DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

TM 11-2225

TO 31W4-2GGC-101

TELETYPEWRITER SET AN/GGC TELETYPEWRITER REPERFORATOR-TRANSMITTERS TT-76/GGC AND TT-76A/GGC

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

MAY 1957

WARNING NOTICE

WARNING
DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working on the 115-volt motor circuits or on the 95- to 250-volt power supply circuits. Serious injury or death may result from contact with these circuits. Turn off the power and discharge all high-voltage capacitors before making any connections or replacing any parts inside the equipment.

DON'T TAKE CHANCES!

TECHNICAL MANUAL
No. 11-2225
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DEPARTMENTS OF THE ARMY AND
THE AIR FORCE
WASHINGTON 25, D. C., *4 April 1957*

TELETYPEWRITER SET AN/GGC-3, TELETYPEWRITER REPERFORATOR-TRANSMITTERS TT-76/GGC, AND TT-76A/GGC

* This manual supersedes TM 11-2225, 29 April 1955, TM 11-2270, 17 September 1953, and TM 11-2271, 1 November 1954.

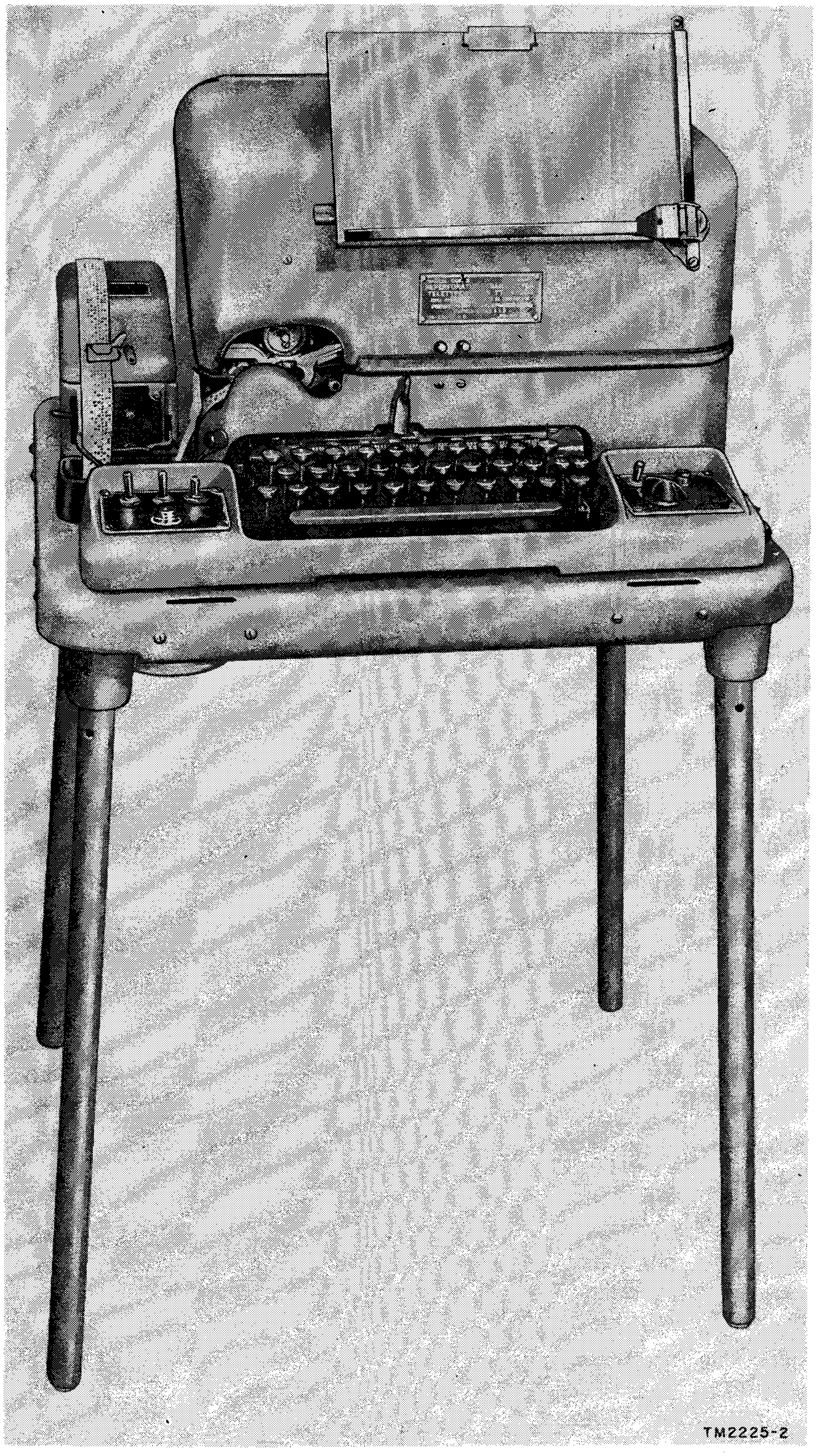

Figure 1. Teletypewriter Set AN/GGC–3, less running spares.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope.

a. This manual contains information on the description, installation, operation, theory, maintenance, and repair of Teletypewriter Set AN/GGC–3 and its major component, Teletypewriter Reperforator-Transmitter TT–76/GGC, and Teletypewriter Reperforator-Transmitter TT–76A/GGC.

b. Official nomenclature followed by (*) is used to indicate all models of the equipment item covered in this manual. Therefore, Teletypewriter Reperforator-Transmitter TT–76(*)/GGC refers to Teletypewriter Reperforator-Transmitter TT–76/GGC and Teletypewriter Reperforator - Transmitter TT–76A/GGC. If no reference is made to either TT–76/GGC or TT–76A/GGC, the information given is applicable to both models.

c. Forward all comments on this publication direct to Commanding Officer, U. S. Army Signal Publications Agency, Fort Monmouth, N. J.

2. Forms and Records

a. Unsatisfactory Equipment Reports.

(1) Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, N. J., as prescribed in AR 700–38.

(2) Fill out and forward AFTO Form 29 (Unsatisfatcory Report, to Commander) Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO 00–35D–54.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700–58 (Army) and AFR 71–4 (Air Force).

c. Preventive Maintenance Forms. Prepare DA Form 11–252 (fig. 25) (Operator First Echelon Maintenance Check List for Signal Corps Equipment (Teletypewriter)) or DA Form 11–253 (fig. 26) (Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Teletypewriter)) in accordance with instructions on the back of the form.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. Teletypewriter Set AN/GGC–3 (fig. 1) is a lightweight, transportable unit which may be used in either fixed or tactical military teletypewriter stations. It provides facilities for manual transmission directly from keyboard (fig. 2) and for tape transmission from the transmitter-distributor. Received messages are printed and perforated on a paper tape for later transmission.

b. The TT–76(*)/GGC may be used to send and receive over direct-current (dc) wire lines (fig. 3), carrier, or radio systems (fig. 4) in association with Telegraph Terminal TH–5/TG, Line Unit BE–77–A, or similar line terminating devices.

4. Technical Characteristics

Technical characteristics of Teletypewriter Set AN/GGC–3, excluding its major component, Teletypewriter Reperforator-Transmitter TT–76/GGC, are given in *a* below. Technical characteristics of the TT–76/GGC and TT–76A/GGC are given in *b* below.

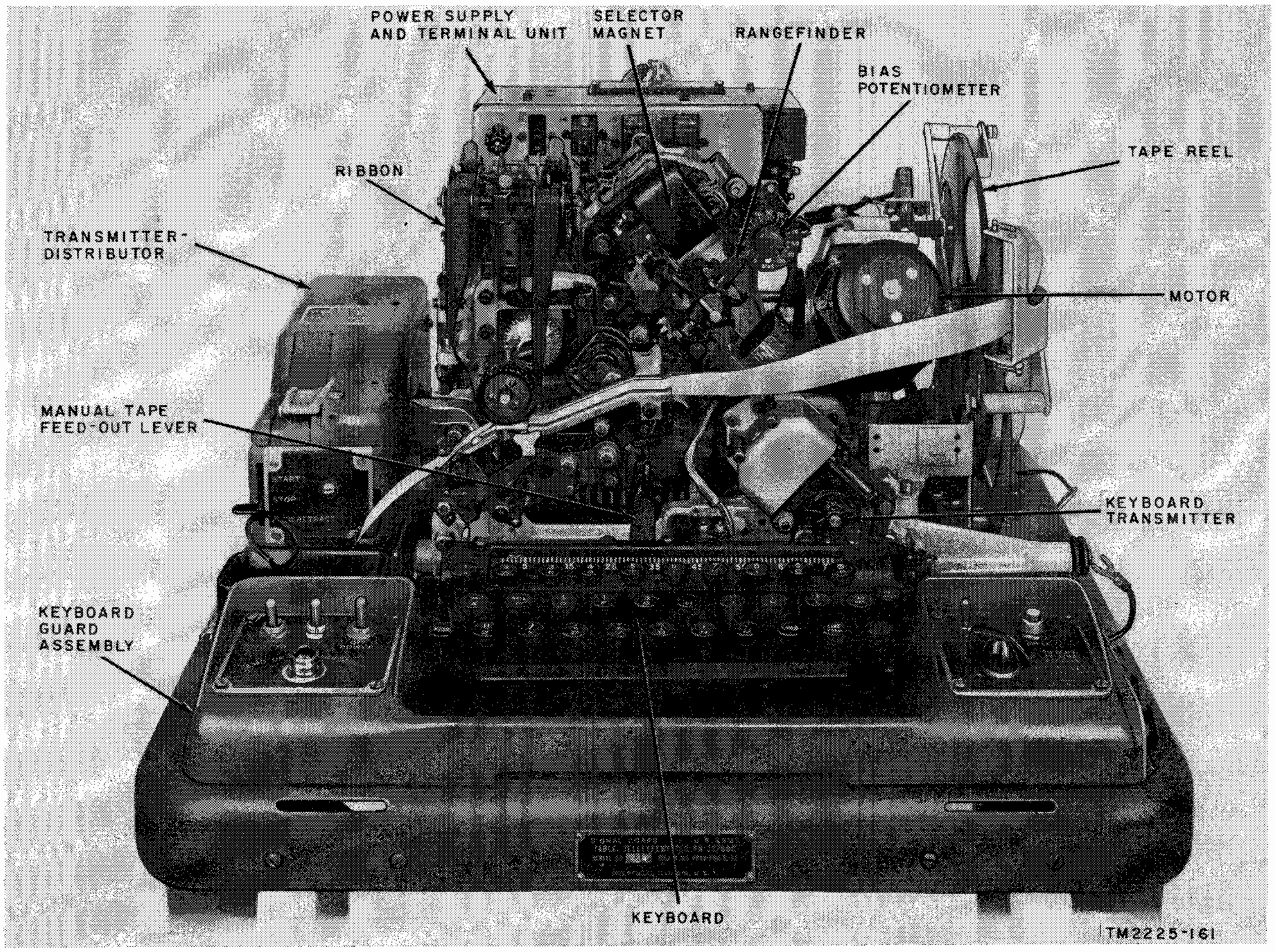

Figure 2. Teletypewriter Reperforator-Transmitter TT–76/GGC.

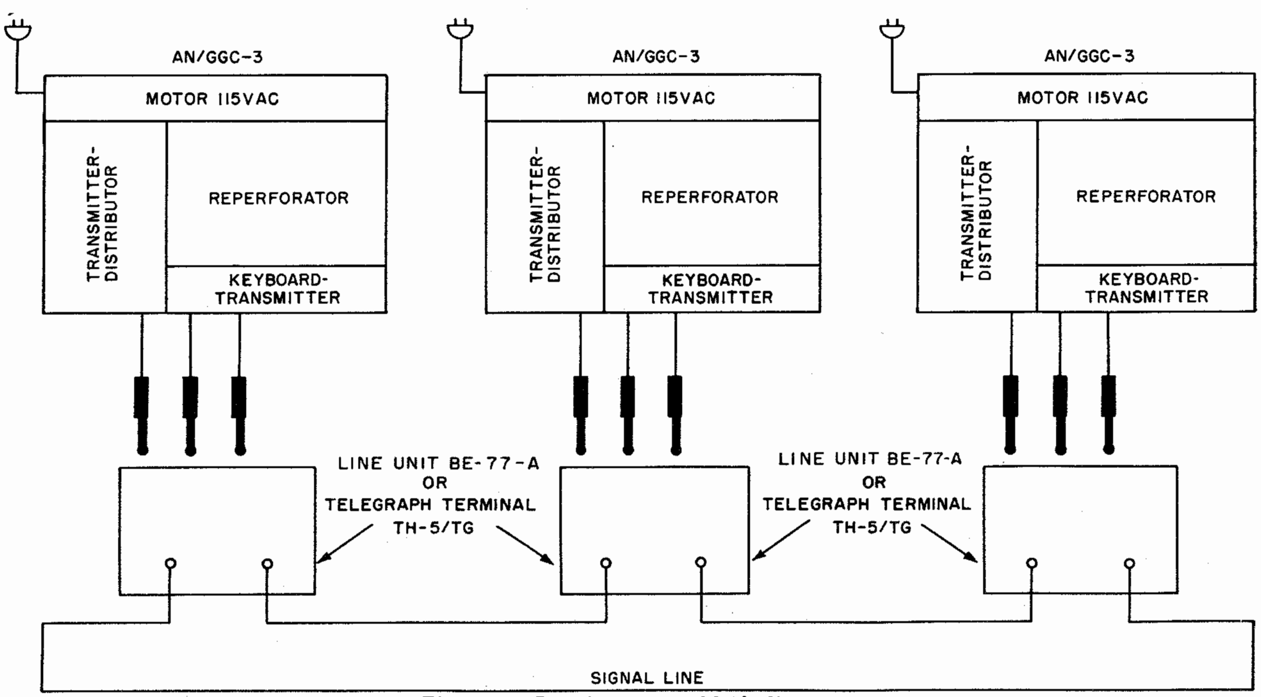

Figure 3. Dc wire system, block diagram.

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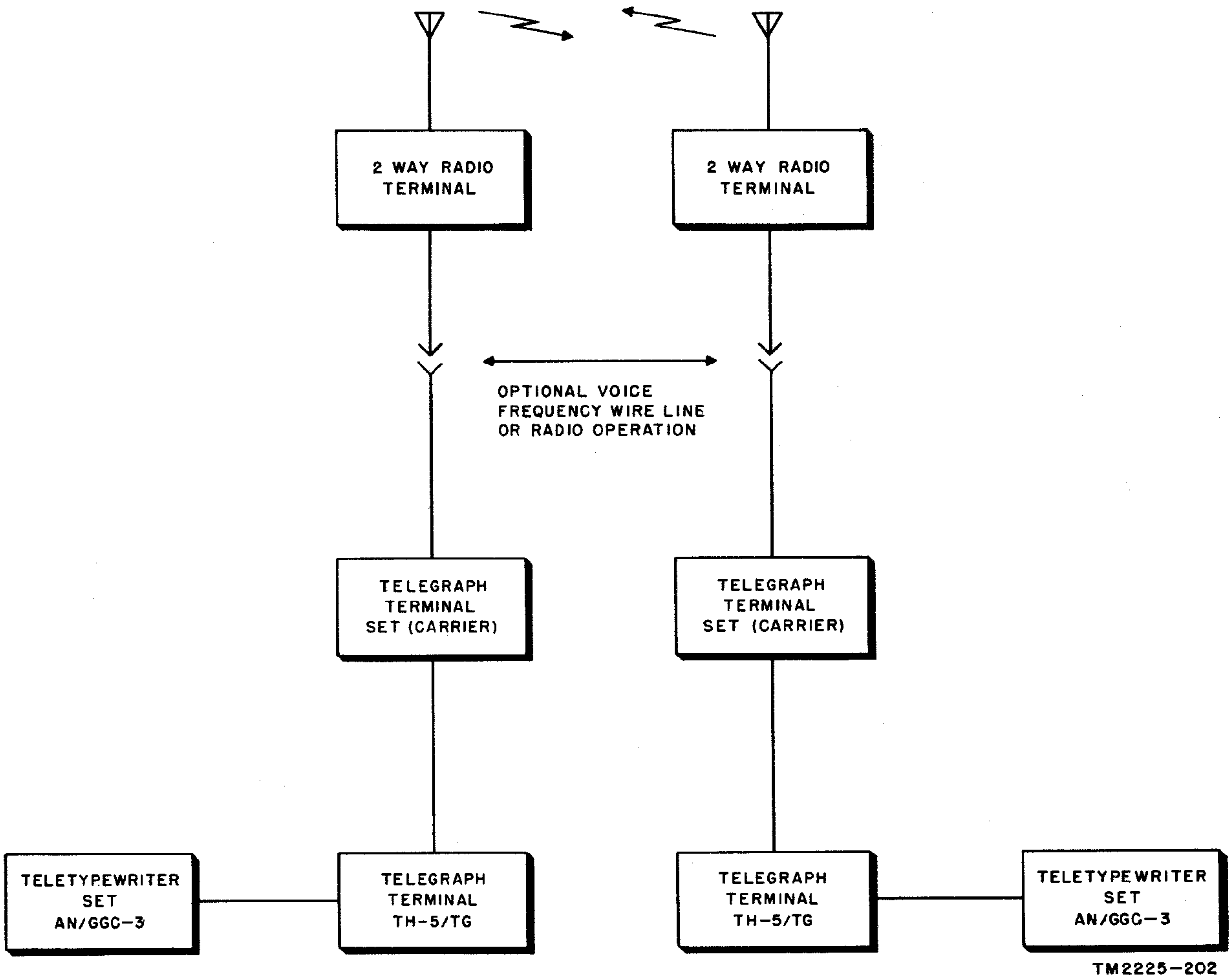

Figure 4. Carrier or radio system, block diagram.

a. Teletypewriter Set AN/GGC–3.

Type of installation .... Field or fixed station; sending and receiving; wire or radio.

Total weight of equipment (including Teletypewriter Reperforator-Transmitter Case CY–1110/GGC). 97 lb with full roll of paper tape.

Space requirements of installed equipment (not including Teletypewriter Reperforator-Transmitter Case CY–1110/GGC). 8 cu ft.

Ambient temperature limits:

Equipment in use .... +32° F. (0° C.) to +132° F. (+55.6° C.).

Equipment in storage .... —80° F. (—62.2° C.) to +160° F. (+71.1° C.).

Minimum barometric pressure:

Operating .... 16.88-in. mercury (equivalent to 15,000-ft altitude).

In transportation .... 5.5-in. mercury (equivalent to 40,000-ft altitude).

Other climatic conditions .... Equipment withstands high humidity and moisture as encountered in tropics; Teletypewriter Set AN/GGC–3 has an immersionproof transportation and storage case.

b. TT–76/GGC and TT–76A/GGC.

Keyboard .... Standard communications.

Type of characters .... English.

Method of recording .... Message printed and perforated on ⅞-inch paper tape.

Characters per line.........Character counter records a maximum of 76 characters.

Type of feed................Sprocket.

Signaling code ....Five-unit, start-stop; stop impulse equals start impulse length multiplied by 1.42.

Type of signals.............Neutral or polar receiving, neutral sending.

Speed:

Operations per minute (send and receive). 368.1, 404, 460, or 600 opm.

Words per minute (send and receive). 60, 66, 75, or 100 wpm.

Service range:

368.1 opm ....25 mi.

600 opm ....15 mi.

Motor type ....Series-governed.

Motor speed ....3,600 revolutions per minute.

Power required:

Voltage ....115 v ac or 230 v ac.

Frequency ....50 to 60 cps (single phase).

Consumption ....Approx 150 watts.

Line current requirements:

Dc line ....60 ma dc.

Voice-frequency line ....20 ma dc.

Polar line ....Not more than 30 ma dc.

Tape capacity ....Enough for—

5 hours, 20 minutes at 368.1 opm.

3 hours, 10 minutes at 600 opm.

Distortion tolerances:

Transmitted signals .....±5% max at 368.1 opm on dc line.

Bias tolerance (received signals):

368.1 opm ....±40%.

600 opm ....±35%.

End-distortion tolerance (received signals):

368.1 opm ....35% marking or spacing.

600 opm ....30% marking or spacing.

Range adjustment (for received signal bias and end distortion). Scale calibrated 0 to 120; 100 scale units equal width of 1 unit signal pulse (22 milliseconds at 368.1 opm).

Bias potentiometer ....Adjusts current flow in selector magnet bias wingings.

Radio-frequency suppression. Teletypewriter does not interfere with radio reception at frequencies between .35 and 150 megacycles when located 1 foot or more from radio antenna.

Safety shielding ....Points at which potentials of 30 volts or more exist are shielded against accidental contact by personnel.

5. Table of Components

The components of Teletypewriter Set AN/GGC-3 and Teletypewriter - Reperforator - Transmitters TT-76/GGC and TT-76A/GGC are listed below.

a. Teletypewriter Set AN/GGC-3.

Quantity	Item	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Teletypewriter Reperforator-Transmitter TT-76/GGC (*b.* below)	21	18	12	45
1	Teletypewriter Table FN-52/GGC	21	18	28	15
1	Teletypewriter Reperforator-Transmitter Case CY-1110/GGC	25	22	16	30
2	TM 11-2225.				
1	Set of running spares (par. 7).				

b. Teletypewriter Reperforator-Transmitter TT-76/GGC.

Quantity	Item	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Chad bin.				
1	Tape bin.				
1	Tuning fork (180 vps)	9	7/8	1/4	
1	Worm (600 opm)	1 1/4	.750 dia		
1	Worm gear (600 opm)	13/16	2.031 dia		
2	TM 11-2225.				
1	Set of running spares (par. 7).				

c. *Teletypewriter Reperforator-Transmitter TT–76A/GGC.*

Quantity	Item	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Base.				
1	Chad bin.				
1	Tape bin.				
1	Tuning fork (180 vps)	9	7/8	1/4	
1	Worm (600 opm)	1 1/4	.750 dia		
1	Worm gear (600 opm)	13/16	2.031 dia		
2	TM 11–2225.				
1	Set of running spares (par. 7).				

6. Description of Major Components

a. *Teletypewriter Set AN/GGC–3* (fig. 5). The AN/GGC–3 consists of Teletypewriter Reperforator-Transmitter TT–76/GGC, Teletypewriter Table FN–52/GGC, and Teletypewriter Reperforator-Transmitter Case CY–1110/GGC.

(1) *Teletypewriter Reperforator-Transmitter TT–76/GGC* (fig. 2). The TT–76/GGC is mounted on Table FN–52/GGC and is provided with a dust cover and a copy holder. The keyboard, mounted at the front of the unit, uses a conventional teletypewriter

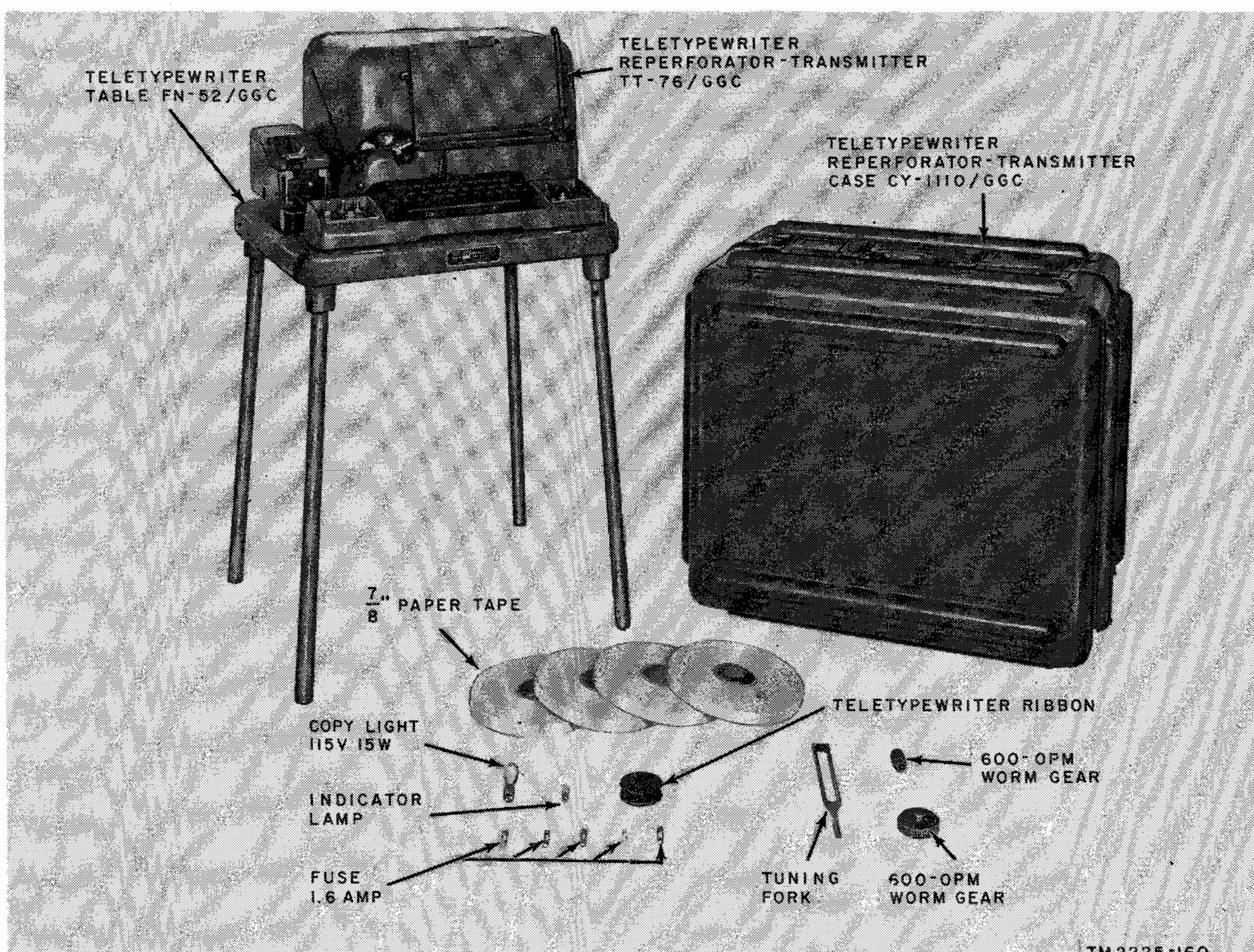

Figure 5. Teletypewriter Set AN/GGC–3.

keyboard. Control switches are installed on either side of the keyboard in the keyboard guard. The transmitter-distributor is located on the left side of the unit and is provided with its own dust cover.

(2) *Teletypewriter Table FN–52/GGC* (fig. 5). The FN–52/GGC is made of steel and has four removable tubular legs. The table top has rounded corners and is provided with holes to properly mount the reperforator-transmitter.

(3) *Teletypewriter Reperforator-Transmitter Case CY–1110/GGC* (fig. 5). The CY–1110/GGC is an immersion proof carrying and storage case. It is provided with metal handles and spring-loaded latches.

b. Teletypewriter Reperforator - Transmitter TT–76A/GGC (fig. 20). The TT–76A/GGC is similar in appearance to TT–76/GGC described in *a* above except that it is mounted on a separate base which contains the major portion of the wiring.

7. Running Spares

(fig. 5)

Quantity			Item
AN/GGC–3	TT–76/GGC	TT–76A/GGC	
5	2	5	Fuse, 1.6 ampere, 250 volt.
1	1	1	Inking ribbon.
1	1	1	End-of-line indicator lamp.
1	1	1	Copylight.
4	4	4	Paper tape (rolls).

8. Differences in Models

Operationally, the TT–76/GGC and the TT–76A/GGC, when not used as part of the AN/GGC–3, are directly interchangeable. However, certain assemblies in the TT–76A/GGC have been changed for ease of installation and maintenance. The chart below lists these differences.

Item	Teletypewriter Reperforator-Transmitter TT–76/GGC	Teletypewriter Reperforator-Transmitter TT–76A/GGC
Exterior painting	Olive drab	Light gray.
Base	Flat metal plate and wooden shipping base.	Table top type metal base on fiberboard shipping base.
Signal leads enter at	Rear of dust cover	Rear of base.
Rangefinder locking facilities	Knurled nut and lockwasher or spigot type dial lock.	Spring-loaded dial detent.
End-of-line warning device	Lamp lights	Lamp lights and bell rings.
Wiring options accomplished by	Terminal connections	Selector magnet cable connections and 20–BIAS/OFF–60 switch settings.
Friction clutch spring tension adjusted by.	Positioning collars retained by set screws.	Adjusting collars secured by two machine screws with micro-adjustment feature
Selector **Y**-levers held in position by	Friction plates	Y-lever dentents.
Tape cover latch	Mounts on eccentric attached to frame	Part of tape cover.
Key lever locking device	None	Locking bar added.
Tape roll	Nonremovable reel, alarm lever rides against top of paper tape roll.	Removable reel, alarm level rides against bottom of paper tape roll.
Keyboard-transmitter cable connects at	Rear of keyboard frame on bracket	Right of keyboard on base.
Power supply connecting facilities	Five receptacle connectors, one plug connector, and an external terminal board.	Cable leading from power supply plugs into base. Two receptacle connectors at front of power supply and terminal unit.
Tape roll retainer	Support arm latches in position	Circular plate locks by tabs and slots.

Item	Teletypewriter Reperforator-Transmitter TT-76/GGC	Teletypewriter Reperforator-Transmitter TT-76A/GGC
Tape puller mechanism	None	Mounts on front support frame in front of the rangefinder.
Potentiometer adjustment facilities	BIAS potentiometer knob	Locked in optimum position.
Ribbon spool retaining device	U-shaped holding clip	Locking clips at each end of ribbon spool shaft.
Bearing retainers	All bearings retained in frames or support bracket.	One bearing block on front support frame and two bearing caps on reperforator frame.
Tape tear wire	None	Provided on code die support.
Tape guide lever and position indicator	None	Mounted on code die assembly.
Code-ring cage adjustable fulcrums	Spade shaped	Hook shaped, mounted on eccentric studs.
Main shaft driven gear	Pinned to shaft	Keyed to shaft.
Power shaft bearing support bracket	One piece	Two sections held together by two machine screws.
Keyboard guard	Secured to base plate by machine screws and washers.	Hinged, can be tilted away from reperforator-transmitter; held to base by ball catches.
Transmitter-distributor front plate	Not stepped	Stepped to prevent accidental movement of the STOP-START lever to FEED RETRACT position.

CHAPTER 2

INSTALLATION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

9. Siting

Selection of a suitable location for the installation of Teletypewriter Set AN/GGC–3 or Teletypewriter Reperforator-Transmitter TT–76(*)/GGC requires consideration of the following:

a. Power. A 115- or 230-volt ac power supply capable of providing at least 150 watts of power is required for the operation of the motor and rectifier. If Telegraph Terminal TH–5/TG or other line-terminating device is to be used, the power requirements will have to be increased accordingly.

b. Space Requirement. Provide enough space at the front and sides of the equipment to permit freedom of movement for operating personnel. Allow at least 10 inches at the back of the set for installation and maintenance purposes.

c. Lighting. Provide an adequate lighting arrangement for the operating personnel.

10. Unpacking

a. Packaging Data.

(1) *Teletypewriter Set AN/GGC–3* (fig. 6). When the AN/GGC–3 is packed for shipment, Teletypwriter Reperforator-Transmitter TT–76/GGC is fastened to Teletypewriter Table FN–52/GGC. This assembly is then placed in Teletypewriter

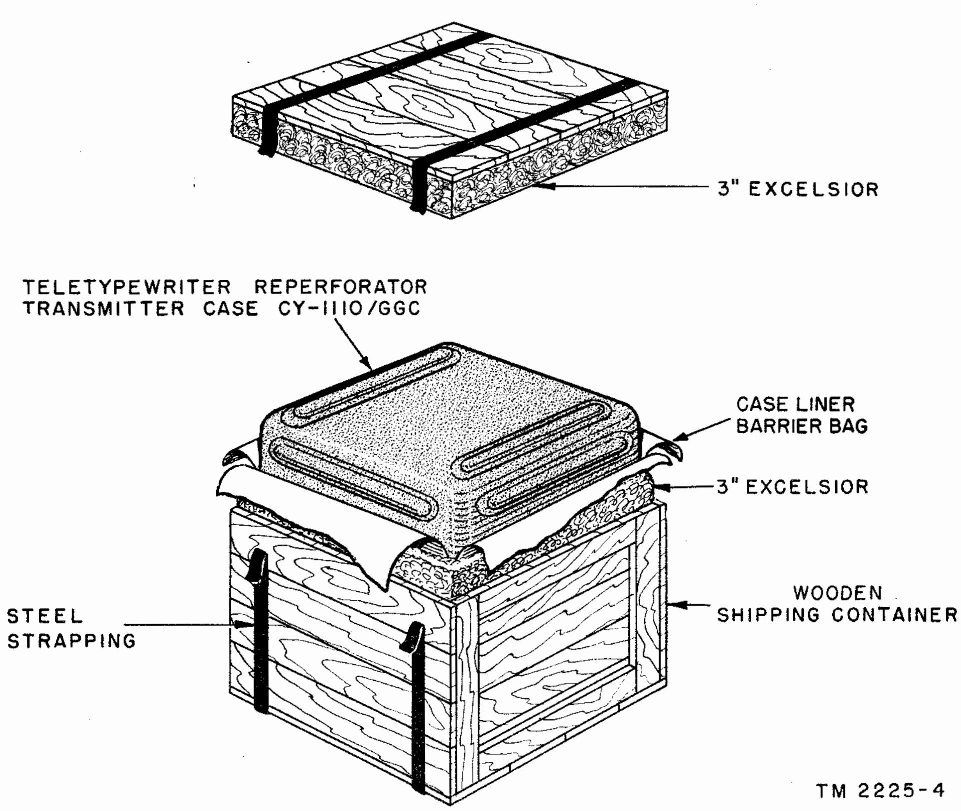

Figure 6. Packaging arrangement, Teletypewriter Set AN/GGC–3.

Reperforator - Transmitter Case CY-1110/GGC and the remaining space is used for storage of the removable table legs, technical manuals, chad bin, and running spares. The CY-1110/GGC is then placed in a case liner barrier bag which, in turn, is placed in a wooden shipping container 38⅛ inches long, 31⅞ inches wide, and 26 15/16 inches high. A 3-inch layer of excelsior is placed between the case liner barrier bag and the interior of the wooden shipping container. The top is nailed and secured with steel strapping. The wooden shipping container has an approximate volume of 18.36 cubic feet and weighs 208 pounds when completely packed.

(2) *Teletypewriter Reperforator-Transmitter TT-76(*)/GGC.* When the TT-76(*)/GGC is shipped, it is mounted on a wooden shipping base (fig. 7). The chad bin accessory pack is taped to the top of the transmitter-distributor and contains the chad bin, tape guide, lamp, inking ribbon, spool, and fuses. The complete unit is placed in a corrugated box with folded corrugated end liners each containing two rolls of paper tape. A fifth paper tape roll is taped to the copy holder. A top liner of folded corrugated fiberboard is placed in the box and rests on the dust cover of the unit. The bench layout template (TT-76A/GGC only) and the tape storage bin kit containing the tape storage bin and chad bin mounting accessories are taped between the edges of the folded corrugated top liner. The corrugated box is sealed with tape and is placed in a wooden box with rubber corners installed to reduce shock to the equipment during shipment. Two technical manuals are individually wrapped and taped to the top of the corrugated box. The wooden box cover is nailed securely to the box.

b. Removing Contents.

Caution: Be careful when unpacking the equipment. Do not thrust tools into the interior of the shipping container.

(1) *Teletypewriter Set AN/GGC-3* (fig. 6). Unpack the AN/GGC-3 as follows:

(*a*) Cut the steel straps from the wooden shipping container.

(*b*) Remove the top, side, and back sections.

(*c*) Remove the CY-1110/GGC from the wooden shipping container.

(*d*) Release the pressure valves with a pencil or small screwdriver and unfasten the spring-loaded latches on the CY-1110/GGC. Remove the top section.

(*e*) Remove the blocking frames that position the TT-76/GGC and FN-52/GGC during transportation.

(*f*) Remove the TT-76/GGC and FN-52/GGC.

(*g*) Remove the table legs and chad bin from the case.

(*h*) Assemble the CY-1110/GGC and store in a safe place.

(2) *Teletypewriter Reperforator-Transmitter TT-76(*)/GGC* (fig. 7). Unpack the TT-76(*)/GGC as follows:

(*a*) Use a nail puller and remove the nails from the wooden box cover.

(*b*) Carefully lift the corrugated box from the wooden shipping box.

(*c*) Remove the technical manuals and open the corrugated box.

(*d*) Remove the folded corrugated top liner.

(*e*) Carefully cut the sealed barrier and remove the equipment from the corrugated box.

(*f*) Remove the nuts and washers that secure the equipment to the wooden shipping base.

(*g*) Cut the tape that secures the chad bin accessory pack to the transmitter-distributor.

(*h*) Remove the contents of the tape storage bin kit, chad bin accessory pack, and the folded corrugated end liners.

(*i*) Save the wooden shipping base for use as a template for drilling mounting holes (TT-76/GGC only).

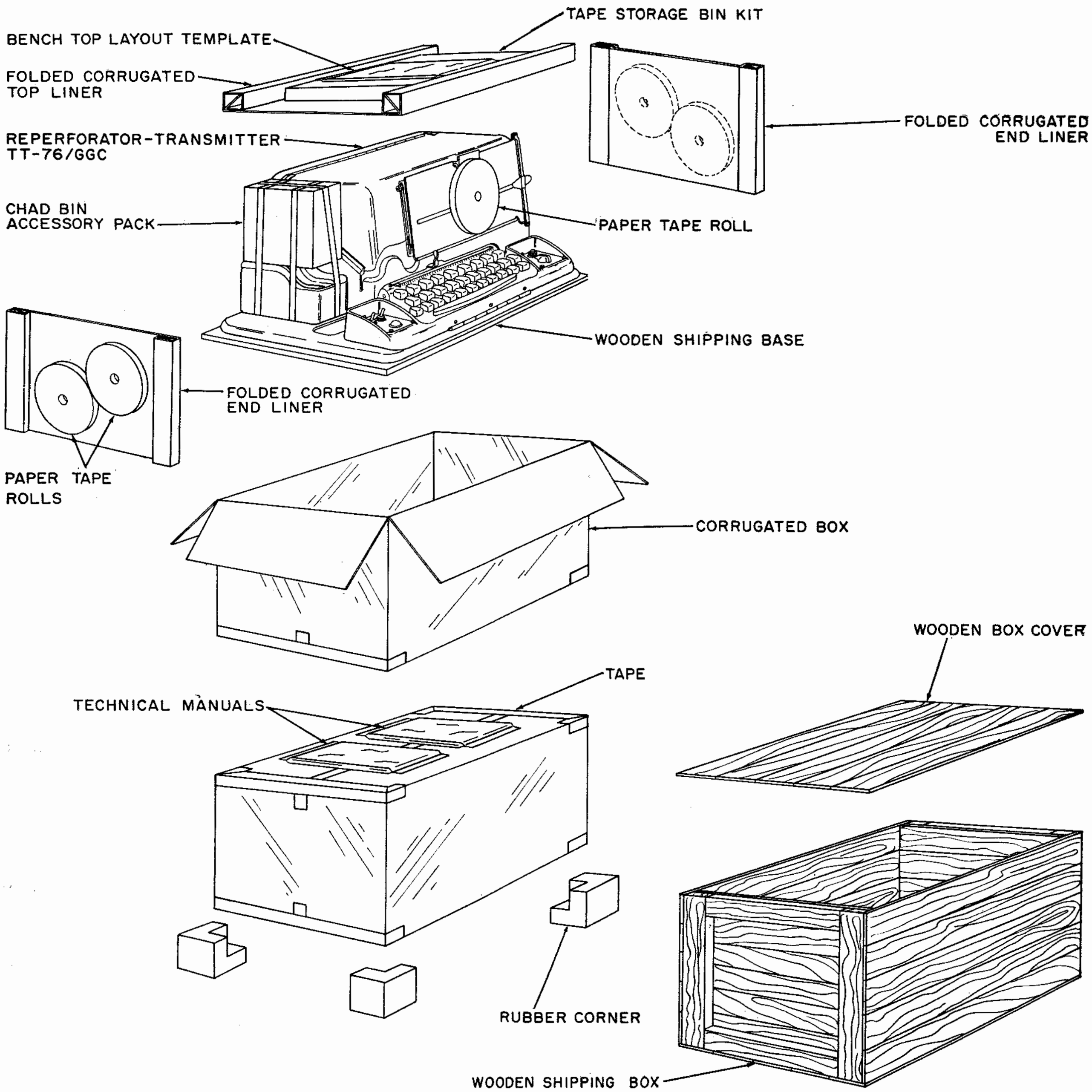

Figure 7. Packaging arrangement, Teletypewriter Reperforator-Transmitter TT–76(*)/GGC.

11. Checking Unpacked Equipment

a. Check the contents of the boxes against the master packing list. If no packing list accompanies the equipment, the table of components (par. 5) may be used as a general checklist.

b. Examine each component to be sure that it is complete, in good condition, and has not been damaged during shipment.

c. If the equipment does not check with the packing lists, or if any damage is noted, fill out and forward DD Form 6 according to instructions in paragraph 2.

12. Assembly of Components

a. Teletypewriter Set AN/GGC–3.

(1) Place Teletypewriter Reperforator-Transmitter TT–76/GGC and Teletypewriter Table FN–52/GGC on which it is mounted on a flat surface. Lift the front of Teletypewriter Table FN–52/GGC until it is almost upright.

(2) Screw the four table legs into the leg mounts on the underside of the table top.

(3) Press the chad bin (fig. 11) into its holder under the table and secure it with the wire retainer.

(4) Install the paper tape (par. 24*b*) and the inking ribbon (par. 24*c*).

b. Teletypewriter Reperforator - Transmitter TT–76(*)/GGC.

(1) Use the paper template (TT–76A/GGC) or the wooden base shipping base (TT–76/GGC) and mark the top surface of the table or shelf that will be used to support the unit.

(2) Cut openings in the table or shelf to accommodate the tape storage guide, chad tube, and mounting bolts.

(3) Secure the TT–76(*)/GGC to the table or shelf with suitable mounting bolts and install the tape guide, tape storage bin, and chad tube retainer with the hardware provided.

(4) Install the paper tape (par. 24*b*) and the inking ribbon (par. 24*c*).

13. Removal and Replacement of Dust Cover
(figs. 20 and 23)

a. Removal. Remove the dust cover as follows:

(1) Disconnect the grounding straps from the binding posts on the dust cover.

(2) Release the cover latch that is located below the copy holder and raise the dust cover top until it locks in the open position.

(3) Remove the copy light plug from the jack on the power supply and terminal unit.

(4) Remove the dust cover by lifting it straight up off its rubber mounting grommets (fig. 23).

b. Replacement.

(1) Place the dust cover on the rubber mounting grommets so that the cutouts in the cover are in the groove of the rubber grommet.

(2) Push down on the cover until the cover is seated in the groove of the rubber grommet.

(3) Reverse the procedures described in *a*(1) through (3) above.

14. Ground and Power Connections

a. Remove the dust cover (par. 13*a*).

b. See that 1.6 amp fuses are installed in the fuse holders in the power supply and terminal unit (fig. 12).

Note. The TT–76/GGC uses one 1.6 amp fuse and the TT–76A/GGC uses two.

c. Loosen the clamping screw on the power supply and terminal unit which locks the power selector switch and position the switch to match the supply voltage at the installation site. Tighten the clamping screw.

d. Place the MOTOR, LIGHT, and POWER switches (fig. 19) in the OFF position.

e. Connect a wire from the ground post behind the transmitter-distributor to a cold water pipe, ground rod, or similar low resistance ground connection.

f. Ground the power supply as follows:

(1) On the TT–76/GGC, connect the braided lead attached to the power cord to a grounded portion of the ac outlet.

(2) On the TT–76A/GGC, the power cord is fitted with a 3-pronged plug; the third prong completes the ground connection when the plug is inserted into a mating receptacle. If the available ac outlet will not accommodate the 3-pronged plug, remave the screws that hold the third prong to the plug and turn the prong so that it points in a direction opposite to the other two prongs. Disconnect the ground lead fastened to the third prong and connect it to a grounded portion of the ac outlet.

g. Plug the power cord into the ac outlet.

15. Friction Clutches

The reperforator uses four friction clutches—the keyboard-transmitter friction clutch (fig. 9), the

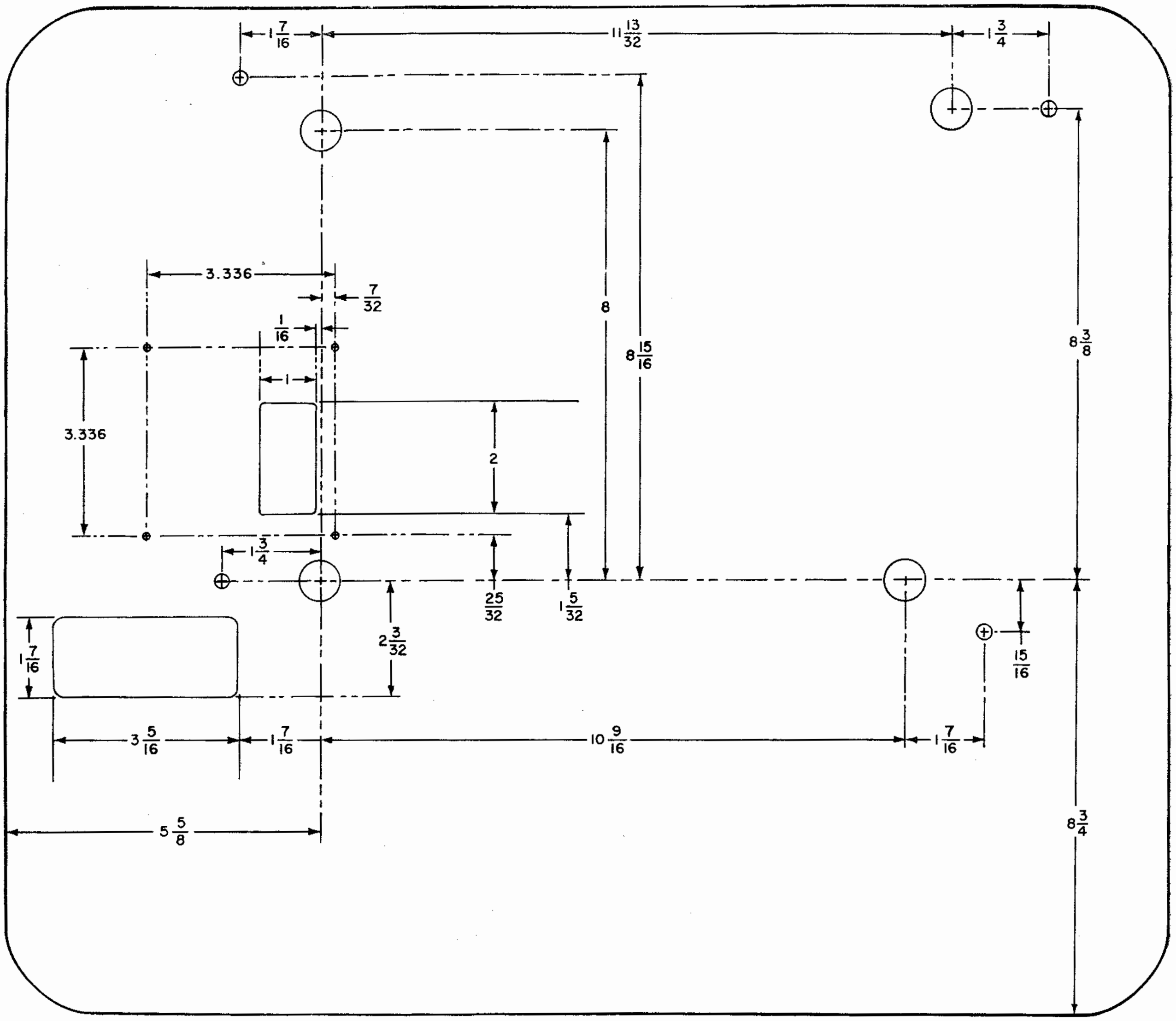

Figure 8. Template for mounting TT–76A/GGC.

transmitter-distributor friction clutch, the selector camshaft friction clutch (fig. 10), and the function shaft friction clutch. These friction clutches were lubricated and adjusted by the manufacturer prior to shipment. However, they should be checked for proper lubrication and adjustment to make sure these conditions have not changed as the result of shipment and storage. Lubricate as directed in paragraph 43*d*. Turn the MOTOR and POWER switches ON and check the adjustment as described in paragraphs 55 or 56, 84, 129 or 130, and 159 or 160.

16. Preliminary Adjustments

a. Checking and Adjusting Motor Speed.

(1) Turn the MOTOR switch to ON (fig. 19).

(2) Remove the 180 vibrations per second (vps) tuning fork (fig. 11) from inside the dust cover. Strike the tuning fork gently against the hand to get it into vibration.

(3) View the spots on the rotating target wheel through the vibrating shutter on the end of the tuning fork. If the spots are stationary, no adjustment is necessary. If the spots

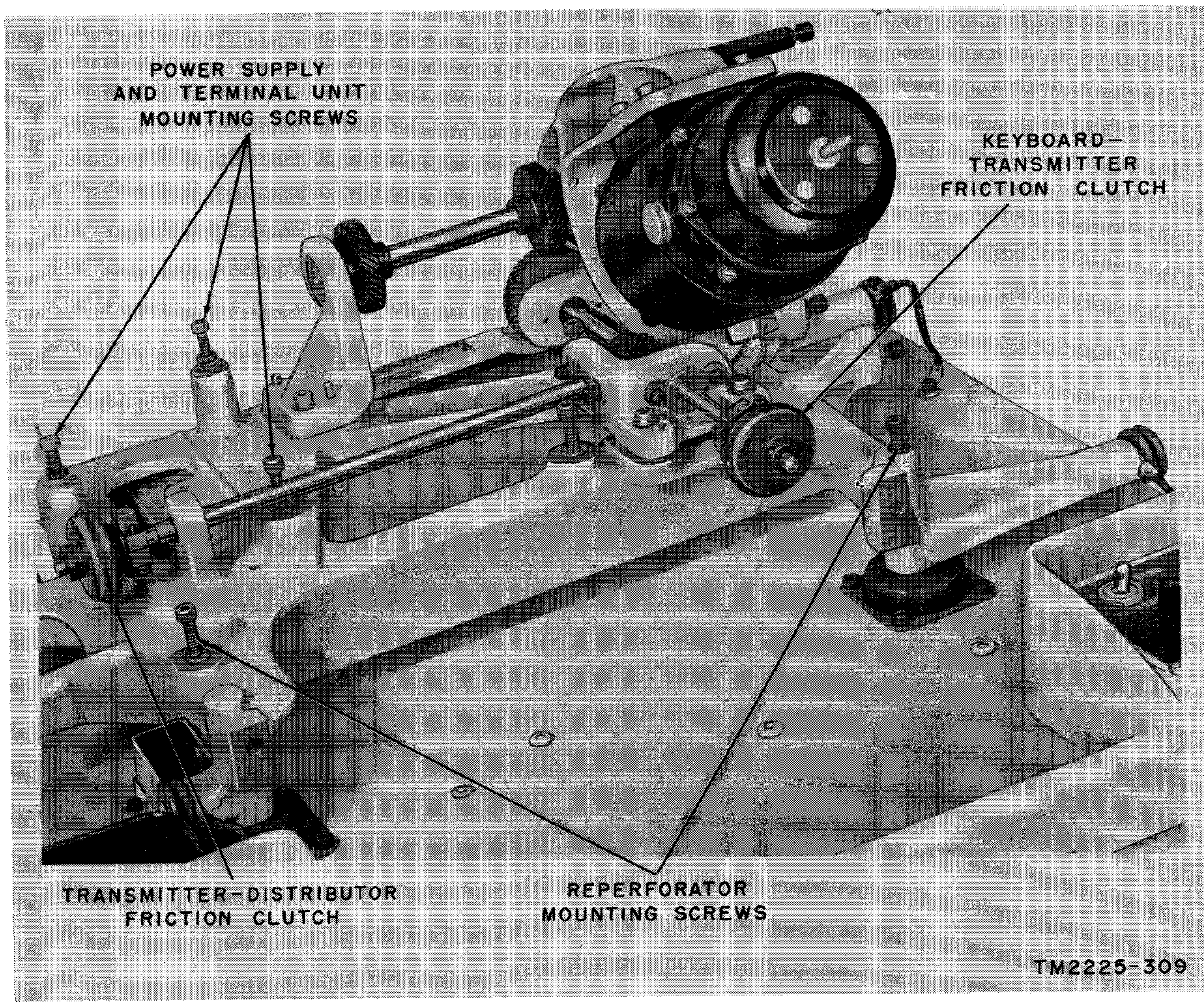

Figure 9. Base casting, showing the keyboard-transmitter and transmitter-distributor friction clutches.

are moving clockwise, pull the end of the adjusting worm outward, and hold it until the clockwise motion of the target spots has stopped. If the spots are moving counterclockwise, push the end of the adjusting worm inward until the motion of the target spots has stopped. The motor now is set at its operating speed of 3,600 revolutions per minute (rpm).

(4) Turn the MOTOR switch to OFF.

b. Changing Operating Speed of Reperforator. The operating speed of the reperforator is varied by changing the drive gear set which consists of the worm gear on the motor armature shaft and the meshing driven gear. The equipment was shipped from the factory with a 368.1 operations per minute (opm) 60 words per minute (wpm) gear set installed. A gear set for 600 opm (100 wpm) operation is mounted on the gear case cover at the right rear of the machine. The gears are identified by the marks stamped into the gears. If necessary, change the gear set so that the operating speed of the reperforator conforms to the operating speed of allied equipment as follows:

Note. If operation at either 404 opm (66 wpm) or 460 opm (75 wpm) is desired, it is necessary to obtain the proper gear sets through the usual supply channels.

(1) Remove the tape reel (par. 246*a* or 247*a*).

(2) Remove the motor (par. 272*a*).

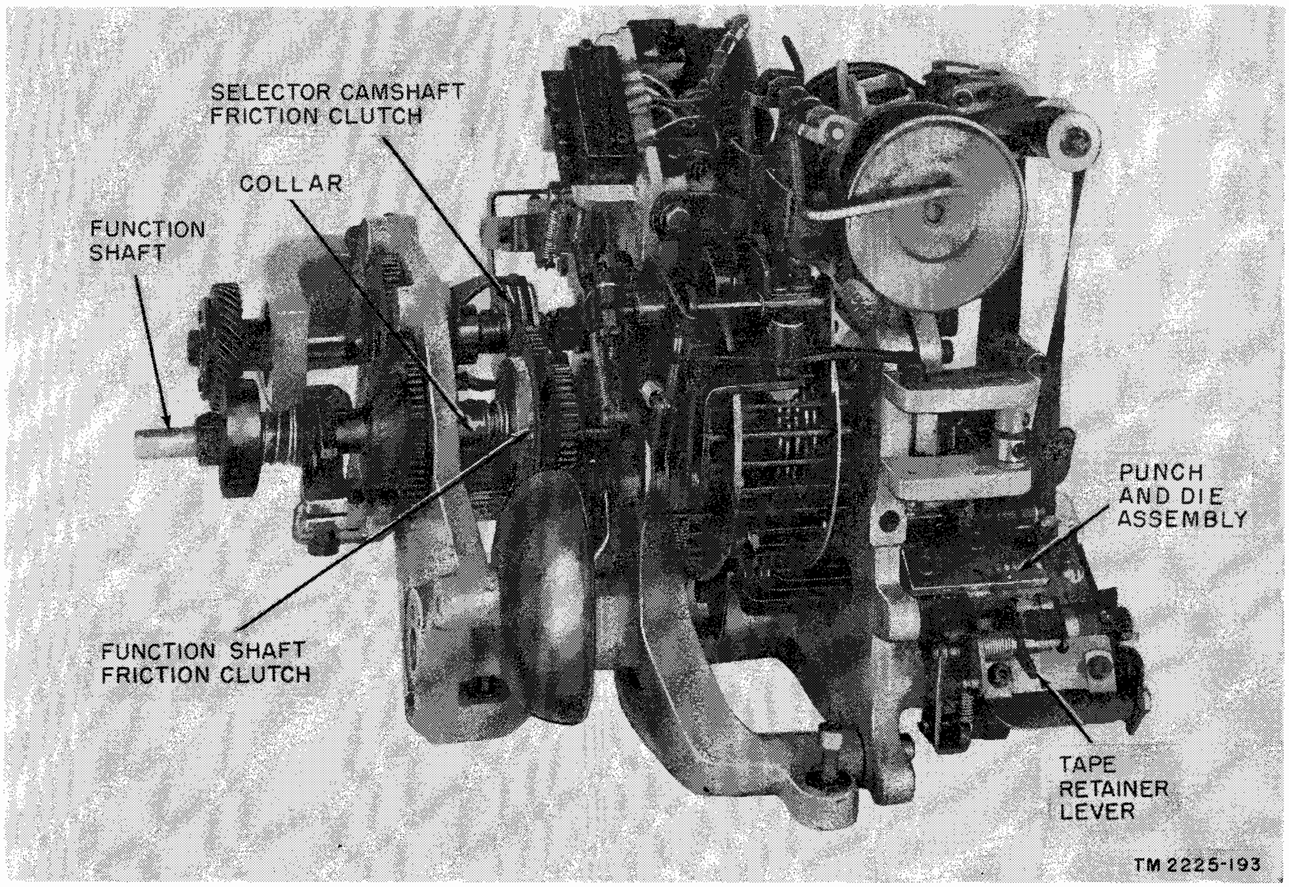

Figure 10. Reperforator, showing selector camshaft and function shaft friction clutches.

(3) Remove the worm wear from the shaft of the motor armature (par. 273*a*(2)).

(4) Remove the driven gear from the power shaft using a puller (par. 281*a*(2) and (3), or 282*a*(2) and (3)).

(5) Install the correct worm gear on the shaft of the motor armature (par. 273*b*).

(6) Install the correct driven gear on the power shaft (par. 281*b*).

(7) Install the motor (par. 272*b*).

(8) Install the tape reel (par. 246*b* or 247*b*).

c. Bias Potentiometer. The bias potentiometer on the TT–76A/GGC has been adjusted and locked at the factory and requires no subsequent adjustment except after a complete overhaul. If the machine does not give the desired range, the potentiometer setting should be checked. Remove shorting bar and connect a milliammeter between the two terminals of the BIAS TEST MA (B, fig. 12). Read the current in the bias circuit. The milliammeter should read 12.25 ma if the selector plug is in the 60-ma jack or 8.75 ma if the selector plug is in the 20-ma jack. If the reading does not conform to these values, adjustment by field maintenance personnel is required. Adjust the bias potentiometer (fig. 2) on the TT–76/GGC as follows:

(1) Set the KEYBOARD switch to the SEND position and the SELECTOR switch to LOCAL REPUNCH and send continuous R and Y signals from the keyboard-transmitter.

(2) Set the rangefinder dial to 60 and slowly turn the BIAS potentiometer knob to maximum and minimum good copy positions. Note the dial markings at each position.

(3) Set the pointer five points above the midpoint between the readings.

Note. This adjustment should be made only when the equipment is operating in a neutral circuit, since the bias windings are not used for polar operation.

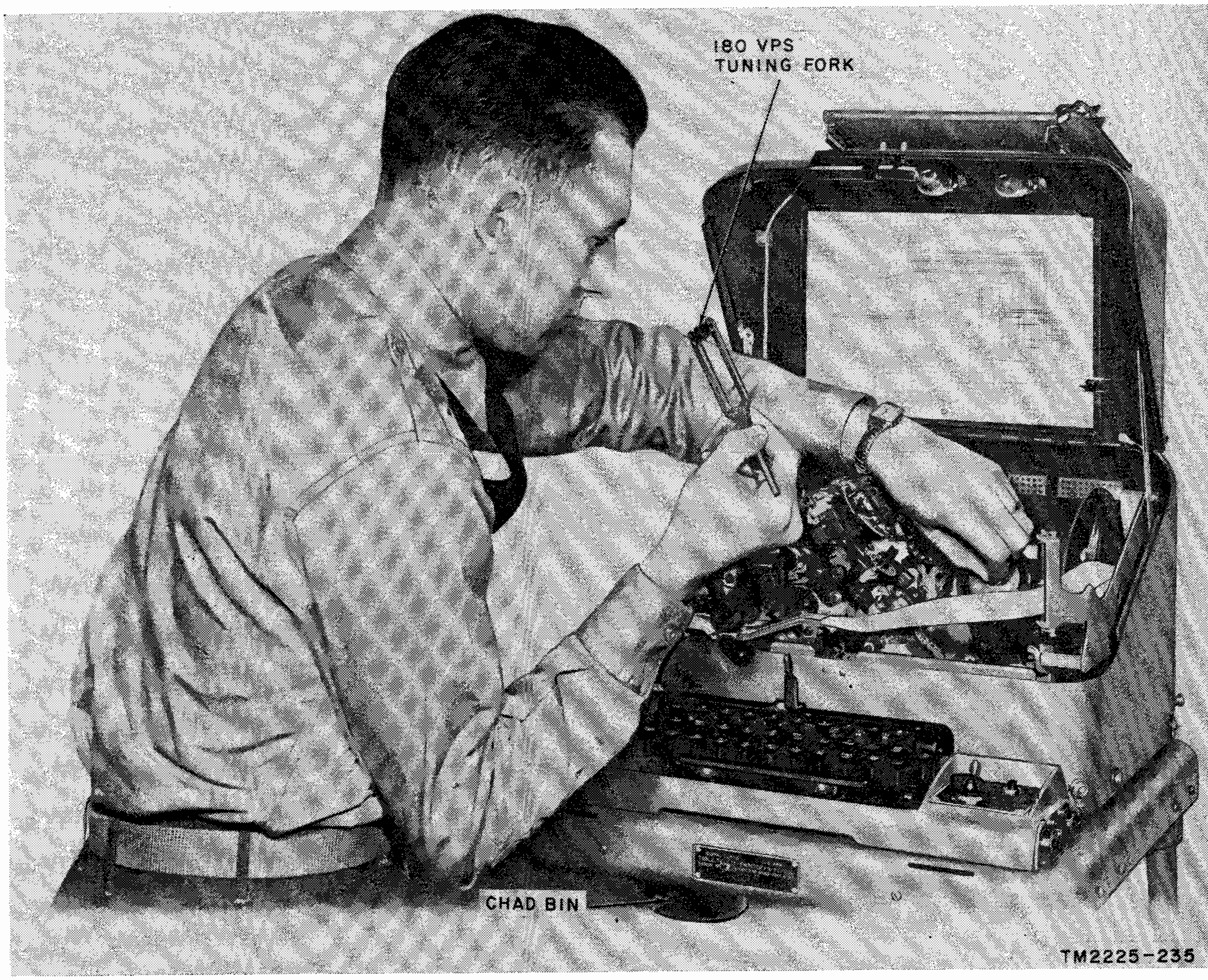

Figure 11. Checking motor speed.

d. Adjusting Rangefinder.

Note. The rangefinder dial should be moved only when signals are being received in the selector magnet and the selector camshaft is rotating.

(1) Adjust the rangefinder (fig. 2) immediately after adjusting the BIAS potentiometer.

(2) Loosen the rangefinder dial lock by turning it counterclockwise.

(3) While receiving continuous R and Y signals from the keyboard-transmitter or transmitter-distributor, turn the dial to the maximum and minimum good copy positions and set the dial at the midpoint between the dial settings.

(4) Lock the position by means of the dial lock.

e. Operational Checks.

(1) Perform the operational checks listed in paragraph 25*a* through *n*.

(2) Turn the MOTOR, LIGHT, and POWER switches to OFF. The motor should stop, copy light be extinguished, and all local power removed from the reperforator-transmitter.

Section III. SIGNAL CIRCUIT CONNECTIONS

17. General

a. Teletypewriter Set AN/GGC–3 or Teletypewriter Reperforator-Transmitter TT–76/GGC and TT–76A/GGC provide dc current for operation of the internal local circuits only. Current for external signal line circuits must be supplied by a telegraph switchboard, a line unit, Telegraph Terminal TH–5/TG or other external source.

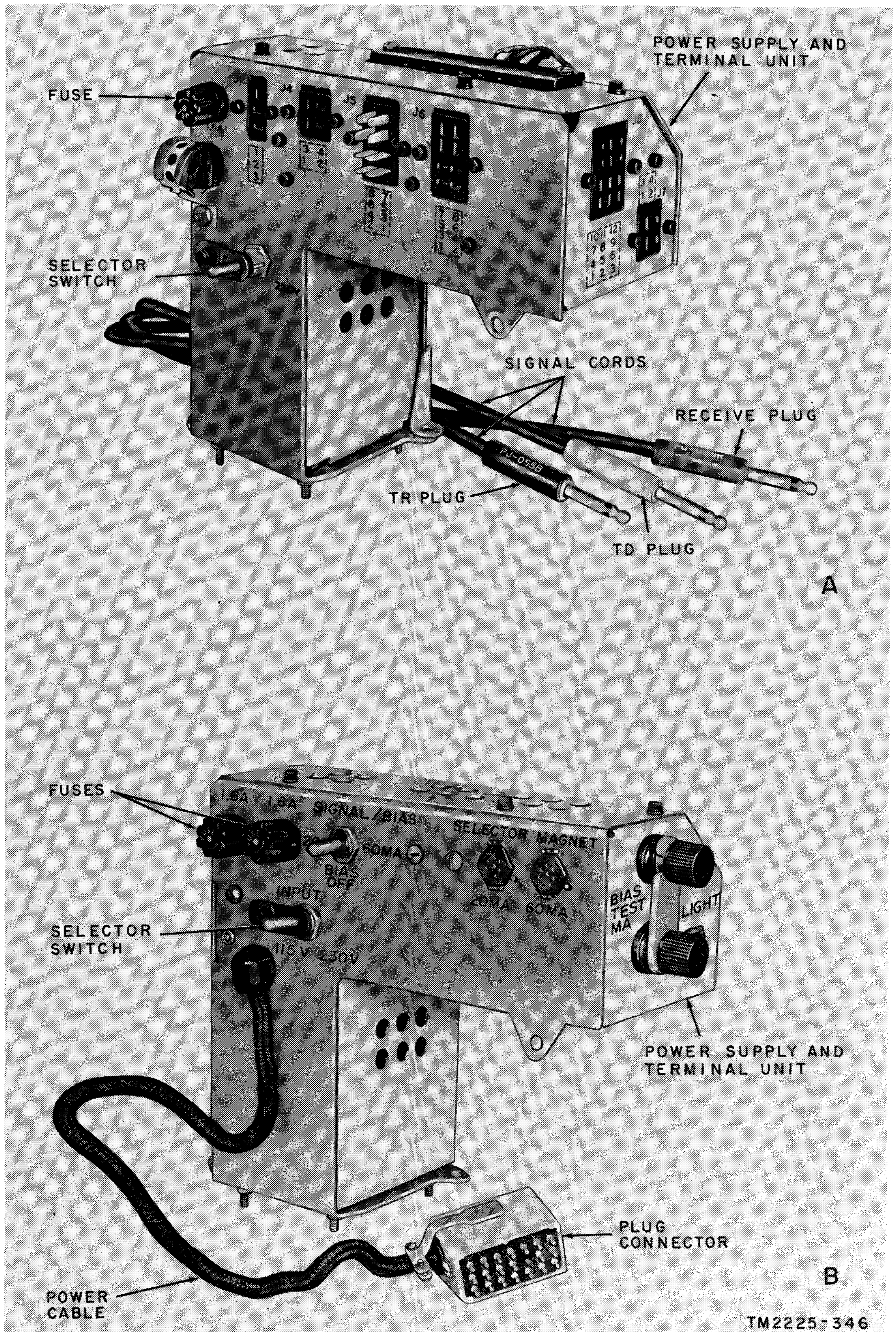

Figure 12. Power supply and terminal unit.

b. The signal circuits within the reperforator-transmitter are controlled by a SELECTOR switch located to the right of the keyboard. The signal circuits of the transmitter-distributor, the keyboard-transmitter, and the reperforator are terminated in standard 2-conductor jack plugs (fig. 12). This arrangement permits operation of the reperforator-transmitter in various sending and receiving combinations.

18. Wiring Options

a. Neutral Operation (TT–76/GGC). The selector magnet is wired for 20-ma neutral operation when the reperforator is delivered by the manufacturer. Wiring options for both 20- and 60-ma neutral operation of the selector magnet are shown in figure 291.

b. Neutral Operation (TT–76A/GGC). Set the 20–BIAS/OFF–60 switch on the power supply and terminal unit (B, fig. 12) to either the 20-ma or 60-ma position, whichever is applicable. Insert the plug from the selector magnet cable into the socket marked 20 or 60, whichever is applicable.

c. Polar Operation. Adapt the reperforator for polar operation as follows:

(1) *Polar receive (TT–76/GGC).* Remove and tape separately the brown-white wire from terminal 1 and the white wire from terminal 2 of terminal block TB3 (fig. 291).

(2) *Polar receive (TT–76A/GGC).* Set the 20–BIAS/OFF–60 switch to the BIAS/OFF setting and insert the plug from the selector maget cable into the 60-ma socket.

(3) *Polar send (TT–76(*)/GGC).* The transmitter-distributor and keyboard-transmitter may be arranged to send polar signals by making wiring changes ((*a*) and (*b*) below) at terminal block TB2 (fig. 291, TT–76/GGC) or TB1 (fig. 292, TT–76A/GGC) and by adding to the circuit the following items that are not supplied with the reperforator-transmitter: two 200-ohm wire wound resistors, one 7,000-ohm center tapped resistor (voltage divider) and a power source capable of supplying 120 volts dc at 200 ma. A typical 30-ma polar send circuit using the above items is shown in figure 13.

(*a*) *Transmitter - distributor.* Remove the gray plug and cord from terminals 6 and 7 of the terminal block. Connect marking battery to terminal 7 and spacing battery to terminal 8. Connect one wire of the signal line to terminal 6 and connect the second signal line wire to the midpoint of the 7,000-ohm resistor.

(*b*) *Keyboard - transmitter.* Remove the black plug and cord from terminals 1 and 2 of the terminal block. Connect marking battery to terminal 1 and spacing battery to terminal 3. Connect one wire of the signal line to terminal 2 and connect the second signal line wire to the midpoint of the 7,000-ohm resistor.

19. Installation Connections

This paragraph includes instructions for connecting the reperforator-transmitter for five different operating combinations. The operational capabilities of each arrangement are also described.

a. Send Only and Local Preparation of Tape. This arrangement provides facilities for preparing a perforated and printed tape locally, using the keyboard-transmitter and reperforator, and for simultaneous transmission to the line from the transmitter-distributor, using a message tape (fig. 14).

(1) Set the SELECTOR switch to position 2 (TD SEND LOCAL PUNCH).

(2) Insert the gray plug of the transmitter-distributor in the SEND jack of the line terminating device.

(3) Do not use the red and black plugs.

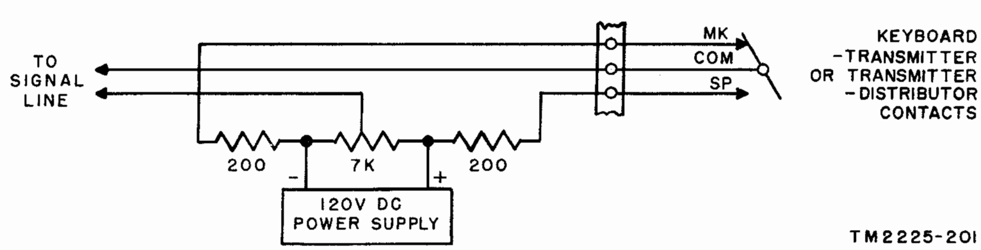

Figure 13. Typical wiring arrangement for polar sending.

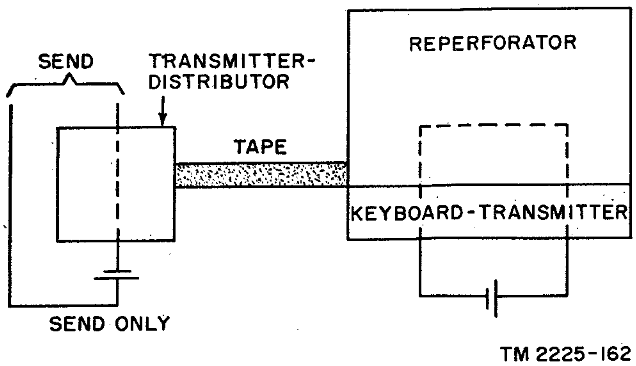

Figure 14. Send only with simultaneous local preparation of tape.

b. Full-Duplex Operation (fig. 15). This arrangement provides facilities for receiving printed and perforated tape from one line and simultaneous sending from the keyboard-transmitter or transmitter-distributor to a second line.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RECEIVE).

(2) Insert the red plug of the reperforator into the REC jack in the line terminating device of one line.

(3) Insert the black and gray plugs into the SEND jacks of the line terminating device of the second line.

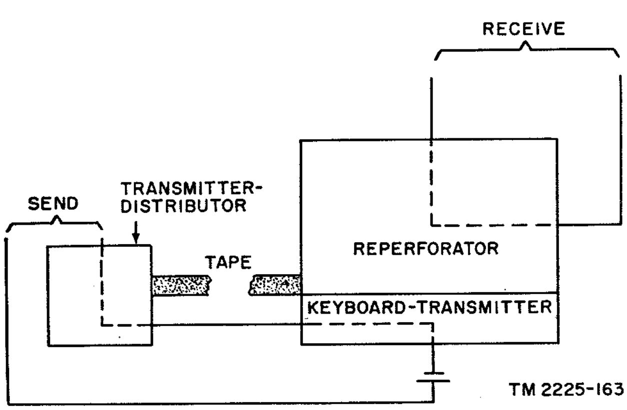

Figure 15. Full-duplex operation.

c. Half-Duplex Operation (fig. 16). This arrangement provides facilities for sending to the line from the keyboard-transmitter or transmitter-distributor and for receiving printed and perforated tape from the same line on the reperforator, but not simultaneously. Home copy is recorded on all transmissions.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RECEIVE).

(2) Insert the red, black, and gray plugs into the SEND and REC jacks of the line terminating device.

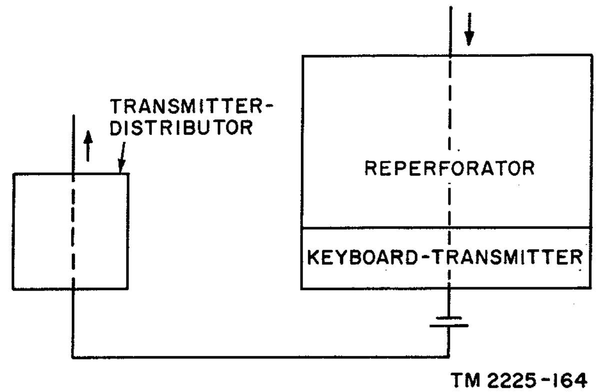

Figure 16. Half-duplex operation.

d. One-Way Operation (Receive Only) (fig. 17). This arrangement provides facilities for receiving a printed and perforated tape from a signal line. No transmission is possible. This type of operation, although possible, is not normally used.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RECEIVE).

(2) Insert the red plug into the REC jack of the line terminating device.

(3) Do not use the black and gray plugs in this arrangement.

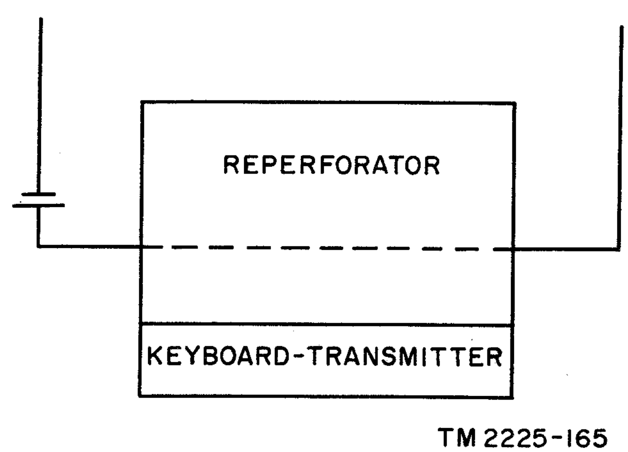

Figure 17. One-way operation (receive only).

e. Half Duplex and Send Only (fig. 18). This arrangement provides facilities for sending from the keyboard-transmitter to a line or receiving from the same line (making perforated and printed tape in either case) and transmitting another message simultaneously to a second line from the transmitter-distributor.

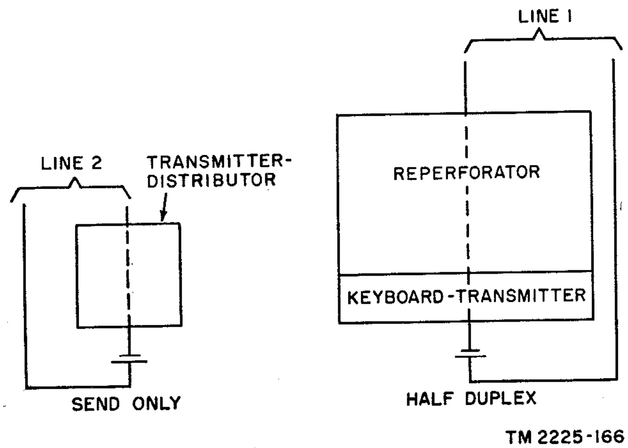

Figure 18. Half duplex and send only operation.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RECEIVE).

(2) Insert the red and black plugs in the REC and SEND jacks of the half-duplex line.

(3) Insert the gray plug into the SEND jack of the send-only line.

20. Circuit Line-Up

After the reperforator-transmitter is installed into one of the circuit arrangements described in paragraph 19, readjust the BIAS potentiometer for the TT-76/GGC (par. 16*c*). The potentiometer on the TT-76A/GGC has been set and locked at the factory and requires no subsequent adjustment except after overhaul. Adjust the rangefinder (par. 16*d*). Replace the dust cover by reversing the procedure outlined in paragraph 13*b*. The reperforator-transmitter is now ready to be turned over to the operator for traffic.

