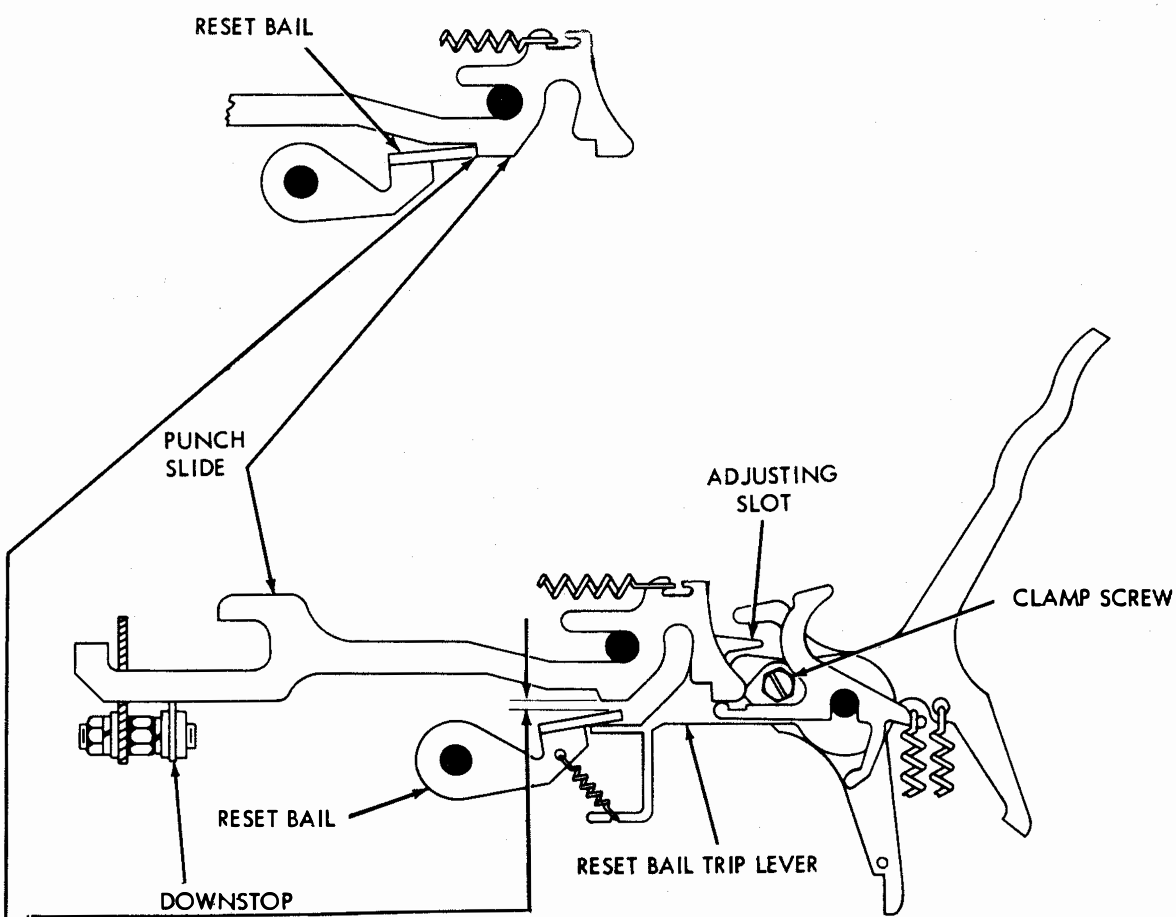


Figure 5-54. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism



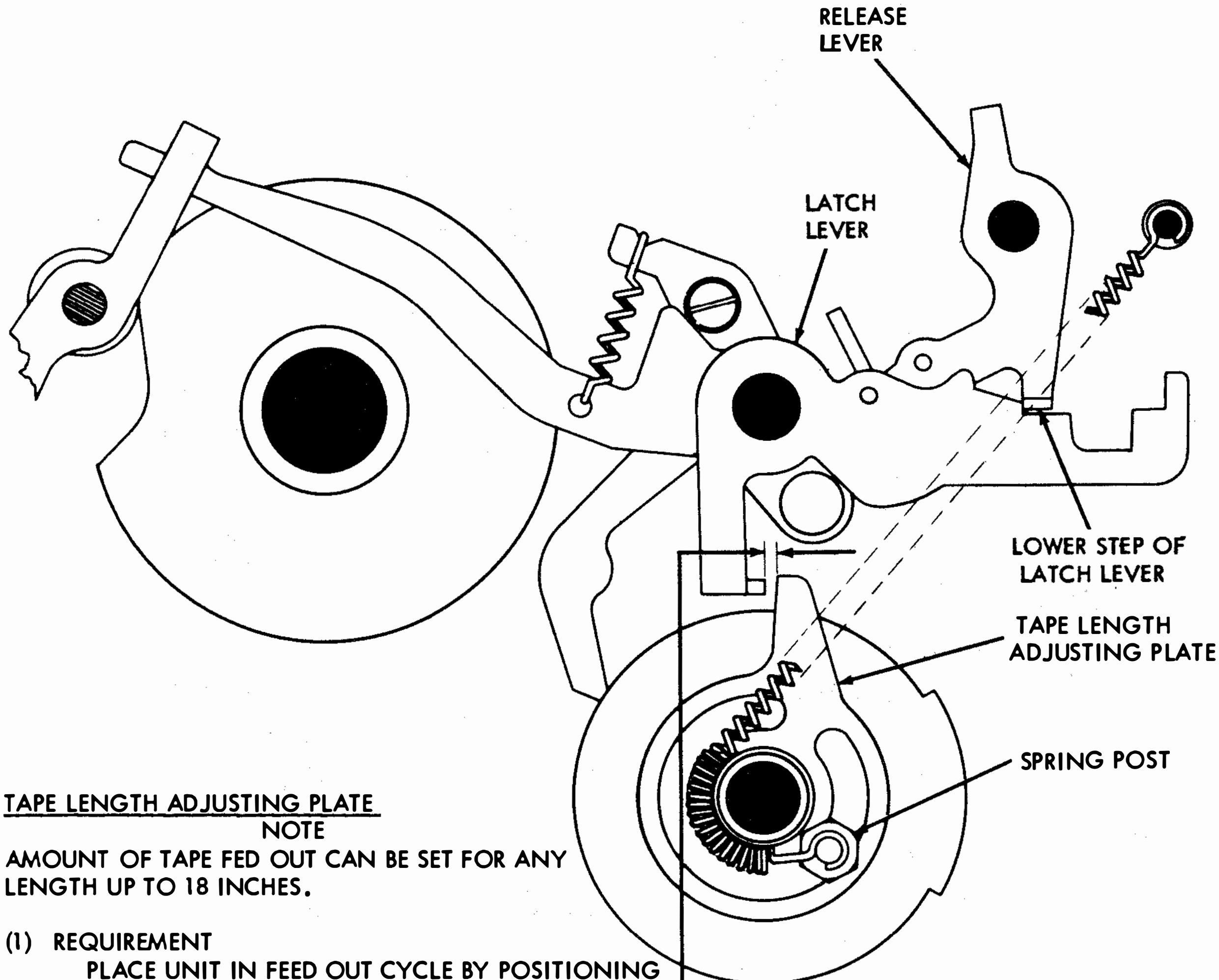
RESET BAIL TRIP LEVER

(1) REQUIREMENT
LETTERS COMBINATION SELECTED, FUNCTION CLUTCH TRIPPED, TRIP CAM FOLLOWER RESTING ON THE HIGH PART OF CAM, PUNCH SLIDES AGAINST THEIR DOWNSTOP. CLEARANCE BETWEEN LOWER EDGE OF SLIDE AND UPPER EDGE OF RESET BAIL.
MIN. 0.008 INCH --- MAX. 0.020 INCH

(2) REQUIREMENT
CLUTCH DISENGAGED AND LATCHED. RESET BAIL SHOULD FULLY ENGAGE THE NOTCHES IN THE PUNCH SLIDES.

TO ADJUST
POSITION RESET BAIL TRIP LEVER BY ITS ADJUSTING SLOT, WITH ITS CLAMP SCREW LOOSENED.

Figure 5-55. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism



TAPE LENGTH ADJUSTING PLATE

NOTE

AMOUNT OF TAPE FED OUT CAN BE SET FOR ANY LENGTH UP TO 18 INCHES.

(1) REQUIREMENT

PLACE UNIT IN FEED OUT CYCLE BY POSITIONING RELEASE LEVER ON LOWER STEP OF LATCH LEVER. MANUALLY ADVANCE RATCHETS SO THAT FRONT RATCHET IS IN THE TOOTH PRECEDING TRIP OFF. ROTATE MAIN SHAFT UNTIL FEED PAWL IS IN THE EXTREME LEFT POSITION. CLEARANCE BETWEEN ADJUSTING PLATE AND LATCH LEVER PROJECTION:
MIN. 0.002 INCH
MAX. 0.020 INCH

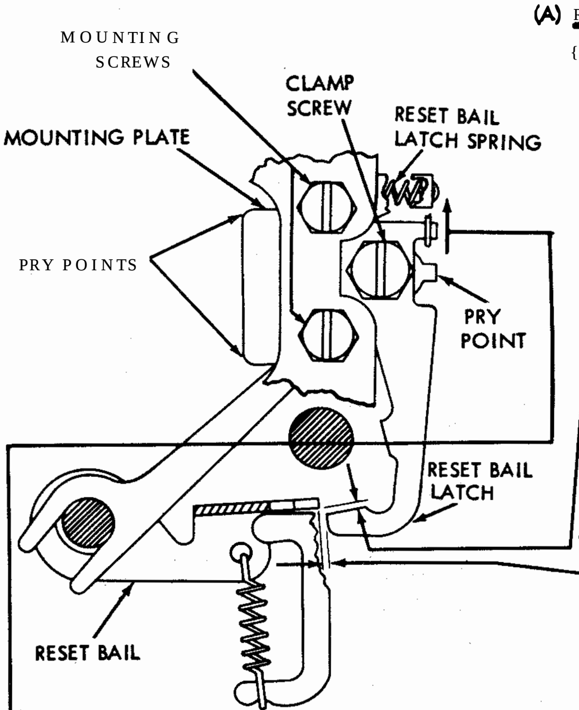
(2) REQUIREMENT

WHEN OPERATING UNDER POWER, UNIT SHOULD FEED OUT CORRECT LENGTH OF TAPE.

TO ADJUST

WITH SPRING POST FRICTION TIGHT. POSITION ADJUSTING PLATE.

Figure 5-56. Typing Reperforator (LPR35BWA), Remote Control Non-Interfering Letters Tape Feed-Out Mechanism



(A) RESET BAIL LATCH

(1) TO CHECK (VERTICAL CLEARANCE)
SELECT LETTERS CODE COMBINATION (1235). ROTATE M IN SHAFT UNTIL FUNCTION CLUTCH TRIPS AND PUNCH SLIDES ARE TO EXTRE M LEFT. SET UP BLANK CODE COMBINATION (-----) IN SELECTOR BY STRIPPING ALL PUSH LEVERS FROM SELECTING LEVERS. ROTATE M IN S1AFT UNTIL PUNCH SLIDES ARE JUST LATCHED.

REQUIRE M NT
MIN. 0.008INCH--- M X. 0.020 INCH BETWEEN RESET BAIL AND RESET BAIL LATCH.

TO ADJUST
WITH MOUNTING SCREWS LOOSENED, POSITION MOUNTING P L TE BY M ANS OF PRY POINTS.

(2) **REQUIREMENT** (HORIZONTAL CLEARANCE)
WITH CLUTCtES DISENGAGED,
MIN. 0.05 INCH--- M X. 0.020 INCH BETWEEN RESET BAIL A D RESET BAIL LATCH.

TO ADJUST
POSITION RESET BAIL SO THAT APPROX. HALF ITS THICKNESS IS BELOW TOP SURFACE OF ITS 1ATCH. WITH C L M SCREW LOOSENED, POSITION RESET BAIL LATCH BY M ANS OF PRY POINT.

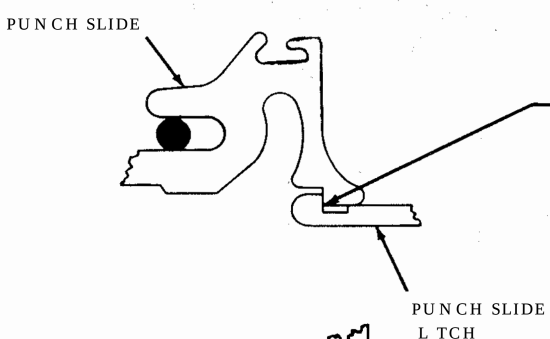
(B)
RESET BAIL LATCH SPRING

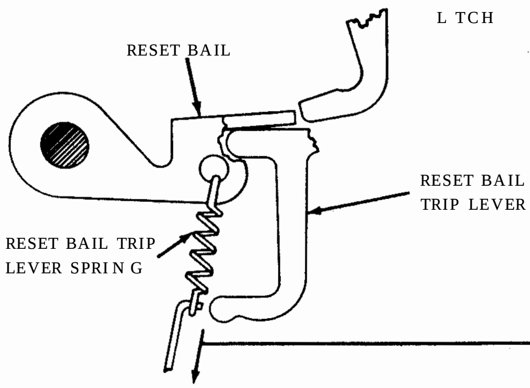
REQUIREMENT
WITH UNIT IN STOP CONDITION:
MIN. 1 OZ.--- M X. 3 OZS.
TO START RESET BAIL LATCH MOVING.

(3) TO CHECK
SELECT LETTERS CODE COMBINATION (12345). ROTATE M IN SHAFT UNTIL FUNCTION CL U CH TRIPS. SET UP B L NK CODE COMBINATION (-----) IN SELECTOR BY STRIPPING ALL PUSH LEVERS FROM SELECTING LEVERS. ROTATE M IN SHAFT TO STOP POSITION.

REQUIREMENT
PUNCH SLIDES LATCHED BY PUNCH SLIDE LATCHES

TO ADJUST
REFINE (1) AND (2) ABOVE.





(C) RESET BAIL TRIP LEVER SPRING

TO CHECK
DISENGAGE BOTH CLUTCHES. TRIP FUNCTION CLUTCH BY PIVOTING M IN TRIP LEVER COUNTERCLOCKWISE HOLD RESET BAIL TRIP LEVER UP AGAINST RESET B IL.

REQUIRE M NT
MIN. 18 OZS.--- M X. 24 0ZS.
TO PULL SPRING TO INSTALLED LENGTH.

Figure 5-57. Typing Reperforator (LP35BWA), Remote Control Non-Interfering L tters Tape Feed-Out Mechanism

e. MULTIPLE REPERFORATOR BASE

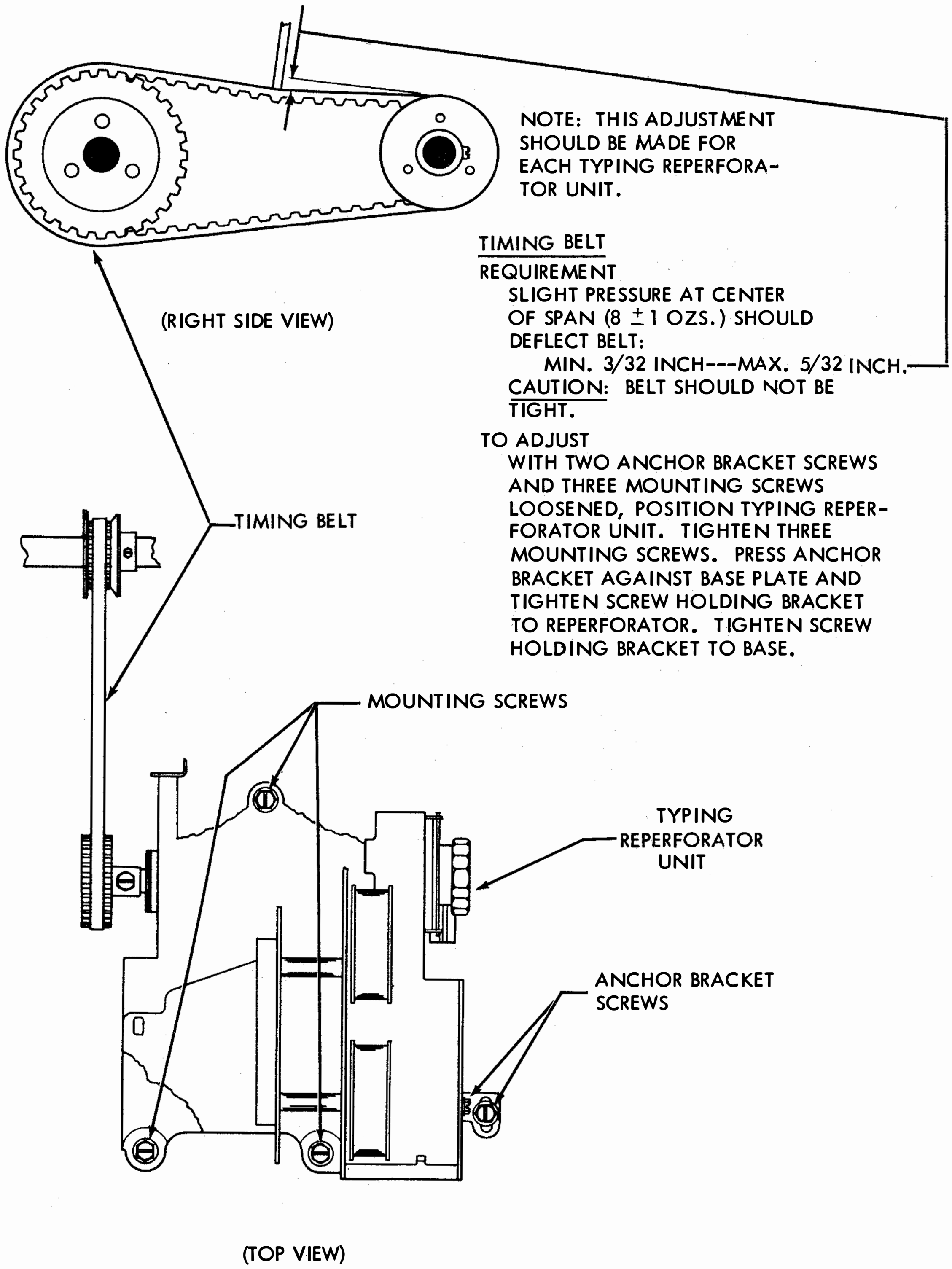


Figure 5-58. Multiple Reperforator Base, Drive Mechanism

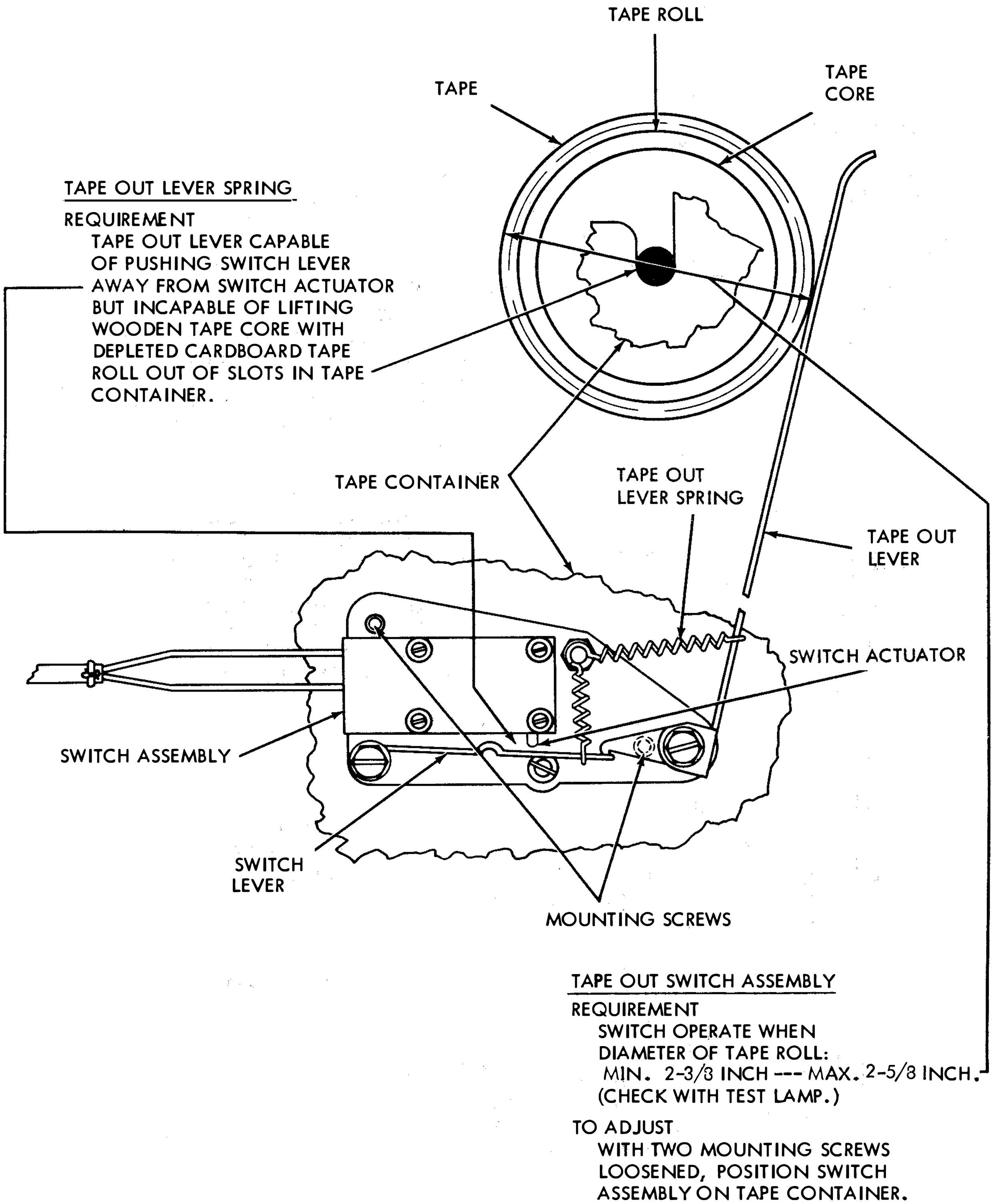


Figure 5-59. Multiple Reperforator Base, Low Tape Switch

(A)
MOTOR ADJUSTING STUD

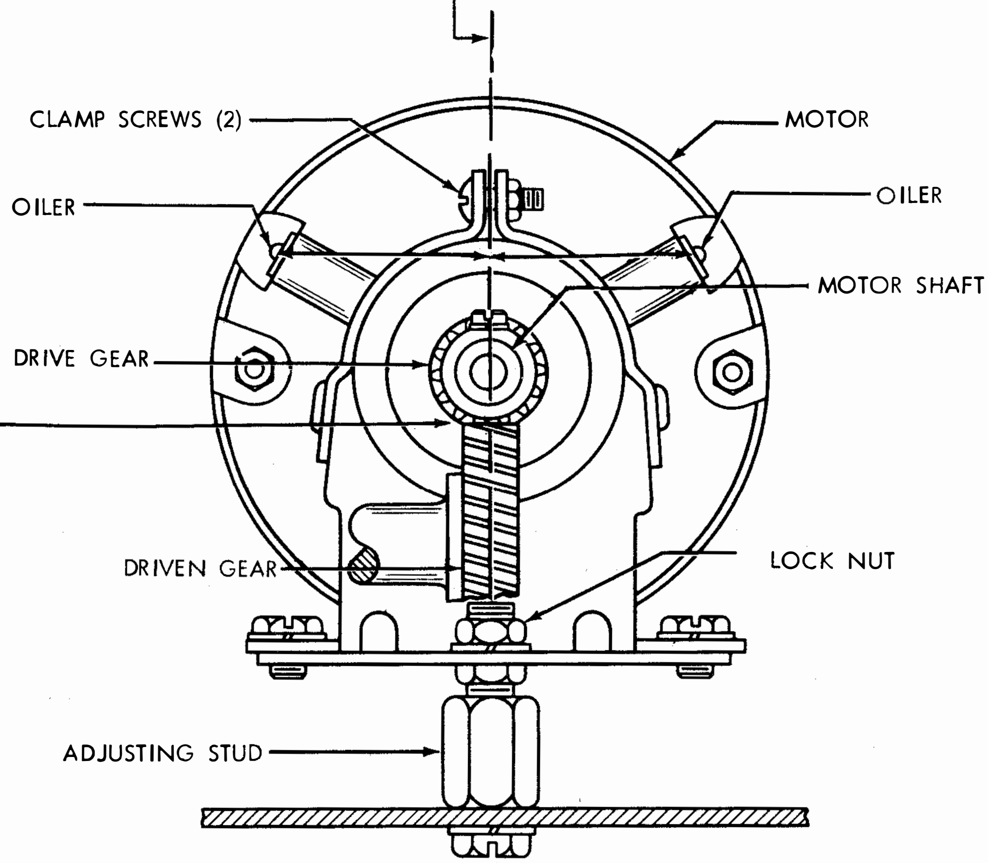
REQUIREMENT
BARELY PERCEPTIBLE BACKLASH BETWEEN DRIVE GEAR AND DRIVEN GEAR AT POINT WHERE BACKLASH IS LEAST.

TO ADJUST
WITH LOCK NUT LOOSENED, POSITION ADJUSTING STUD. TIGHTEN NUT WHILE HOLDING STUD IN POSITION.

(B)
MOTOR

REQUIREMENT
OILERS SHOULD BE UPWARD AND APPROXIMATELY EQUIDISTANT FROM A VERTICAL LINE THROUGH MOTOR SHAFT.

TO ADJUST
POSITION MOTOR WITH CLAMP SCREWS (2) LOOSENED.



CAUTION:
IF MOTOR BECOMES BLOCKED FOR SEVERAL SECONDS, THERMAL CUT-OUT SWITCH WILL BREAK CIRCUIT. SHOULD THIS HAPPEN, ALLOW MOTOR TO COOL AT LEAST 5 MINUTES BEFORE DEPRESSING RED RESET BUTTON.

Figure 5-60. Multiple Reperforator Base, Motor Unit Adjusting Stud f PIVOTED TRANSMITTER DISTRIBUTOR (LAXD)

INSTRUCTIONS FOR:

(A) REMOVING GEAR GUARD --- REMOVE THREE MOUNTING SCREWS AND LIFT GUARD UPWARD. REPLACE IN REVERSE ORDER.

(B) REMOVING CABLE ASSEMBLY FROM BASE --- REMOVE SCREW WHICH MOUNTS CABLE CLAMP TO BASE. REMOVE TWO SCREWS WHICH MOUNT CONNECTOR TO BASE AND DROP CONNECTOR DOWNWARD THROUGH HOLE IN BASE. REPLACE IN REVERSE ORDER.

(C) REMOVING TRANSMITTER DISTRIBUTOR FROM BASE --- WITH GEAR GUARD AND CABLE ASSEMBLY REMOVED FROM BASE, REMOVE THREE MOUNTING SCREWS AND LIFT UNIT UP-WARD. REFER TO FIGURE 5-83 WHEN REPLACING UNIT.

(D) REMOVING COVER PLATE --- REMOVE ONE MOUNTING SCREW FROM TOP OF COVER PLATE AND TWO MOUNTING SCREWS FROM LEFT SIDE. THEN LIFT PLATE UPWARD.

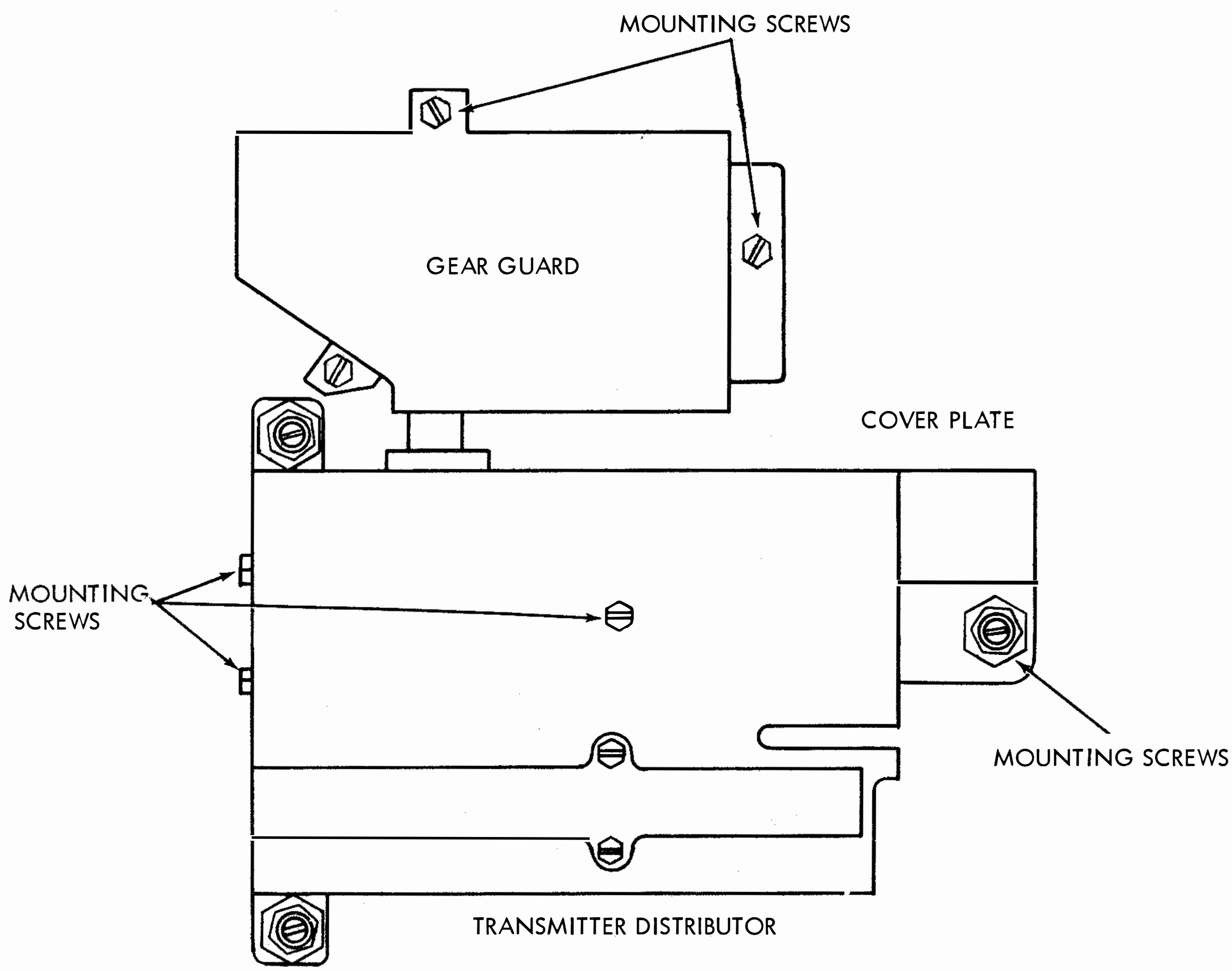
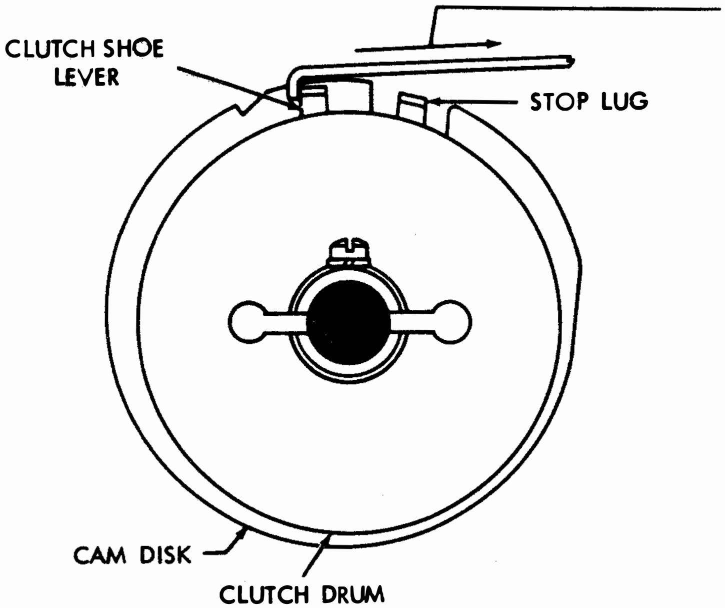


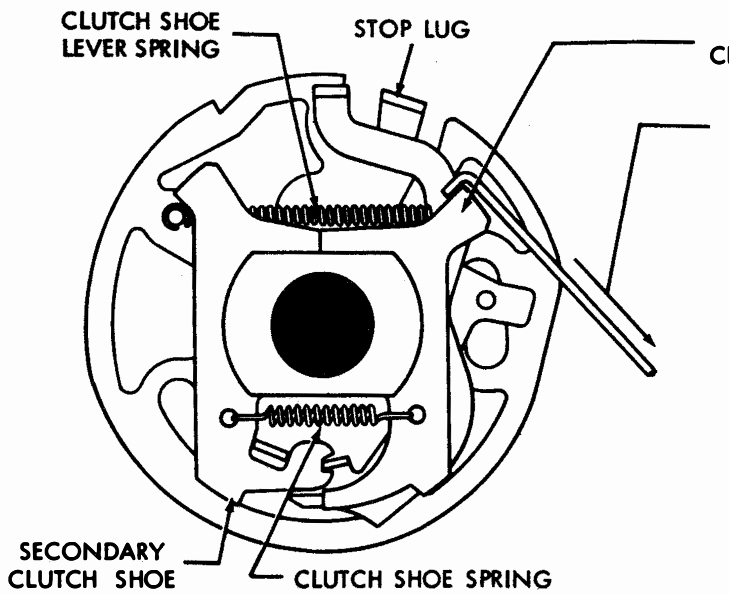
Figure 5-61. Transmitter Distributor (LAXD), Removal of Transmitter Distributor From Base

NOTE: REQUIREMENTS A AND B ARE ADJUSTED AT THE FACTORY AND SHOULD NOT BE DISTURBED UNLESS ASSOCIATED MECHANISMS HAVE BEEN REMOVED FOR SERVICING OR THERE IS REASON TO BELIEVE THAT THE REQUIREMENTS ARE NOT MET. THE FOLLOWING REQUIREMENTS APPLY TO BOTH THE SENSING CLUTCH AND DISTRIBUTOR CLUTCH.



(A) CLUTCH SHOE LEVER SPRING

REQUIREMENT
CLUTCH ENGAGED AND CAM DISK HELD TO PREVENT TURNING. SCALE PULLED AT TANGENT TO CLUTCH.
MIN. 15 OZS.
MAX. 20 OZS.
TO MOVE CLUTCH SHOE LEVER IN CONTACT WITH STOP LUG.



(B) CLUTCH SHOE SPRING

NOTE: IT IS NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SHAFT TO FACILITATE THIS CHECK.

REQUIREMENT
CLUTCH DRUM REMOVED. SCALE APPLIED TO PRIMARY SHOE AT A TANGENT TO THE FRICTION SURFACE.
MIN. 3 OZS.
MAX. 5 OZS.
TO START PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.

Figure 5-62. Transmitter Distributor (LAXD), Clutch Mechanism

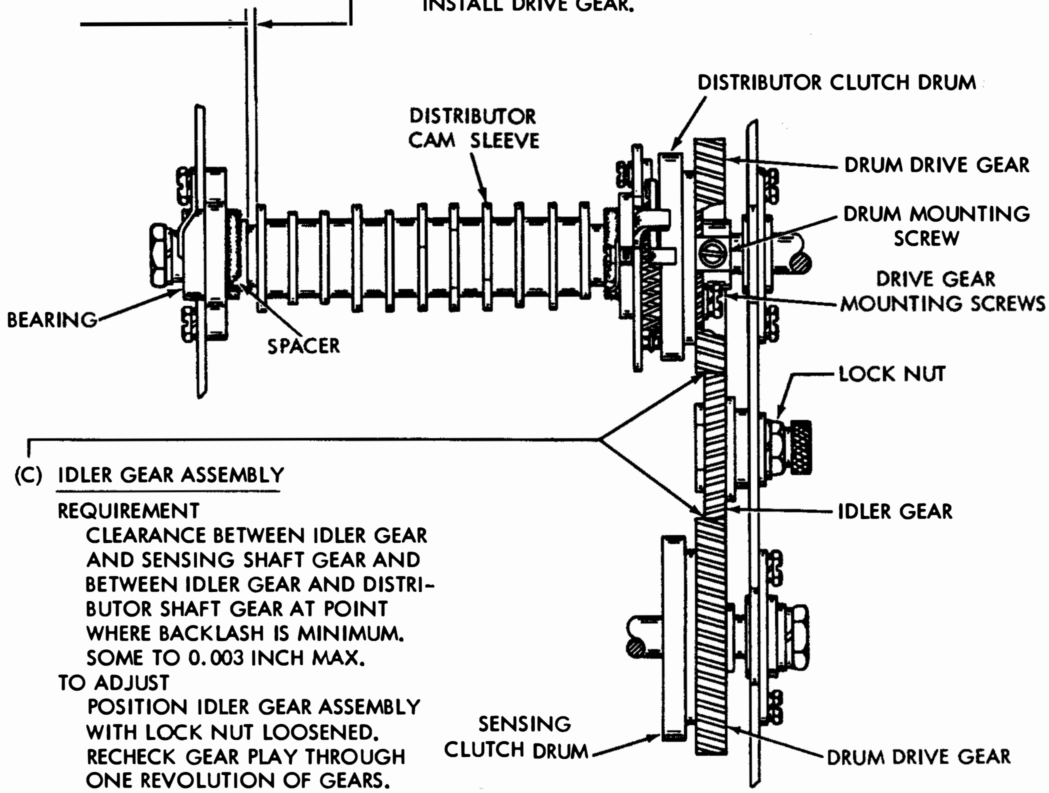
NOTE: THE FOLLOWING REQUIREMENTS APPLY TO BOTH THE DISTRIBUTOR AND SENSING CAM SLEEVES. THESE MECHANISMS SHOULD NOT BE DISTURBED UNLESS THERE IS REASON TO BELIEVE THE REQUIREMENTS ARE NOT MET.

(A) CAM SLEEVE END PLAY

NOTE: THE ADJUSTMENT IS TO BE MADE PRIOR TO ASSEMBLING GEAR.

REQUIREMENT
PLAY BETWEEN SLEEVE AND SPACER, SOME TO 0.010 INCH MAX.

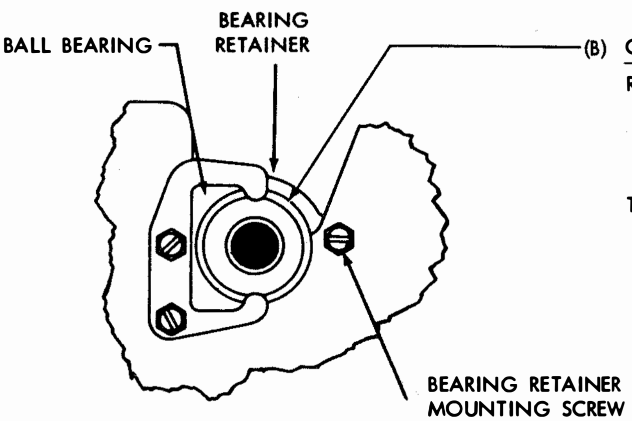
TO ADJUST
REMOVE CLUTCH DRUM DRIVE GEAR AND LOOSEN DRUM MOUNTING SCREW. RELEASE CLUTCH AND POSITION CAM SLEEVE. TIGHTEN CAM SLEEVE MOUNTING SCREW AND RE-INSTALL DRIVE GEAR.



(C) IDLER GEAR ASSEMBLY

REQUIREMENT
CLEARANCE BETWEEN IDLER GEAR AND SENSING SHAFT GEAR AND BETWEEN IDLER GEAR AND DISTRIBUTOR SHAFT GEAR AT POINT WHERE BACKLASH IS MINIMUM. SOME TO 0.003 INCH MAX.

TO ADJUST
POSITION IDLER GEAR ASSEMBLY WITH LOCK NUT LOOSENED. RECHECK GEAR PLAY THROUGH ONE REVOLUTION OF GEARS.



(B) CAM SHAFT BEARING RETAINER

REQUIREMENT
WHEN MOUNTING SHAFT ASSEMBLY, BEARING SHALL SEAT PROPERLY. (NO CLEARANCE PERMISSIBLE BETWEEN BEARING AND MOUNTING SURFACE.)

TO ADJUST
ROTATE BEARING RETAINER 180 DEGREES AND POSITION BY PUSHING DOWNWARD FIRMLY.

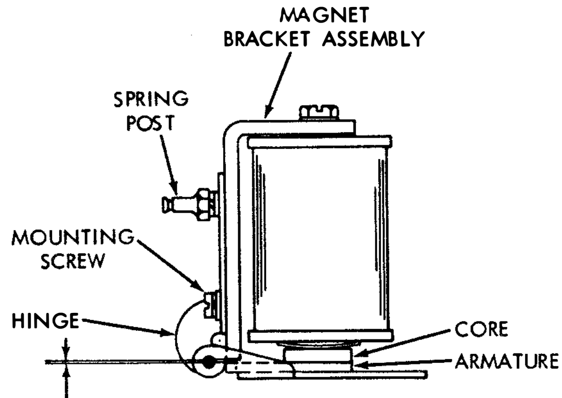
Figure 5-63. Transmitter Distributor (LAXD), Cam Shafts

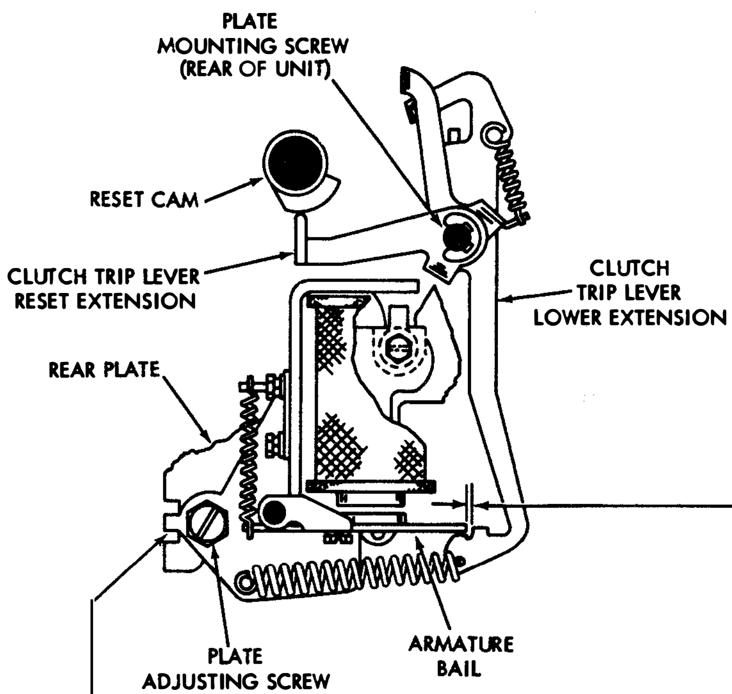
NOTE: REQUIREMENTS APPLY TO BOTH CLUTCH TRIP MECHANISMS.

(A) CLUTCH TRIP MAGNET ARMATURE HINGE

REQUIREMENT
AIR GAP BETWEEN ARMATURE AND MAGNET ASSEMBLY BRACKET WITH ARMATURE FLUSH AGAINST MAGNET CORE. MIN. 0.004 - MAX. 0.008 INCH

TO ADJUST
REMOVE ARMATURE EXTENSION SPRING. POSITION HINGE WITH SPRING POST AND HINGE MOUNTING SCREW LOOSENED. RECHECK AIR GAP AND REPLACE SPRING.

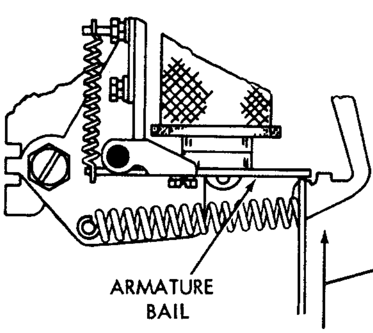




(B) CLUTCH TRIP ASSEMBLY MOUNTING PLATE

REQUIREMENT
CLEARANCE BETWEEN END OF ARMATURE BAIL AND LATCHING SURFACE OF CLUTCH TRIP LEVER LOWER EXTENSION WITH CLUTCH TRIP LEVER RESET EXTENSION ON HIGH PART OF CAM. (TAKE-UP PLAY IN PARTS FOR MINIMUM CLEARANCE.)
MIN. 0.020 INCH
MAX. 0.030 INCH

TO ADJUST
POSITION PLATE WITH SCREWDRIVER IN LOWER ADJUSTING SLOT WITH PLATE ADJUSTING SCREW AND PLATE MOUNTING SCREW LOOSENED. (TAKE-UP PLAY IN TRIP LEVER IN DIRECTION OF CAM.)



(C) ARMATURE BAIL SPRING

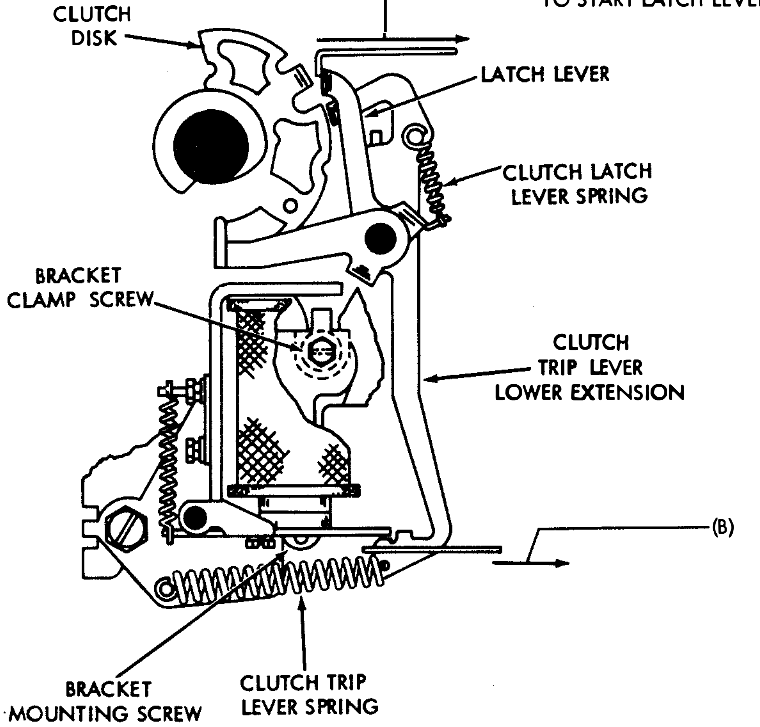
REQUIREMENT
TRIP LEVER RESET EXTENSION ON HIGH PART OF CAM. SCALE APPLIED TO LATCHING END OF ARMATURE BAIL.
MIN. 2-1/2 OZS.
MAX. 4-1/2 OZS.
TO START ARMATURE BAIL MOVING.

Figure 5-64. Transmitter Distributor (LAXD), Clutch Trip Mechanism

NOTE: REFER TO REQUIREMENTS IN PRECEDING PAGE.

(A) CLUTCH LATCH LEVER SPRING

REQUIREMENT
CLUTCH LATCH LEVER NOT LATCHED AND UNIT UPRIGHT. SCALE APPLIED TO BENT EAR OF LATCH LEVER HORIZONTALLY.
MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START LATCH LEVER MOVING.



(B) CLUTCH TRIP LEVER SPRING

REQUIREMENT
WITH CLUTCH JUST TRIPPED, HOLD ARMATURE AGAINST CORE. SCALE APPLIED TO TRIP LEVER LOWER EXTENSION IN LINE WITH SPRING.
MIN. 2 OZS.
MAX. 3-1/2 OZS.
TO START TRIP LEVER LOWER EXTENSION MOVING.

(C) MAGNET BRACKET

REQUIREMENT
CLEARANCE BETWEEN ARMATURE BAIL AND TOP EDGE OF TRIP LEVER LOWER EXTENSION WITH CLUTCH TRIP LEVER RESET EXTENSION ON HIGH PART OF CAM AND ARMATURE FLUSH AGAINST CORE. (TAKE-UP PLAY FOR MINIMUM CLEARANCE.)
MIN. 0.030 INCH
MAX. 0.040 INCH

TO ADJUST
INSERT SCREWDRIVER IN UPPER SLOT AND PIVOT BRACKET, WITH BRACKET MOUNTING SCREW AND CLAMP SCREW LOOSENED.

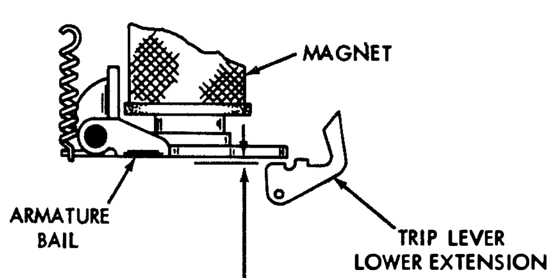
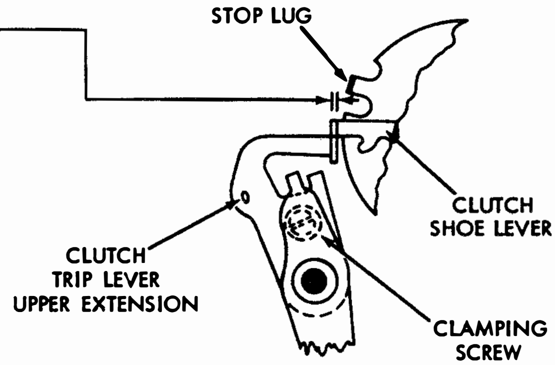


Figure 5-65. Transmitter Distributor (LAXD), Clutch Trip Mechanism

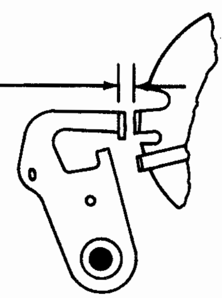
NOTE: REQUIREMENTS A AND B APPLY TO BOTH CLUTCHES.

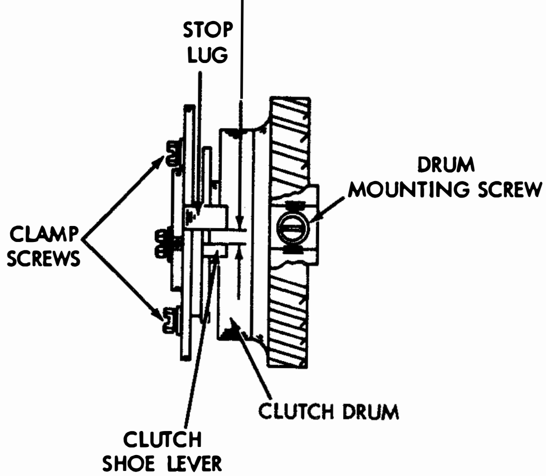
(A) CLUTCH TRIP LEVER UPPER EXTENSION

(1) REQUIREMENT
CLUTCH TRIP LEVER LATCHED (CLUTCH IN STOP POSITION). CLUTCH TRIP LEVER UPPER EXTENSION SHALL FULLY ENGAGE CLUTCH SHOE LEVER.
TO ADJUST
POSITION UPPER EXTENSION, WITH CLUTCH TRIP LEVER CLAMPING SCREW LOOSENED.



(2) REQUIREMENT
ARMATURE IN ATTACHED POSITION, THERE SHALL BE SOME CLEARANCE BETWEEN CLUTCH TRIP LEVER UPPER EXTENSION AND THE SHOE LEVER OR STOP LUG WITH THE CLUTCH ROTATED TO MAKE THIS CLEARANCE A MINIMUM.
TO ADJUST
ABOVE ADJUSTMENT MAY BE MADE UNDER OR OVER FLUSH BY NOT MORE .015 INCH TO MEET CLEARANCE REQUIREMENT.



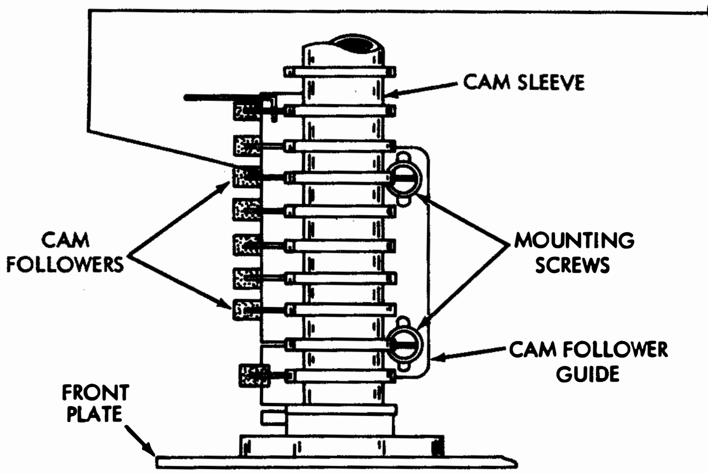


(B) CLUTCH SHOE LEVER
REQUIREMENT
GAP BETWEEN CLUTCH SHOE LEVER AND ITS STOP LUG SHOULD BE 0.055 INCH TO 0.085 INCH GREATER WHEN CLUTCH IS ENGAGED THAN WHEN CLUTCH IS DISENGAGED.
TO ADJUST
ENGAGE A WRENCH OR SCREWDRIVER ON A SCREW ON ADJUSTING DISK AND ROTATE DISK, WITH CLAMP SCREWS LOOSENED AND CLUTCH DISENGAGED.

NOTE: AFTER ADJUSTMENT, DISENGAGE CLUTCH, REMOVE DRUM MOUNTING SCREW AND ROTATE DRUM IN ITS NORMAL DIRECTION OF ROTATION TO MAKE CERTAIN THAT IT DOES NOT DRAG ON SHOE. IF DRUM DRAGS, REFINE ABOVE ADJUSTMENT.

Figure 5-66. Transmitter Distributor (LAXD), Clutch Mechanism

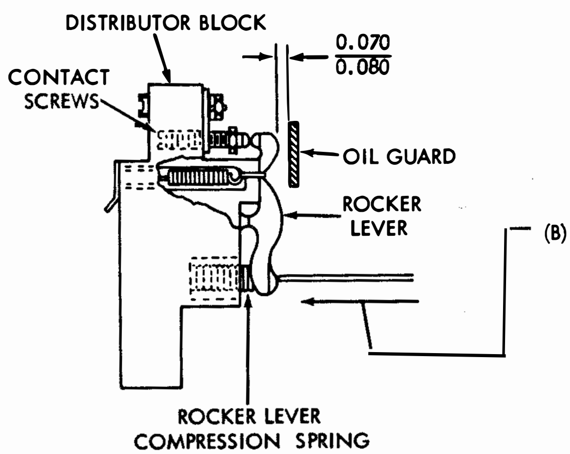
NOTE: REMOVE OIL RESERVOIR AND DISTRIBUTOR BLOCK ASSEMBLY FOR REQUIREMENTS A, B AND C.



(A) DISTRIBUTOR CAM FOLLOWER GUIDE

REQUIREMENT
AT LEAST ONE CAM FOLLOWER SHOULD ENGAGE CAM BY FULL THICKNESS OF THE FOLLOWER AS FOLLOWER IS MOVED FROM SIDE TO SIDE IN ITS GUIDE SLOT. OTHER CAM FOLLOWERS SHOULD ENGAGE BY 75 PER CENT IN SAME MANNER WHEN PLAY IS TAKEN UP FOR A MAXIMUM. ALL CAM FOLLOWERS SHOULD MOVE FREELY IN GUIDE SLOTS.

TO ADJUST
POSITION GUIDE WITH CAM FOLLOWER GUIDE MOUNTING SCREWS LOOSENED. RECHECK REQUIREMENT

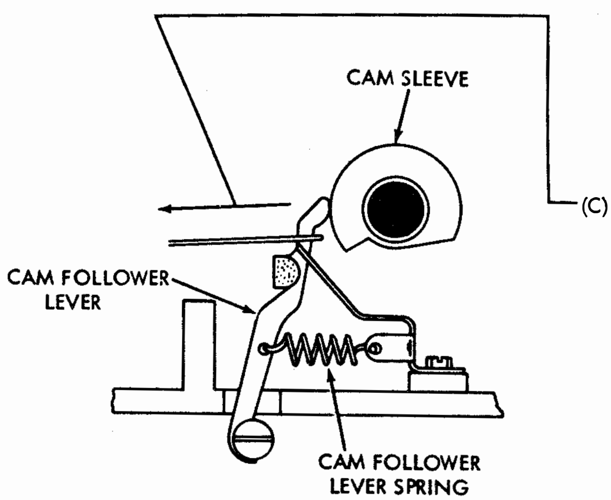


NOTE --- WITH DISTRIBUTOR BLOCK REMOVED ADJUST CONTACTS SO THAT THERE IS 0.070 TO 0.080 INCHES BETWEEN ROCKER LEVERS AND OIL GUARD.

(B) DISTRIBUTOR ROCKER COMPRESSION SPRINGS

REQUIREMENT----WITH COMPRESSION SPRINGS INSTALLED, APPLY SPRING SCALE AT LOWER END OF ROCKER AND PUSH DOWNWARD (VERTICALLY)
MIN. 6-1/2 OZS. — MAX. 9-1/2 OZS.
TO SEPARATE THE CONTACTS

IF THE REQUIREMENT CANNON BE MET AFTER COMPRESSION SPRINGS ARE RE-PLACED, CHECK ROCKER LEVER TENSION SPRINGS.



(C) CAM FOLLOWER LEVER SPRING

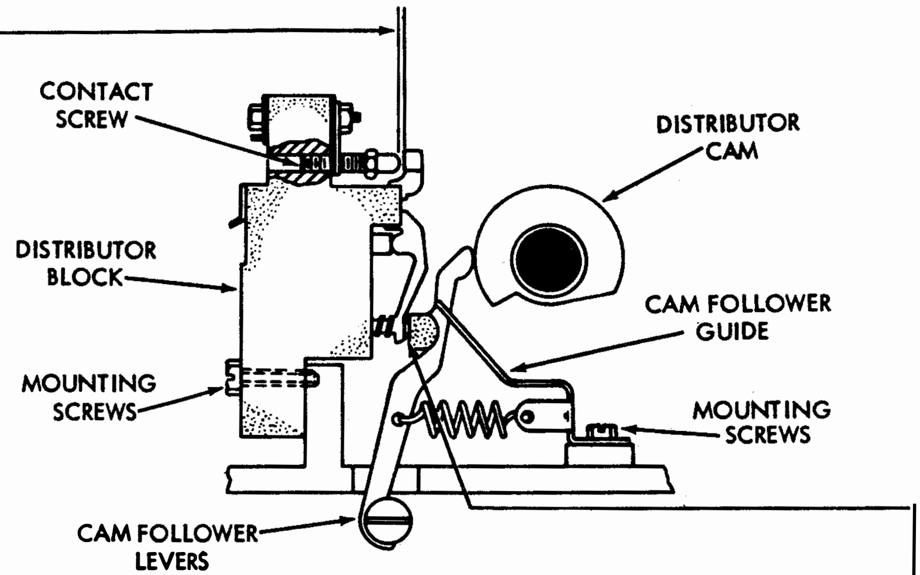
REQUIREMENT
CAM FOLLOWER LEVER ON HIGH PART OF CAM. SCALE APPLIED JUST BELOW SLIDING SURFACE OF LEVER HORIZONTALLY.
MIN. 1/2 OZ.
MAX. 1-1/2 OZS. TO START EACH LEVER MOVING.

Figure 5-67 Transmitter Distributor (LAXD), Distributor Contact Mechanism

(B) DISTRIBUTOR CONTACT GAP

REQUIREMENT
CONTACT GAP WITH CAM FOLLOWER LEVER ON HIGH PART OF CAM.
MIN. 0.025 INCH
MAX. 0.030 INCH

TO ADJUST
TRIP CLUTCH MANUALLY TO POSITION CAM. TURN CONTACT SCREW TO ADJUST. CHECK ALL CONTACTS.

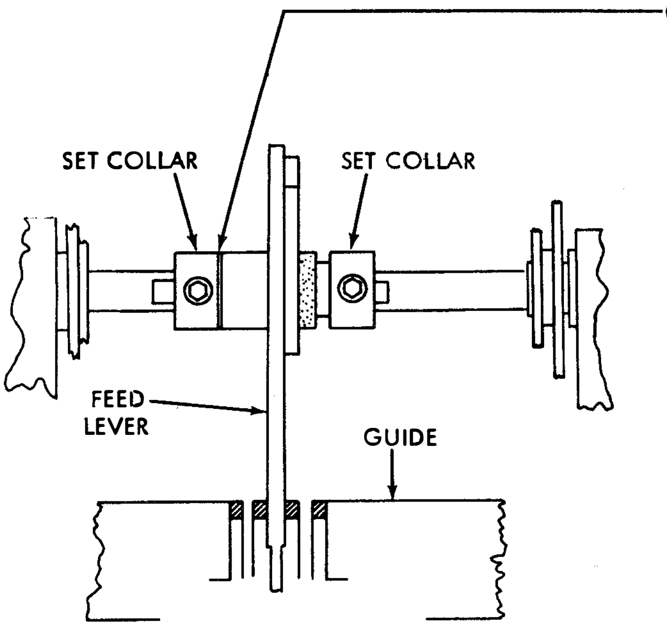


(A) DISTRIBUTOR BLOCK ASSEMBLY

REQUIREMENT
ROCKERS SHOULD FULLY ENGAGE INSULATED PORTION OF RESPECTIVE CAM FOLLOWER LEVERS.

TO ADJUST
POSITION BLOCK WITH DISTRIBUTOR BLOCK MOUNTING SCREWS LOOSENED.

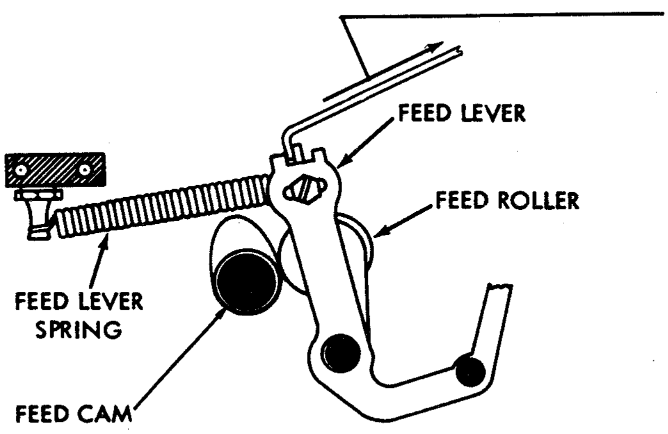
Figure 5-68. Transmitter Distributor (LAXD), Distributor Contact Mechanism



(A) FEED LEVER SET COLLAR

REQUIREMENT
CLEARANCE BETWEEN FEED LEVER AND COLLARS
SOME ——————— .015 INCH
FEED LEVER SHOULD MOVE FEEELY WITHOUT BINDING AT GUIDE OR SET COLLARS.

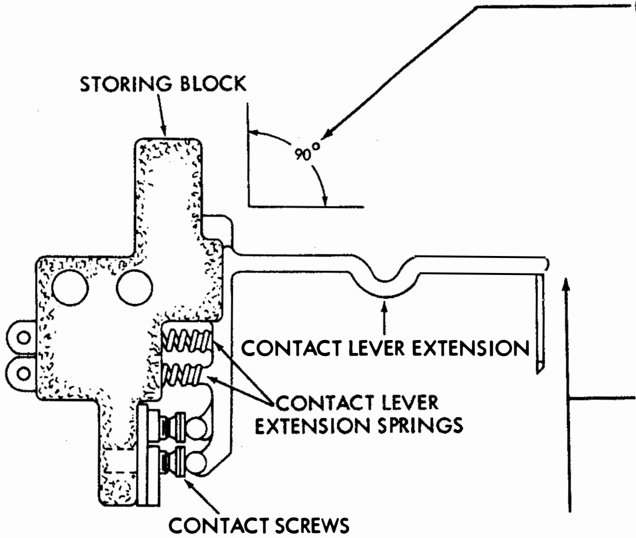
TO ADJUST
POSITION FEED LEVER, WITH SET COLLAR SCREWS LOOSENED.



(B) FEED LEVER SPRING

REQUIREMENTS
SENSING CLUTCH TRIPPED AND SHAFT ROTATED UNTIL FEED ROLLER IS OFF FEED CAM. SCALE APPLIED TO FEED LEVER.
MIN. 30 OZS.
MAX. 40 OZS.
TO START FEED ROLLER MOVING AWAY FROM CAM.

Figure 5-69. Transmitter Distributor (LAXD), Feed Lever



(A) STORING SWITCH CONTACTS

(PRELIMINARY)

NOTE: STORING SWITCH ASSEMBLY SHOULD BE REMOVED.

REQUIREMENT

CONTACT LEVER EXTENSIONS SHOULD BE PERPENDICULAR TO STORING BLOCK.

TO ADJUST

TURN EACH CONTACT SCREW WITH ALLEN WRENCH TO ADJUST. GAUGE BY EYE.

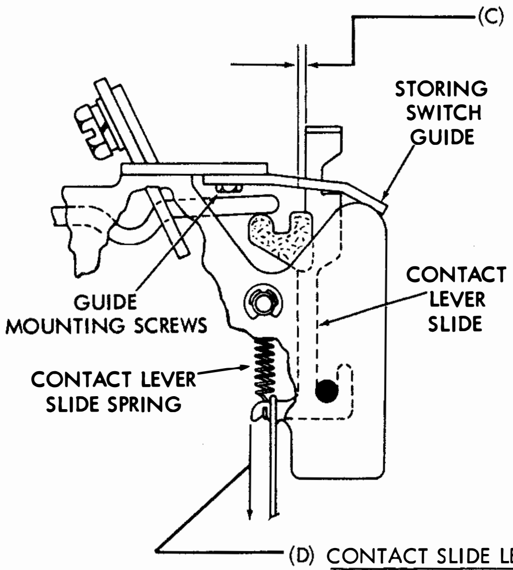
(B) STORING SWITCH CONTACT LEVER EXTENSION SPRING

REQUIREMENT

SCALE APPLIED TO END OF CONTACT LEVER EXTENSION.

MIN. 1-3/4 OZS. MAX. 3-1/2 OZS.	CONTACT LEVER EXTENSION
MIN. 1/2 OZ. MAX. 1 OZ.	TAPE-OUT (6TH) LEVER EXTENSION ONLY

TO START LEVER EXTENSION MOVING.



(C) STORING SWITCH GUIDES

PRELIMINARY - BEFORE SWITCH ASSEMBLY IS SECURED TO UNIT, ROTATE SLIDE ECCENTRIC TO MAKE CLEARANCE BETWEEN SLIDE STOP POST AND END CONTACT LEVER SLIDES MINIMUM.

(1) REQUIREMENT

MIN. 0.005 INCH
MAX. 0.012 INCH
CLEARANCE BETWEEN END SLIDES AND STOP POST. (HOLD SLIDES AWAY FROM STOP POST).

NOTE

AFTER CONTACT LEVER SLIDE ADJUSTMENT CLEARANCE MAY BE 0.005 TO 0.015 INCH

(2) REQUIREMENT

CONTACT LEVER SLIDES FREE IN GUIDE SLOTS AND PARALLEL TO SIDE PLATES (GAUGE BY EYE).

TO ADJUST

POSITION GUIDE WITH ITS MOUNTING SCREWS LOOSENED.

(D) CONTACT SLIDE LEVER SPRINGS

TO CHECK

SELECT BLANK COMBINATION, TRIP SENSING CLUTCH AND ROTATE SHAFT TO STOP POSITION. HOLD EXTENSION LEVERS AWAY.

(1) REQUIREMENT

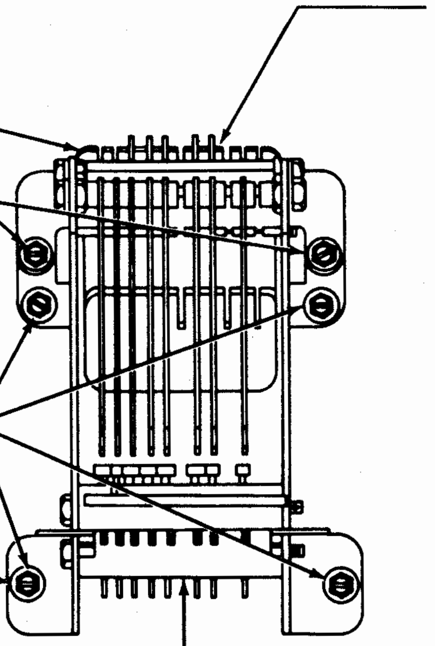
MIN. 4 OZS.
MAX. 6 OZS.
TO START EACH SLIDE LEVER SPRING MOVING.

(2) REQUIREMENT

MIN. 1-1/2 OZS.
MAX. 3 OZS.
TO START TAPE-OUT (6TH) SLIDE LEVER SPRING MOVING.

Figure 5-70. Transmitter Distributor (LAXD), Storing Switch Mechanism

NOTE: REINSTALL STORING SWITCH ASSEMBLY.



(A) STORING SWITCH ASSEMBLY

REQUIREMENT

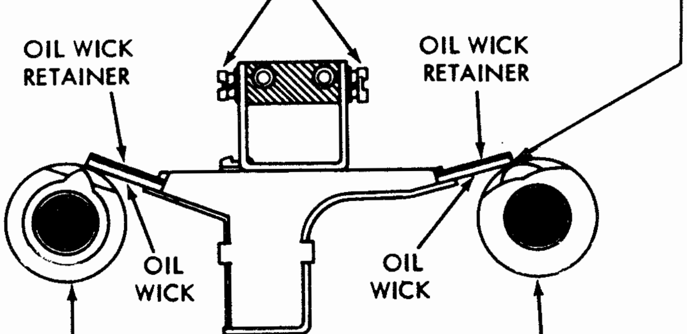
STORING SWITCH ASSEMBLY SHOULD ALIGN WITH LATCH LEVERS SO THAT LATCH LEVERS AND SLIDES FUNCTION WITHOUT BINDING.

TO CHECK

MANUALLY PUSH LATCH BAIL FOLLOWER AWAY FROM CAM UNTIL LATCHES ARE FREE FROM GUIDE. RELEASE LATCH BAIL FOLLOWER AND NOTE IF LATCHES FALL INTO THEIR RESPECTIVE SLOTS.

TO ADJUST

PIVOT STORING SWITCH WITH STORING SWITCH MOUNTING SCREWS LOOSENED. RECHECK REQUIREMENT.



(B) OIL RESERVOIR

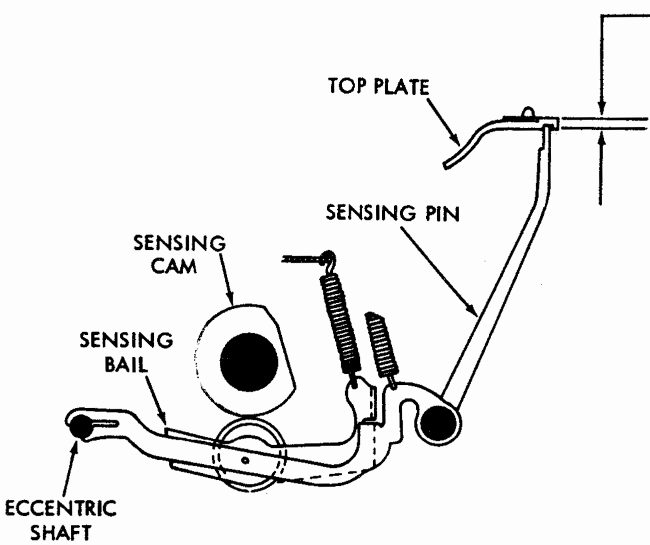
REQUIREMENT

EACH OIL WICK RESTS LIGHTLY ON HIGH PARTS OF FRONT AND REAR CAM OF EACH CAM SLEEVE.

TO ADJUST

TRIP BOTH ARMATURES AND ROTATE SHAFT UNTIL HIGH PART OF FRONT AND REAR CAM OF EACH SLEEVE IS UNDER ITS WICK. POSITION OIL RESERVOIR ASSEMBLY WITH ITS MOUNTING SCREWS (2) LOOSENED. WHEN CAM SLEEVE IS ROTATED, TEETH OF WICK RETAINER SHOULD NOT DEFLECT UPWARD MORE THAN 1/32 INCH (GAUGE BY EYE). REFINE ADJUSTMENT BY SLIGHTLY BENDING TEETH ON WICK COMB SPRING.

Figure 5-71. Transmitter Distributor (LAXD), Storing Switch Mechanism



(A) SENSING PINS

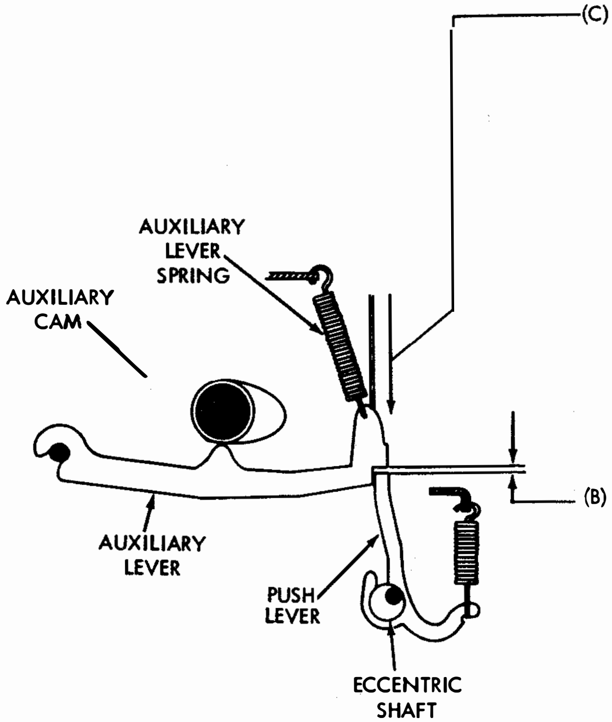
REQUIREMENT
IN STOP POSITION, HIGHEST SENSING PIN SHOULD BE FLUSH TO 0.005 INCH BELOW SURFACE OF TOP GUIDE PLATE.

TO ADJUST
WITH CLUTCH LATCHED AND YOKE IN LOCKED POSITION, LOOSEN NUT ON ECCENTRIC SHAFT AND ADJUST ECCENTRIC SHAFT WITH HIGH PART OF ECCENTRIC TOWARD RIGHT OF UNIT. TIGHTEN NUT, ROTATE SHAFT AND RECHECK. CHECK THROUGHOUT SENSING HEAD TRAVEL.

NOTE: HIGH PART OF ECCENTRIC IS MARKED ON FRONT END OF SHAFT BY A SMALL INDENTATION.

(C) AUXILIARY LEVER SPRING

REQUIREMENT
EACH AUXILIARY LEVER ON LOW PART OF ITS CAM. SCALE APPLIED TO LEVER JUST AHEAD OF SPRING.
MIN. 1/2 OZ.
MAX. 3 OZS.
TO START AUXILIARY LEVER MOVING.



(B) PUSH LEVER

REQUIREMENT
WITH FIRST ONE AND THEN THE OTHER OF THE TWO AUXILIARY LEVERS ON THE LOW PART OF CAM, THE AUXILIARY LEVER WITH THE LEAST CLEARANCE SHOULD CLEAR THE TIP OF ITS PUSH LEVER BY
MIN. 0.020 INCH
MAX. 0.045 INCH

TO ADJUST
WITH CLUTCH IN STOP POSITION AND PUSH LEVER ECCENTRIC SHAFT LOCK NUT (FRONT PLATE) LOOSENED, ROTATE ECCENTRIC WITH THE HIGH PART OF THE ECCENTRIC LOCATED TOWARD THE RIGHT. ROTATE CAM SLEEVE AND RECHECK REQUIREMENT.

Figure 5-72. Transmitter Distributor (LAXD), Sensing Mechanism

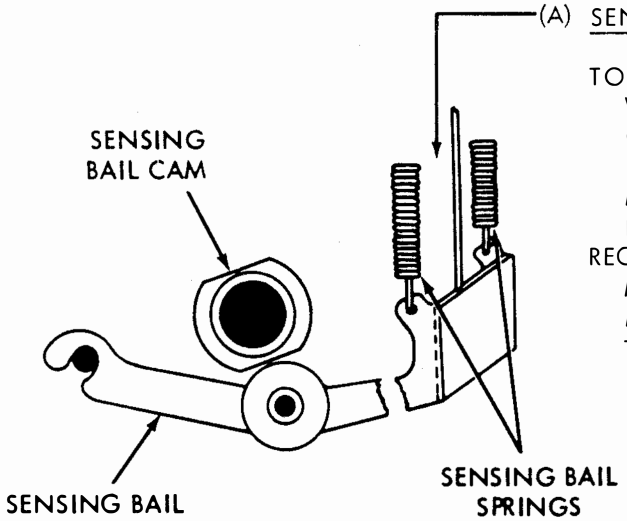
(A) SENSING BAIL SPRINGS

TO CHECK

WITH BLANK TAPE UNDER TAPE LID, TRIP CLUTCH MAGNET AND MANUALLY ROTATE SHAFT UNTIL SENSING BAIL IS IN UPPERMOST POSITION. APPLY SCALE TO BAIL BETWEEN SPRINGS.

REQUIREMENT

MIN. 1/4 OZ.
MAX. 2 OZ.
TO START SENSING BAIL MOVING.



(B) SENSING PIN SPRINGS

TO CHECK

WITH SENSING HEAD IN LOCKED POSITION, TRIP SENSING CLUTCH AND ROTATE SENSING SHAFT UNTIL SENSING PINS ARE IN UPPERMOST POSITION. WHILE HOLDING PUSH LEVERS AWAY FROM TRANSFER LEVER, APPLY SCALE IN LINE WITH PIN.

REQUIREMENT

MIN. 3 OZS.
MAX. 4 OZS.
TO MOVE SENSING PINS FLUSH WITH TOP GUIDE PLATE.

(C) TAPE-OUT (6TH) PIN SPRING

TO CHECK

SENSING HEAD IN LOCKED POSITION, AND TAPE-OUT PIN IN UPPERMOST POSITION. APPLY SCALE IN LINE WITH PIN.

REQUIREMENT

MIN. 2-1/2 OZS.
MAX. 5 OZS..
TO MOVE SENSING PIN FLUSH WITH TOP GUIDE PLATE.

NOTE

WHEN CHECKING THIS SPRING ALLOW THE PUSH LEVER TO REMAIN UNDER THE TRANSFER LEVER.

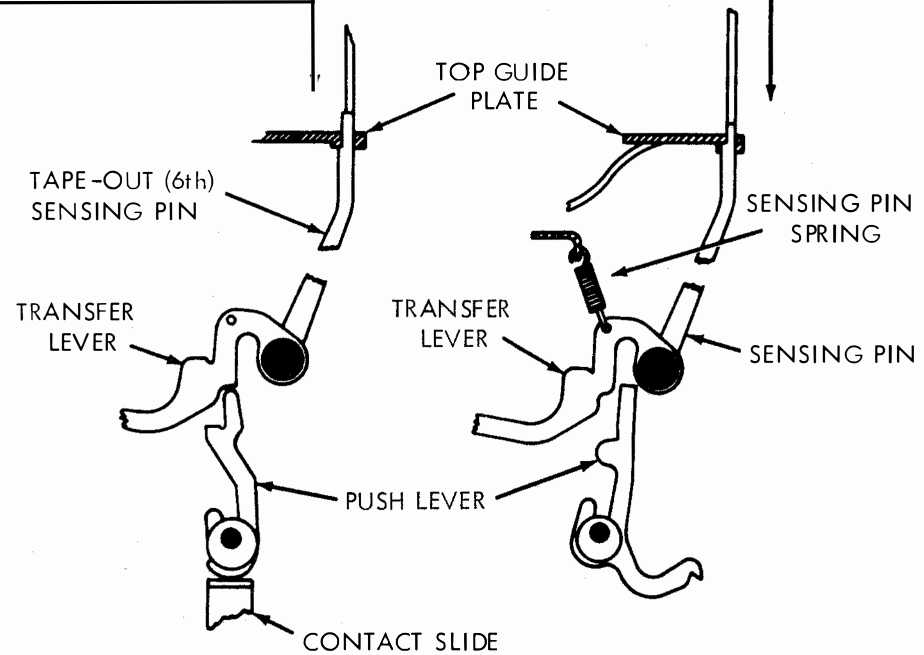
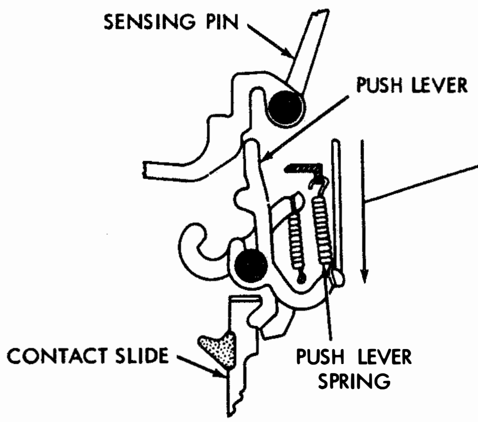
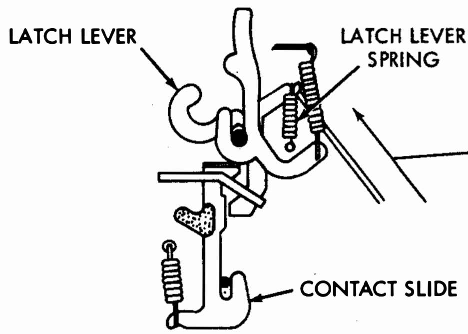


Figure 5-73. Transmitter Distributor (LAXD), Sensing Mechanism Springs



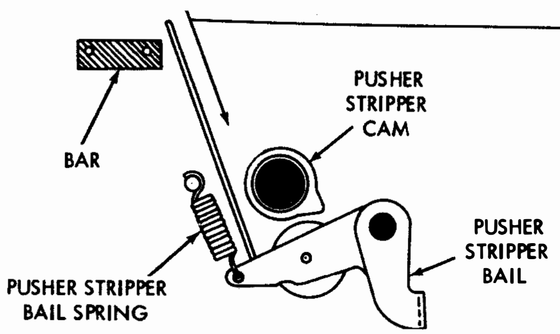
(A) PUSH LEVER SPRING

REQUIREMENT
CLUTCH TRIPPED AND SHAFT ROTATED UNTIL SENSING PINS ARE IN UPPERMOST POSITION. APPLY SCALE AT RIGHT ANGLE TO EXTREME LOWER END OF PUSH LEVER (SENSING PUSH LEVERS ONLY).
MIN. 1 OZ.
MAX. 2 OZS.
TO START PUSH LEVER MOVING.
NOTE: BE SURE CONTACT SLIDES DO NOT INTERFERE WITH MOVEMENT OF PUSH LEVERS.



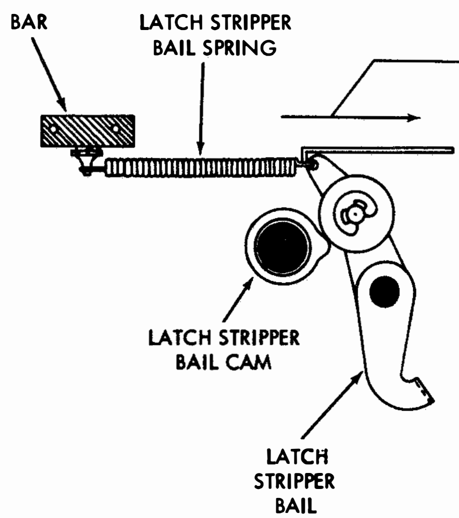
(B) LATCH LEVER SPRING

REQUIREMENT
SELECT BLANK COMBINATION, TRIP SENSING CLUTCH AND ROTATE SHAFT TO STOP POSITION. SCALE APPLIED AT RIGHT ANGLE TO TOP OF LATCH LEVER.
MIN. 1 OZ.
MAX. 3 OZS.
TO START LATCH LEVER MOVING.
NOTE: TAKE CARE NOT TO DAMAGE PUSH LEVER SPRINGS IN CHECKING REQUIREMENT.



(C) PUSHER STRIPPER BAIL SPRING

REQUIREMENT
WITH UNIT UPRIGHT, SELECT BLANK COMBINATION, TRIP CLUTCH AND ROTATE SHAFT TO STOP POSITION.
32 OZ SCALE APPLIED TO POINT JUST BELOW SPRING ANCHOR.
MIN. 7 OZS.
MAX. 11 OZS.
TO START BAIL MOVING AWAY FROM CAM.



(D) LATCH STRIPPER BAIL SPRING

REQUIREMENT
TRIP CLUTCH, ROTATE SHAFT SO LATCH BAIL FOLLOWER ROLLER IS ON LOW PART OF CAM. SCALE APPLIED TO TOP OF LATCH STRIPPER BAIL.
MIN. 2-3/4 OZS.
MAX. 6 OZS.
TO START LATCH STRIPPER BAIL MOVING.

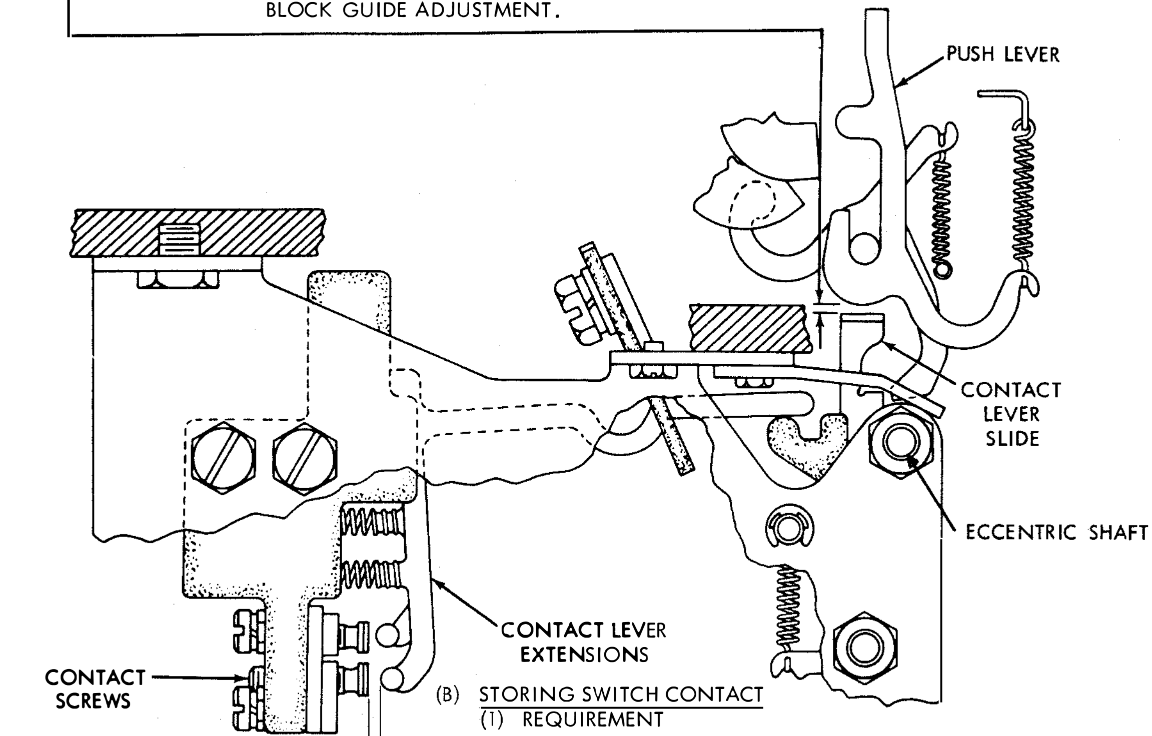
Figure 5-74. Transmitter Distributor (LAXD), Sensing Mechanism Springs

(A) CONTACT SLIDE LEVER

REQUIREMENT
CLEARANCE BETWEEN CLOSEST PUSH LEVER AND CONTACT LEVER SLIDE WITH SENSING PINS IN UPPERMOST POSITION, PUSH LEVERS SELECTED AND LATCH LEVERS STRIPPED.
MIN. 0.005 INCH
MAX. 0.015 INCH

TO ADJUST
SENSING SHAFT CLUTCH TRIPPED AND SHAFT ROTATED UNTIL SENSING PINS ARE IN UPPERMOST POSITION. TRIP LATCH LEVERS MANUALLY. POSITION ECCENTRIC SHAFT TOWARD THE RIGHT WITH LOCKING NUTS LOOSENED.

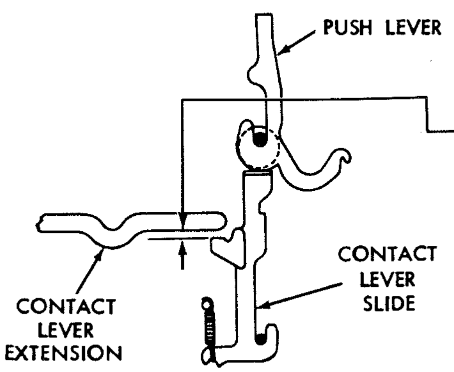
NOTE: AFTER ADJUSTING, RECHECK STORING BLOCK GUIDE ADJUSTMENT.



(B) STORING SWITCH CONTACT

(1) REQUIREMENT
BLANK COMBINATION SELECTED, CLUTCH TRIPPED, AND SHAFT ROTATED ONE REVOLUTION TO STOP POSITION.
MIN. 0.015 INCH
MAX. 0.020 INCH
GAP BETWEEN EACH CONTACT LEVER EXTENSION AND ITS CONTACT SCREW.

TO ADJUST
ROTATE INDIVIDUAL CONTACT SCREW



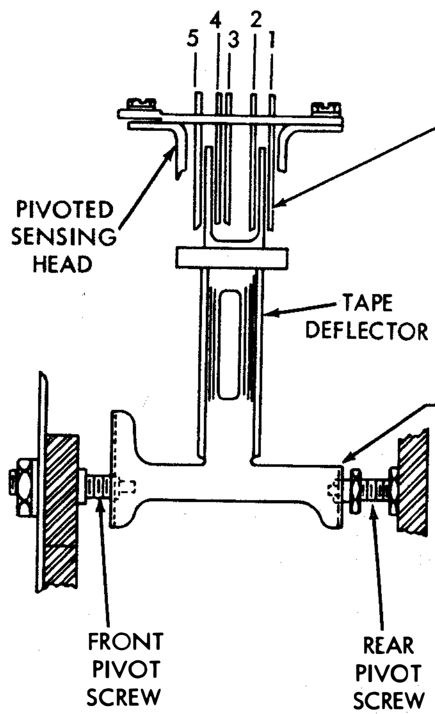
(2) REQUIREMENT
MIN. 0.010 INCH
CLEARANCE BETWEEN CONTACT SLIDE AND CONTACT LEVER EXTENSION (SENSING PIN CONTACTS ONLY)

TO CHECK
ROTATE SHAFT TO STRIP PUSHERS, BUT NOT LATCH LEVERS.

TO ADJUST
REFINE REQUIREMENT (1).

NOTE
TO GAUGE TAPE-OUT (6TH) PIN, ROTATE SHAFT UNTIL SENSING PINS ARE IN UPPERMOST POSITION.

Figure 5-75. Transmitter Distributor (LAXD), Storing Switch Mechanism



(B) TAPE DEFLECTOR

REQUIREMENT
THE TAPE DEFLECTOR VERTICAL EARS SHOULD PASS FREELY BETWEEN SENSING PINS 1-2 AND 4-5 AS PIVOTED SENSING HEAD IS MOVED AWAY FROM ITS LOCKED POSITION.

TO ADJUST
POSITION TAPE DEFLECTOR WITH FRONT PIVOT SCREW.

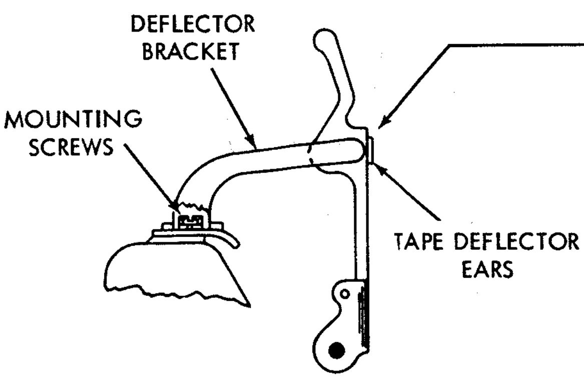
(A) SENSING HEAD PIVOT SCREWS

(1) REQUIREMENT
SENSING YOKE SHALL BE FREE OF BINDS

TO ADJUST
POSITION REAR PIVOT SCREW FOR MINIMUM END PLAY WITHOUT BINDING.

(2) REQUIREMENT
SENSING PINS SHALL MOVE FREELY IN TOP PLATE

TO ADJUST
REFINE REQUIREMENT NO. 1 ADJUSTMENT.



(C) TAPE DEFLECTOR BRACKET

REQUIREMENT
ARMS OF DEFLECTOR BRACKET SHALL CONTACT EARS ON TAPE DEFLECTOR SIMULTANEOUSLY WITH SENSING YOKE IN FIXED POSITIONS.

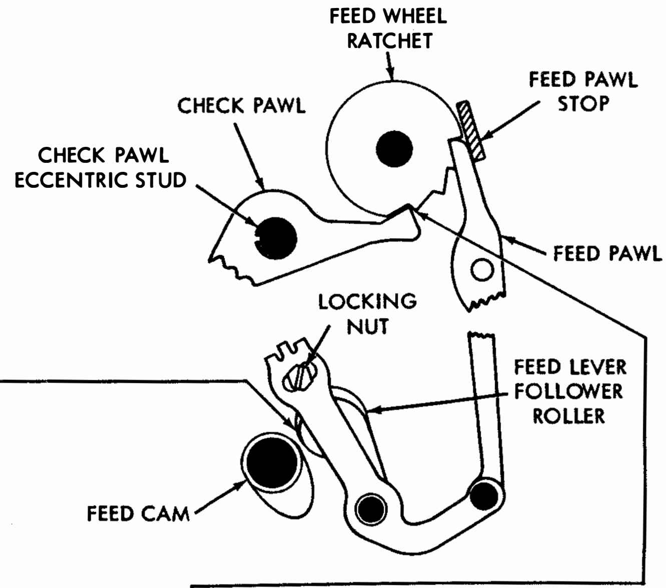
TO ADJUST
POSITION DEFLECTOR BRACKET WITH MOUNTING SCREWS LOOSENED.

Figure 5-76. Transmitter Distributor (LAXD), Pivoted Sensing Head

(A) FEED PAWL (PRELIMINARY)

REQUIREMENT
FEED LEVER FOLLOWER ROLLER SHALL BE OFF CAM WHEN FEED PAWL RESTS AGAINST ITS UPWARD STOP.

TO ADJUST
TRIP CLUTCH AND ROTATE SHAFT UNTIL FEED PAWL IS IN ITS UPPER POSITION AND BOTTOMED ON ITS STOP. POSITION ROLLER WITH LOCK NUT LOOSENED.



(B) CHECK PAWL

(1) REQUIREMENT
CHECK PAWL SHALL ENGAGE BOTH TEETH ON RATCHET WITH FEED PAWL IN ITS UP POSITION.

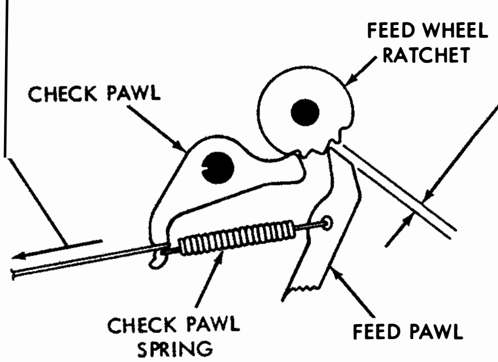
TO ADJUST
ROTATE CHECK PAWL ECCENTRIC STUD.
NOTE: GROOVE ON ECCENTRIC STUD (HIGH PART OF ECCENTRIC) MUST BE ON LEFT SIDE DURING ADJUSTMENT.

(2) REQUIREMENT
FEED WHEEL SHALL NOT MOVE WITH SENSING CLUTCH IN STOP POSITION (FEED PAWL DOWN FULLY).
NOTE: CHECK REQUIREMENT AROUND ENTIRE PERIPHERY OF RATCHET.

TO ADJUST
REFINE REQUIREMENT NO. 1
NOTE: USE SLIGHT PRESSURE ON FEED WHEEL TO PREVENT FALSE INDICATION DUE TO OVER-RIDING CHECK PAWL SPRING.

(D) CHECK PAWL SPRING

REQUIREMENT
SENSING CLUTCH IN STOP POSITION. SCALE APPLIED TO CHECK PAWL.
MIN. 4-1/2 OZS.
MAX. 8-1/2 OZS.
TO START CHECK PAWL MOVING.



(C) FEED PAWL (FINAL)

REQUIREMENT
CLEARANCE BETWEEN FEED PAWL AND FEED RATCHET TOOTH WITH CLUTCH IN STOP POSITION.
MIN. 0.030 INCH
MAX. 0.035 INCH

TO ADJUST
WITH YOKE AGAINST BACK STOP AND SHAFT IN STOP POSITION, ADJUST FEED LEVER WITH LOCK NUT LOOSENED.

Figure 5-77. Transmitter Distributor (LAXD), Pivoted Sensing Head

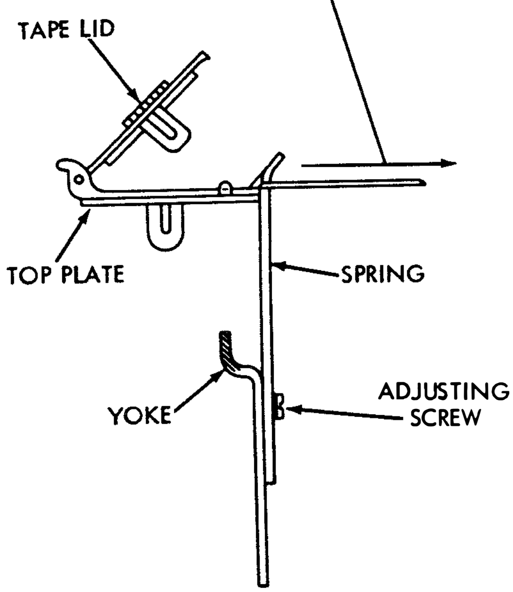
(B) TAPE RETAINING LID LATCH

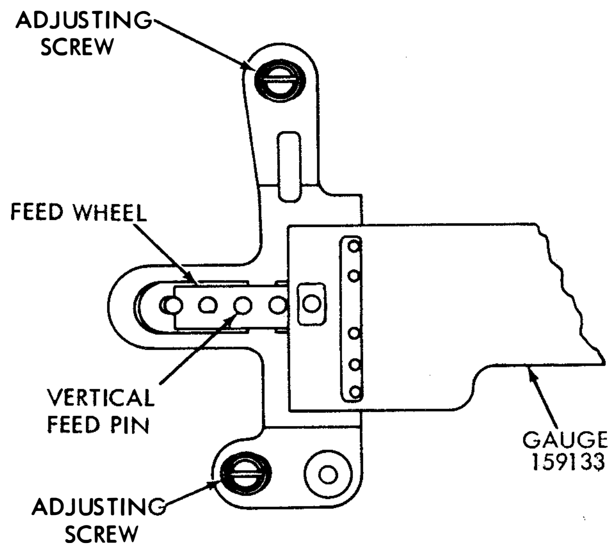
(1) REQUIREMENT
TENSION REQUIRED TO START TAPE RETAINING LID LATCH SPRING AWAY FROM TOP PLATE.
MIN. 8 OZS.
MAX. 14 OZS.

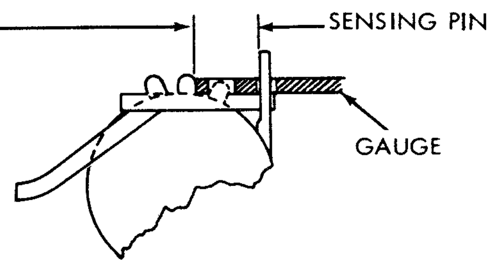
TO ADJUST
BOW LID LATCH SPRING WITH FINGERS. DO NOT REMOVE SPRING FROM YOKE.

(2) REQUIREMENT
WHEN LATCHED, NO PLAY BETWEEN TAPE RETAINING LID AND TOP PLATE.

TO ADJUST
POSITION LID LATCH SPRING WITH ADJUSTING SCREW LOOSENED.
NOTE: BE SURE LID LATCH SPRING ALIGNS WITH LID ON TAPE RETAINING LID.







(A) TOP PLATE

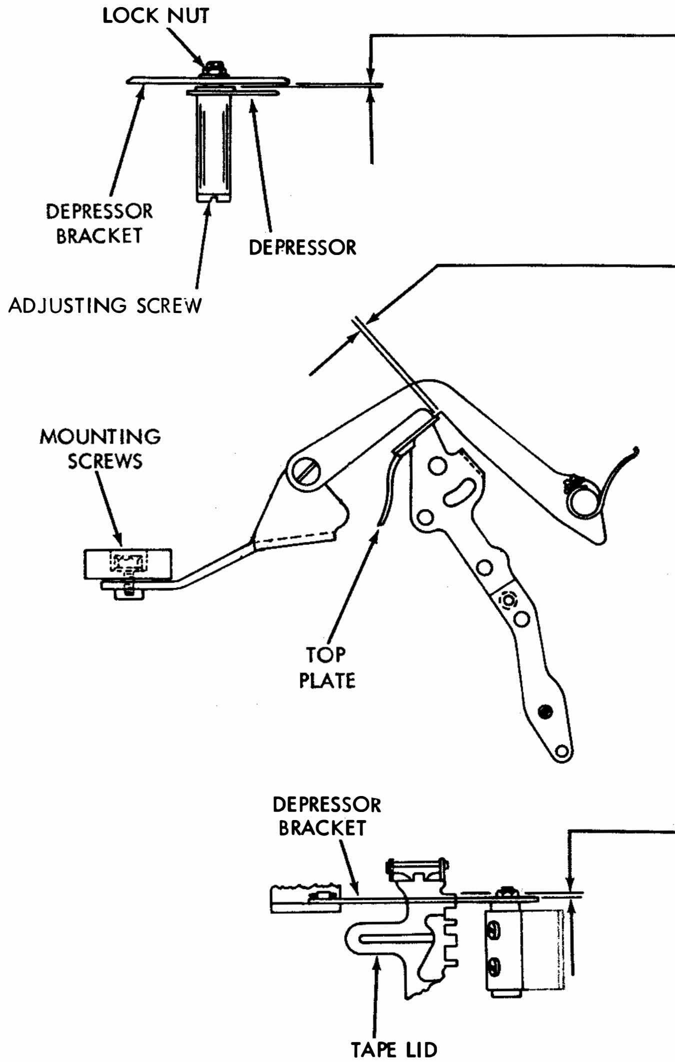
(1) REQUIREMENT
SPACING BETWEEN VERTICAL FEED WHEEL PIN AND SENSING PINS. -0.300 INCH

TO ADJUST
WITH PIVOTED SENSING HEAD AGAINST ITS BACKSTOP, TRIP CLUTCH AND ROTATE SHAFT UNTIL SENSING PINS ARE IN UPPERMOST POSITION. WITH TOP PLATE MOUNTING SCREWS LOOSENED, PLACE GUAGE 159133 ON TOP PLATE AND POSITION TOP PLATE. RELEASE CLUTCH AND ROTATE SHAFT UNTIL SENSING PINS ARE IN THEIR UPPERMOSE POSITION.
RECHECK REQUIREMENT.

(2) REQUIREMENT
TAPE RETAINING LID MUST CENTER OVER TOP PLATE (GUAGE VISUALLY)

TO ADJUST
REFINE REQUIREMENT NO. 1.

Figure 5-78. Transmitter Distributor (LAXD), Pivoted Sensing Mechanism



(A) TAPE DEPRESSOR

(1) REQUIREMENT
CLEARANCE BETWEEN TAPE DEPRESSOR AND DEPRESSOR BRACKET.
SOME TO 0.002 INCH

TO ADJUST
POSITION ADJUSTING SCREW AND DEPRESSOR WITH LOCK NUT LOOSENED.

(2) REQUIREMENT
WITH TAPE DEPRESSOR LOCKED ON TOP PLATE, AND PIVOTED YOKE AGAINST ITS STOP, CLEARANCE BETWEEN TAPE DEPRESSOR AND TOP PLATE
MIN. 0.005 INCH
MAX. 0.015 INCH

TO ADJUST
POSITION TAPE DEPRESSOR WITH MOUNTING SCREWS LOOSENED.

NOTE
WHEN INSTALLED ON REPERFORATOR TRANSMITTER BASE, 0.005 TO 0.020 INCH CLEARANCE IS ACCEPTABLE AFTER PIVOTED HEAD IS PROPERLY ALIGNED WITH PUNCH BLOCK.

(3) REQUIREMENT
CLEARANCE BETWEEN DEPRESSOR BRACKET AND TAPE LID
MIN. 0.010 INCH
MAX. 0.050 INCH

TO ADJUST
REFINE REQUIREMENT (2).

(B) LAST CHARACTER SWITCH SPRING LEAF

REQUIREMENT
TENSION REQUIRED TO JUST OPEN CONTACTS.
MIN. 1/4 OZ.
MAX. 1/2 OZ.

TO ADJUST
WITH SHORT CONTACT SPRING TENSIONED AGAINST BACKSTOP.

NOTE
SEE INSTALLATION SPECIFICATION FOR FINAL ADJUSTMENT OF LAST CHARACTER SWITCH.

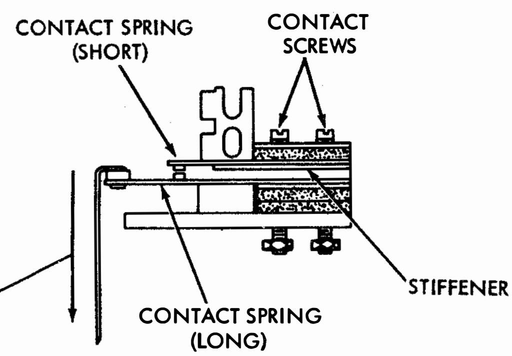
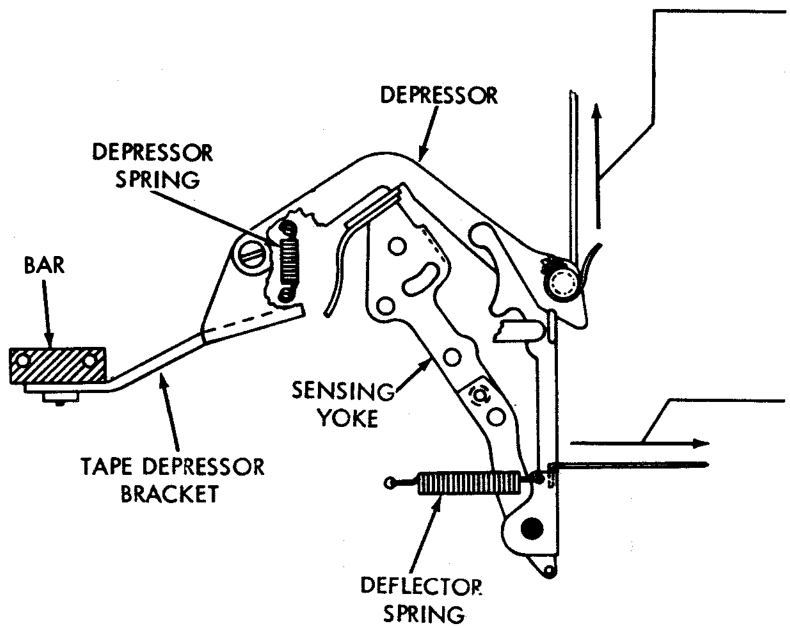


Figure 5-79. Transmitter Distributor (LAXD), Tape Depressor and Last Character Switch



(A) TAPE DEPRESSOR SPRING

REQUIREMENT

TAPE DEPRESSOR IN LOCKED POSITION. SCALE APPLIED TO LIP AT EXTREME RIGHT END OF DEPRESSOR VERTICALLY.
MIN. 1/4 OZ.
MAX. 3/4 OZ.
TO START TAPE DEPRESSOR MOVING.

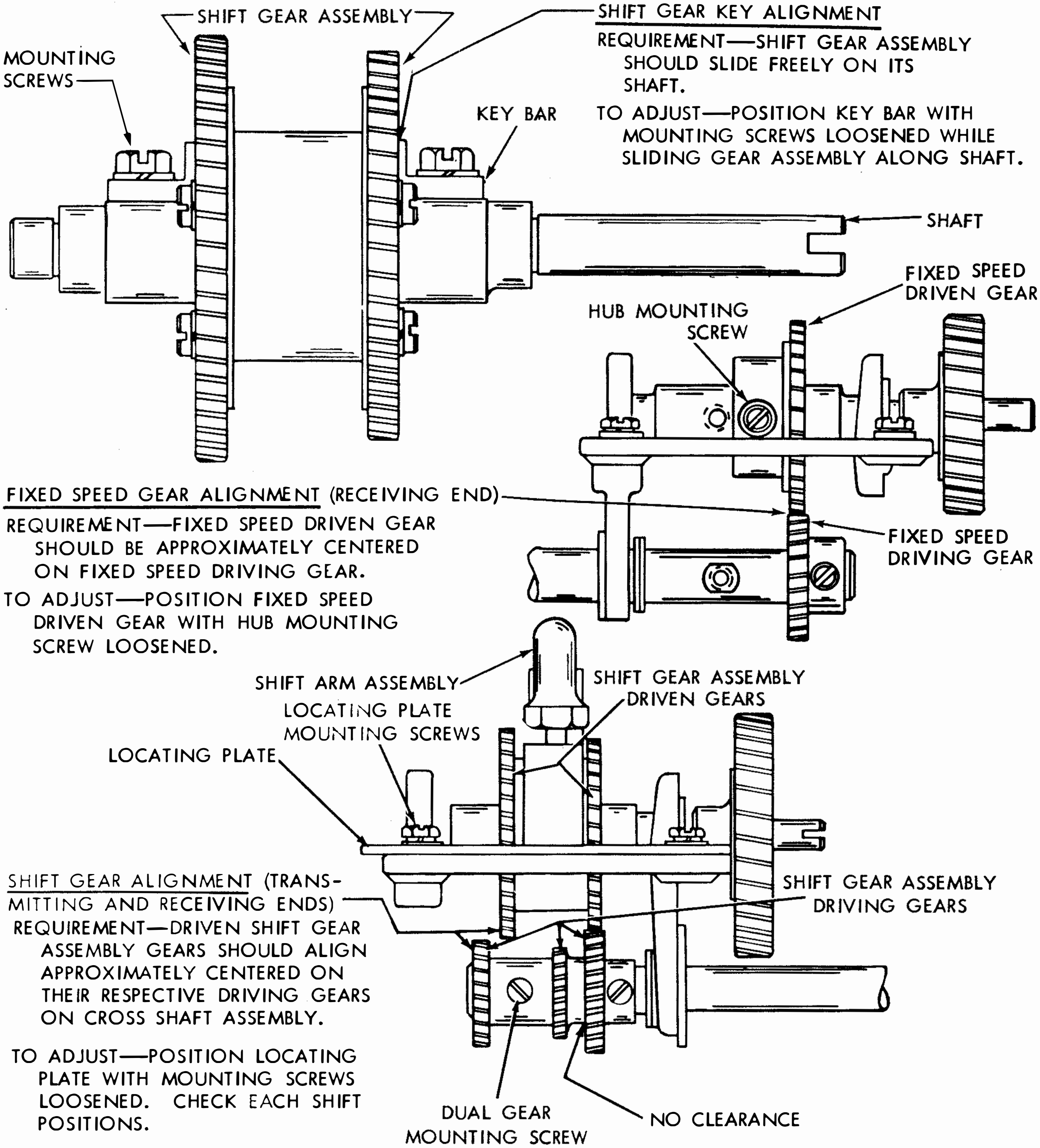
(B) TAPE DEFLECTOR SPRING

REQUIREMENT

PIVOTED SENSING HEAD AGAINST BACKSTOP. SCALE APPLIED TO TAPE DEFLECTOR HORIZONTALLY.
MIN. 1/4 OZ.
MAX. 1-1/2 OZS.
TO START TAPE DEFLECTOR MOVING.

Figure 5-80. Transmitter Distributor (LAXD), Tape Depressor and Tape Deflector Springs

g. REPERFORATOR TRANSMITTER BASE



SHIFT GEAR KEY ALIGNMENT

REQUIREMENT—SHIFT GEAR ASSEMBLY SHOULD SLIDE FREELY ON ITS SHAFT.

TO ADJUST—POSITION KEY BAR WITH MOUNTING SCREWS LOOSENED WHILE SLIDING GEAR ASSEMBLY ALONG SHAFT.

FIXED SPEED GEAR ALIGNMENT (RECEIVING END)

REQUIREMENT—FIXED SPEED DRIVEN GEAR SHOULD BE APPROXIMATELY CENTERED ON FIXED SPEED DRIVING GEAR.

TO ADJUST—POSITION FIXED SPEED DRIVEN GEAR WITH HUB MOUNTING SCREW LOOSENED.

SHIFT GEAR ALIGNMENT (TRANSMITTING AND RECEIVING ENDS)

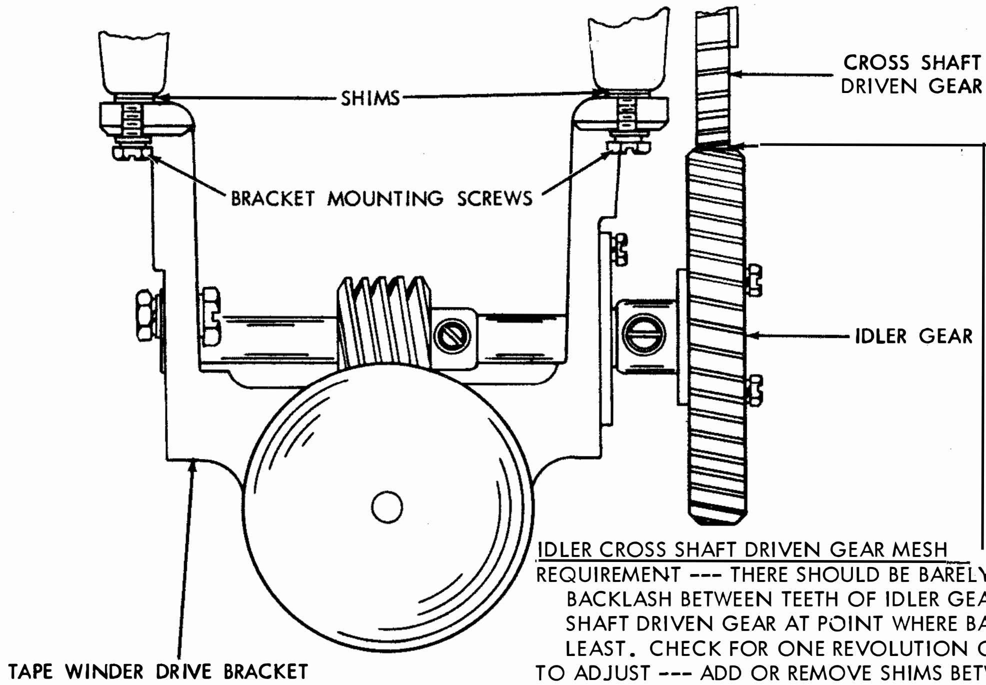
REQUIREMENT—DRIVEN SHIFT GEAR ASSEMBLY GEARS SHOULD ALIGN APPROXIMATELY CENTERED ON THEIR RESPECTIVE DRIVING GEARS ON CROSS SHAFT ASSEMBLY.

TO ADJUST—POSITION LOCATING PLATE WITH MOUNTING SCREWS LOOSENED. CHECK EACH SHIFT POSITIONS.

NOTE

MAKE CERTAIN THAT THE TWO PORTIONS OF THE SHIFT GEARS ON THE CROSS SHAFT ASSEMBLY ARE MOUNTED WITH NO CLEARANCE BETWEEN THEM. IF THERE IS CLEARANCE, LOOSEN DUAL GEAR MOUNTING SCREW AND ELIMINATE CLEARANCE BEFORE MAKING ABOVE ADJUSTMENT.

Figure 5-81. Reperforator Transmitter Base (LRXB), Shift Gear Mechanism



IDLER CROSS SHAFT DRIVEN GEAR MESH

REQUIREMENT --- THERE SHOULD BE BARELY PERCEPTIBLE BACKLASH BETWEEN TEETH OF IDLER GEAR AND CROSS SHAFT DRIVEN GEAR AT POINT WHERE BACKLASH IS LEAST. CHECK FOR ONE REVOLUTION OF IDLER GEAR.

TO ADJUST --- ADD OR REMOVE SHIMS BETWEEN BASE AND TAPE WINDER DRIVE BRACKET. KEEP EQUAL NUMBER OF SHIMS ON EACH SIDE.

IDLER GEAR MOTOR PINION MESH

REQUIREMENT --- THERE SHOULD BE BARELY PERCEPTIBLE BACKLASH BETWEEN IDLER GEAR AND MOTOR PINION AT POINT WHERE BACKLASH IS LEAST. CHECK FOR ONE REVOLUTION OF IDLER GEAR.

TO ADJUST --- POSITION TAPE WINDER DRIVE BRACKET WITH MOUNTING SCREWS LOOSENED.

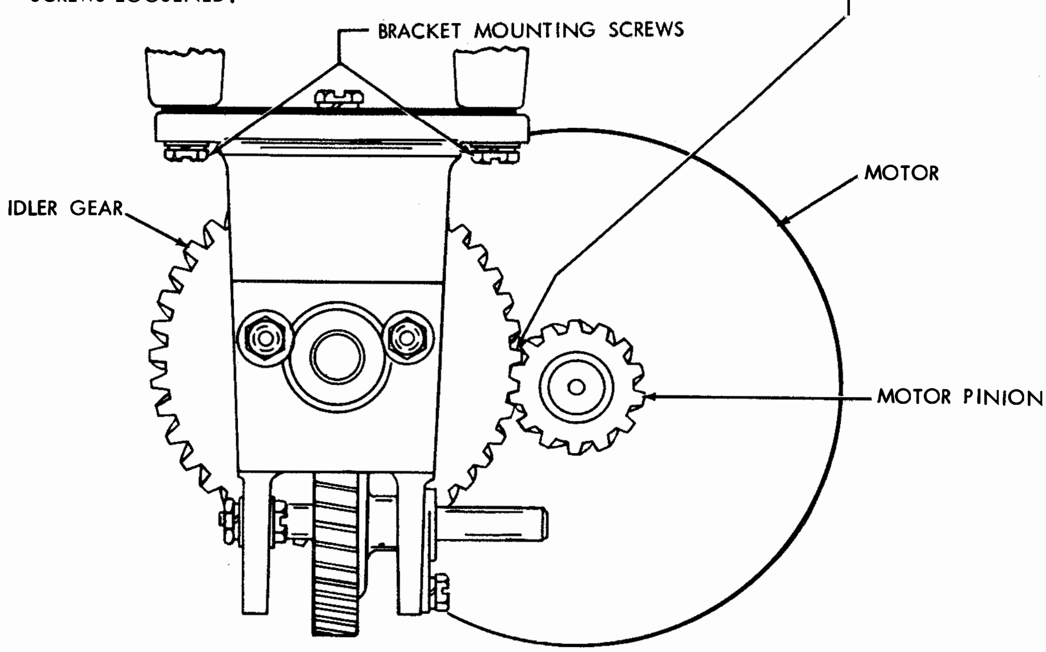


Figure 5-82. Reperforator Transmitter Base (LRXB), Idler Gears and Motor Pinion

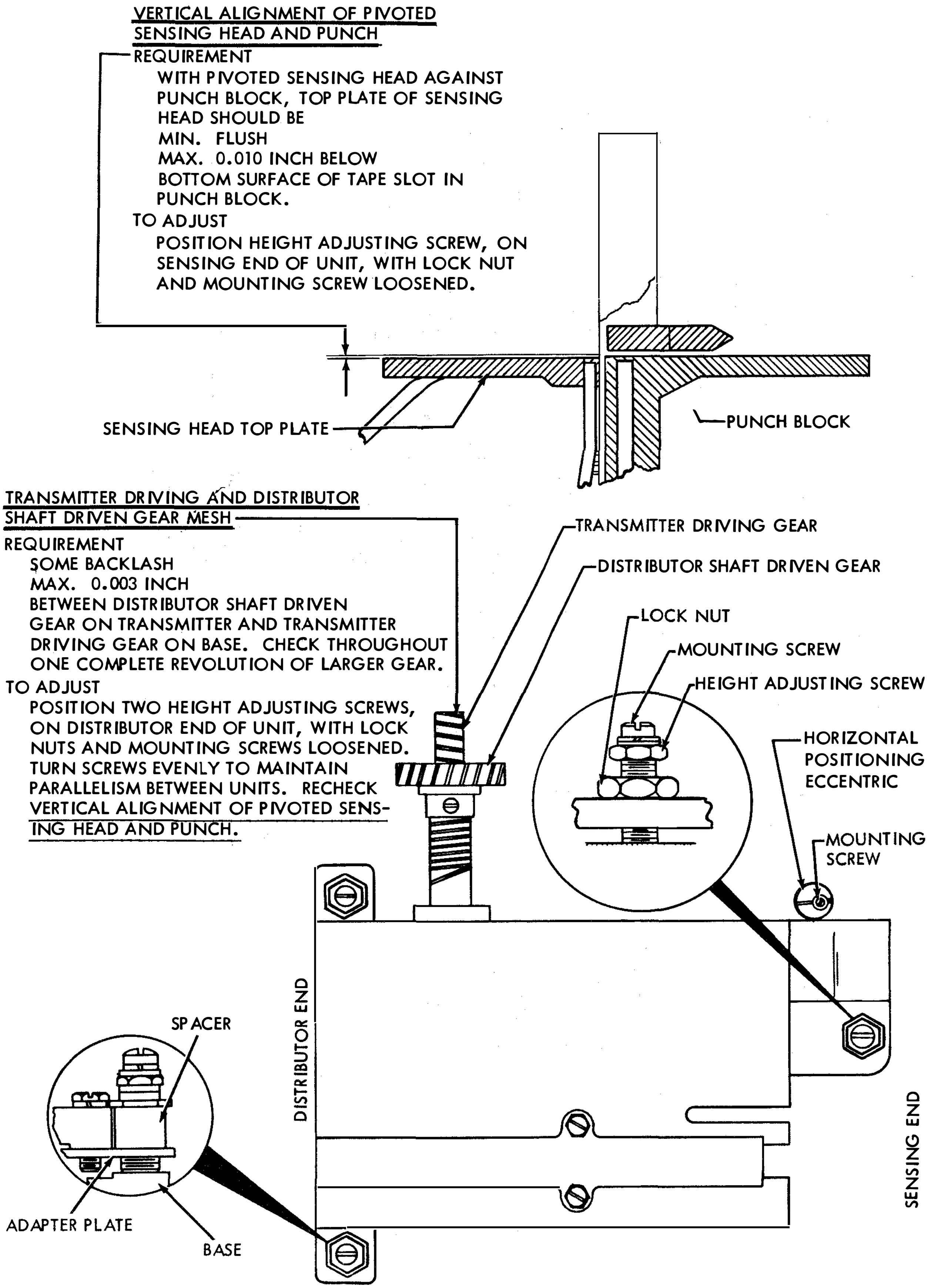


Figure 5-83. Reperforator Transmitter Base (LRXB), Transmitter Distributor and Reperforator

HORIZONTAL ALIGNMENT OF PIVOTED SENSING HEAD AND PUNCH

REQUIREMENT

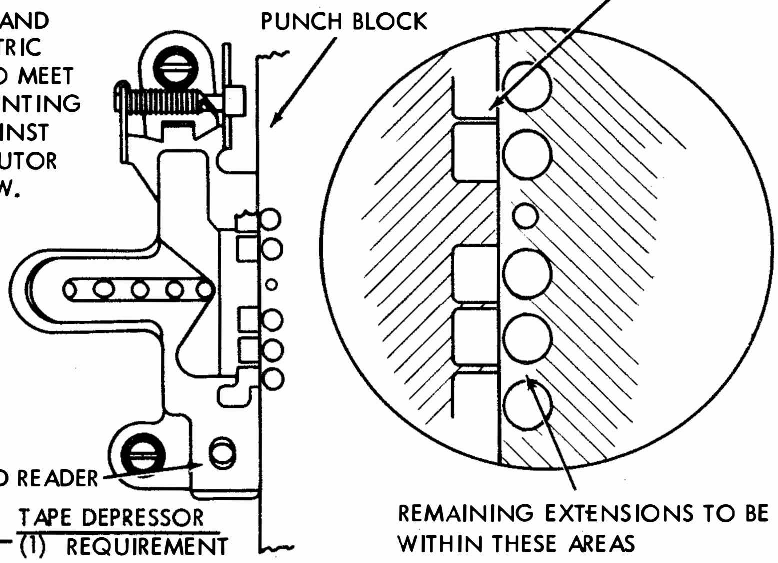
WHEN ONE TAPE LID EXTENSION IS CENTERED ON RESPECTIVE AREA BETWEEN PUNCH PIN SLOTS, REMAINING EXTENSIONS SHOULD BE FULLY WITHIN THEIR RESPECTIVE AREAS.

TO ADJUST

LOOSEN TRANSMITTER DISTRIBUTOR AND HORIZONTAL POSITIONING ECCENTRIC MOUNTING SCREWS. SHIFT UNIT TO MEET REQUIREMENT. TIGHTEN UNIT MOUNTING SCREWS. POSITION ECCENTRIC AGAINST REAR PLATE OF TRANSMITTER DISTRIBUTOR AND TIGHTEN ITS MOUNTING SCREW.

NOTE

IT MAY BE NECESSARY TO POSITION THE REPERFORATOR UNIT IF THE REQUIREMENT CANNOT BE MET BY THE ADJUSTMENT OF THE TRANSMITTER DISTRIBUTOR. IF NECESSARY, POSITION THE REPERFORATOR IN THE SAME MANNER AS THE TRANSMITTER DISTRIBUTOR.



TAPE DEPRESSOR

(1) REQUIREMENT

TIP OF DEPRESSOR EXTENSION SHOULD BE CENTERED BETWEEN #2 AND #3 PUNCH PIN SLOTS IN PUNCH BLOCK.

TO ADJUST

POSITION DEPRESSOR EXTENSION WITH ITS TWO ADJUSTING SCREWS LOOSENED.

(2) REQUIREMENT

DEPRESSOR EXTENSION SHOULD BE POSITIONED BELOW TOP SURFACE OF PUNCH BLOCK

MIN. FLUSH

MAX. .060 BELOW

(3)-REQUIREMENT

CLEARANCE BETWEEN TAPE DEPRESSOR EXTENSION AND PUNCH BLOCK

MIN. 0.040 INCH

MAX. 0.080 INCH

TO ADJUST

POSITION BY MOVING TAPE DEPRESSOR EXTENSION ANGULARLY AND/OR HORIZONTALLY WITH LOCK NUT ON DEPRESSOR LOOSENED.

NOTE

IF REQUIREMENT (2) IS STILL NOT MET, ROTATE BAR AT TOP OF TRANSMITTER DISTRIBUTOR (TO WHICH DEPRESSOR BRACKET IS SECURED) WITH FOUR MOUNTING SCREWS OF BAR ASSEMBLY LOOSENED. MAKE SURE CLEARANCE BETWEEN PUNCH BLOCK AND DEPRESSOR EXTENSION (AT MOUNTING STUD) IS MAXIMUM POSSIBLE WHILE STILL MEETING REQUIREMENT.

(4) REQUIREMENT

WITH TAPE FOLLOWING NORMAL PATH, AND PIVOTED HEAD APPROXIMATELY 15 CHARACTERS FROM PUNCH BLOCK, TAPE EDGE SHOULD NOT TOUCH DEPRESSOR.

TO ADJUST

REFINE "TAPE DEPRESSOR" ADJUSTMENT AS PRESCRIBED IN (FIGURE 5-79).

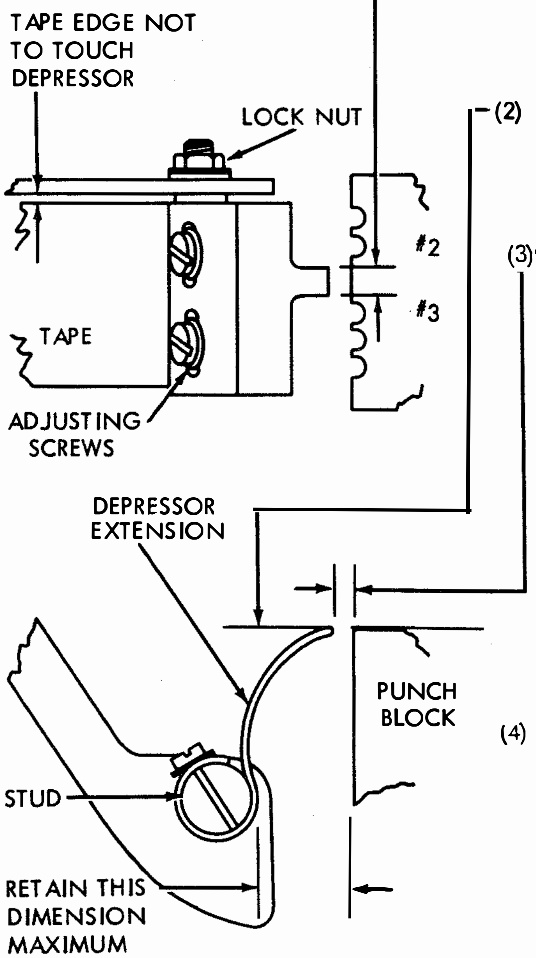


Figure 5-84. Reperforator Transmitter Base (LRXB), Pivoted Sensing Head and Tape Depressor

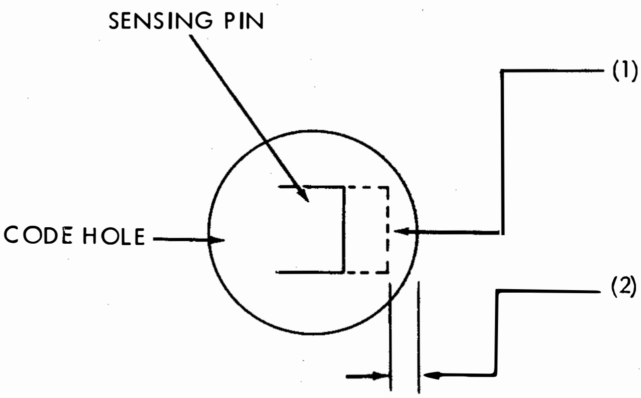
CODE HOLE-SENSING PIN ALIGNMENT

NOTE

ALL PRECEDING ADJUSTMENTS BETWEEN TRANSMITTER DISTRIBUTOR AND TYPING REPERFORATOR SHOULD BE COMPLETED AND REQUIREMENTS MET BEFORE PRECEEDING WITH FOLLOWING ADJUSTMENTS.

TO CHECK

WITH A LOOP OF LETTERS TAPE (PERFORATED UNDER POWER BY THE REPERFORATOR) BETWEEN REPERFORATOR AND TRANSMITTER DISTRIBUTOR, AND PIVOTED SENSING HEAD RESTING AGAINST ITS BACKSTOP, MANUALLY TRIP SENSING SHAFT CLUTCH AND ROTATE SHAFT UNTIL SENSING PINS ARE IN THEIR UPPERMOST POSITION.



(1) REQUIREMENT

THE SENSING PINS SHOULD BE APPROXIMATELY CENTERED LATERALLY ON CODE HOLES.

TO ADJUST

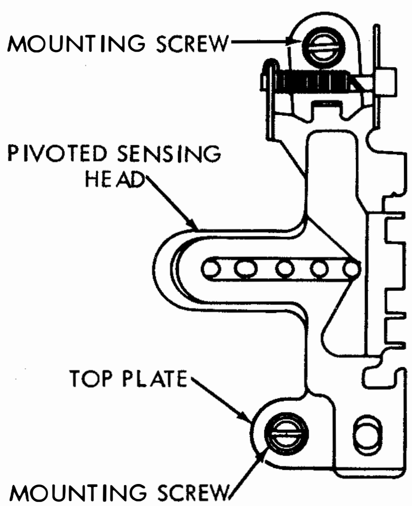
REFINE PUNCH "FEED HOLE LATERAL ALIGNMENT" (FIGURE 5-19)

(2) REQUIREMENT

SENSING PINS SHOULD BE POSITIONED TOWARD REAR EDGE OF CODE HOLE
MIN. 0.008 INCH
CLEARANCE BETWEEN PIN AND REAR EDGE.
CHECK FIVE PLACES.

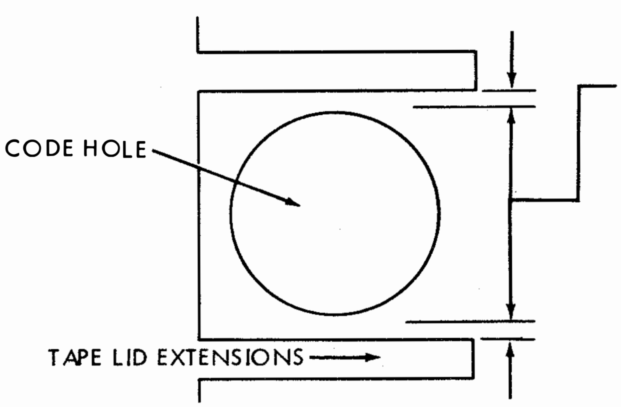
TO ADJUST

CHECK TAPE QUALITY FOR COMPLIANCE WITH 156011 TAPE GUAGE AND, IF NECESSARY, REFINE "DETENT" ADJUSTMENT (FIGURE 5-19)



NOTE

IF REQUIREMENT STILL IS NOT MET, POSITION PIVOTED SENSING HEAD TOP PLATE IN REQUIRED DIRECTION WITH ITS MOUNTING SCREWS LOOSENED. RECHECK "LAST CHARACTER CONTACT SWITCH" ADJUSTMENT.



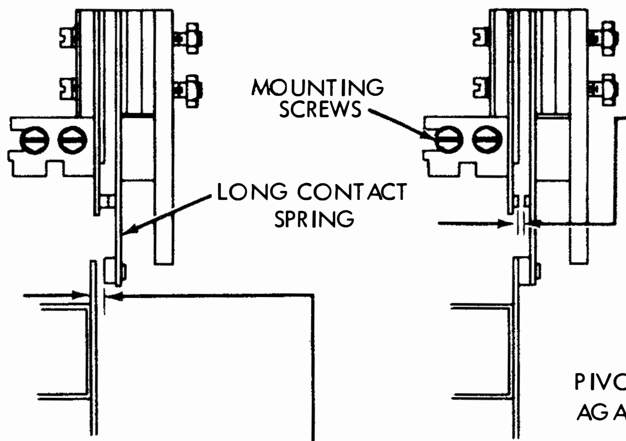
(3) REQUIREMENT

AS CODE HOLES ARE PUNCHED BY SENSING PINS, THERE SHOULD BE SOME CLEARANCE BETWEEN SIDES OF HOLES AND TAPE LID EXTENSIONS. CHECK TEN PLACES.

TO ADJUST

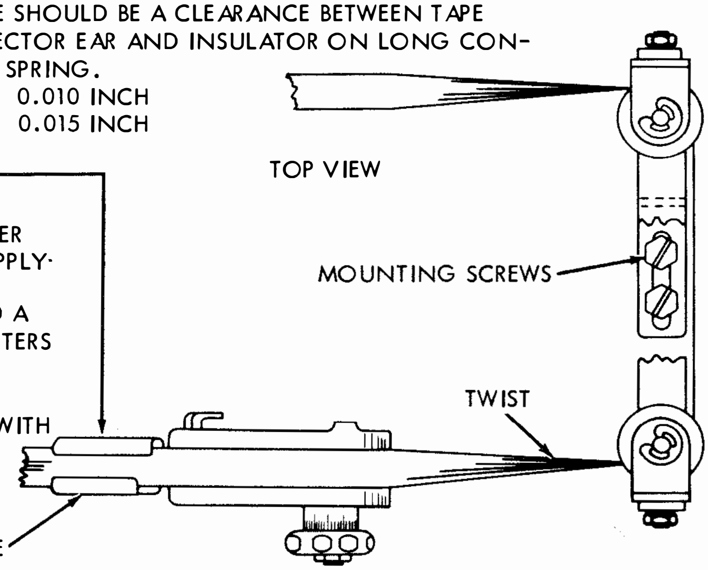
POSITION PIVOTED SENSING HEAD TOP PLATE LATERALLY WITH ITS MOUNTING SCREWS LOOSENED. RECHECK (2).

Figure 5-85. Reperforator Transmitter Base (LRXB), Code Hole and Sensing Pin Alignment



(2) REQUIREMENT
WITH PIVOTED SENSING HEAD AGAINST PUNCH BLOCK, THERE SHOULD BE A GAP BETWEEN THE CONTACTS.
MIN. 0.005 INCH
TO ADJUST
POSITION CONTACT BRACKET WITH MOUNTING SCREWS LOOSENED.

LAST CHARACTER CONTACT SWITCH
(1) REQUIREMENT
WITH CONTACT SWITCH COVER REMOVED, TAPE INSERTED IN PUNCH UNIT AND PIVOTED SENSING HEAD, AND PIVOTED SENSING HEAD POSITIONED ONE CHARACTER AWAY FROM PUNCH BLOCK, THERE SHOULD BE A CLEARANCE BETWEEN TAPE DEFLECTOR EAR AND INSULATOR ON LONG CONTACT SPRING.
MIN. 0.010 INCH
MAX. 0.015 INCH



(A) REAR TAPE GUIDE BRACKET
REQUIREMENT
WITH REPERFORATOR OPERATING UNDER POWER AND DRAWING TAPE FROM SUPPLY REEL, TAPE SHOULD SQUARELY ENTER CENTER OF TAPE CHUTE (TAPE TWISTED A QUARTER - TURN CLOCKWISE AS IT ENTERS CHUTE).
TO ADJUST
POSITION REAR TAPE GUIDE BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

(B) REAR TAPE GUIDE ROLLER
REQUIREMENT
TAPE SHOULD RIDE APPROXIMATELY CENTERED ON TAPE ROLLERS WHEN REPERFORATOR IS OPERATING UNDER POWER AS IN (A).
TO ADJUST
LOOSEN ROLLER BRACKET LOCK NUT AND POSITION BRACKET WHILE TAPE IS IN MOTION.

NOTE
RECHECK REAR TAPE GUIDE BRACKET ADJUSTMENT.

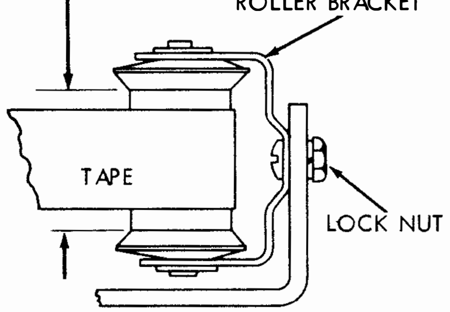


Figure 5-86. Reperforator Transmitter Base (LRXB), Last Character Switch and Rear Tape Guide Bracket

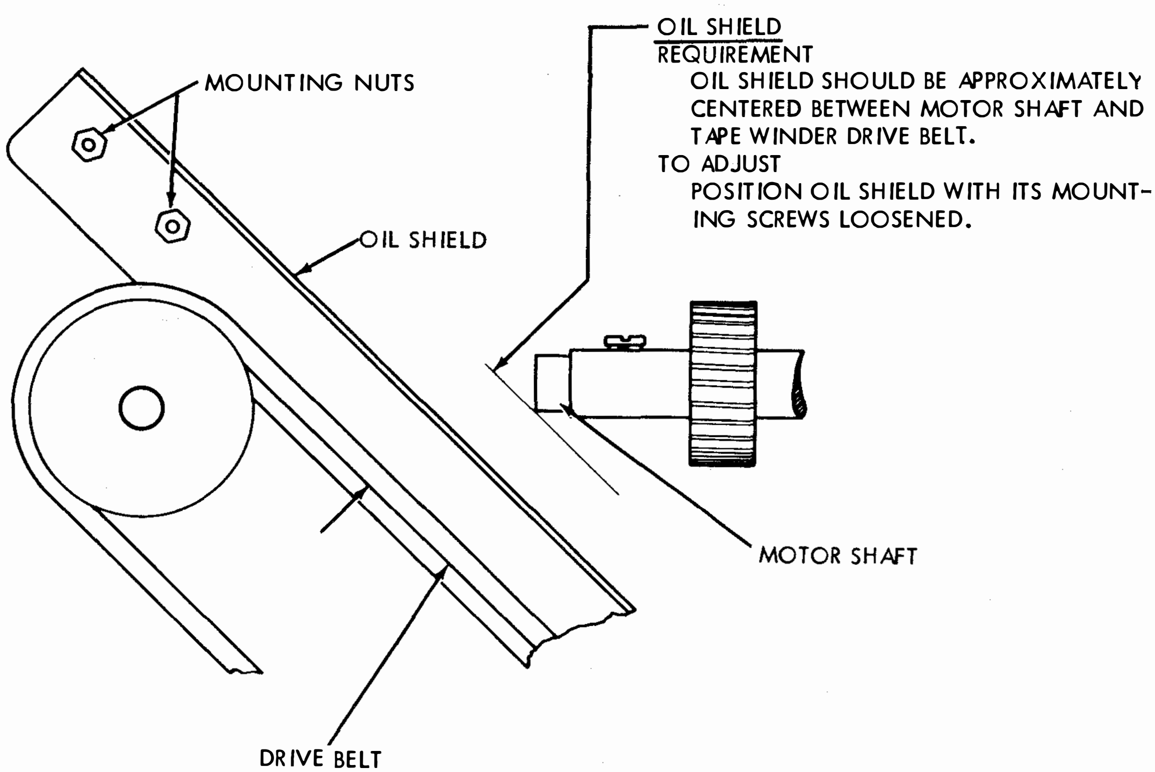
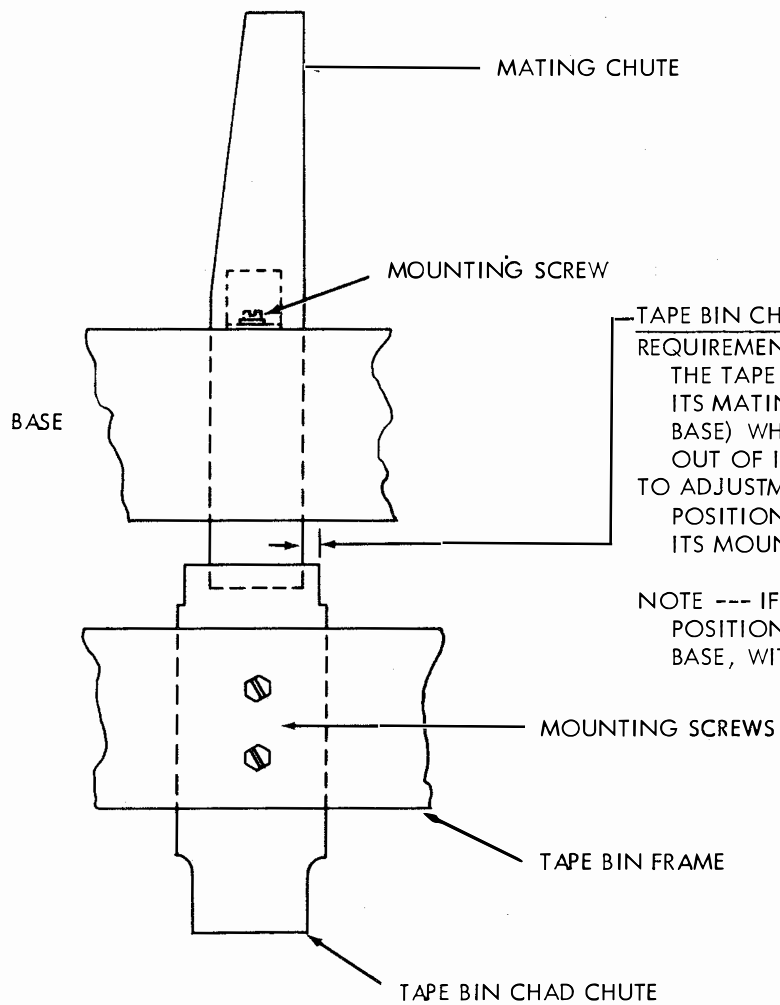


Figure 5-87. Reperforator Transmitter Base (LRXB), Oil Shield



TAPE BIN CHAD CHUTE

REQUIREMENT

THE TAPE BIN CHAD CHUTE SHOULD NOT TOUCH ITS MATING CHAD CHUTE (MOUNTED ON LRXB BASE) WHEN THE TAPE BIN IS SNAPPED IN AND OUT OF ITS DETENT SPRINGS.

TO ADJUSTMENT

POSITION OR ROTATE TAPE BIN CHAD CHUTE WITH ITS MOUNTING SCREWS LOOSENED.

NOTE --- IF REQUIREMENT CANNOT BE MET, RE-POSITION CHAD CHUTE MOUNTED ON LRXB BASE, WITH ITS MOUNTING SCREW LOOSENED.

Figure 5-88. Reperforator Transmitter Base (LRXB), Tape Bin Chad Chute

h. TRANSMITTER DISTRIBUTOR (LBXD)

INSTRUCTION FOR:

(A) REMOVING COVER PLATE --- LIFT LEFT END OF COVER PLATE (WHEN VIEWED FROM FRONT OF INDIVIDUAL TRANSMITTER DISTRIBUTOR UNIT) TO DISENGAGE DETENTS. THEN SLIDE PLATE TOWARD THE LEFT TO DISENGAGE SPRING PLATE

(B) REMOVING TRANSMITTER DISTRIBUTOR ASSEMBLY --- WITH HINGED FRONT PANEL OF COVER OPEN, REMOVE COVER PLATE AND CLAMP SCREW. THEN LIFT UPWARD AND PULL FORWARD TO DISENGAGE THE UNIT.

(C) REMOVING TAPE DEFLECTOR - LOOSEN TWO SCREWS WHICH SECURE DEFLECTOR TO COVER AND FILLER PLATES. REMOVE DEFLECTOR.

(D) REMOVING FILLER PLATE - REMOVE TWO NUTS WHICH SECURE FILLER PLATE TO ITS SUPPORT BRACKETS.

(E) REMOVING TOP PLATE --- WITH FRONT AND REAR MOUNTING SCREWS LOOSENED, LIFT PLATE UPWARD. REFER TO FIGURE 5-103 WHEN REPACING THE PLATE.

(F) REMOVING TAPE GUIDE PLATE --- WITH FRONT AND REAR MOUNTING SCREWS LOOSENED, LIFT PLATE UPWARD. REFER TO FIGURE 5-102 WHEN REPLACING THE PLATE.

(G) REMOVING TRANSMITTER DISTRIBUTOR FROM CRADLE --- REMOVE CONNECTOR FROM CRADLE BY REMOVING (2) MOUNTING SCREWS. (WHEN REPLACING SCREWS MAKE SURE THAT THE HEAD OF EACH SCREW IS ON THE OUTSIDE OF THE CRADLE). THEN REMOVE THE (3) MOUNTING SCREWS WHICH SECURE THE CASTING TO THE CRADLE. LIFT CASTING OFF OF CRADLE.

TOP VIEW OF MULTIPLE MOUNTING TRANSMITTER DISTRIBUTOR

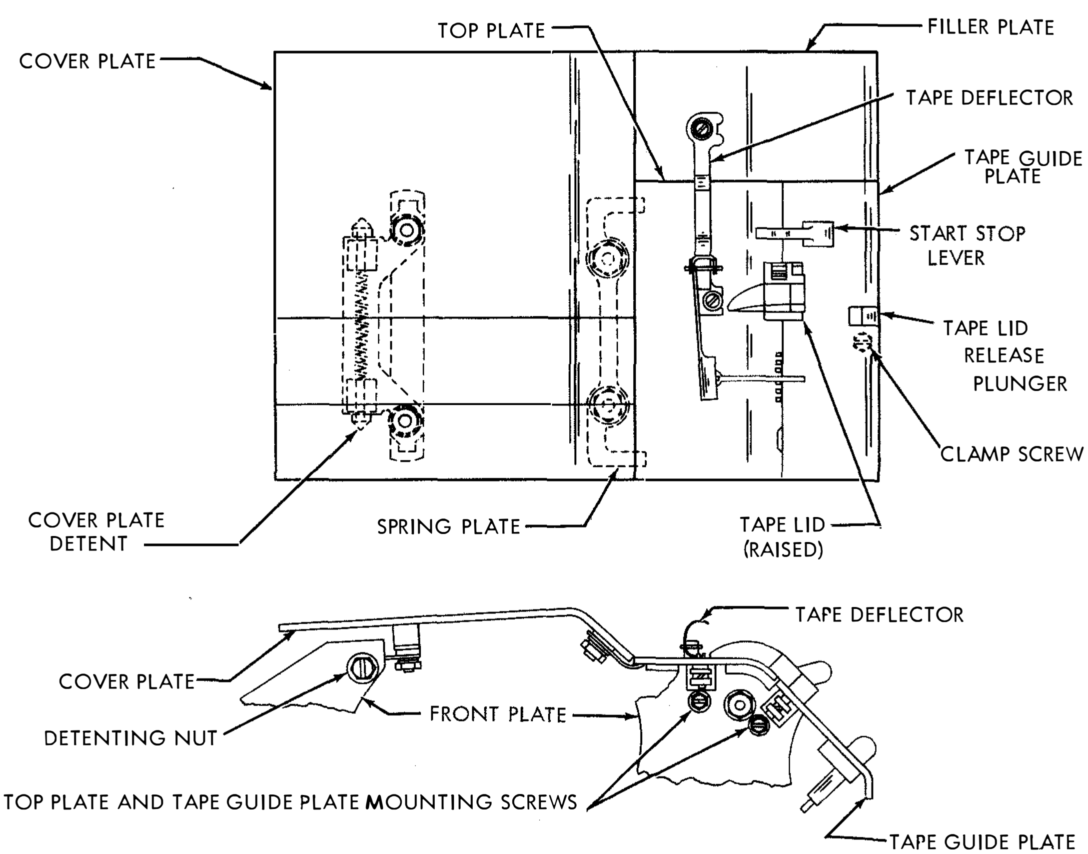
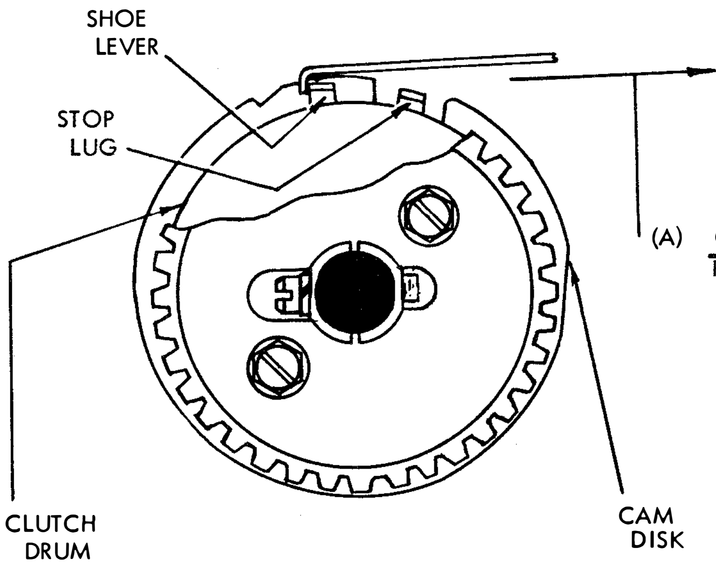


Figure 5-89. Transmitter Distributor (LBXD), Removal of Transmitter Distributor From Base

NOTE----REQUIREMENTS "A & B" ARE ADJUSTED AT THE FACTORY AND SHOULD NOT BE DISTURBED UNLESS ASSOCIATED MECHANISMS HAVE BEEN REMOVED FOR SERVICING OR THERE IS REASON TO BELIEVE THAT THE REQUIREMENTS ARE NOT MET. THE FOLLOWING REQUIREMENTS APPLY TO BOTH THE SENSING CLUTCH AND THE DISTRIBUTOR CLUTCH.

REMOVE DEFLECTOR TO PROVIDE ACCESSIBILITY TO GEARS ETC. (TWO MOUNTING SCREWS).

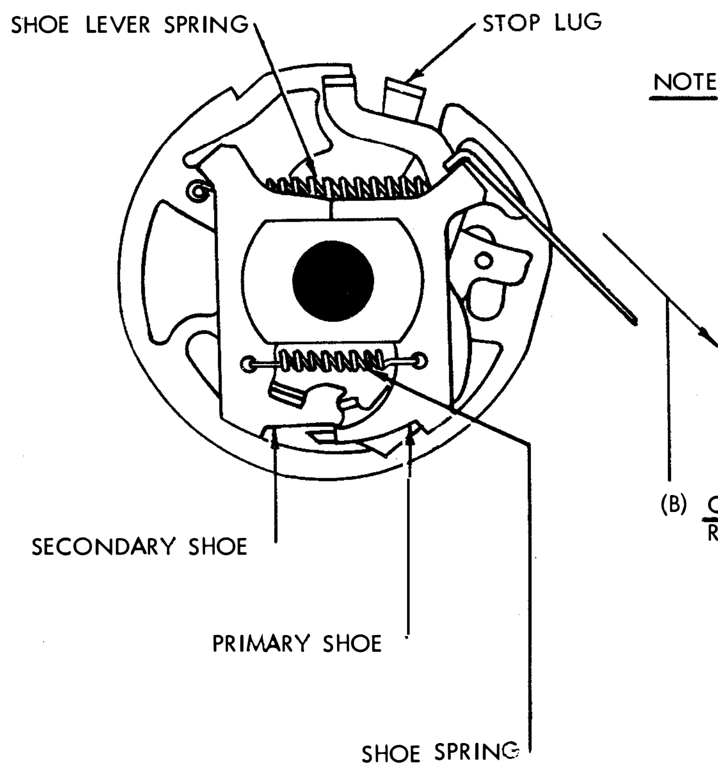


(A) CLUTCH SHOE LEVER SPRING

REQUIREMENT----WITH CLUTCH ENGAGED, HOLD CAM DISK TO PREVENT TURNING. SPRING SCALE PULLED AT TANGENT TO CLUTCH

MIN. 15 OZS.—— MAX. 20 OZS.

TO MOVE SHOE(RELEASE) LEVER IN CONTACT WITH STOP LUG.



NOTE--- IT IS NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SHAFT TO FACILITATE THIS CHECK

(B) CLUTCH SHOE SPRING

REQUIREMENT----WITH CLUTCH DRUM REMOVED, HOOK SPRING SCALE TO PRIMARY SHOE AT A TANGENT TO THE FRICTION SURFACE.

MIN. 3 OZS. —— MAX. 5 OZS.

TO START PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.

Figure 5-90. Transmitter Distributor (LBXD), Clutch Mechanism

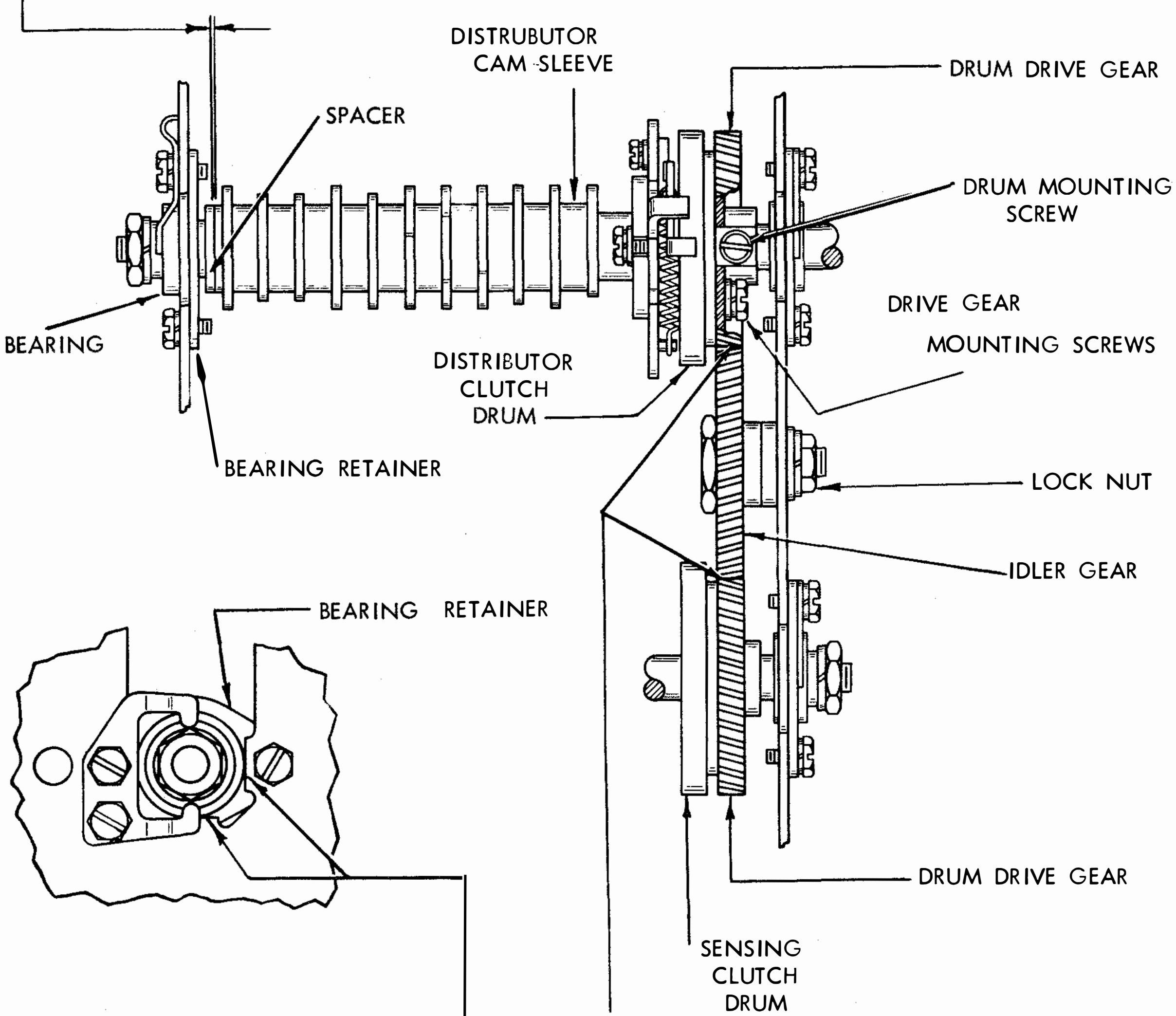
NOTE 1---THE FOLLOWING REQUIREMENTS APPLY TO BOTH THE DISTRIBUTOR AND SENSING CAM SLEEVES. THESE MECHANISMS SHOULD NOT BE DISTURBED UNLESS THERE IS REASON TO BELIEVE REQUIREMENTS ARE NOT MET.

NOTE 2 --- ADJUSTMENT (A) IS TO BE MADE PRIOR TO ASSEMBLING GEAR.

(A) CAM SLEEVE END PLAY

REQUIREMENT----PLAY BETWEEN END OF CAM SLEEVE AND SPACER SOME ——— TO ——— 0.010 INCH

TO ADJUST----WITH CLUTCH DRUM DRIVE GEAR REMOVED AND DRUM MOUNTING SCREW LOOSENED, RELEASE CLUTCH AND POSITION CAM SLEEVE.



(B) CAM SHAFT BEARING RETAINER

REQUIREMENT----EACH BEARING SHOULD SEAT PROPERLY IN CUT-OUT OF THE PLATE (NO CLEARANCE BETWEEN BEARING RETAINER AND MOUNTING SURFACE ON PLATE)

TO ADJUST----ROTATE BEARING RETAINER 180 DEGREES AND POSITION THE ASSEMBLY.

(C) IDLER GEAR ASSEMBLY

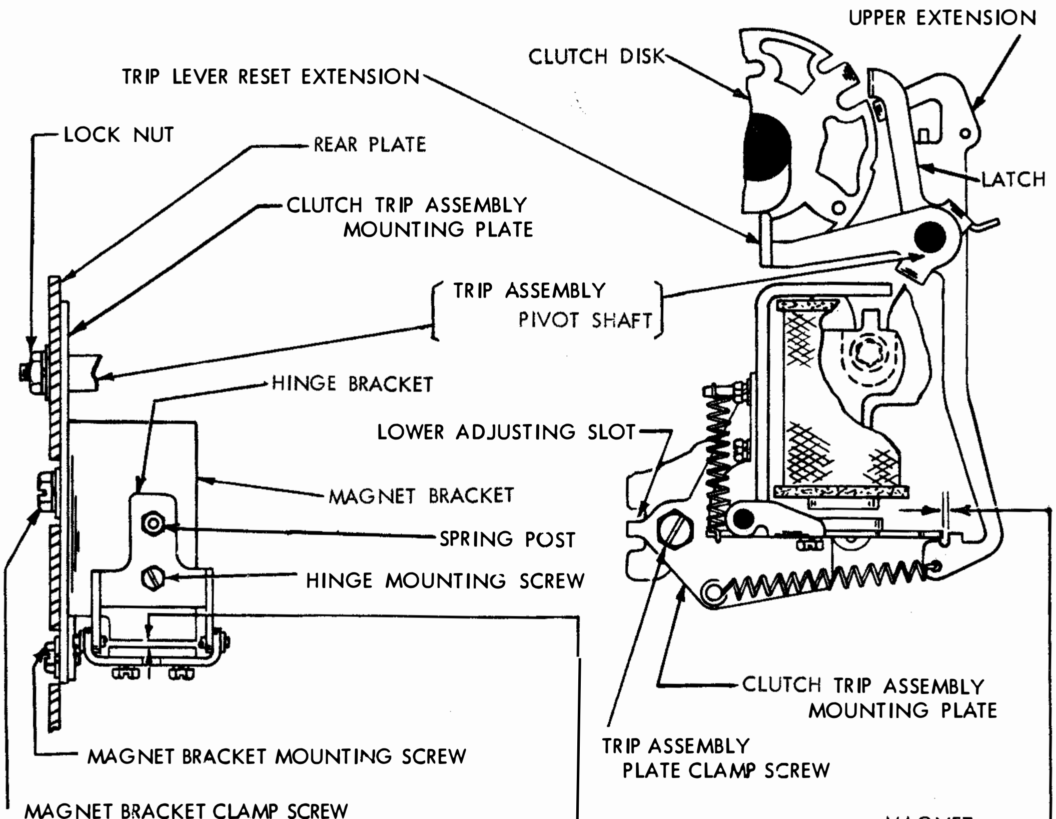
REQUIREMENT----THERE SHOULD BE SOME TO 0.003 INCH CLEARANCE BETWEEN IDLER GEAR, SENSING SHAFT GEAR, AND DISTRIBUTOR SHAFT GEAR AT THE POINT WHERE BACKLASH IS MINIMUM. (CLOSEST POINT BETWEEN ANY TWO GEARS).

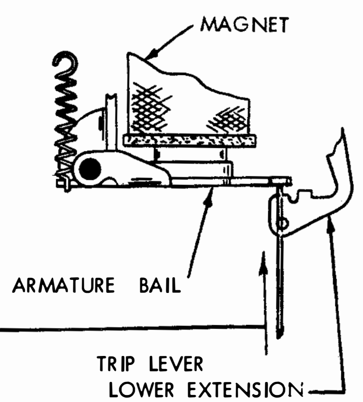
TO ADJUST----WITH ITS LOCK NUT LOOSENED, POSITION THE IDLER GEAR. TIGHTEN AND RECHECK GEAR PLAY THROUGH-OUT ONE REVOLUTION.

Figure 5-91. Transmitter Distributor (LBXD), Cam Shafts

NOTE----REQUIREMENTS APPLY TO BOTH CLUTCH TRIP MECHANISMS.

(TOP PLATE AND COVER PLATE REMOVED)





(A) CLUTCH TRIP MAGNET ARMATURE HINGE

REQUIREMENT --- WITH ARMATURE HELD AGAINST ITS CORE, CLEARANCE BETWEEN ARMATURE AND MAGNET BRACKET

MIN. 0.004 INCH ———— MAX. 0.008 INCH

TO ADJUST --- REMOVE ARMATURE EXTENSION SPRING. WITH ARMATURE HINGE MOUNTING SCREW AND SPRING POST CLAMP SCREW LOOSENED, POSITION THE HINGE.

(B) TRIP ASSEMBLY MOUNTING PLATES

REQUIREMENT----WITH TRIP LEVER RESET EXTENSION ON HIGH PART OF CAM, CLEARANCE BETWEEN LATCHING SURFACE OF TRIP LEVER LOWER EXTENSION AND END OF ARMATURE BAIL. (PLAY TAKEN UP BY SPRING).

MIN. 0.020 INCH ——— MAX. 0.030 INCH

TO ADJUST----WITH (TRIP ASSEM.) MOUNTING PLATE LOCK NUT AND PLATE CLAMP SCREW FRICTION TIGHT, POSITION PLATE WITH SCREW DRIVER IN LOWER ADJUSTING SLOT.

(C) ARMATURE BAIL SPRING

REQUIREMENT --- WITH UNIT INVERTED, TRIP CLUTCH MAGNET AND ROTATE SHAFT MANUALLY UNTIL TRIP LEVER RESET EXTENSION IS ON HIGH PART OF ITS CAM. (#160455 SPRING).

MIN. 3 OZS.—— MAX. 4-1/2 OZS TO START ARMATURE BAIL MOVING.

Figure 5-92. Transmitter Distributor (LBXD), Clutch Trip Mechanism

NOTE---REFER TO REQUIREMENTS ON PRECEDING PAGE. (TAPE GUIDE PLATE REMOVED)

(D) <u>CLUTCH LATCH LEVER SPRING</u>

REQUIREMENT --- WITH CLUTCH LATCH LEVER ON LOW PART OF CLUTCH DISK (NOT LATCHED). SCALE APPLIED TO BENT EAR ON LATCH LEVER (HORIZONTALLY).
MIN. 1/2 OZ.——— MAX. 1-1/2 OZS.
TO START LATCH LEVER MOVING.

TRIP LEVER RESET EXTENSION

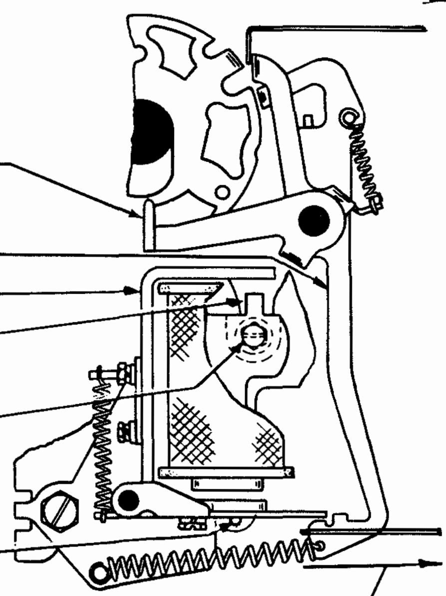
TRIP LEVER LOWER EXTENSION

MAGNET BRACKET

UPPER ADJUSTING SLOT

MAGNET BRACKET CLAMP SCREW

MAGNET BRACKET MOUNTING SCREW

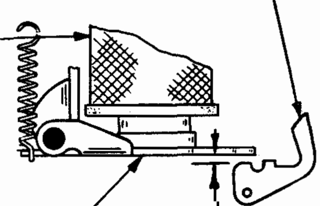


(E) <u>CLUTCH TRIP LEVER (LOWER EXTENSION) SPRING.</u>

REQUIREMENT----WITH CLUTCH JUST TRIPPED, HOLD ARMATURE AGAINST CORE. (UNIT ON ITS LEFT SIDE)
MIN. 2 OZS.——MAX. 3-1/2 OZS.
TO START TRIP LEVER MOVING.

TRIP LEVER LOWER EXTENSION

MAGNET



ARMATURE BAIL

(F) <u>MAGNET BRACKET</u>

REQUIREMENT----WITH TRIP LEVER RESET EXTENSION ON HIGH PART OF CAM AND ARMATURE AGAINST CORE, CLEARANCE BETWEEN TOP EDGE OF TRIP LEVER LOWER EXTENSION AND ARMATURE BAIL (PLAY TAKEN UP BY SPRING).
MIN. 0.030 INCH ——— MAX. 0.040 INCH
TO ADJUST----WITH BRACKET MOUNTING SCREW AND CLAMP SCREW FRICTION TIGHT, PIVOT THE MAGNET BRACKET ABOUT ITS LOWER MOUNTING SCREW (INSERT SCREW DRIVER IN UPPER ADJUSTING SLOT).

Figure 5-93. Transmitter Distributor (LBXD), Clutch Trip Mechanism

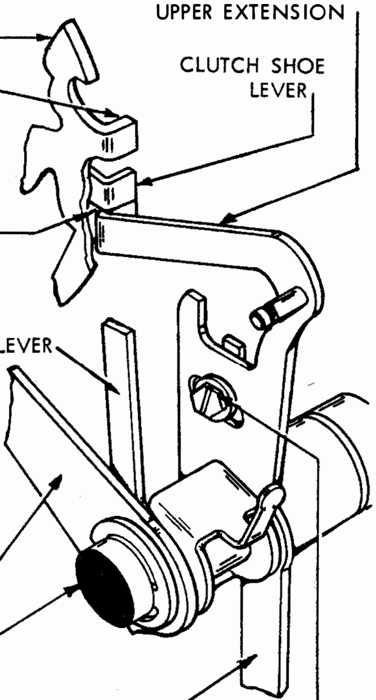
NOTE----REQUIREMENTS "A & B" APPLY TO BOTH CLUTCHES. (REMOVE TOP PLATE)

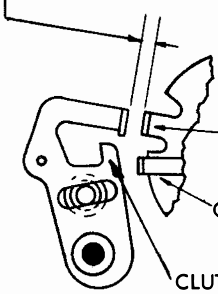
(A) <u>CLUTCH TRIP LEVER UPPER EXTENSION</u>
REQUIREMENT----
1. WITH CLUTCH IN STOP (DISENGAGED) POSITION, TRIP LEVER UPPER EXTENSION SHOULD ENGAGE CLUTCH SHOE (RELEASE) LEVER BY FULL THICKNESS OF SHOE LEVER.

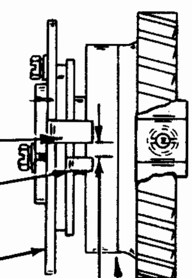
TO ADJUST----WITH CLAMPING SCREW LOOSENED, POSITION CLUTCH TRIP LEVER UPPER EXTENSION.

2. WITH CLUTCH ARMATURE ATTRACTED, THERE SHOULD BE SOME CLEARANCE BETWEEN THE CLUTCH TRIP LEVER UPPER EXTENSION AND THE CLUTCH DISK STOP LUG WHEN THE SHAFT IS ROTATED TO MAKE THIS CLEARANCE A MINIMUM.

TO ADJUST----REFINE REQUIREMENT 1. SO THAT CLUTCH TRIP LEVER UPPER EXTENSION IS UNDER OR OVER FLUSH WITH CLUTCH SHOE LEVER BY NOT MORE THAN 0.015 INCH, IF NECESSARY.







(B) <u>CLUTCH SHOE LEVER (ALSO SEE FIGURE ABOVE)</u>
REQUIREMENT --- CLEARANCE AS SHOWN SHOULD BE 0.055 INCH TO 0.085 INCH GREATER WITH CLUTCH ENGAGED THAN WITH CLUTCH FULLY DISENGAGED.

NOTE --- WITH CLUTCH DISENGAGED (FULLY RELEASED) CLUTCH TRIP LEVER UPPER EXTENSION SHOULD ENGAGE CLUTCH SHOE LEVER AND CLUTCH DISK SHOULD BE ROTATED MANUALLY TO ENGAGE LATCH IN ITS DETENT.

TO ADJUST --- WITH CLUTCH DISK CLAMPING SCREWS LOOSENED, PLACE WRENCH OVER ADJUSTING LUG AND POSITION ADJUSTING DISK.

CAUTION --- MAKE SURE THAT DRUM DOES NOT DRAG ON SHOES. REMOVE DRUM MOUNTING SCREW, DISENGAGE CLUTCH AND ROTATE DRUM IN ITS NORMAL DIRECTION. IF DRUM DRAGS, REFINE ADJUSTMENT.

Figure 5-94. Transmitter Distributor (LBXD), Clutch Trip Mechanism

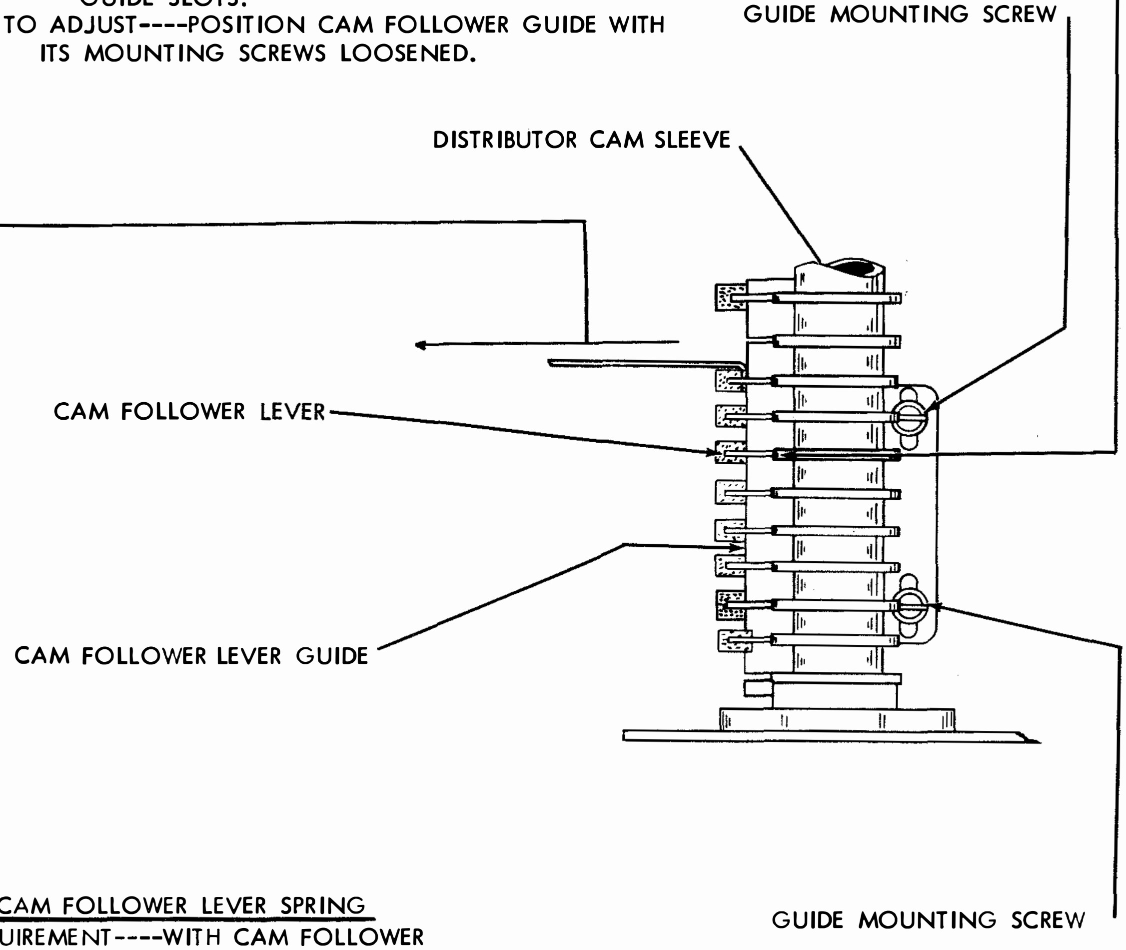
NOTE----REMOVE OIL RESERVOIR AND DISTRIBUTOR BLOCK ASSEMBLY TO FACILITATE ADJUSTMENT.

(A) CAM FOLLOWER GUIDE

REQUIREMENT----

1. CENTER CAM FOLLOWER LEVER SHOULD ENGAGE CAM BY FULL THICKNESS OF THE FOLLOWER WHEN MOVED FROM SIDE TO SIDE IN ITS GUIDE SLOT.
2. IN SIMILAR MANNER, THE OTHER FOLLOWERS SHOULD ENGAGE CAM BY AT LEAST 75% OF FOLLOWER THICKNESS.
3. ALL FOLLOWERS SHOULD MOVE FREELY IN THEIR GUIDE SLOTS.

TO ADJUST----POSITION CAM FOLLOWER GUIDE WITH ITS MOUNTING SCREWS LOOSENED.



(B) CAM FOLLOWER LEVER SPRING

REQUIREMENT----WITH CAM FOLLOWER LEVER ON HIGH PART OF ITS CAM AND SPRING SCALE HOOKED JUST BELOW SLIDING SURFACE OF LEVER, PULL HORIZONTALLY

MIN. 1/2 OZ. —— MAX. 1-1/2 OZS.

TO START EACH LEVER MOVING.

Figure 5-95. Transmitter Distributor (LBXD), Distributor Cam Follower Guide

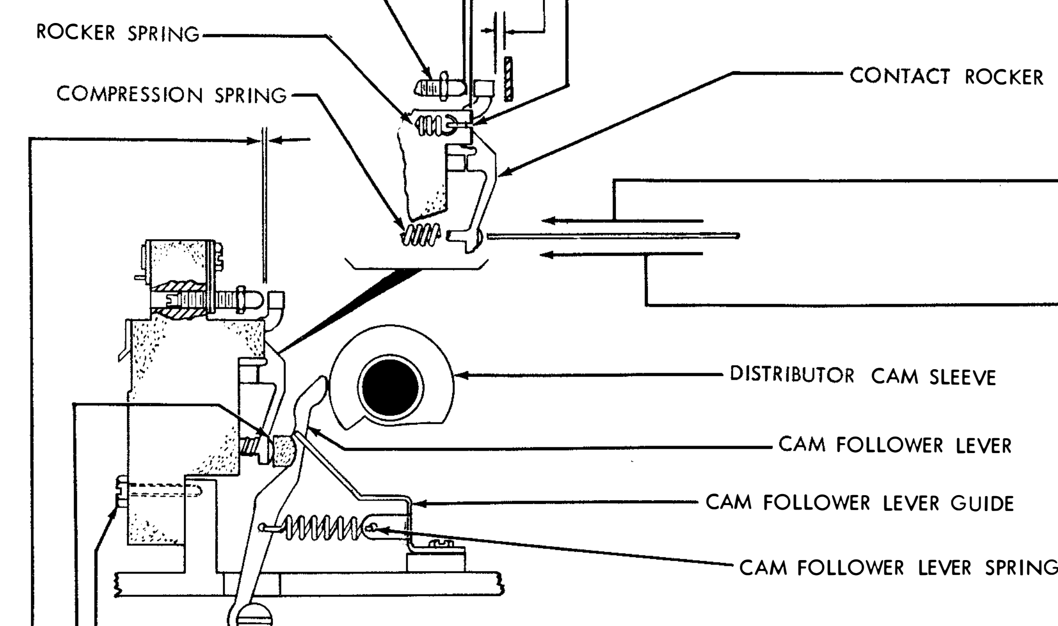
NOTE --- REMOVE OIL RESERVOIR AND DISTRIBUTOR ASSEMBLY FOR REQUIREMENTS (A), (B). AND (C).

(A) INITIAL ADJUSTMENT WITH DISTRIBUTOR BLOCK REMOVED

POSITION EACH CONTACT SCREW SO THAT ITS CONTACT SURFACE IS APPROXIMATELY 1/32 INCH FROM EDGE OF BLOCK.

(B) DISTRIBUTOR ROCKER SPRING (PRELIMINARY)

DISTRIBUTOR BLOCK REMOVED AND INITIAL ADJUSTMENT (A) COMPLETED.
REQUIREMENT --- WITH COMPRESSION SPRING REMOVED, HOLD DISTRIBUTOR BLOCK HORIZONTAL. PUSH SPRING SCALE DOWNWARD (VERTICALLY).
MIN. 3 OZS.————MAX. 4 OZS.
TO SEPARATE THE CONTACTS.



(C) DISTRIBUTOR ROCKER COMPRESSION SPRINGS

REQUIREMENT----WITH COMPRESSION SPRINGS INSTALLED, APPLY SPRING SCALE AT LOWER END OF ROCKER AND PUSH DOWNWARD (VERTICALLY)
MIN. 6-1/2 OZS. — MAX. 9-1/2 OZS.
TO SEPARATE THE CONTACTS

(D) DISTRIBUTOR CONTACT ASSEMBLY

REQUIREMENT----ROCKERS SHOULD FULLY ENGAGE INSULATED PORTION OF THEIR RESPECTIVE CAM FOLLOWER LEVERS.
TO ADJUST----WITH DISTRIBUTOR BLOCK MOUNTING SCREWS LOOSENED, POSITION THE ASSEMBLY.

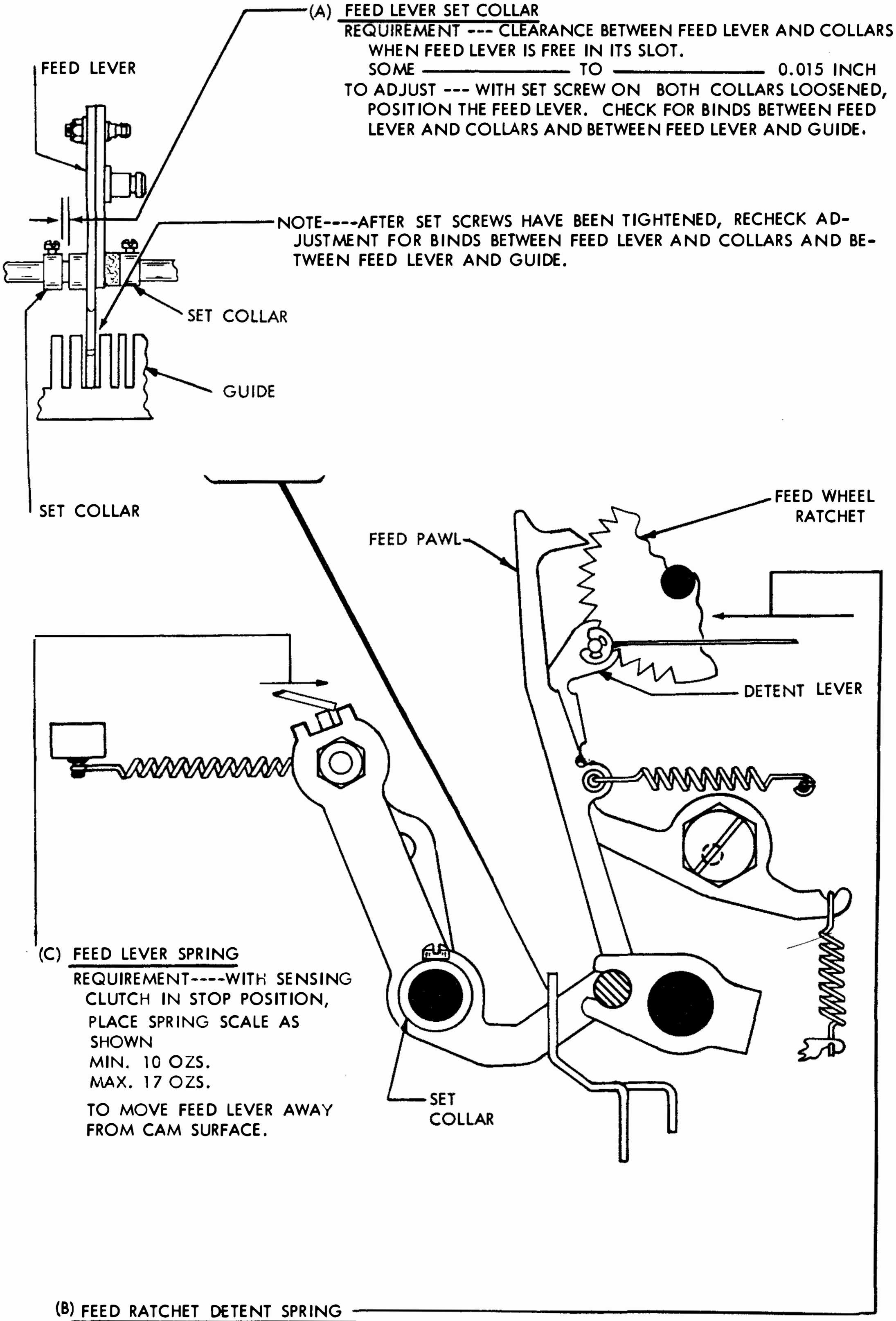
NOTE 1 --- PROVIDE CLEARANCE OF 0.070 INCH — TO — 0.080 INCH BETWEEN ROCKERS AND GUARD.

(E) DISTRIBUTOR CONTACT GAP (SEE NOTE 2.)

REQUIREMENT----TRIP CLUTCH MANUALLY TO ROTATE SHAFT. WITH A CAM FOLLOWER LEVER ON HIGH PART OF ITS CAM, CONTACT GAP SHOULD BE (CHECK ALL CONTACTS)
MIN. 0.020 INCH ———— MAX. 0.030 INCH
TO ADJUST----ROTATE CONTACT SCREW TOWARD RIGHT OR LEFT.

NOTE 2.--REFINE SIGNAL PULSE ADJUSTMENT WITH A DISTORTION TESTS SET SUCH AS THE "DXD" SHOULD CLOSER ADJUSTMENT BE REQUIRED .

Figure 5-96. Transmitter Distributor (LBXD), Distributor Contact Assembly



(A) FEED LEVER SET COLLAR

REQUIREMENT --- CLEARANCE BETWEEN FEED LEVER AND COLLARS WHEN FEED LEVER IS FREE IN ITS SLOT.
SOME ——————— TO ——————— 0.015 INCH

TO ADJUST --- WITH SET SCREW ON BOTH COLLARS LOOSENED, POSITION THE FEED LEVER. CHECK FOR BINDS BETWEEN FEED LEVER AND COLLARS AND BETWEEN FEED LEVER AND GUIDE.

NOTE----AFTER SET SCREWS HAVE BEEN TIGHTENED, RECHECK ADJUSTMENT FOR BINDS BETWEEN FEED LEVER AND COLLARS AND BETWEEN FEED LEVER AND GUIDE.

(C) FEED LEVER SPRING

REQUIREMENT----WITH SENSING CLUTCH IN STOP POSITION, PLACE SPRING SCALE AS SHOWN
MIN. 10 OZS.
MAX. 17 OZS.
TO MOVE FEED LEVER AWAY FROM CAM SURFACE.

(B) FEED RATCHET DETENT SPRING

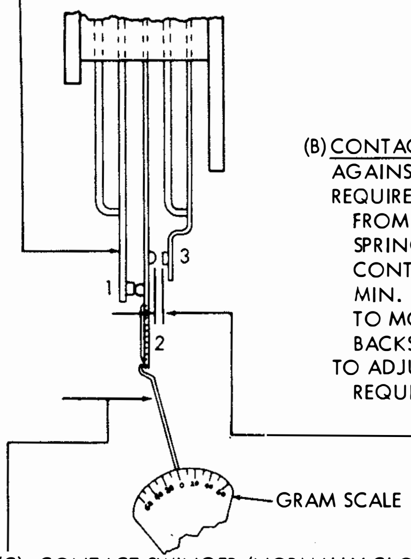
REQUIREMENT---WITH SPRING SCALE APPLIED AS SHOWN AND FEED PAWL HELD AWAY
MIN. 7 OZS. ——————— MAX. 13 OZS.
TO START DETENT ROLLER MOVING AWAY FROM RATCHET.

Figure 5-97. Transmitter Distributor (LBXD), Feed Pawl

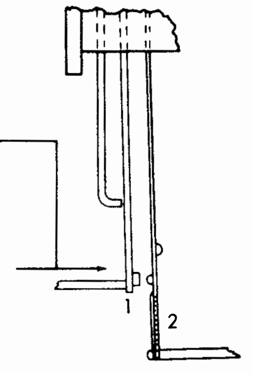
INSTRUCTION FOR REMOVING STORING SWITCH ASSEMBLY:
WITH THE UNIT INVERTED REMOVE THE TWO SCREWS WHICH MOUNT THE CABLE CONNECTORS TO THE BASE, REMOVE THE TWO MOUNTING SCREWS THAT SECURE THE STORING CONTACT ASSEMBLY TO THE MAIN CASTING AND LIFT THE SWITCH UPWARDS, EXCERCISE CARE IN HANDLING TO PREVENT DAMAGE TO SLIDES OR MATING PARTS.

THE FOLLOWING FIVE ADJUSTMENTS ARE PRELIMINARY.

(A) BACKSTOP (NORMALLY CLOSED CONTACTS)
REQUIREMENT---FIVE CONTACT LEAVES (#1 IN FIGURE) SHOULD BE PARALLEL TO THE MOUNTING PLATE AND IN LINE WITH EACH OTHER. GAGE BY EYE.
TO ADJUST---BEND THE BACKSTOP TO MEET THE REQUIREMENT.

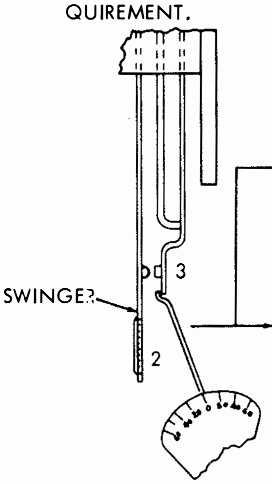


(B) CONTACT SPRING (NORMALLY CLOSED AGAINST BACKSTOP)
REQUIREMENT---WITH SWINGER HELD AWAY FROM NORMALLY CLOSED CONTACT, APPLY SPRING SCALE PERPENDICULAR TO LEAF AT CONTACT POINT.
MIN. 2 OZS. ———— MAX. 6 OZS.
TO MOVE STATIONARY LEAF FROM ITS BACKSTOP.
TO ADJUST---BEND STATIONARY LEAF TO MEET REQUIREMENT. SEE NOTE 2.



(C) CONTACT SWINGER (NORMALLY CLOSED CONTACTS)
REQUIREMENT---WITH GRAM SCALE APPLIED TO END OF CONTACT SWINGER
MIN. 35 GRAMS --- MAX. 50 GRAMS
TO OPEN CONTACTS
TO ADJUST---BEND SWINGER TO MEET REQUIREMENT.

(D) CONTACT GAP (NORMALLY OPEN CONTACTS)
REQUIREMENT---WHEN REMOVED FROM THE UNIT, THE GAP BETWEEN CONTACTS ON SWINGER (#2) AND LEAF (#3) SHOULD BE
MIN. 0.010 INCH --- MAX. 0.015 INCH
TO ADJUST---BEND NORMALLY OPEN CONTACT BACKSTOP TO MEET REQUIREMENT.



(E) CONTACT SPRING (NORMALLY OPEN AGAINST BACKSTOP)
REQUIREMENT---WITH GRAM SCALE APPLIED TO END OF NORMALLY OPEN CONTACT LEAF (#3).
MIN. 35 GRAMS --- MAX. 50 GRAMS
TO MOVE LEAF AWAY FROM BACKSTOP.
TO ADJUST---BEND CONTACT LEAF TO MEET REQUIREMENT. SEE NOTE 2.

NOTE 1 -- USE A 172060 ADJUSTING TOOL TO BEND THE CONTACTS. FOR EACH ADJUSTMENT START WITH THE CONTACT PILE-UP FARTHEST FROM THE HANDLE OF THE BENDING TOOL TO AVOID DISTURBING COMPLETED ADJUSTMENTS.

NOTE 2---TO INCREASE TENSION OF THE LEAF AGAINST ITS BACKSTOP, BEND BACK STOP AWAY FROM THE LEAF, THEN FORM THE LEAF TO INCREASE THE TENSION. REPOSITION BACKSTOP TO MEET REQUIREMENT OF B OR E. RECHECK A, C, AND D.

Figure 5-98. Transmitter Distributor (LBXD), Storing Switch Assembly

INSTRUCTIONS FOR REPLACING & POSITIONING STORING SWITCH ASSEMBLY

PLACE SWITCH ASSEMBLY ON LOWER SURFACE OF MAIN CASTING EXERCISING CARE IN SEATING SLIDE LEVERS AGAINST PUSHER LEVERS AND LATCH LEVERS IN APPROPRIATE SLOT OF SLIDE LEVER GUIDE.

(A) STORING SWITCH ASSEMBLY

REQUIREMENT----WITH TOP PLATE IN PLACE, SELECT A LETTERS, BLANK, LETTERS COMBINATION AND OBSERVE LATCH AND PUSHER LEVER ACTION. STORING SWITCH SHOULD ALIGN WITH LATCH LEVER SO THAT LATCH LEVERS AND SLIDES FUNCTION WITHOUT BINDING.

TO ADJUST----WITH SWITCH ASSEMBLY MOUNTING SCREWS LOOSENED, POSITION THE ASSEMBLY TO ALIGN LEVERS. RECHECK WHEN SCREWS ARE TIGHTENED.

NOTE----A MINOR ADJUSTMENT OF THE SENSING PIN AND PUSHER LEVER GUIDE MAY BE NECESSARY.

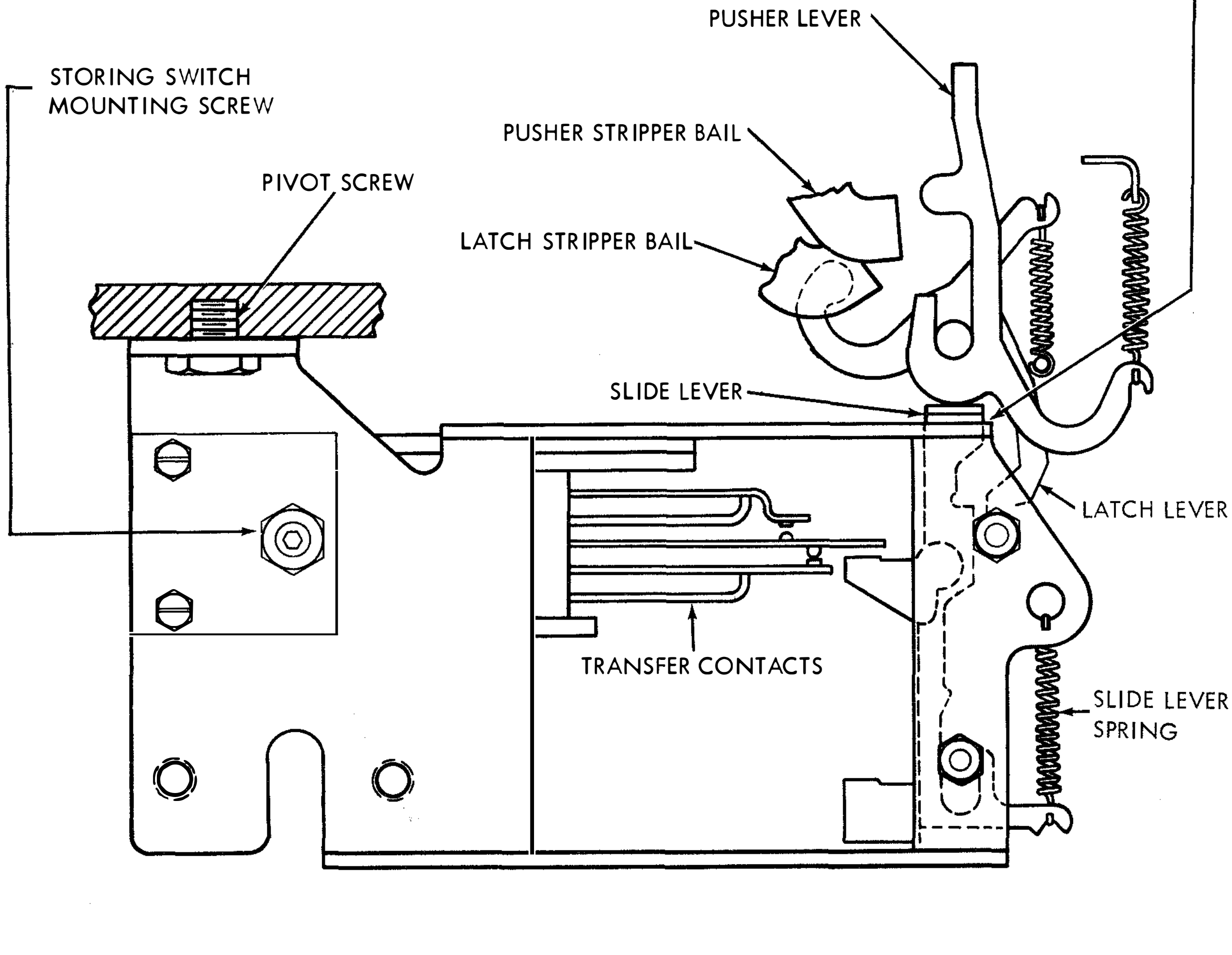
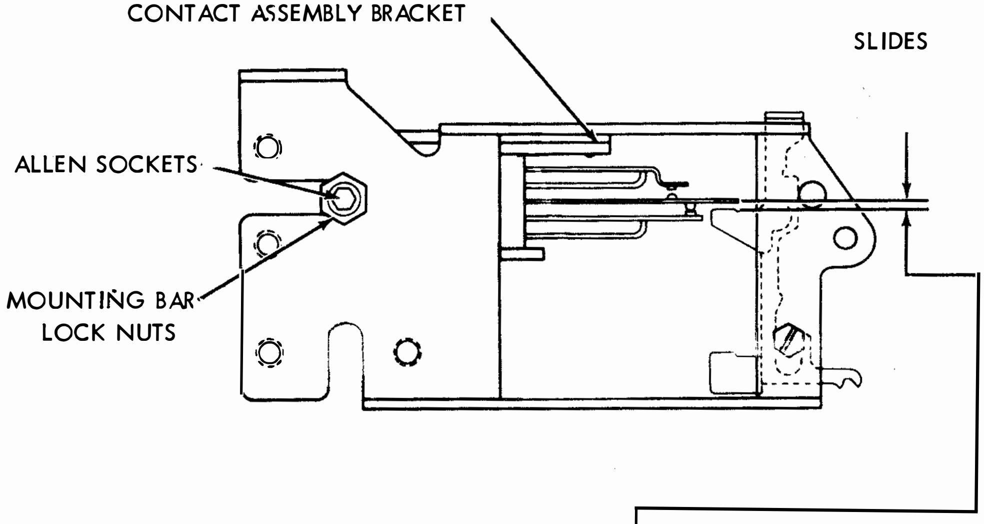
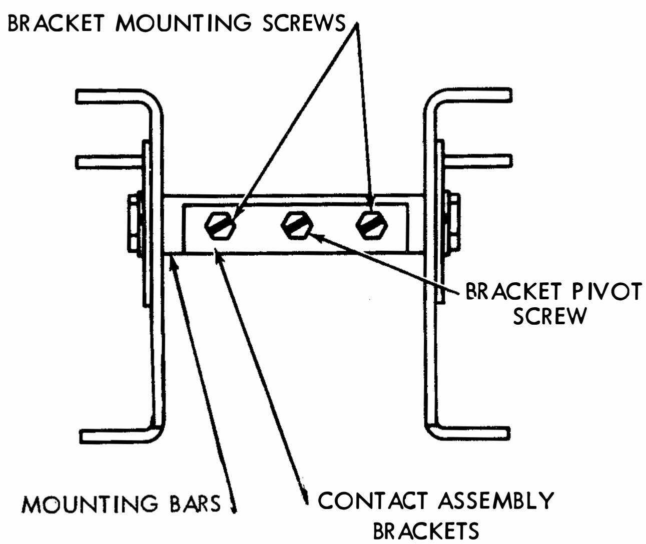


Figure 5-99. Transmitter Distributor (LBXD), Storing Switch Assembly

SEE FIGURE 5-99 FOR INSTRUCTIONS IN REPLACING STORAGE SWITCH ASSEMBLY.

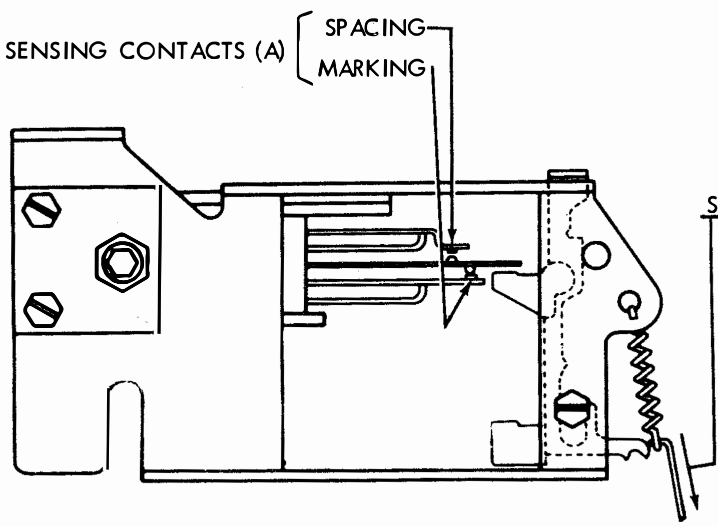




SLIDE LEVER (FINAL EXCEPT WHERE TEST SET IS AVAILABLE)

REQUIREMENT---WITH THE STORING SWITCH ASSEMBLIES INSTALLED IN THE UNIT AND THE SLIDES SELECTED AND LATCHED, THERE SHOULD BE
MIN. 0.005 INCH—— MAX. 0.020 INCH
BETWEEN ALL SENSING SLIDES AND CONTACT SWINGERS.

TO ADJUST---LOOSEN MOUNTING BAR LOCK NUTS AND BRACKET MOUNTING SCREWS TO FRICTION TIGHT. INSERT AN ALLEN WRENCH IN THE END OF THE CONTACT ASSEMBLY MOUNTING BAR AND POSITION THE CONTACT ASSEMBLY BY ROTATING THE BAR AND PIVOTING THE CONTACT ASSEMBLY BRACKET. CHECK AT ALL SWINGERS.



SLIDE LEVER SPRING

REQUIREMENT---WITH THE SLIDE LEVERS IN THEIR UPPERMOST POSITION (BLANK SELECTED, LATCHES STRIPPED) HOOK A SPRING SCALE IN THE SPRING LOOP. IT SHOULD REQUIRE
MIN. 6 OUNCES——— MAX. 9 OUNCES
TO PULL SPRING TO INSTALLED LENGTH.

Figure 5-100. Transmitter Distributor (LBXD), Storing Block Slide Lever Mechanism (Units With Transfer Type Contacts)

(A) TAPE LID

REQUIREMENTS----(REMOVE TOP & TAPE GUIDE PLATES; LUBRICATE PRIOR TO ADJUSTMENT).

(1) PRELIMINARY:

WITH TAPE LID HELD AGAINST NOTCH IN TAPE GUIDE PLATE

A FEED WHEEL GROOVE IN TAPE LID SHOULD ALIGN WITH SLOT IN PLATE.

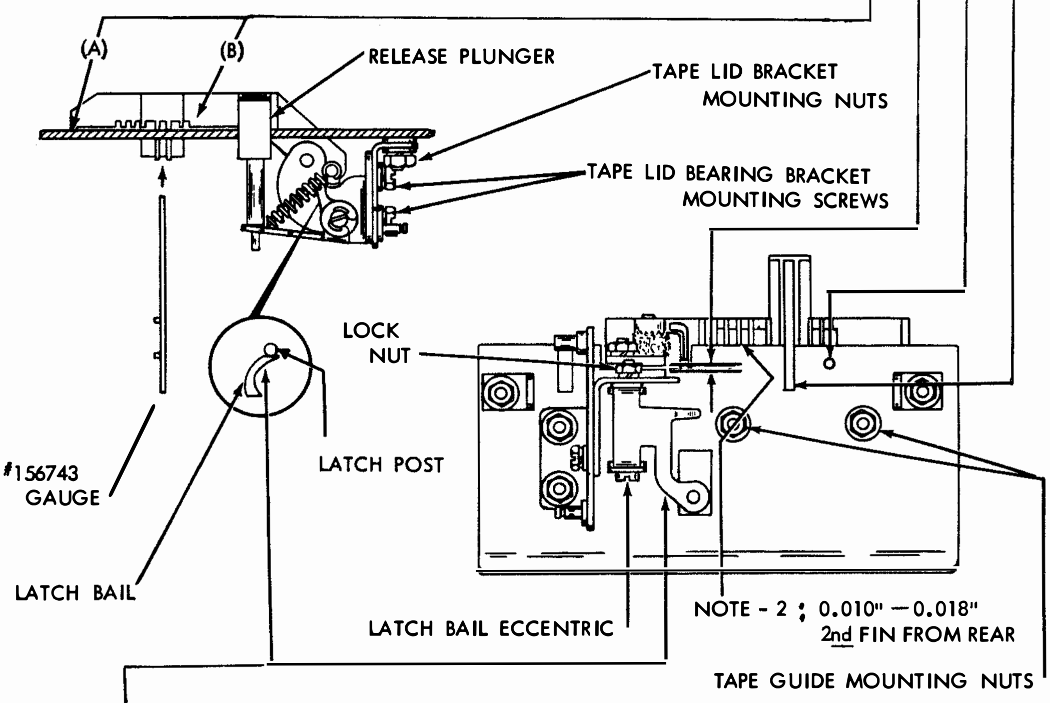
B HOLE IN TAPE LID FOR TAPE-OUT PIN SHOULD ALIGN WITH HOLE IN PLATE. (GAUGE BY EYE)

C CLEARANCE BETWEEN PIVOT SHOULDER AND TAPE LID SOME ———— TO ———— 0.010 INCH MAX.

TO ADJUST-----WITH TAPE LID BRACKET MOUNTING NUTS (2) LOOSENED (INSERT TIP OF #156743 GAUGE THROUGH SLOT AND INTO GROOVE OF LID), POSITION TAPE LID BRACKET — RE-TIGHTEN NUTS.

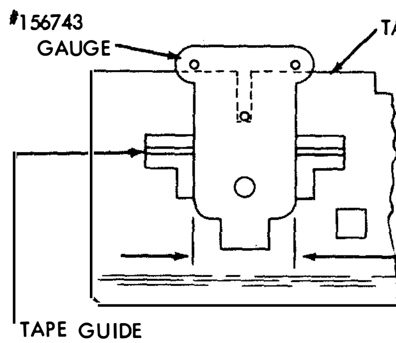
(2) TAPE LID FRONT BEARING SURFACE (A) SHOULD TOUCH TAPE GUIDE PLATE. CLEARANCE (B) MEASURED AT FIN OF TAPE LID WHICH IS IN LINE WITH REAR TAPE GUIDE (SEE NOTE 2)
MIN. 0.010 INCH ———— MAX. 0.018 INCH.
NOTE 1 -- WHEN BOTH PLATES ARE ASSEMBLED ON UNIT, LEFT EDGE OF LID MAY TOUCH TOP PLATE AND SOME CHANGE IN THIS CLEARANCE MAY BE EXPECTED.
TO ADJUST -- WITH TAPE LID BEARING BRACKET MOUNTING SCREWS FRICTION TIGHT AND TAPE LID PRESSED AGAINST TAPE GUIDE PLATE, POSITION BEARING BRACKET. RECHECK REQUIREMENT #1.

SEE SPRING REQUIREMENTS FIGURE 5-109



(3) RELEASE PLUNGER SHOULD HAVE SOME END PLAY WHEN LID IS LATCHED AGAINST TAPE GUIDE PLATE.
TO ADJUST----WITH ECCENTRIC MOUNTING POST LOCK NUT FRICTION TIGHT AND TAPE LID RAISED, ROTATE HIGH PART OF ECCENTRIC TOWARD TAPE GUIDE PLATE. CLOSE LID AND ROTATE ECCENTRIC TOWARD BRACKET UNTIL LATCH JUST FALLS UNDER FLAT ON POST. RE-CHECK BY DEPRESSING PLUNGER — WITH LID HELD DOWN, TIP OF LATCH SHOULD CLEAR POST AS PLUNGER IS OPERATED.

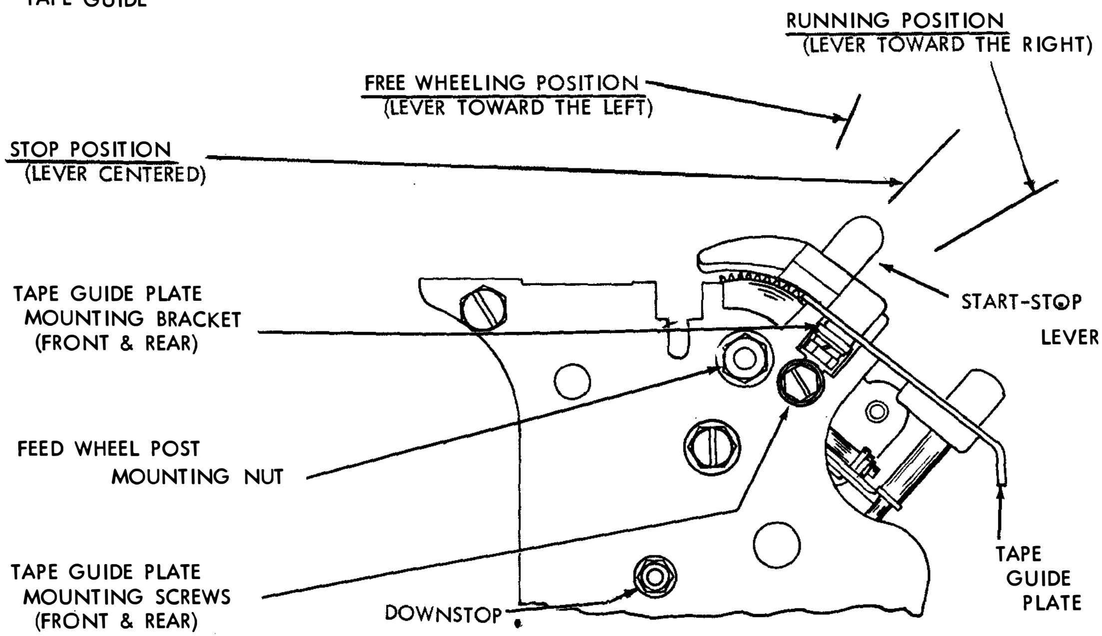
Figure 5-101. Transmitter Distributor (LBXD), Tape Lid Assembly



(A) TAPE GUIDE

REQUIREMENTS----GAUGE MAY TOUCH BUT NOT BIND WHEN PLACED BETWEEN GUIDES AS SHOWN; CLEARANCE NOT TO EXCEED 0.003 INCH

TO ADJUST----WITH TAPE GUIDE MOUNTING NUTS FRICTION TIGHT, POSITION EACH GUIDE.



INSTRUCTIONS FOR

REPLACING AND POSITIONING TAPE GUIDE PLATE

REQUIREMENTS ---

(1) SHOULDER OF FEED WHEEL POST SHOULD NOT INTERFERE WITH TOP PLATE OR TAPE GUIDE PLATE MOUNTING BRACKETS.
TO ADJUST --- WITH FEED WHEEL POST MOUNTING NUT LOOSENED, ROTATE THE POST.

(2) TAPE GUIDE PLATE SHOULD REST FIRMLY AGAINST AT LEAST THREE PROJECTIONS OF FRONT AND REAR PLATE. CLEARANCE ON REMAINING PROJECTION SHOULD NOT EXCEED 0.003 INCH.
TO ADJUST --- WITH TAPE-OUT DOWNSTOP IN ITS LOWERMOST POSITION AND LOCK NUT THAT SECURES TAPE GUIDE PLATE MOUNTING BRACKET (FRONT & REAR) FRICTION TIGHT, TRIP CLUTCH AND ROTATE SHAFT UNTIL SENSING PINS ARE IN THEIR UPPERMOST POSITION. WITH TAPE LID RAISED AND START-STOP LEVER IN RUN POSITION, PRESS TAPE GUIDE PLATE INTO POSITION WHILE GUIDING MOUNTING SCREWS INTO NOTCH OF FRONT AND REAR PLATE AND PLACING SENSING PINS ADJACENT TO LEFT EDGE OF GUIDE PLATE. ALSO PLACE TAPE-OUT PIN INTO ITS HOLE. TIGHTEN EACH BRACKET MOUNTING SCREW.

(3) OUTER EDGES OF MOUNTING BRACKETS AND OUTER EDGES OF (MOUNTING STUD) SHOULDERS SHOULD ALIGN AND PROJECT EQUALLY ON FRONT AND REAR BRACKETS.
TO ADJUST --- MOVE TAPE GUIDE PLATE TOWARD THE FRONT OR REAR. TIGHTEN NUTS ONLY AFTER TOP PLATE IS ADJUSTED.

Figure 5-102. Transmitter Distributor (LBXD), Tape Guide Plate Assembly

INSTRUCTIONS FOR

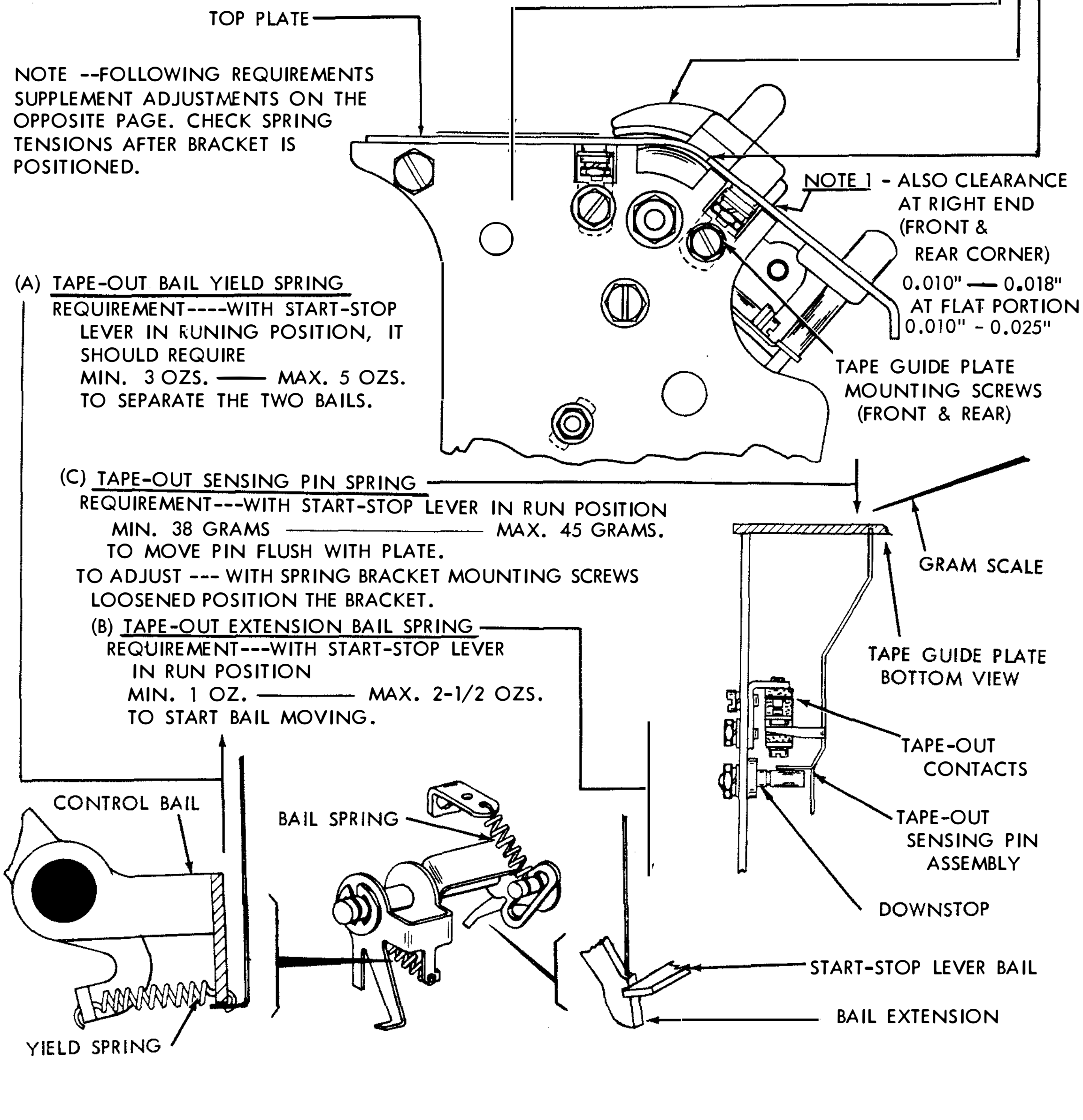
REPLACING AND POSITIONING TOP PLATE----LOOSEN NUTS (FRICTION TIGHT) THAT SECURE MOUNTING BRACKETS. PRESS TOP PLATE INTO POSITION WHILE GUIDING BRACKET MOUNTING SCREWS INTO NOTCH OF FRONT AND REAR PLATE. MAKE SURE THAT TOP PLATE SEATS FIRMLY AGAINST PROJECTIONS OF FRONT AND REAR PLATE (3 PROJECTION SHOULD ENGAGE) AND TIGHT-TAPE ARM EXTENSION IS UNDER TOP PLATE.

REQUIREMENT----

1. MATING EDGE OF TOP PLATE SHOULD BE FLUSH TO 0.003 INCH UNDER FLUSH WITH EDGE OF TAPE GUIDE PLATE (WITHIN AREA OF TAPE LID) WHEN PLATE ENGAGES AT LEAST 3 PROJECTIONS.
2. FEED WHEEL SLOT SHOULD ALIGN WITH SLOT IN TAPE GUIDE PLATE.
3. CLEARANCE BETWEEN PROJECTION OF TAPE LID AND TOP PLATE. (SEE NOTE 1.) MIN. 0.010 INCH ——— MAX. 0.020 INCH. (PLAY TAKEN UP TOWARD TAPE GUIDE PLATE)

TO ADJUST REQUIREMENT NUMBER----

1. POSITION TOP PLATE AND TAPE GUIDE PLATE BY MEANS OF THEIR OVERSIZED MOUNTING HOLES. TIGHTEN MOUNTING SCREWS.
2. POSITION PLATES SO THAT FEED WHEEL ROTATES FREELY WHEN ITS DETENT AND FEED PAWL ARE DISENGAGED. TIGHTEN NUTS THAT SECURE MOUNTING BRACKETS TO TOP PLATE AND TAPE GUIDE PLATE. (DO NOT DISTURB REQUIREMENT 2 FIGURE 1-13)
3. IF NECESSARY, LOOSEN TAPE LID BEARING BRACKET MOUNTING SCREWS AND POSITION TAPE LID. TIGHTEN SCREWS AND RECHECK REQUIREMENT (1) AND (2) FIGURE 5-101.



NOTE --FOLLOWING REQUIREMENTS SUPPLEMENT ADJUSTMENTS ON THE OPPOSITE PAGE. CHECK SPRING TENSIONS AFTER BRACKET IS POSITIONED.

(A) TAPE-OUT BAIL YIELD SPRING

REQUIREMENT----WITH START-STOP LEVER IN RUNING POSITION, IT SHOULD REQUIRE MIN. 3 OZS. —— MAX. 5 OZS. TO SEPARATE THE TWO BAILS.

(C) TAPE-OUT SENSING PIN SPRING

REQUIREMENT---WITH START-STOP LEVER IN RUN POSITION MIN. 38 GRAMS ——— MAX. 45 GRAMS. TO MOVE PIN FLUSH WITH PLATE.

TO ADJUST --- WITH SPRING BRACKET MOUNTING SCREWS LOOSENED POSITION THE BRACKET.

(B) TAPE-OUT EXTENSION BAIL SPRING

REQUIREMENT---WITH START-STOP LEVER IN RUN POSITION MIN. 1 OZ. ——— MAX. 2-1/2 OZS. TO START BAIL MOVING.