CHAPTER 3

OPERATION

Section I. CONTROLS

21. Keyboard-Transmitter and Reperforator
(figs. 19 and 20)

The following chart and the chart in paragraph 22 list the various controls and switches used in the operation of Teletypewriter Set AN/GGC-3 and Teletypewriter Reperforator - Transmitter TT-76(*)/GGC. The operator must become familiar with the location and function of each control before attempting to operate the machine.

Control	Location	Function
POWER switch	In left side of keyboard guard assembly.	On position connects ac input to set. OFF position disconnects ac input to set
MOTOR switch	In left side of keyboard guard assembly.	ON position connects ac power to the motor. OFF position connects ac power to the motor.
BREAK switch	In right side of the keyboard guard assembly.	Push-button switch. When it is depressed, opens signal circuit. When released, closes signal line circuit.
KEYBOARD switch	In right side of keyboard guard assembly.	SEND position permits keyboard transmission. LOCK position prevents keyboard transmission.
LIGHT switch	In left side of keyboard guard assembly.	ON position lights the copy light. OFF position extinguishes the copy light.
TD, TR, and REC jacks	In right side of keyboard guard assembly.	Permit supervisory or monitoring equipment to be connected in series with transmitter-distributor, reperforator or keyboard-transmitter.
Manual tape feed-out lever	Center above keyboard	Allows tape feeding when no messages are being received.
Back-space lever	Below type wheel	Permits manual back-spacing of tape to correct errors in tape.
CAR. RET. key	Extreme right of the middle row of keys (fig. 17).	Returns character counter to zero. Returns carriage on page printing machine in circuit to the left margin.
LINE FEED key	Second key from the right in the bottom row of keys.	Causes page-printing machines in the circuit to feed paper.
SELECTOR switch	In right side of keyboard guard assembly.	1. TD SEND TR SEND RECEIVE: Arranges the set to send to the signal line from the transmitter-distributor and keyboard-transmitter and receive from the line on the reperforator. 2. TD SEND LOCAL PUNCH: Permits sending to the line from the transmitter-distributor while a local message is being prepared on the keyboard-transmitter and the reperforator.

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Control	Location	Function
SELECTOR switch—Continued.		3. LOCAL REPUNCH: Places the transmitter-distributor, keyboard-transmitter and the receiving portion of the reperforator in series with each other electrically for local preparation of tape or for local testing the set.
LTRS key	Third key from the right in the bottom row of keys.	Position type wheel mechanism to print lower case characters.
FIGS key	First key from the left in the bottom row of keys.	Positions the type wheel mechanism to print upper case characters.
BELL key (upper case S)	Second key from the right in the middle row of keys.	Rings the signal bell.
REPEAT key	First key from the right in the top row of keys.	Repeats the last character or space, sent from the machine for as long as the two keys are held depressed.

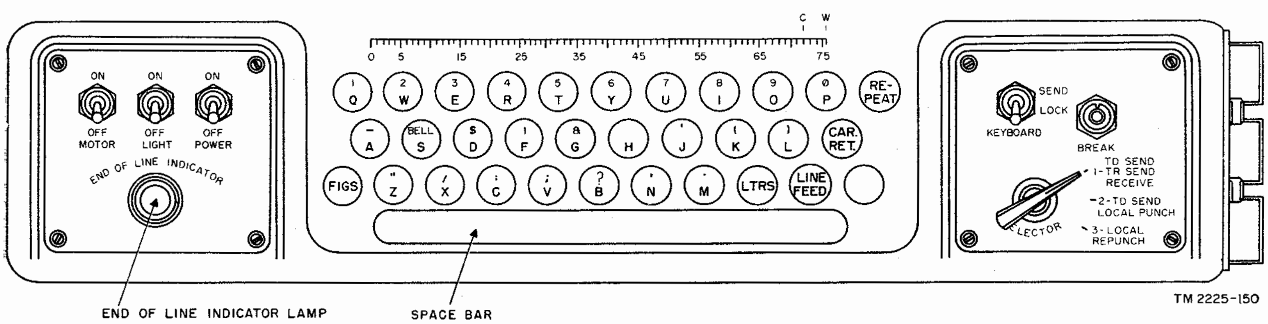


Figure 19. Typical keyboard-transmitter and keyboard guard.

22. Transmitter-Distributor Controls
(fig. 21)

The following chart lists the controls and switches used to operate the transmitter-distributor.

Control	Location	Function
STOP–START lever	In left front side of the transmitter-distributor cover.	START position allows a message to be transmitted from the transmitter-distributor. STOP position stops transmission from the transmitter-distributor. FEED RETRACT position depresses feed pins and permits a tape to be inseted into the transmitter-distributor.
Tight tape lever	In front of transmitter-distributor	When tape becomes tight, lever stops transmission. Slack in tape allows transmitter-distributor to transmit.
Tape-out lever	Under tape cover	When the end of the tape is reached, the lever is permitted to rise and stop the transmitter-distributor.

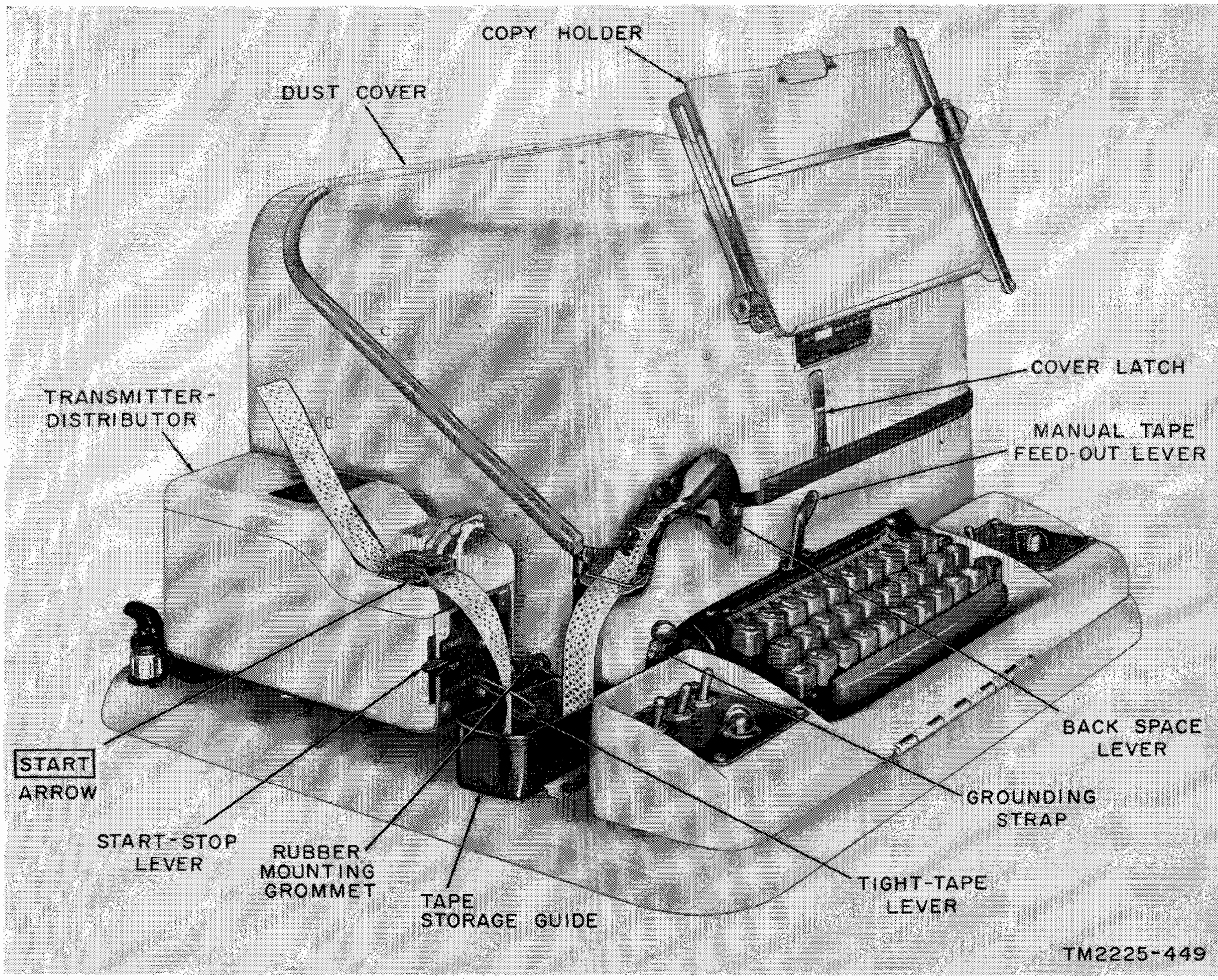


Figure 20. Teletypewriter Reperforator-Transmitter TT–76A/GGC.

23. Warning Devices
(figs. 19 and 20)

The following devices are used to alert the operator to certain operating conditions.

Control	Location	Function
END OF LINE INDICATOR lamp....	In the left side of the keyboard guard...	Visually warns the operator that the end of a line of typing is near.
Warning bell (TT–76A/GGC)..........	Between the keyboard-transmitter and the reperforator.	Audibly warns the operator that the end of a line of typing is near.
Character counter.....................	Above the top row of keys............	Indicates the number of code groups perforated in the tape since the CAR. RET. key was last depressed.
Tape-alarm buzzer....................	Behind the tape reel..................	Aubibly indicates diminishing supply of tape.
Signal bell...........................	Mounted on the reperforator...........	Signals the operator. Bell will ring when the machine is in the figures position and the S code group is received or sent.

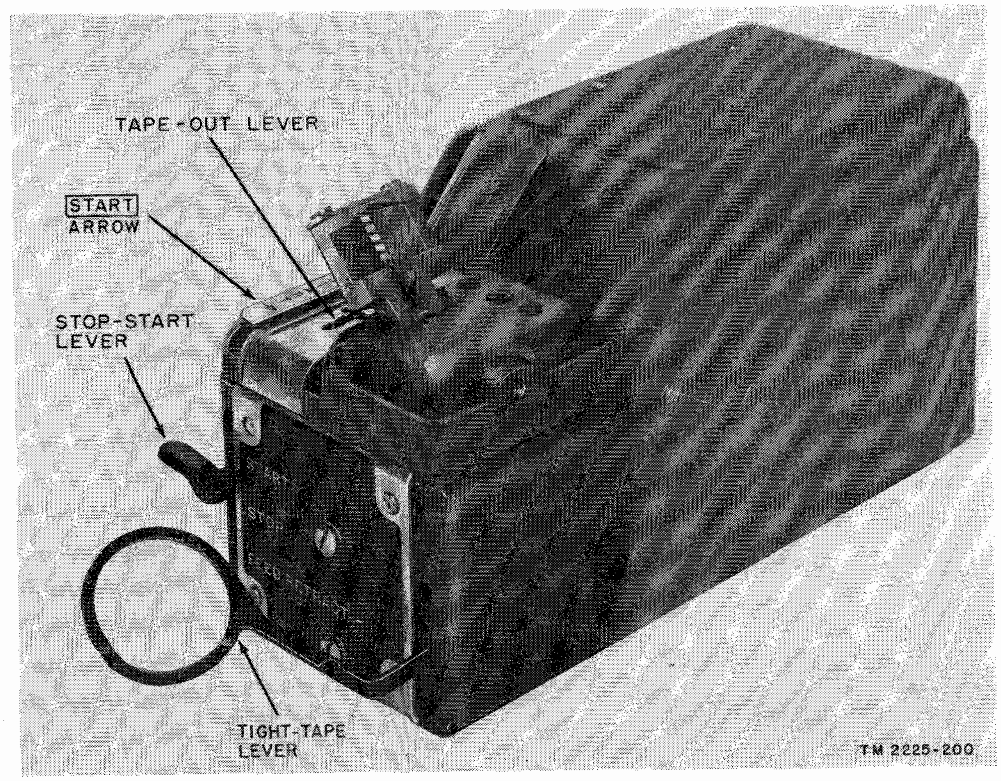


Figure 21. Transmitter-distributor controls (TT–76/GGC).

Section II. OPERATING PROCEDURE

Note. At the beginning of each operating day, the operator of the reperforator-transmitter should check it as described in paragraphs 24 through 26.

24. Preparation for Starting

a. Be sure the power cord is inserted in the power outlet and is properly grounded.

b. Check for the presence of sufficient paper tape. If the paper tape supply is low, install new paper tape as follows:

(1) *TT–76/GGC* (fig. 22).

(*a*) Push the reel support latch and raise the outer reel support arm.

(*b*) Move the tape-out alarm lever away from the reel hub; place the roll of paper tape on the hub so that the tape feeds from the rear to the front over the top of the paper tape roll. Release the tape-out alarm lever so that the upper end is against the roll of paper tape.

(*c*) Swing the outer reel support arm down to the latched position, and thread the end of the paper tape around the guide rollers.

(*d*) Feed the paper tape into the tape chute; pass it under the type wheel and into the slot in the punch and die assembly.

(*e*) Press down on the tape retainer lever and feed the paper tape under the roller. Feed out enough paper tape so that it will extend through the opening in the dust cover when the dust cover is closed.

(2) *TT–76A/GGC* (fig. 23).

(*a*) Lift straight up on the tape reel assembly to remove it from the reperforator-transmitter.

(*b*) Shut off the tape-alarm buzzer, by pivoting the tape-alarm lever counterclockwise until it is locked in place by the tape-alarm lever latch.

(*c*) Press the release plunger and turn the tape roll retaining plate counterclockwise to release the tape roll retaining plate from the reel hub; remove the tape

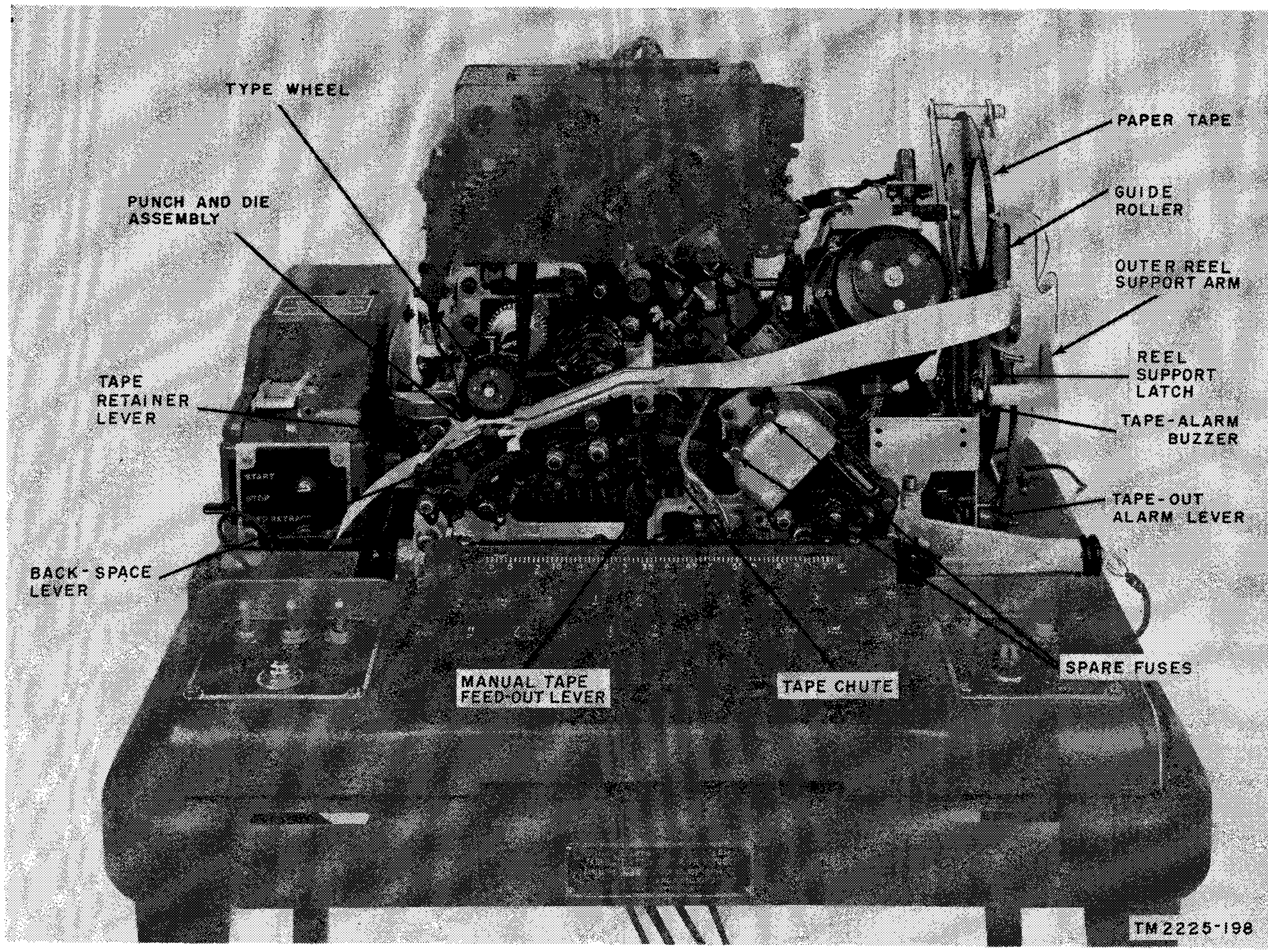


Figure 22. Tape installation details (TT–76/GGC).

roll retaining plate and the core from the old paper tape roll.

(*d*) Position the new paper tape roll on the reel hub so that the paper tape feeds from the rear of the front over the top of the paper tape roll. Position the tape roll retaining plate on the reel hub. Apply slight pressure on the tape roll retaining plate and turn it clockwise until it engages the projections on the reel hub and the release plunger engages the hole in the tape roll retaining plate.

(*e*) Position the assembled tape reel assembly and the paper tape roll on the reperforated-transmitter. Press the tape-alarm lever latch release to permit the tape-alarm lever to pivot against the paper tape roll.

(*f*) Thread the end of the paper tape through the tape guide.

(*g*) Thread the paper tape through the tape puller so that the paper tape is under the stud at the end of the tape puller arm and is between the tape puller stud and the tape puller spring.

(*h*) Feed the paper tape into the tape chute; pass it under the type wheel and into the slot in the punch and die assembly.

(*i*) Press down on the tape retainer lever and feed the paper tape under the roller. Feed enough tape through so that the paper tape will extend through the opening in the dust cover when the dust cover is closed.

c. Check the inking ribbon; if it is torn or badly frayed, replace it as follows:

(1) *TT–76/GGC* (fig. 24).

(*a*) Raise the spool clip (fig. 24), push backward on the ribbon sensing lever, pull

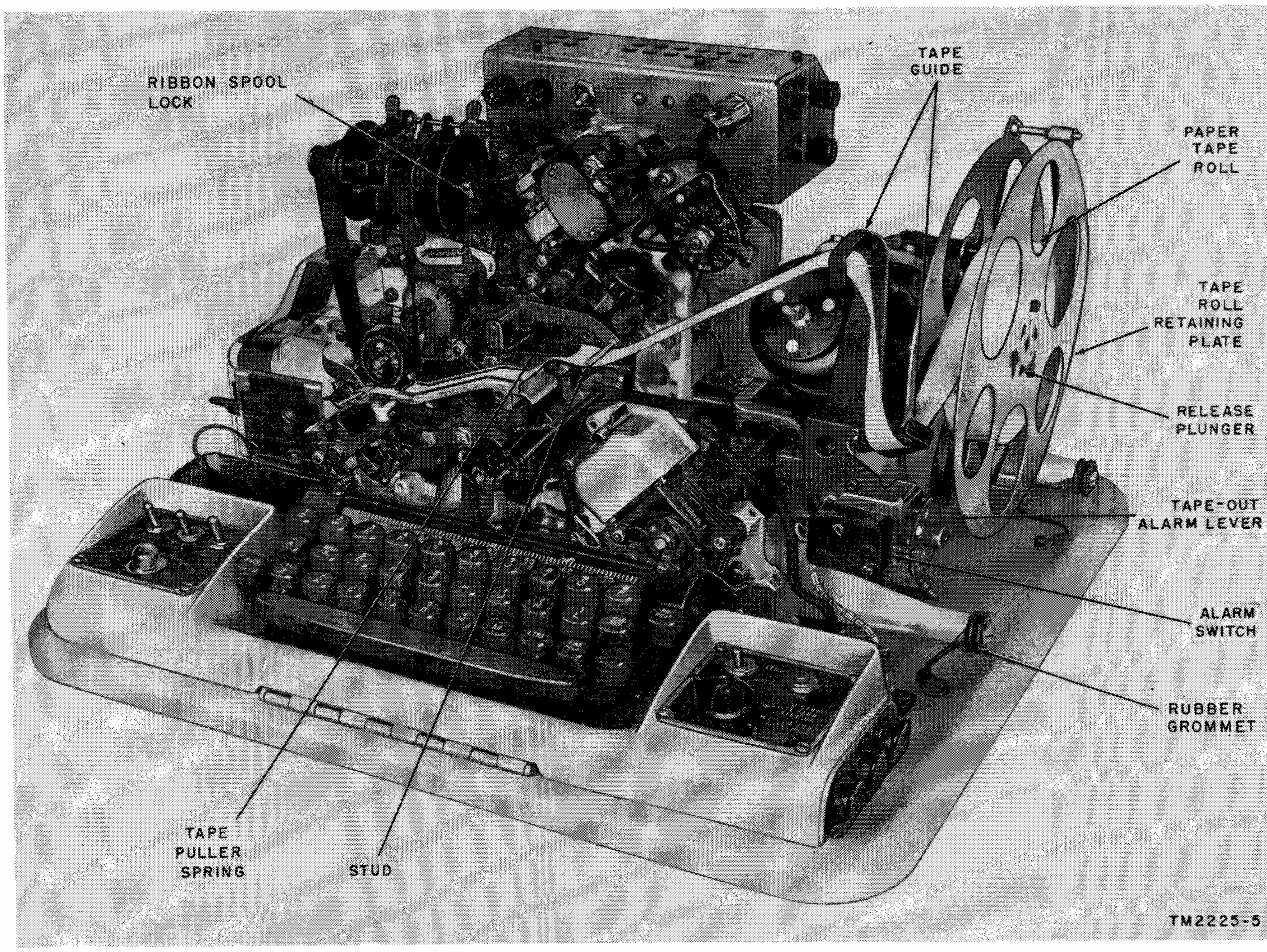


Figure 23. Tape installation details (TT–76A/GGC).

forward on the tab at the top of the ribbon retainer, and place the loaded ribbon spool on the spool shaft. Be sure that the slots in the spool hub engage the projections on the ribbon spool shaft.

(*b*) Attach the free end of the inking ribbon to the empty spool and place it on the ribbon spool shaft as indicated in (*a*) above. Leave a long loop (approx 10 in.) in the inking ribbon.

(*c*) Move the spool clip down to its locked position.

(*d*) Pass the inking ribbon over the ribbon rollers in front of each spool.

(*e*) Give the inking ribbon a half twist, pass it under the type wheel, then slip it into the slots at each side of the ribbon guide on the type wheel.

(2) *TT–76A/GGC.*

(*a*) Turn the ribbon spool locks on the spool shaft to the outward (unlocked) position. Pul forward on the tab at the top of the ribbon retainer, and place the loaded ribbon spool on the spool shaft. Be sure the slots in the spool hub engage the projections on the ribbon spool shaft.

(*b*) Attach the free end of the inking ribbon to the empty spool and place it on the ribbon spool shaft as indicated in (*a*) above. Leave a long loop (approx 10 in.) in the inking ribbon.

(*c*) Turn the two ribbon spool locks to the inward (locked) position.

(*d*) Complete the installation as directed in (1)(*d*) and (*e*) above.

d. Empty the chad bin.

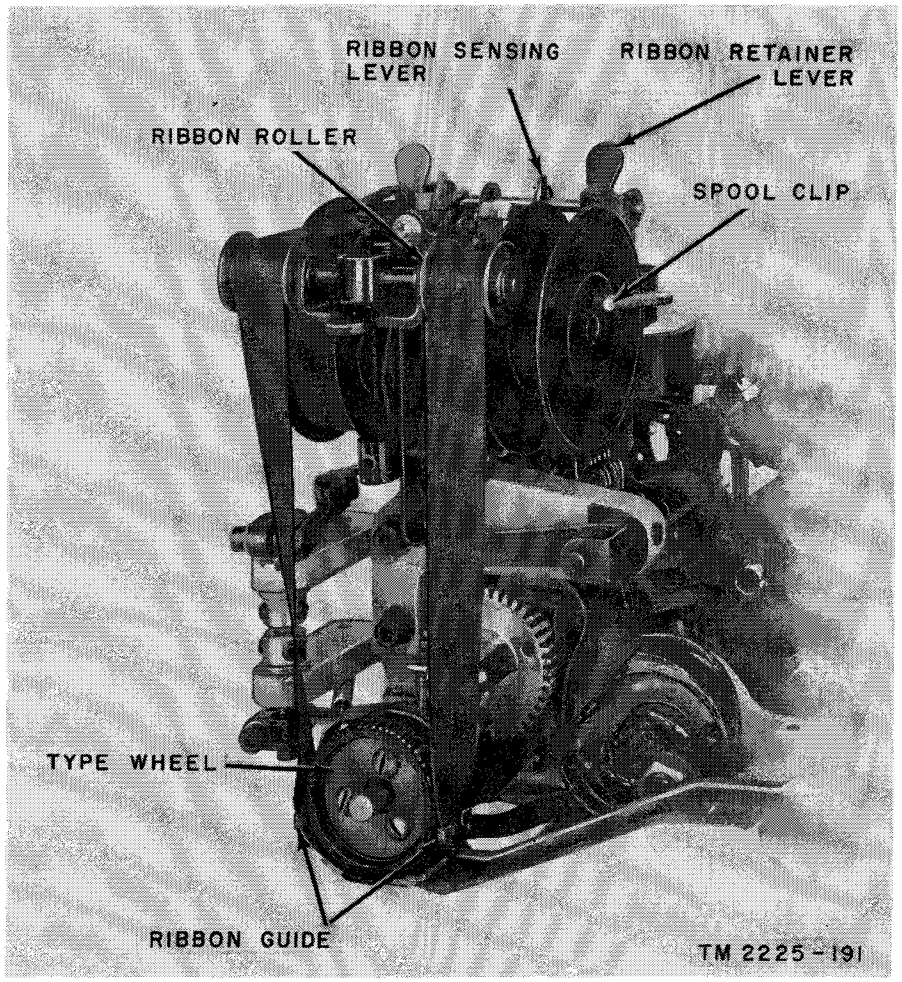


Figure 24. Ribbon feed mechanism (TT–76/GGC).

e. Set the SELECTOR switch to the LOCAL REPUNCH position. This removes the set from the signal line and arranges it for a local test by the operator.

25. Starting and Testing Procedures

a. Operate the POWER, LIGHT, and MOTOR switches to ON. The copy light should light and motor start.

b. Operate the KEYBOARD switch to SEND. Transmission should be possible from the keyboard-transmitter.

c. Depress and hold down the space bar and REPEAT key and check the feeding of the paper tape. Check to see that the character counter on the keyboard-transmitter is operating. The END OF LINE INDICATOR lamp should light on the 66th character. On the TT–76A/GGC, the end-of-line warning bell should also ring on the 66th character.

d. Depress the CAR. RET. key. The END OF LINE INDICATOR lamp should go out and the character counter indicator should return to zero.

e. Send from the keyboard-transmitter at least five copies of the following message: LTRS, THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK, LINE FEED, FIGS, 1234567890 - $! & ' ( ) " / : ; ? , .

f. Observe the printed impression on the paper tape for proper darkness and clarity.

Note. On the TT–76A/GGC, the letters combination prints a rectangular symbol.

g. Check the type wheel to be sure it is projected forward and restored for each operation and that it shifts to the figures position properly.

h. Check to insure that the inking ribbon feeds every other time a character is printed, and that it projects forward and backward with the type wheel each time a character is printed.

i. Check the punch and die mechanism for proper punching of the code and feed holes in the paper tape.

j. Push down on the back-space lever (fig. 22). The paper tape should move backward through the punch and die assembly one character space each time the back-space lever is operated.

k. Move the manual tape feed-out lever (fig. 22) to the left. Paper tape should feed out of the punch and die assembly. The feed hole should be perforated and the blank symbol should be printed on the paper tape.

l. Depress the FIGS (fig. 19) and then the S (BELL) keys. The signal bell should ring.

m. Place a perforated paper tape in the transmitter-distributor as follows:

(1) Move the STOP–START lever (fig. 22) to the FEED RETRACT position.

(2) Insert a perforated paper tape under the tape cover (the design of the transmitter-distributor permits paper tape to be inserted without raising the tape cover) and line up the first letter or symbol of the message opposite the START arrow (fig. 20) on the top cover of the transmitter-distributor.

(3) Move the STOP-START lever to the STOP position. Be sure the feed holes in the paper tape engage the pins on the feed claw.

(4) Raise the STOP–START lever to the START position and send five copies of the test message (*e* above).

(5) While the transmitter-distributor is sending a message, each of the following actions should stop the transmitter-distributor.

(*a*) Raising the tight-tape lever (fig. 21).

(*b*) Moving the STOP–START lever to the STOP or FEED RETRACT position.

(*c*) Passing of the end of the message tape over the tape-out lever.

n. Place the SELECTOR switch in position for the circuit operating combination desired. The set is now ready for operation.

26. Operating Arrangements

a. Half-Duplex. The following arrangements are possible when the TT–76(*)/GGC is installed for operation on one line.

Operation desired	SELECTOR switch	Transmitter-distributor START–STOP lever	Line cords		
			Red	Black	Gray
Prepare tape locally, using keyboard and reperforator and simultaneously transmitting to the line from the transmitter-distributor.	Position 2 TD SEND, LOCAL PUNCH.	START*	Line 1	Line 1	Line 1
Send to the line from keyboard or transmitter-distributor and receive from the same line on the same line but not simultaneously. Home copy of all transmissions.	Position 1 TD SEND, TR SEND, RECEIVE.	START*	Line 1	Line 1	Line 1
Receive on tape from distant station. No transmission possible.	Position 1 TD SEND, TR SEND, RECEIVE.	Not used	Line 1	Not used	Not used

* A preliminary setting to FEED RETRACT position is required to allow for tape insertion.

b. Full-Duplex. The following operating arrangements are possible when the TT–76(*)/GGC is installed for operation on two lines.

Operation desired	SELECTOR switch	Transmitter-distributor START–STOP lever	Line cords		
			Red	Black	Gray
Receive tape copy on the reperforator from one line and send to a second line from either the keyboard transmitter or the transmitter-distributor.	Position 1 TD SEND, TR SEND, RECEIVE.	START*	Line 1	Line 2	Line 2
Send to or receive from one line on tape and simultaneously transmit to a second line from the transmitter distributor.	Position 1 TD SEND, TR SEND, RECEIVE.	START*	Line 1	Line 1	Line 2

* A preliminary setting to FEED RETRACT position is required to allow for tape insertion.

27. Stopping Procedure

To shut down Teletypewriter Reperforator-Transmitter TT–76(*)/GGC to traffic, place the MOTOR, LIGHT, and POWER switches to OFF. The motor should stop, copy light should go out, and all power should be removed from the unit.

28. Procedure for Correcting Errors in Tape

The back-space lever (fig. 20) is used for correcting errors made by the operator when preparing a paper tape locally. To correct an error in the paper tape, replace the wrong combination with the LTRS combination as follows:

a. Depress the back-space lever until the error in the paper tape is over the punches in the punch and die assembly (fig. 22). A white pointer is provided on the TT–76A/GGC to indicate which code group is aligned with the type wheel and with the punch and die assembly.

b. Depress the LTRS key. This will cancel the incorrect code combination perforated in the tape. In the same manner cancel all code groups that were punched into the paper tape following the error.

c. Type the correct letter or symbol and then continue typing the remainder of the message.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE

Section I. FIRST ECHELON MAINTENANCE

29. Scope of Operator Maintenance

Operator maintenance is limited to the cleaning and inspection of external parts, inspection of electrical connections, wiring, and insulation, and the performing of operational checks to determine if the machine is operating properly.

30. Materials Required for Operator's Maintenance

The following materials are required for first echelon maintenance:

Item	Signal Corps stock No.
Orange stick	6Z7360
Brush, toothbrush style	53B–121610 (QM)
Cheesecloth, bleached, 36 in. wide	6Z1989
Cloth, emery, crocus, 9 x 11-in. sheets.	6Z2000
Cleaning Compound	(Federal stock No. 7930–395–9542).
Paper, cleaning, Bell Seal Bond, ¼ x 2½-in.	6M750
Sandpaper, No. 0000	6Z7500–0000
Solvent, Dry Cleaning (SD) (Fed spec No. P–S–661a).	51–S–4385–1 (QM)
Brush, sash, 1 x ⅝-in.	6Z1567

31. Definition of Preventive Maintenance

Preventive maintenance is work performed on equipment (usually when the equipment is not in use) to keep it in good working condition so that breakdowns and needless interruptions in service will be kept to a minimum. Preventive maintenance differs from troubleshooting and repair since its object is to prevent certain troubles from occurring.

32. Operator First Echelon Maintenance Checklist

a. DA Form 11–252 (fig. 25) is the preventive maintenance checklist to be used by his commander.

b. Items not applicable to Teletypewriter Reperforator-Transmitter TT–76(*)/GGC are lined out in figure 25. References to the ITEM block in this figure are to paragraphs in this manual that contain additional maintenance information pertinent to the particular item.

33. Operator's Maintenance

a. Covers.

(1) Inspect the dust covers thoroughly. Look for dents, cracks, marred painted surfaces, rust, corrosion, loose or missing screws, and faulty hinges. See that the copy holder is in good condition.

(2) Check all visible screws for tightness.

(3) Clean the outer surfaces of the dust cover with a cloth slightly moistened with water. To remove oil, grease, or gummy stains on the outer surface of the dust cover, moisten the cloth with solvent (SD).

b. Table.

(1) Inspect the table for breaks or cracks. Look for marred painted surfaces, missing or loose screws, dust, and dirt.

(2) Clean the outer or painted surfaces of the table by using cheesecloth and water or solvent (SD).

c. Keyboard-Transmitter.

(1) Inspect the keyboard-transmitter for cracked key levers. Examine the keyboard guard for cracks or breaks.

(2) Check each keytop to be sure it is fastened securely to the key levers.

(3) Clean the keytops and space bar with a damp cloth.

OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT
TELETYPEWRITER

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE	EQUIPMENT SERIAL NO.
TELETYPEWRITER SET AN/GGC-3	350

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (X) Defect corrected.
NOTE: Strike out items not applicable.

DAILY

NO.	ITEM	S	M	T	W	T	F	S
1	INSPECT UNIT FOR PRESENCE OF ~~TOOLS,~~ ACCESSORIES, AND RUNNING SPARES. PAR. 7	✓	✓	✓				
2	~~TIGHTEN ALL LOOSE SCREWS, BOLTS, AND NUTS ON CHESTS, TELETYPEWRITER COVER, COMPONENT PANEL.~~							
3	CLEAN INSIDE AND OUTSIDE OF CHESTS AND TELETYPEWRITER COVER OF DIRT, GRIME, GREASE, RUST, OIL, GUMMY DEPOSIT. PAR. 33a(3)	✓	✓	✓				
4	INSPECT THE COVER OF THE TELETYPEWRITER FOR ~~CRACKED OR BROKEN GLASS,~~ LOOSE SCREWS, BROKEN OR DAMAGED HINGES, DAMAGED COPYHOLDER, SCRATCHES. PAR. 33a	✓	✓	✓				
5	INSPECT ALL ELECTRICAL CONNECTIONS FOR FIRMNESS OF SEATING AND PROPER CONTACT, CORROSION, GREASE, OIL. PAR. 33d	✓	✓	✓				
6	~~TIGHTEN ALL LOOSE ELECTRICAL CONNECTIONS.~~							
7	~~TIGHTEN ALL LOOSE SCREWS, LUGS, MOUNTING BOLTS ON TERMINAL BLOCKS, AND SLIP CONNECTORS.~~							
8	CLEAN EXTERIOR OF KEYS, SWITCHES, AND TERMINAL BLOCKS OF DIRT, GREASE, GRIME, MOISTURE. PAR. 33c	✓	✓	✓				
9	INSPECT EACH KEY OR SWITCH FOR PROPER MECHANICAL ACTION; FREEDOM OF MOVEMENT, POSITIVE ACTION, SPRING TENSION; LOOK FOR BROKEN, MISSING OR ILLEGIBLE KEY TOPS. PAR. 33c	✓	X	✓				

WEEKLY

NO.	ITEM	CONDITION	NO.	ITEM	CONDITION
10	INSPECT CHESTS FOR DIRT, CRACKS, MISSING OR BROKEN SCREWS, RUST, DAMAGE, WORN LORD MOUNTINGS. PAR. 33a		12	INSPECT TERMINAL BLOCKS FOR CRACKS, BREAKS, DIRT, LOOSE CONNECTIONS, LOOSE SCREWS AND MOUNTINGS.	
11	INSPECT ALL WIRING AND CABLING FOR CRACKS, ROTTING INSULATION, FRAYED, CUT, OR GOUGED JACKETING, KINKS, PROPER SUPPORT WHERE REQUIRED, LOOSE TERMINATIONS, BROKEN CONDUCTORS. PAR. 33d		13	OPERATE THE TELETYPEWRITER AND CHECK FOR SMOOTH OPERATION, CLEAR PRINTING, ~~SIGNS OF WEAR, EVIDENCE OF MOTOR OVER-HEATING.~~ PAR. 25	

14 IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

"R" KEY TOP BROKEN. REPORTED TO MAINTENANCE

DA FORM 1 MAY 51 **11-252** REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM2225-3

Figure 25. DA Form 11-252.

d. External Wiring.

(1) Wipe the external wiring with a cloth dampened with water.

(2) Check the wiring for cracks, deteriorated insulation, kinks, or excessive strain due to the improper placement of the machine. Adjust the machine position to relieve the strain.

Section II. SECOND ECHELON MAINTENANCE

34. Scope of Technician's Maintenance

This level of maintenance must be performed by qualified technicians and includes all items of maintenance which can be done with the tools available to the maintenance technician provided that part replacement, other than the replacement of running spares, is not required. Partial disassembly required to perform any of the items of maintenance described in this section are within the scope of the second echelon maintenance technician.

35. Tools and Maintenance Materials Required

a. Tools. No tools are supplied with Teletypewriter Set AN/GGC–3 or with Teletypewriter Reperforator-Transmitter TT–76(*)/GGC. Tool Equipment TE–50–B should be available to technical personnel performing maintenance duties at organizational level. This kit contains all tools necessary to maintain the equipment. Tool Equipments TE–50 and TE–50–A do not include some special wrenches and gages included in TE–50–B. Organizations that have the TE–50 or TE–50–A should requisition the additional tools in accordance with appropriate supply bulletins.

b. Maintenance Materials.

(1) Materials necessary for maintenance at organizational levels are included in Tool Equipment TE–50–B with the exception of a liquid cleaning agent and an antiseize compound. Mechanical assemblies should be cleaned with solvent (SD), which is available through established supply channels. Gasoline never should be used as a cleaning fluid. When solvent (SD) is not immediately available, Oil, Fuel, Diesel (DA), QMC stock No. 7–0–142, may be used as a temporary substitute. Cleaning compound (Sig Corps stock No. 7930–395–9542) should be used for cleaning electrical contact surfaces.

Caution: Repeated or prolonged breathing of cleaning compound is dangerous. Make certain adequate ventilation is provided. Cleaning compound is flammable; do not use near a flame.

(2) These reperforator-transmitters contain numerous aluminum and magnesium castings. When steel screws are placed in such castings, tendency exists for seizure between the screws and the castings unless the screws are treated first with an antiseize compound. Screws are given such a coating at the factor when the machines are assembled. Whenever machines are disassembled after having been in use, the coating should be renewed by maintenance personnel to insure that there will be no difficulty at the time of the next disassembly.

36. General Preventive Maintenance Techniques

Most preventive maintenance techniques pertain to specific areas of preventive maintenance, such as lubrication; however, the following general instructions should be helpful:

a. Use No. 0000 sandpaper to remove corrosion.

b. Use a clean, dry, lint-free cloth or a dry brush for most cleaning purposes.

(1) When necessary, use a cloth or a brush moistened with solvent (SD) to clean parts except electrical contacts. Wipe the solvent and dirt from the part with a clean dry cloth.

(2) A flushing action normally is best when cleaning electrical contacts. Dip an orange stick in cleaning compound and allow the liquid to drip from the stick through the contacts. Rub the contact surfaces with the wet orange stick to loosen dirt or gummy deposits. Allow the contacts to dry by evaporation and then polish with the contact burnisher.

c. If available, vacuum cleaning equipment is suitable for removal of loose dust, paper lint, and dirt from the reperforator-transmitter. Compressed dry air may be used also, but the pressure must be kept below 60 pounds per square inch to prevent equipment damage.

SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT

TELETYPEWRITER

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE	EQUIPMENT SERIAL NO.
TELETYPEWRITER SET AN/GGC-3	350

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (X) Defect corrected.
NOTE: Strike out items not applicable.

NO.	ITEM	CONDITION	NO.	ITEM	CONDITION
1	INSPECT UNIT FOR PRESENCE OF ~~TOOLS,~~ ACCESSORIES, AND RUNNING SPARES. PAR. 7	✓	15	INSPECT THE CONTACTS OF SWITCHES AND KEYS FOR PITTING, CORROSION AND WEAR. PAR. 37l	✓
2	TIGHTEN ALL LOOSE SCREWS, BOLTS, AND NUTS ON CHESTS, TELETYPEWRITER COVER, COMPONENT PANEL. PAR. 33a	✓	16	ADJUST SPRING TENSION OF CONTACT SPRINGS, KEY AND SWITCH CONTACTS WHERE NECESSARY. PAR. 37i	✓
3	CLEAN INSIDE AND OUTSIDE OF CHESTS AND TELETYPEWRITER COVER OF DIRT, GRIME, GREASE, RUST, OIL, GUMMY DEPOSIT. PAR. 33a(3)	✓	17	CLEAN CONTACTS OF SWITCHES AND KEYS OF DIRT, GREASE, DUST, CORROSION. PAR. 37i	✓
4	INSPECT THE COVER OF THE TELETYPEWRITER FOR ~~CRACKED OR BROKEN GLASS,~~ LOOSE SCREWS, BROKEN OR DAMAGED HINGES, DAMAGED COPYHOLDER, SCRATCHES. PAR. 33a	✓	18	CLEAN THE TYPING UNIT ~~AND TYPE-BAR CARRIAGE~~ VERY CAREFULLY OF GREASE, DUST, DIRT, OIL; *(care should be exercised to prevent dirt from getting into the bearings).* PAR. 37f	✓
5	INSPECT ALL ELECTRICAL CONNECTIONS FOR FIRMNESS OF SEATING AND PROPER CONTACT, CORROSION, GREASE, OIL. PAR. 37e	✓	19	INSPECT THE TYPING UNIT FRAME CASTING, ~~TYPE-BAR CARRIAGE FRAME CASTING,~~ KEYBOARD CASTING, MOTOR BASE FOR CRACKS, LOOSE OR MISSING SCREWS, OTHER DAMAGE. PAR. 37b	✓
6	TIGHTEN ALL LOOSE ELECTRICAL CONNECTIONS. PAR. 37e	✓	20	INSPECT THE TYPING UNIT, ~~TYPE-BAR CARRIAGE,~~ KEYBOARD, FOR LOOSE OR MISSING SCREWS, FREE MOVEMENT OF ALL MOVING PARTS, BENT, BROKEN, DISTORTED, OR WORN SHAFTS, GEARS, SPRINGS, BEARINGS, CAMS, CLUTCHES. PAR. 37c, 37f	✓
7	TIGHTEN ALL LOOSE SCREWS, LUGS, MOUNTING BOLTS ON TERMINAL BLOCKS, AND SLIP CONNECTORS. PAR. 37h	✓	21	ADJUST ANY ITEMS ON TYPING UNIT WHICH REQUIRE ADJUSTMENT. PAR. 66 THRU 136	✓
8	CLEAN EXTERIOR OF KEYS, SWITCHES, AND TERMINAL BLOCKS OF DIRT, GREASE, GRIME, MOISTURE. PAR. 37h, 37l	✓	22	INSPECT ~~EACH BELL CRANK, CODE BAR, TYPE-BAR,~~ TO DETERMINE THAT ALL PARTS MOVE FREELY AND ARE NOT BENT OR BROKEN, ~~THERE ARE NO MISSING OR DAMAGED PALLETS.~~	✓
9	INSPECT EACH KEY OR SWITCH FOR PROPER MECHANICAL ACTION; FREEDOM OF MOVEMENT, POSITIVE ACTION, SPRING TENSION; LOOK FOR BROKEN, MISSING OR ILLEGIBLE KEY TOPS. PAR. 37C, 37l	✓	23	INSPECT GEARS, SHAFTS, BEARINGS ~~OF TYPE-BAR CARRIAGE~~ FOR SIGNS OF EXCESSIVE WEAR, LOOSE PARTS, DAMAGE.	✓
10	INSPECT CHESTS FOR DIRT, CRACKS, MISSING OR BROKEN SCREWS, RUST, DAMAGE, WORN LORD MOUNTINGS. PAR. 33a	✓	24	ADJUST ANY UNITS ~~ON THE TYPE-BAR CARRIAGE~~ THAT REQUIRE ADJUSTMENT.	✓
11	INSPECT ALL WIRING AND CABLING FOR CRACKS, ROTTING INSULATION, FRAYED, CUT, OR GOUGED JACKETING, KINKS, PROPER SUPPORT WHERE REQUIRED, LOOSE TERMINATIONS, BROKEN CONDUCTORS. PAR. 37g	✓	25	INSPECT THE MOTOR FOR SIGNS OF OVERHEATING, WORN BRUSHES, PROPER BRUSH SPRING TENSION. PAR. 37d	✓
12	INSPECT TERMINAL BLOCKS FOR CRACKS, BREAKS, DIRT, LOOSE CONNECTIONS, LOOSE SCREWS AND MOUNTINGS. PAR. 37h	✓	26	CLEAN THE MOTOR AND GOVERNOR ASSEMBLY OF DIRT, GREASE, FOREIGN MATTER. PAR. 37d	✓
13	OPERATE THE TELETYPEWRITER AND CHECK FOR SMOOTH OPERATION, CLEAR PRINTING, SIGNS OF WEAR, EVIDENCE OF MOTOR OVERHEATING. PAR. 37d	✓	27	CLEAN OIL, GREASE, DUST, DIRT FROM KEYBOARD, KEY TOPS, KEY LEVERS, AND AROUND THE TRANSMITTING MECHANISM. PAR. 37c	✓
			28	INSPECT THE MOISTURE AND FUNGUS PROOFING.	✓
14	SOLDER ANY LOOSE OR BROKEN SOLDER CONNECTIONS. PAR. 37h	✓	29	INSPECT GENERAL CONDITION OF LUBRICATION AND LUBRICATE AS REQUIRED ACCORDING TO LATEST DEPARTMENT OF THE ARMY LUBRICATION ORDER. PAR. 38 THRU 43	✓

30 IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

DA FORM 1 MAY 51 11-253 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM2225-6

Figure 26. DA Form 11–253.

37. Technician's Maintenance

This level of maintenance must be performed by qualified technicians. To service a reperforator-transmitter thoroughly, take the equipment out of service and partially disassemble it as described in *a* below. Be sure to notify all other stations that the reperforator-transmitter will be out of service temporarily. Refer to the Second and Third Echelon maintenance checklist, DA Form 11–253 (fig. 26) for a listing of maintenance items. Items not applicable to the TT–76(*)/GGC are lined out in figure 26. References in the ITEM blocks refer to paragraphs in the text that contain additional maintenance information.

a. Procedure. Remove the equipment from service and perform the following steps:

(1) Remove the power cord from the wall outlet.

(2) Remove the dust cover (par. 13*a*).

(3) Remove the reperforator from the base casting (par. 215*a*).

(4) Remove the transmitter-distributor (par. 230*a*).

(5) Remove the keyboard-transmitter (par. 216*a*).

b. Preventive Maintenance for Teletypewriter Base.

(1) Clean the base thoroughly with a clean cloth. Wipe away all deposits of oil or grease that may have dropped from the mechanical assemblies. Use a cleaning brush to brush away all loose dirt and paper lint from the hard-to-get-at places such as connecting jacks, switches, and terminal blocks. If grimy deposits are difficult to remove with a dry cloth, moisten the cloth with solvent (SD).

(2) Perform the preventive maintenance for cords, cables, wiring, terminal board, keys, and switches as described in *g, h,* and *i* below.

c. Preventive Maintenance for Keyboard-Transmitter and Transmitter-Distributor.

(1) Inspect the following:

(*a*) Cracks and other damage to the keyboard guard assembly and any mechanical linkages.

(*b*) Loose, missing, or broken screws, nuts, bolts, fastenings, and electrical connections; frayed or broken wire insulation and oil-soaked wiring or insulation.

(*c*) Levers, pawls, latches, code bars, springs, bearings, etc. Check to see that all parts move freely and are not damaged or broken.

(*d*) Missing, broken, or illegible keytops (keyboard-transmitter).

(*e*) Missing, broken, or distorted springs.

(*f*) Worn, burned, or dirty contacts and insulation in the transmitting contact assembly.

(2) Do not tighten parts that require clearance or tension adjustments. Tighten all screws and bolts that are not part of an adjustment.

(3) Clean the keyboard-transmitter as follows:

(*a*) Clean the keytops with a piece of cloth moistened with water.

(*b*) Blow out or brush away dust and debris that may have accumulated in the transmitter mechanism and around the mechanical levers connecting it to the keyboard.

(*c*) Burnish or file contacts if they are dirty, built up, or pitted.

(4) Lubricate the keyboard-transmitter as described in paragraphs 38 through 43. Remove excess lubricant.

d. Preventive Maintenance for Motor.

(1) The motor should turn freely and quietly with very little end play when turned by hand. Check the motor for evidences of overheating. This may be indicated by discoloration or by an odor of burned insulating material. Check the governor, governor cover, and target of the governed motor for looseness. Tighten the mounting screws firmly to correct any looseness.

(2) Clean the exterior of the motor. Remove all dust, dirt, grease, and corrosion from the outside of the motor. Check to see that the governor is clean and that the wires leading to the motor are intact and clean.

(3) Apply lubricant, as necessary, to the governor lubrication points listed in paragraphs 38 through 43.

e. Preventive Maintenance for Power Supply and Terminal Unit.

Warning: The failure of selenium rectifiers can result in the liberation of poisonous fumes and deposit of poisonous selenium compounds. If a rectifier burns out or arcs over, the odor is strong. Provide adequate ventilation immediately. *Avoid inhaling the fumes and do not handle the damaged rectifier until it has cooled.*

(1) Inspect for loose connections, damaged or broken parts, and defective or burned-out wiring. Look for evidence of overheating, and note whether the transformer and rectifying stack appear to be discolored. Check the fuse holder and the power SELECTOR switch.

(2) Tighten all loose screws, bolts, nuts, cable clamps, etc. Solder any loose or broken connections. Check the condition of the flexible transformer taps.

(3) Use a suitable brush, cheesecloth, and a vacuum cleaner, if available, to remove dust and dirt. To remove oily or gummy deposits, use a cloth dampened with a small quantity of solvent (SD). Remove all rust spots and repaint all exposed metal surfaces.

f. Preventive Maintenance for Reperforator. The reperforator includes the selector magnet (fig. 2), the punch and die assembly (fig. 10) and the function assemblies.

(1) Examine all operating mechanical assemblies for signs of wear, lack of lubrication, accumulations of dirt or grime, and undesired looseness of any operating parts.

(2) Check the condition of the inking ribbon. Replace it if necessary (par. 24*c*). If the top edge of the inking ribbon appears frayed and the rest of the inking ribbon is serviceable, check the ribbon guides for proper alignment.

(3) Check the type wheel for dirt deposits in the character symbols. Clean the type wheel with a brush moistened with solvent (SD). Check the small center areas of letters such as O, Q, D, G, and B to be sure no dirt remains.

(4) After performing all maintenance checks, lubricate the assemblies as described in paragraphs 38 through 43. Remove all excess lubricant.

g. Preventive Maintenance for Cords, Cables, and Wiring.

(1) Check all visible wiring for cracked or deteriorated insulation, frayed or cut insulation at connecting points, kinks, and strain caused by improper placement.

(2) Tighten loose fasteners, clamps, and wiring connections. Repair loose or broken connections. Remove corrosion, rust, dirt, and dust from ground connections. Be sure that the outer insulating cover on cords and cables is wiped clean. Never use oil or solvent (SD) on rubber insulation.

(3) Adjust the wiring so that it does not interfere with the operation of mechanical parts. It may be necessary to resolder certain connections or to replace some wiring or conductors when they become worn or damaged.

h. Preventive Maintenance for Terminal Boards.

(1) Terminal boards used as receiving, connecting, and distributing points for electrical circuits usually are made of a strip of insulating material and one or more types of electrical connectors. These devices may be either solder- or screw-type terminals, contact springs, or contact lugs. They normally require little preventive maintenance unless the wiring is changed. Inspect the terminal boards for cracks, breakage, and loose connecting or mounting screws. Examine the connections for mechanical defects (broken or stripped screws and threads), dirt, grease, and corrosion. Tighten loose screws, lugs, and mounting bolts. Use tools of the correct size. Be careful not to strip the threads by exerting too much force. Solder loose or broken connections.

(2) Wipe off any moisture with a clean cloth and brush the dust and dirt from the terminal board with a clean dry brush. When necessary, terminal boards may be cleaned with a cloth moistened with solvent (SD): however, be careful that the solvent (SD) does not come in contact with the insulation of any of the wires leading to the terminal board. Remove and clean corroded or loose connections. Use cleaning compound to clean electrical contacts on all connecting devices.

i. Preventive Maintenance for Keys and Switches.

(1) Inspect the mechanical action of each key and switch. Look for dirt or corrosion. Operate each key or switch to see that it moves freely. Note the amount of spring tension and inspect for insufficient contact pressure when applicable. Tighten loose screws, lugs, and mounting bolts. Remove loose conections that are dirty or corroded, and clean them before they are tightened or soldered. Tighten switch connections and repair soldered connections.

(2) Wipe off any moisture present. Carefully clean the exterior surfaces of keys and switches with a dry, stiff brush. Clean corroded and dirty contacts. Use a burnishing tool to polish contact surfaces after cleaning with abrasives such as No. 0000 sandpaper, crocus cloth, or a contact file. If contacts are pitted or burned, use a contact file to restore the surfaces and then polish with a burnishing tool.

j. Reassembly and Performance Test.

(1) Reassemble the reperforator-transmitter as follows:

(*a*) Replace the reperforator (par. 215*b*).

(*b*) Replace the keyboard-transmitter (par. 216*b*).

(*c*) Replace the dust cover by reversing the procedure outlined in paragraph 13*b*.

(*d*) Replace the transmitter-distributor (par. 230*b*).

(2) Make sure the SELECTOR switch is in the LOCAL REPUNCH position and the power input cord into the outlet from which it was removed. Operate the POWER, LIGHT, and MOTOR switches to ON.

Section III. LUBRICATION

38. General

Lubrication is the most important single item in a preventive maintenance program. Carefully follow lubrication instructions, using the lubricants indicated in the quantities recommended and at the correct time interval.

39. Recommended Lubricants

The recommended lubricants are:

a. Oil, lubricating, Signal Corps stock No. 6G1325 (1-qt can).

b. Grease, Signal Corps stock No. 6G650 (1-lb container).

40. Recommended Lubrication Schedule

The following chart shows the recommended intervals for checking the lubrication of reperforator-transmitters. When checking, lubricate only those points that require lubrication.

DO NOT OVERLUBRICATE.

Reperforator-transmitter operating speeds (wpm)	Operating periods (No. of days)			
	Up to 8 hours per day	8 to 12 hours per day	12 to 16 hours per day	16 to 24 hours per day
60	30	20	15	10
66	27	18	13	9
75	24	18	12	8
100	18	12	9	6

41. Preparation for Lubrication

To completely lubricate the reperforator-transmitter, take it out of service and disassemble it as outlined in *a* below. After lubrication, reassemble the reperforator-transmitter in the reverse order and make the checks and adjustments listed in paragraph 16.

a. Disassembly. To disassemble the reperforator-transmitter for lubrication, proceed as follows:

(1) Remove the power cord from the wall outlet and remove the dust cover (par. 13*a*).

(2) Remove the transmitter-distributor (par. 230*a*).

(3) Remove both ribbon spools and the inking ribbon on the TT–76/GGC as follows:

(a) Raise the spool clip (fig. 24).

(b) Push backward on the ribbon sensing lever.

(c) Pull forward on the tab at the top of the ribbon retainer.

(d) Remove the ribbon spools and the ribbon.

(4) Remove both ribbon spools and the inking ribbon on the TT–76A/GGC as follows:

(a) Move the ribbon spool locks at the ends of the ribbon spool shaft to the outward (unlocked) position.

(b) Pull forward on the tab at the top of the ribbon retainer.

(c) Remove the ribbon spools and inking ribbon from the ribbon spool shaft.

(5) Tear the paper tape where it enters the tape chute (fig. 21 and 23). Depress the tape retainer lever and remove the paper tape from the punch and die assembly.

(6) Remove the keyboard-transmitter (par. 216*a*).

(7) Remove the three screws that mount the indicator cover to the keyboard-transmitter and remove the indicator cover.

(8) Remove the motor governor target and cover (par. 273*a*).

b. Old Lubricants. Remove all old grease and oil with a clean, dry, lint-free cloth. Wrap the cloth around the end of a screw driver or an orange stick to remove old lubricants from hard-to-reach places.

42. General Lubrication Instructions

a. Method of Applying Grease. Use a grease gun to apply grease to gears. Hold the nozzle of the grease gun against the gear teeth at an angle of about 45°. Operate the handle until enough grease is ejected and, at the same time, turn the gear to form a continuous ribbon of grease.

b. Method of Applying Oil. To apply only one or two drops of oil dip a piece of No. 22 wire one-half inch into the oil and immediately touch it to the lubrication point to be oiled. This method prevents overlubrication. Where more oil is required, use the oiler supplied with Tool Equipment TE–50–B.

c. Preventing Corrosion. Apply only enough oil (except as otherwise indicated) to wet the rubbing surfaces. After the teletypewriter is completely lubricated, wipe off excess oil and any visible dirt.

43. Detailed Lubrication Instructions
(figs. 27–39)

The points to be lubricated, the type of lubricant to be used, and the quantity applied are listed in the charts below. The item numbers are arranged according to the method of application, so that the reperforator-transmitter can be treated by one lubricant or by one method at a time in a systematic way. Item numbers shown in figures 27 through 39 for the parts to be lubricated correspond with item numbers listed in the charts.

a. Ball Bearings. All ball bearings in the reperforator-transmitter are sealed and do not require lubrication.

b. Gears. Wipe all old grease from gears with a clean, dry, lint-free cloth. Apply fresh grease as follows:

Fig. No.	Item No.	Name of part	Method and quantity
27	8	Worm gear set	Work grease around gears, cover gear teeth liberally.
28	2	Function shaft drive gear	Apply grease sparingly around gear teeth.
28	3	Stop arm shaft driven gear	Apply grease sparingly around gear teeth.
28	6	Function camshaft gear	Work grease around gears, cover teeth liberally.
27	9	Main shaft driven gear	Apply grease sparingly around gear teeth.
28	10	Main shaft drive gear	Apply grease sparingly around gear teeth.
28	11	Keyboard drive shaft driven gear	Apply grease sparingly around gear teeth.
28	12	Keyboard drive shaft drive gear	Apply grease sparingly around gear teeth.
28	13	Function shaft drive gear	Apply grease sparingly around gear teeth.
29	26	Type wheel hub assembly	Apply grease sparingly only around those teeth engaged by the register lever.
29	27	Type wheel driven gear	*Do not lubricate this gear.*
30	4	Transmitter-distributor drive shaft drive gear set	Apply grease sparingly around gear teeth.

c. Cams. Remove all of the old lubricants and any dust or residue that might be present. Wipe off with a cloth moistened with solvent (SD). Use a clean cloth to dry the surface thoroughly; apply grease as indicated in the following chart:

Fig. No.	Item No.	Name of part	Method and quantity
27	5	Manual tape feed-out disabling cam	Apply a thin film on the working surface of the cam.
28	7	Ball bearing	Apply a thin film on the outer circumference.
28	8	Clutch latch arm	Apply a thin film on surface contacted by stop arm.
29	2	Print and register cam	Apply grease to coat all surfaces of cam groove and the bearing of the roller.
29	4	Transfer lever restoring cam	Apply a film on the working surface of the cam.
29	10	Selector camshaft and stop plate	Apply a thin film on working surfaces.
30	5	Type wheel register lever cam	Apply sparingly to cam groove.
30	6	Print hammer cam	Apply sparingly to cam groove.
30	12	Reciprocating and restoring cams.	Apply a thin film to all exposed surfaces.
30	15	Cam stud plate	Apply a thin film on studs.
31	7	Transmitter-distributor camshaft	Apply a thin coat on all cam lobes and stop lever cam teeth.
32	4	Keyboard-transmitter camshaft	Apply a thin coat on all cam lobes and locking lever teeth.

d. Friction Clutches. Apply oil as shown in the chart below. Do not release the spring tension on friction clutches for periodic lubrication unless it is necessary to provide a thorough cleaning. If a thorough cleaning is necessary, release the tension on the TT–76/GGC friction clutches by loosening the set screws that hold the spring positioning collars. On the TT–76A/GGC, loosen the clamping machine screws in the adjusting collar enough to permit the collar to be rotated, releasing the spring tension. Rotate the friction clutch and apply oil. After all the clutches are oiled, set them to give approximately the required spring tension on each friction clutch and run the reperforator-transmitter without printing or punching for about 5 minutes; then operate on repeat space for about 5 minutes. When lubrication is completed, set the spring tension of the friction clutches as described in paragraphs 55 or 56, 84, 129 or 130, and 160 or 161.

Fig. No.	Item No.	Name of part	Method and quantity
27	6	Selector camshaft friction clutch	10 to 15 drops of oil along periphery of felt friction plates; apply sparingly to spring and collar.
27	11	Keyboard-transmitter drive shaft friction clutch	10 to 15 drops of oil along periphery of felt friction plates; apply sparingly to spring and collar.
30	16	Function shaft friction clutch	10 to 15 drops of oil along periphery of felt friction plates; apply sparingly to spring and collar.
33	14	Transmitter-distributor friction clutch	10 to 15 drops of oil along periphery of felt friction plates; apply sparingly to spring and collar.

e. Moving Parts. Apply oil at the following places:

Fig. No.	Item No.	Name of part	Method and quantity
27	1	Ribbon roller	1 drop at each end of rollers.
27	2	Ribbon sensing lever	2 drops at each stud of sensing lever.
27	3	Spool clip	Apply sparingly at pivots.
27	4	Manual tape feed-out trip latch	1 drop at pivot and latching surface.
27	7	Manual tape feed-out link	1 drop at pivot points.
27	9	Transfer trip latch shaft	Apply sparingly at both ends of shaft.

Fig. No.	Item No.	Name of part	Method and quantity
27	10	Transfer lever latch and trip latch	2 drops at each end of sleeve between the two latches.
27	12	Grooved spindle in end of selector camshaft	Several drops between spindle and camshaft.
27	13	Type wheel post	Apply 2 drops at each end of post. Slide type wheel in and out several times for even lubrication.
28	1	Manual tape feed-out latching lever shaft	1 drop at each lever pivot point of shaft.
28	4	Code-ring locking bail cam follower	Apply sparingly to latching surface.
28	5	Code-ring locking bail shaft	Apply sparingly to all working surfaces and to pivot point of figures and levers latch.
29	1	Ribbon feed cam follower eccentric stud	Apply sparingly at both ends of stud.
29	3	Transfer lever roller stud	1 drop between roller stud and lever.
29	5	**T**-levers and separating washers	Apply sparingly to all rubbing and bearing surfaces.
29	6	Armature mounting shaft	Apply sparingly to bearing points.
29	7	**Y**-levers and separating washers	Apply sparingly to all rubbing and bearing surfaces.
29	8	Selector levers and separating washers	Apply sparingly between levers and washers.
29	9	Selector lever stop comb	Apply sparingly to all rubbing surfaces.
29	11	Switch actuating arm latch	Apply sparingly to both ends of latch.
29	12	Switch actuating lever pivot	Apply sparingly to both ends of pivot.
29	13	Tape-out alarm lever hub	Apply sparingly to both ends of hub.
29	14	Transfer lever trip latch	Apply sparingly to latching surfaces.
29	15	Rangefinder cam	Apply thin film on cam surfaces.
29	16	Tape feed-out shaft	2 drops at all pivot points.
29	17	Print and register levers shaft	Apply sparingly to all working surfaces of the levers.
29	18	Punch lever stop pin	Apply sparingly to entire length of pin.
29	19	Punch arm pivot post	Apply 5 drops of oil in oil hole of punch arm assembly.
29	20	Punch lever pivot stud	Several drops between levers and washers.
29	21	Feed pawl pivot	1 drop at each end of pivot.
29	22	Back space pivot stud	Apply sparingly at pivot points.
29	23	Code hole punch levers	Thin film on working surfaces.
29	24	Interference lever shaft	Thin film on working surfaces.
29	25	Code punch bars	Thin film on contact surfaces.
29	28	Stop arm	1 drop each side of collar on shaft.
30	1	Sliding clutch coupling	Several drops into clutch coupling.
30	2	Sliding drum clutch	2 drops in oil hole in drum clutch.
30	3	Transfer lever shaft bearings	1 drop between collars and bearings and on transfer lever shaft.
30	7	Ribbon feed cam	Apply thin film on cam.
30	8	Ribbon feed lever pawl	Apply thin film on all working surfaces of ribbon feed pawl.
30	9	Driving link lever toggle assembly	Apply thin film on all working surfaces of toggle assembly.
30	10	Ribbon spool shaft	2 drops at each ratchet of spool shaft.
30	11	Ribbon retainers	Apply sparingly to ribbon retainer shaft pivot points.
30	13	Reciprocating and restoring cam followers	Apply sparingly to roller, pivots, and all rubbing surfaces.
30	14	Cam lever assembly	Several drops between sensing levers and spacers on hub.
31	1	Clutch magnet armature	1 or 2 drops at pivot and working end.
31	2	Sensing lever comb	1 or 2 drops in each comb slot.
31	3	Tape feed retracting lever	1 or 2 drops at pivot and working end.
31	4	Code sening levers	Apply sparingly at working surfaces and at pivot.
31	5	Stop-start lever	1 or 2 drops at pivot and working points.
31	6	Tape feed lever	1 or 2 drops at pivot and working points.
31	8	Selector levers, bearing shoes, and flat washers	Apply sparingly to all rubbing and bearing surfaces.
31	9	Transmitter contact bail pivot stud	2 or 3 drops between arm and pivot stud.
32	1	Selector levers, bearing shoes, and flat washers	Apply sparingly to all rubbing and bearing surfaces.

Fig. No.	Item No.	Name of part	Method and quantity
32	2	Transmitter contact bail pivot stud	2 or 3 drops between arms and pivot stud.
32	3	Sensing lever locking bail	1 or 2 drops on bail surfaces and between lever and comb.
32	5	Cam-stop lever	1 or 2 drops at pivot; apply sparingly to latching surface.
32	6	Sensing levers	Apply sparingly at working surfaces at each end at pivot.
32	7	Locking lever latch	2 or 3 drops at pivot points; thin film at latching surface.
33	1	Type wheel reciprocating drive levers	2 drops on drive pin and between levers and flat washers.
33	2	Type wheel reciprocating eccentric stud	2 drops at upper end of stud.
33	3	Code rings	Thin film all along inner and outer working surfaces of each code ring. One drop between code rings and washers.
33	4	Stop bars in code-ring cage	2 drops at each end of all 32 stop bars.
33	5	Upper bell crank lever	Apply sparingly to coupling of arm and type wheel reciprocating transfer lever.
33	6	Upper bell crank lever stud	Apply sparingly to upper bell crank lever stud.
33	7	Reciprocating lever shaft	2 drops at upper and lower bell crank shaft collars.
33	8	Lower bell crank lever	Apply sparingly to lower bell crank lever end.
33	9	Tape feed sprocket	2 drops in each hole on both sides of sprocket shaft.
33	10	Tape retainer assembly	1 drop at each end of tape retainer assembly.
33	11	Detent lever	1 drop at each end of detent lever roller.
33	12	Detent lever eccentric stud	1 drop at each end of stud.
33	13	Punch interference levers	1 drop between interference levers and washers.
34	1	Tape-out lever	1 or 2 drops at pivot and working points.
34	2	Tape feed claw	1 or 2 drops at pivot and working points.
34	3	Start-stop lever detent	1 or 2 drops at pivot and working points.
34	4	Lower switch bail lever	1 or 2 drops at pivot and working points.
34	5	Tight-tape lever	1 or 2 drops at pivot and working points.
34	6	Upper switch bail lever	1 or 2 drops at pivot and working points.
35	1	Tape cover latch	1 or 2 drops at pivot and working points.
35	2	Tape cover hinge	1 or 2 drops at pivot.
36	1	Indicator return spring	Light coat on spring surface.
36	2	Return latch	1 or 2 drops at pivot and working surface.
36	3	Key levers	1 drop at each of the 33 key lever pivots.
36	4	Indicator carriage	1 or 2 drops on roller.
36	5	Line indicator drive shaft	1 or 2 drops at pivot; light coat on entire working surface.
36	6	Cam follower	1 or 2 drops at pivot and working surfaces.
36	7	Ratchet pawl	1 or 2 drops at pivot point and working surfaces.
36	8	Ratchet wheel	Light coat on entire working surface.
36	9	Ratchet wheel detent	1 or 2 drops at pivot and working surface.
36	10	Function blocking bar	1 or 2 drops at each pivot and working surface.
36	11	Front key lever guide	1 drop in each slot.
36	12	Space bar arm assembly pivots	1 drop at each of the three pivots.
36	13	Middle key lever guide	1 drop in each of the 33 key lever guide slots.
36	14	Code bar guide studs	2 or 3 drops in each groove.
37	1	Motor governor adjustment gear	Apply sparingly on gear teeth.
37	2	Governor worm	1 or 2 drops in governor hub opening.
37	3	Governor adjustment lever	1 drop each end.
37	4	Governor adjustment screw	Apply sparingly to entire thread.
38	1	Tape puller arm roller	1 or 2 drops on roller.
38	2	Tape puller arm pivot stud	1 drop at each working point of stud.
39	1	Alarm lever	1 or 2 drops at pivot point.
39	2	Lever latch	1 drop at pivot point.

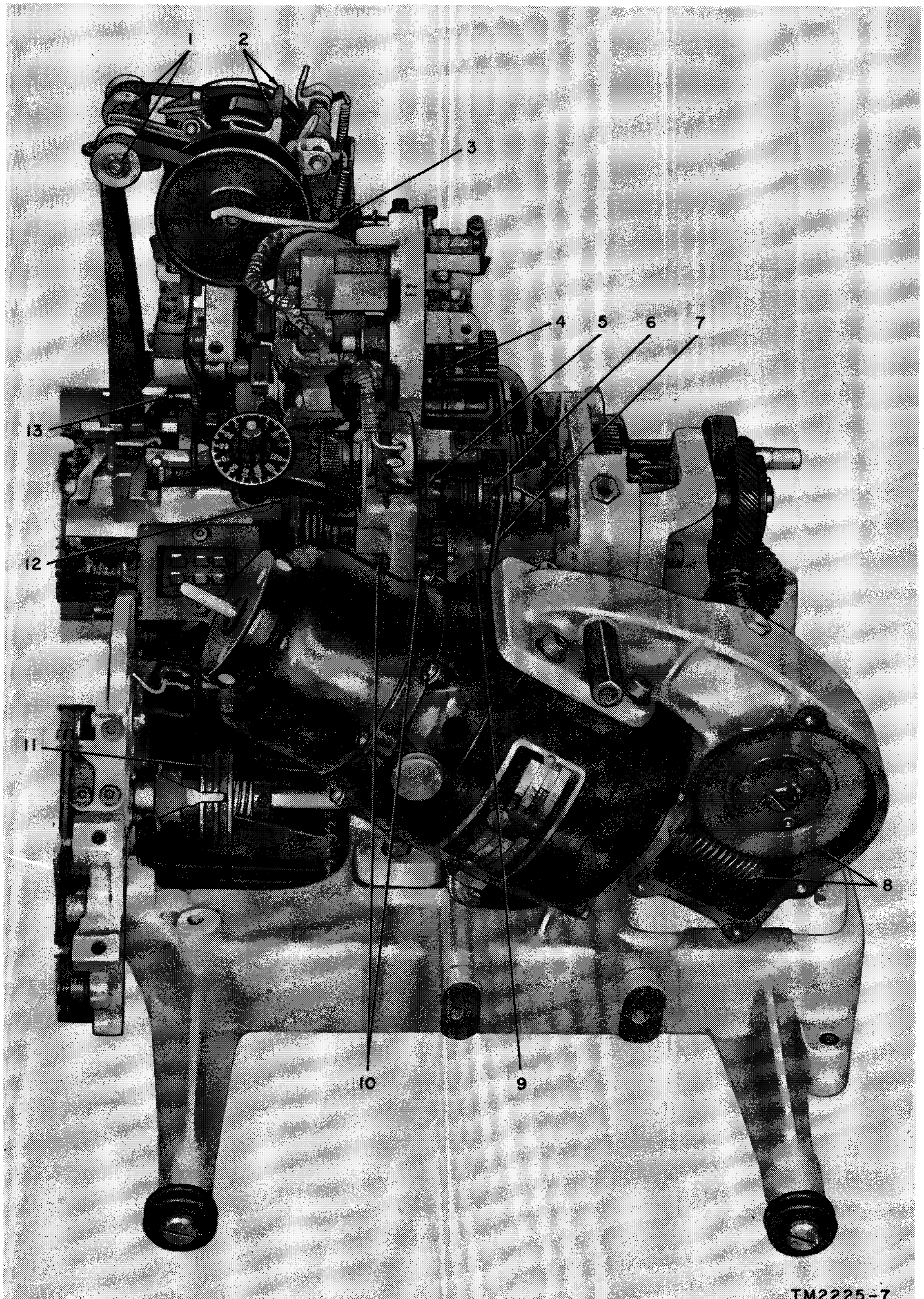
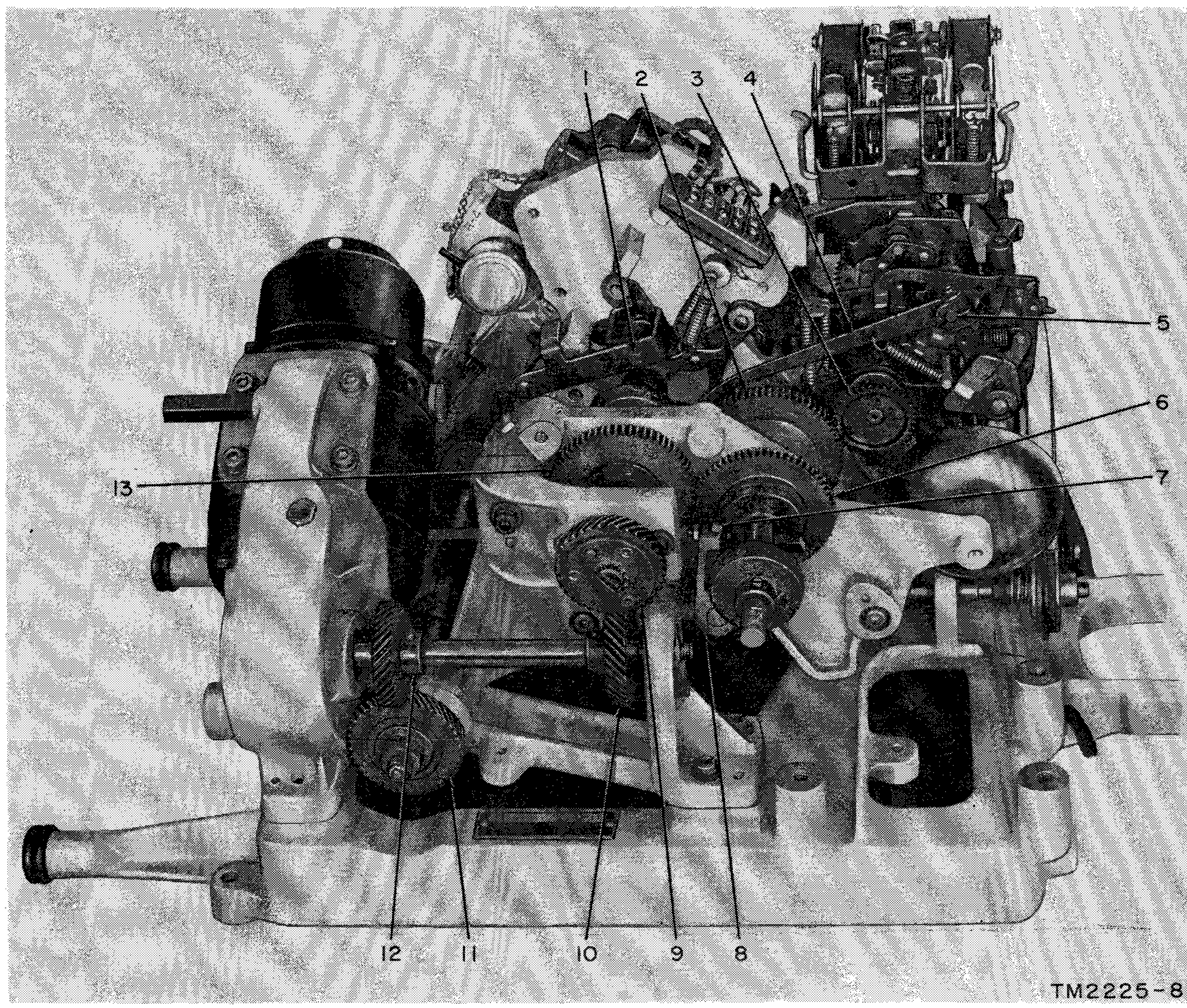


Figure 27. Right side of reperforator, showing lubrication points.