Figure 5-103. Transmitter Distributor (LBXD), Top Plate Assembly

(A) TAPE-OUT SWITCH

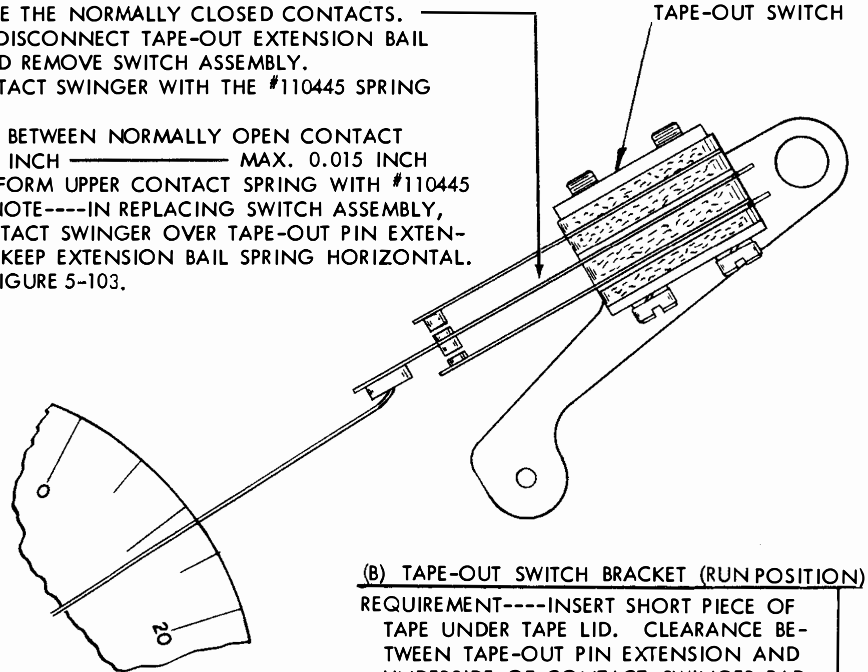
REQUIREMENTS----(COVER & TOP PLATE REMOVED — REMOVAL OF TAPE GUIDE PLATE OPTIONAL.) WITH TAPE-OUT PIN SPRING BRACKET MOUNTING SCREWS FRICTION TIGHT, POSITION BRACKET SO THAT TAPE-OUT PIN EXTENSION DOES NOT TOUCH SWINGER PAD.

(1) PLACE GRAM SCALE ON CENTER OF SWINGER PAD.
MIN. 8 GRAMS ——— MAX. 15 GRAMS.
TO SEPARATE THE NORMALLY CLOSED CONTACTS.

TO ADJUST----DISCONNECT TAPE-OUT EXTENSION BAIL SPRING AND REMOVE SWITCH ASSEMBLY.
FORM CONTACT SWINGER WITH THE #110445 SPRING BENDER.

(2) CLEARANCE BETWEEN NORMALLY OPEN CONTACT
MIN. 0.008 INCH ——— MAX. 0.015 INCH

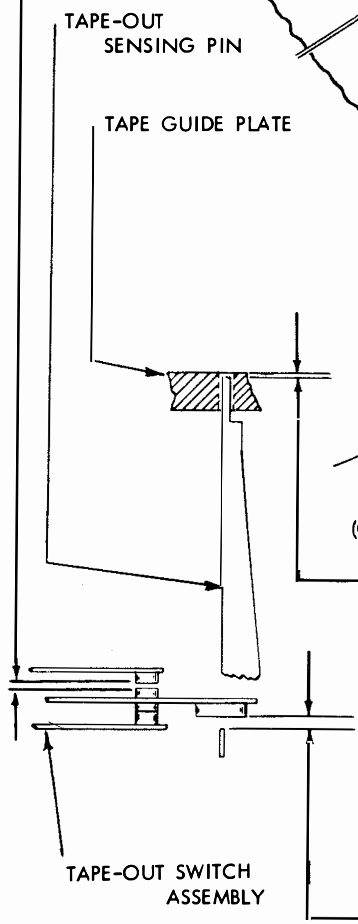
TO ADJUST----FORM UPPER CONTACT SPRING WITH #110445 BENDER. NOTE----IN REPLACING SWITCH ASSEMBLY, PLACE CONTACT SWINGER OVER TAPE-OUT PIN EXTENSION AND KEEP EXTENSION BAIL SPRING HORIZONTAL. REFER TO FIGURE 5-103.

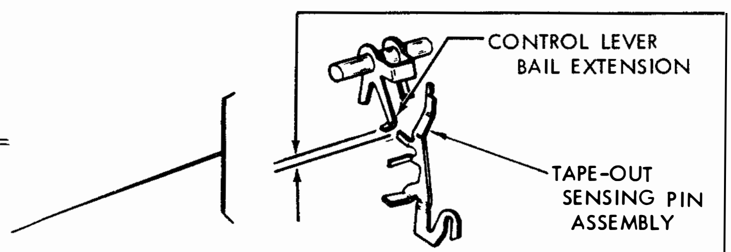


(B) TAPE-OUT SWITCH BRACKET (RUN POSITION)

REQUIREMENT----INSERT SHORT PIECE OF TAPE UNDER TAPE LID. CLEARANCE BETWEEN TAPE-OUT PIN EXTENSION AND UNDERSIDE OF CONTACT SWINGER PAD.
MIN. 0.006 INCH --- MAX. 0.020 INCH

TO ADJUST-----POSITION SWITCH BRACKET WITH ITS LOWER MOUNTING SCREW FRICTION TIGHT.





(C) TAPE-OUT PIN

REQUIREMENTS ---

(1) WITH START-STOP LEVER FREE WHEELING POSITION, TIP OF TAPE-OUT PIN SHOULD BE
FLUSH ——— TO ——— 0.010 INCH
BELOW TOP SURFACE OF TAPE GUIDE PLATE.

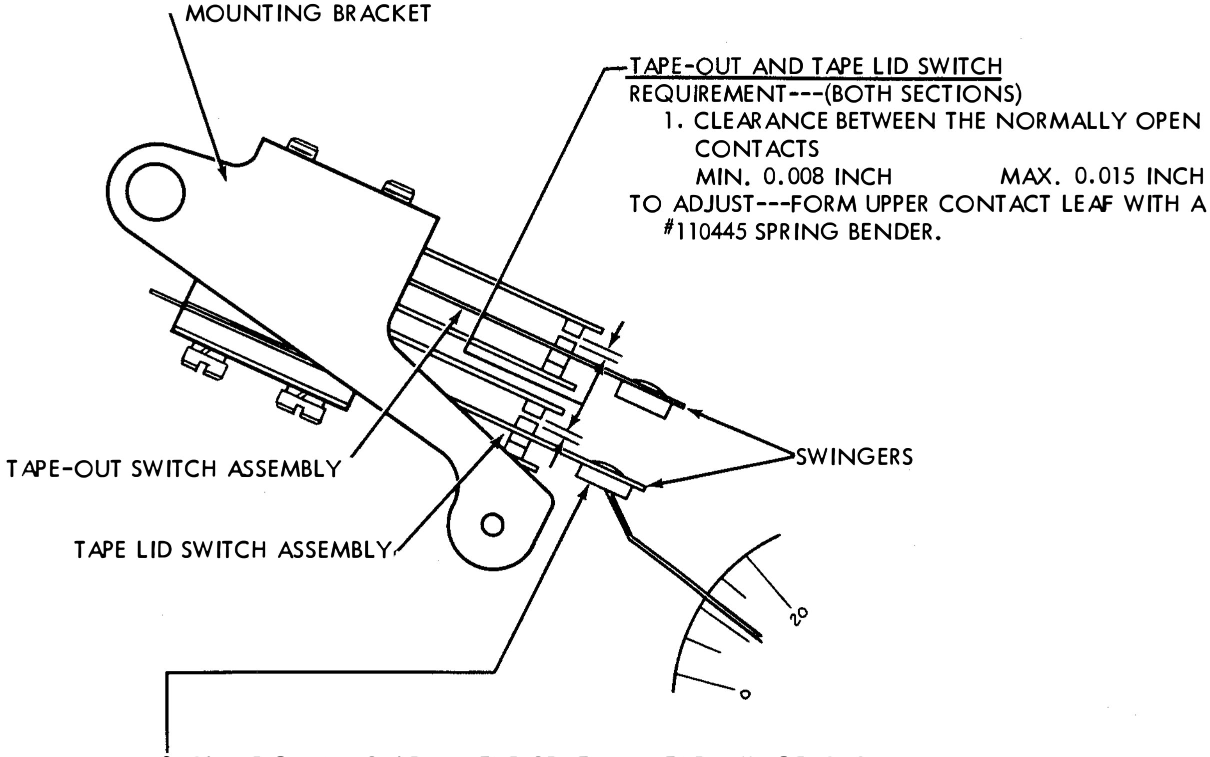
TO ADJUST----WITH START-STOP LEVER IN ITS FREE-WHEELING POSITION, POSITION THE DOWNSTOP WITH ITS LOCK NUT LOOSENED.

(2) WITH START-STOP LEVER IN ITS RUN POSITION, THERE SHOULD BE A MINIMUM CLEARANCE OF 0.055 INCH BETWEEN TAPE-OUT PIN EXTENSION AND THE CONTROL LEVER BAIL EXTENSION.

TO ADJUST----POSITION EXTENSION BAIL, WITH ITS CLAMPING SCREW LOOSENED.

Figure 5-104. Transmitter Distributor (LBXD), Tape Out Switch Assembly

NOTE: THE FOLLOWING ADJUSTMENTS SHOULD BE PERFORMED WITH THE TAPE-OUT AND TAPE LID SWITCH ASSEMBLY REMOVED FROM THE UNIT. SEE INSTRUCTIONS BELOW.



2. PLACE GRAM SCALE ON THE CENTER OF THE SWINGER PAD.
MIN. 8 GRAMS MAX. 15 GRAMS
TO SEPERATE THE NORMALLY CLOSED CONTACTS.
TO ADJUST---FORM THE CONTACT SWINGER WITH A #110445 SPRING BENDER.

REPLACE THE TAPE-OUT AND TAPE LID SWITCH ASSEMBLY.

TO REMOVE TAPE-OUT AND TAPE LID SWITCH ASSEMBLY: WITH THE COVER AND TOP PLATE REMOVED TAKE OUT THE GUIDE POST AT THE TOP ON WHICH THE SWITCH ASSEMBLY PIVOTS. THIS IS ACCOMPLISHED BY REMOVING THE 111342 SPRING AND PARTIALLY REMOVING THE SCREW THAT SECURES THE POST TO THE REAR PLATE. REMOVE THE 110334 NUT WITH WASHER #2191 FROM THE FRONT END OF THE POST. THE POST CAN NOW BE REMOVED FAR ENOUGH TO RELEASE THE SWITCH ASSEMBLY. REMOVE THE ADJUSTING SCREW FROM THE LOWER END OF SWITCH BRACKET. WITHDRAW SWITCH ASSEMBLY USING CARE NOT TO DISTORT THE SWITCH MEMBERS.

TO REPLACE TAPE-OUT AND TAPE LID SWITCH ASSEMBLY REVERSE THE PROCEDURE USED IN REMOVING IT. USE CARE SO AS NOT TO DISTURB THE ADJUSTMENTS.

Figure 5-105. Transmitter Distributor (LBXD), Tape Out and Tape Lid Switch Assembly

START-STOP ; TIGHT-TAPE SWITCH

(A) START STOP SWITCH BRACKET

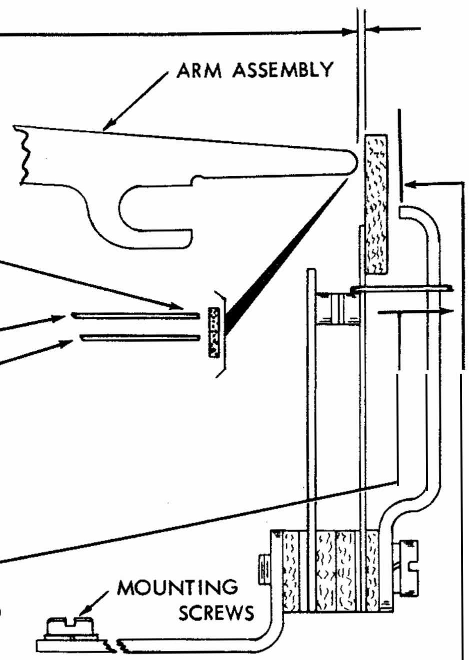
REQUIREMENT----

(1) WITH START-STOP LEVER IN RUN POSITION, CLEARANCE BETWEEN TIP END OF START-STOP SLIDE ARM AND BAKELITE PORTION OF CONTACT SWINGER. (SEE NOTE).
MIN. 0.006 INCH —— MAX. 0.015 INCH

(2) START-STOP AND TIGHT TAPE SLIDE ARMS SHOULD ENGAGE BAKELITE PORTION OF SWINGER BY FULL THICKNESS OF RESPECTIVE ARM.

TO ADJUST----WITH SWITCH BRACKET MOUNTING SCREWS LOOSENED, POSITION THE BRACKET

NOTE----IF TIGHT TAPE SLIDE ARM RESTS AGAINST BAKELITE, HOLD THE ARM AWAY.



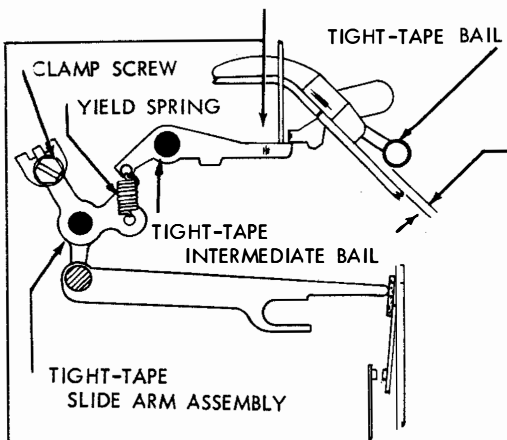
(C) TIGHT-TAPE AND START-STOP CONTACT SPRING

REQUIREMENT----

(1) WITH SPRING SCALE HOOKED AS SHOWN, PULL TO RIGHT
MIN. 3 OZS. —— MAX. 4 OZS.
TO SEPARATE THE CONTACTS

(2) CLEARANCE BETWEEN SWITCH BACKSTOP AND BAKELITE PORTION OF SWINGER WITH CONTACTS CLOSED.
MIN. 0.050 INCH —— MAX. 0.070 INCH

TO ADJUST----FORM THE SWINGER USING 110445 SPRING BENDER. RECHECK REQUIREMENTS "A" & " B ".



(B) TIGHT TAPE SLIDE ARM (TOP PLATE REMOVED)

REQUIREMENT----TIGHT TAPE CONTACTS SHOULD OPEN WHEN TIGHT TAPE BAIL IS RAISED
MIN. 0.045 INCH —— MAX. 0.075 INCH
AWAY FROM TAPE GUIDE PLATE.

TO ADJUST----WITH START-STOP LEVER IN RUN POSITION AND ADJUSTING SLOT CLAMP SCREW LOOSENED, POSITION ARM ASSEMBLY SO THAT CONTACTS ARE CLOSED WITH A 0.045 INCH GAUGE PLACED UNDER TIGHT TAPE BAIL. HOWEVER, CONTACTS SHOULD OPEN WHEN A 0.075 INCH GAUGE IS USED.

(D) TIGHT-TAPE BAIL YIELD SPRING

REQUIREMENT----WITH TAPE LID OPEN, START-STOP LEVER IN FREE WHEELING POSITION
MIN. 2 OZS. —— MAX. 3-1/2 OZS.
TO SEPARATE BAILS.

(E) START -STOP BAIL YIELD SPRING

REQUIREMENT---WITH START-STOP LEVER IN RUN POSITION (TOP PLATE REMOVED)
MIN. 4 OZS. —— MAX. 6 OZS.
TO START BAIL MOVING.

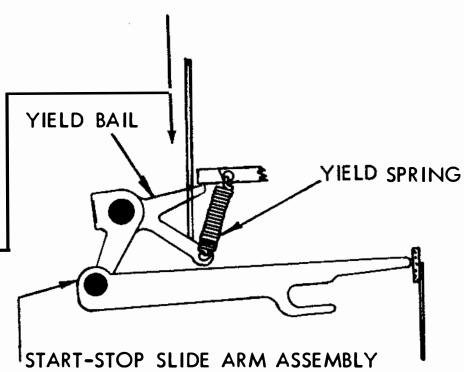


Figure 5-106. Transmitter Distributor (LBXD), Start-Stop, Tight Tape Switch Assembly

(C) SENSING PIN

REQUIREMENT----(TOP PLATE REPLACED) WITH SENSING CLUTCH DISENGAGED AND SENSING BAIL ECCENTRIC INDENT (MARKING) TOWARD THE RIGHT, TIP OF HIGHEST SENSING PIN SHOULD BE
FLUSH ———— TO ———— 0.005 INCH
BELOW TOP SURFACE OF TAPE GUIDE PLATE.

TO ADJUST----LOOSEN ECCENTRIC SHAFT LOCK NUT AND POSITION THE ECCENTRIC. RECHECK REQUIREMENT AFTER LOCK NUT IS TIGHTENED.

RECHECK AND REFINE IF NECESSARY

(B) SENSING PIN SPRING

REQUIREMENT----TRIP SENSING CLUTCH MANUALLY AND ROTATE SHAFT UNTIL SENSING PINS ARE AT PEAK OF THEIR UPWARD TRAVEL. WITH PUSHER LEVERS HELD AWAY
MIN. 2 OZS. ——— MAX. 3 OZS.
TO MOVE EACH PIN FLUSH WITH TOP SURFACE OF TAPE GUIDE PLATE.

(A) SENSING BAIL SPRING (TOP PLATE REMOVED)

REQUIREMENT --- WITH TAPE LID RAISED, TRIP SENSING CLUTCH AND MANUALLY ROTATE SHAFT UNTIL SENSING BAIL IS IN ITS UPPERMOST POSITION. DEPRESS SENSING PINS (MANUALLY) UNTIL THEY ARE FREE OF SENSING BAIL.
MIN. 1/4 OZS. ———————— MAX. 2 OZS.
TO START SENSING BAIL MOVING.

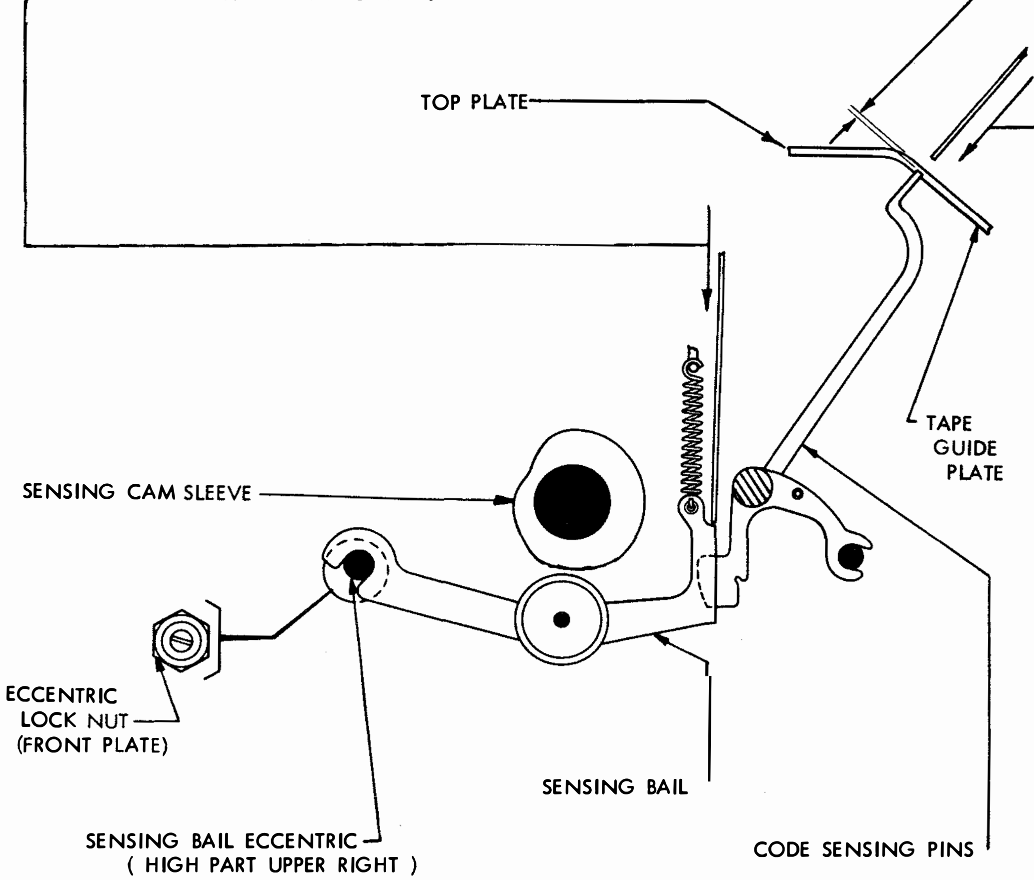
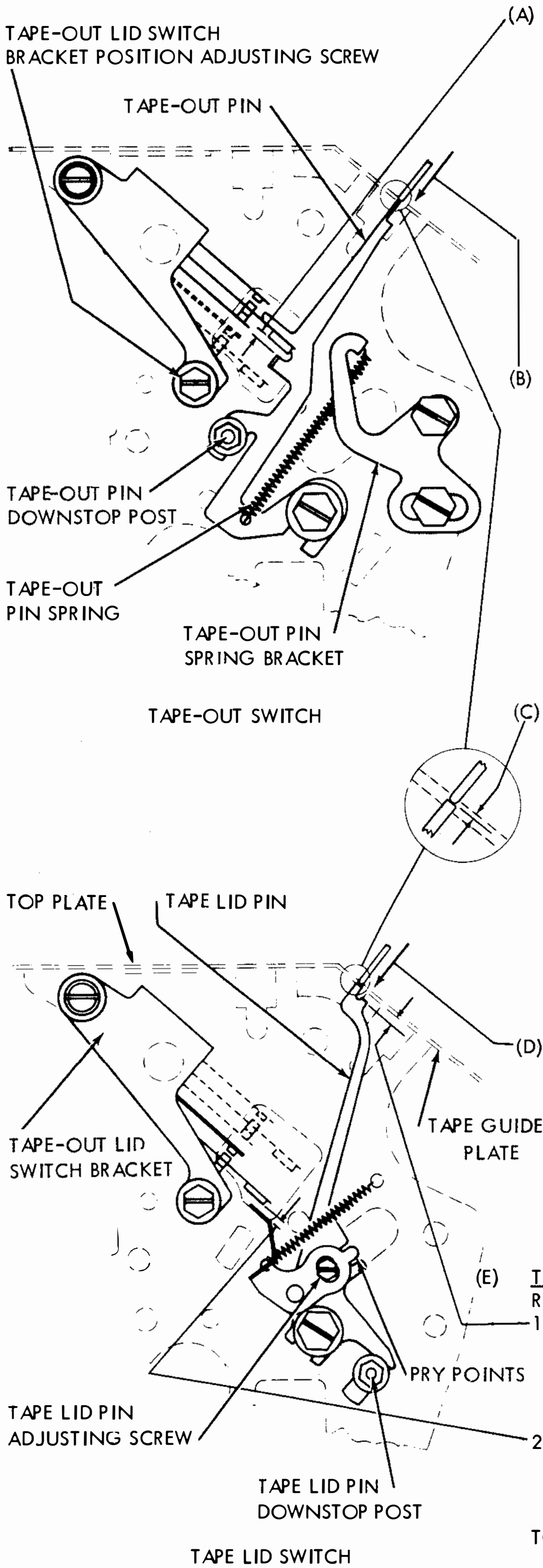


Figure 5-107. Transmitter Distributor (LBXD), Sensing Pin Assembly



(A) TAPE-OUT AND TAPE LID SWITCH BRACKET

REQUIREMENT---WITH A PIECE OF TAPE INSERTED UNDER TAPE LID, THE CLEARANCE BETWEEN TAPE-OUT PIN EXTENSION AND UNDERSIDE OF TAPE-OUT SWITCH SWINGER PAD SHOULD BE
MIN. 0.006 INCH——— MAX. 0.012 INCH

TO ADJUST---LOOSEN THE SWITCH BRACKET POSITION ADJUSTING SCREW AND ADJUST BRACKET TO OBTAIN CLEARANCE WITH TAPE STILL UNDER LID. TIGHTEN SCREW AND RECHECK ADJUSTMENT.

(B) TAPE-OUT PIN SPRING

REQUIREMENT---WITH SCALE APPLIED TO END OF TAPE-OUT PIN, PUSH DOWN IN LINE WITH THE PIN. IT SHOULD REQUIRE
MIN. 38 GRAMS ——— MAX. 45 GRAMS
TO DEPRESS PIN FLUSH WITH TOP PLATE.

TO ADJUST---LOOSEN MOUNTING SCREWS FOR TAPE-OUT PIN SPRING BRACKET. POSITION BRACKET, TIGHTEN SCREWS AND RECHECK TENSION.

(C) TAPE-OUT AND TAPE LID PIN DOWNSTOP

REQUIREMENT---TAPE-OUT AND TAPE LID PINS, WHEN DEPRESSED TO THEIR LOWEST POSITION, SHOULD BE FROM
MIN. FLUSH ——— MAX. 0.005 INCH
BELOW TOP SURFACE OF TAPE GUIDE PLATE.

TO ADJUST---WITH TAPE-OUT PIN AND TAPE LID PIN DOWNSTOP POST NUTS LOOSENED, POSITION THE POSTS AS NECESSARY. TIGHTEN THE NUTS AND RECHECK REQUIREMENT.

(D) TAPE LID PIN SPRING

REQUIREMENT--- WITH SCALE APPLIED TO END OF TAPE LID PIN, PUSH DOWN IN LINE WITH PIN. IT SHOULD REQUIRE
MIN. 1-1/2 OUNCES——MAX. 3 OUNCES
TO DEPRESS PIN FLUSH WITH TOP PLATE.

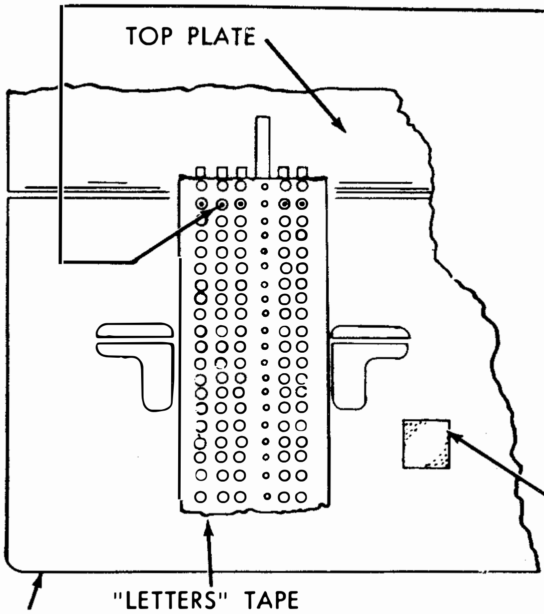
(E) TAPE LID PIN

REQUIREMENT---

1. WITH TAPE LID UP AND NORMALLY OPEN TAPE LID SWITCH CONTACTS CLOSED, CLEARANCE BETWEEN SHOULDER ON TAPE LID PIN AND BOTTOM SURFACE OF TAPE GUIDE PLATE SHOULD BE
MIN. 0.010 INCH
2. WITH TAPE LID CLOSED, CLEARANCE BETWEEN TAPE LID PIN EXTENSION AND UNDERSIDE OF CONTACT SWINGER PAD SHOULD BE
MIN. 0.005 INCH

TO ADJUST---LOOSEN TAPE LID PIN ADJUSTING SCREW. OPEN OR CLOSE PRY POINTS AS REQUIRED. RE-CHECK REQUIREMENTS AFTER SCREW IS TIGHTENED.

Figure 5-108. Transmitter Distributor (LBXD), Tape Out and Tape Lid Switch Mechanism



(A) FEED WHEEL DETENT (REFER TO FIGURE 5-110)

REQUIREMENT----WITH START-STOP LEVER IN ITS STOP POSITION, PLACE A "LETTERS" PERFORATED TAPE OVER FEED WHEEL TAKING UP PLAY IN FEED HOLES TOWARD THE RIGHT (VIEWED FROM FRONT). SENSING PINS SHOULD BE CENTRALLY LOCATED IN CODE HOLES.

TO ADJUST----WITH FEED WHEEL DETENT ECCENTRIC MOUNTING POST AND POST LOCKING SCREWS FRICTION TIGHT, POSITION THE ECCENTRIC. HIGH PART OF ECCENTRIC SHOULD BE TOWARD THE RIGHT. HOLD ECCENTRIC AND TIGHTEN GUIDE POST AND LOCKING SCREW. RECHECK ADJUSTMENT.

NOTE----FEED PAWL SHOULD BE HELD AWAY TO FACILITATE ADJUSTMENT.

(D)

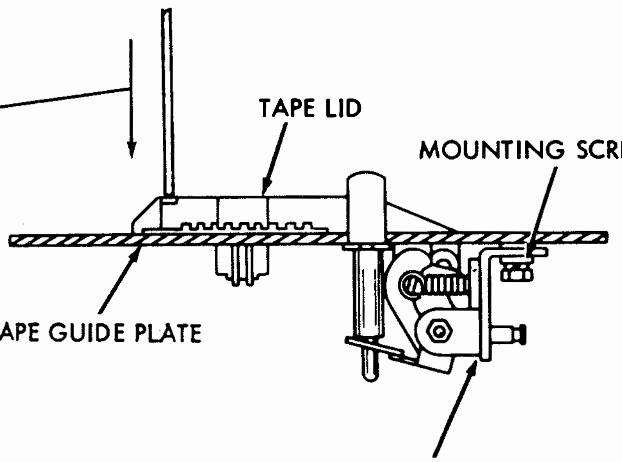
TAPE LID SPRING

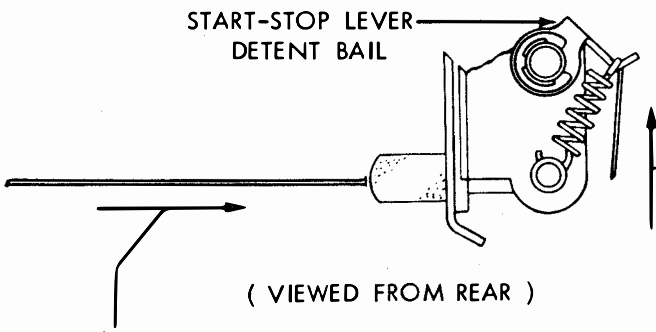
TO CHECK

OPEN TAPE LID. HOLD UNIT SO TAPE GUIDE PLATE IS HORIZONTAL. APPLY SCALE AT TOP OF LID IMMEDIATELY LEFT OF TAPE-OUT PIN HOLE. HOLD PLUNGER FULLY DEPRESSED.

REQUIREMENT

MIN. 3 OZS.
MAX. 4-1/2 OZS.
TO MOVE OPEN END OF TAPE LID AGAINST TAPE GUIDE PLATE.





(B) START-STOP LEVER DETENT SPRING

REQUIREMENT----WITH START-STOP LEVER IN RUN POSITION, APPLY SPRING SCALE AS SHOWN.

MIN. 14 OZS. —————— MAX. 22 OZS.
TO START BAIL MOVING.

(C) TAPE LID RELEASE PLUNGER SPRING

REQUIREMENT---WITH TAPE GUIDE PLATE POSITIONED IN A HORIZONTAL PLANE AND TAPE LID IN ITS OPEN POSITION.

MIN. 28 OZS. —————————— MAX. 48 OZS.
TO START TAPE LID BAIL MOVING.

NOTE---WITH TAPE GUIDE PLATE INSTALLED, ROTATE THE UNIT SO THAT THE TAPE GUIDE PLATE IS IN A HORIZONTAL PLANE.

Figure 5-109. Transmitter Distributor (LBXD), Feed Wheel Detent

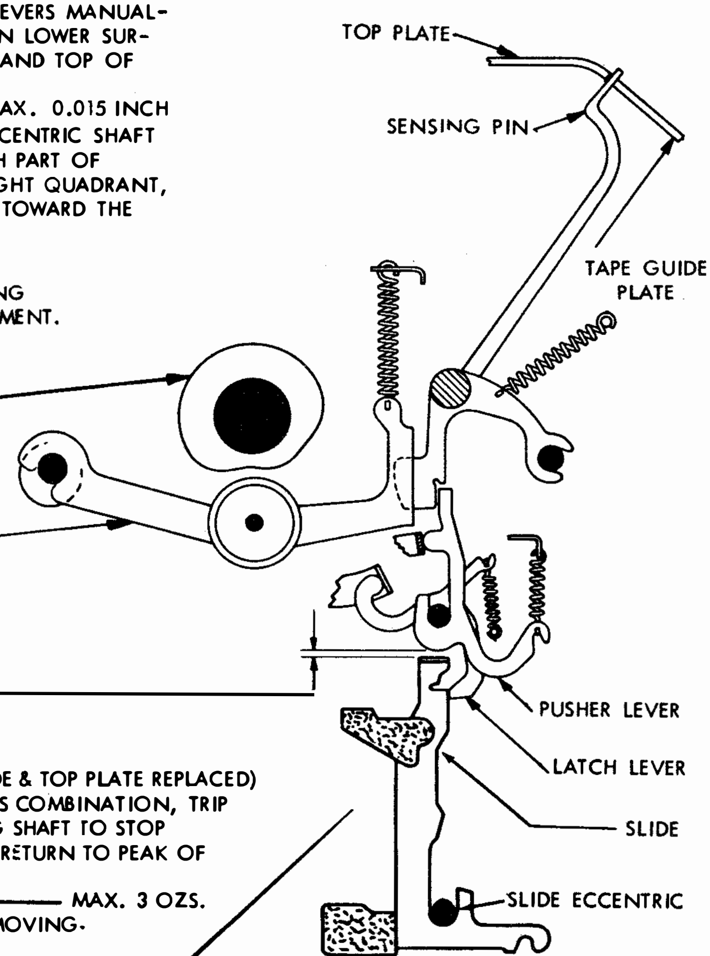
(A) CONTACT LEVER SLIDE

REQUIREMENT----(CHECK CLOSEST SLIDE) WITH SENSING SHAFT ROTATED UNTIL SENSING PINS ARE AT PEAK OF THEIR UPWARD TRAVEL AND PUSHER LEVERS SELECTED, TRIP LATCH LEVERS MANUALLY, CLEARANCE BETWEEN LOWER SURFACE OF PUSHER LEVER AND TOP OF SLIDE.

MIN. 0.005 INCH --- MAX. 0.015 INCH

TO ADJUST----LOOSEN ECCENTRIC SHAFT LOCK NUT. WITH HIGH PART OF ECCENTRIC IN UPPER RIGHT QUADRANT, ROTATE THE ECCENTRIC TOWARD THE RIGHT.

NOTE----RECHECK STORING SWITCH GUIDE ADJUSTMENT.



(B) LATCH LEVER SPRING (TAPE GUIDE & TOP PLATE REPLACED)

REQUIREMENT --- SELECT BLANKS COMBINATION, TRIP CLUTCH AND ROTATE SENSING SHAFT TO STOP POSITION UNTIL SLIDE LEVERS RETURN TO PEAK OF THEIR UPWARD TRAVEL.

MIN. 1 OZ ——————— MAX. 3 OZS.

TO START EACH LATCH LEVER MOVING.

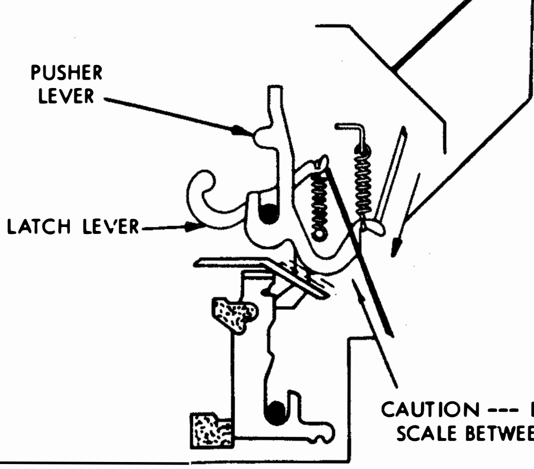
(C) PUSHER LEVER SPRING

REQUIREMENT----WITH UNIT ON ITS LEFT SIDE, SELECT A LETTERS COMBINATION AND LATCH CLUTCH. TRIP CLUTCH AND ROTATE SHAFT UNTIL PUSHER LEVERS ARE STRIPPED.

MIN. 1/4 OZ. —— MAX. 1-1/2 OZS.

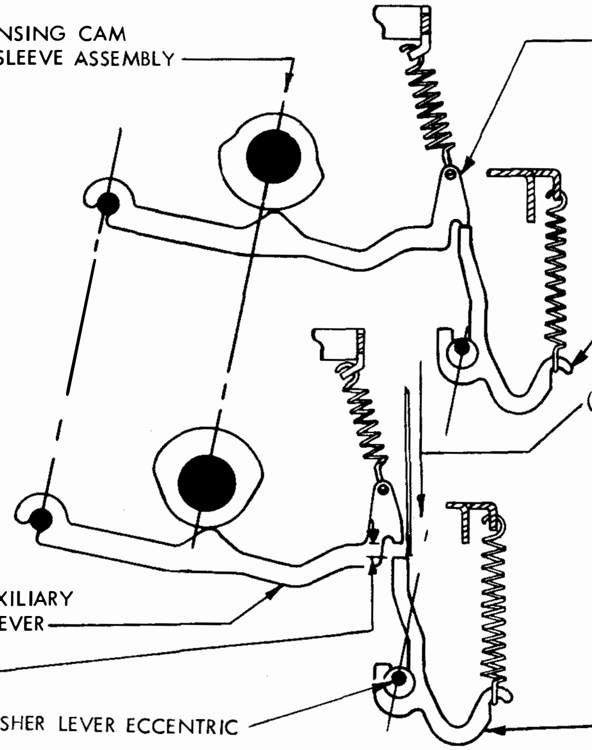
TO START EACH PUSHER LEVER MOVING.

NOTE----TO CHECK EITHER AUXILIARY PUSHER LEVER, ROTATE SHAFT UNTIL RESPECTIVE AUXILIARY LEVER IS ON LOW PART OF ITS CAM.



CAUTION --- EXERCISE CARE WHEN INSERTING SCALE BETWEEN PUSHER LEVER SPRINGS.

Figure 5-110. Transmitter Distributor (LBXD), Sensing Bail Mechanism

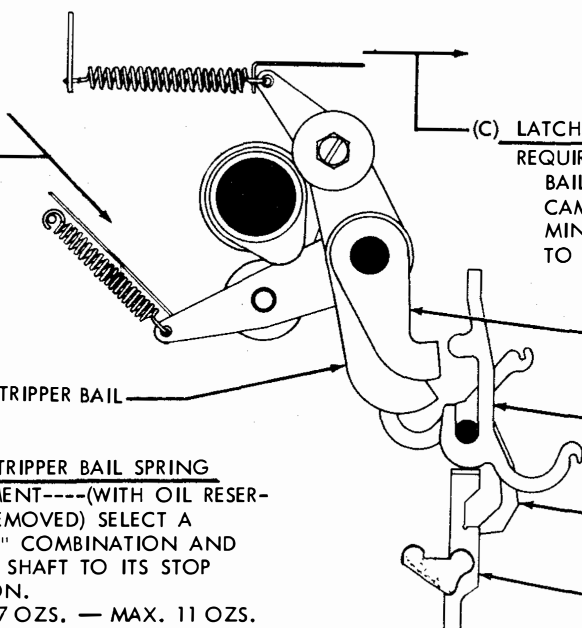


(B) AUXILIARY LEVER SPRING
REQUIREMENT --- WITH FIRST ONE AND THEN THE OTHER AUXILIARY LEVER ON LOW PART OF CAM HOLD PUSHER LEVERS AWAY.
MIN. 1/2 OZ.—— MAX. 3 OZS.
TO START EACH LEVER MOVING.

(A) PUSHER LEVER (TOP PLATE REPLACED)
REQUIREMENT----WITH FIRST ONE AND THEN THE OTHER AUXILIARY LEVER ON LOW PART OF CAM, THE AUXILIARY LEVER WITH THE LEAST CLEARANCE SHOULD CLEAR THE TIP OF ITS PUSH LEVER BY

MIN. 0.020 INCH --- MAX. 0.045 INCH

TO ADJUST----WITH PUSHER LEVER ECCENTRIC SHAFT LOCK NUT (FRONT PLATE) LOOSENED AND HIGH PART OF ECCENTRIC LOCATED TOWARD THE UPPER RIGHT, ROTATE ECCENTRIC TOWARD THE RIGHT OR LEFT.



(TAPE GUIDE PLATE REMOVED)

(C) LATCH STRIPPER BAIL SPRING
REQUIREMENT----WITH LATCH STRIPPER BAIL ROLLER ON LOW PART OF ITS CAM. TAPE GUIDE PLATE REMOVED.
MIN. 2-3/4 OZS.— MAX. 6 OZS.
TO START LATCH BAIL MOVING.

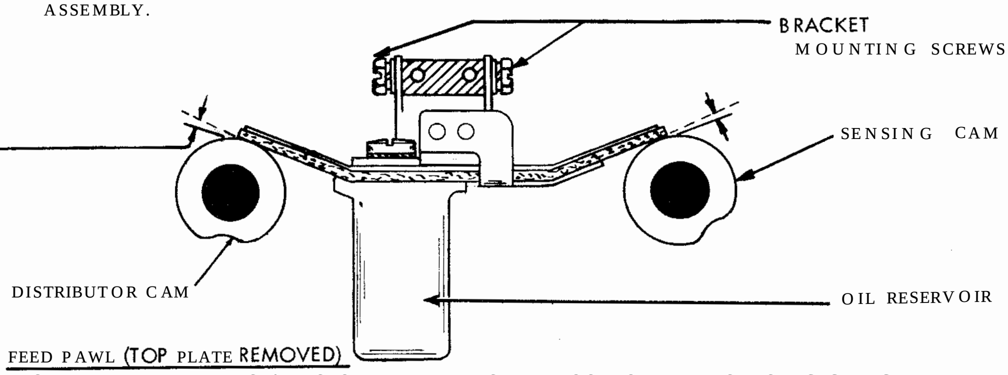
(B) PUSHER STRIPPER BAIL SPRING
REQUIREMENT----(WITH OIL RESERVOIR REMOVED) SELECT A "BLANK" COMBINATION AND ROTATE SHAFT TO ITS STOP POSITION.
MIN. 7 OZS. — MAX. 11 OZS.
TO START BAIL ROLLER MOVING AWAY FROM SENSING CAM SLEEVE.

Figure 5-111. Transmitter Distributor (LBXD), Auxiliary Lever Mechanism

(C) OIL RESERVOIR (TOP PLATE REMOVED)

REQUIREMENT----TRIP BOTH ARMTURES AND ROTATE SHAFT UNTIL HIGH PART OF FRONT AND REAR CAM OF EACH SLEEVE IS UNDER ITS WICK. EACH WICK SHOULD REST LIGHTLY ON FRONT AND REAR CAM OF RESPECTIVE SLEEVE. WHEN CAM SLEEVE IS ROTATED, TEETH OF WICK RETAINER SHOULD NOT DEFLECT BY MORE THAN 1/32 INCH (GAUGE BY EYE).

TO ADJUST----WITH RESERVOIR BRACKET MOUNTING SCREWS (4) LOOSENED, POSITION THE ASSEMBLY.

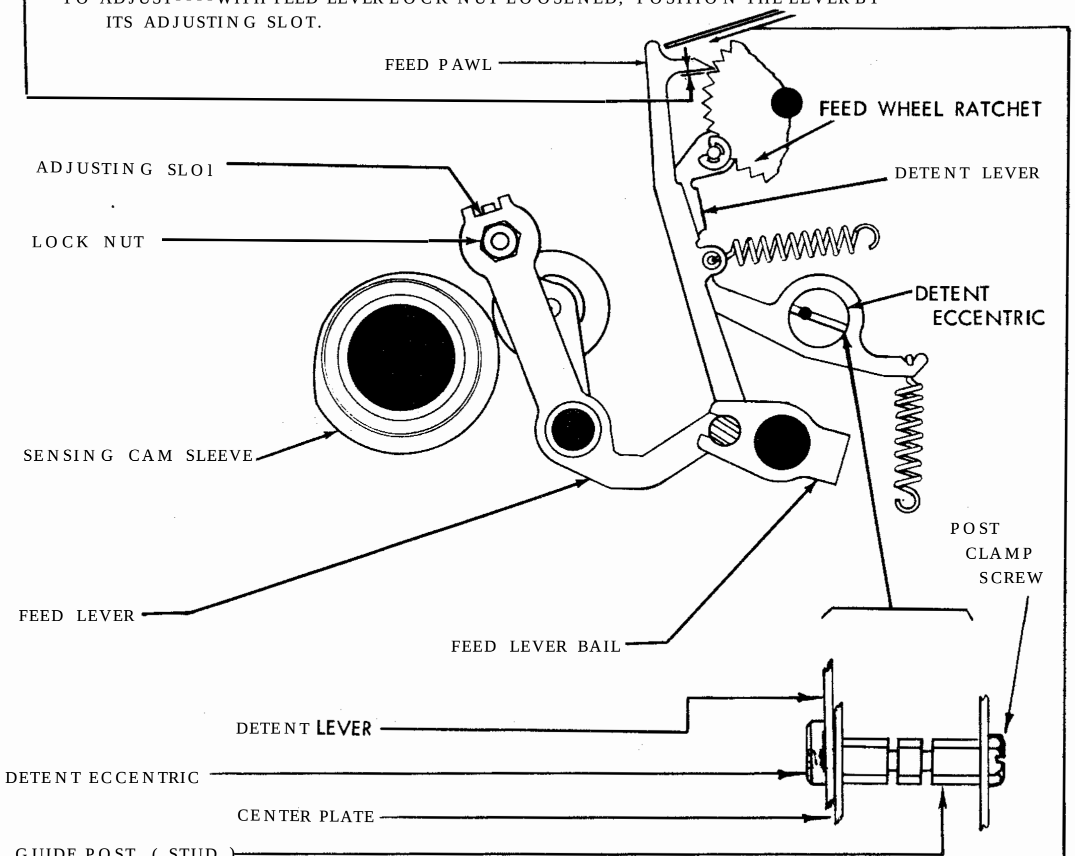


(A) FEED PAWL (TOP PLATE REMOVED)

REQUIREMENT----WITH START-STOP LEVER IN ITS RUN POSITION, TRIP SENSING CLUTCH MANUALLY AND ROTATE CAM SLEEVE UNTIL FEED LEVER ROLLER IS ON HIGH PART OF ITS CAM. ROTATE FEED WHEEL RATCHET UNTIL OIL HOLE IS UP. CLEAANCE BETWEEN FEED PAWL AND RATCHET TOOTH WITH PLAY TAKEN UP BY DEPRESSING FEED LEVER BAIL LIGHTLY AT ITS RIGHT SIDE

SOME ———— TO ———— 0.003 INCH

TO ADJUST----WITH FEED LEVER LOCK NUT LOOSENED, POSITION THE LEVER BY ITS ADJUSTING SLOT.



(B) FEED PAWL SPRING

REQUIREMENT----WITH SENSING CAM SLEEVE IN STOP POSITION, APPLY SPRING SCALE AS SHOWN.

MIN. 1/4 OZ ———— MX. 1-1/2 OZS.

TO START FEED PAWL MOVING.

Figure 5-112. Transmitter Distributor (LBXD), Feed Pawl Mechanism

TAPE DEFLECTOR

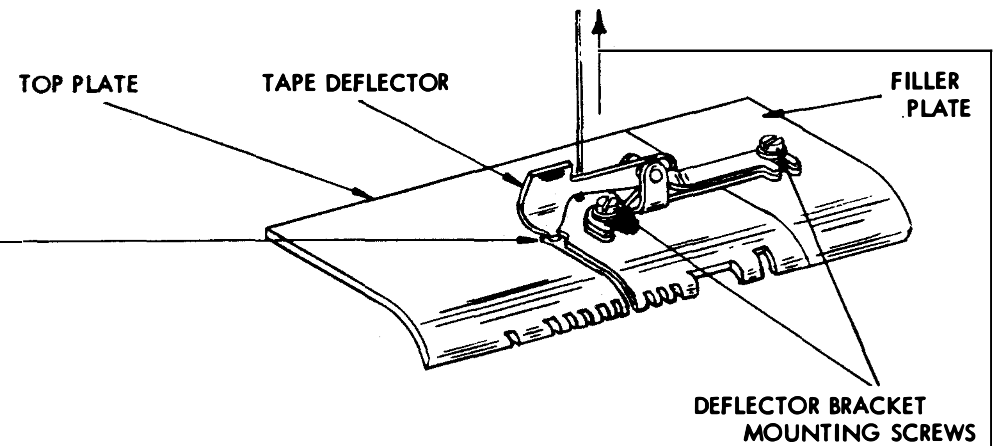
NOTE---DEFLECTOR IS HINGED TO SWING IN EITHER OF TWO POSITIONS.

1. OPERATING POSITION - (LEFT SIDE) --- DEFLECTS TAPE BACK TO OPERATOR.
2. NON-OPERATING POSITION - (RIGHT SIDE) --- TAPE ALLOWED TO FOLLOW NATURAL PATH TO REAR OF UNIT.

A. DEFLECTOR BRACKET

REQUIREMENT --- WITH DEFLECTOR IN ITS OPERATING POSITION, TANG OF DEFLECTOR SHOULD BE CENTRALLY LOCATED IN HOLE OF TOP PLATE

TO ADJUST --- WITH BRACKET MOUNTING SCREWS LOOSENED, POSITION THE BRACKET.



B. DEFLECTOR SPRING

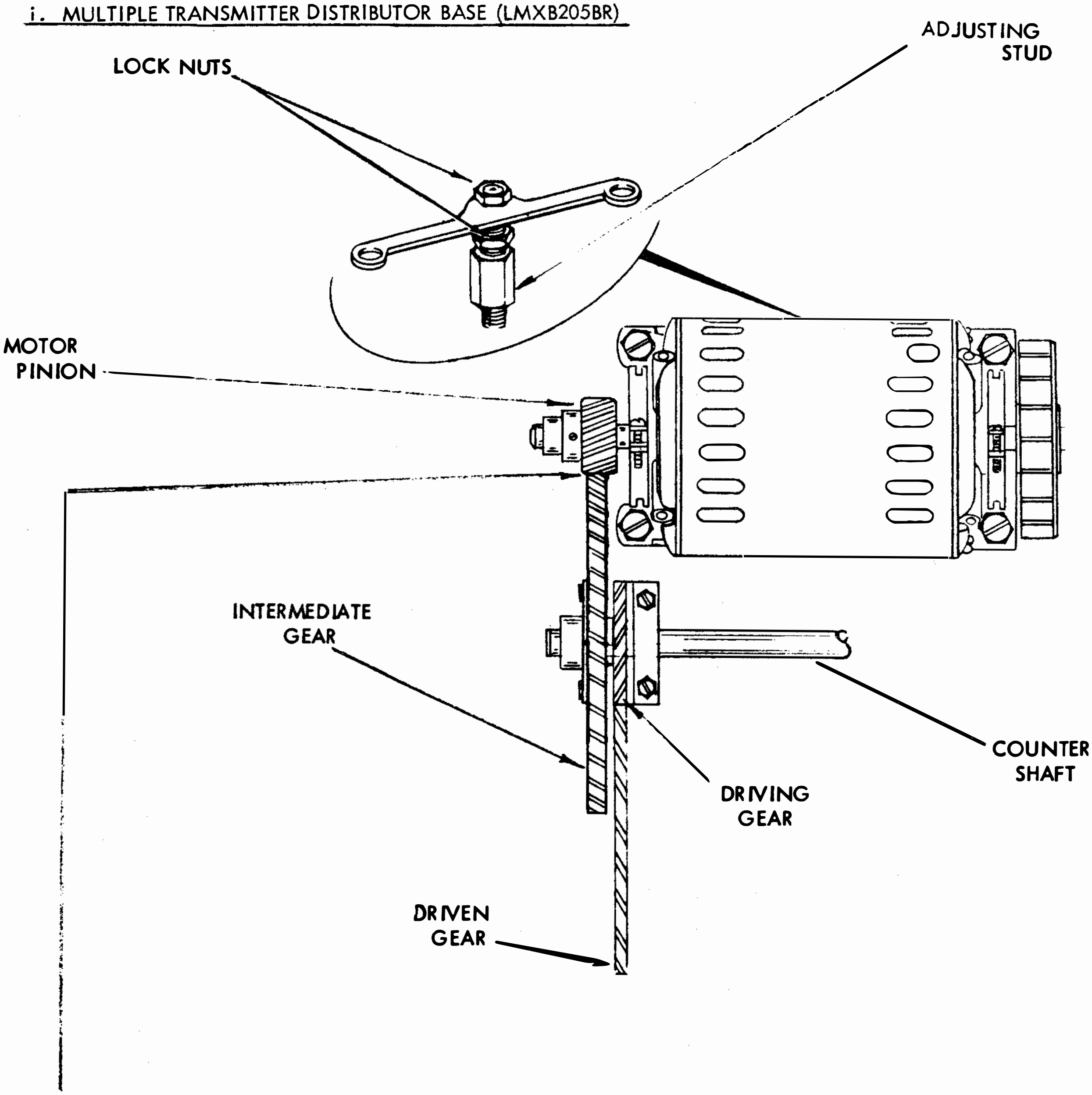
REQUIREMENT --- WITH DEFLECTOR IN ITS OPERATING POSITION, HOOK SPRING SCALE UNDER NARROW SECTION.

MIN. 1-1/2 OZS. ———— MAX. 4 OZS.

TO ADJUST --- WITH SCREW THAT ANCHORS SPRING TO FILLER PLATE LOOSENED, POSITION SPRING IN ITS ELONGATED MOUNTING SLOT. IF NECESSARY, FORM THE SPRING.

Figure 5-113. Transmitter Distributor (LBXD), Tape Deflector

i. MULTIPLE TRANSMITTER DISTRIBUTOR BASE (LMXB205BR)



(A) MOTOR PINION

REQUIREMENT --- PINION AND INTERMEDIATE GEAR SHOULD HAVE A BARELY PERCEPTIBLE AMOUNT OF BACKLASH AT POINT OF MINIMUM CLEARANCE (CHECK FOR ONE REVOLUTION OF INTERMEDIATE GEAR).

TO ADJUST --- WITH ITS LOCK NUTS LOOSENED, POSITION THE ADJUSTING STUD UP OR DOWN.

Figure 5-114. Multiple Transmitter Distributor Base (LMXB205BR), Motor Pinion

NOTE --- FOR ADJUSTMENT OF BACKLASH BETWEEN MOTOR PINION AND INTERMEDIATE DRIVEN GEAR AND ADJUSTMENT OF THE LMXB COUNTERSHAFT. SEE FIGURE 5-114.

TRANSMITTER DISTRIBUTOR POSITIONING

REQUIREMENT

BARELY PERCEPTIBLE AMOUNT OF BACKLASH BETWEEN COUNTER SHAFT DRIVING GEAR AND ITS ASSOCIATED TRANSMITTER DISTRIBUTOR DRIVEN GEAR AT POINT OF LEAST CLEARANCE.

TO ADJUST

(1) WITH LOCATING PLATE MOUNTING SCREWS FRICTION TIGHT, POSITION PLATE AT CENTER OF ITS ADJUSTMENT RANGE.
(2) INSERT AN LBXD UNIT (WITH CRADLE) INTO LEFT MOUNTING POSITION ON BASE. POSITION LOCATING PLATE TO MEET REQUIREMENT. TIGHTEN PLATE MOUNTING SCREWS.
(3) REMOVE LBXD FROM LEFT POSITION, AND PLACE IT IN RIGHT MOUNTING POSITION. LOOSEN MOUNTING SCREWS ON COUNTERSHAFT PEDESTALS AND POSITION RIGHT END OF COUNTER SHAFT TO MEET REQUIREMENT.
(4) TIGHTEN ALL MOUNTING SCREWS, CHECK FOR BINDS, AND RECHECK REQUIREMENTS IN RIGHT AND LEFT MOUNTING POSITIONS. REFINE IF NECESSARY.

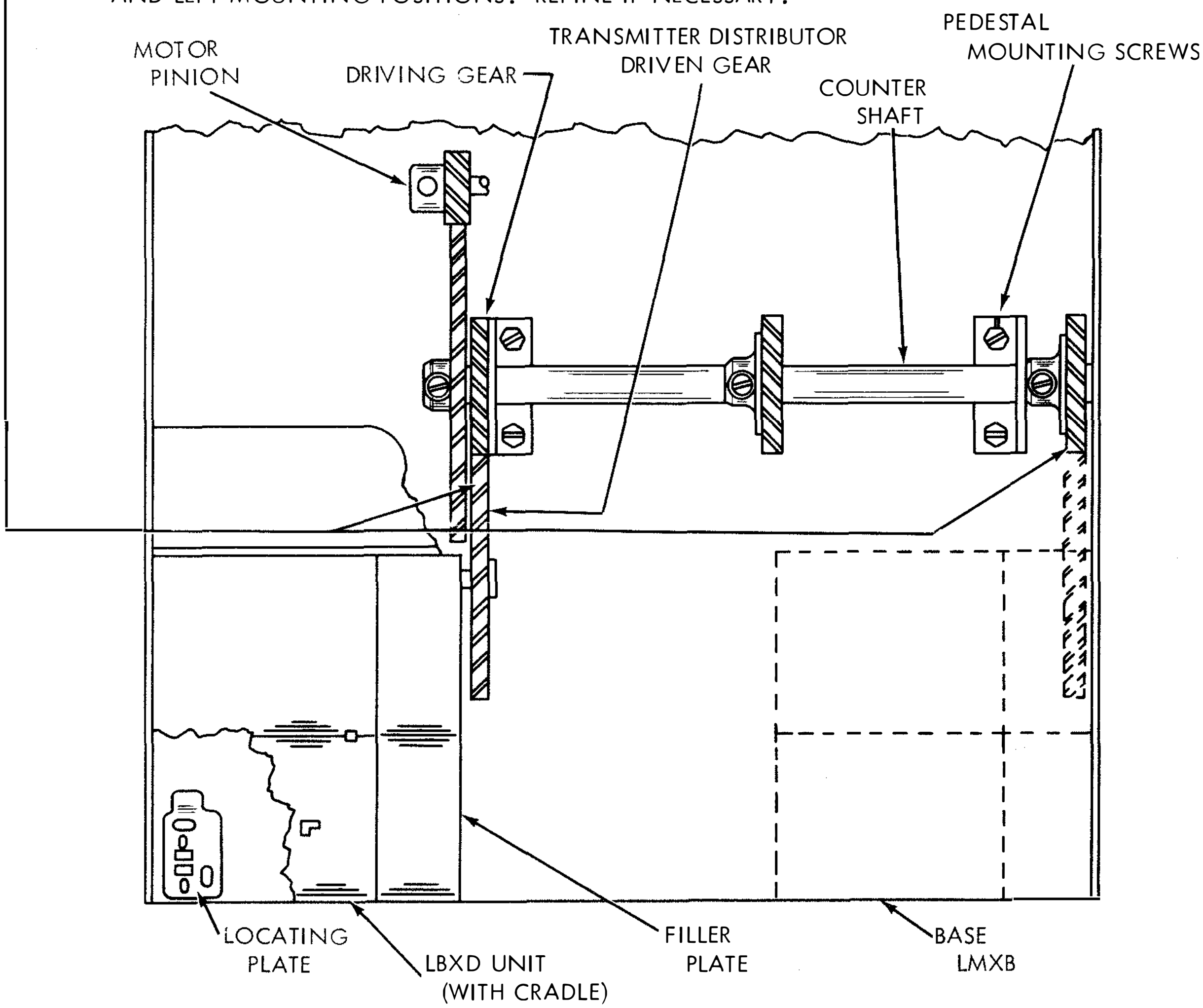


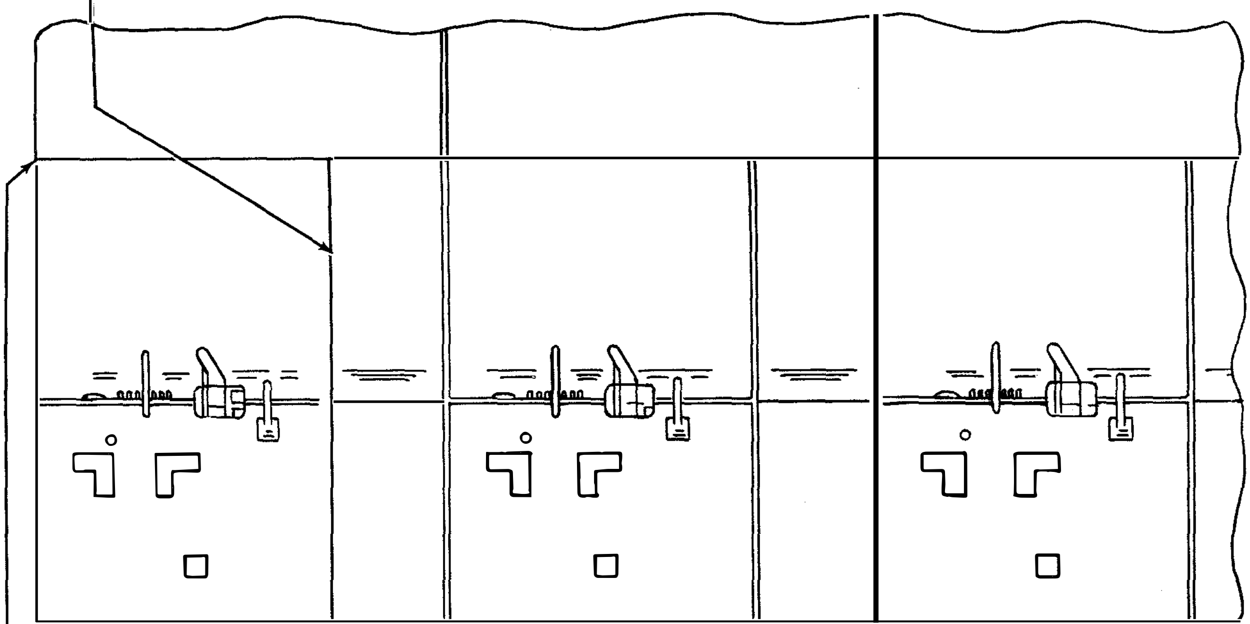
Figure 5-115. Multiple Reperforator Base (LMXB205BR), Transmitter Distributor Positioning

(A) FILLER PLATE ASSEMBLY

REQUIREMENT --- TOP SURFACE OF FILLER PLATE SHOULD ALIGN WITH TOP SURFACE OF BOTH THE TOP PLATE AND THE TAPE GUIDE PLATE. THE COMMON EDGES SHOULD BEAR AGAINST EACH OTHER.

(1) LAY A STRAIGHTEDGE ACROSS THE TOP PLATES AND FILLER PLATES AT A DISTANCE OF 1/4" FROM COVER PLATE. MEASURE GAP BETWEEN EACH PLATE AND STRAIGHT-EDGE, AT A DISTANCE OF 1/8 INCH ON EACH SIDE OF EDGE BETWEEN TOP PLATE AND FILLER PLATE FOR ALL (5) SUCH EDGES
FLUSH ——— TO ——— 0.010 INCH

(2) LAY A STRAIGHTEDGE ACROSS THE TAPE GUIDE PLATES AND FILLER PLATES AT A DISTANCE OF 1/8 INCH FROM THE LOWER EDGE OF THE TAPE GUIDE PLATES. MEASURE GAP BETWEEN THE STRAIGHTEDGE AND THE TAPE GUIDE PLATE AT A DISTANCE OF 1/8 INCH ON EACH SIDE OF THE EDGE BETWEEN TAPE GUIDE PLATES AND FILLER PLATES AT ALL (5) SUCH EDGES
FLUSH ——— TO ——— .010 INCH



NOTE --- WHEN LESS THAN THREE LBXD UNITS ARE USED ON THE BASE, THE UNUSED COMPARTMENTS CONTAIN A DUMMY UNIT. POSITION THE TOP PLATE AND COVER PLATE IN A MANNER SIMILAR TO REQUIREMENT B.

(B) COVER PLATE (REFER TO FIGURE 1-18)

REQUIREMENTS ---

(1) WITH (THREE) UNITS IN THEIR OPERATING POSITION ON THE BASE, COVER PLATES SHOULD ALIGN HORIZONTALLY AND MATING EDGE OF COVER AND RESPECTIVE TOP PLATE SHOULD BE FLUSH.

TO ADJUST --- WITH DETENTING NUTS LOOSENED, POSITION THE COVER.

(2) EDGE OF COVER PLATE OPPOSITE DRIVING GEAR SHOULD ALIGN WITH EDGE OF TOP PLATE.

TO ADJUST --- WITH COVER PLATE DETENT MOUNTING NUTS (2) AND SPRING PLATE MOUNTING NUTS (2) FRICTION TIGHT, POSITION COVER PLATE.

Figure 5-116. Multiple Reperforator Base (LMXB205BR), Cover Plate and Filler Plate

j. TRANSMITTER DISTRIBUTOR (LXD)

INSTRUCTIONS FOR

(A) REMOVING COVER PLATE --- LIFT LEFT END OF COVER PLATE (WHEN VIEWED FROM THE LEFT OF INDIVIDUAL TRANSMITTER DISTRIBUTOR UNIT) TO DISENGAGE DETENTS. THEN SLIDE PLATE TOWARD THE LEFT TO DISENGAGE SPRING PLATE. REPLACE IN REVERSE ORDER.

(B) REMOVING TRANSMITTER - DISTRIBUTOR ASSEMBLY --- WITH HINGED FRONT PANEL OF COVER OPEN, REMOVE COVER PLATE AND CLAMP SCREW. LOOSEN LOCK NUT ON LOCKING DEVICE AT REAR OF LXD UNIT. SLIDE LOCKING DEVICE TO THE LEFT. THEN LIFT UNIT UPWARD TO DISENGAGE. WHEN REPLACING UNIT, HOLD FIRMLY AGAINST POSITIONING ECCENTRIC WHILE REPLACING CLAMP SCREW.
CAUTION --- WHEN REMOVING OR REPLACING ASSEMBLY, TAKE CARE NOT TO DAMAGE CABLES.

(C) REMOVING TOP PLATE ---WITH FRONT AND REAR MOUNTING SCREWS LOOSENED, LIFT PLATE UPWARD. REFER TO FIGURE 5-123 WHEN REPLACING THE UNIT.

(D) REMOVING TAPE GUIDE PLATE --- WITH FRONT AND REAR MOUNTING SCREWS LOOSENED, LIFT TAPE GUIDE PLATE UPWARD. REFER TO FIGURE 5-122 WHEN REPLACING THE UNIT.

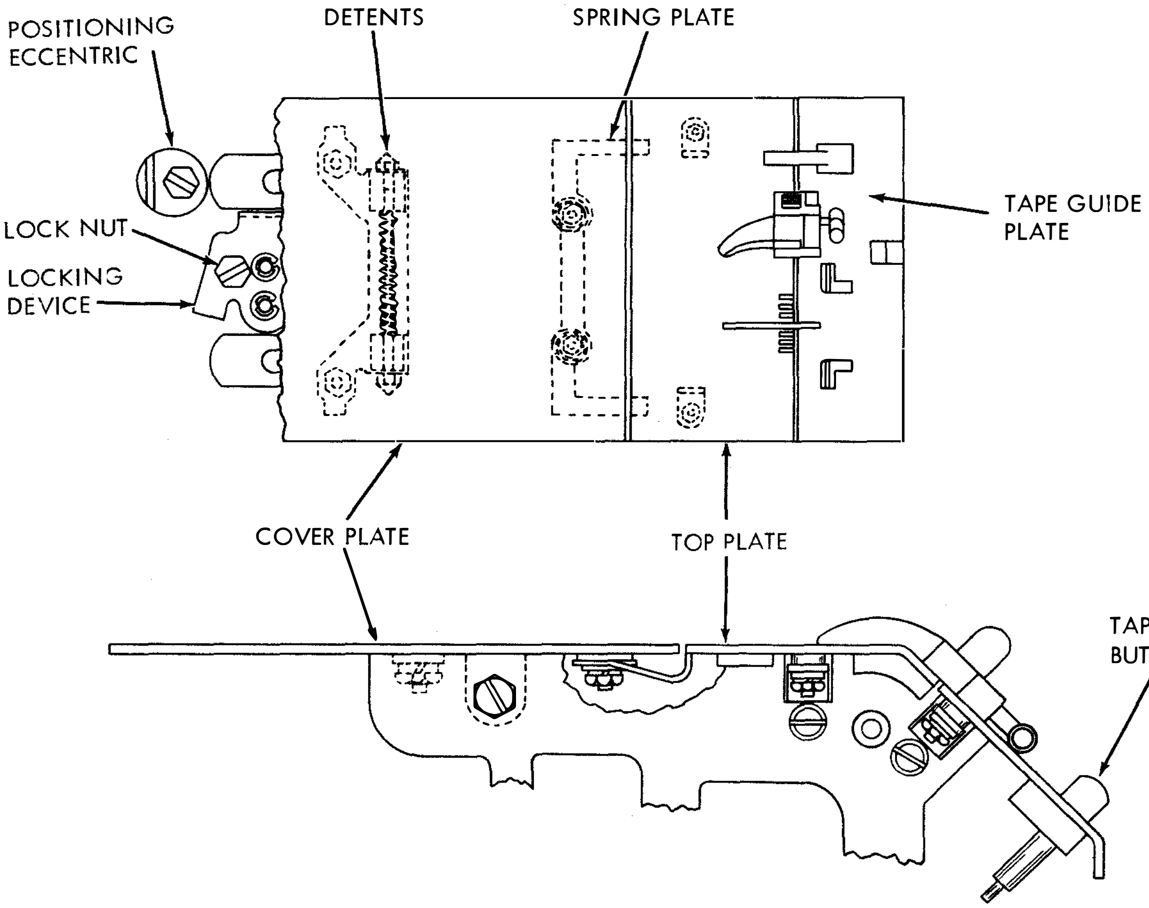
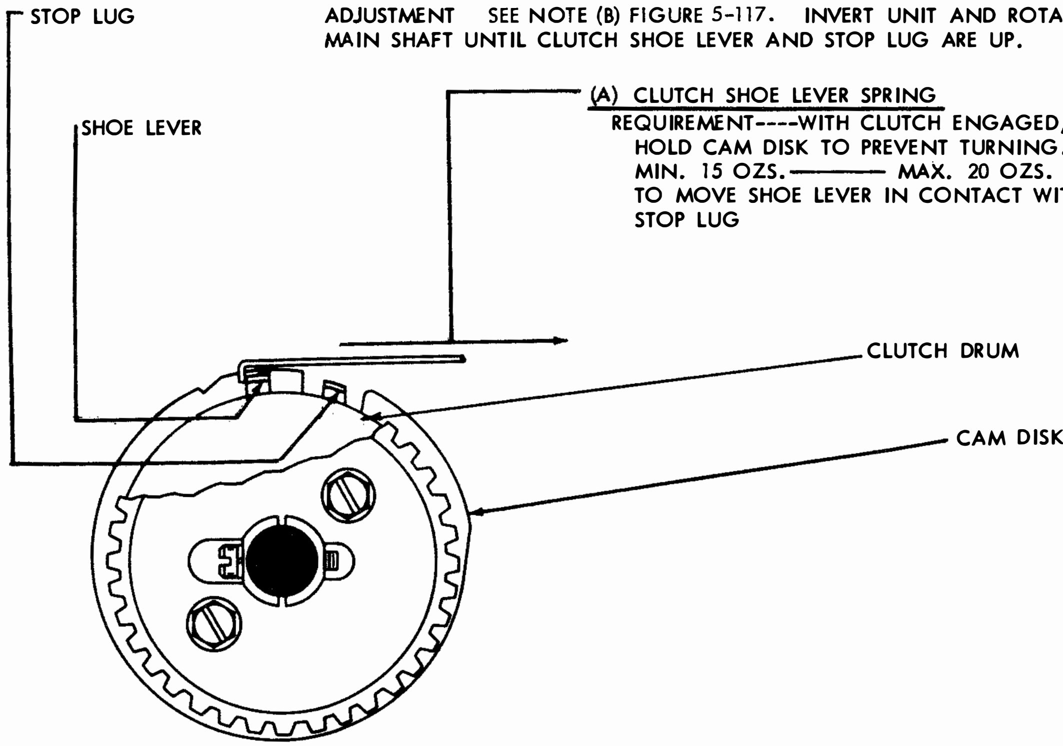


Figure 5-117. Transmitter Distributor (LXD), Removal of Transmitter Distributor

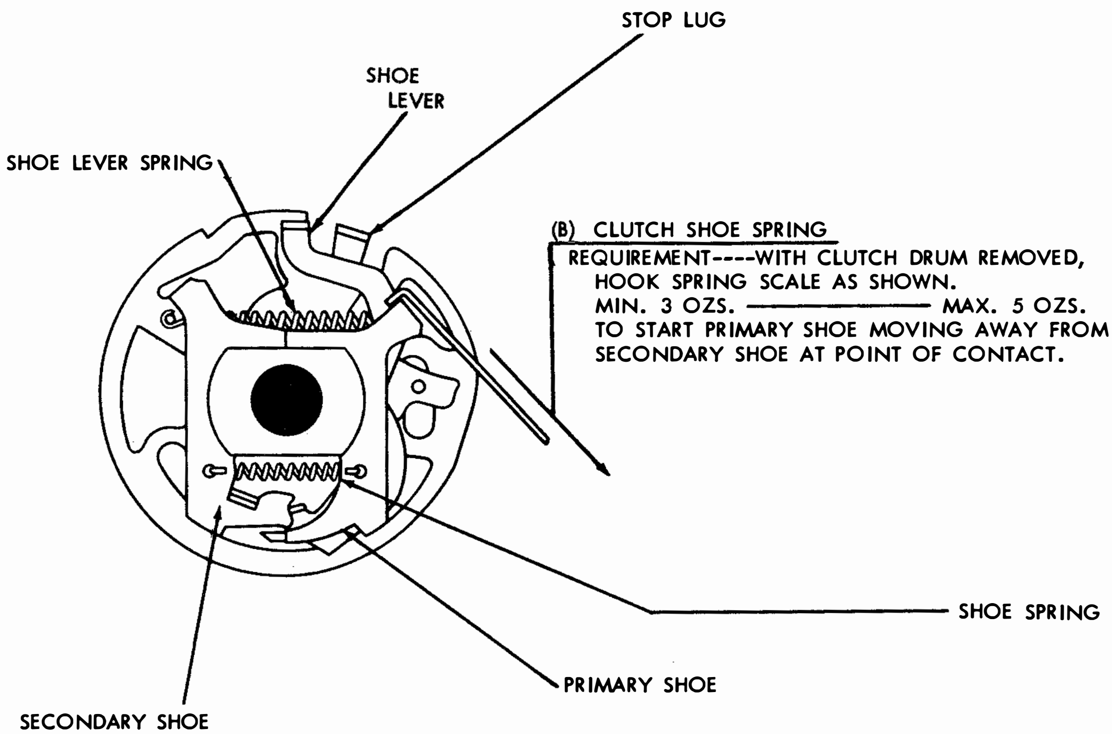
NOTE 1----REQUIREMENTS "A & B" ARE ADJUSTED AT THE FACTORY AND SHOULD NOT BE DISTURBED UNLESS ASSOCIATED MECHANISMS HAVE BEEN REMOVED FOR SERVICING OR THERE IS REASON TO BELIEVE THAT THE REQUIREMENTS ARE NOT MET.

NOTE 2---REMOVE TRANSMITTER DISTRIBUTOR FROM ITS BASE PRIOR TO ADJUSTMENT SEE NOTE (B) FIGURE 5-117. INVERT UNIT AND ROTATE MAIN SHAFT UNTIL CLUTCH SHOE LEVER AND STOP LUG ARE UP.



(A) CLUTCH SHOE LEVER SPRING

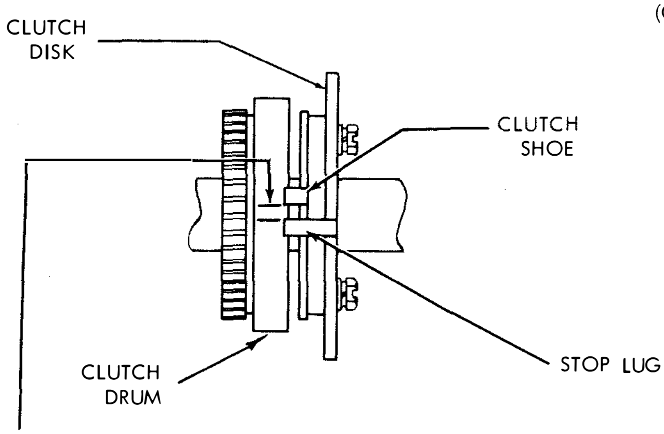
REQUIREMENT----WITH CLUTCH ENGAGED, HOLD CAM DISK TO PREVENT TURNING.
MIN. 15 OZS.——— MAX. 20 OZS.
TO MOVE SHOE LEVER IN CONTACT WITH STOP LUG



(B) CLUTCH SHOE SPRING

REQUIREMENT----WITH CLUTCH DRUM REMOVED, HOOK SPRING SCALE AS SHOWN.
MIN. 3 OZS. ——————— MAX. 5 OZS.
TO START PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.

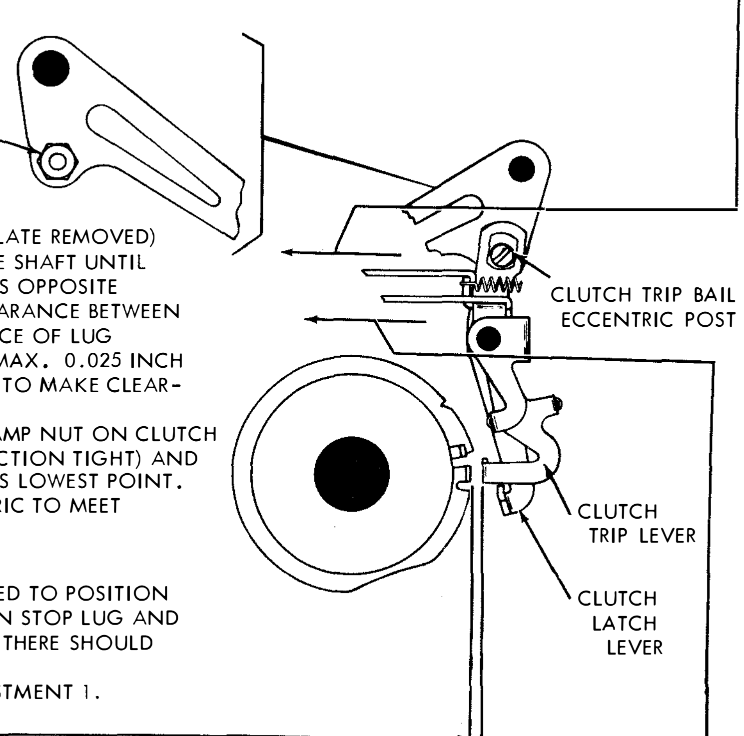
Figure 5-118. Transmitter Distributor (LXD), Clutch Mechanism



(C) CLUTCH LATCH LEVER SPRING
REQUIREMENT --- ENGAGE CLUTCH AND ROTATE SHAFT UNTIL LATCH LEVER IS ON LOW PART OF DISK
MIN. 3 OZS. MAX. 5-1/2 OZS.
TO START LATCH MOVING.

(B) CLUTCH SHOE LEVER
REQUIREMENT----CLEARANCE AS SHOWN SHOULD BE 0.055 INCH —— TO —— 0.085 INCH GREATER WITH CLUTCH ENGAGED* THAN WITH CLUTCH DISENGAGED-
TO ADJUST --- WITH CLUTCH DISK CLAMPING SCREWS LOOSENED, PLACE WRENCH OVER STOP LUG AND MOVE DISK.

CAUTION----MAKE SURE THAT DRUM DOES NOT DRAG ON SHOES WHEN CLUTCH IS DISENGAGED AND DRUM IS ROTATED IN ITS NORMAL DIRECTION. REFINE ABOVE ADJUSTMENT TO CORRECT SHOE DRAG.



(A) CLUTCH TRIP LEVER
(1) REQUIREMENT --- (COVER PLATE REMOVED)
TRIP CLUTCH AND ROTATE SHAFT UNTIL CLUTCH DISK STOP LUG IS OPPOSITE CLUTCH TRIP LEVER. CLEARANCE BETWEEN LEVER AND INSIDE SURFACE OF LUG
MIN. 0.012 INCH ——MAX. 0.025 INCH
WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE A MAXIMUM.
TO ADJUST --- LOOSEN CLAMP NUT ON CLUTCH TRIP BAIL ECCENTRIC (FRICTION TIGHT) AND ROTATE ECCENTRIC TO ITS LOWEST POINT. THEN POSITION ECCENTRIC TO MEET REQUIREMENT.

(2) REQUIREMENT
WHEN THE SHAFT IS ROTATED TO POSITION WHERE CLEARANCE BETWEEN STOP LUG AND TRIP LEVER IS A MINIMUM, THERE SHOULD BE SOME CLEARANCE.
TO ADJUST --- REFINE ADJUSTMENT 1.

(D) CLUTCH TRIP LEVER SPRING
REQUIREMENT --- WITH CLUTCH ENGAGED
MIN. 7 OZS.—— MAX. 10 1/2 OZS.
TO START CLUTCH TRIP LEVER MOVING.

Figure 5-119. Transmitter Distributor (LXD), Clutch Trip Mechanism

(A) TAPE LID

REQUIREMENT --- (REMOVE TOP AND TAPE GUIDE PLATES; LUBRICATE ASSEMBLY PRIOR TO ADJUSTMENT).

1. (PRELIMINARY) WITH TAPE LID HELD AGAINST NOTCH IN TAPE GUIDE PLATE:

a. FEED WHEEL GROOVE IN TAPE LID SHOULD ALIGN WITH SLOT IN PLATE.
b. HOLE IN TAPE LID FOR TAPE-OUT PIN SHOULD ALIGN WITH HOLE IN PLATE (GUAGE BY EYE).
c. CLEARANCE BETWEEN SHOULDER AND TAPE LID BEARING.
SOME ———— TO ———— 0.010 INCH

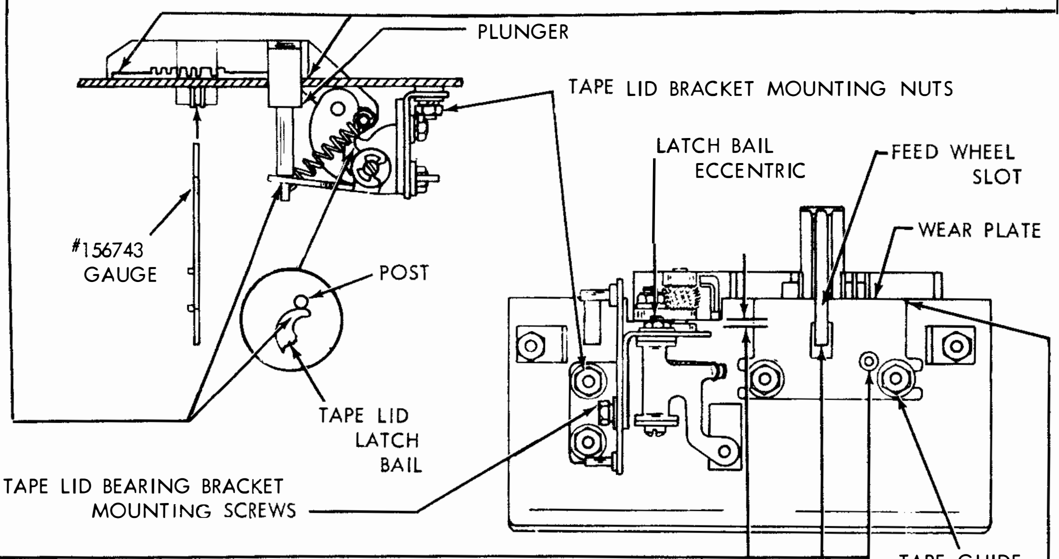
TO ADJUST --- WITH TAPE LID BRACKET MOUNTING NUTS (2) FRICTION TIGHT (INSERT TIP OF #156743 GAUGE THROUGH SLOT AND INTO GROOVE OF LID, POSITION TAPE LID BRACKET; RE-TIGHTEN NUTS.

2. TAPE LID FRONT BEARING SURFACE SHOULD REST SQUARELY AGAINST TAPE GUIDE PLATE; THERE SHOULD BE 0.010 TO 0.018 INCH CLEARANCE BETWEEN TAPE GUIDE PLATE AND REAR BEARING SURFACE OF TAPE LID. NOTE --- WHEN BOTH PLATES ARE ASSEMBLED ON UNIT, LEFT EDGE OF LID MAY TOUCH TOP PLATE AND SOME CHANGE IN THIS CLEARANCE MAY BE EXPECTED.

TO ADJUST----WITH (TAPE LID) BEARING BRACKET MOUNTING SCREWS FRICTION TIGHT AND TAPE LID PRESSED AGAINST TAPE GUIDE PLATE, POSITION BRACKET. RECHECK REQUIREMENT #1.

3. RELEASE PLUNGER SHOULD HAVE SOME END PLAY WHEN LID IS LATCHED AGAINST TAPE GUIDE PLATE.

TO ADJUST----WITH ECCENTRIC MOUNTING POST LOCK NUT FRICTION TIGHT AND TAPE LID RAISED, ROTATE HIGH PART OF ECCENTRIC TOWARD TAPE GUIDE PLATE. CLOSE LID AND ROTATE ECCENTRIC TOWARD BRACKET UNTIL LATCH JUST FALLS UNDER FLAT ON POST. RE-CHECK BY DEPRESSING PLUNGER — WITH LID HELD DOWN, TIP OF LATCH SHOULD CLEAR POST AS PLUNGER IS OPERATED.



(B) TAPE GUIDE

REQUIREMENTS --- WITH 156743 GUAGE POSITIONED AS SHOWN

1. CLEARANCE BETWEEN RIGHT AND LEFT TAPE GUIDE AND GUAGE.
SOME ———— TO ———— 0.003 INCH
2. EDGE OF WEAR PLATE SHOULD BE FLUSH WITH EDGE OF TAPE GUIDE PLATE.
3. TAPE SHOULD NOT RIDE UP ON SIDES OF THE TAPE GUIDES.

TO ADJUST----WITH EACH TAPE GUIDE MOUNTING NUT FRICTION TIGHT, MOVE WEAR PLATE UPWARD UNTIL IT OVERHANGS EDGE OF TAPE GUIDE PLATE. PLACE GAUGE IN POSITION AND MOVE GAUGE AND WEAR PLATE DOWNWARD UNTIL BOTH STUDS ENGAGE EDGE OF TAPE GUIDE PLATE TO ALIGN COMMON EDGES. HOLD GAUGE AND WEAR PLATE AND POSITION EACH GUIDE. (GAUGE MAY TOUCH BUT NOT BIND).

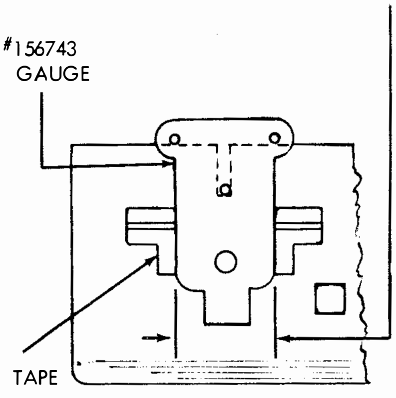


Figure 5-120. Transmitter Distributor (LXD), Tape Guide Plate

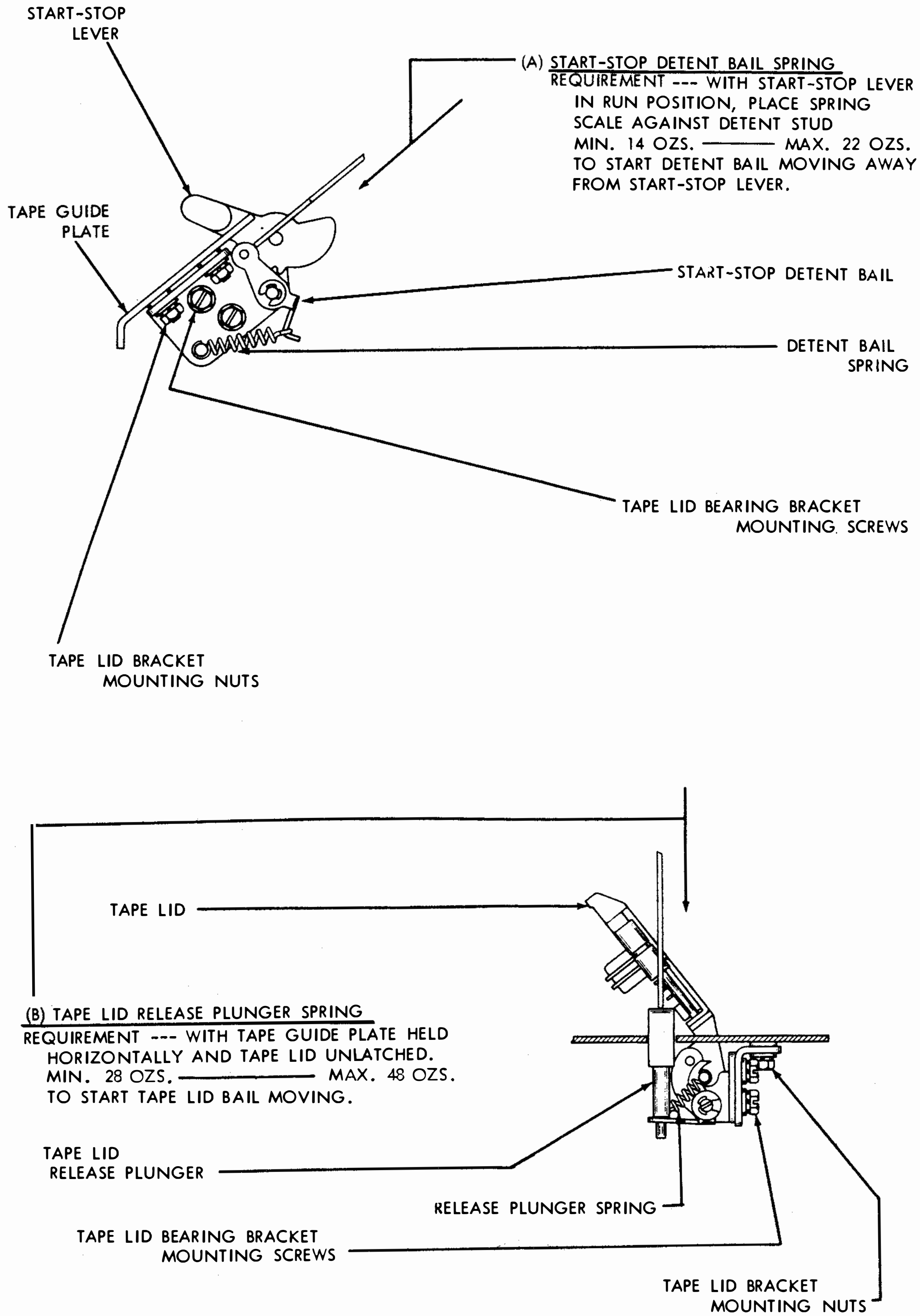
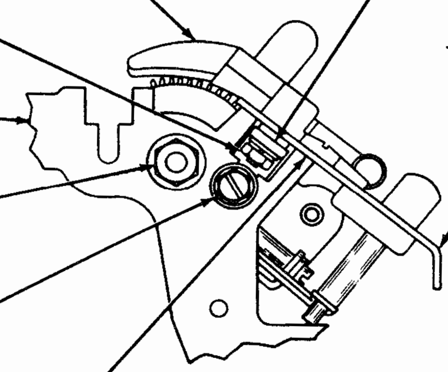


Figure 5-121. Transmitter Distributor (LXD), Tape Lid Assembly



INSTRUCTIONS FOR

REPLACING AND POSITIONING TAPE GUIDE PLATE

REQUIREMENTS----

(1) SHOULDER OF FEED WHEEL POST SHOULD NOT INTERFERE WITH TOP PLATE OR TAPE GUIDE PLATE MOUNTING BRACKETS.

TO ADJUST---- SEE NOTE 1. WITH (FEED WHEEL) BEARING POST CLAMP NUT FRICTION TIGHT, POSITION THE POST.

(2) TAPE GUIDE PLATE SHOULD REST FIRMLY AGAINST AT LEAST THREE PROJECTIONS OF FRONT AND REAR PLATE.

TO ADJUST---- SEE NOTE 1. WITH CLAMP NUT THAT SECURES TAPE GUIDE PLATE MOUNTING BRACKET (FRONT & REAR) FRICTION TIGHT, TRIP CLUTCH AND ROTATE SHAFT UNTIL SENSING PINS ARE IN THEIR UPPERMOST POSITION. WITH TAPE LID RAISED AND START-STOP LEVER IN RUN POSITION, PRESS GUIDE PLATE INTO POSITION WHILE GUIDING MOUNTING SCREWS INTO NOTCH OF FRONT AND REAR PLATE. ENGAGE TIP OF TAPE OUT PIN WITH HOLE IN TAPE GUIDE PLATE.

(3) OUTER EDGE OF FRONT AND REAR MOUNTING BRACKET SHOULD BE LOCATED FLUSH WITH SHOULDER OF MOUNTING STUD SO THAT EDGE OF TAPE GUIDE PLATE PROJECTS OVER FRONT AND REAR PLATE BY AN EQUAL AMOUNT. (GAUGE BY EYE).

TO ADJUST----MOVE TAPE PLATE TOWARD THE FRONT OR REAR. TIGHTEN NUTS ONLY AFTER TOP PLATE IS ADJUSTED.

NOTE --- POSITION TAPE OUT STOP ARM IN ITS LOWEST POSITION TO PREVENT DISTORTION OF TAPE OUT PIN AND HOLD START STOP BAIL EXTENSION AWAY FROM RATCHET WHEEL.

Figure 5-122. Transmitter Distributor (LXD), Tape Guide Plate Mounting

INSTRUCTIONS FOR

REPLACING AND POSITIONING TOP PLATE----LOOSEN NUTS (FRICTION TIGHT) THAT SECURE MOUNTING BRACKETS TO PLATE. PRESS TOP PLATE INTO POSITION WHILE GUIDING TOP PLATE MOUNTING SCREWS INTO NOTCH OF FRONT AND REAR PLATE. MAKE SURE THAT TOP PLATE SEATS FIRMLY AGAINST PROJECTIONS OF FRONT AND REAR PLATE (5 OF 6 PROJECTIONS SHOULD ENGAGE) AND TIGHT TAPE ARM EXTENSION IS UNDER TOP PLATE

REQUIREMENTS----

1. MATING EDGE OF TOP PLATE SHOULD BE FLUSH TO 0.003 INCH UNDER FLUSH WITH EDGE OF TAPE GUIDE PLATE (WITHIN AREA OF TAPE LID) WHEN PLATE ENGAGES AT LEAST 3 PROJECTIONS

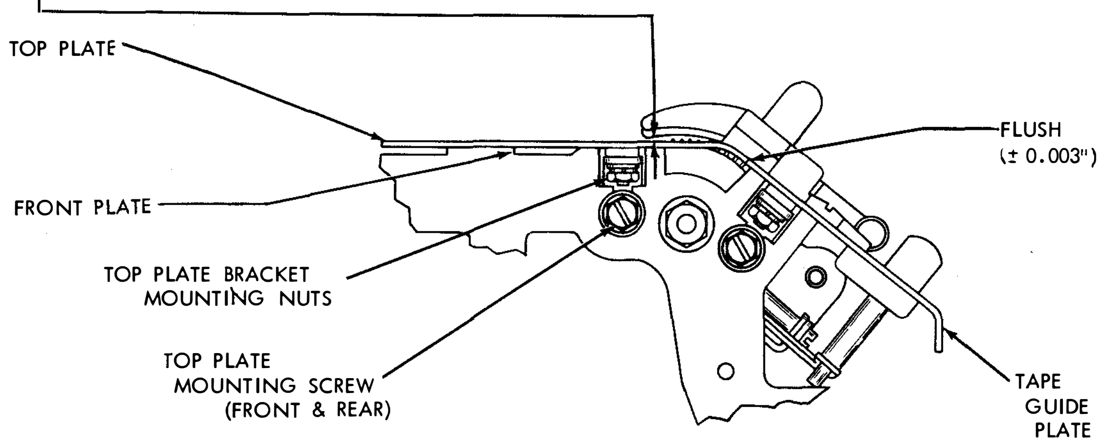
TO ADJUST----POSITION TOP PLATE, TIGHTEN MOUNTING SCREWS AND THEN TIGHTEN NUTS THAT SECURE TAPE GUIDE PLATE MOUNTING BRACKETS.

2. FEEDWHEEL SLOT SHOULD ALIGN WITH SLOT IN TAPE GUIDE PLATE SO THAT FEED WHEEL ROTATES FREELY WITH START-STOP LEVER IN FREE-WHEELING POSITION.

TO ADJUST----POSITION TOP PLATE TOWARD FRONT OR REAR TO ALIGN SLOT.

3. CLEARANCE BETWEEN PROJECTION OF TAPE LID AND TOP PLATE (TAPE LID LATCHED)
MIN. 0.010 INCH --- MAX. 0.020 INCH AT CURVED PORTION.
MIN. 0.010 INCH --- MAX. 0.025 INCH AT FLAT PORTION.
MIN. 0.010 INCH --- MAX. 0.018 INCH CLEARANCE BETWEEN THE TAPE GUIDE PLATE AND TAPE LID FIN THAT IS IN LINE WITH THE REAR TAPE GUIDE.

TO ADJUST --- IF NECESSARY, LOOSEN TAPE LID BEARING BRACKET MOUNTING SCREWS AND POSITION TAPE LID. RETIGHTEN SCREWS AND RECHECK REQUIREMENTS.



INSTRUCTIONS FOR

REPLACING AND POSITIONING COVER PLATE

REQUIREMENT----

1. RIGHT EDGE OF COVER PLATE SHOULD BE HELD FLUSH AGAINST LEFT EDGE OF TOP PLATE BY THE COVER PLATE DETENTS.
2. COVER PLATE SHOULD REST AGAINST AT LEAST THREE OF THE FOUR PROJECTIONS (FRONT & REAR PLATE).
3. FRONT EDGE OF COVER PLATE AND TOP PLATE SHOULD ALIGN.

TO ADJUST----WITH DETENTING NUT CLAMP SCREW (FRONT & REAR PLATE) FRICTION TIGHT, MOVE DETENT NUTS TO THEIR EXTREME LOWER RIGHT POSITION THEN TIGHTEN SCREWS. LOOSEN DETENT BRACKET AND SPRING PLATE MOUNTING NUTS. PLACE COVER ON UNIT AND POSITION HORIZONTALLY TO MEET THE REQUIREMENTS.

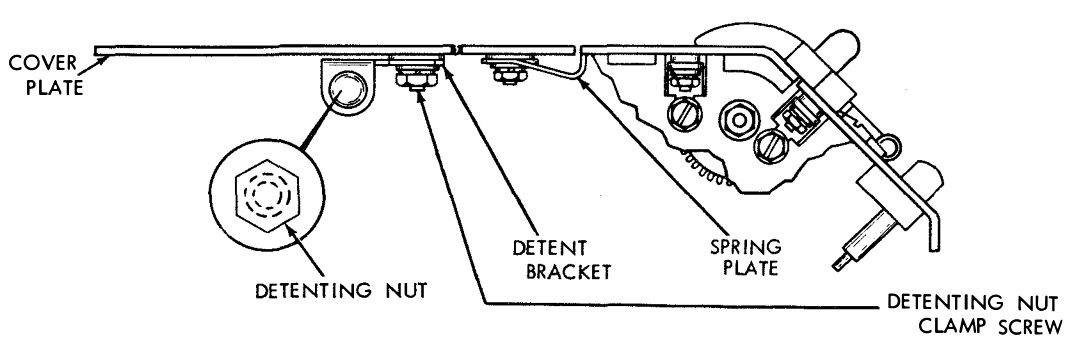


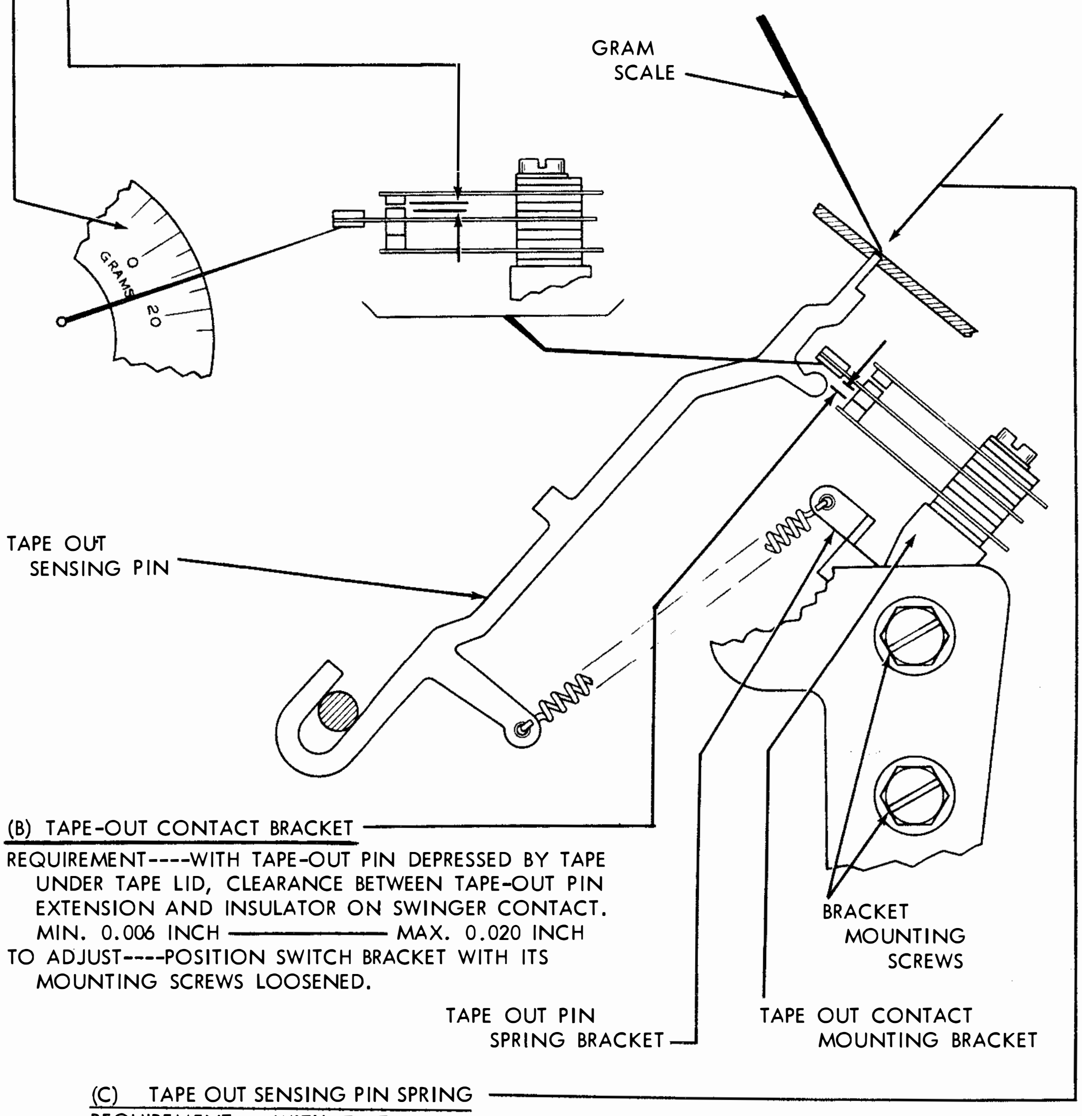
Figure 5-123. Transmitter Distributor (LXD), Top Plate and Cover Plate Mounting

(A) TAPE-OUT CONTACT ASSEMBLY

REQUIREMENTS----(COVER PLATE AND TOP PLATE REMOVED; REMOVAL OF TAPE GUIDE PLATE OPTIONAL). WITH TAPE-OUT SPRING BRACKET FRICTION TIGHT, MOVE BRACKET DOWNWARD UNTIL TAPE-OUT PIN EXTENSION CLEARS INSULATED PORTION OF CONTACT SWINGER.

1. WITH GRAM SCALE APPLIED AS SHOWN.
   MIN. 8 GRAMS ——— MAX. 15 GRAMS.
   TO SEPARATE NORMALLY CLOSED CONTACTS
   TO ADJUST----REMOVE BAIL SPRING AND CONTACT ASSEMBLY. FORM THE CONTACT SWINGER WITH THE 110445 SPRING BENDER.

2. CLEARANCE BETWEEN NORMALLY OPEN CONTACTS
   MIN. 0.008 INCH ——— MAX. 0.015 INCH
   TO ADJUST----FORM UPPER CONTACT SPRING USING THE 110445 SPRING BENDER.
   NOTE----REPLACE CONTACT ASSEMBLY WITH SWINGER OVER TAPE-OUT PIN EXTENSION. PLACE SPRING BRACKET SHOULDER BUSHING ON UPPER HOLE AND THE WASHER ON LOWER MOUNTING HOLE.



(B) TAPE-OUT CONTACT BRACKET

REQUIREMENT----WITH TAPE-OUT PIN DEPRESSED BY TAPE UNDER TAPE LID, CLEARANCE BETWEEN TAPE-OUT PIN EXTENSION AND INSULATOR ON SWINGER CONTACT.
MIN. 0.006 INCH ——— MAX. 0.020 INCH
TO ADJUST----POSITION SWITCH BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

(C) TAPE OUT SENSING PIN SPRING

REQUIREMENT --- WITH START STOP LEVER IN RUN POSITION, APPLY GRAM SCALE TO TIP END OF SENSING PIN.
MIN. 38 GRAMS ——— MAX. 45 GRAMS
TO MOVE PIN TO A POSITION FLUSH WITH TAPE GUIDE PLATE.
TO ADJUST --- WITH CONTACT BRACKET LOWER MOUNTING SCREW LOOSENED, POSITION THE SPRING BRACKET.

Figure 5-124. Transmitter Distributor (LXD), Tape Out Contact Assembly

(A) TAPE-OUT SENSING PIN

REQUIREMENTS

1. WITH START-STOP LEVER IN FREE WHEELING OR STOP POSITION, TIP OF TAPE OUT PIN SHOULD BE FLUSH ———— TO ———— 0.010 INCH BELOW TOP SURFACE OF TAPE GUIDE PLATE.

TO ADJUST----PLACE START-STOP LEVER IN STOP POSITION. WITH STOP ARM CLAMP SCREW FRICTION TIGHT, POSITION THE STOP ARM.

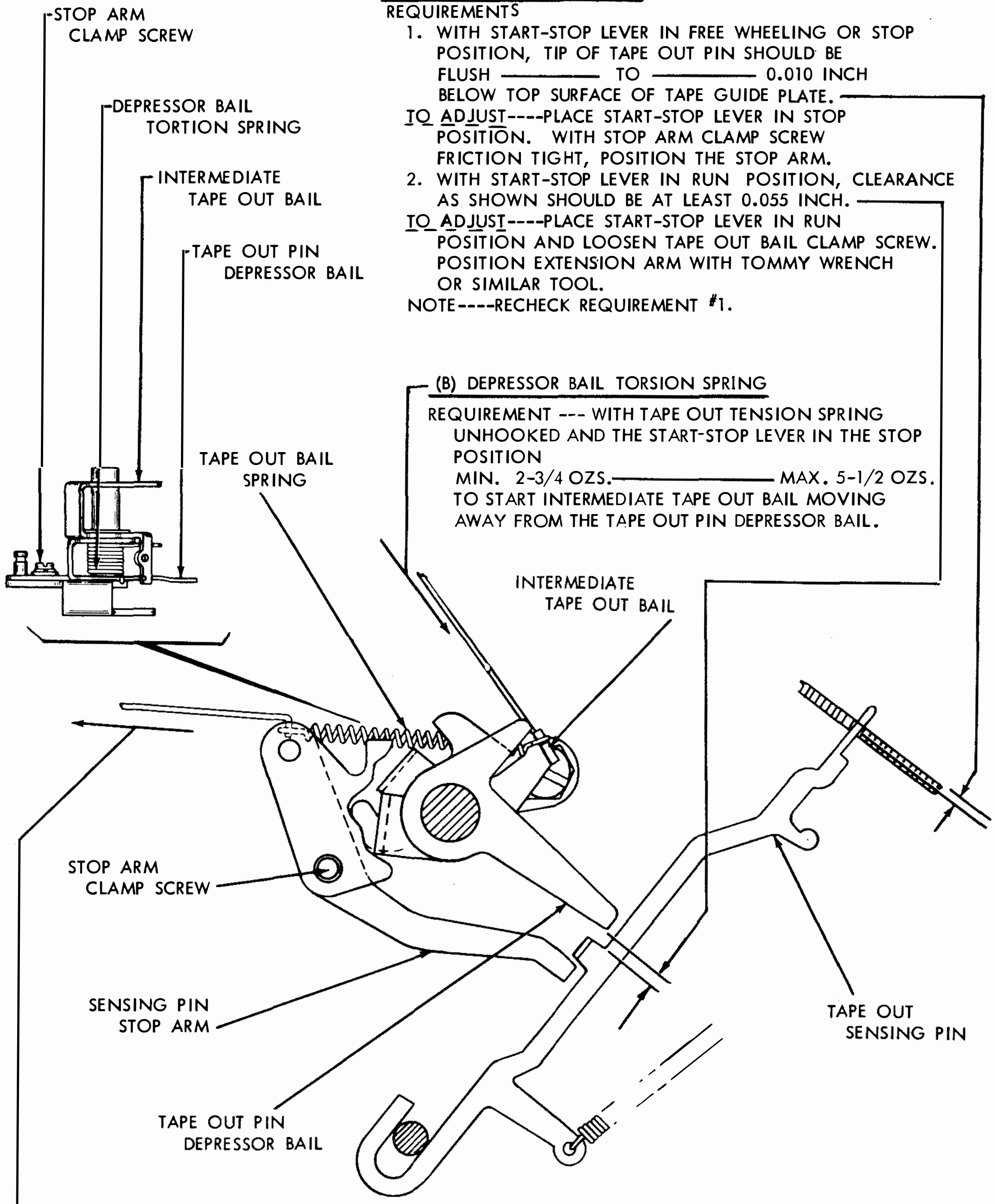
2. WITH START-STOP LEVER IN RUN POSITION, CLEARANCE AS SHOWN SHOULD BE AT LEAST 0.055 INCH.

TO ADJUST----PLACE START-STOP LEVER IN RUN POSITION AND LOOSEN TAPE OUT BAIL CLAMP SCREW. POSITION EXTENSION ARM WITH TOMMY WRENCH OR SIMILAR TOOL.

NOTE----RECHECK REQUIREMENT #1.

(B) DEPRESSOR BAIL TORSION SPRING

REQUIREMENT --- WITH TAPE OUT TENSION SPRING UNHOOKED AND THE START-STOP LEVER IN THE STOP POSITION
MIN. 2-3/4 OZS.———— MAX. 5-1/2 OZS.
TO START INTERMEDIATE TAPE OUT BAIL MOVING AWAY FROM THE TAPE OUT PIN DEPRESSOR BAIL.



(C) INTERMEDIATE TAPE OUT BAIL SPRING

REQUIREMENT --- WITH START-STOP LEVER IN ITS RUN POSITION, HOOK SPRING SCALE IN LOOP.
MIN. 3 OZS. ———— MAX. 5 OZS.
TO PULL SPRING TO ITS INSTALLED LENGTH.

Figure 5-125. Transmitter Distributor (LXD), Tape Out Sensing Pin

(A) START - STOP SWITCH BRACKET

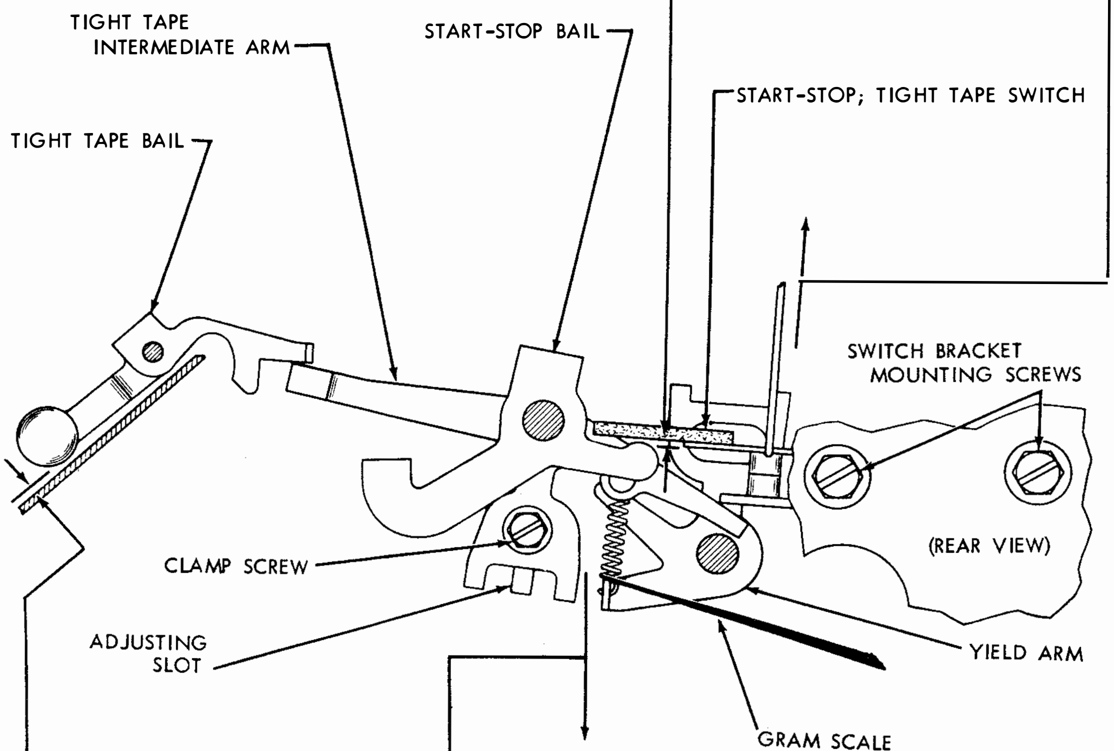
REQUIREMENTS ---

1. WITH START - STOP LEVER IN RUN POSITION AND CLUTCH IN ITS DISENGAGED POSITION, CLEARANCE BETWEEN START - STOP BAIL EXTENSION AND INSULATOR ON START - STOP SWITCH SWINGER
   MIN. 0.006 INCH ——— MAX. 0.015 INCH
   TO ADJUST --- WITH SWITCH BRACKET MOUNTING SCREWS LOOSENED, POSITION THE BRACKET.
2. START - STOP BAIL ESTENSION SHOULD FULLY ENGAGE INSULATED PORTION OF SWITCH SWINGER
   TO ADJUST --- LOOSEN CONTACT PILE-UP MOUNTING SCREWS AND ALIGN CONTACT ASSEMBLY

(B) TIGHT TAPE; START-STOP CONTACT SPRING

REQUIREMENT----WITH START-STOP LEVER IN RUN POSITION.
MIN. 3 OZS.
MAX. 4 OZS.
TO SEPARATE CONTACTS.
TO ADJUST----FORM SWINGER WITH #110455 SPRING BENDER.

NOTE----RECHECK REQUIREMENTS " A & C "



(C) TIGHT TAPE INTERMEDIATE ARM

REQUIREMENT----WITH START-STOP LEVER IN RUN POSITION, TIGHT TAPE; START-STOP CONTACTS SHOULD FUNCTION AS FOLLOWS:

1. REMAIN CLOSED WHEN TIGHT TAPE BAIL IS RAISED 0.045 INCH.
2. OPEN AS BAIL IS RAISED TO HEIGHT OF 0.075 INCH.

TO ADJUST----WITH TIGHT TAPE INTERMEDIATE ARM CLAMP SCREW LOOSENED, POSITION THE ARM AT ITS ADJUSTING SLOT.

(D) TIGHT TAPE INTERMEDIATE ARM SPRING

REQUIREMENT----WITH START-STOP LEVER IN RUN POSITION,
MIN. 20 GRAMS ——— MAX. 40 GRAMS.
TO START INTERMEDIATE ARM MOVING AWAY FROM ITS YIELD ARM

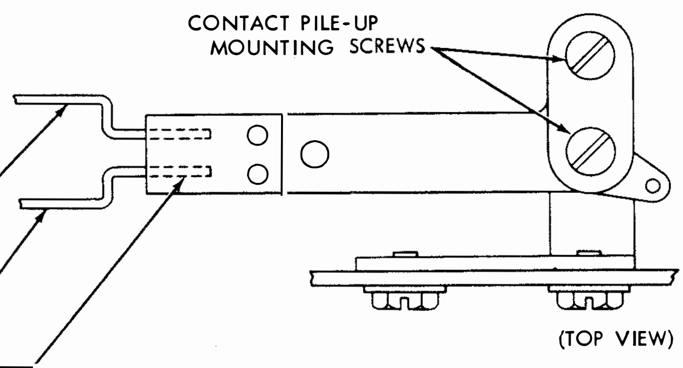
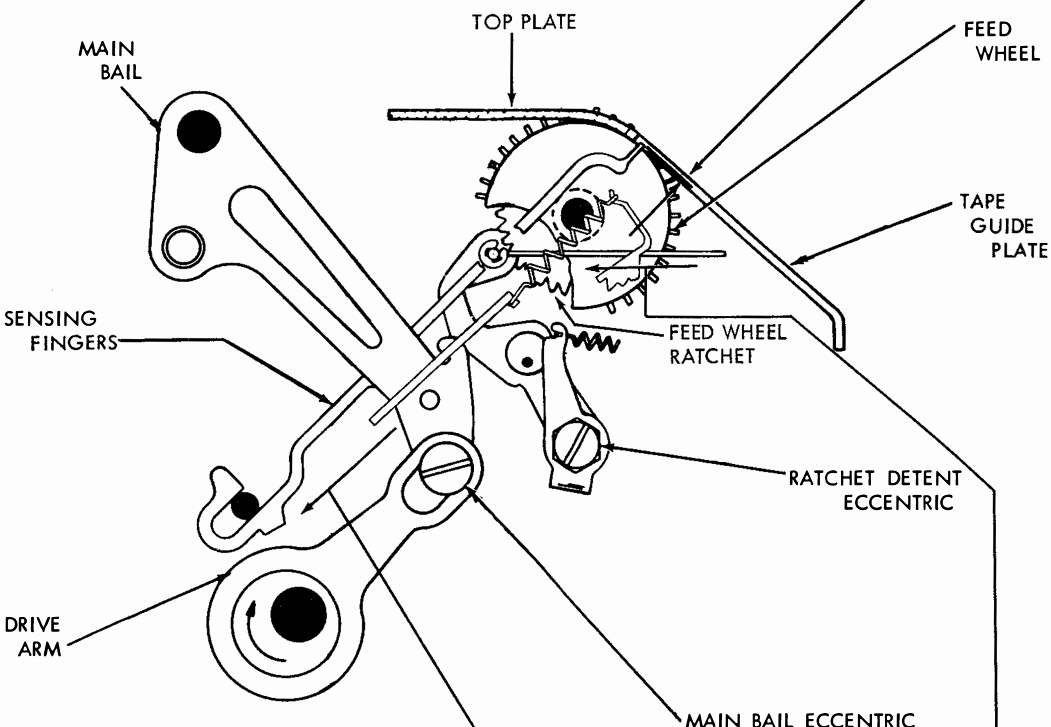


Figure 5-126. Transmitter Distributor (LXD), Start-Stop Switch Assembly

(C) MAIN BAIL

REQUIREMENT----(TOP PLATE REPLACED)
WITH CODE SENSING PINS IN LOWERMOST POSITION, CLEARANCE BETWEEN TIP OF HIGHEST SENSING PIN AND TOP SURFACE OF TAPE GUIDE PLATE.
MIN. 0.010 INCH — MAX. 0.020 INCH

TO ADJUST----WITH MAIN BAIL ECCENTRIC LOCK NUT FRICTION TIGHT, AND HIGH PART OF ECCENTRIC TOWARD THE RIGHT, POSITION THE ECCENTRIC.



(A) MAIN BAIL SPRING

REQUIREMENT --- (TOP PLATE REMOVED)
CLUTCH DISENGAGED, PLACE UNIT ON ITS REAR PLATE. UNHOOK SPRING FROM MAIN BAIL (LOWER END).
MIN. 6 OZS. ——— MAX. 10 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

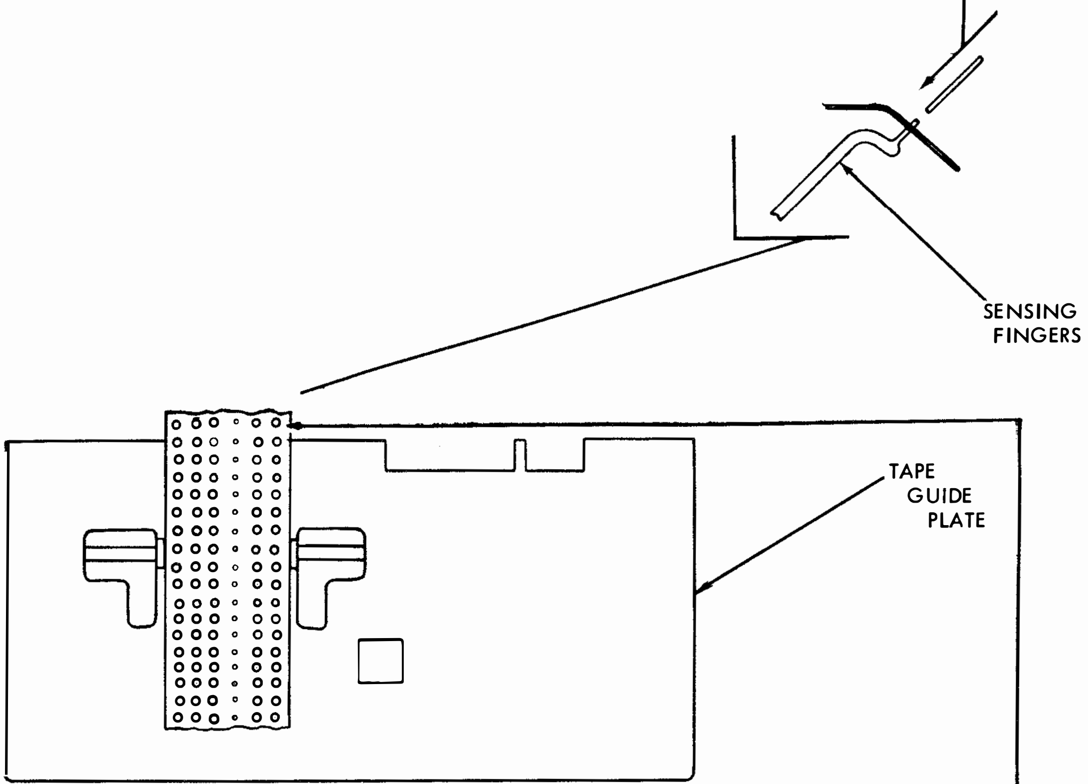
(B) FEED RATCHET DETENT SPRING

REQUIREMENT --- WITH MAINSHAFT IN STOP POSITION AND FEED PAWL HELD AWAY FROM ITS RATCHET.
MIN. 8 OZS. ——— MAX. 13 OZS.
TO START ROLLER MOVING AWAY FROM RATCHET.

Figure 5-127. Transmitter Distributor (LXD), Main Bail Assembly

(A) SENSING FINGER SPRING

REQUIREMENT----WITH UNIT UPRIGHT, TRIP CLUTCH AND ROTATE MAINSHAFT UNTIL SENSING FINGERS ARE IN THEIR UPPERMOST POSITION.
MIN. 3 OZS. ———— MAX. 5 OZS.
TO MOVE TIP OF EACH FINGER FLUSH WITH TOP SURFACE OF TOP PLATE.



(B) FEED WHEEL DETENT

REQUIREMENT --- WITH TAPE LID RAISED, SENSING FINGERS DOWN, HIGH PART OF DETENT ECCENTRIC (FIGURE 5-127) TOWARD THE RIGHT, PLACE A "LETTERS" PERFORATED TAPE BETWEEN TAPE GUIDES. WITH PLAY IN TAPE TAKEN (LIGHTLY) TOWARD THE RIGHT, TIP OF EACH SENSING FINGER SHOULD BE CENTRALLY LOCATED IN CODE HOLES.

TO ADJUST --- WITH DETENT ECCENTRIC CLAMP SCREW FRICTION TIGHT AND FEED PAWL HELD AWAY FROM RATCHET WHEEL, POSITION THE ECCENTRIC.

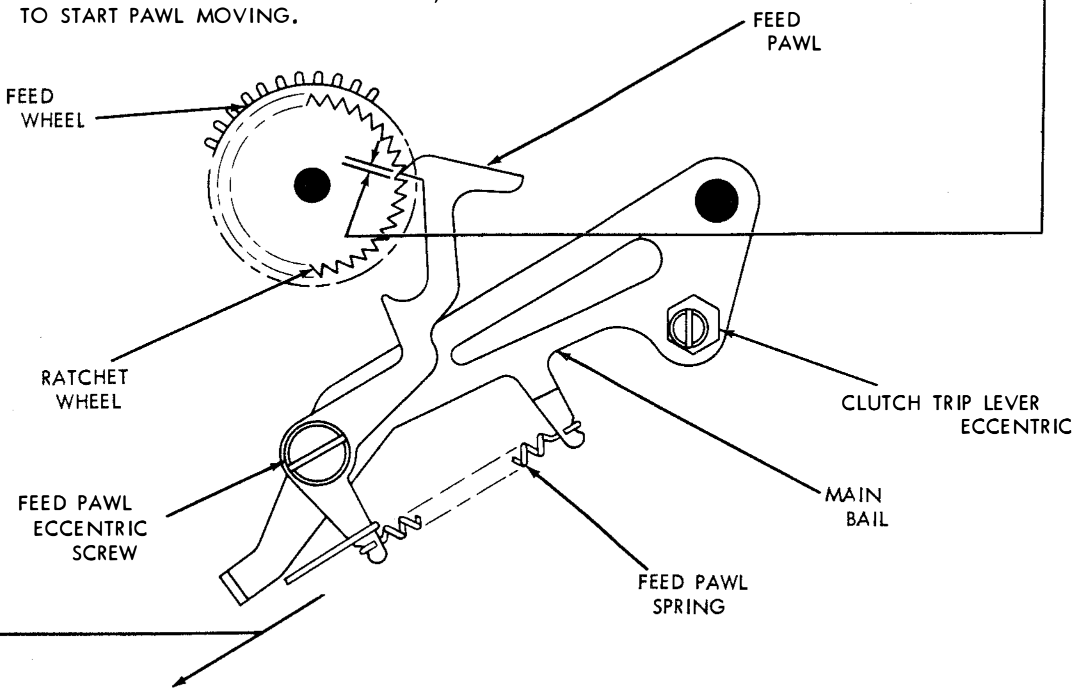
Figure 5-128. Transmitter Distributor (LXD), Code Sensing Fingers

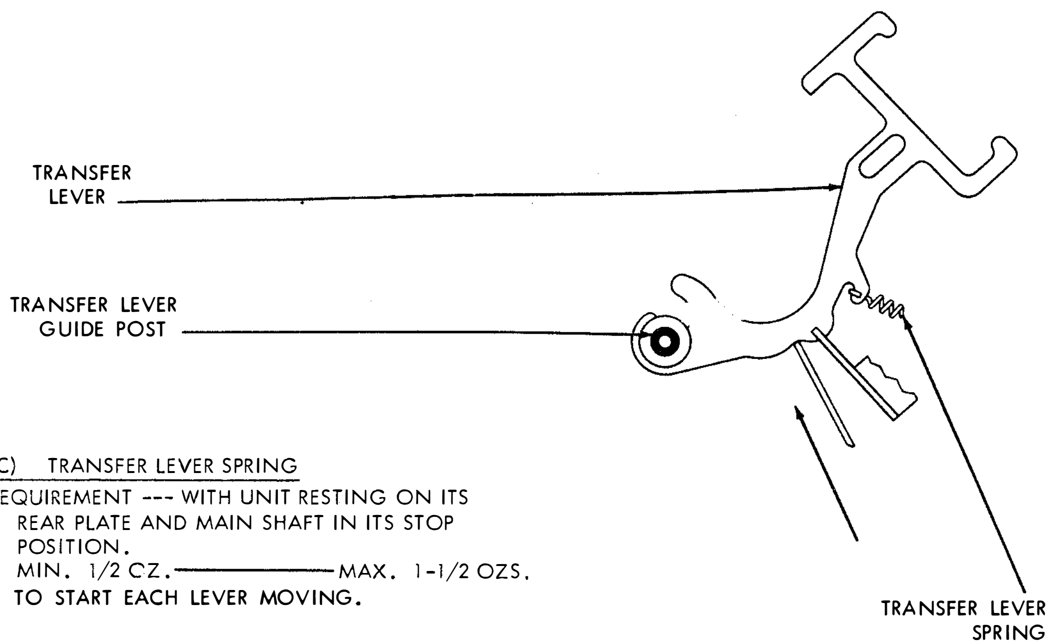
(A) FEED PAWL

REQUIREMENT----(TOP PLATE REMOVED) - WITH HIGH PART OF ECCENTRIC TOWARD THE RIGHT AND SENSING FINGERS IN THEIR LOWERMOST POSITION, CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH JUST ENGAGED.
SOME ——————————— TO ——————————— 0.003 INCH
TO ADJUST----WITH ECCENTRIC SCREW LOCK NUT LOOSENED, POSITION THE SCREW. RECHECK REQUIREMENT AT FOUR POSITIONS OF RATCHET APPROXIMATELY 90 DEGREES APART.

(B) FEED PAWL SPRING

REQUIREMENT----WITH UNIT TILTED TOWARD THE LEFT AND MAINSHAFT IN ITS STOP POSITION.
MIN. 2 OZS. ——————— MAX. 3-1/2 OZS.
TO START PAWL MOVING.





(C) TRANSFER LEVER SPRING

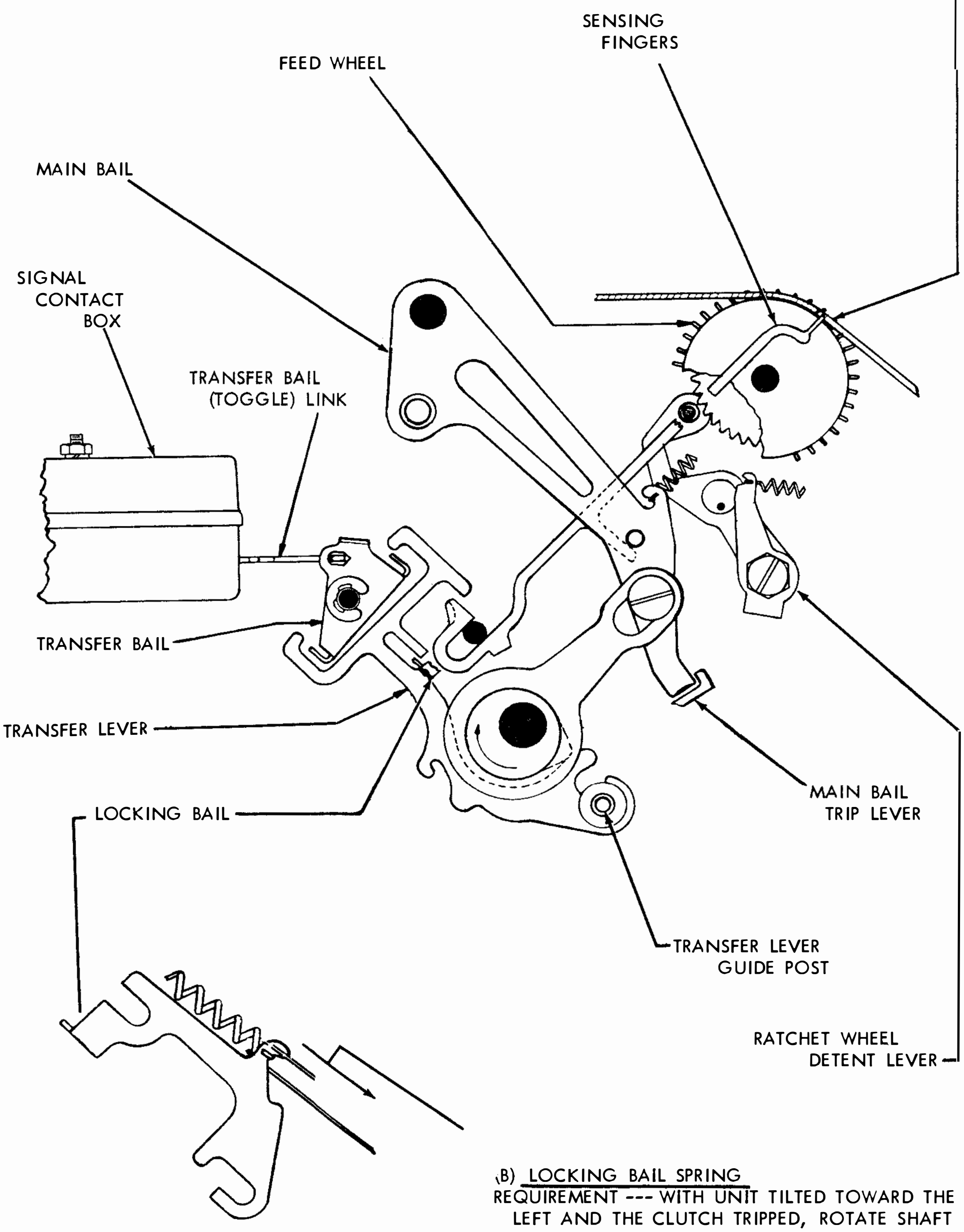
REQUIREMENT --- WITH UNIT RESTING ON ITS REAR PLATE AND MAIN SHAFT IN ITS STOP POSITION.
MIN. 1/2 OZ.——————MAX. 1-1/2 OZS.
TO START EACH LEVER MOVING.

Figure 5-129. Transmitter Distributor (LXD), Feed Pawl Mechanism

(A) MAIN BAIL TRIP LEVER

REQUIREMENT----(TOP PLATE REPLACED) - WITH CLUTCH DISENGAGED AND MAINSHAFT IN ITS STOP POSITION, TIP OF HIGHEST SENSING FINGER SHOULD BE FLUSH ——— TO ——————— 0.005 INCH BELOW TOP SURFACE OF TAPE GUIDE PLATE.

TO ADJUST----WITH CLAMPS NUTS (FRONT & REAR) THAT SECURE THE TRANSFER LEVER GUIDE POST LOOSENED, ROTATE POST SO THAT ITS ECCENTRIC (REAR END OF POST) POSITIONS THE TRIP LEVER TO MEET REQUIREMENT.



(B) LOCKING BAIL SPRING

REQUIREMENT --- WITH UNIT TILTED TOWARD THE LEFT AND THE CLUTCH TRIPPED, ROTATE SHAFT UNTIL SENSING FINGERS START ON THEIR DOWN WARD TRAVEL.

MIN. 6-1/2 OZS. ——— MAX. 10-1/2 OZS.

TO START THE BAIL MOVING.

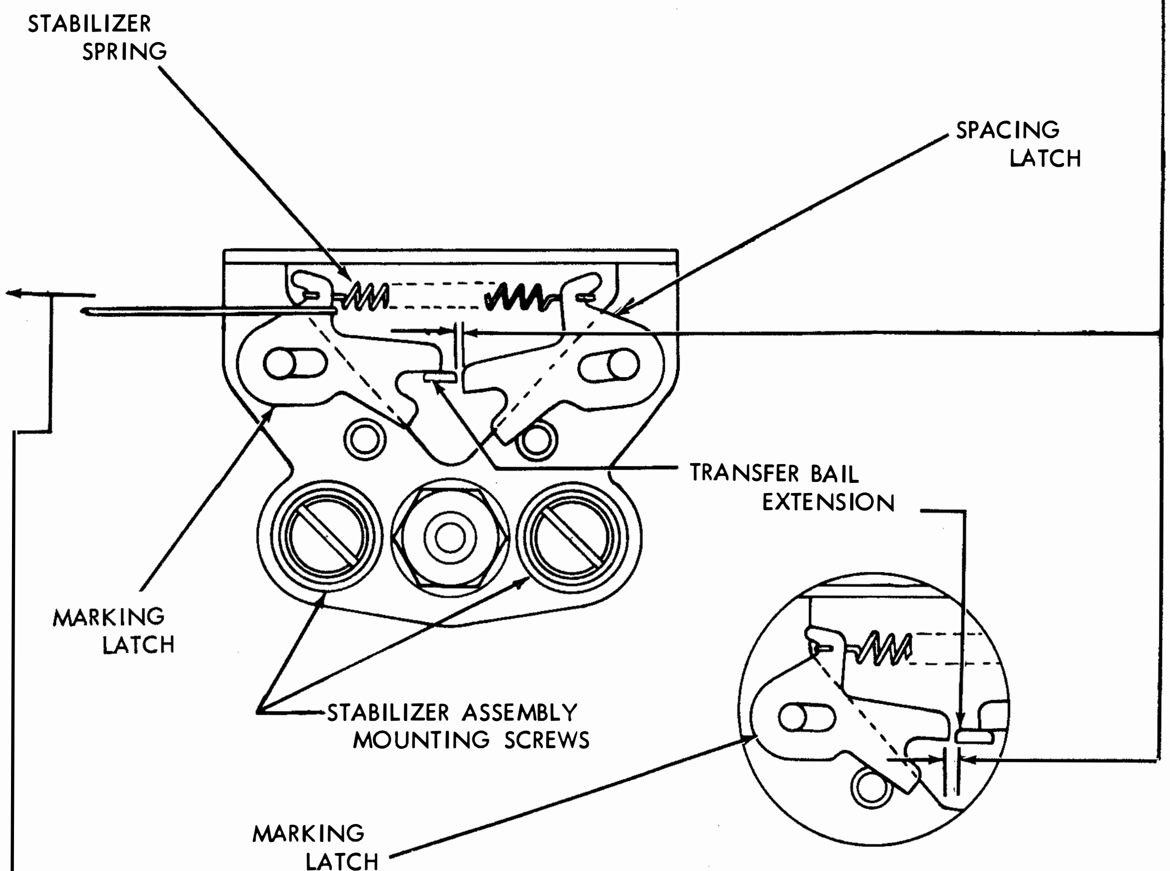
Figure 5-130. Transmitter Distributor (LXD), Main Bail Trip Assembly

(A) TRANSFER BAIL STABILIZER (PRELIMINARY)

REQUIREMENT --- (1) WITH A "LETTERS" COMBINATION SELECTED, ROTATE MAINSHAFT UNTIL #3 TRANSFER LEVER IS ON HIGH PART OF ITS CAM. CHECK CLEARANCE BETWEEN SIDE OF TRANSFER BAIL EXTENSION AND ITS LATCH. (2) REPEAT ABOVE PROCEDURE WITH A "BLANKS" COMBINATION SELECTED AND CHECK THE CLEARANCE ON OTHER LATCH. CLEARANCE IN MARKING AND SPACING POSITION SHOULD BE EQUAL WITHIN 0.002 INCH.

TO ADJUST --- WITH STABILIZER ASSEMBLY MOUNTING SCREWS FRICTION TIGHT, POSITION THE ASSEMBLY.

NOTE --- LATCHES SHOULD DROP IN PLACE AS OTHER TRANSFER LEVERS CAM THE TRANSFER BAIL.



(B) STABILIZER SPRING

REQUIREMENT----WITH UNIT UPRIGHT AND MAINSHAFT IN STOP POSITION.
MIN. 2-1/2 OZS. —— MAX. 5 OZS.
TO START STABILIZER LATCH MOVING.

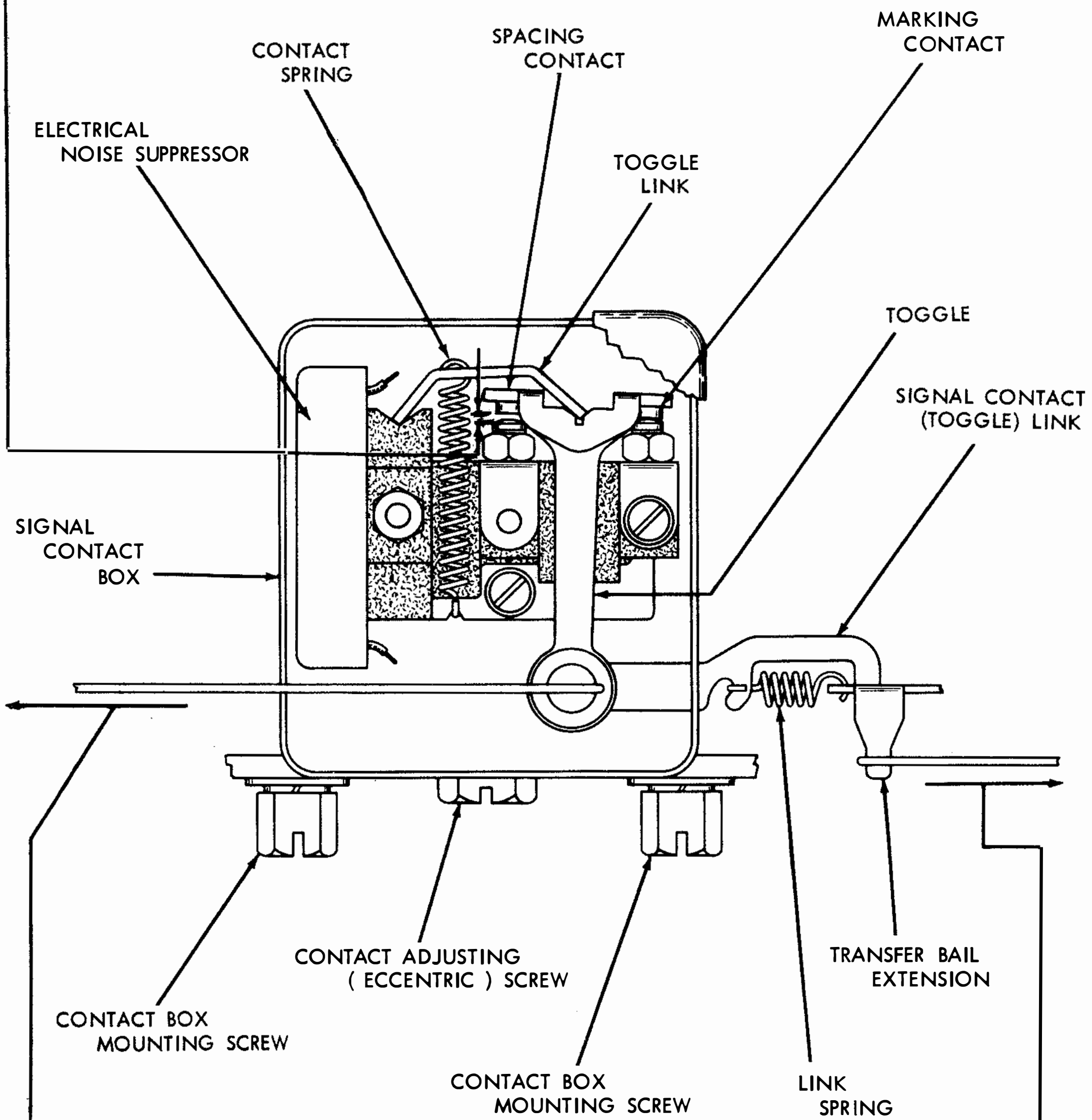
Figure 5-131. Transmitter Distributor (LXD), Transfer Bail Stabilizer

(A) SIGNAL CONTACT

REQUIREMENT----(CONTACT BOX COVER REMOVED). CONTACT GAP IN THE MARKING POSITION AND THE SPACING POSITION SHOULD BE EQUAL WHEN CLEARANCE BETWEEN RESPECTIVE CONTACT IS MAXIMUM. (ENGAGE CLUTCH AND ROTATE MAINSHAFT SLOWLY).

TO ADJUST----WITH CONTACT BOX MOUNTING SCREWS FRICTION TIGHT, POSITION BOX WITH ITS ECCENTRIC.

NOTE----IN ORDER TO REMOVE THE COVER OF THE CONTACT BOX, IT IS NECESSARY TO REMOVE THE DETENT WHICH HOLDS THE COVER PLATE. WHEN REPLACING THIS NUT, RECHECK THE COVER PLATE ADJUSTMENT, FIGURE 5-123.



(B) SIGNAL CONTACT SPRING

REQUIREMENT----
WITH MAINSHAFT IN STOP POSITION AND COVER OF CONTACT BOX REMOVED, UNHOOK TOGGLE LINK SPRING AND MOVE TRANSFER BAIL TO SPACING POSITION (RIGHT)
MIN. 2 OZS. ——— MAX. 3-1/2 OZS.
TO OPEN SPACING CONTACTS (LEFT).

(C) SIGNAL CONTACT LINK SPRING

REQUIREMENT --- WITH MAIN SHAFT IN STOP POSITION, CONTACT TOGGLE HELD FIRMLY AGAINST THE CONTACTS, AND STABILIZER SPRING UNHOOKED, MOVE LATCHES AWAY FROM TRANSFER BAIL EXTENSION. (FIGURE 5-131)
MIN. 6 OZS. ——— MAX. 12 OZS.
TO START TRANSFER BAIL EXTENSION MOVING.

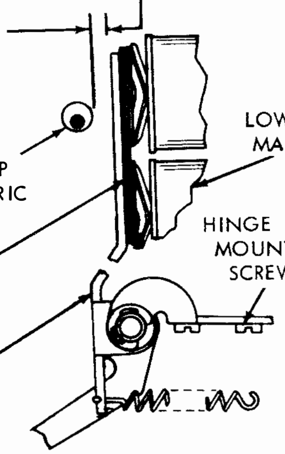
Figure 5-132. Transmitter Distributor (LXD), Signal Contact Assembly

(A) CLUTCH MAGNET (PRELIMINARY)
REQUIREMENTS----
1. WITH ARMATURE IN ITS ENERGIZED POSITION,
   a. TOP END OF ARMATURE SHOULD CONTACT UPPER CORE FACE.
   b. CLEARANCE AT LOWER MAGNET CORE FACE SOME ——— TO ——— 0.004 INCH (CHECK POINT OF LEAST CLEARANCE WITH PLAY TAKEN UP TO MAKE CLEARANCE A MAXIMUM).

TO ADJUST--WITH MAGNET ASSEMBLY MOUNTING SCREWS REMOVED, LIFT ASSEMBLY FROM UNIT. INVERT ASSEMBLY, LOOSEN HINGE BRACKET MOUNTING SCREWS AND POSITION BRACKET.

2. WITH ARMATURE IN ITS ENERGIZED POSITION AND HIGH PART OF BACKSTOP ECCENTRIC UPWARD, CLEARANCE BETWEEN ARMATURE BAIL AND BACKSTOP.
   MIN. 0.045 INCH ——— MAX. 0.055 INCH

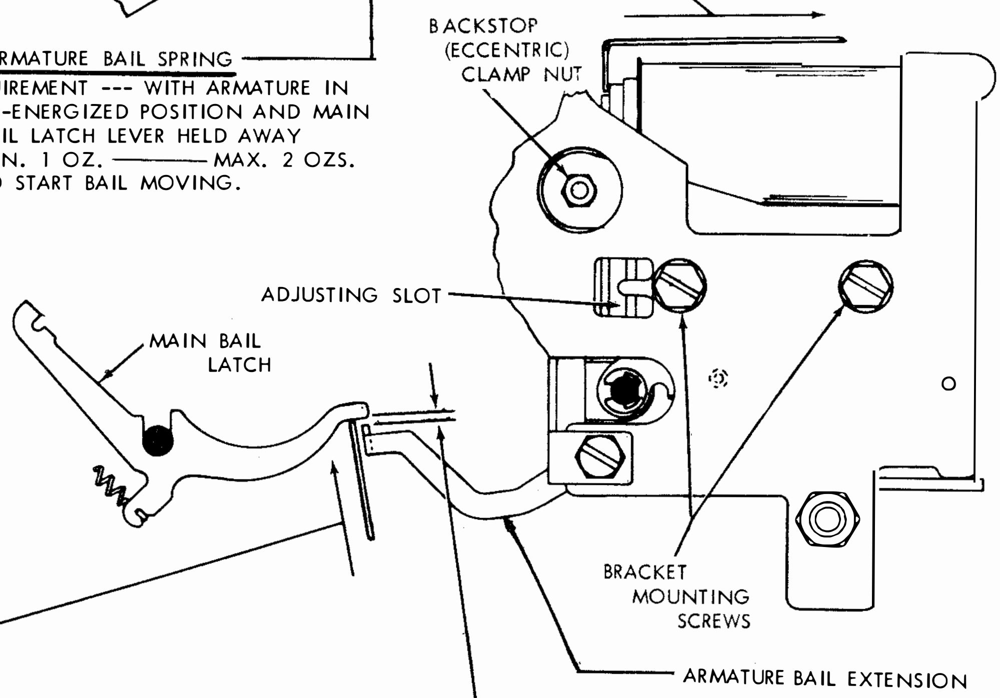
TO ADJUST--LOOSEN BACKSTOP CLAMP NUT AND POSITION THE ECCENTRIC.



3. WITH MAGNET ASSEMBLY REPLACED AND CLUTCH DISENGAGED, CLEARANCE BETWEEN END OF ARMATURE BAIL EXTENSION AND MAIN BAIL LATCH.
   MIN. 0.007 INCH ——— MAX. 0.015 INCH

TO ADJUST--WITH BRACKET MOUNTING SCREWS FRICTION TIGHT, MOVE ASSEMBLY TO ITS LOWERMOST POSITION THEN POSITION BRACKET BY ITS ADJUSTING SLOT.

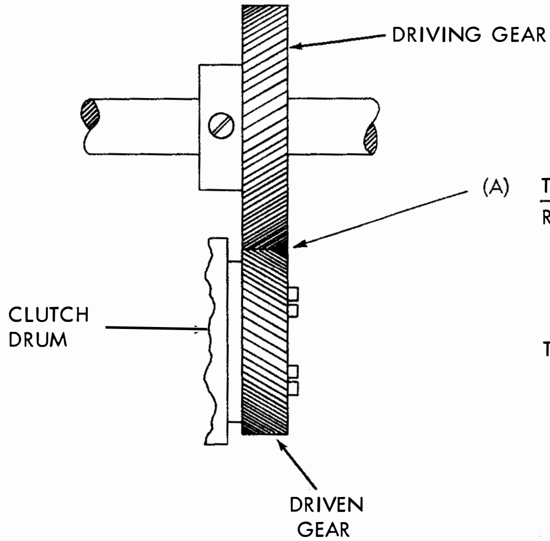
(B) ARMATURE BAIL SPRING
REQUIREMENT --- WITH ARMATURE IN DE-ENERGIZED POSITION AND MAIN BAIL LATCH LEVER HELD AWAY
MIN. 1 OZ. ——— MAX. 2 OZS.
TO START BAIL MOVING.



(C) MAIN BAIL LATCH SPRING
REQUIREMENT----WITH UNIT INVERTED AND MAIN BAIL LATCH RELEASED.
MIN. 3/4 OZ. ——— MAX. 2 OZS.
TO START MAIN BAIL LATCH MOVING.

Figure 5-133. Transmitter Distributor (LXD), Clutch Trip Magnet Assembly

k. MULTIPLE TRANSMITTER DISTRIBUTOR BASE (LMXB206BR)



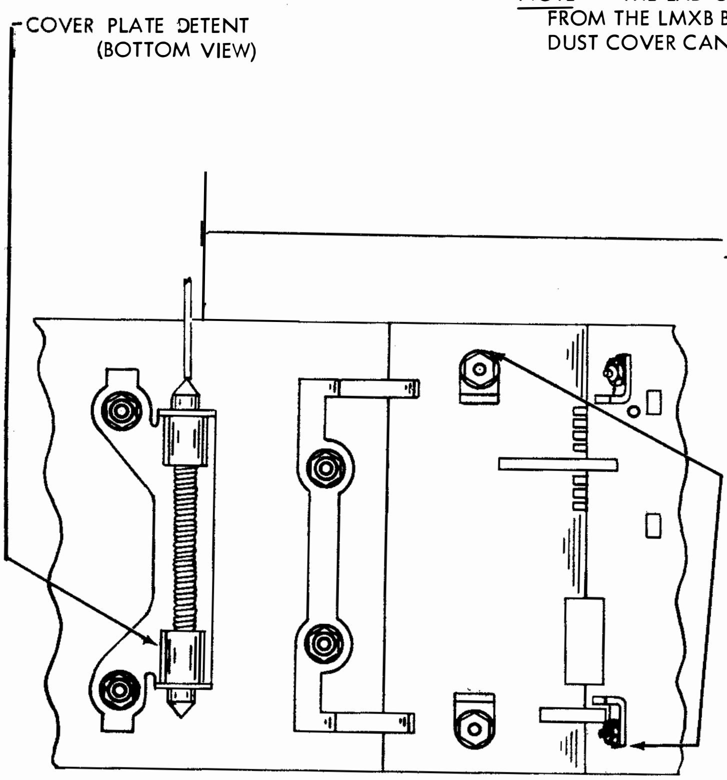
(A) TRANSMITTER DISTRIBUTOR GEAR

REQUIREMENT --- THERE SHOULD BE ONLY A PERCEPTIBLE AMOUNT OF BACKLASH BETWEEN TEETH OF DRIVING AND DRIVEN GEAR AT THE POINT OF MINIMUM CLEARANCE BETWEEN THE GEARS

TO CHECK --- WITH THE LXD UNITS REMOVED FROM THE BASE, (SEE FIGURE 1-20) REMOVE THE DUST COVER OF THE LMXB BASE. PLACE AN LXD UNIT SUCCESSIVELY IN EACH OF THE THREE MOUNTING POSITIONS ON THE LMXB BASE. HOLD THE LXD UNIT AGAINST ITS POSITIONING ECCENTRIC AND CHECK REQUIREMENT AT SEVERAL POINTS ON THE CIRCUMFERENCE OF THE GEARS.

TO ADJUST --- POSITION THE ECCENTRIC WITH ITS LOCKING SCREW FRICTION TIGHT.

NOTE --- THE LXD UNITS MUST BE REMOVED FROM THE LMXB BASE BEFORE THE LMXB DUST COVER CAN BE REPLACED.



(B) COVER PLATE DETENT SPRING

REQUIREMENT --- WITH SPRING SCALE APPLIED TO CENTER OF ONE DETENT
MIN. 28 OZS.—MAX. 48 OZS.
TO START PLUNGER MOVING.

NOTE

OUTER EDGE OF EACH MOUNTING BRACKET SHOULD BE APPROXIMATELY IN LINE WITH SHOULDER OF ITS MOUNTING STUD, SO THAT PROJECTION OF FRONT AND REAR BRACKETS ARE EQUAL (GAUGE BY EYE).

Figure 5-134. Multiple Transmitter Distributor Base (LMXB206BR), Intermediate Gear Assembly

I. TRANSMITTER DISTRIBUTOR BASE (LXDB)

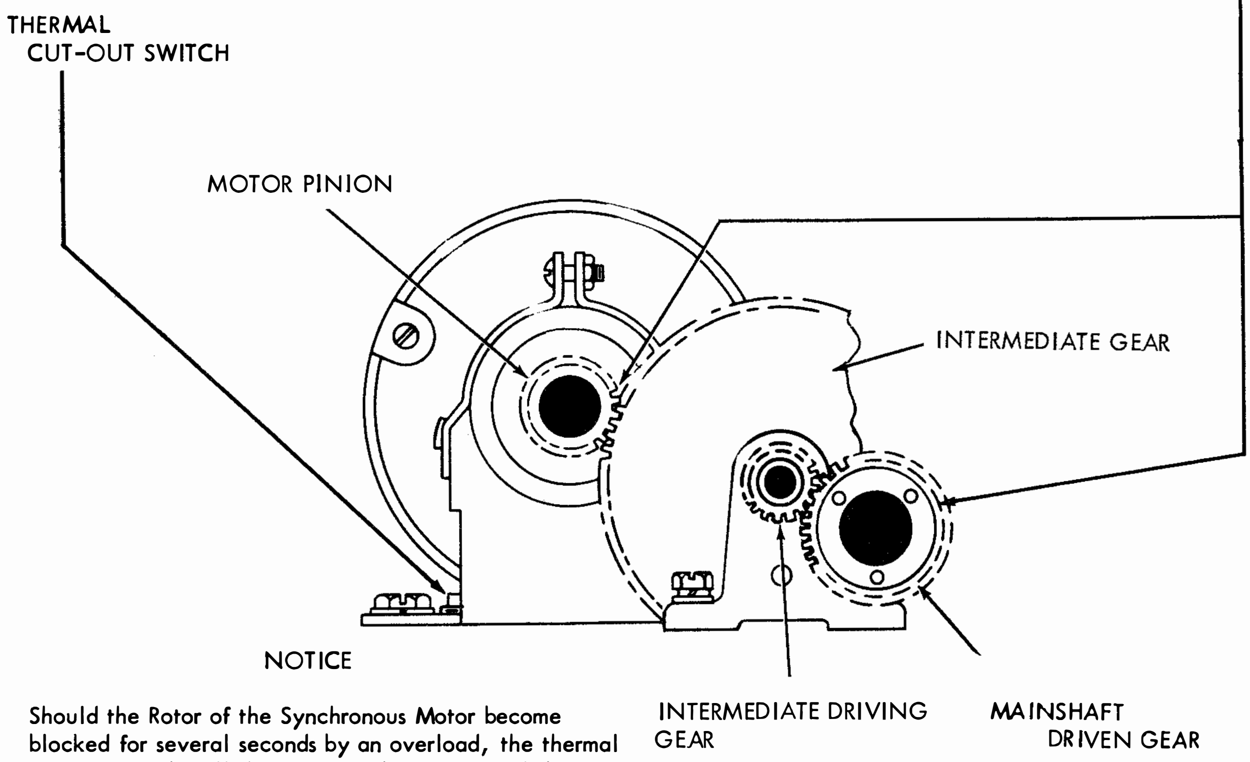
INTERMEDIATE GEAR ASSEMBLY

REQUIREMENT - (GEAR GUARD REMOVED)

THERE SHOULD BE A PERCEPTIBLE AMOUNT OF BACKLASH BETWEEN TRANSMITTER DISTRIBUTOR MAINSHAFT DRIVEN GEAR AND INTERMEDIATE DRIVEN GEAR, AND MOTOR PINION GEAR AND INTERMEDIATE GEAR.

TO ADJUST

POSITION MOTOR UNIT AND TRANSMITTER DISTRIBUTOR UNIT WITH THEIR MOUNTING SCREWS LOOSENED.

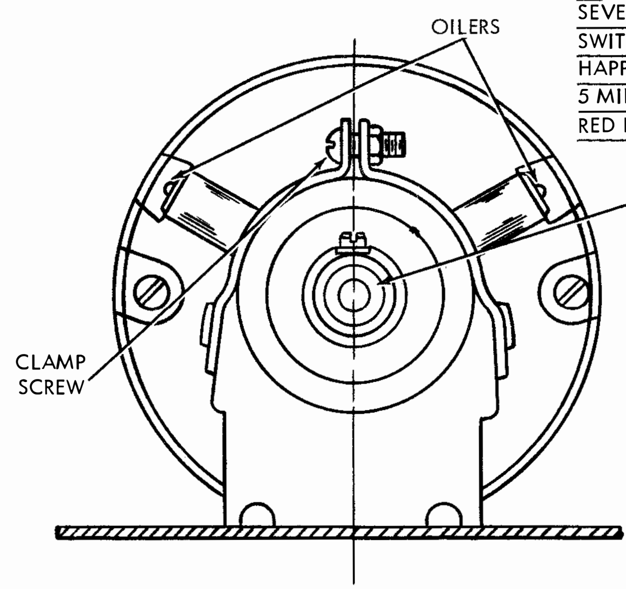


NOTICE

Should the Rotor of the Synchronous Motor become blocked for several seconds by an overload, the thermal cut-out switch will de-energize the motor until the manual reset button is depressed. However, allow at least 5 minutes for the motor to cool before attempting to reset the switch and start the motor.

Figure 5-135. Transmitter Distributor Base (LXDB), Intermediate Gear Assembly

m. SYNCHRONOUS AND GOVERNED MOTORS.



IF THE MOTOR SHOULD BECOME BLOCKED FOR SEVERAL SECONDS, THE THERMAL CUT-OUT SWITCH WILL BREAK THE CIRCUIT. SHOULD THIS HAPPEN, ALLOW THE MOTOR TO COOL AT LEAST 5 MINUTES BEFORE MANUALLY DEPRESSING THE RED BUTTON. AVOID REPEATED DEPRESSION.

SYNCHRONOUS MOTOR POSITIONING

REQUIREMENT

TWO OILERS SHOULD BE UPWARD AND APPROXIMATELY EQUIDISTANT FROM A VERTICAL LINE THROUGH THE MOTOR SHAFT

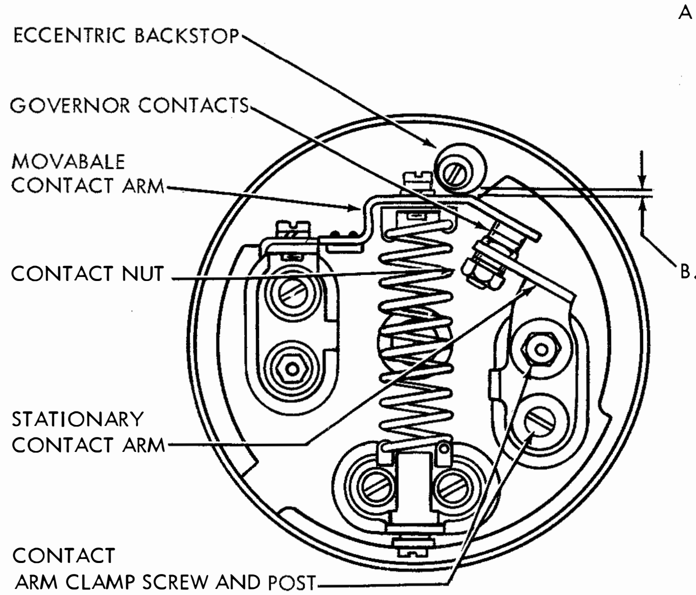
TO ADJUST

POSITION THE MOTOR WITH THE TWO CLAMP SCREWS LOOSENED.

GOVERNED MOTOR POSITIONING

REQUIREMENT

MOTOR SHOULD BE CENTRALLY POSITIONED IN ITS RUBBERMOUNTS SO AS TO PROVIDE AT LEAST 0.020 CLEARANCE BETWEEN THE MOTOR HOUSING AND THE CRADLE AT THE GOVERNOR END. THE CABLE SHOULD ALSO CLEAR THE GROMMET IN THE SCREEN BY AT LEAST 0.030 INCH.



A. GOVERNOR CONTACT

REQUIREMENT

THE CONTACTS SHOULD MEET SQUARELY AND NOT OVERLAP MORE THAN 0.010 INCH.

TO ADJUST

POSITION THE STATIONARY CONTACT AND CONTACT ARM WITH THE CLAMP SCREW AND POST LOOSENED.

B. GOVERNOR CONTACT BACKSTOP

REQUIREMENT

CLEARANCE BETWEEN THE MOVABLE CONTACT ARM AND ITS ECCENTRIC BACKSTOP.

MIN. 0.030 INCH

MAX. 0.050 INCH

TO ADJUST

ROTATE THE ECCENTRIC BACKSTOP WITH CLAMPING SCREW LOOSENED.

Figure 5-136. Synchronous and Governed Motors Positioning

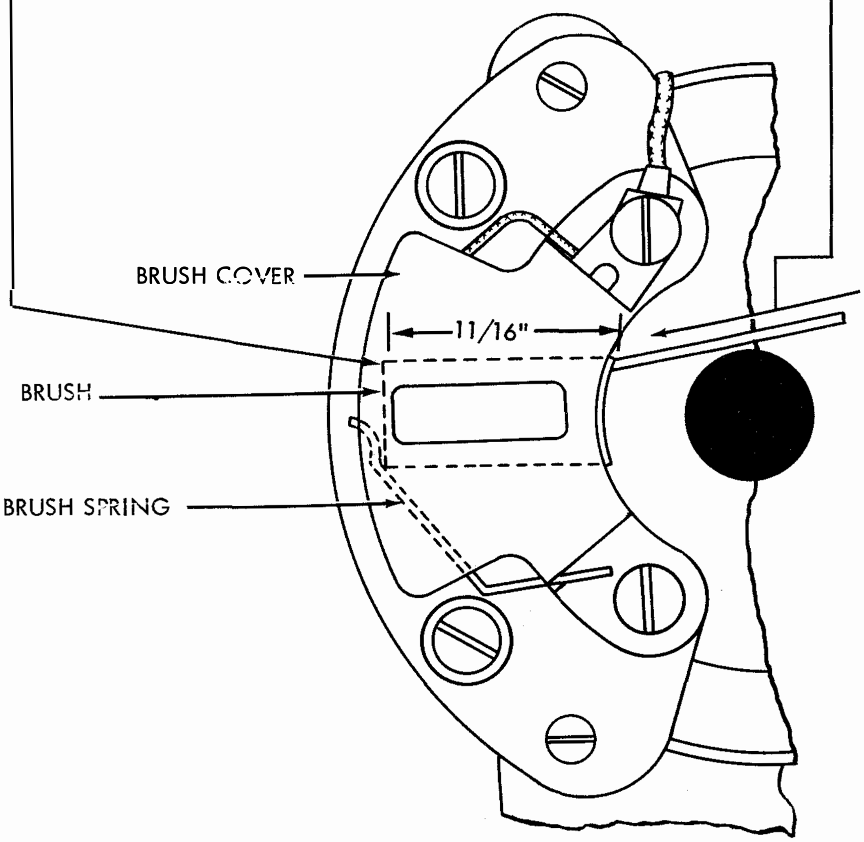
NOTE

REPLACE GOVERNOR BRUSHES THAT HAVE WORN TO A LENGTH OF APPROXIMATELY 15/32 INCH (2/3 OF ORIGINAL LENGTH).

(A) GOVERNOR BRUSH SPRING TENSION

REQUIREMENT

GOVERNOR FAN REMOVED.
MIN. 4 OZS.
MAX. 6 OZS.
TO MOVE THE SPRING FLUSH WITH BRUSH COVER.



(B) GOVERNED MOTOR SPEED ADJUSTMENT

REQUIREMENT ---

WITH THE TARGET ILLUMINATED AND VIEWED THROUGH THE VIBRATING SHUTTERS OF A 120 VPS TUNING FORK, THE SPOTS SHOULD APPEAR STATIONARY WHILE THE MOTOR IS ROTATING.

TO ADJUST ---

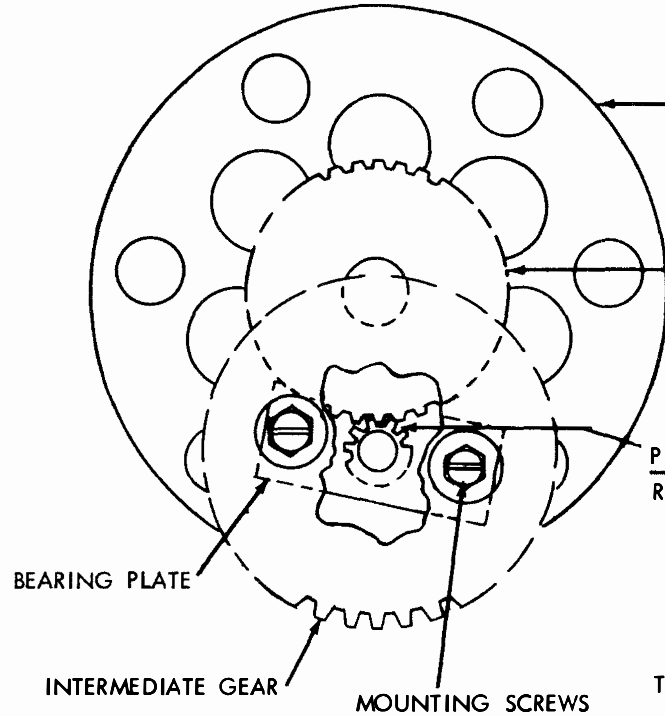
STOP THE MOTOR AND TURN THE ADJUSTING SCREW AS INDICATED ON THE GOVERNOR COVER.

NOTE

IT IS POSSIBLE TO ADJUST THE MOTOR AT SOME MULTIPLE OF THE CORRECT SPEED. TO CHECK FOR CORRECT SPEED WITH A MONITOR PRINTER, HAVE THE TYPE BOX CARRIAGE AT THE LEFT MARGIN, INSERT A PERFORATED TAPE IN THE TRANSMITTER DISTRIBUTOR TO OPERATE THE PRINTER. IF THE UNIT IS EQUIPPED WITH GEARS FOR 60 SPEED OPERATION, IT SHOULD PRINT 70 CHARACTERS IN 10 SECONDS: WITH 75 SPEED GEARS - 44 CHARACTERS IN 5 SECONDS: WITH 100 SPEED GEARS - 57 CHARACTERS IN 5 SECONDS.

Figure 5-137. Governed Motor Speed and Brush Spring Tension

n. TAPE HANDLING STAND (LTHS)



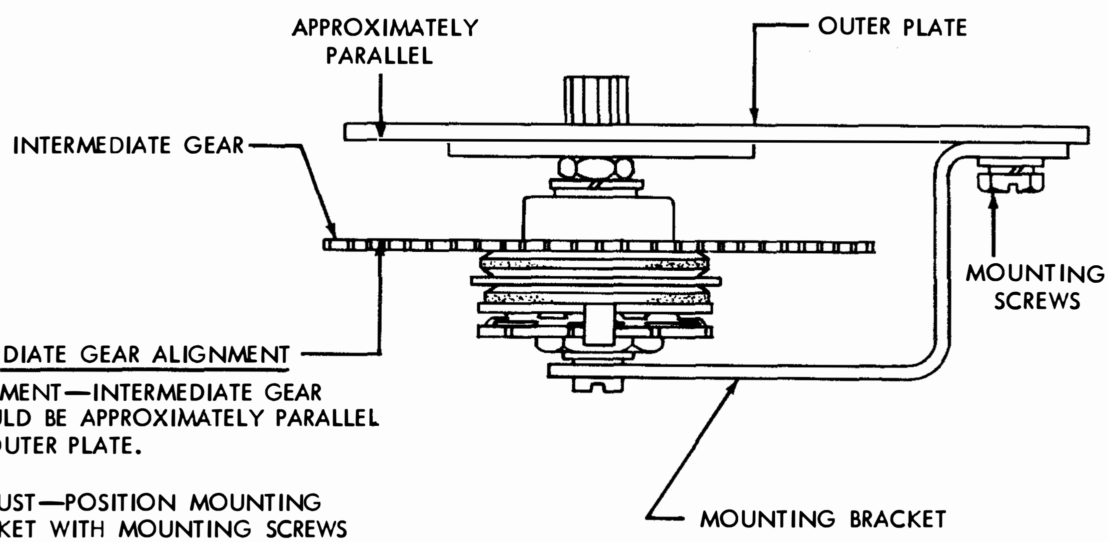
PINION-REEL DRIVE GEAR MESH

REQUIREMENT—WITH TAPE WINDER REEL IN POSITION, THERE SHOULD BE BARELY PERCEPTIBLE BACKLASH BETWEEN PINION AND REEL DRIVE GEAR THROUGHOUT ONE REVOLUTION OF THE DRIVE GEAR.

TO ADJUST—POSITION BEARING PLATE WITH MOUNTING SCREWS LOOSENED. (MOUNTING SCREWS ARE ACCESSIBLE THROUGH HOLES IN INTERMEDIATE GEAR).

NOTE

THIS ADJUSTMENT SHOULD BE RECHECKED IF TAPE WINDER REELS ARE INTERCHANGED BETWEEN UNITS.

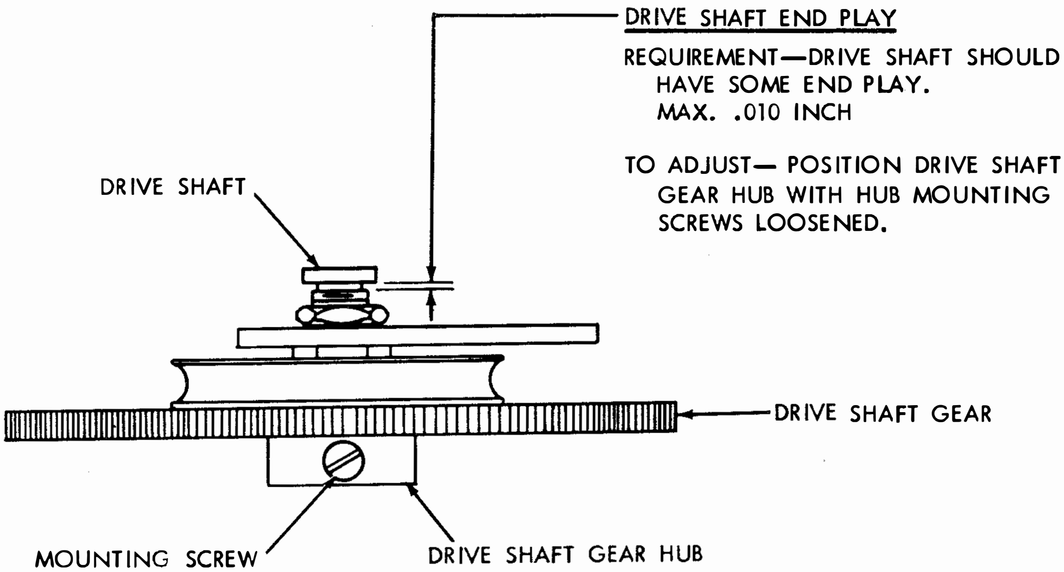


INTERMEDIATE GEAR ALIGNMENT

REQUIREMENT—INTERMEDIATE GEAR SHOULD BE APPROXIMATELY PARALLEL TO OUTER PLATE.

TO ADJUST—POSITION MOUNTING BRACKET WITH MOUNTING SCREWS LOOSENED.

Figure 5-138. Tape Handling Stand (LTHS), Reel Drive Gear and Intermediate Gear



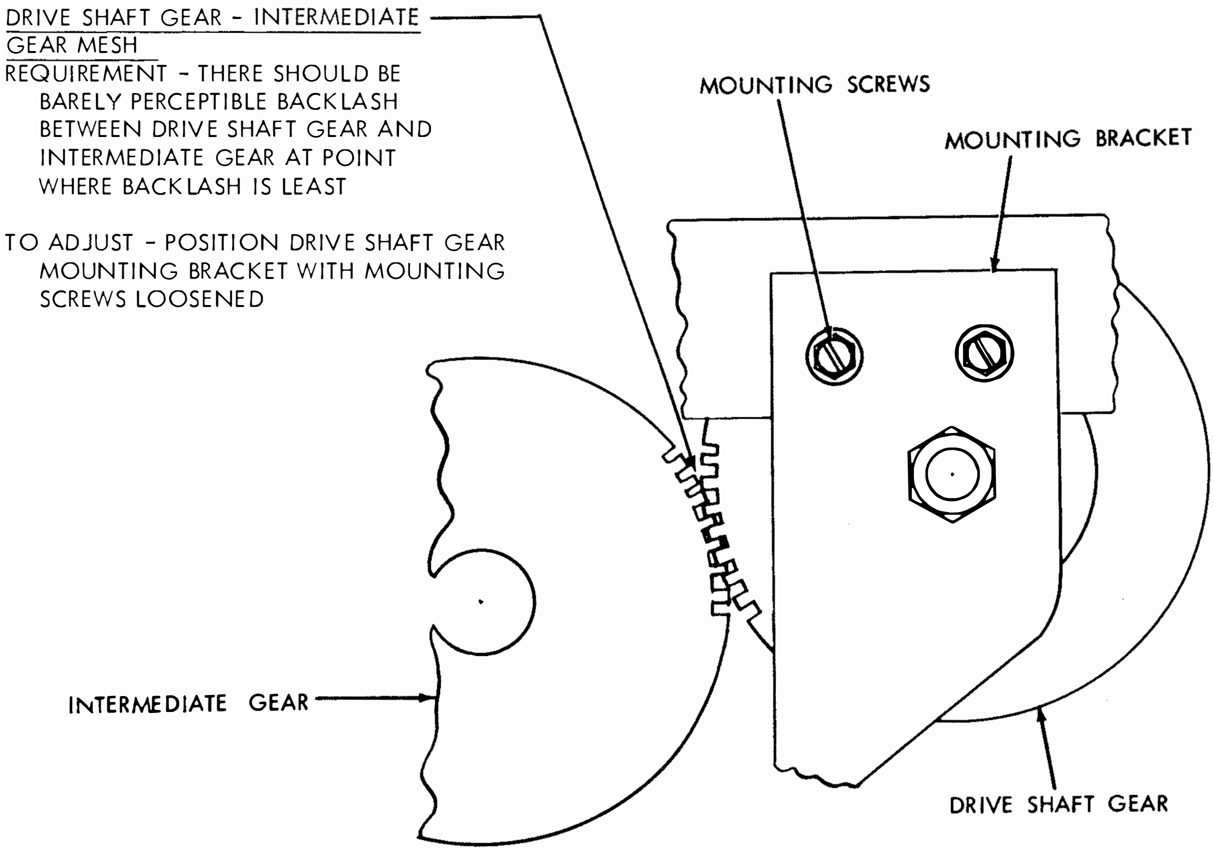


Figure 5-139. Tape Handling Stand (LTHS), Drive Shaft Gear and Intermediate Gear

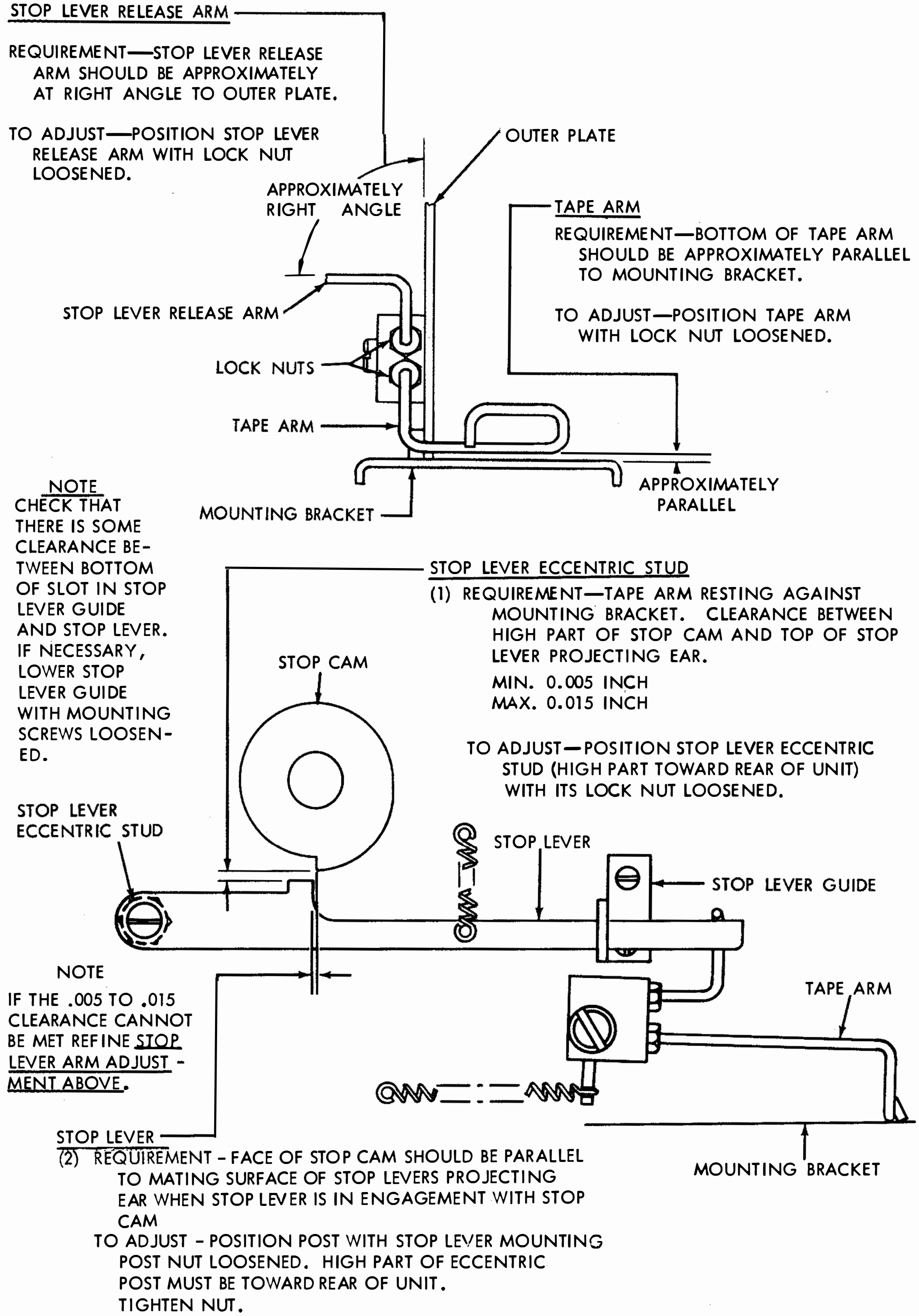
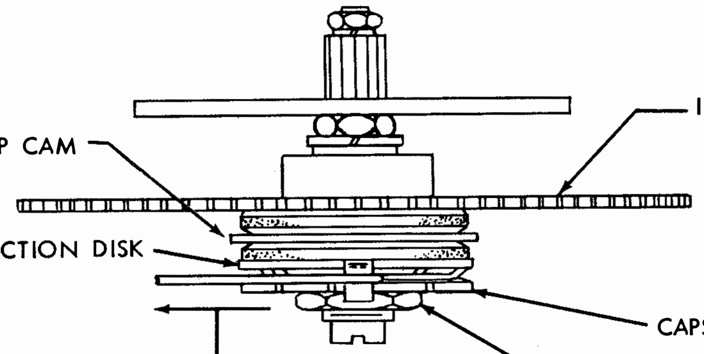


Figure 5-140. Tape Handling Stand (LTHS), Tape Winder Control Mechanism

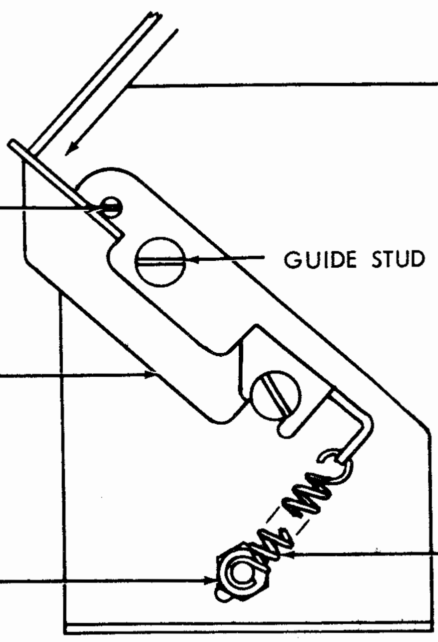


CLUTCH TORQUE

REQUIREMENT—POWER APPLIED TO UNIT. STOP LEVER HELD OUT OF ENGAGEMENT WITH STOP CAM.
MIN. 12 OZS.
MAX. 16 OZS.
TO KEEP CLUTCH FRICTION DISK FROM MOVING.

TO ADJUST—POSITION CAPSTAN NUT WITH LOCK NUT LOOSENED: CLOCKWISE TO INCREASE TENSION, COUNTER CLOCK-WISE TO DECREASE TENSION.

NOTE:
THIS MEASUREMENT SHOULD BE MADE WHEN UNIT IS WARM FROM OPERATION.

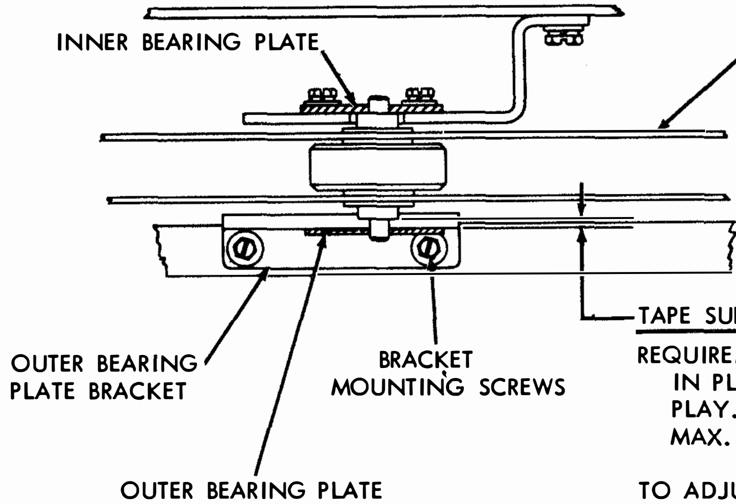


CHAD DEPRESSOR SPRING TENSION

REQUIREMENT
MIN. 2 OZS.
MAX. 6 OZS.
TO START DEPRESSOR MOVING AWAY FROM DEPRESSOR STUD.

TO ADJUST— POSITION SPRING POST WITH LOCK NUT LOOSENED.

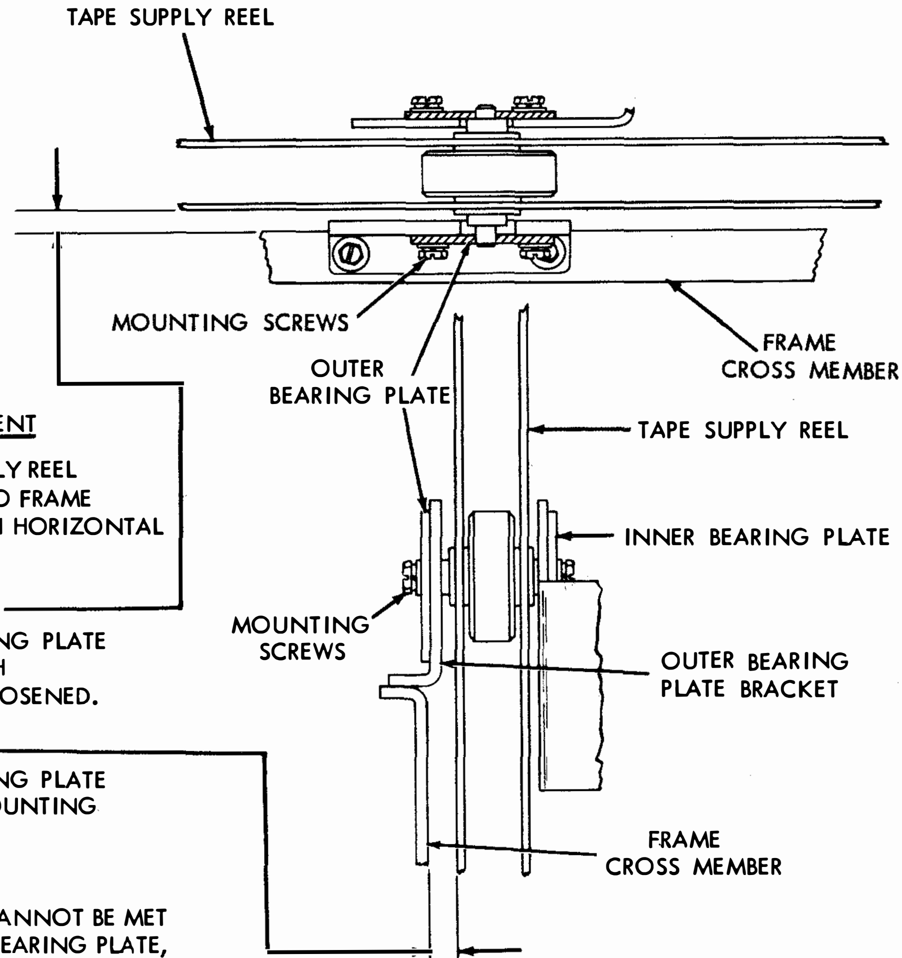
Figure 5-141. Tape Handling Stand (LTHS), Clutch Torque and Chad Depressor



TAPE SUPPLY REEL SHAFT END PLAY

REQUIREMENT—WITH TAPE SUPPLY REEL IN PLACE, SHAFT SHOULD HAVE SOME END PLAY.
MAX. 0.100 INCH

TO ADJUST—POSITION OUTER BEARING PLATE BRACKET WITH MOUNTING SCREWS LOOSENED.



TAPE SUPPLY REEL ALIGNMENT

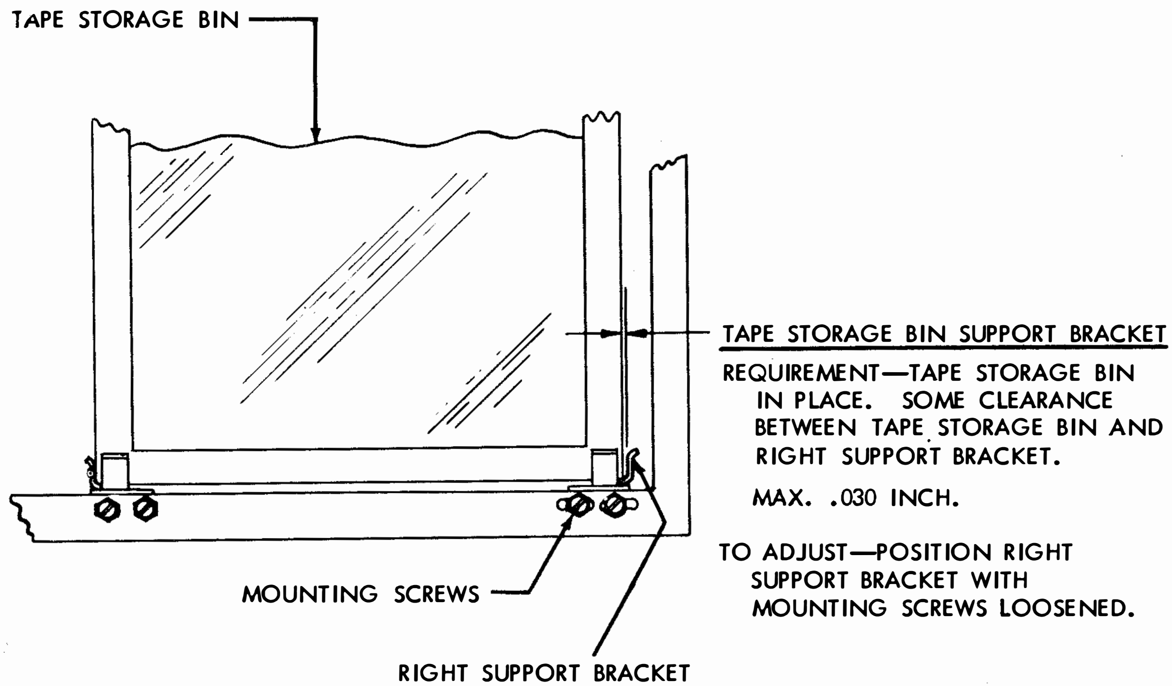
REQUIREMENT—TAPE SUPPLY REEL SHOULD BE PARALLEL TO FRAME CROSS MEMBER IN BOTH HORIZONTAL AND VERTICAL PLANES.

TO ADJUST (HORIZONTAL) POSITION OUTER BEARING PLATE TO LEFT OR RIGHT WITH MOUNTING SCREWS LOOSENED.

TO ADJUST (VERTICAL) POSITION OUTER BEARING PLATE UP OR DOWN WITH MOUNTING SCREWS LOOSENED.

NOTE:
IF THESE REQUIREMENTS CANNOT BE MET BY POSITIONING OUTER BEARING PLATE, POSITION INNER BEARING PLATE IN SIMILAR MANNER. CHECK SUPPLY REEL END PLAY.

Figure 5-142. Tape Handling Stand (LTHS), Tape Supply Reel and Shaft



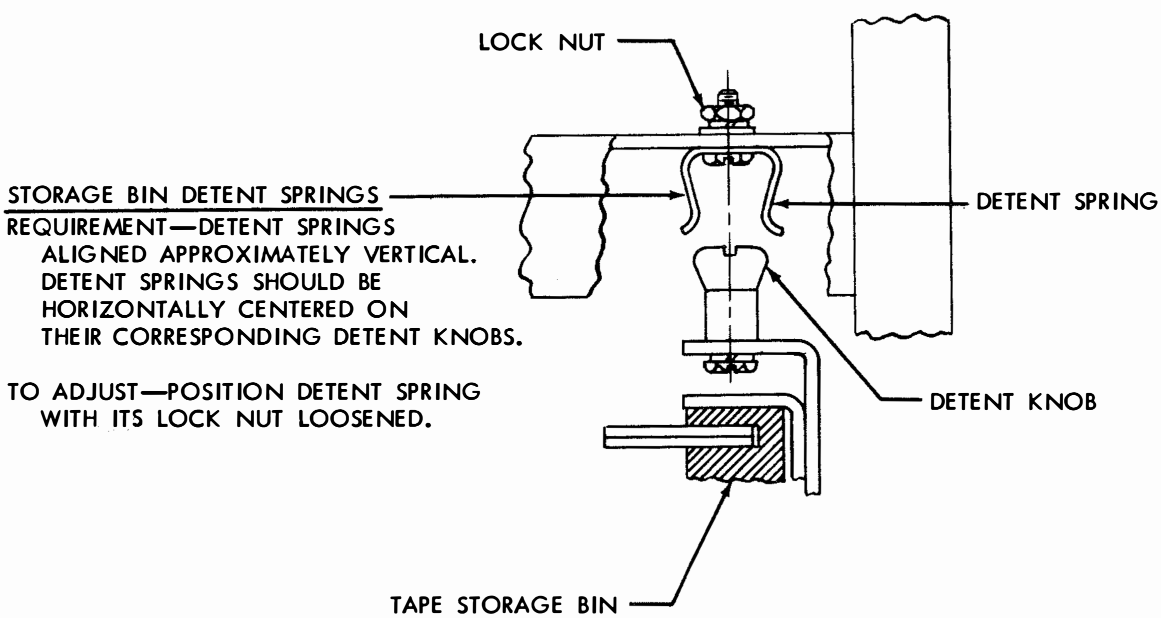
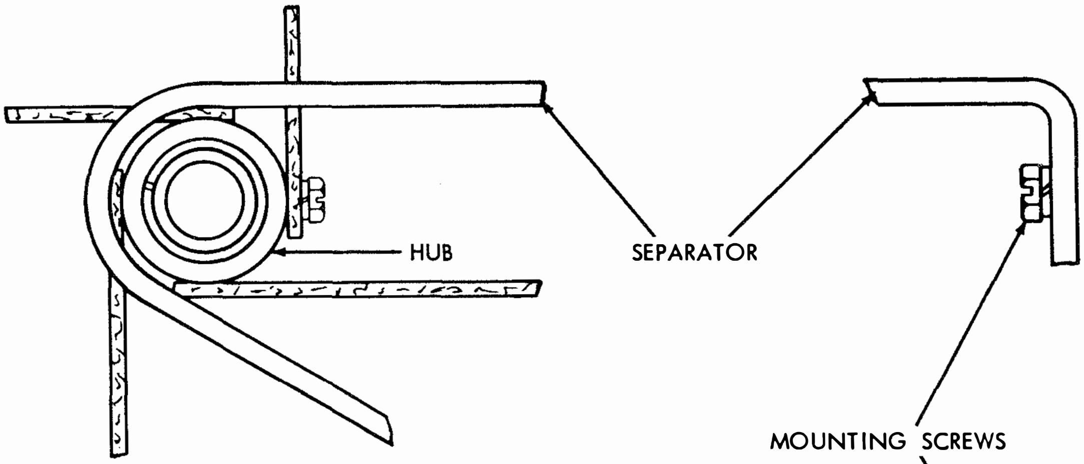
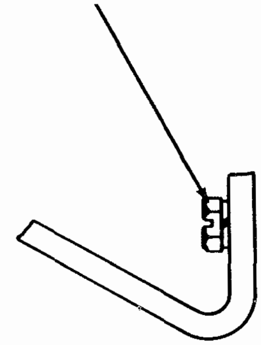


Figure 5-143. Tape Handling Stand (LTHS), Tape Storage Bin





SEPARATOR POSITION (MOTORIZED BINS ONLY)
REQUIREMENT — HUB APPROXIMATELY CENTERED WITHIN CURVED PORTION OF SEPARATOR.
TO ADJUST — POSITION SEPARATOR WITH MOUNTING SCREWS LOOSENED.

NOTE: UNITS USING A 176402 FLAT WASHER DO NOT REQUIRE THE ABOVE ADJUSTMENT.

BLADE POSITION (MOTIRIZED BINS ONLY)
REQUIREMENT — BLADES SHOULD BE APPROXIMATELY CENTERED IN SLOT IN SEPARATOR. CHECK FOUR BLADES.
TO ADJUST — POSITION BLADES WITH MOUNTING SCREWS LOOSENED.

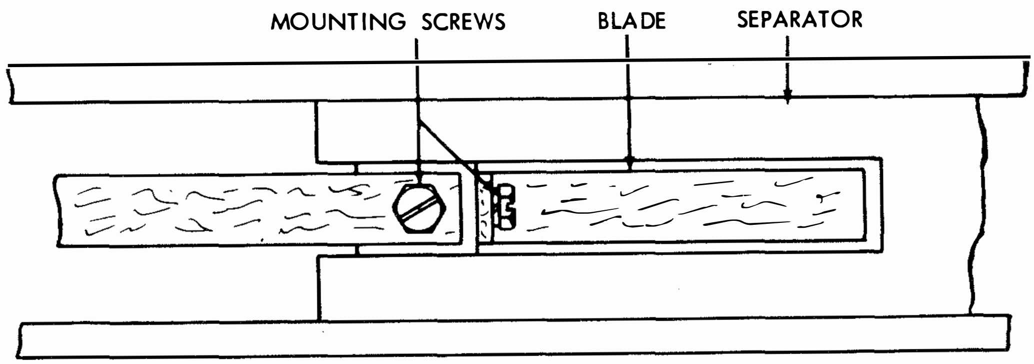
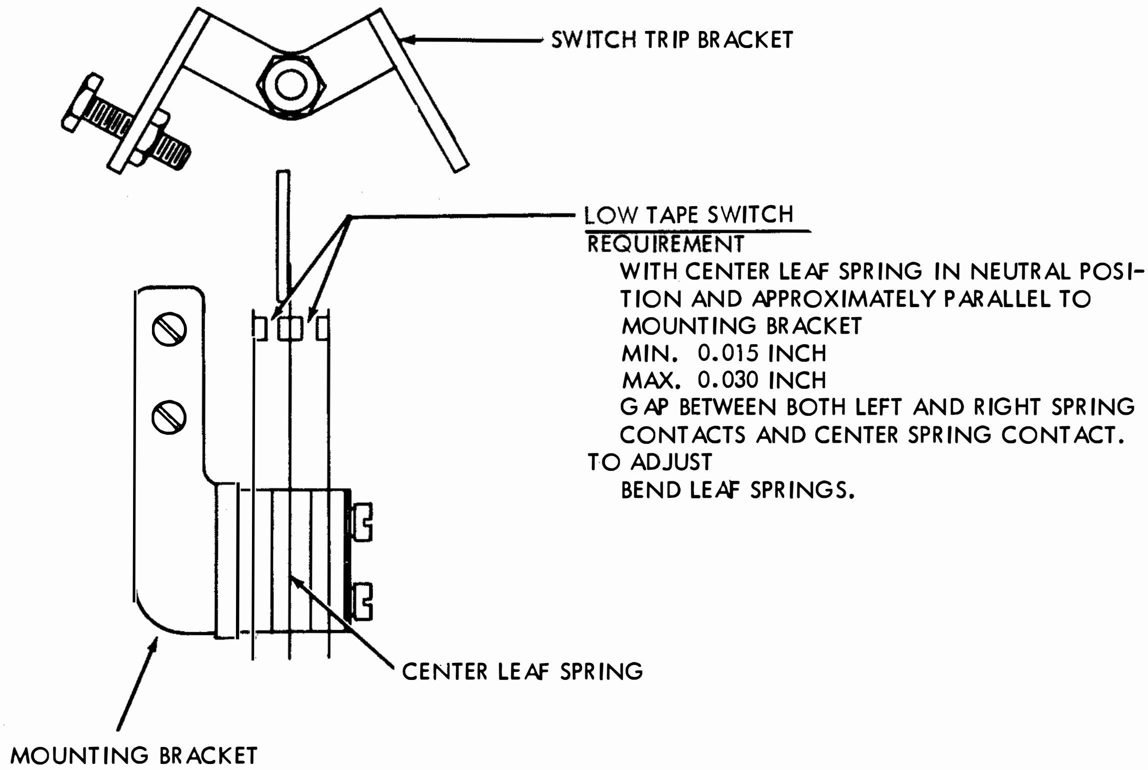


Figure 5-144. Tape Handling Stand (LTHS), Tape Puller Assembly



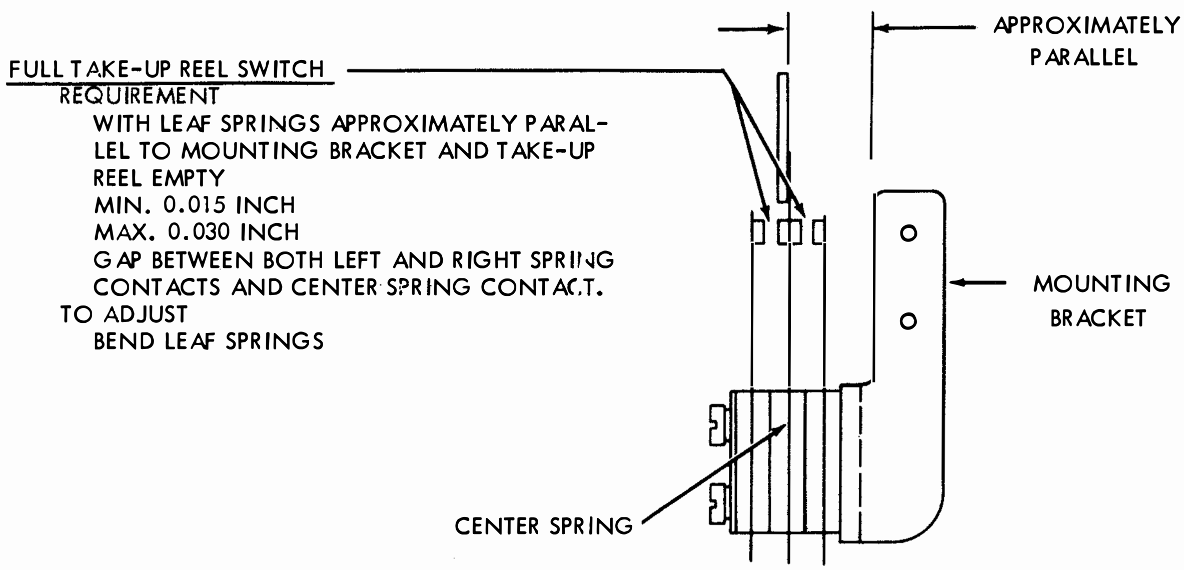
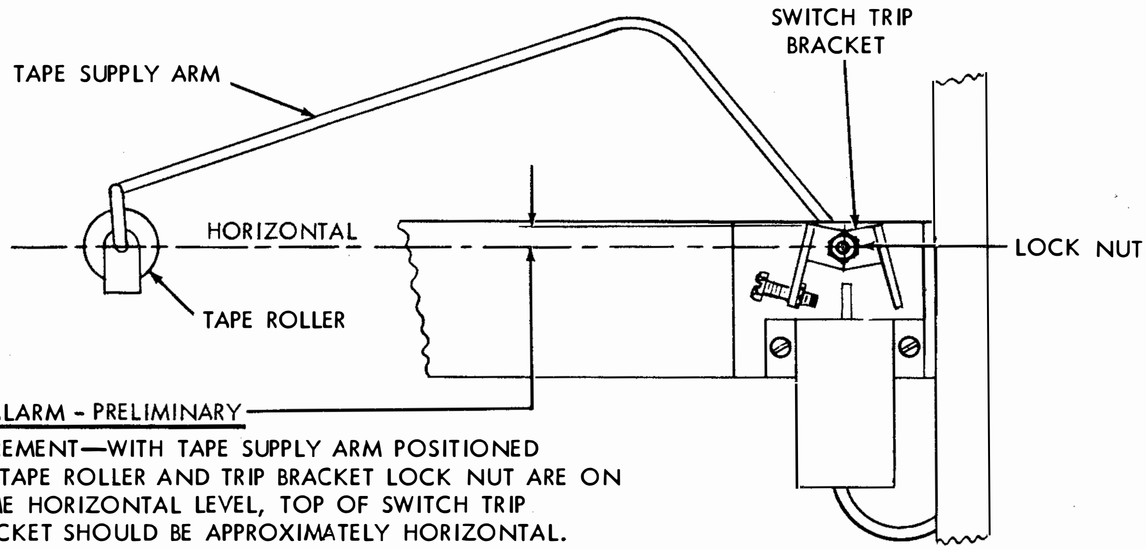


Figure 5-145. Tape Handling Stand (LTHS), Low Tape and Full Take-Up Reel Alarm Switches



TAPE ALARM - PRELIMINARY

REQUIREMENT—WITH TAPE SUPPLY ARM POSITIONED SO TAPE ROLLER AND TRIP BRACKET LOCK NUT ARE ON SAME HORIZONTAL LEVEL, TOP OF SWITCH TRIP BRACKET SHOULD BE APPROXIMATELY HORIZONTAL.

TO ADJUST—POSITION SWITCH TRIP BRACKET WITH LOCK NUT LOOSENED.

LOW TAPE ALARM

REQUIREMENT—WITH TAPE SUPPLY ARM POSITIONED SO THERE IS CLEARANCE BETWEEN EMPTY TAPE REEL CORE AND TAPE SUPPLY ARM
MIN. 1/2 INCH
MAX. 3/4 INCH
LOW TAPE ADJUSTING SCREW SHOULD JUST CLOSE TAPE ALARM SWITCH.

TO ADJUST—POSITION LOW TAPE ADJUSTING SCREW WITH LOCK NUT LOOSENED.

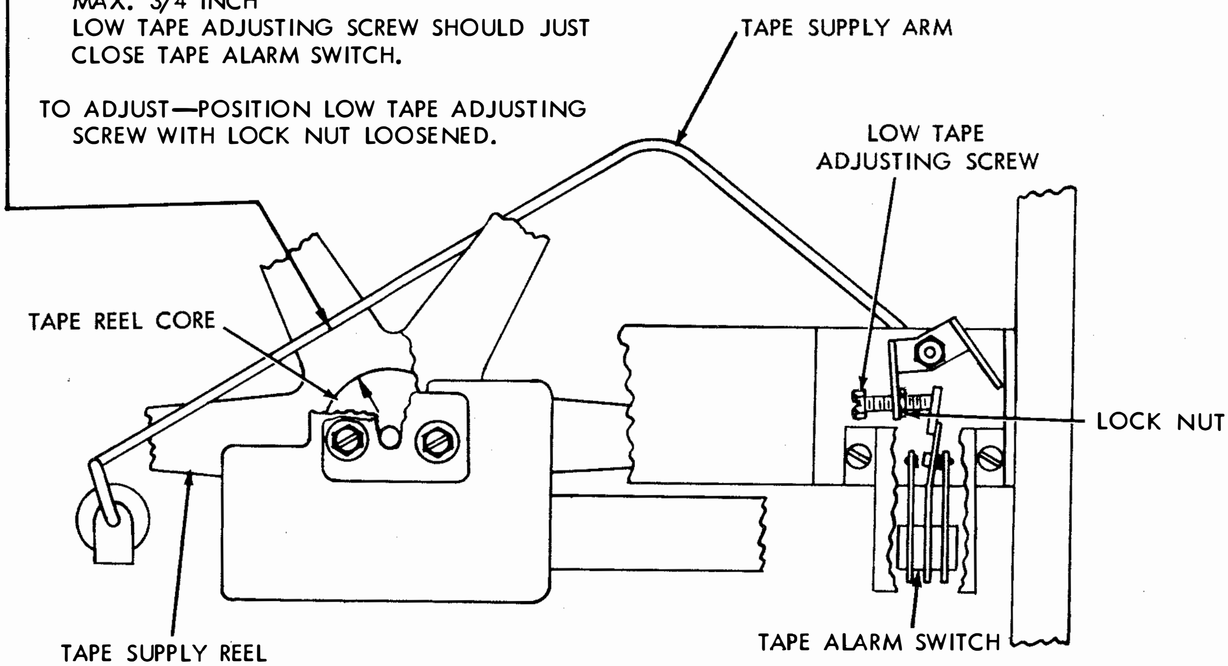
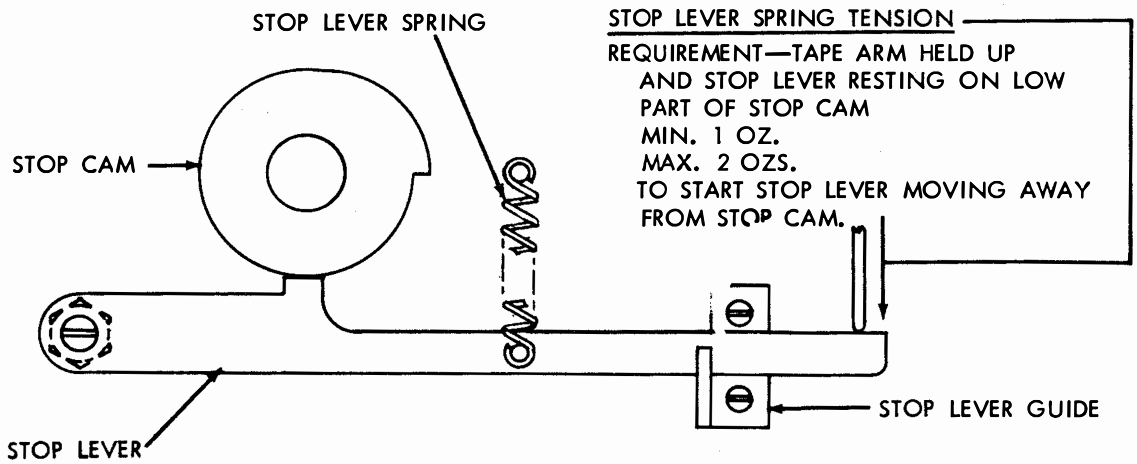


Figure 5-146. Tape Handling Stand (LTHS), Low Tape Alarm



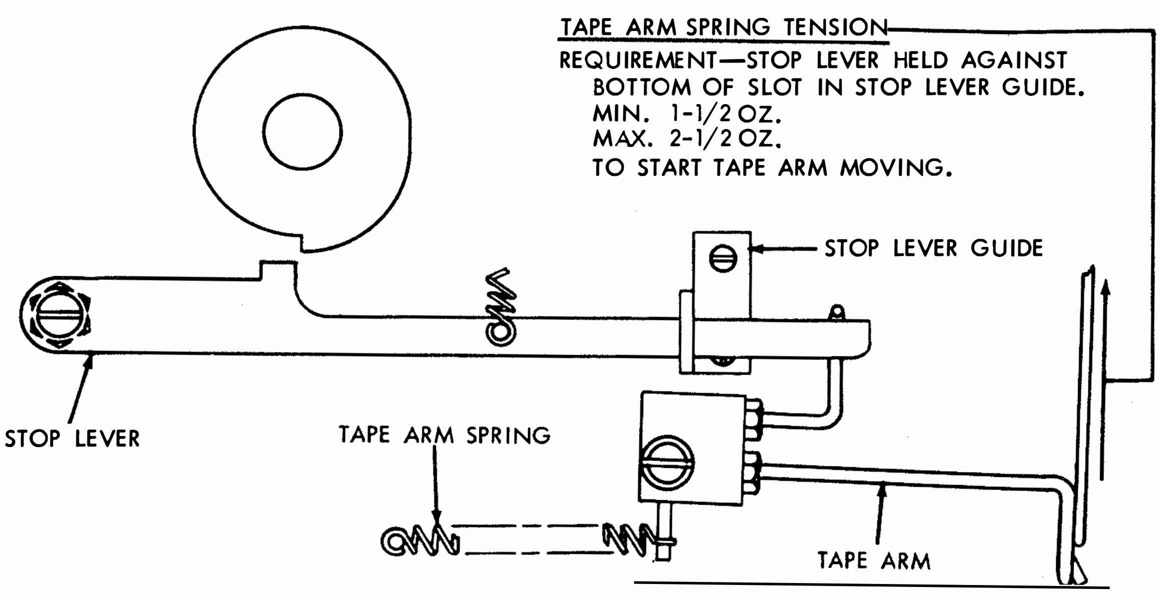
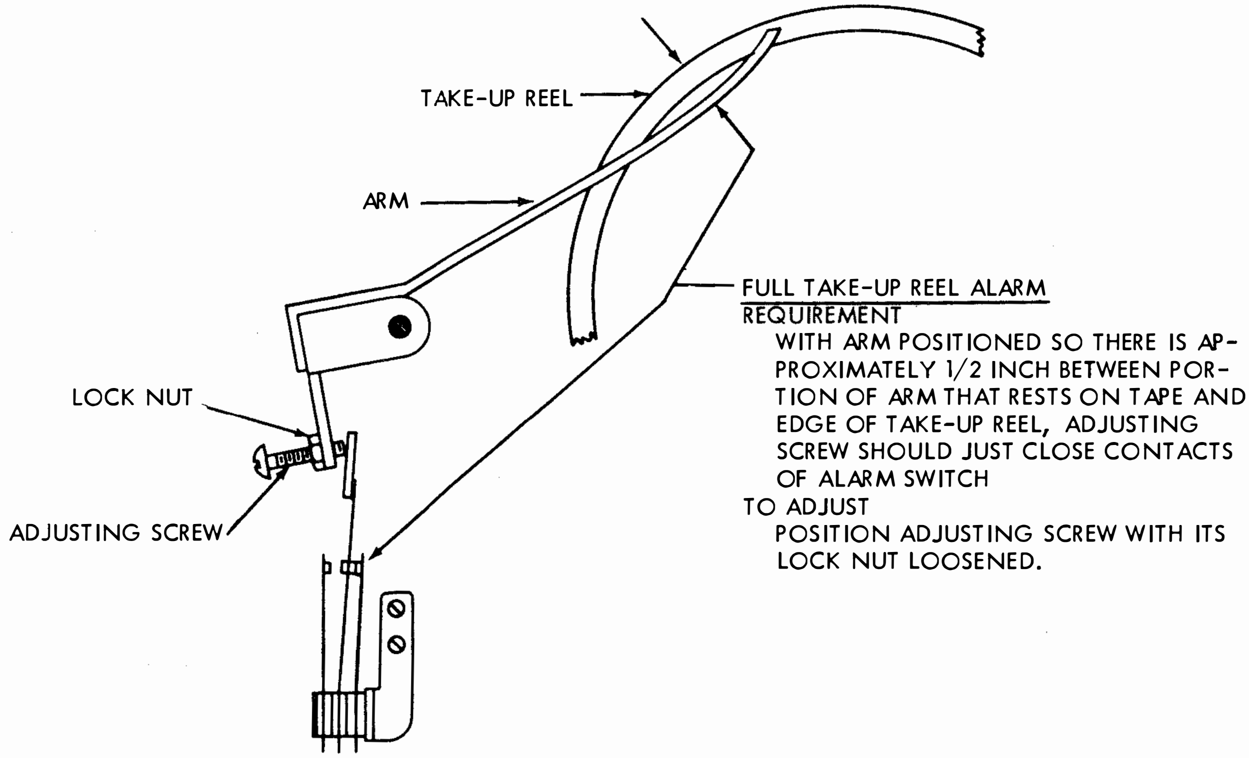


Figure 5-147. Tape Handling Stand (LTHS), Stop Lever and Tape Arm Springs



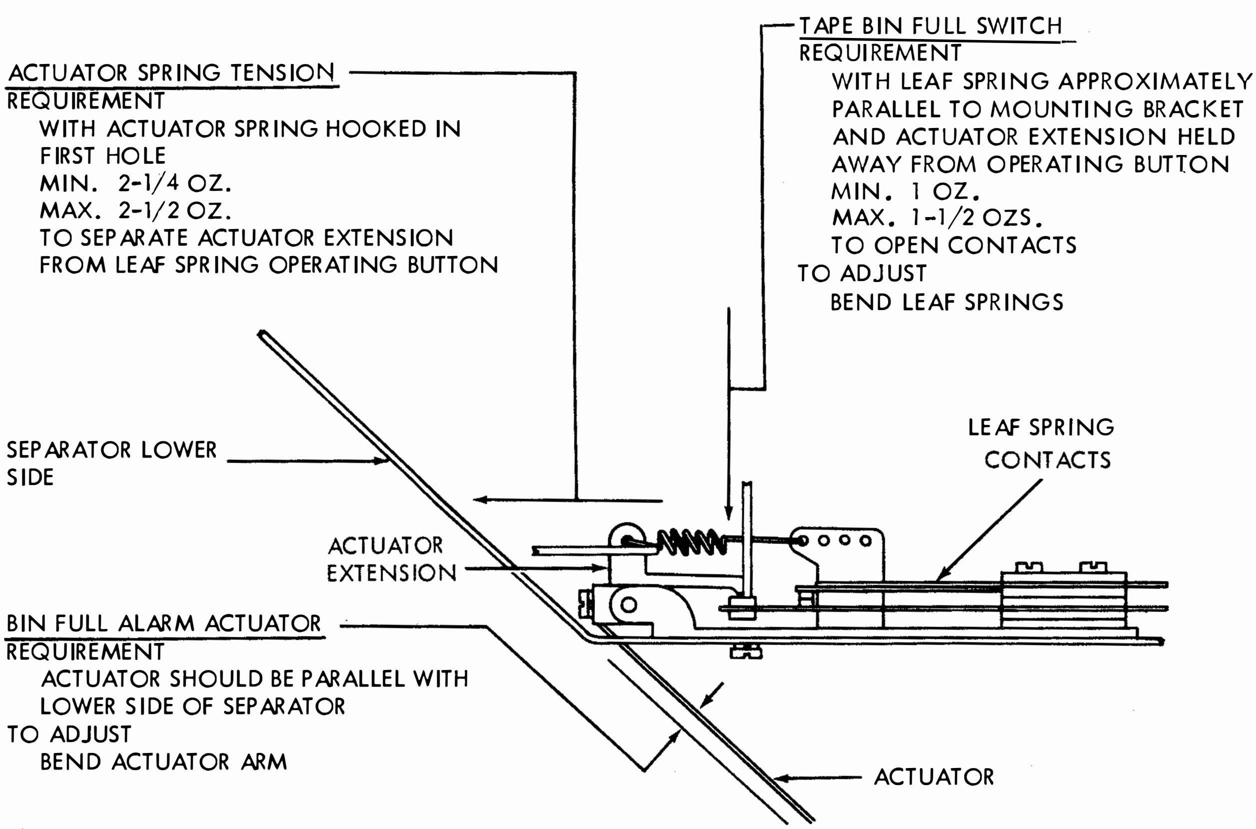
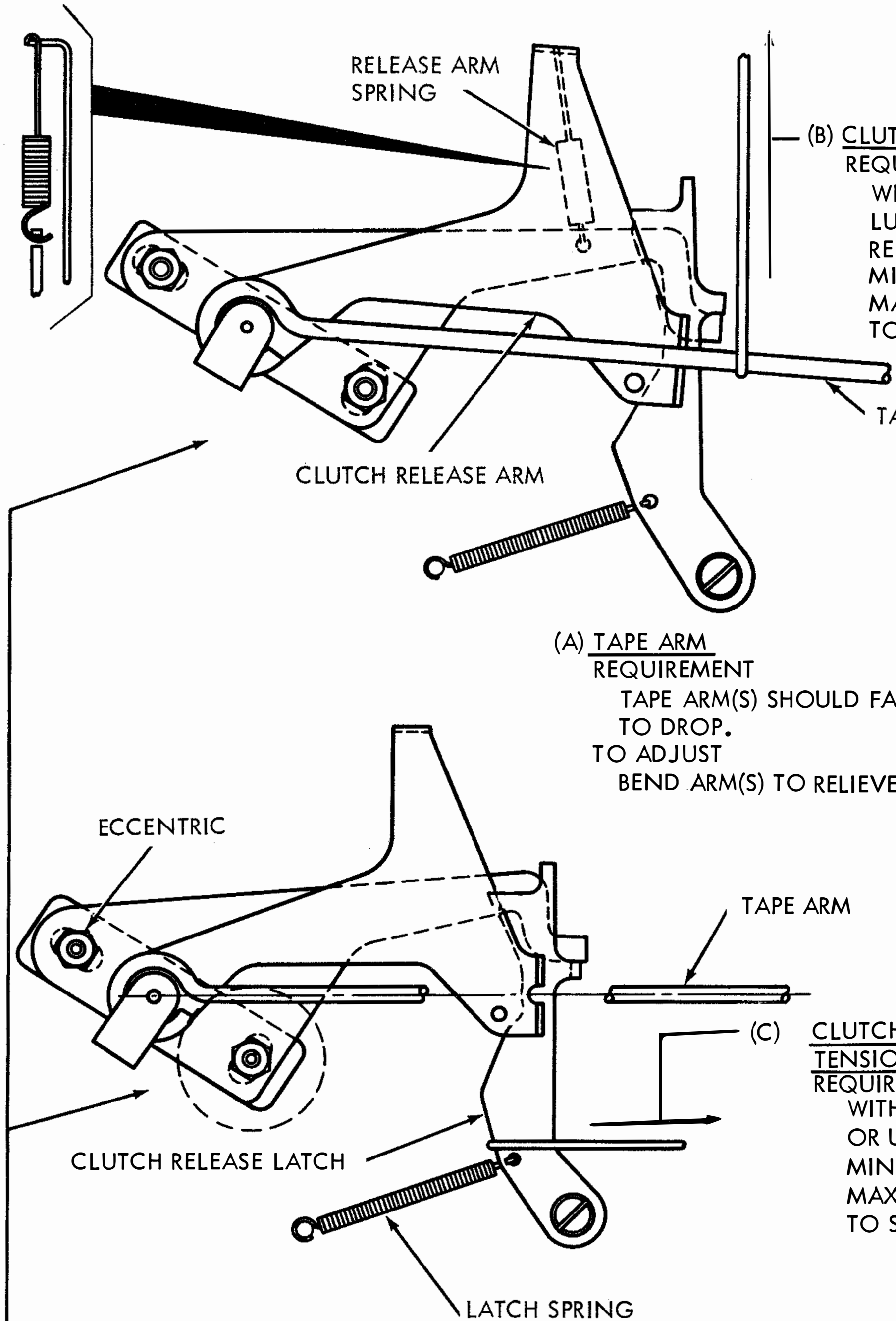


Figure 5-148. Tape Handling Stand (LTHS), Full Take-Up Reel Alarm and Tape Bin Full Alarm

o. TAPE WINDER (TW15)



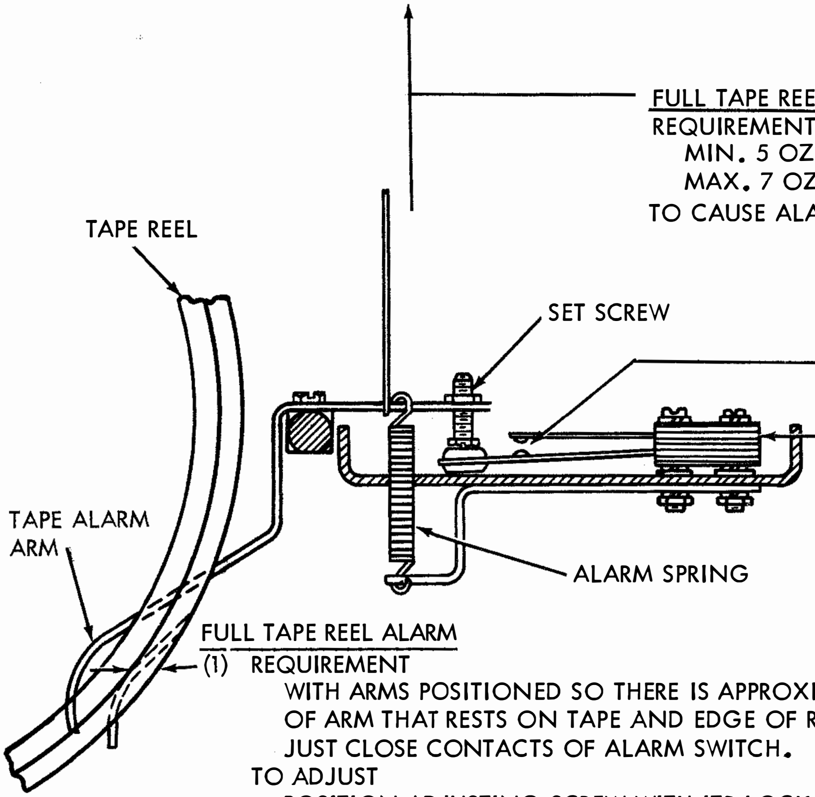
(B) CLUTCH RELEASE ARM SPRING TENSION
REQUIREMENT
WITH THE CLUTCH RELEASE LATCH LUG ENGAGED WITH THE CLUTCH RELEASE ARM LUG
MIN. 12 OZS.
MAX. 15 OZS.
TO START TAPE ARM MOVING.