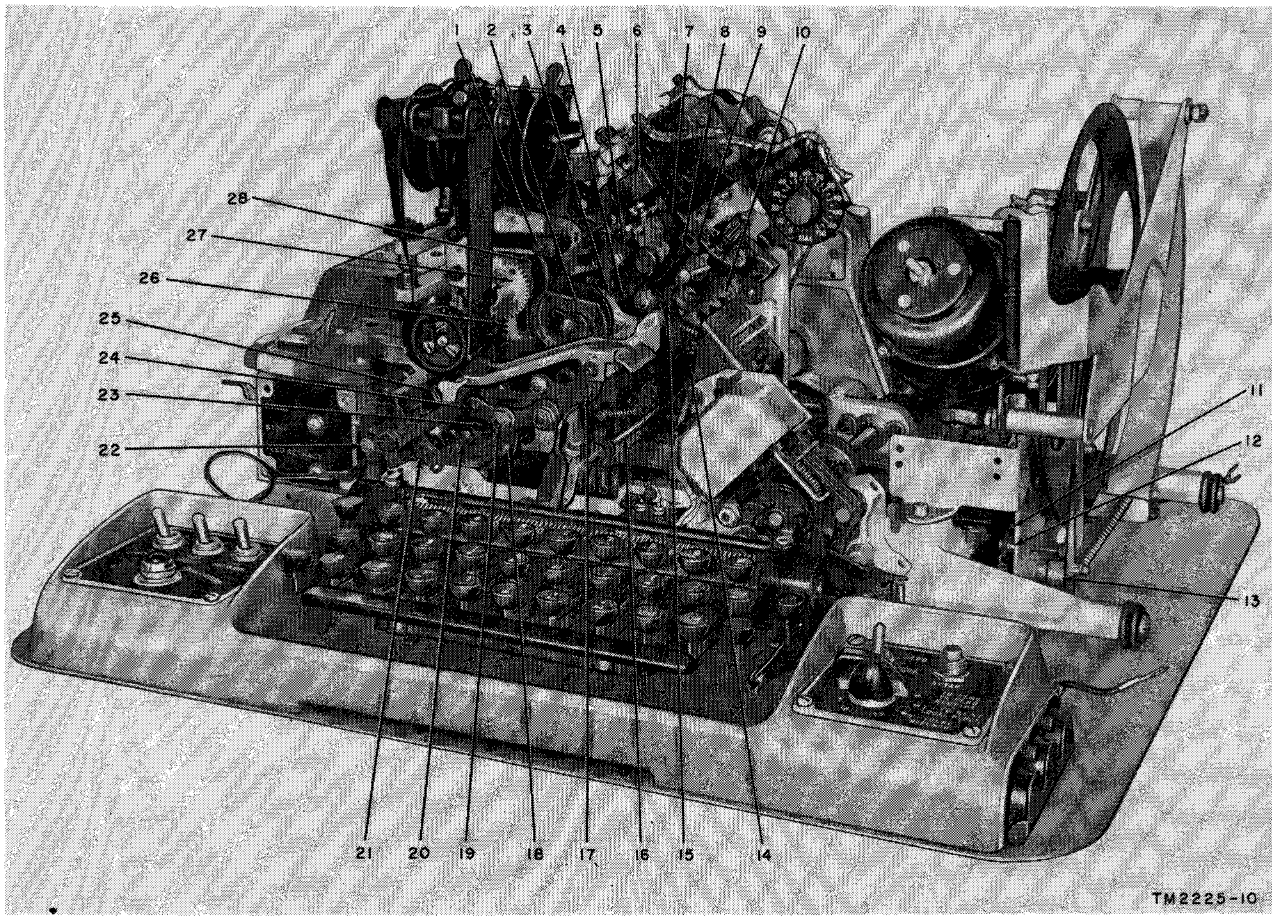
1 Ribbon roller
2 Ribbon sensing levers
3 Spool clip
4 Manual tape feed-out trip latch
5 Manual tape feed-out disabling cam
6 Selector camshaft friction clutch
7 Manual tape feed-out link
8 Worm gear set
9 Transfer trip latch shaft
10 Transfer lever latch and trip latch
11 Keyboard-transmitter drive shaft friction clutch
12 Grooved spindle
13 Type wheel post

Figure 27—Continued.



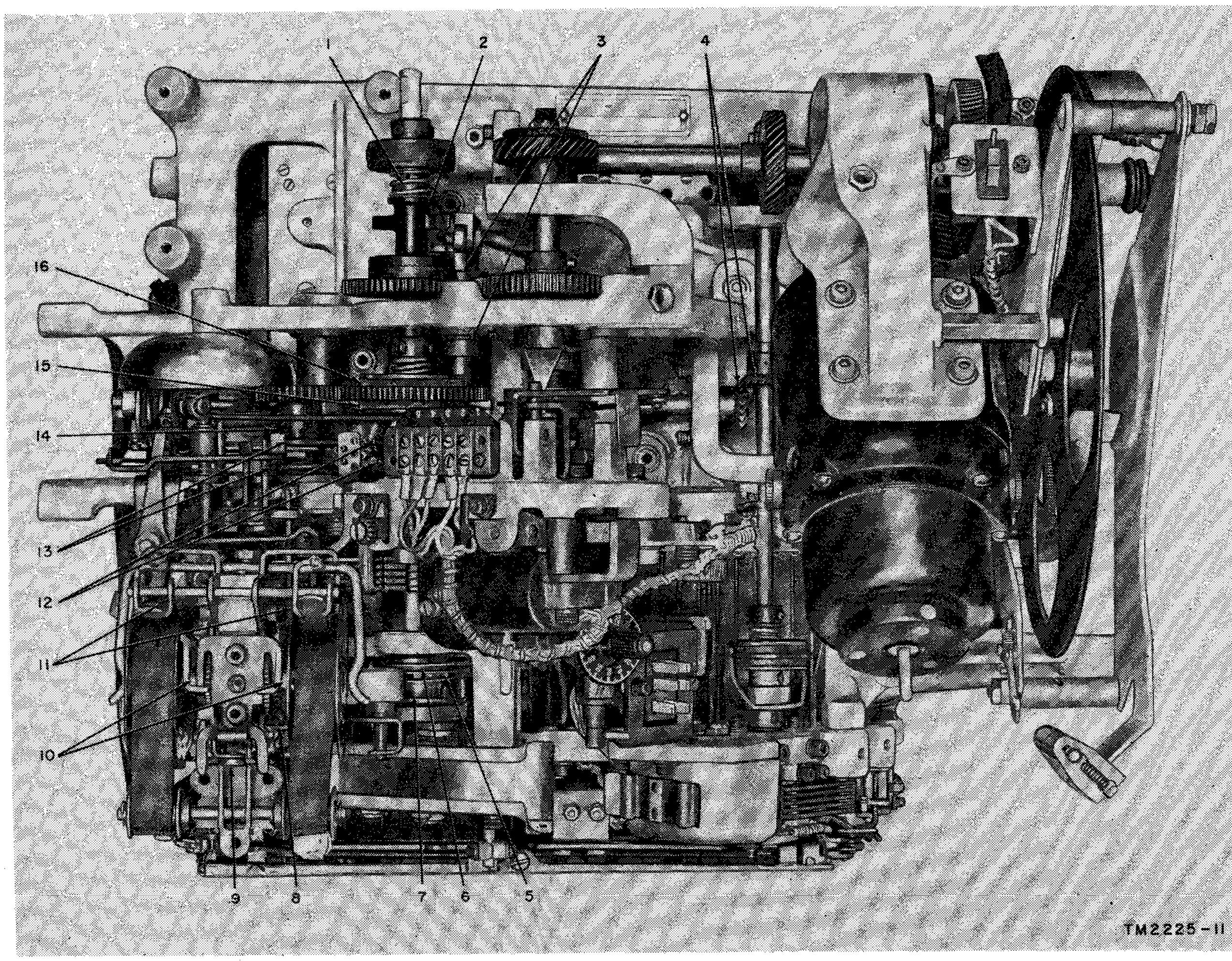
1 Manual tape feed-out latching lever shaft
2 Function shaft drive gear
3 Stop arm shaft driven gear
4 Code-ring locking bail cam follower
5 Code-ring locking bail shaft
6 Function camshaft gear
7 Ball bearing
8 Clutch latch arm
9 Main shaft driven gear
10 Main shaft drive gear
11 Keyboard drive shaft driven gear
12 Keyboard drive shaft drive gear
13 Function shaft drive gear

Figure 28. Rear view of reperforator, showing lubrication points.



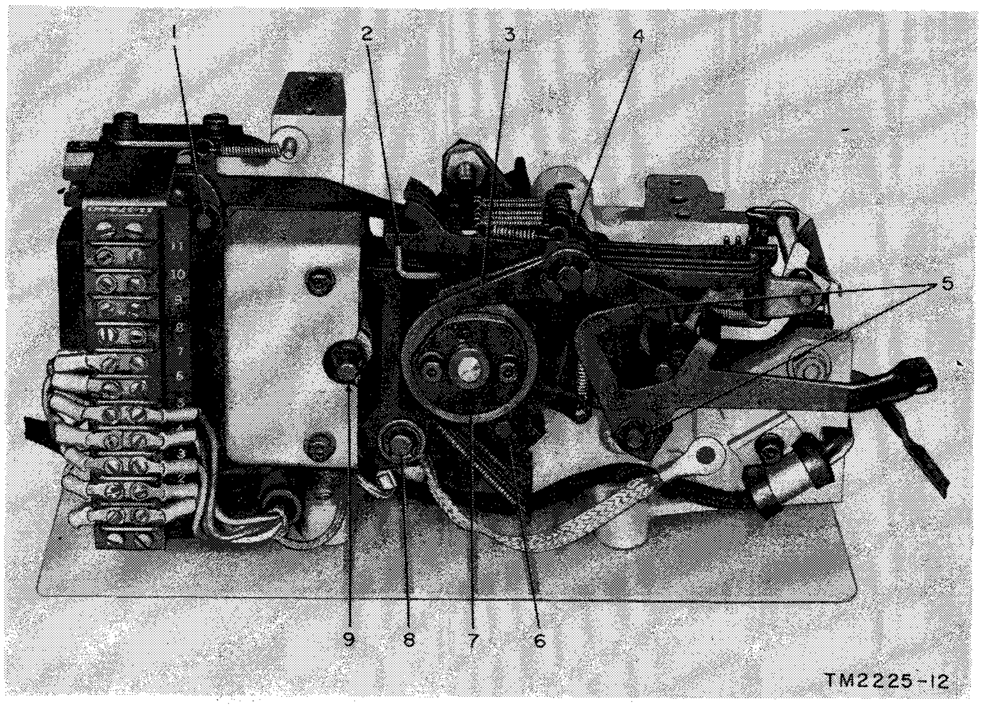
1	Ribbon feed cam follower eccentric stud	15	Rangefinder cam
2	Print and register cam	16	Tape feed-out shaft
3	Transfer lever roller stud	17	Print and register levers shaft
4	Transfer lever restoring cam	18	Punch lever stop pin
5	T-levers and separating washers	19	Punch arm pivot post
6	Armature mounting shaft	20	Punch lever pivot stud
7	Y-levers and separating washers	21	Feed pawl pivot
8	Selector levers and separating washers	22	Back space pivot stud
9	Selector lever stop comb	23	Code hole punch levers
10	Selector camshaft and stop plate	24	Interference lever shaft
11	Switch actuating arm latch	25	Code punch bars
12	Switch actuating lever	26	Type wheel hub assembly
13	Tape-out alarm lever hub	27	Type wheel driven gear
14	Transfer lever trip latch	28	Stop arm

Figure 29. Front view of reperforator, showing lubrication points.



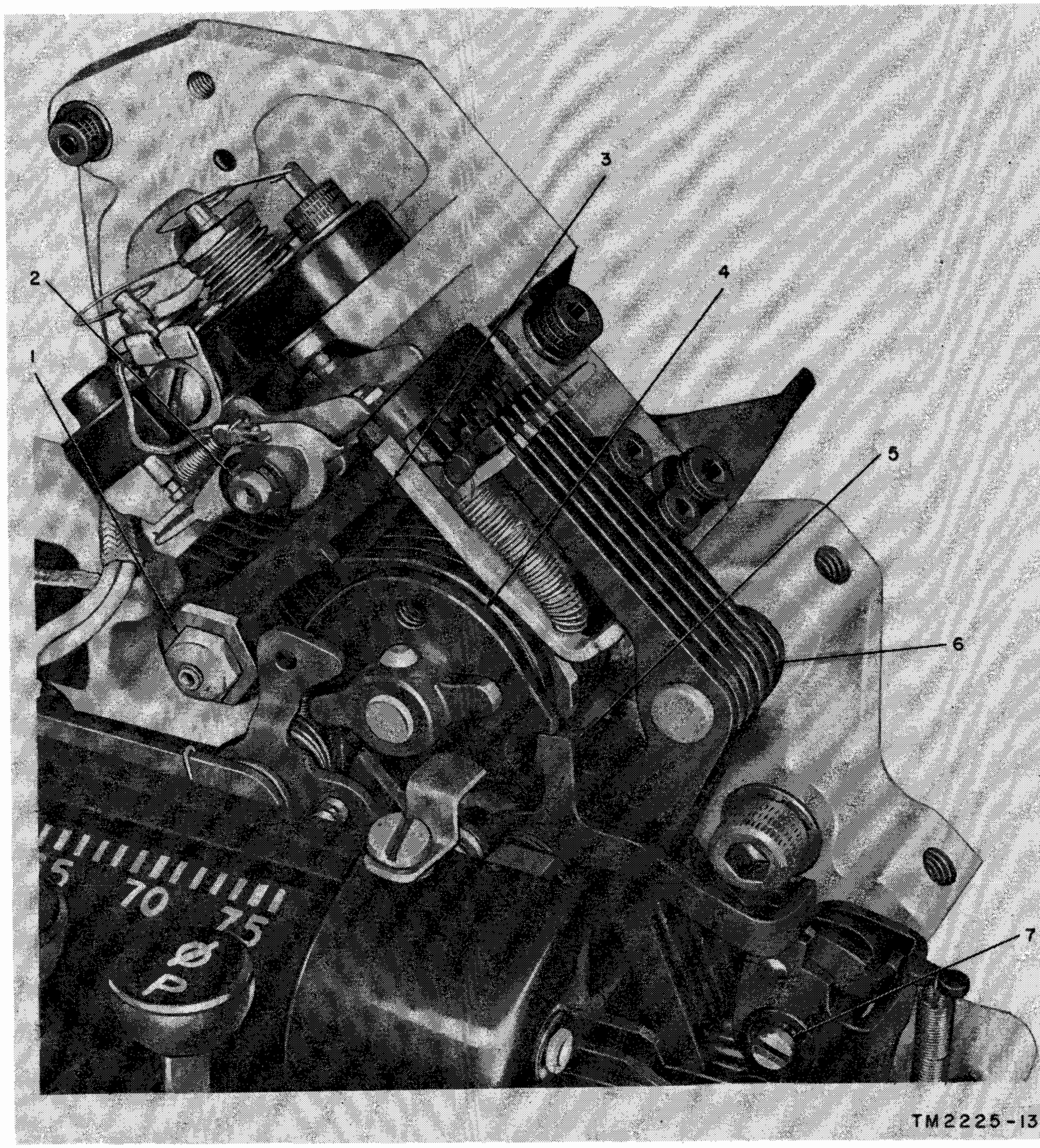
1 Sliding clutch coupling
2 Sliding drum clutch
3 Transfer lever shaft bearings
4 Transmitter-distributor drive shaft drive gear set
5 Typewheel register lever cam
6 Print hammer cam
7 Ribbon feed cam
8 Ribbon feed lever pawl
9 Driving link lever toggle assembly
10 Ribbon spool shaft
11 Ribbon retainer levers
12 Reciprocating and restoring cams
13 Reciprocating and restoring cam followers
14 Cam lever assembly
15 Cam stud plate
16 Function shaft friction clutch

Figure 30. Top view of reperforator, showing lubrication points.



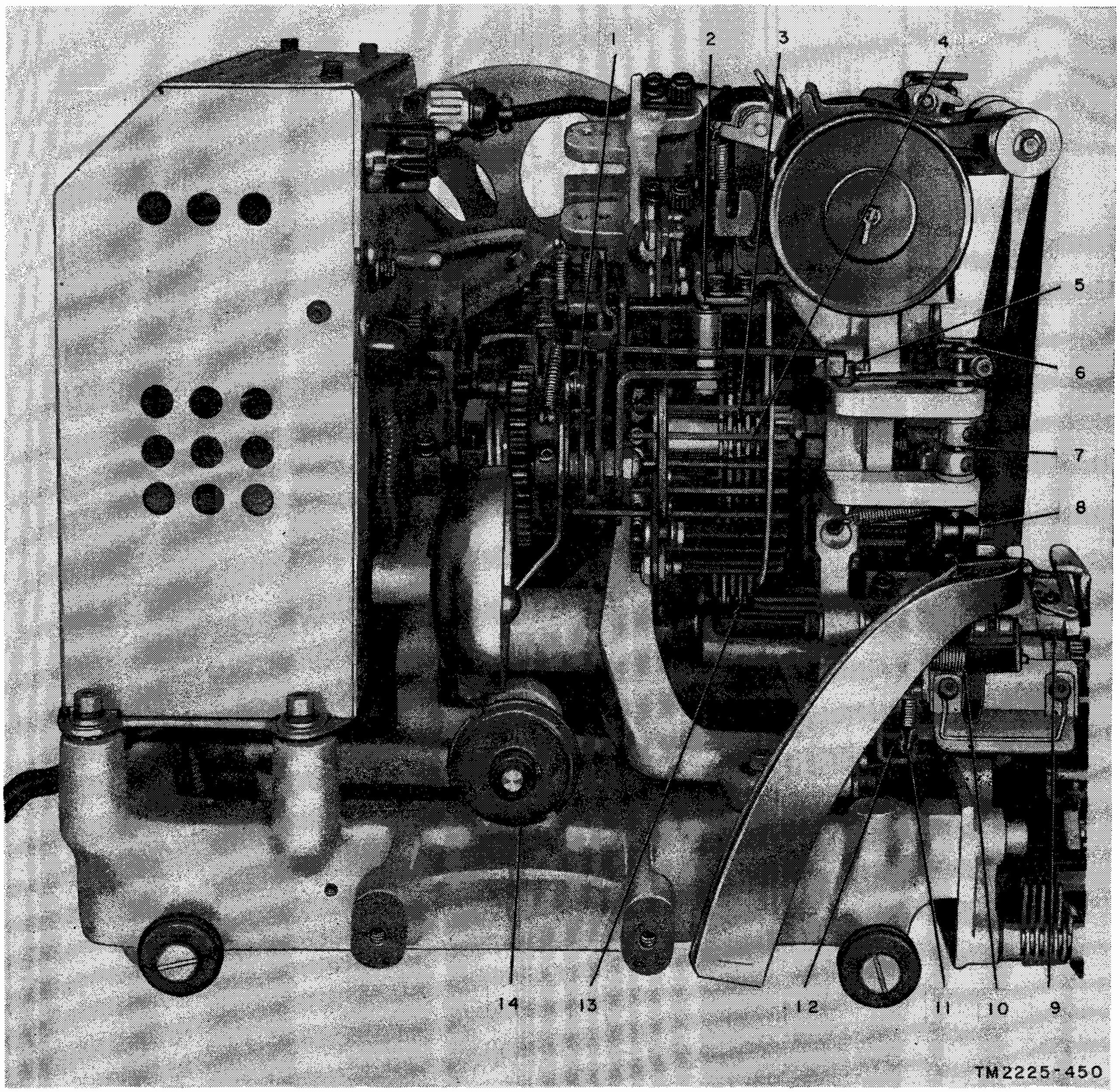
1 Clutch magnet armature
2 Selector lever comb
3 Tape feed retracting lever
4 Code sensing lever
5 Stop-start lever
6 Tape feed lever
7 Transmitter-distributor camshaft
8 Selector levers, bearing shoes, and flat washers
9 Transmitter contact bail pivot

Figure 31. Right side of transmitter-distributor, showing lubrication points.



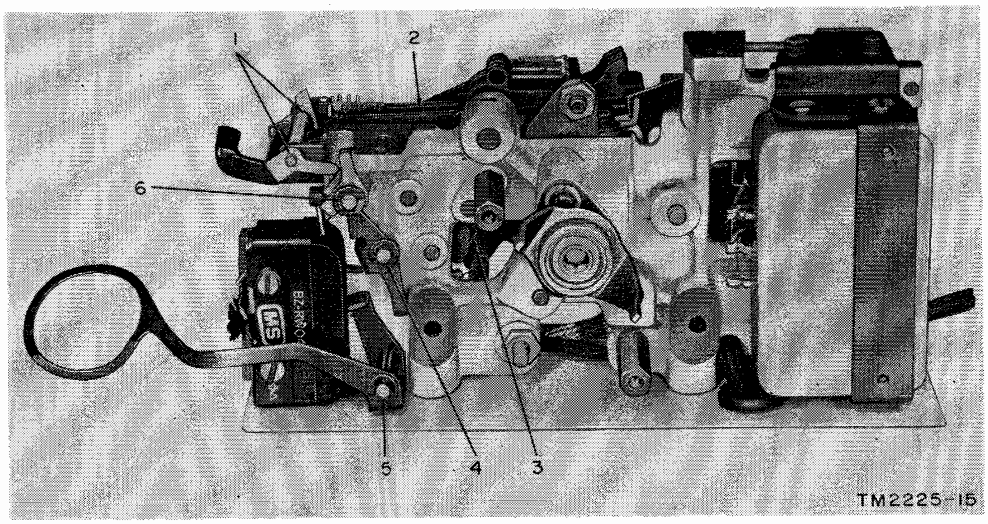
1 Selector levers, bearing shoes, and flat washers
2 Transmitter contact bail pivot stud
3 Sensing lever locking bail
4 Transmitter camshaft
5 Cam-stop lever
6 Sensing levers
7 Locking lever latch

Figure 32. Keyboard-transmitter transmitting mechanism, showing lubrication points.



1 Type wheel reciprocating drive levers
2 Type wheel reciprocating transfer lever eccentric stud
3 Code rings
4 Stop bars in code-ring cage
5 Upper bell crank lever
6 Upper bell crank lever stud
7 Reciprocating lever shaft
8 Lower bell crank lever
9 Tape feed sprocket
10 Tape retainer assembly
11 Detent lever
12 Detent lever eccentric stud
13 Punch interference levers
14 Transmitter-distributor friction clutch

Figure 33. Left side of reperforator, showing lubrication points.

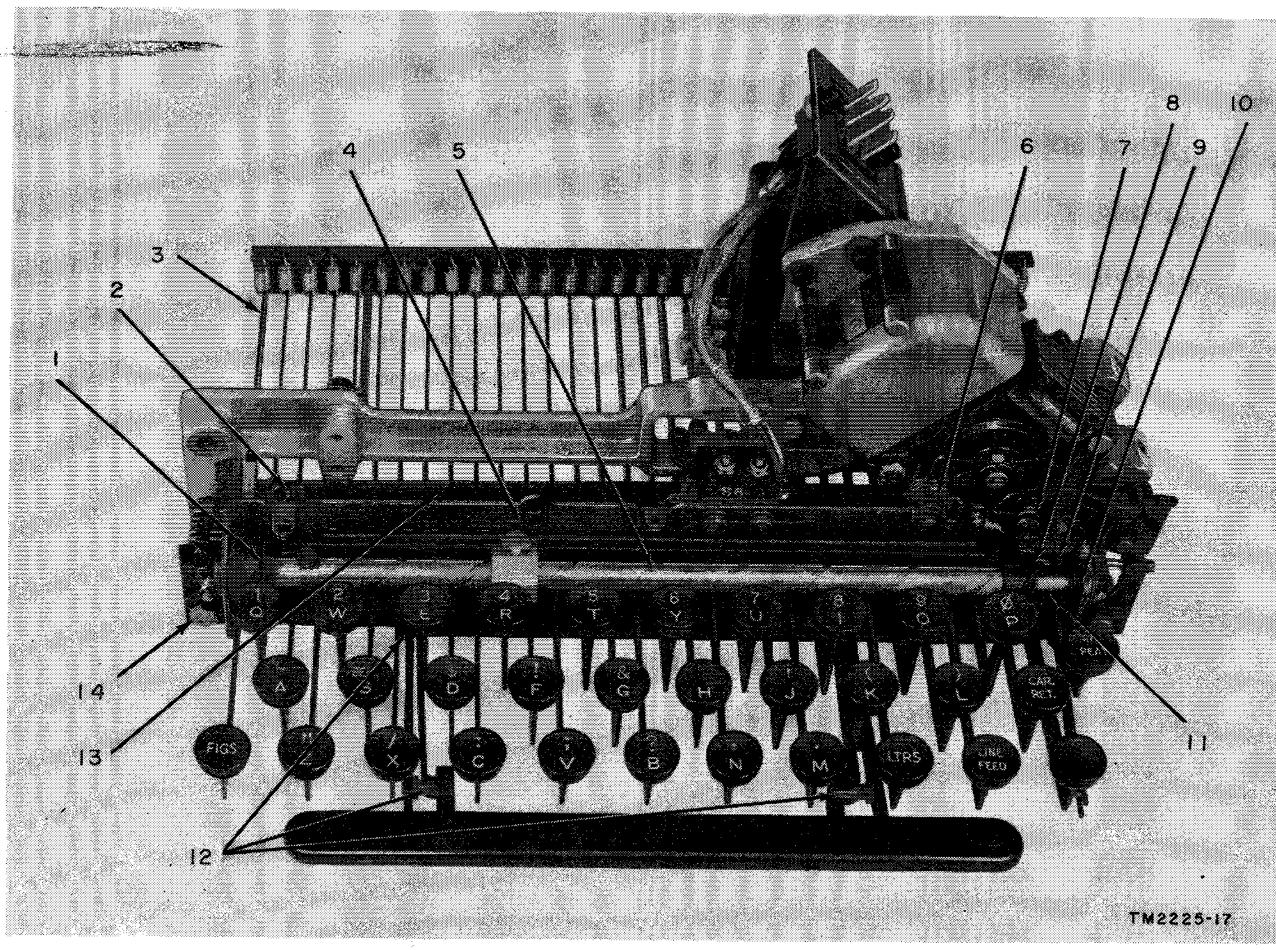


1 Tape-out lever
2 Tape feed claw
3 Start-stop lever detent
4 Lower switch bail lever
5 Tight-tape lever
6 Upper switch bail lever

Figure 34. Left side of transmitter-distributor, showing lubrication points.

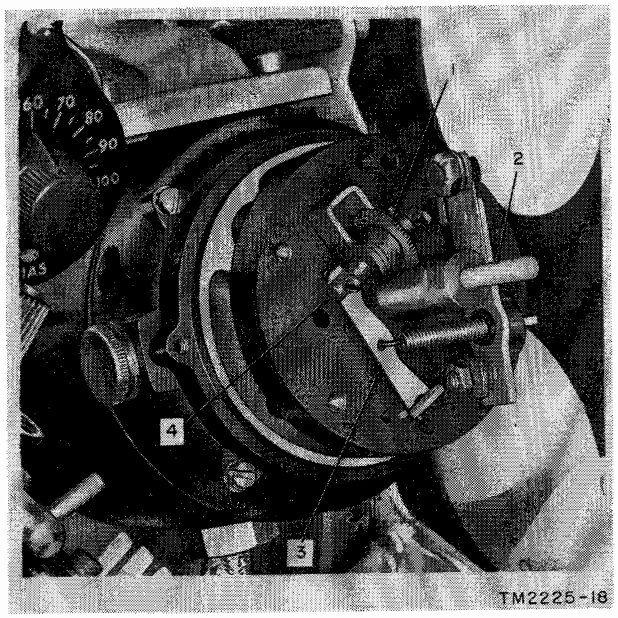
1 Tape cover latch
2 Tape cover hinge

Figure 35. Transmitter-distributor, tape cover lubrication points.



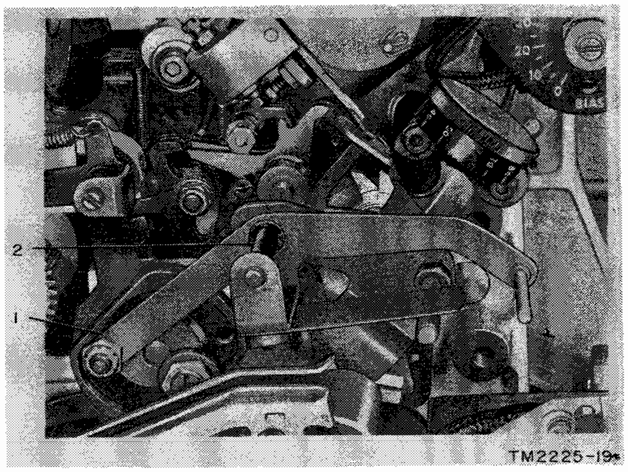
1 Indicator return spring
2 Return latch
3 Key levers
4 Indicator carriage
5 Line indicator drive shaft
6 Cam follower
7 Ratchet pawl
8 Ratchet wheel
9 Ratchet wheel detent
10 Function blocking bar
11 Front key lever guide
12 Space bar arm assembly pivots
13 Middle key lever guide
14 Code bar guide studs

Figure 36. Front view of keyboard-transmitter, showing lubrication points.



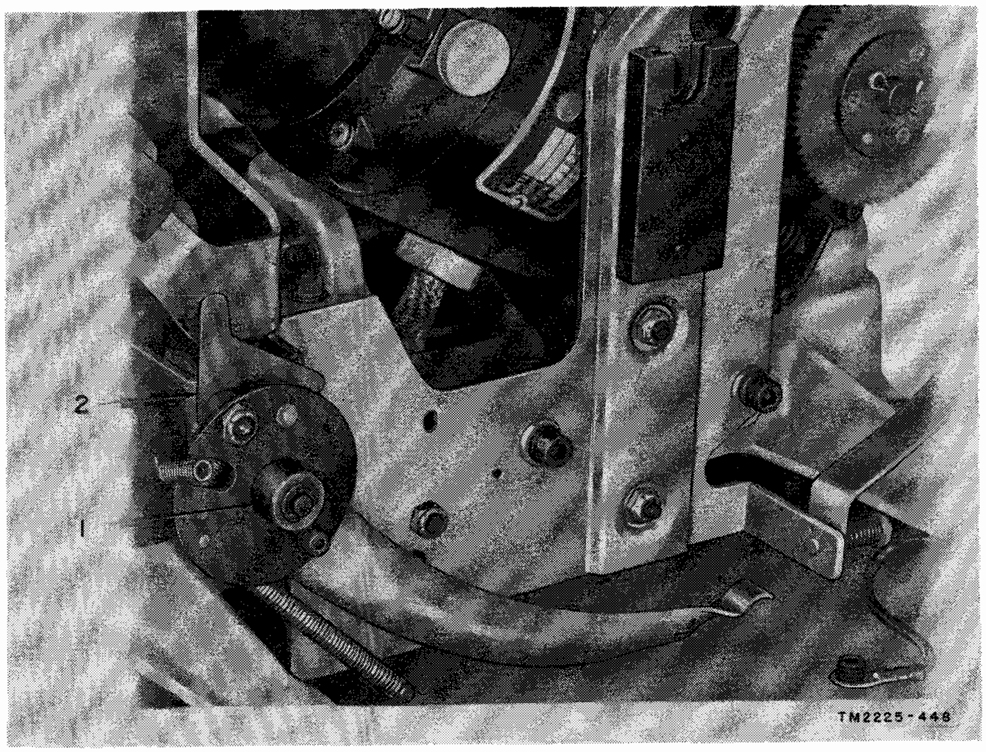
1 Motor governor adjustment gear
2 Governor worm
3 Governor adjustment lever
4 Governor adjustment screw

Figure 37. Motor governor, showing lubrication points.



1 Tape puller arm roller
2 Tape puller arm pivot stud

Figure 38. Tape puller, showing lubrication points (TT–76A/GGC).



1 Alarm lever 2 Lever latch

Figure 39. Tape-alarm lever, showing lubrication points (TT–76A/GGC).

Section IV. TROUBLE SHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

Note. This section contains instructions for troubleshooting at organizational level. Troubleshooting at field maintenance level is described in chapter 6.

44. General

Troubleshooting at the organizational maintenance level requires that the trouble be sectionalized by tracing it to a faulty component as quickly as possible. It must be determined whether the faulty component can be repaired at the organizational maintenance level or whether it must be sent to a field repair shop. The repair work that can be performed at the organizational level is limited in scope by the tools, test equipment, and replaceable parts available.

45. Visual Inspection

a. Failure of equipment to operate properly usually is caused by one or more of the following visible faults:

(1) Improperly connected power cord.

(2) Burned-out fuse in power supply and terminal unit.

(3) Worn, broken, burned-out, or disconnected cord or plug.

(4) Wires broken by excessive vibration.

(5) Loose ground connection (particularly in dc system using simplex line).

(6) Visibly worn or damaged mechanical part.

b. When failure or troublesome operation occurs and the cause is not immediately apparent, check as many of these items as is practicable before starting a detailed examination. If possible, obtain information from the operator of the equipment regarding the performance at the time trouble occurred.

c. Visually inspect as much of the line system as possible for obvious trouble.

46. Sectionalizing Trouble

When the cause of trouble cannot be found by simple visual inspection (par. 45), follow the procedure outlined in the equipment performance checklist (par. 48). In this list it is assumed that the teletypewriter is connected to a signal line or to the local test circuit (par. 47), that a good fuse is inserted properly in the fuse holder, and that the teletypewriter is loaded properly with paper tape. Perform the steps in the order they are listed. If the trouble cannot be found by means of the equipment performance checklist, field maintenance is required.

47. Local Test Arrangement

When a trouble exists and cannot readily be located in associated teletypewriters, or in some part of the line circuit between stations by visual inspection, place the SELECTOR switch in the LOCAL REPUNCH position. This connects the teletypewriter transmitter contacts in series with the selector magnet and a local dc supply. The reperforator of the local machine now can be operated with signals received directly from the keyboard-transmitter or transmitter-distributor. Perform the steps outlined in the equipment performance checklist (par. 48). If the trouble no longer is evident, look for it in the line circuit or at the distant teletypewriter.

48. Equipment Performance Checklist

	Item No.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	Power selector switch	Set to match ac power	None	None.
	2	Ground	Check connections. Be sure all power connections are in OFF position while checking.	None	Establish good connection (par. 14).
	3	Power	Power cord plugged in	None	None.
	4	POWER switch	In OFF position	None	None.
	5	Line connections	Signal cords plugged into provided line facilities for type of service desired.	None	Connect as required (par. 19).

	Item No.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	6	Paper tape	Check for adequate supply; be sure that paper tape is positioned correctly through its guides, under type wheel, and through punch and die assembly.	None	Replenish or adjust paper tape (par. 24*b*).
	7	Inking ribbon	In proper position around spools and rollers, and passed through guide slots.	None	Adjust inking ribbon (par. 24*c*).
	8	POWER switch	Operate to ON	None	None.
	9	LIGHT switch	Operate to ON	Copy light should light	Check lamp and switch.
EQUIPMENT PERFORMANCE	10	MOTOR switch	Operate to ON	Motor starts	Check fuse; check power source connection. Check brushes.
	11	KEYBOARD switch	Operate to SEND	Transmission possible from keyboard-transmitter.	Check switch.
	12	Motor speed	Adjust according to instructions in paragraph 16.		
	13	BIAS potentiometer	Adjust according to instructions in paragraph 16.		
	14	Rangefinder	Adjust according to instructions in paragraph 16.		
	15	Tape feed (reperforator)	Depress space bar and hold REPEAT key depressed.	Paper tape should feed properly.	Check paper tape reel guides.
	16	END OF LINE INDICATOR lamp.	Depress R and Y alternately.	Lamp should light on operation of 66th character.	Check lamp and contacts (pars. 63 or 64).
	17	CAR. RET. key	Depress key	When depressed, END OF LINE INDICATOR lamp should extinguish; indicator mechanism should return to zero position.	Check function blocking bar, ratchet pawl, and return spring housing (pars. 62 and 63 or 64).
	18	REPEAT key	Depress and hold any key and the REPEAT key.	Selected character should repeat as long as both keys are held depressed.	Check REPEAT key lever, repeat lever, and repeater blocking lever (par. 54).
	19	BREAK key	Depress key	Opens signal line	Check key.
	20	Type wheel	Receive test message	Should be projected and restored for each operation and should shift to figures position properly.	Check bell crank assemblies and operation of the type wheel drive lever (pars. 70 and 107).
	21	Inking ribbon feed mechanism.	Receive test message	Inking ribbon should feed as every other character is typed.	Check inking ribbon in guides and ribbon feed pawl action (pars. 109–114).
	22	Code and feed punches	Receive test message	Check operation by sending continuous R's and Y's on keyboard-transmitters.	Check punch arm, code punch lever and code hole punches (pars. 93, 94, and 96).
	23	Manual tape feed-out lever.	Move lever to left	Paper tape should feed-out; BLANK symbol will print on paper tape.	Check transfer lever trip latch, and manual tape feed-out linkage (pars. 131–134).

	Item No.	Item	Action or condition	Normal indications	Corrective measures
EQUIPMENT PERFORMANCE	24	Signal bell mechanism....	Depress S key with unit in figures shift position.	Signal bell should ring.....	Check signal bell sensing lever, clapper, and bell (pars. 77, 78, and 72).
	25	Back-space lever.........	Operate lever............	Paper tape should back space one space for each operation.	Check back-space pawl and spring (pars. 101 and 102).
	26	KEYBOARD switch......	Operate to LOCK........	No transmission possible from keyboard-transmitter.	Check switch.
	27	Transmitter-distributor...	Test paper tape in position. STOP-START lever at START.	Transmitter-distributor should transmit from tape.	Check tight-tape and tape-out linkage and power supply (pars. 158, 160, and 161).
	28	Tight-tape lever (on transmitter distributor).	Raise lever..............	Transmitter-distributor should stop.	Check tight-tape and tape-out linkage (pars. 148 and 158).
	29	Tape-out lever...........	End of message tape passes over tape-out lever.	Transmitter-distributor should stop.	Check tape-out lever, tape-out linkage and switch (par. 148 and 158).
STOP	30	MOTOR switch..........	Turn to OFF............	Motor should stop........	Check action of switch.
	31	LIGHT switch...........	Turn to OFF............	Light should be extinguished.	Check switch.
	32	POWER switch..........	Turn to OFF............	Supply of power to power supply and terminal unit is cut off.	Check switch.

Section V. REPERFORATOR-TRANSMITTER ADJUSTMENT PROCEDURES

49. General

This section contains the requirement and adjustment procedures for the reperforator-transmitter. Complete the individual checks and make the necessary adjustments, if required. Adjustments are arranged in sequence for a complete readjustment of the reperforator-transmitter. Adjustments not otherwise identified apply to all units, those applicable only to TT-76/GGC or TT-76A/GGC are so indicated. When making individual adjustments, check all related adjustments. When removing parts to make an adjustment refer to paragraphs 212 through 296 for instructions. Perform adjustments described in paragraphs 50 through 161 in the order presented.

50. Sensing Levers Clearance Adjustment
(fig. 40)

a. Requirement. The sensing levers and code bars should be in line and there should be .001- to .005-inch clearance between the laminated flat washer and the sensing lever.

b. Adjustment. Peel the laminated flat washer until the sensing lever and code bar are in line. Move the selector lever pivot stud in or out to obtain the .001- to .005-inch clearance; tighten the set screw.

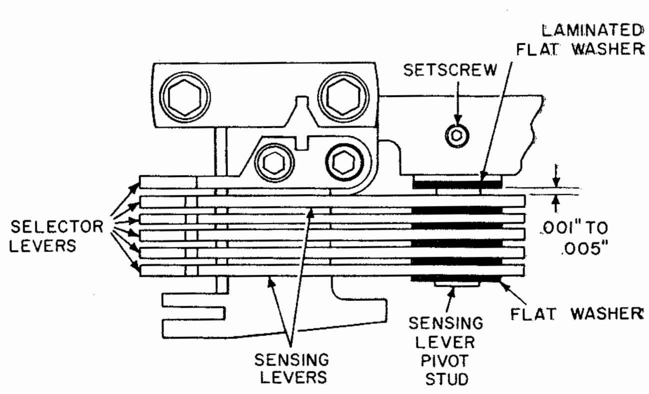


Figure 40. Sensing levers clearance adjustment.

51. Selector Levers and Sensing Levers Adjustment
(fig. 41)

a. Requirement. With the selector lever on the low part of the cam, there should be a minimum of .005-inch clearance between the selector levers and the sensing levers.

b. Adjustment. Move the selector levers comb to obtain the required clearance. This adjustment should be made and checked at the same time as the minimum clearance when making the stop selector lever latch adjustment. Check related adjustment (par. 52).

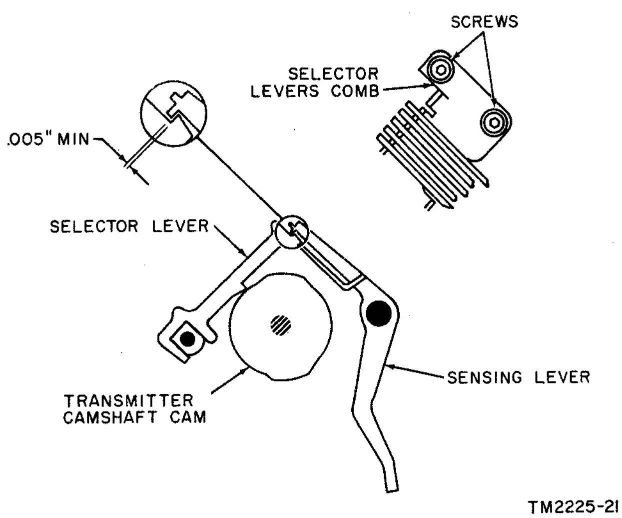


Figure 41. Selector levers and sensing levers adjustment.

52. Keyboard Stop Pulse and Contacts Adjustment
(fig. 42)

Note. Place the POWER switch to ON, the MOTOR switch to OFF, and the selector switch to position 3 (LOCAL REPUNCH) while performing this adjustment.

a. Requirements.

(1) There should be minimum breaks in the send circuit between successive marking impulses.

(2) The stop selector lever latch should be adjusted to give a minimum break in the send circuit between the 5th marking impulse and the stop pulse. There should be .005-inch minimum clearance between the stop selector lever and the stop 1 selector level latch when the stop selector lever is on the low point of its cam.

b. Method of Checking.

(1) Set Multimeter TS-297/U to read on the 100 ma scale. Connect the multimeter and Cord CX-468/U into the TR jack at the right side of the keyboard guard. This will place the multimeter in series with the signal line. Depress the LTRS key lever and slowly turn the motor by hand. There should be slight, but minimum, breaks between the marking impulses.

(2) Connect a milliammeter in series with the signal line in (1) above. Depress the T-key lever and turn the motor slowly by hand. There should be a slight, but minimum, break between the marking 5th intelligence impulse and the stop pulse. With the stop selector lever on the low point of its cam, check the clearance between the stop selector lever latch with a feeler gage.

c. Adjustments.

(1) Connect a milliammeter in series with the signal line (*b*(1) above). Depress the LTRS key lever and slowly turn the motor by hand. Turn the mark stationary contact in or out until the requirement of *a*(1) above is met.

(2) With the milliammeter still connected in series with the line (*b*(1) above), loosen the machine screws that hold the stop selector lever latch. Depress the T-key lever and slowly turn the motor by hand. Move the stop selector lever latch to the right or left until a slight, but minimum, break is obtained between the 5th marking impulse and the stop pulse. Move the stop selector lever latch to the right to decrease the break and to the left to increase the break. With the stop selector lever against the low part of its cam, check the clearance between the stop selector lever and the stop selector lever latch. If the clearance is less than .005 inch, remake adjustment in paragraph 51. Then reposition the stop selector lever latch to meet the requirement of *b*(2) above.

Note. TT-76A/GGC has a screwdriver slot to aid in the adjustment of the stop selector lever latch.

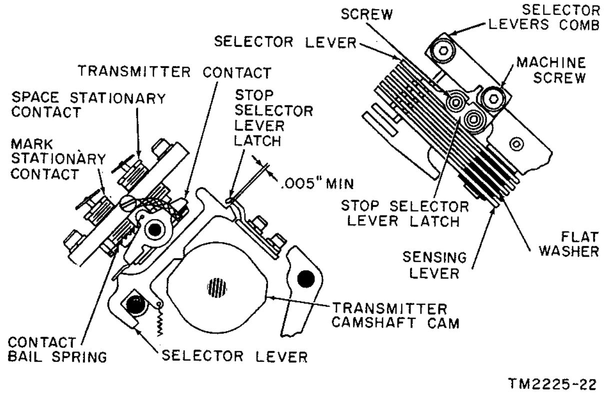


Figure 42. Keyboard stop pulse and contacts adjustment.

53. Sensing Lever Locking Bail Adjustment
(fig. 43)

a. Requirement. There should be equal clearance between the sensing lever locking bail latching surface and the sensing levers latching surface when the sening levers are in both the mark and space positions.

b. Method of Checking. Depress either the R or Y key lever. Turn the transmitter camshaft clockwise by hand until the sensing lever locking bail engages the sensing levers; check the clearance visually.

c. Adjustment. Loosen the self-locking hexagonal nut. With the sensing lever locking bail engaged with the sensing levers, turn the sensing lever locking bail bearing clockwise or counterclockwise until the requirement is met; tighten the self-locking hexagontal nut.

54. Universal Bar Adjustment
(fig. 44)

a. Requirement. There should be .005- to .010-inch clearance betwen the cam-stop lever and the repeat blocking lever when the key lever giving the minimum amount of clearance is depressed.

Note. Check all key levers.

b. Adjustment. Loosen the hexagonal nut and turn the universal bar adjusting screw in or out to meet the requirement; tighten the hexagonal nut. Check related adjustments (par. 61).

55. Keyboard-Transmitter Friction Clutch Adjustments (TT–76/GGC)
(A, fig. 45)

a. Requirement. It should require a pull of 25 to 30 ounces to prevent the keyboard-transmitter fric-

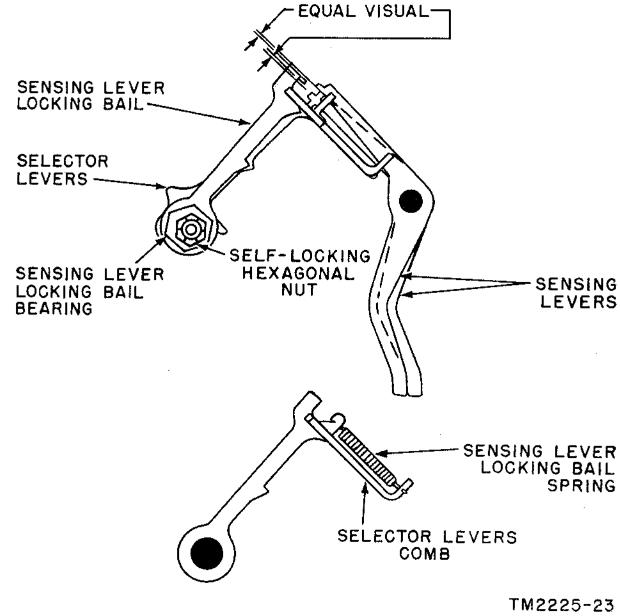


Figure 43. Sensing lever locking bail adjustment.

tion clutch from turning when the motor is on and the camshaft is not operating any levers.

b. Method of Checking. Hook a spring scale on the clutch yoke. While holding the scale rigidly, depress the space bar and allow the camshaft to turn slightly until it is not operating any levers. When the free spot has been established, hold the clutch yoke from turning and read the scale.

c. Adjustment. Loosen the two setscrews in the drive shaft collar, shift the colar forward or back-

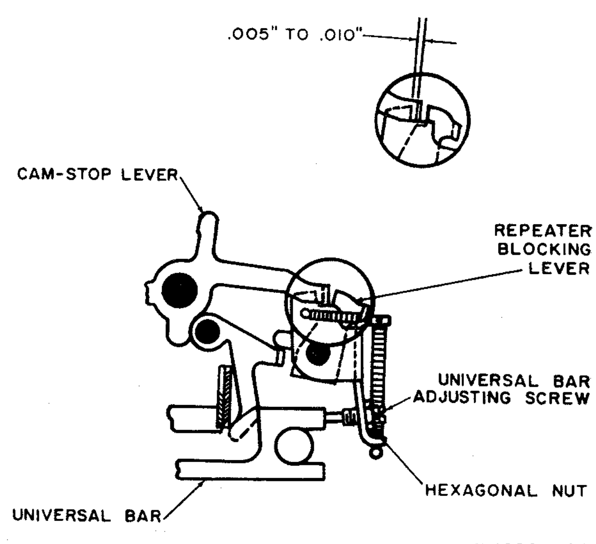


Figure 44. Universal bar adjustment.

ward to obtain the proper spring tension on the friction clutch; tighten the setscrews. Recheck the requirement and readjust if necessary.

56. Keyboard-Transmitter Friction Clutch Adjustment (TT–76A/GGC)

(B, fig. 45)

a. Requirement. It should require a pull of 25 to 30 ounces to prevent the keyboard-transmitter friction clutch from turning when the motor is on and the camshaft is not operating any levers.

b. Method of Checking. Hook a spring scale on the clutch yoke. While holding the scale rigidly, depress the space bar and allow the camshaft to turn slightly until it is not operating any levers. When the free point has been established, hold the clutch yoke from turning and read the scale.

c. Adjustment. Loosen the two clamping screws in the drive shaft collar, rotate the collar to obtain the proper spring tension on the friction clutch; tighten the clamping screws. Recheck the requirement and readjust if necessary.

57. Line Indicator Adjustments

(fig. 46)

a. Clearance Adjustment.

(1) *Requirement.* There should be .001- to .005-inch clearance between the retainer ring and the bearing.

(2) *Adjustment.* Remove the retainer ring next to the laminated flat washer. Peel the laminated flat washer to meet the requirement. Replace the retainer ring and recheck the clearance.

b. Spring Adjustment.

(1) *Requirement.* The indicator carriage should return to the left hand margin from one space out when the carriage return is selected. It should require a pull of 4 to 5 ounces to rotate the ratchet wheel one space.

(2) *Method of Checking.* Move the indicator carriage one space out. Select the carriage return; the indicator carriage should move to the left hand margin.

(3) *Adjustment.* Remove both retainer rings on the right hand side and move the line indicator drive shaft to the right. Hold the indicator return spring assembly while moving the line indicator drive shaft. Rotate the indicator return spring assembly clockwise to increase the spring tension and counterclockwise to decrease the spring tension. Replace the line indicator drive shaft and indicator return spring assembly; make sure the tab on the indicator return spring assembly goes into the slot on the frame to prevent the indicator return spring assembly from turning. Replace the retainer rings and recheck the

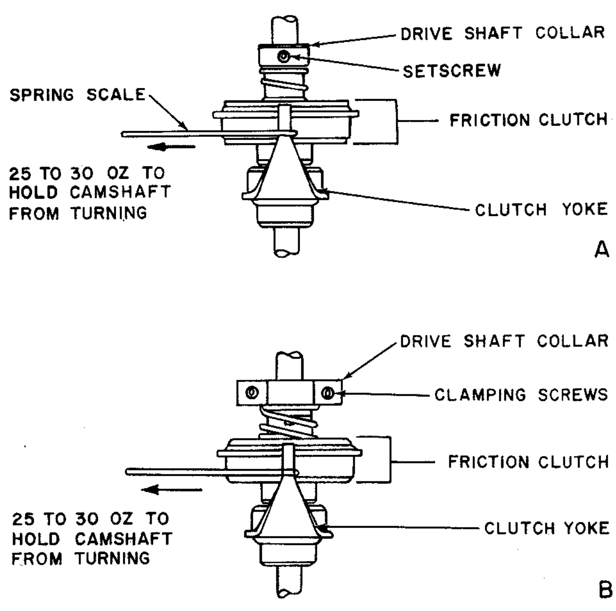


Figure 45. Keyboard-transmitter friction clutch adjustment.

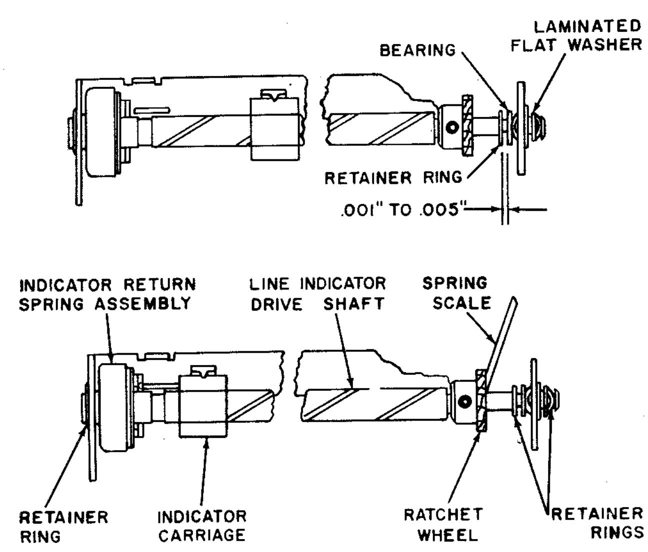


Figure 46. Line indicator adjustments.

tension. Check related adjustments (par. 58).

58. Drive Shaft Ratchet Wheel Alignment Adjustment
(fig. 47)

a. Requirements.

(1) There should be a .005- to .010-inch clearance between the blocking portion of the ratchet wheel detent and a tooth on the ratchet wheel when the indicator carriage is in its extreme left hand position.

(2) There should be .005- to .010-inch clearance between the ratchet pawl and the upper left extension of the function blocking bar when the indicator carriage is in its extreme left hand position.

(3) With the function blocking bar pushed manually all the way to the right, there should be 7/64- to 9/64-inch clearance between the ratchet wheel detent and the ratchet wheel.

b. Adjustments.

(1) Loosen the two setscrews in the ratchet wheel. Hold the ratchet wheel against the shoulder of the drive shaft and rotate it to obtain required clearance. Tighten the setscrews and recheck the adjustment.

(2) Bend the upper left extension of the function blocking bar until the requirement is met.

(3) Bend the upper right extension of the function blocking bar until the requirement is met.

(4) Check related adjustments (pars. 60, 61, and 62).

59. Return Latch and Drive Shaft Pin Adjustment
(fig. 48)

a. Requirement. There should be .005- to .015-inch clearance between the indicator return latch and the pin in the left end of the line indicator drive shaft when the indicator carriage has been spaced out so that the pin in the drive shaft is vertical, and the return latch is against the high portion of the left extension of the function blocking bar.

b. Method of Checking. Depress the CAR. RET. key lever; then depress the space bar approximately 5 times so that the return latch is against the high

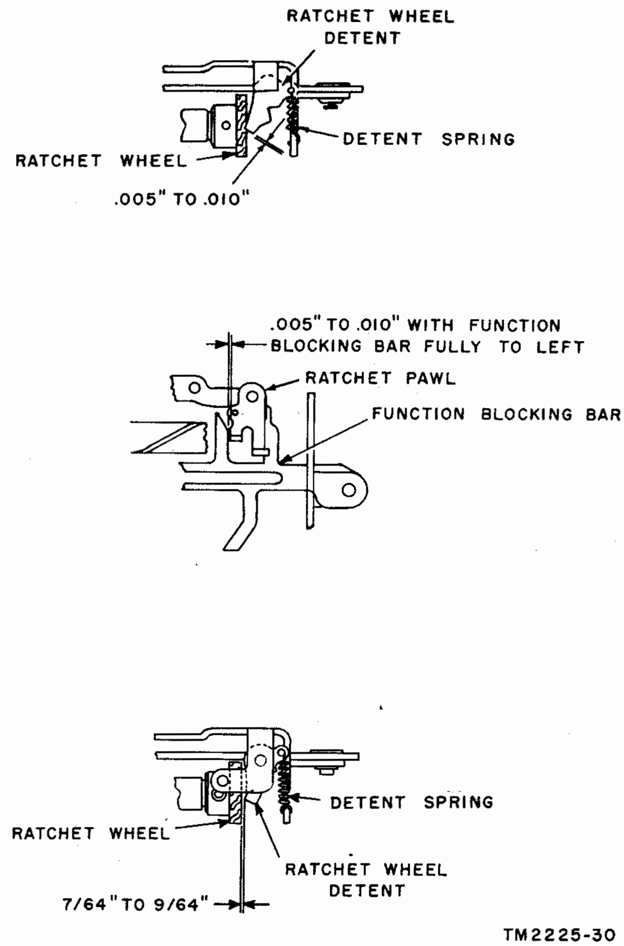


Figure 47. Drive shaft ratchet wheel alignment adjustment.

portion of the left extension of the function blocking bar and the pin in the drive shaft is vertical. Check the clearance.

c. Adjustment. Bend the return latch as shown in the figure to meet the requirement. Check related adjustments (par. 60).

60. Return Latch Adjustment
(fig. 49)

a. Requirement. There should be .010- to .025-inch clearance between the ratchet wheel and the ratchet wheel detent when the indicator carriage is held by hand approximately 10 spaces from the extreme left hand position and the function blocking bar is held latched by the return latch.

b. Method of Checking. Space the indicator carriage out approximately 10 spaces from the extreme left hand position. Manually hold the indicator carriage from returning and depress the CAR. RET.

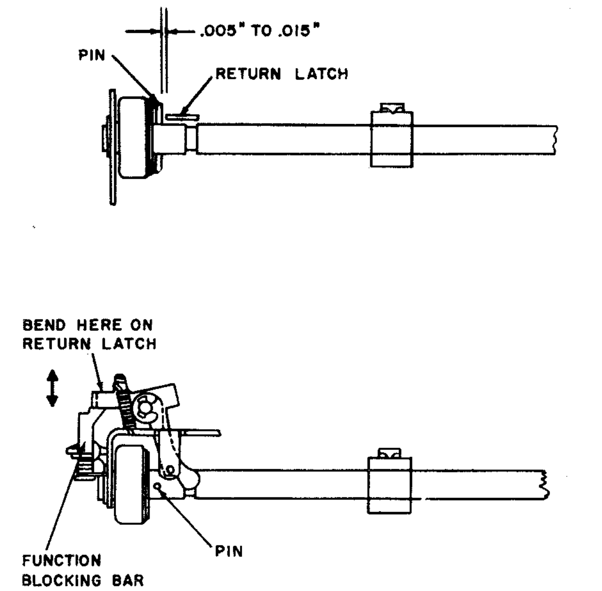


Figure 48. Return latch and drive shaft pin adjustment.

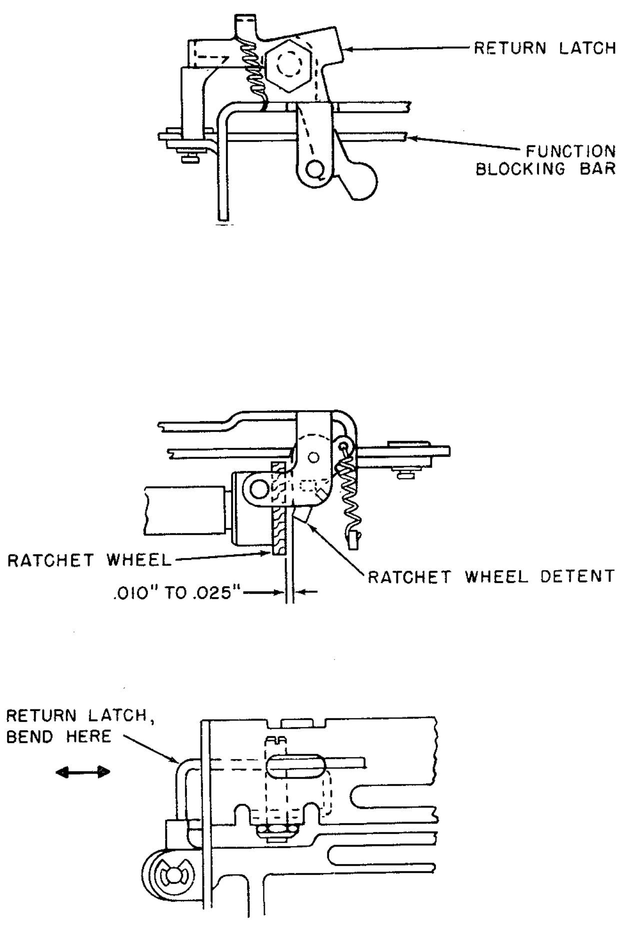


Figure 49. Return latch adjustment.

key lever until the function blocking bar is latched by the return latch. Release the CAR. RET. key lever and recheck the clearance.

c. Adjustment. Bend the return latch as shown until the requirement is met. Check related adjustments (pars. 61 and 62).

61. Figures, Letters, and Line Feed Fingers Adjustment

(fig. 50)

a. Requirement. With the FIGS, LTRS, and LINE FEED key levers each individually depressed, there should be a .015- to .025-inch clearance between the top right extension on the function blocking bar and the ratchet wheel detent.

b. Adjustment.

(1) Depress the FIGS key lever and bend the FIGS finger until the requirement is met.

(2) Depress the LTRS key lever and bend the LTRS finger until the requirement is met.

(3) Depress the LINE FEED key lever and bend the LINE FEED finger until the requirement is met.

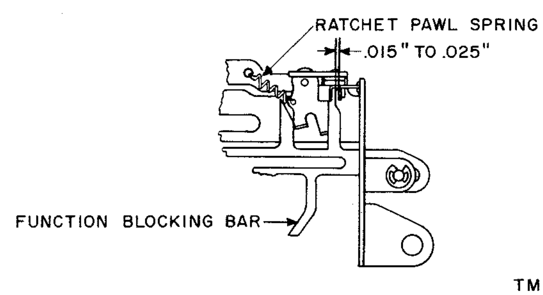


Figure 50. Figures, letters, and line feed fingers adjustment.

62. Carriage Return Finger Adjustment

(fig. 51)

a. Requirement. With the carriage return finger fully depressed, the indicator return latch should just latch the left extension of the function blocking bar as the keyboard-transmitter camshaft trips off.

b. Adjustment. Hold the indicator carriage to prevent it from returning to the zero position. Depress the CAR. RET. key lever and observe the point at which the indicator return latch latches the left extension of the function blocking bar. If latching occurs before the camshaft is tripped off, bend the carriage return finger counterclockwise. If latching takes place after the camshaft trips off, bend the carriage return finger clockwise.

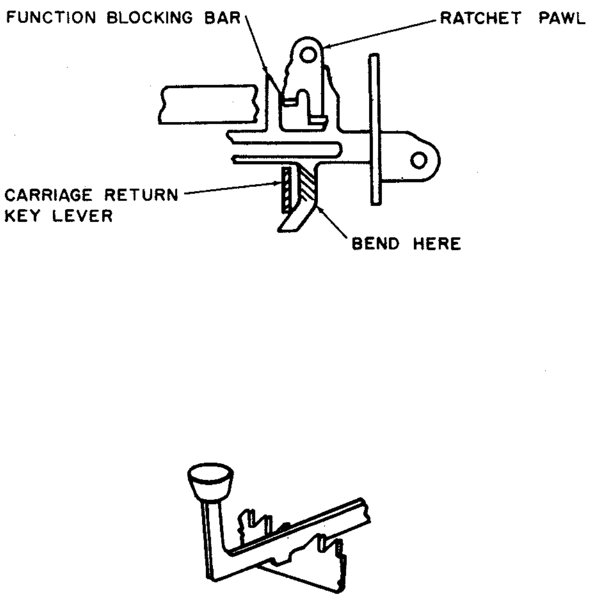


Figure 51. Carriage return finger adjustment.

63. Indicator Lamp Switch Adjustment (TT–76/GGC)

(fig. 52)

a. Requirement.

(1) A push of 15 to 20 grams is required to start the switch actuator arm moving.

(2) There should be a .030- to .045-inch clearance between the contacts of the switch when the switch actuator is in its unoperated position.

(3) The END OF LINE INDICATOR lamp should light when the indicator carriage pointer is opposite number 66.

b. Adjustment.

(1) Bend the lower switch contact until the requirement is met.

(2) Bend the upper switch contact until the requirement is met.

(3) Loosen the two machine screws and position the indicator lamp switch until the requirement is met.

64. Indicator Lamp Switch Adjustment (TT–76A/GGC)

(fig. 53)

a. Requirement.

(1) A push of 15 to 20 grams is required to start the switch actuator arm moving.

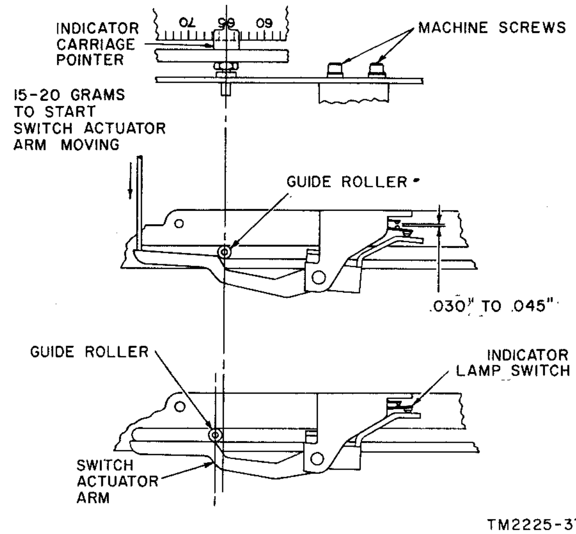


Figure 52. Indicator lamp switch adjustment (TT–76/GGC).

(2) There should be a .030- to .045-inch clearance between the contacts of the switch when the switch actuator arm is in its unoperated position.

(3) The END OF LINE INDICATOR lamp should light and the warning bell should ring when the indicator carriage pointer is moved from number 65 to number 66.

(4) The warning bell should sound loud and clear.

b. Adjustment.

(1) Bend the lower switch contact until the requirement *a*(1) above is met.

(2) Bend the upper switch contact until the requirement *a*(2) above is met.

(3) Loosen the two machine screws and position the indicator lamp switch and warning bell clapper until the requirement *a*(3) above is met.

(4) Loosen the machine screw and self-locking hexagonal nut that mount the warning bell and reposition the warning bell with the elongated hole until the requirement *a*(4) above is met.

Note. To disable the warning bell, pull the clapper around and on top of the disabling lever.

65. Indicator Cover Alignment Adjustment

a. Requirement. The indicator carriage pointer should be opposite the first line to the right of zero when the CAR. RET. key lever has been depressed,

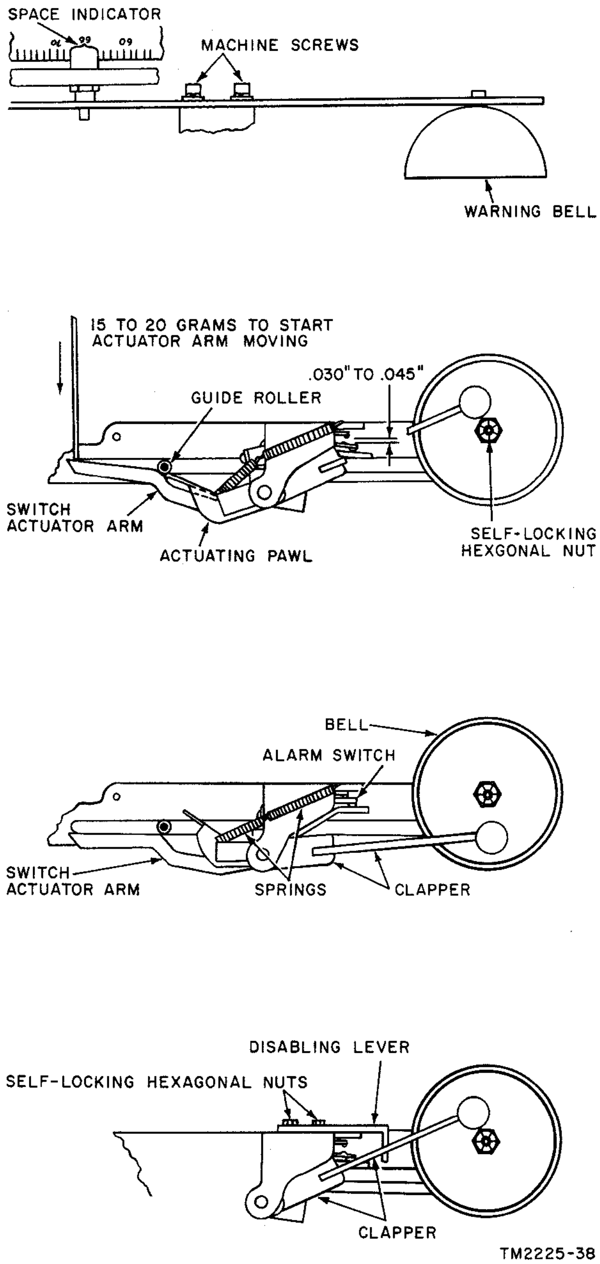


Figure 53. Indicator lamp switch adjustment (TT–76A/GGC).

followed by depressing any one of the alphabet key levers.

b. Method of Checking. Depress the CAR. RET. key lever, then depress any one of the alphabet key levers. Check the requirment visually.

c. Adjustment. Loosen the three machine screws that mount the indicator cover and position the indicator cover right or left to meet the requirement.

66. Function Plate and Stop Bars Clearance Adjustment
(fig. 54)

a. Requirement. There should be .001- to .010-inch clearance between the function plate and the function stop bar having the least amount of clearance.

b. Adjustment. Loosen the machine screws on the function plate. Turn the plate clockwise or counterclockwise until the requirement is met; tighten the machine screws. Recheck the requirement.

67. Sensing Levers Stacking Clearance Adjustment
(fig. 55)

a. Requirements.

(1) The code selecting guide plate hub should not project more than .003 inch beyond the type wheel reciprocating cam follower.

(2) The cam lever assembly hub should not project more than .003 inch beyond the sensing lever spacer.

b. Adjustments.

(1) Remove enough laminations from the laminated spacer to meet the requirement in *a*(1) above.

(2) Remove enough laminations from the sensing lever spacer to meet the requirement in *a*(2) above. When checking, be sure there is no clearance between the sensing levers and spacers.

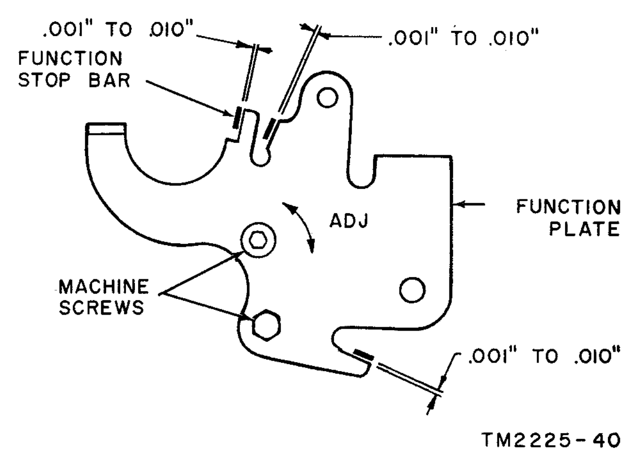


Figure 54. Function plate and stop bars clearance adjustment.

(3) Check related adjustments (par. 68).

Note. Spacers are made of brass laminations bonded together. Each lamination is .002-inch thick. Check the adjustment requirements carefully to avoid removal of too many laminations. Use a knife blade to remove each lamination. Remove all burrs from laminated spacers.

68. Code-Ring End Play and Function Sensing Levers Clearance Adjustment

(fig. 56)

a. Requirement.

(1) The clearance between the ball retainer and the code-ring collar should be .002 to .004 inch.

(2) There should be .002- to .005-inch clearance between the thrust bearing and the stop arm shaft driven gear.

b. Method of Checking.

(1) Check the clearance by inserting a flat feeler gage from the bottom of the code-ring cage between a code ring and a ball of the ball retainer.

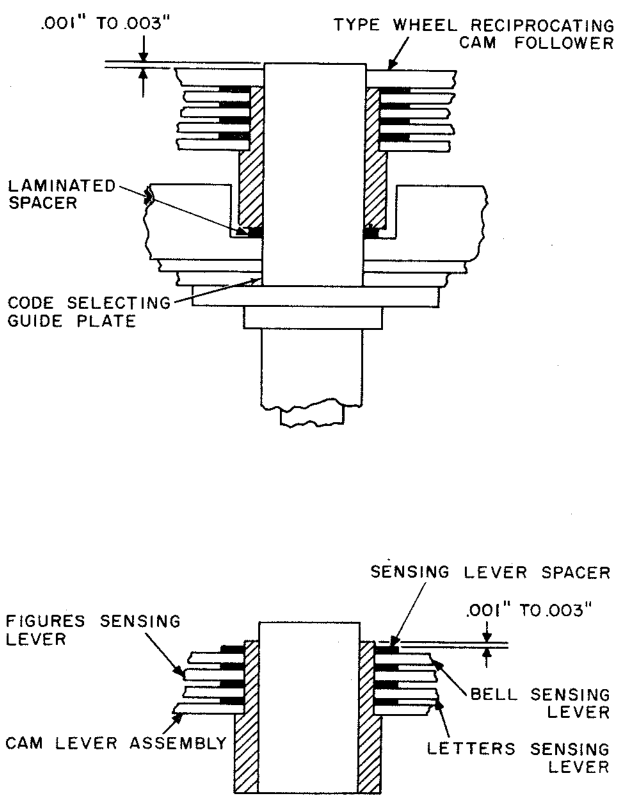


Figure 55. Sensing levers stacking clearance adjustment.

(2) Check the clearance by inserting a flat feeler gage between the stop arm shaft driven gear and the thrust bearing.

c. Adjustment.

(1) Insert an allen wrench through the top stop bars, then through the hole in the code cage spacer and into a setscrew in the code-ring collar. Loosen the setscrews and move the code-ring collar to meet the requirement in *a*(1) above. Tighten the setscrews in the code-ring collar and check the requirement.

(2) Loosen the setscrews in the stop arm shaft driven gear and reposition to meet the requirement in *a*(2) above. Tighten the setscrews and recheck the requirement.

69. Function Shaft Parts Alignment Adjustment

(fig. 57)

a. Requirements.

(1) The flat washer and the transfer lever cam should be tight against the opposite sides of the ball bearing.

(2) The function shaft drive gear on the function shaft should be centered with the stop arm shaft driven gear.

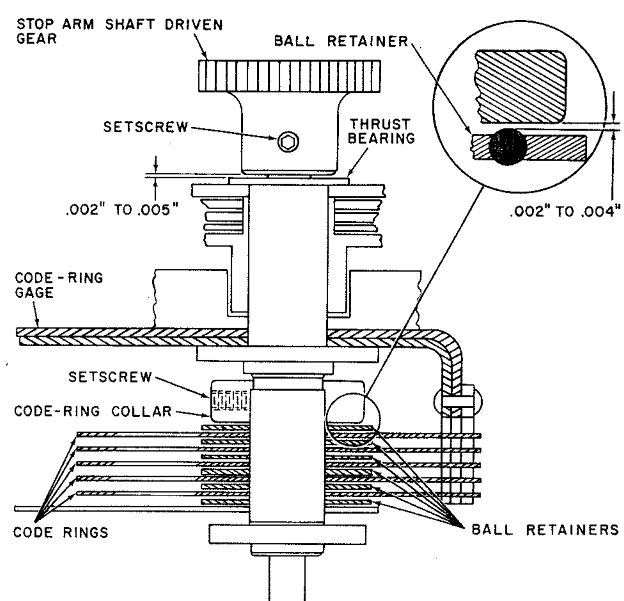


Figure 56. Code ring end play and function sensing levers clearance adjustment.

(3) There should be .010- to .015-inch clearance between the sliding drum clutch and the function shaft gear when the clutch latch arm is engaged by the sliding drum clutch.

b. Method of Checking.

(1) Push and pull on the transfer lever cam and check for clearance between the transfer lever cam and the ball bearing.

(2) Visually check the alignment between the stop arm shaft driven gear and the function shaft drive gear.

(3) Make sure the machine is in the stop position and the clutch latch is engaged by the sliding drum clutch. Check the clearance between the function shaft gear and the sliding drum clutch with a flat feeler gage. Both fingers of the sliding drum clutch should be checked.

c. Adjustments.

(1) Loosen the transfer lever cam setscrews and slide the function shaft until it pushes the flat washer tight against the ball bearing. Hold the function shaft and slide the transfer lever cam tight against the ball bearing. Tighten the transfer lever cam setscrews and recheck the requirement.

(2) Loosen the type wheel and function lever cam setscrews. While maintaining a pressure on the keyed clutch disk, move the type wheel and function lever cam to meet the requirement; tighten the setscrews.

(3) Loosen the setscrews in the transfer lever shaft collar and loosen the function clutch latch screw of the clutch latch arm. Shift the position of the clutch latch arm axially until the requirement is met. Slide the transfer lever shaft collar tight against the clutch latch arm and tighten only the setscrews in the transfer lever shaft collar so as to locate the position of the clutch latch arm. Adjust the clutch latch arm (par. 75).

(4) Check related adjustments (pars. 75 and 76).

70. Type Wheel Reciprocating Levers Clearance Adjustment
(fig. 58)

a. Requirement.