(A) TAPE ARM
REQUIREMENT
TAPE ARM(S) SHOULD FALL FREELY WHEN ALLOWED TO DROP.
TO ADJUST
BEND ARM(S) TO RELIEVE INTERFERENCES.

(C) CLUTCH RELEASE LATCH SPRING TENSION
REQUIREMENT
WITH TAPE ARM IN ITS LOWERMOST OR UPPERMOST POSITION
MIN. 2 OZS.
MAX. 4 OZS.
TO START LATCH MOVING.

(D) CLUTCH ENGAGE-DISENGAGE
REQUIREMENT
(1) WITH MOTOR RUNNING AND END OF CLUTCH RELEASE ARM RESTING ON TOP OF CLUTCH RELEASE LATCH LUG, TAPE REEL SHOULD NOT ROTATE.
(2) WITH MOTOR RUNNING AND CLUTCH RELEASE ARM UNDER CLUTCH RELEASE LATCH LUG, TAPE REEL SHOULD ROTATE.
TO ADJUST
WITH TAPE REEL IN PLACE AND MOTOR RUNNING, PLACE AN OBJECT THROUGH THE HOLE IN THE WINDER SIDE FRAME AND UNDER THE TAPE ARM SO THAT CLUTCH RELEASE ARM RESTS ON CLUTCH RELEASE LATCH LUG. ROTATE ECCENTRIC WITH LOCK NUTS LOOSENED UNTIL TAPE REEL JUST CEASES TO ROTATE. CHECK REQUIREMENTS.

Figure 5-149. Tape Winder (TW15), Clutch Mechanism



FULL TAPE REEL ALARM SPRING TENSION
REQUIREMENT
MIN. 5 OZS.
MAX. 7 OZS.
TO CAUSE ALARM CONTACT TO CLOSE

FULL TAPE REEL ALARM

(1) REQUIREMENT
WITH ARMS POSITIONED SO THERE IS APPROXIMATELY 3/8 INCH BETWEEN PORTION OF ARM THAT RESTS ON TAPE AND EDGE OF REEL, ADJUSTING SCREW SHOULD JUST CLOSE CONTACTS OF ALARM SWITCH.
TO ADJUST
POSITION ADJUSTING SCREW WITH ITS LOCK NUT LOOSENED.

(2) REQUIREMENT
WITH AN EMPTY REEL, THE SET SCREW SHOULD HOLD THE SWINGER AWAY FROM THE CONTACT WITH A MINIMUM CONTACT GAP OF .020 INCHES.
TO ADJUST
REFINE ADJUSTMENT 1.

NOTE
THE CONTACT CLOSURE POINT CAN BE MODIFIED TO PROVIDE EITHER AN EARLIER OR LATER TAPE REEL ALARM INDICATION.

FULL TAPE REEL ALARM CONTACT PRESSURE
REQUIREMENT
WITH ADJUSTING SCREW HELD AWAY FROM CONTACT SWINGER
MIN. 1 OZ.
MAX. 3 OZS.
TO SEPARATE CONTACTS.

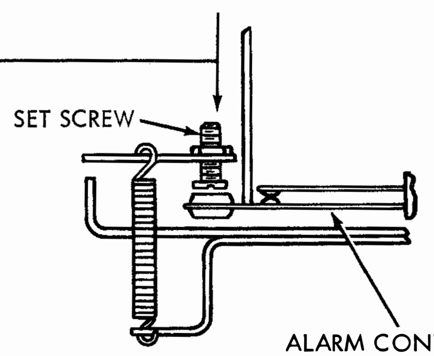
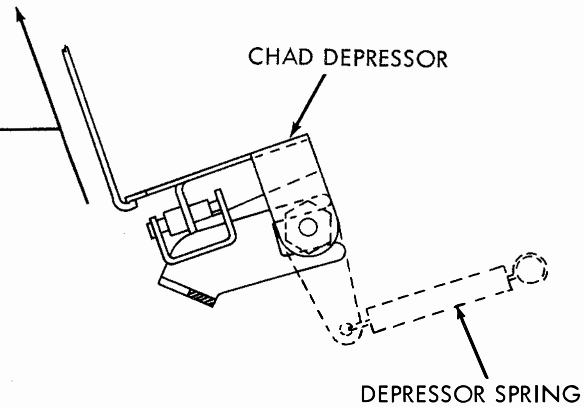


Figure 5-150. Tape Winder (TW15), Full Tape Alarm

CHAD DEPRESSOR SPRING TENSION

REQUIREMENT

MIN. 7 OZS.
MAX. 9 OZS.
TO PULL THE DEPRESSOR AWAY FROM ITS BACKSTOP.



MOTOR PINION

REQUIREMENT

THERE SHOULD BE ONLY A BARELY PERCEPTIBLE AMOUNT OF BACKLASH BETWEEN THE MOTOR PINION AND THE DRIVEN GEAR AT THE POINT WHERE THE CLEARANCE IS THE LEAST.

TO ADJUST

WITH THE (4) MOUNTING SCREWS WHICH SECURE THE MOTOR MOUNTING PLATE TO THE SIDE FRAMES LOOSENED, POSITION THE PLATE TO MEET REQUIREMENT.

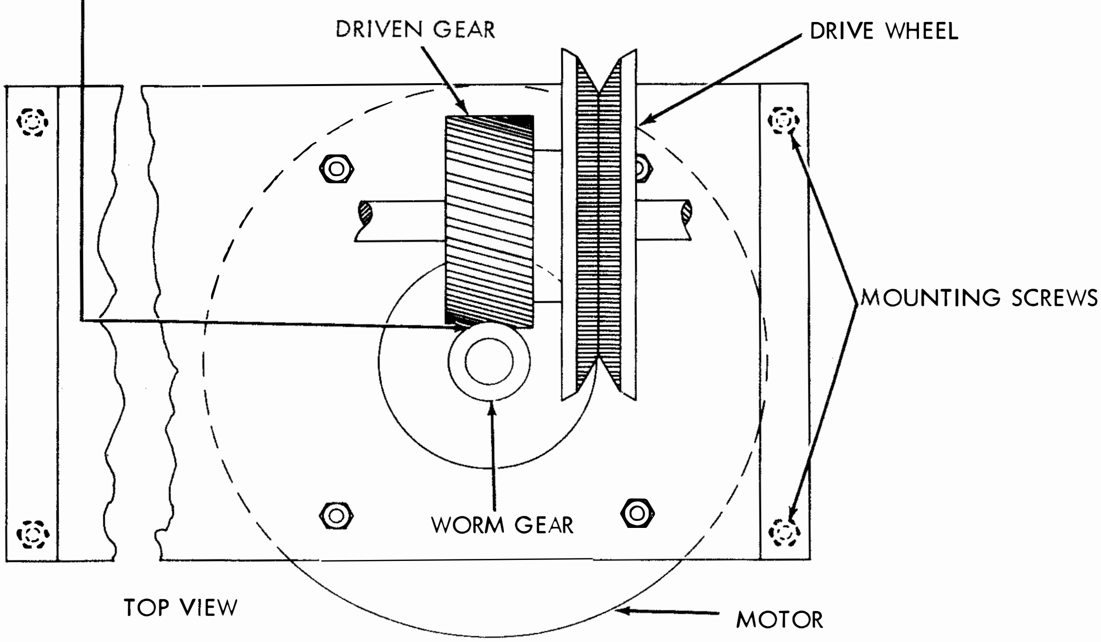
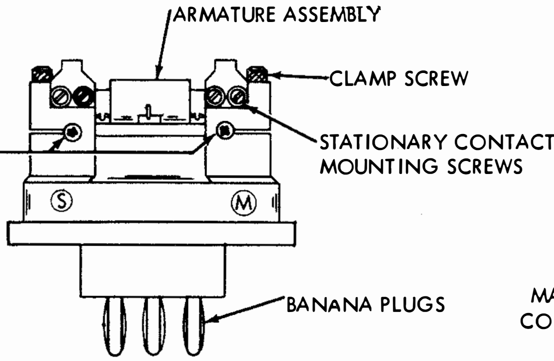
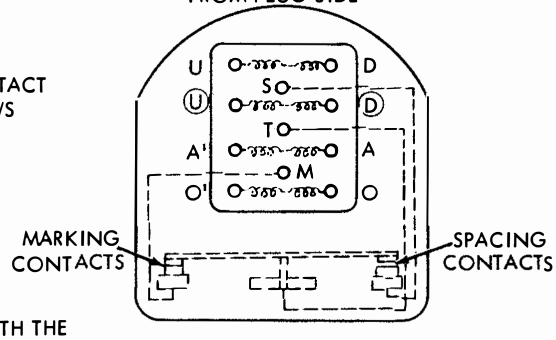


Figure 5-151. Tape Winder (TW15), Chad Depressor and Motor Pinion

p. RELAY (RY34)

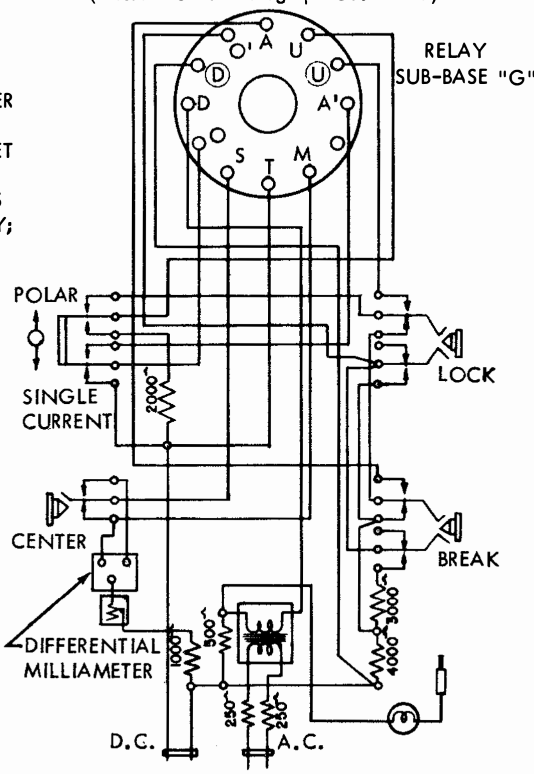


TERMINAL CONNECTIONS FROM PLUG SIDE



THE FOLLOWING ADJUSTMENTS ARE TO BE MADE WITH THE TEST SET SWITCH SET AT "POLAR."
NOTE: THIS TEST SET CANNOT BE USED FOR TESTING THE 33RY POLAR RELAY.

CIRCUIT OF TEST SET FOR 34RY RELAY
(Western Union Telegraph Co. #42-B)



(A) CENTER TEST
REQUIREMENT----WITH TEST SET "CENTER" BUTTON DEPRESSED, DEFLECTION OF MILLIAMETER NEEDLE FROM ITS ZERO POSITION SHOULD NOT BE GREATER THAN ± 2 DIVISIONS.
TO ADJUST----WITH EACH STATIONARY CONTACT SET SCREW CLAMPING SCREW LOOSENED, TURN SET SCREWS IN THE SAME DIRECTION EQUAL AMOUNTS TO VARY THE CONTACT GAPS. ADJUST CAREFULLY; TURN EACH SET SCREW ONLY A FEW DEGREES AT A TIME. MAKE SURE CLAMPING SCREWS ARE TIGHTENED BEFORE RECHECKING ADJUSTMENT.

(B) EFFICIENCY TEST
REQUIREMENT----WITH TEST SET "CENTER" BUTTON RESTORED TO NORMAL THE MINIMUM EFFICIENCY SHOULD BE 70.
TO ADJUST----RECHECK CONTACT GAPS AS IN(A) ABOVE.

(C) LOCK TEST
REQUIREMENT----WITH TEST SET "CENTER" BUTTON DEPRESSED, REPEATEDLY DEPRESS THE "LOCK" BUTTON. THE METER SHOULD BE STEADY AT 100 ON EITHER CONTACT. THE RELAY SHOULD BE CHECKED ON BOTH "MARK" AND "SPACE".

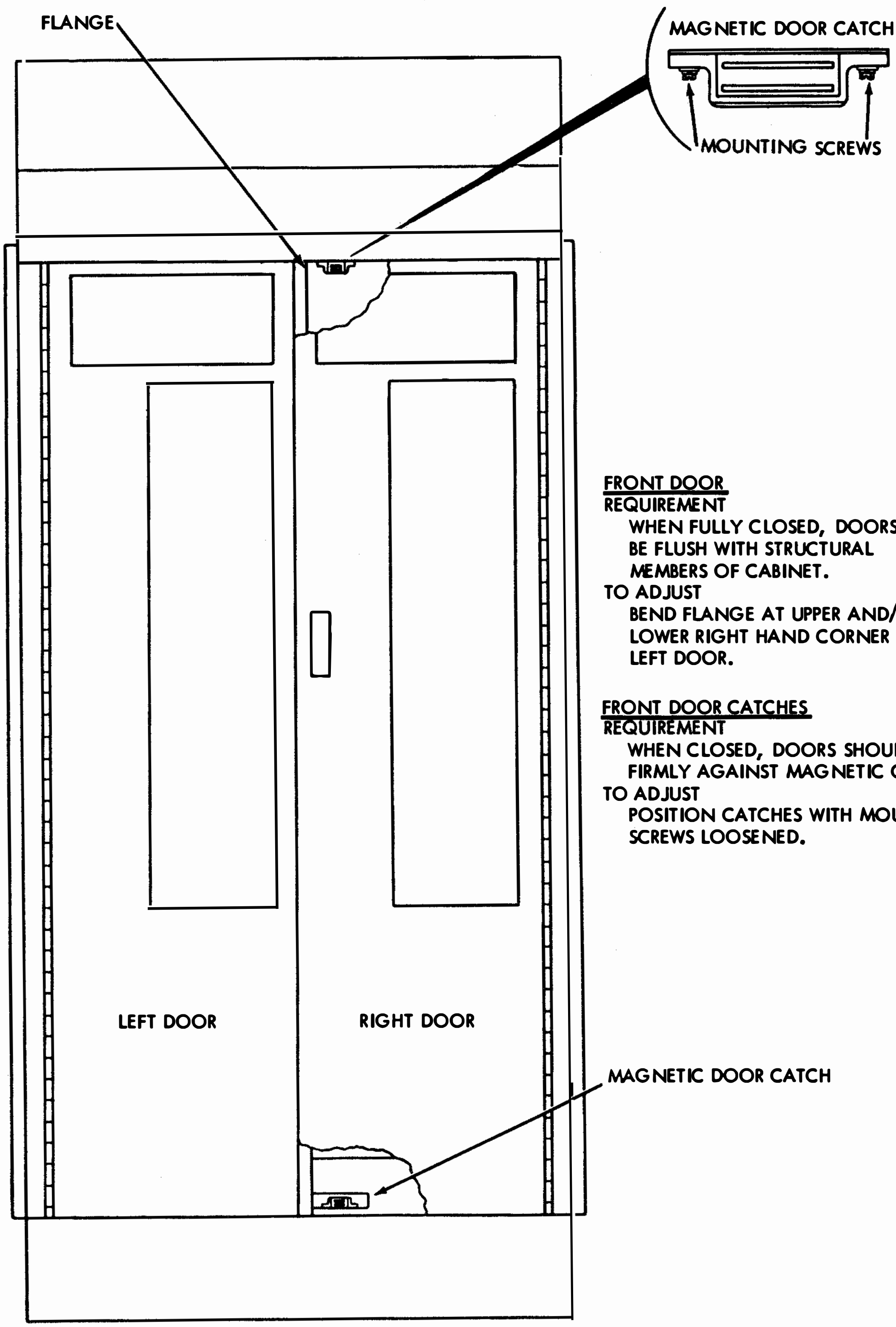
THIS TEST CHECKS THE FORCE REQUIRED TO MAINTAIN SUFFICIENT CONTACT PRESSURE.
BE SURE THE CONTACTS ARE CLEAN AND FREE OF FOREIGN MATERIALS. RECHECK CONTACT REQUIREMENTS IF NECESSARY. FAILURE OF A WINDING OR REDUCED FIELD STRENGTH OF POLE PIECES WILL REQUIRE REPLACEMENT OF RELAY.

(D) BREAK TEST
REQUIREMENT----WITH TEST SET "LOCK" AND "CENTER" BUTTONS RESTORED TO NORMAL, DEPRESS THE "BREAK" BUTTON. THE RELAY SHOULD VIBRATE, AND THE METER READING SHOULD BE LESS THAN 100.
TO ADJUST----USE SAME PROCEDURE AS IN "A" ABOVE EXCEPT THAT SET SCREWS ARE TURNED EQUAL AMOUNTS IN OPPOSITE DIRECTIONS RATHER THAN SAME DIRECTION. THIS CHANGES THE MAGNETIC BALANCE WITHOUT AFFECTING CONTACT GAP.

NOTES
1. WHEN MAKING THE "CENTER" AND "EFFICIENCY" TESTS THE D-U WINDING IS ENERGIZED WITH APPROXIMATELY 20 MA.A.C.
2. WHEN MAKING THE "LOCK" TEST D-U AND D-U WINDINGS ARE CONNECTED IN SERIES OPPOSING AND ENERGIZED WITH APPROXIMATELY 80 MA.A.C.
3. WHEN MAKING THE "BREAK" TEST, WINDINGS A-A', D-U AND O-O' ARE CONNECTED IN SERIES AIDING AND ENERGIZED WITH APPROXIMATELY 13 MA.A.C.

Figure 5-152. Relay (RY34), Contact Adjustments

q. UNIVERSAL CABINETS (LBAC)

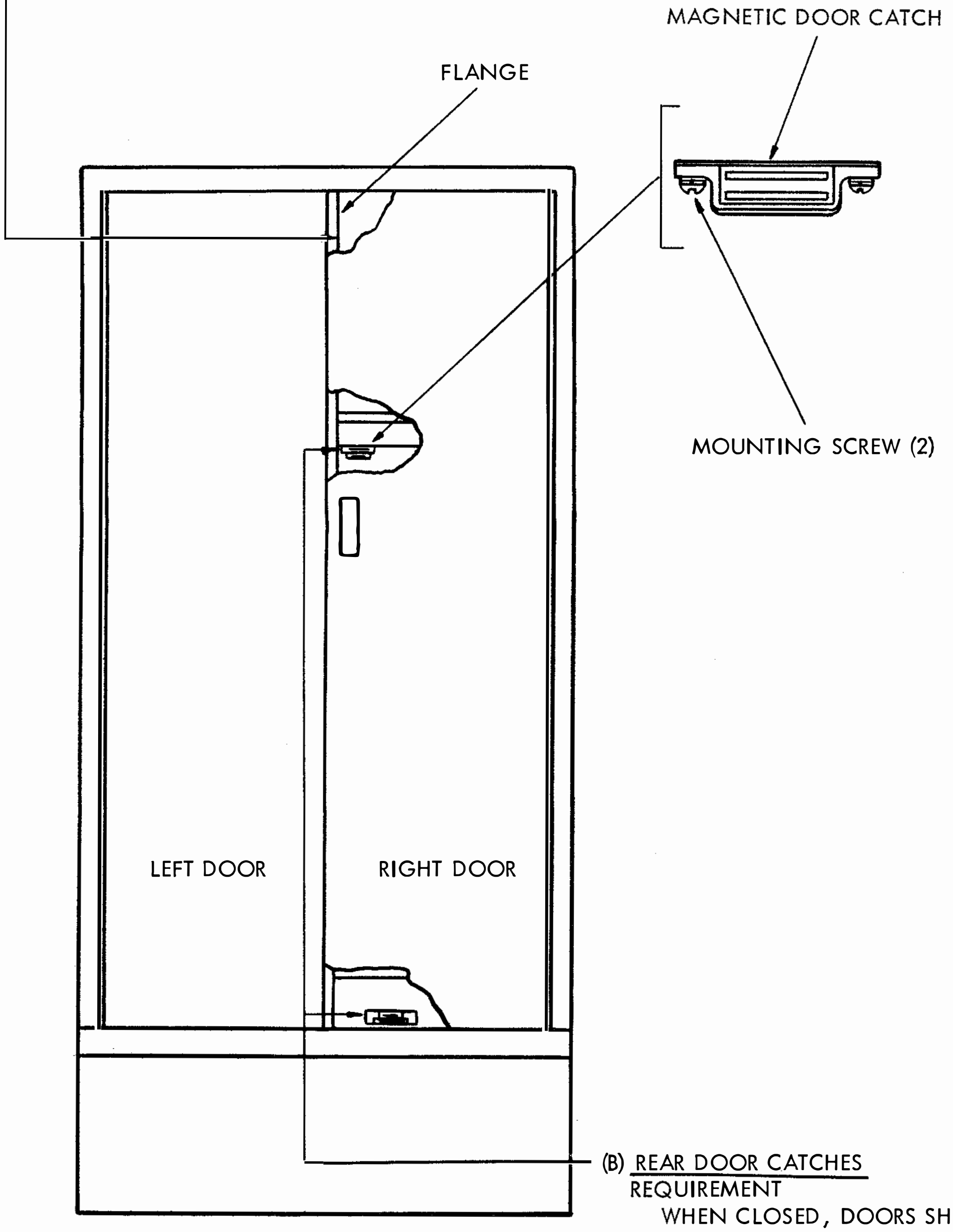


FRONT DOOR
REQUIREMENT
WHEN FULLY CLOSED, DOORS SHOULD BE FLUSH WITH STRUCTURAL MEMBERS OF CABINET.
TO ADJUST
BEND FLANGE AT UPPER AND/OR LOWER RIGHT HAND CORNER OF LEFT DOOR.

FRONT DOOR CATCHES
REQUIREMENT
WHEN CLOSED, DOORS SHOULD FIT FIRMLY AGAINST MAGNETIC CATCHES.
TO ADJUST
POSITION CATCHES WITH MOUNTING SCREWS LOOSENED.

Figure 5-153. Universal Cabinet (LBAC), Front Doors and Magnetic Door Catches

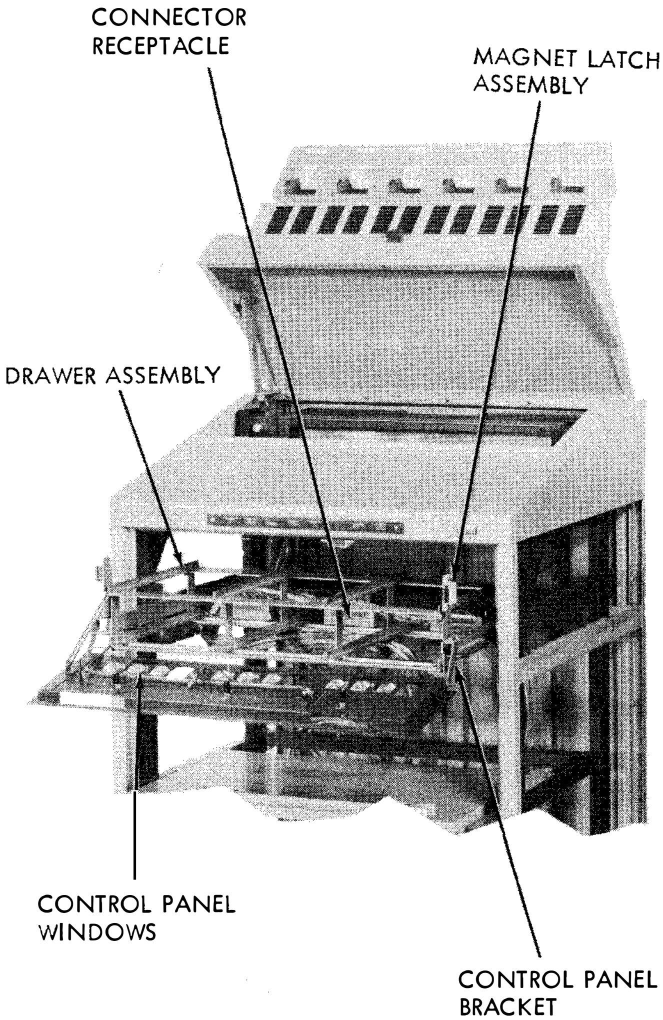
(A) REAR DOORS
REQUIREMENT --- WHEN FULLY CLOSED, DOORS SHOULD BE FLUSH WITH STRUCTURAL MEMBER OF CABINET
TO ADJUST --- BEND FLANGE AT UPPER RIGHT HAND CORNER OF LEFT DOOR (AS VIEWED FROM REAR).



(B) REAR DOOR CATCHES
REQUIREMENT
WHEN CLOSED, DOORS SHOULD FIT FIRMLY AGAINST MAGNETIC DOOR CATCHES.
TO ADJUST
POSITION CATCHES WITH MOUNTING SCREWS LOOSENED.

Figure 5-154. Universal Cabinet (LBAC), Rear Doors and Magnetic Door Catches

(A) NUMBERING MODULE ADJUSTMENT
(1) REQUIREMENT
EACH MODULE CENTERED ON ITS TRACK
(2) REQUIREMENT
CONNECTOR PLUG ON EACH MODULE ENGAGES ITS ASSOCIATED RECEPTACLE TO PERMIT QUICK CONNECT-DISCONNECT WITH LEAST INTERFERENCE.
TO ADJUST
(1) REMOVE DRAWER ASSEMBLY FROM CABINET. LOOSEN SHOULDER SCREW THAT GUIDES MODULE AT REAR OF DRAWER. LOOSEN SCREWS THAT MOUNT THE CONNECTOR RECEPTACLE, AND THE SCREWS THAT SECURE THE CONNECTOR BRACKET TO THE DRAWER. MOVE BRACKET TO REARMOST POSITION. INSERT AND CENTER MODULE. MAKE FRONT EDGE OF MODULE PARALLEL AND FLUSH WITH FRONT EDGE OF DRAWER CHANNEL. REMOVE MODULE AND TIGHTEN SHOULDER SCREW. CHECK AND REFINE.
(2) WITH MODULE RE-INSERTED AND SECURED, POSITION CONNECTOR BRACKET AND CONNECTOR SO RECEPTACLE FULLY ENGAGES PLUG. TIGHTEN BRACKET SCREWS AND THEN RECEPTACLE MOUNTING SCREWS.



(B) CONTROL PANEL ASSEMBLY
REQUIREMENT
CONTROL PANEL ON DRAWER ASSEMBLY POSITIONED SO NUMERALS ON MODULES ARE CENTRALLY LOCATED WITH RESPECT TO CONTROL PANEL WINDOWS.
TO ADJUST
(1) POSITION PANEL HORIZONTALLY WITH RIGHT AND LEFT BRACKET MOUNTING SCREWS LOOSENED.
(2) POSITION PANEL VERTICALLY WITH MAGNET BRACKET EXTENSION SHOULDER SCREW LOOSENED.

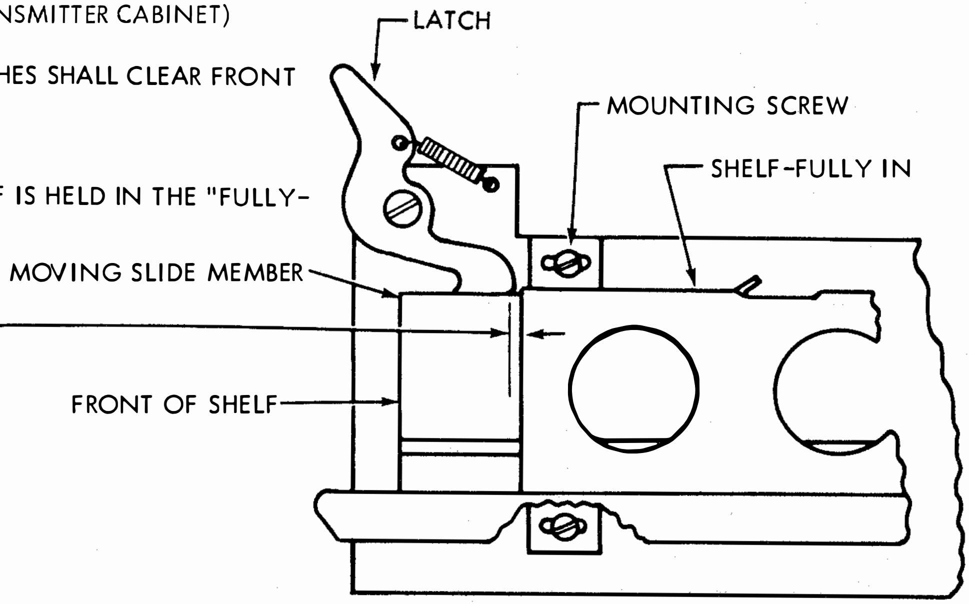
(C) CONTROL PANEL MAGNET ADJUSTMENT
REQUIREMENT
WHEN CLOSED, CONTROL PANEL EDGES SHOULD BE PARALLEL TO CABINET UPRIGHTS.
TO ADJUST
POSITION MAGNET LATCH ASSEMBLY WITH MOUNTING SCREWS LOOSENED.

Figure 5-155. Universal Cabinet (LBAC223BR), Control Panel Assembly

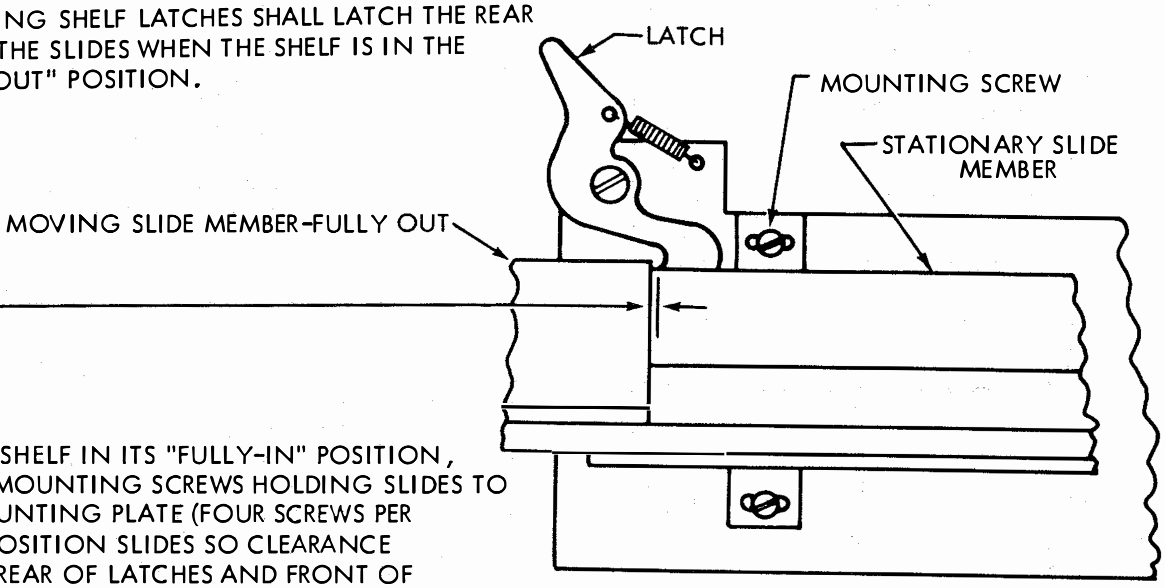
SLIDING SHELF LATCHES (TRANSMITTER CABINET)

REQUIREMENT

(1) THE SLIDING SHELF LATCHES SHALL CLEAR FRONT ENDS OF THE SHELF
MIN. SOME
MAX. 0.062 INCH
WHEN THE SLIDING SHELF IS HELD IN THE "FULLY-IN" POSITION.



(2) THE SLIDING SHELF LATCHES SHALL LATCH THE REAR END OF THE SLIDES WHEN THE SHELF IS IN THE "FULLY-OUT" POSITION.



TO ADJUST

(1) WITH THE SHELF IN ITS "FULLY-IN" POSITION, LOOSEN MOUNTING SCREWS HOLDING SLIDES TO THEIR MOUNTING PLATE (FOUR SCREWS PER SLIDE). POSITION SLIDES SO CLEARANCE BETWEEN REAR OF LATCHES AND FRONT OF SHELF IN REQUIREMENT (1) IS MET.

(2) RELEASE THE LATCHES AND PULL SHELF TO ITS "FULLY-OUT" POSITION. THE FRONT END OF THE LATCHES SHOULD ENGAGE THE REAR OF THE SLIDES. IF NOT REFINE ADJUSTMENT (1) UNTIL THE SHELF LATCHES IN BOTH POSITIONS.

Figure 5-155A. Transmitter Group Cabinet (With Sliding Shelves)

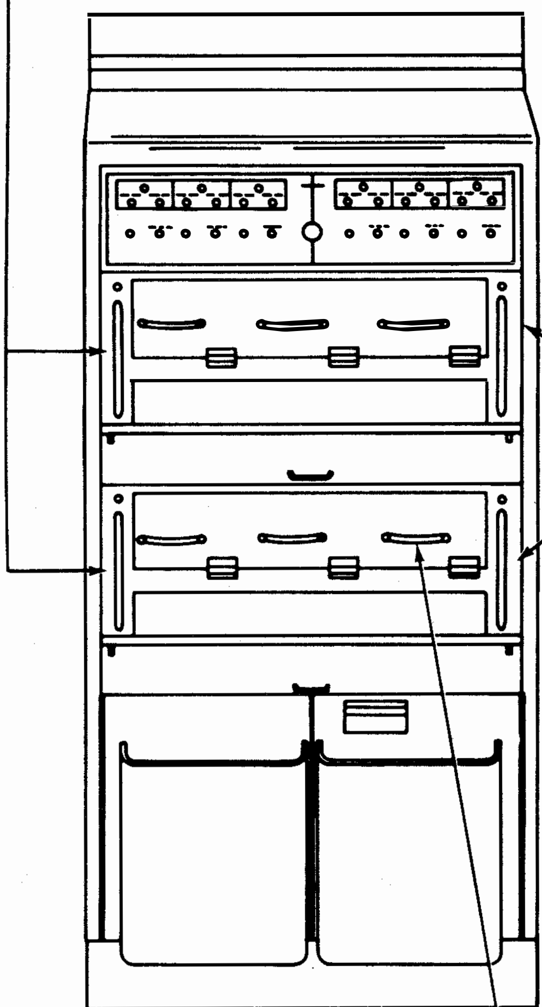
PANEL ASSEMBLY

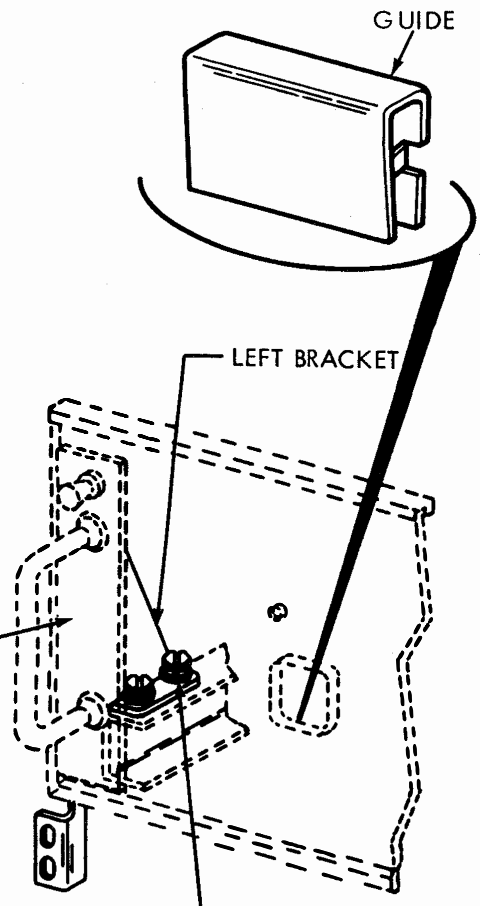
REQUIREMENT

THE PANEL ASSEMBLY SHOULD BE CENTRALLY LOCATED WITHIN THE OPENING OF THE CABINET FRAME.

TO ADJUST

LOOSEN THE SCREWS THAT MOUNT THE LEFT AND RIGHT MOUNTING BRACKETS AND POSITION THE MOUNTING BRACKETS.

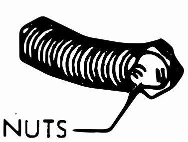




NOTE

TO PREVENT TAPES FROM CATCHING IN THE HORIZONTAL OPENINGS AND JAMMING BEHIND FRONT PANELS.

1. INSTALL ADHESIVE STRIPS ON THE LOWER EDGE OF EACH OF THE FRONT PANEL ASSEMBLIES.
2. INSTALL ADHESIVE STRIP ON THE TOP EDGE OF THE LOWER FRONT PANEL ASSEMBLY.
3. INSTALL ADHESIVE STRIP ON THE TOP EDGE TOWARD THE REAR OF THE LEFT AND RIGHT FRONT DOOR ASSEMBLIES.
4. INSTALL GUIDE SMOOTH SIDE TOWARD THE FRONT AND OPENING DOWN IN EACH OF THE TAPE EXIT HOLES ON THE FRONT PANELS. (REFER TO INSTALLATION SECTION)



TAPE CLIP SPRING

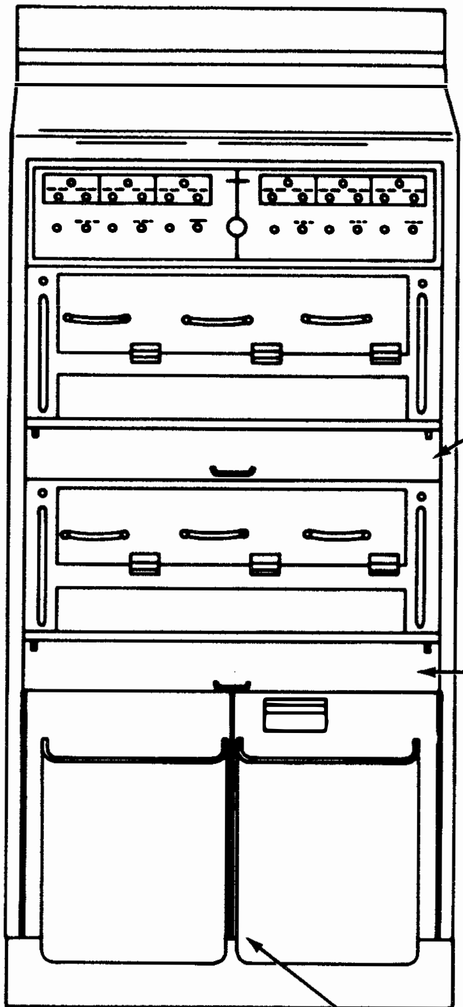
REQUIREMENT

THE ENDS OF TAPE CLIP SPRING SHALL BE FLUSH WITH EDGES OF CAP NUTS.

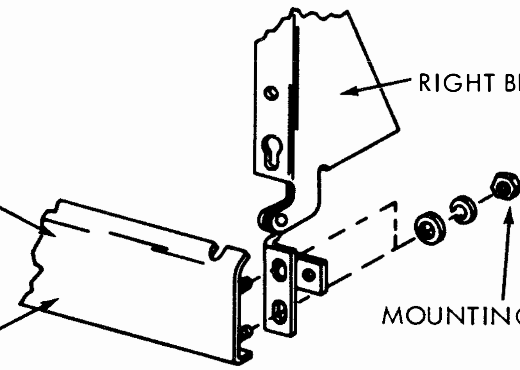
TO ADJUST

WITH THE SCREWS THAT SECURE THE TAPE CLIP SPRINGS TO THE PANEL FRICTION TIGHT. POSITION SPRINGS SO ENDS OF LOOPS ARE FLUSH WITH THE CAP NUTS.

Figure 5-155B. Receiving Group Cabinet, Front Enclosures



FRONT PLATE (UPPER SHELF)
REQUIREMENT
THE FRONT PLATE SHOULD BE CENTRALLY LOCATED BETWEEN BOTH UPPER AND LOWER SHELF PANEL ASSEMBLIES.
TO ADJUST
LOOSEN THE NUTS THAT MOUNT THE FRONT PLATE AND POSITION THE FRONT PLATE.



DOOR CATCH
REQUIREMENT
THE FRONT DOORS, WHEN FULLY CLOSED, SHALL FIT FIRMLY AGAINST THE MAGNETIC DOOR CATCH.
TO ADJUST
WITH THE SCREWS THAT MOUNT THE MAGNETIC DOOR CATCH TO THE CABINET FRICTION TIGHT. POSITION THE MAGNETIC DOOR CATCH.

FRONT PLATE (LOWER SHELF) AND DOORS
REQUIREMENT
THE FRONT PLATE SHOULD BE CENTRALLY LOCATED BETWEEN THE LOWER SHELF PANEL ASSEMBLY AND THE FRONT DOORS.
TO ADJUST
WITH NUTS THAT MOUNT THE FRONT PLATE AND THE SCREWS THAT MOUNT THE LEFT AND RIGHT DOORS FRICTION TIGHT. POSITION THE FRONT PLATE AND DOORS.

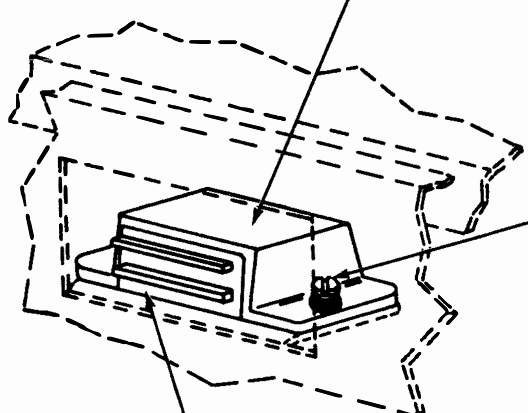


Figure 5-155C. Receiving Group Cabinet, Front Enclosures and Magnetic Door Catches

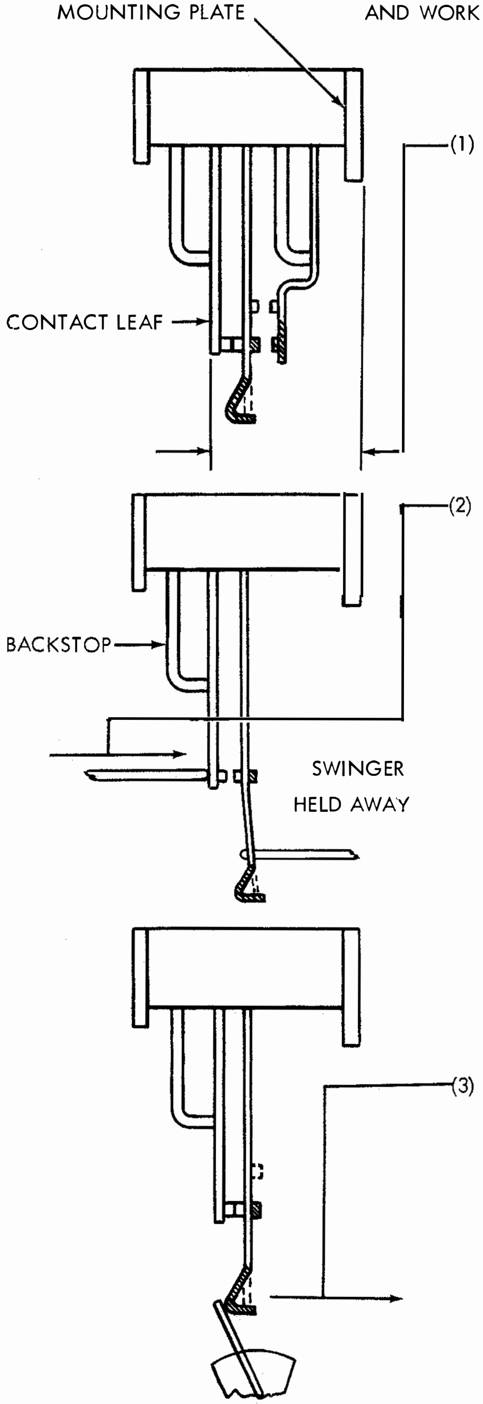
r. TANDEM MESSAGE IDENTIFICATION MODULE (173520) (LBAC223BR CABINET)

(A) CODE READING CONTACT ASSEMBLY ADJUSTMENT

NOTE

FOLLOWING ADJUSTMENTS TO BE MADE WITH CONTACT ASSEMBLIES REMOVED FROM MODULE. WHEN USING CONTACT SPRING BENDER, START WITH THE CONTACT PILE-UP FARTHEST FROM HANDLE OF TOOL AND WORK TOWARD CONTACT NEAREST TOOL HANDLE.

NOTE
CONTACT ASSEMBLY
EARLY DESIGN (BROKEN LINES)
LATEST DESIGN (SHADED AREAS)
MOUNTING PLATE



(1) BACKSTOP - NORMALLY CLOSED CONTACT

REQUIREMENT
FIVE NORMALLY CLOSED CONTACT LEAFS PARALLEL TO MOUNTING PLATE AND IN LINE WITH EACH OTHER AS GUAGED BY EYE.

TO ADJUST
BEND BACKSTOP

(2) SPRING TENSION - NORMALLY CLOSED CONTACT

REQUIREMENT
WITH SWINGER CONTACT HELD AWAY
MIN. 2 OZS.
MAX. 6 OZS.
TO MOVE EACH NORMALLY CLOSED LEAF AWAY FROM BACKSTOP.

TO ADJUST
BEND NORMALLY CLOSED LEAF SPRING

NOTE

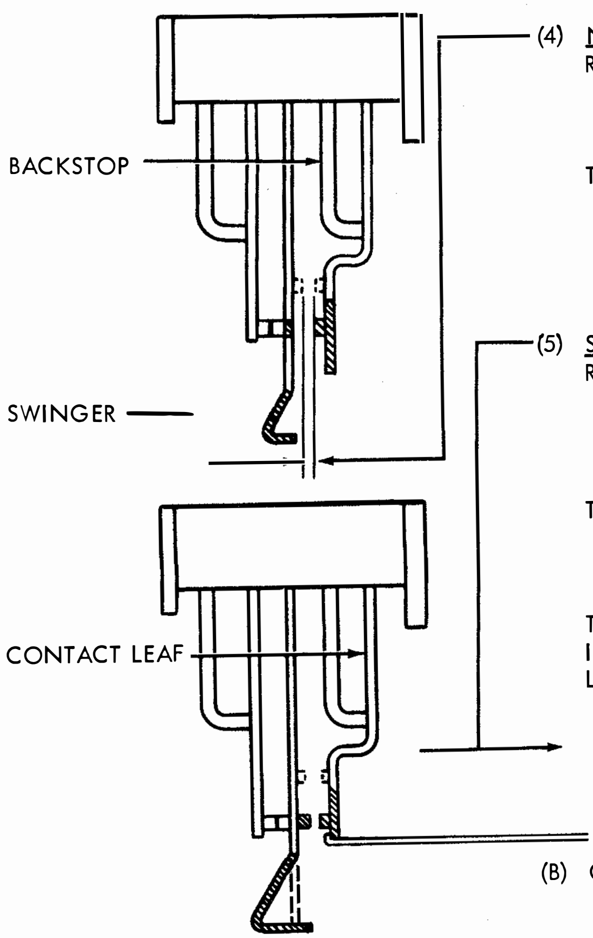
TO INCREASE TENSION OF NORMALLY CLOSED LEAF, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM LEAF, BEND LEAF, AND THEN REMAKE ADJUSTMENT (1).

(3) SWINGER SPRING TENSION

REQUIREMENT
MIN. 30 GRAMS
MAX. 40 GRAMS
TO OPEN NORMALLY CLOSED CONTACT

TO ADJUST
BEND SWINGER LEAF

Figure 5-156. Tandem Message Identification Module (173520), Code Reading Contact Assembly



(4) NORMALLY OPEN CONTACT GAP
REQUIREMENT
MAX. 0.010 INCH
MIN. 0.015 INCH
CLEARANCE
TO ADJUST
BEND NORMALLY OPEN CONTACT BACKSTOP

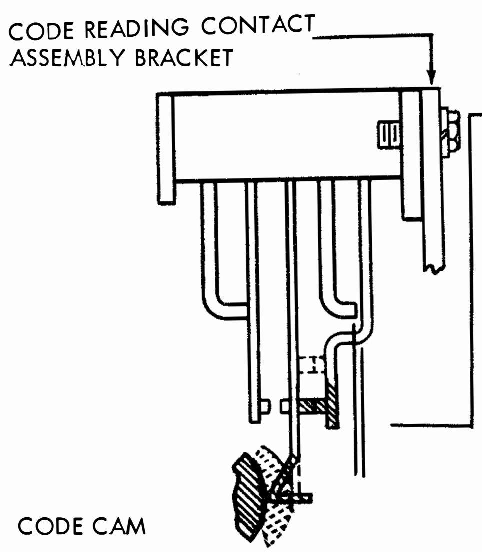
(5) SPRING TENSION - NORMALLY OPEN CONTACT
REQUIREMENT
MIN. 30 GRAMS
MAX. 40 GRAMS
TO MOVE EACH NORMALLY OPEN LEAF AWAY FROM ITS BACKSTOP
TO ADJUST
BEND NORMALLY OPEN LEAF SPRING

NOTE
TO INCREASE TENSION OF NORMALLY OPEN LEAF SPRING, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM LEAF, BEND LEAF, AND THEN REMAKE ADJUSTMENT (4).

NOTE
CONTACT ASSEMBLY
EARLY DESIGN (BROKEN LINES)
LATEST DESIGN (SHADED AREAS)

(B) CODE READING CONTACT ASSEMBLY ADJUSTMENT

NOTE
FOLLOWING ADJUSTMENTS TO BE MADE WITH CONTACT ASSEMBLIES MOUNTED ON THEIR BRACKETS, AND PLACED IN THE NUMBERING MODULE. BRACKET SHOULD BE APPROXIMATELY CENTERED IN ITS ADJUSTMENT RANGE.



(1) BRACKET ADJUSTMENT
REQUIREMENT
WITH SWINGER ON UPPER DWELL OF NUMBER ONE (TOP) CODE CAM
MIN. SOME
MAX. 0.015 INCH
CLEARANCE BETWEEN NORMALLY OPEN LEAF SPRING AND BACKSTOP
TO ADJUST
POSITION CONTACT ASSEMBLY MOUNTING BRACKET WITH ITS MOUNTING SCREWS FRICTION TIGHT.

(2) CODE READING CONTACT SWINGER ALIGNMENT
REQUIREMENT
CODE READING CONTACTS SHOULD BE APPROXIMATELY CENTERED ON THEIR ASSOCIATED CAM LOBES.
TO ADJUST
POSITION CONTACT ASSEMBLY WITH ITS MOUNTING SCREWS LOOSENED.

Figure 5-157. Tandem Message Identification Module (173520), Code Reading Contact Assembly

(A) FEED PAWL BACK STOP BRACKET

REQUIREMENT

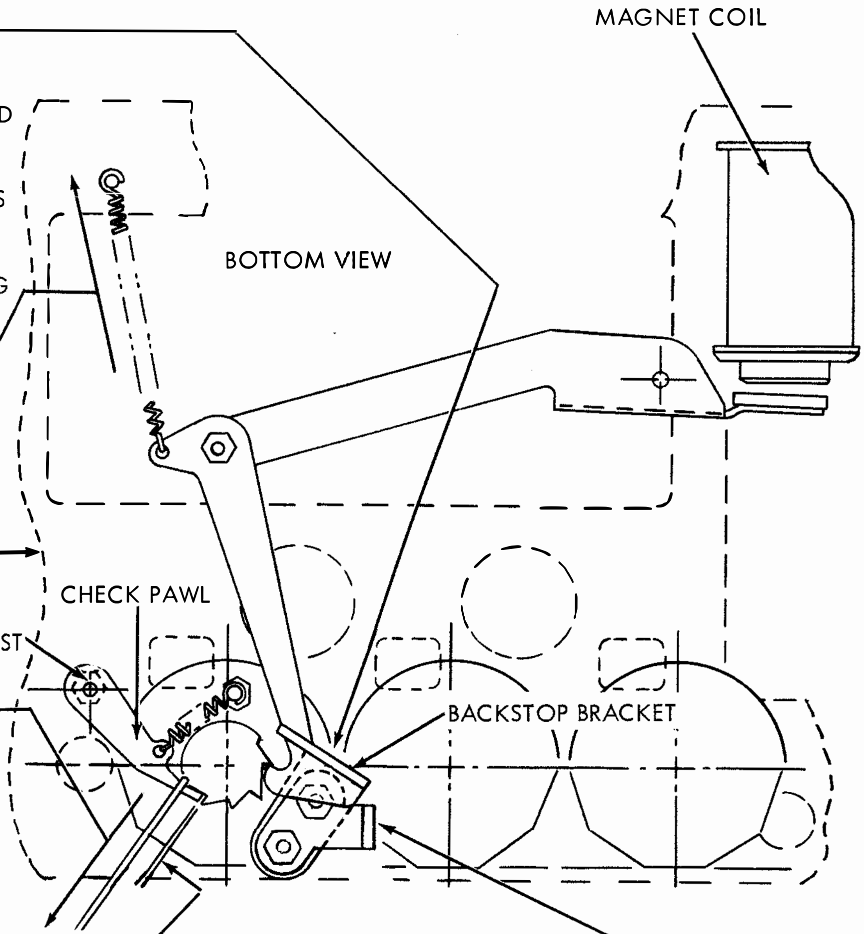
THE VERTICAL CENTERLINE OF THE NUMERAL "1" ON THE UNITS NUMBER DRUM SHALL BE APPROXIMATELY IN LINE WITH THE VERTICAL CENTERLINE OF ITS MOUNTING PLATE POST AS GAUGED BY EYE FROM A POSITION DIRECTLY IN FRONT OF THE NUMBERING ASSEMBLY.

TO ADJUST

LOOSEN THE SCREW THAT SECURES THE ECCENTRIC POST FOR THE CHECK PAWL. POSITION POST SO THAT THE CLEARANCE BETWEEN CHECK PAWL AND TOOTH IS GREATEST. (TO PREVENT ANY POSSIBLE JAMMING WHEN ADJUSTING BRACKET).

NOTE

THE NUMERALS OF THE 10 UNIT AND 100 UNIT DRUMS WHEN ASSEMBLED SHALL BE PERPENDICULAR TO THE MOUNTING PLATE. THE NUMERALS MAY BE 18 DEGREES OUT OF PHASE AND WILL REQUIRE ROTATING THE DRUM ONE TOOTH WHILE HOLDING SPUR GEAR STATIONARY.



FEED PAWL SPRING TENSION

REQUIREMENT

WITH MAGNET DE-ENERGIZED
MIN. 36 OZS.
MAX. 44 OZS.
TO PULL SPRING TO INSTALLED LENGTH

MOUNTING PLATE

ECCENTRIC POST

CHECK PAWL SPRING TENSION

REQUIREMENT

MIN. 1-1/2 OZS.
MAX. 3 OZS.
TO PULL PAWL AWAY FROM RATCHET

(C) CHECK PAWL ADJUSTMENT

REQUIREMENT

CLEARANCE BETWEEN END OF CHECK PAWL AND RATCHET TOOTH TO BE
MIN. SOME
MAX. 0.010 INCH
WHEN PLAY IN RATCHET IS TAKEN UP TO MAKE CLEARANCE LEAST.

TO ADJUST

POSITION CHECK PAWL ECCENTRIC POST. CHECK AT SEVERAL PLACES AROUND RATCHET.

(B) FEED PAWL AUXILIARY BACKSTOP ADJUSTMENT

(1) REQUIREMENT

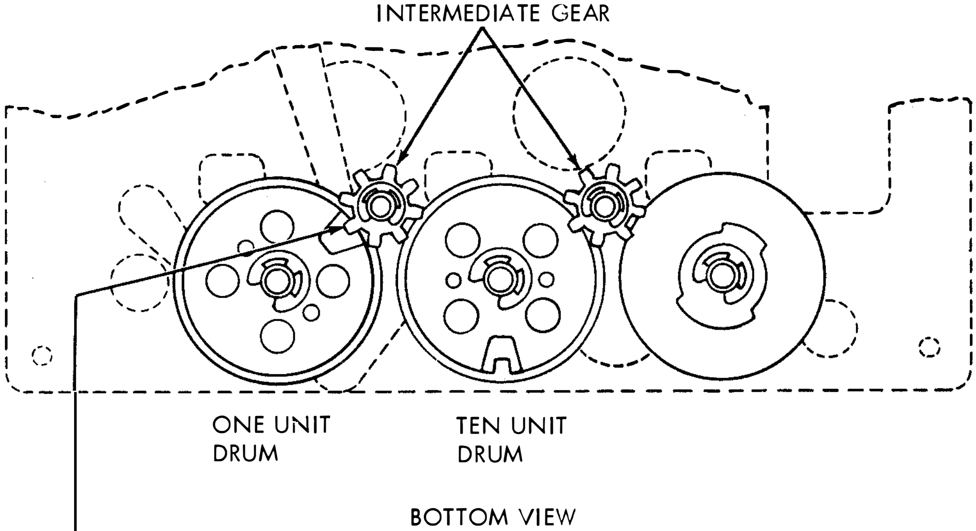
CLEARANCE BETWEEN FEED PAWL AND AUXILIARY STOP BRACKET TO BE
MIN. 0.015 INCH
MAX. 0.025 INCH
WHEN FEED PAWL IS AGAINST RATCHET TOOTH ALLOWING LEAST CLEARANCE.

(2) WHEN MANUALLY OPERATED, FEED PAWL SHOULD NOT TOUCH AUXILIARY BACKSTOP

TO ADJUST

POSITION THE AUXILIARY BACKSTOP WITH ITS MOUNTING NUTS LOOSENED.

Figure 5-158. Tandem Message Identification Module (173520), Feed and Check Pawls



INTERMEDIATE GEAR ADJUSTMENT

(1) REQUIREMENT

BARELY PERCEPTIBLE BACKLASH BETWEEN INTERMEDIATE GEAR TOOTH AND DISK ASSEMBLY TOOTH WHEN DISK IS HELD IN MIDDLE OF STEP. CHECK "UNIT" AND "TEN" DRUMS.

(2) REQUIREMENT

BARELY PERCEPTIBLE BACKLASH BETWEEN SPUR GEAR AND 20 TEETH GEAR AT POSITION OF MINIMUM CLEARANCE.

TO ADJUST

POSITION SPUR GEAR WITH ITS MOUNTING NUT LOOSENED.

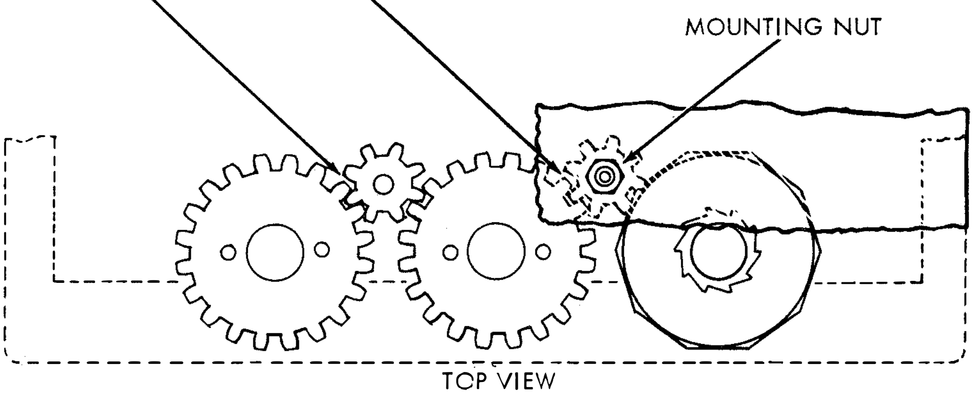
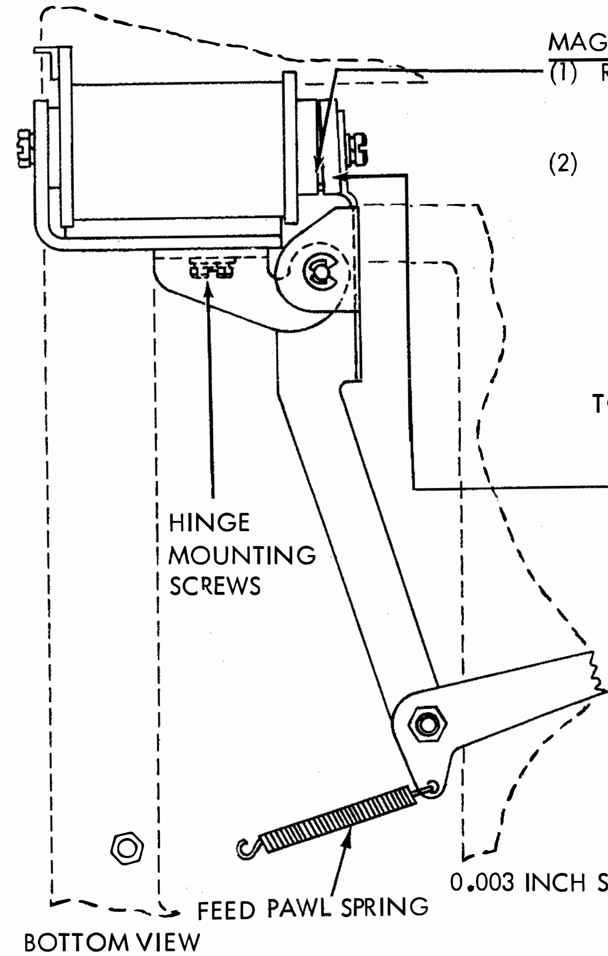


Figure 5-159. Tandem Message Identification Module (173520), Intermediate Gear



MAGNET ASSEMBLY

(1) REQUIREMENT

IN THE ENERGIZED POSITION, (UNDER POWER) THE ARMATURE SHOULD CONTACT THE ENTIRE CORE FACE.

(2) WITH THE FEED PAWL SPRING ENGAGED (UNIT NOT UNDER POWER). THERE SHALL BE SOME CLEARANCE BETWEEN THE FEED PAWL AND ALL RATCHET TEETH WHEN ARMATURE IS HELD UNDER POWER AGAINST CORE FACE. THE FEED PAWL SHALL NOT CLEAR AT LEAST ONE RATCHET TOOTH WHEN A 0.003 INCH SHIM STOCK IS HELD BETWEEN ARMATURE AND CORE FACE.

TO ADJUST

(1) DISENGAGE FEED PAWL SPRING AND LOOSEN HINGE MOUNTING SCREWS FRICTION TIGHT.

(2) PLACE A 0.002 INCH GAUGE BETWEEN ARMATURE AND CORE FACE AT POINT WHERE ARMATURE CONTACTS CORE FACE FIRST.

(3) PRESS ARMATURE AGAINST CORE FACE AND TIGHTEN HINGE MOUNTING SCREWS

(4) WITH LOCK NUT LOOSENED POSITION ARMATURE ECCENTRIC. KEEP MARK ON ECCENTRIC AWAY FROM MAGNET ASSEMBLY

NOTE

IF ADDITIONAL ADJUSTMENT RANGE IS NECESSARY TO MEET REQUIREMENTS, REPOSITION THE MAGNET ASSEMBLY WITH ITS MOUNTING SCREWS LOOSENED. REPOSITION FEED PAWL ECCENTRIC AS NECESSARY.

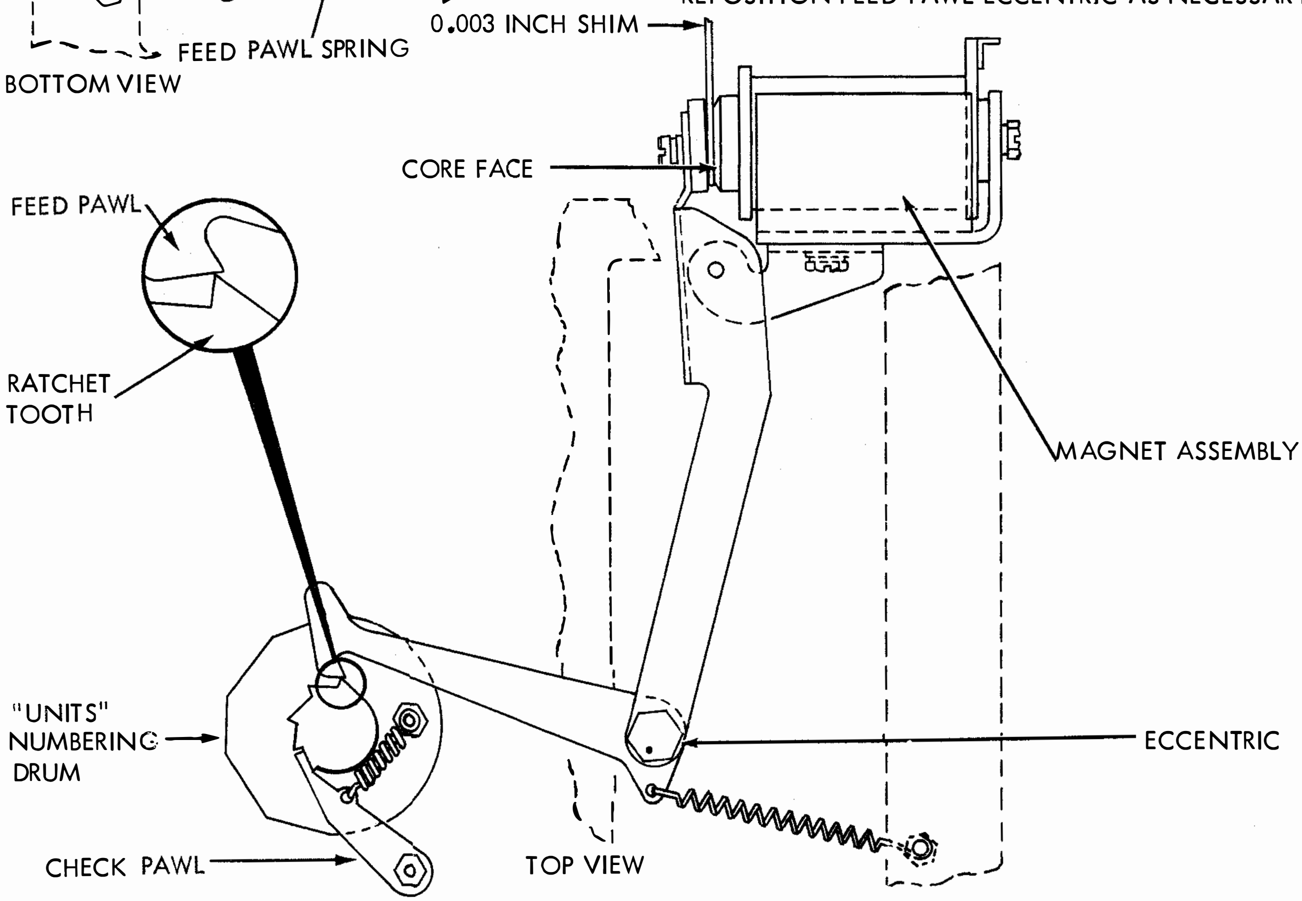
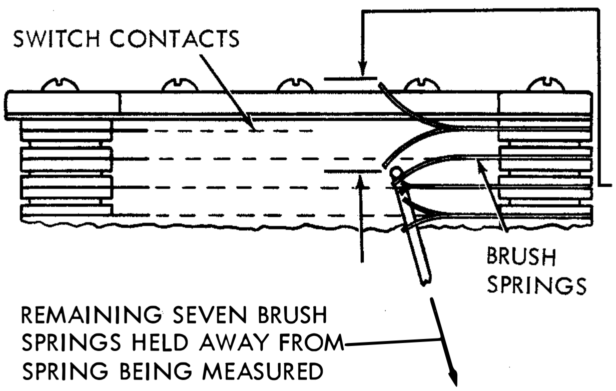


Figure 5-160. Tandem Message Identification Module (173520), Magnet Assembly

NOTE

ADJUSTMENTS ON THE RELAYS AND THE STEPPING SWITCH WILL NOT BE REQUIRED UNDER NORMAL CONDITIONS. IN EMERGENCY CASES, WHEN A REPLACEMENT IS NOT AVAILIABE OR DURING A MAJOR OVERHAUL, ADJUSTMENTS SHOULD BE MADE ONLY BY QUALIFIED PERSONNEL.

SWITCH BANK REMOVED FROM ASSEMBLY



BRUSH SPRING TENSION

(1) REQUIREMENT

BRUSH SPRINGS SHOULD REST AGAINST THE INNER HUB OF WIPER CONTACTS WITH ENOUGH TENSION TO INSURE GOOD ELECTRICAL CONTACT.

NOTE

UNDER NORMAL CONDITIONS THE BRUSH SPRINGS WILL NOT REQUIRE ADJUSTMENT DURING THE LIFE OF THE SWITCH. IF ADJUSTMENT IS NECESSARY, PROCEED AS FOLLOWS:

(2) REQUIREMENT

WITH SWITCH ASSEMBLY REMOVED FROM BANK, TENSION AND CURVE BRUSH SPRINGS TO OBTAIN A MINIMUM 1/2 INCH SEPARATION OF THE ENDS.

TO ADJUST

LOOSEN TWO BANK MOUNTING SCREWS AND REMOVE SWITCH ASSEMBLY. BEND BRUSH SPRINGS AS REQUIRED. REPLACE SWITCH ASSEMBLY.

CAUTION

USE EXTREME CARE WHEN REASSEMBLING THE SWITCH TO AVOID DAMAGE TO THE BRUSHES AND WIPERS.

WIPER SPRING ALIGNMENT AND TENSION

(1) REQUIREMENT

WIPERS SHOULD HAVE SUFFICIENT TENSION TO INSURE GOOD ELECTRICAL CONTACT WITH SWITCH BANK CONTACTS.

TO ADJUST

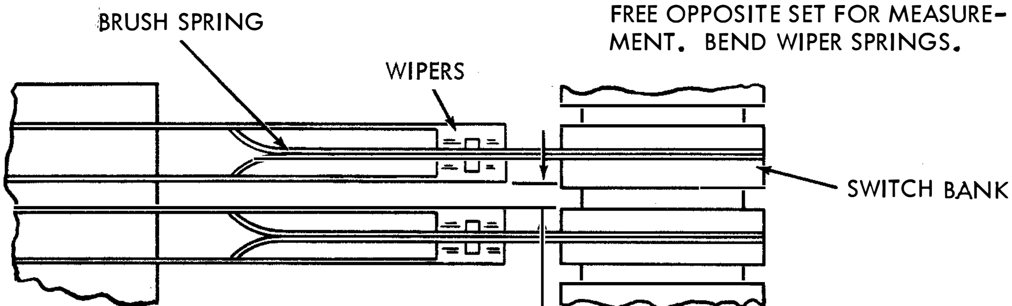
BEND WIPER SPRINGS

(2) REQUIREMENT

EACH SPRING OF A WIPER PAIR SHOULD HAVE SUFFICIENT TENSION TO FOLLOW ITS OPPOSING SPRING 0.094 INCH WHEN ITS OPPOSING SPRING IS DEFLECTED.

TO ADJUST

POSITION ONE SET OF WIPERS ON FIFTH SWITCH CONTACTS TO FREE OPPOSITE SET FOR MEASUREMENT. BEND WIPER SPRINGS.



VIEWED FROM RIGHT SIDE OF MODULE

(3) REQUIREMENT

ALIGN WIPER PAIRS SO THEY PASS ONTO BASE OF BRUSH SPRINGS WITHOUT EXCESSIVE MOVEMENT (0.015 INCH) TO ONE SIDE OR THE OTHER.

(4) REQUIREMENT

CLEARANCE BETWEEN WIPER SPRINGS OF ADJACENT WIPER PAIRS

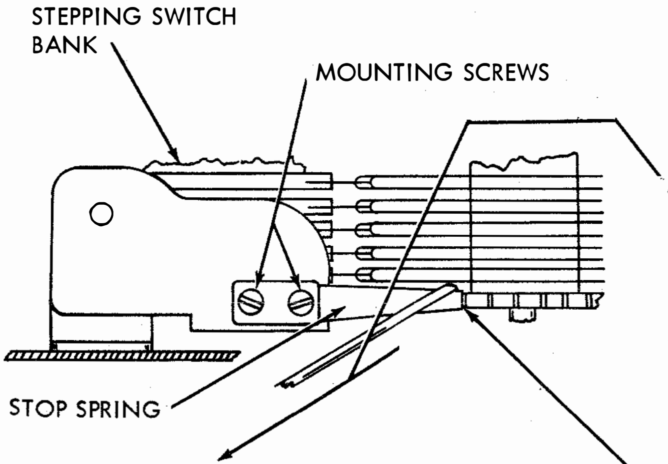
MINIMUM 0.062 INCH

WITH WIPERS RESTING ON BANK CONTACTS

TO ADJUST

BEND WIPER SPRINGS

Figure 5-161. Tandem Message Identification Module (173520), Stepping Switch Assembly



RATCHET STOPPING SPRING TENSION

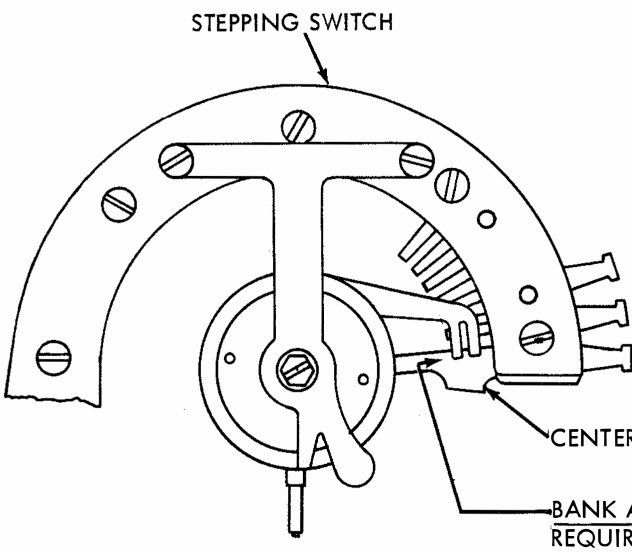
REQUIREMENT
SPRING TENSION AGAINST RATCHET WHEEL
MIN. 2-1/2 OZS.
MAX. 4-1/2 OZS.
MEASURED AT SPRING TIP.

TO ADJUST
BEND RATCHET STOPPING SPRING

RATCHET STOPPING SPRING ALIGNMENT

REQUIREMENT
WITH PLAY BETWEEN FEED PAWL AND RATCHET WHEEL TAKEN UP IN CLOCKWISE DIRECTION AND THE ARMATURE IN THE UNOPERATED POSITION.
MIN. SOME
MAX. 0.003 INCH
CLEARANCE BETWEEN SPRING TIP AND RADIAL SURFACE OF RATCHET TOOTH.

TO ADJUST
POSITION SPRING WITH MOUNTING SCREWS LOOSENED.



TOP VIEW

BANK ALIGNMENT

REQUIREMENT
THE EDGE OF THE WIPERS SHALL LIE ON THE CENTER THIRD OF THE ZERO CONTACTS.

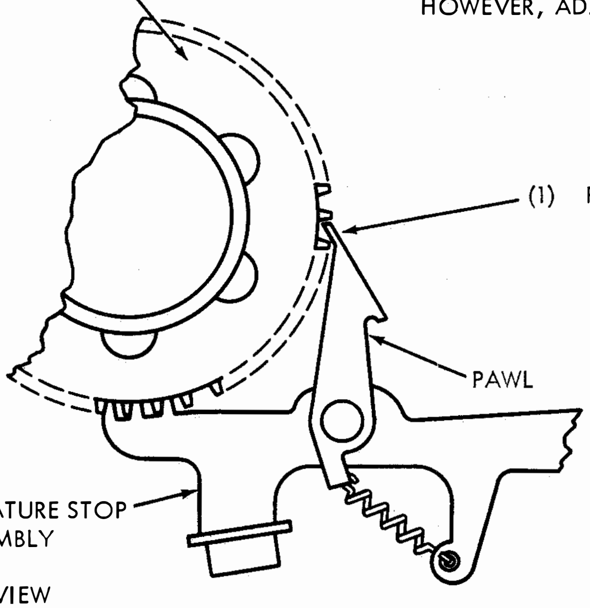
TO ADJUST
POSITION BANK ASSEMBLY WITH MOUNTING SCREWS LOOSENED.

Figure 5-162. Tandem Message Identification Module (173520), Stepping Switch Assembly

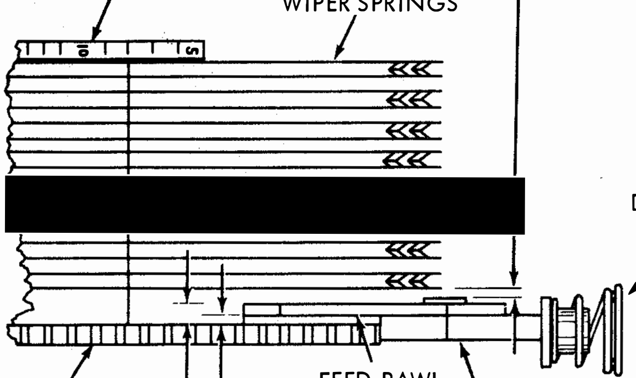
(A) ARMATURE ASSEMBLY ALIGNMENT

NOTE

UNDER NORMAL CONDITIONS THE ARMATURE ASSEMBLY SHOULD NOT REQUIRE ADJUSTMENT DURING THE LIFE OF THE SWITCH. IF, HOWEVER, ADJUSTMENT IS NECESSARY PROCEED AS FOLLOWS:



(1) REQUIREMENT
EDGES OF FEED PAWL SHOULD BE PARALLEL TO RATCHET WHEEL SIDE AND TOP OF FEED PAWL SHOULD BE PARALLEL TO EDGE OF RATCHET TEETH. GAUGE BY EYE.



(2) REQUIREMENT
MIN. 0.031 INCH
CLEARANCE BETWEEN WIPER SPRINGS AND FEED PAWL

(3) REQUIREMENT
HORIZONTAL SURFACE OF ARMATURE STOPPING TEETH TO PROJECT ABOVE OR BELOW HORIZONTAL SURFACE OF RATCHET GEAR
MIN. 0 INCH
MAX. 0.010 INCH

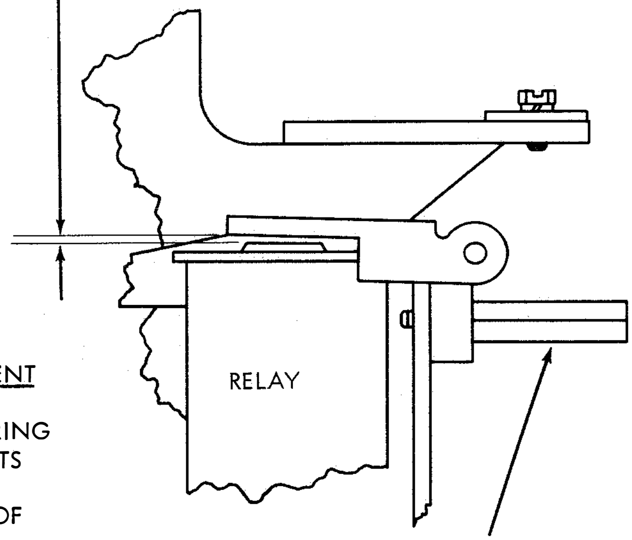
(4) REQUIREMENT
HORIZONTAL EDGE OF FEED PAWL TO PROJECT
MIN. 0.015 INCH
MAX. 0.094 INCH
ABOVE HORIZONTAL SURFACE OF RATCHET GEAR IS ALLOWED BY ARMATURE AND PAWL BEARING PLAY

Figure 5-163. Tandem Message Identification Module (173520), Stepping Switch Assembly

(5) REQUIREMENT
AIRLINE CLEARANCE
MIN. 0.003 INCH
MAX. 0.015 INCH
WITH ARMATURE ELECTRICALLY OPERATED

(6) REQUIREMENT
ARMATURE SHOULD CLEAR, AND BE PARALLEL TO HEEL PIECE AS GAUGED BY EYE.

TO ADJUST
POSITION ARMATURE ASSEMBLY WITH HEEL MOUNTING SCREWS LOOSENED.



(B) INTERRUPTER ADJUSTMENTS

(1) INTERRUPTER SWINGER AND CONTACT ALIGNMENT
REQUIREMENT
ARMATURE ARM TO STRIKE SWINGER LEVER SPRING BUSHING CENTRALLY. INTERRUPTER CONTACTS TO BE ALIGNED WITHIN 1/5 OF THEIR FACE DIAMETER, AND MAKE CONTACT AT CENTER OF THEIR FACES.
TO ADJUST
POSITION INTERRUPTER CONTACTS WITH SPRING ASSEMBLY MOUNTING SCREWS LOOSENED.

(3) INTERRUPTER SWINGER TENSION
REQUIREMENT
MIN. 9-1/2 OZS.
MAX. 14 OZS.
TO JUST SEPARATE SWINGER FROM NORMALLY CLOSED CONTACT.
TO ADJUST
BEND SWINGER. RECHECK (2).

(2) INTERRUPTER CONTACT GAP
REQUIREMENT
GAPS BETWEEN NORMALLY CLOSED CONTACT AND SWINGER, AND NORMALLY OPEN CONTACT AND SWINGER
MIN. 0.008 INCH
TO ADJUST
BEND CONTACT SPRINGS

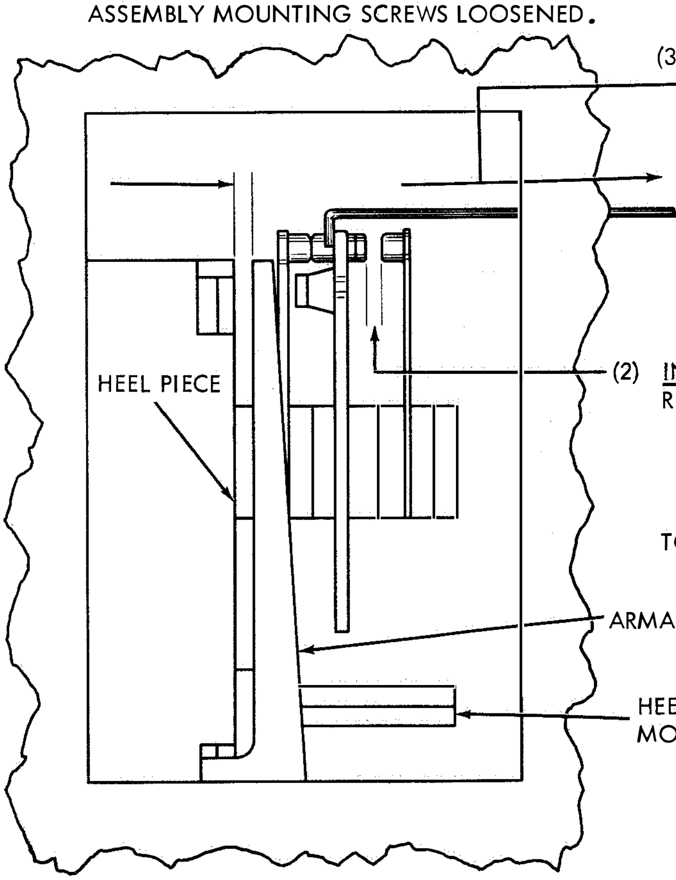


Figure 5-164. Tandem Message Identification Module (173520), Stepping Switch Assembly

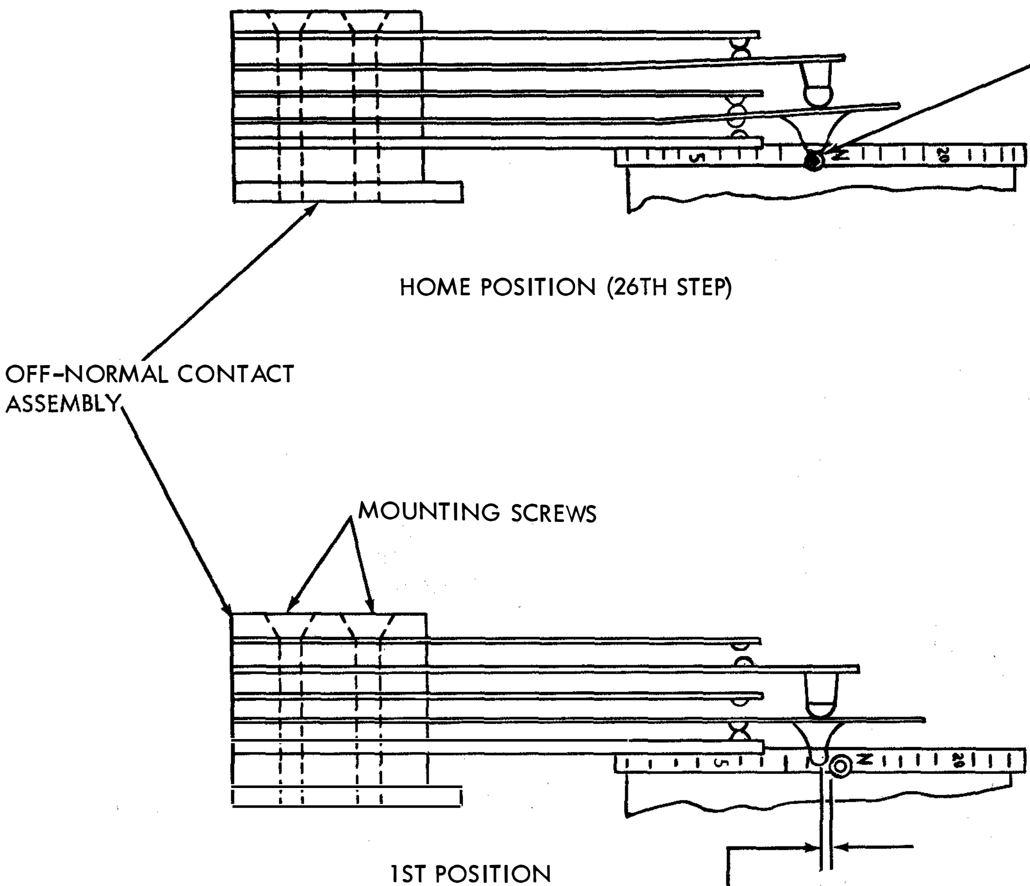
(A) OFF-NORMAL SWINGER ALIGNMENT

(1) REQUIREMENT

APEX OF "V" FORM ON LOWER SWINGER APPROXIMATELY CENTERED ON OFF-NORMAL ARM ACTUATING BUSHING WHEN SWITCH IS ON 26TH STEP.

(2) REQUIREMENT

EITHER EDGE OF "V" FORM
MIN. 1/32 INCH
FROM EDGES OF ACTUATING BUSHING



(3) REQUIREMENT

CLEARANCE BETWEEN "V" FORM AND ACTUATING BUSHING
MIN. 0.010 INCH
WHEN SWITCH IS ON 25TH OR 1ST STEP AND WIPER ASSEMBLY PLAY IS TAKEN UP IN THE CLOCKWISE DIRECTION.

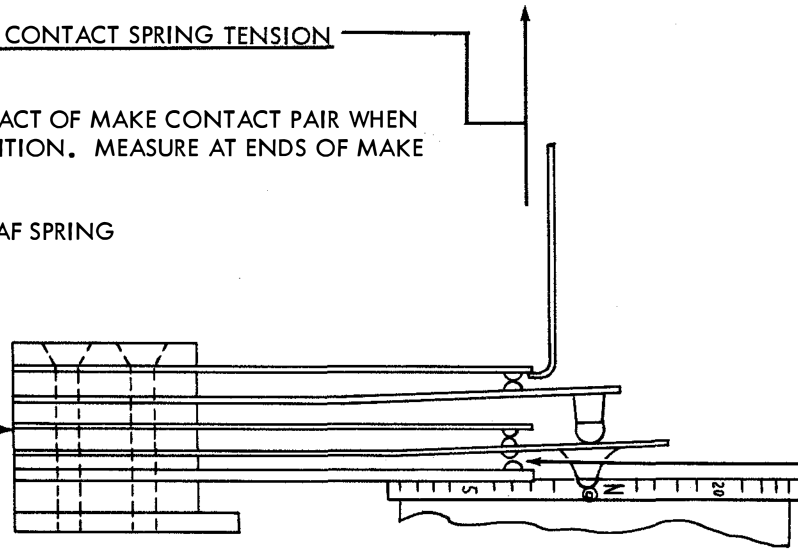
TO ADJUST

POSITION OFF-NORMAL SWITCH ASSEMBLY WITH MOUNTING SCREWS LOOSENED.

Figure 5-165. Tandem Message Identification Module (173520), Stepping Switch Assembly

(D) OFF-NORMAL SWITCH MAKE CONTACT SPRING TENSION
REQUIREMENT
MIN. 0.015 GRAMS
TO SEPARATE EACH CONTACT OF MAKE CONTACT PAIR WHEN SWITCH IS ON HOME POSITION. MEASURE AT ENDS OF MAKE CONTACT SPRING LEAF
TO ADJUST
BEND MAKE CONTACT LEAF SPRING

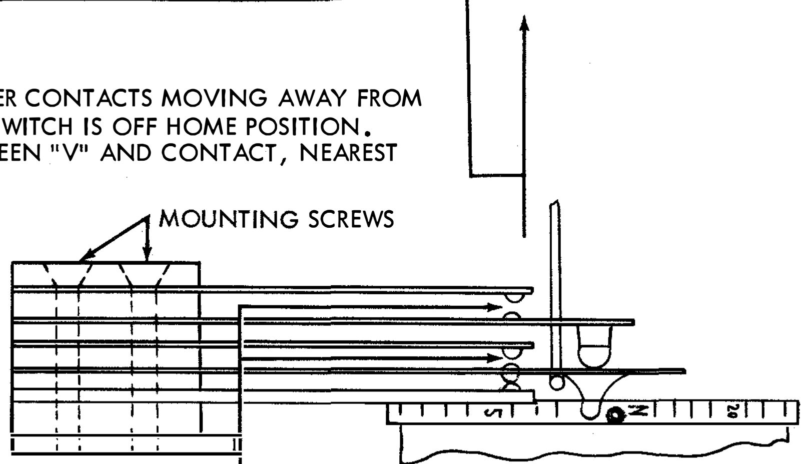
OFF-NORMAL CONTACT ASSEMBLY



HOME POSITION (26TH STEP)

(C) OFF-NORMAL SWITCH BREAK CONTACT SPRING TENSION
REQUIREMENT
MIN. 35 GRAMS
MAX. 50 GRAMS
TO START LOWER SWINGER CONTACTS MOVING AWAY FROM BREAK CONTACT WHEN SWITCH IS OFF HOME POSITION. MEASURE AT POINT BETWEEN "V" AND CONTACT, NEAREST TO "V".
TO ADJUST
BEND SWINGER

MOUNTING SCREWS



(B) OFF-NORMAL SWITCH BREAK AND MAKE CONTACT GAPS

NOTE

BREAK COMBINATIONS ARE THOSE WHICH ARE OPEN WHEN SWITCH IS IN HOME POSITION. MAKE COMBINATIONS ARE THOSE WHICH ARE CLOSED WHEN SWITCH IS IN HOME POSITION.

(1) REQUIREMENT
BREAK CONTACT SEPARATION
MIN. 0.008 INCH
WHEN SWITCH IS ON HOME POSITION.
TO ADJUST
BEND BREAK CONTACT SPRING LEAF

(2) REQUIREMENT
MAKE CONTACT SEPARATION
MIN. 0.008 INCH
WHEN SWITCH IS OFF HOME POSITION
TO ADJUST
BEND MAKE CONTACT SPRING LEAF

Figure 5-166. Tandem Message Identification Module (173520), Stepping Switch Assembly

5-3. LUBRICATION

a. GENERAL

(1) This section provides lubrication information for the Model 28 Teletype equipment contained in this manual. On the following pages the general areas of the equipment are shown by photographs. The specific points to receive lubricant are indicated by line drawings and descriptive text. The symbols in the text indicate the following directions:

- O Apply one drop of oil.
- O2 Apply two drops of oil.
- O3 Apply three drops of oil, etc.
- G Apply thin coat of grease.
- SAT Saturate with oil (felt washers, etc.)
- L Apply Lubriplate

Use following lubricants:

Oil - Teletype KS7470 oil.
Grease - Teletype KS7471 grease.
Grease - (Lubriplate 105) Teletype 108805 grease.
Grease - (Beacon 325 grease or its equivalent) Teletype 195298 grease.

(2) The equipment should be thoroughly lubricated, but over-lubrication which might allow oil to drop or grease to be thrown on other parts should be avoided. Special care should be exercised to prevent lubricant from getting between armatures and pole faces or between electrical contact points. The following general instructions supplement the specific lubricating points illustrated on subsequent pages:

Apply one drop of oil to all spring hooks.
Apply a light film of oil to all cam surfaces.
Apply a thick coat of grease to all gears.
Saturate all felt washers, oilers, etc.
Apply oil to all pivot points.
Apply oil to all sliding surfaces.

(3) All equipment should be lubricated before being placed in service or prior to storage. After a few weeks of service, relubricate to make certain that all specified points have received lubricant. Thereafter, the following schedule should be adhered to:

Operating Speed	Lubrication Interval
65 WPM	3000 hours or 1 year*
106 WPM	1500 hours or 6 months*

*Whichever occurs first.

b. TYPING REPERFORATORS

NOTE
FOLLOWING LUBRICATION INSTRUCTIONS PERTAIN TO THE LPR34, LPR35, AND LPR37 TYPING REPERFORATORS UNLESS OTHERWISE SPECIFIED.

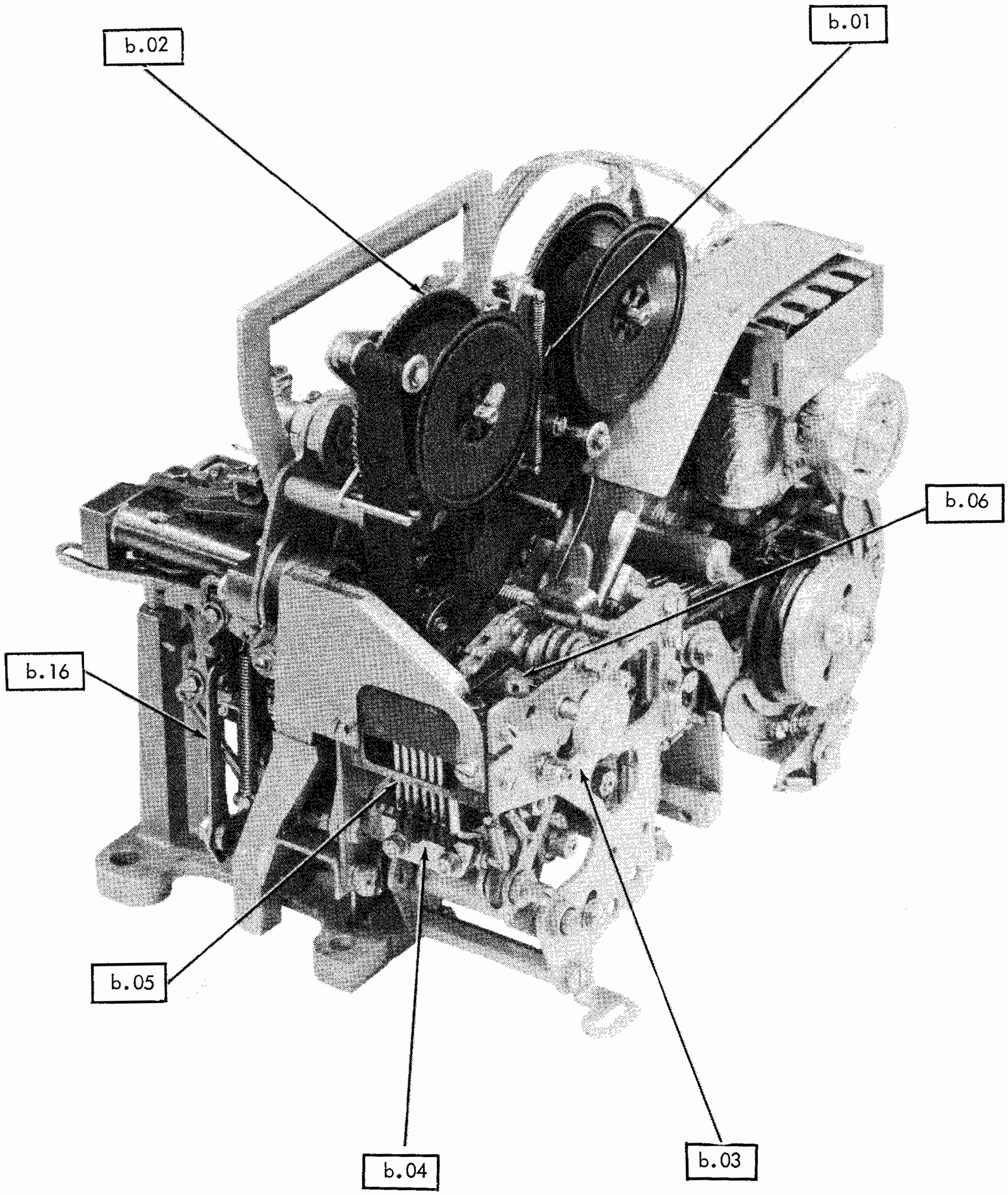
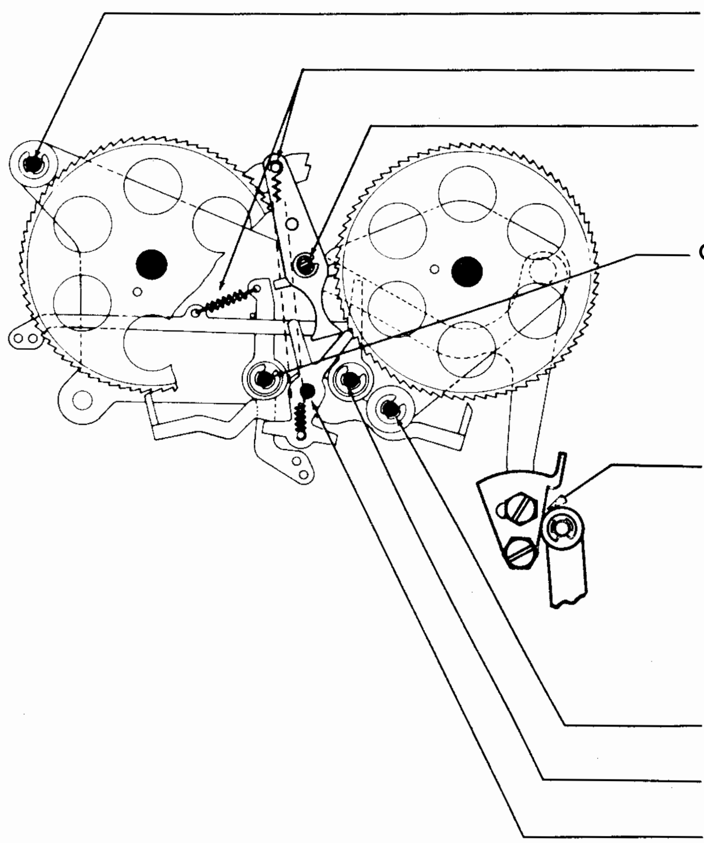


Figure 5-167. Typing Reperforators

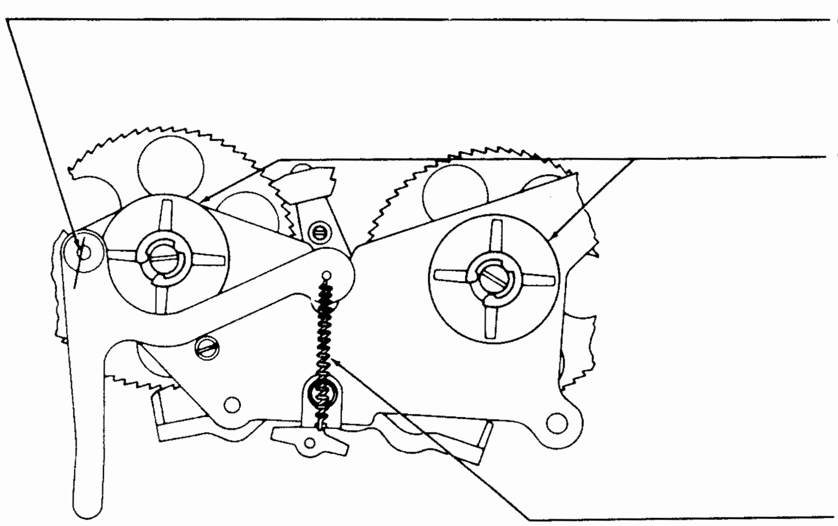
b. TYPING REPERFORATOR

b.01 RIBBON FEED MECHANISM EARLY DESIGN (FOR LATEST DESIGN SEE PARAGRAPH b.C1a)



O2	PIVOT POINTS (2)	RIBBON ROLLER
O	HOOKS - EACH END (2)	SPRINGS
O2	PIVOT POINT	FEED PAWL
O2	PIVOT POINTS (2)	REVERSING ARM
G	CONTACT SURFACE ADJUSTABLE DRIVE ARM	
O2	PIVOT POINTS (2)	RIBBON ROLLER
O2	PIVOT POINTS (2)	REVERSING ARM
O2	PIVOT POINT	REVERSING LEVER RETAINING PAWL

b.02 RIBBON FEED MECHANISM EARLY DESIGN (FOR LATEST DESIGN SEE PARAGRAPH b.C1b)

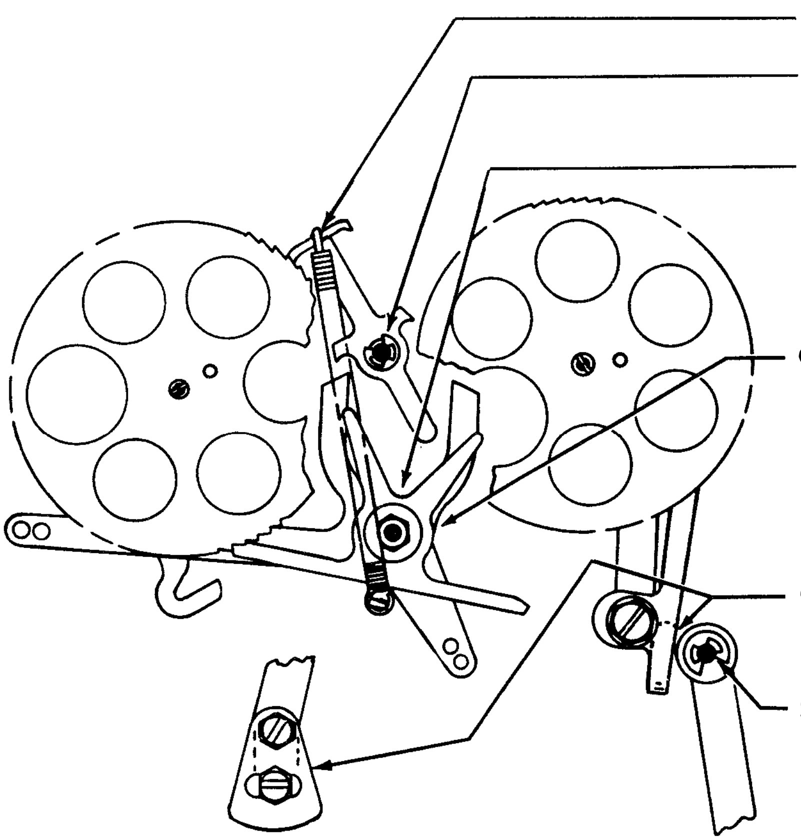


O2	PIVOT POINT	DRIVE ARM
SAT	PIVOT POINTS (2) (FELT WASHERS)	SHAFTS
O	HOOKS - EACH END	SPRING

(REAR VIEW)

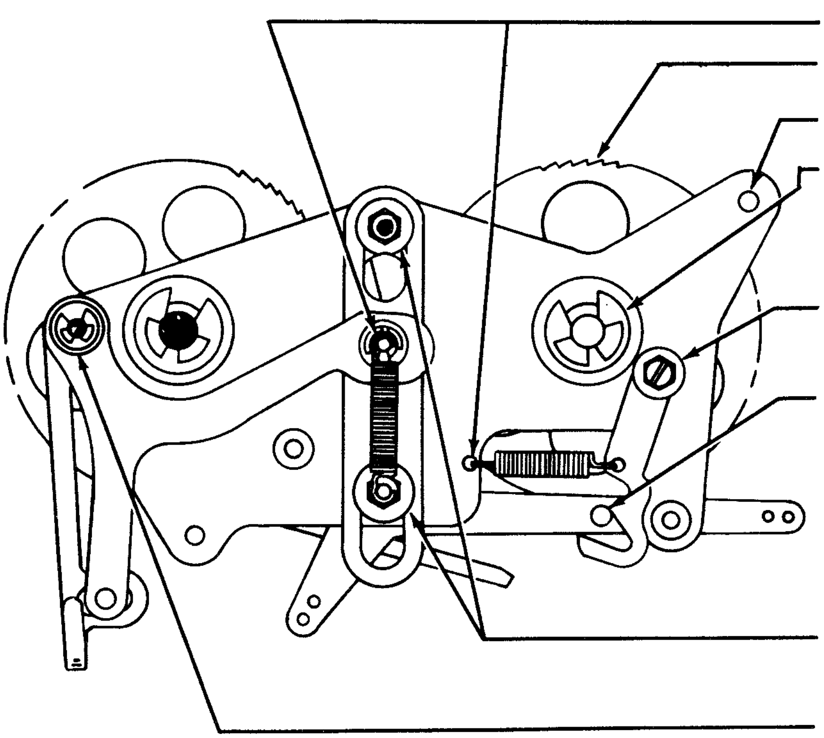
Figure 5-168. Typing Reperforator

b.01a RIBBON FEED MECHANISM LATEST DESIGN (FOR EARLY DESIGN SEE PARAGRAPH b.01)



O	HOOKS (2)	SPRING
O2	PIVOT POINT	FEED PAWL
O2	PIVOT	CHECK PAWL
O2	PIVOT POINTS (2)	REVERSING ARM
G	CONTACTING SURFACE	DRIVE ARM ADJUSTABLE EXTENSION
SAT	FELT WASHER	DRIVE ARM ROLLER

b.01b RIBBON FEED MECHANISM LATEST DESIGN (FOR EARLY DESIGN SEE PARAGRAPH b.02)

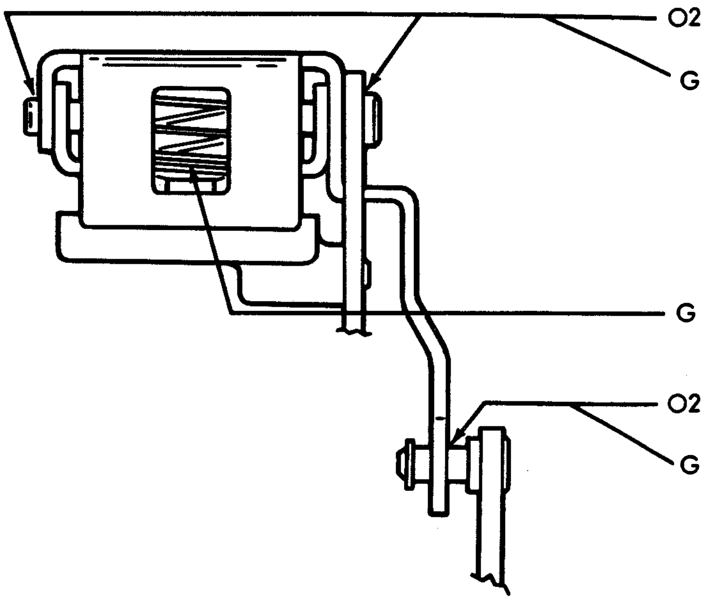


O	HOOKS (2)	SPRINGS (2)
G	TEETH	RATCHET WHEEL
O2	SHAFT	ROLLERS (2)
O2	SHAFT, FELT WASHERS	RATCHET WHEEL
O2	PIVOT	DETENT
G	CONTACTING SURFACES	DETENT
O2	UPPER AND LOWER BUSHING	SLIDE LEVER
O2	PIVOT	DRIVE ARM

(REAR VIEW)

Figure 5-168 A. Typing Reperforator

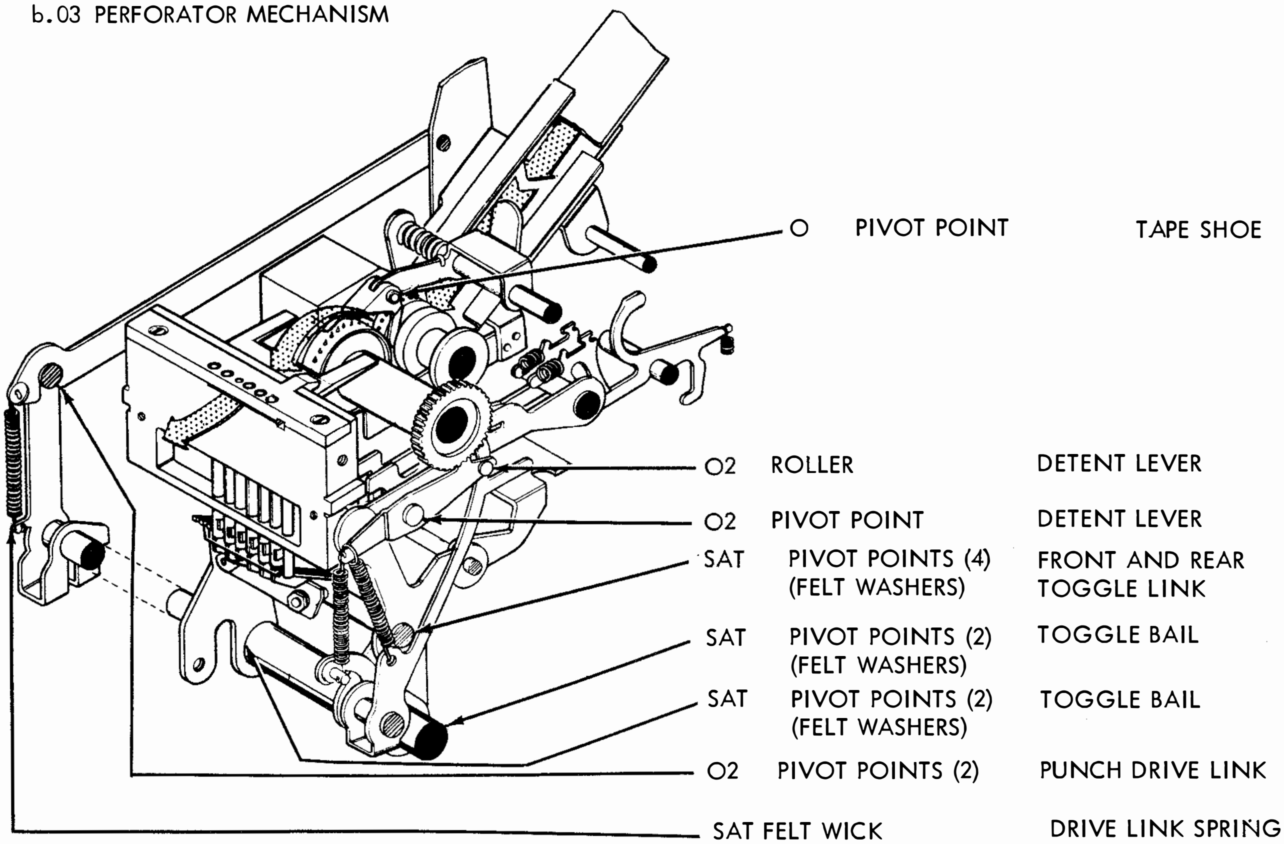
b.01c **Tape Depressor Mechanism**



PIVOT POINTS	TAPE DEPRESSOR
CONTACTING SURFACES - EACH END	CLAMP PLATE SPRING
ROLLER SURFACE	DRIVE ROLLER

Figure 5-168B. Typing Reperforator

b.03 PERFORATOR MECHANISM



b.04 PERFORATOR MECHANISM

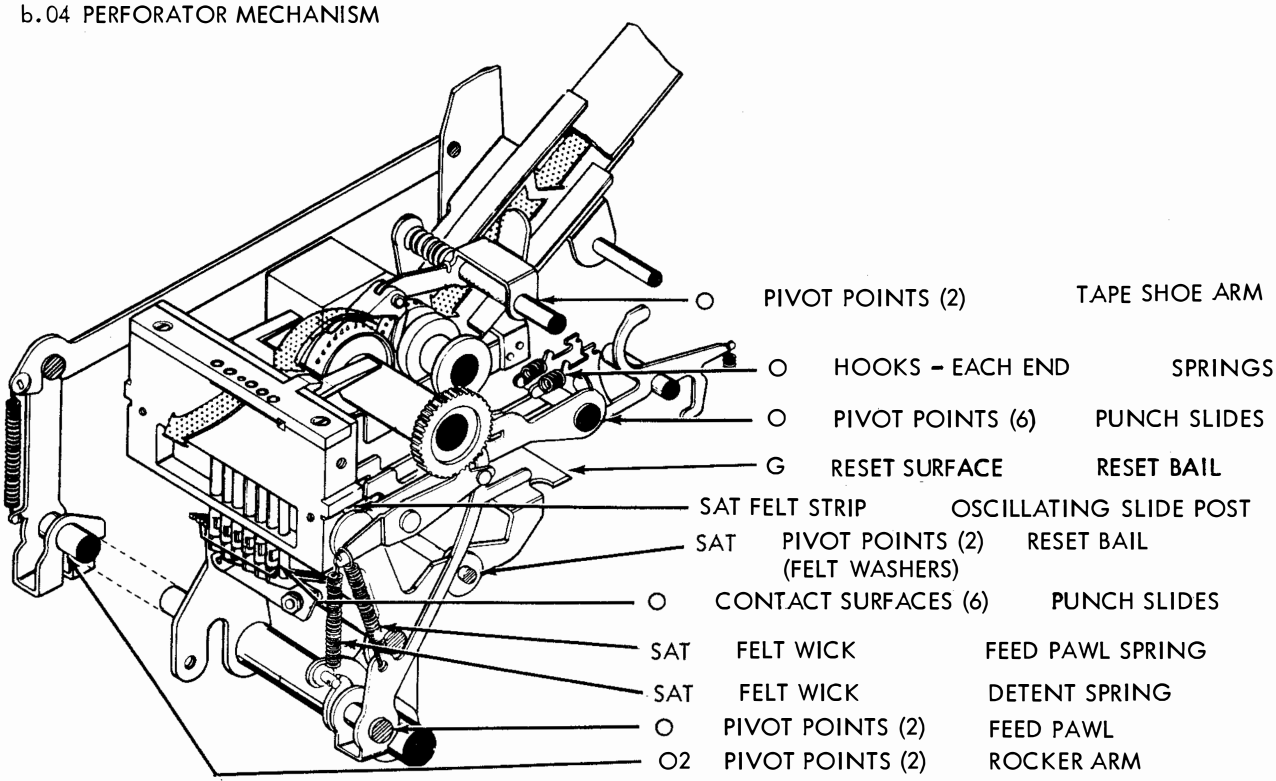
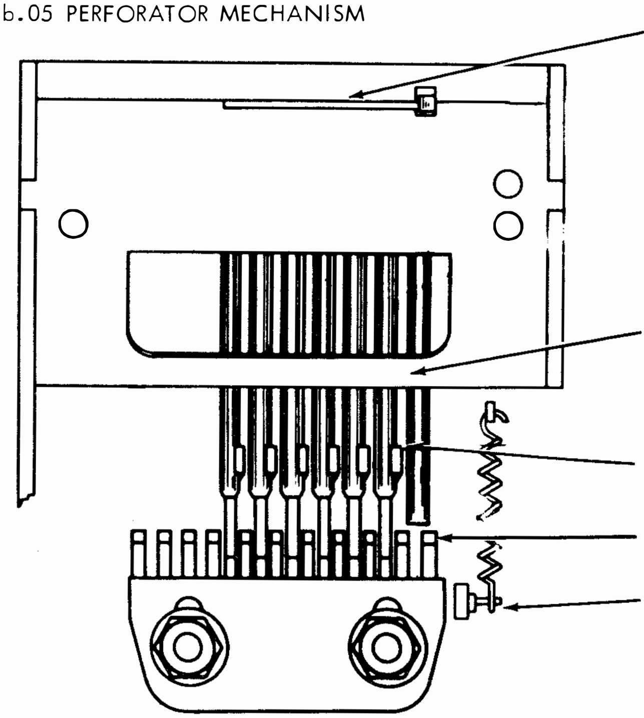


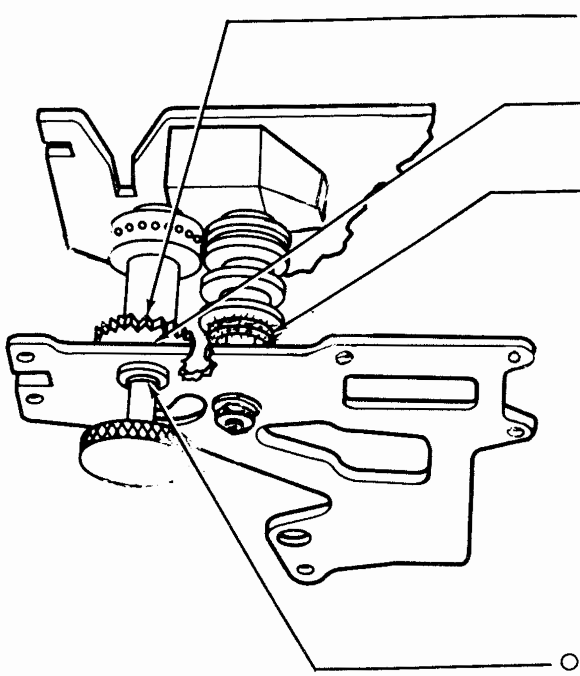
Figure 5-169. Typing Reperforators

b.05 PERFORATOR MECHANISM



O	SLIDING SURFACE (6) (UPPER GUIDE)	PUNCH PIN
O	SLIDING SURFACE (6) (LOWER GUIDE)	PUNCH PIN
O	SLIDING SURFACE (6)	PUNCH PIN
O	SLIDING SURFACE (6)	PUNCH SLIDE GUIDE
O	HOOKS-EACH END	SPRING

b.06 PERFORATOR MECHANISM



G	RATCHET TEETH (2)	FEED WHEEL
SAT	PIVOT POINT (FELT WASHER)	FEED WHEEL
SAT	PIVOT POINT (FELT WASHER)	DIE WHEEL
O2	PIVOT POINTS (2)	HANDWHEEL BEARING

Figure 5-170. Typing Reperforators

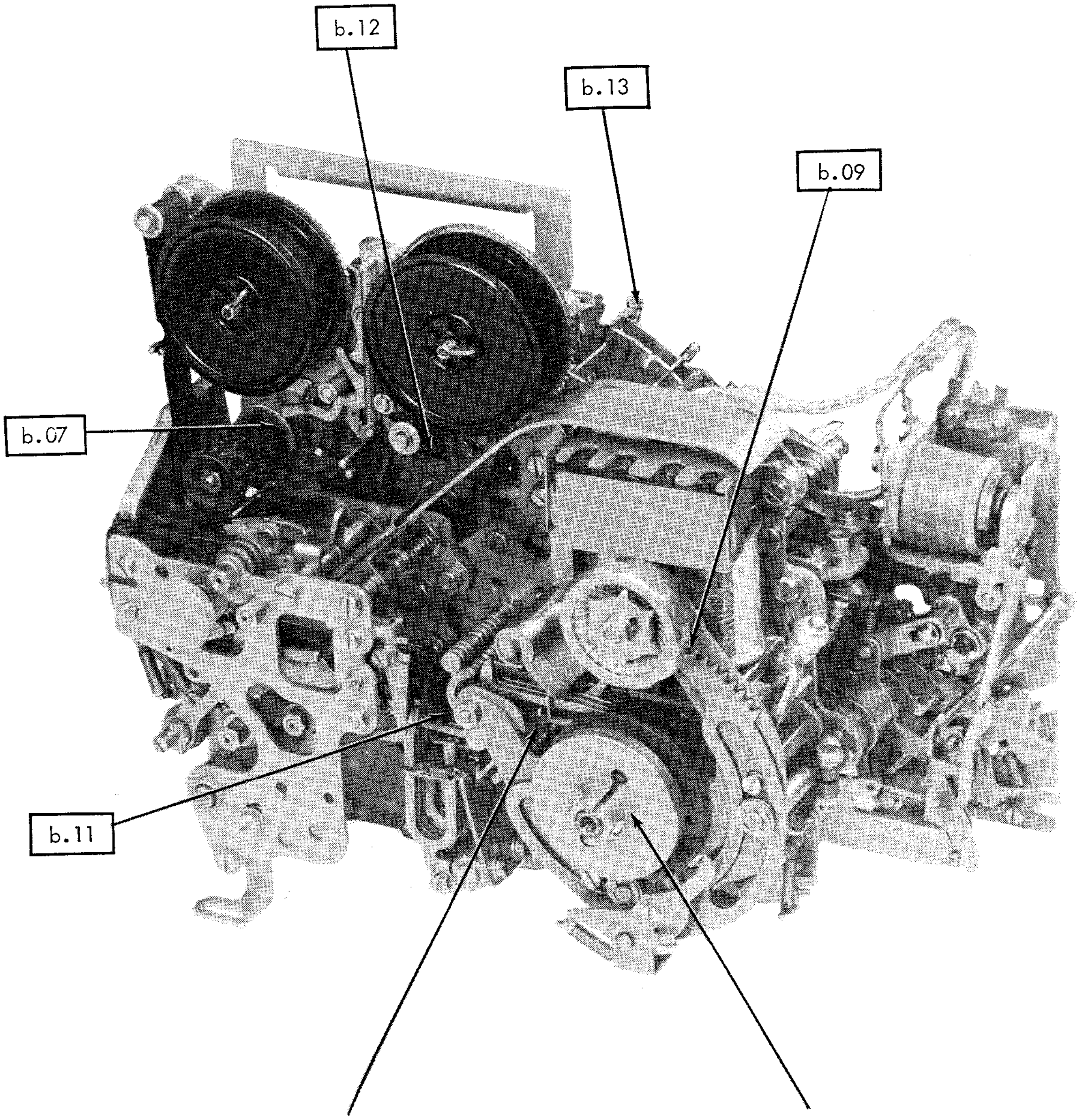
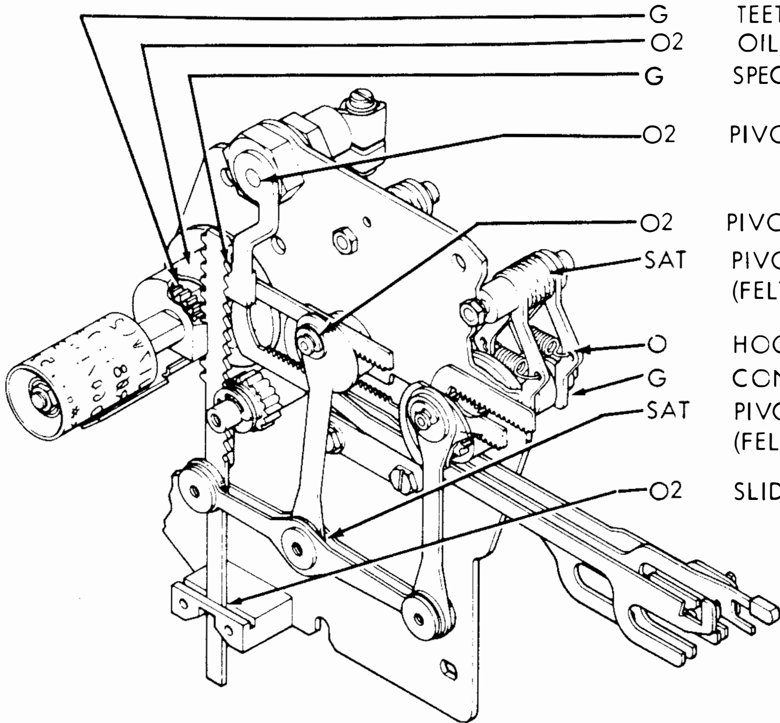


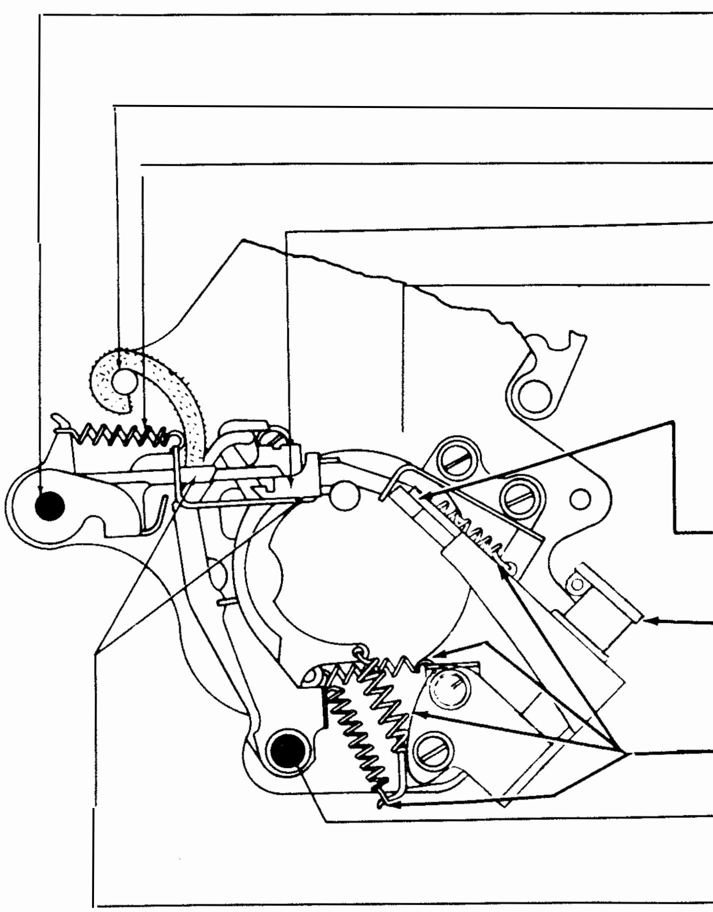
Figure 5-171. Typing Reperforators

b.07 ROTARY POSITIONING MECHANISM



G	TEETH	ROTARY OUTPUT RACK
O2	OIL HOLE	TYPE WHEEL HOUSING
G	SPECIAL TEETH	ROTARY OUTPUT RACK ROTARY CORRECTING LEVER
O2	PIVOT POINT	ROTARY CORRECTING LEVER SHAFT
O2	PIVOT POINTS (2)	CONNECTING RODS
SAT	PIVOT POINTS (FELT WASHERS)	DETENT LEVERS (8)
O	HOOKS - EACH END	SPRINGS (4)
G	CONTACT POINTS	DETENT LEVERS (8)
SAT	PIVOT POINTS (3) (FELT WASHERS)	CROSS LINKS
O2	SLIDING SURFACE	ROTARY OUTPUT RACK

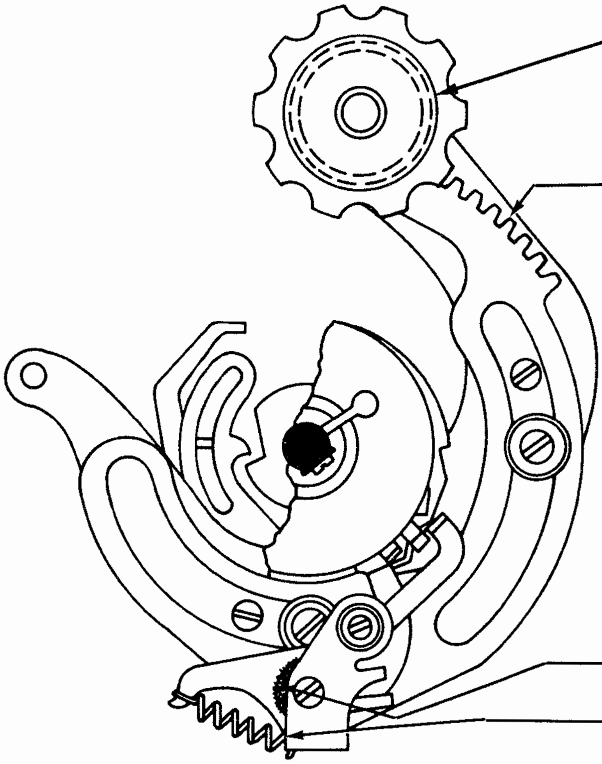
b.08 SELECTING MECHANISM



O2	BEARING GUIDE SLOTS (5)	PUSH LEVER GUIDE
SAT	FELT WICK	SELECTOR WICK
O	HOOKS - EACH END (12)	SPRINGS
O2	ENGAGING SURFACES (5)	PUSH LEVERS
O2	GUIDE SLOT	MARKING LOCK LEVER
O2	WICK	LUBRICATOR WICK
	FILL UP (AVOID AIRLOCK)	LUBRICATOR RESERVOIR
O	HOOKS - EACH END (12)	SPRINGS
O2	BEARING GUIDE SLOTS (6)	SELECTOR LEVER GUIDE
O2	GUIDE SLOTS	SELECTOR AND PUSH LEVER GUIDE

Figure 5-172. Typing Reperforators

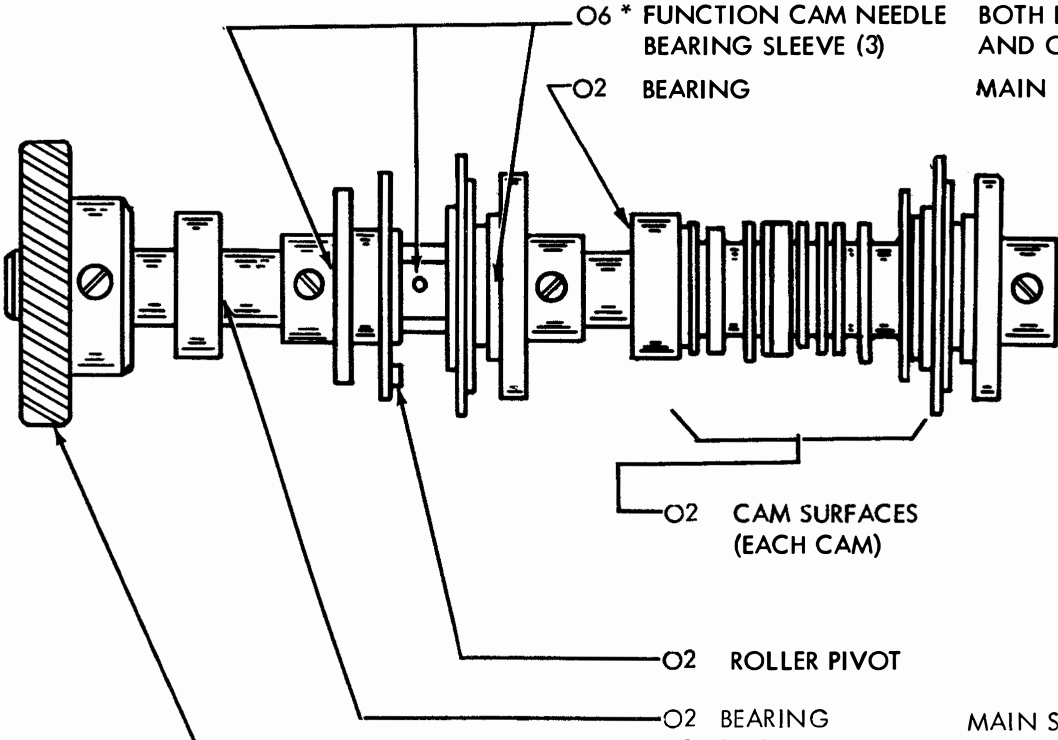
b.09 RANGE FINDER MECHANISM



G	TEETH	KNOB
G	TEETH	RACK
SAT	FELT WASHERS (2)	CLUTCH STOP ARM
O	HOOKS - EACH END	SPRING

b.10 MAIN SHAFT MECHANISM

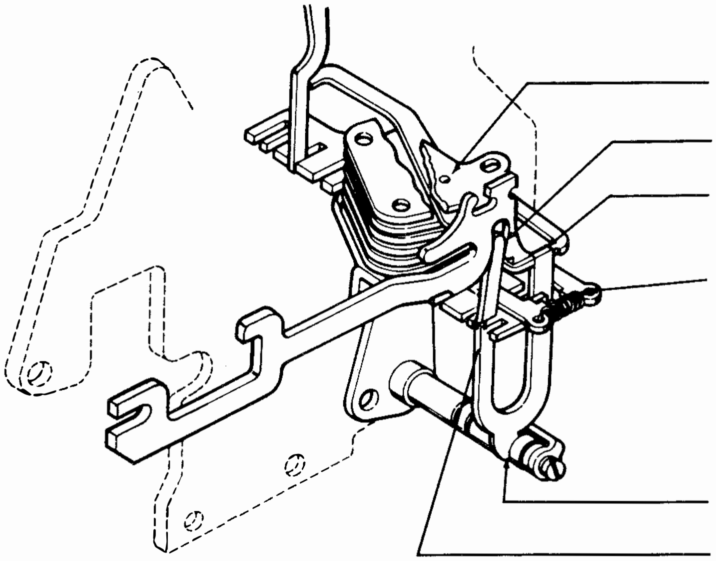
*IF FUNCTION CAM NEEDLE BEARINGS ARE DISASSEMBLED AT ANY TIME, REPACK BEARINGS WITH GREASE (BEACON 325) (TELETYPE 195298) OR ITS EQUIVALENT.



O6 *	FUNCTION CAM NEEDLE BEARING SLEEVE (3)	BOTH ENDS OF SLEEVE AND OIL HOLE IN SLEEVE
O2	BEARING	MAIN SHAFT
O2	CAM SURFACES (EACH CAM)	SELECTOR CAM
O2	ROLLER PIVOT	FUNCTION CAM
O2	BEARING	MAIN SHAFT DRIVEN GEAR (IF UNIT IS SO EQUIPPED)
G	TEETH	

Figure 5-173. Typing Reperforators

b.11 TRANSFER MECHANISM



b.12 PUSH BARS

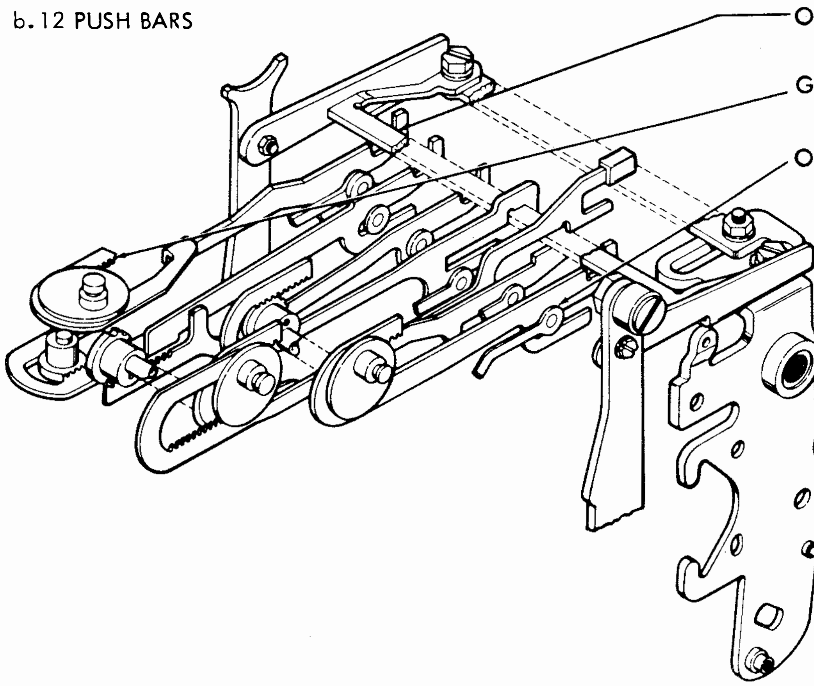


Figure 5-174. Typing Reperforators

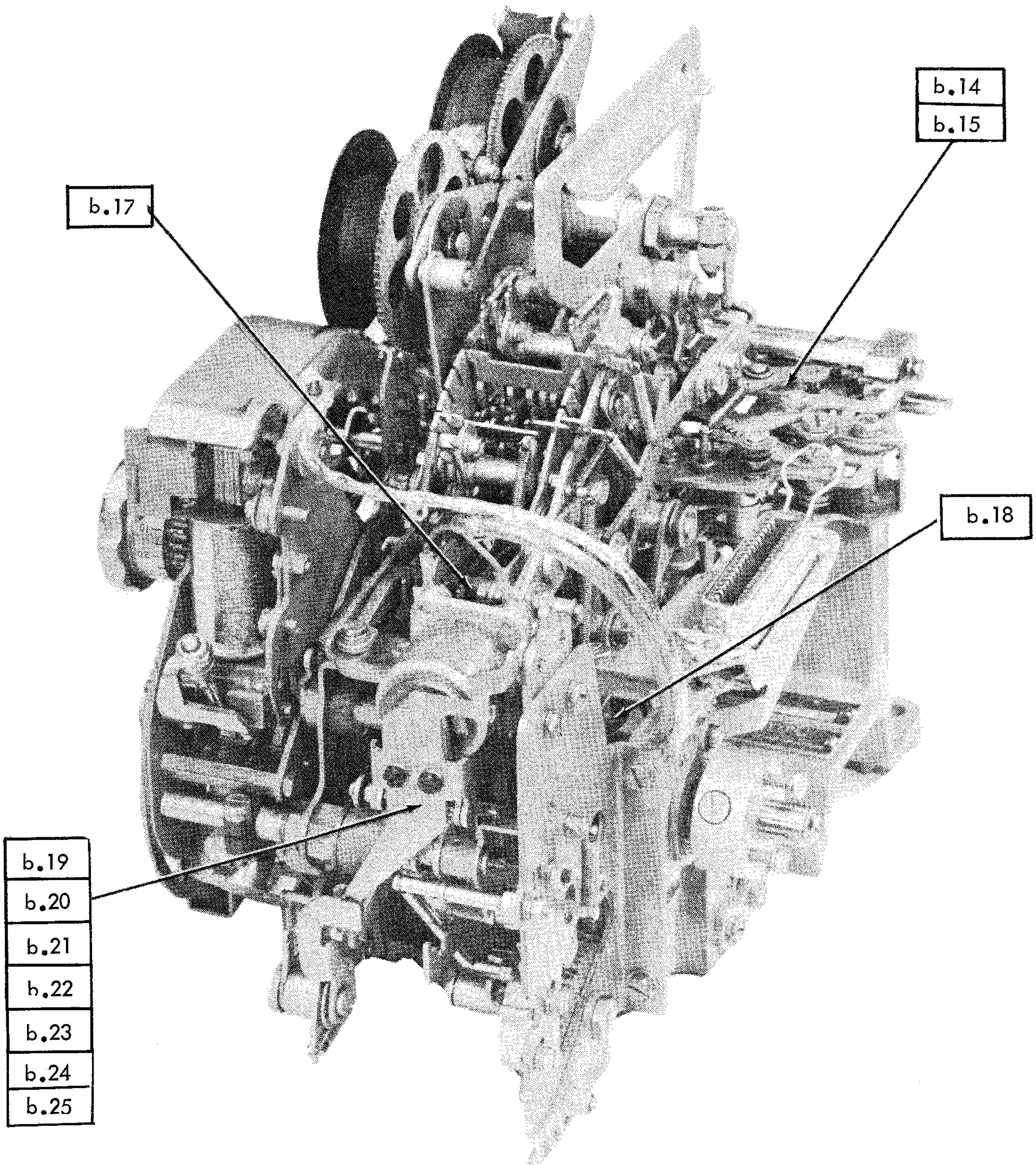
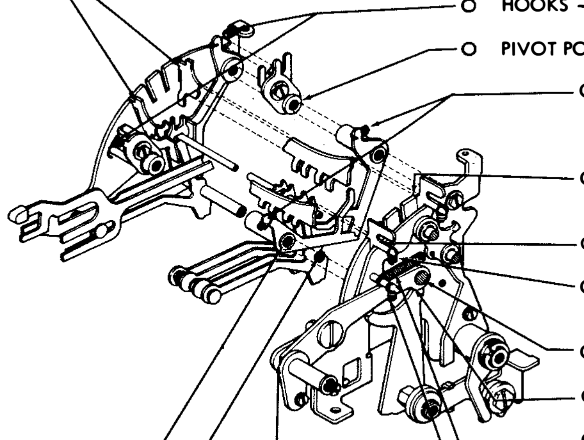


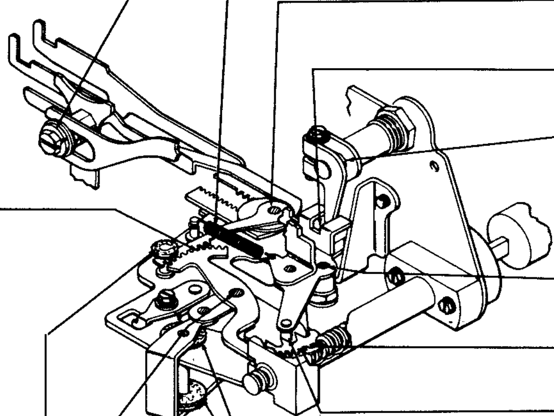
Figure 5-175. Typing Reperforators

b.13 FUNCTION BOX



O	SLIDING SURFACES (EACH SIDE)	FUNCTION BLADES
O	HOOKS - EACH END (2)	EXTENSION ARMSPRINGS
O	PIVOT POINTS	FIGURES ARM ASSEMBLY
O	HOOKS - EACH END (2)	LETTERS AND FIGURES ARM ASSEMBLY SPRINGS
O	SLIDING SURFACES (EACH SIDE)	FUNCTION BLADES
G	CONTACT POINTS (2)	FUNCTION BLADES
O	HOOKS - EACH END	FUNCTION BLADE SPRINGS (2)
O	PIVOT POINT	LIFTER ROLLER
G	ROLLER SURFACE	LIFTER ROLLER
O	HOOKS - EACH END	LIFTER TOGGLE LINK SPRING
O	HOOKS - EACH END	LIFTER SPRING
O	PIVOT POINT	FUNCTION BLADE LIFTER
O	PIVOT POINTS (6)	BELL CRANKS
O	PIVOT POINTS	LETTERS ARM ASSEMBLY EXTENSION

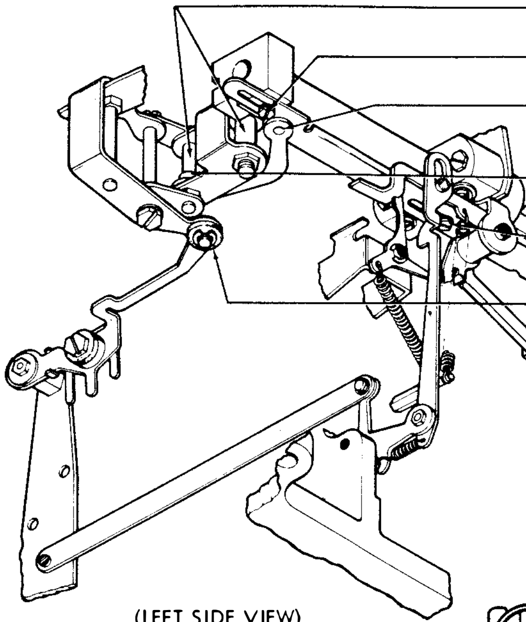
b.14 AXIAL POSITIONING MECHANISM



G	SLIDING GUIDE SURFACES	CORRECTING DRIVE LINK
O	HOOKS - EACH END	SPRING
O	PIVOT POINT	AXIAL OUTPUT RACK
G	CONTACT POINTS	ROTARY CORRECTING CLAMP
O2	PIVOT POINT	ROTARY CORRECTING LEVER SHAFT
O	PIVOT POINT	AXIAL CORRECTING PLATE
G	TEETH	AXIAL SECTOR TYPEWHEEL SHAFT
G	CONTACT SURFACE	AXIAL CORRECTING PLATE ROLLER
SAT	PIVOT POINTS (FELT WASHERS)	OSCILLATING DRIVE BAIL
O	PIVOT POINT	AXIAL SECTOR
SAT	PIVOT POINT (FELT WASHER)	GUIDE ROLLER
G	TEETH	AXIAL SECTOR AXIAL OUTPUT RACK

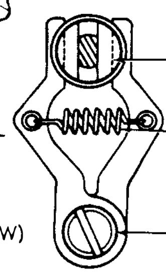
Figure 5-176. Typing Reperforators

b.15 AXIAL POSITIONING MECHANISM



(LEFT SIDE VIEW)

O	PIVOT POINT	OSCILLATING BAIL
O	CONTACT SURFACES	RIBBON CARRIER
O	PIVOT POINTS	RIBBON OSCILLATING LEVER
O	PIVOT POINT (FELT WASHER)	RIBBON OSCILLATING LEVER
O	CONTACT SURFACES	RIBBON CARRIER
SAT	PIVOT POINTS (2) (FELT WASHERS)	OSCILLATING DRIVE LINK

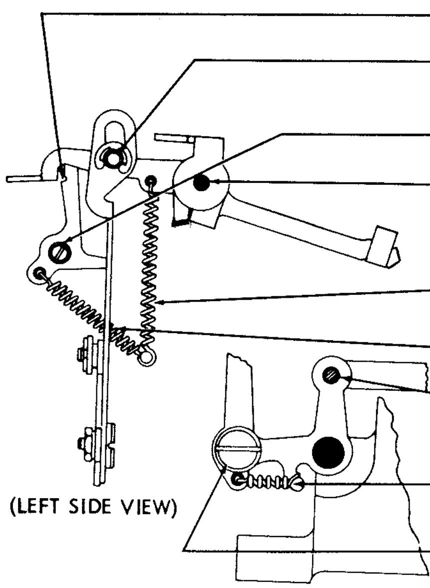


DETENT ASSEMBLIES (TWO ON AXIAL POSITIONING MECHANISM.

(BOTTOM VIEW)

O	DETENT POINTS	DETENT LEVERS (4)
O	HOOKS - EACH END	DETENT LEVER SPRINGS (2)
SAT	PIVOT POINTS (FELT WASHERS)	DETENT LEVERS (4)

b.16 * PRINTING MECHANISM

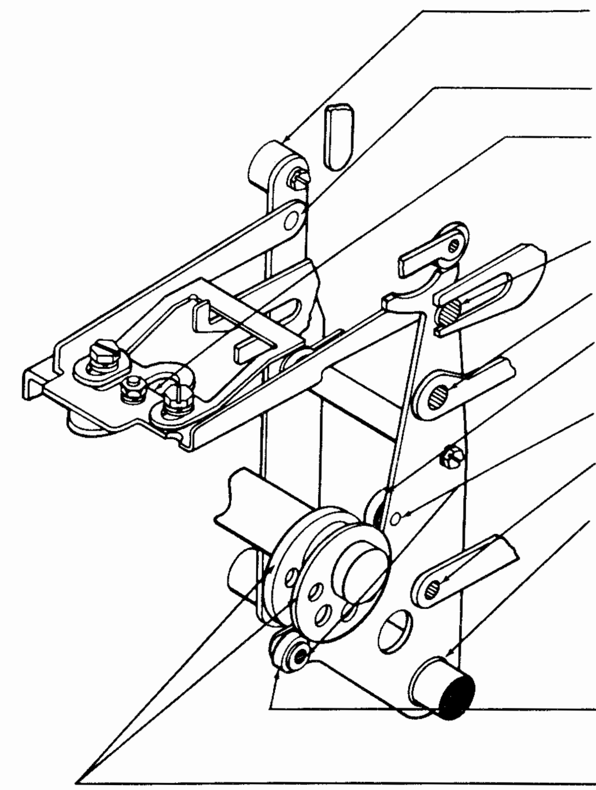


(LEFT SIDE VIEW)

G	CONTACT SURFACE	PRINTING LATCH
O2	SLIDING SURFACE	PRINTING TRIP LINK
O2	PIVOT POINT	PRINTING LATCH
O2	PIVOT POINTS	PRINT HAMMER
O	HOOKS - EACH END	HAMMER ACCELERATOR SPRING
O	HOOKS - EACH END	PRINTING LATCH SPRING
O	PIVOT POINT	PRINTING DRIVE LINK
O	HOOKS - EACH END	PRINTING TRIP LINK SPRING
O	PIVOT POINTS (2)	PRINTING PIVOT ARM

Figure 5-177. Typing Reperforators

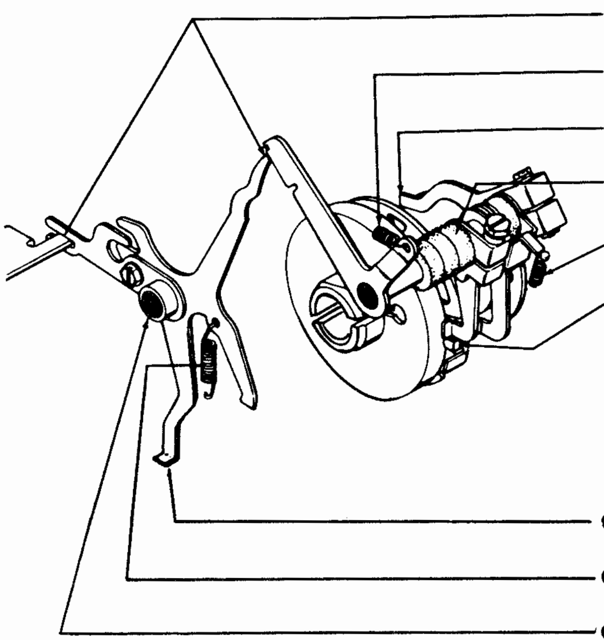
b.17 ROCKER BAIL MECHANISM



G	CONTACT SURFACE	RIBBON FEED ECCENTRIC STUD
O	PIVOT POINTS	PUSH BAR OPERATING BLADE
SAT	SLIDING SURFACE (FELT WASHER UNDER BLADE)	PUSH BAR OPERATING BLADE
G	PIVOT POINT	CORRECTING DRIVE LINK
O	PIVOT POINT	OSCILLATING DRIVE LINK
O	ROLLER SURFACE	CAM FOLLOWER ROLLER (UPPER AND LOWER)
O	PIVOT POINTS	CAM FOLLOWER ROLLERS
O	PIVOT POINT	PRINTING DRIVE LINK
SAT	PIVOT POINT (FELT STRIP)	ROCKER BAIL
O	ROLLER SURFACE	CAM FOLLOWER ROLLER
O	CONTACT SURFACE	FUNCTION CAM

(REAR VIEW)

b.18 FUCTION CAM - CLUTCH TRIP MECHANISM



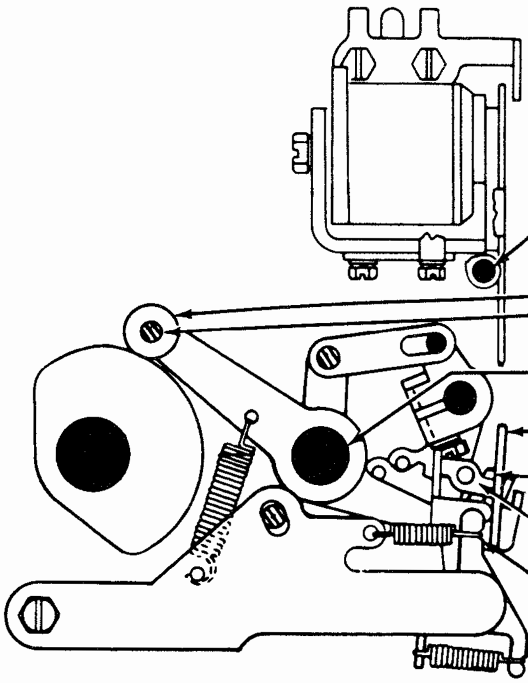
O	CONTACT POINTS (2)	MAIN TRIP LEVER
O	HOOKS - EACH END	CLUTCH RELEASE SPRING
G	CONTACT SURFACE	RESET LEVER
SAT	FELT WASHERS	CLUTCH TRIP SHAFT
O	HOOKS - EACH END	LATCH LEVER SPRING
O	CONTACT SURFACE	CLUTCH STOP LUG
O	CONTACT POINT	MAIN TRIP LEVER
O	HOOKS - EACH END	MAIN TRIP LEVER SPRING
O	PIVOT POINT	MAIN TRIP LEVER

Figure 5-178. Typing Reperforators

NOTE

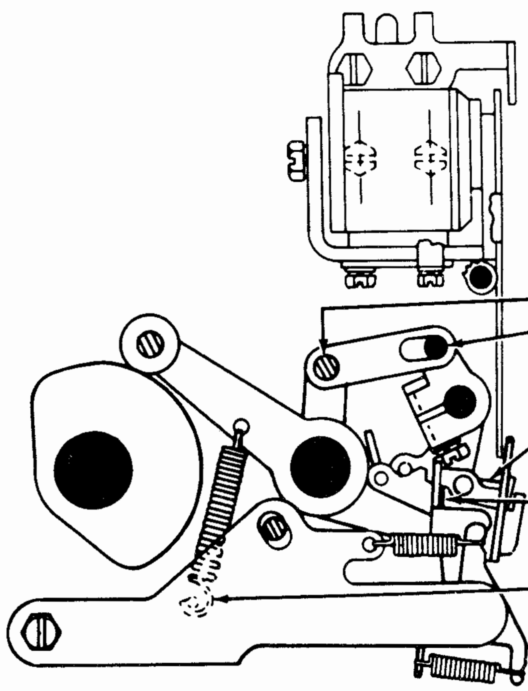
FOLLOWING LUBRICATION INSTRUCTIONS PERTAIN TO THE LPR35 TYPING REPERFORATOR ONLY.

b.19 NON-INTERFERING LETTERS TAPE FEED OUT MECHANISM



O2	PIVOT POINT	ARMATURE HINGE
O2	ROLLER SURFACE	DRIVE BAIL ROLLER
O2	PIVOT POINT	DRIVE BAIL ROLLER
O2	PIVOT POINT	DRIVE BAIL
G	CONTACT POINT	BLOCKING BAIL
G	CONTACT POINT	DRIVE BAIL
G	CONTACT POINT	BLOCKING LATCH
O	HOOKS-EACH END (2)	SPRING

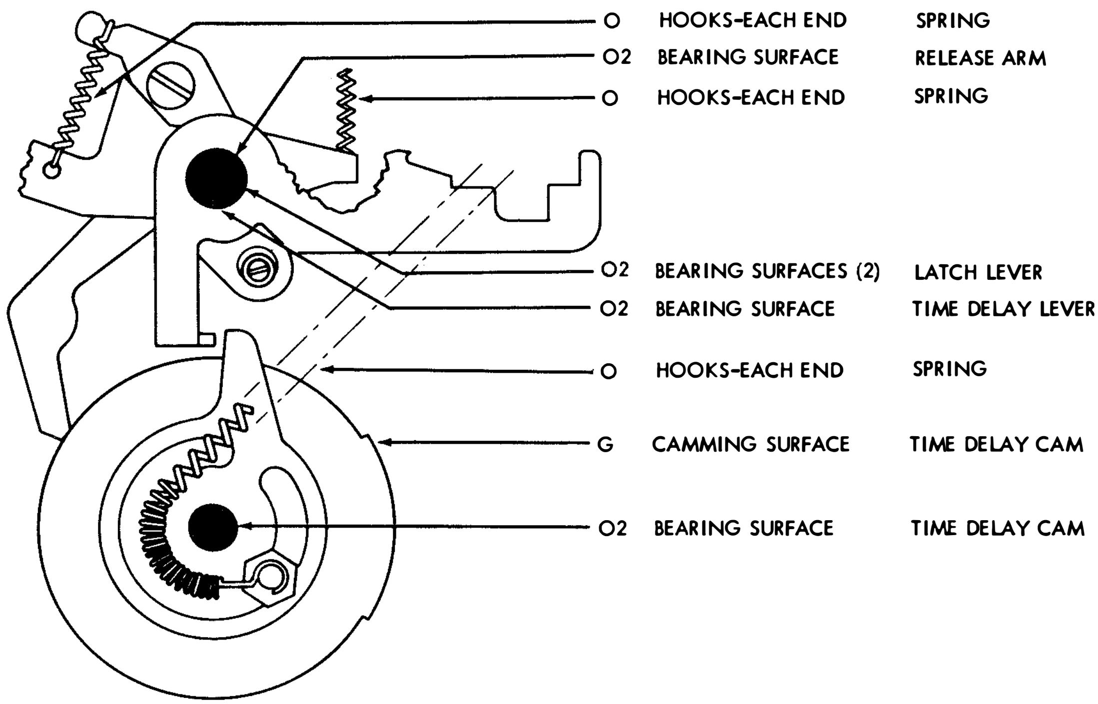
b.20 NON-INTERFERING LETTERS TAPE FEED OUT MECHANISM



O2	PIVOT POINT	DRIVE LINK
O2	SLIDE SURFACE	DRIVE LINK
G	CONTACT POINT	RELEASE LEVER
G	CONTACT POINT	LATCH LEVER
O2	HOOKS-EACH END	SPRING

Figure 5-179. Typing Reperforator (LPR35)

b.21 NON-INTERFERING LETTERS TAPE FEED OUT MECHANISM



b.22 NON-INTERFERING LETTERS TAPE FEED OUT MECHANISM

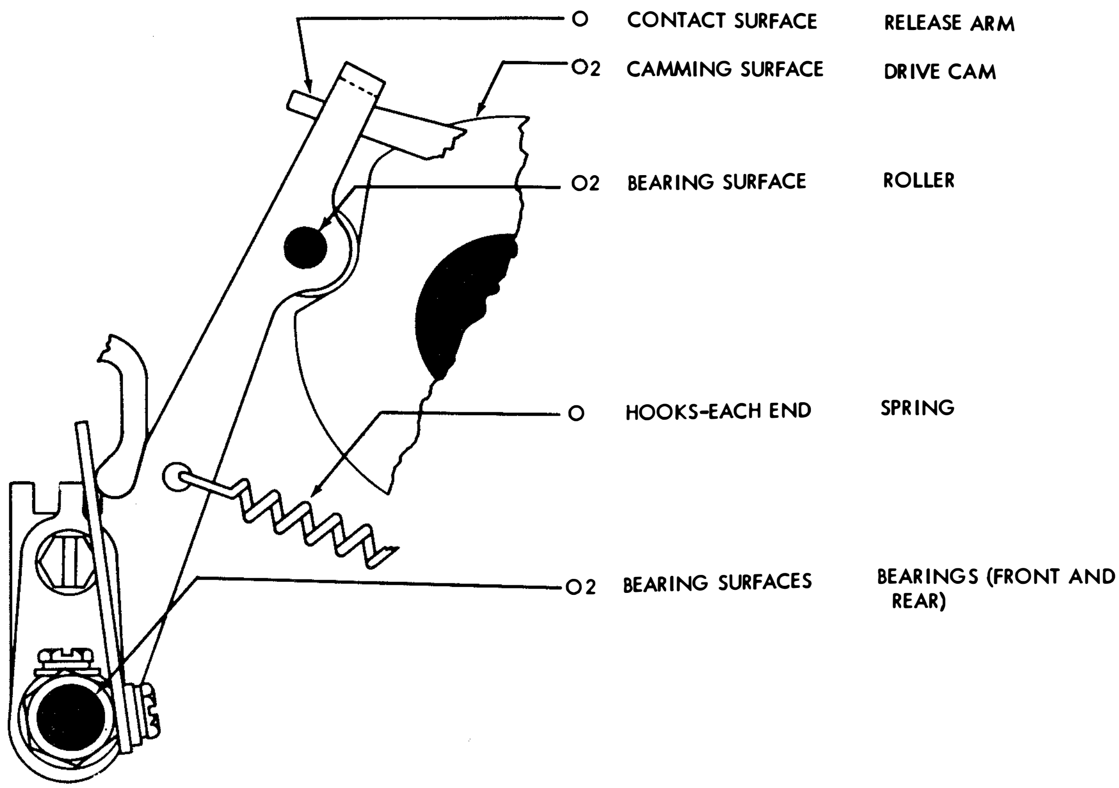
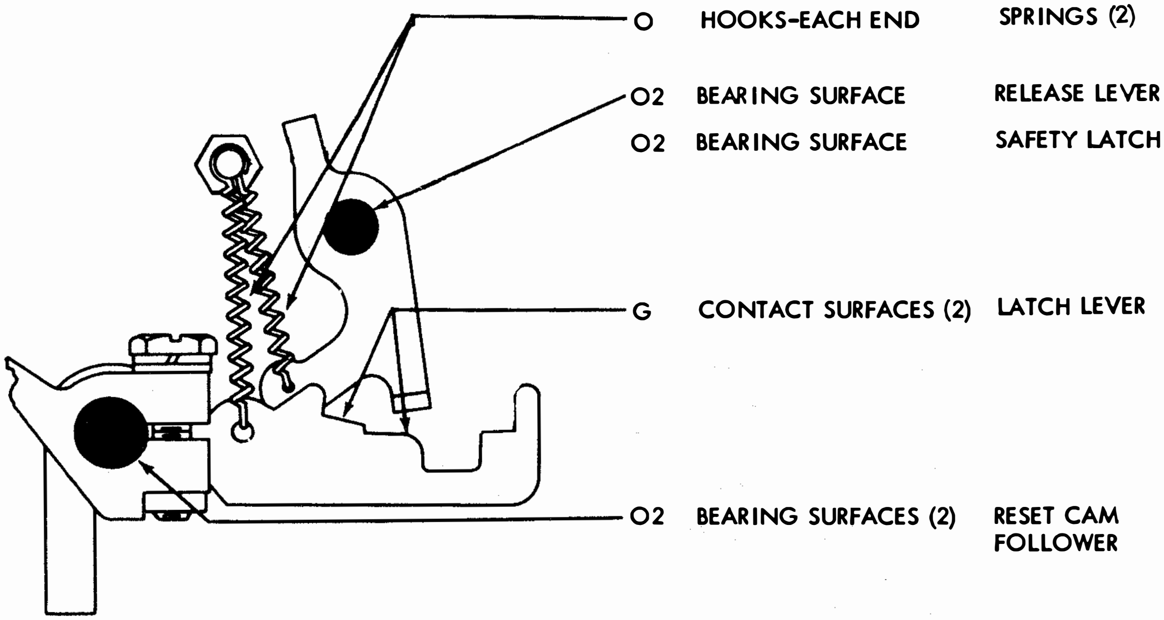


Figure 5-180. Typing Reperforator (LPR35)

b.23 **NON-INTERFERING LETTERS TAPE FEED OUT MECHANISM**



b.24 NON-INTERFERING LETTERS TAPE FEED OUT MECHANISM

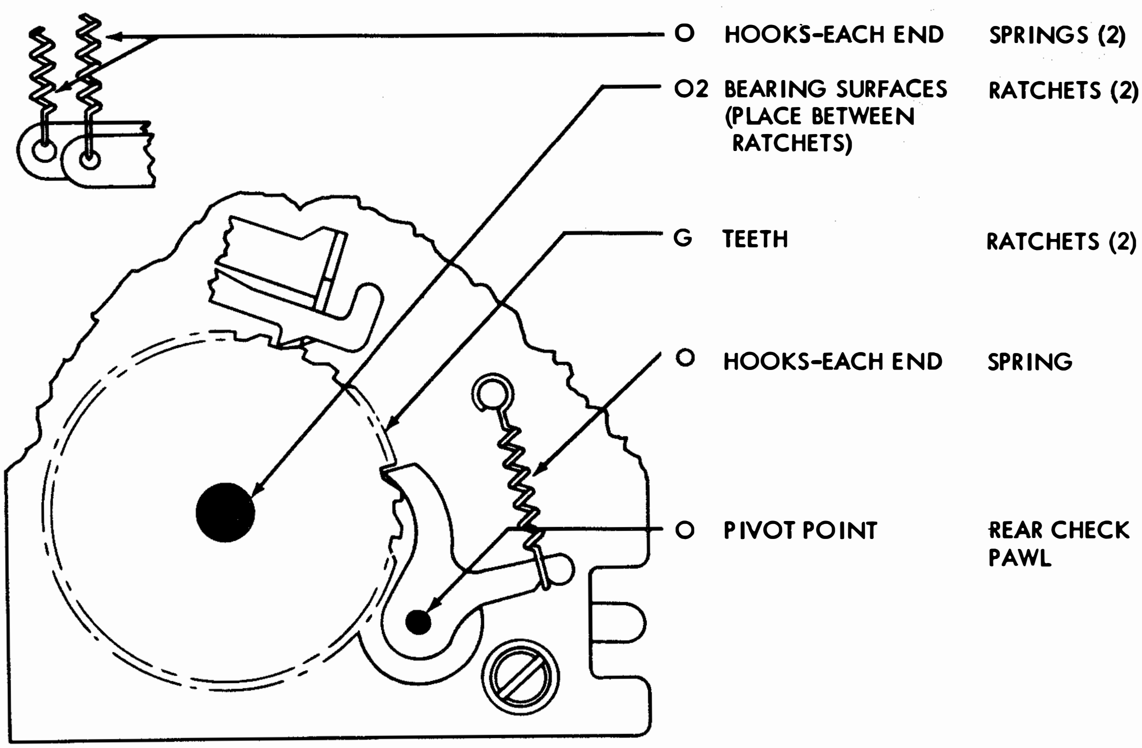


Figure 5-181. Typing Reperforator (LPR35)

b.25 **NON-INTERFERING LETTERS TAPE FEED OUT MECHANISM**

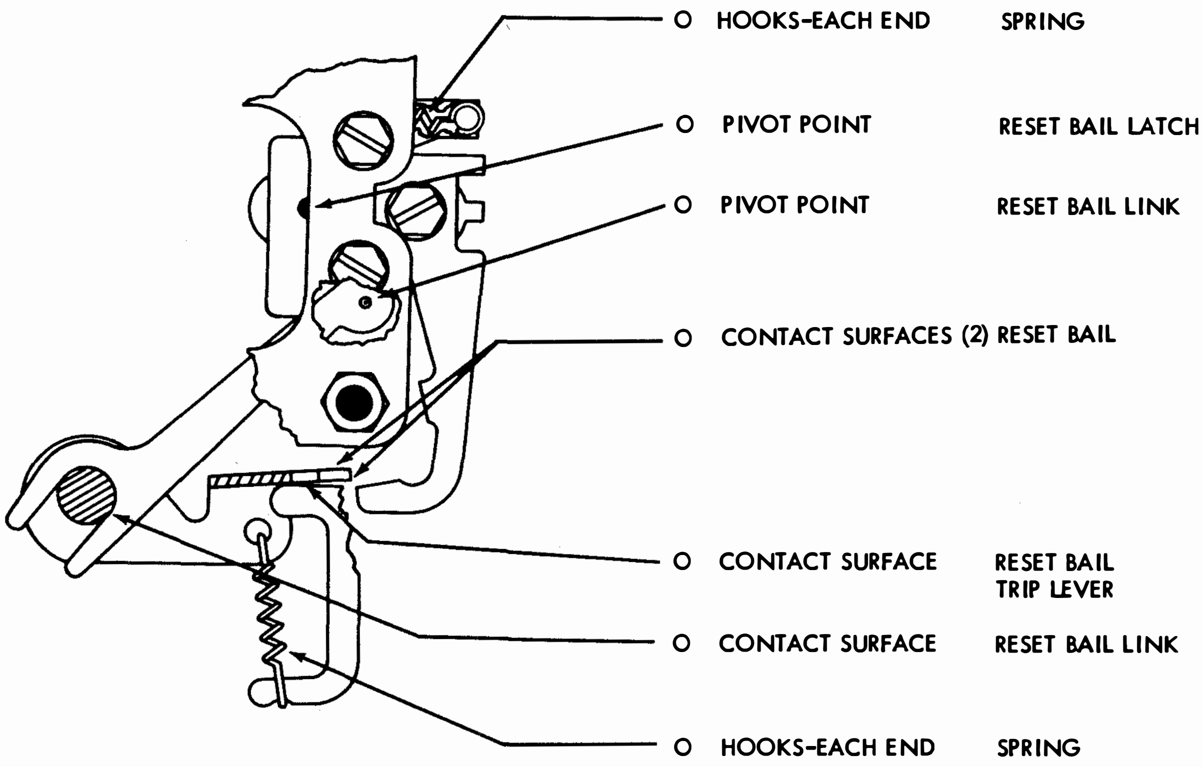


Figure 5-182. Typing Reperforator (LPR35)

c. TRANSMITTER DISTRIBUTOR (LAXD7, LAXD8)

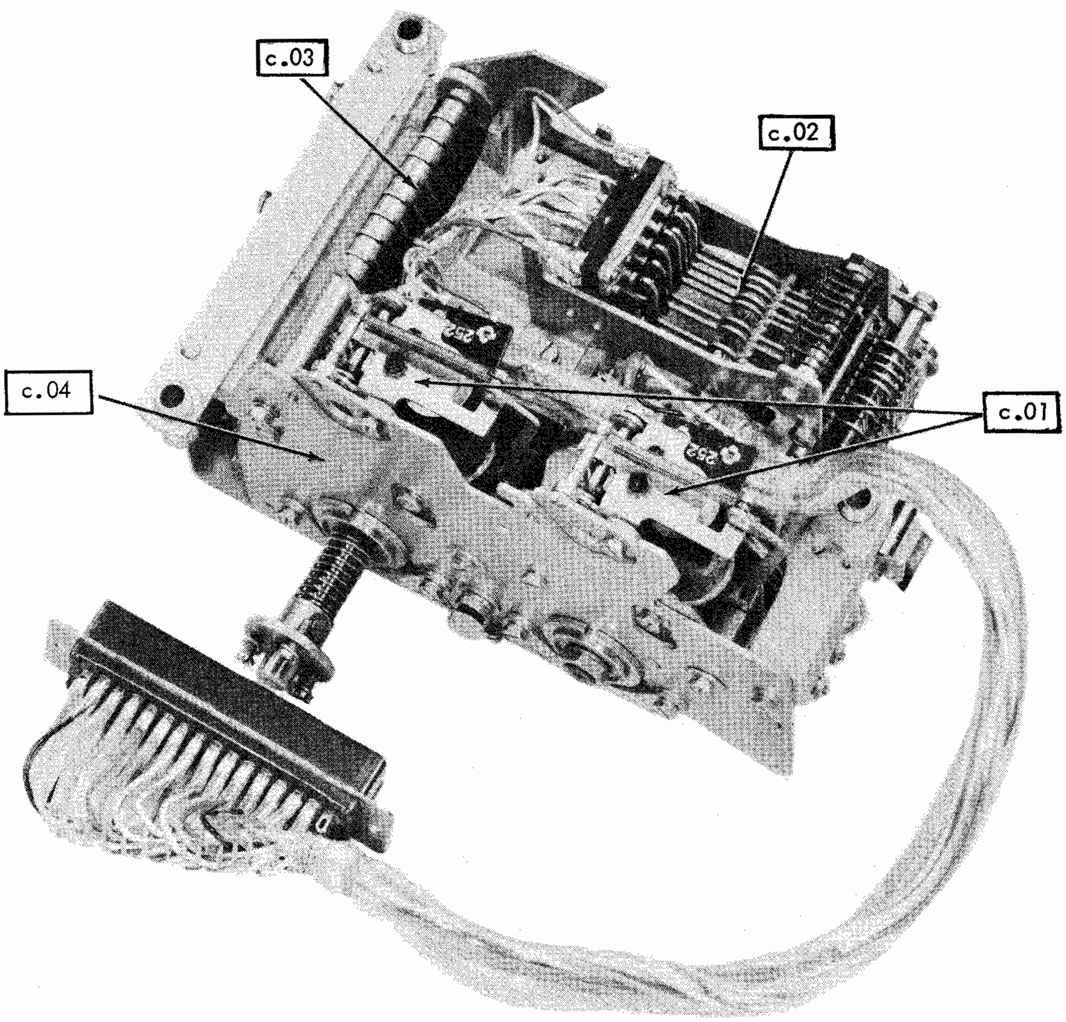
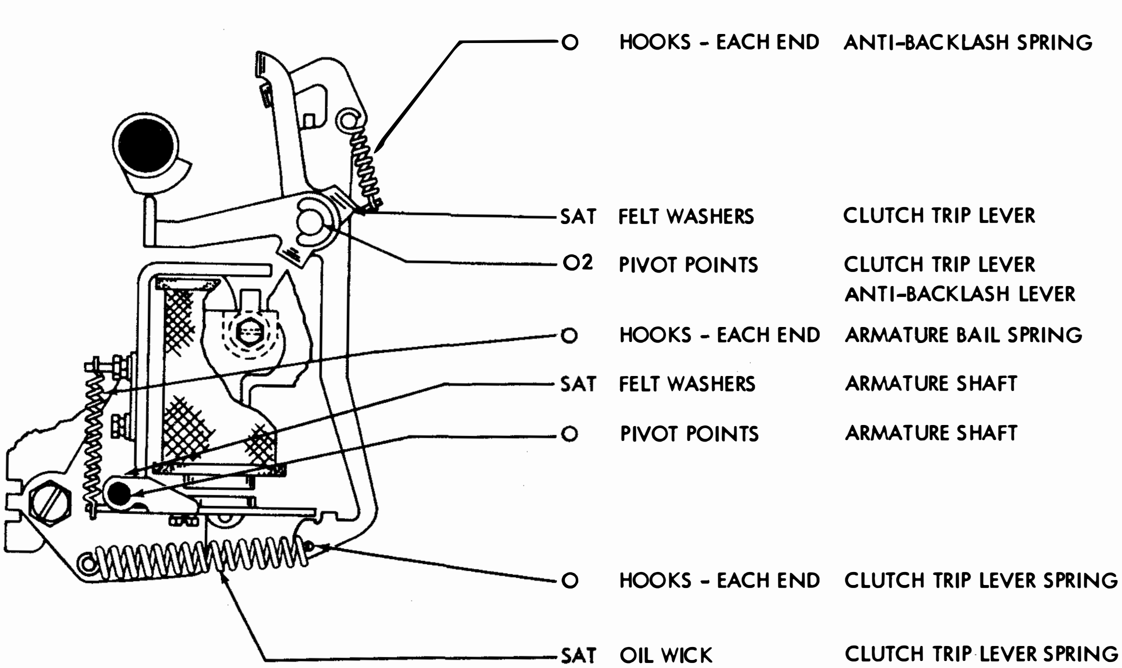


Figure 5-183. Transmitter Distributor (LAXD7, LAXD8)

c.01 CLUTCH TRIP ASSEMBLIES



c.02 STORING SWITCH ASSEMBLY

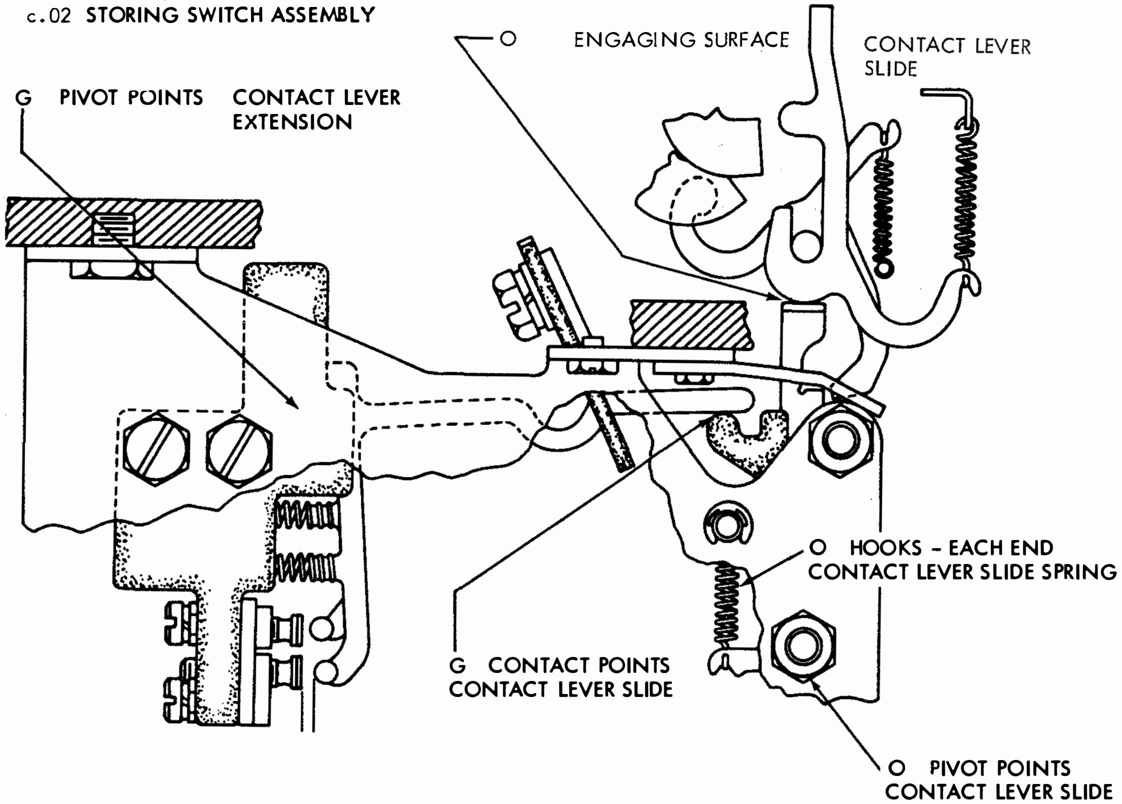
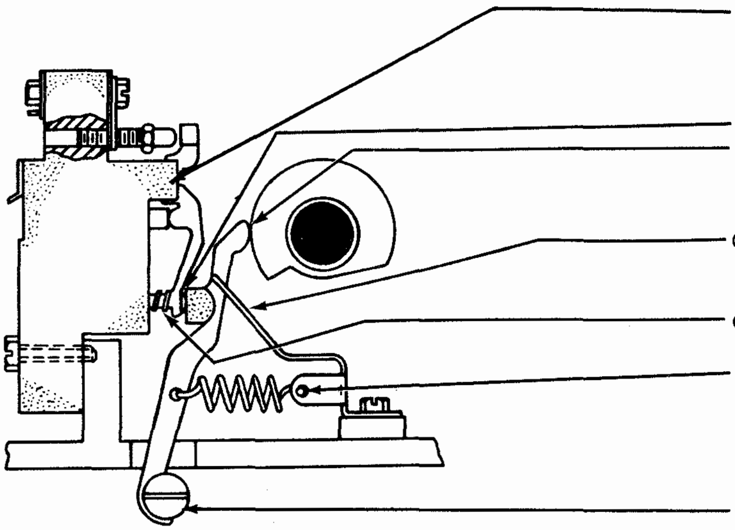


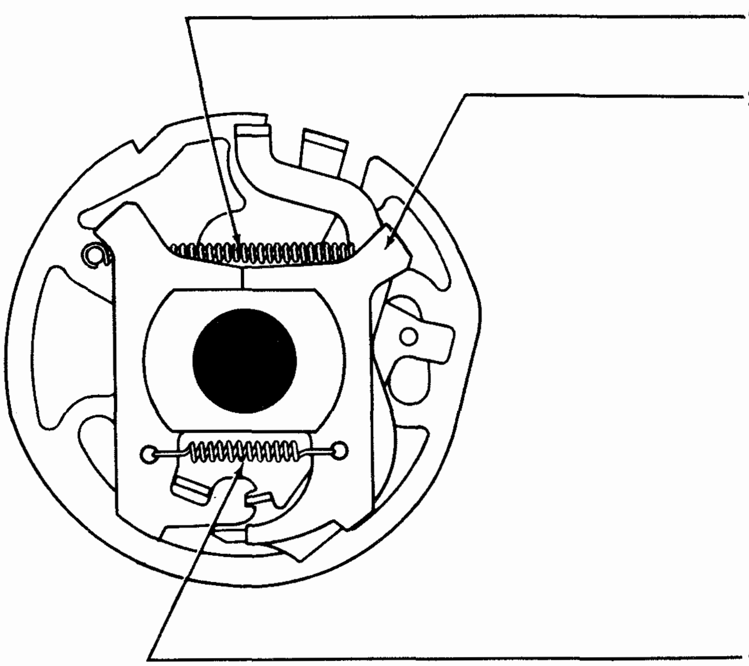
Figure 5-184. Transmitter Distributor (LAXD7, LAXD8)

c.03 **DISTRIBUTOR BLOCK ASSEMBLY**



G	**PIVOT POINTS**	**CONTACT LEVERS**
G	**CONTACT POINTS**	**CONTACT LEVERS**
O	CAMMING SURFACE	CAM FOLLOWER LEVER
O	GUIDE SLOTS	CAM FOLLOWER LEVER
O	LOOPS	COMPRESSION SPRING
O	**HOOKS - EACH END**	**CAM FOLLOWER LEVER SPRINGS**
O2	**PIVOT POINT**	**CAM FOLLOWER LEVER**

c.04 **CLUTCH ASSEMBLIES**



O	**HOOKS - EACH END**	**CLUTCH SHOE LEVER SPRING**
SAT	**FELT WICK (2 PLACES)**	**CLUTCH SHOE**
O	**HOOKS - EACH END**	**CLUTCH SHOE SPRING**

Figure 5-185. Transmitter Distributor (LAXD7, LAXD8)

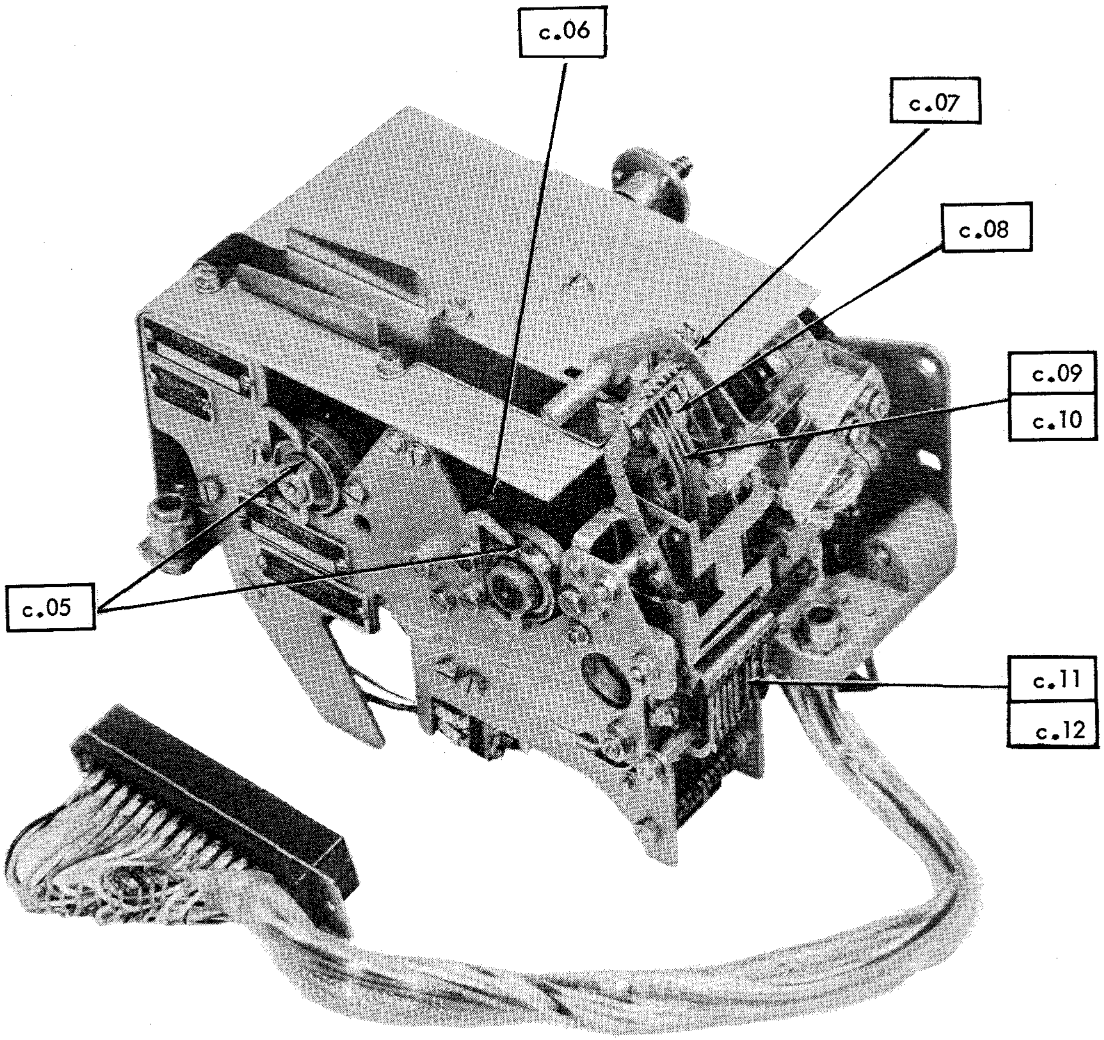
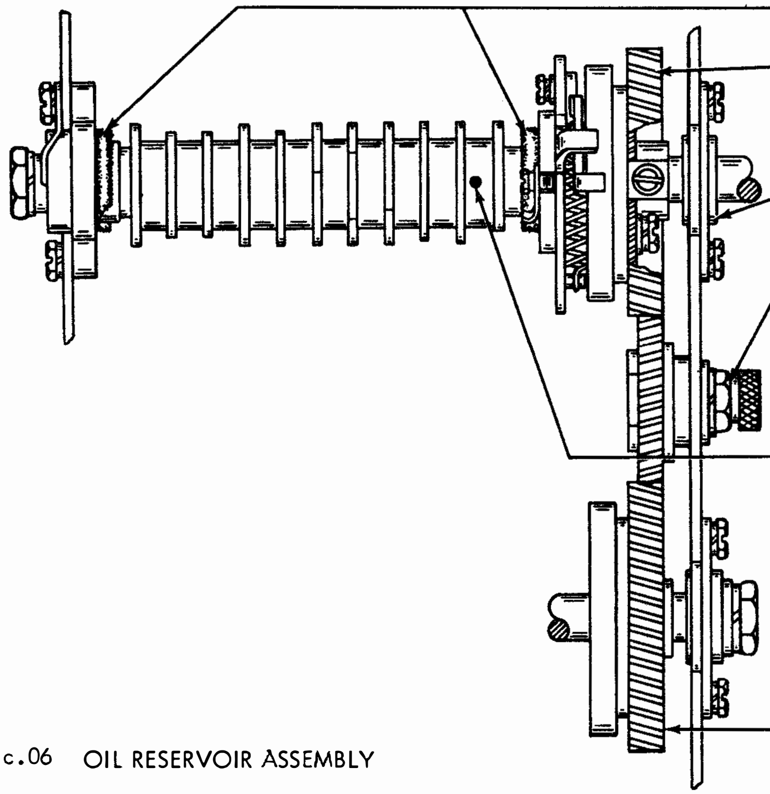
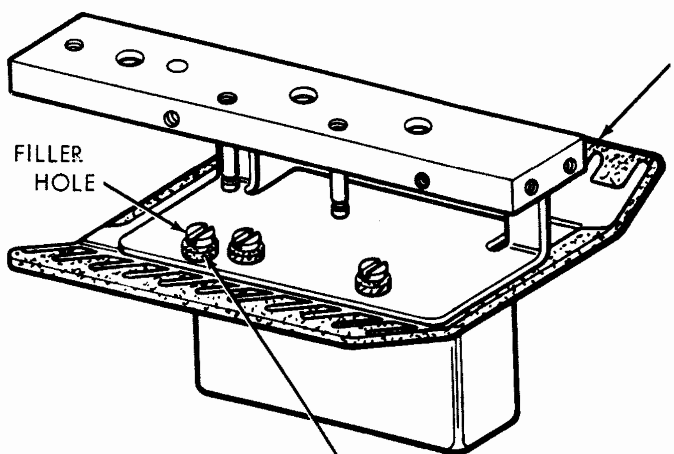


Figure 5-186. Transmitter Distributor (LAXD7, LAXD8)

c.05 CAM SLEEVE ASSEMBLIES



c.06 OIL RESERVOIR ASSEMBLY

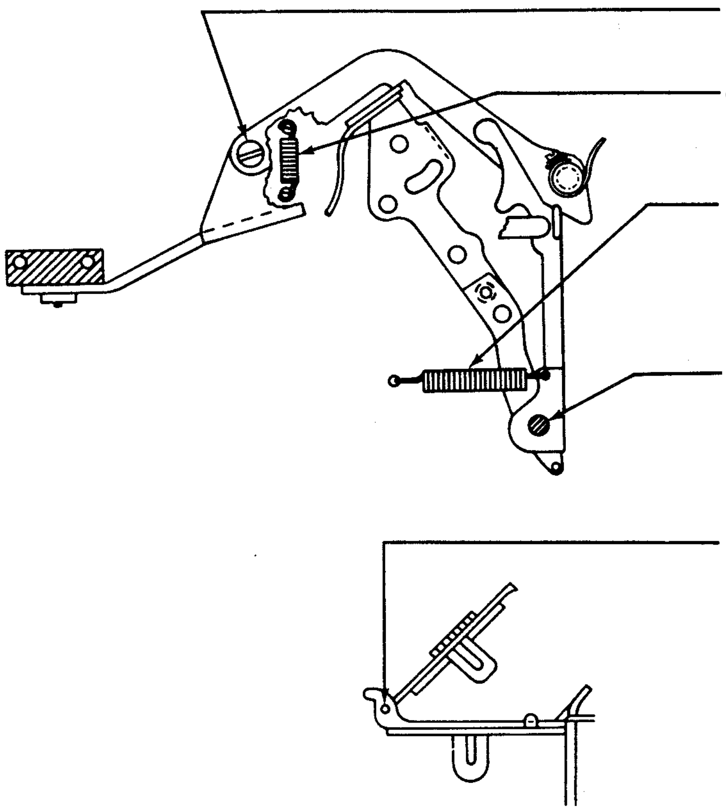


NOTE

OIL DEPTH NOT TO EXCEED 7/8 INCH. USE A 0.010 INCH FLAT GAUGE FROM 117781 SET OF GAUGES AS A DIP STICK.

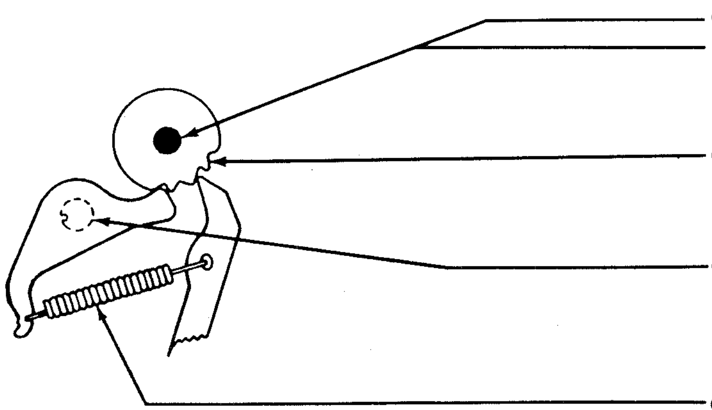
Figure 5-187. Transmitter Distributor (LAXD7, LAXD8)

c.07 **PIVOTED SENSING HEAD**



O2	PIVOT POINT	TAPE DEPRESSOR
O	HOOKS - EACH END	TAPE DEPRESSOR SPRING
O	HOOK - EACH END	TAPE DEFLECTOR SPRING
O2	PIVOT POINTS	YOKE AND TAPE DEFLECTOR
O2	PIVOT POINT	TAPE LID

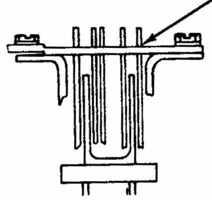
c.08 **CHECK PAWL AND FEED WHEEL**



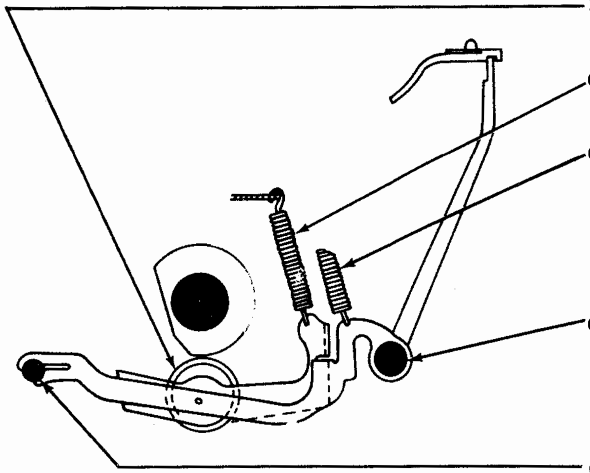
O2	PIVOT POINTS	FEED WHEEL
SAT	FELT WASHERS	FEED WHEEL
O	TEETH	FEED WHEEL RATCHET
O2	PIVOT POINT	CHECK PAWL
O	HOOKS - EACH END	CHECK PAWL SPRING

Figure 5-188. Transmitter Distributor (LAXD7, LAXD8)

c.09 SENSING MECHANISM



O SLIDING SURFACES — SENSING PINS



SAT FELT WASHER — CAM FOLLOWER ROLLER

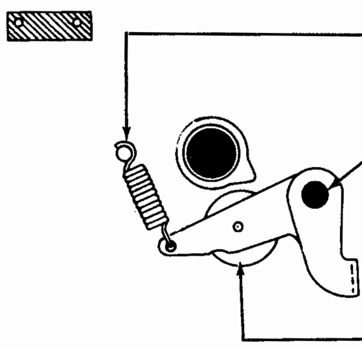
O HOOKS - EACH END — AUXILIARY LEVER SPRING

O HOOKS - EACH END — SENSING BAIL SPRING

O2 PIVOT POINT — SENSING PIN

O2 PIVOT POINT — SENSING BAIL
SENSING PINS

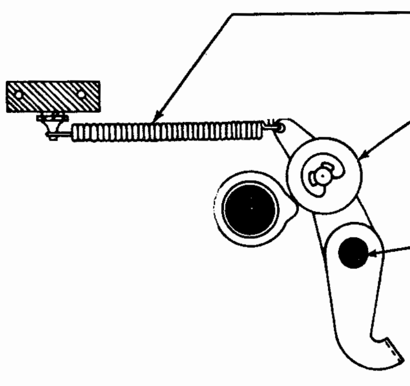
c.10 SENSING MECHANISM



O HOOKS - EACH END — PUSHER STRIP P R BAIL SPRING

O2 PIVOT POINT — PUSHER STRIPPER BAIL

SAT FELT WASHER — CAM FOLLOWER ROLLER



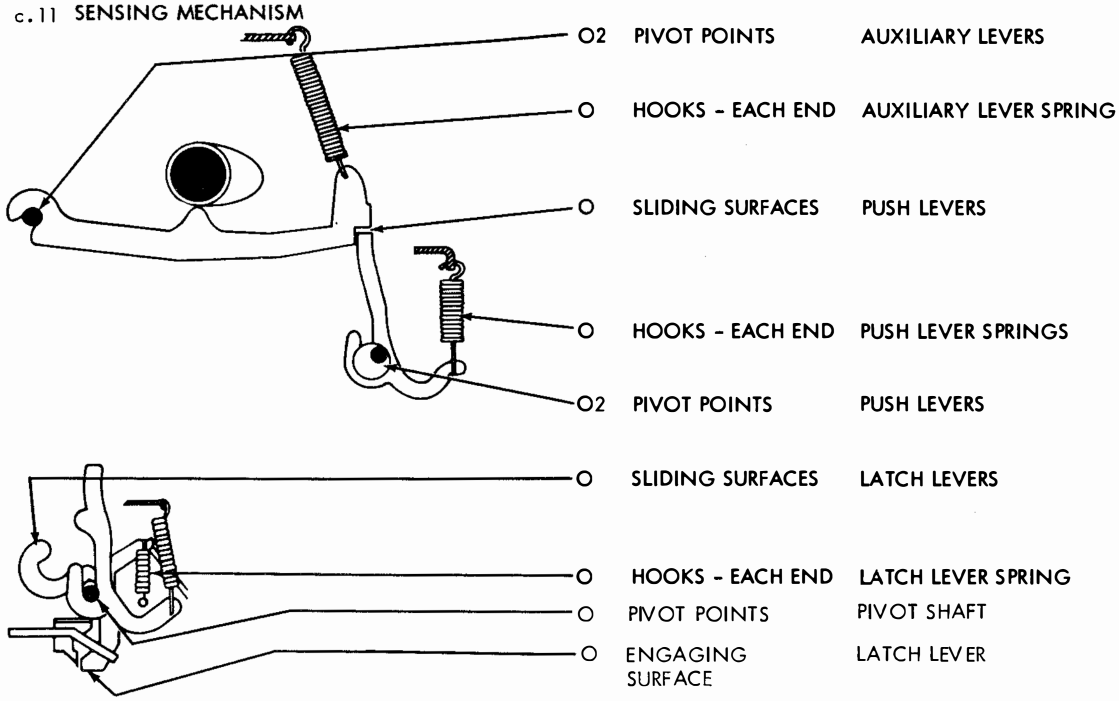
O HOOKS - EACH END — LATCH STRIPPER BAIL SPRING

SAT FELT WASHER — CAM FOLLOWER ROLLER

O2 PIVOT POINT — LATCH STRIPPER BAIL

Figure 5-189. Transmitter Distributor (LAXD7, LAXD8)

c.11 SENSING MECHANISM



c.12 FEED MECHANISM

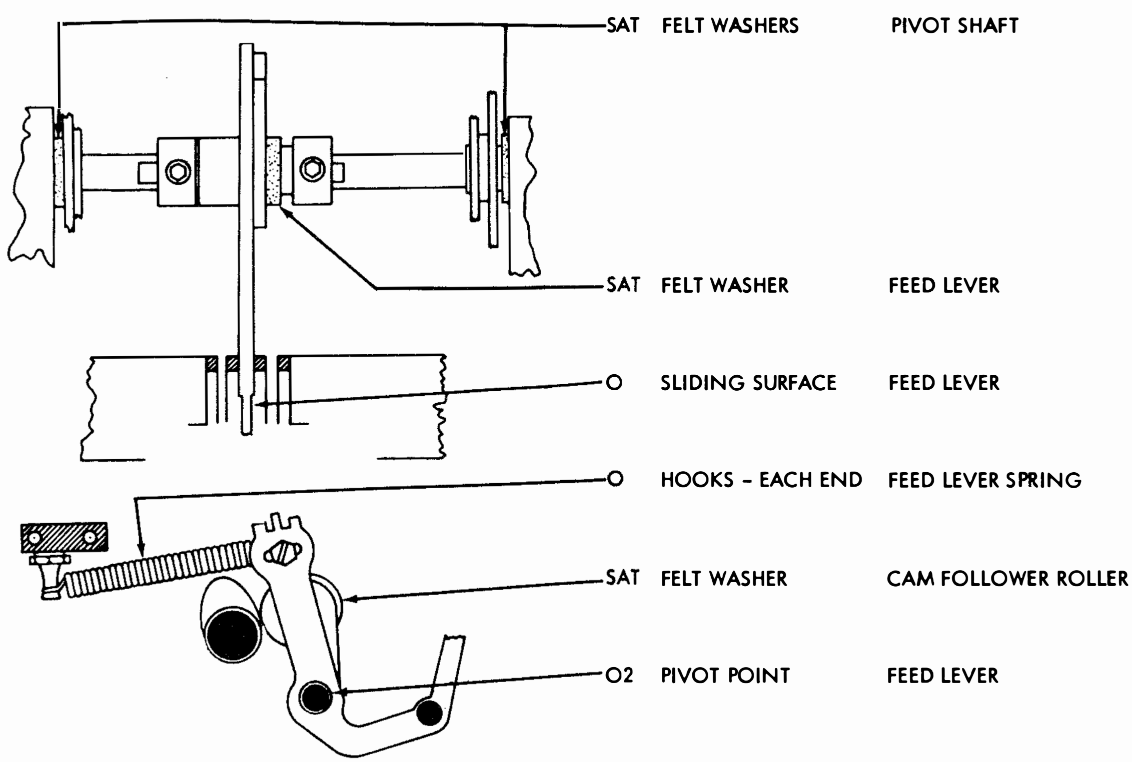


Figure 5-190. Transmitter Distributor (LAXD7, LAXD8)

d. TRANSMITTER DISTRIBUTOR (LBXD16)

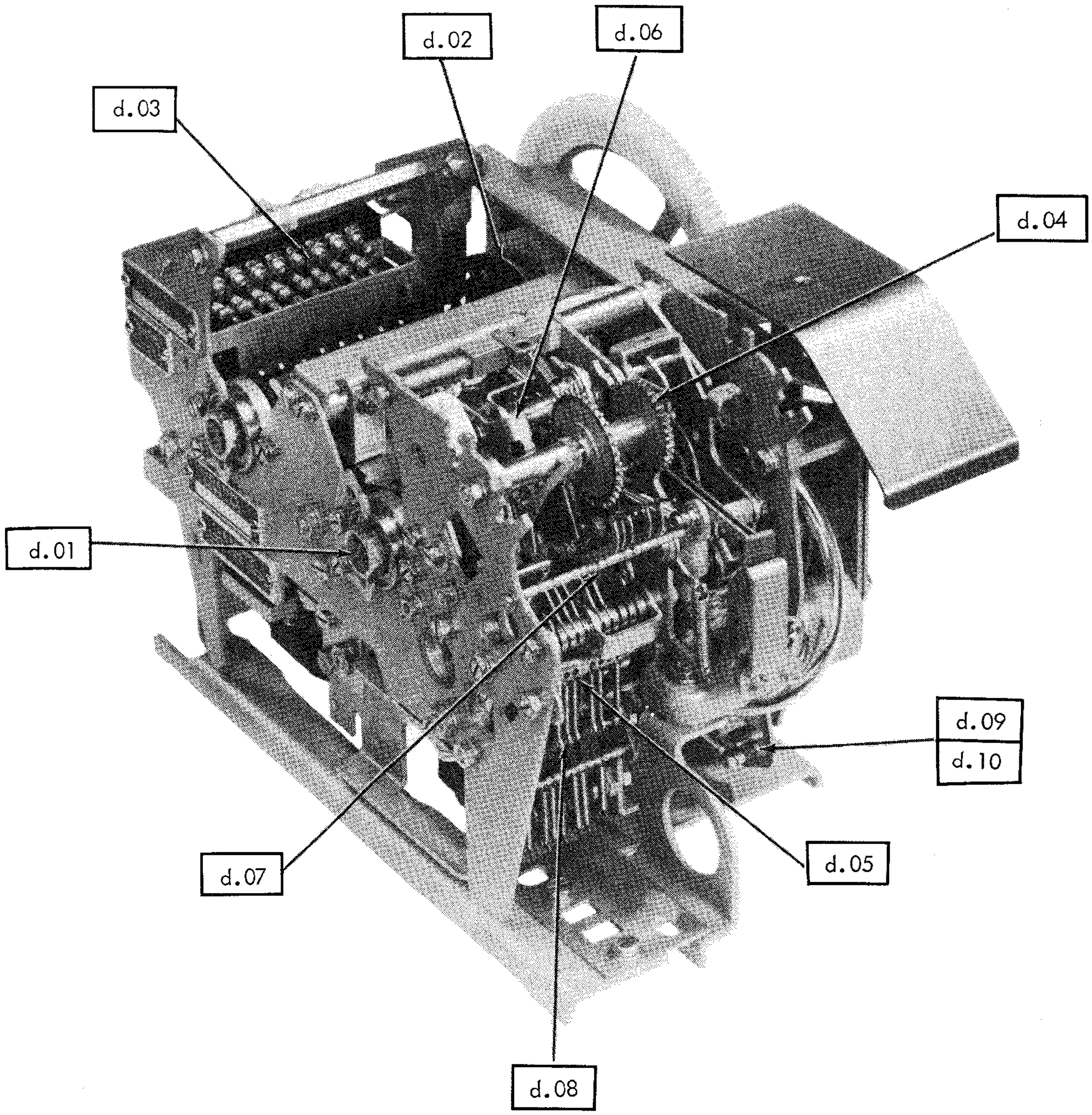
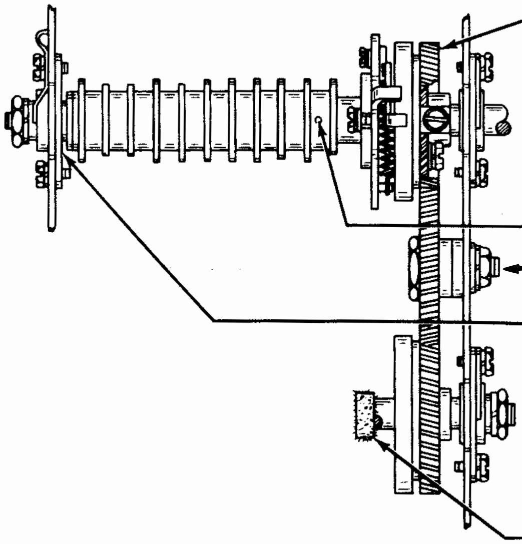


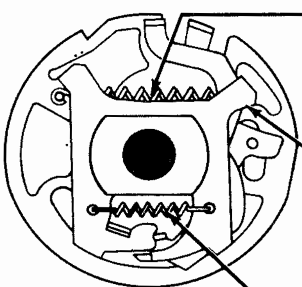
Figure 5-191. Transmitter Distributor (LBXD16)

d.01 DISTRIBUTOR AND SENSING SHAFT ASSEMBLIES



G	GEARS (2)	CLUTCH
02	OIL HOLES (2)	CAM SLEEVE
SAT	FELT WICKS	IDLER GEAR SHAFT
02	BEARINGS (4)	
SAT	FELT WICKS (4)	CAM SLEEVE

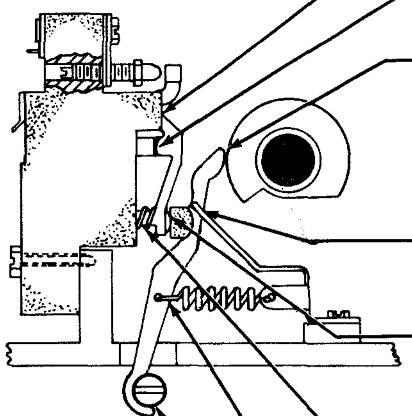
d.02 CLUTCH ASSEMBLY



0	HOOKS EACH END	CLUTCH SHOE LEVER SPRING
SAT	FELT WICK 2 PLACES	CLUTCH SHOE
0	HOOKS EACH END	CLUTCH SHOE SPRING

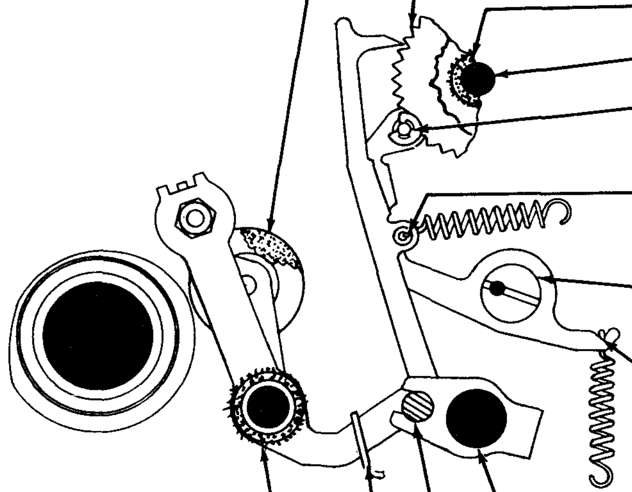
Figure 5-192. Transmitter Distributor (LBXD16)

d.03 DISTRIBUTOR CONTACT MECHANISM



O	HOOKS - EACH END (7 SPRINGS)	CONTACT ROCKER SPRING
G	PIVOT SURFACE (7 ROCKERS)	CONTACT ROCKER
O	CAMMING SURFACES (7 LEVERS)	CAM FOLLOWER LEVER
O	GUIDE SLOT (7 LEVERS)	CAM FOLLOWER LEVER
G	ENGAGING SURFACES (7 ROCKERS)	CONTACT ROCKER
O	LOOPS (7 SPRINGS)	COMPRESSION SPRING
O	HOOKS - EACH END (7 SPRINGS)	CAM FOLLOWER SPRING
O	BEARING SURFACE	CAM FOLLOWER LEVER

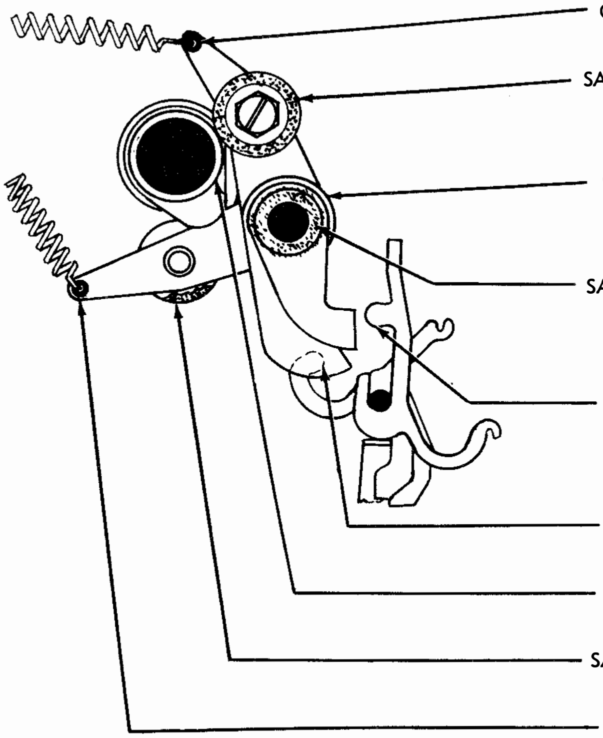
d.04 FEED PAWL MECHANISM



SAT	FELT WASHER	FEED LEVER ROLLER
O	TEETH	FEED WHEEL RATCHET
SAT	FELT WASHER	FEED WHEEL SHAFT
O	SHAFT	FEED WHEEL RATCHET
O2	ROLLER	FEED WHEEL DETENT
O	HOOKS - EACH END	FEED PAWL SPRING
O	PIVOT - SURFACE	DETENT ECCENTRIC BUSHING
O	HOOKS - EACH END	DETENT LEVER SPRING
O2	PIVOT POINTS	FEED LEVER BAIL
O	ENGAGING SURFACE	FEED LEVER EXTENSION
O	GUIDE SLOT	FEED LEVER
SAT	FELT WASHER	FEED LEVER SHAFT

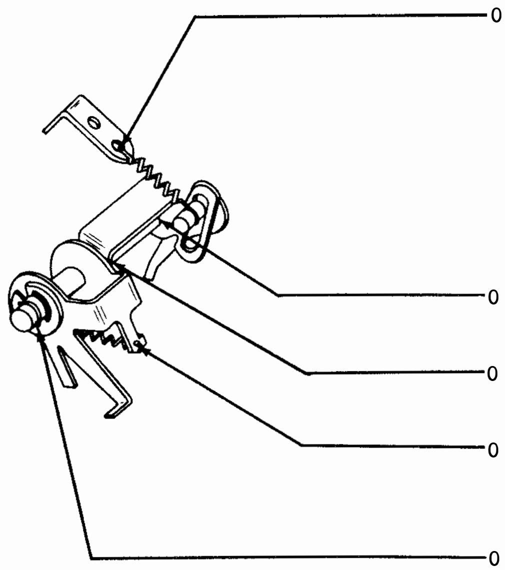
Figure 5-193. Transmitter Distributor (LBXD16)

d.05 LATCH AND PUSHER BAIL STRIPPER



O	HOOKS - EACH END	LATCH STRIPPER BAIL
SAT	FELT WASHER	LATCH STRIPPER BAIL ROLLER
O	BEARING SURFACE - EACH END	LATCH AND PUSHER STRIPPER BAIL
SAT	FELT WASHER	STRIPPER SHAFT
O	ENGAGING SURFACE (9 PUSHERS)	PUSHER LEVER
O	ENGAGING SURFACE (9 LATCHES)	LATCH LEVER
O	ENGAGING SURFACE	CAM AND ROLLER ASSEMBLY
SAT	FELT WICK	PUSHER STRIPPER BAIL ROLLER
O	HOOKS - EACH END	PUSHER STRIPPER BAIL SPRING

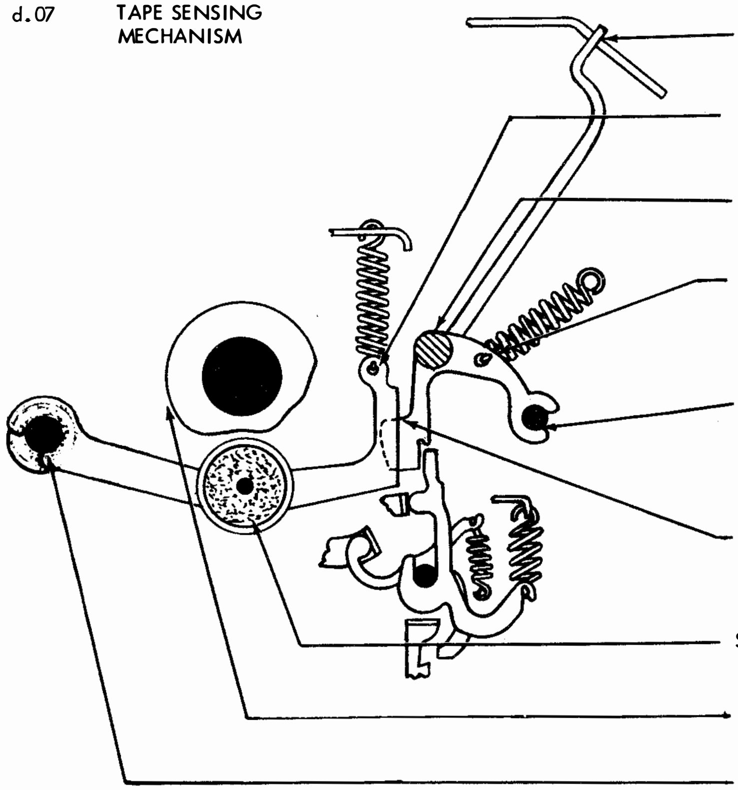
d.06 TAPE OUT AND CONTROL MECHANISM



0	HOOKS EACH END	YIELD SPRING
0	PIVOTS	TAPE-OUT BAIL
0	PIVOT	CONTROL BAIL
0	HOOKS EACH END	YIELD SPRING
0	PIVOT	CONTROL BAIL

Figure 5-194. Transmitter Distributor (LBXD16)

d.07 TAPE SENSING MECHANISM



d.08 PUSHER LEVERS

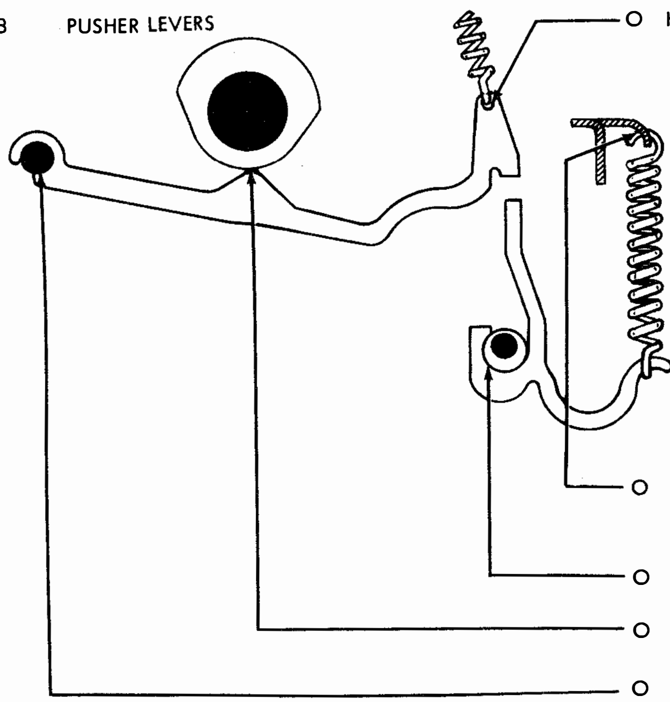
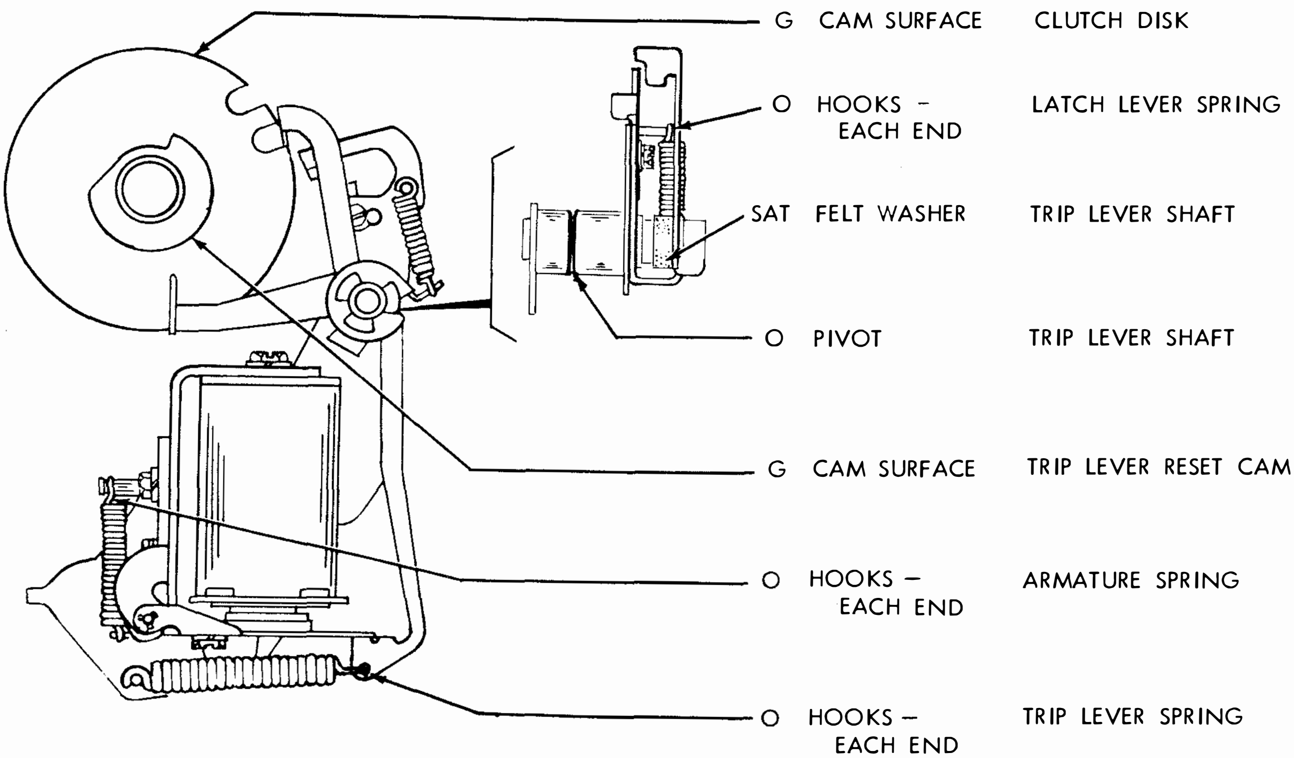


Figure 5-195. Transmitter Distributor (LBXD16)

d.09 DISTRIBUTOR AND SENSING SHAFT TRIP MECHANISMS



d.10 MAGNET ARMATURE HINGES

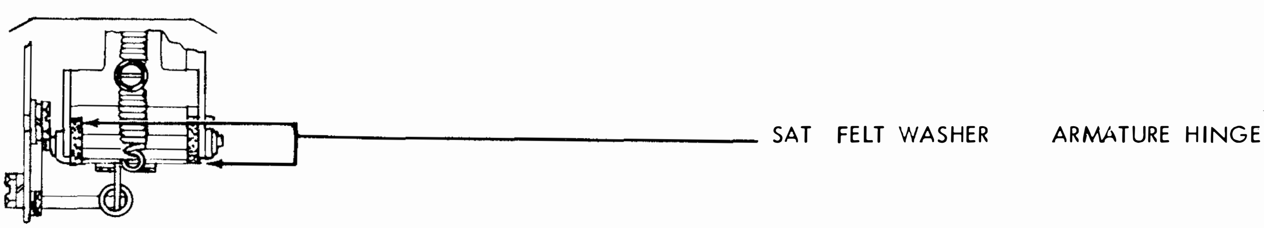


Figure 5-196. Transmitter Distributor (LBXD16)

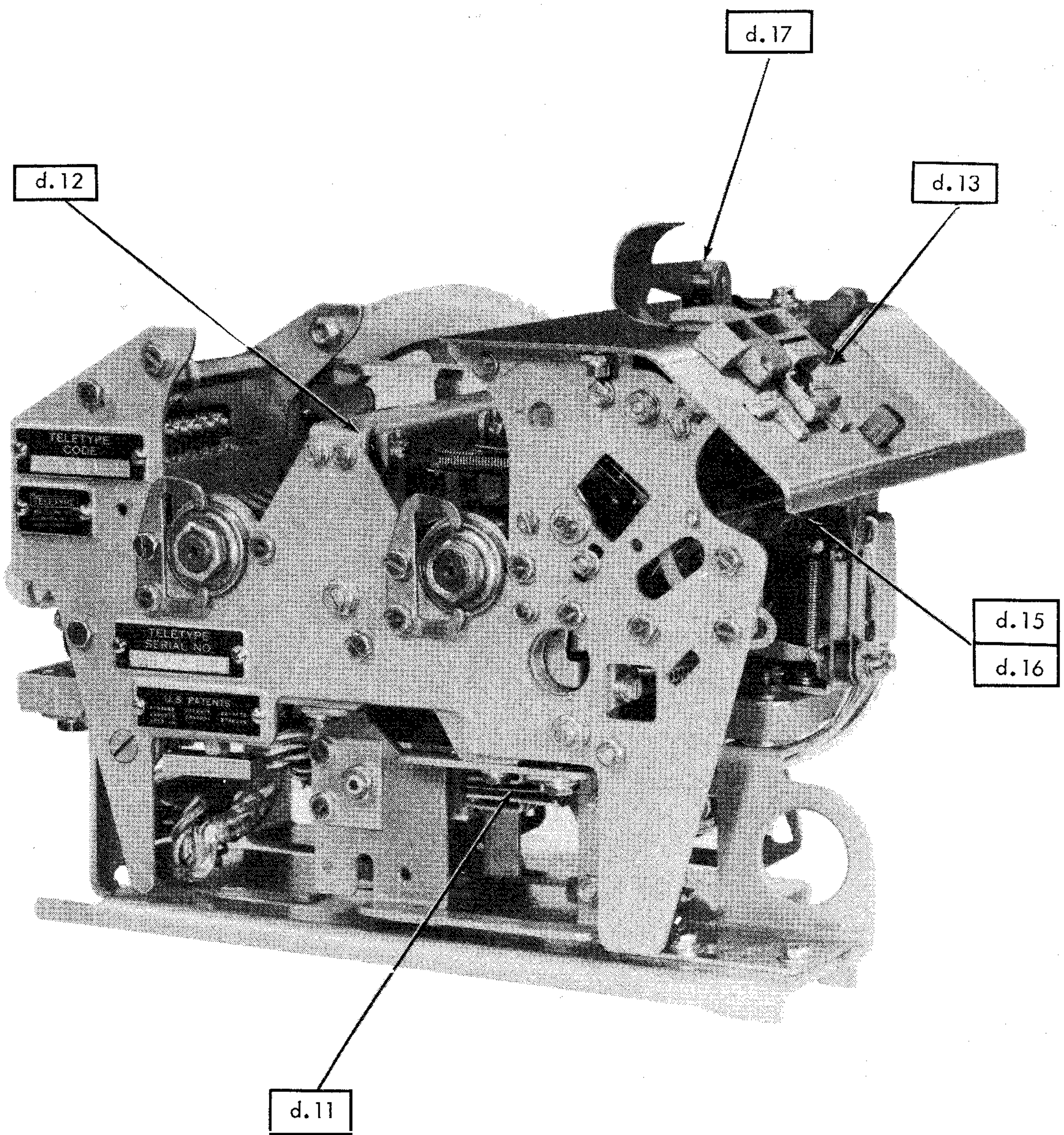
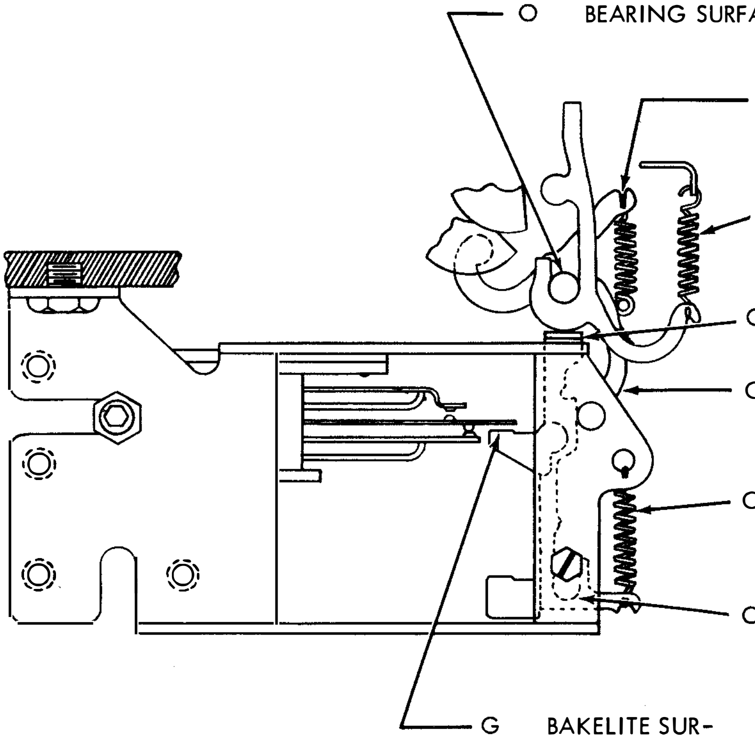


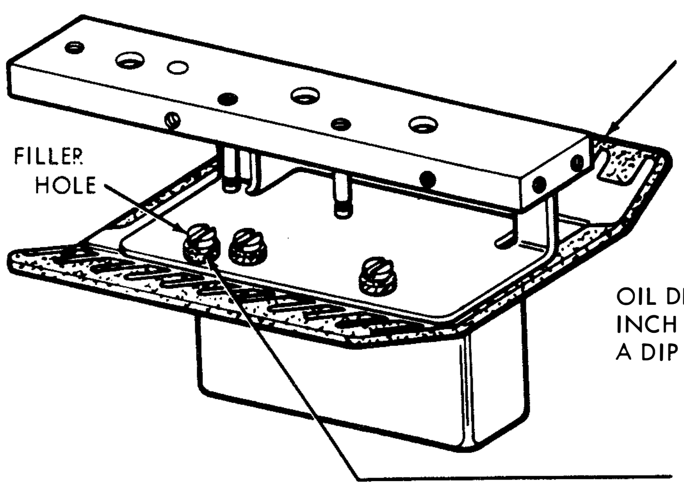
Figure 5-197. Transmitter Distributor (LBXD16)

d.11 STORING SWITCH MECHANISM



NOTE: KEEP CONTACTS FREE OF GREASE

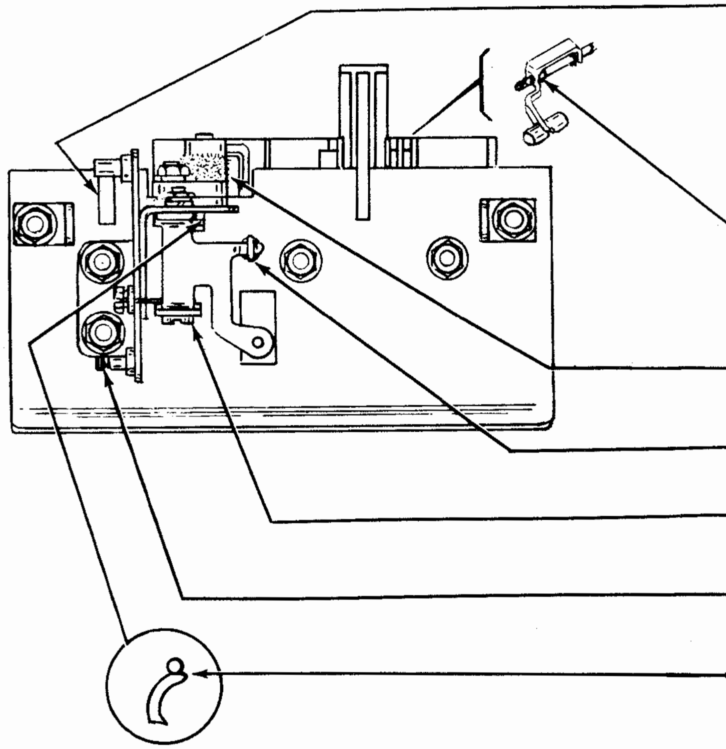
d.12 OIL RESERVOIR



NOTE
OIL DEPTH NOT TO EXCEED 7/8 INCH. USE A 0.010 INCH FLAT GAUGE FROM 117781 SET OF GAUGES AS A DIP STICK.