(1) The type wheel reciprocating cam follower

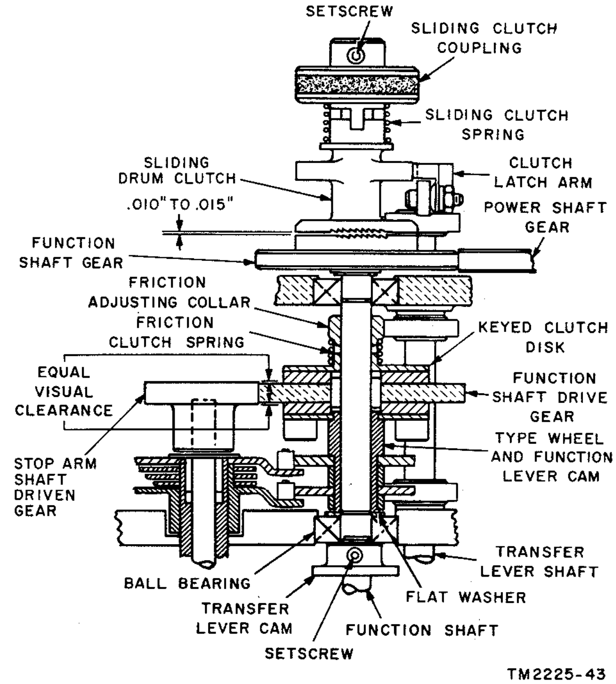


Figure 57. Function shaft parts alignment adjustment.

should be centered with the spring pin of the type wheel reciprocating drive levers.

(2) There should be a .001- to .005-inch clearance between the retainer plate and the shaft collar when the levers of the lever assembly are held together.

b. Adjustment.

(1) Add or remove laminations from the laminated flat washer to meet the requirement in *a*(1) above.

(2) Loosen the setscrews in the shaft collar. Holding the levers together, position the shaft collar to meet the requirement; tighten the setscrews. Recheck the clearance and readjust if necessary.

Note. Remove all burrs from laminated flat washers.

71. T-Levers and Selector Y-Lever Alignment Adjustment (TT–76/GGC)
(fig. 59)

a. Requirement. T-levers should be in line visually with the selector Y-levers.

b. Adjustment. With the rear shaft collar loose, loosen the setscrews and slide the transfer lever in or out to meet the requirement. Holding the transfer lever in position, slide the shaft collar tight

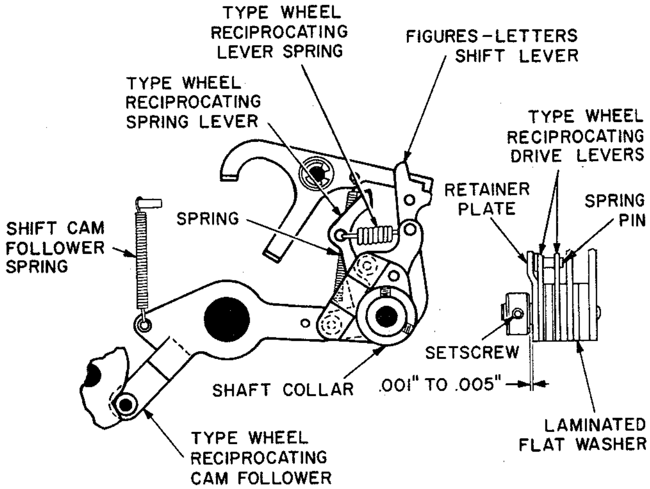


Figure 58. Type wheel reciprocating levers clearance adjustment.

against the bearing and tighten the setscrews. Check related adjustments (pars. 69 and 74).

72. T-Lever and Selector Y-Lever Alignment Adjustment (TT–76A/GGC)

(fig. 60)

a. Requirement. T-levers should be in line visually with the selector Y-levers.

b. Adjustment. With the rear shaft collar loose, loosen the clamping machine screws and slide the transfer lever in or out to meet the requirement. Holding the transfer lever in position, slide the shaft collar tight against the bearing and tighten the clamping machine screws. Check related adjustments (pars. 69 and 73).

73. Transfer Lever Shaft End Play Adjustment (TT–76/GGC)

(fig. 61)

a. Requirement. There should be .002- to .005-inch clearance between the rear shaft collar and the rear bearing when the front shaft collar is tight against the front bearing.

b. Adjustment. Loosen the setscrews and slide the front shaft collar tight against the front bearing. With a feeler gage between the rear shaft collar and the rear bearing, tighten the setscrews.

74. Transfer Lever Shaft End Play Adjustment (TT–76A/GGC)

(fig. 62)

a. Requirement. There should be .002- to .005-inch clearance between the rear shaft collar and the

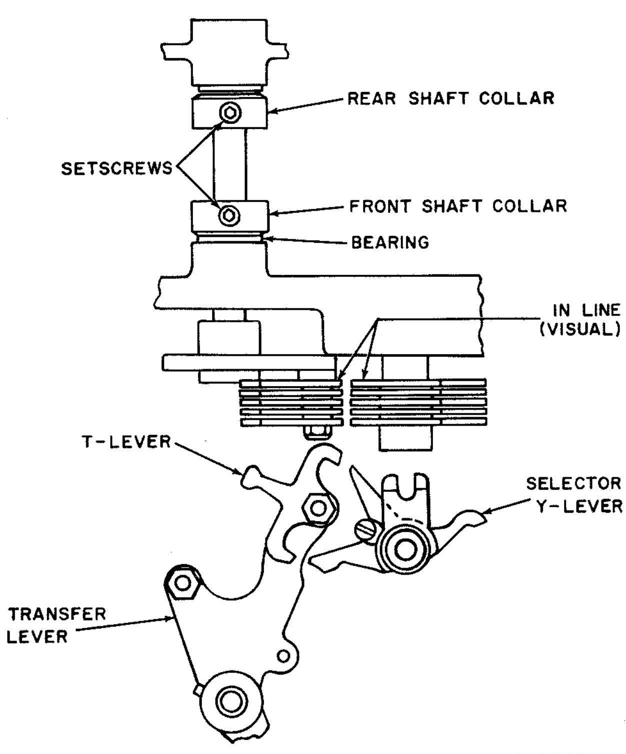


Figure 59. T-lever and selector Y-lever alignment adjustment (TT–76/GGC).

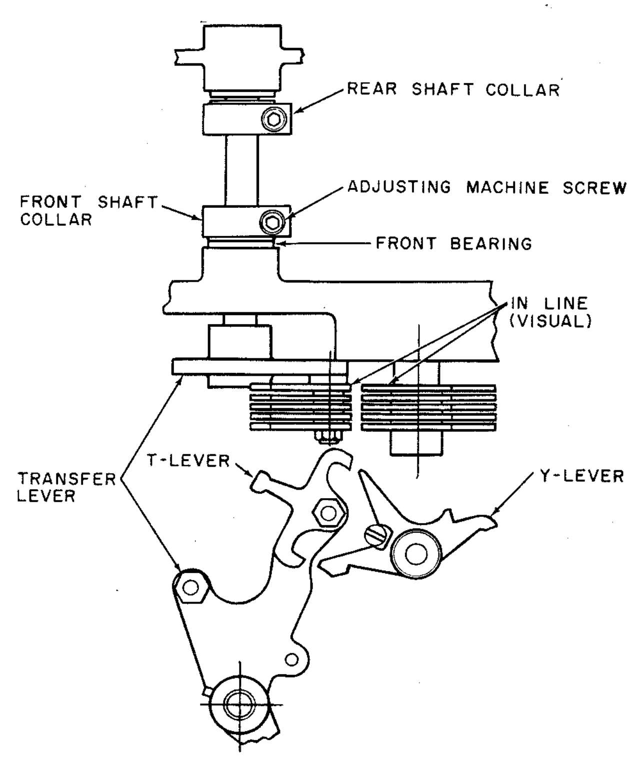


Figure 60. T-lever and selector Y-lever alignment adjustment (TT–76A/GGC).

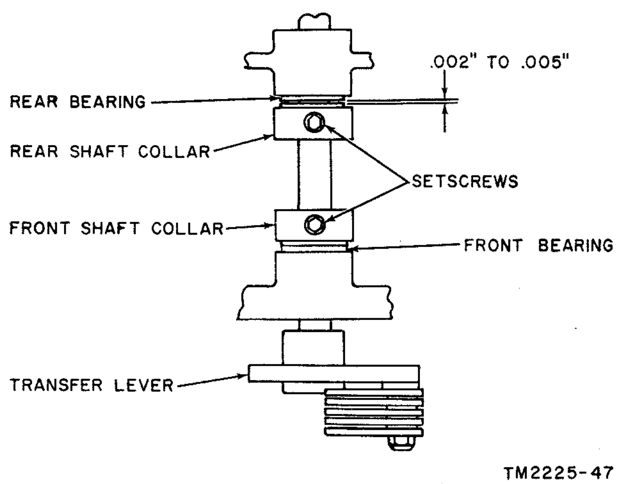


Figure 61. Transfer lever shaft end play adjustment (TT–76/GGC).

rear bearing when the front shaft collar is tight against the front bearing.

b. Adjustment. Loosen the clamping screw and slide the front shaft collar tight against the front bearing. Slide the rear shaft collar to meet the requirement. Tighten the clamping screw.

75. Clutch Latch Arm Adjustment

(fig. 63)

a. Requirement. There should be .015- to 0.25-inch clearance between the clutch latch arm and the sliding drum clutch when the clutch latch arm is disengaged.

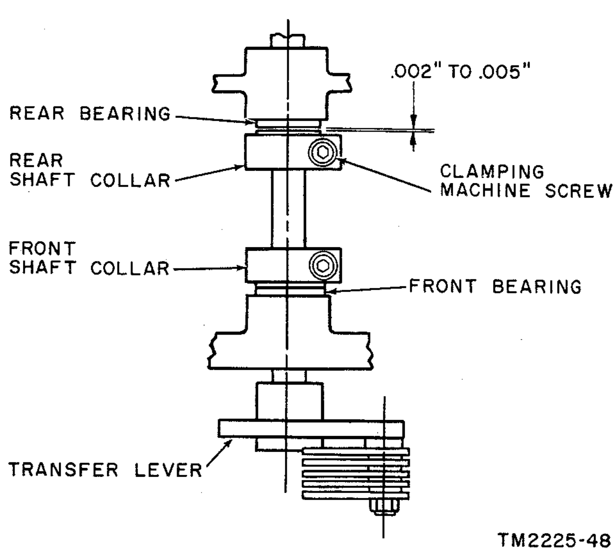


Figure 62. Transfer lever shaft end play adjustment (TT–76A/GGC).

b. Method of Checking. With the transfer lever latched and the function shaft in the stopped position, trip the transfer lever by pulling the transfer lever trip latch down. The clutch latch arm then will be disengaged from the sliding drum clutch. Check the requirement with a feeler gage.

c. Adjustment. Loosen the function clutch latch screw in the clutch latch arm. Position the clutch latch arm to meet the requirement; tighten the function clutch latch screw.

76. Sliding Drum Clutch Clearance and Actuating Load Adjustment

(fig. 64)

a. Requirements.

(1) There should be .002- to .008-inch clearance between the sliding drum clutch and the clutch latch arm when the type wheel reciprocating cam follower is in the indent of the type wheel and function lever cam.

(2) There should be a clearance of .080- to .100-inch between the flexible coupling disk and the function shaft sliding clutch drum, when the sliding clutch drum is fully engaged with the function driven gear.

b. Adjustments.

(1) Be sure the type wheel reciprocating cam follower is in the indent of the type wheel and function lever cam. Loosen the setscrews in the sliding clutch coupling and turn the sliding clutch coupling clockwise or counterclockwise to obtain the requirement. Tighten the setscrews and recheck the requirements.

(2) Trip the transfer lever latch and turn the motor by hand until the sliding clutch drum has fully engaged the function driven

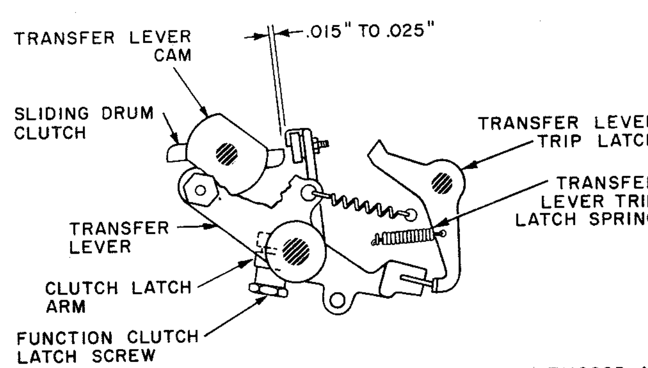


Figure 63. Clutch latch arm adjustment.

gear. Loosen the two setscrews in the flexible coupling disk and shift the flexible coupling disk in the proper direction to obtain the required clearance; tighten the two setscrews.

Note. Check both fingers of the sliding drum clutch and establish the clearance with the finger having the least amount of clearance.

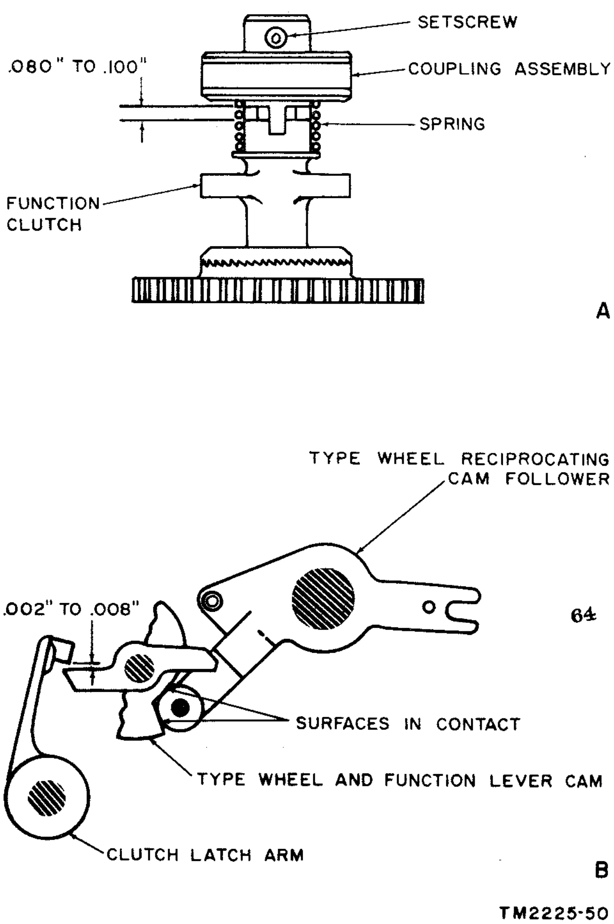


Figure 64. Sliding drum clutch clearance and actuating load adjustment.

77. Functioning Sensing Levers Clearance Adjustment
(fig. 65)

a. Requirement. There should be .005-inch minimum clearance between the bell function stop bar and its associated sensing lever when the high point of the restoring cam is against the cam lever assembly and none of the stop bars is in the selected positions.

b. Adjustment. Turn the motor by hand until the cam lever assembly is against the high point of the restoring cam. Loosen the hexagonal nut and turn the restoring lever eccentric until the requirement is met; tighten the hexagonal nut and recheck the clearance. Check related adjustment (par. 79).

Note. Check other function stop bars for a clearance.

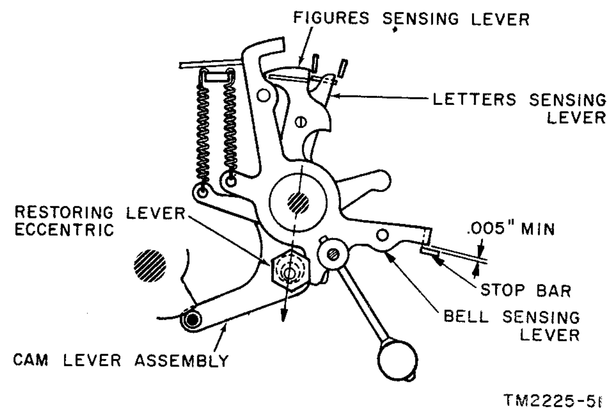


Figure 65. Function sensing levers clearance adjustment.

78. Function Stop Bars Adjustable Fulcrum Alignment
(fig. 66)

a. Requirement. There should be a .010- to .015-inch clearance between the tops of each function sensing lever and the associated stop bar when the cam lever assembly is against the low point of the restoring cam and each function stop bar is individually moved to the selected position.

b. Method of Checking. Move the T-levers clockwise and counterclockwise and check for drag on stop bars. If a drag is present, obtain greater clearance between the stop bar and the selected sensing lever.

c. Adjustment. Loosen the machine screws and adjust each adjustable fulcrum to meet the requirement. Tighten the machine screws and recheck the clearance.

79. Signal Bell Clapper Adjustment
(fig. 67)

a. Requirement. The signal bell should ring with a clear tone when the S code group is received while the machine is in the figure-shift position.

b. Adjustment. Loosen the setscrew in the bell sensing lever. Position the signal bell clapper approximately three-thirty-seconds inch from the signal bell, until the requirement is met.

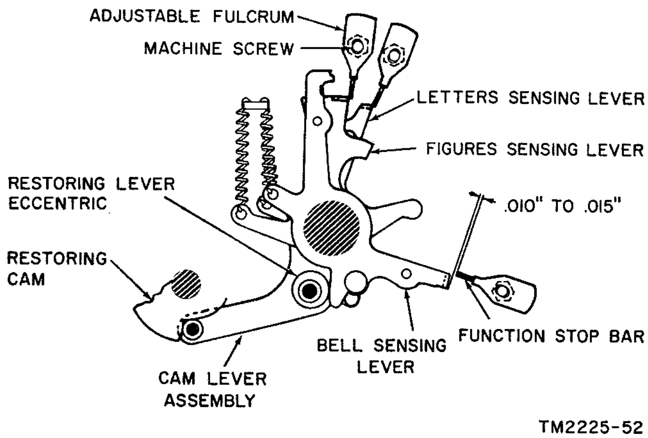


Figure 66. Function stop bars adjustable fulcrum alignment.

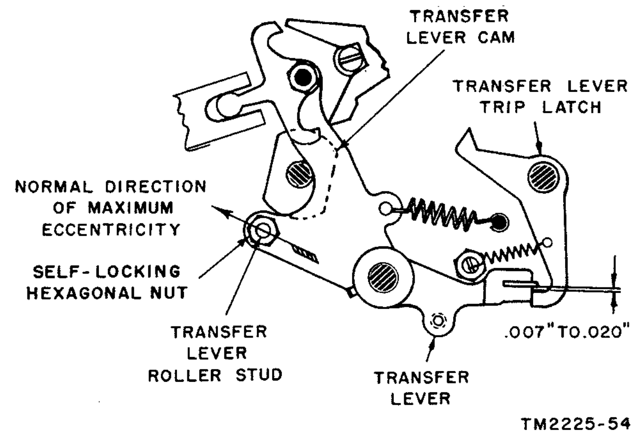


Figure 68. Transfer lever roller stud adjustment.

80. Transfer Lever Roller Stud Adjustment
(fig. 68)

a. Requirement. There should be .007- to .020-inch clearance between the transfer lever and the transfer lever trip latch when the transfer lever roller is on the high portion of the transfer lever cam.

b. Adjustment. Loosen the self-locking hexagonal nut and set the transfer lever roller stud for maximum eccentricity. Manually rotate the function shaft until the roller is on the high portion of the transfer lever cam. Turn the transfer lever roller stud in either direction until the requirement is met. Tighten the self-locking hexagonal nut and recheck the clearance.

81. Code-Ring Locking Bail Adjustment
(fig. 69)

a. Requirement. When in the locking position, the code-ring locking bail should rest against the bottom of the locking notches in the code rings for both mark and space positions of the code rings.

b. Adjustment. Loosen the machine screws in the code-ring locking bail. Position the code-ring locking bail until the requirement is met. Tighten the machine screws and recheck the requirement.

82. Code-Ring Locking Bail Cam Follower Clearance Adjustment
(fig. 70)

a. Requirement. There should be a .015- to .025-inch clearance between the code-ring locking bail and the high part of the code ring when the code-ring locking bail cam follower is against the top of the type wheel and function lever cam.

b. Adjustment. With the code-ring locking bail cam follower against the type wheel and function

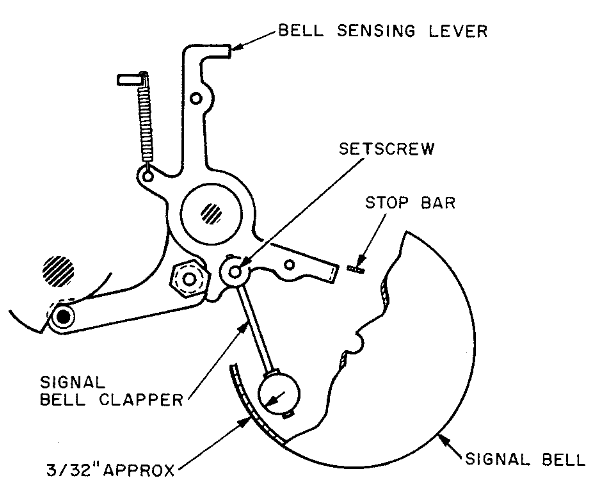


Figure 67. Signal bell clapper adjustment.

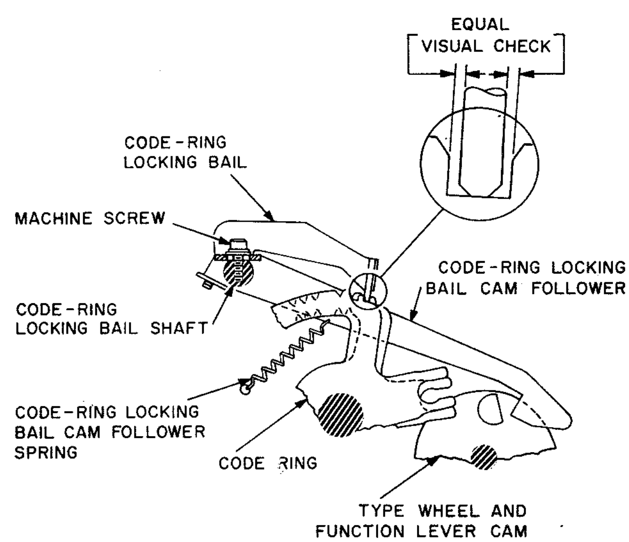


Figure 69. Code-ring locking bail adjustment.

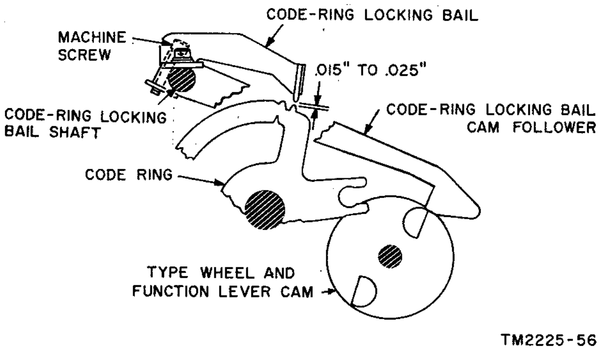


Figure 70. Code-ring locking bail cam follower clearance adjustment.

lever cam, loosen the cam follower machine screw and position the code-ring locking bail cam follower to meet the clearance requirement. Tighten the cam follower machine screw and recheck the clearance.

83. Code Rings Actuating Load Adjustment
(fig. 71)

a. Requirement. A maximum force of 12 ounces should be required to move the code ring from mark to space position and from space to mark position.

b. Adjustment. Correct any burr on working surfaces of the code-ring cage. Replace distorted code rings with a new set.

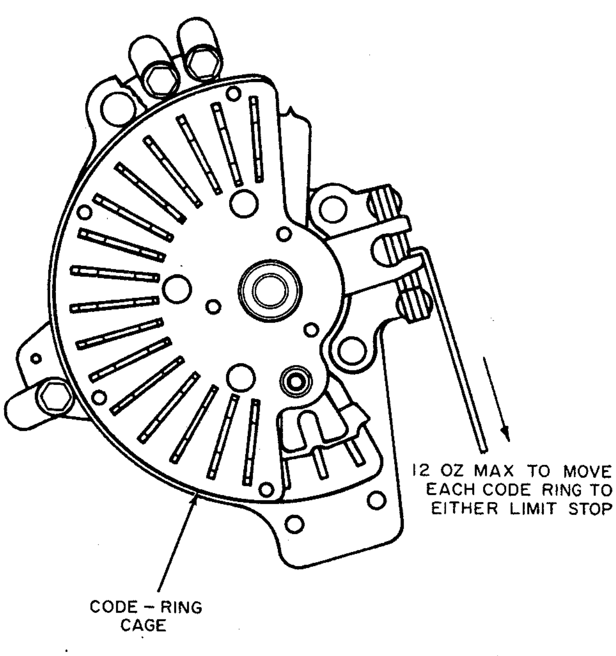


Figure 71. Code rings actuating load adjustment.

84. Stop Arm Torque Adjustment
(fig. 72)

a. Requirement. With the motor running and the function shaft rotating, a pull of 12 to 17 ounces is required to hold the stop arm stationary.

b. Adjustment. With the motor off, loosen the setscrews on the friction adjusting collar. Move the friction adjusting collar in or out to meet the requirement; tighten the setscrews and recheck the tension.

Note. On the TT–76A/GGC, the friction adjusting collar on the function shaft is secured by clamping screws.

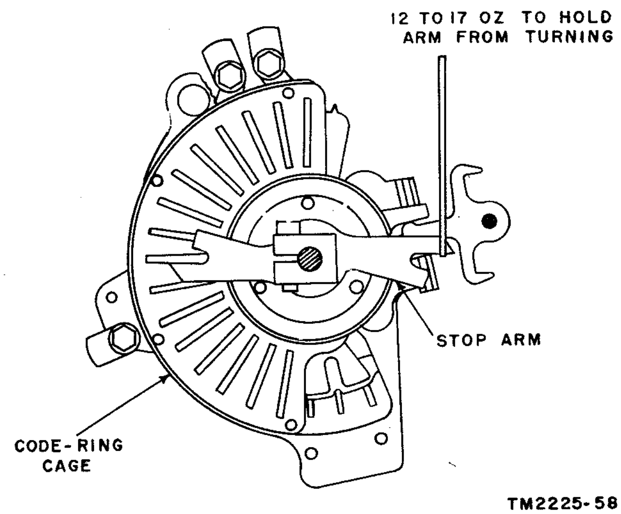


Figure 72. Stop arm torque adjustment.

85. T-Lever Pivot Stud Adjustment
(fig. 73)

a. Requirement. The T-levers should engage the Y-levers an equal amount for both mark and space positions of the Y-levers.

b. Method of Checking. With the transfer lever latched and the function shaft in the stopped position, set the No. 1 Y-lever in a mark position. Then trip the transfer lever by pulling the transfer lever trip latch down causing the T-levers to engage the Y-levers. Check the amount of engagement visually. Reposition the transfer lever and the T-levers by rotating the motor by hand. Set the No. 1 Y-lever in a space position, trip the transfer lever, and check the amount of engagement visually.

c. Adjustment. Loosen the self-locking hexagonal nut on the rear of the T-lever pivot stud. Position the pivot stud until the requirement is met and tighten the self-locking hexagonal nut. Note the

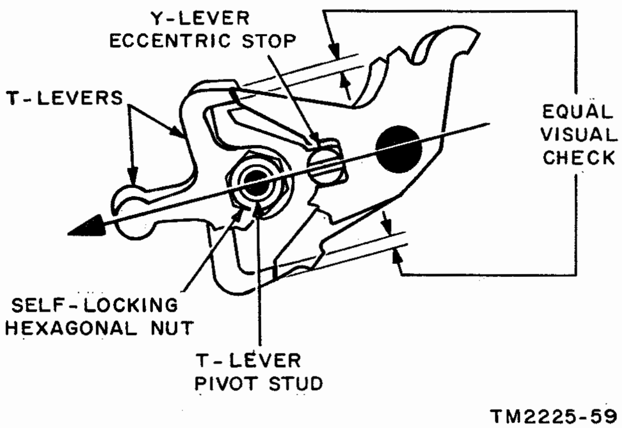


Figure 73. T-lever pivot stud adjustment.

normal direction of maximum eccentricity. Check related adjustments (pars. 75 and 88 or par. 91).

86. Rangefinder Cam and Selector Lever Stop Comb Adjustment (TT–76/GGC)

(fig. 74)

a. Requirements.

(1) The selector levers should be centered visually with their corresponding Y-levers.

(2) The rangefinder dial must read 55 to 65 when the rangefinder cam high point is in line with the index mark on the rangefinder and comb bracket.

b. Adjustments.

(1) Loosen the machine screws and position the selector lever stop comb to visually center the selector levers with the Y-levers; tighten the machine screws. If the selector lever stop comb cannot be adjusted to meet the requirement, loosen the machine screws that hold the rangefinder and comb bracket. Add or remove shims to provide the desired clearance. Tighten the machine screws and recheck the clearance.

(2) Loosen the setscrews in the rangefinder cam. Center the rangefinder cam visually with the spindle in the selector camshaft assembly. Set the rangefinder dial at 60 and tighten the knurled nut. Rotate the rangefinder cam until the high point is in line with the index mark; tighten the setscrews.

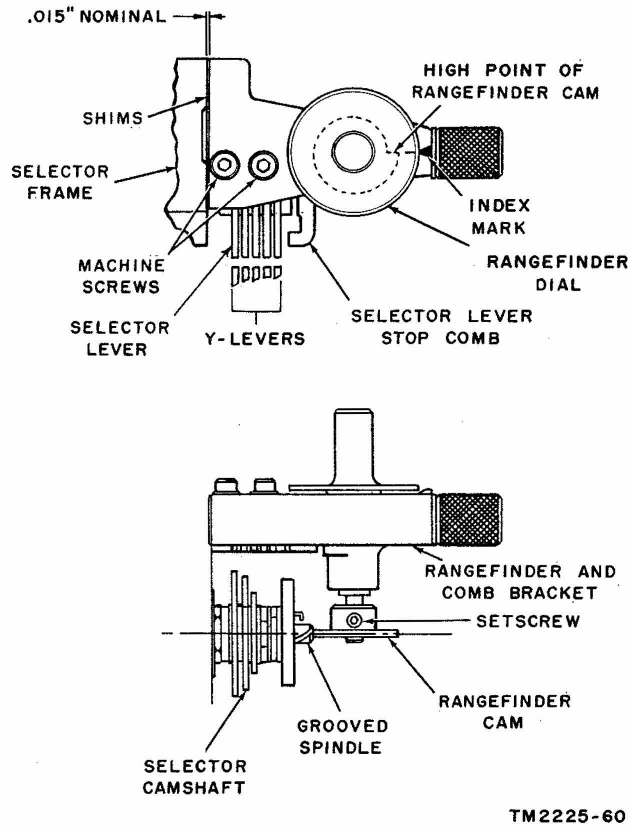


Figure 74. Rangefinder cam and selector lever stop comb adjustment (TT–76/GGC).

87. Selector Lever Stop Comb, Rangefinder Cam, and Rangefinder Detent Adjustment (TT–76A/GGC)

(fig. 75)

a. Requirements.

(1) The selector levers should be centered with their corresponding Y-levers.

(2) The dial must read 55 to 65 when the rangefinder cam high point is in line with the index mark on the rangefinder and comb bracket.

(3) The detent should be set so that the detent holds the rangefinder dial firmly without excessive tightness.

b. Adjustments.

(1) Loosen the machine screws and position the selector lever stop comb to visually center the selector levers with the Y-levers; tighten the screws. If the selector lever stop comb cannot be adjusted to meet the requirement, loosen the machine screws

that secure the rangefinder and comb bracket. Add or remove shims to provide the desired clearance.

(2) Loosen the setscrews in the rangefinder cam. Center the rangefinder cam visually with the grooved spindle in the selector camshaft assembly. Set the rangefinder dial assembly at 60. Rotate the rangefinder cam until the high point is in line with the index mark; tighten the setscrews.

(3) Loosen the setscrew holding the detent. Slide the detent against the rangefinder dial to obtain the required detent action. Tighten the setscrew holding the detent.

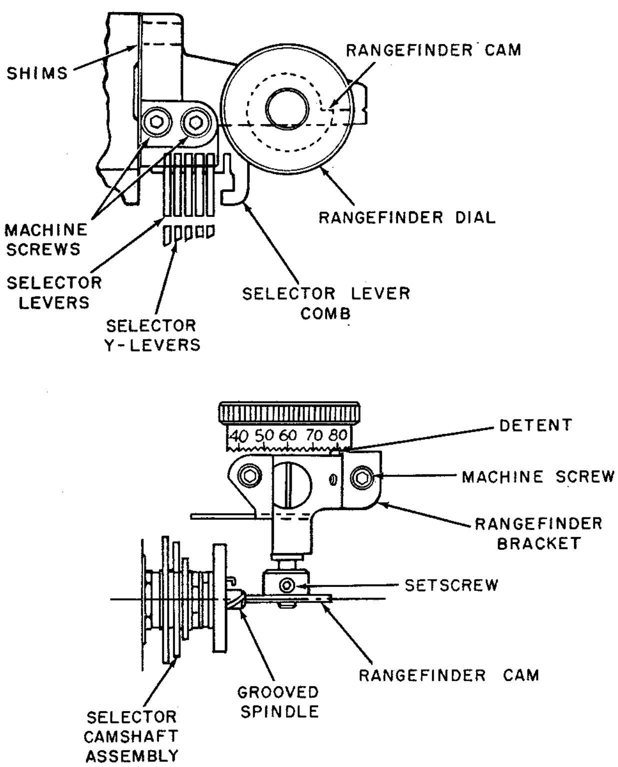


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Figure 75. Selector lever comb, rangefinder cam and rangefinder detent adjustment (TT–76A/GGC).

88. Y-Levers Friction and Eccentric Stop Adjustment (TT–76/GGC)

(fig. 76)

a. Requirements.

(1) A push from 40 to 50 grams with a spring scale is required to start each selector Y-lever moving.

(2) The Y-lever eccentric stop should be set in its normal direction of maximum eccentricity.

b. Adjustments.

(1) Loosen the two setscrews in the spring retaining collar. Move the collar on the Y-lever pivot post stud to obtain the required spring pressure. Tighten the setscrews and recheck the requirement.

(2) Loosen the setscrew holding the Y-lever eccentric stop; set the Y-lever eccentric stop in the normal direction of maximum eccentricity and tighten the setscrew.

(3) Check related adjustments (pars. 75, 85, and 127).

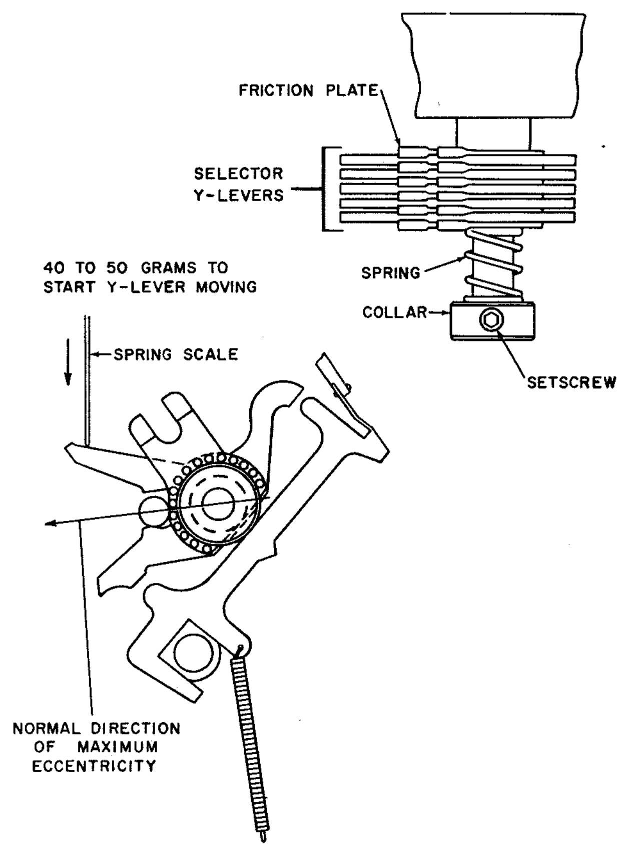

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Figure 76. Y-levers friction adjustment (TT–76/GGC).

89. Y-Levers Collar Adjustment (TT–76A/GGC)

(fig. 77)

a. Requirement. There should be .002- to .005-inch clearance between the Y-lever retaining collar and flat washer.

b. Adjustment. Loosen the setscrews, move the Y-lever retaining collar in or out to meet the requirement. Tighten the setscrews.

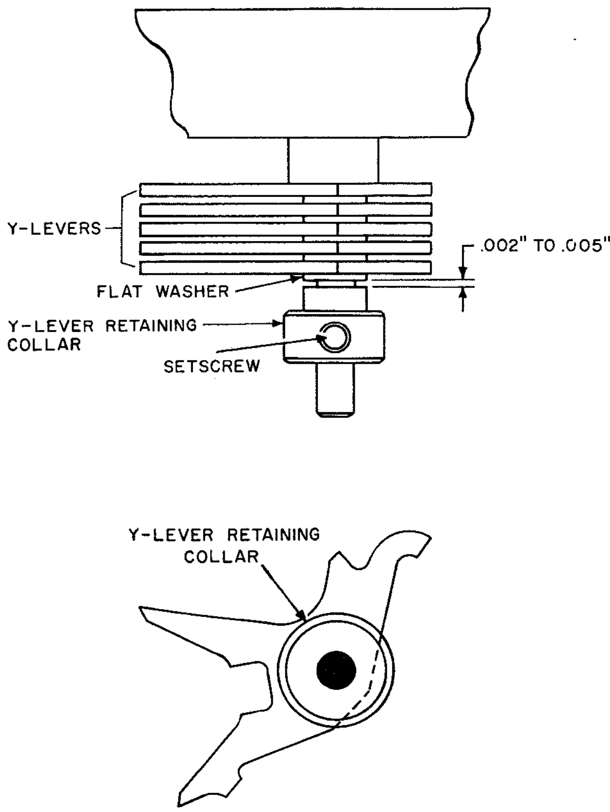


Figure 77. Y-levers collar adjustment (TT–76A/GGC).

90. Y-Levers Detent End Play Adjustment (TT–76A/GGC)

(fig. 78)

a. Requirement. There should be .002- to .005-inch clearance between the centering sleeve and the thrust washer.

b. Adjustment. Y-lever detents and thrust washers are placed on the centering sleeve, then the stackup is slipped on the Y-lever detent pivot. Tighten the hexagonal nut and check the clearance between the thrust washer and centering sleeve. If the clearance is not right, remove the hexagonal nut, slide the stackup off, and peel the laminated flat washer to meet the requirement. Check related adjustment (par. 91).

Note. The one thrust washer adjacent to the laminated flat washer may have to be replaced by five laminated flat washers to help meet the requirement.

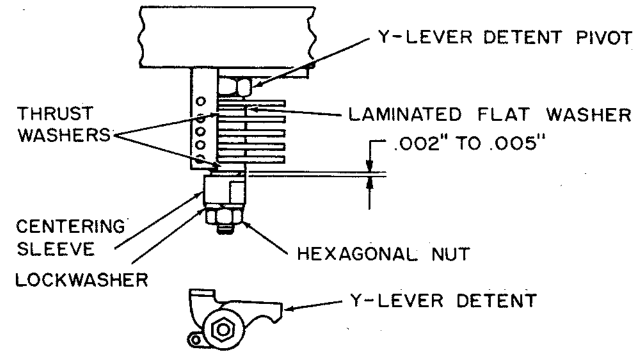


Figure 78. Y-levers detent end play adjustment (TT–76A/GGC).

91. Y-Lever Detents and Y-Levers Adjustment (TT–76A/GGC)

(fig. 79)

a. Requirement.

(1) The Y-lever eccentric stop should be set in the normal direction of maximum eccentricity.

(2) There should be an equal engagement of each Y-lever detent with each Y-lever when the Y-levers are in either the mark or space position.

(3) It should require 30 to 60 grams to start a Y-lever moving.

b. Adjustment.

(1) Loosen the setscrew holding the Y-lever eccentric stop; set the Y-lever eccentric stop in the normal direction of maximum eccentricity and tighten the setscrew.

(2) Loosen the hexagonal nut and turn the centering sleeve until both of the requirements in *a*(2) and (3) above are met. Tighten the hexagonal nut.

(3) Check related adjustments (pars. 75, 85, and 127).

92. Selector Lever Clearance Adjustment

(fig. 80)

a. Requirement. There should be .002- to .005-inch clearance between the flat washer and the first selector lever.

b. Adjustment. Loosen the setscrew and slide the selector lever pivot stud in or out to meet the requirement. Tighten the setscrew.

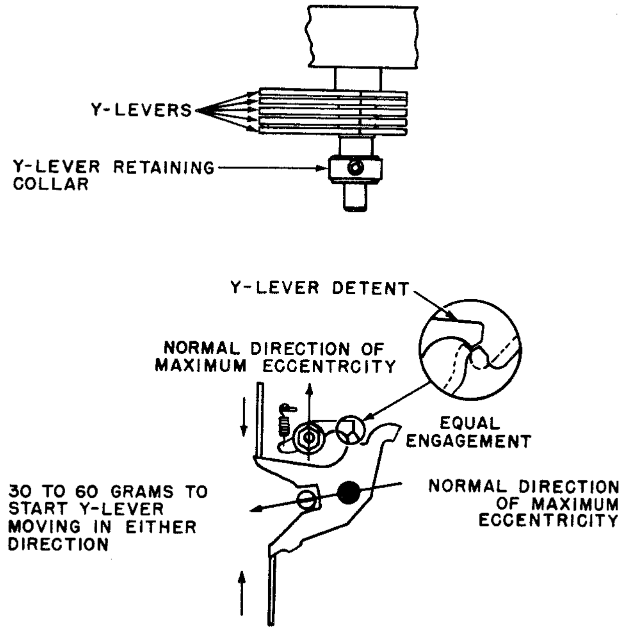


Figure 79. Y-lever detents and Y-levers adjustment (TT–76A/GGC).

93. Code Hole Punch Levers Clearance Adjustment
(fig. 81)

a. Requirement. There should be .001- to .003-inch clearance between the last flat washer and the punch arm assembly.

b. Adjustment. Loosen the self-locking hexagonal nut and adjust the pivot stud for proper clearance; tighten the self-locking hexagonal nut and recheck the requirement.

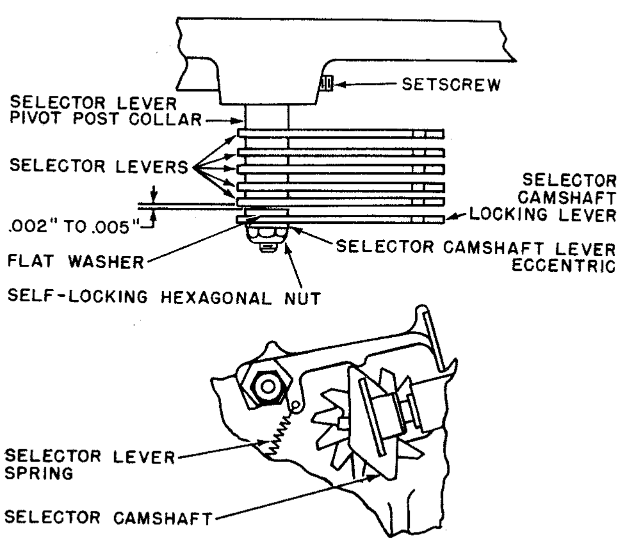


Figure 80. Selector lever clearance adjustment.

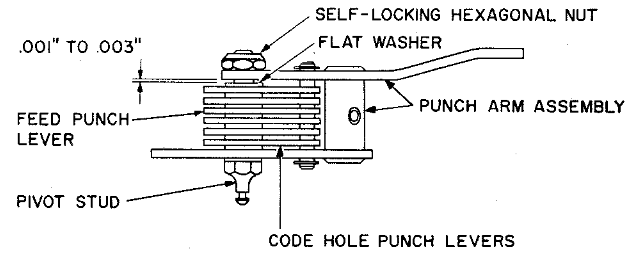


Figure 81. Code hole punch levers clearance adjustment.

94. Punch Interference and Code Hole Punch Levers Alignment Adjustment
(fig. 82)

a. Requirement. The code hole punch levers and punch interference levers should be aligned for equal spacing.

b. Adjustment. Loosen the setscrew in the front support frame and position the punch arm pivot post to meet the requirement. Tighten the setscrew and recheck the requirement. Check related adjustment (par. 96).

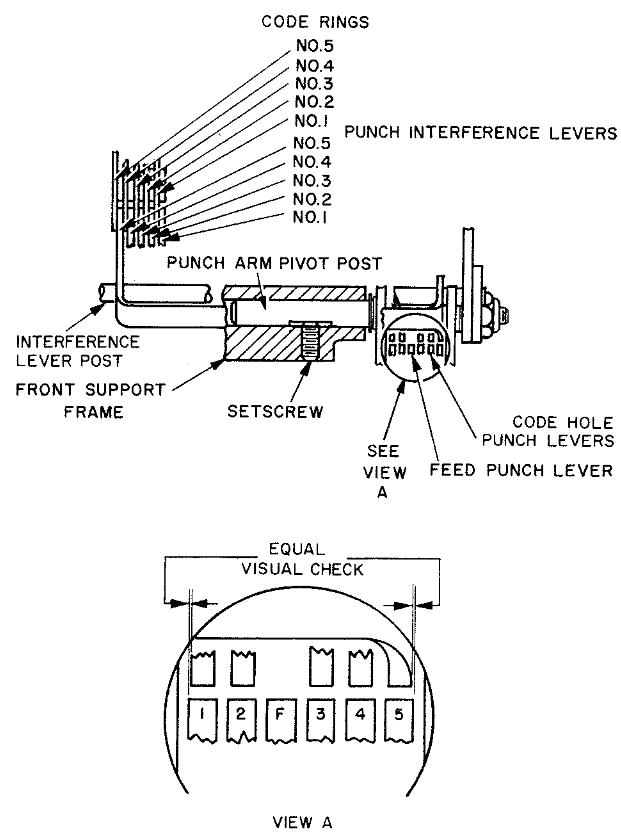


Figure 82. Punch interference and code hole punch levers alignment adjustment.

95. Feed Pawl Assembly and Ratchet Wheel Clearance Adjustment
(fig. 83)

a. Requirement. The feed pawl assembly should turn the ratchet wheel one tooth for each operation.

b. Adjustment. Release the transfer lever trip latch and turn the motor by hand until the feed pawl assembly turns the ratchet wheel one tooth. Turn the machine screw in or out so the feed pawl will just clear the ratchet wheel tooth when the motor is turned by hand to complete the cycle. Recheck this step to be sure that this is a complete feed of one tooth by the feed pawl assembly. Check related adjustment (par. 136).

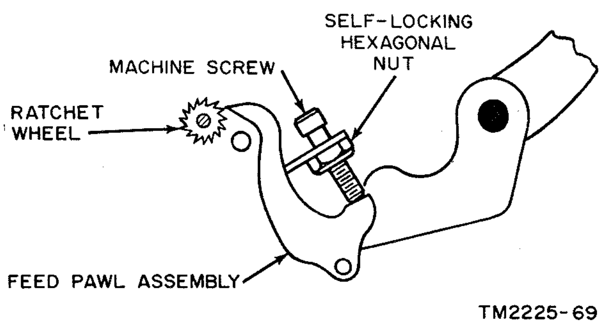


Figure 83. Feed pawl assembly and ratchet wheel clearance adjustment.

96. Code Punch Bars and Code Hole Punch Levers Alignment and Clearance Adjustment
(fig. 84)

a. Requirements.

(1) There should be a .001- to .013-inch clearance between each code hole punch lever and the flat surfaces of its associated code punch bar.

(2) There should be a .001- to .003-inch clearance between the comb and the flat surface of each code punch bar.

b. Adjustments.

(1) Loosen the machine screws that hold the punch and die assembly to the front support frame. Insert or remove enough shims to meet the requirements in *a*(1) above; tighten the machine screws and recheck the clearance.

(2) Loosen the machine screws that hold the comb to the code die support. Position the comb until the requirement in *a*(2) above is met; tighten the machine screws and recheck the clearance.

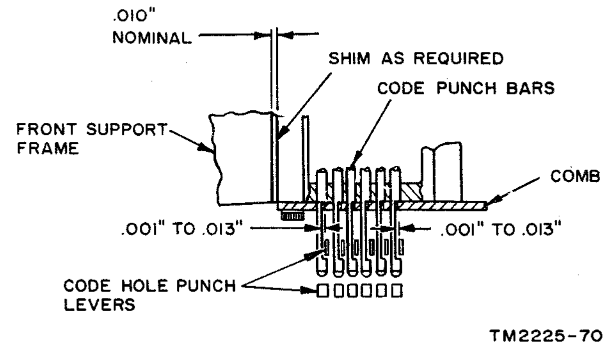


Figure 84. Code punch bars and code hole punch levers alignment and clearance adjustment.

97. Tape Feed Sprocket and Retainer Bracket Adjustments
(fig. 85)

a. Requirements.

(1) There should be a .001- to .003-inch clearance between the tape feed sprocket and the code die support.

(2) The retainer mounting bracket must be mounted as closely as possible to the tape feed sprocket without touching it.

b. Adjustments.

(1) Loosen the two setscrews in the tape feed sprocket. Position the sprocket until the requirement in *a*(1) above is met. Tighten the setscrews and recheck the clearance.

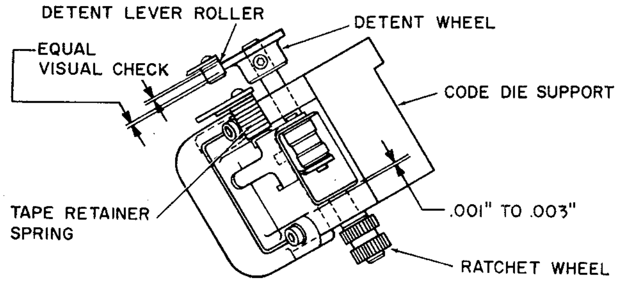
(2) Loosen the retainer mounting bracket machine screws. Position the retainer mounting bracket against the tape feed sprocket to meet the requirement in *a*(2) above. Tighten the machine screws and recheck the requirement.

(3) Check related adjustment (par. 100).

98. Code Hole Punch Levers and Cam Roller Clearance Adjustment
(fig. 86)

a. Requirement. Adjust for clean punching and proper back-spacing action.

b. Method of Checking. Operate back space lever. Any burring or elongation of perforated holes indicates code hole punch levers are too high.



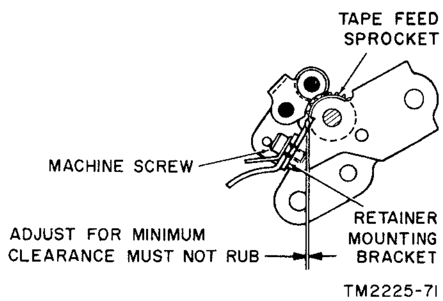


Figure 85. Tape feed sprocket and retainer bracket adjustments.

c. *Adjustment.* Loosen the hexagonal nut and adjust the eccentric stud until the requirement is met. The eccentric stud is to be adjusted for minimum clearance between the cam roller and the print and register cam. Tighten the hexagonal nut and recheck the clearance. Check related adjustments (pars. 99 and 95).

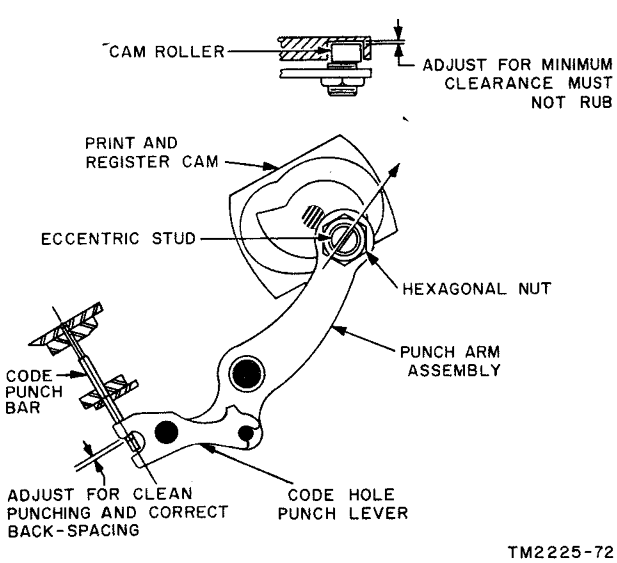


Figure 86. Code hole punch levers and cam roller clearance adjustment.

99. Feed Pawl Assembly Alignment
(fig. 87)

a. *Requirement.* There should be .010- to .025-inch clearance between the feed pawl assembly and the ratchet wheel when the print and register cam is in the stop position.

b. *Adjustment.* Loosen the self-locking hexagonal nut on the feed pawl pivot and turn the feed pawl pivot until the requirement is met; tighten the self-locking hexagontal nut and recheck the clearance. Check related adjustment (par. 95).

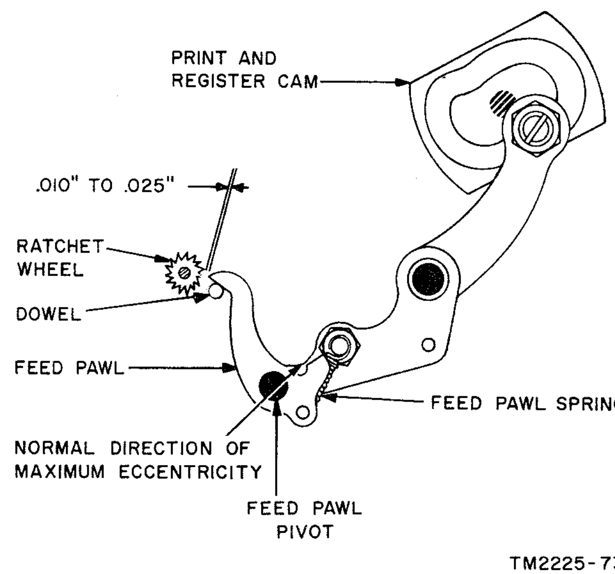


Figure 87. Feed pawl assembly alignment.

100. Feed Hole Spacing and Detent Lever Alignment Adjustment
(fig. 88)

a. *Requirement.* Punched feed holes in the message tape should be spaced evenly; 10 holes per inch.

b. *Adjustment.* Measure the distance between 60 consecutive holes. The distance should be 6 inches plus or minus 1/64 inch. If the requirement is not met, loosen the self-locking hexagonal nut; turn the eccentric stud clockwise to decrease spacing or counterclockwise to increase spacing until the requirement is met. Tighten the self-locking hexagonal nut and recheck the requirement. Repeat this procedure until the requirement is met. Check related adjustments (pars. 95 and 101 or pars. 102 and 136).

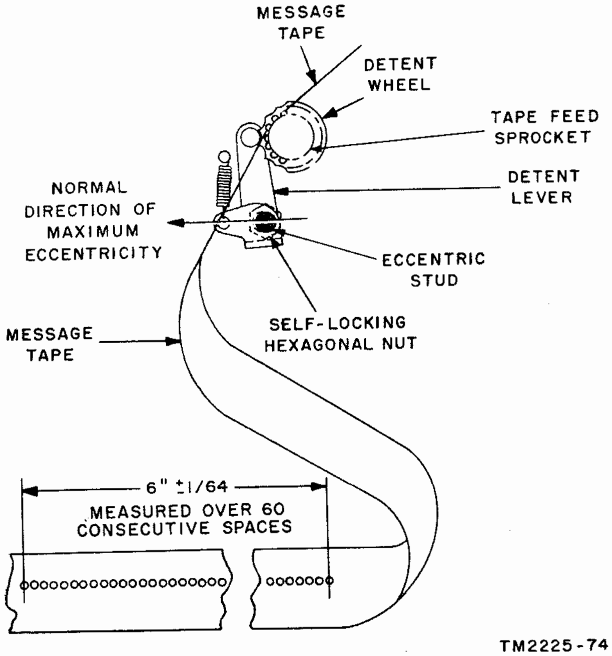


Figure 88. Feed hole spacing and detent lever alignment adjustment.

101. Back Space Mechanism Alignment Adjustment (TT–76/GGC)

(fig. 89)

a. Requirements.

(1) With full depression of the back space lever the tape should back space one character, and the detent lever should be seated in the detent wheel. Any additional pressure applied to the back space lever should not cause the tape or the detent wheel to move.

(2) The back space pawl should engage the ratchet wheel directly between two of its teeth when the back space lever is depressed.

b. Adjustments.

(1) Loosen the self-locking hexagonal nut and rotate the pawl eccentric stud to meet the requirement of *a*(1) above. Tighten the self-locking hexagonal nut and recheck the requirement.

(2) Bend the back space pawl tab with a long nose pliers until the requirement of *a*(2) above is met.

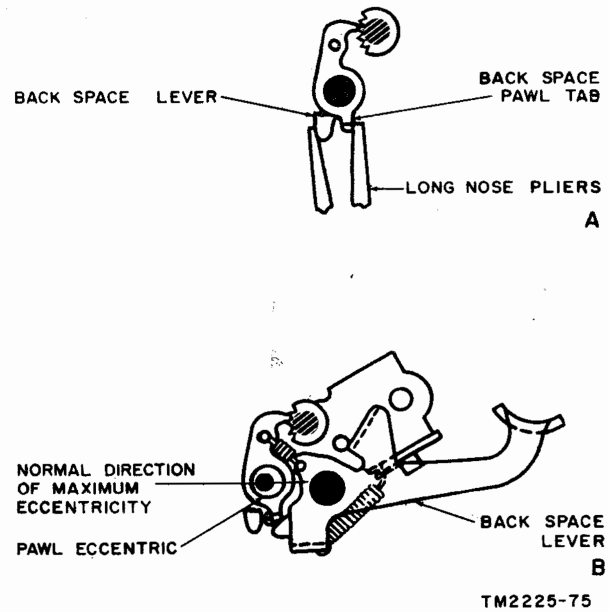


Figure 89. Back space mechanism alignment adjustment (TT–76/GGC).

102. Back Space Mechanism Alignment Adjustment (TT–76A/GGC)

(fig. 90)

a. Requirements.

(1) With full depression of the back space lever the tape should back space one character, and the detent lever should be seated in the detent wheel. Any additional pressure applied to the back space lever should not cause the tape or the detent wheel to move.

(2) The back space pawl should engage the ratchet wheel directly between two of its teeth when the back space lever is depressed.

(3) When the above requirements have been met and the back space lever is depressed, the indicator should point directly at the previously typed character on the message tape.

b. Adjustments.

(1) Loosen the self-locking hexagonal nut and rotate the pawl eccentric stud to meet the requirement of *a*(1) above. Tighten the self-locking hexagonal nut and recheck the requirement.

(2) Bend the back space pawl tab with a long nose pliers until the requirement of *a*(2) above is met.

(3) Remove the retainer ring, tape guide lever, and tape guide lever spring from the tape guide lever pivot. Loosen the tape guide lever pivot and position the indicator to meet the requirement of *a*(3) above. Tighten the tape guide lever pivot and recheck the requirement. Assemble the tape guide lever spring, tape guide lever, and retainer ring on the tape guide pivot.

103. Type Wheel Register Lever Alignment in Operated Position

(fig. 91)

a. Requirement. There should be a .001- to .005-inch clearance between the type wheel register lever and the print hammer eccentric stop.

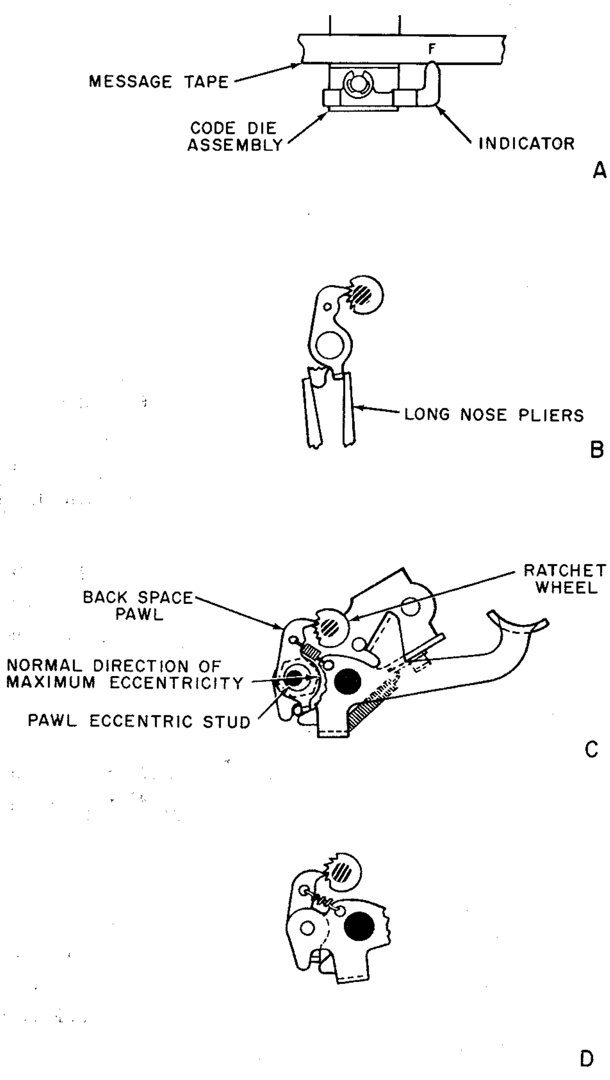


Figure 90. Back space mechanism alignment adjustment (TT–76A/GGC).

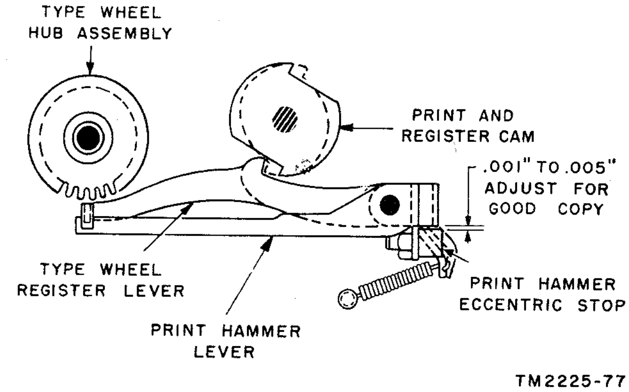


Figure 91. Type wheel register lever alignment in operated position.

b. Adjustment. Loosen the self-locking hexagonal nut and position the print hammer eccentric stop until the requirement is met; tighten the self-locking hexagonal nut and recheck the clearance.

104. Print Hammer Lever Alignment in Operated Position Adjustment (TT–76/GGC)

(fig. 92)

a. Requirement. The print hammer eccentric stop should be adjusted to give clear copy.

b. Adjustment. Loosen the self-locking hexagonal nut on the print hammer eccentric stop. Rotate the print and register cam to the position shown. Adjust the print hammer eccentric stop until the requirement is met. Tighten the self-locking hexagonal nut and recheck the requirement. Check the related adjustment (par. 103).

105. Stop Arm and Type Wheel Hub Assembly Alignment Adjustment

(fig. 93)

a. Requirement. With the stop arm against the left side of the selected V stop bar, the type wheel

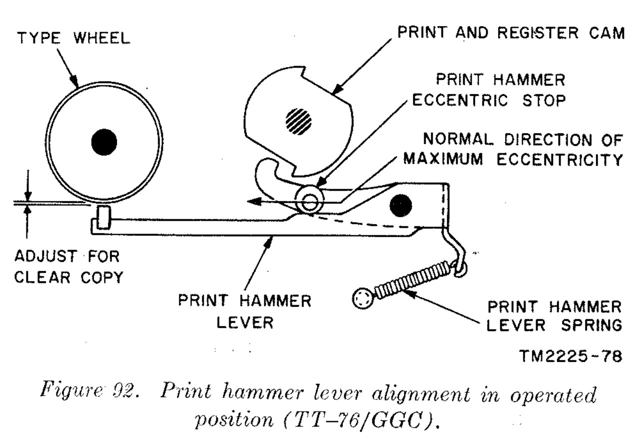


Figure 92. Print hammer lever alignment in operated position (TT–76/GGC).

register lever should engage the fifth notch counterclockwise from the blank portion of the type wheel hub assembly.

b. Adjustment.

(1) Operate the code rings manually, placing the first code ring in the space position and the other four in the mark position. This will allow the V stop bar to be selected.

(2) Loosen the machine screw in the stop arm. Manually turn the type wheel driving gear until the type wheel register lever engages the fifth notch counterclockwise from the blank portion of the type wheel hub assembly. When this requirement is met, tighten the machine screw.

(3) Check related adjustment (par. 106).

Note. On the TT–76/GGC, the type wheel register lever engages the fourth notch counterclockwise from the blank portion of the type wheel hub assembly.

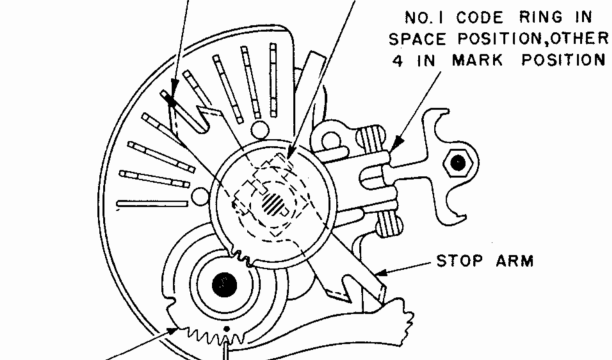


Figure 93. Stop arm and type wheel hub assembly alignment adjustment.

106. Type Wheel and Type Wheel Hub Assembly Alignment Adjustment
(fig. 94)

a. Requirement. The letter V on the type wheel must be aligned with the fifth notch counterclockwise from the blank portion of the type wheel hub assembly.

b. Adjustment. Loosen the machine screws of the type wheel clamp plate mounting disk and turn the type wheel until the requirement is met; tighten the machine screws. The stop arm and type wheel hub assembly must be aligned (par. 105) before this adjustment is made.

c. Final Check. All characters must be fully printed.

Note. On the TT–76/GGC, the letter V is aligned with the fourth notch counterclockwise from the blank portion of the type wheel hub assembly.

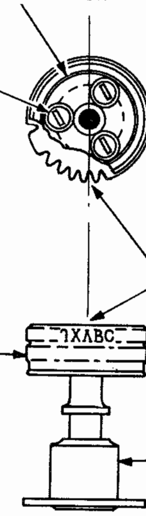


Figure 94. Type wheel and type wheel hub assembly alignment adjustment.

107. Type Wheel Reciprocating Transfer and Bell Crank Levers End Clearance Adjustments
(fig. 95)

a. Requirements.

(1) There should be a .005-inch clearance between the type wheel reciprocating transfer lever and the type wheel upper bell crank lever. The upper bell crank machine screw should clear the frame.

(2) There should be a .005- to .010- inch clearance between the type wheel lower bell crank lever and the type wheel hub assembly.

(3) There should be a .002- to .005-inch clearance between the upper shaft collar and the frame.

b. Adjustment.

(1) Loosen the machine screw in the type wheel upper bell crank lever and position the

lever to give the required clearance; tighten the machine screw and recheck the clearance.

(2) Loosen the machine screw in the type wheel lower bell crank lever. Adjust for the required clearance between the type wheel lower bell crank lever and the type wheel hub assembly; tighten the machine screw and recheck the clearance.

(3) Loosen the setscrew in the upper shaft collar and position the shaft collar to give the proper clearance. Tighten the setscrew and recheck the clearance.

(4) Check related adjustment (par. 116).

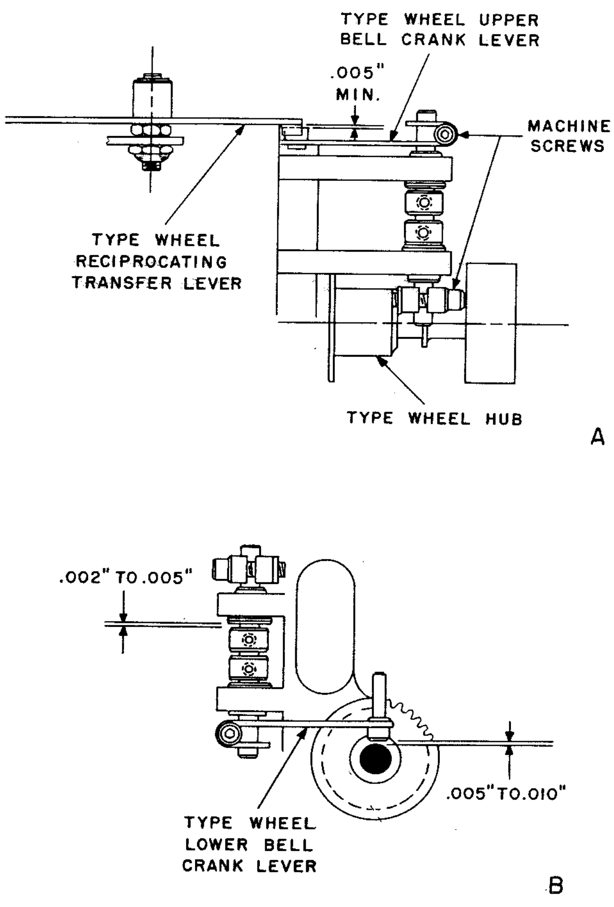


Figure 95. Type wheel reciprocating transfer and bell crank levers end clearance adjustments.

108. Stop Arm Shaft Support Plate Alignment Adjustment
(fig. 96)

a. Requirement. The stop arm shaft should turn freely in the stop arm shaft support plate.

b. Adjustments. Loosen the stop arm shaft support plate machine screws. Position the stop arm shaft support plate until the stop arm shaft rotates freely. Tighten the stop arm shaft support plate machine screws. Check related adjustment (par. 109 or 110).

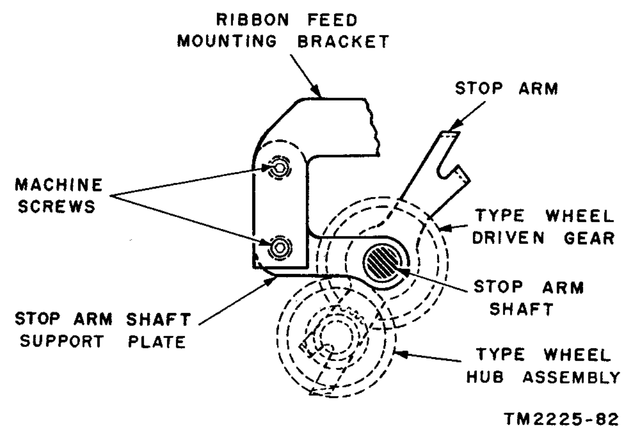


Figure 96. Stop arm shaft support plate alignment adjustment.

109. Cam Follower Eccentric Stud Adjustment (TT–76/GGC)
(fig. 97)

a. Requirement. When the left side of the ribbon feed cam follower is against the low side of the cam, there should be a .015- to .030-inch clearance between the ribbon reversing arm and the empty spool sensing lever.

b. Adjustment. Adjust the eccentric stud until the requirement is met. Check related adjustment (par. 114).

110. Ribbon Feed Reversing Toggle Adjustment (TT–76A/GGC)
(fig. 98)

a. Requirement. When the ribbon feed cam follower is against the low side of the cam, there should be some clearances but not more than .005 inch between the ribbon reversing arm and the empty spool sensing lever.

b. Adjustment. Bend the ear on the empty spool sensing lever to meet the requirement. Check related adjustment (par. 114).

Note. The ear should engage the ribbon reversing arm approximately 50 per cent of the thickness of the empty spool sensing lever.

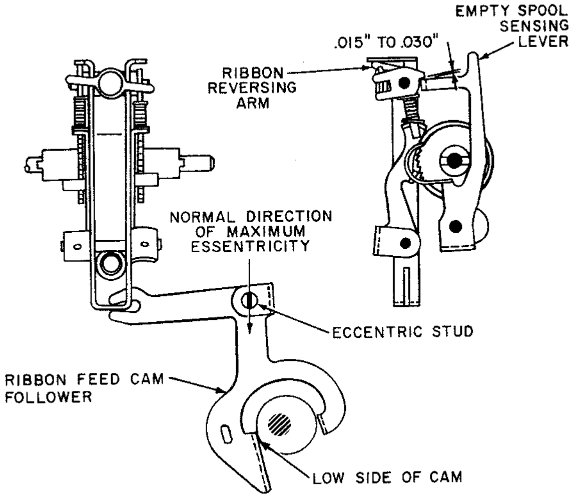


Figure 97. Cam follower eccentric stud adjustment (TT–76/GGC).

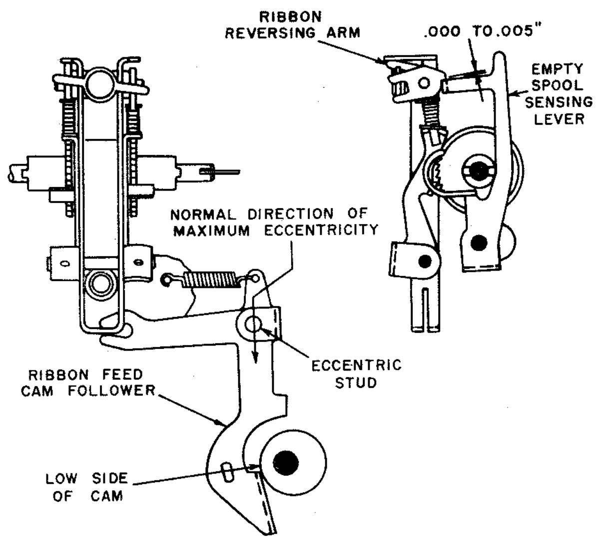


Figure 98. Ribbon feed reversing toggle adjustment. (TT–76A/GGC).

111. Ribbon Feed Lever Clearance Adjustment
(fig. 99)

a. Requirement. The ribbon feed lever should engage the ribbon feeding detent wheel with .001- to .005-inch clearance between the ribbon feed lever and the bottom of the tooth in the ribbon feeding detent wheel.

b. Adjustment. If the ribbon feed lever does not meet the requirement, carefully bend the limiting tabs of the driving link lever until the requirement is met. Check related adjustment (par. 114).

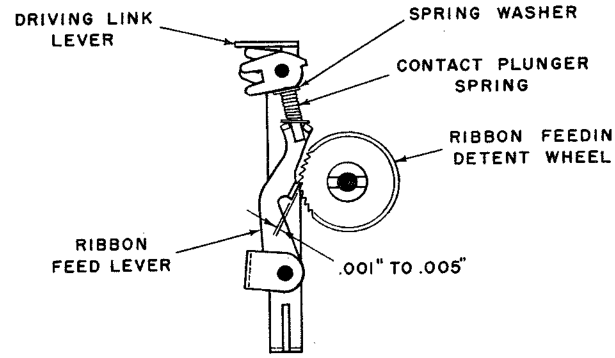


Figure 99. Ribbon feed lever clearance adjustment.

112. Sensing Lever Retracting Levers Adjustment (TT–76A/GGC)
(fig. 100)

a. Requirements.

(1) There should be approximately $\frac{1}{16}$-inch clearance between the lower extension of the sensing lever retracting lever and the ribbon feeding detent wheel when the sensing lever is all the way forward against the ribbon feeding detent wheel.

(2) When the ribbon retainer lever is against the hub of the empty spool, the sensing lever must be free to move all the way forward against the ribbon feeding detent wheel. When the ribbon retainer lever is held back, the sensing lever must be retracted enough to remove the empty ribbon spool.

b. Method of Checking.

(1) Remove the ribbon spool. With the sensing lever all the way forward against the ribbon feeding detent wheel, visually check the clearance.

(2) Place an empty ribbon spool on the ribbon spool shaft. With the ribbon retainer lever against the empty ribbon spool, check to see that the sensing lever moves all the way forward against the ribbon feeding detent wheel. Then hold the ribbon retainer lever back and check to see that the sensing lever is retracted enough to remove the empty ribbon spool.

c. Adjustments.

(1) Bend the lower extension of the sensing lever retracting lever to meet the requirement of *a*(1) above.

(2) Remove the ribbon retainer lever, the ribbon retainer lever spring, and the ribbon retainer lever collar. With the sensing lever retracting lever still on the ribbon retainer shaft, wind or unwind the coiled portion of the sensing lever retracting lever until the requirement of *a*(2) above is met. To check the requirement while making the adjustment, place the ribbon retainer lever on the ribbon retainer shaft without the collar. When the requirement has been met, reassemble the ribbon retainer lever, the ribbon retainer lever collar, and the ribbon retainer lever spring, and make the adjustment in paragraph 113.

Note. Unwinding the coiled portion of the sensing lever retracting lever causes the sensing lever to be retracted farther. Winding will allow the sensing lever to move farther forward.

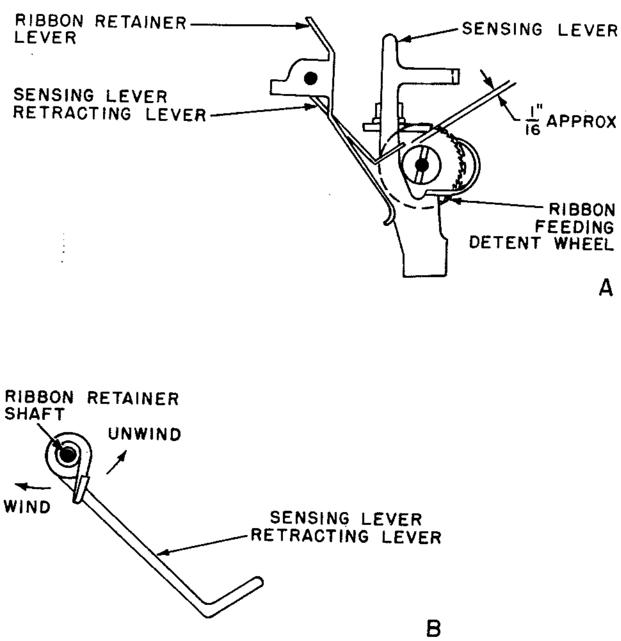


Figure 100. Sensing lever retracting levers adjustment (TT–76A/GGC).