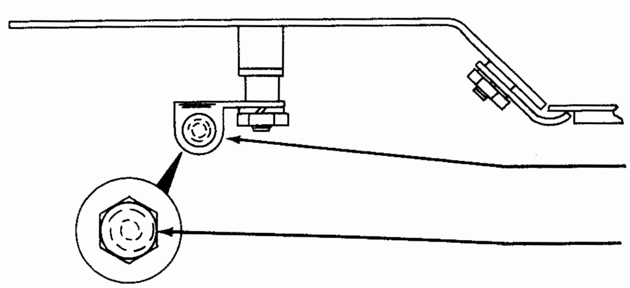
Figure 5-198. Transmitter Distributor (LBXD16)

d.13 TAPE GUIDE PLATE



G	TEETH	START-STOP LEVER
O	PIVOTS	TIGHT TAPE BAIL
SAT	FELT WASHER	TAPE LID SHAFT
O	HOOKS - EACH END	TAPE LID RELEASE SPRING
O	PIVOT - EACH END	RELEASE BAIL SHAFT
O	HOOKS - EACH END	DETENT SPRING
G	LATCHING SURFACE	TAPE LID LATCH

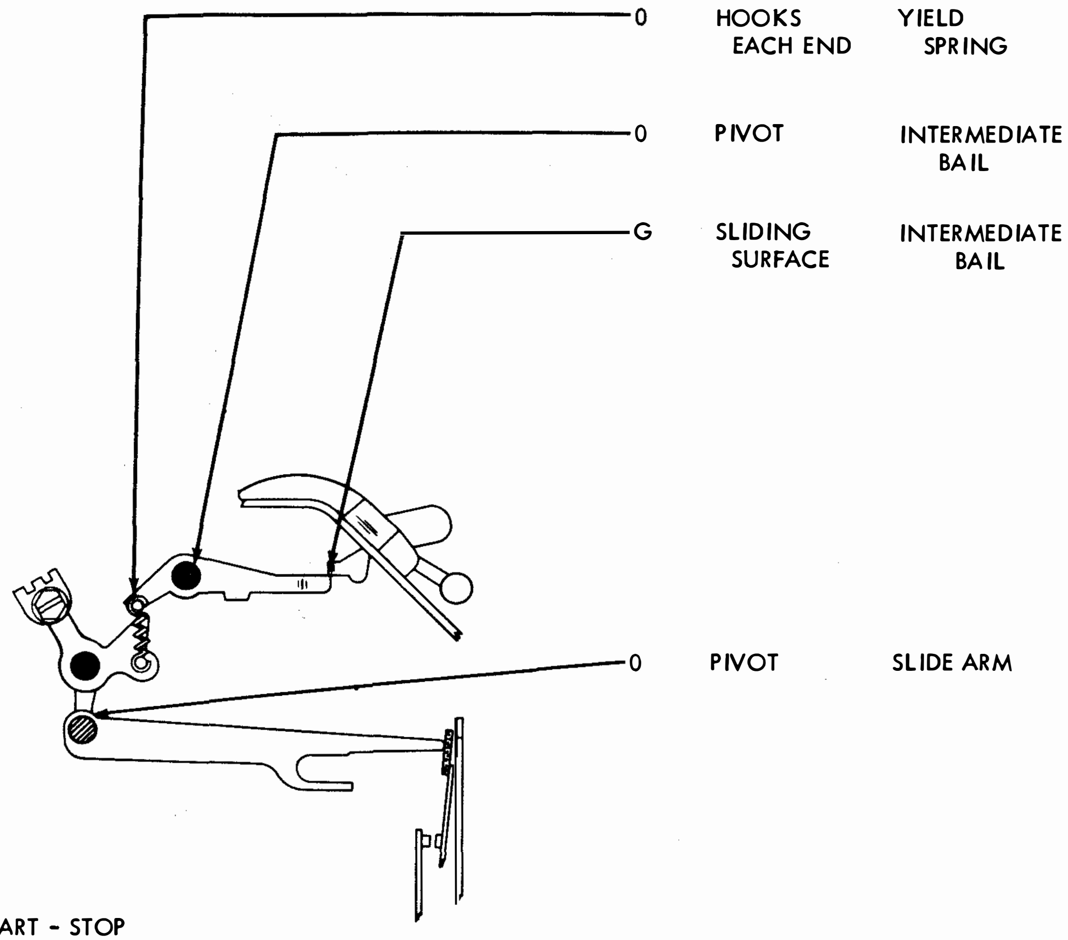
d.14 COVER PLATE



O	SLIDING SURFACE	COVER PLATE DETENTS AND SPRINGS
O	ENGAGING SURFACE	DETENTING NUTS (FRONT & REAR PLATE)

Figure 5-199. Transmitter Distributor (LBXD16)

d.15 TIGHT TAPE
SLIDE ARM ASSEMBLY



d.16 START - STOP
SLIDE ARM ASSEMBLY

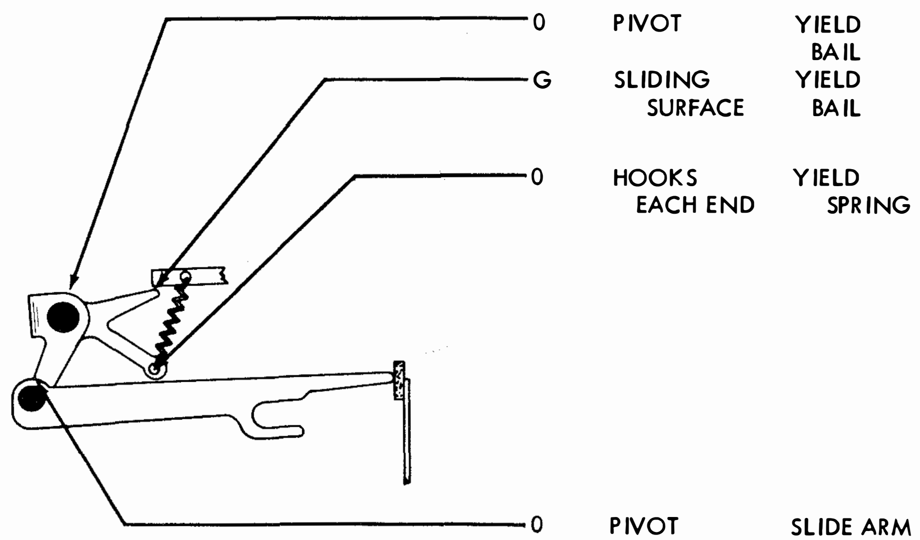
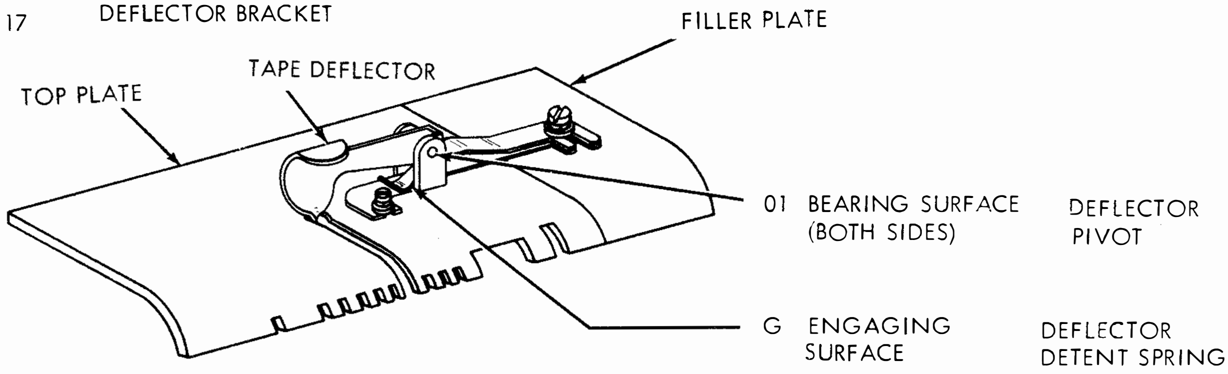


Figure 5-200. Transmitter Distributor (LBXD16)

d.17 DEFLECTOR BRACKET



d.18 DRIVE GEAR ASSEMBLY

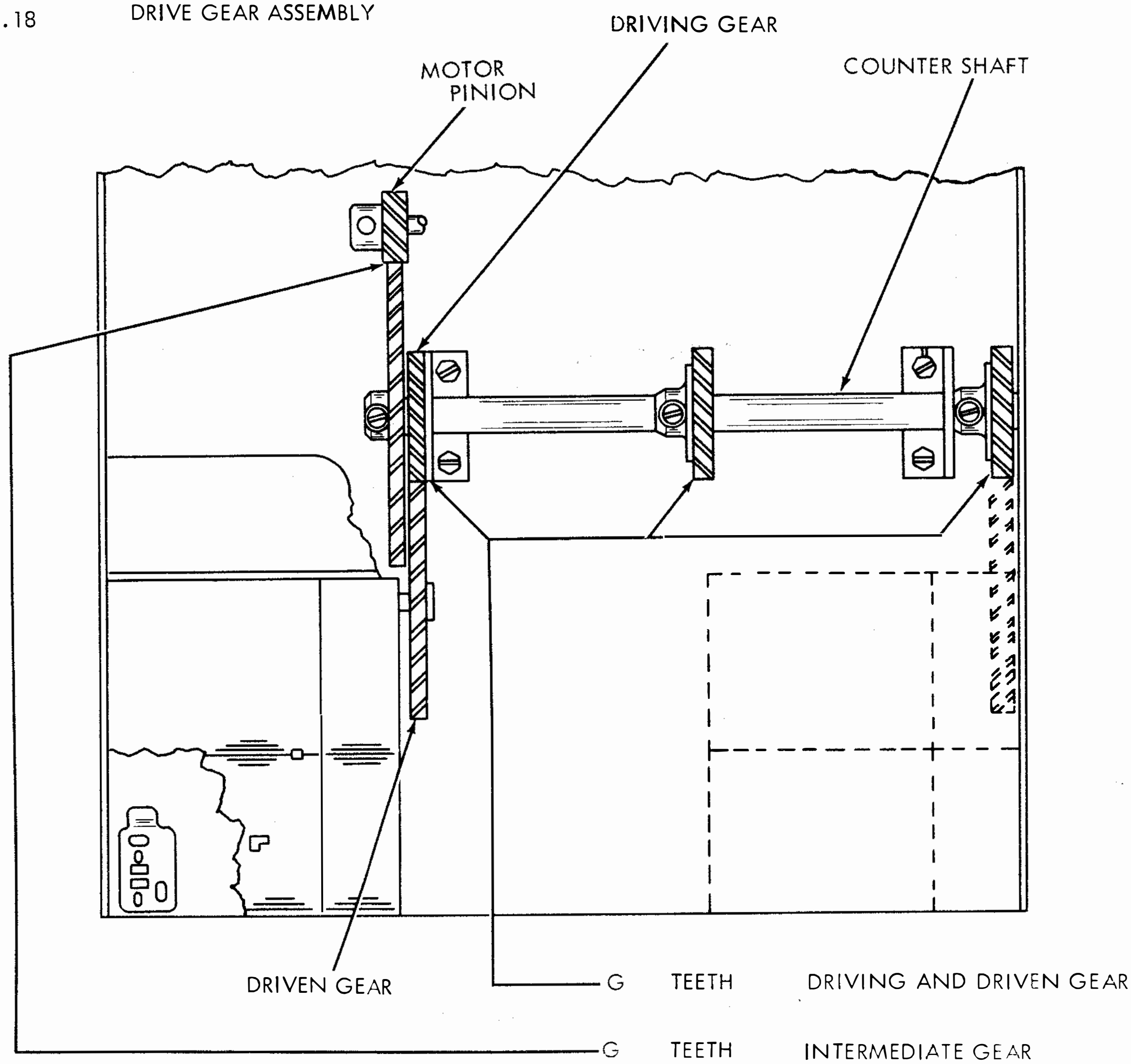


Figure 5-201. Transmitter Distributor (LBXD16)

e. TRANSMITTER DISTRIBUTOR (LXD)

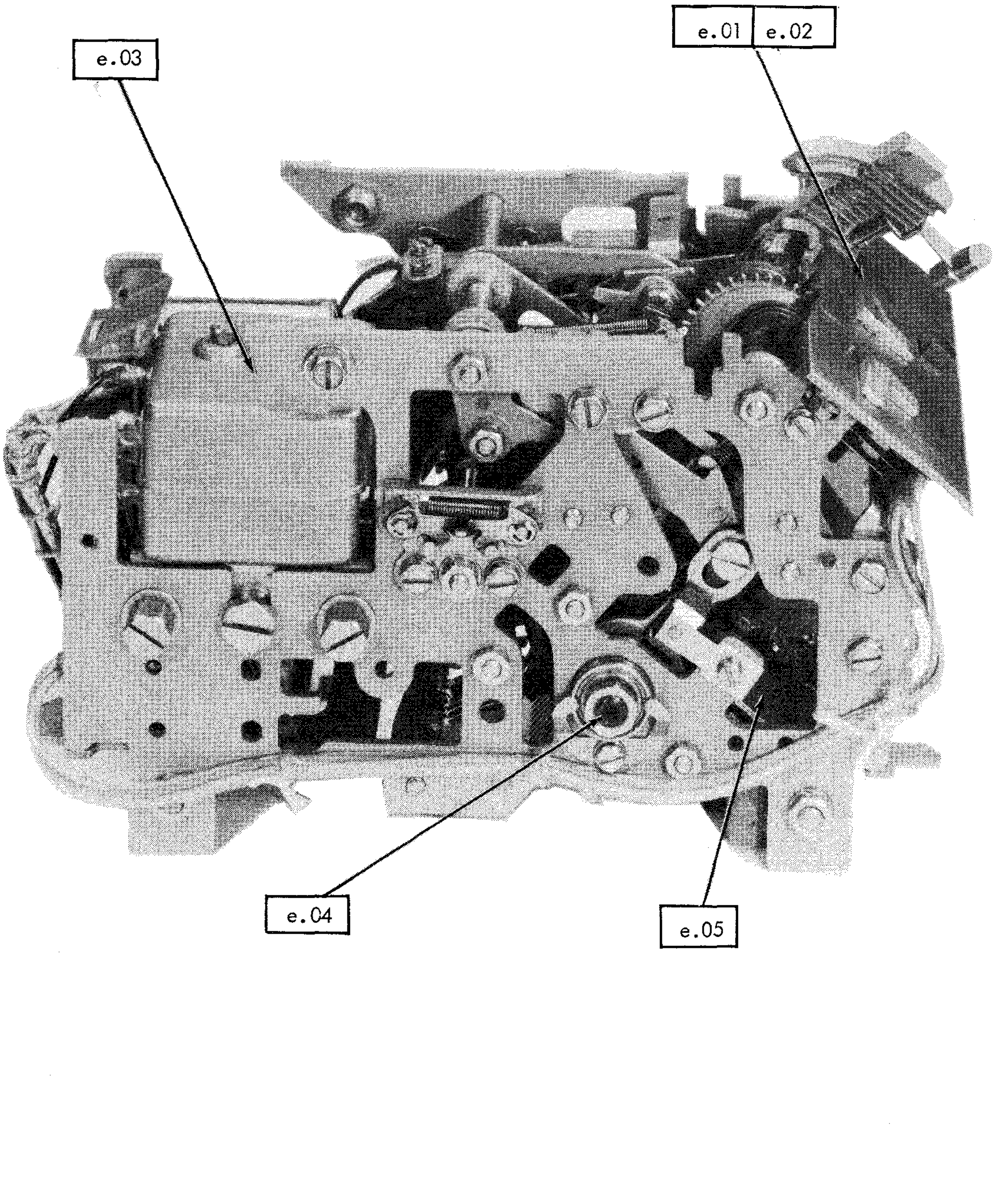
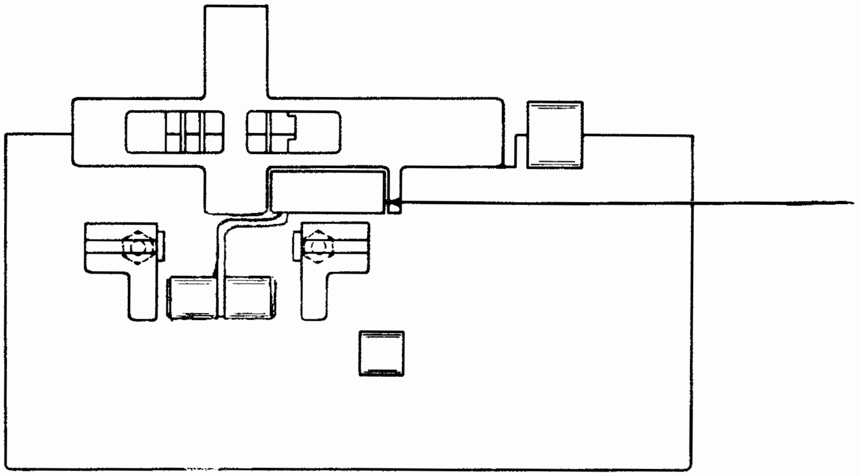


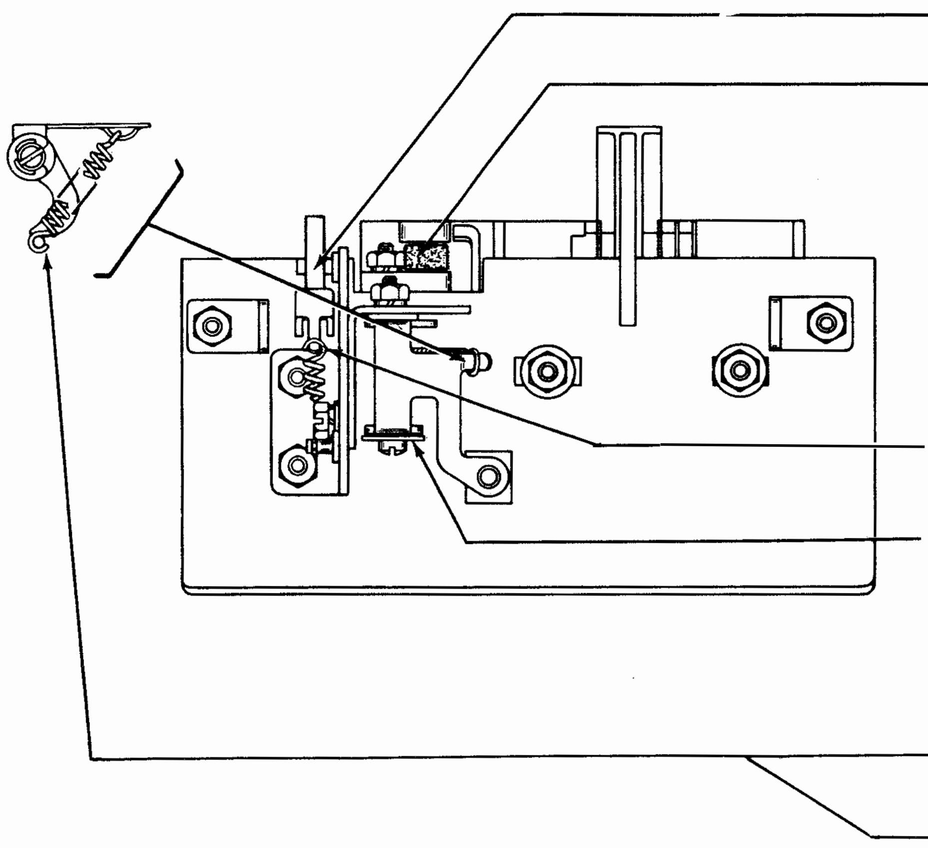
Figure 5-202. Transmitter Distributor (LXD)

e.01 TAPE GUIDE PLATE



O	BEARING SURFACE	TIGHT TAPE BAIL

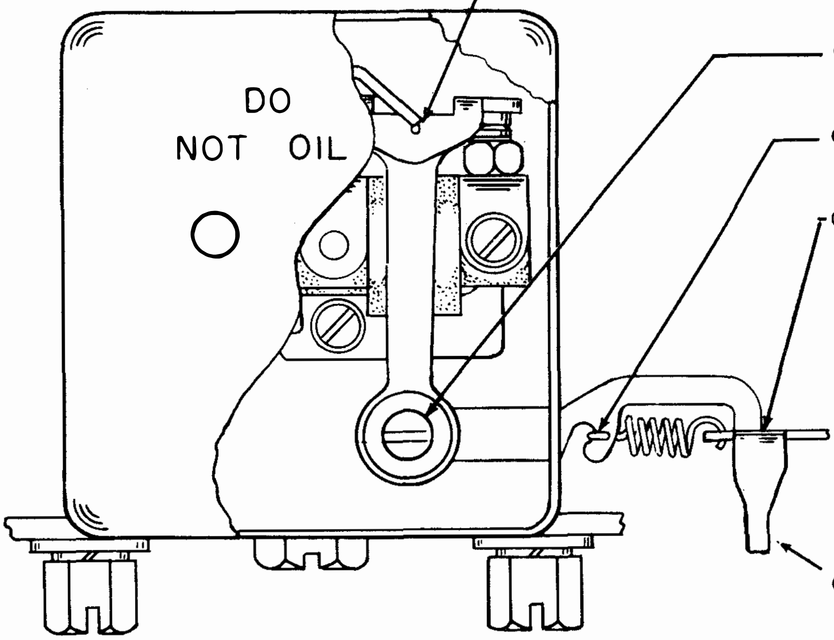
e.02 TAPE GUIDE PLATE



G	TEETH	START-STOP LEVER
SAT	FELT WASHER	TAPE LID SHAFT
O	EACH LOOP	START-STOP DETENT BAIL
O	BEARING SURFACE	TAPE LID RELEASE BAIL
G	LATCHING SURFACE	TAPE LID LATCH
O	EACH LOOP	TAPE LID LATCH SPRING

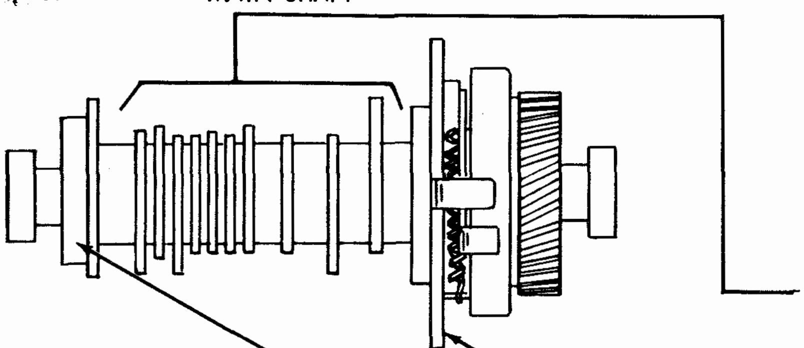
Figure 5-203. Transmitter Distributor (LXD)

e.03 SIGNAL CONTACT ASSEMBLY



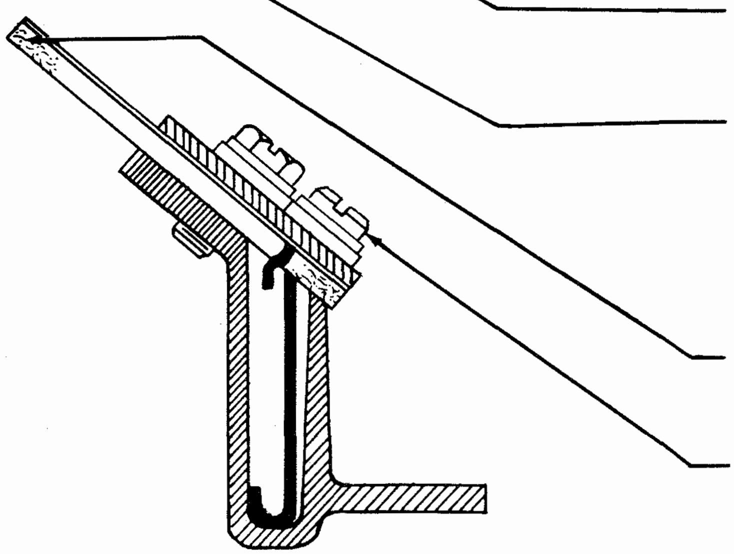
G	(LIGHT FILM) ENGAGING SURFACE	TOGGLE LINK
G	BEARING SURFACE	TOGGLE (METAL) BUSHING
O	EACH LOOP	TRANSFER BAIL LINK SPRING
G	ENGAGING SURFACE	TRANSFER BAIL AND LINK
G	ENGAGING SURFACE	TRANSFER BAIL EXTENSION

e.04 MAIN SHAFT



0	CAMING SURFACES	CAM SLEEVE
0 3	CAMING SURFACE	CLUTCH DISK
0 2	CAMING SURFACE	DRIVE ARM CAM

e.05 OIL RESERVOIR



SAT	LEATHER WICK	CAM OILER
FILL	RESERVOIR	CAM OILER

Figure 5-204. Transmitter Distributor (LXD)

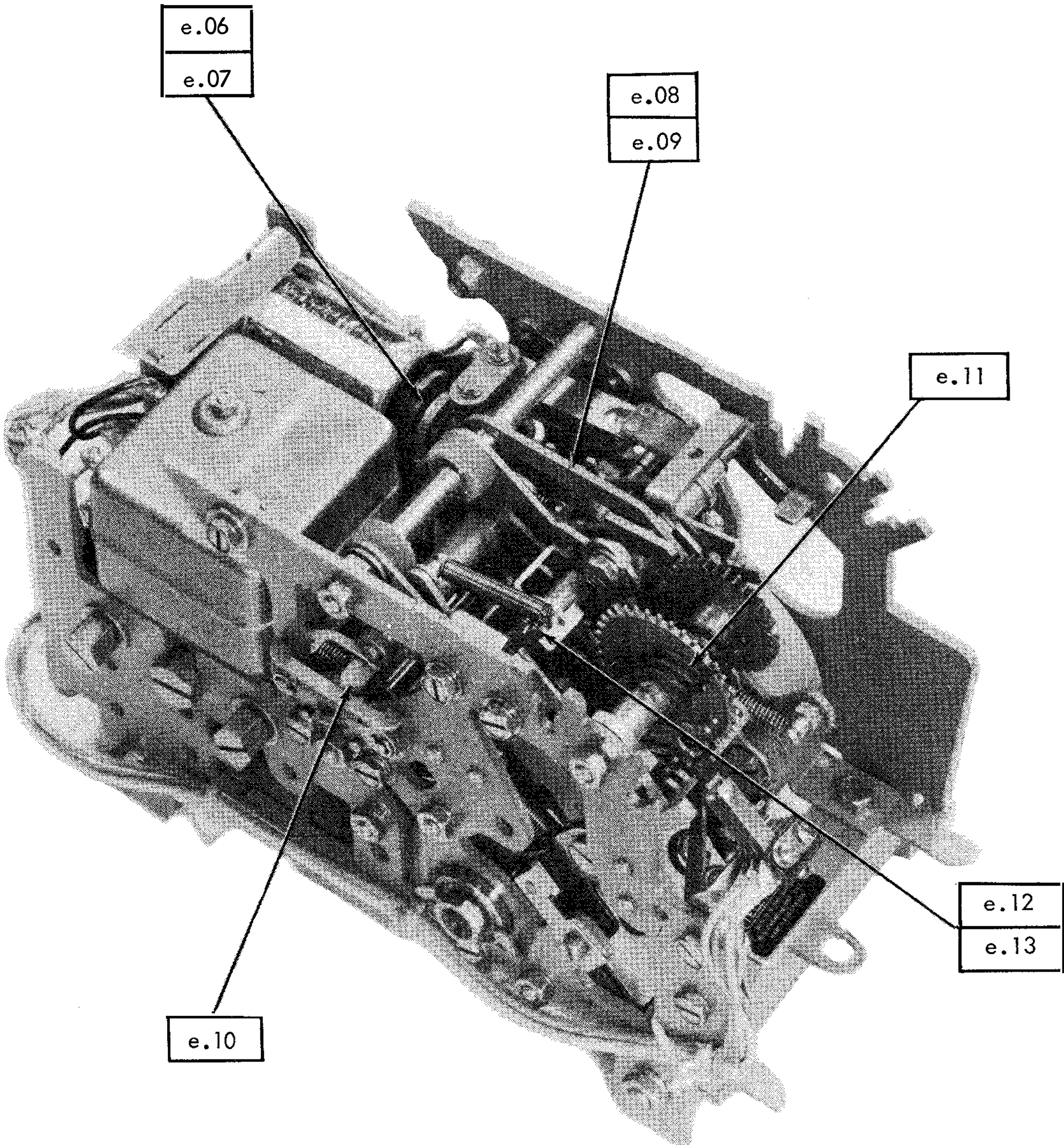
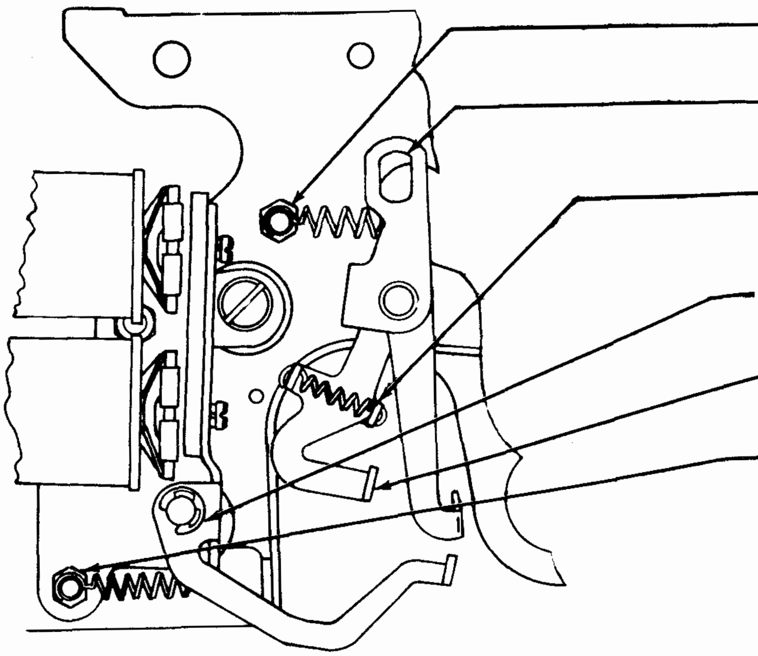


Figure 5-205. Transmitter Distributor (LXD)

e.06 CLUTCH TRIP ASSEMBLY



0	EACH LOOP	LATCH LEVER SPRING
0	SLOT	CLUTCH TRIP BAIL
0	EACH LOOP	TRIP LEVER SPRING
SAT	FELT WASHERS	ARMATURE BAIL
0	ENGAGING SURFACE	TRIP LEVER
0	EACH LOOP	ARMATURE SPRING

e.07 CLUTCH TRIP ASSEMBLY

SAT	FELT WASHER	LATCH LEVER
SAT	FELT WASHER	TRIP LEVER
G	ENGAGING SURFACE	ARMATURE BAIL EXTENSION

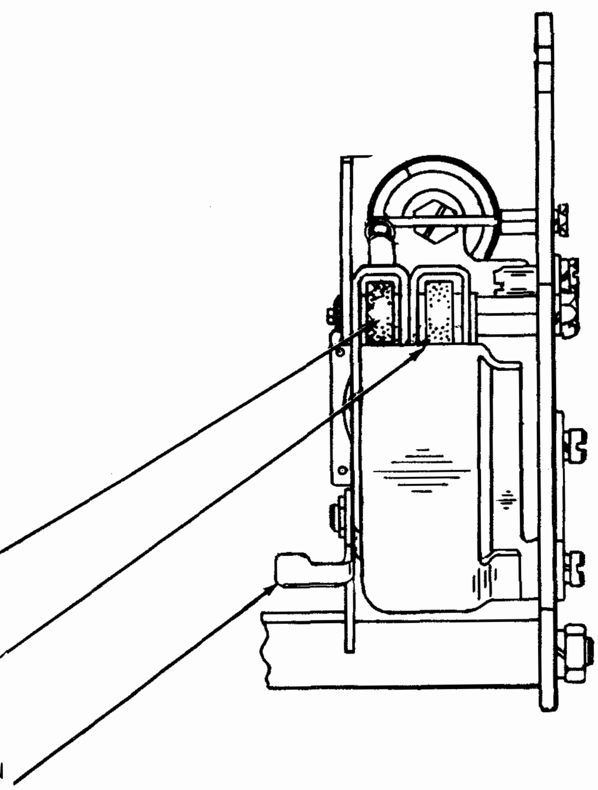
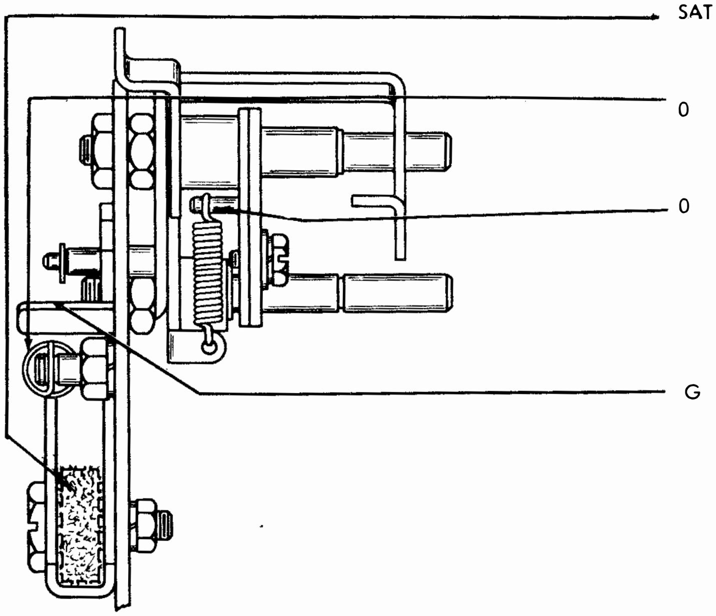


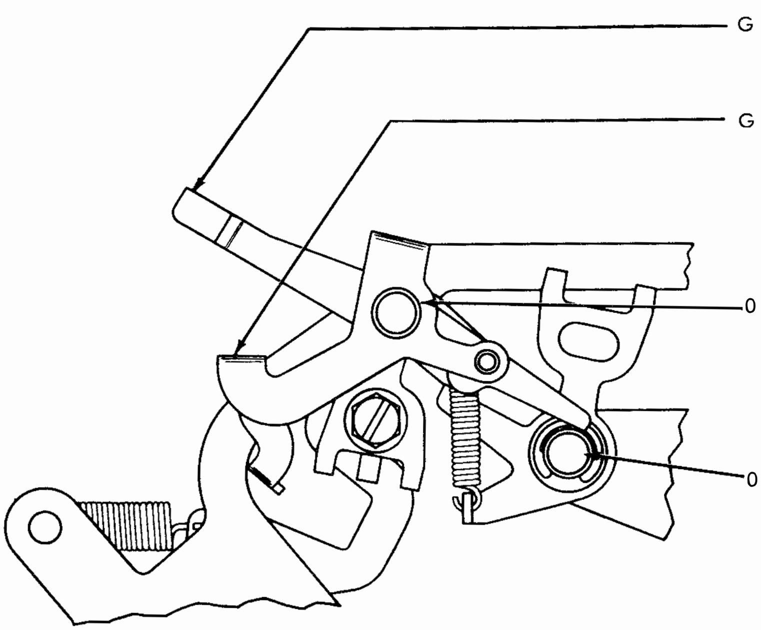
Figure 5-206. Transmitter Distributor (LXD)

e.08 CENTER PLATE ASSEMBLY



SAT	FELT WASHER	RATCHET DETENT BAIL
0	BOTH LOOPS	DETENT BAIL SPRING
0	BOTH LOOPS	TIGHT TAPE ARM
G	ENGAGING SURFACE	START-STOP BAIL EXTENSION

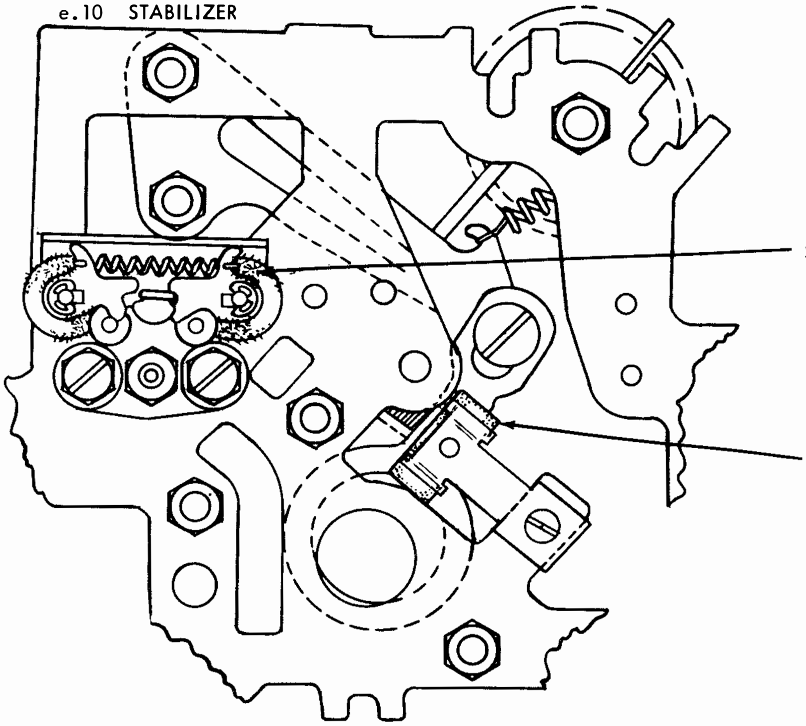
e.09 CENTER PLATE ASSEMBLY



G	ENGAGING SURFACE	TIGHT TAPE ARM
G	ENGAGING SURFACE	START-STOP BAIL
0	BEARING SURFACE	START-STOP BAIL
0	BEARING SURFACE	YIELD ARM

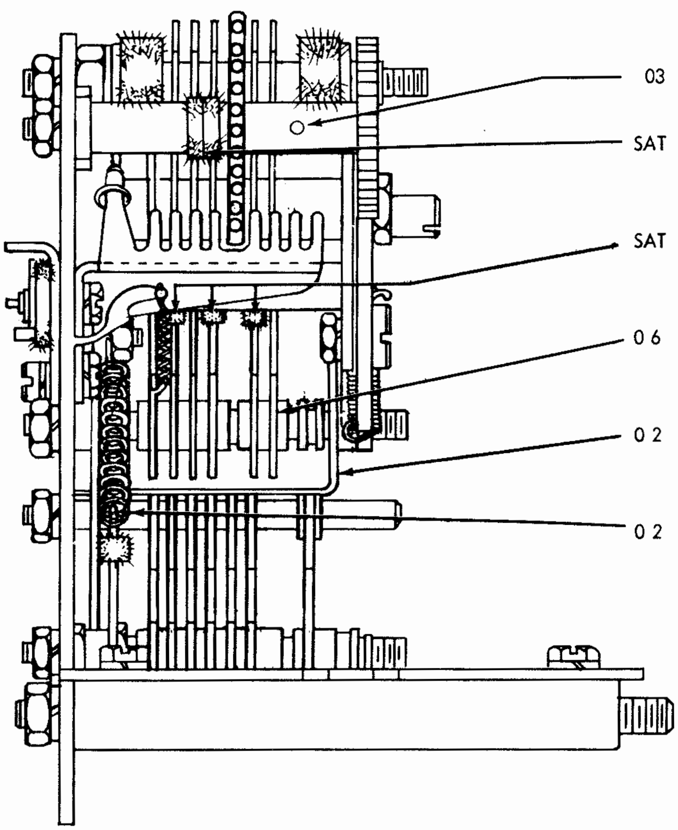
Figure 5-207. Transmitter Distributor (LXD)

e.10 STABILIZER



SAT	FELT WICK	STABILIZER LATCH
SAT	LEATHER WICK	DRIVE ARM OILER

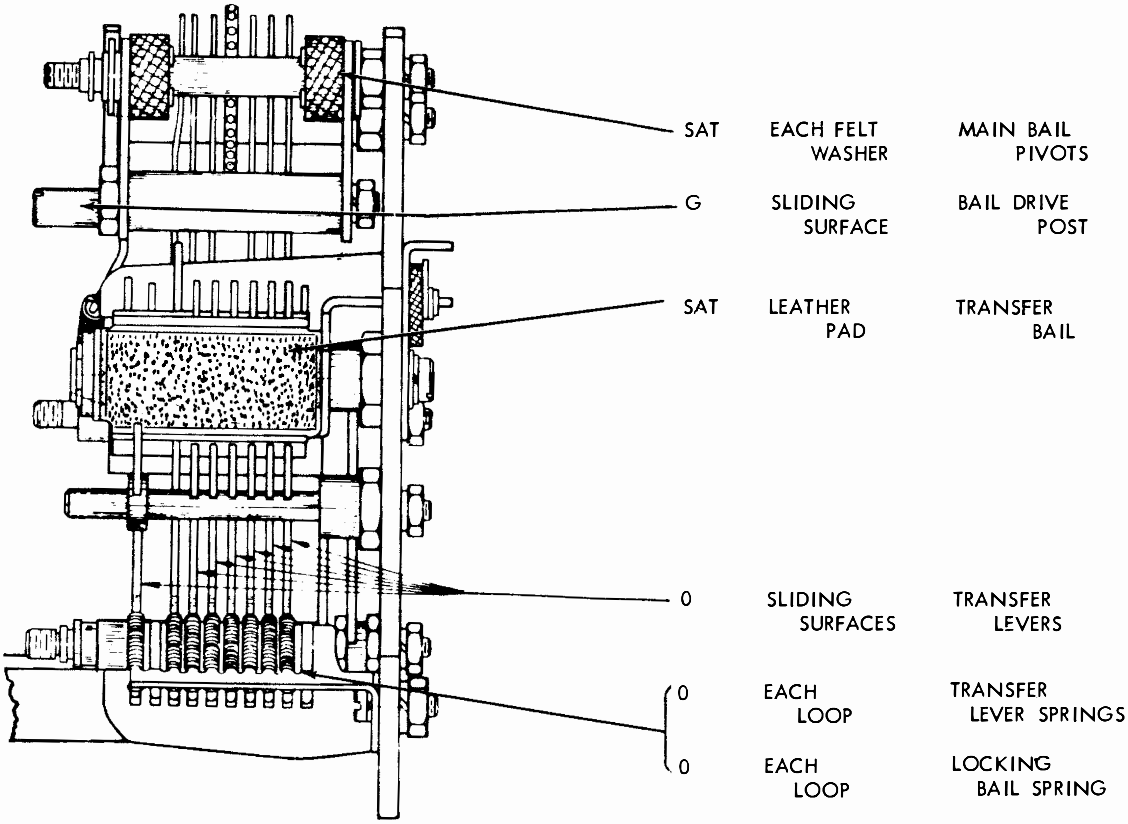
e.11 SENSING AND FEED MECHANISM



03	SHAFT	FEED WHEEL
SAT	FELT WICKS	FEED WHEEL BEARING
SAT	FELT WICKS	SENSING PINS
06	SLIDING SURFACE	SENSING PIN GUIDE POST
02	SLIDING SURFACE	LOCKING BAIL
02	BOTH LOOPS	LOCKING BAIL SPRING

Figure 5-208. Transmitter Distributor (LXD)

e.12 TRANSFER MECHANISM



e.13 TRANSFER MECHANISM

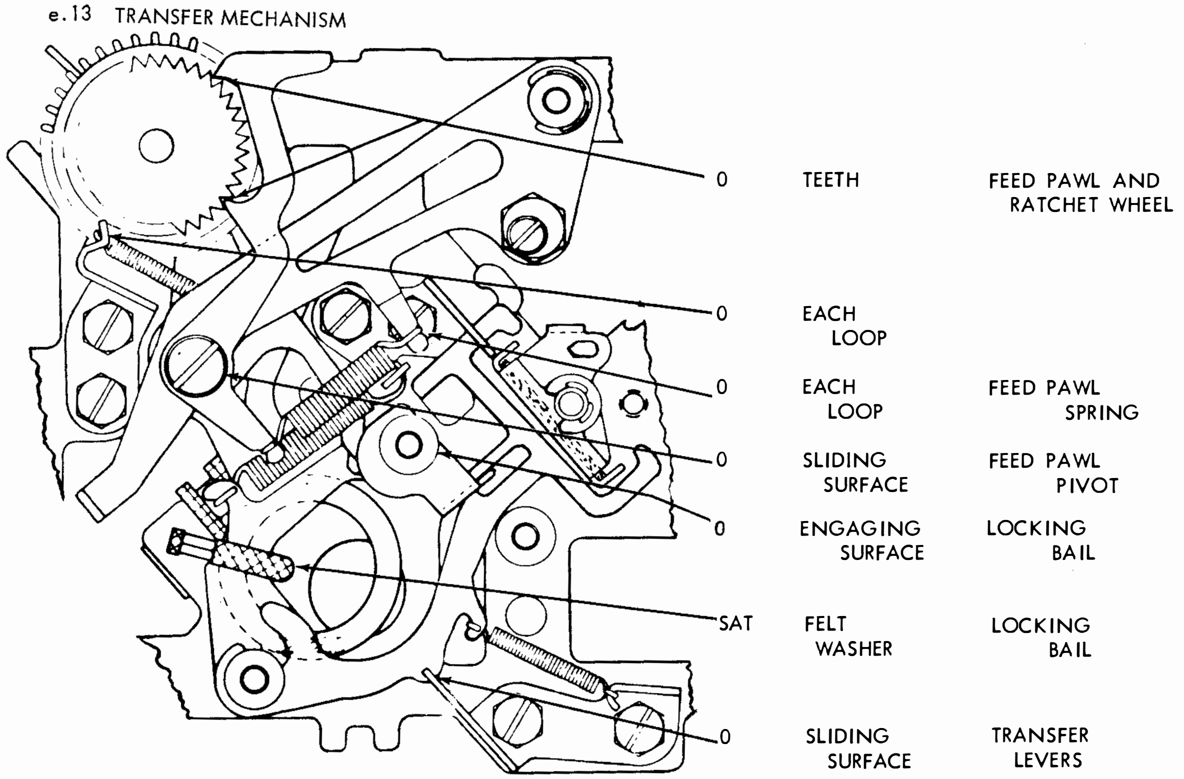


Figure 5-209. Transmitter Distributor (LXD)

f. TAPE HANDLING STAND

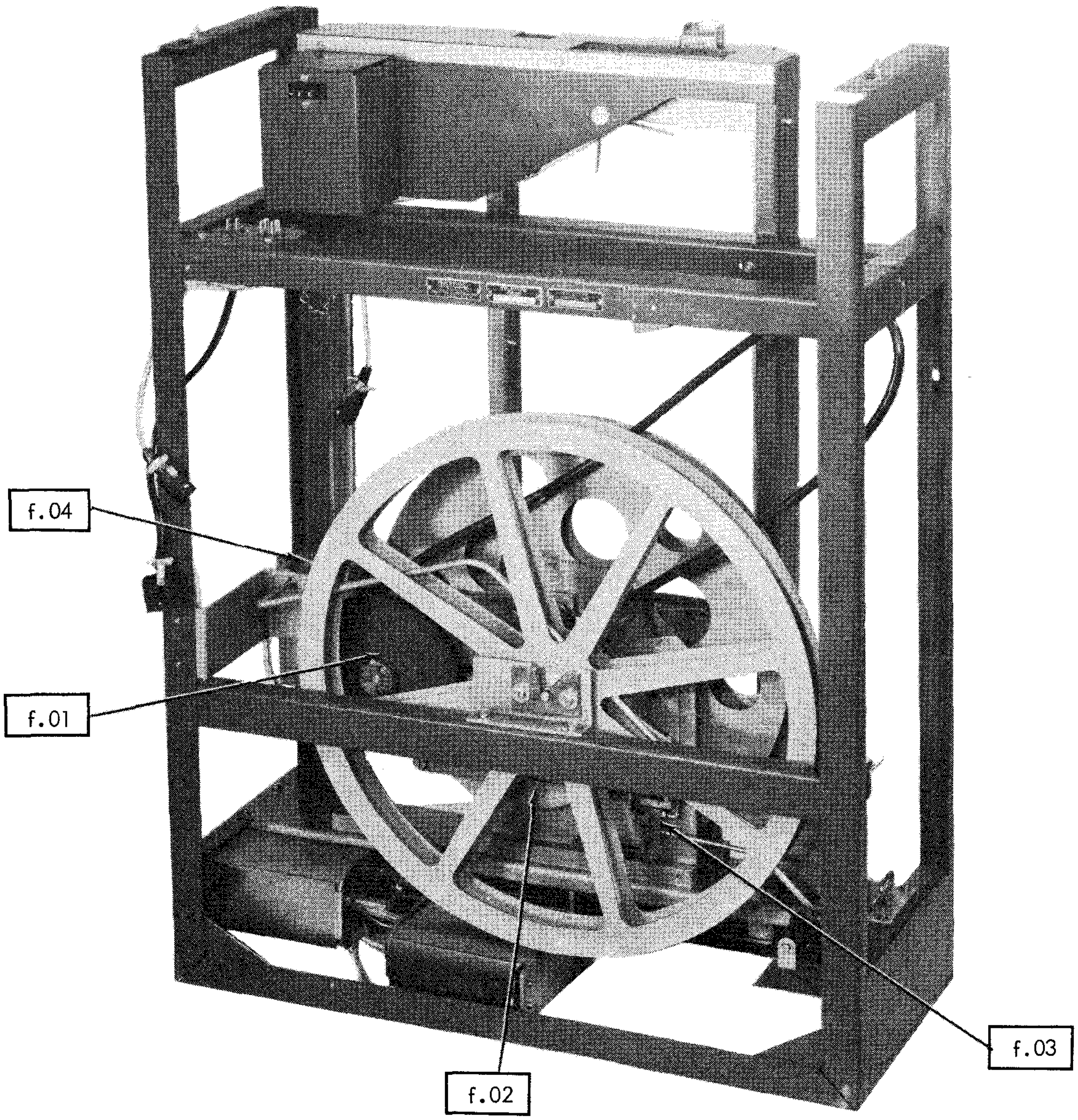
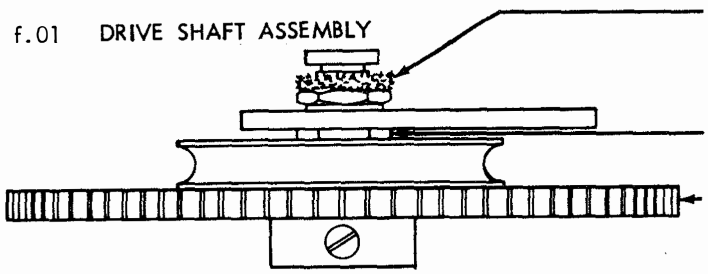
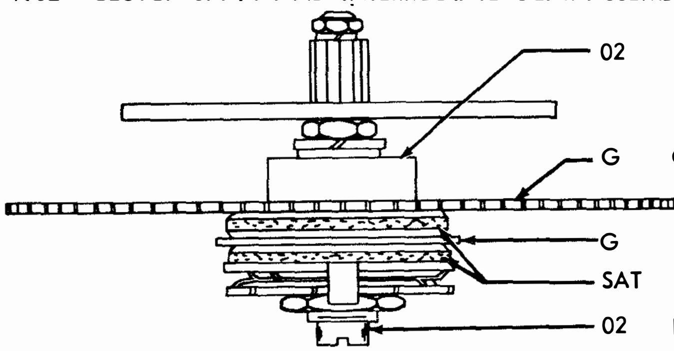


Figure 5-210. Tape Handling Stand

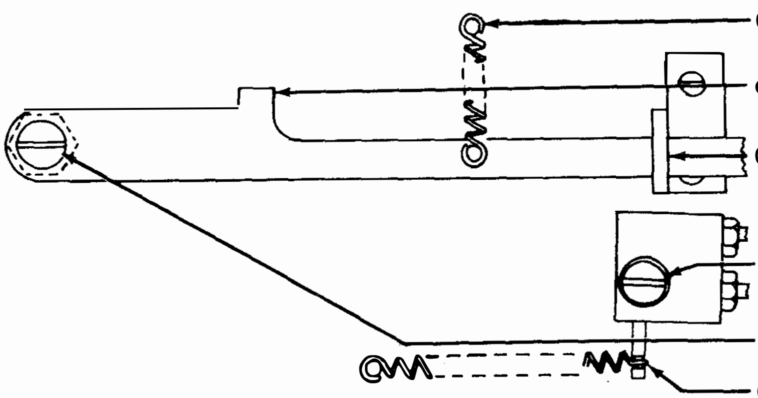
f.01 DRIVE SHAFT ASSEMBLY



f.02 CLUTCH SHAFT AND INTERMEDIATE GEAR ASSEMBLY



f.03 STOP LEVER AND TAPE ARM MECHANISM



f.04 TAPE ALARM MECHANISM

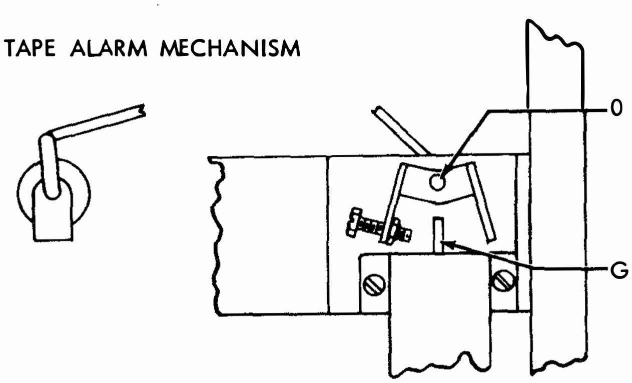


Figure 5-211. Tape Handling Stand

g. REPERFORATOR TRANSMITTER BASE

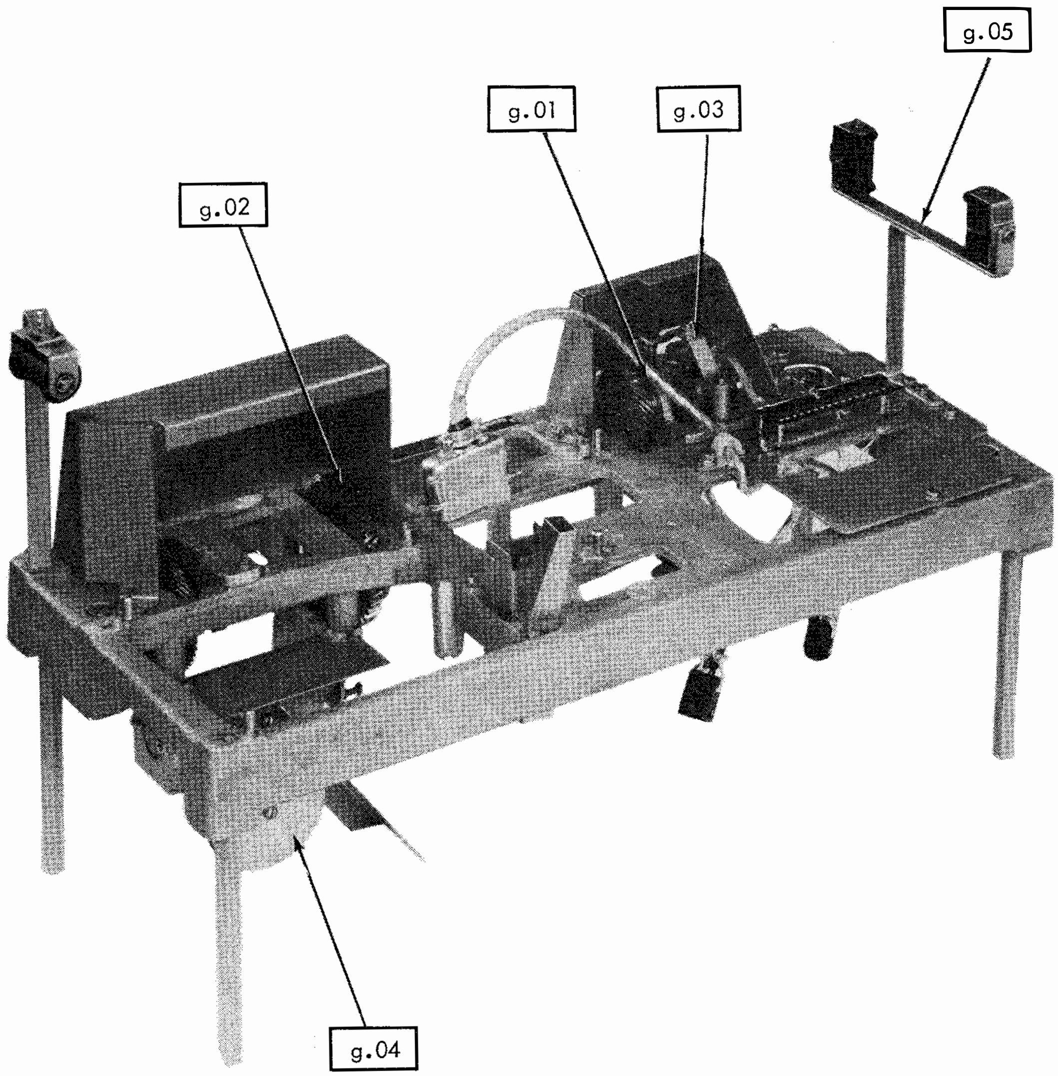
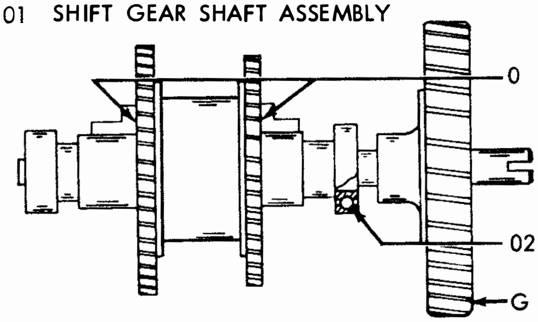


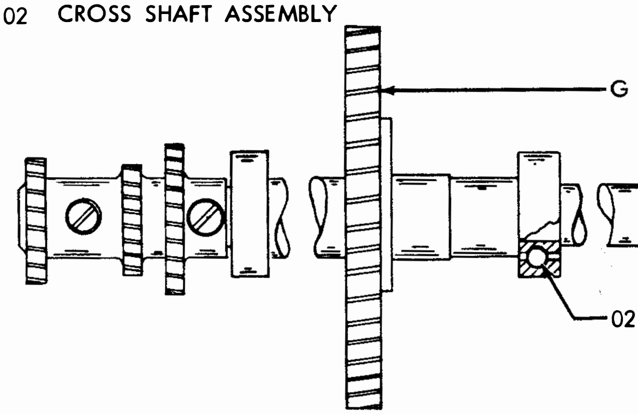
Figure 5-212. Reperforator Transmitter Base

g.01 SHIFT GEAR SHAFT ASSEMBLY



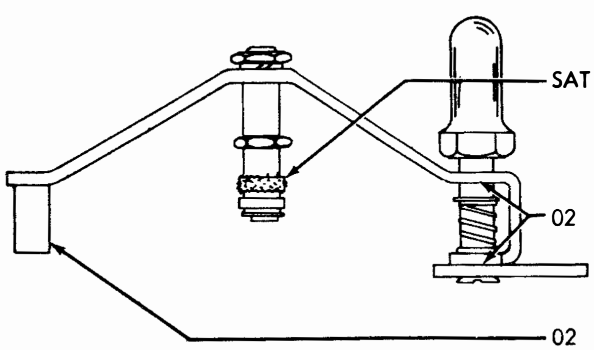
0	GUIDING SURFACES	KEY BAR
02	BALL BEARINGS (2 PLACES)	SHIFT GEAR SHAFT BEARINGS
G	GEAR TEETH (4 GEARS)	SHIFT GEAR SHAFT GEARS

g.02 CROSS SHAFT ASSEMBLY



G	GEAR TEETH (5 GEARS)	CROSS SHAFT GEARS
02	BALL BEARINGS (2 PLACES)	CROSS SHAFT BEARINGS

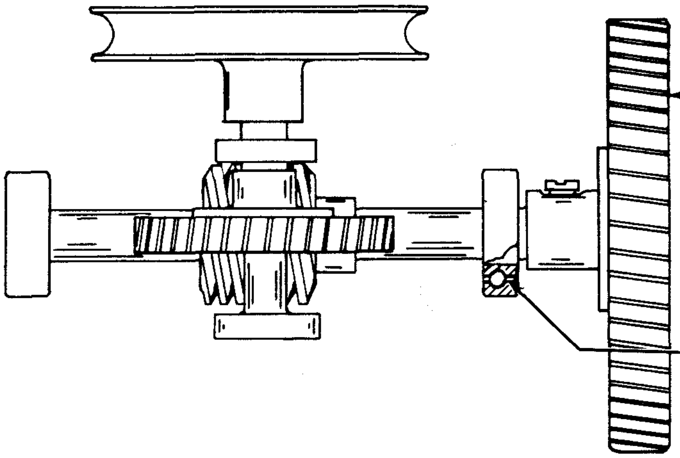
g.03 GEAR SHIFT ARM ASSEMBLY



SAT	FELT OILER	GEAR SHIFT ARM ROLLER
02	BEARING SURFACES	GEAR SHIFT ARM STUD
02	PIVOT	GEAR SHIFT ARM

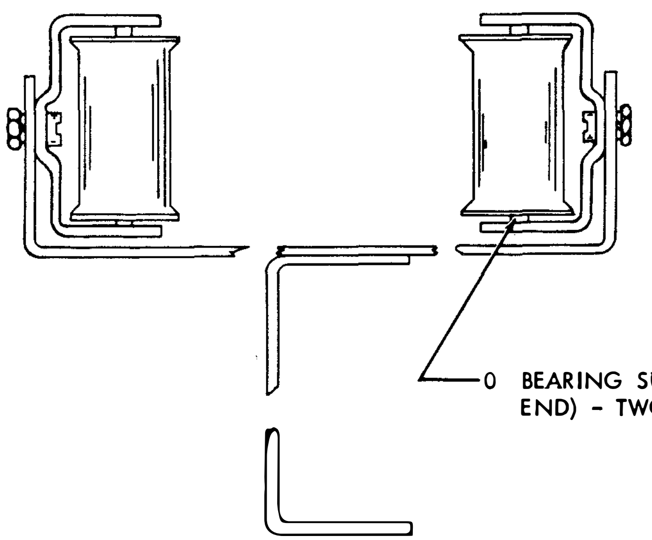
Figure 5-213. Reperforator Transmitter Base

g.04 TAPE WINDER DRIVE BRACKET ASSEMBLY

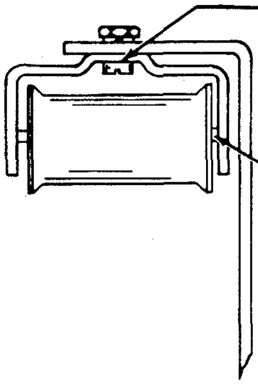


G	GEAR TEETH (3 GEARS)	TAPE WINDER DRIVE BRACKET GEARS
02	BALL BEARINGS (4 BEARINGS)	TAPE WINDER DRIVE BRACKET BEARINGS

g.05 TAPE BRACKET ROLLERS AND SHAFT



0	BEARING SURFACE (EACH END) - TWO ROLLERS	REAR TAPE BRACKET ROLLERS



0	PIVOT	FRONT TAPE BRACKET
0	BEARING SURFACE (EACH END)	FRONT TAPE BRACKET ROLLER

Figure 5-214. Reperforator Transmitter Base

h. CABINETS

h.01 CABINET HINGES AND SLIDES

NOTE
FOLLOWING LUBRICATION INSTRUCTIONS PERTAIN TO ALL CABINETS.

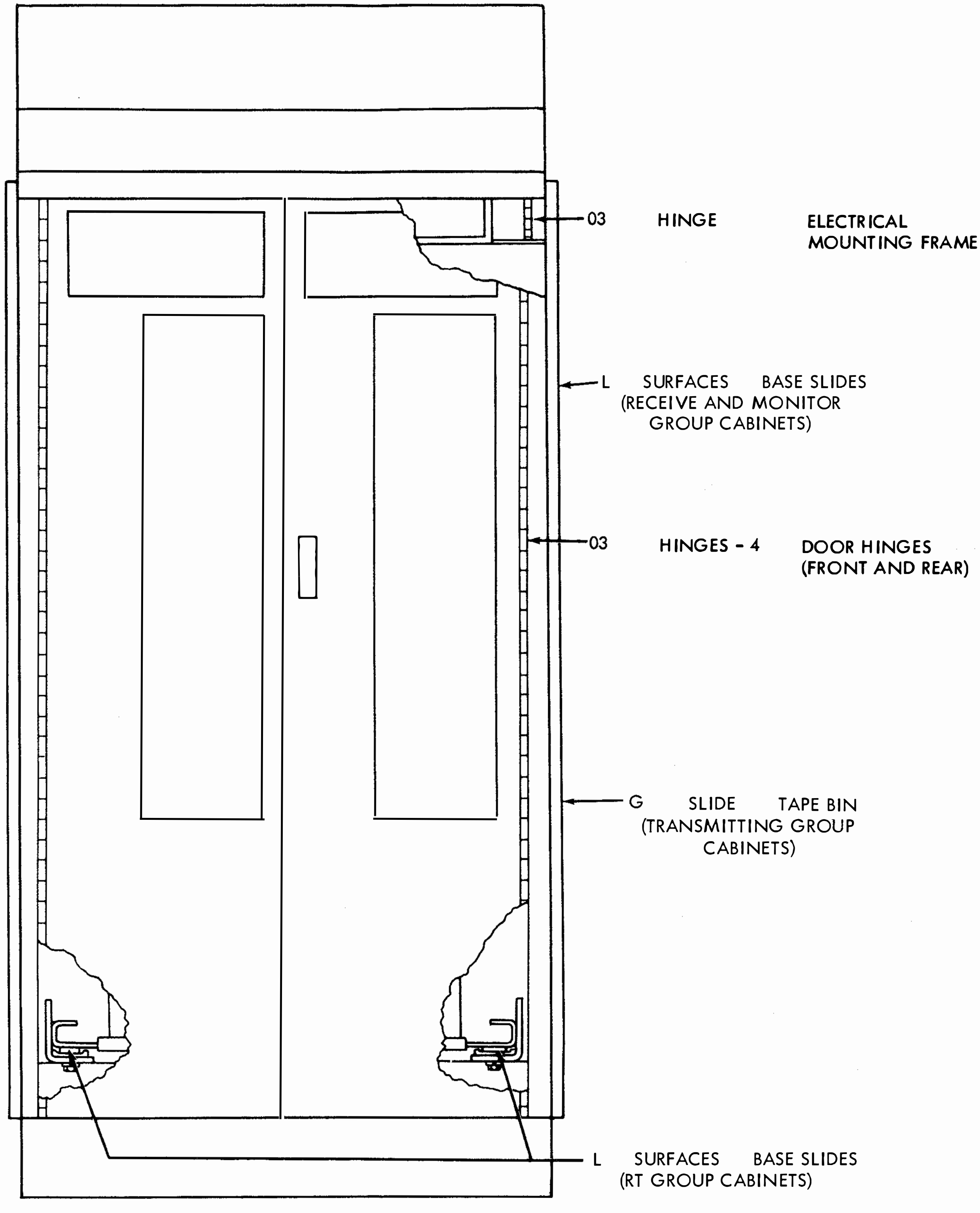
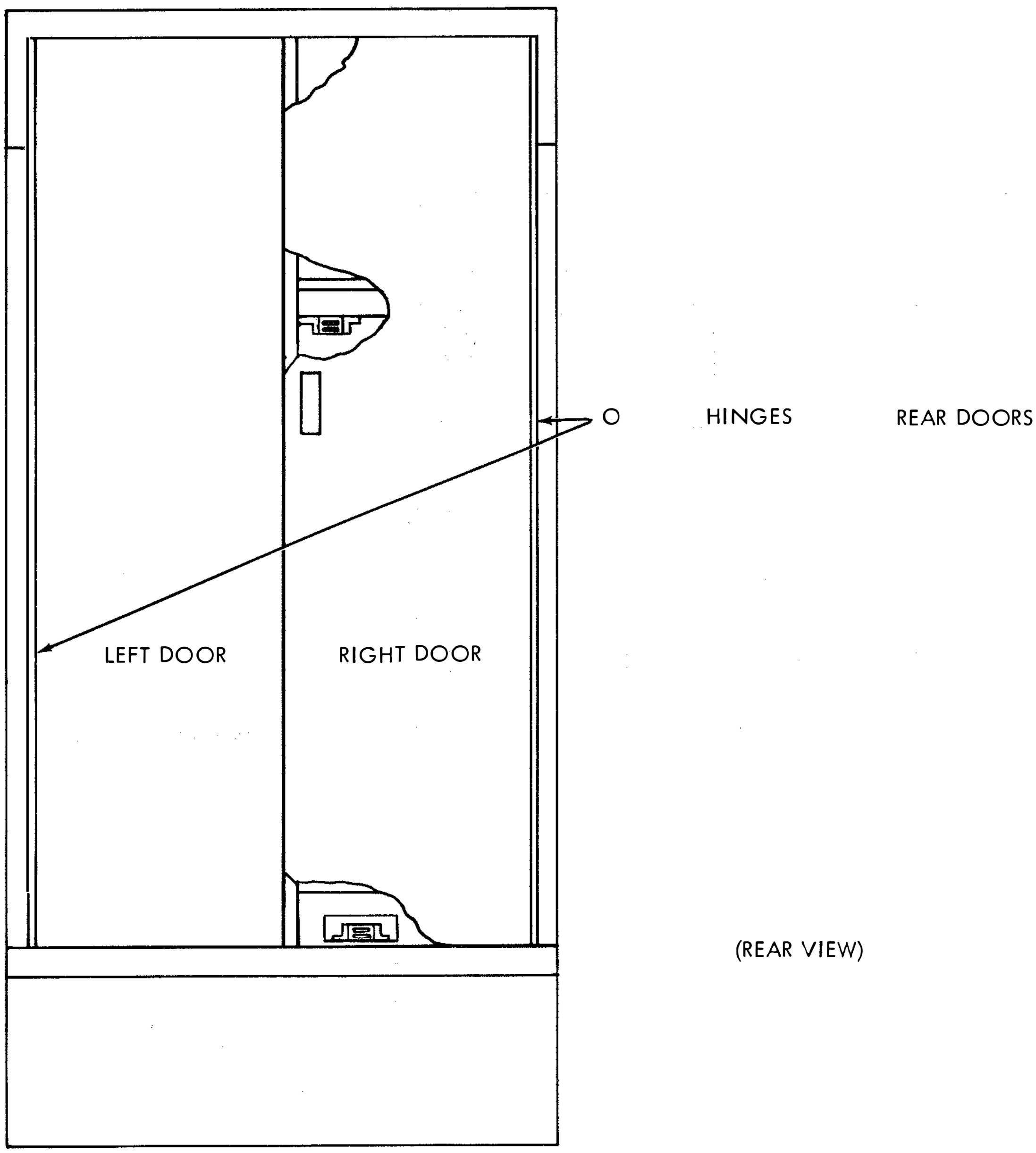


Figure 5-215. Universal Cabinet

h.02



h.03 DOLLY

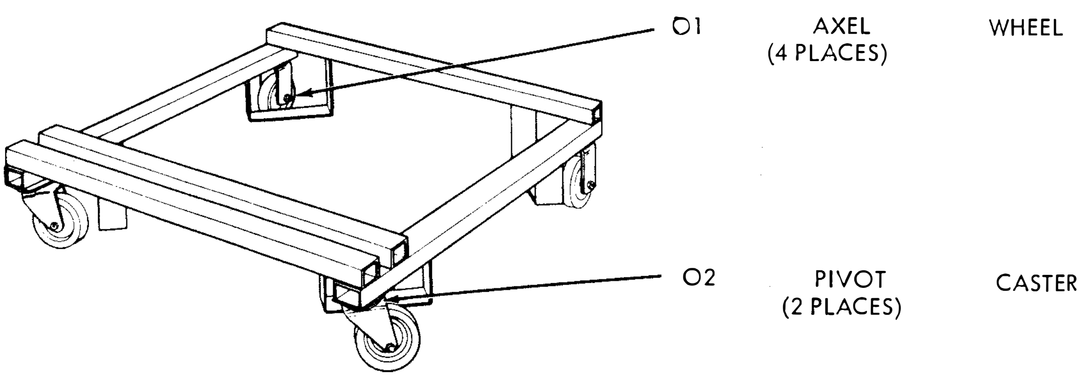


Figure 5-216. Universal Cabinet and Rerun Cart Dolly

i. TANDEM MESSAGE NUMBERING MODULE

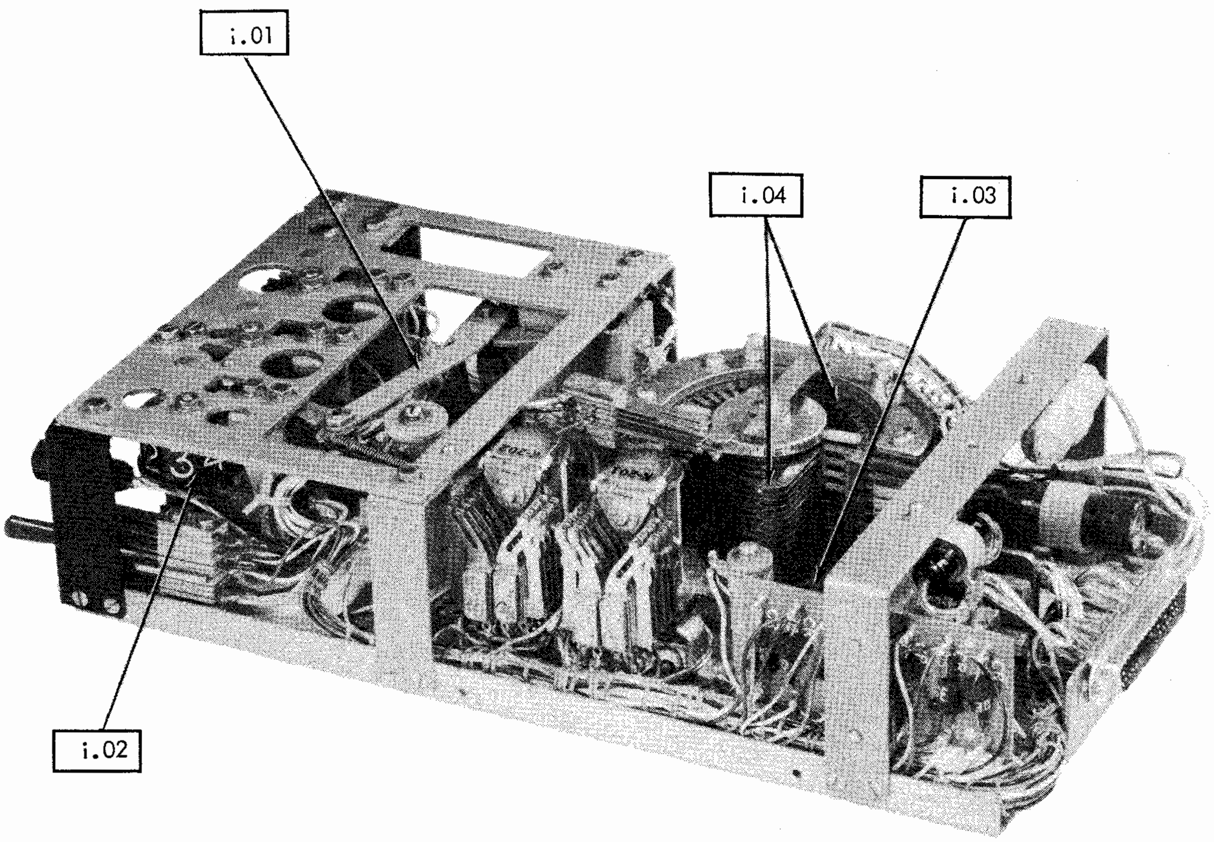
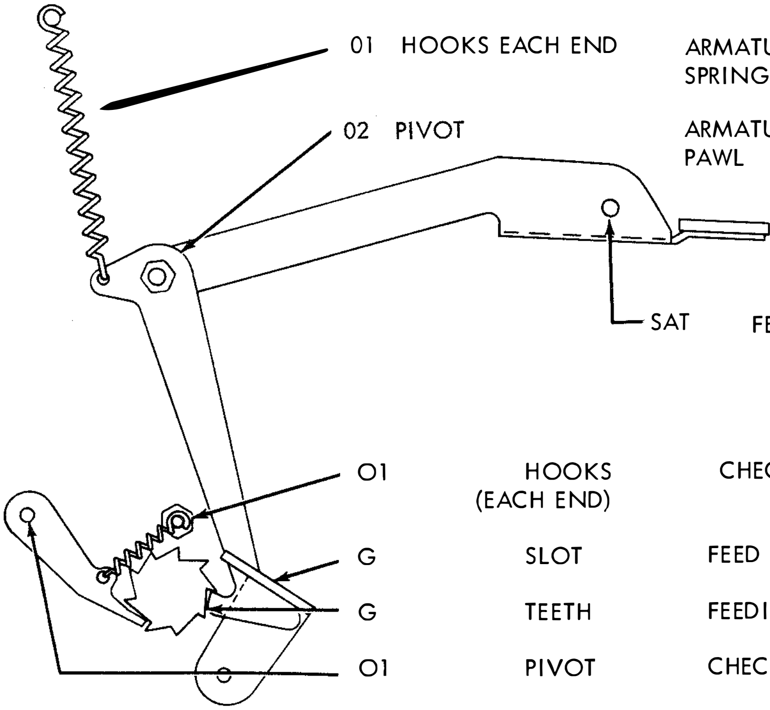


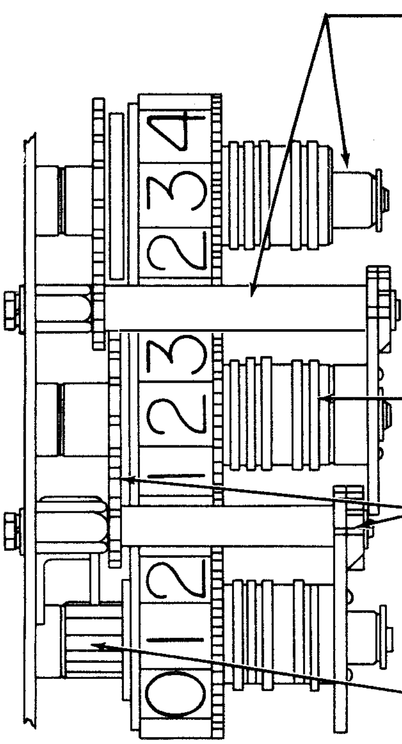
Figure 5-217. Tandem Message Numbering Module

i.01 NUMBER ADVANCE MECHANISM



01	HOOKS EACH END	ARMATURE RETURN SPRING
02	PIVOT	ARMATURE FEED PAWL
SAT	FELT WICKS	ARMATURE HINGE
O1	HOOKS (EACH END)	CHECK PAWL SPRING
G	SLOT	FEED PAWL BACKSTOP
G	TEETH	FEEDING RATCHET
O1	PIVOT	CHECK PAWL

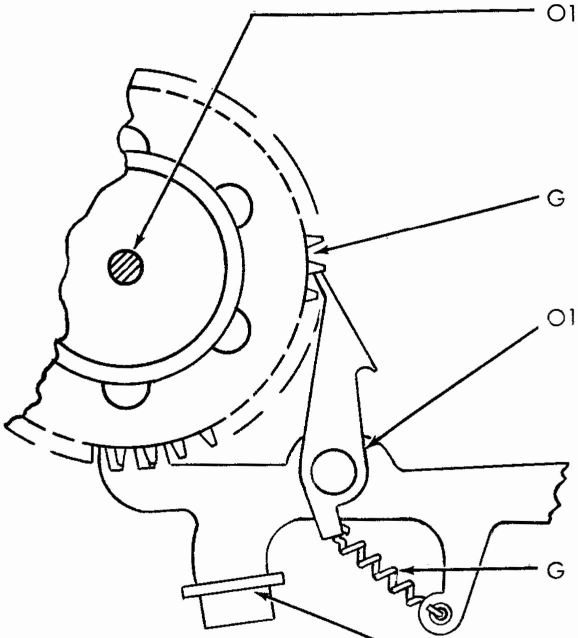
i.02 COUNTER DRUM ASSEMBLY



G	POSTS	COUNTER DRUM AND SPUR GEAR POSTS (ASSEMBLY ONLY)
G	SURFACE	COUNTER DRUM CAMS
G	GEARS	COUNTER DRUM SPUR GEARS
G	RATCHET	COUNTER DRUM FEEDING RATCHET

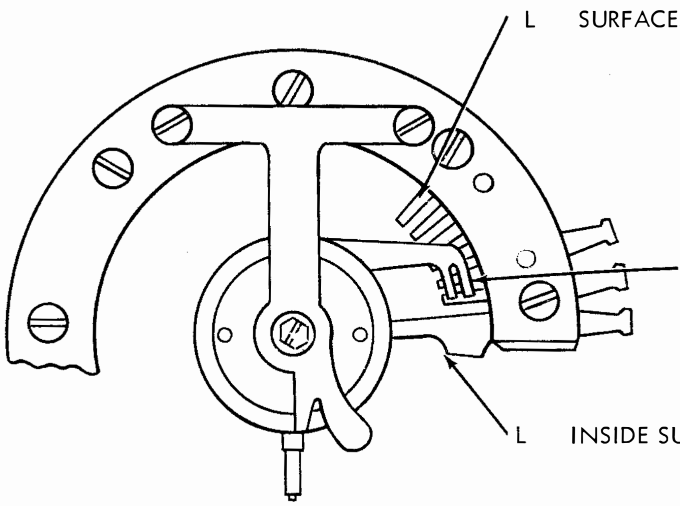
Figure 5-218. Tandem Message Numbering Module

i.03 STEPPING SWITCH FEED MECHANISM



O1	SHAFT	SWITCH WIPER SHAFT
G	TEETH	SWITCH RATCHET
O1	PIVOT	SWITCH ARMATURE PAWL
G	SURFACE	INTERRUPTER SPRING BUFFER
O1	SPRING (EACH END)	SWITCH ARMATURE PAWL

i.04 STEPPING SWITCH ELECTRICAL CONTACTS



L	SURFACES	SWITCH BANK CONTACTS
L	TIPS	SWITCH WIPER BLADES
L	INSIDE SURFACE	SWITCH WIPER ASSEMBLY BRUSH SPRINGS

Figure 5-219. Tandem Message Numbering Module

j. TAPE WINDER

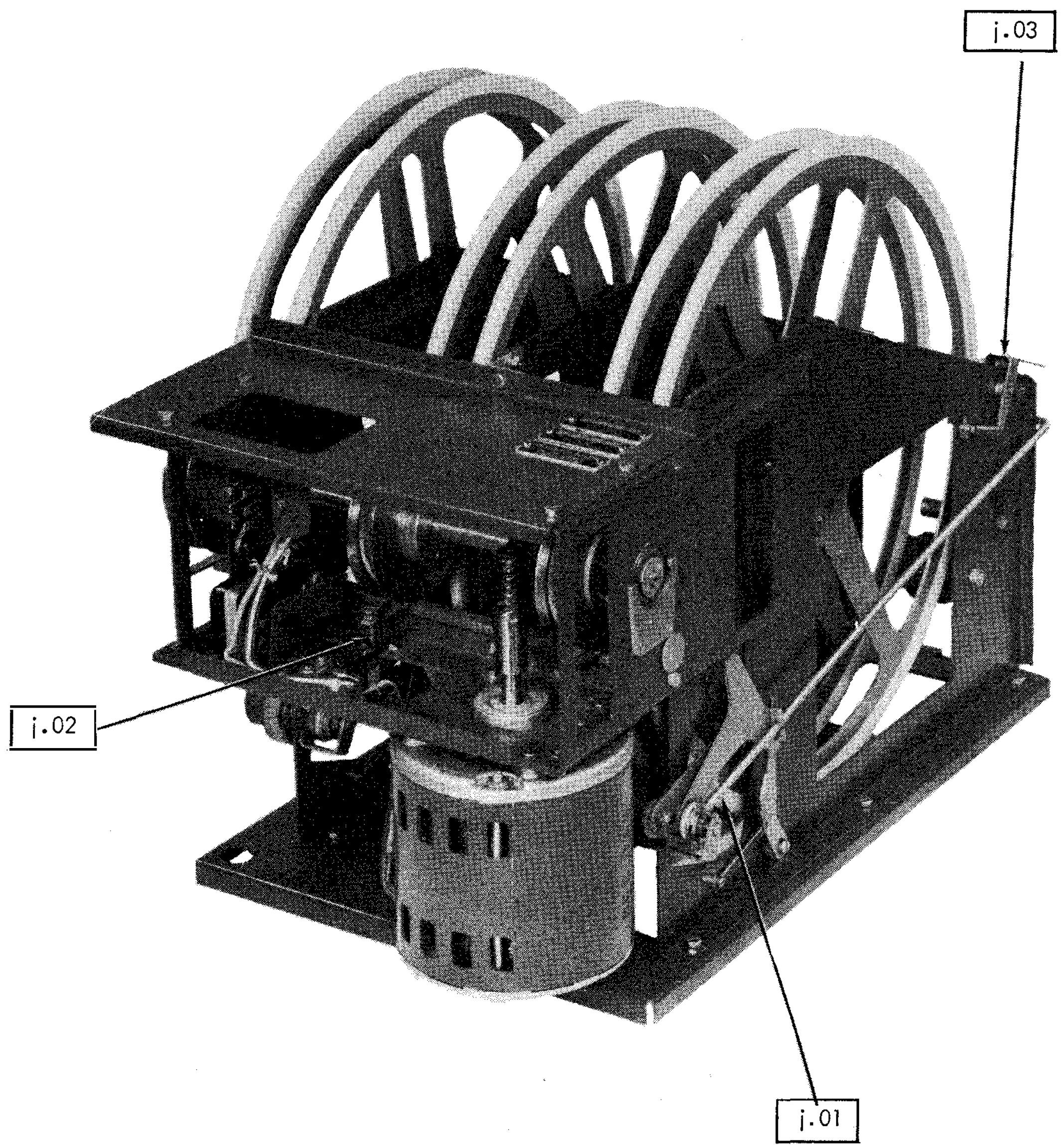
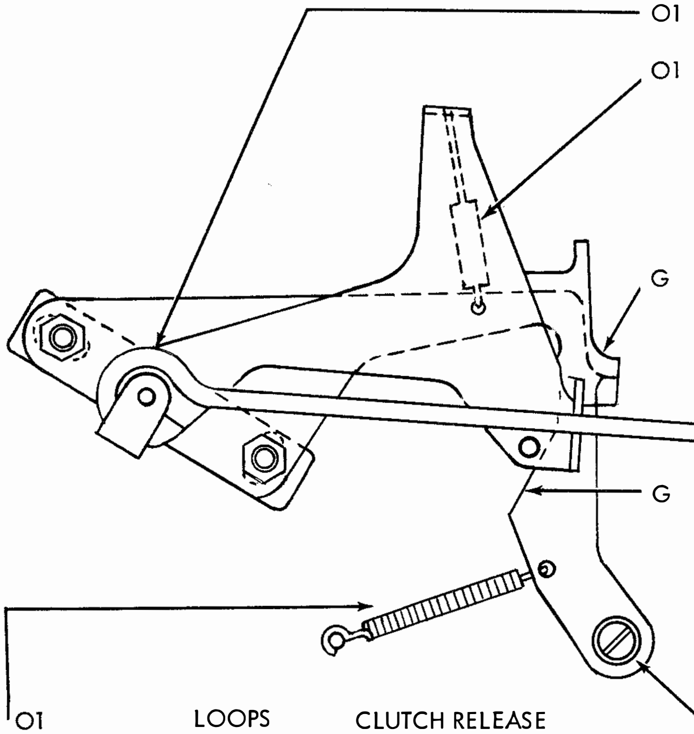


Figure 5-220. Tape Winder

j.01 CLUTCH ENGAGE-DISENGAGE MECHANISM



O1 PIVOT CLUTCH RELEASE ARM

O1 LOOPS CLUTCH RELEASE ARM SPRING

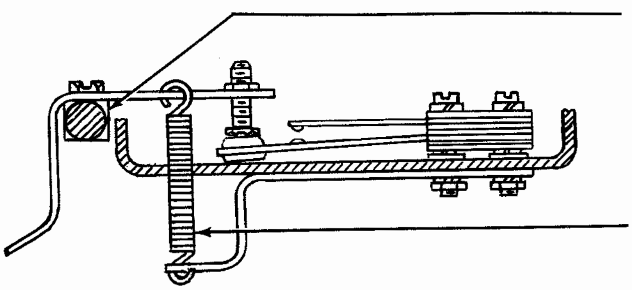
G SURFACE CLUTCH RELEASE LATCH

G CAM SURFACE CLUTCH RELEASE ARM

O1 LOOPS CLUTCH RELEASE LATCH SPRING

O1 PIVOT CLUTCH RELEASE LATCH

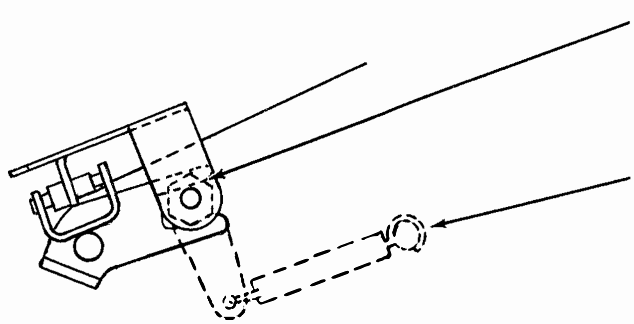
j.02 FULL REEL TAPE ALARM MECHANISM



O1 PIVOT (EACH END) FULL REEL ALARM ARM BRACKET

O1 LOOPS FULL REEL ALARM SPRING

j.03 CHAD DEPRESSOR ASSEMBLY



O1 PIVOT CHAD DEPRESSOR

O1 LOOPS CHAD DEPRESSOR SPRING

Figure 5-221. Tape Winder

SECTION 6
SERVICE AND REPAIR

6-1. GENERAL

a. This section provides instructions for "Preventive Maintenance", "Trouble Shooting" and "Disassembly and Reassembly".

b. Refer to other volumes and sections of this technical manual as need arises. "Lubrication", which is a definite requirement in "Preventive Maintenance", and "Adjustments" required for any repair and correction of troubles, will be found in Section 5. Refer to the specific wiring diagrams shipped with the equipment or to the diagram associated with the piece of equipment in Volume 3. Refer to Section 4, "Principles of Operation" for aid in "Trouble Shooting". "Operation" is covered in Section 3. Volume 2 contains "Parts Ordering Information" with exploded views of parts and assemblies that illustrate the detailed arrangement of parts to supplement the assembly and disassembly information. Refer to Section 2 for "Installation" and to the "Disassembly and Reassembly" paragraphs toward the end of this section as required.

6-2. COMPONENTS COVERED

a. The equipment covered by this technical manual is divided into 5 groups as described in Section 1. The preventive maintenance instructions in this section are either general or refer to specific components and should be used with all groups as applicable.

b. Illustrations covering each of the above groups and their components may be found in Section 1.

c. The five groups are referenced throughout the technical manual in the following order:

(1) Model 28 Reperforator Transmitter Group.

(2) Model 28 Transmitter Group.

(3) Model 28 Typing Reperforator Monitor Group.

(4) Model 28 Typing Reperforator Receiving Group.

(5) Model 28 Transmitter Distributor Rerun Cart Group.

6-3. GENERAL PREVENTIVE MAINTENANCE INSTRUCTIONS

a. The preventive maintenance listed in this paragraph is a systematic series of operations to be performed at regular intervals on equipment, when the equipment is not in the operating circuit, in order to prevent major breakdowns and unwanted interruptions in service and to keep the equipment operating at top efficiency.

b. Most of the operating mechanical and electrical parts used in teletypewriter equipment require some type of routine preventive maintenance. Definite and specific work schedules are needed. This section contains specific instructions and serves as a guide for personnel assigned to perform the following maintenance operations.

(1) FEEL - The feel operation is used most often to check rotating machinery, such as the motor, cams, and shafts, and to determine if electrical connections, bushings, etc., are loose or overheated. Feeling indicates the need for lubrication and the existence of other types of defects requiring correction. Many motors used in teletypewriter equipment operate at relatively high temperatures. The maintenance man must be familiar with normal operating temperatures of the equipment in order to be able to properly recognize signs of overheating.

NOTE

It is important that the feel operation be performed as soon as possible after shutdown and always before any other maintenance is done.

(2) INSPECT - Inspection is the most important operation in the preventive maintenance program. The inspector must know what and how to check for required clearances, tensions, and adjustments of the various assemblies, without overlooking the evidence of minor trouble. Although these minor defects may not immediately interfere with performance of the equipment, valuable in-service time and correction effort can be saved if they are corrected before they lead to major breakdowns. Make every effort to become thoroughly familiar with the indications of normal functioning in order to be able to recognize the signs of defective

equipment. Inspection includes carefully observing and checking with tools, gauges, etc. (when they are required), all parts of the equipment. Notice state of cleanliness, lubrication, amount of wear, adjustment and placement, tightness, clearance, tension, overheating, bind, drag, noise, moisture accumulation and foreign matter; inspect for these conditions as follows:

(a) Cleanliness, by carefully examining all surfaces of the units for accumulation of dust, dirt, and excessive oil or grease. Parts, connections, and joints should be free of dust, corrosion, and other foreign matter. In tropical and high-humidity locations, look for fungus growth, mildew, and moisture accumulation.

(b) Inadequate or excessive lubrication.

(c) Excessive wear, as indicated by loose fittings, bearings, etc.

(d) Adjustment and placement, by determining that all mechanical and electrical parts are properly adjusted and in their original positions.

(e) Tightness, by testing any connection, assembly, or mounting that is normally fastened in a rigid position.

CAUTION

Before tightening any screws, bolts, or nuts, determine whether or not they are part of some adjustment. If so, tighten in accordance with detailed requirements and adjustment procedures given in Section 5 and check all related adjustments.

(f) Clearance between specified points, by feeling, sighting, or inserting gauges as specified for item inspected.

(g) Spring tensions, by using the appropriate special spring scale in the exact manner illustrated for each spring tension requirement. (See Section 5).

(h) Overheating, as indicated by discoloration, blistering, odor or bulging of the parts or surface of the container; by leakage of insulating compounds; and by oxidation of metal contact surfaces.

(3) TIGHTEN - This operation applies to soldered connections, bolts, screws, and fasteners holding items rigidly in place. Solder loose or broken soldered connections. Correct tightening procedure requires the careful use of the proper type and size of tools. Do not over-tighten screws, bolts and nuts. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

CAUTION

Do not tighten parts or apparatus requiring clearance or tension adjustment.

(4) CLEAN - This operation as applied to external surfaces of boxes, covers, panels, frames, etc. is the normal cleaning process.

(a) Cleaning equipment interiors including delicate electrical and mechanical parts requires detailed specific procedures. This cleaning is normally performed as part of the preventive maintenance routine.

(b) Items scheduled for cleaning in the check list need not be cleaned each time they are inspected. Under some conditions, however, it may be necessary to complete the cleaning of a unit before starting the other operations. Clean all parts only when inspection shows that it is necessary.

(5) ADJUST - Adjustments are made only when they are necessary to restore normal operating conditions. Use extreme care in selecting the proper tools and gages before making adjustments. Many adjustments must be made in a particular sequence. EACH adjustment must meet ALL requirements for clearance, spring tension, speed, and other tolerance limits. If ONE adjustment is changed, ALL related adjustments must be checked. This check may involve a certain amount of duplication, but there are no practical short cuts when making overlapping functional adjustments. Detailed instructions for specific requirements and adjustments are given in Section 5.

(6) LUBRICATE - Lubrication refers to the application of oil or grease to all rotating shafts, bearings, cam rollers, sliding surfaces, and other moving parts. It may include the application of oil to metal surfaces or parts of the equipment. All lubrication should be performed as directed in Section 5. Section 5 indicates the normal preventive maintenance-lubrication interval, the points to be lubricated, and the type and quantity of lubricant to be used.

6-4. PREVENTIVE MAINTENANCE CLEANING - The majority of preventive maintenance techniques pertain to specific areas of preventive maintenance. However, the following general instructions should be helpful.

a. Use crocus cloth or No. 0000 sandpaper to remove rust or corrosion, where there is no danger of sand or grit lodging in moving parts.

b. Use a clean, dry, lint-free cloth and/or a dry brush for cleaning purposes.

(1) Use a cloth, moistened with solvent if necessary, to clean metallic parts (except electrical contacts). Wipe solvent and dirt from the part with a clean, dry, lint-free cloth.

(2) Flushing, or burnishing followed by a flushing action normally is best when cleaning electrical contacts; recheck clearances after filing or burnishing. Dip an orange stick in cleaning compound and allow the liquid to drip from the stick through the contacts only. Remove all cleaning compound carefully with a clean lint-free cloth, and/or bond paper. Protect other parts against cleaning compound.

WARNING

Prolonged breathing of cleaning compound is dangerous. Be sure that adequate ventilation is provided. Some cleaning compounds are flammable in addition to their toxic fumes; do not use near a flame.

c. If available, use vacuum cleaning equipment for removing loose dust, paper lint, and dirt from the Teletypewriter equipment.

CAUTION

Never use compressed air for cleaning operations in assemblies of small parts since it may dislodge springs or other delicate parts. Use vacuum cleaner with care; do not break or loosen wiring and connections.

d. OIL-IMPREGNATED BRONZE PARTS - Do not immerse oil-impregnated bronze (oilite) bearings and other oil-impregnated parts in solvent because the impregnated oils will dissolve. To clean these parts, use a stiff brush or wipe with an oil-soaked cloth.

e. BALL BEARINGS - Most ball bearings, except motor bearings, used on the Teletypewriter Sets are grease sealed. Do not attempt to clean or lubricate these, other than to wipe them with a clean, dry cloth. Lubricate other bearings as directed in Section 5. Replace any bearings that do not spin freely.

f. MOTORS - Clean the motors as follows.

(1) Use a clean, dry sash brush to remove dust and dirt from the exterior of the motor. Remove all oil and gummy deposits with a clean, lint-free cloth, dampened if necessary with suitable solvent.

(2) To clean the internal parts of the motors; disassemble the motor (refer to paragraphs at end of this section and to Volume 2). Remove all dust and dirt from the motor with a clean dry, sash brush.

CAUTION

Take care in cleaning not to damage the motor windings.

(3) When necessary, clean all parts made entirely of metal by immersing in a container of solvent.

g. SELECTOR-MAGNET - Clean the coils of the selector-magnet with a cloth, dampened in solvent if necessary. Clean rust off the pole pieces with crocus cloth or with No. 0000 sandpaper; refer to Section 5 for adjustments.

h. FELT WASHERS - Discard any dirty or gritty felt washers or oilers. Do not clean by immersing in solvent. When overhauling the equipment, replace all nonmetallic washers, mechanically preformed felts, and felt washers with new ones regardless of condition.

6-5. ROUTINE MAINTENANCE CHECK CHARTS AND PROCEDURE

a. GENERAL - Time intervals for routine preventive maintenance will usually vary with operating conditions, importance of continuous operation and available personnel. Normal operation is based on operating conditions which prevail when the temperature is moderate and the air is relatively free of foreign matter and excessive moisture. When equipment is being operated in localities where there are extreme temperatures, excess moisture, dust, dirt, sand, or other adverse conditions, establish the routine schedules at whatever intervals necessary to keep the equipment in satisfactory operating condition.

b. TIME INTERVALS - Time intervals are recommended under lubrication in Section 5 for equipment operating under normal conditions.

WARNING

Disconnect the power before starting to remove or replace any of the components.

NOTE

Wherever applicable, check or perform the preventive maintenance on the same and similar related parts of a component associated with the component referenced, i.e., drive and driven gears, cables, cards, connectors, etc.

c. PREVENTIVE MAINTENANCE PROCEDURE - Preventive maintenance procedure can be divided into two classes, work which can be completed while the Teletypewriter Set (group) remains in service, and work which requires that the Teletypewriter Set be taken out of service.

(1) The first class of work is limited to the operations performed on the Teletypewriter Set exterior which is accessible while the Teletypewriter is in service.

(2) The second class of work includes the operations which require the Teletypewriter Set be removed from service before the preventive maintenance work is started.

(3) Detailed information on the different individual test requirements and adjustments of complicated parts and mechanisms are given in Section 5.

(4) After all preventive maintenance work including lubrication has been completed and the Teletypewriters have been assembled, make the following tests and adjustments.

(a) Motor speed (governed motors only).

(b) Rangefinder setting (all typing reperforators).

(c) Operating and monitoring tests.

NOTE

Always check related adjustments when any adjustment is made.

CAUTION

Do not attempt to pick up units by clip-on top plates or small protruding parts.

(5) DISASSEMBLY AND REASSEMBLY.

(a) Disconnect the power and line cords. Place the components (units) on a bench or other suitable work-place.

(b) Refer to the applicable "Disassembly and Reassembly" paragraphs toward the end of this section and to the parts diagrams of Volume 2 for detailed instructions, as required.

(c) Refer to Installation Instructions in Section 2 for assembly of complete sets or groups, and for disassembly, reverse the procedures therein.

(6) LUBRICATION - Lubricate the equipment as shown in the figures of Section 5. Section 5 indicates the lubrication interval, the points to be lubricated, and the quantity and type of lubricants to be used.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
1. Exterior of Teletypewriter Cabinets	Check for dirt, rust, corrosion, cracked or chipped enamel; loose or missing bolts, nuts, screws, etc.; bent, rusted, or damaged door latches and hinges, rollers, and sliding surfaces on shelves; broken, cracked, or damaged windows. Rotate the tape reels to see that they move freely. Tighten all loose screws on the exterior of the cabinet; replace any missing parts. Tighten all switch mounting and knobs. Wipe off excess oil, dirt, moisture, etc., with a clean, dry, cloth. Lubricate rollers and sliding surfaces of the shelves (see Section 5).	Do not over-tighten screws, nuts, bolts, etc. Wipe off all excessive lubricant. Refer to Section 5 for detailed instructions for making any necessary adjustments.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
2. Electrical Facilities and Cabinet Interiors	Clean all dirt, dust, etc., from the interior using a brush and clean cloth. Inspect the interior for loose, damaged or missing parts. Check and perform applicable preventive maintenance listed in 3 through 15 below. Refer to wiring diagrams shipped with the equipment or to Volume 3 as needed.	Make sure all power is disconnected before cleaning. Protect the various units housed in the cabinets from dirt, etc., falling off the interior.
3. Cords, Cables and Connectors	Inspect cords and cables for cracked or deteriorated insulation, frayed or cut insulation at connecting points, excessive strains on the wires or connections. Inspect the connector plugs and sockets for dirt, rust, oil, corrosion, and cracked or damaged shells. Remove the connector shells and tighten any loose connections or clamps. Tighten the connections on the power cords. Check all connections on terminal boards for tightness. Clean grease, oil, and moisture from cords, plugs and sockets with a clean, dry cloth, or if necessary, clean outer insulation with clean cloth moistened in water. Clean corrosion or strains from plugs with metal polish. Be sure to remove all residue of the polish after cleaning.	Disconnect all power before cleaning. Protect units in cabinets from dirt, etc., which is removed from the wiring.
4. Fuses	Inspect the fuses and fuse holders for dirt, dust, and corrosion. Check for burned out fuses. Clean the fuses and fuse holders with a sash brush. Remove corrosion on the fuse or fuse holder with crocus cloth or #0000 sandpaper and wipe clean with a dry cloth.	Make sure all power is disconnected before cleaning. Protect units in cabinets from dirt, etc., falling off the fuses and holders.
5. Equipment Shelves	Inspect for excessive dirt, cracks, missing or broken parts, bent, rusted, or damaged sliding surfaces, worn or damaged mountings. Tighten all loose screws, bolts and nuts. Clean the surfaces if necessary with a clean rag dampened with a suitable dry cleaning solvent. Oil may be used to remove rust spots from the metal surfaces. Lubricate moving parts in accordance with lubrication diagrams of Section 5.	Protect units which may be exposed to dirt, etc., falling from the shelf. Maintain adequate ventilation of cleaning solvent and avoid exposure to fire or sparks. Avoid prolonged breathing of fumes.
6. Vacuum Tubes	Check for good contacts, tight connections and sockets. Test tubes in a tube tester.	Seat completely in sockets, keep clear of insulated wiring and replace tube shields.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
7. Terminal Boards	Inspect terminal boards for loose connections and mounting screws, cracks, breaks, oil, moisture and dirt. Carefully examine the connections for mechanical defects, dirt, and corrosion. Tighten loose screws, bolts, and mounting lugs. Remove and clean dirty or corroded connections before tightening. Clean terminal board with a dry brush. Use a suitable dry cleaning solvent if necessary and then wipe with a clean, dry cloth followed by a brush to remove all lint.	Disconnect all power before performing maintenance operations. Protect any units which might be exposed to dirt, etc., brushed from the terminal blocks. Prevent solvent from coming into contact with insulation.
8. Wiring	Inspect for cracked, frayed or torn insulation. Check for loose clamps, loose or dirty connections and faulty lacing. Check for wires which may be bearing on moving parts. Be sure the ground connections are clean and tight. Tighten all loose screw connections. Resolder loose or broken solder connections. Place all wiring in the proper place and retie if necessary. (Soldering must be done by an experienced repairman.) Clean all moisture, oil, grease, etc., from wiring with a clean dry cloth. Clean all connections before reconnecting.	Disconnect all power before performing the maintenance operation.
9. Rectifiers and Transformers	Inspect for dirt, dust, and gummy deposits. Check fuses, terminals, and leads on the control panels, or terminal boards. Investigate any odor or discoloration of burning insulation or excessive heating of parts. Remove any strap, wire or other device used to strap, a blown fuse. Tighten any loose mounting screws and bolts. Solder any loose or broken connections. Clean the exterior of the unit with a clean cloth and if necessary, a suitable dry cleaning solvent. Remove any foreign material from between the rectifier connections and diodes; use a small touch-up brush about one inch wide. Clean foreign matter from all other parts with a stiff brush. Test the rectifier for output voltage. Before changing the diodes or transformers, or trouble shooting to provide the proper output voltage, check the A.C. line voltage to be sure it is not temporarily higher or lower than normal. (See wiring diagrams or Volume 3.)	Disconnect all power before performing maintenance operations. Refer to wiring diagrams shipped with equipment or in Volume 3.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
10. Switches, Relays and Contacts	Operate and check the mechanical action and spring tension of each switch; also check for corrosion, dirt, oil, and moisture on all exposed parts. Clean with brush and clean cloth, remove corrosion with crocus cloth and, if necessary, remove grease or oil deposits with a solvent of known, suitable characteristics. a. Remove any pits, build ups and corrosion from contacts with a file or crocus cloth and finish with a burnisher. Replace contacts if insufficient metal remains. Remove corrosion from armatures and magnet pole pieces with crocus cloth. Recheck adjustments per Section 5. b. Remove last traces of oil or cleaning compound by pulling a strip of bond paper through contacts while pressing them together against the paper; for armature and pole piece use thin, preferrably non-magnetic, flat piece of metal, if required, with the bond paper. c. Remove any filings or small particles sticking to pole pieces, armature or contacts by pressing, without rubbing, fresh pieces of friction tape against them until clean. Wrap the tape around a thin piece of metal as in b. above.	Disconnect all power. Keep oil and solvent from insulation and contacts to greatest extent possible; remove all traces before returning equipment to service. Make certain that grit and fillings do not lodge in moving parts.
11. Loose or Defective Parts	Tighten or replace all loose, missing or damaged parts; if part of, or affecting any adjustment, make the adjustment and check all related adjustments in accordance with Section 5. Check all components for breaks, cracks, kinks, corrosion, excessive wear etc. Manually check rotating and moving parts of all units against bind or drag. Check all clutches for complete engagement and disengagement.	Disconnect power before working on a component.
12. Accumulation of Dust and Dirt	Check for dust from paper beneath its path through punch and typewheel mechanisms and for dust and dirt on other parts of the equipment. Clean by wiping with a soft lint-free cloth. Cleaning with an air hose should be avoided.	Be sure that springs are not disengaged or other parts disturbed in cleaning. Avoid getting dust or dirt into bearings or other moving parts.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
13. Selector Response (Typing Reperforator)	If the selector responds to distorted signals in the manner specified in Section 5, no maintenance is required. If the requirements are not met, the following routine should be observed: a. Clean the magnet pole faces by running a clean piece of paper between them and the armature. If corroded, see 10 above. b. Examine selector parts for wear and replace if worn. c. Check adjustment of selector mechanism in Section 5. d. Check selector mechanism springs and replace if necessary. (See Section 5.)	
14. Adjustments	Most adjustments will remain within specification limits for the life of the equipment and, therefore, do not require checking unless trouble occurs. Refer to individual items for adjustments to be checked.	Exercise extreme precaution to guard against overtightening screws which might result in stripping.
15. Lubrication	For disassembly prior to lubrication, see detailed instructions at end of this section, then refer to Section 5. Remove the units from the cabinets. Examine all mechanism for signs of lubrication failure, frequently evidenced by the presence of red, powdery substance at point of failure. If failure is observed, parts should be examined and if damaged they should be replaced. Lubricate the equipment in accordance with Section 5 and wipe off excessive lubricant with a clean cloth.	Be sure that springs are not disengaged and that other parts are not disturbed during examination and lubrication.

Note: Check all components, wherever applicable, in accordance with above instructions numbered 1 through 15, regardless of specific checks called out in the chart for any component.

16. Tape Winders	Inspect the housing for excess dirt and missing or broken parts. Tighten all mounting screws on the exterior of the unit, replace any missing parts. Clean excessive oil, dirt, moisture, etc., with a clean, dry cloth. Adjust the tape winders as instructed in Section 5. Lubricate the unit in accordance with the lubrication diagrams of Section 5.	Disconnect power source while performing maintenance operations.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
17. Tape Winder Motors	Check for cracks or other damage to the motor. Check for loose, broken, or missing mounting screws. Feel the motor to make sure it is not overheating. Clean the outside of the motor with a clean, dry cloth. Do not remove the motor from the tape winder. Lubricate in accordance with the lubrication diagrams of Section 5.	Disconnect the power source before performing maintenance operations. Motor normally runs hot.
18. Motor Units	Preventive maintenance may be performed on the unit or on the motor, bracket and base assemblies separately after removal. a. Shaft should turn freely, smoothly and quietly by hand and under power. b. Check for overheating by feel, discoloration, odor of burned insulation or operation of thermal cut-out safety switch. c. Check motor position on mounting bracket assembly and tighten mounting strap screws that secure the motor. d. Clean the motor as instructed in Paragraph 6-4.f. e. Check for breaks and loose or missing screws. f. Check items listed under "cords, cables and connectors", "Fuses", "Terminal Boards", "Wiring", "Switches and Relays" above. g. Lubricate and, if necessary, adjust in accordance with Section 5.	Disconnect all power before removing or replacing any component.
19. Motor Brushes (Governed Motor only)	Remove and replace if length is less than 3/8 inch. Wipe and blow off the accumulation of carbon dust.	Relationship of brush to armature should be maintained (governed motors only).
20. Motor Governor Brushes	Examine length and replace if less than 3/8 inch remains. Wipe and blow off accumulation of carbon dust.	Be sure brush springs are in place (governed motors only).
21. Motor Governor Contacts	Replace if badly burned.	Be sure that contacts are properly aligned.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
22. Motor Governor Speed	See Section 5.	Applies to governed motor only. Motor may be considered on-speed if not more than 12 target spots pass a given point in ten seconds.
23. Bases and Motor Unit Brackets	Check for deposits of oil, grease and dirt. If necessary, scrape or use solvent to remove hardened grease or oil from metal parts; otherwise use clean cloth and brush. Use oily cloth to remove rust and to clean non-metallic gears. Clean with dry cloth and keep oil from belts, sprocket belts, sprockets, V pulleys and friction drive parts. Check all gears and belts for reasonable play and tension. Lubricate and, if necessary, adjust in accordance with Section 5. Perform applicable preventive maintenance listed under "Cords, Cables and Connectors", "Terminal Boards" and "Wiring".	Disconnect all power. Avoid over-lubrication.
24. Typing Reperforators	Remove the unit and examine all operating assemblies for wear, lubrication, dirt and loose or missing parts. a. Check manually against bind of all moving parts. b. Check for broken or weak springs and missing or loose parts. c. Clean and remove any excess lubricant. (See paragraph 6-4.) d. Check condition of ribbon and replace if necessary. If one edge is frayed, check ribbon guide alignment. e. Blow or brush out dirt and paper lint accumulated around printing and punching mechanism. f. If typewheel has dirt deposits, remove ribbon from guides, insert paper under typewheel and brush dirt out toward front of unit while rotating typewheel, then wipe with clean cloth. g. Check the selector as instructed in 13 above.	Disconnect all power. Avoid over-lubrication.

Table 6-1. Routine Maintenance Check Chart

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
24. Typing Reperforators (Cont)	h. Check contacts and tape feed-out magnet (see 10, above). i. Lubricate (see Section 5).	
25. Transmitter Distributors	Remove the unit and examine all operating assemblies for wear, lubrication, dirt and loose or missing parts. a. Check manually against bind of all moving parts. b. Check for broken or weak springs and missing or loose parts. c. Clean and remove any excess lubricant (see paragraph 6-4). d. Check clutch trip magnet armatures and pole pieces (see 10, and 13 above). e. Spot check, at least, visible contacts. If any are found dirty, oily, pitted, out of adjustment or otherwise defective, recheck all contacts in accordance with 10 above and Section 5. f. Check contacts enclosed in the contact box of LXD units in accordance with 10 above and Section 5. g. Lubricate (see Section 5).	Disconnect all power. Avoid over-lubrication.

6-6. TROUBLE SHOOTING

a. GENERAL - Failures of the equipment can be traced functionally with the aid of the Trouble Shooting Charts, Tables 6-2 through 6-5. A step-by-step analysis of the behavior of the equipment in response to the tabulated checks will help indicate the area of trouble in which to apply remedial measures outlined below and referenced in the chart. Since, in most cases, each check step is conditioned by the procedure in preceding steps, examine the condition of all controls, and switches before rechecking any step or otherwise performing any trouble shooting check out of sequence. An eliminative process relative to probable troubles indicated should greatly facilitate clearing faulty operation at any point in the equipment.

(1) When check of an adjustment is indicated, care should be exercised not to disturb the adjustment or related adjustments. Reference is made to adjustment illustrations in Section 5 as required. If adjustment is found to be needed, check applicable sequence of paragraphs in Section 5 to determine if related adjustments may be required.

(2) For removal and disassembly procedures, when indicated, refer to paragraph starting with 6-9 and to the exploded views of the equipment contained in Volume 2 of this manual.

(3) Comprehensive electrical analysis of the equipment is not generally required in trouble shooting. Reference to an "open" condition represents a circuit through which current will not flow, due either to a break, a poor connection, or a poor or dirty contact mechanism. Reference to a "closed" condition represents a normally or intermittently open circuit through

which current will flow, either due to a short or to a sticky, dirty or poorly adjusted contact mechanism.

(4) "Running open" is a condition created by an open signal circuit, resulting in operation of typing and printing mechanisms because of the absence of a stop signal to latch the function clutches.

(5) "Running closed" is a condition created by a closed signal circuit, resulting in failure of typing and printing mechanisms to respond to a signal, due to the absence of the start and spacing elements in the signal, or to mechanical failure.

(6) "Garbling" is a condition in which the response of the typing and printing mechanisms does not correspond to the mechanical or signal input.

NOTE

If trouble shooting checks indicate abnormal conditions, refer to paragraphs starting with 6-8 Elimination of Trouble Indications, in this section. If lubrication is indicated, refer back to Section 5, Lubrication.

b. PROCEDURE - The trouble shooting information presented in this section consists of operational, electrical, and mechanical checks designed to lead maintenance personnel to the specific part, adjustment, or electrical component that is causing the trouble in the equipment. A thorough knowledge of the sequence of operation for each functioning element is of fundamental importance. Refer to "Operation", Section 3 and to the theory sections "Principles of Operation", Section 4 of this manual to clarify the operation and function of all teletypewriter parts. Because the teletypewriter groups and sets are an assemblage of components, the first step in trouble shooting, if the trouble is not obvious, is to sectionalize the trouble to a particular component, then determine what specific mechanism or electrical part is faulty.

(1) Make a visual inspection of the equipment to determine if the trouble is caused by loose line or power connections, improperly set switches, erratic motor speed, or improper rangefinder setting.

(2) Arrange an operating test of the equipment. Refer to "Installation" in Section 2 and to "Operation" in Section 3, if required, to sectionalize the trouble. These procedures are primarily performed after initial installation of new or repaired equipment and may be used to locate troubles when they occur.

(3) Localizing Electrical Troubles - Most electrical troubles are found at the various contacts in the equipment, which include, switch contacts, plug-in connector and pin contacts, terminal board contacts, soldered contacts, (including spliced wires), and chassis ground contacts. Electrical circuits in the teletypewriter set have jack or terminal board connections at the points where most tests must be made. Do not disturb the wiring more than necessary when testing or inspecting. Maintenance personnel must be thoroughly familiar with the schematic and wiring diagrams to be found with the equipment or in Volume 3, and use them while making point-to-point checks of the circuits. Schematic wiring diagrams of external equipment to which the teletypewriter set is connected furnish information helpful for testing and localizing trouble.

(a) Power Supply Checks - To be sure that proper operating conditions exist, check the input power, A.C. circuits, and D.C. circuits in turn before making other tests. These checks will, of necessity, include normal operation of the parts in these circuits and the requirements of all adjustments which would affect the indicated trouble as related to the parts. When check of an adjustment is indicated, care should be exercised not to disturb the adjustment or related adjustments.

(b) Continuity, Resistance, and Capacitor Checks

1. Continuity. The continuity check is used to locate suspected open circuits. In making continuity checks, be sure that parallel current paths are disconnected. Make the tests by checking the continuity through the circuit suspected to be faulty by connecting the tests leads so that the current can go only through the suspected circuit. Be sure no other part of the circuit is shunting the circuit being tested. If necessary, disconnect certain leads. Check all likely circuits, in this manner. If, after checking all possible causes, the fault cannot be located, make a continuity test of the entire circuit. Test from one terminal to a half-way point in the circuit. If continuity is indicated, test the other half of the circuit. Continue subdividing the circuit until the open point is definitely located.

2. Resistance. The resistance check is used to locate suspected open or shorted coil windings, transformer windings, motor windings, fixed resistors and inductors. In making resistance checks, follow the same general procedures as those described for continuity checks (1. above).

3. Capacitor. The capacitor check is used to locate shorted or leaking elements. To test, discharge the suspected capacitor with an insulated shorting jumper. Then disconnect one lead and connect the capacitor to an ohmmeter. Use the highest reading scale. A good capacitor will be indicated by the ohmmeter pointer first moving up the scale rapidly, then returning more slowly to the infinity mark. A capacitor which is open will give a reading of infinite ohms. A shorted capacitor will give a reading of constant value between zero and infinity, depending upon the resistance of the short.

WARNING

Be extremely careful when handling charged capacitors. A severe electrical shock may be received from the capacitor or leads connected to a power supply in operation.

(c) Electrical Checks

1. Check for external interruptions to the 115 volt A.C. power supply at the cabinet terminal boards.

2. Check for open fuses located on the equipment control panels or electrical service assembly facilities. If open, rotate the motor by hand and check for excessive mechanical load before replacing the fuse. If a replaced fuse burns out immediately upon installation, check for shorted wiring in the motor, selector magnets, the copy light transformer, or the rectifier transformers.

3. Proceed to Trouble Shooting Chart, for a more complete tabulation.

(4) Localizing Mechanical Troubles - Although many mechanical troubles can occur in the teletypewriter sets, no difficulty should be experienced in locating the fault if the sequence of operation is checked through its various steps. When a mechanical function fails to operate, or operates in a faulty manner, the trouble may be in a particular adjustment, or series of adjustments, or it may be in a particular assembly. One method for checking troubles involves checking the individual requirement for all adjustments in the faulty subassembly or mechanism. Use the related data, found in the detailed adjustment procedures of Section 5 to determine the sequence to be followed. A second method involves setting up by hand the selecting mechanism and completing the operation by manually rotating the motor, shaft, gear, or cam that normally drive the assembly. This second method is usually quicker when only one adjustment is faulty and the remainder of the mechaism is in good condition. In such cases only the related adjustments need be checked. In some instances, faulty operation may be observed only when the mechanism is power-driven. The experience of the maintenance personnel and the over-all condition of the equipment will indicate which of the two methods is the better approach to various troubles. As with electrical troubles, additional aid in locating mechanical troubles may be secured from records of previous troubles and adjustments. The procedure for localizing mechanical trouble is divided into the effects of the trouble observed. Proceed to applicable Trouble Shooting Chart.

6-7. TROUBLE SHOOTING CHARTS

The following tables, 6-2 through 6-6, are arranged by group to help in locating a probable faulty component.

a. Any trouble listed in the trouble column is assumed to be the only trouble. Multiple simultaneous troubles would probably require some degree of special service engineering analysis while using the schematic wiring diagram applicable to the equipment along with the Theory of Operation (Section 4) of this Technical Manual.

b. When a type of trouble has been located in the trouble column of a chart, refer back to the preceding steps in the first column and, if necessary, to the operators Section 4 in order to verify proper control and switch settings as well as otherwise normal operation of the overall group.

Table 6-2. Reperforator Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
1.	Cabinet LBAC222BR, LBAC238BR or LBAC253BR: Main power switch ON; alarm and control panel lamps light and extinguish as required by operating conditions. Keyer tube heaters and rectifier are on (For applicable group).	No Power	a. Check 2 amp. fuse to transformer. b. Check external power and connections.	6-8.a.(1)
		None of the red, amber or white control panel lamps for either RT Set light as required.	a. Check 2 amp. fuse. b. Check step-down transformer. c. Check Relay K6 or K12. d. Check diodes and connections.	6-8.a.(2)
		Red lamp will not light.	Check bulb, socket, associated operating contact mechanism and connections.	6-8.a.(2)(e)
		Red lamp will not extinguish.	a. Check operating contacts. b. Check sticking relay contacts and wiring.	
		White alarm lamp will not light when red one lights.	a. Check bulb, socket. b. Check lamp relay contacts and connections.	
		White alarm lamp will not extinguish when red lamps are out and alarm reset switch is depressed.	a. Check alarm reset switch. b. Check sticking relay, burned out red lamp bulb. c. Check diodes, connection and wiring. NOTE: Lamp operating switches may be checked by manual operation.	6-8.a.(2)(f)
2.	Cabinet control panel power switch and base power switch for each RT Set ON; all motors run normally.	RT Set Motor and associated Tape Bin Motor do not run.	a. Check 4 amp. fuse. b. Check power switch on control panel, power switch on base and connections.	6-8.a.(3)(a) NOTE: If governed motor is used refer to Table 6-3. STEP 3 and to 6-8.b.(3)(a)
		Tape Bin Motor does not run.	a. Check connections and wiring to motor. b. Check motor winding.	6-8.a.(4)

Table 6-2. Reperforator Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
2. Cont		RT Set Motor (LMU11) will not start.	a. Check and if required, reset thermal cut-out switch. b. Check Motor start relay, connections, motor start capacitor and motor start winding.	6-8.a.(3)(b)
		LMU11 Motor will not run. Motor speed incorrect.	Check power line frequency and voltage.	6-8.a.(3)(d)
		Motor over heats, noise and/or vibration.	a. Disconnect power and check for lubrication. b. Check manually for binding or loose mechanical parts. c. If more than one motor overheats check power.	
3.	Typing Reperforator LPR34BWA or LPR34BRP receives incoming message; fully perforates and prints tape.	LPR34BWA or LPR34BRP will not run: runs open on mark signal; runs closed on space signal.	a. Check drive parts through motor end base. b. Check incoming signal line current, voltage and polarity at keyer tube input and output jacks. c. Check local D.C. power. d. Check selector magnet, armature and linkage.	6-8.a.(5)(a)
			e. Check selector magnet driver (If group is so equipped).	6-8.f.
		Poor selector receiving range.	a. Check incoming signal voltage, current and marking and spacing bias. b. Check tube and operating voltages. c. Check selector magnet armature and pole pieces for oil and dirt. d. Check selector adjustments.	6-4.g. and Table 6-1.(10)
			e. Check selector magnet driver (If group is so equipped).	6-8.f.
		Intermittent errors in printing and perforating (same errors).	a. Check range finder adjustment to incoming signal. b. Check line current, keyer tube and rectifier. c. Check selector magnet armature adjustment.	6-8.a.(5)(b)

Table 6-2. Reperforator Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
3. Cont			d. Check selector adjustments.	
			e. Check selector magnet driver (If group is so equipped).	6-8.f.
		Tape does not feed properly.	a. Check tape loading.	6-8.a.(5)(c)
			b. Check tape feed mechanism adjustments.	
			c. Check for excess chad packed in punch block.	
		Tape is not printed.	a. Check ribbon installation.	6-8.a.(5)(d)
			b. Check printing mechanism adjustments.	
		Punch pins do not penetrate tape.	a. Check adjustments.	6-8.a.(5)(e)
			b. Check for worn pins.	
		Garbled copy and perforations; gaining or loosing a pulse.	a. Check as for "Intermittent errors" above.	6-8.a.(5)(f)
			b. Check for damaged or missing springs on punch slides or punch slide latches.	
			c. Check positioning mechanism adjustments.	
			d. Check punch mechanism adjustments.	
		Typewheel does not shift.	a. Check function blade adjustments.	6-8.a.(5)(g)
			b. Check positioning mechanism adjustments.	
4.	Transmitter Distributor LAXD7 or LAXD8; starts from external stepping pulse, reads (senses) perforated tape from intermediate storage bin and transmits through Polar Send Relay to send signal line.	Will not run or stops running during normal message transmission.	a. Check stepping pulse and relay K1 or K7 through relay K3 or K9 contacts to distributor clutch magnet.	6-8.a.(6)(a)
			b. Check distributor clutch.	
			c. Check last character contacts through relay K2 or K8, transmitter clutch magnet and aux. No. 2 distributor contact to 48 volt D.C.	
			d. Check mechanical linkages and drive parts.	

Table 6-2. Reperforator Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
4. Cont		Will not transmit properly or transmits garbled signal.	a. Check mark and space current. b. Check polar send relay. c. Check distributor contacts. d. Check transmitter contacts. e. Check sensing pins and linkage. f. Check for straight properly adjusted sensing pins. g. Check for clean, unburnt, well adjusted distributor and transmitter contacts.	6-8.a.(6)(b)
		Does not feed or sense tape.	a. Check mechanical linkage. b. Check for defective clutch, release magnet and coil.	6-8.a.(6)(c)
		Tape lid does not open when released.	a. Check latch. b. Check for damaged or missing springs.	6-8.a.(6)(d)
		Feed wheel does not engage tape feed holes.	Check adjustments.	
		Red broken tape (tape-out) alarm lamp will not light.	a. Check tape-out (6th) pin in pivoted transmitter. b. Check tape-out contacts through to lamp bulb.	6-8.a.(6)(e)
5.	LRXB17 or LRXB27 Base; mounts RT Set Typing Reperforator LPR34BWA and Transmitter Distributor LAXD7 or LAXD8 with their drive parts and common LMU11 Motor Unit.	Overheating, noise and/or vibration.	a. Check for lubrication. b. Check for tightness of screws and nuts. c. Check for proper alignment and loose or binding parts.	6-8.a.(7)
		Tape breaks, tangles or does not feed properly.	a. Check operation and alignment of tape guide rollers. b. Check tape feed mechanism on unit. c. Check tape winders.	

Table 6-3. Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
1.	Cabinet LBAC223BR or LBAC256BR: for each of 3 channels, as required by operating conditions; amber SEND TRAFFIC lamp lights or extinguishes, LBXD control relay, LXD control relay, step relay, LBXD sensing clutch release magnet, LBXD distributor clutch release magnet, counter magnet and LXD clutch magnet mechanisms operate from external 60 volt D.C. clear ABNORMAL TRAFFIC LAMP lights from external pulse.	SEND TRAFFIC LAMPS will not light.	a. Check bulb, and socket. b. Check connections and wiring. (If 1 bulb only); otherwise check connections to cabinet and external control circuits.	6-8.b.(1)
		No relays or clutches will operate.	Check external 60 volt D.C. source.	6-8.b.(2)
		One relay or magnet operated mechanism does not operate properly.	a. Check connections and wiring. b. Check adjustment of defective part (refer to affected unit in STEPS below).	6-8.b.(2)
		ABNORMAL TRAFFIC LAMPS will not light.	a. Check bulb and socket. b. Check connections and wiring. c. Check external pulse source.	6-8.b.(1)
2.	Cabinet main power switch and both motor switches ON; all motors (two LMU3's) run normally. NOTE: If governed motor is used, refer to STEP 3.	No motor runs.	a. Check A.C. power to cabinet terminal connection. b. Check convenience receptacle and connections for short.	6-8.a.(3)(a)
		Motor will not start.	a. Check 4 amp. slow-blow fuse. b. Check motor switch. c. Check power factor corrector (esp. if second fuse blows). d. Check, and, if required, reset thermal cut-out switch. e. Check motor-start relay. f. Check connections and wiring. g. Check motor-start capacitor. h. Check start winding.	6-8.a.(3)(b)
		Motor will not run.	Check operating winding.	

Table 6-3. Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
2. Cont		Motor speed incorrect.	Check power line frequency and voltage.	6-8.a.(3)(d)
		Motor overheats, noise and/or vibration.	a. Disconnect power. b. Check for lubrication. c. Check manually for binding or loose mechanical parts. d. If more than 1 motor overheats, check power.	6-8.a.(3)(d)
3.	Governed Motor LMU4: Switches ON; both motors run normally, as in STEP 2 above. NOTE: Use this step only where governed motor is used in place of synchronous motor.	Motor will not start.	a. Check fuse and power connections. b. Check motor brushes. c. Check governor brushes. d. Check governor adjustment.	6-8.b.(3)(a) 6-8.b.(3)(b) 6-8.b.(3)(c)
		Motor runs at incorrect speed.	a. Check 115 volt A.C. power line voltage. b. Check motor and governor brushes. c. Check governor adjustment. d. Check governor resistor.	6-8.b.(3)(d)
		Motor speed uncontrollable.	a. Check governor capacitor and resistor. b. Check for sticking governor contacts.	6-8.b.(3)(e) 6-8.b.(3)(f)
4.	Tandem Message Identification Module: Deletion switch in "NO DELETE" position; preceding each channel message, the module automatically transmits, through LBXD, the channel identification code and message number with local visual indication of number. As tape runs out of	Will not start transmission.	a. Check delete switch. b. Check LBXD tape out contact through LBXD control relay, to plus 60 volt D.C. c. Check from tape out contact through normally closed contact of LXD control relay, diode, normally closed contact of step relay and LBXD start (tight tape) contacts to minus 60 volt D.C.	6-8.b.(5)(a)

Table 6-3. Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
4. Cont	one Transmitter Distributor, Module switches transmission to the other loaded Transmitter Distributor in series on the same channel.	Will not properly transmit complete code sequence.	a. Check a. through c. above and associated contacts.	6-8.b.(5)(b)
			b. Check interrupter contacts, step relay, auxiliary contacts and stepping switches.	6-8.b.(5)(b)
			c. Check counter mechanism.	
			d. Check LBXD Distributor contacts.	
			e. Check all components of affected circuit per schematic wiring diagram.	6-8.b.(5)(c), 4-4.g.(4) and schematic wiring diagram.
		Will not transfer transmission to other loaded Transmitter Distributor at end of tape.	a. Check tape-out contacts.	6-8.b.(5)(c)
			b. Check control relays.	
			c. Check stepping switches.	
			d. See e. above.	
			NOTE: The over-lap of most functions may require careful study of wiring diagrams to clear troubles.	4-4.g.(4) and schematic wiring diagram.
5.	Transmitter Distributor LXD11, LXD31 or LBXD16: Loaded with tape and start-stop lever in start position; starts from "flip-flop" control circuit of Numbering Module. Transmits message through LXD11 or LXD31 transmitter contacts to out-going signal line after LBXD16 has transmitted identification code and message number from Numbering Module.	Will not start.	a. Check tape-out contacts and start or tight tape contacts.	
			b. Check external plus and minus 60 volt D.C.	
			c. Refer to STEP 4 above.	
		Will not transmit, or transmits garbled signal.	a. Check plus and minus external 60 volt D.C. and signal line current.	6-8.b.(6)(a)
			b. Check LXD11 or LXD31 Transmitter contacts.	
			c. Check LBXD16 reader and distributor contacts.	
			d. Check circuit back through code and stepping switches (refer to STEP 4. above).	
			e. Check sensing pins and linkage.	

Table 6-3. Transmitter Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
5. Cont		Will not run, or stops during normal message transmission.	a. Check start (tight tape) and tape-out contacts. b. Check control relays and external 60 volt D.C. c. Check mechanical linkages, clutches and magnets. d. Check all auxiliary and stepping switch contacts in circuit. e. Check step relay (refer to STEP 4. above).	6-8.b.(6)(b)
		Does not feed or sense tape.	a. Check mechanical linkages. b. Check for defective clutch, release magnet and coil.	6-8.b.(6)(c)
		Tape lid does not open when released.	a. Check latch. b. Check for damaged or missing springs.	6-8.b.(6)(d)
		Feed wheel does not engage tape feed holes.	a. Check adjustment. b. Check alignment of feed and code holes. (If not correct, check original perforator of tape.)	6-8.b.(6)(c)
		Transmitter Distributor does not stop when tape runs out.	a. Check tape lid. b. Check tape-out pin. c. Check tape-out contacts.	6-8.b.(6)(e)
6.	Multiple Transmitter Distributor Bases: LMXB206BR Base mounts three LXD11's and LMXB209BR mounts three LXD31's (upper T.D. Set) with LMU3 motor and drive parts; LMXB205BR or LMXB207BR Bases mount three LBXD16's (lower T.D. Set) with LMU3 motor and drive parts.	Overheating, noise and/or vibration.	a. Check for lubrication. b. Check for tightness of screws and nuts. c. Check for proper alignment and mesh of all gears. d. Check for loose or binding gears, bearings and other moving parts.	6-8.b.(7)

Table 6-4. Typing Reperforator Monitor Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
1.	Cabinets LBAC224BR, LBAC257BR or LBAC259BR: Main power switch On; control panel Low Tape lamp and Winder Full lamp light and extinguish for either of 2 Multiple Typing Reperforator Sets and Abnormal Traffic lamps light from external source for each of six Typing Reperforators, as required by operating conditions. Six keyer tube heaters or selector magnet drivers are on. Power is available at two A.C. receptacles. Plus and minus 60 volt D.C. from an external source is available at control panel D.C. outlet.	No power.	a. Check A.C. to cabinet and connections. b. Check main power switch. c. Check A.C. receptacle connections and wiring.	6-8.c.(1)
		Neither of the 2 control panel lamps will light.	Check connections and wiring back to A.C. power source.	6-8.c.(2)
		One control panel lamp will not light.	Check bulb, socket and connections.	
		Control panel lamp will not operate under one requirement operating condition.	Check specific operating contacts for the immediate requirement.	
		Abnormal Traffic lamp will not light.	Check bulb, socket, connections and external control voltage source.	
		No 60 volt D.C.	Check external source and connections.	
2.	Both Tape Winder Motor switches and both Typing Reperforator Set Motor switches ON: All motors run normally.	No motor runs.	Check main A.C. power source, connections and wiring.	6-8.c.(3)
		Motor will not start.	a. Check 4 amp. fuse (one for both Tape Winder motors and one for each Set motor). b. Check LMU12 power factor corrector (esp. if new fuse blows). c. Check motor switch and, if required, reset LMU12 thermal cut-out switch. d. Check motor start relay. e. Check connections and wiring. f. Check motor start capacitor. g. Check motor start winding.	6-8.c.(4) NOTE: If governed motor is used, refer to Table 6-3, STEP 3.

Table 6-4. Typing Reperforator Monitor Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
2. Cont		Motor will not run.	Check operating winding.	
		Motor speed incorrect.	Check power line frequency and voltage.	
		Motor overheats, noise and/or vibration.	a. Disconnect power. b. Check lubrication. c. Check manually for loose or binding parts (if more than one motor overheats, check power).	
3.	Typing Reperforator LPR37BWA or LPR37BRP: Receives (monitors) signal line messages, perforates and prints tape.	Troubles are the same as those listed for LPR34 BWA under STEP 3. of the Reperforator Transmitter Group.	Refer to STEP 3. of Table 6-2.	6-8.c.(5)
4.	Multiple Typing Reperforator Base LMRB203BZ: Mounts three LPR37BWA's or three LPR37BRP's with LMU12 motor and drive parts.	Overheating, noise and/or vibration.	a. Check lubrication. b. Check for tightness of screws and nuts. c. Check adjustment of motor pinion to driven gear. d. Check alignment and tension of sprockets and timing belts. e. Check for loose or binding gears, bearings and other moving parts.	6-8.c.(6)
5.	Tape Winder TW15.	Tape breaks, tangles or does not wind properly.	a. Check tape tension mechanism. b. Check disengage clutch. c. Check friction drive roller and reel engagement.	6-8.c.(7)

Table 6-5. Reperforator Receiving Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
1.	Cabinet LBAC225BR, LBAC254BR or LBAC260BR: Main power switch ON;LOW TAPE lamp on left control panel, 6 ABNORMAL TRAFFIC lamps, 6 BUSY lamps and 6 URGENT lamps light and extinguish as required by operating conditions. Six keyer tube heaters or selector magnet drivers and the rectifier are on. Power is available at A.C. convenience receptacle.	No power.	a. Check A.C. to cabinet and connections. b. Check double pole single throw main power switch. c. Check A.C. receptacle, power, connections and wiring.	6-8.d.(1)
		LOW TAPE lamp will not light.	a. Check applicable contacts at tape reel, wiring and connection back to A.C. supply.	6-8.d.(2)(a)
			b. Check bulb, socket and connections.	6-8.d.(2)(b)
		ABNORMAL TRAFFIC, BUSY or URGENT lamp will not light.	Check bulb, socket, connections and wiring back to external voltage and control source.	6-8.d.(2)(b)
2.	Main power switch and two motor power switches are ON; both synchronous LMU12 motors run normally.	No motor runs.	Check main A.C. power source, connections and wiring.	6-8.d.(3) NOTE: If a governed motor is used, refer to STEP 3. of Table 6-3.
		Motor will not start.	a. Check 4 amp. slow-blow fuse. b. Check motor switch. c. Check power factor corrector (esp. if new fuse blows). d. Check and, if required, reset thermal cut-off switch. e. Check motor start relay. f. Check motor start capacitor. g. Check motor start winding.	
		Motor will not run.	Check operating winding.	
		Motor speed incorrect.	Check power line frequency and voltage.	

Table 6-5. Reperforator Receiving Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
2. Cont		Motor overheats, noise and/or vibration.	a. Disconnect power. b. Check lubrication. c. Check manually for loose or binding parts (if more than one motor overheats, check power).	
3.	Non-Interfering Letters Tape Feed-Out mechanism: Feeds out predetermined length (adjustable up to 18 inches in 0.6 inch steps) of tape punched with letters combination after 1 second time delay following end of message if associated TAPE FEED OUT button is depressed. Feed-out stops, without interfering, upon receipt of incoming message or at end of its cycle.	None will feed tape.	a. Check external 120 volt D.C. (plus 60 volt and minus 60 volt) source and series resistor. b. Check terminal connections and wiring.	6-8.d.(4)(b)1. NOTE: If an adjustment requires checking, check all related adjustments.
		One unit will not feed tape.	a. Check tape feed-out magnet and armature.	6-8.d.(4)(b)2.
			b. Check drive bail, release lever and latch lever.	6-8.d.(4)(b)3.
			c. Check non-repeat latch and blocking latch.	
			d. Check reperforator clutch trip mechanism.	6-8.d.(4)(b)4.
		Will not feed correct length.	a. Check tape length adjusting plate.	6-8.d.(4)(b)5.
			b. Check release and latch levers.	6-8.d.(4)(b)6.
			c. Check feed and check pawls. d. Check ratchet cam follower. e. Check tripping and unblocking mechanism.	
		Starts feeding before elapse of 1 second time delay.	Check time delay lever adjustment and related adjustments.	6-8.d.(4)(b)6.
		Will not stop feeding or interfers with message.	a. Check non-repeat latch. b. Check tripping mechanism and blocking.	

Table 6-5. Reperforator Receiving Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
3. Cont			c. Check storage mechanism and reset bail toggle linkage.	
		Will not punch letters combination in tape.	a. Check reperforator clutch trip lever and bail. b. Check punch slide latches. c. Check storage mechanism.	
4.	Typing Reperforator LPR35BWA or LPR35BRP: Receives signal line message, perforates and prints tape; feeds out predetermined length of tape (see STEP 3. above).	Troubles are the same, except for the TAPE FEED OUT covered above, as those listed for LPR34BWA under STEP 3. of the Reperforator Transmitter Group.	Refer to STEP 3. of Table 6-2.	6-8.d.(4)(a)
5.	Multiple Typing Reperforator Base LMRB203BZ or LMRB207BZ: Covered in STEP 4. of Table 6-4.	Same base used in Reperforator Monitor Group.	Refer to STEP 4. of Table 6-4.	6-8.d.(5)

Table 6-6. Transmitter Distributor Rerun Cart Group Trouble Shooting Chart

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
1.	Transmitter Distributor LXD11: START-STOP lever in START position; reads (senses) perforated tape and transmits message over out-going signal line (as already covered in Table 6-3, STEP 5.).	Troubles are the same as those listed for the same unit under STEP 5. of the Transmitter Group.	Refer to STEP 5. of Table 6-3.	6-8.b.(6)
2.	Governed Motor Unit LMU4: LXDB9 Base power switch ON; motor runs normally (as already covered in Table 6-3, STEP 3.).	Troubles are the same as those listed for same motor under STEP 3. of Table 6-3.	Refer to Table 6-3, STEP 3.	6-8.c.(3) NOTE: If Synchronous Motor Unit LMU3 is used in place of LMU4, refer to Table 6-3, STEP 2.
3.	Transmitter Distributor Base LXDB9: Mounts Transmitter Distributor LXD11, Motor Unit, motor switch; A.C., D.C. and signal line cords with plugs; also 36 point receptacle connector and drive parts (shaft and gears).	Overheating, noise and/or vibration.	a. Check lubrication. b. Check for tightness of screws and nuts. c. Check for proper adjustment of drive parts. d. Check for loose or binding parts.	6-8.e.(3)
		Any electrical troubles in Group.	Check switch, connections and wiring.	

6-8. ELIMINATION OF TROUBLE INDICATIONS

a. REPERFORATOR TRANSMITTER GROUP (See Table 6-2)

(1) POWER FAILURE

(a) Check for external interruptions to 115 volt A.C. power supply to the cabinet terminal boards.

(b) Check main power fuse located at rear of cabinet on electrical relay control rack. Fuse is accessible when rear doors are opened, or rack is pivoted forward.

(2) ALARM LAMP FAILURE

(a) Check main power fuse.

(b) Check for burned out stepdown transformer, or loose transformer connections.

(c) Check condition of alarm circuit control relay and diodes in relay circuit. Refer to paragraph 4-3.g.(4)(d).

(d) Check for defective alarm switches on individual units. Refer to Table 6-1(10).

(e) Check for loose or broken socket connections, broken or burned out bulbs.

(f) If alarm lamps light, but cannot be extinguished, check alarm reset switch (Table 6-1(10). Also check alarm circuit control relay for sticking contacts.

(g) Check wiring and terminal board connections (Table 6-1(7) and (8).

(3) MOTOR FAILURE (SYNCHRONOUS MOTOR)

(a) Check fuses in motor circuit. Fuses are located on electrical control relay rack and are accessible when rear doors are opened.

(b) Check for open thermal cutout switch on motor mounting bracket. If the red button is raised, rotate motor by hand and check for binds or obstructions. Depress switch button. If the cut-out operates shortly after the motor switch has been reset, allow the motor to cool for five minutes and check further for the cause of overheating. Refer to Table 6-1 (18) and paragraph 4-3.e.

(c) Check motor ON-OFF switch on cabinet and RT set power switch on set base (See Table 3-1) for loose connections or defective operation.

(d) If motor operates at incorrect speed, check for 60 cycle ($\pm$0.5 cycle) frequency in power supply.

(4) MOTOR FAILURE (TAPE WINDER)

(a) Check fuse in motor circuit. (See 6-8.a.(3).

(b) Check connections and wiring to motor, motor brushes and windings. Refer to Table 6-1(17).

(5) TYPING REPERFORATOR FAILURE.

(a) RUNS OPEN OR CLOSED

1. Check connections of cabinet terminal boards, and receptacle to reperforator transmitter set.

2. Check for open magnets or faulty connections in selector mechanism on reperforator unit. See Table 6-1(13) and (24).

3. Check for defective 6005 tube in electronic keyer, keyer power supply or selector magnet driver of selector involved.

4. Check incoming signal at cabinet terminals. Check equipment independently of line signal.

5. Check for binding mechanism in selector unit and transfer mechanisms.

(b) INTERMITTENT ERRORS

1. Check for inadequate or excessive line current.

2. Check range finder setting beyond range of incoming signal. For operating theory refer to paragraph 4-3.b.(3). For adjustment see Figure 5-8.

3. Check selector mechanism adjustments, Figures 5-3 through 5-10.

(c) IMPROPER TAPE FEED

1. Check tape loading (refer to paragraph 3-2.d.(1).

2. Check tape feed mechanism (refer to paragraph 4-3.b.(7)(c). See Figures 5-17 through 5-19 for adjustments.

3. Check for fouled punch mechanism due to excessive chad. Refer to Paragraph 3-2.d.(2).

(d) PRINTING FAILURE

1. Check ribbon installation (paragraph 3-2.e.(2).

2. Check printing mechanism. For operating theory see Paragraph 4-3.b.(8). See adjustment Figures 5-40 through 5-46.

(e) PUNCH FAILURE - Check adjustment Figures 5-13 through 5-19. Refer to Paragraph 4-3.b.(7) for operating theory.

(f) GARBLING

1. Check free movement of linkages around eccentrics in linkage from code bar extension through transfer mechanism and bell cranks to push bars. Check the particular linkage for the code or code element most frequently involved in the incorrect interpretation of the input signal.

2. Check and adjust axial and rotary correcting mechanisms for firm positioning of correcting plate roller (axial) or correcting lever lobes (rotary) simultaneously with activation of the printing hammer. See adjustment Figures 5-34 through 5-39.

3. Check oscillating drive link and bail if only the tops of characters are printing. Mechanism may be withdrawing the type wheel prior to printing hammer stroke. See adjustment Figure 5-34.

(g) LETTERS - FIGURES SHIFT FAILURE

1. Check mechanical linkage from push lever extensions through punch slide latches and punch slides to punch pins for binding on erroneous code hole perforating sequence. Refer to Paragraph 4-3.b.(8)(b)5.

2. Check function mechanism linkage and adjustments. See Figures 5-1, 5-10, and 5-23 through 5-29.

(6) TRANSMITTER DISTRIBUTOR (LAXD7 OR LAXD8) FAILURE

(a) STOPS DURING NORMAL TRANSMISSION

1. Check for presence of stepping pulse. Refer to Paragraph 4-3.g.(4)(c)4.

2. Check operation of control circuit. For operating theory refer to Paragraph 4-3.g.(4)(c). See appropriate wiring diagram in Volume 3.

3. Check distributor clutch assembly. See adjustment Figures 5-64 through 5-66.

4. Check mechanical linkages and drive parts. See Paragraph 4-3.c. for LAXD7 or LAXD8 operating theory and paragraph 5-2.f. for adjustments. Refer to Table 6-1(25).

(b) IMPROPER TRANSMISSION

1. Check mark and space current.

2. Check polar send relay.

3. Check distributor and transmitter contacts for corrosion and pitting. See adjustment Figures 5-68 through 5-75.

4. Check sensing pins and linkage. See adjustment Figures 5-72 and 5-73.

(c) TAPE FEED FAILURE - Check tape feed mechanism. For operating theory see Paragraph 4-3.c.(5)(e). See adjustment Figures 5-69 and 5-77.

(d) TAPE LID FAILURE - Check tape lid latch (see Figure 4-23). For adjustment refer to Figure 5-78.

(e) BROKEN TAPE ALARM LAMP FAILURE

1. Refer to Paragraph 6-8.a.(2).

2. Check tape-out pin in transmitter distributor. Refer to Paragraph 4-3.c.(6)(a) for operating theory. See adjustment Figures 5-72 and 5-13.

3. Check tape-out contact. See Table 6-1(10).

(7) LRXB17 OR LRXB27 BASE FAILURE

(a) Check for lubrication of gears.

(b) Check for proper alignment of units on base. See adjustment Figures 5-81 through 5-83 and Paragraphs 2-2.d.(2)(b) and (c) for positioning of units.

(c) If tape breaks, check alignment of tape guide rollers. Also check tape feed mechanisms on typing reperforator (Paragraph 6-6.c.(7) and transmitter distributor (Paragraph 6-8.a.(10)(e). Refer to adjustment Figures 5-86.

(d) Check tape winder on tape handling stand. For operating theory refer to Paragraph 4-3.f.(2).

b. TRANSMITTER GROUP (See Table 6-3.)

(1) ALARM LAMP FAILURES

(a) Check main power fuse.

(b) Check bulb, socket, connections, and wiring. Refer to appropriate wiring diagram in Volume 3 of this manual. See Table 6-1.(8).

(2) RELAY AND CLUTCH RELEASE MAGNET FAILURES

(a) Check external 60 volt D.C. sources. Refer to Table 6-1 (10).

(b) Check connections to relays, wiring, and relay contacts (Table 6-1 (10).

(3) MOTOR FAILURE (GOVERNED MOTOR)

(a) Check A. C. power to cabinet terminal board. Check convenience receptacles on multiple bases for loose connections.

(b) Check fuse in motor circuit.

(c) Examine motor brushes and replace if length is less than 3/8 of an inch. Wipe and brush off accumulated carbon dust. Relationship of brush to armature should be maintained. Similarly, examine governor brushes, and be sure brush springs are in place.

(d) Check governor adjustment, Figure 5-137. If motor runs at incorrect speed, check 115 volt A. C. power line supply. If line voltage is stable. Use a tuning fork and check motor speed (see Paragraph 4-6.d.).

(e) If motor speed is uncontrollable, check for short in governor capacitor. To readjust, refer to Figures 5-136 and 5-137.

(f) If motor overheats check for binding and lack of lubrication.

(4) MOTOR FAILURE SYNCHRONOUS MOTOR) - If a synchronous motor is used in place of a governed unit, refer to Paragraph 6-8.a.(3)(a), (b), and (d).

(5) TANDEM MESSAGE IDENTIFICATION MODULE FAILURE

(a) NO TRANSMISSION

1. Check delete switch.

2. Check energizing circuit for LBXD16 clutch release magnet. Refer to Paragraph 4-4.g.(4), and 4-4.g.(5)(b). See appropriate wiring diagram in Volume 3 of this manual.

(b) IMPROPER TRANSMISSION OF FOURTEEN CHARACTER CODE SEQUENCE - Refer to Paragraph 4-4.g.(5)(b)1.a. through e. for operation sequence.

1. Check operation of stepping relay.

2. Check stepping switch contacts and connections to stepping switch.

3. Check code reading contacts on numbering drums. For adjustments see Figures 5-156 and 5-157.

4. Check interrupter contacts on stepping switch assembly. Adjust according to Figure 5-166.

5. Check LBXD16 distributor contacts (see Table 6-1 (10).

(c) TANDEM TRANSMISSION FAILURE

1. Check control circuit and numbering module as outlined above. Refer to Paragraph 4-4.g.(5)(b)3. for operation sequence.

2. Check tape-out contacts on LBXD16 and start contact on LXD11 or LXD31.

(6) TRANSMITTER DISTRIBUTOR (LBXD16, LXD11 or LXD31) FAILURE

(a) IMPROPER TRANSMISSION

1. Check mark and space current.

2. Check LXD11 or LXD31 transmitter contacts in signal generator. Refer to Paragraph 4-4.b.(2) for operating sequence. Adjust signal generator according to Figure 5-132. (See Table 6-1(10).)

3. Check LBXD16 reader and distributor contacts (see Table 6-1(10)). For operation sequence, see Paragraph 4-4.d. Adjust contacts as shown in Figures 5-96 and 5-99.

4. Check control relay circuit as explained above.

(b) STOPS DURING NORMAL TRANSMISSION

1. Check for presence of external stepping pulse (SEND TRAFFIC lamp should be lit).

2. Check transmitter distributor clutch assembly. (For LBXD16 refer to adjustments Figures 5-91 through 5-93. For LXD11 or LXD31 refer to adjustment Figures 5-118, 5-119, and 5-133.)

3. Check mechanical linkages and drive parts. See Paragraph 4-4.b. for LXD11 or LXD31 theory, and Paragraph 5-2.h. for LXD11 or LXD31 adjustments. See Paragraph 5-2.j. for LBXD16 adjustments.

4. Check operation of control circuit. Refer to appropriate wiring diagram in Volume 3 of this manual.

(c) TAPE FEED FAILURE - Check tape feed mechanism. Refer to Paragraphs mentioned in Paragraph 6-8.b.(6)(b)3. above.

(d) TAPE LID FAILURE - Check tape lid release mechanism. For LXD11, refer to Paragraph 4-4.b.(5) and Figure 5-120. For LBXD16, refer to Paragraph 4-4.d.(6)(c) and Figure 5-101.

(e) TAPE-OUT FAILURE

1. Check tape lid (see 6-8.b.(6)(d)).

2. Check tape out pin and contacts. Refer to Paragraph 4-4.b.(8) and (9) for LXD11 or LXD31 Tape-Out operation. For LBXD16 unit see Paragraph 4-4.d.(6)(b). For adjustment procedure refer to Figures 5-103, 104 and 108 for LBXD16; Figures 5-124 through 5-126 for LXD11 and LXD31.

(7) LMXB205BR, LMXB206BR, LMXB207BR and LMXB209BR BASE FAILURE

(a) Check for lubrication of gears.

(b) Check for proper alignment of units on base. Refer to Paragraphs 2-3.c.(2)(e) and 2-3.d.(2)(b), for positioning of LXD11, LXD31 and LBXD16 respectively. See Figure 5-115 for LBXD16 positioning and 5-134 for LXD11 and LXD31 positioning.

c. TYPING REPERFORATOR MONITOR GROUP

(1) POWER FAILURE

(a) Check for external interruptions to 115 volt A.C. power supply to cabinet terminal boards.

(b) Check main power fuse located at rear of cabinet on electrical relay control rack. Fuse is accessible when rear doors are opened, or control rack is tilted forward.

(2) ALARM LAMP FAILURE

(a) Check bulb, socket, connections, and wiring to lamp (see Table 6-1(3) and (8). Refer to applicable wiring diagram in Volume 3 of this manual.

(b) Check tape out and winder full switches on units. Refer to Paragraph 4-5.f.(4)(b) and (c).

(3) MOTOR FAILURE - For synchronous motors refer to Paragraph 6-8.a.(3)(a), (b), and (d). For governed motors refer to Paragraph 6-8.b.(3)(a) through (f).

(4) MOTOR FAILURE (TW15 TAPE WINDER)

(a) Check fuse in motor circuit. See appropriate wiring diagram in Volume 3 of this manual.

(b) Check tape winder power switches on cabinet.

(c) Check motor for damage or loose, broken, or missing parts. Refer to Table 6-1(17) and (18). See Paragraph 4-5.e. for operating theory.

(5) TYPING REPERFORATOR FAILURE - Refer to Paragraph 6-8.a.(5)(a) through (g).

(6) LMRB203BZ BASE FAILURE

(a) Check for lubrication of gears.

(b) Check for proper belt tensions. Refer to Paragraphs 4-5.c. and adjustment Figure 5-58.

(c) Check for proper alignment of motors and typing reperforators. See Paragraph 2-4.c. and adjustment Figures 5-58 through 5-60.

(7) TAPE WINDER FAILURE (TAPE BREAKAGE OR FOULING)

(a) Refer to Paragraph 4-5.e. for operation theory. Check tape tension mechanism.

(b) Check clutch engage - disengage mechanism, and friction drive roller and reel engagement. See adjustment Figures 5-149 and 5-150.

d. TYPING REPERFORATOR RECEIVING GROUP

(1) POWER FAILURE

(a) Check for external interruptions to 115 volt A.C. power supply to cabinet terminal boards.

(b) Check main power fuse located at rear of cabinet on electrical control rack. Fuse is accessible when rear doors are opened, or control rack is pivoted forward.

(2) ALARM LAMP FAILURE

(a) Check alarm switch on appropriate tape supply reel. Refer to Paragraph 4-5.f.(4)(b) and (c), and Table 6-1(8) and (10).

(b) Check bulb, socket, connections, and wiring to lamp (see Table 6-1(3) and (8). Refer to applicable wiring diagram in Volume 3 of this manual.

(3) MOTOR FAILURE - For synchronous motors refer to Paragraph 6-8.a.(3)(a), (b), and (d). For governed motors refer to Paragraph 6-8.b.(3)(a) through (f).

(4) TYPING REPERFORATOR FAILURE

(a) Refer to Paragraph 6-8.a.(5)(a) through (g).

(b) "LETTERS" TAPE FEED OUT MECHANISM FAILURE

1. Check external 120 volt D.C. supply to tape feed-out mechanism magnets. Check wiring, connections, and series dropping resistor. Refer to Table 6-1 (3), (7), and (8).

2. Check for dirty or poorly adjusted switch contacts in the tape feed-out circuit involved. Check for an open tape feed-out magnet, or dirty magnet armature. Clean armature and magnet pole piece by drawing a thin piece of paper between them while applying slight pressure to the armature. See Table 6-1(10).

3. Check tape feed-out mechanism adjustments, Figures 5-47 through 5-49.

4. Check reperforator clutch trip mechanism adjustments, Figures 5-1 through 5-10.

5. Check tape length adjusting plate (Figure 5-56) and adjust to desired length of tape feed-out.

6. Check remaining tape feed-out mechanism adjustments, Figures 5-50 through 5-57, and correct if necessary.

(5) LMRB203BZ AND LMRB207BZ BASE FAILURE - Refer to Paragraph 6-8.c.(6).

e. TRANSMITTER DISTRIBUTOR RERUN CART GROUP

(1) TRANSMITTER DISTRIBUTOR (LXD11) FAILURE - Refer to Paragraph 6-8.b.(6).

(2) MOTOR FAILURE - Refer to Paragraph 6-8.c.(3).

(3) LXDB9 BASE FAILURE

(a) Check for lubrication of gears.

(b) Check for proper alignment of units on base. Refer to Paragraphs 2-6.c.(2)(a) 3., and 2-6.c.(2)(b) for alignment of motor and transmitter distributor. For adjustments, refer to Figure 5-135.

f. ELECTRONIC SELECTOR MAGNET DRIVER FAILURE

(1) The following covers trouble shooting and repair of Selector Magnet Driver. General instructions in Paragraphs 6-8.f.(2) through 6-8.f.(6)(a).

(2) It is recommended that field servicing be limited to replacing the Driver with a spare since it is probable that suitable tools and test equipment will not be available. Replace the device upon the absence of output signal when a known test signal of proper polarity is applied. The mere absence of an output signal does not necessarily require replacement since the trouble may be checked in the signal or power circuits external to the Driver. Therefore, these should be checked first.

(3) Repairs should be made at a properly-equipped maintenance center by qualified personnel. Testing and repair should preferably be handled by persons familiar with transistor circuits. The following equipment is required:

(a) A suitable source of d.c. teletypewriter signals such as a Distortion Test Set or a Transmitter Distributor.

(b) An oscilloscope with differential pre-amp for observing current waveforms.

(c) A 0-5-50 20,000 ohm per volt DC voltmeter.

(d) A 0-150 5,000 ohm per volt AC voltmeter.

(e) A 0-100 DC milliammeter.

(f) A selector-magnet assembly to receive Driver's output.

(g) A 1-ohm resistor in series with selector-magnet assembly to monitor selector's current waveform.

(4) To locate a trouble, proceed as follows:

(a) Check input signals for quality and correct polarity (see Tables 6-7 and 6-8).

(b) Check output signal for absence or distortion (see Tables 6-7 and 6-8).

(c) Check power supply's d.c. voltage (approx. -40V).

(d) Using some sort of repetitive signal as an input, check collector of each transistor to see if it is switching, i.e., changing each time input signal changes (see Tables 6-7 and 6-8). This should locate general circuit that has the trouble.

(e) Use Table 6-9 to determine component causing trouble.

(5) Replacement of parts such as resistors may be replaced by those obtained from local electronic suppliers. On the other hand, to ensure obtaining proper parts, diodes, transistor, etc. should be ordered by part number from Teletype Corporation. In an emergency, a 2N1008B transistor may be used as a replacement for any transistor on the Driver. Do not substitute diodes.

(a) When parts are replaced, do not overheat leads of transistors or diodes, or card itself. Excessive heat will damage components and cause printed circuits to lift from board. Use a small soldering iron with a relatively low operating temperature.

(b) CAUTION - If circuit card is removed, when replacing it, place 131228 insulating washer between card and 152426 nut; otherwise, nut will contact printed circuit and will cause damage to Driver. It may be more satisfactory to replace entire circuit cards than to trouble shoot the card and replace individual components.

(c) During testing or servicing of teletypewriter equipment, it may be necessary to remove typing unit or disconnect selector magnets from Driver. Before doing either, turn off or remove a.c. power from equipment. Otherwise Driver may operate into an open circuit, or into a short circuit if line shunting contacts are present. Either condition will cause damage to Driver.

Table 6-7. Electronic Selector Magnet Driver Circuit Voltages

LOCATION	TEST POINT	INPUT LINE CONDITION	
		MARK	SPACE
Negative Signal Line	TP1	2.9 v.	0.85 v.
Q1 Base		2.7 v.	0.85 v.
Q1 Emitter	TP7 or Terminal Post #3	2.2 v.	2.2 v.
Q1 Collector	Terminal Post #5	2.2 v.	3.4 v.
Junction R4 - R5		4.3 v.	10.9 v.
Q2 Base	Terminal Post #6	2.2 v.	3.4 v.
Q2		2.95 v.	2.95 v.
Q2 Collector	TP4	9.2 v.	3.0 v.
Q3 Base		4.15 v.	3.4 v.
Q3 Emitter		3.65 v.	3.6 v.
Q3 Collector	TP8	3.8 v.	10.9 v.
CR10 Cathode	TP5	4.6 v.	3.0 v.
Q4 Base		9.7 v.	3.4 v.
Q4 Emitter	TP4	9.2 v.	3.0 v.
Q4 Collector - Q5 Base	TP3	9.3 v.	3.1 v.
Junction R7 - R8		36.0 v.	35.0 v.
Q5 Emitter		9.85 v.	3.65 v.
Q5 Collector	TP2	39.5 v.	39.0 v.

NOTES: All voltages negative with respect to TP6.
Nominal Power supply voltage (TP2 to TP6): 39.5 v.
Voltage readings may vary ±15% from above values.

Table 6-8. Electronic Selector Magnet Driver Waveforms

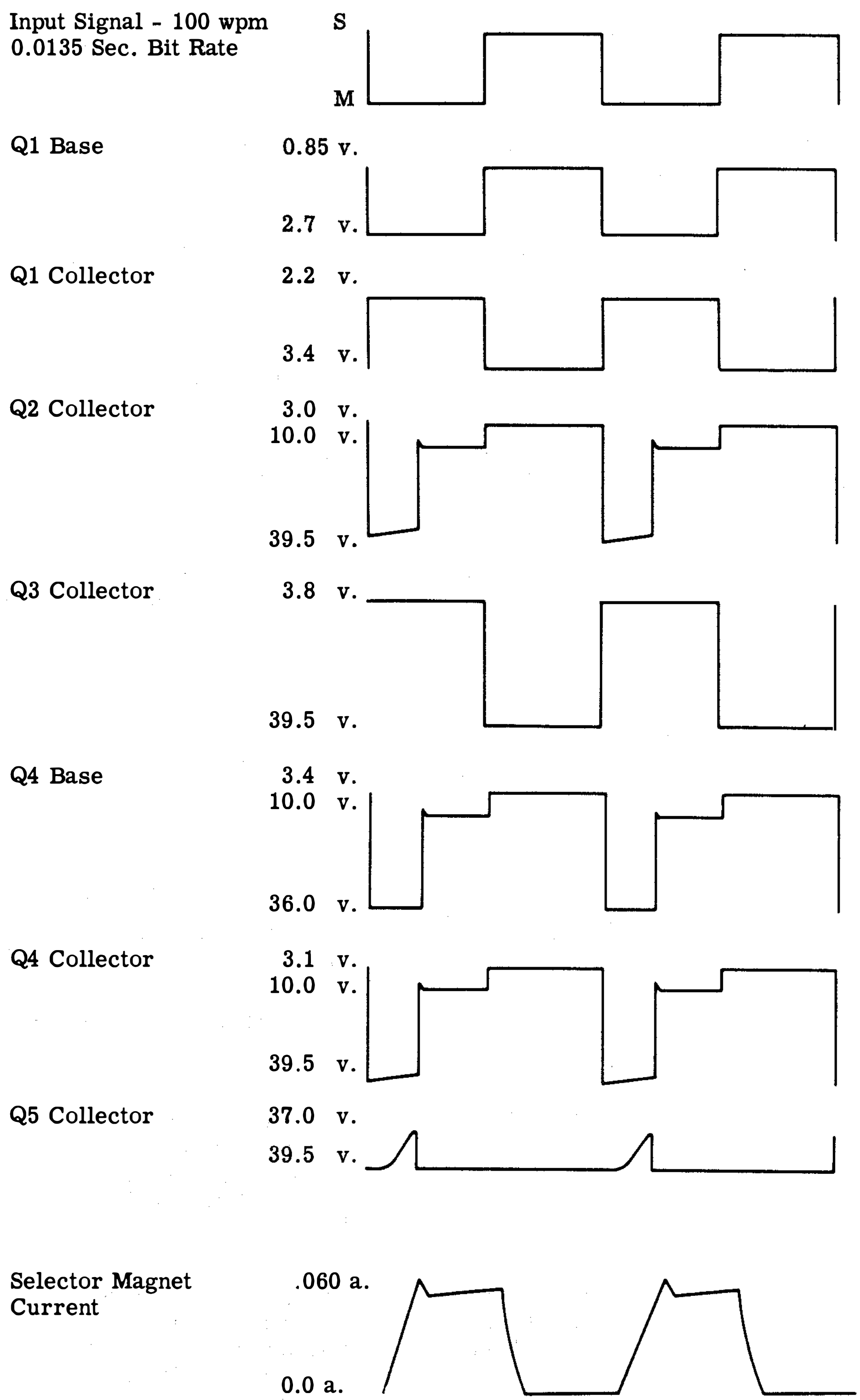


Table 6-9. Electronic Selector Magnet Driver

STEP	PROCEDURE AND NORMAL INDICATION	* TROUBLE	** NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
1.	Output remains marking despite changes in input signal.	Q1 shorted.	Check Q1 collector, -2.2 volts. With spacing input.	6-8.f.(2) through 6-8.f.(6)(a)
		Q2 open.	Check Q2 collector, -9.3 volts with spacing input.	
		Q3 shorted.	Check Q3 collector, -3.6 volts with spacing input.	
		CR10 shorted.	Check TP4, -8.5 volts with marking input.	
2.	Output remains spacing despite changes in input signal.	Q1 open.	Check Q1 collector, -3.4 volts with marking input.	6-8.f.(2) through 6-8.f.(6)(a)
		Q2 shorted.	Check Q2 collector, -3.0 volts with marking input.	
		Q3 open.	Check Q2 or Q3 collector, -44 volts with marking input.	
		Transformer open.	Check TP2, nominal DC voltage outside rated limits of 39.5 volts ±5 volts.	
		Transformer shorted.	Check TP2, nominal DC voltage outside rated limits of 39.5 volts ±5 volts.	
		C1 shorted.	Check Q4 and Q2 or Q3 inoperative, probably destroyed.	
		C2 open.	Check DC output voltage drops to approximately 32 volts across TP2 and TP6 shows pulsating DC (no filtering).	
		C2 shorted. CR9 shorted reversed or open.	Check TP2, DC output voltage drops to 0 volts transformer and diodes CR14, CR15, may be damaged, Q3 inoperative, probably destroyed.	

Table 6-9. Electronic Selector Magnet Driver - Continued

STEP	PROCEDURE AND NORMAL INDICATION	* TROUBLE	** NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
2. Cont.		CR14, CR15 shorted.	Check TP2, DC output voltage drops very low oscilloscope shows AC.	
		CR14, CR15 open.	Check TP2, DC voltage -35 volts with one diode open. With both diodes open 0 volts.	
		CR11 shorted.	Check TP4, -5.1 volts with marking input.	
		CR11 reversed.	Check TP4, -5.1 volts with marking input.	
		CR10 open.	Check TP4 and TP5, -44 volts with marking input.	
		CR10 reversed.	Check TP4 and TP5, -44 volts with marking input.	
		Q4 open.	Check Q5, Q2 and/or Q3 in-operative probably de-stroyed.	
		Q5 shorted.	Check Q2, Q3 and Q4 in-operative, probably de-stroyed.	
3.	Garbling or loss of range.	Q5 open.	Delayed current rise time in selector magnet coils. 0.010 to 0.012 sec. to reach 0.060 ampere level. No overshoot current. (See Table 6-8) Poor margin on spacing bias distortion.	6.8.f.(2) through 6.8.f.(6)(a)
		CR13 open.	Check Q5 emitter -39.5 volts with marking or spac-ing input. Also symptoms of Q5 open.	
		Q4 shorted.	Delayed current rise time in selector magnet coils. 0.010 to 0.012 seconds to reach 0.060 ampere level. No overshoot cur-rent. (See Table 6-8) Poor margin on spacing bias distortion.	

Table 6-9. Electronic Selector Magnet Driver - Continued

STEP	PROCEDURE AND NORMAL INDICATION	* TROUBLE	** NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
3. Cont.		CR8 open	Check R4 - R5 junction, -10.3 volts with marking input. Vary input current above and below 0.030 ampere trigger level. Oscillations observed when scope connected across one ohm sampling resistor in series with selector magnet coils. Transistors Q1 through Q5 may be damaged by this trouble condition.	
		CR8 shorted.	Delayed current fall time in selector magnet coils. Approximately 0.007 seconds to reach 0 current level. Printer has poor range on marking bias signal.	
		CR8 reversed.	Delayed current fall time as described above (CR8 shorted). Also, as above (CR8 open) oscillations observed.	
		CR11 open.	Check Q3 collector, -3.8 volts with spacing input. Delayed current fall time in selector magnet coils. 0.030 seconds to reach zero current level. Poor range on marking bias distortion.	
		CR12 open.	Delayed current rise time in selector magnet coils. 0.012 seconds to rise to 0.060 ampere level; no overshoot current. (See Table 6-8) Poor margin on spacing bias signals.	
		CR12 shorted.	Delayed current rise time in selector magnet coils; 0.012 seconds to reach 0.060 ampere level; no overshoot current. (See Table 6-8) Poor range on spacing bias distortion. Maximum selector magnet current 0.100 ampere.	

Table 6-9. Electronic Selector Magnet Driver - Continued

STEP	PROCEDURE AND NORMAL INDICATION	* TROUBLE	** NEXT STEP	CORRECTION (REFERENCE PARAGRAPH)
3. Cont.		CR12 reversed.	Delayed current rise time in selector magnet coils; 0.012 seconds to reach 0.060 ampere level; no overshoot current. (See Table 6-8) Poor range on spacing bias signals. Maximum selector magnet current 0.100 ampere.	
		CR14 or CR15 open.	Check DC voltage at TP2 decreases below 39.5 volts -15%. Maximum selector magnet current approximately 0.040 ampere. Poor range on spacing bias signals.	
		C2 open.	Check TP2, low DC output volts; high ripple voltage; poor overall range.	

* "Shorted" refers to short-circuit between emitter and collector.
"Open" refers to any pair or all three terminals open.

** Voltages shown are measured with respect to TP6.

6-9. DISASSEMBLY AND REASSEMBLY

a. GENERAL

(1) Refer to the Installation Instructions in Section 2 and reverse the procedure when the major components are to be removed from their respective cabinets. The power leads should be disconnected first as a safety precaution. On cabinets equipped with the power factor correcting feature, make sure that the capacitors are discharged before handling the associated connectors or before placing a meter in the circuit. The list of tools referenced in the adjusting procedure will be applicable for the disassembly or reassembly procedure.

(2) The disassembly procedure that follows breaks the respective unit down into its major subassembly. Further disassembly of each mechanism is fully explained by the exploded illustrations shown in Volume 3 of Bulletin 271B. The illustrations are arranged on a functional basis insofar as possible, with a part number adjacent to each piece part. The pages following the illustrations lists the part number with its nomenclature. Frequent use of the part number is made in the disassembly procedure.

(3) Exercise care when removing or replacing gear guards, covers and units so as not to damage cables or wiring. Route the connecting cables away from moving parts.

NOTE

Retaining rings (tru-arc) are of spring steel and have a tendency to release suddenly. Loss of these can be minimized as follows: Hold the ring with your left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the ring. Rotate the screwdriver in a direction to increase the diameter of the ring. The retaining rings will come off easily without flying.

b. REPERFORATOR TRANSMITTER SET Figure 4-3, Vol. 1.

(1) Disconnect the interconnecting cables and the tape reel drive belt. Loosen the three captive screws securing the base to the stand and lift the unit upward.

(2) Replace in the reverse order.

(3) To remove the Reperforator from the base.

(a) Remove the mounting screws that secure the tape alarm cable clamp - Figure 2-2. Remove any electrical connections (selector magnet leads, connectors, etc.) that would prohibit the removal of the unit.

(b) Remove the hex mounting nut that secures the reperforator cable clamp adjacent to the 32 point connector - Figure 4-31.

(c) Remove the mounting screws that secure the 32 point connector.

(d) Remove the mounting screw that secures the 156183 or 156184 anchor bracket to the base. Remove the three mounting screws that secure the reperforator frame to the base. Lift the reperforator from the base.

(4) To replace the reperforator unit on its base:

(a) Place the reperforator unit on its base so that its three mounting holes line up with those in the base. Loosen the screw that secures the 156183 or 156184 anchor bracket to the punch assembly frame. Thread the previously removed mounting screw through the anchor bracket and into the tapped hole in the base, but do not tighten the screw. Start the remaining three mounting screws through the reperforator frame mounting holes into the tapped holes in the base but do not tighten the screws. Press the anchor bracket against the base and tighten the screw that secures the bracket to the punch assembly frame. Tighten the screw that secures the bracket to the base. Tighten the three screws that secure the reperforator frame to the base.

(b) Replace the 32 point connector and cable clamps removed during disassembly. See paragraph 6-9.b.(3)(c) before proceeding with reassembly.

(5) To remove the Reperforator Selecting Mechanism (Figures 4-1, 4-12 and 4-13, Vol. 2).

(a) Remove the screw, lock washer and nut from the 150001 selector clutch drum. Place the 152410 reset bail in its raised position. Holding the 152432 stop arm and 152405 marking lock lever to the left, grasp the cam-clutch by the cam disk (not by drum) and pull forward rotating the cam-clutch slowly. The cam-clutch should come off easily; it should not be forced.

(b) Unhook the spring on the 150355 function clutch latch lever. Remove the 156472 spring post by removing its nut and lock washer. Remove the 151442 screw (with lock washer) that passes through frame and 152400 selector mounting plate into the 152402 selector lever guide. Remove the 152457 oil wick, 153538 screw, 2191 lock washer and 159467 wick holder. Remove the selecting mechanism. Figures 4-1, 4-13, Vol. 2.

(c) To replace the selecting mechanism, reverse the procedure used to remove it.

(6) To remove Ribbon Feed Mechanism:

(Figure 4-16; Vol. 2.)

(a) Remove the ribbon. Remove the two 151632 mounting screws (with lock washers) from the 156414 ribbon feed mounting plate. Remove the ribbon feed mechanism.

(b) To replace the ribbon feed mechanism, reverse the procedure used to remove it.

(7) To Remove Perforator Mechanism:

(Figures 4-2; 4-6, Vol. 2.)

(a) Remove the 90573 spring and disconnect the 156412 perforator drivelink from the 156884 rocker arm.

(b) Remove the 159621 pivot screw Figure 4-4, Vol. 2, with lock washer from the 159622 perforator adjusting clamp. Remove the 151631 and 151632 mounting screws (with lock washers and flat washers) that fasten the 156024 rear plate to the 159472 main plate. Remove the perforator mechanism.

(c) To remount the perforator mechanism, reverse the procedure used to remove it. Make certain that the 162763 reset bail fits in the fork of the 159430 reset bail trip lever and that the print hammer fits in its slot in the perforator mechanism. Figures 4-1, 4-6, Vol. 2.

(8) To Remove Transfer Mechanism:

(Figures 4-1; 4-15; Vol. 2.)

(a) Remove the 49084 main trip lever spring. Remove the 151631 and 515632 mounting screws (with lock washers and flat washers) from the 159488 transfer mounting bracket. Remove the transfer mechanism.

(b) To remount the transfer mechanism, reverse the procedure used to remove it.

(9) To Remove Typing Mechanism:

(Figures 4-2 and 4-8, Vol. 2.)

(a) Remove the 156872 operating blade from the rocker ball assembly by removing its two mounting screws with lock washers, flat washers and shims. Remove the 119651 retaining ring and disconnect the 159512 printing trip link. Remove the nut, lock washer and flat washer from the 156396 eccentric on the 162350 rocker bail, and disconnect the 159526 oscillating drive link. Remove 33828 spring from the 173981 accelerator and the 90606 spring from the 156252 lifter.

(b) Remove screw with lockwasher that fastens the 159434 lifter plate to the 162862 bar on the frame. Remove the screw with lock washer that secures the 159525 axial bracket to the 159404 post on the frame. Remove the 151631 screw (with lock washer and flat washer) that fastens the 159487 function box front plate to the 159472 main plate. Remove the 119653 retaining ring from the 159659 idler gear eccentric shaft. (Refer to Figures 4-8, 4-11, 4-17, Vol. 2). Remove the eccentric shaft, 159536 idler gear, 151629 special nut and lock washer by removing the 159658 mounting screw. Remove the three 151631 screws (with lock washers and flat washers) that secure the 159535 front plate to the frame. Remove the typing mechanism from the frame.

(c) To remount the typing mechanism, reverse the procedure used to remove it.

(10) To remove Function Box Mechanism:

(a) Remove the 151631 mounting screw (with lock washer and two flat washers) that passes through the 156316 function box rear plate and 159483 spring bracket into the 159535 front plate. Remove the function box from the typing mechanism.

(b) To remount the function box, reverse the procedure used to remove it.

(11) To remove Axial Plate Assembly: (Figures 4-17, 4-10, 4-8, 4-9, Vol. 2).

(a) Remove the 3870 correcting drive line spring. Remove the 156413 correcting drive link by removing the retaining ring from the 156378 axial correcting plate. Remove the retaining ring and disconnect the 173755 ribbon guide from the 156870 ribbon oscillating lever.

(b) Remove the three mounting screws and lock washers from the 159525 axial plate. Remove the axial plate assembly.

(c) To remount the axial plate assembly, reverse the procedure used to remove it. The rearmost tooth of the rack on the 173775 typewheel shaft must mesh with the rearmost tooth space in the 156294 axial sector, and the forward tooth on the sector must mesh with the second tooth space on the shaft: there is an extra tooth space on the forward portion of the shaft's rack. (Figure 4-8, 4-9, Vol. 2).

(12) After the function box mechanism and axial plate assembly have been removed, the remainder of the typing mechanism is the front plate assembly.

(13) To Remove Pushbars: Remove the typing mechanism. Remove the function box mechanism from the typing mechanism. Remove the pushbar by disengaging the pushbar rack from its associated pinion.

(a) Correct gear tooth engagement of racks.

1. Pushbar #1 - #5 Inclusive

a. In assembling the pushbars to the various eccentric assemblies, great care must be exercised to assure the correct rack-pinion gear mesh. The correct mesh is such that the first tooth on the pinion and the first tooth space on the rack are meshed. The last tooth on the pinion and the last tooth on the rack should therefore also mesh. Misalignment of the mesh by as little as one tooth will produce a jam in the machine and cause part breakage if the machine is put under power while this condition exists.

2. Letters and Figures Pushbar.

a. The assembly of these two pushbars to the left eccentric assembly must follow the assembly of the detents on the same eccentric. Starting with the left eccentric in the lower detented position, locate the gear tooth of the pinion which is at top dead center. (Using the oil hole in the eccentric housing as a reference may help since it also is located at top dead center.) The first tooth space of the rack of the "Letters" pushbar must engage the tooth located directly below. This requirement is met when the indicating mark on the pushbar and eccentric shaft are in line. Pull the letters pushbar all the way on the pinion. The eccentric shaft should now be in the upper detented position. Now locate the tooth at bottom dead center. The first tooth space of the rack on the "Figure" pushbar should engage the tooth just located. The full travel of either pushbar should result in the eccentric shaft being rotated from one detented position to the other without jamming. As before, a misalignment of the mesh by one tooth will cause a jam and parts breakage if the machine is put under power while this condition exists.

(14) To Remove Rocker Bail Assembly: (Figure 4-17, Vol. 2).

(a) Disconnect the 156937 printing drive link by removing the retaining ring at its left end. Remove the 3598 nut, lock washer, flat washer, felt washer, bushing and 151632 screw from the 156871 operating blade mounting bail.

(b) Remove the nut, lock washer and 156921 adjusting lever guide, and remove the 156366 rocker bail shaft. Remove the rocker bail. (Figure 4-2).

(c) To replace the rocker bail assembly, reverse the procedure used to remove it.

(15) To Remove Main Shaft Assembly: (Figure 4-3, Vol. 2).

(a) Remove the 87401 spring from the function clutch latch lever. Remove the retaining ring spring washer and flat washers from the forward end of the 154397 main shaft. (Figure 4-3, Section 2).

(b) Remove the screw and lock washer (if present) from the 150000 function clutch drum. Remove the screw and lock washer from the 173340 collar. Remove the screw and lock washer from the 158745 bearing clamp.

(c) Pull main shaft out of rear of unit, removing the cam-clutch and 173340 collar.

CAUTION

Note the location of the main shaft needle roller bearings as shown in Figure 4-3, Volume 2 of 271B. Move the main shaft toward the rear of the unit a small amount at a time and exercise care not to drop or contaminate the 20 needle rollers in each race. A 125252 spring (as used on the ribbon feed pawl) may be stretched around the shaft and rollers with the ends of the spring hooked together. The garter spring in conjunction with the KS7471 grease will hold the rollers in place.

(d) To replace the main shaft assembly, reverse the procedure used to remove it. Make sure the rollers are clean then lubricate the race only with KS7471 grease. Apply a liberal amount of KS7470 oil at each end of the bearing sleeve.

NOTE

When the main shaft is inserted into the cam-clutch hold the latter firmly so that the drum is not pushed off the clutch, and compress the drum and cam disk together so that holes in drum and clutch bearings are aligned.

(16) To Remove Transmitter Distributor (LAXD) from the Base.

(a) Remove the cover plate.

(b) Remove the two screws that secure the two transmitter distributor cable clamps.

(c) Remove the mounting screws that secure the 32 point connector.

(d) Remove the transmitter gear guard from the base.

(e) Remove the three mounting screws that secure the transmitter to the base. Lift the transmitter from the base.

(f) To replace the transmitter distributor, reverse the disassembly procedure. See Paragraph (7) before replacing cable clamps and 32-point connector.

(g) Check the adjustment outlined in Section 5, Figure 5-84 -- whenever the reperforator or transmitter distributor has been remounted to the base.

NOTE

If it is necessary to readjust the Vertical Alignment of Pivoted Sensing Head and Punch, do not replace the cable clamps and 32-point connector for the transmitter distributor until the adjustment is completed.

(17) To Remove The Reperforator Transmitter Base from the Tape Handling Stand:

(a) Remove the tape winder drive belt from the tape winder drive pulley. (Figure 4-31)

(b) Disconnect all plugs from their connectors on the tape handling stand frame.

(c) Loosen the three captive screws securing the base to the stand, and lift the base from the stand.

(d) Remove four screws, washers, and lock washers that secure the motor.

(18) Idler Gear Assembly

(a) To remove idler gear assembly, remove feed lever spring (82727) and latch stripper bail spring (125252) (Figure 5-4, Vol. 2).

(b) Remove oil reservoir bar assembly by removing four screws (152893) and lock washers (110793) and washer (125011)(Figure 5-3).

(c) Pull out idler gear oil retainer plug (158789) and remove leather washer (85318).

(d) Remove idler gear bearing stud lock nut (3595), lock washer (104451) and flat washer (111767).

(e) Remove idler gear bearing stud (163363) idler gear assembly (163011) as a unit.

(f) To install idler gear assembly, reverse disassembly procedure.

(19) Sensing Shaft Assembly

(a) To remove sensing shaft assembly, remove idler gear (see Paragraph 2.a.).

(b) Remove the front bearing clamp (158788) by removing two screws (151631) and lock washers (2191) (Figure 5-7, Vol. 2).

(c) Remove the rear bearing clamp (158847) by removing two screws (151630) and lock washers (2191).

(d) Remove sensing shaft assembly.

(e) To install sensing shaft assembly, reverse the disassembly procedure.

(20) Distributor Shaft Assembly. Follow the sensing shaft procedure in step b, above. Refer to Figure 5-9, Vol. 2.

(21) Clutch Trip Assembly

(a) To remove the clutch trip assembly, disconnect wires leading to the clutch magnet (252M). (Figure 5-11, Vol. 2.)

(b) Remove the plate mounting screw (151630), lock washer (2191) and flat washer (125015) and the plate adjusting screw (151630) lock washer (2191) and flat washer (151610).

(c) Withdraw clutch trip assembly from bottom side of unit.

(d) To install clutch trip assembly, reverse disassembly procedure.

(22) Pivot Shaft (Figure 5-4, Vol. 2)

(a) To remove the pivot shaft, (161328), remove the sensing shaft assembly (Paragraph (19) above).

(b) Remove two ring retainers (119652) (one is hidden under a felt washer).

(c) Loosen the collar (158852) set screws.

(d) Remove pivot shaft nut (151880) lock washer (110743) and flat washer (125011).

(e) Remove the pivot shaft (161328) by pushing it toward the rear plate, being careful not to lose the feed lever collars and felt washers (10752).

(f) To install pivot shaft, reverse disassembly procedure.

(23) Pivoted Sensing Head (Figure 5-2, Vol. 2).

(a) To remove sensing head and tape deflector, remove the last character contact assembly. The contact assembly is secured by two screws (152893), lock washers (110743) and flat washers (125011).

(b) Remove check pawl spring (45104).

(c) Remove tape deflector spring (82999) Figure 5-2, Vol. 2.

(d) Loosen rear pivot screw lock nut (76474) and run the rear pivot screw (158801) as far as possible into the casting (Figure 5-6, Vol. 2).

(e) Pull the sensing pins down and free from the top plate (159153).

(f) Loosen from pivot screw lock nut (112626). (Figure 5-6, Vol. 2).

(g) Turn front pivot screw (158800) until deflector (173788) is free from the pivot screw.

(h) Remove sensing head and tape deflector.

(i) To install sensing head and tape deflector, reverse disassembly procedure.

(24) Storing Switch Assembly (Figure 5-10; Vol. 2).

(a) To remove the storing switch assembly, disconnect cable (173470) Figure 5-9, Vol. 2.

(b) Remove four mounting screws (151631), lock washers (2191) and flat washers (7002).

(c) Remove storing switch assembly.

(d) To install storing switch assembly, reverse disassembly procedure. Exercise care to align slides etc.

(25) Distributor Block Assembly.

(a) To remove the distributor block assembly, disconnect cable (173470) Figure 5-9, Vol. 2.

(b) Remove three mounting screws (151721) lock washers (2191) and flat washers (7002).

(c) Remove distributor block assembly.

(d) To install distributor block assembly, reverse disassembly procedure.

(26) To Remove Tape Winder Drive Bracket Assembly:

(a) Remove the four mounting screws, lock washers, and flat washers that secure the 158748 tape winder drive bracket to the base.

(b) Remove the bracket and note the number of 158750 shims between the bracket and the base.

(27) To Remove the Cross Shaft Assembly:

(a) Remove the screw and lock washer that secure the 158745 bearing clamp.

(b) Remove the cross shaft bearing retaining screws, washers and nuts.

(c) Remove the cross shaft driven gear hub mounting screw, and lock washer.

(d) Slide cross shaft assembly sideways out of bearing seats and remove shaft assembly from base.

(28) Check the following five adjustments wherever a reperforator or transmitter distributor has been remounted to a base.

(a) Vertical alignment of pivoted sensing head and punch.

(b) Transmitter driving and Distributor Shaft driven Gear Mesh.

(c) Horizontal alignment of pivoted Sensing Head and Punch.

(d) Last Character Contact Switch.

(e) Motor Gear Mesh.

(29) To Remove Gear Bracket Assembly (fixed speed or shift gears):

(a) Remove the transmitter and reperforator gear covers.

(b) Remove the three gear bracket mounting screws and washers and remove the gear bracket assembly.

(30) TAPE HANDLING STAND

(a) Remove the tape supply and take-up reels and the intermediate tape storage bin.

(b) To Remove Tape Winder Assembly:

1. Remove the two screws and lock washers that secure the 158995 capacitor bracket to the tape winder base plate.

2. Remove the two screws, lock washers, and flat washers that secure the 159214 support bracket to the 158972 bracket.

3. Remove the four screws, lock washers, and flat washers that secure the tape winder assembly to the stand frame.

(31) SELECTOR MAGNET DRIVER

(a) To remove a Selector Magnet Driver from its mounting:

1. Disconnect the six Selector Magnet Driver leads from the terminal board.

2. Loosen the two screws in the upper left and lower right corners. Slide the screws in their slotted holes toward the center of the Selector Magnet Driver and lift out the component.

(b) To replace reverse the procedure.

c. TRANSMITTER GROUP (Figures 1-26, 1-27 and 4-50)

(1) Message Identification Unit

(a) To remove the Message Identification Unit (173520), reverse the procedure described in Paragraph 2-3.b.(3)(d). Exercise care not to damage the cables and numbering mechanism. Refer to Figures 1-12 and 1-13, Vol. 2 for the exploded illustrations of the mechanisms when further disassembly is required.

(b) To reassemble the unit, reverse the procedure used in disassembling the mechanisms shown in Figures 1-12 and 1-13, Vol. 2, then proceed with Paragraph 2-3.b.(3)(d).

(2) Transmitter Distributor (LXD11 and LXD31)

(a) To remove the Multiple (Single Shaft) Transmitter Distributors, refer to Paragraph 2-3.c. Vol. 1 and reverse the procedure; however, disregard Paragraph 2-3.c.(5)(a). Observe the note in Paragraph 2-3.c.(5)(d).

(b) Cover Plate

1. To remove the 163756 Cover Plate (Figure 7-9, Vol. 2), lift the rear end upward and slide the plate toward the rear to disengage the spring clip. (Figure 1-20)

2. To replace the cover plate, reverse the procedure.

(c) Top Plate

1. To remove the 156606 Top Plate (Figure 7-10, Vol. 2), loosen the front and rear mounting screws and lift the plate upward.

2. To replace the top plate, guide the mounting screws into the notch of the front and rear plate. Align the sensing pins and feed wheel with their respective slots. Refer to adjusting procedure in Section 5 if the plates do not align.

(d) Tape Guide Plate

1. To remove the 156550 Tape Guide Plate (Figure 7-10, Vol. 2), loosen the front and rear mounting screw and slide the plate upward.

2. To replace the tape guide plate, guide the mounting screws into the respective notch of the front and rear plate while guiding the tape-out pin into its notch and locating the sensing pins against the left edge of the tape guide plate. Refer to the adjusting Section 5.

(e) Oil Reservoir

1. To remove the oil reservoir (Figure 7-4, Vol. 2), remove the screws that secure the casting and lift the assembly upward and toward the right.

2. To replace the oil reservoir, reverse the procedure.

(f) Rear Plate Assembly

1. To remove the rear plate assembly (Figure 7-4, Vol. 2), remove the leads from the start-stop switch and the clutch magnet. Remove the right rear and left front 112626 Nuts and 2669 lock washer from the bottom post. Remove the 156588 retaining ring with 151722 screw and 2191 lock washer. Remove the 151630 screws securing the plate to the 156622 post. Remove the two 151630 screws which secure the 156541 clutch trip magnet to the rear plate and remove the clutch trip magnet assembly. Remove the rear plate assembly from the unit.

2. To replace reverse the procedure.

(g) Main Shaft Assembly

1. Remove the 156831 clamp and 156832 plate from the front plate assembly. Remove the main shaft assembly. Refer to Figure 7-2 and 7-5, Vol. 2.

2. Replace in the reverse order.

(h) Center Plate Assembly

1. Remove the 156622 post two nuts that secure the center plate to the two guide post and the 7603 spring; then remove the center plate assembly.

2. Replace in the reverse order.

(i) When the unit is reassembled, check associated adjustments (Section 5), gear play and lubrication. Refer to portions of Paragraph 2-3.c.(5)(c) in reverse order for instructions on replacing the unit and dust cover. Then snap the cover plate in place. Refine adjustment as required.

(j) Refer to Figures 3-10, 3-11 and 3-12 for disassembly and reassembly of Multiple Transmitter Distributor Base (LMXB206BR).

(3) Transmitter Distributor (LBXD16)

(a) To remove the Multiple (two shaft) Transmitter Distributors refer to Paragraph 2-3.d. (Vol. 1) and reverse the procedure.

(4) General (Figures 1-18, 1-20 and 4-50)

(a) Open the hinged front panel portion of the dust cover to provide access to each Transmitter Distributor and its attached cradle assembly. (Figure 6-16, Vol. 2.) Lift the rear end of each cover plate to disengage its detents; then slide the cover toward the rear. Remove the clamp screw that secures each unit to the common base. Lift the respective transmitter upward and pull forward to disengage the unit.

(b) To replace the unit, reverse the procedure. Refer to Paragraph 2-3.d.(3); make sure that the cover plate, top plate, tape guide plate and filler plate are aligned and that the gear play requirement is met. See Section 5.

(5) Top Plate

(a) To remove the 158521 top plate (Figure 6-1, Vol. 2), loosen the front and rear mounting screws and lift the plate upward.

(b) To replace the top plate, guide the mounting screws into the notch of the front and rear plate. Align the sensing pins and feed wheel with their respective slots. Refer to the adjusting procedure in Section 5 if the plates do not align.

(6) Tape Guide Plate

(a) To remove the 158627 or 158518 top plate (Figure 6-3, Vol. 2), loosen the front and rear mounting screws and slide the plate upward.

(b) To replace the tape guide plate, guide the mounting screws into the respective notch of the front and rear plate while guiding the tape-out pin into its notch and place the sensing pins against the left edge of the tape guide plate.

(7) Filler Plate - Refer to Figure 6-16, Vol. 2.

(8) Cradle (Figure 6-16; Vol. 2)

(a) Remove the two 42827 screws and the lock washers which secure the 161594 connector to the cradle. When the screws are replaced make sure that the head of each screw is on the outside of the cradle. Refer to Figure 6-16, Vol. 2 for further disassembly of the cradle.

(b) Replace in the reverse order.

(9) Oil Reservoir

(a) To remove the oil reservoir, remove the four screws that secure the 158860 cross bar to the front and rear plate. Unhook the springs attached to the under side of the cross bar and lift the assembly upward. (Figure 6-6, Vol. 2)

(b) Replace in the reverse order.

(10) Distribution Block Assembly (Figure 6-13, Vol. 2).

(a) To remove the distributor contact assembly, remove the nuts that secure the cable connector to the rear plate if the unit is so equipped. Remove the three screws that secure the assembly. Lift the assembly out far enough for servicing.

(b) To replace the distributor contact assembly, reverse the procedure. Refer to Section 5 for alignment and adjustment requirements.

(11) Idler Gear Assembly (Figure 6-6, Vol. 2)

(a) To remove the idler gear, remove the lock nut that secures the shaft to the rear plate. Remove this assembly before removing the sensing and distributor shaft assemblies.

(b) To replace the idler gear, reverse the procedure.

(12) Distributor Shaft Assembly

(a) To remove the distributor shaft, remove the mounting screws (2) that secure each bearing clamp to the front and rear plate (Figure 6-10, Vol. 2).

(b) To replace the shaft, reverse the procedure and check the requirements for adjustment in Section 5.

(13) Sensing Shaft Assembly

(a) To remove the sensing shaft, remove the mounting screws (2) that secure each bearing clamp to the front and rear plate. (Figure 6-9; Vol. 2)

(b) To replace the shaft, reverse the procedure and observe the alignment and adjusting procedures in Section 5.

(14) Feed Wheel

(a) To remove the feed wheel, back off the nut that secures the cantilever post sufficiently to raise the post and slide the wheel off. (Figure 6-8; Vol. 2)

(b) To replace the feed wheel, reverse the procedure. Align the shoulder of the 158539 shaft with the notch for the tape guide and top plate mounting.

(15) Storing Switch Assembly

(a) To remove the transfer contact type storing switch assembly (Figure 6-14; Vol. 2), remove the mounting screws (4) that secures the storing switch assembly to the main casting. Exercise care in handling not to damage the contact and slide projections. Withdraw switch assembly far enough to permit servicing.

(b) To replace storing switch assembly, reverse the procedure. Replace the left front screw first and position the assembly about this pivot point to align the slides. Refer to Section 5.

(16) Pusher and Latch Levers (Remove storing switch, spring post, etc. to aid disassembly).

(a) To remove the pusher and latch levers, remove both sets of springs and slide the 158849 and the 158848 pusher levers down. (Figure 6-11; Vol. 2) Slide and rotate the 158834 latch levers to left and out.

(b) To replace the pusher and latch levers, reverse the procedure.

(17) Sensing pins (Remove tape guide plate, spring bracket and sensing finger guide).

(a) To remove the sensing pins, remove all springs at the lower end. Rotate the bell cranks downward and remove each 158522 sensing pin assembly. (Figure 6-7; Vol. 2)

NOTE

The 158522 Sensing Bail Eccentric Shaft may be positioned toward the rear to facilitate disassembly.

(b) To replace the sensing pins, reverse the procedure.

(18) Switch Actuating Mechanism (Start-Stop and/or Tight Tape Switch).

(a) To remove the switch slide arm assembly, remove the 158560 intermediate plate (Figure 6-6; Vol. 2), by removing the three mounting screws and its spacer. Rotate the intermediate plate and remove the bail and slide arm mounting nut.

(b) To replace the switch mechanism, reverse the procedure.

(c) To remove the tape-out switch (Figure 6-8; Vol. 2), remove the mounting screws that secure the 160590 bracket to the front plate.

(d) To replace the tape-out switch, reverse the procedure.

(19) Center Plate Assembly (Figure 6-4; Vol. 2)

(a) To remove the center plate assembly, remove the 110334 screw and lock washer from the 158535 post and the 151630 screw with lock and flat washer from the 158531 shaft that secures the plate assembly to the front plate. Lift the projection of the center plate that is hooked over the stripper bail pivot shaft, then pull the plate away.

(b) To replace the center plate assembly, reverse the procedure.

(20) Sensing Assembly (Figure 6-7; Vol. 2)

(a) To remove the sensing mechanism, remove the 161328 pivot shaft by loosening the nut, set collars and the two retaining rings. Slide the shaft out and remove the 161325 latch bail, 161326 pusher bail and the 158526 feed lever. Remove the 158831 sensing bail (Figure 6-11; Vol. 2).

(b) To replace the assembly, reverse the procedure.

(21) Clutch Trip Mechanism

(a) To remove either clutch trip mechanism, it will not be necessary to unsolder the leads to the magnet coil. Refer to Figure 6-15; Vol. 2 and remove the screws that secure the 158751 mounting plate.

(b) Replace the mechanism in the reverse order. Refer to Section 5 for adjustments.

(22) Frame Assembly

(a) Remove all screws and/or nuts that secure eccentric shaft to side frame and/or casting. Remove all screws that secure the front and rear plates to the castings.

(b) To replace the frame assembly, reverse the procedure.

(23) Motor Unit

(a) Remove the motor mounting screws. The motor height adjustment should not be disturbed.

(b) To replace reverse the procedure.

(24) Multiple Drive Mechanism

(a) To remove the counter shaft refer to Figure 3-8; Vol. 2.

(b) To replace the assembly, reverse the procedure noting the adjusting procedure in Section 5.

CAUTION

Make sure that the screw in the right as well as the left end of the cross shaft is tightened before the respective gear hub is secured to the cross shaft by its mounting screw.

d. TYPING REPERFORATOR MONITOR GROUP

(1) LBAC224BR, LBAC257BR and LBAC259BR Cabinet Disassembly

(a) Remove two multiple typing reperforator sets from cabinet. Disconnect all interconnecting cables. Reverse installation procedure of Paragraph 2-4.c.(2) (f).

(b) Remove multiple tape winders from cabinet. Reverse installation procedure of Paragraph 2-4.c.(2) (e).

(c) Refer to Paragraph 2-4.b., Vol. 1 and reverse installation procedure to complete disassembly of cabinet.

(d) To reassemble cabinet, reverse disassembly procedure.

(2) Typing Reperforator Disassembly

(a) Remove multiple base from cabinet.

(b) Remove typing reperforator unit from base by removing the three 151631 mounting screws holding the reperforator to the "T" plate and anchor bracket mounting screw.

(c) To replace typing reperforator, reverse disassembly procedure. Refer to Paragraph 2-4.c.(2)(c) 4.

(d) To disassemble and reassemble typing reperforator, refer to Paragraph 6-6. b.(5) through (15).

(3) Tape Winder Disassembly (Figures 8-1 through 8-6 in Vol. 2)

(a) Remove tape winder from cabinet.

(b) Motor Removal.

1. Disconnect wiring.

2. Remove 151631 screw and 2191 washer which mount 162722 worm drive gear to motor shaft. Remove worm gear.

3. Remove four 151723 screws and 2669 lock washers which secure motor to the mounting plate.

4. To remount motor reverse disassembly procedure.

(c) Drive Shaft Removal.

1. Remove 162704 cover plate by removing four 151630 screws and 2191 lock washers, and 151631 screw, 3598 nut, 2191 lock washer, and 7002 flat washer.

2. Loosen the 151631 screw which mounts the worm drive gear to the motor shaft. Remove the gear.

3. Remove 151631 screw and 2191 lock washer from left end of drive shaft (viewed from rear of unit.) Remove 151642 screw and 2191 lock washer which secure 173377 drive wheel to shaft. Remove drive wheel.

4. Remove 152537 bearing retainer from left 162700 bracket extension by removing its two 151630 mounting screws.

5. Remove two 151630 screws and 2191 lock washers which secure the right bearing plate and clamp to the right 162700 bracket extension.

6. Slide drive shaft out. If necessary remove 151642 screw which secures right drive wheel and drive gear to shaft.

7. To reassemble shaft reverse disassembly procedure.

(d) Clutch Latch Mechanism Removal.

1. Remove 119655 retainer from 163527 arm stud. Remove 162999 roller from stud.

2. Remove 74807 nut and 2669 washer which secure the 162715 stud to the 162700 bracket. Remove latch mechanism.

3. Remove 49645 spring from 163528 latch. Remove 73276 shoulder screw which secures 163528 latch to 162700 bracket. Remove latch.

4. To reassemble latch mechanism reverse disassembly procedure.

e. TYPING REPERFORATOR RECEIVING GROUP

(1) LBAC225BR, LBAC254BR and LBAC260BR

Refer to Paragraph 2-5.b., and reverse installation procedure for cabinet disassembly. Multiple typing reperforator units slide out of cabinet (refer to Paragraph 2-4.c. (2)(f) and should be removed prior to cabinet disassembly.

(2) Typing Reperforator Disassembly

(a) Refer to Paragraph 6-6.d.(2). Removal of LPR35BWA or LPR35BRP typing reperforator units from the base is the same as removal of the typing reperforators used in the monitor group.

(b) "Letters" Tape feed-out mechanism disassembly (LPR35BWA or LPR35BRP).

1. Remove two 119652 tru-arc retaining rings holding the 162798 roller on the 162791 shaft (see Figure 1-36, Vol. 1.)

2. Remove the 162798 roller, 172795 ratchet assembly, and 172793 ratchet from the 162791 shaft.

3. Remove the two 119652 tru-arcs holding the 173614 link (with stud) to the 173605 bail assembly and 164888 lever (see Figure 1-36; Vol. 1.)

4. Remove the two 151631 screws, 2191 lock washers, and 8330 flat washers which mount the 162773 main plate to the typing reperforator casting (see Figure 1-37; Vol. 1.)

5. For further disassembly to mechanism refer to Figure 4-19 through 4-21 in Vol. 2.

(c) "Letters" Tape Feed-out Mechanism Reassembly.

1. Reassemble mechanism according to Figures 4-19 through 4-21 in Vol. 2.

2. When re-mounting mechanism to typing reperforator, make certain the following conditions are met:

a. The 162786 blocking arm must engage the 162745 drive arm.

b. Fit the 163326 lever into the rectangular opening of the 162760 latch lever.

c. Position the 173620 armature bail so that it moves the 173618 bail away from the 173605 bail assembly.

3. Follow the disassembly procedure (steps (4) through (1)), in reverse. Make sure all levers properly engage their respective latches before assembly is tightened down.

f. TRANSMITTER DISTRIBUTOR RERUN CART GROUP

(1) General - Refer to Paragraph 2-6 for the identification and instructions for the assembly of the Rerun Cart Group. Disassemble the major components in the reverse order.

(2) Transmitter Distributor LXD11.

(a) Front (snap) panel.

1. To remove the front panel, pull outward on the lower right and left rear corner at the front panel and slide the panel toward the front.

2. To replace the front panel, engage the right and left slide on the frame and push toward the rear.

(b) Cover Plate

1. To remove the 156607 cover plate, lift the left end upward and slide the plate toward the left to disengage the spring clip.

2. To replace the cover plate, reverse the procedure.

(c) For further disassembly and reassembly of the Transmitter-Distributor unit refer to Paragraph 6-9.c.