113. Ribbon Retainer Levers Adjustment (TT–76A/GGC)
(fig. 101)

a. Requirement.

(1) The ribbon retainer levers should be positioned so there is a slight clearance between the ribbon retainer levers and the inside of the ribbon spool when the ribbon spool is fully engaged with the ribbon feeding detent wheel.

(2) The ribbon retainer levers should prevent the ribbon spools from becoming disengaged with the ribbon feeding detent wheels.

b. Method of Checking.

(1) Visually check for clearance.

(2) Unlock the ribbon spool clips and pull outward on the ribbon spool. When the outward motion of the spool is stopped by the ribbon retainer lever check for the requirement by turning the ribbon spool. The spool should not turn unless the ribbon feeding detent wheel turns with it.

c. Adjustment. Loosen the two setscrews in each of the ribbon retainer lever collars and position the retainer levers to meet the requirements. Tighten th setscrews and recheck the requirements.

Note. After this adjustment has been made, be sure the sensing levers move all the way forward under the ribbon reversing arms (par. 114).

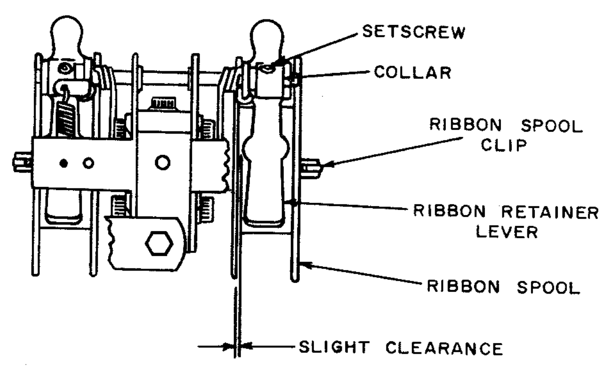


Figure 101. Ribbon retainer levers adjustment (TT–76A/GGC).

114. Empty Spool Sensing Levers Adjustment (TT–76A/GGC)
(fig. 102)

a. Requirement. The empty spool sensing levers must move forward through the hole in the empty ribbon spools.

b. Method of Checking. Place an empty ribbon spool on the ribbon spool shaft; be sure the spool is on all the way. Lock on the spool with the ribbon spool clip. Rotate the spool slowly. The sensing lever should move forward approximately in the center of the hole in the empty ribbon spool. Check both sensing levers in this manner.

c. Adjustment. Remove the empty ribbon spool and bend the lower extension of the empty spool sensing lever to the right or left to meet the requirement. Adjust both sensing levers in this manner.

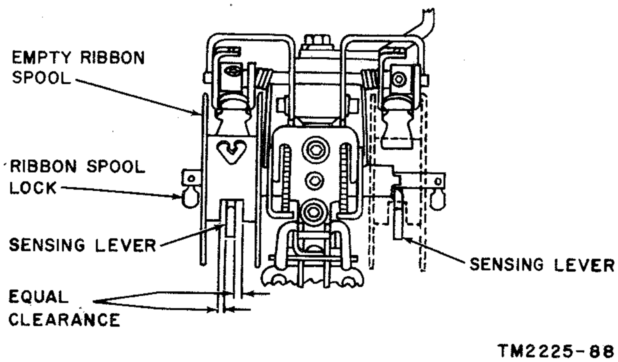


Figure 102. Empty spool sensing levers adjustment (TT–76A/GGC).

115. Type Wheel Figures-Letters Alignment Adjustment

(fig. 103)

a. Requirement. The printing of figures and letters on the paper tape must appear in a straight line of print.

b. Adjustment. Loosen the self-locking hexagonal nut on the type wheel reciprocating transfer lever eccentric stud and adjust the type wheel reciprocating transfer lever eccentric stud until the requirement is met. Tighten the self-locking hexagonal nut and recheck the requirements. Check related adjustment (par. 116).

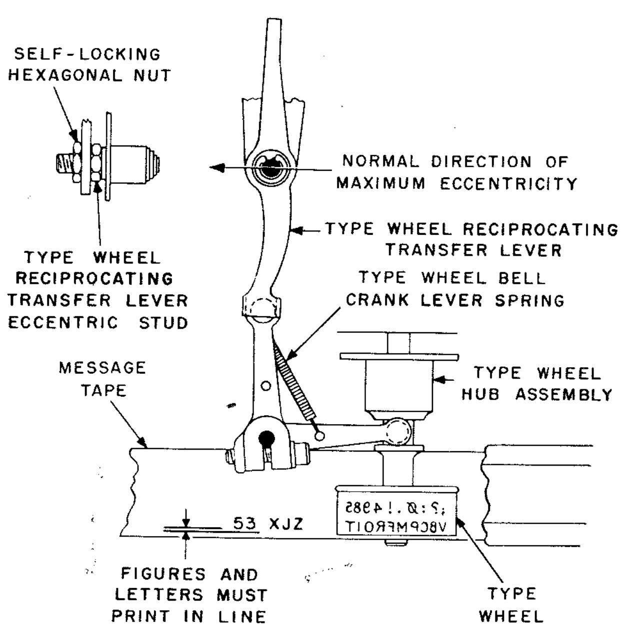


Figure 103. Type wheel figures-letters alignment adjustment.

116. Copy Alignment Adjustment

(fig. 104)

a. Requirement. The copy should be equally spaced between the first line of the punched code holes and the edge of the paper tape.

b. Adjustment. Loosen the machine screw in the type wheel lower bell crank lever and adjust the type wheel lower bell crank lever until the requirement is met; tighten the machine screw. Check related adjustment (par. 107).

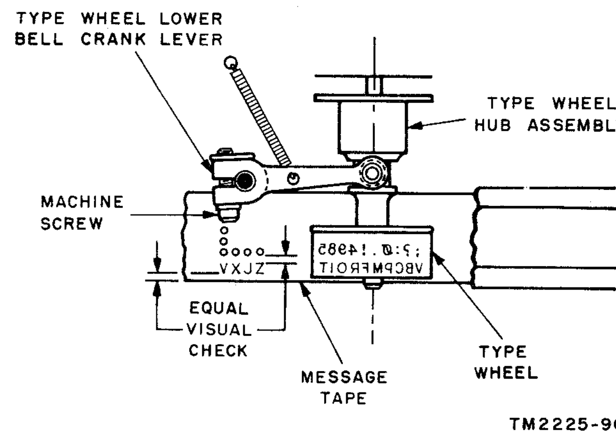


Figure 104. Copy alignment adjustment.

117. Selector-Magnet Bracket and Armature Alignment Adjustment

(fig. 105)

a. Requirement. The selector-magnet bracket must be positioned on the frame so the larger holes in the selector-maget bracket and the mounting holes in the frame are aligned. Armature position must permit number one selector lever to just pass the knife-edge of the armature.

b. Adjustment. Position the selector-magnet bracket on the frame so the holes in the frame are visually centered with the larger holes in the selector-magnet bracket. Hold the selector-magnet bracket against the selector-magnet bracket adjustment screws and position the selector-magnet bracket adjustment screws in or out to get the requirement. Adjust the armature with the machine screws until the first selector lever will just pass the knife-edge of the armature when the selector levers are manually moved toward the armature. Either machine screw can be used by holding the armature against the machine screw and screwing in or out until the requirement is obtained. Remove the selector-magnet bracket from the frame and position the other machine screw until only a barely perceptible amount of movement remains between the machine screws and the armature. This procedure will avoid bending the armature by overtightening a machine screw. Check related adjustment (par. 119 or 120).

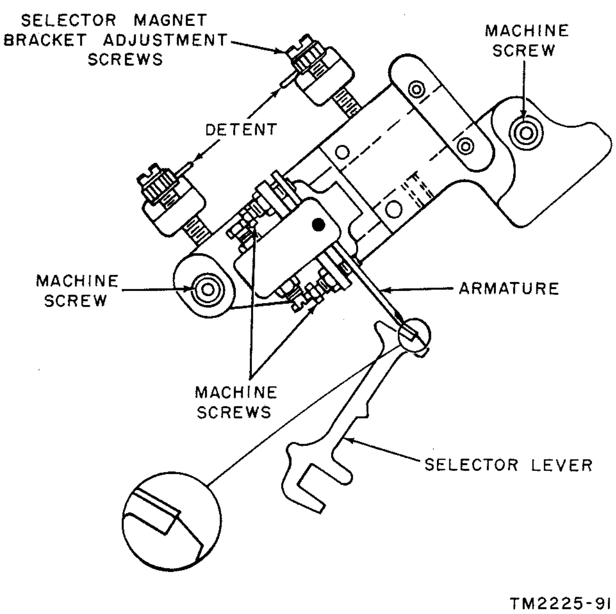


Figure 105. Selector-magnet bracket and armature alignment adjustment.

118. Bar Magnet Preliminary Clearance Adjustment
(fig. 106)

a. Requirement. There should be a clearance of .015-inch between the south pole of the bar magnet and the armature stop bracket.

b. Adjustment. Assemble the bar magnet on the selector-magnet bracket so that the requirement is met. Tighten the setscrew. Check related adjustment (par. 119 or 120).

Note. The north pole of the bar magnet is designated by a red dot on the side of the bar magnet.

119. Selector-Magnet Pole Faces and Armature Alignment Adjustment (TT–76/GGC)
(fig. 107)

a. Requirement. The selector-magnet pole faces should be parallel with the armature and there should be .008-inch clearance between both selector-magnet pole faces and the armature with the armature in the fixed position (as a result of the adjustment in par. 117).

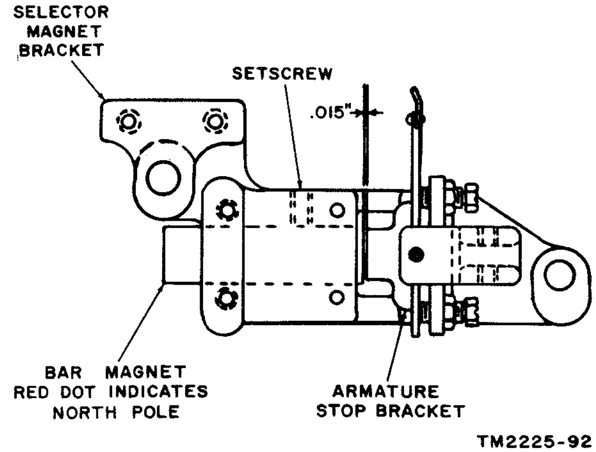


Figure 106. Bar magnet preliminary clearance adjustment.

b. Adjustment. The selector magnet is fastened to the selector-magnet bracket by two machine screws. Loosen the two machine screws slightly. This allows the selector magnet to be moved toward and away from the armature. Place .008-inch flat gages (brass, if possible) between the selector-magnet pole faces and the armature. Move the selector magnet toward the armature until the flat gages are held in place. Hold the bracket (fastened between the selector magnet and the selector-magnet bracket) against the north end of the bar magnet. Tighten the machine screws slightly and remove the flat gages. Adjust the setscrews to make the selector-magnet pole faces parallel with the armature. When parallel, recheck the .008-inch clearance and tighten the machine screws. Check related adjustment (par. 121).

120. Selector-Magnet Pole Faces and Armature Alignment Adjustment (TT–76A/GGC)
(fig. 108)

a. Requirement. There should be a gap of .004 inch between the pole faces of the selector-magnet core and the toffets on the armature.

b. Adjustment. Mount the magnet bracket and the selector magnet on the selector-magnet bracket by the machine screw and selector-magnet cable stud. Use two .004-inch gages, one between either side of the pole face and armature toffets. Make sure the .004-inch clearances are equal and that the

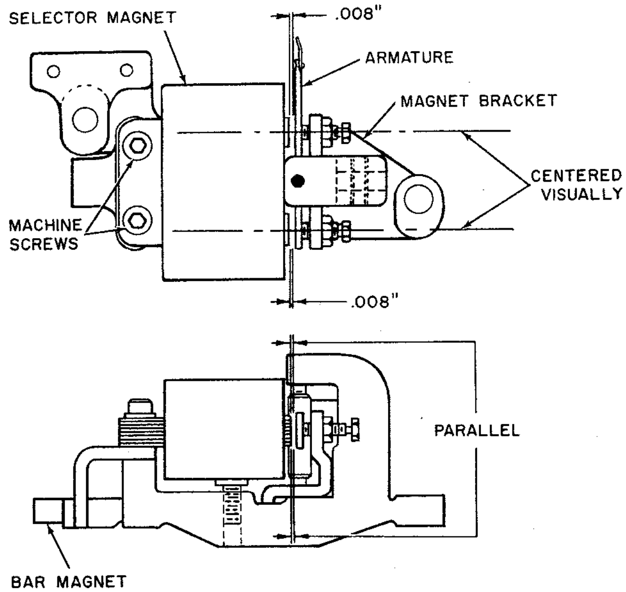


Figure 107. Selector-magnet pole faces and armature alignment adjustment (TT–76/GGC).

surfaces on the armature toffets and the pole faces are parallel with each other within .002 inch. Use the setscrews underneath the selector magnet to adjust to the latter requirement. Remove the lock setscrews and position the adjusting setscrews in or out to meet the requirement. Replace the lock setscrews. Back out the armature adjusting screw so that the armature in either the mark or space position does not touch the adjusting screws. Check related adjustment (par. 122).

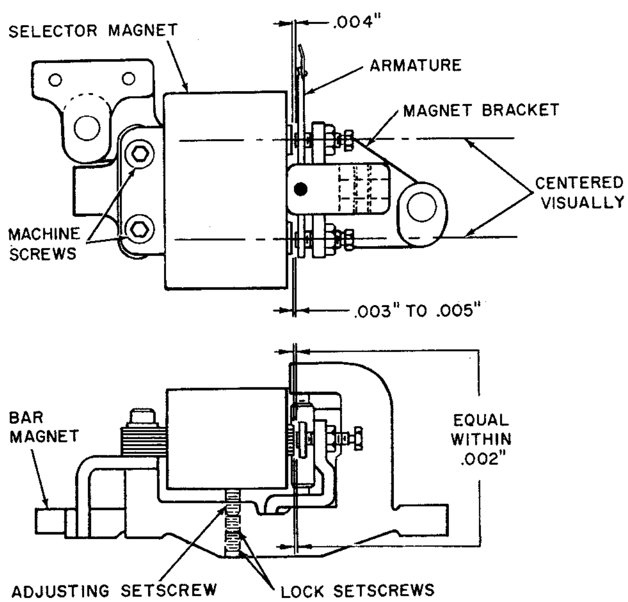


Figure 108. Selector-magnet pole face and armature alignment adjustment (TT–76A/GGC).

121. Armature Machine Screws Final Adjustment and Bar Magnet Attractive Force (TT–76/GGC)

(fig. 109)

Note. Perform adjustments in paragraphs 117, 118, and 119 before making this adjustment.

a. Requirements.

(1) There should be a .004-inch clearance between the selector-magnet pole faces and the armature when the opposite end of the armature is against its machine screw.

(2) A force of 50 to 65 grams should be required to start the armature moving from either the mark or space position when the selector-magnet bracket is removed from the machine and the signal and bias current are removed and the two armature leaf spring stop screws are away from the leaf springs of the armature.

b. Method of Checking.

(1) With the armature held in the space position, there should be .004-inch clearance between the armature and the selector-magnet pole face. With the armature in the mark position, there should be .004-inch clearance between the selector-magnet pole face and the armature.

(2) Use a spring scale to measure the 50 to 65 grams required to move the armature from mark to space position.

c. Adjustments.

(1) Loosen the hexagonal nuts on the armature machine screws and slowly back one machine screw away from the armature until the clearance requirement of .004 inch is met between the opposite end of the armature and its selector-magnet pole face. Tighten the hexagonal nut.

(2) If a force greater than 65 grams is required to move the armature from either the mark or space position, check to determine that no bind is present at the armature pivot point. If the armature pivots with no bind, readjust the position of the bar magnet as directed in paragraph 118. Increase the clearance between the bar magnet and the armature stop bracket until the attractive force requirement is met. If the force is less than 50 grams, decrease the bar magnet clearance. When the attractive force re-

quirement is met, recheck the adjustments in paragraphs 117 and 119 and the requirement in $a(1)$ above. If the requirements can not be met after this adjustment, replace the bar magnet. Check related adjustments (par. 123 and 125).

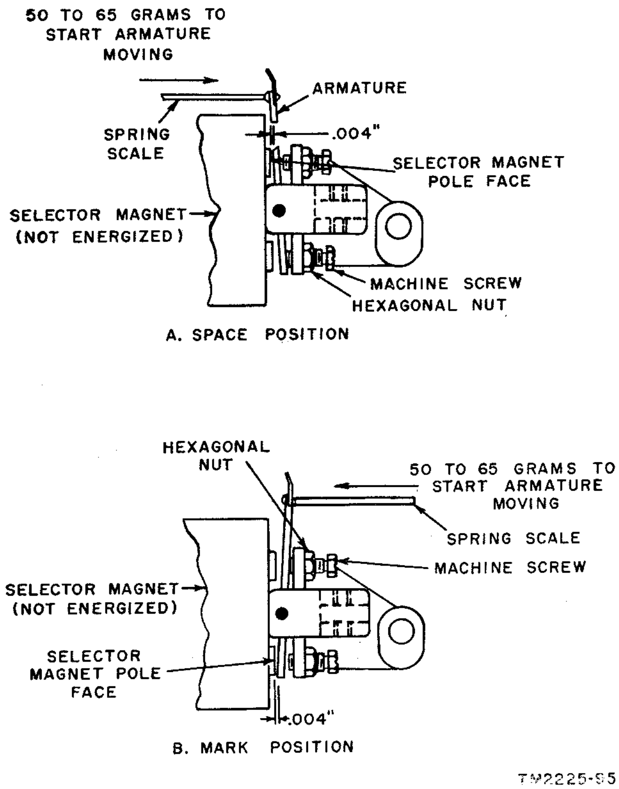


Figure 109. Armature machine screws final adjustment and bar magnet attractive force (TT–76/GGC).

122. Bar Magnet Attractive Force and Armature Clearance Adjustment (TT–76A/GGC)

(fig. 110)

a. Requirement. A pull from 40 to 75 grams should be exerted by the permanent magnet on the armature.

b. Method of Checking. With the selector-magnet coil not energized, use a spring scale to measure the pull required to start the armature blade moving in each direction. Pull toward the magnet coil assembly in the space position, pull away from the magnet coil assembly in the mark position.

c. Adjustment. Place .004-inch feeler gages between the pole faces of the core and the toffets on the armature. Set the adjusting screws back down on the armature blade; be sure that screws are not too tight or they will bend the blade. Loosen the selector-magnet coil mounting screws and bar magnet setscrew. Close or open the gap at the south pole of the bar magnet to obtain the requirement. Perform the adjustments outlined in paragraphs 124 and 126 and recheck the requirement in *a* above.

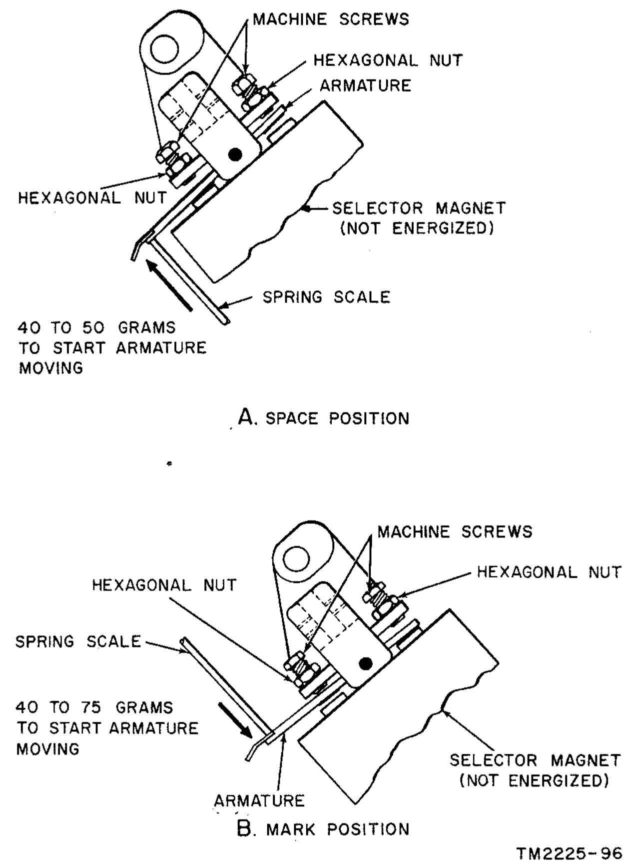


Figure 110. Bar magnet attractive force and armature clearance adjustment (TT–76A/GGC).

123. Armature Leaf Spring Adjustment (TT–76/GGC)

(fig. 111)

Note. This adjustment is to be completed after those in paragraph 121.

a. Requirement. It should require a force of 30 to 50 grams to start the armature moving to the space position, and 0 gram to start the armature moving to the mark position.

b. Method of Checking. Move the armature to the mark position. Place the push end of the spring scale in the center of the armature blade. Check the required force to start the armature moving toward the space position. Hold the armature in the space position. When released, the armature should immediately return to the mark position.

c. Adjustment. Loosen the hexagonal nuts on the armature leaf spring stop screws. Place the armature in the mark position and turn the spacing armature leaf spring stop screw in or out until it just makes contact with the leaf spring. Then place the armature in the space position and turn the marking armature leaf spring stop screw until it makes contact with the leaf spring. Continue adjusting the armature leaf spring stop screws until the requirement is made. Tighten the plain hexagonal nuts.

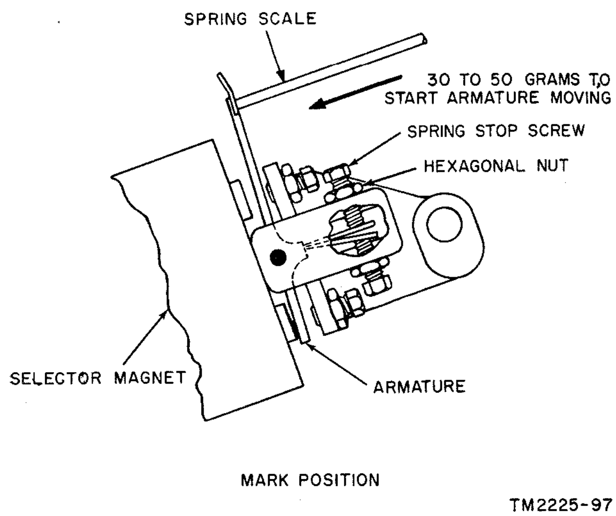


Figure 111. Armature leaf spring adjustment (TT-76/GGC).

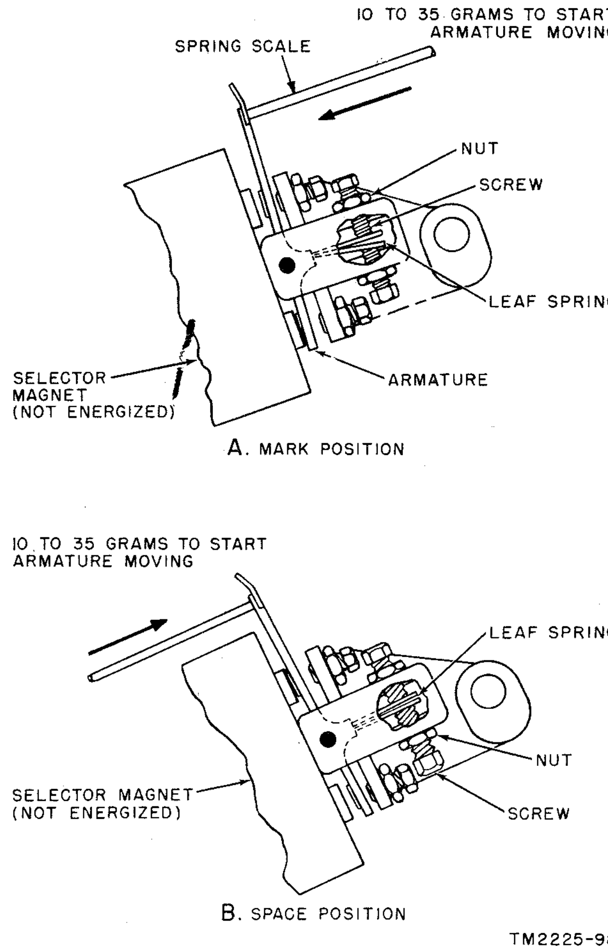


Figure 112. Selector-magnet attractive force and leaf spring adjustment (TT-76A/GGC.)

124. Selector-Magnet Attractive Force and Leaf Spring Adjustment (TT-76A/GGC)
(fig. 112)

a. Requirement. The pressure required to move the armature to the mark or space positions should be within 10 grams of each other, and both should fall between 10 and 35 grams.

b. Method of Checking. The magnet assembly should be mounted to the selector casting. Use the spring scale against armature blade.

c. Adjustment. Position the armature leaf spring stop screws until the requirement is met.

125. Selector Lever and Armature Alignment and Selector Camshaft Lever Eccentric Adjustment (TT-76/GGC)
(fig. 113)

a. Requirements.

(1) With the armature in its midtravel position, the armature blade should contact the selector levers.

(2) There should be .002-inch engagement between the armature and the selector camshaft locking lever when the armature is in its midtravel position.

b. Method of Checking.

(1) Place .008-inch feeler gages between the selector-magnet pole faces and the armature. Manually move the selector levers toward the armature and check the requirement visually.

(2) Place .008-inch feeler gages between the selector-magnet pole faces and the armature. Manually move the selector camshaft locking lever toward the armature and visually check the requirement.

c. Adjustments.

(1) Set the armature in the midtravel position

by inserting .008-inch feeler gages between the armature and the selector-magnet pole faces.

(2) Loosen the selector-magnet bracket machine screws; leaving them tight enough to set firm tension against the selector-magnet bracket.

(3) Turn the right hand selector-magnet bracket adjusting screw clockwise; rotate the selector-magnet bracket clockwise about its pivot pin, until the first selector lever just touches the armature. Tighten the selector-magnet bracket machine screws.

(4) Loosen the self-locking hexagonal nut that holds the selector camshaft lever eccentric. Place .008-inch feeler gages between the armature and the selector-magnet pole faces. Manually move the selector camshaft locking lever toward the armature and turn the selector camshaft lever eccentric clockwise or counterclockwise until the requirement is met. Tighten the self-locking hexagonal nut. Check related adjustment (par. 127).

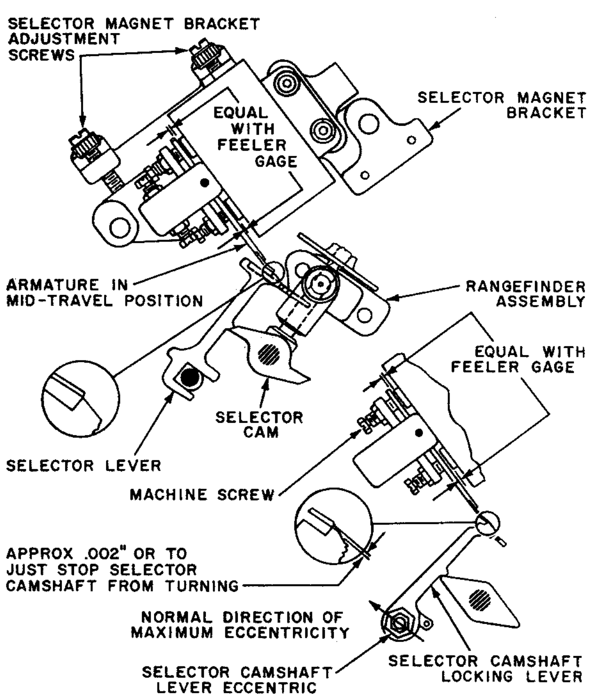


Figure 113. Selector lever and armature alignment and selector camshaft lever eccentric adjustment (TT–76/GGC).

126. Selector Lever and Armature Alignment and Selector Camshaft Lever Eccentric Adjustment (TT–76A/GGC)

(fig. 114)

a. Requirements.

(1) With the armature in its midtravel position, the armature blade should just contact the selector levers.

(2) There should be .002-inch engagement between the armature and the selector camshaft locking lever when the armature is in its midtravel position.

b. Method of Checking.

(1) Place .004-inch feeler gages between the selector-magnet pole faces and the armature. Manually move the selector levers toward the armature and visually check the requirement.

(2) Place .004-inch feeler gages between the selector-magnet pole faces and the armature. Manually move the selector camshaft locking lever toward the armature and visually check the requirement.

c. Adjustments.

(1) Set the armature in the midtravel position by inserting .004-inch feeler gages between the armature and the selector-magnet pole faces.

(2) Loosen the selector-magnet bracket machine screws; leave them tight enough to set firm tension against the selector-magnet bracket.

(3) Turn the right hand selector-magnet bracket adjusting screw clockwise; rotate the selector-magnet bracket clockwise about its pivot pin until the first selector lever just touches the armature. Tighten the selector-magnet bracket machine screws.

(4) Loosen the self-locking hexagonal nut that holds the selector camshaft lever eccentric. Place .004-inch feeler gages between the armature and the selector-magnet pole faces. Manually movė the selector camshaft locking lever toward the armature and turn the selector camshaft lever eccentric clockwise or counterclockwise until the requirement is met. Tighten the self-locking hexagonal nut. Check related adjustment (par. 127).

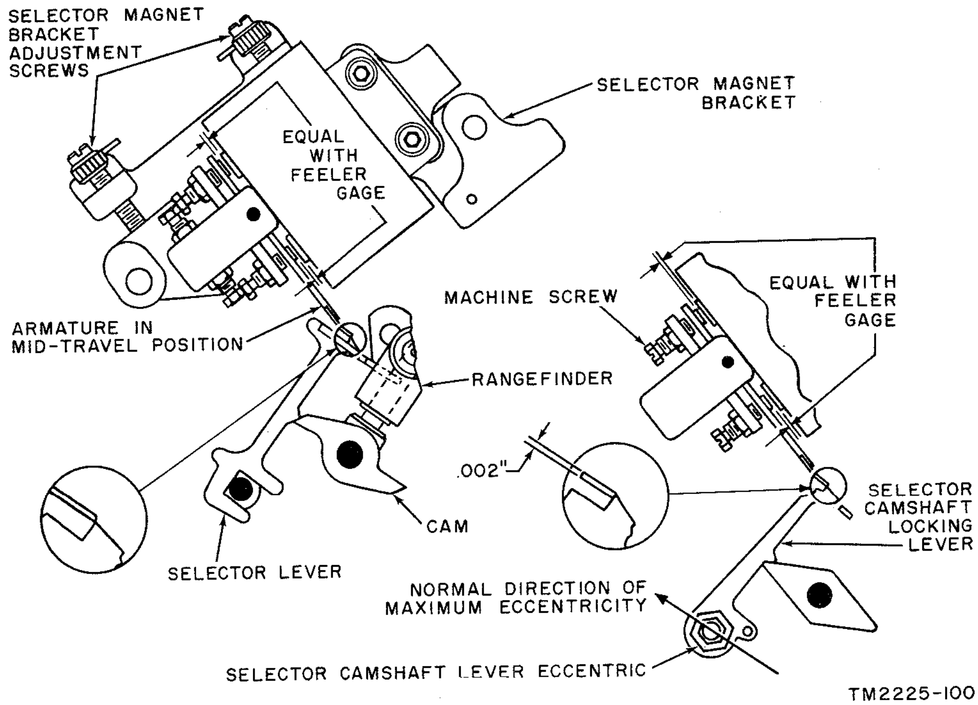


Figure 114. Selector lever and armature alignment and selector camshaft lever eccentric adjustment (TT–76A/GGC).

127. Selector-Magnet Bracket Final Adjustment (TT–76/GGC)

(fig. 115)

Note. Make this adjustment after adjustment paragraph 126.

a. Requirement. The selector camshaft should not rotate with a .006-inch feeler gage between the Y-lever and the bottom of the Y-lever eccentric stop when the letters code group is received by the selector mechanism and the motor is running. The selector camshaft should rotate when a .002-inch feeler gage is inserted at that position.

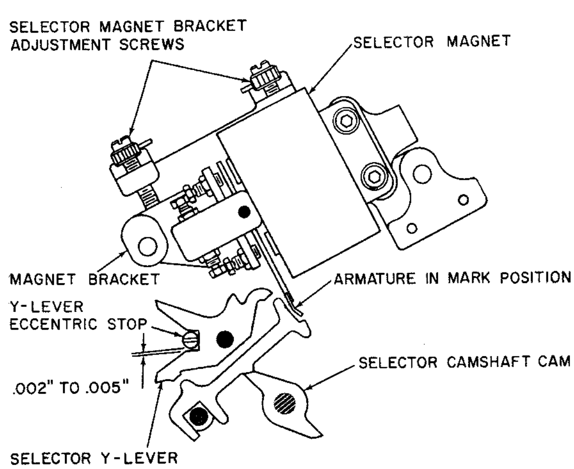


Figure 115. Selector magnet bracket final adjustment.

b. Adjustment. Adjust the selector magnet bracket adjustment screws until the above requirement is met. Check related adjustments (par. 125 or 126 and par. 128).

128. Selector Magnet Armature Blade and Selector Lever Clearance

(fig. 116)

a. Requirement. The gap between the armature blade and the selector levers should be between .015 and .020 inch.

b. Adjustment. Position the selector lever comb bracket vertically so the requirement is met.

129. Selector Camshaft Friction Clutch Adjustment (TT–76/GGC)

(fig. 117)

a. Requirement. A pull of 44 to 48 ounces is required to prevent the selector camshaft friction clutch from turning when the motor is on and the selector cams are not operating any selector levers.

b. Method of Checking. Hook a spring scale on the lug on the selector camshaft. While holding the scale rigidly, allow the camshaft to turn just slightly until it is not operating any levers. When the free spot is established, hold the camshaft from turning and read the scale.

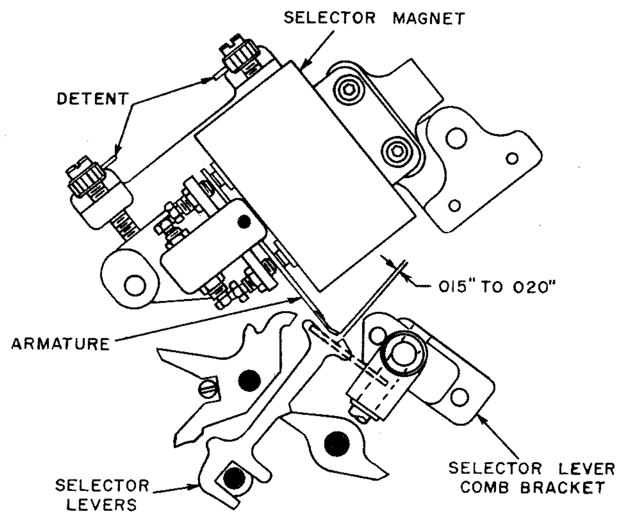


Figure 116. Selector-magnet armature blade and selector lever clearance.

c. Adjustment. Loosen the two setscrews in the drive shaft collar, shift the collar forward or back to obtain the proper spring tension on the friction clutch, and tighten the setscrews. Recheck the requirement and readjust if necessary.

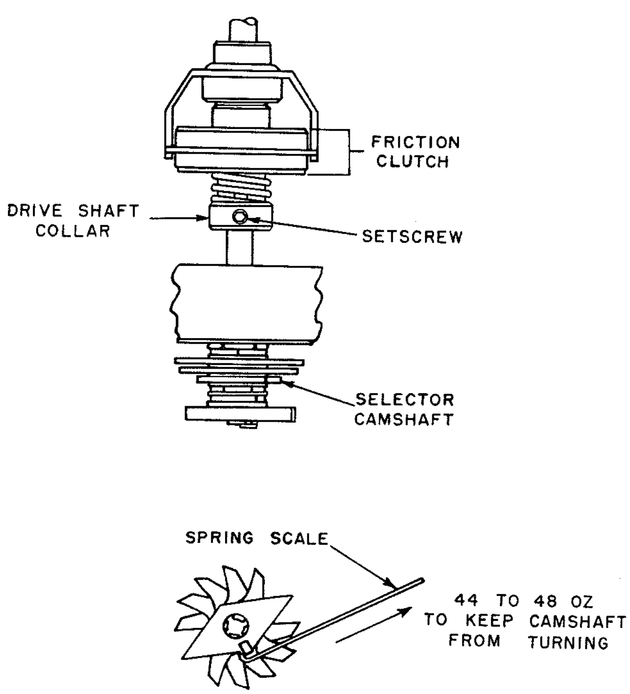


Figure 117. Selector camshaft friction clutch adjustment (TT–76/GGC).

130. Selector Camshaft Friction Clutch Adjustment (TT–76A/GGC)

(fig. 118)

a. Requirement. A pull of 44 to 48 ounces is required to prevent the selector camshaft friction clutch from turning when the motor is on and the selector cams are not operating any selector levers.

b. Method of Checking. Hook a spring scale on the lug on the selector camshaft. While holding the scale rigidly allow the camshaft to turn just slightly until it is not operating any levers. When the free spot has been established, hold the camshaft from turning and read the scale.

c. Adjustment. Loosen the two clamping screws in the drive shaft collar, rotate the collar forward or back to obtain the proper spring tension on the friction clutch, and tighten the clamping screws. Recheck the requirement and readjust if necessary.

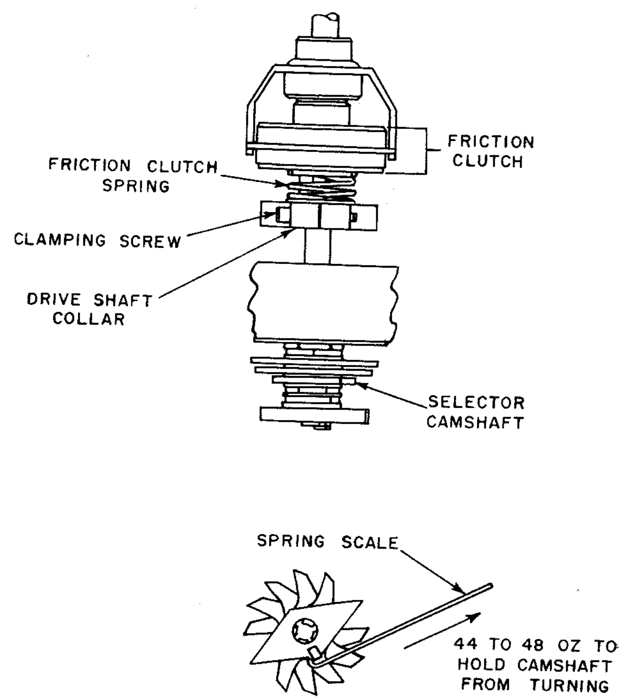


Figure 118. Selector camshaft friction clutch adjustment (TT–76A/GGC).

131. Selector Y-Lever Eccentric Spindle Preliminary Adjustment

(fig. 119)

a. Requirement. With the machine in the transferred position, there should be a slight clearance between the T-levers and the eccentric spindle.

b. Adjustment. Position the selector Y-levers to the space position. Trip the transfer lever latch so the T-levers engage the Y-levers. Loosen the plain hexagonal nut that holds the eccentric spindle to the manual tape-out operating arm and adjust the eccentric spindle so that it is barely contacting the Y-levers and there is a slight clearance between the eccentric spindle and the T-levers. Tighten the plain hexagonal nut on the eccentric spindle. Check related adjustment (pars. 132 and 133).

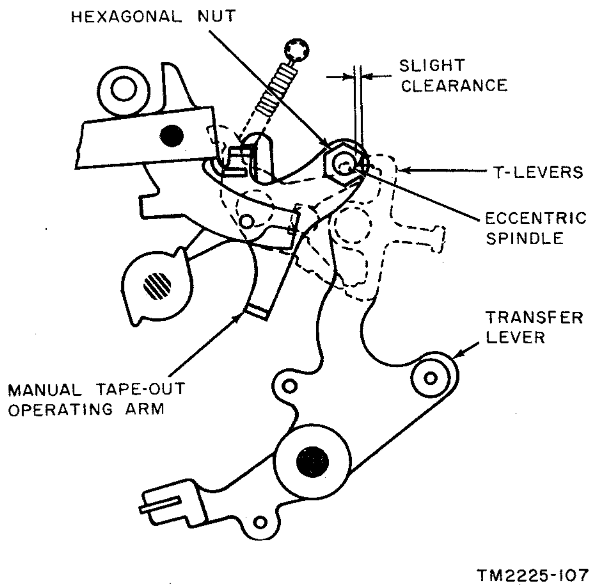


Figure 119. Y-lever eccentric spindle preliminary adjustment.

132. Limit Stop Lever and Manual Tape Feed-Out Lever Adjustment
(fig. 120)

a. Requirements.

(1) There should be .010- to .015-inch clearance between the limit stop lever and the flat washer.

(2) With the eccentric spindle holding the selector Y-levers in position, the limit stop lever should prevent any further movement of the manual tape feed-out lever.

(3) In the unoperated position, the manual tape feed-out lever should be vertical.

b. Adjustments.

(1) Loosen the limit stop lever clamping screw. Place a .010- to .015-inch feeler gage between the limit stop lever and the flat washer and rotate the limit stop lever to meet the requirement in *a*(2) above. Tighten the limit stop lever clamping screw.

(2) Loosen the manual tape feed-out lever clamping screw and position the manual tape feed-out lever to meet the requirement in *a*(3) above. Tighten the manual tape feed-out lever clamping screw.

133. Manual Tape Feed-Out Latching Lever Adjustment
(fig. 121)

a. Requirement. There should be a .010- to .020-inch clearance between the tape feed-out operating arm and the disabling latch.

b. Adjustment. Loosen the self-locking hexagonal nut and turn the setscrew in or out to meet the requirement. Tighten the self-locking hexagonal nut and recheck the clearance.

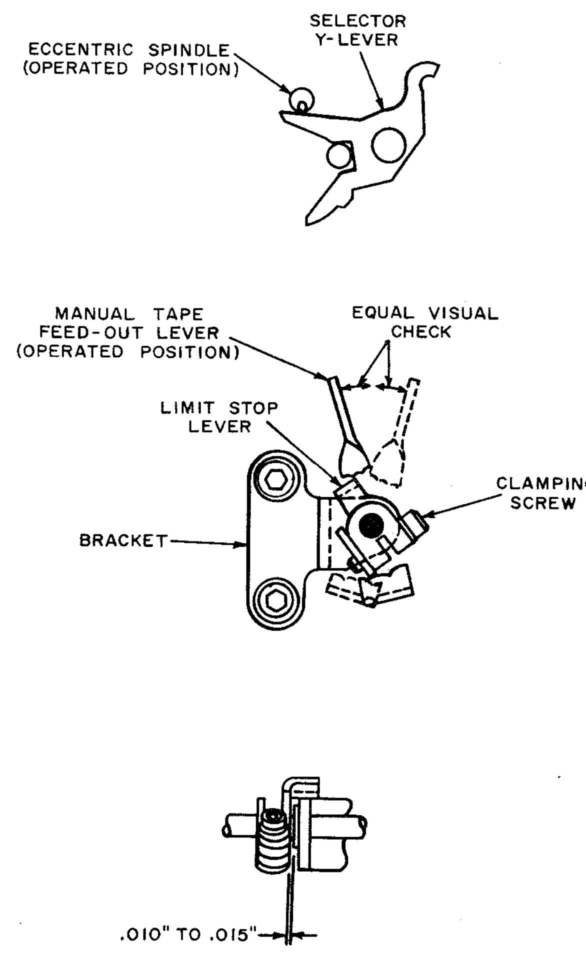


Figure 120. Limit stop lever and manual tape feed-out lever adjustment.

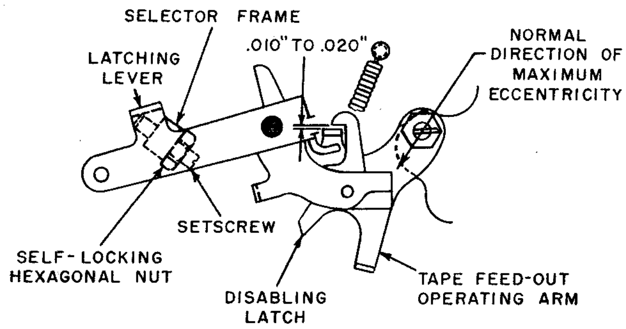


Figure 121. Manual tape feed-out latching lever adjustment.

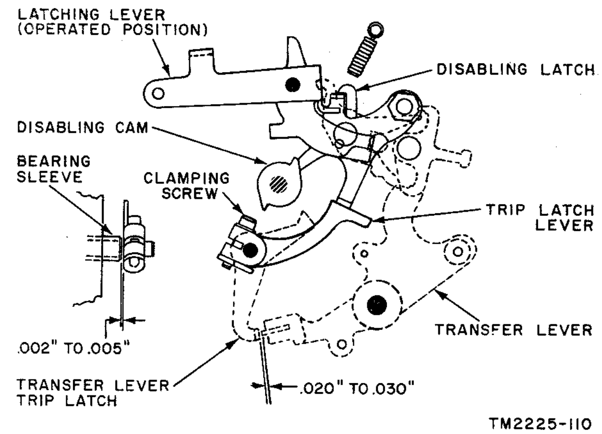


Figure 122. Trip latch lever and disabling cam adjustments.

134. Trip Latch Lever and Disabling Cam Adjustments
(fig. 122)

a. Requirements.

(1) There should be a .020- to .030-inch clearance between the transfer lever trip latch and the transfer lever assembly when the eccentric spindle is holding the selector Y-levers in the space position.

(2) There should be a .002- to .005-inch clearance between the trip latch lever and the bearing sleeve.

(3) The disabling cam should be aligned in contact with the disabling latch when the first selector lever is against a high portion of the first selector cam.

b. Adjustments.

(1) Loosen the trip latch lever clamping screw. Position the trip latch lever until requirements in *a*(1) and (2) above are met. Tighten the trip latch lever clamping screw and recheck both requirements.

(2) Loosen the setscrews of the disabling cam and align the cam until the requirement in *a*(3) above is met. Tighten the setscrew and recheck the alignment.

135. Tape Puller Bracket Adjustment
(fig. 123)

a. Requirement. The tape puller arm roller should have some clearance but not more than .010 inch between the edge of the tape puller arm roller and the bottom of the print and register cam.

b. Adjustment. Loosen the two machine screws and position the tape puller bracket to meet the requirement. Tighten the machine screws.

136. Tape Puller Arm Adjustment
(fig. 124)

a. Requirement. There should be a .003- to .010-inch clearance between the tape puller spring and the tape puller stud when the feed pawl has just cleared the feed ratchet and the feed operation is completed. The tape puller arm roller should be held toward the center of the print and register cam.

b. Adjustment. Move the tape puller stud to the bottom of the slot of the tape puller bracket and tighten the tape puller stud nut. Move the arm pivot stud to the right of the slot and tighten the arm pivot stud nut friction tight. Release the transfer lever trip latch and turn the motor by hand until the feed pawl assembly just clears the ratchet wheel and the feed operation is completed. Move the arm pivot stud to the left until there is .003- to .010-inch clearance between the tape puller spring and the tape puller stud. The .003- to .010-inch gap should be measured when the tape puller arm roller is held toward the center of the punch cam. If, when the arm pivot stud is moved all the way to the right,

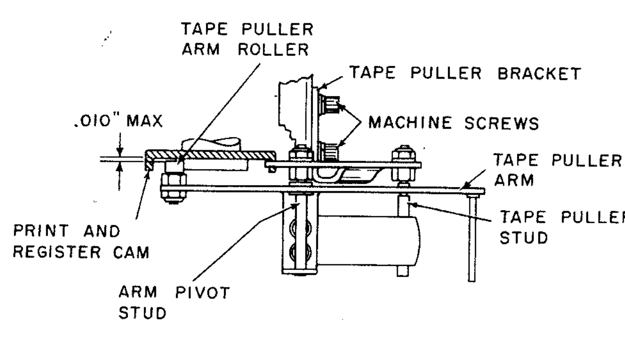


Figure 123. Tape puller bracket adjustment.

and the clearance is greater than the requirement, loosen the tape puller stud nut and move the tape puller stud upward against the tape puller spring. Tighten the tape puller stud nut. Then move the arm pivot stud to the left until the requirement is met. Tighten the arm pivot stud nut.

Note. To check for completion of the feed operation, turn the ratchet wheel backwards while turning the motor slowly. At the point where the ratchet wheel is just free to turn backwards, the feed operation is completed.

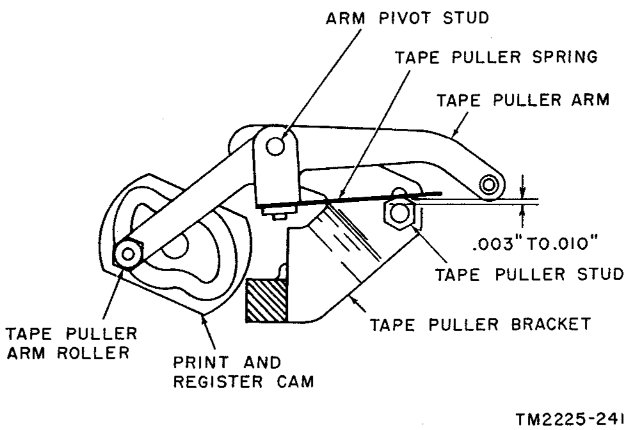


Figure 124. Tape puller arm adjustment.

137. Motor Governor Contacts Alignment
(fig. 125)

a. Requirements.

(1) The contacts should be visually centered and adjusted for maximum area of engagement.

(2) A maximum force of 8 ounces should be required to turn the gear assembly at any point within the operating range of the motor.

b. Adjustment.

(1) Loosen the contact arm spring mounting screw and position the contact arm assembly to meet the requirement.

(2) Check for dirt or bind between the governor adjustment screw and the adjustment gear.

138. Tape-Out Alarm Adjustment (TT–76/GGC)
(fig. 126)

a. Requirement. The tape alarm buzzer should sound when the alarm lever is moved within one-fourth to three-eighths of an inch of the tape reel hub.

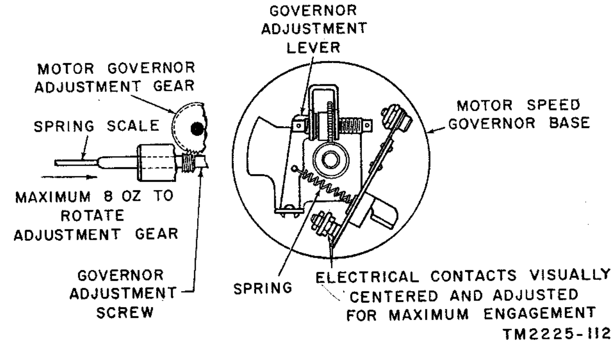


Figure 125. Motor governor contacts alignment.

b. Adjustment. Loosen the self-locking hexagonal nut on the switch actuating stud. Adjust the stud to trip the switch actuating arm latch when the alarm lever is in the position shown. Tighten the self-locking hexagonal nut.

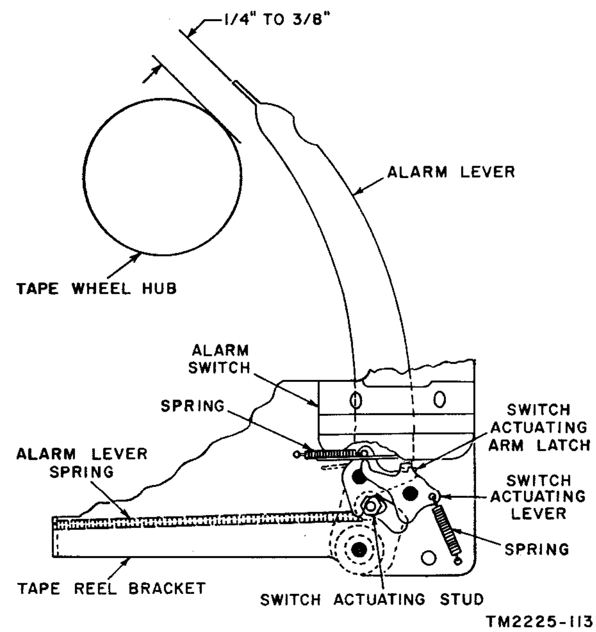


Figure 126. Tape-out alarm adjustment (TT–76/GGC).

139. Tape-Out Alarm Preliminary Adjustments (TT–76A/GGC)
(fig. 127)

a. Requirements. The alarm switch should be centered from right to left in the elongated holes, and the bottom of the alarm switch should be aligned with the bottom edge of the mounting bracket.

b. Adjustment. Remove the two self-locking hexagonal nuts that hold the cover on the alarm switch.

Remove the switch cover and loosen the two plain hexagonal nuts that hold the alarm switch to the mounting bracket. Position the alarm switch to meet the requirement and tighten the two plain hexagonal nuts. Then replace the cover and tighten the two self-locking hexagonal nuts. Check related adjustment (par. 140).

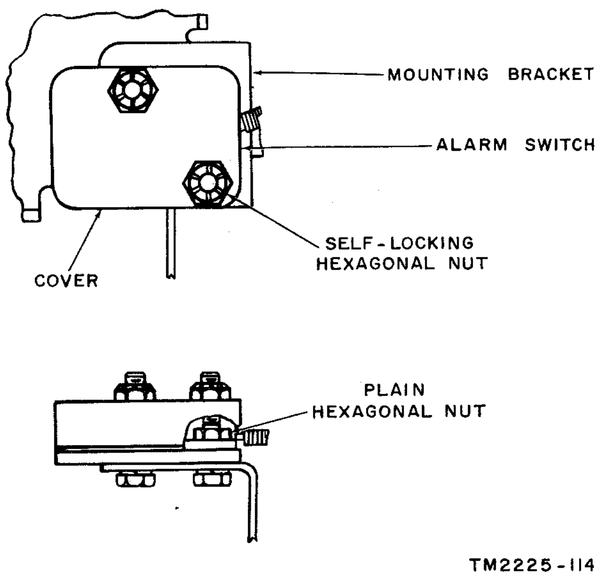


Figure 127. Tape-out alarm preliminary adjustment (TT–76A/GGC)

140. Alarm Lever Adjustment (TT–76A/GGC)
(fig. 128)

a. Requirement. The alarm switch should close and the tape-out alarm should sound when the alarm lever is one-fourth to three-eighths inch from from the hub of the tape supply reel.

b. Adjustment. Loosen the machine screw that holds the alarm lever to the switch operating plate; position the alarm lever to meet the requirement. Tighten the machine screw and recheck the requirement.

Note. If the above requirement cannot be met, reposition the alarm switch slightly (par. 139). Moving the alarm switch to the left should allow the alarm lever to move farther before the alarm switch operates. Moving the alarm switch to the right will allow the alarm switch to operate with less movement of the alarm lever. Then readjust to meet the above requirement.

141. Switch Actuating Arm Latch (TT–76A/GGC)
(fig. 129)

a. Requirement. When the alarm lever is latched in its downward position there should be ¼ to ⅜-

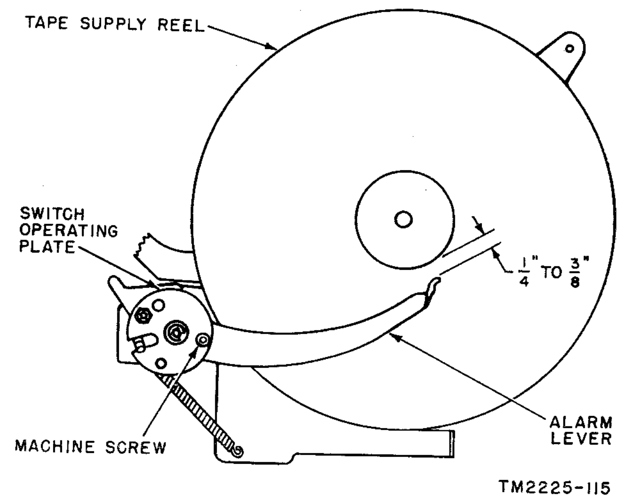


Figure 128. Alarm lever adjustment (TT–76A/GGC).

inch clearance between the alarm lever and the lower edge of the tape supply reel.

b. Adjustment. Loosen the self-locking hexagonal nut that holds the switch actuating arm latch to the switch operating plate, and position the switch actuating arm latch to meet the requirement. Tighten the self-locking hexagonal nut and recheck the clearance.

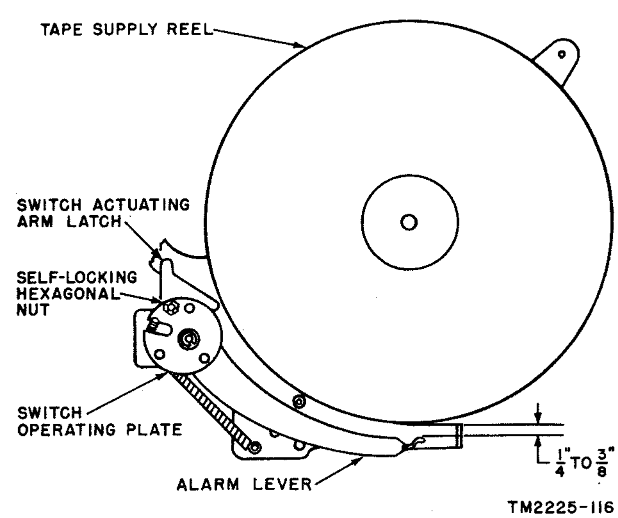


Figure 129. Switch actuating arm latch (TT–76A/GGC).

142. Transmitter Contact Bail End Play Adjustment
(fig. 130)

a. Requirement. There should be .002- to .005-inch clearance between the retainer ring on the post and the contact bail.

b. Adjustment. Loosen the setscrew. Move the post axially to meet the requirement; tighten the setscrew.

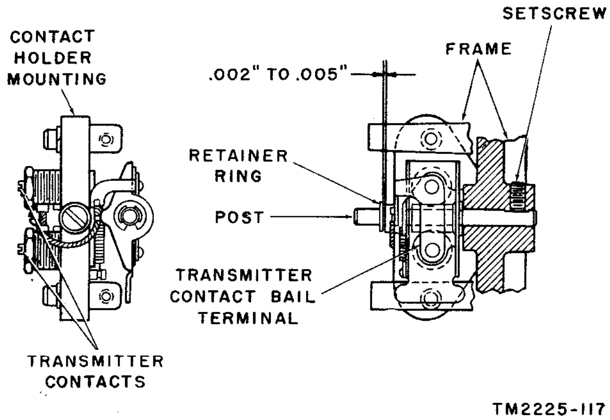


Figure 130. Transmitter contact bail end play adjustment.

143. Selector Lever End Play Adjustment
(fig. 131)

a. Requirement. There should be .002- to .005-inch clearance between the spacer and the first selector lever.

b. Adjustment. Loosen the setscrew and slide the stud in or out to meet the requirement. Tighten the setscrew.

144. Transmitter-Distributor Selector Lever Comb Adjustment
(fig. 132)

a. Requirements.

(1) There should be a .010- to .025-inch clearance between the clutch magnet armature and the camshaft stop lever when the camshaft stop lever is resting against the selector lever comb and the clutch magnet armature is in its unenergized position.

(2) There should be a minimum of .005-inch clearance between the latching surface of each code sensing lever and the latching surface of its mating selector lever.

b. Method of Checking.

(1) Rotate the transmitter-distributor camshaft until the camshaft stop lever is resting against the selector lever comb. Check the clearance with a feeler gage.

(2) Rotate the transmitter-distributor camshaft until the sensing lever restoring bail is on the low part of the restoring cam and the latching ends of the code sensing levers are in engagement with their mating selector levers. Check the clearance at each of the five selector levers.

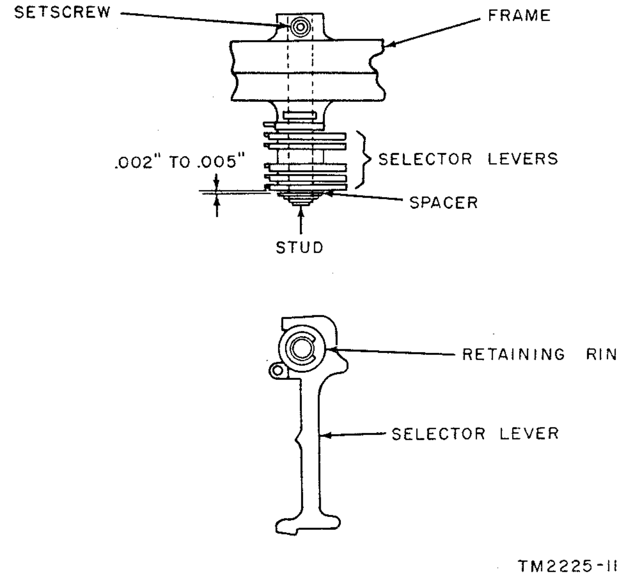


Figure 131. Selector lever end play adjustment.

c. Adjustment. Loosen the two comb mounting machine screws and position the selector lever comb until the requirements are met. Tighten the machine screws. Recheck the clearances and readjust if necessary. Check related adjustment (par. 147).

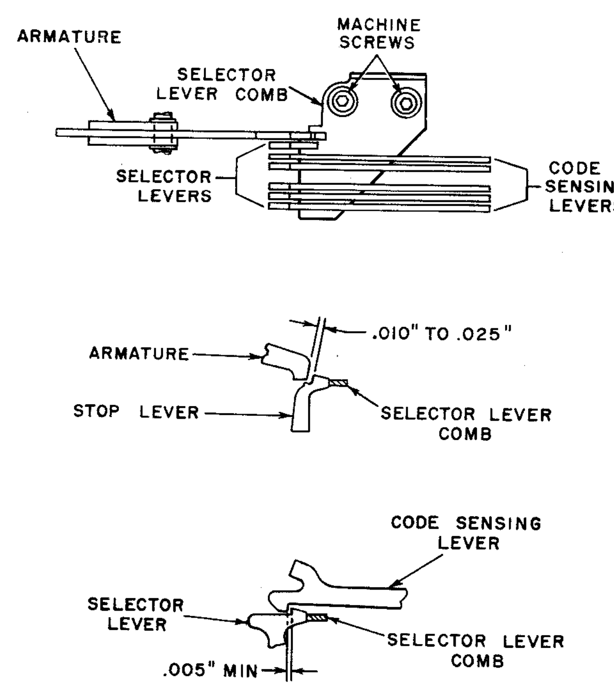


Figure 132. Transmitter-distributor selector lever comb adjustment.

145. Clutch Magnet Armature Eccentric Stud Adjustment
(fig. 133)

a. Requirement. When the clutch magnet armature is held in its operated position, there should be a .003- to .006-inch clearance between the top of the camshaft stop lever and the clutch magnet armature.

b. Method of Checking. With the top cover removed from the transmitter-distributor, manually hold the clutch magnet armature in the operated position. With the front of the transmitter-distributor facing you, rotate the transmitter-distributor camshaft toward you until the front edge of the camshaft stop lever is just under the clutch magnet armature. Check the clearance with a feeler gage.

c. Adjustment. Loosen the setscrew in the frame above the eccentric stud and position the eccentric stud until the requirement is met. Tighten the setscrew. Check related adjustment (par. 146).

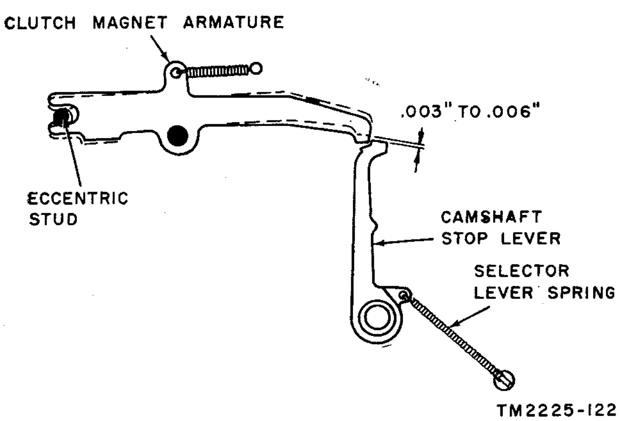


Figure 133. Clutch magnet armature eccentric stud adjustment.

146. Clutch Magnet Laminated Cores Adjustment
(fig. 134)

a. Requirement. When the clutch magnet armature is in its operated position, there should be .003- to .004-inch clearance between the clutch magnet laminated cores and the clutch magnet armature. Use a piece of blank message tape for a feeler gage.

b. Method of Checking. Energize the clutch magnet; make sure the clutch magnet armature is against the eccentric stud, and check the clearance.

c. Adjustment. Loosen the two machine screws that are used for mounting the clutch magnet laminated cores and position the cores to meet the requirement. Tighten the machine screws and recheck the clearance.

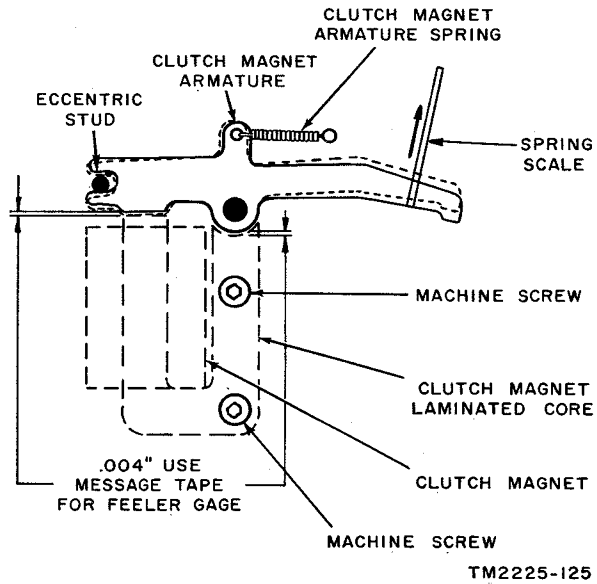


Figure 134. Clutch magnet laminated cores adjustment.

147. Transmitter-Distributor Stop Pulse and Contacts Adjustment
(fig. 135)

Place the POWER switch to ON, the MOTOR switch to OFF, and the SELECTOR switch to position 3 (LOCAL REPUNCH) while performing this adjustment.

a. Requirements.

(1) There should be minimum breaks in the send circuit between successive marking impulses.

(2) The stop selector lever latch should be adjusted to give a minimum break in the send circuit between the marking fifth intelligence impulse and the stop pulse. There should be .005-inch minimum clearance between the stop selector lever and the stop selector lever latch when the stop selector lever is on the low point of its cam.

b. Method of Checking.

(1) Set Multimeter TS–297/U to read on the 100-ma scale. Connect the Multimeter with Cord CX–468/U to the TD jack on the right side of the keyboard guard. This will place the Multimeter in series with the signal line. Place a piece of message tape,

perforated with the LTRS code group, under the tape cover. Move the stop-start lever to the START position and slowly turn the motor by hand. There should be slight, but minimum, breaks between the marking impulses.

(2) Connect a milliammeter in series with the signal line ((1) above). Place a piece of message tape, perforated with the T code group, under the tape cover. Move the stop-start lever to the START position and turn the motor slowly by hand. There should be a slight, but minimum, break between the marking fifth intelligence impulses and the stop pulse. With the stop selector lever on the low point of its cam, check the clearance between the stop selector lever and the stop selector lever latch with a feeder gage.

c. Adjustments.

(1) Connect a milliammeter in series with the signal line (*b*(1) above). Place a piece of message tape perforated with the LTRS code group under the tape cover. Move the stop-start lever to the START position and slowly turn the motor by hand. Turn the mark stationary contact in or out until the requirement in *a*(1) above is met.

(2) With the milliammeter still connected in series with the line, place a piece of message tape perforated with the T code group under the tape cover. Loosen the machine screws that hold the stop selector lever latch. Move the stop-start lever to the START position and slowly turn the motor by hand. Move the stop selector lever latch to the right or left until a slight, but minimum, break is obtained between the marking fifth intelligence impulse and the stop pulse. Move the stop selector lever latch to the right to decrease the break and to the left to increase the break. With the stop selector lever against the low part of its cam, check the clearance between the stop selector lever and the stop selector lever latch. If the clearance is less than .005 inch, remake the adjustment in paragraph 144, setting the .010- to .025-inch clearance between the clutch magnet armature and the stop lever to the high side. Then reposition the stop selector lever latch to meet the requirement of *a*(2) above.

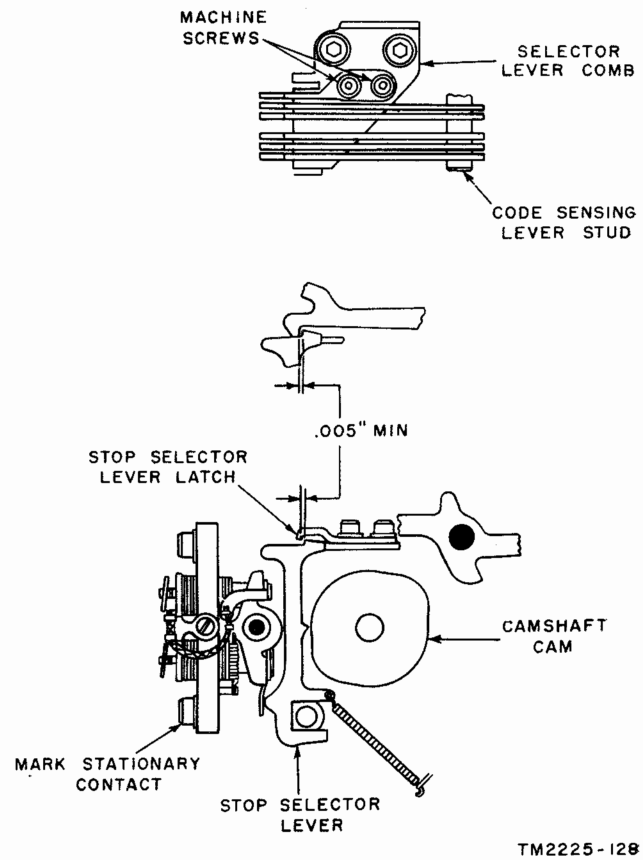


Figure 135. Transmitter-distributor stop pulse and contacts adjustment.

148. Tape-Out Lever Spring Adjustment
(fig. 136)

a. Requirement. With the tight-tape lever held in the up position, it should require a force of 84 to 98 grams to rotate the tape-out lever.

b. Adjustment. Wind the tape-out lever spring about the tape-out lever pivot shaft to meet the requirement.

149. Tape Cover and Tape Guide Adjustment
(fig. 137)

a. Requirement. There should be .003-inch maximum clearance between the tape guide and the tape cover.

b. Adjustment. Back the setscrews away from the adjustment screws. Adjust the adjustment screws to meet the requirement when the tape guide is held against the heads of the adjustment screws.

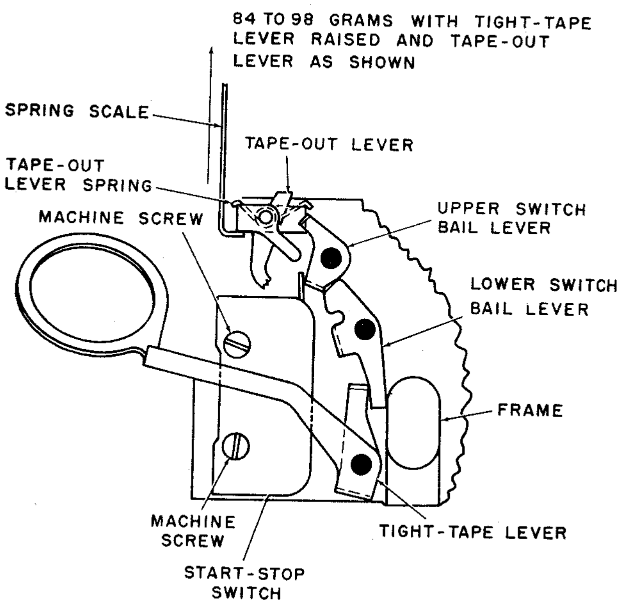


Figure 136. Tape-out lever spring adjustment.

Tighten the setscrews against the adjustment screws. Check related adjustments (pars. 150, 153, 155, 156, and 158).

Note. To make this adjustment, remove the tape cover from the top cover.

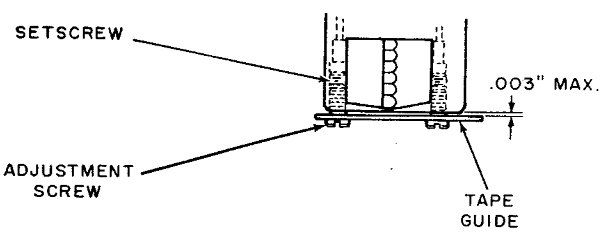


Figure 137. Tape cover and tape guide adjustment.

150. Top Cover Preliminary Adjustment (TT–76A/GGC)

(fig. 138)

a. Requirement. The tape cover should be parallel with the tape guide in the top cover.

b. Adjustment. Loosen the setscrew and turn the eccentric screw clockwise or counterclockwise to meet the requirement. Check related adjustment (par. 151).

151. Tape Cover Clearance Adjustment (TT–76A/GGC)

(fig. 139)

a. Requirement. There should be .012- to .015-inch clearance between the tape cover and the top cover of the transmitter-distributor.

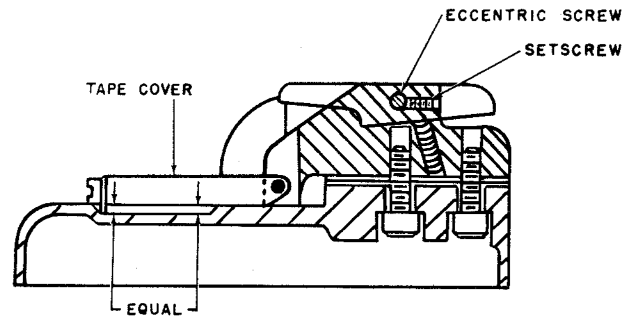


Figure 138. Top cover preliminary adjustment (TT–76A/GGC).

b. Adjustment. Loosen the machine screws and add or remove shims (ref Nos. 57201 and 57202) to meet the requirement. Tighten the machine screws and recheck clearance. Check related adjustment (par. 152).

Note. To make this adjustment, remove the top cover from the transmitter-distributor.

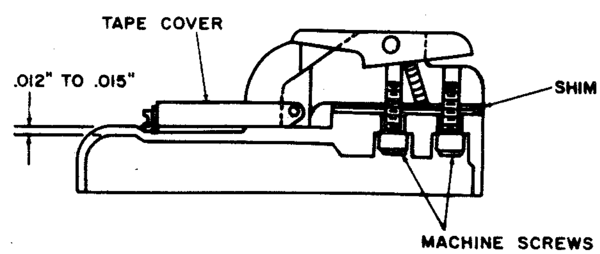


Figure 139. Tape cover clearance adjustment (TT–76A/GGC).

152. Tape Cover Block Adjustment (TT–76A/GGC)

(fig. 140)

a. Requirement. There should be .002- to .005-inch clearance between the edge of the tape guide of the top cover and the message tape when the code holes of a message tape perforated with the LTRS code combination is centered with the holes in the tape cover.

b. Method of Checking. Perforate a message tape with the LTRS code combination and position the message tape .002- to .005-inch from the tape guide. The holes of the tape cover should be centered over the perforations in the message tape.

c. Adjustment. Loosen the two machine screws and position the tape cover block, to meet the requirement. Check related adjustment (par. 153).

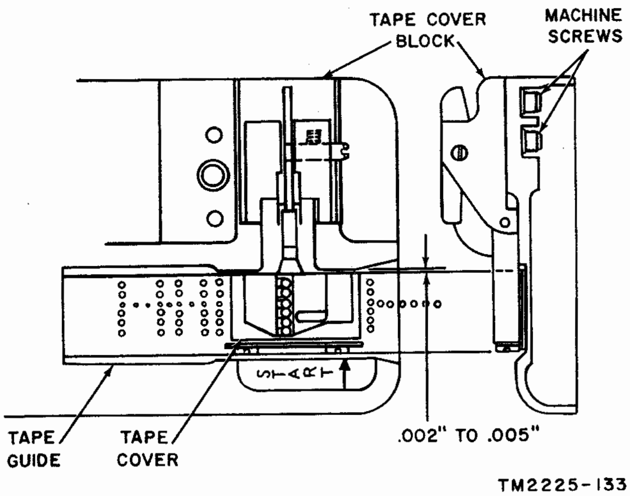


Figure 140. Tape cover block adjustment (TT–76A/GGC).

153. Selector Lever and Code Sensing Lever Clearance Adjustment
(fig. 141)

a. Requirement. There should be .015- to .025-inch clearance between the top of the selector levers and the tip of the code sensing levers, when the sensing lever restoring bail is on the low part of the restoring cam and the sensing levers are held downward in the space position by a blank piece of message tape.

b. Method of Checking. With a piece of blank message tape inserted under the tape cover, move the stop-start lever to the START position. Rotate the transmitter-distributor camshaft until the sensing lever restoring bail is against the low part of the restoring cam and the sensing levers are against the message tape. Check the clearance.

c. Adjustment. With the top cover held in place with only the two rear mounting screws, fold a piece of blank message tape as shown in figure 141 and position it under the tape cover so that one thickness of message tape is over the sensing lever pins and three thicknesses are under the front part of the tape cover. Manually energize the clutch magnet armature lever and turn the transmitter-distributor camshaft until the sensing lever restoring bail is on the low part of the cam and the sensing levers are against the message tape. Hold down the tape cover tight against the top cover and turn the adjusting screws in the top cover up or down until the requirement is met. Replace and tighten the front mounting screw. Recheck the clearance. On the TT–76/GGC, make the adjustments in paragraph 155. Check related adjustments (pars. 157, 158, and 159).

Note. Turn the adjusting screws clockwise to decrease the clearance or counterclockwise to increase the clearance.

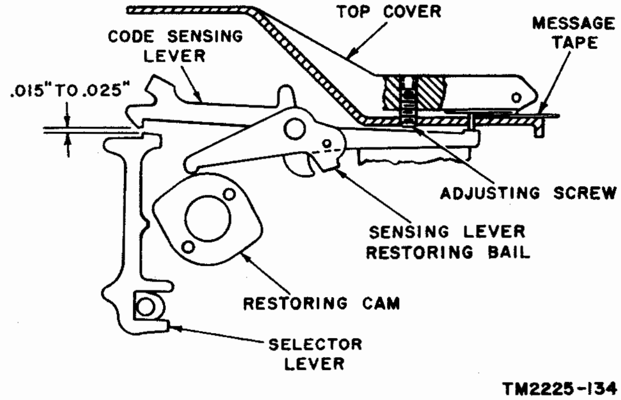


Figure 141. Selector lever and code sensing lever clearance adjustment.

154. Tape Cover Latch Eccentric Adjustment (TT–76/GGC)
(fig. 142)

a. Requirement. The lockwasher should be fully compressed by the adjusting nut and hexagonal nut.

b. Adjustment. Loosen the hexagonal nut and tighten the adjusting nut until the lockwasher is fully compressed. Tighten the hexagonal nut. Check related adjustments (pars. 153 and 155).

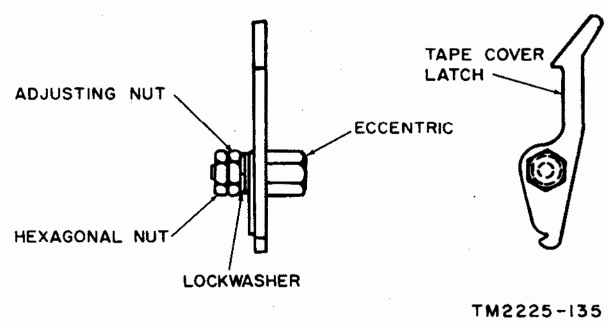


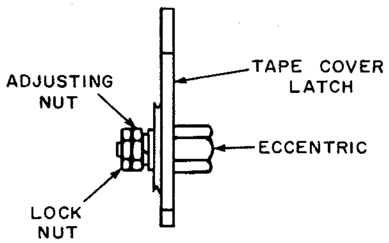
Figure 142. Tape cover latch eccentric adjustment (TT–76/GGC).

155. Tape Cover Latch Adjustment (TT–76/GGC)
(fig. 143)

a. Requirement. There should be a .012- to .015-inch clearance at the tightest point between the bottom of the tape cover and the surface of the tape guide slot, when the tape cover is latched by the tape cover latch.

b. Adjustment. Rotate the eccentric until the requirement is met. Check related adjustment (par. 153).

Note. If the adjusting nut and hexagonal nut work loose while adjusting the eccentric, remake the adjustment in paragraph 154.



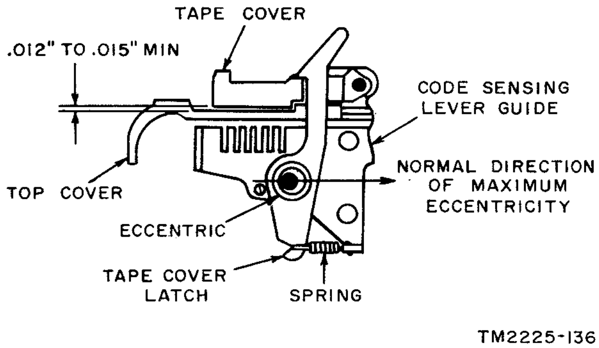


Figure 143. Tape cover latch adjustment (TT–76/GGC).

156. Tape Cover Actuating Load (TT–76/GGC)
(fig. 144)

a. Requirement. It should require a pressure of 10 to 14 ounces to latch the tape cover.

b. Adjustment. Remove the outer setscrew. Adjust the inner setscrew until the requirement is met. Then replace the outer setscrew.

Note. There are two setscrews for this adjustment. The inner setscrew is used to vary the compression of the spring and the outer setscrew locks the front setscrew in position.

157. Top Cover Adjustment (TT–76A/GGC)
(fig. 145)

a. Requirement. With the tape feed claw engaging the feed holes of the message tape, the edge of the message tape should be .002 to .005 inches from the guide of the top cover.

b. Adjustment. Loosen the three machine screws that mount the top cover and position the top cover to meet the requirement. Tighten the mounting machine screws and recheck the requirement.

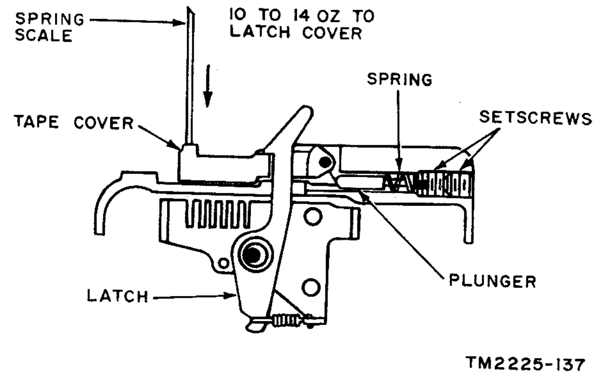


Figure 144. Tape cover actuating load (TT–76/GGC).

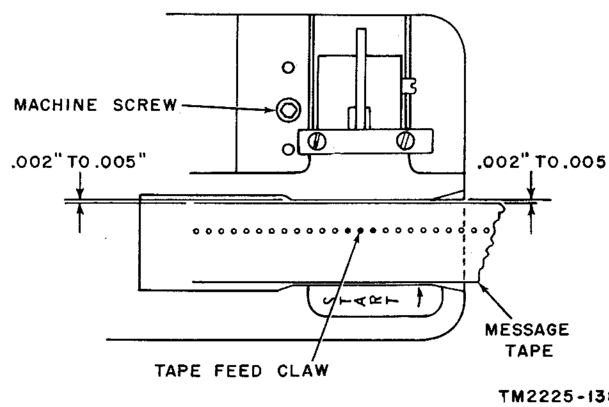


Figure 145. Top cover adjustment (TT–76A/GGC).

158. Upper Switch Bail Lever Adjustment
(fig. 146)

a. Requirement.

(1) With the start-stop lever detent and the stop-start lever in the position shown, there should be a clearance of .005 to .025 inch between the tape-out lever and the upper switch bail lever.

(2) The start-stop switch should be actuated in the center of the STOP-START positions of the stop-start lever.

b. Adjustment.

(1) Obtain the required clearance by bending the upper switch bail lever.

(2) Loosen the two start-stop switch machine screws and position the start-stop switch to meet the requirement; tighten the machine screws.

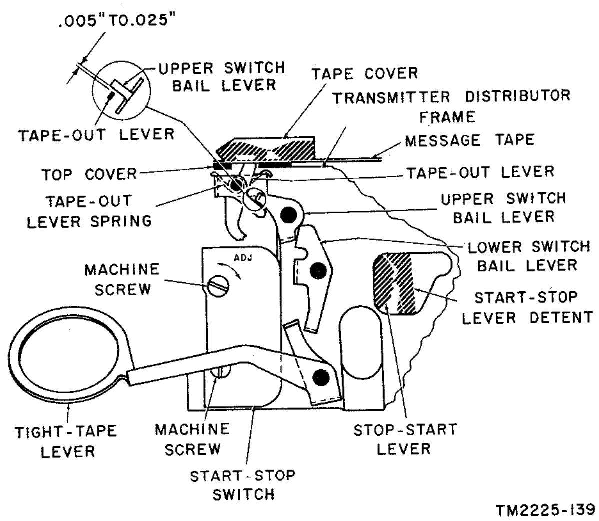


Figure 146. Upper switch bail lever adjustment.

159. Transmitter-Distributor Top Cover Alignment (TT–76/GGC)

(fig. 147)

a. Requirement. The holes in a piece of message tape perforated with the LTRS code group should be centered with the holes in the tape cover when the tape feed claw is fully engaged with the tape feed holes.

b. Adjustment. Install a piece of message tape perforated with the LTRS code group under the tape cover. Move the stop-start lever to the START position. This will cause the tape feed claw to engage in the tape feed holes. Loosen the three machine screws and reposition the top cover until the requirement is met. Tighten the three machine screws and recheck the requirement.

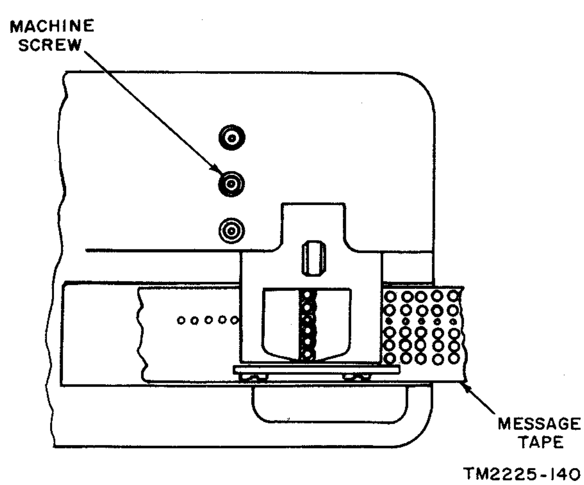


Figure 147. Transmitter-distributor top cover alignment (TT–76/GGC).

160. Transmitter-Distributor Friction Clutch Adjustment (TT–76/GGC)

(fig. 148)

a. Requirement. It should require a pull of 25 to 30 ounces to prevent the transmitter-distributor friction clutch from turning when the motor is on and the transmitter-distributor camshaft is not operating any levers.

b. Method of Checking. Install a piece of punched message tape in the transmitter-distributor. Hook a spring scale on the friction clutch fork. Move the stop-start lever to the START position. While holding the scale rigidly, allow the transmitter-distributor camshaft to turn just slightly until it is not operating any levers. When the free spot has been established, hold the friction clutch fork to keep it from turning and read the scale.

c. Adjustment. Loosen the two setscrews in the drive shaft collar, shift the collar forward or backward to obtain the proper spring tension on the friction clutch, and tighten the setscrews. Recheck the requirement and readjust if necessary.

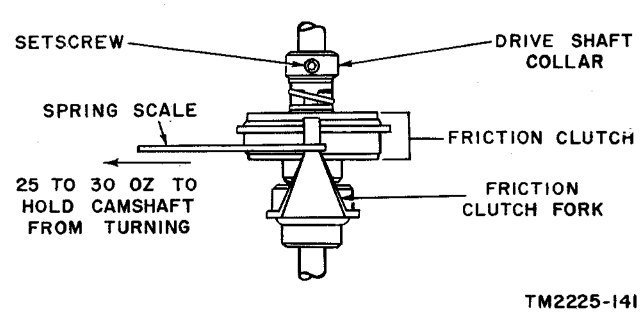


Figure 148. Transmitter-distributor friction clutch adjustment (TT–76/GGC).

161. Transmitter-Distributor Friction Cluch Adjustment (TT–76A/GGC)

(fig. 149)

a. Requirement. It should require a pull of 25 to 30 ounces to prevent the transmitter-distributor friction clutch from turning when the motor is on and the transmitter-distributor camshaft is not operating any levers.

b. Method of Checking. Install a piece of punched message tape in the transmitter-distributor. Hook a spring scale on the friction clutch fork. Move the stop-start lever to the START position. While holding the scale rigidly, allow the transmitter-distributor camshaft to turn just slightly until it is not operating any levers. When the free spot has been established, hold the friction clutch fork to keep it from turning and read the scale.

c. Adjustment. Loosen the clamping screws in the drive shaft collar, shift the collar forward or back to obtain the proper spring tension on the friction clutch, and tighten the clamping screws. Recheck the requirement and readjust if necessary.

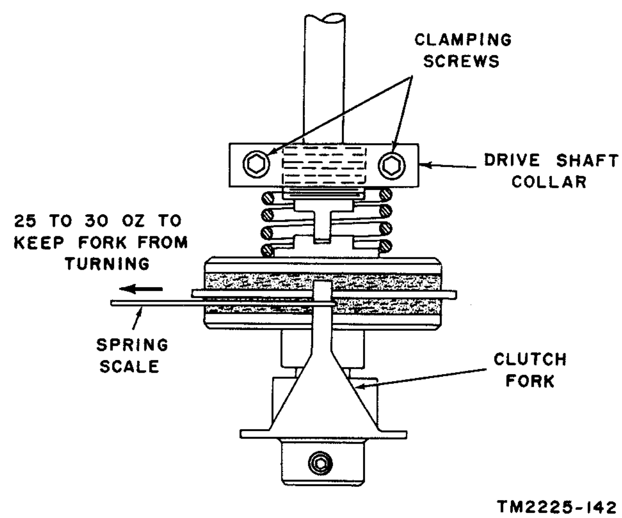


Figure 149. Transmitter-distributor friction clutch adjustment (TT–76A/GGC).

CHAPTER 5

THEORY

Section I. INTRODUCTION

162. General

This chapter describes the theory of operation of Teletypewriter Reperforator-Transmitter TT-76(*)/GGC. The theory of operation of the TT-76/GGC and TT-76A/GGC is identical, unless otherwise indicated. Section I presents the basic priciples of teletypewriter communication. Section II gives a general description of the component mechanisms. The detailed theory of the keyboard-transmitter is provided in Section III. Section IV describes the detailed theory of the tape printing and punching mechanism. Section V presents the theory of the transmitter-distributor, and Section VI describes the various circuits of the set in detail.

163. Basic Teletypewriter System

A basic circuit used for operating two interconnected teletypewriters on a neutral basis is shown in figure 150. Impulses sent from either sending contact operate the selector magnets in both teletypewriters. In neutral operation, the selector magnets are operated when signal current flows and released when no current flows, in accordance with a signaling code that determines the character to be transmitted and received. In a basic circuit such as this, each station has a means of sending and receiving. Additional stations, sending units, or receiving units can be added to this basic circuit as required.

164. Standard Start-Stop, 5-Unit Code

Signal intelligence is transferred between teletypewriters through the use of a standard start-stop, 5-unit code. The code group for each of the 26 letters of the alphabet and for each of the functional operations requires seven individual impulses. Two of these inpulses, the first (start) impulse and the last (stop) impulse, are standard impulses which are used to keep the sending and receiving mechanisms synchronized. The five impulses which may be varied provide 32 code combinations. These code combinations have been assigned to individual letters and functions as shown in figure 151.

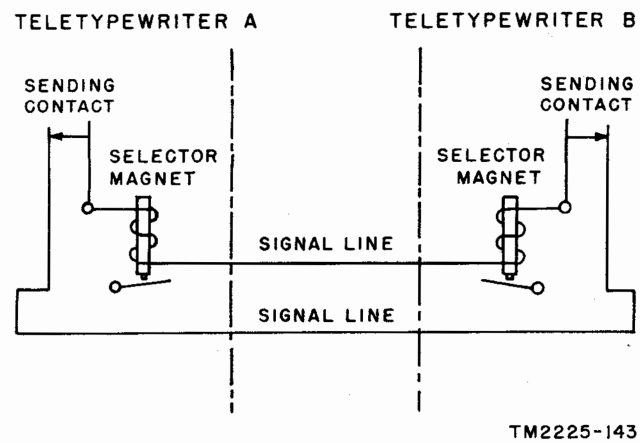


Figure 150. Basic teletypewriter circuit, schematic diagram.

165. Signaling Code

a. In standard teletypewriter operation, the code for different characters always consists of five units or elements of equal length. These equal-length elements are called marking impulses and spacing impulses. Figure 152 illustrates the 5-unit code group used for the letter X. Codes for other characters are made by combining five elements in different combinations. Thirty-two different combinations are possible.

b. Standard teletypewriter signals are transmitted by neutral and polar operation. In neutral operation, current flows through the circuit in only one direction; marking impulses are current impulses, and spacing impulses are no-current impulses. In polar operation, current flows through the circuit in both directions; marking impulses are current impulses in one direction, and spacing impulses are current impulses in the opposite direction, that is, of opposite polarity.

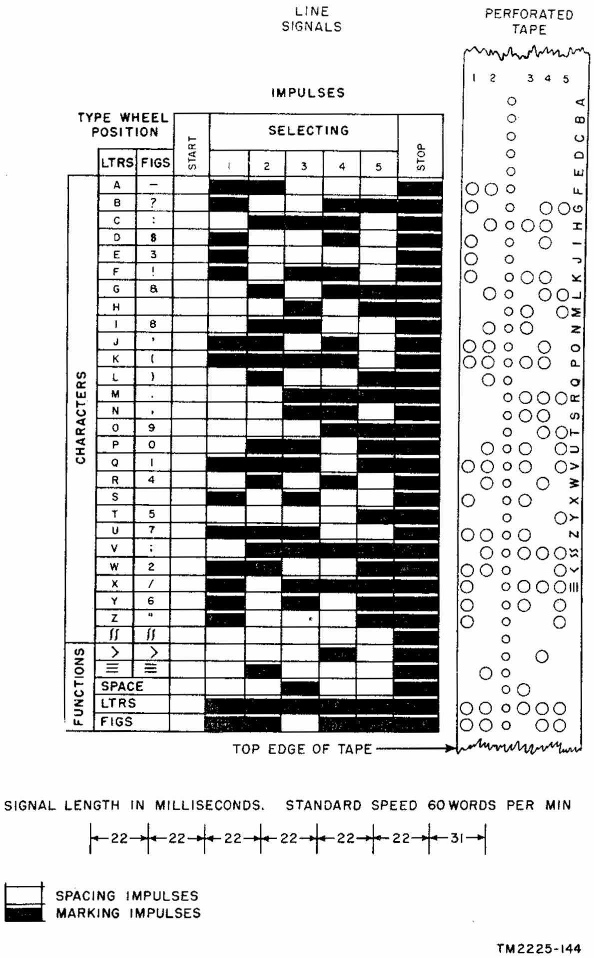


Figure 151. Standard start-stop, 5-unit code chart.

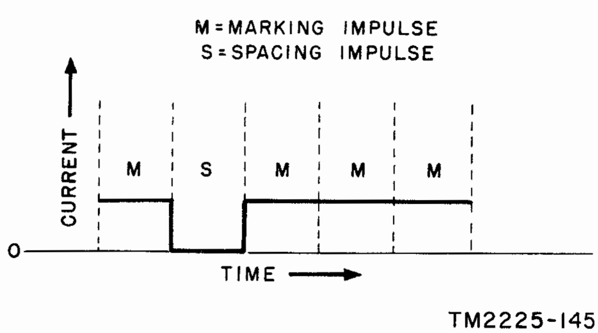


Figure 152. Standard start-stop, 5-unit signal code for the letter X.

c. The reperforator is designed to receive both neutral and polar impulses. The keyboard-transmitter and the transmitter-distributor in these sets are wired to send neutral impulses. Polar signals can be sent only if the transmitters are rewired (par. 18*c*).

166. Synchronism

Starting and stopping the receiving mechanism in synchronism with the sending mechanism is accomplished by transmitting two additional impulses with the 5-unit code impulses for each character. The start impulse is a spacing impulse sent immediately preceding the 5-unit code impulses, and the stop impulse is a marking impulse sent immediately following the 5-unit code impulses (fig. 153). The start impulse causes the receiving mechanism to start operation when the sending mechanism starts, and the stop impulse causes the receiving mechanism to stop somewhat before the sending mechanism stops. Therefore, even if the receiving mechanism is operating a bit slowly, it still will be brought to a complete stop before the next signal group is sent and will be ready to start in step again. The length of the start impulse is equal to that of one of the 5-unit code impulses, but the length of the stop impulse is 1.42 times as long. This insures that the receiving mechanism will have enough time to complete its functions and come to a complete stop.

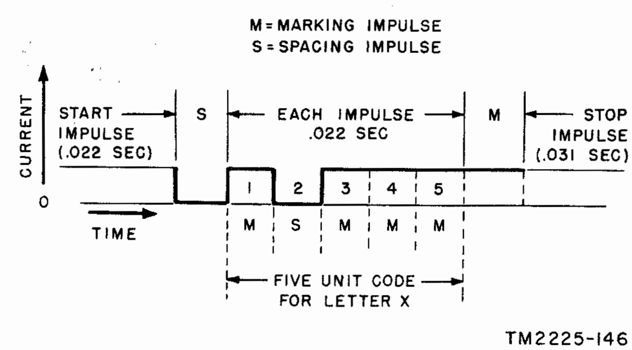


Figure 153. Standard start-stop, 5-unit code signal for the letter X, plus start and stop impulses.

Section II. THEORY OF TELETYPEWRITER REPERFORATOR-TRANSMITTER TT–76(*)/GGC

167. General

a. The reperforator-transmitter consists of a keyboard-transmitter, transmitter-distributor, and a reperforator, which are mounted together on a common base. Each unit is electrically capable of independent operation, depending on the type of operation desired.

b. The keyboard-transmitter and transmitter-distributor are capable of transmitting standard 5-unit, start-stop code to the signal line. The reperforator is capable of receiving standard start-stop, 5-unit code.

168. Set Component Relationship

a. Figure 154 shows in simplified form the relationship between the major electrical and mechanical components of two interconnected Teletypewriter Sets AN/GGC–3. The sending mechanisms controlled by the keyboard-transmitter and transmitter-distributor operate sending contacts to transmit electrical 5-unit code signals. The selector magnet (at both teletypewriters) responds to these signals to position a group of five code rings in the selector mechanism, which in turn controls the character printed and perforated by the reperforator.

b. The mechanisms of each set are driven by a constant speed motor. All mechanisms must operate in synchronism so that the same code signals will be undergoing transformation at both the sending and the receiving ends. The motors of all teletypewriters are set to run at the same speed. However, since there are always small variations in speed between independent motors, the sending and receiving mechanisms in the two communicating teletypewriters would inevitably get out of step. Unless these speed differences are compensated for, they will result in the printing of wrong characters at the distant receiving machine. To guarantee that the receiving mechanism always will be in step (synchronized) with the sending mechanism, both mechanisms are stopped by clutch action after the transmission of each code group. Starting both mechanisms together at the beginning of each code group prevents the accumulation of small variations in speed.

169. Motor
(fig. 2)

The series governed motor operates on 105- to 125-volt regulated or unregulated ac and is governed to run at 3,600 rpm. The armature and field coils are in series with the contacts of the motor governor assembly and MOTOR switch. The governor contacts are normally closed, but are opened when the motor speed increases above the allowable maximum. This places a resistor (fig. 291) in series with the motor armature and field coils and causes

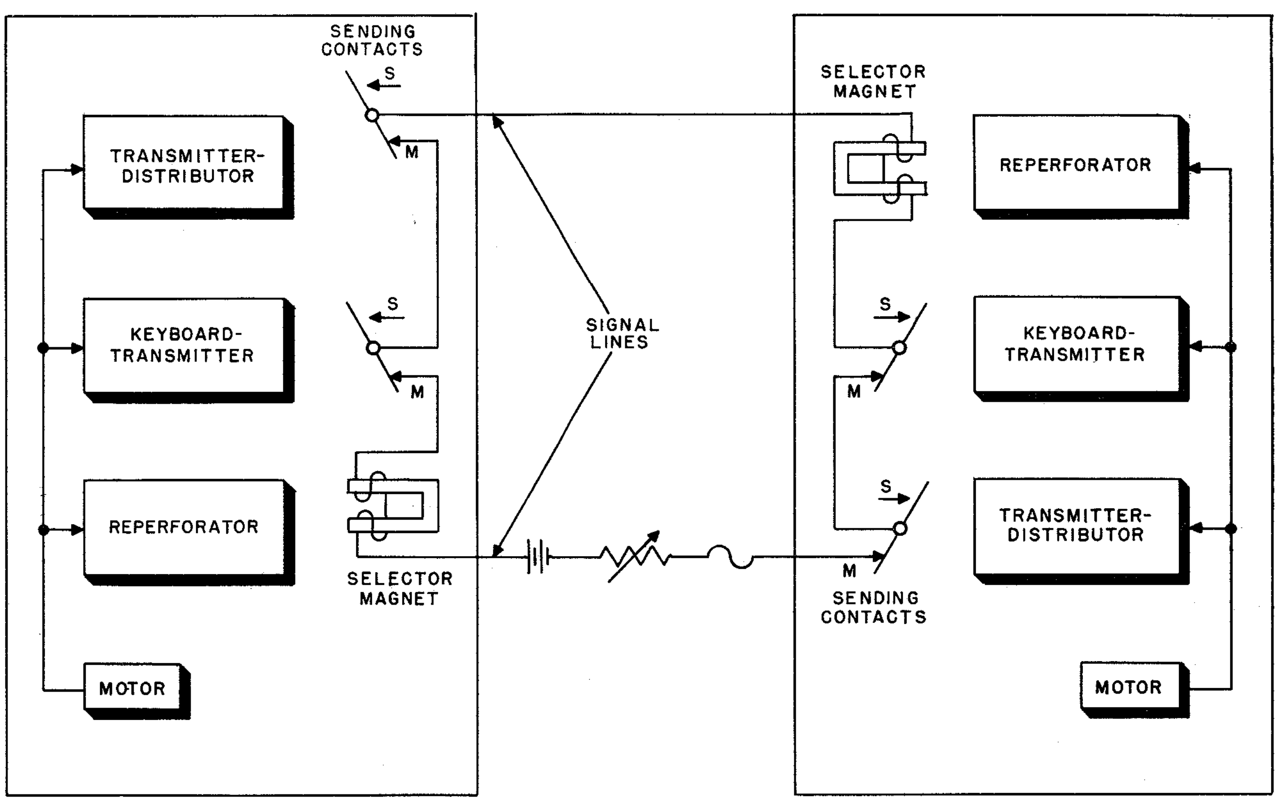


Figure 154. Interconnected teletypewriter reperforator-transmitters.

the voltage and thus the speed of the motor to decrease. When the proper speed is reached the governor contacts close again. A resistor in combination with a capacitor also acts as a spark suppressor for the governor contacts. A motor filter suppresses radio frequencies generated by the governor contacts and the motor commutator. The suppression of these frequencies lessens interference with associated electronic equipment.

170. Governor

a. The motor governor assembly is adjustable to permit the motor speed to be maintained at precisely 3,600 rpm. The governor is mounted on the motor shaft and rotates with it. The governor contact points are connected in series with the field coils and armature of the motor through two slip rings (located on the back of the motor speed governor base), which are contacted by two brushes in the motor housing. The movable electrical contact of the governor (fig. 155) is flexible and is held against the stationary electrical contact by a coil spring until the motor speed exceeds 3,600 rpm. When this occurs, the centrifual force acting on the movable electrical contact is greater than the tension of the spring. The movable electrical contact then moves away from the stationary electrical contact. The speed at which this movement will occur depends on the tension applied to the spring by the governor adjusting lever, which should be adjusted while the motor is running by manipulating the governor worm shaft.

b. The governor worm has two integral threaded portions, one right hand and one left hand. Complete instructions for adjusting the motor speed are given in paragraph 16*a*.

171. Power Shaft and Power Distribution

Motion is distributed to the mechanisms of the set by the motor through a drive gear set (fig. 156). This drive gear set consists of a removable worm gear on the motor shaft and a fiber worm gear fastened to the right end of the power shaft. The reperforator-transmitter is equipped with gears for operating at a standard speed of 368.1 (60 wpm) opm but can be altered for speeds of 404, 460, or 600

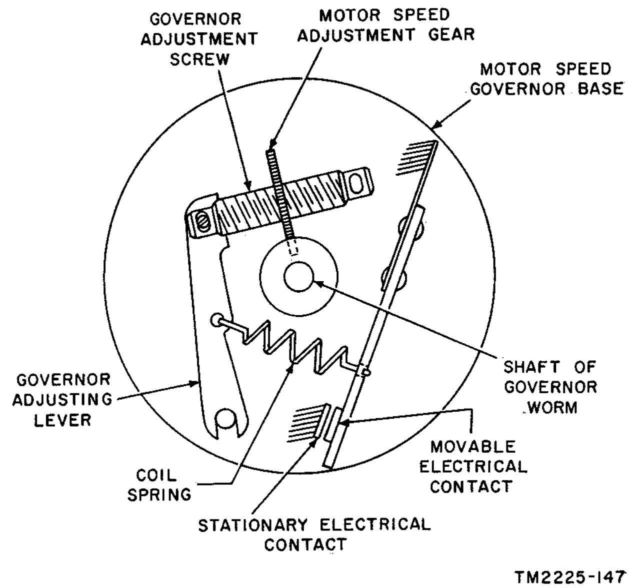


Figure 155. Motor governor, functional view.

opm by changing the gear set. When shipped from the factory, a 600- (100 wpm) opm gear set is supplied as accessory equipment and is located on mounting studs at the right rear of the motor. Alternate 404- (66 wpm) or 460- (75 wpm) opm gear sets are obtainable through normal supply channels. The power shaft rotates constantly when the set is in operation and transfers power to the entire assembly through friction clutches and gears.

172. Friction Clutches

a. Power for the keyboard-transmitter and transmitter-distributor camshafts is received through friction clutches (fig. 157) mounted on the ends of the keyboard-transmitter and transmitter-distributor drive shafts. These friction clutches make rapid start and stop actions possible. The fork of each driven camshaft engages the notches on the clutch driver plate of the clutch. Two felt plates on the driving shaft are held against the clutch driver plate by spring pressure. The spring pressure can be increased or decreased by tightening or loosening the clutch collar, increasing or decreasing the torque transmitted through the clutch. The clutch driver disk has projections which engage holes in the felt plates. This causes the clutch driver disk and the

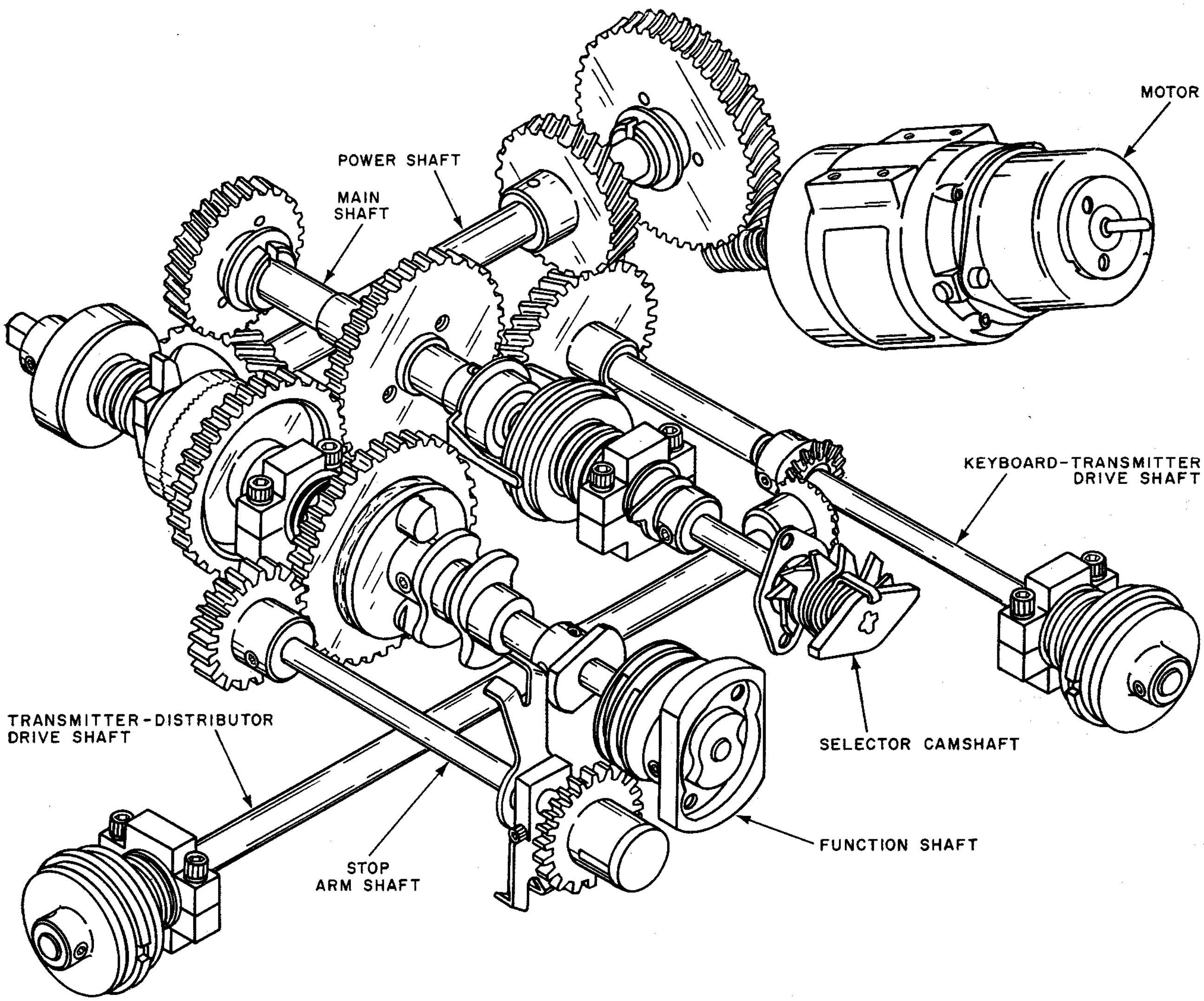


Figure 156. Mechanical power distribution.

felt plates to rotate in unison. Friction between the felt plates and the outer clutch disks is sufficient to rotate the driven shaft under a normal work load. When a greater load is placed on a clutch (when the cam stop lever is blocking the rotation of the transmitter camshaft), the friction is overcome and slipping occurs at the friction surfaces. This allows the driven shaft to stop, but maintains a steady torque on the shaft to permit it to resume rotation immediately when the blocking force is removed.

b. The operation and design of the selector camshaft friction clutch is identical to that of the transmitter friction clutches. The design of the function shaft friction clutch is different from the others, but its operating principle is the same.

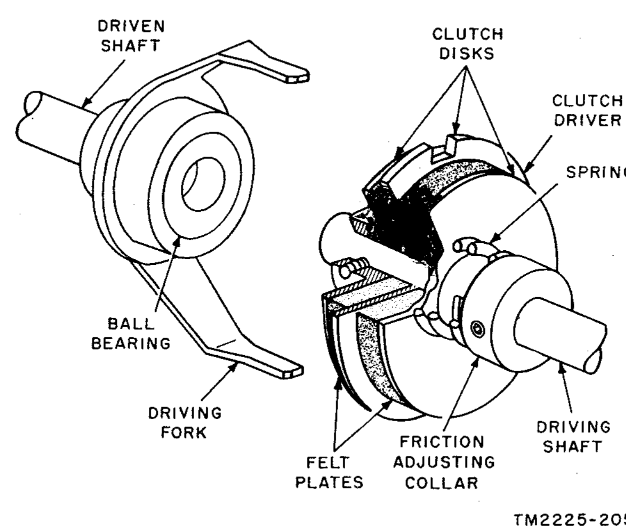


Figure 157. Typical friction clutch.

173. General

The keyboard-transmitter converts the mechanical positioning that occurs when a key lever is depressed, into a series of current and no current impulses which make up the teletypewriter code group for the letter or function represented by the depressed key lever. It consists of key levers (fig. 158), code bars, and sensing levers that are used in selecting code groups to be transmitted; a transmitter camshaft, selector levers, and transmitting contacts used to transmit the selected code group; and a universal bar, cam-stop lever, and friction clutch used to start and stop transmission.

174. Transmitting Mechanism

a. The five code bars used to set up the mechanical form of the code are located under the key levers (fig. 159). They run the width of the keyboard-transmitter and can be engaged by pressing any key lever. Each code bar is notched in one of two ways at the point where it is engaged by each key lever. The sides of these notches are slanted to the right or to the left. The downward movement of a key lever pushes the code bars either to the right or left. The notches are cut so that the first code bar will move to the right (A, fig. 160) if the first unit of the code for the key pressed is a marking signal. If the second unit of the code is to be a spacing signal, the movement of the second code bar will be to the left (B, fig. 160).

b. The universal bar (fig. 159) is mounted in front of the code bars and is notched in such a way that depressing any key lever causes that key lever to strike the slanted portion of the notch, camming the universal bar to the right. As it moves to the right it strikes the universal bar adjusting screw on the locking lever latch, pivoting the locking lever latch counterclockwise. As the locking lever latch and its assembled repeat blocking lever are pivoted, the repeat blocking lever strikes and is held by the cam-stop lever, forming a slot between the locking lever latch and the repeat blocking lever. The cam-stop lever is pulled into this slot by its spring, permitting the cam-stop lever to pivot far enough to

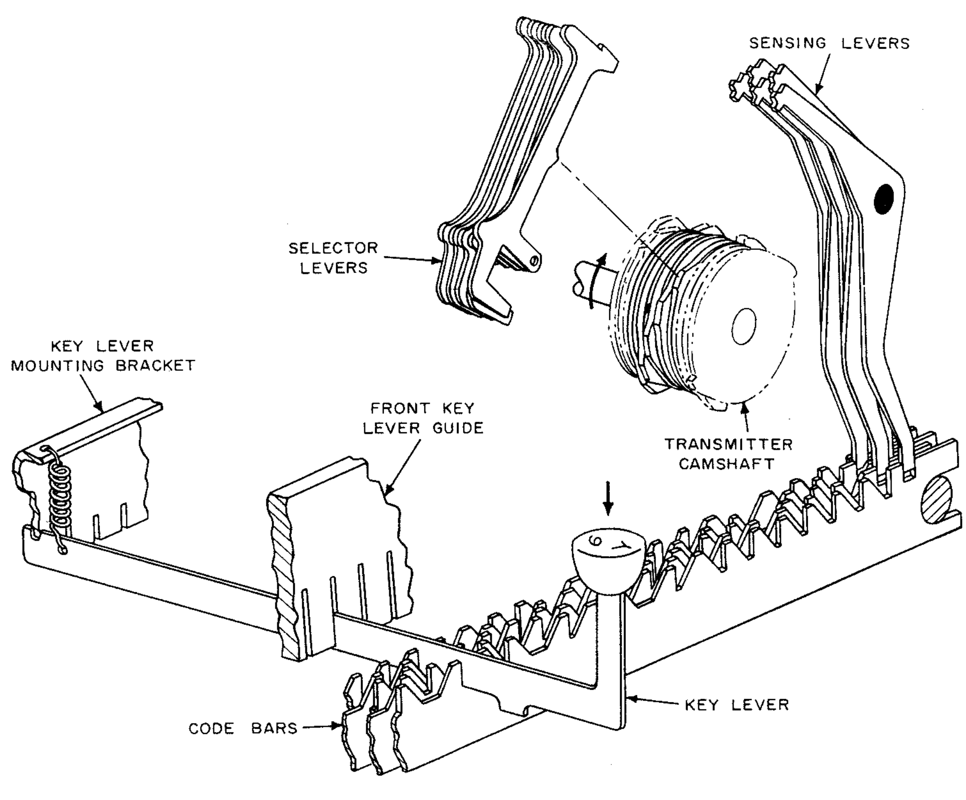


Figure 158. Mechanical form of 5-unit code being set up by operation of a key lever.

clear the tooth on the transmitter camshaft. Since the transmitter camshaft is no longer blocked, the friction clutch rotates the camshaft to start transmission.

c. The positions of the code bars are transformed into electrical signals by the positioning of the transmitter contact. The positioning of the transmitter contact is controlled by the code bars, the five rotating cams on the transmitter camshaft, the five selector levers, and the five sensing levers (fig. 158). Each code bar moves only its associated sensing lever. Any selector lever, however, will actuate the transmitter contacts when the selector lever is moved by its associated cam. The five cams are positioned so that they operate their associated selector levers and transmitter contact in sequence as the transmitter camshaft rotates. To send marking signals, a code bar shifted to the right turns its mating sensing lever counterclockwise so that the end of the sensing lever engages and latches the upper end of the selector lever. When the lobe of the mating cam raises the midpoint of the selector lever, its lower end slides on the bearing shoe and closes the transmitter contact. To send spacing signals, a code bar shifted to the left turns its mating sensing lever clockwise so that the end of the sensing lever does not latch the upper end of the selector lever. When the lobe of the mating cam raises the midpoint of the selector lever, its upper end moves and permits the contact bail spring to open the transmitter contact.

d. When a key lever is depressed, the sensing levers (fig. 158) are locked in position until the code group is completed. Pressing another key lever right away will not interfere with the settings. This locking is accomplished by the sensing lever locking bail (fig. 159), that drops and engages the upper ends of the sensing levers.

e. When the keyboard-transmitter is at rest, the key levers (fig. 158) are held in the raised position by the key lever springs. The code bars are shifted to the left or to the right as they were positioned by the last key lever depression. The universal bar (fig. 159) which is mounted immediately in front of the code bars is held to its left position by the universal code bar return spring. The sensing levers which engage the notches at the right side of the code bars are pivoted clockwise or counterclockwise depending on the position of their associated code bars. The clockwise pivoted sensing levers (B, fig. 160) are out of engagement with their associated selector levers while the counterclockwise pivoted sensing levers latch the notch of their associated selector levers. The permanently latched start-stop selector lever is held in the marking position by its mating cam on the transmitter camshaft, holding the transmitter marking contacts closed. The sensing lever locking bail (fig. 159) is held clear of the sensing levers by its mating cam. The locking lever latch is pivoted in its counterclockwise position, held there by the locking lever latch spring. In this position, the locking lever latch holds the cam-stop lever in its counterclockwise position in the path of the tooth on the transmitter camshaft, blocking the rotation of the transmitter camshaft. This causes the keyboard-transmitter friction clutch to slip without transferring motion to the transmitter camshaft. The sequence of operations that occurs when any key lever other than the REPEAT key lever is depressed is summarized in the chart below.

Keyboard Sending Sequence Chart

1.	Key lever or space bar pressed.	
2.	Key lever or space bar strikes slanted groove of universal bar camming the universal bar to the right (fig. 159).	Key lever or space bar strikes slanted grooves of the five code bars camming them individually to the right or left according to code (fig. 160).
3.	Universal bar strikes adjusting screw pivoting locking lever latch counterclockwise (fig. 159).	Code bars turn the five sensing levers individually counterclockwise or clockwise (fig. 160).
4.	Repeat blocking lever on locking lever latch strikes the cam-stop lever and is pivoted clockwise causing a slot between the repeat blocking lever and locking lever latch. Cam-stop lever dropped between locking lever latch and repeat blocking lever (fig. 159) permits rotation of the transmitter camshaft.	

5.	Transmitter camshaft released by the cam-stop lever starts revolving (fig. 159) as friction clutch operates.	Sensing lever locking bail pivoted counterclockwise by the sensing lever locking bail spring as the locking bail moves off the high point of the locking bail cam locking the five sensing levers (key lever may bereleased at any time hereafter) (fig. 159).
6.	No. 6 selector lever (permanently latched) drops off cam to permit the selector lever to pivot counterclockwise, moving away from the transmitter contact.	
7.	Contact bail spring turns transmitter contact counterclockwise opening contacts (fig. 160).	
8.	Start (no current) inpulse sent.	
9.	First 5-unit code impulse cam raises No. 1 selector lever.	
10.	If latched by sensing lever, lower end of selector lever No. 1 turns transmitter contact clockwise; if not latched by sensing lever, contact bail spring turns transmitter contact counterclockwise (fig. 160).	
11.	Mark impulse or space impulse sent, depending on whether transmitter contact turned clockwise or counterclockwise (fig. 160).	
12.	Second, third, fourth, and fifth code impulses sent by corresponding parts of the transmitter mechanism as for the first code impulse (fig. 160).	
13.	Cam-stop lever restoring cam raises cam-stop lever (fig. 159).	
14.	Cam-stop lever latched in up position by repeat blocking lever if universal bar is still shifted or by locking lever latch if universal bar has been released by key lever (fig. 159).	
15.	Stop-cam lever raises No. 6 selector lever (permanently latched).	
16.	Lower end of No. 6 selector lever turns transmitter contact clockwise, closing contacts.	
17.	Stop (current) impulse sent.	
18.	Tooth on transmitter camshaft strikes cam-stop lever and transmitter camshaft stops revolving (having completed a one-half revolution) (fig. 159).	
19.	Key lever must be released before above sequence can be repeated for any other or the same key lever to allow locking lever latch to return under cam-stop lever (fig. 159).	

175. Character Repeat Feature

The character repeat feature of the keyboard-transmitter permits the repeated sending of any letter or function as long as the key lever associated with that letter or function and the REPEAT key lever are held down. The transmitting mechanism is in its normal, at rest position as described in paragraph 174*e* prior to the depression of the REPEAT key lever. In the at rest position, the REPEAT key lever is raised and the repeat lever (fig. 161) is pivoted clockwise, out of engagement with the repeat blocking lever. In this position, the slanting finger of the repeat lever is in the downward path of the REPEAT key lever. The repeat blocking lever is held counterclockwise by its spring. The sequence of operations that occurs when the REPEAT key lever is depressed is summarized below:

Repeat Sending Sequence Chart

1.	REPEAT key lever depressed (fig. 159).
2.	Same sequence of operations takes place as in paragraph 174 up to the point where cam-stop lever restoring cam raises cam-stop lever. REPEAT key is either released or still depressed at this point. Rest of sequence is identical with the chart in paragraph 174*e* if key is released. If REPEAT key lever is still depressed, sequence given below takes place.

3.	Repeat key lever strikes angled finger of the repeat lever, pivoting it counterclockwise.
4.	Repeat lever pivots repeat blocking lever (fig. 161), holding it in its clockwise position.
5.	Restoring cam moves clear of cam-stop lever (fig. 159).
6.	Cam-stop lever drops again since it is not blocked by the repeat blocking lever (fig. 159).
7.	Stop cam raises No. 6 selector lever (permanently latched).
8.	Lower end of No. 6 selector lever turns transmitter contact clockwise, closing contacts.
9.	Stop (current) impulse sent.
10.	Tooth on transmitter camshaft passes cam-stop lever (fig. 159).
11.	Transmitter camshaft continues to turn and sequence above starts again, since it is not blocked by the cam-stop lever.

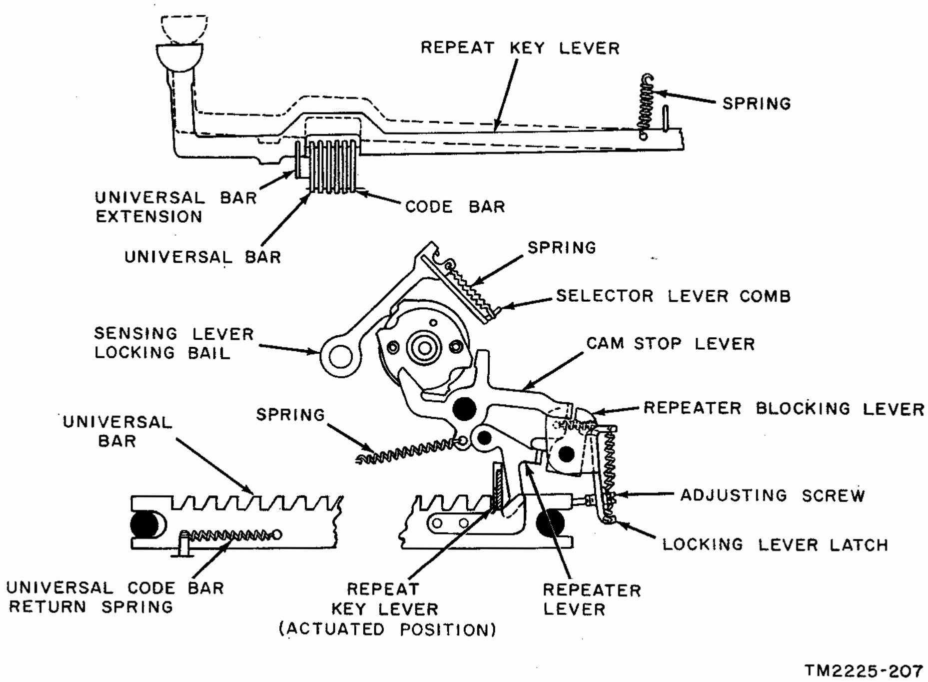


Figure 159. Transmitter camshaft control mechanism.

176. Character Counter and End of Line Indicator Mechanism

A mechanical counter and end of line indicator mechanism (fig. 162) are provided with the keyboard-transmitter of this set. Both mechanisms are located behind the top row of keys. The character counter mechanism is operated each time a key lever is depressed, except the FIGS, LTRS, LINE FEED, and CAR. RET. key levers. The purpose of the character counter is to indicate to the operator the number of characters perforated in the paper tape or sent out on the signal line since the last depression of the CAR. RET. key. When the END OF LINE INDICATOR lamp lights, the operator is warned that the character counter is six spaces from the right margin of a standard line of type. On the TT–76A/GGC a warning bell is also installed to audibly warn the operator that the character counter is six spaces from the right margin.

a. Operation of Character Counter Mechanism.

(1) The indicator carriage (fig. 162 is advanced each time a key lever or the space

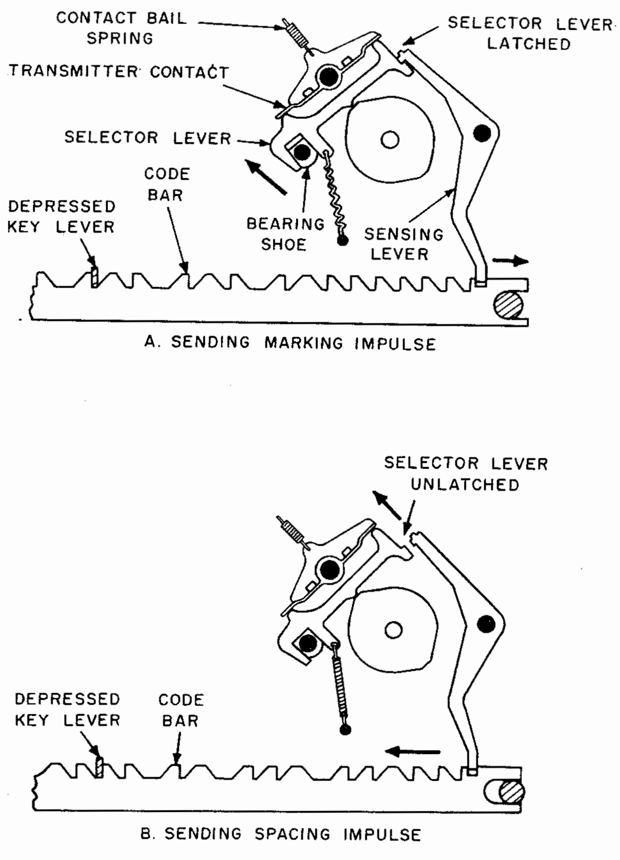


Figure 160. Operation of keyboard-transmitter (transforming mechanical settings into electrical impulses).

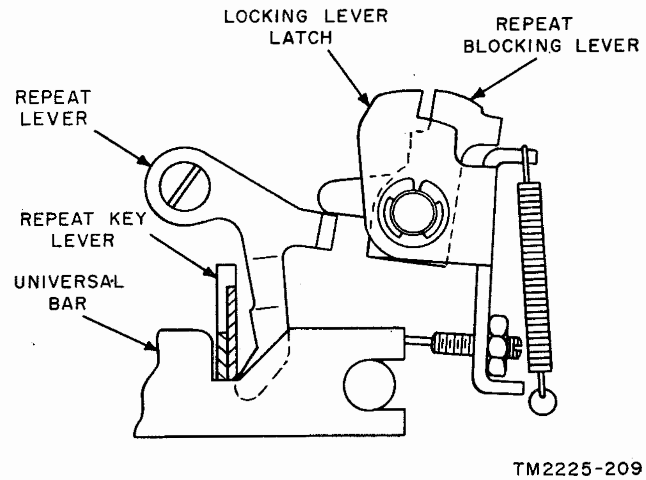


Figure 161. Repeat mechanism.

bar is depressed. The FIGS, LTRS, LINE FEED, and CAR. RET. key levers do not advance the indicator carriage of the keyboard-transmitter because reception of those function code groups at the receiving page printing machine does not space the type bar carriage to the right.

(2) In the at rest position, the line indicator cam follower (fig. 163) is held clockwise in the path of the line indicator cam on the transmitter camshaft. The ratchet pawl which is mounted on the line indicator cam follower is so aligned to permit it to engage the ratchet wheel (fig. 162) when the ratchet pawl is moved upward by the line indicator cam follower. The indicator return spring is partially wound, and applies torque that would rotate the line indicator drive shaft toward the rear if its rotation was not blocked by the ratchet wheel detent that has engaged one of the ratchet wheel teeth, preventing rearward rotation of the line indicator drive shaft. The bore of the indicator carriage on the line indicator drive shaft has an internal projection that engages the spiral groove of the line indicator drive shaft, forcing the indicator carriage to the left or right when the line indicator drive shaft is rotated. The sequence of operations that occurs when the character counter mechanism operates is summarized in the chart below:

Character Counter Mechanism Sequence Chart

1.	Any key lever or space bar depressed[a].
2.	Transmitter camshaft starts to rotate.
3.	Restoring cam stikes the line indicator cam follower and moves it counterclockwise.
4.	Right extension of cam follower raises ratchet pawl.

[a] Except FIGS, LTRS, LINE FEED, and CAR. RET. key levers.

5.	Ratchet pawl engages a tooth on the ratchet wheel and rotates line indicator drive shaft one-tenth revolution.
6.	Rotation of line indicator drive shaft moves indicator carriage one space to the right.
7.	Ratchet wheel detent holds line indicator drive shaft in advanced position against the torque of the indicator return spring.

(3) The character counter mechanism prevents the movement of the indicator mechanism when the FIGS, LTRS, or LINE FEED key levers are depressed. Prior to depressing any of these key levers, the character counter mechanism is in the at rest position described in (2) above. The function blocking bar is shifted to the left so that the slanting fingers are in the downward path of the FIGS, LTRS, or LINE FEED key levers. The sequence of character counter operations that occurs when any of these key levers is depressed is summarized in the chart below:

FIGS, LTRS, or LINE Feed Sequence Chart

1.	FIGS, LTRS, or LINE FEED key lever depressed.
2.	Selected key lever strikes angled finger associated with it and moves the function blocking bar partially to the right.
3.	The right projection on the function blocking bar moves the ratchet pawl counterclockwise out of engagement with the ratchet wheel.
4.	Cam follower lifts the ratchet pawl which moves past the ratchet wheel.
5.	Line indicator drive shaft is held stationary by the ratchet wheel detent. Indicator carriage is not advanced.

(4) The indicator carriage is returned to the left margin when the CAR. RET. key lever is depressed. The character counter mechanism is in the at rest position as described in (2) and (3) above prior to depressing of the CAR. RET. key lever. The return latch (A, fig. 162) is blocked in its clockwise position by the left projection of the function blocking bar which is shifted to the left. In this position CAR. RET. finger on the function blocking bar is in the downward path of the CAR. RET. key lever. The sequence of character counter operations that occurs when the CAR. RET. key lever is depressed is summarized in the chart below.

Carriage Return Sequence Chart

1.	CAR. RET. key lever depressed (fig. 164).
2.	Selected key lever strikes the finger which is more sharply angled than the fingers associated with the other function key levers, shifting the function blocking bar to the far right.
3.	Ratchet pawl and ratchet wheel detent moved out of the path of the ratchet wheel by projections on the function blocking bar.
4.	Function blocking bar latched in extreme right position by the return latch.
5.	Line indicator drive shaft, released by the ratchet wheel detent, rotates toward the back of the keyboard-transmitter driven by the indicator return spring.
6.	Indicator carriage moves to the left striking a projection on the return latch.

7.	Return latch pivots clockwise releasing the function blocking bar.
8.	Function blocking bar returned to normal position by its spring.
9.	Ratchet pawl and ratchet wheel detent, released by projection on function blocking bar, re-engages the ratchet wheel.
10.	Indicator carriage at zero position.

b. Operation of End of Line Indicator Mechanism. The end of line indicator mechanism operates as follows:

(1) If tape is being originated at the local keyboard-transmitter, the END OF LINE INDICATOR lamp will light to warn the operator of the approach of the end of a line. When the lamp is lighted, the operator should depress the CAR. RET. key lever to return the indicator carriage to the zero position. The END OF LINE INDICATOR lamp should light when the indicator carriage is six spaces from the right margin of a standard line of typing (normally the 66th character on machines equipped with standard communication keyboards). The indicator carriage guide roller moves against the switch actuating arm (fig. 165) and pivots the arm clockwise slightly. As the switch actuating arm pivots, the left end moves upward closing the contacts of the indicator lamp switch. This completes the lamp circuit (figs. 197 and 198) and lights the END OF LINE INDICATOR lamp.

(2) The warning bell (fig. 166) is used on the TT–76A/GGC only. It operates in conjunction with the END OF LINE INDICATOR lamp to warn the operator of the approach of the end of the line. The warning bell rings when the operator strikes the key which causes the space indicator to reach the 66th character on the indicator scale. The clapper actuating pawl is operated by the indicator carriage guide roller which also actuates the indicator lamp switch. When the indicator carriage guide roller reaches the 60th space on the indicator scale it contacts the clapper actuating pawl. Between the 61st and 65th spaces the indicator carriage guide roller cams the end of the clapper actuating pawl down against the tension of the actuating pawl spring. This pivots the clapper actuating pawl so that the clapper mounted on the other end of the pawl moves away from the striking surface of the warning bell. When the key lever is struck which causes the indicator carriage to move beyond the 65th space, the indicator carriage guide roller moves beyond the clapper actuating pawl and the clapper actuating pawl is pivoted in the opposite direction by the tension of the clapper arm spring. This causes the clapper to strike the warning bell and alert the operator of the approach of the end of the line.

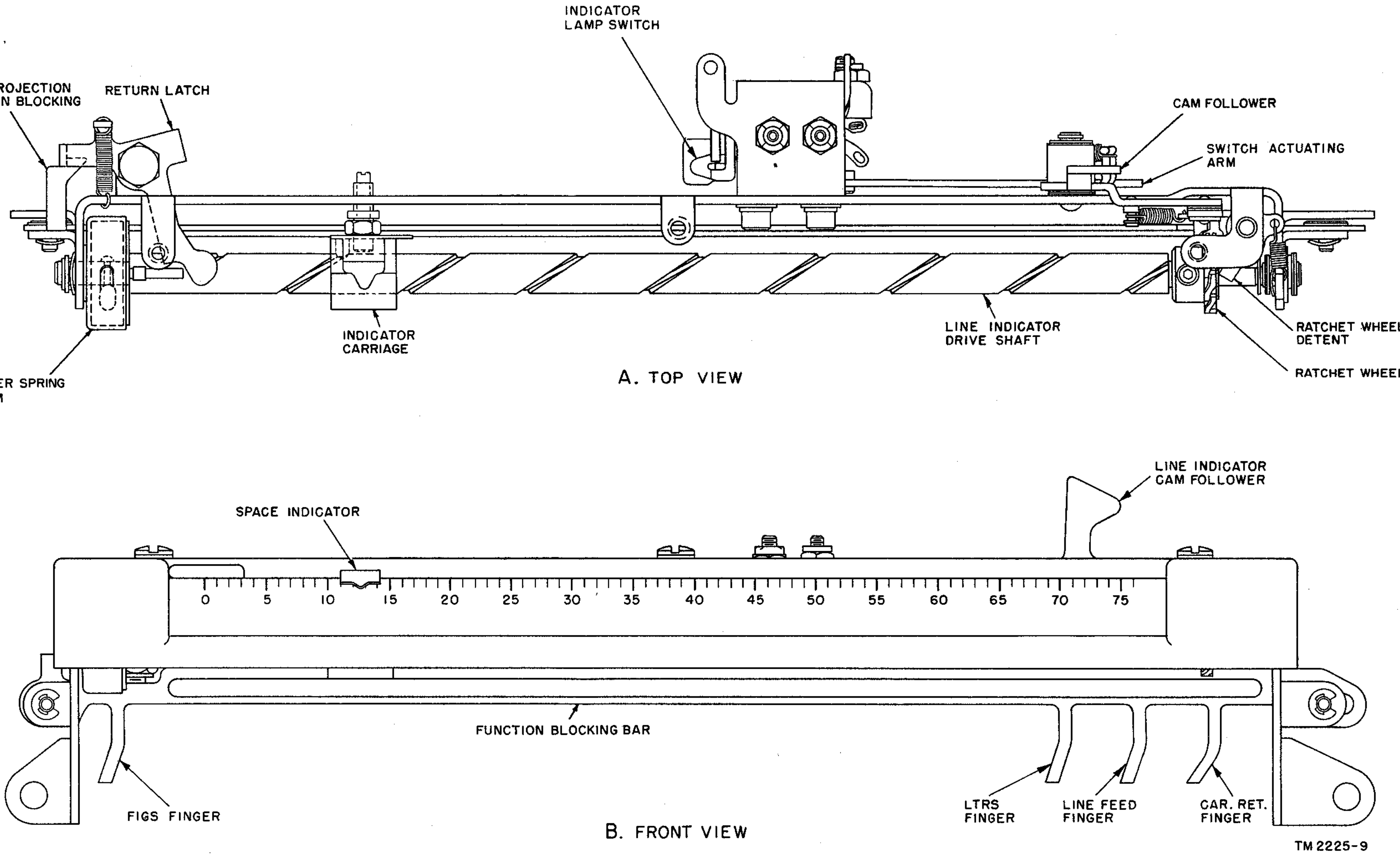


Figure 162. Character counter and end of line indicator mechanism.

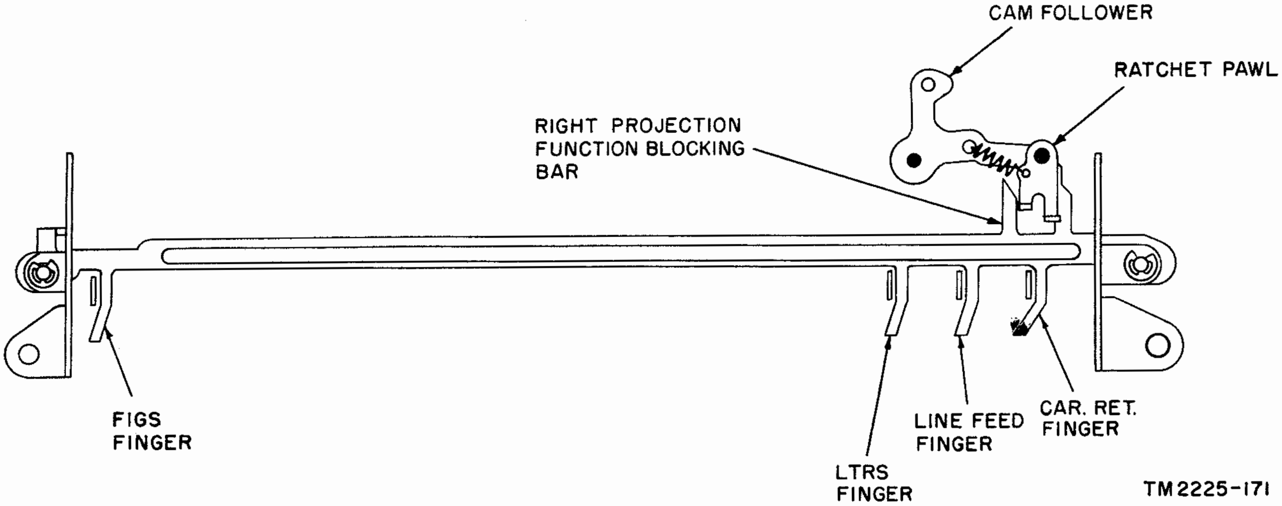


Figure 163. Function blocking bar, front view (unoperated position).

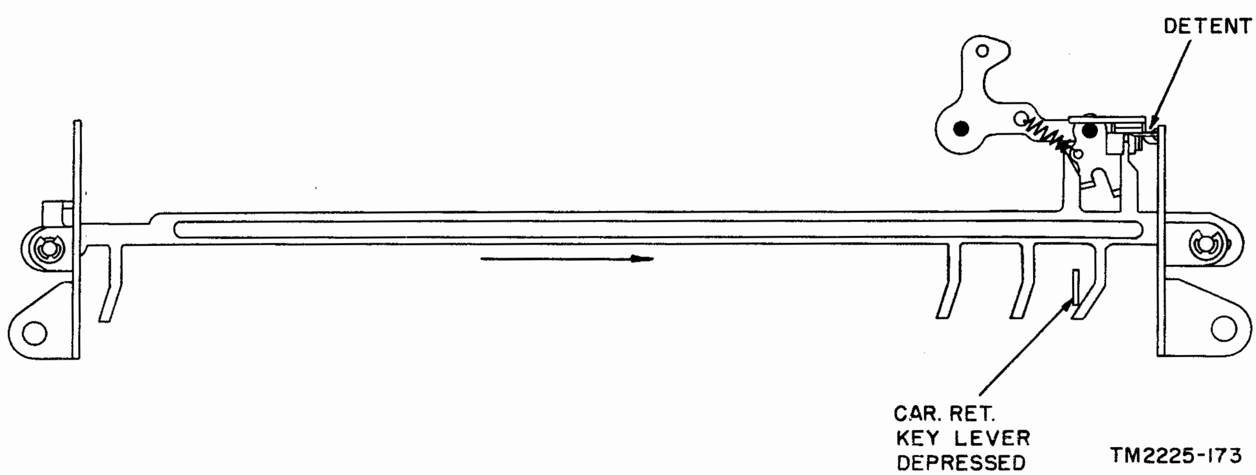


Figure 164. Function blocking bar, CAR. RET. key lever depressed.

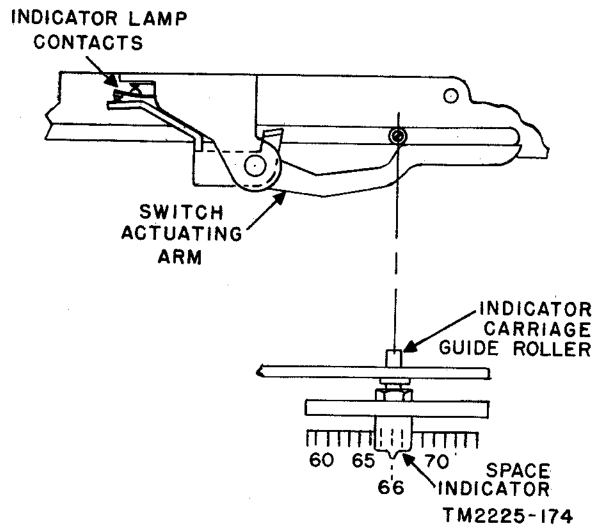


Figure 165. End of line indicator mechanism (TT–76/GGC).

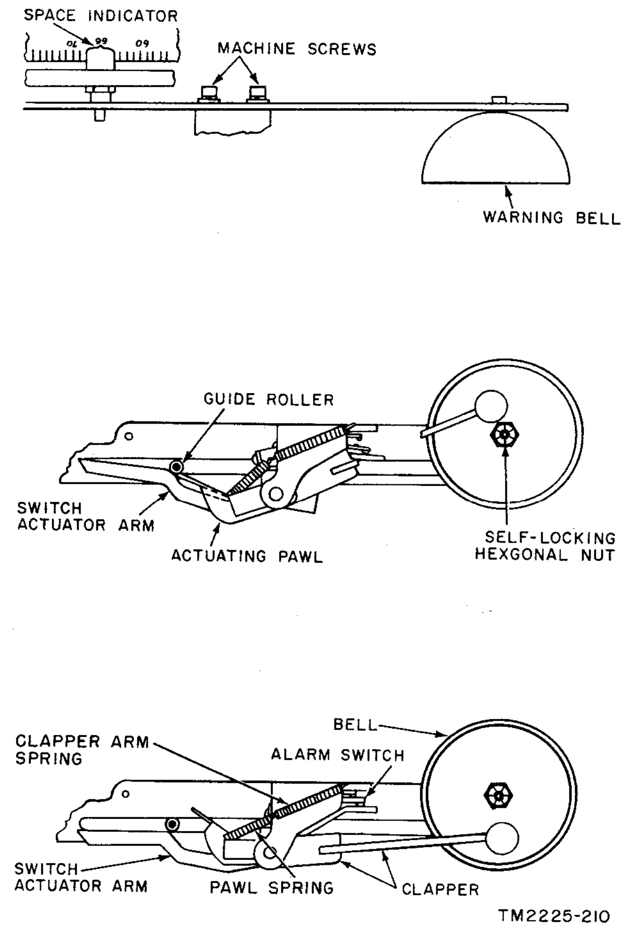


Figure 166. Warning bell and indicator lamp switch mechanism (TT–76A/GGC).

Section IV. TRANSMITTER-DISTRIBUTOR

177. General

The transmitter-distributor translates the code perforations in a paper tape into electrical impulses and transmits these impulses as teletypewriter code groups to teletypewriter receiving units. It consists of a control lever mechanism, control mechanism, sensing mechanism, code transmitting mechanism, and tape feed mechanism.

178. Control Lever Mechanism
(fig. 167)

The operation of the transmitter-distributor is controlled by the control lever mechanism which operates the start-stop switch in the clutch magnet circuit. Unless the clutch magnet is energized no transmission can take place from the transmitter-distributor. Three control levers are involved, the stop-start lever, the tape-out lever, and the tight-tape lever.

a. Stop-Start Lever. The stop-start lever provides the operator with a manual control of the operation of the transmitter-distributor. There are three lever positions; the START position which, when selected, permits the start-stop switch to close, energizing the clutch magnet, the STOP position which, when selected, opens the start-stop switch, and the FEED RETRACT position which holds the start-stop switch open and lowers the feed pins of the tape feed claw. This prevents the tape feed pins from engaging the feed holes in the message tape permitting the tape to be positioned in the unit without raising the tape cover. Just prior to starting the transmitter-distributor when the tape is properly installed and the stop-start lever is held in the STOP position by the start-stop lever detent, the stop-start lever holds the lower switch bail lever against the start-stop switch operating lever so that the normally closed start-stop switch is open. When the start-stop switch is open, the clutch magnet is de-energized to prevent the transmitter camshaft from rotating (par. 179). Below is a chart which summarizes the sequence of events that occurs when the stop-start lever is operated with the message tape properly installed in the unit and the tight-tape lever is in the slack position.

Stop-Start Lever Sequence Chart

1.	Stop-start lever is in the STOP position.	Start-stop switch is open and clutch magnet is not energized.
2.	Stop-start lever is raised to the START position.	Projection on the stop-start lever moves away from the lower switch bail lever permitting it to be moved.
3.	Spring in the switch pushes out the start-stop switch operating lever to move the upper switch bail lever and the lower switch bail lever away from the start-stop switch.	
4.	Start-stop switch closes to engerize the clutch magnet permitting transmission (par. 179).	
5.	Stop-start lever moved to the STOP position.	
6.	Projection on the stop-start lever strikes the lower switch bail lever, pivoting it against the upper switch bail lever.	
7.	Upper switch bail lever moves against the start-stop switch operating lever to open the normally closed switch, interrupting the circuit to the clutch magnet and preventing transmission (par. 179).	
8.	Stop-start lever moved to the FEED RETRACT position.	
9.	Projection on stop-start lever moves against the stud on the tape feed retracting lever, pivoting it clockwise.	
10.	Tape feed retracting lever pivots the tape feed claw so that the pins at the end of the tape feed claw move downward, out of engagement with the message tape.	

b. Tape-Out Lever. The tape-out lever is provided to stop transmission from the transmitter-distributor when the end of the message tape passes through the sensing mechanism. This prevents the repeated sending of the LTRS code group which would occur if the unit continued to transmit without tape. It also stops transmission if the tape cover is raised during operation. When a message tape is properly installed in the transmitter-distributor and the units is transmitting, the stop-start lever is in the START position and the lower switch bail lever is pivoted away from the start-stop switch operating lever so that the switch is closed, energizing the clutch magnet to permit transmission. The tape-out lever is pivoted away from the upper switch bail lever, held in that position by the message tape which is installed in the machine. The switch spring holds the start-stop switch operating lever and the upper switch bail lever pivoted away from the start-stop switch body. The following chart summarizes the sequence of events which occurs when the end of the message tape passes through the transmitter-distributor:

End-of-Tape Lever Operation Sequence Chart

1.	End of the message tape passes through the sensing mechanism.
2.	Tape-out lever, no longer blocked by the message tape, pivots counterclockwise by spring tension.
3.	Tape-out lever moves upper switch bail lever clockwise.
4.	Lower finger of the upper switch bail lever moves start-stop switch operating lever toward start-stop switch to open normally closed start-stop switch.
5.	Clutch magnet de-energized to stop transmission (par. 179).

c. Tight-Tape Lever. The tight-tape lever is provided to shut off transmission from the transmitter-distributor when the message tape becomes excessively tight, preventing the message tape from being torn or damaged when too much tension is applied to the message tape. This is accomplished by threading the message tape through the hole in the tight-tape lever, to permit the lever to operate the start-stop switch in the clutch magnet circuit when the tight-tape lever is raised by the message tape tension. When the message tape is properly installed in the transmitter-distributor and the unit is operating, the start-stop switch is closed and the switch spring holds the start-stop switch operating lever, the upper switch bail lever, and the lower switch bail lever pivoted away from the switch body. The tight-tape lever is pivoted forward out of engagement with the lower switch bail lever. The chart below summarizes the sequence of events that occurs when the tight-tape lever is operated by message tape tension:

Tight-Tape Lever Sequence Chart

1.	Tight-tape lever in the slack position.	Clutch magnet is energized and transmitter-distributor is transmitting.
2.	Message tape starts to tighten, raising the loop end of the tight-tape lever.	
3.	Projection on the tight-tape lever strikes the bottom of the lower switch bail lever, causing it to pivot.	
4.	Top of the lower switch bail lever strikes the upper switch bail lever, moving the upper switch bail lever against the switch operating lever.	
5.	Switch operating lever moves far enough to open the normally closed start-stop switch, de-energizing the clutch magnet to stop transmission (par. 179).	

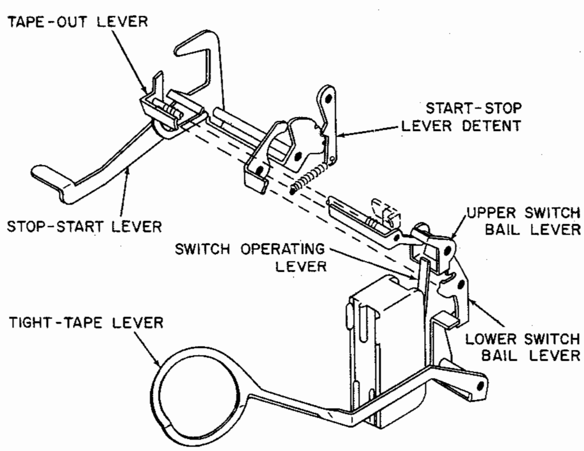


Figure 167. Control lever mechanism.

179. Control Mechanism

a. The control mechanism regulates the starting and stopping of the transmitter camshaft as directed by the tight-tape lever, start-stop lever and tape-out lever. It consists of a clutch magnet (fig. 168), clutch magnet armature, camshaft stop lever, and the stop lever cam which is part of the transmitter camshaft assembly.

b. The control mechanism controls the starting and stopping of the transmitter camshaft. When the clutch magnet is de-energized (A, fig. 168) and the transmitter-distributor is stopped, the armature spring holds the clutch magnet armature pivoted in its clockwise position so that it latches the blocking end of the camshaft stop lever. A projection in the middle of the camshaft stop lever engages a tooth on the stop lever cam, blocking the rotation of the transmitter camshaft. When the clutch magnet is energized (B, fig. 168), the magnetic field of force produced in the magnet attracts the rear end of the clutch magnet armature, pivoting the clutch magnet armature counterclockwise to unlatch the blocking end of the camshaft stop lever. The friction clutch then operates to turn the transmitter camshaft, moving the camshaft stop lever out of the path of the tooth on the stop lever cam. As the high point if the stop lever cam passes the projection on the camshaft stop lever, the camshaft stop lever spring pivots the camshaft stop lever back into the path of the second tooth on the stop lever cam and permits the clutch magnet armature to again engage the blocking end of the camshaft stop lever if the magnet is de-energized.

c. The sequence chart in paragraph 183 lists the sequence of operations for the transmitter-distributor and shows the relationship of the control mechanism to the other operations.

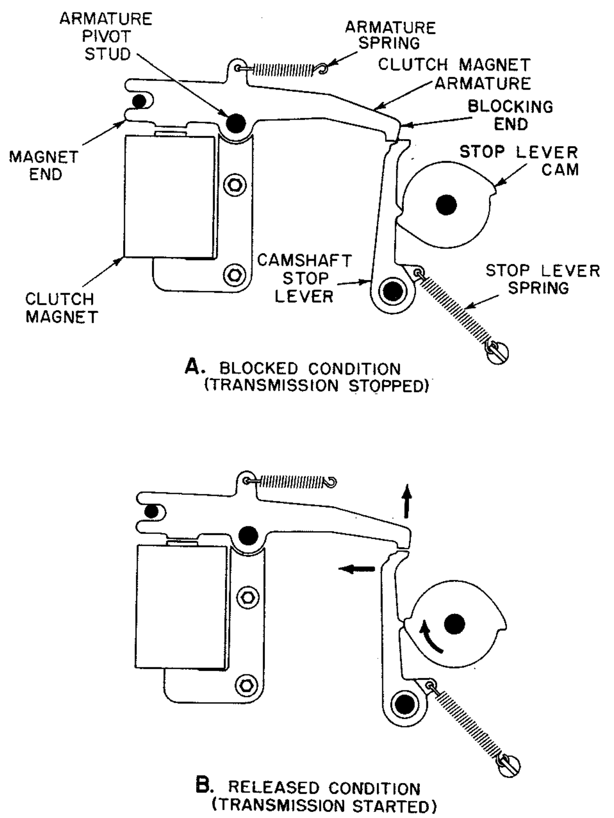


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Figure 168. Transmitter camshaft control mechanism.

180. Tape Sensing Mechanism

The tape sensing mechanism translates the holes punched into a message tape into mechanical settings. It consists of five identical code sensing levers (fig. 169) and sensing lever springs, a sensing lever restoring bail, and a sensing lever restoring cam which is part of the transmitter camshaft assembly.

a. The five code sensing levers are mounted on the code sensing lever stud in such a manner that the pins at the end of the code sensing levers are aligned with the code holes punched in the message tape (fig. 151). When the transmitter camshaft is in the at rest position, the sensing lever restoring bail (fig. 169) is held at its furthest clockwise position by the sensing lever restoring cam, holding the pin end of the code sensing levers down and out of engagement with the message tape.

b. As the transmitter camshaft starts to rotate, as described in paragraph 179, the sensing lever restoring bail cam follower moves to the low portion of the sensing lever restoring cam, pivoting the sensing lever restoring bail counterclockwise and releasing the code sensing levers. The code sensing lever springs pivot the code sensing levers counterclockwise, raising the pin end upward into engagement with the message tape.

c. If the message tape has no hole above the pin of a code sensing lever, the counterclockwise movement of the code sensing lever is blocked and the code sensing lever is positioned for a spacing impulse. If the message tape has a hole above the pin of the code sensing lever, the counterclockwise movement of the code sensing lever continues, positioning the code sensing lever for a marking impulse. In this manner the five code sensing levers are positioned in the marking or spacing position for the code group to be transmitted.

d. The sequence chart in paragraph 183 lists the sequence of operations for the transmitter-distributor and shows the relation of the tape sensing mechanism to the other operations.

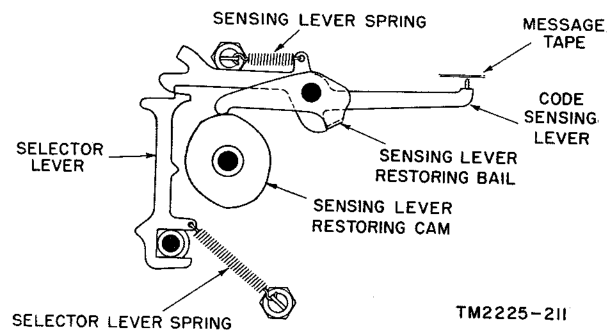

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Figure 169. Tape sensing mechanism.

181. Code Transmitting Mechanism

The code transmitting mechanism converts the mechanical settings of the sensing mechanism into electrical impulses that can be transmitted to the signal line. It consists of five selector levers (fig. 170), a transmitter camshaft, a transmitter contact bail, and transmitter stationary contacts. Start and stop impulses are transmitted through the interoperation of the permanently latched start-stop selector lever (fig. 171) and its associated start-stop cam.

a. If a hole is present in the message tape, the code sensing lever associated with the code impulse is moved to the marking position (par. 180). In this position, the latching end of the code sensing lever (A, fig. 170) engages the notched end of its associated selector lever, latching the upper end of the selector lever in place. When the lobe of the associated cam moves against the center projection of the selector lever, the bottom of the selector lever is forced to move toward the transmitter contact bail, pivoting the transmitter contact bail clockwise and causing the contact on the transmitter contact bail to touch the stationary contact to send a current impulse.

b. If no hole is present in the message tape, the movement of the code sensing lever is blocked (par. 180), and the code sensing lever is prevented from latching the selector lever (B, fig. 170). As the lobe of the associated cam rotates against the center projection of the selector lever, the top of the selector lever is free to move and the selector lever pivots counterclockwise, permitting the transmitter contact bail spring to open the transmitter contacts, causing a no current or spacing impulse.

c. The start-stop impulses are transmitted when the permamently latched start-stop selector lever is moved by the start-stop cam on the transmitter camshaft. When the transmitter camshaft is in the latched position, the lobe of the start-stop cam is pressed against the center projection of the start-stop lever, forcing the lower end of the associated selector lever against the transmitter contact bail to hold the transmitter contacts closed. When the transmitter camshaft starts to rotate the center projection of the start-stop selector lever moves off the cam lobe and the start-stop selector lever is pivoted counterclockwise by the selector lever spring, permitting the transmitter contact bail spring to pivot the transmitter contact bail and open the transmitter contacts. This causes a no current, start impulse to be transmitted. As the transmitter camshaft nears the end of its half revolution, the cam lobe again moves against the center projection of the start-stop selector lever to close the transmitter contacts, sending a marking, stop impulse.

d. The cams on the transmitter camshaft are arranged to operate each selector lever in turn, causing the impulse associated with that selector lever to be sent at precisely the correct instant, and to give the start and code impulses a duration of 22 milliseconds and the stop impulse a duration of 31 milliseconds.

e. The sequence chart in paragraph 183 summarizes the sequence of operations for the transmitter-distributor and shows the relationship of the code transmitting cycle to the other operations.

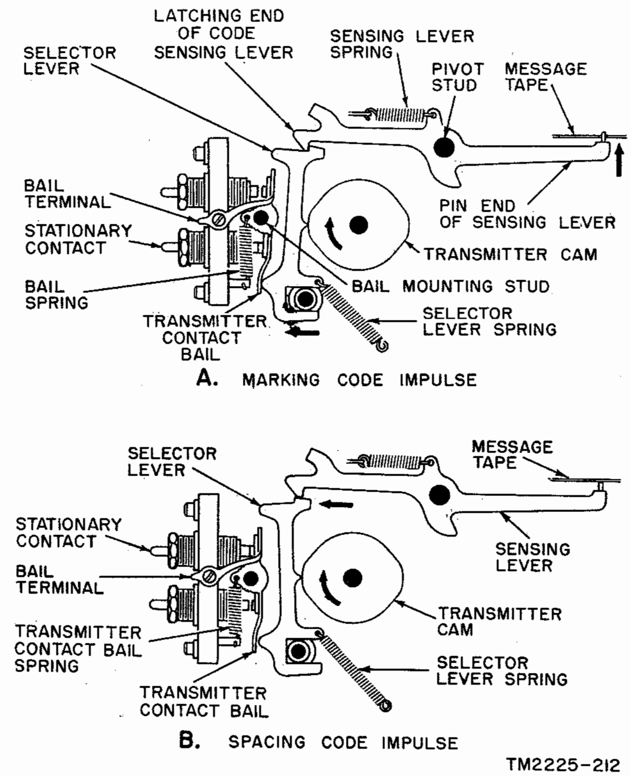


Figure 170. Transmission of marking and spacing code impulse.

182. Tape Feed Mechanism

The tape feed mechanism feeds the message tape through the transmitter-distributor mechanism, positioning the message tape to permit the sensing mechanism to sense the perforated code group and advance the message tape after each code group is transmitted. It consists of a tape feed lever (fig. 172), tape feed lever cam, tape feed claw, tape feed claw spring, tape feed retracting lever cam, tape feed retracting lever, and tape feed retracting lever spring. Tape feed occurs immediately after the transmission of each code group. Tape feeding is done in two distinct movements. A horizontal movement in which the tape feed claw moves from the front toward the back of the transmitter-distributor and a vertical movement in which the tape feed claw raises and lowers to engage and disengage the feed holes in the message tape.

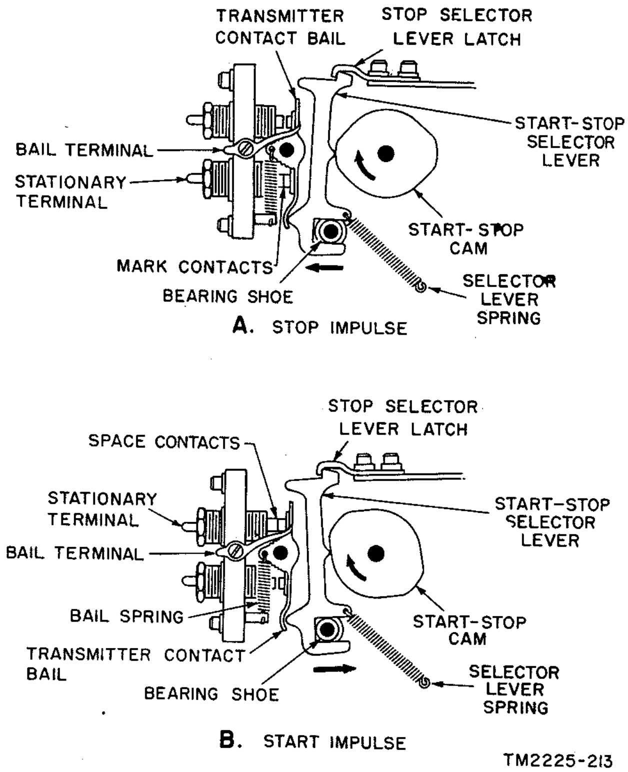


Figure 171. Transmission of start and stop impulses.

a. When the transmitter camshaft is in the at rest position, the tape feed lever is held in the low part of the feed lever cam by the tape feed lever spring. In this position it is pivoted counterclockwise, and the top of the tape feed lever that engages the tape feed claw holds the tape feed claw to the left. This is the position of the tape feed claw immediately after feeding the message tape in the transmitter-distributor. As the transmitter camshaft starts to rotate, the tape feed lever is cammed clockwise by the feed lever cam. The clockwise movement of the tape feed lever permits the tape feed claw spring to pull the tape feed claw to the right where it engages the feed holes in the message tape as described in *b* below. As the high point of the feed lever cam passes the projection on the tape feed lever, the tape feed lever spring snaps the tape feed lever clockwise against the low portion of the feed lever cam and causes the top end of the tape feed lever to snap to the left, positioning the message tape for the next code group.

b. In addition to the horizontal movement described in *a* above, the tape feed claw is also moved vertically by the tape feed retracting lever (B, fig. 172) and the tape feed retracting lever cam. A pin through the right arm of the tape feed retracting lever horizontally engages the notch in the tape feed claw. This pin causes the tape feed claw to follow the movements of the right end of the tape feed retracting lever. When the transmitter-distributor is in the at rest position, the tape feed retracting lever cam follower is in the low part of the tape feed retracting cam and the right end is raised by action of the tape feed retracting lever spring, holding the tape feed claw in its upper position. At the beginning of the transmission of a code group the tape feed retracting lever cam rotates, and cams the tape feed retracting lever clockwise, dropping the right end of the tape feed retracting lever and with it the tape feed claw. This lowers the pins of the tape feed claw out of engagement with the feed holes in the message tape. Before the tape feed retracting lever cam completes its one-half revolution, the tape feed retracting lever again moves to the low part of the cam; the tape feed retracting lever spring raises the right end of the tape feed retracting lever and the tape feed claw. The combined action of the tape feed retracting lever cam and the tape feed retracting lever moves the tape feed claw vertically, upward to engage the feed holes in the message tape and downward to disengage the feed holes after feeding.

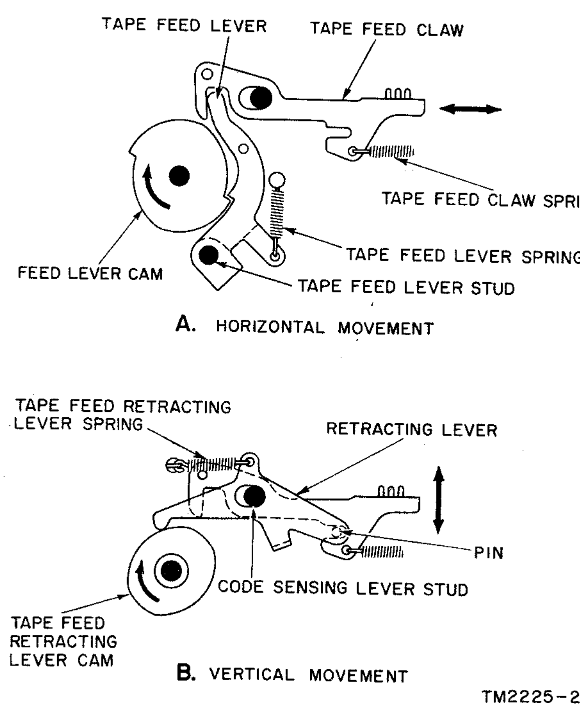


Figure 172. Tape feed mechanism.

c. The actual motion of the tape feed claw under the control of the tape feed lever the tape feed retracting lever, and their respective cams is rectangular. The tape feed retracting lever causes the tape feed claw to engage the message tape before feeding, and disengages from the message tape after feeding. The tape feed lever causes the tape feed claw to move the tape a distance of one space and then moves back into position to re-engage the message tape for the next feeding cycle.

d. The chart in paragraph 183 summarizes the sequence of operations for the transmitter-distributor, and shows the relationship of the tape feed cycle to the other operations.

183. Transmitter-Distributor Operation Sequence Chart

The following sequence chart summarizes the various operations which occur in the transmitter-distributor. Assume that a message tape is properly installed in the transmitter-distributor.

Transmitter-Distributor Operation Sequence Chart

1.	Stop-start lever moved to the START position.	
2.	Clutch magnet energized, energizing the laminated core (B, fig. 168).	
3.	Clutch magnet armature pivoted counterclockwise by clutch magnet, releasing camshaft stop lever.	
4.	Camshaft stop lever pivots counterclockwise, freeing stop lever cam.	
5.	Friction clutch operates.	Transmitter camshaft starts rotating.
6.	Sensing lever restoring bail moves into low part of sensing lever restoring cam, code sensing levers rise (fig. 169).	
7.	Code sensing levers strike message tape (fig. 169).	If code sensing lever is aligned with hole in message tape (marking), it latches selector lever (A, fig. 170). If code sensing lever is aligned with no hole in message tape (spacing), it does not latch selector lever (B, fig. 170).
8.	Start-stop cam allows selector lever spring to pull start-stop selector lever counterclockwise (B, fig. 171).	
9.	Start-stop selector lever pivots transmitter contact bail to spacing position.	Start (no current) impulse sent.
10.	Transmitter camshaft causes No. 1 selector lever to pivot at top if latched (marking) (A, fig. 170) or at the bottom if not latched (spacing) (B, fig. 170).	Transmitter contact bail moved to marking or spacing position sending No. 1 marking or spacing impulse (fig. 170).
11.	Tape feed claw moves down out of engagement with tape feed holes (B, fig. 172).	
12.	Second, third, and fourth code impulses sent (fig. 170).	Tape feed claw moves forward (A, fig. 172).
13.	Fifth code impulse sent (fig. 170).	Feed claw rises to engage with holes (B, fig. 172).
14.	Stop impulse sent (A, fig. 171).	Code sensing levers lowered by cam action out of way of message tape (fig. 169).
15.	Tape feed lever moves to low part of cam, allowing tape feed lever spring to pull tape feed lever to the rear, moving the message tape one space (A, fig. 172).	
16.	Transmitter-distributor ready to transmit another code group.	

Section V. REPERFORATOR MECHANISM

184. Selector Magnet

a. *Description.* The selector magnet (A, fig. 173) consists of a permanent bar magnet, an armature, a potentiometer, and two line and two bias windings mounted on a U-shaped silicon-steel core. Around each arm of the U-shaped core are wound one line and one bias winding as shown in B^1 of figure 173. The armature, pivoted in the center, is mounted over the open end of the core. During operation of the magnet, reception of a marking impulse causes one end of the armature to be pulled toward one arm of the U-shaped core. Reception of a spacing impulse causes the opposite end of the armature to move toward the other arm of the core. The selector manget is constructed so that when current is not present in any of the windings, a balanced magnetic field is present (B^1, fig. 173). Under this condition, the permanent magnet is the only source of magnetism. Note that the magnetic flux at the lower end of the magnet (north pole) divides equally and returns to the south pole through both arms of the core and both sides of the armature. The magnetic pull of the cores on the armature is therefore equal, when all windings are not energized.

b. Operation with Polar Signals. When operating in polar circuits, the bias windings are not used. The line windings are connected in series for 15-ma operation (B^2, fig. 173) and in parallel for 30-ma operation (not illustrated).

(1) During a marking impulse, current flows through the line windings. Terminal 2 is positive and terminal 6 is negative. The magnetic field set up by the line winding around the left arm *opposes* the field of the permanent magnet, and little pull is present on the left side of the armature. The magnetic field set up by the line winding around the right arm of the core is poled to *aid* the field of the permanent magnet and therefore, the right end of the armature is pulled toward the right arm of the U-shaped core. The left end of the armature that includes the armature blade, moves to the marking position and into the path of the selector levers.

(2) During reception of a polar spacing impulse, current flow in the line windings is reversed, and the opposite of the above occurs. The magnetic pull on the right end of the armature is *weakened* and the pull on the left is *increased*, causing the armature to be drawn toward the left arm of the core.

c. Operation with Neutral Signals. When operating in neutral circuits, the bias windings must be used. They are wired in series and are energized constantly. The magnetic field set up by the left bias winding is poled to *aid* the magnetic field of the permanent magnet. The field of the right bias winding *opposes* the field of the permanent magnet. During reception of a netural spacing impulse, current is not present in the line windings. The combined magnetic fields of the energized bias windings and the permanent magnet cause the blade end of the armature to be pulled toward the left core, away from the selector levers. Current flows in both line windings during reception of a netural marking impulse. The current value in a line winding normally is twice the bias current value. The field set up by the energized line winding around the left core *opposes* the combined magnetic fields of the left bias winding and the permanent magnet. The energized line winding around the right core *aids* the field of the permanent magnet and *opposes* the field of the right bias winding. Therefore, a marking impulse in the line windings will cause the right end of the armature to be pulled toward the right core arm, and the left (blade) end is moved into the path of the selector levers (marking position). Neutral operation of this selector magnet is possible in both 20- and 60-ma circuits. The line windings are connected in series for 20-ma neutral operation and in parallel for 60-ma neutral operation. Adjustment of the bias current value to obtain the most advantageous machine range is accomplished with a potentiometer that is connected in series in the bias circuit.

185. Selector Mechanism Operation

The selector mechanism translates received code impulses into a mechanical selection that will result in the printing and punching of the proper character or the selection of some functional operation. Operation of the selector mechanism begins with reception of the start impulse of a code group. The start impulse permits the selector camshaft to begin one-half revolution. When started, the selector mechanism records each of the five code impulses in the form of a mechanical position as each is received. Reception of the stop impulse immediately after the fifth code impulse stops rotation of the selector camshaft.

a. Starting and Stopping Selector Camshaft (Synchronization). To synchronize operation of the reperforator with the incoming electrical impulses, the selector cams are started from a stopped position at the beginning of each code group and stopped at the end of each code group. The selector camshaft is friction clutch driven by the main shaft. When current is flowing in the line (normal condition when messages are not being transmitted), the selector camshaft is prevented from turning by the engagement of the selector magnet armature, selector camshaft lever, and stop plate. The armature

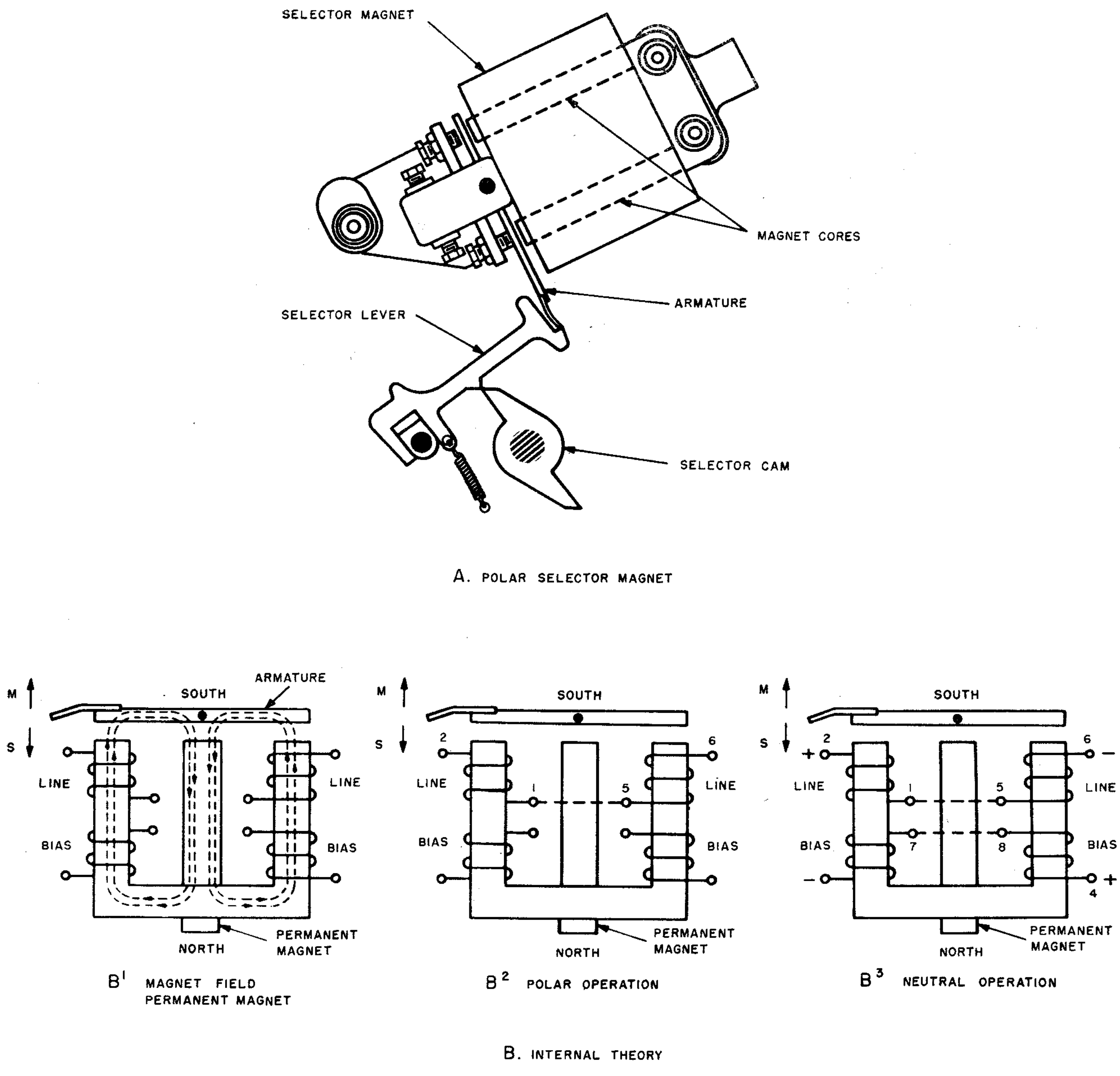


Figure 173. Polar selector magnet operation.

when lowered (A, fig. 174), blocks the locking lever which, in turn, holds the stop plate (fig. 175) and selector camshaft from turning. When the start (no current) impulse for a signal is received, the armature is raised, releasing the selector camshaft locking lever and stop plate. The selector camshaft, driven by the friction clutch, immediately starts to turn, bringing the first selector cam into engagement with its selector lever during the time the next impulse (first of the five code impulses) is being received. Thereafter, each of the remaining four selector cams engages its corresponding selector lever in a timed sequence because of the location of the cams around the circumference of the shaft. Rotation speed of the selector camshaft causes each of the five cams to contact its respective selector lever during the time the corresponding code impulse is being received. All five selector levers are operated during one-half revolution of the selector camshaft. The selector camshaft is limited to one-half revolution at a time by the stop impulse. This impulse moves the magnet armature to the marking (lower) position where it blocks the selector camshaft locking lever which, in turn, blocks the stop plate on the selector camshaft as it completes one-half revolution. The selector camshaft is held in this stopped position until reception of the start impulse of the next code group releases the selector camshaft locking lever as described above.

b. Recording Code Impulses.

(1) Each of the five code impulses of the code group is recorded in the form of clockwise or counterclockwise movement of the five corresponding selector Y-levers (fig. 174) that are mounted on a common Y-lever pivot post stud. This is accomplished through the interaction of the selector magnet, the selector camshaft cams, and the selector levers.

(2) When a marking current impulse is received, the magnet armature moves downward to block the movement of the upper portion of the selector lever associated with that impulse as shown in A, figure 174. As the lobe of the associated selector camshaft cam moves against the projection in the center of the selector lever, the selector lever is forced to move in a clockwise direction, moving with it its associated selector Y-lever. The selector Y-lever is held at this clockwise setting by its friction plates on the TT–76/GGC or by its Y-lever detent on the TT–76A/GGC to record a marking impulse.

(3) When a spacing (no current) impulse is received, the magnet armature is raised, releasing the top of the selector lever associated with that impulse. As the lobe of the associated selector camshaft cam moves against the projection at the center of the selector lever, the tension of the selector lever spring retards the movement of the bottom of the selector lever, forcing the selector lever to rotate counterclockwise, moving with it its associated selector Y-lever. The selector Y-lever is held in this counterclockwise position by its friction plates on the TT–76/GGC or by its Y-lever detent on the TT–76A/GGC to record a spacing impulse.

(4) In the same manner, all five of the Y-levers are positioned to change the incoming electrical impulses to mechanical settings.

c. Rangefinder Mechanism.

(1) Although the time length of each code impulse is 22 milliseconds, only about one-fifth of that time is required for the selector cam to position a selector Y-lever. Under ideal conditions, maximum reliability is obtained when the selector Y-lever positioning time occurs during the middle portion of the 22 milliseconds. The rangefinder setting determines which portion of each impulse is used for the positioning of its respective selector Y-lever.

(2) The rangefinder mechanism is provided to allow the operator or mechanic to make an adjustment of the angular position relationship between the selector camshaft cams and the stop plate (fig. 175). Increasing the angle between the cams and the stop plate causes the selector cams to position the selector Y-levers later during each code impulse. Decreasing the angle causes the selector Y-levers to be positioned earlier during each code impulse.

(3) The angular position of the stop plate is controlled by the position of the grooved spindle. The angle is increased whenever the spindle is moved inward and is decreased whenever the spindle is moved outward. The position of the grooved spindle is controlled by the rangefinder dial assembly and rangefinding cam. Clockwise rotation of the rangefinder dial assembly causes the rangefinding cam to push the spindle inward, and the selector Y-levers are positioned later during each code impulse. Counterclockwise rotation of the rangefinder dial assembly has the opposite effect.

d. Selector Operation Sequence Chart. Just prior to the receipt of a code group, the current in the signal line holds the armature of the selector magnet lowered, latching the upper end of the selector camshaft locking lever. The selector camshaft locking lever is held in the path of the stop plate (fig. 173) on the selector camshaft, prevention rotation of the selector camshaft and causing the friction clutch to slip without transferring rotation. On the TT–76/GGC the friction plates between the selector Y-levers hold the selector Y-levers as they were positioned by the last received code group. On the TT–76A/GGC they are held in position by the Y-lever detents. The sequence chart below describes the sequence of operations that occurs when the code group is received by the reperforator.

1.	Start impulse received.
2.	Selector magnet armature moves to space position.
3.	Armature releases stop lever.
4.	Stop lever releases stop plate.
5.	Selector camshaft starts rotating, driven by the friction clutch.
6.	First code impulse moves armature to mark or space position, depending on whether code impulse is a marking or spacing impulse.
7.	First selector cam lifts first selector lever.
8.	First selector lever pivots on the end of armature if armature is in marking position or on selector lever pivot stud if armature is in spacing position.
9.	First selector lever pushes first **T**-lever clockwise if selector lever is pivoting on the armature end (marking), or counterclockwise if selector lever is pivoting on the pivot stud (spacing). The TT–76A/GGC **Y**-lever detents engage **Y**-levers to hold them in place.
10.	Second, third, fourth, and fifth code impulses, in turn, are recorded in the corresponding parts of the selector mechanism, as described for the first code impulse. Each **Y**-lever is positioned clockwise or counterclockwise as determined by its associated code impulse.
11.	Transfer lever latch tripping cam turns transfer lever latch.
	Note. The actions described in the transfer operation and function shaft operation sequence chart (par. 186) begin at this point in the overall sequence of equipment operation.
12.	Stop impulse is received.
13.	Armature moves to marking position.
14.	Stop plate engages stop lever.
15.	Armature latches stop lever.
16.	Stop lever holds stop plate.
17.	Selector camshaft stops at end of one-half revolution.

186. Transfer Mechanism

After the five selector **Y**-levers have been positioned as described in paragraph 185, the selector **Y**-lever settings must be transferred to the code rings (fig. 177) and the function shaft must be allowed to rotate (fig. 177). This is accomplished by means of five **T**-levers which are mounted on the **T**-lever pivot stud of the transfer lever. The **T**-levers engage the slotted tails of the code rings and pivot the code rings either clockwise or counterclockwise, depending upon whether the associated code impulse is a marking or spacing impulse.

a. The transfer operation occurs immediately after the fifth code impulse is stored in the selector **Y**-levers. The transfer lever latch tripping cam (fig. 177) on the selector camshaft moves against the transfer lever trip latch, pivoting the transfer lever trip latch counterclockwise against the tension of the spring. The lower arm of the transfer lever trip latch moves out of engagement with the transfer lever and permits the transfer lever spring to snap the transfer lever clockwise, moving the **T**-levers into engagement with the selector **Y**-levers. Each selector **Y**-lever positioned in a clockwise direction will cause its associated **T**-lever to pivot counterclockwise. The **T**-lever, in pivoting, will cause its

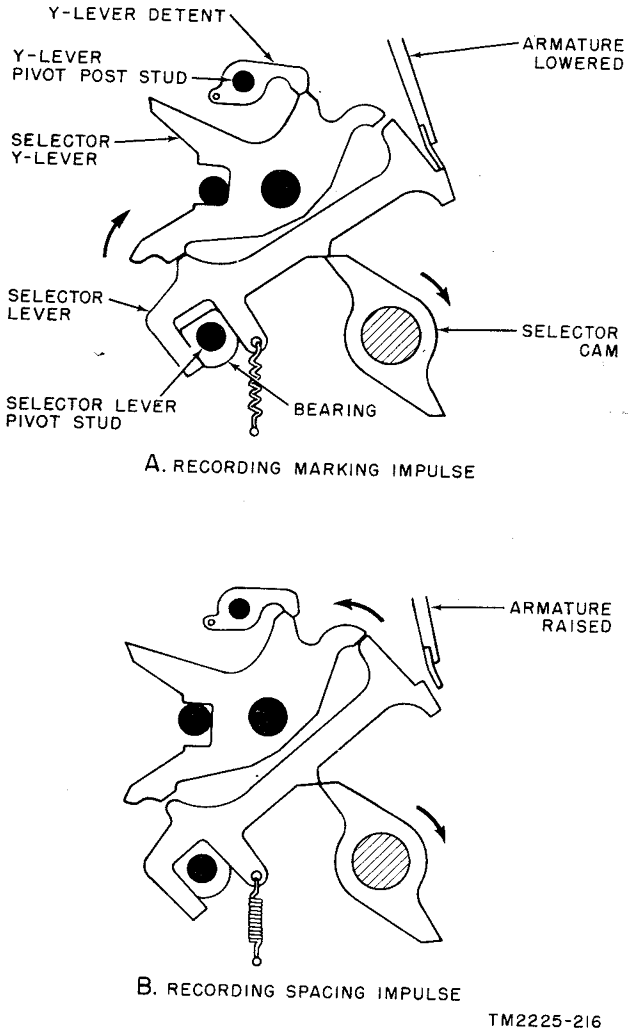


Figure 174. Recording code impulses.

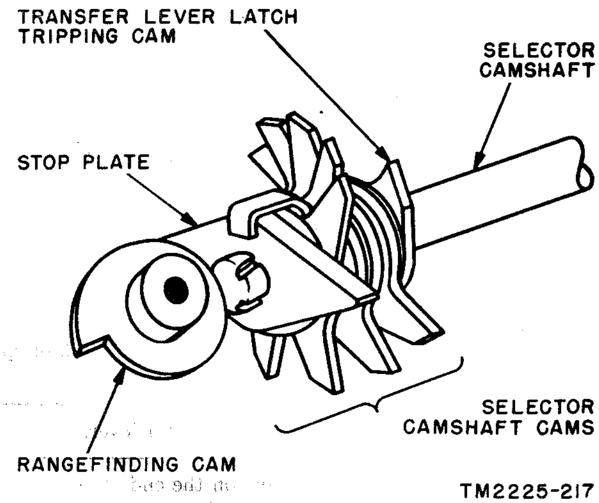


Figure 175. Selector camshaft and stop plate.

associated code ring to pivot clockwise. Thus a selector Y-lever pivoted clockwise will cause its associated code ring to pivot clockwise. Likewise, any selector Y-lever pivoted counterclockwise will cause its associated code ring to pivot counterclockwise.

b. Each code ring is provided with a unique arrangement of notches cut into the inner and outer edges of the curved portion of the code ring (fig. 177). After the transfer lever has positioned the code rings, the rings are arranged with a notch of each ring lined up with the notches of the other four at one point on their circumference. At this point the notches form a groove into which one stop bar moves under pressure of a compression spring (fig. 178). This movement places the selected stop bar into the path of the selector stop arm to control the degree of turn of the selector stop arm for proper character or function selection. The previously selected stop bar at the same time is moved to the unselected position by the sloped high portion of one or more of the code rings.

c. The 32 stop bars are arranged in one inner and one outer row about a semicircle in the code ring cage (fig. 177). The ends of the outer stop bars move inward when selected (fig. 178). The ends of the inner stop bars move outward when selected. The selector stop arm (fig. 181) has one inner and one outer projection on each end for engaging a selected stop bar. The inner projections of the stop arm halt the arm halfway between the outer projection stop positions. The character or function assigned to each stop bar is shown in figure 179.

d. Just prior to the stop bar selector operation, the five selector Y-levers, the five T-levers, and the code rings are positioned as they were by the last received code group. The stop bars (fig. 177) are all held in the unselected position by one or more code rings, except the code bar selected by the last received code group which remains in the selected position. The transfer lever is held in its counterclockwise position by the transfer lever trip latch. The T-levers that are mounted on the T-lever pivot stud at the top of the transfer lever are held out of engagement with the selector Y-levers. The following sequence chart summarizes the operations that occur when the transfer mechanism operates.

1.	Transfer lever latch tripping cam turns transfer lever trip latch (fig. 177).
2.	Transfer lever trip latch releases transfer lever.
	Note. The action described in the function shaft clutch control sequence chart begins at this point in the sequence of operations.
3.	Transfer lever moves five **T**-levers against **Y**-levers.
4.	**Y**-levers position **T**-levers.
5.	**T**-levers position code rings, forming notch in code rings.
6.	Selected stop bar pushed into notch in code rings (fig. 178).
7.	Previously selected stop bar pushed out by code rings.

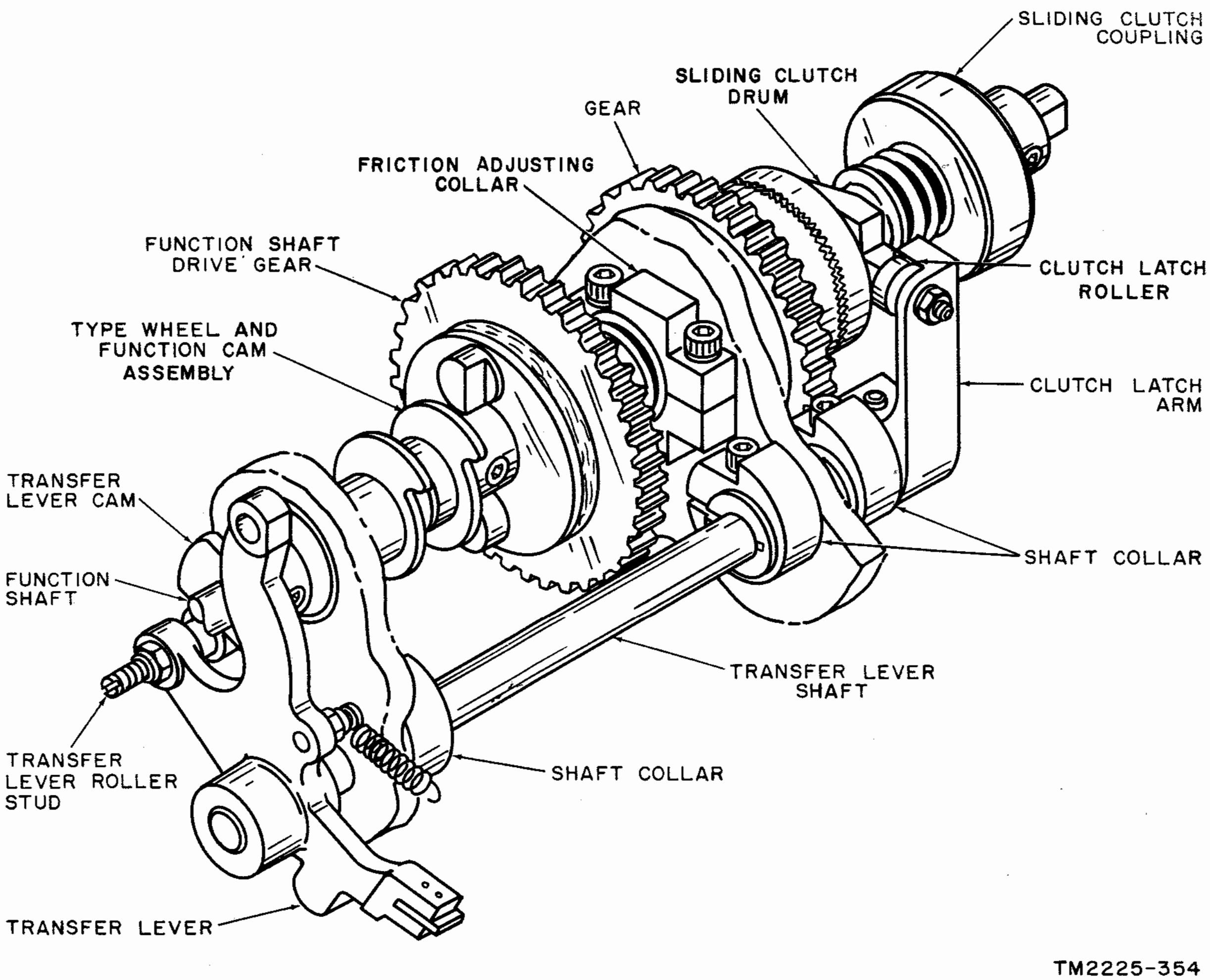


Figure 176. Function shaft, sliding clutch drum engaged.

187. Function Shaft Clutch Control

The function shaft (fig. 156) is driven by the main shaft through the operation of the function shaft clutch and is engaged by the movement of the clutch latch arm that is firmly fastened to the end of the transfer lever shaft. The function shaft does not begin its one-half revolution until after the code impulses are stored in the selector **Y**-levers. It pro-

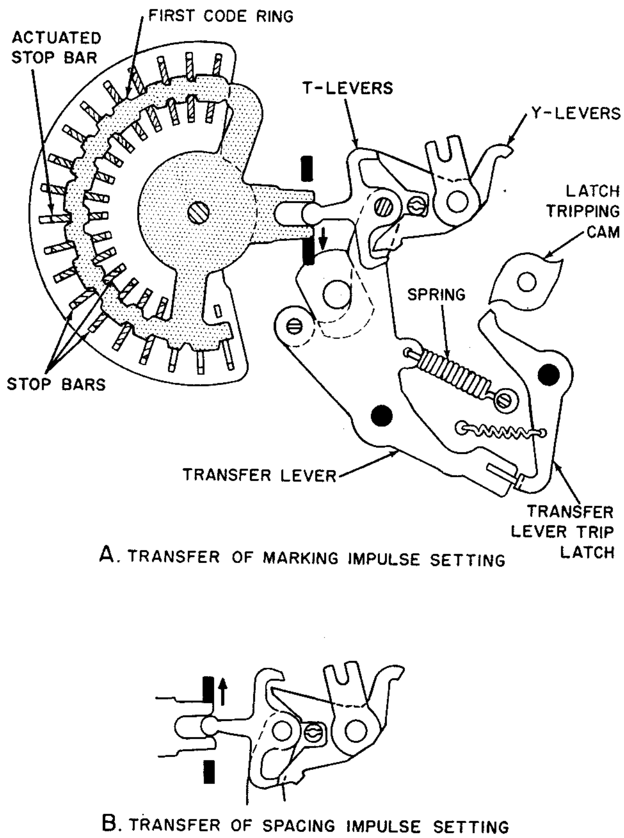


Figure 177. Transfer lever operated.

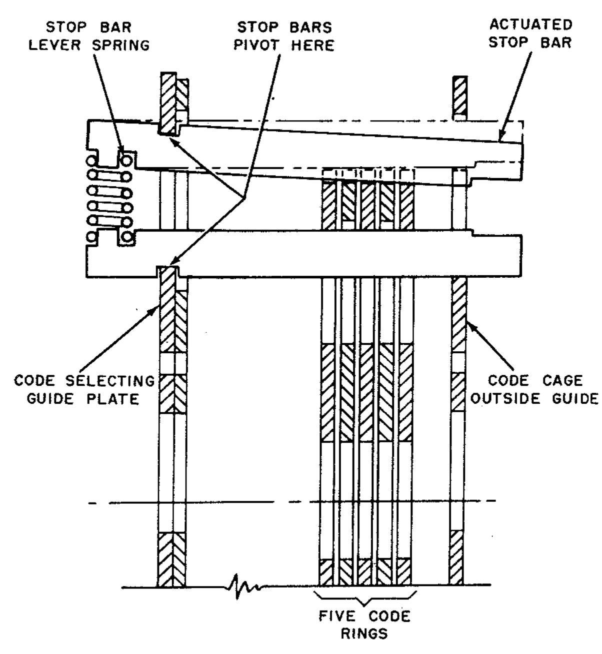


Figure 178. Cross section of code ring showing a stop bar selected by code rings.

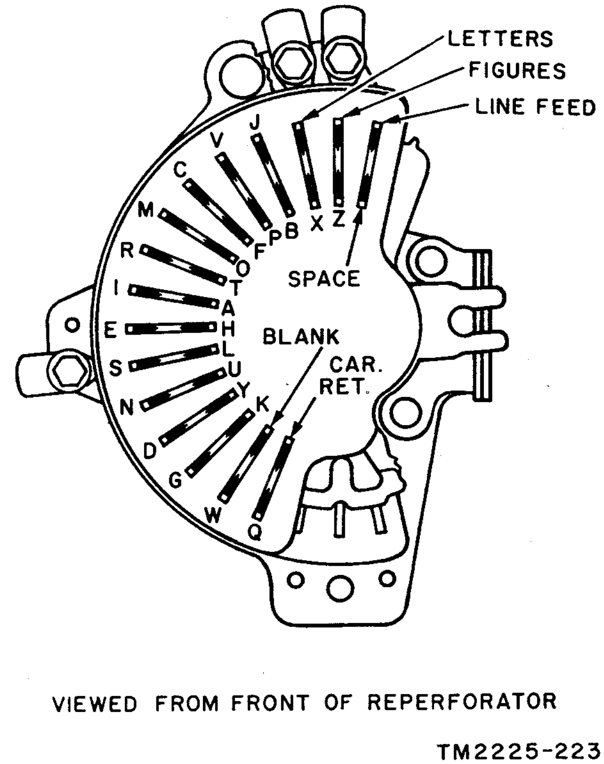


Figure 179. Characters and functions selected by stop bars.

vides the power to operate the printing and punching mechanism, to restore the transfer lever, and to perform the various reperforator functions.

a. As the transfer lever (fig. 176) is unlatched and turns slightly clockwise, the clutch latch arm at the end of the transfer lever shaft moves out of the path of the arm on the sliding clutch drum. The sliding clutch spring closes the clutch and the function shaft begins its one-half revolution. When the function shaft nears the end of its cycle, the transfer lever cam on the function shaft strikes the transfer lever roller stud and cams the transfer lever counterclockwise beyond its latched position, permitting it to be latched by the transfer lever trip latch. As the transfer lever shaft rotates slightly, it moves the clutch latch arm back into the path of the arm of the sliding drum clutch and the clutch members are cammed out of engagement to stop the rotation of the function shaft.

b. To prevent the code rings from shifting after the code group has been set up in them, a code-ring locking mechanism is provided to hold the code rings in place through almost one-half revolution of the function shaft. This is accomplished by a code-ring locking bail (fig. 180) which is operated by cam studs on the type wheel and function lever cam of the function shaft friction clutch through the code-ring locking bail cam follower. While code impulses are being stored in the selector mechanism the function shaft is motionless and one cam stud is positioned under the code-ring locking bail cam follower, holding the code-ring locking bail out of engagement with the code rings. When the function shaft starts to rotate, the cam stud moves counterclockwise out of the path of the code-ring locking bail cam follower. The code-ring locking bail cam follower and the code-ring locking bail are mounted on the same shaft and the code-ring locking bail pivots with the code-ring locking bail cam follower to engage the code rings, locking them in place. When the function shaft nears the end of its one-half revolution the opposite cam stud moves the code-ring locking bail cam follower upward, moving with it the code-ring locking bail to release the code rings.

c. Just prior to the transfer operation which starts the rotation of the function shaft, the sliding drum clutch is held out of engagement with the mating clutch gear by the clutch latch arm. The clutch gear is rotating, driven by a gear on the main shaft. The transfer lever (fig. 177) is held in the latched position by the transfer lever trip latch. The code-ring locking bail (fig. 180) is held out of engagement with the code rings. The following sequence chart summarizes the operations that occur when the transfer lever is released by the transfer lever trip latch.

Function Shaft Sequence Chart

1.	Transfer lever trip latch releases transfer lever (fig. 176).
2.	Transfer lever, transfer shaft, and clutch latch arm turn.
3.	Sliding drum clutch stop arm released by clutch latch arm.
4.	Sliding drum clutch engages.
5.	Function shaft starts rotating.
	Note. The action described in the printing operation sequence chart, begins at this point in the sequence of operations.
6.	Code-ring locking bail cam follower moves off the cam stud pivoting code-ring locking bail to lock code rings (fig. 180).
7.	Transfer lever restoring cam lifts transfer lever (fig. 177).
8.	**T**-levers move clear of **Y**-levers, and clutch latch arm returns to latching position.
9.	Transfer lever latches.
	Note. The action described in the printing operation sequence chart ends at this point.
10.	Cam stud strikes code-ring locking bail cam follower pivoting code-ring locking bail to release code rings (fig. 180).
11.	Near the end of one-half revolution of the function shaft, sliding drum clutch stop arm meets clutch latch arm ball bearing.
12.	Sliding drum clutch (fig. 176) disengaged by clutch latch arm.
13.	Clutch latch arm holds sliding drum clutch stop arm.
14.	Function shaft stops at completion of one-half revolution.

188. Stop Arm Shaft Operation

Driven by the function shaft through a friction clutch and gear arrangement, the stop arm shaft (fig. 181) turns the stop arm shaft driven gear and type wheel driven gear. The stop arm and type wheel are aligned so that the desired character will appear on the type wheel in the printing position when the selected stop bar stops rotation of the stop

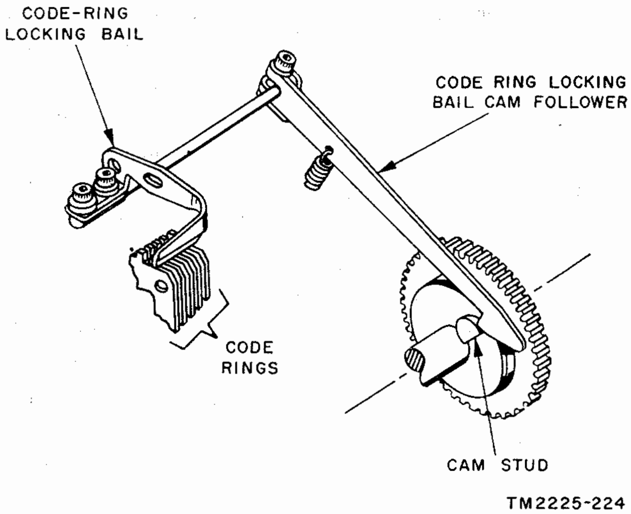


Figure 180. Code ring locking mechanism.

arm. Therefore, the position of the code rings and stop bars determines the character or symbol to be printed and punched. Since the stop arm shaft must be positioned accurately, any tendency of the shaft to travel in a reverse direction must be prevented. An antibounce clutch (fig. 182), mounted on the stop arm shaft between the code ring cage and the selector stop arm, serves this purpose. The central portion of the clutch is fastened to the stop arm shaft. The outer part of the clutch is locked in place by a stud on the code-ring cage. Four rollers in the clutch are spring-loaded in notches cut into the center portion of the clutch at an angle that permits only clockwise rotation of the stop arm shaft. The rollers roll along the inside surface of the cylindrical housing. Any attempt to make the shaft rotate counterclockwise immediately causes the rollers to jam between the housing and the moving part of the clutch. Therefore, travel in a reverse direction is prevented.

189. Printing Operation

The printing operation in reperforators is accomplished by the mechanism shown in figure 181. Portions of the selector and transfer mechanisms are included in this illustration to show the relationship between all mechanisms concerned.

a. Selecting Character or Symbol. A round type wheel contains the raised letters of the alphabet,

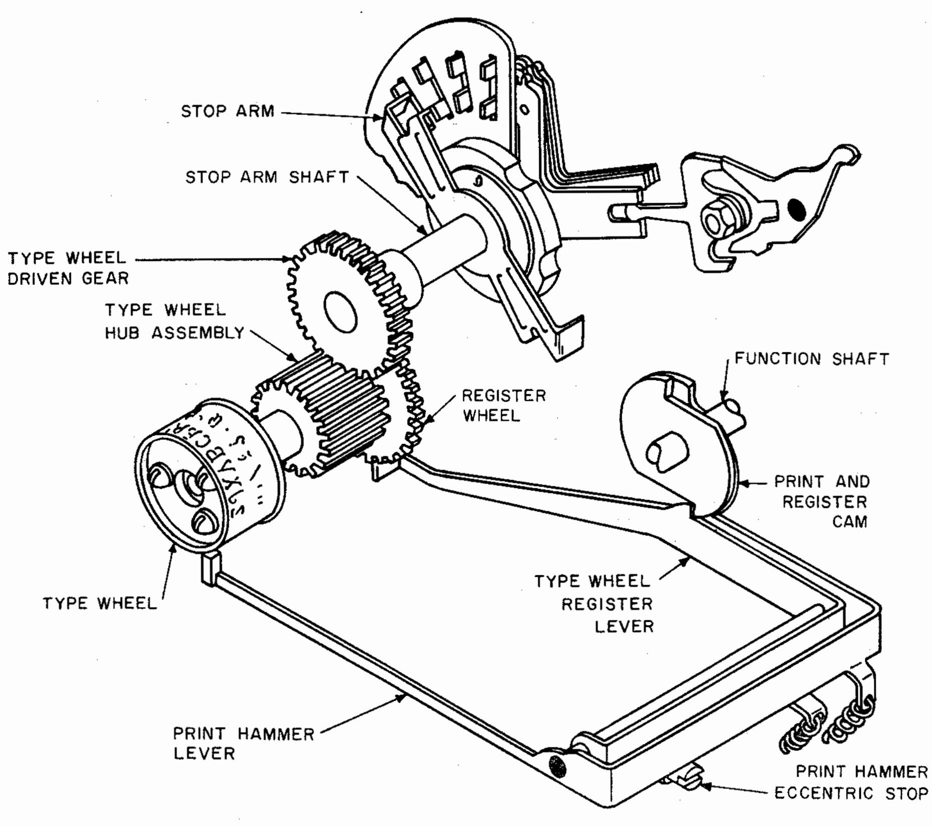


Figure 181. Selecting and printing, functional diagram.

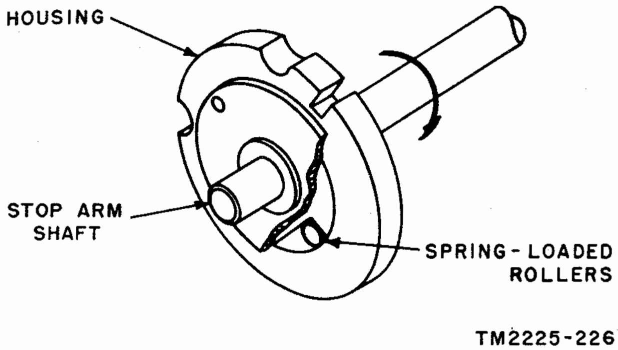


Figure 182. Antibounce clutch for stop arm shaft.

symbols, and figures that may be printed by this reperforator. The type wheel is driven by the type wheel hub driven gear on the stop arm shaft. Rotation of the stop arm shaft rotates the type wheel. After a received code group has positioned the code rings, the stop arm rotates until it is stopped by the selected stop bar of the code-ring cage. The type wheel, geared to the stop arm shaft, also rotates and when stopped, the letter on the type wheel corresponding to the stop arm position will appear directly above the print hammer lever. The stop arm can stop the type wheel in any of 32 positions, as the unit includes 32 stop bars, each in a different position in the code-ring cage. Of the 32 possible type wheel positions, 26 are used for letters of the alphabet, 3 are for symbols, and 3 are blank and do not print. When the type wheel moves to the figures-shift position, the type wheel positions are used for printing numerals, punctuation marks, and communication symbols (fig. 151). Rotation of the stop arm, therefore, controls rotation of the type wheel which, in turn, brings the desired character to the printing position directly above the print hammer lever. The function shaft and the stop arm shaft begin rotating at the same time. Because of the gear ratio between the two shafts, rotation of the stop arm to the selected stop bar is always completed well in advance of the printing or punching action. This applies in all cases except when a selection is repeated. The stop arm, in this case, remains in the previously chosen position without any stop arm shaft motion. Operated by another mechanism, the print hammer lever moves upward sharply at the proper instant striking the paper tape and inking ribbon against the character on the type wheel.

b. Printing Character or Symbol. The printing operation follows the positioning of the stop arm and is controlled by rotation of the print and register cam on the function shaft (fig. 181). The type wheel register lever, riding against the print and register cam on the function shaft, is pulled sharply upward by spring action when a high part of the cam passes the contacting surfaces of the type wheel register lever. The blade at the left end of the register lever engages a notch of the register wheel, locking the type wheel in the desired character position. At the same time, the print hammer eccentric stop attached to the register lever moves downward, no longer blocking rotation of the print hammer lever. As a high portion of the print cam rotates past the contacting surfaces of the print hammer lever, the print hammer lever is pivoted sharply upward by a spring. The print hammer lever strikes the paper tape pressing the inking ribbon against the desired character on the locked type wheel. After the character has been printed, the print and register cam moves the type wheel register lever downward, disengaging the register wheel and the type wheel is free to rotate for printing the next character. Printing does not occur when the letters-shift, figures-shift, or space code group is received. The stop bars for these operations halt rotation of the stop arm at a point where the highest portion of the register wheel is stopped directly above the register lever blade. When the print and register cam permits the type wheel register lever to begin moving upward, it strikes against the portion of the register wheel that has no teeth cut into it. This prevents the register lever from moving fully to the upward position, and the print hammer eccentric stop continues to block rotation of the print hammer lever. With the print hammer eccentric stop in this position, the print hammer lever cannot follow the print cam surface and printing is prevented. The printing operation is summarized in the chart below.

c. Printing Operation Sequence Chart. Just prior to the printing operation, the incoming code group has been set up in the selector Y-levers and in the code rings, the print hammer lever (fig. 181) is in its released position, the type wheel register lever is cammed away from the register wheel by the print and register cam, and the function shaft has just begun its one-half revolution. The following sequence chart summarizes the operations that occur when the printing mechanism operates.

1.	Printing operation sequence started by transfer operation; function shaft starts to rotate.
2.	Stop arm is released by the previously selected stop bar. Function shaft friction clutch operates, permitting the friction shaft drive gear to rotate the stop arm shaft.
3.	Type wheel driven gear on the stop arm shaft rotates type wheel hub assembly and type wheel.
4.	Type wheel reciprocating drive lever begins to push type wheel reciprocating transfer lever toward figures-letters shift lever (par. 194).
5.	Stop arm stopped by selected stop bar. Type wheel stopped in corresponding position. Function shaft friction clutch is overcome, stopping the driving gear and stop arm shaft.
6.	Type wheel moves forward, carrying the inking ribbon with it. Forward movement of the type wheel is halted by figures-letters shift lever and held under spring tension.
7.	Register cam releases type wheel register lever. Spring tension moves type wheel register lever into engagement if a character is to be printed.
8.	Print cam releases print hammer lever which allows spring to drive print hammer lever toward type wheel. Momentum of print hammer lever causes hammer to snap momentarily against bottom of message tape, driving the tape and inking ribbon against character on type wheel, printing the character on the message tape.
9.	Type wheel register lever is withdrawn from the register wheel by register cam.
10.	Print hammer lever is moved away from the type wheel by print cam.
11.	Low portion on type wheel reciprocating cam allows spring to move type wheel to normal rear position.
12.	Function shaft clutch is disengaged. Function shaft stops.

190. Tape Punching and Feeding Operations

In addition to printing messages on a paper tape, as described in paragraph 189 the reperforator records the code impulses of each received code group in the form of punched code holes in the message tape. The printing appears along one edge of the message tape, and the code impulses are recorded as holes across the message tape. This perforated portion of a message tape is subdivided into six columns; five for the code impulse holes and one for the tape feed hole. The first column along the edge opposite the printing is reserved for recording the first code impulse. When it is a marking impulse, a code hole is punched in this column, and when it is a spacing impulse, a hole is not punched. The second column is used to record the second code impulse in a like manner. The third column consists of a continuous row of smaller holes that are used for feeding the message tape through the reperforator. The remaining three columns are used for the third, fourth, and fifth code impulses. Start and stop impulses are not recorded in perforated form because the transmitter-distributor mechanism automatically provides these impulses. Operation of the mechanism that perforates the code and feed holes and feeds the tape is described in subparagraphs *a* through *c* below.

a. Code Hole Punching Selection. This operation begins when the code impulses of a received code group are stored in the code rings as described in paragraph 186. The lower end of each of the five code rings mates with one of five punch interference levers (fig. 183). These punch interference levers transfer the code ring settings to the punching mechanism.

(1) When a code ring is positioned counterclockwise to record a spacing impulse, the mating punch interference lever is rotated clockwise. The lower arm moves away from the raised portion of its corresponding code hole punch lever and a hole will not be punched when the punching operation occurs.

(2) When a code ring is positioned clockwise to record a marking impulse, the mating punch interference lever rotates counter-

clockwise. This causes the lower arm of the punch interference lever to move in the blocking position directly above the raised portion of its code hole punch lever. When the punching operation occurs, a hole will be punched in the message tape to record this code impulse.

(3) The five code punch bars and the feed punch are mounted in the code die support and are held in place by a comb (fig. 184). Each of the code punch bars is engaged by an associated code hole punch lever. The feed punch bar is smaller in diameter than the code punch bars. The feed punch lever is slightly different from the code hole punch levers. It does not have a raised portion like the code hole punch levers, but is hooked around the shaft on the punch arm assembly. This arrangement causes it to raise the feed punch bar during the punching operation and perforate a feed hole in the message tape for each code group received.

b. Punching Operation. This operation occurs after the transfer operation positions the punch interference levers in accordance with the received code impulses. One-half revolution of the print and register cam, mounted on the function shaft (fig. 184), provides the power required for the punching operation. The cam starts one-half revolution when the transfer operation occurs. As this cam revolves, it moves the roller end of the punch arm assembly downward and causes the opposite end containing the five code hole punch levers to move upward toward the code punch bars. The code hole punch levers that are blocked by the lower arm of the mating punch interference levers push their respective punch bars upward through the paper tape to record marking code impulses. The code hole punch levers that are not blocked by the lower arm of the punch interference levers pivot counterclockwise slightly on their pivot stud and do not perforate the paper tape to record spacing code impulses.

c. Tape Feeding Operation. Tape feeding in this reperforator is accomplished by a slight rotation of the tape feed sprocket (fig. 185), as it feeds the tape one space for each code group received. The pins in the tape feed sprocket engage the feed holes in the message tape and force the message tape to move when the tape feed sprocket turns. Tape feeding occurs immediately before the message tape is punched.

(1) The initial motion for tape feeding is provided by the punch arm assembly when it begins the punching operation. As the code hole punch lever end of the punch arm assembly moves upward, the feed pawl assembly engages and rotates the ratchet wheel, feeding the tape. The feed pawl assembly must not be permitted to continue turning the ratchet wheel during the punching operation, or the tape will be damaged. To prevent this the machine screw on the code die support is adjusted to cause the feed pawl assembly to rotate free of the ratchet wheel immediately before the tape is punched.

(2) At all times, except during tape feeding, the tape feed sprocket is held motionless by the detent wheel, the detent lever, and a spring. The detent wheel is attached firmly to the shaft that contains the feed sprocket and ratchet wheel. The spring causes the detent lever to exert a constant pressure against the detent wheel. This pressure also is used to complete tape feeding. As the feed pawl assembly pushes and immediately releases the ratchet wheel, the pressure of the detent lever against the detent wheel completes the feeding operation.

d. Tape Puller. The TT–76A/GGC is provided with a tape puller mechanism which operates in conjunction with the tape feed mechanism. The tape puller mechanism pulls the paper tape from the tape reel, providing slack in the paper tape between the tape feed mechanism and the tape reel. This relieves the tape feed mechanism of the strain of unwinding the paper tape from the tape reel. It consists of a tape puller arm (fig. 186) that is driven by the print and register cam, a tape puller spring that pivots with the arm to hold one end of the paper tape against the tape puller studs while the tape puller arm pulls it from the tape reel, and a tape puller bracket for mounting the mechanism.

e. Summary. The following chart summarizes the sequence of operations that occurs during the tape punching and feeding operation:

1.	Sequence starts with transfer operation; function shaft starts to revolve (fig. 183).
2.	Punch interference levers, actuated by code rings, are positioned in accordance with received code impulses. For spacing impulses, lower arm of punch interference lever moves to space position and swings clear of raised portion of mating code hole punch levers. For marking impulses, lower arm of punch interference lever moves to blocking position above raised portion of mating code hole punch levers.
3.	Punch arm assembly begins to pivot, operated by print and register cam (fig. 184).
4.	Feed pawl assembly engages ratchet wheel on tape feed sprocket shaft (fig. 185).
5.	Paper tape is moved forward one character space. Detent lever and detent wheel hold paper tape stationary.
6.	Tape puller arm and spring pivoted clockwise by print and register cam. Spring holds paper tape to tape puller stud as tape puller arm depresses paper tape, unreeling it (fig. 186).
7.	Continued rotation of punch arm assembly forces code hole punch levers that are blocked by punch interference levers to drive code punch bars through paper tape. Other code punch bars remain in lower position. Feed punch lever drives feed punch through tape on every upward movement of punch arm assembly (fig. 183).
8.	Print and register cam returns punch arm assembly to original position, withdrawing punches from paper tape.
9.	Tape puller arm and spring pivoted counterclockwise, releasing tape (fig. 186).
10.	Feed pawl assembly is positioned for the next feeding operation (fig. 185).
11.	Function shaft clutch is disengaged. Function shaft stops.

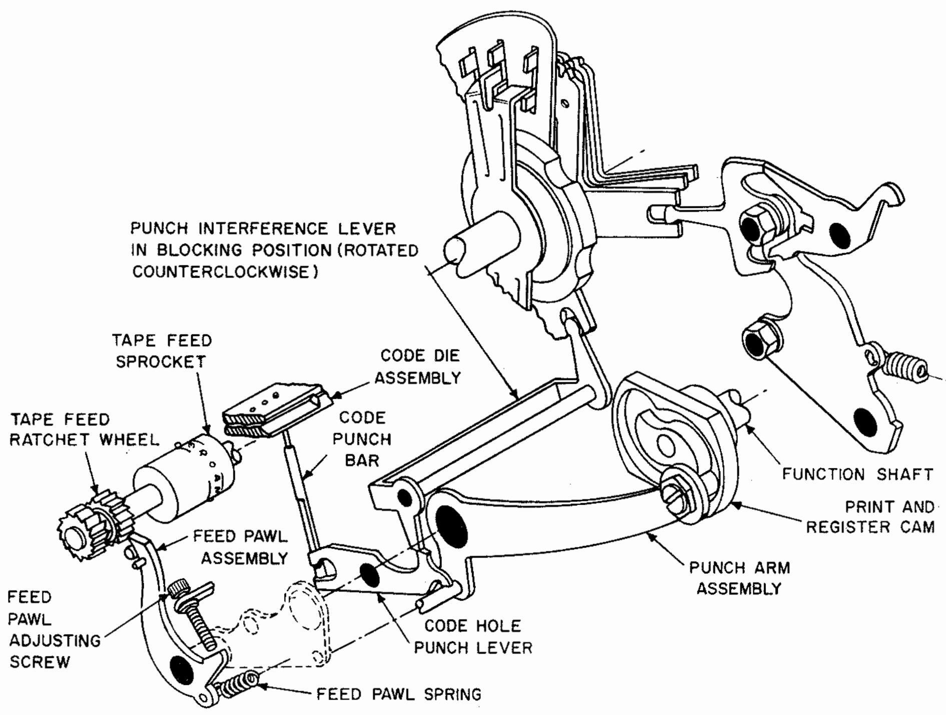


Figure 183. Functional diagram, selecting and punching mechanisms.

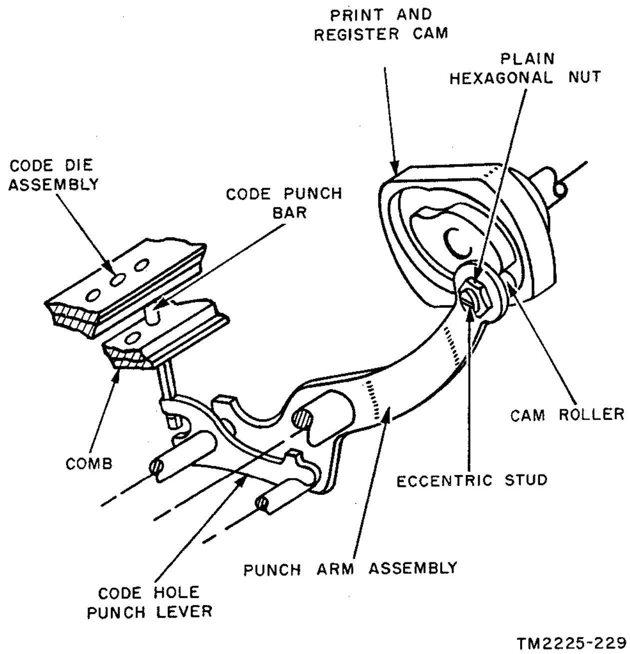


Figure 184. Basic punching mechanism.

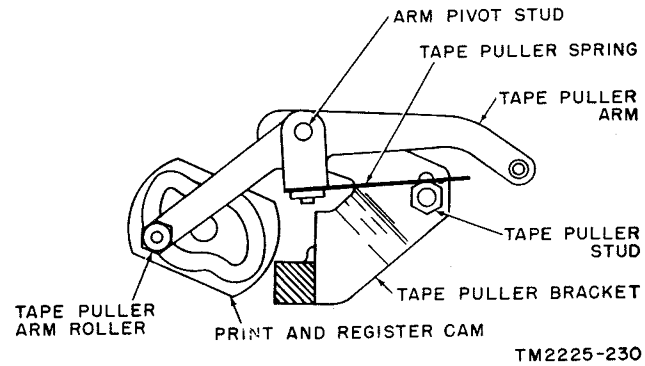


Figure 186. Tape puller mechanism (TT–76A/GGC).

191. Manual Tape Feed-Out Operation

A manually operated mechanism is included in the reperforator to permit feeding tape out of the unit while messages are not being received. To accomplish this, the operator merely operates the manual type feed-out lever (fig. 187) and releases it when sufficient tape has been fed. Operation of the manual tape feed-out lever positions the selector Y-levers for the blank code group (fig. 151) and trips the transfer lever. The printing mechanism prints the blank signal, and the tape feed mechanism feeds the tape. If a code group is received while the manual tape feed-out lever is operated, the motion of the selector camshaft disables the manual tape feed-out mechanism and the incoming message is recorded. Detailed operation of the manual tape feed-out mechanism (fig. 187) is described in *a* and

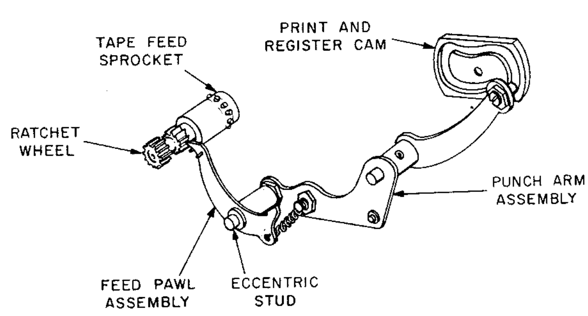


Figure 185. Basic tape feed mechanism.

b below. Manual tape feed-out is a local mechanical operation and has no effect on the signal line.

a. Tape Feed-Out Operation. Operation of the manual tape feed-out lever to the left turns the feed-out control lever counterclockwise. This action raises the manual tape feed-out link which, in moving upward, raises one end of the feed-out latching lever (fig. 187). The feed-out latching lever, in moving upward, moves against an eccentric stud that acts as a pivot point and causes the lever to pivot slightly. As it pivots, the end moving downward moves the feed-out operating arm downward against the trip latch lever. The trip latch lever rotates the transfer lever trip latch away from the transfer lever and permits the transfer lever spring to operate the transfer lever. An eccentric spindle, attached to the feed-out operating arm, extends over the upper arm of the selector Y-levers. As the feed-out operating arm moves downward, the eccentric spindle pushes downward on the Y-levers and rotates all five to the spacing position (blank code group position). With the release of the transfer lever, the transfer operation (par. 186) transfers the blank code group setting of the selector Y-levers to the code rings and punch interference levers. The transfer operation also causes printing of the blank symbol and feeding of the tape. The entire operation is repeated continuously as long as the operator holds the manual tape feed-out lever in the operated position, unless an incoming code group disables the mechanism.

b. Effects of Received Code Group. If a code group is received during operation of the manual tape feed-out mechanism, the feed-out mechanism is disabled immediately by the following actions: Receipt of the start impulse causes the selector camshaft to begin rotating as in normal operation. The manual tape feed-out cam, mounted on the selector camshaft (fig. 156), trips the feed-out disabling latch, that was held in the latched position by the latch spring. When the feed-out disabling latch is tripped, the feed-out operating arm is released and the operating arm spring pulls the feed-out operating arm upward. The eccentric stud on the feed-out operating arm moves upward and releases the selector Y-levers. When the feed-out operating arm is in the upper position, the transfer lever trip latch engages the transfer lever again, and operation of the reperforator is controlled by the incoming code groups only. When this occurs, the operator releases the manual tape feed-out lever. The spring of the feed-out latching lever causes the feed-out disabling latch to latch the feed-out operating arm again; this resets the entire mechanism in the normal unoperated position.

192. Ribbon Feed and Ribbon Reverse Operations

The ribbon mechanism includes two ribbon spools and sufficient inking ribbon to fill only one spool. As the reperforator operates, the inking ribbon is unwound automatically from one spool and wound on the other. When the ribbon is almost entirely wound on one spool, the ribbon mechanism automatically reverses the direction of ribbon feed and begins to wind the inking ribbon onto the empty spool. The mechanisms that accomplish the feeding and reversing actions are described in *a* and *b* below.

a. Ribbon Feeding Operation. Power to operate the ribbon feed and ribbon reverse mechanism is supplied by the ribbon feed cam on the function shaft (fig. 156). As the function shaft rotates during reception of code groups, it causes the ribbon

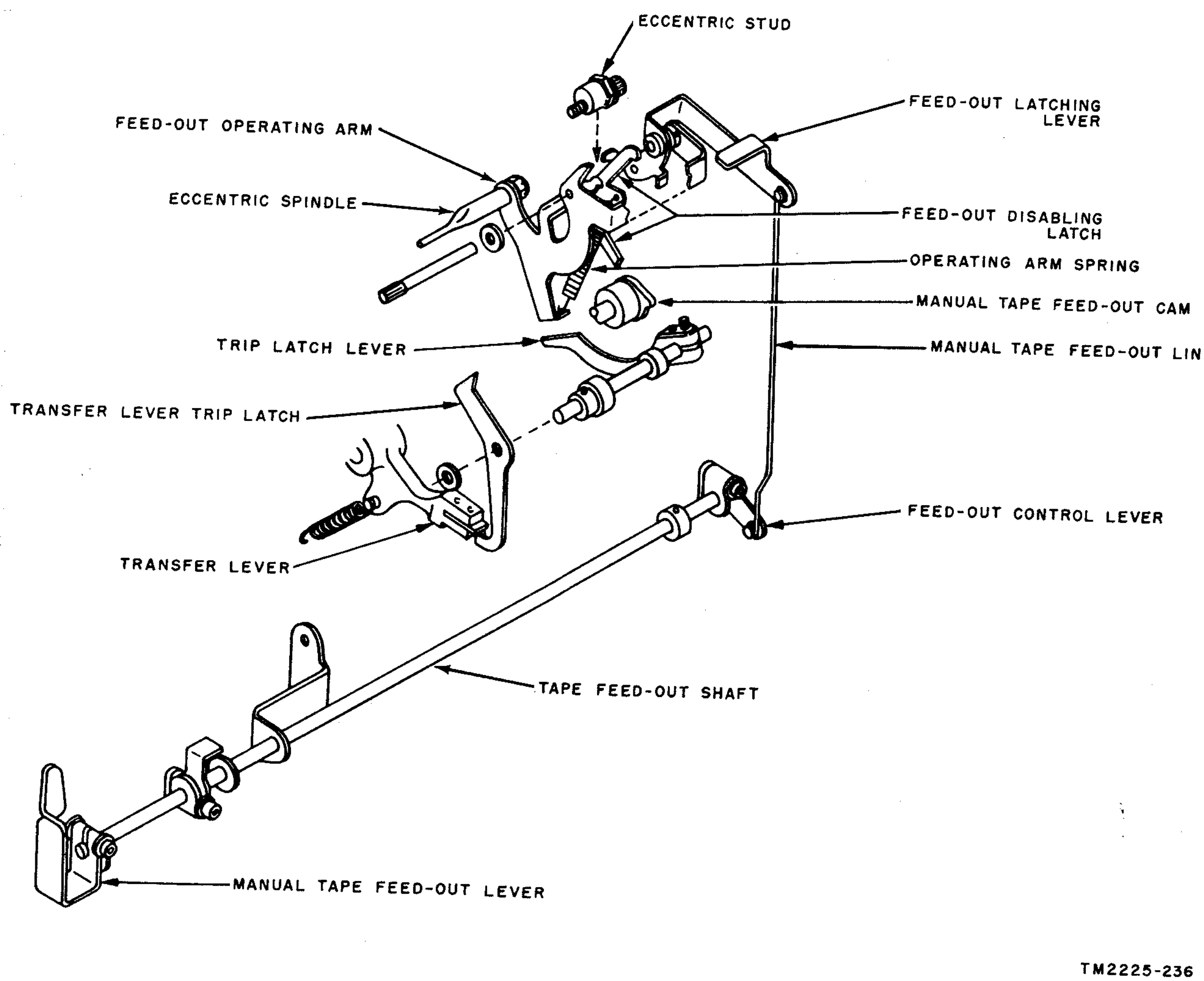


Figure 187. Manual tape feed-out mechanism.

feed cam follower (fig. 188) to pivot about the eccentric stud and swing to the left and right. The cam has one high and one low portion as compared to two for most cams in this unit. Reception of every other code group causes the ribbon feed mechanism to fed the inking ribbon. The feed mechanism includes a left hand and right hand ribbon feed lever, a left hand and right hand ribbon feeding detent wheel, and a left hand and right hand sensing lever, one of each for each ribbon spool. The two ribbon feed levers are mounted on a U-shaped driving link lever that is coupled to the ribbon feed cam follower. As the ribbon feed cam follower pivots to the left, it moves the driving link lever upward. One ribbon feed lever engages its ribbon feeding detent wheel and rotates the ribbon spool shaft enough to feed the inking ribbon one character space. On the downward stroke of the ribbon feed cam follower, the ribbon feed lever also is moved downward in preparation for the next feed stroke. The other ribbon feed lever moves up and down also but is held away from its mating ribbon feeding detent wheel. A ratchet feed detent and spring prevents the driven ribbon feeding detent wheel from rotating freely.

b. Ribbon Feed Sequence. Assume that the function shaft (fig. 156) is in that portion of its cycle so that the ribbon feed cam follower (fig. 188) driven by the function shaft is moved to the right just prior to the start of the ribbon feed operation, the driving link lever and the ribbon feed levers are in their down position. The driving ribbon feed lever is positioned to engage its ribbon feeding detent wheel. The driven ribbon feeding detent wheel is engaged by its detent to prevent reverse rotation of the detent wheel. The ribbon feed lever and the ratchet feed detent associated with the idling ribbon feeding detent wheel are held out of engagement with the detent wheel by the ribbon reversing arm to prevent any engagement with the ribbon feeding detent wheel. The following chart summarizes the sequence of operations of the ribbon feed mechanism as the function shaft starts to rotate.

Ribbon Feed Sequence Chart

1.	Function shaft starts to rotate.
2.	Print and register cam moves the ribbon feed cam follower to the left, moving the driving link lever and ribbon feed lever upward.
3.	Ribbon feed lever engages one of the ribbon feeding detent wheels which drives one of the ribbon spools.
4.	Inking ribbon moves one space, unwinding the inking ribbon from the opposite ribbon spool.
5.	Ratchet feed detent engages the driven ribbon feeding detent wheel to prevent reverse movement of the ribbon feeding detent wheel and ribbon spool.
6.	Function shaft stops until it is again actuated by a received code group.
7.	Function shaft starts to rotate.
8.	Print and register cam moves ribbon feed cam follower to the right, moving the driving link lever and ribbon feed lever.
9.	Ribbon feed lever disengages ribbon feeding detent wheel.
10.	Print and register cam moves ribbon feed cam follower to the extreme right position.
11.	Function shaft stops, having completed one full revolution.

c. Ribbon Reversing Mechanism. The ribbon feed mechanism automatically reverses the direction of feed when the last turn of the ribbon is unwrapped from one of the ribbon spools (fig. 188). As the ribbon spool empties, an opening in the hub of the spool is uncovered and the portion of the sensing lever that is inside the spool moves into the opening under spring tension. This movement pivots the top end of the sensing lever forward into the vertical path of the reversing toggle assembly. On the next downward movement of the cam follower arm the toggle assembly is tripped. This moves the ribbon feed lever and the ratchet feed detent out of engagement with the ribbon feeding detent wheel of the full ribbon spool, and moves the other ribbon feed lever and ratchet feed detent into engagement with the ribbon feeding detent wheel of the empty ribbon spool. As the reperforator continues to operate, the ribbon feed lever engages the ribbon feeding detent wheel associated with the empty ribbon spool and rotates the ribbon spool to wind the inking ribbon onto it. The ribbon reversing action occurs automatically on each side as each ribbon spool, in turn, becomes empty.

193. Stop Bar Selection of Functions

In addition to recording messages in printed and punched form on tape, the reperforator is capable of performing three mechanical operations called functions—the letters-shift function; the figures-shift function; and the signal bell function.

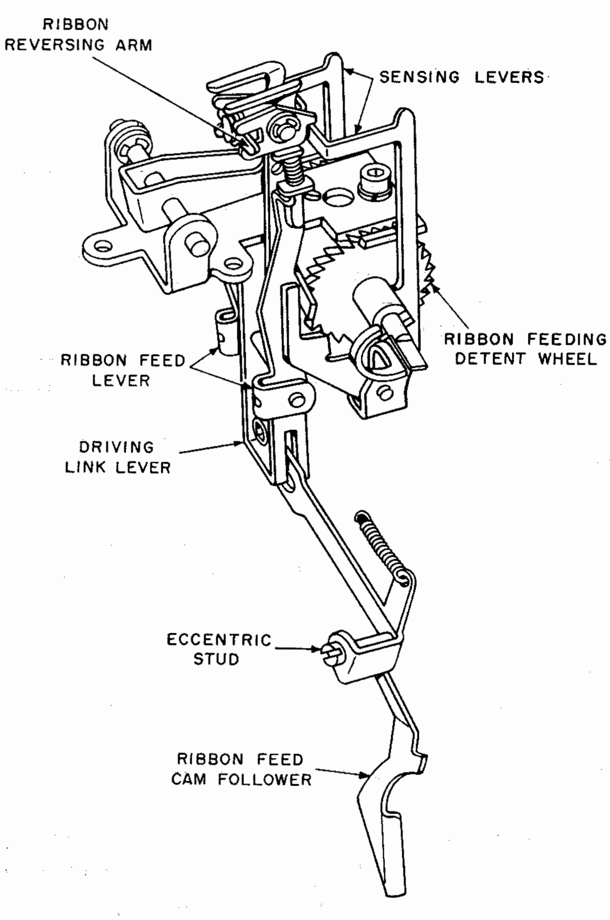


Figure 188. Ribbon feed and reversing mechanism.

a. General. A stop bar for each function is located in the code-ring cage (fig. 179). The signal bell function shares the same stop bar used for selecting the letter "S." The stop bars for these functions are longer than other stop bars, the additional length extending beyond the other bars at the rear of the code-ring cage. Three sensing levers, one for each function, are mounted on the stop arm shaft directly behind the code-ring cage. Springs apply tension to the sensing levers and pull each toward its respective stop bar. Operation of the type wheel and function lever cam and cam lever assembly holds the sensing levers away from the stop bars while an incoming code group is being set up in the code-ring cage. After the transfer operation, the type wheel and function lever cam and cam lever assembly permit the sensing levers to be pulled toward their stop bars. Each of the function stop bars, when not selected, blocks the path of its respective sensing lever.

b. Operation. The function sensing operation begins after the transfer operation positions the code rings. As the type wheel and function lever cam on the function shaft begins to rotate, a low portion of the cam permits the cam lever assembly (fig. 189) to move toward the function shaft allowing the springs to pull each sensing lever toward its stop bar.

(1) If the code rings have not selected one of the function stop bars, the sensing levers rotate until each sensing lever strikes its stop bar. The sensing levers remain in this blocked position until they are restored by the cam lever assembly and type wheel and function lever cam.

(2) If the code rings select one of the function stop bars, the three sensing levers move toward their stop bars until the two not selected are halted by their stop bars. The selected stop bar is not in position to block the sensing lever of the desired function, and the sensing lever rotates past the stop bar causing operation of the associated function mechanism. When a function stop bar is in the selected position, the front end moves into the notch formed by the code rings and raises the rear extension of the stop bar out of the path of its sensing lever.

194. Letters Shift and Figures Shift Operations

The type wheel of the reperforator is moved to the forward position directly above the message tape

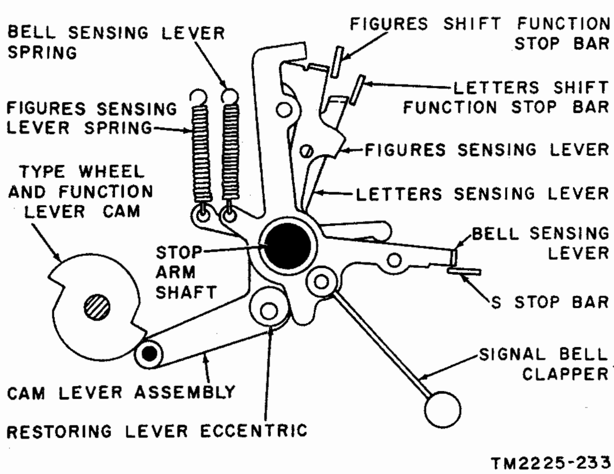


Figure 189. Function sensing levers in normal (blocked) position.

for printing, and is moved backward after printing to expose the character to view. This forward and backward movement of the type wheel is called type wheel reciprocation. It works in conjunction with the figures shift and letters shift mechanisms that control the length of the type wheel reciprocating stroke.

a. Power to move the type wheel is supplied by the type wheel and function lever cam (B, fig. 191) on the function shaft, which begins to rotate after the transfer operation. As the type wheel and function lever cam rotates, its high portion pushes one arm of the type wheel reciprocating cam follower downward. This moves the opposite arm, that is coupled to the type wheel reciprocating spring lever upward, rotating the type wheel reciprocating spring lever clockwise when viewing it from the rear. When the type wheel reciprocating spring rotates, it pivots the type wheel reciprocating transfer lever assembly (A, fig. 191) rotating the bell crank levers. This projects the type wheel forward above the paper tape just before the printing operation occurs. The inking ribbon, attached to the type wheel assembly, reciprocates forward with the type wheel. As the type wheel and function lever cam continues to rotate after printing, the low portion of the cam permits the spring to return the cam lever assembly to its original position. The type wheel, moved by spring tension, returns to its normal position behind the printed portion of the paper tape, permitting the operator to read the last printed character.

b. Just prior to the operation of the type wheel reciprocating mechanism, the type wheel (fig. 190) is in the rearward position withdrawn from the printing so that the last character printed is visible to the operator. The type wheel reciprocating transfer lever assembly is pivoted clockwise. The type wheel reciprocating cam follower is also pivoted clockwise and its roller is in the low portion of its associated cam. The following chart summarizes the sequence of operations that occurs when the function shaft starts to rotate and the type wheel reciprocating mechanism operates.

Type Wheel Reciprocating Operation Sequence Chart

1.	Function shaft starts to rotate.
2.	Type wheel and function lever cam on the function shaft moves against the type wheel reciprocating cam follower, pivoting the type wheel reciprocating cam follower counterclockwise. (fig. 190).
3.	Type wheel reciprocating cam follower pivots type wheel reciprocating spring lever clockwise, moving the lever against the type wheel reciprocating transfer lever assembly.
4.	Type wheel reciprocating transfer lever assembly pivots counterclockwise on its stud, pivoting the type wheel upper bell crank lever in a clockwise direction.
5.	Clockwise rotation of the type wheel upper bell crank lever is transferred to the type wheel lower bell crank lever that moves the type wheel outward.
6.	Driven end of the type wheel reciprocating transfer lever strikes the figures-letters shift lever that limits the type wheel reciprocating transfer lever travel. (Travel distance varies depending upon whether the figures-letters shift lever is in the letters or figures position).
7.	Type wheel reciprocating spring lever continues its clockwise motion, extending its spring.
8.	Type wheel reciprocating cam follower reaches high point of the type wheel and function lever cam.

9.	Print hammer lever strikes paper tape (par. 189) printing aligned character.
10.	Type wheel reciprocating cam follower moves to low point of type wheel and function lever cam under tension of the shift cam follower spring, pivoting the type wheel reciprocating cam follower clockwise, to the restored position.
11.	Type wheel reciprocating cam follower pivots the type wheel reciprocating spring lever counterclockwise, moving the lever out of engagement with the type wheel reciprocating transfer lever assembly.
12.	Type wheel bell crank lever spring on the type wheel lower bell crank lever pivots the bell crank assembly counterclockwise, moving the type wheel reciprocating transfer lever assembly and the type wheel to the restored position.

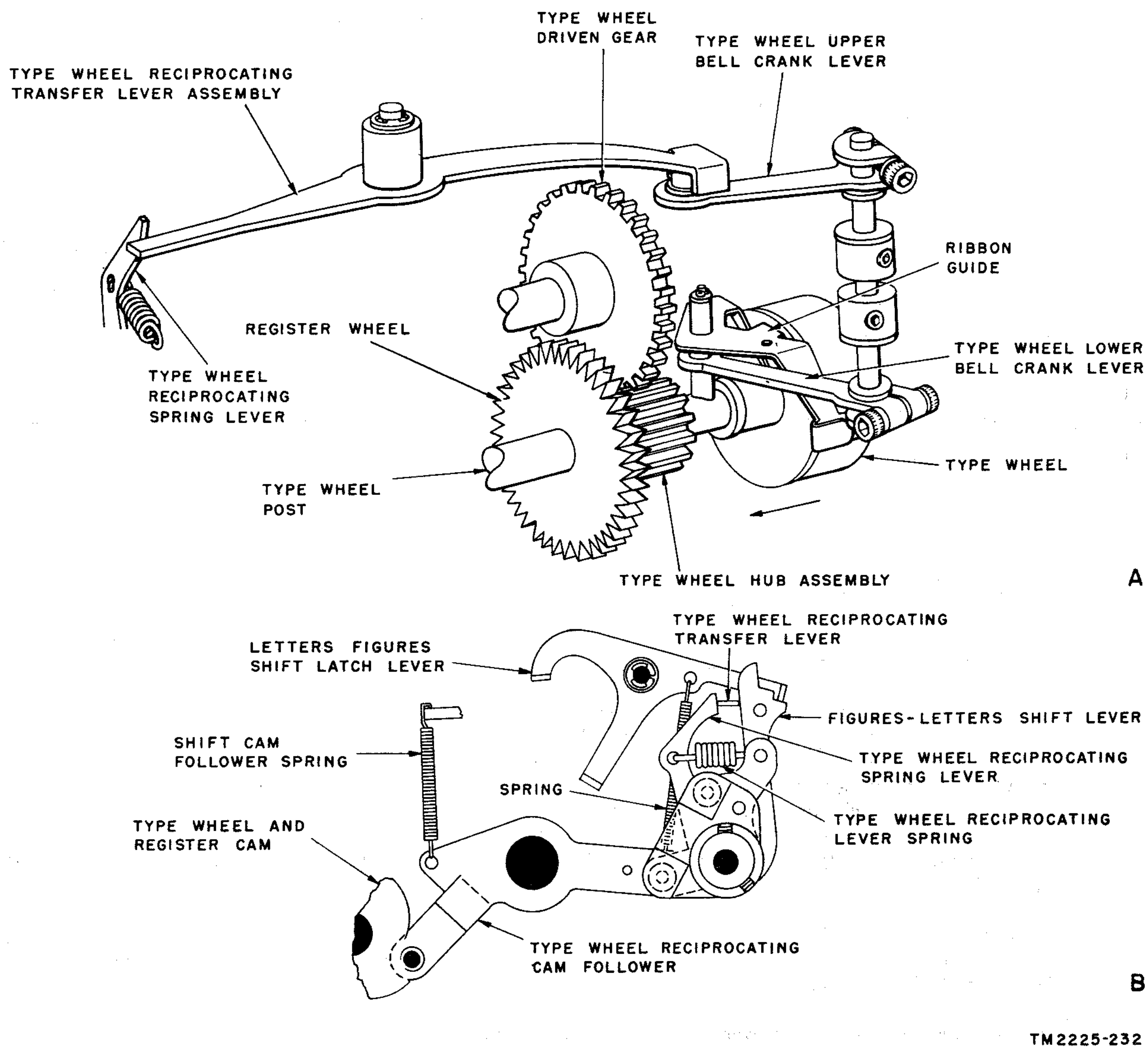


Figure 190. Type wheel reciprocating and shifting mechanism.

195. Letters Shift Operation

The characters and symbols printed by this reperforator are arranged in two raised parallel rows around the type wheel. The letters (outer) row contains the letters of the alphabet and three special symbols shown in the LTRS column (fig. 151). The figures (inner) row contains the numerals, punctuation marks, and symbols shown in the FIGS column. When the reperforator is in the letters shift position, the type wheel reciprocates forward just enough to align the letters row of characters above the print hammer lever. When the reperforator is in the figures shift position, the reciprocating stroke is longer and the figures row is aligned with the print hammer lever.

a. When a letters shift code group is received, the code rings are positioned to select the letters shift function stop bar (fig. 179). The letters sensing lever, (A, fig. 191) no longer blocked by the letters shift function stop bar is rotated by the letters sensing lever spring. The arm opposite the spring engages the figures-letters shift lever and rotates it counterclockwise to the letters shift position. This action permits a spring to pull the letters figures shift latch lever downward, thereby latching the figures-letters shift lever in the letters shift position. In this position, the figures-letters shift lever limits the forward motion of the type wheel (fig. 190) during reciprocation. The type wheel is moved forward during reciprocation as the type wheel reciprocating spring lever rotates the free end of the type wheel reciprocating transfer lever assembly. When the free end of the type wheel reciprocating transfer lever assembly strikes the figures-letters shift lever (A, fig. 191), forward motion of the type wheel is halted and the letters row of characters on the type wheel is positioned above the print hammer lever.

b. The letters shift operating sequence starts as the letters code group is set up in the code-ring cage by the transfer operation (fig. 177). Just prior to this the letters shift function stop bar (A, fig. 191) is in the path of the letters sensing lever. The letters figures shift latch lever holds the figures-letters shift lever clockwise in its figures position. The cam lever assembly is at the high point of its associated cam and holds the sening levers in their restored position. Following is a chart that summarizes the sequence of operations that occurs when the reperforator is shifted from figures shift to letters shift position.

Letters Shift Sequence Chart

1.	Letters code group received and set up by code rings in the code-ring cage.
2.	Letters shift function stop bar pivoted into aligned notches in code rings, moving rear end of the stop bars out of the path of the letters sensing lever.
3.	Function shaft starts to rotate, high part of type wheel and function lever cam moves out of the path of the cam lever assembly.
4.	Letters sensing lever spring pivots letters sensing lever clockwise into contact with lower extension of the figures-letters shift lever.
5.	Figures-letters shift lever pivots counterclockwise.
6.	Shift latch spring pulls letters figures shift latch lever to lower latch surface on the figures-letters shift lever, locking the lever in the letters shift position.
7.	Type wheel reciprocating transfer lever assembly strikes figures-letters shift lever, restricting its travel distance (*a* above)
8.	Type wheel and function lever cam on function shaft moves against the cam lever assembly, moving the cam lever assembly and the letters sensing lever to the restored position.
9.	Figures-letters shift lever remains latched in the letters position.
10.	Function shaft stops rotating.

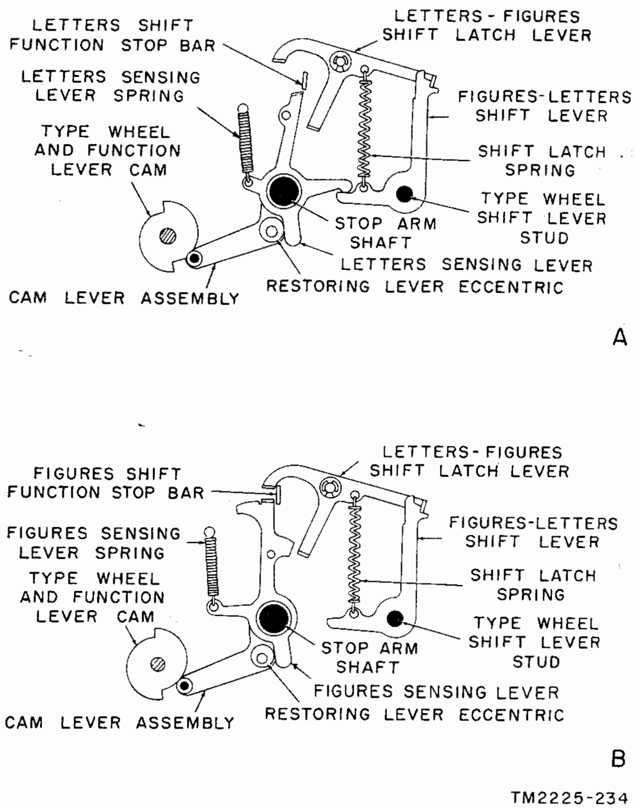


Figure 191. Figures and letters shift mechanism.

196. Figures Shift Operation

Operation of the figures shift mechanism permits a long forward stroke of the type wheel during reciprocation that permits the figures row on the type wheel to print.

a. Reception of the figures code group causes selection of the figures shift function stop bar in the code-ring cage (fig. 179). Since the figures sensing lever (B, fig. 191) is not stopped by its figures shift function stop bar, the figures sensing lever spring rotates the figures sensing lever, causing it to trip the letters-figures shift lever latch. When tripped, the letters-figures shift lever latch moves upward and releases the figures-letters shift lever, which is pulled to the figures shift position by its spring. In this position the figures-letters shift increases the distance the type wheel reciprocating transfer lever assembly (fig. 190) can travel during reciprocation, thereby increasing the forward motion of the type wheel. When the figures-letters shift lever is in the figures shift position, the forward motion of the type wheel is not halted until the figures (inner) row of the type wheel is directly over the print hammer lever. As the operation of the reperforator continues, the figures or symbols in this row are printed until a letters shift code group is received.

b. The figures shift operation sequence starts as the figures code group is set up in the code-ring cage by the transfer operation (fig. 177). Just prior to this the figures shift function stop bar is in the path of the figures sensing lever. The letters figures shift latch lever (B, fig. 191) holds the figures-letters shift lever counterclockwise in the figures position. The cam lever assembly is at the high point of its associated cam and holds the sensing levers in their restored position. Following is a chart that summarizes the sequence of operations that occurs when the reperforator is shifted from the letters shift to the figures shift position.

Figure Shift Sequence Chart

1.	Figures code group received and set up by code rings in the code-ring cage.
2.	Figures shift function stop bar pivoted into the aligned notches in the code rings, moving the rear end of the stop bar out of the path of the figures sensing lever.
3.	Function shaft starts to rotate, high part of type wheel and function lever cam moves out of the path of the cam lever assembly.
4.	Figures sensing lever spring pivots the sensing lever clockwise into contact with lower extension of the letters figures shift latch lever (B, fig. 191).
5.	Figures letters shift latch lever pivots counterclockwise, far enough to unlatch the figures-letters shift lever (fig. 191).
6.	Shift latch spring pivots the figures-letters shift lever clockwise until latched in the figures shift position by the letters figures shift latch lever.
7.	Type wheel reciprocating transfer lever strikes figures-letters shift lever latched in the figures position, restricting its travel distance (*a* above).

8.	Type wheel and function lever cam on function shaft moves against the cam lever assembly, moving the cam lever assembly and the figures sensing lever to the restored position.
9.	Figures-letters shift lever remains latched in the figures position.
10.	Function shaft stops rotating.

197. Signal Bell Operation

This reperforator includes a signal bell mechanism that is used by operators for signaling purposes. The signal bell rings each time the S code group is received while the shift mechanism is in the figures-shift position. The code group also is recorded in punched form on the tape, and the bell symbol (fig. 151) is printed. Reception of the same code group causes the letter "S" to be printed when the shift mechanism is in the letters shift position.

a. Operation. The signal bell mechanism (fig. 192) rings the bell whenever the bell sensing lever spring is permitted to rotate the bell sensing lever clockwise (as viewed from the rear) causing the signal bell clapper to strike the signal bell. The bell function stop bar (used for the letter "S" also) normally blocks rotation of the bell sensing lever when other code groups are received. Reception of the S code group causes the code rings to select the bell function stop bar. The stop bar then moves out of the path of the bell sensing lever and permits the bell sensing lever to rotate when the unit is in the figures shift position. The sensing lever when pivoted by the sensing lever spring strikes the signal bell clapper against the signal bell. The mechanism is reset when the cam lever assembly moves to the high point of its associated cam, restoring the function sensing levers to the original counterclockwise position.

b. Signal Bell Suppression in Letters-Shift. Although the same code group is used both for printing the letter "S" and ringing the signal bell, only one is accomplished when this code group is received. The upper extension of the bell sensing lever is blocked by the upper arm of the letters figures shift latch lever (fig. 192) when the code group is received while the unit is in the letters shift position. When this ocurs, the reperforator prints the letter "S" and punches the code in the paper tape. If the code group is received while the reperforator is in the figures shift position, the upper arm of the letters figures shift latch lever is positioned below the upper extension of the bell sensing lever and does not block rotation of the sensing lever. In this condition, the signal bell rings, the bell code is punched in the paper tape, and the type wheel reciprocates forward far enough to print the bell sysmbol (figures row) on the type wheel.

c. Signal Bell Operating Sequence. The signal bell operating sequence starts when the S code group is received and set up in the code-ring cage. Just prior to the start of the sequence the cam lever assembly is at the high point of its associated cam, holding the bell sensing lever (fig. 192) and its assembled signal bell clapper in the restored position. The figures-letters shift lever is held in the figures (clockwise) position by the letters figures shift latch lever. In the figures position, the left arm of the letters figures shift latch lever is pivoted out of the path of the upper arm of the bell sensing lever. The bell function stop bar remains in the path of the lower arm of the bell sensing lever until the S code group is received in the code-ring cage. The following chart summaries the sequence of signal bell operations.

Signal Bell Sequence Chart

1.	S code group received and set up by the code rings in the code-ring cage.
2.	S stop bar pivots into the aligned notches in the code rings, moving the rear end of the bell function stop bar out of the path of the bell sensing lever.
3.	Function shaft starts to rotate, high part of type wheel and function lever cam moves out of the path of the cam lever assembly.

4.	Cam lever assembly pivots sharply clockwise, releasing the function sensing levers.
5.	Bell sensing lever spring pivots the bell sensing lever and its assembled signal bell clapper clockwise, causing the signal bell clapper to strike the signal bell.
6.	Type wheel and function lever cam on function shaft moves against the cam lever assembly, moving the cam lever assembly and the bell sensing lever to the restored position.
7.	Function shaft stops rotating.

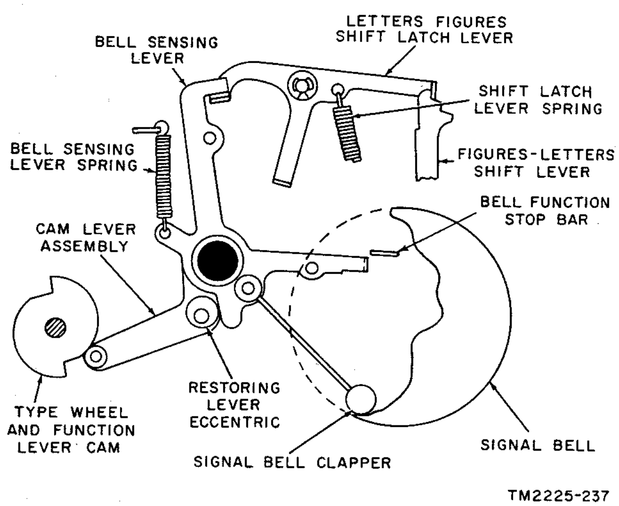


Figure 192. Signal bell mechanism in operated condition.

198. Tape-Out Alarm

Both the TT–76/GGC and the TT–76A/GGC are provided with a tape-out alarm mechanism which warns the operator that the supply of paper tape on the tape reel is running low. The design of the tape-out alarm mechanism differs between the machines, but both use an alarm switch which, when operated, closes the electrical circuit to the tape alarm buzzer. The operation of the tape-out alarm mechanism used on the TT–76/GGC is described in *a* below; the operation of the tape-out alarm mechanism used on the TT–76A/GGC is described in *b* below.

a. Tape-Out Alarm (TT–76/GGC). The upper end of the alarm lever (fig. 193) is held against the outer circumference of the paper tape roll by spring action. As the paper tape roll grows smaller the alarm lever, whose lower end is mounted on a stud on the tape reel bracket, pivots counterclockwise. The switch actuating stud that is mounted near the lower end of the alarm lever, and which extends through a hole in the tape reel brocket moves against the switch actuating arm latch as the paper tape roll diameter diminishes, pivoting the switch actuating arm latch clockwise. This movement unlatches the switch actuating lever that is pivoted clockwise by its spring so that the extended arm of the switch actuating lever strikes the operating lever of the alarm switch closing the alarm switch. When the alarm switch closes, it energizes the circuit to the tape alarm buzzer to sound the alarm. This triggering arrangement is provided to cause the switch to snap to the closed position, preventing arcing that could result if the switch was closed slowly. The tape-out alarm mechanism is reset when the alarm lever is pivoted clockwise to install a new paper tape roll. This moves the switch actuating stud against the switch actuating lever pivoting it counterclockwise so it can be latched by the switch actuating arm latch. The following tape-out alarm sequence describes the operation of the mechanism, assuming that the mechanism is reset as described above.

Tape-Out Alarm Sequence Chart (TT–76/GGC)

1.	Switch actuating arm latch spring pivots the switch actuating arm latch counterclockwise, causing it to latch the switch actuating lever.
2.	As the tape roll is expended, the alarm lever pivots counterclockwise, moving the switch actuating stud against the switch actuating arm latch.
3.	Switch actuating arm latch pivots clockwise, unlatching the switch actuating lever.

4.	Switch actuating lever spring pivots the switch actuating lever counterclockwise.
5.	Arm on the switch actuating lever snaps against the alarm switch operating lever to close the alarm switch.
6.	Closed alarm switch permits the flow of current to the tape alarm buzzer, sounding the alarm.
7.	When a new tape roll is installed, the alarm lever is pivoted to the right, causing the switch actuating stud to strike the switch actuating lever, pivoting it counterclockwise to open the alarm switch.

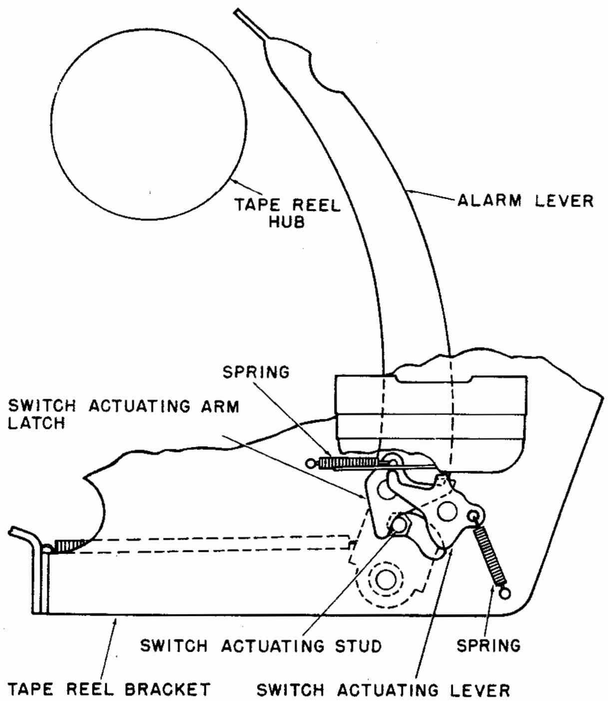


Figure 193. Tape-out alarm mechanism (TT–76/GGC).

b. Tape-Out Alarm (TT–76A/GGC). The free end of the alarm lever (fig. 194) is held against the outer circumference of the paper tape roll by spring action. As the paper tape roll diameter diminishes, the tape alarm lever pivots, counterclockwise on its stud on the switch bracket. The switch arm assembly is fastened to the tape alarm lever and pivots with it. As the free end of the alarm lever approaches the core in the center of the paper tape roll, the switch arm assembly whose notch engages the operating lever of the alarm switch, moves the switch operating lever downward to close the alarm switch. When the alarm switch closes, it energizes the electrical circuit to the tape alarm buzzer to sound the alarm. The switch operating lever that is an intergral part of the alarm switch, terminates with a spring giving the switch operating lever some flexibility. This permits the switch to snap to the closed position to prevent internal arcing which occurs when the switch is closed slowly. A lever latch mounted on the switch arm assembly engages a stud on the switch bracket when the alarm lever is moved to the extreme clockwise position. The lever latch holds the alarm lever in this position while the new paper tape roll is being installed. With the alarm lever in this position the switch operating lever is up and the circuit to the tape alarm buzzer is open. When it is manually pivoted counterclockwise, the lever latch releases the alarm lever, permitting spring action to move the free end of the alarm lever against the tape roll.

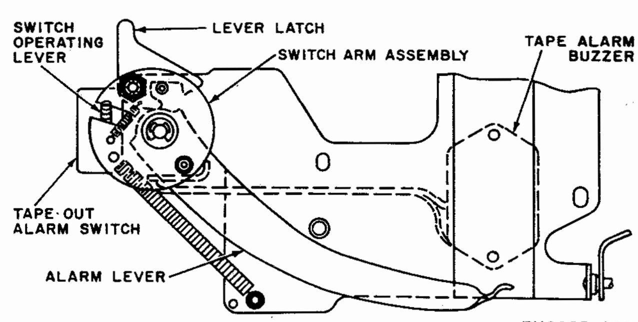


Figure 194. Tape-out alarm mechanism (TT–76A/GGC).

Section VI. CIRCUIT DESCRIPTIONS

199. General

The circuits in the reperforator-transmitter are divided into two main groups: ac circuits and dc circuits. Figures 195 through 206 are the schematic diagrams of the reperforator-transmitter circuits. The circuits for the TT–76/GGC and the TT–76A/GGC are each illustrated separately. Figures 291 through 294 are the complete schematic and air line diagrams of the reperforator-transmitters.

200. Ac Circuits

a. Ac Input Circuit (figs. 195 and 196). A power selector switch is provided to permit operation of the transformer on either 115- or 230-volt, 60 cycle ac. If the source of the voltage is 230 volts, the power selector switch is positioned to 230V and the input voltage is applied to terminals 1 and 3 of the transformer. The autotransformer action of the primary winding steps down the voltage to 115 volts at terminals 1 and 2 of the transformer to operate the motor and copy light circuits. When a 115-volt source is used, the power selector switch is positioned to 115V and the input voltage is applied to terminals 1 and 2 of the transformer. The ac input circuit is traced from the input plug through the POWER ON–OFF switch, fuse, and the primary winding of the transformer. In the TT–76/GGC one side of the power input line is fused, the TT–76A/GGC has both sides of the power input line fused for 1.6 amps.

b. Motor Circuits (figs. 195 and 196). The motor circuit is connected in parallel with the 115-volt portion (terminals 1 and 2) of the transformer primary winding. The circuit begins at the 115-volt portion of the transformer primary winding and is traced through the MOTOR switch, filter, field windings, armature, and governor contacts. When the motor has reached the proper speed, centrifugal force overcomes the pull of the governor contact spring and the governor contacts open. This places a 150 ohm resistor in series with the field winding and reduces the current that flows through the windings, decreasing the motor speed. The motor speed decreases until the governor contacts close. The current through the motor and motor speed again increase until the governor contacts reopen. This procedure continues as long as the motor is running. The filter is provided to suppress the rf interference generated by the motor.

c. Copy Light Circuit (figs. 195 and 196). The copy light circuit is connected in parallel to the motor circuit and across the 115-volt portion (terminals 1 and 2) of the transformer primary winding. The circuit can be traced from terminals 1 and 2 of the transformer primary winding through the LIGHT switch and the copy light, when the LIGHT switch is closed.

d. END OF LINE INDICATOR Lamp and Tape-Out Alarm Circuits (figs. 197 and 198). The END OF LINE INDICATOR lamp and tape-out alarm circuit are powered by the 6.3-volt portion of the secondary winding of the transformer.

(1) The 6.3 volt portion of the transformer supplies 6.3 volts ac to the indicator lamp switch and the END OF LINE INDICATOR lamp, located on the left side of the keyboard guard. When transmitting from the keyboard-transmitter, the END OF LINE INDICATOR lamp lights to indicate that 66 characters have been transmitted since the last carriage return signal. The operator should punch the carriage return and line feed symbols in the message tape.

(2) When the tape roll supply diminishes to a predetermined point, the tape alarm lever resting on the paper tape actuates the contacts of the alarm switch and closes the circuit that connects the tape alarm buzzer across the 6.3 volt portion of the secondary winding of the transformer. This causes the tape alarm buzzer to sound.

201. Dc Circuits

a. Position 1, TR SEND, TD SEND, RECEIVE (figs. 199 and 200). When the SELECTOR switch is operated to position 1, the transmitter-distributor is connected to the gray plug, the keyboard-transmitter is connected to the black plug, and the reperforator selector magnet line windings are connected to the red plug.

(1) *TR SEND Circuit* (A, fig. 199 and A, fig. 200). The keyboard-transmitter contacts, BREAK switch, and TR jack are in series with the TR SEND plug and the signal line. When the transmitter camshaft is allowed to rotate (par. 174) the keyboard-transmitter contacts are opened and closed in sequence and the selected code impulses are sent to the line. The KEYBOARD switch is across the mark (MK) and common (COM) contacts of the keyboard-transmitter. When the KEYBOARD switch is placed in the LOCK position, the keyboard-transmitter contacts are shorted and transmission from the keyboard-transmitter is blocked.

(2) *TD SEND Circuit* (B, fig. 199 and B, fig. 200). The transmitter-distributor contacts and the TD jack are in series with the TD SEND plug and the signal line. When the transmitter camshaft is allowed to rotate (par. 179) the transmitter-distributor contacts are opened and closed in sequence and the selected code impulses are sent to the line.

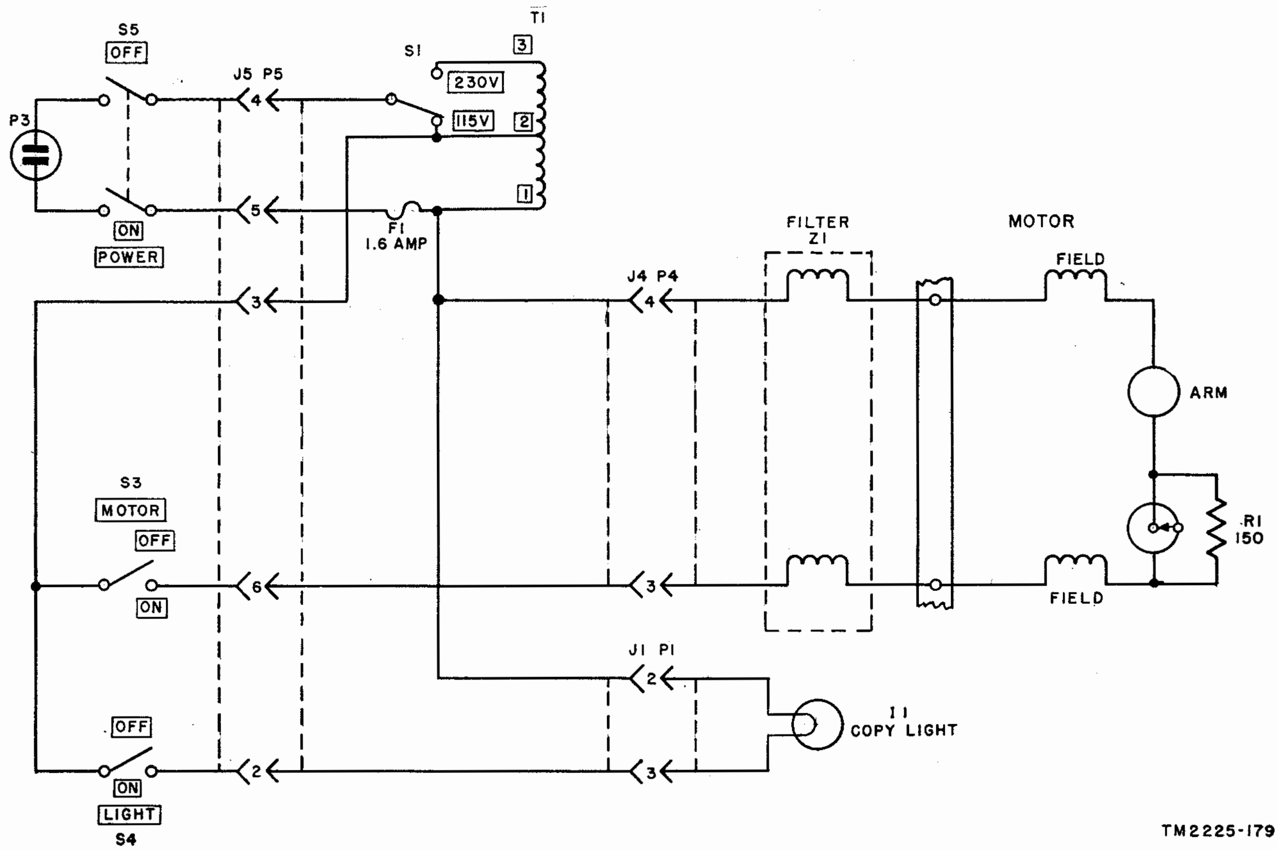


Figure 195. Ac input, motor, and copy light circuits (TT–76/GGC).

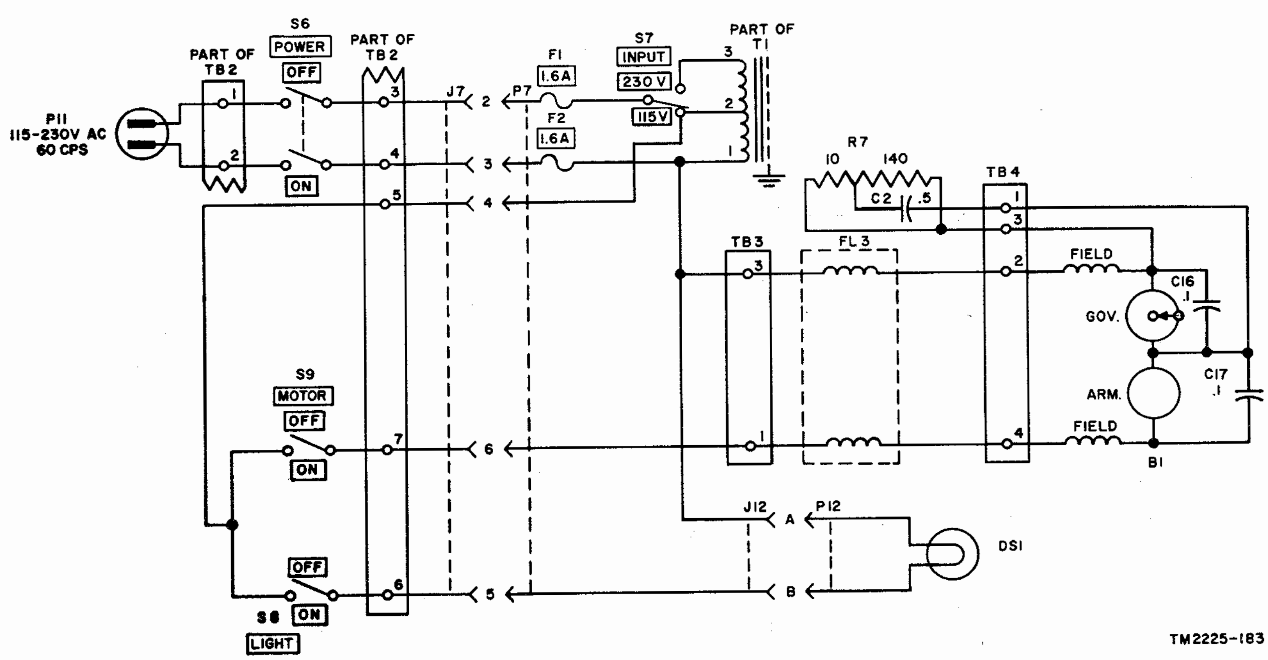


Figure 196. Ac input, motor, and copy light circuits (TT–76A/GGC).

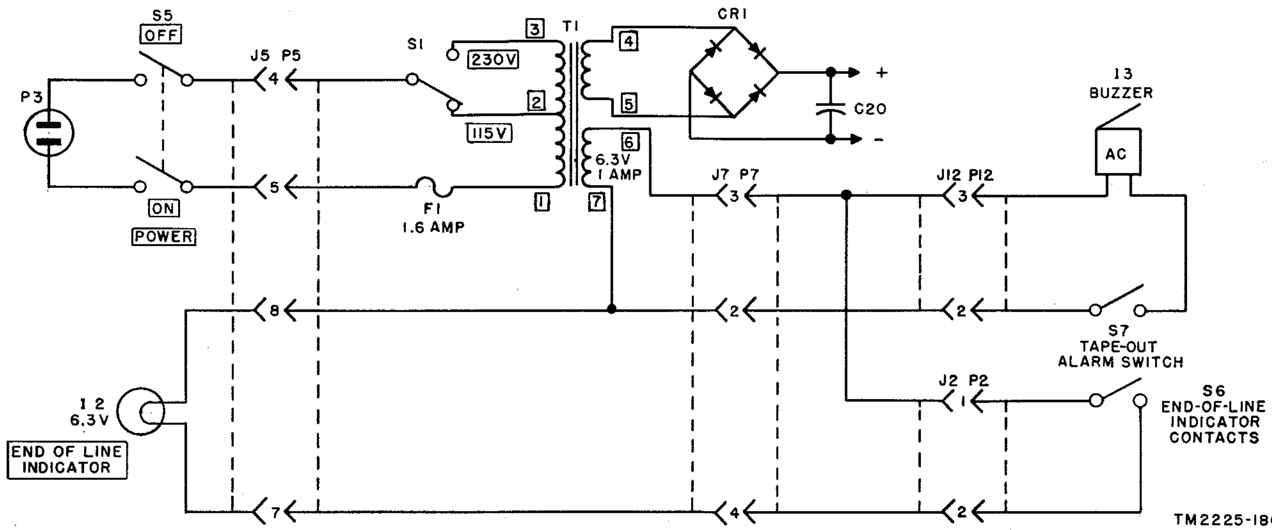


Figure 197. END OF LINE INDICATOR lamp and tape out alarm circuits (TT–76/GGC).

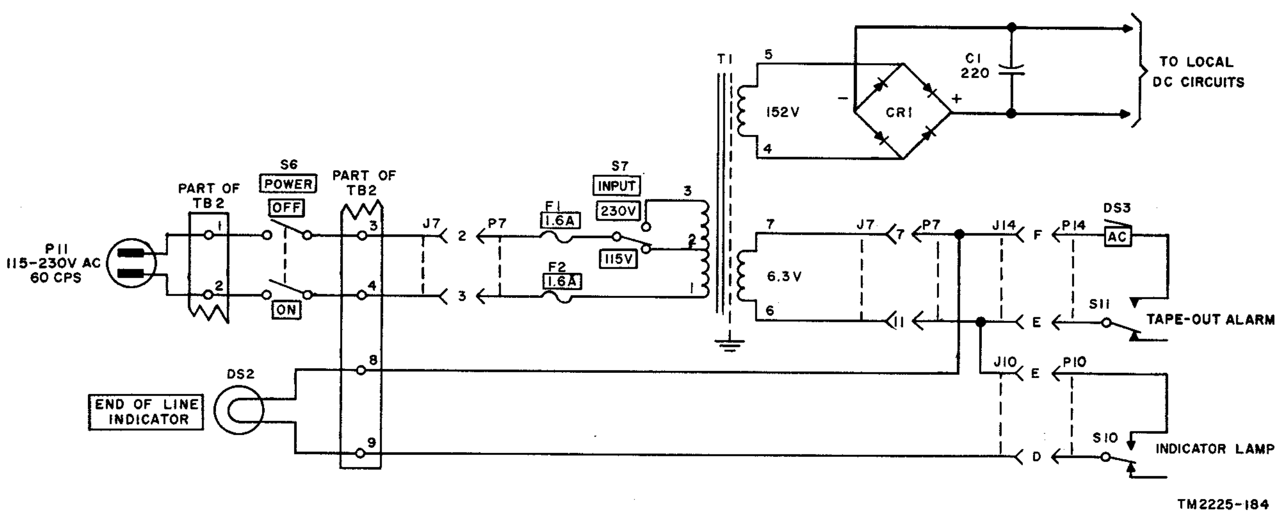


Figure 198. END OF LINE INDICATOR lamp and tape out alarm circuits (TT–76A/GGC).

(3) *RECEIVE Circuit* (C, fig. 199 and C, fig. 200). The reperforator selector magnet line windings and the REC jack are in series with the REC plug and the signal line. The incoming code signals operate the selector magnet line windings. The TT–76A/GGC selector magnets are equipped with a plug and two jacks to facilitate operation of the selector magnet on either 20 or 60 ma line circuits. The plug from the selector magnet is placed in either the 20-MA or 60-MA jack (fig. 292) and the SIGNAL/BIAS switch is placed in a like position. The center position of the SIGNAL/BIAS switch, BIAS OFF, is to be used for polar operation and this switch setting opens the bias circuit of the selector magnet.

b. Position 2, TD SEND, LOCAL PUNCH Circuit (figs. 201 and 202). When the SELECTOR switch is operated to position 2, the transmitter-distributor is connected to the TD SEND plug. The keyboard transmitter contacts and the selector magnet line windings are connected in a local series circuit.

(1) *TD SEND circuit* (B, fig. 199 and B, fig. 200). This circuit is the same as for position 1 of the SELECTOR switch (*a*(2) above).

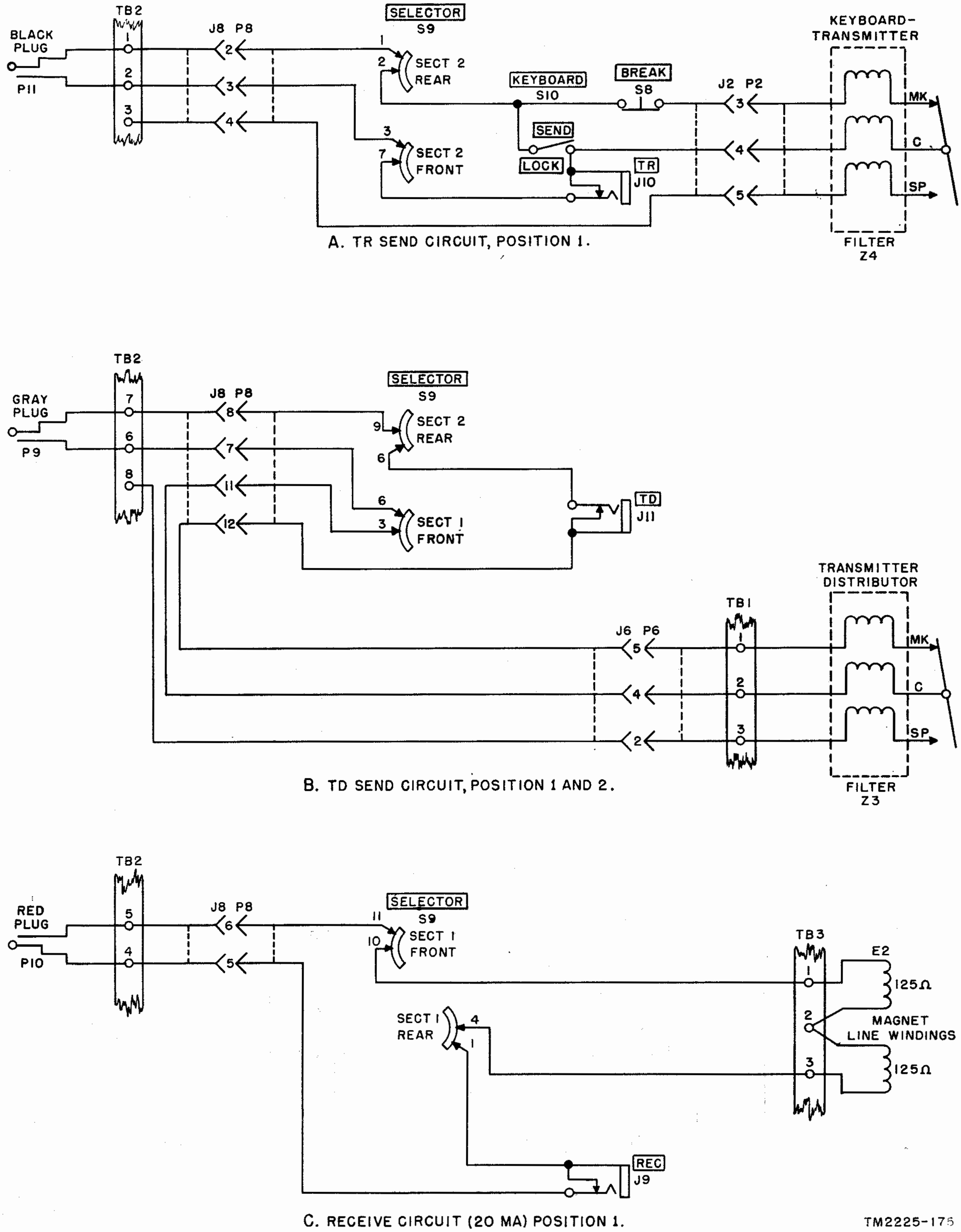


Figure 199. TR SEND, TD SEND, RECEIVE circuits, position 1 (TT-76/GGC).

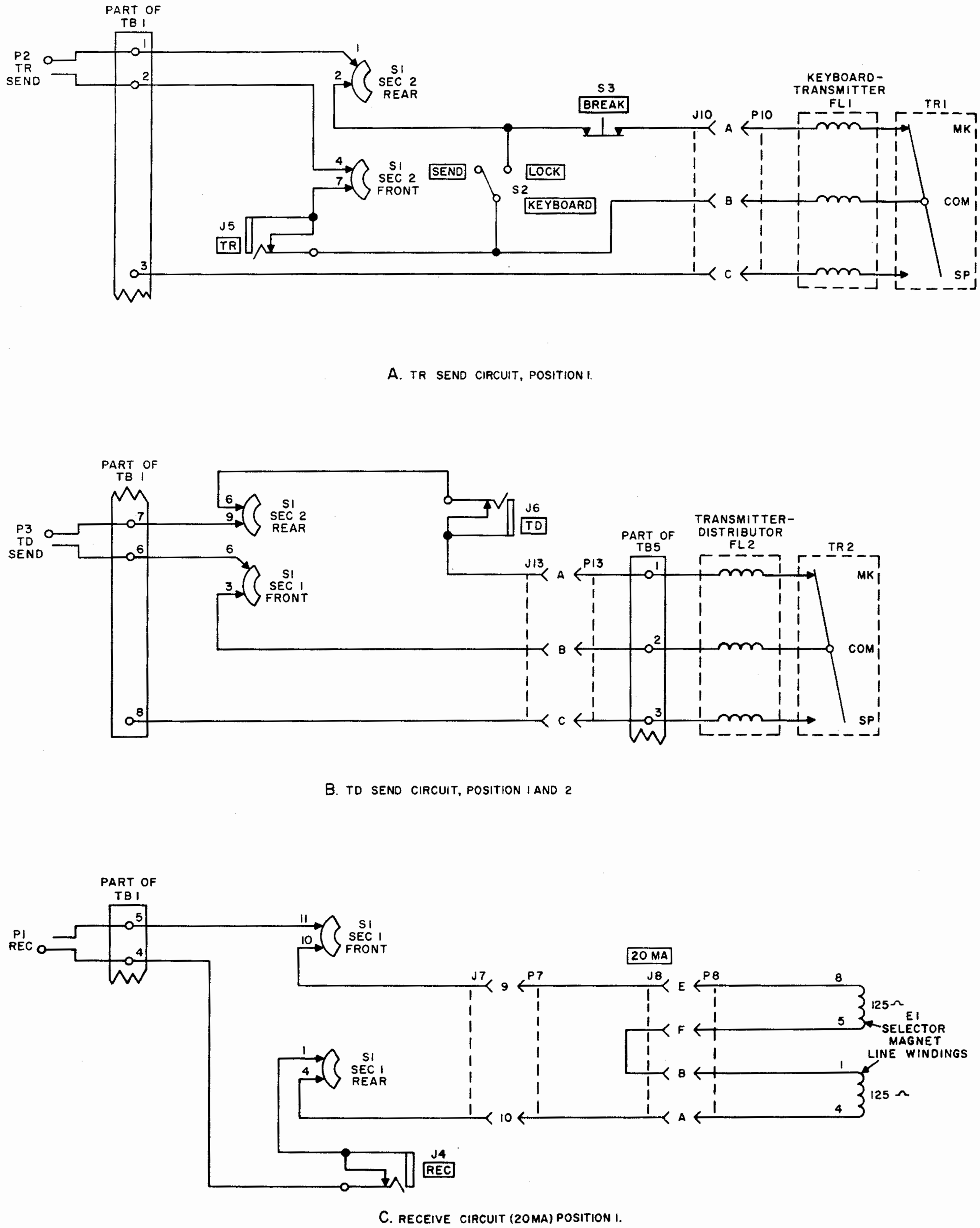


Figure 200. *TR SEND, TD SEND, RECEIVE circuits, position 1 (TT-76A/GGC).*

(2) *LOCAL PUNCH circuit* (figs. 201 and 202). The SIGNAL/BIAS switch, selector magnet line windings, TR jack, keyboard-transmitter contacts, and the BREAK switch are connected in series with the output of the rectifier. As the keyboard-transmitter camshaft is allowed to rotate, the keyboard-transmitter contacts are opened and closed in sequence and the selected code impulses are sent to the selector magnet line windings which in turn position the magnet armature and put the code punching mechanism into operation. When the KEYBOARD switch is in the LOCK position, the keyboard-transmitter contacts are shorted and transmission from the keyboard-transmitter is blocked. The local punch circuit can be operated on either 20-ma or 60-ma signal current. When a local punch circuit operation of 60 ma is desired, the selector magnet plug must be inserted in the 60-MA jack and the SIGNAL/BIAS switch placed in the 60-MA position. For local punch operation of 20 ma the plug must be in the 20-MA jack and the SIGNAL/BIAS switch in the 20-MA position. Since the keyboard-transmitter is not wired for polar operation, the SIGNAL/BIAS switch must not be positioned in the BIAS OFF position.

c. LOCAL REPUNCH Circuit (figs. 203 and 204). When the SELECTOR switch is operated to position 3, the SIGNAL/BIAS switch, selector magnet line windings, transmitter-distributor contacts, TD plug, TR plug, keyboard-transmitter contacts, and the BREAK switch are connected in series and powered by the output of the rectifier. When either the transmitter-distributor or the keyboard-transmitter contacts are opened and closed in sequence the selected code impulses are sent to the selector magnet line windings that in turn position the magnet armature and put the code punching mechanism into operation. When the KEYBOARD switch is in the LOCK position, the keyboard-transmitter contacts are shorted and only the transmitter-distributor operation will actuate the code punching mechanism. The local repunch circuit can be operated on either 20-ma or 60-ma signal current. When operation of local repunch at 60 ma is desired, the selector magnet plug must be inserted in the 60-MA jack and the SIGNAL/BIAS switch placed in the 60-ma position. For local repunch operation of 20 ma the plug must be in the 20-MA jack and the SIGNAL/BIAS switch in the 20-MA position. Since polar transmission is not possible from the keyboard-transmitter or the transmitter-distributor the SIGNAL/BIAS switch must not be positioned in the BIAS OFF position. In position 3 of the SELECTOR switch, the TD SEND, TR SEND, and RECEIVE cords are shorted to keep the signal line isolated from the local circuits of the reperforator.

d. Selector Magnet Bias Circuit (figs. 205 and 206). The magnetic fields set up by the current in the selector magnet bias windings control the movement of the selector magnet armature when neutral signal space impulses are received. The circuit connects the SIGNAL/BIAS switch, BIAS TEST MA, and selector magnet bias windings in series with the rectifier output. The SIGNAL/BIAS switch controls the amount of bias current in the selector magnet bias windings. This circuit is in parallel with the one containing the clutch magnet. The BIAS TEST MA strap provides a convenient means of testing the current in the selector magnet bias circuit. A variable resistor in series between the two windings is adjusted to give the correct amount of bias current for optimum performance.

e. Transmitter-Distributor Clutch Magnet Circuit (figs. 205 and 206). The transmitter-distributor clutch magnet must be energized to transmit from the transmitter-distributor. The clutch magnet is controlled by the START-STOP switch. When the START-STOP switch is open (START position) the clutch magnet will energize and transmission is possible. When the START-STOP switch is closed the clutch magnet windings are shorted, the clutch magnet will de-energize, and transmission stops. The clutch magnet circuit is traced from the rectifier through the limiting resistor to the clutch magnet coil. When the START-STOP switch is in the STOP or FEED RETRACT position, the circuit is closed around the clutch magnet and transmission from the transmitter-distributor is stopped.

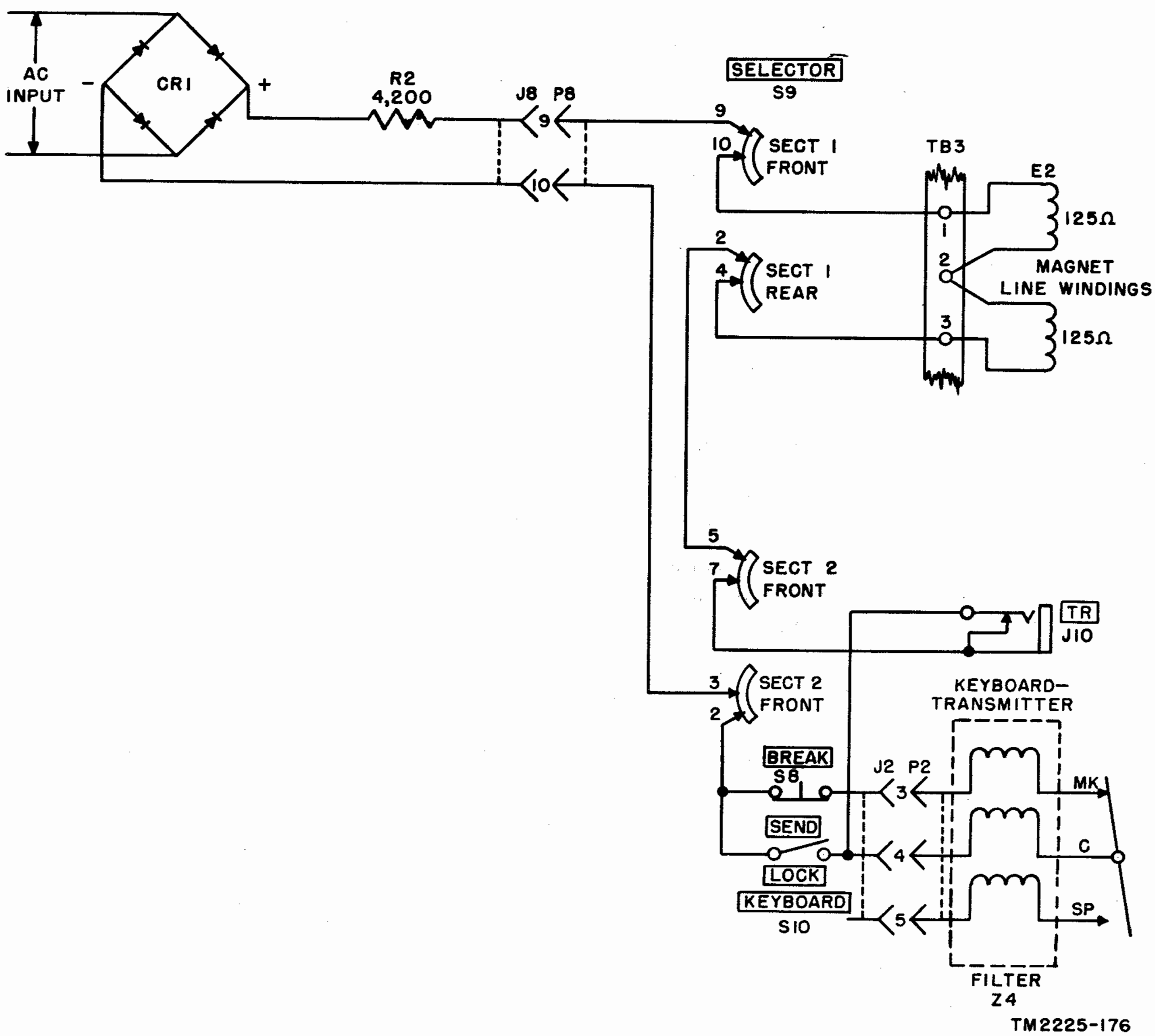


Figure 201. LOCAL PUNCH circuit, position 2 (TT–76/GGC).

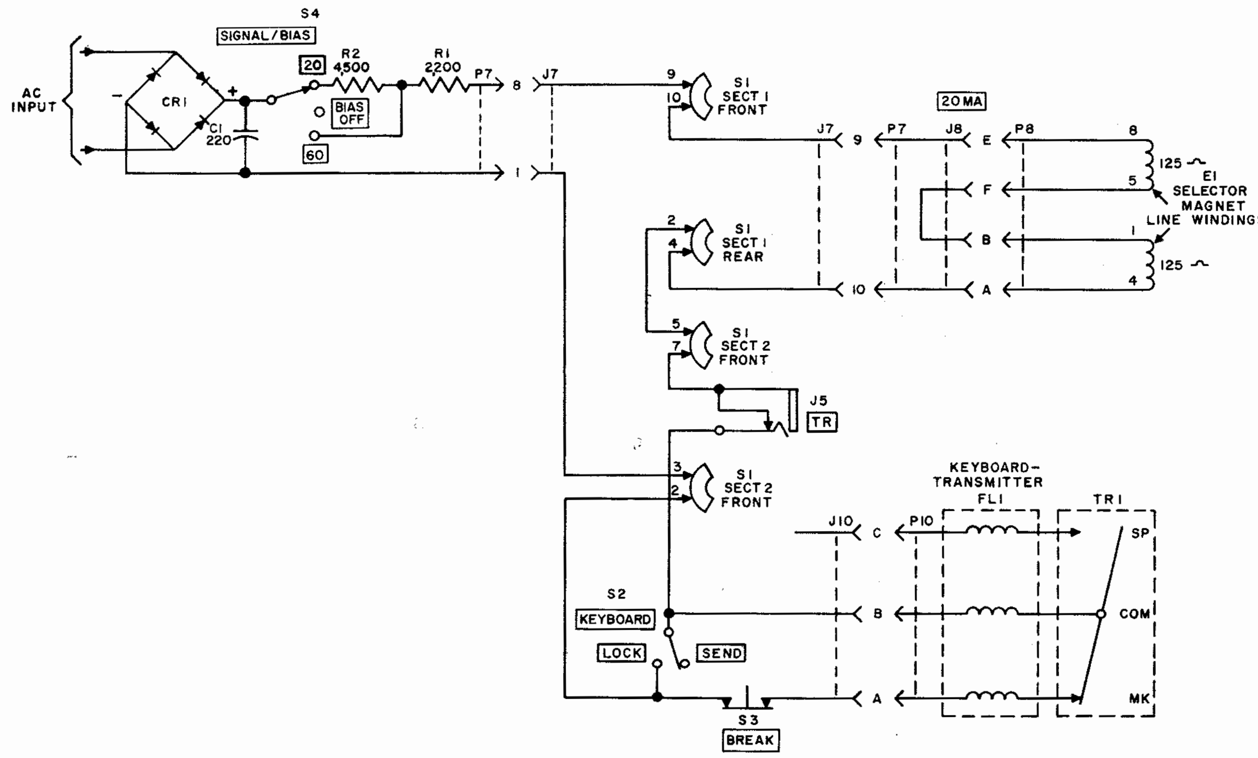


Figure 202. LOCAL PUNCH circuit, position 2 (TT–76A/GGC).

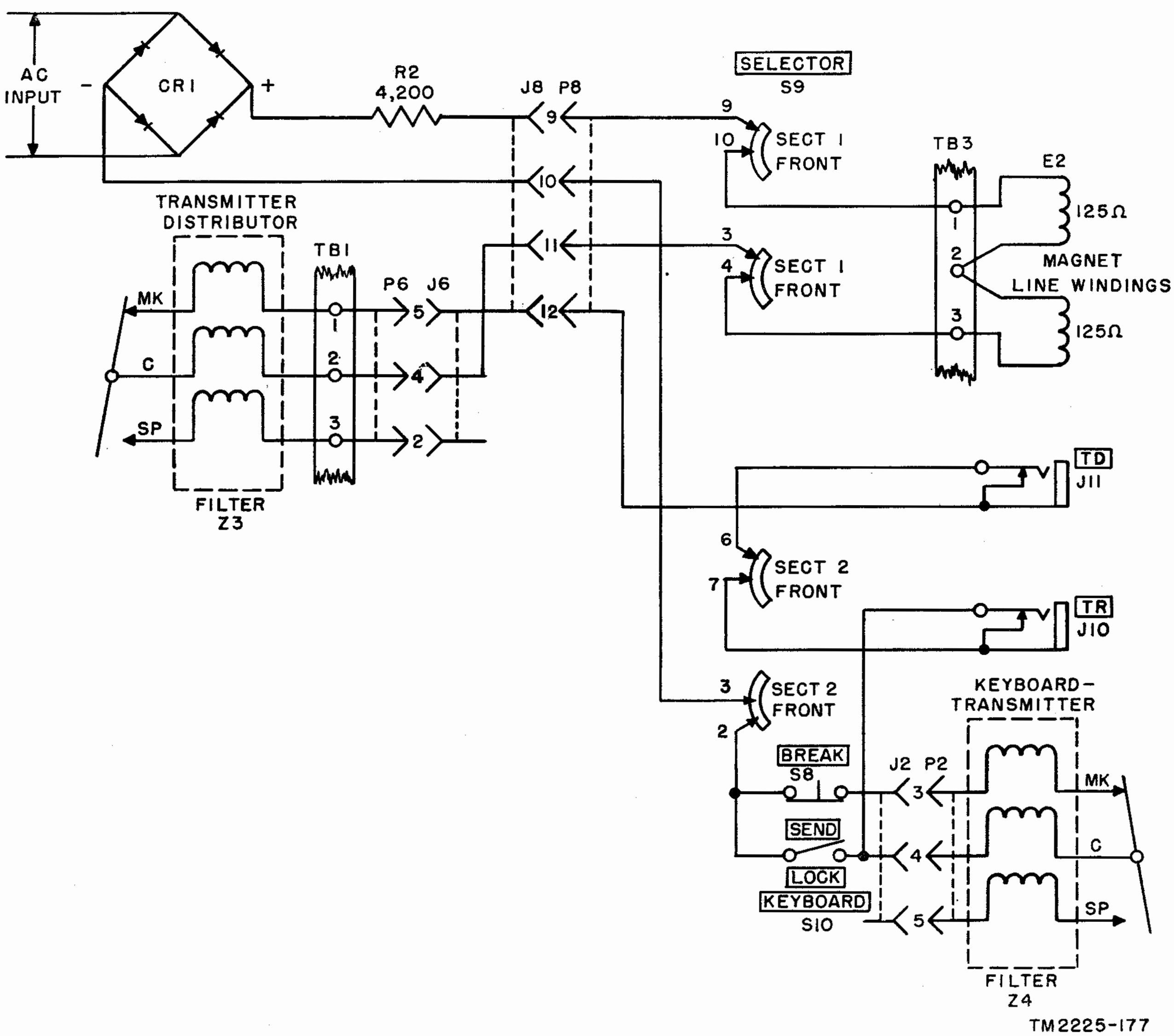


Figure 203. LOCAL REPUNCH circuit, position 3 (TT–76/GGC).

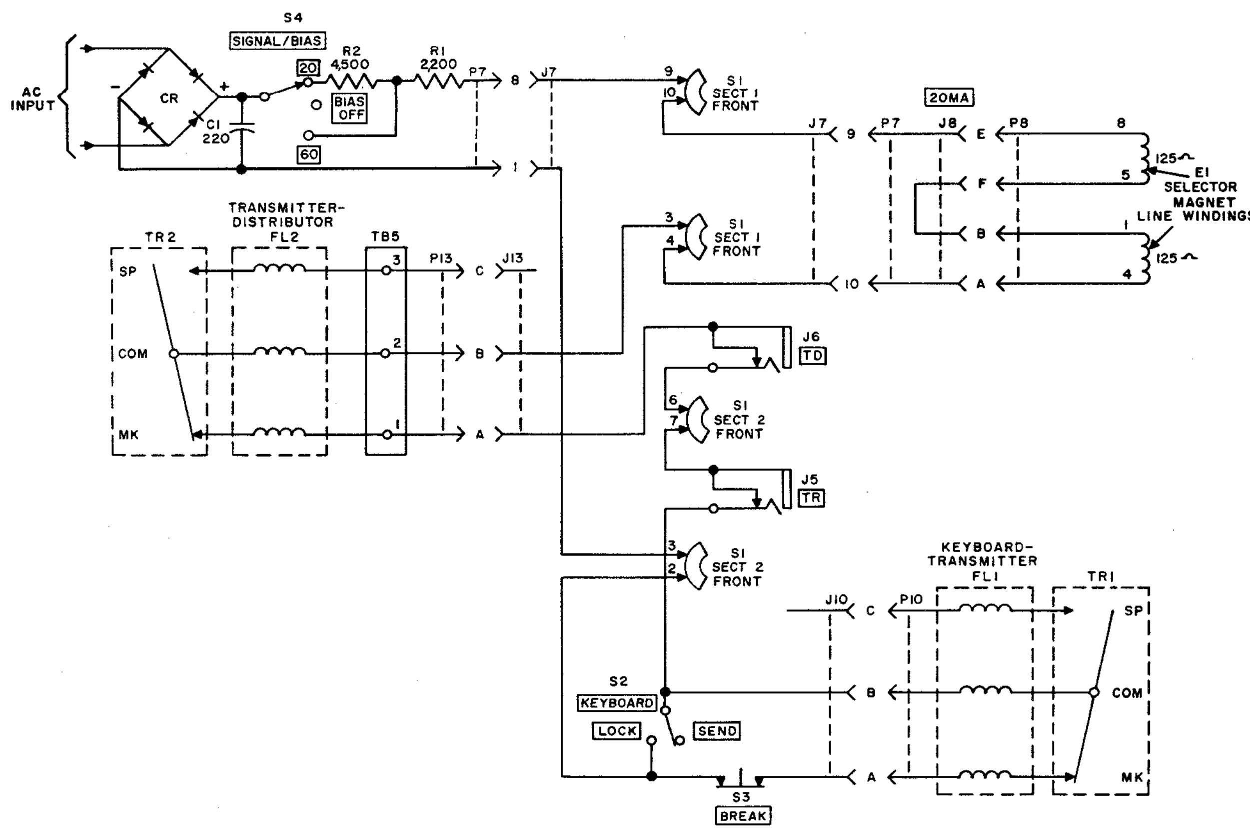


Figure 204. LOCAL REPUNCH circuit, position 3 (TT-76A/GGC).

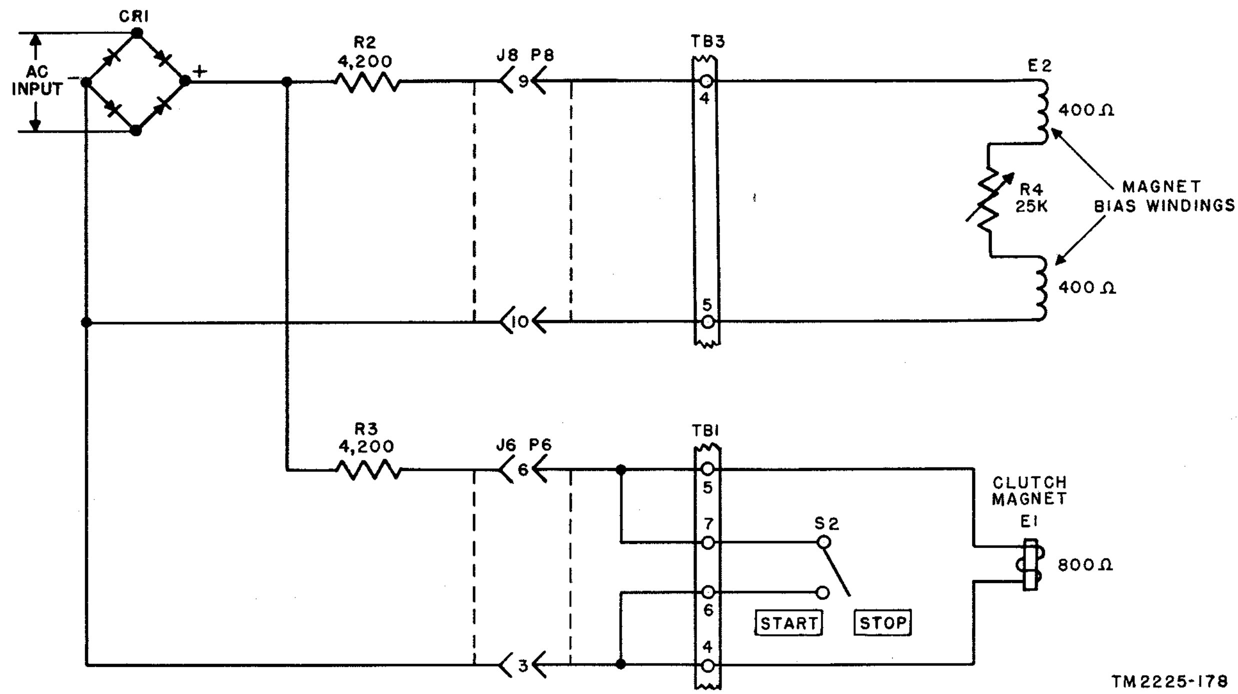


Figure 205. Selector magnet bias and transmitter-distributor clutch magnet circuits (TT–76/GGC).

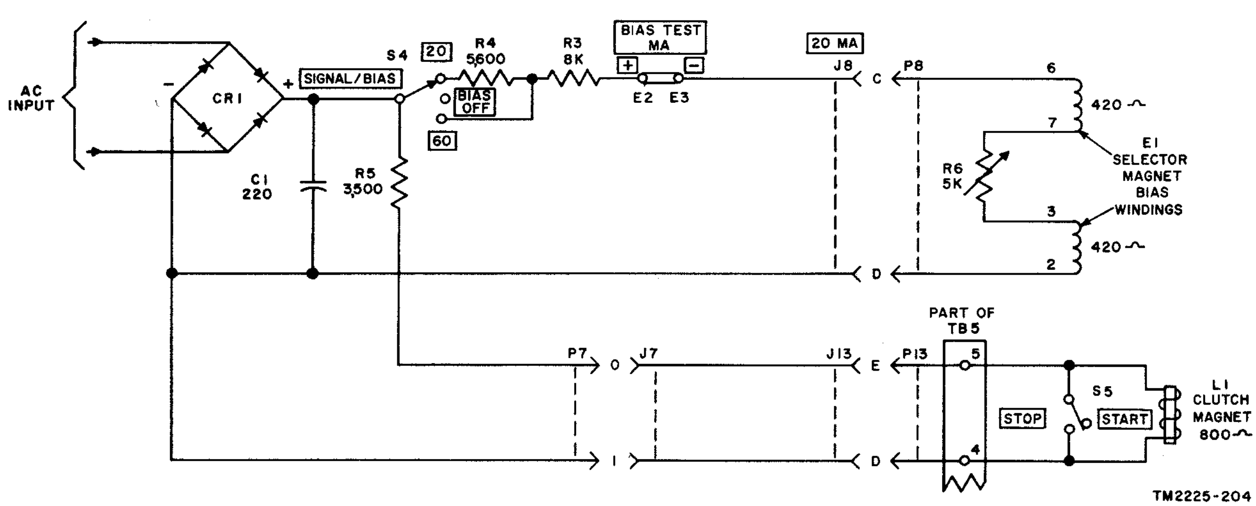


Figure 206. Selector magnet bias and transmitter-distributor clutch magnet circuits (TT–76A/GGC).

CHAPTER 6

FIELD MAINTENANCE

Section I. PREREPAIR PROCEDURES

202. Tools

a. General. Tool Equipment TB–50–B should be available to technical personnel responsible for maintenance of the TT–76(*)/GGC. This kit includes most of the tools and test equipment required to perform normal repairs and test. Tool Equipments TE–50 and TE–50–A do not include the special wrenches and gages required for maintenance of this reperforator. Organizations with these tool kits may requisition the added tools in accordance with appropriate supply bulletins.

b. Additional Tools. The necessity for reworking old parts or making new parts may require metal cutting tools such as drill sets, taps and dies for National Coarse and National Fine thread sizes, a ¼-inch electric hand drill, adjustable tap wrenches and die stocks, a metal handsaw, and ¼-inch chisel. Welding and brazing equipment may be required for occasional emergency repairs. This equipment should be operated only by authorized skilled personnel.

203. Test Equipment and Materials

a. Test Equipment. The test equipment required to perform shop maintenance on teletypewriter equipment includes the following test sets:

(1) Multimeter TS–297/U or Multimeter TS–352/U.

(2) Test Set TS–2/TG (provides normal or distorted test signals).

(3) Distortion Test Set TS–383/GG (provides normal or distorted test signals and a stroboscopic light for viewing the signals).

Note. Test Set TS–2/TG (fig. 207) is mounted in a wooden case with carrying handles. It normally is issued to field maintenance units that require a degree of mobility. Distortion Test Set TS–383/GG (fig. 208) is not so easily transported and normally is issued to rear echelon repair shops.

b. Maintenance Materials. In addition to the organizational maintenance materials listed in paragraph 30, the following are required for field maintenance:

Item	Sig C stock No.
Tape TL–192	6N8692
Tape TL–83	6N8583
Grease	6G650
Oil, lubricating	6G1325

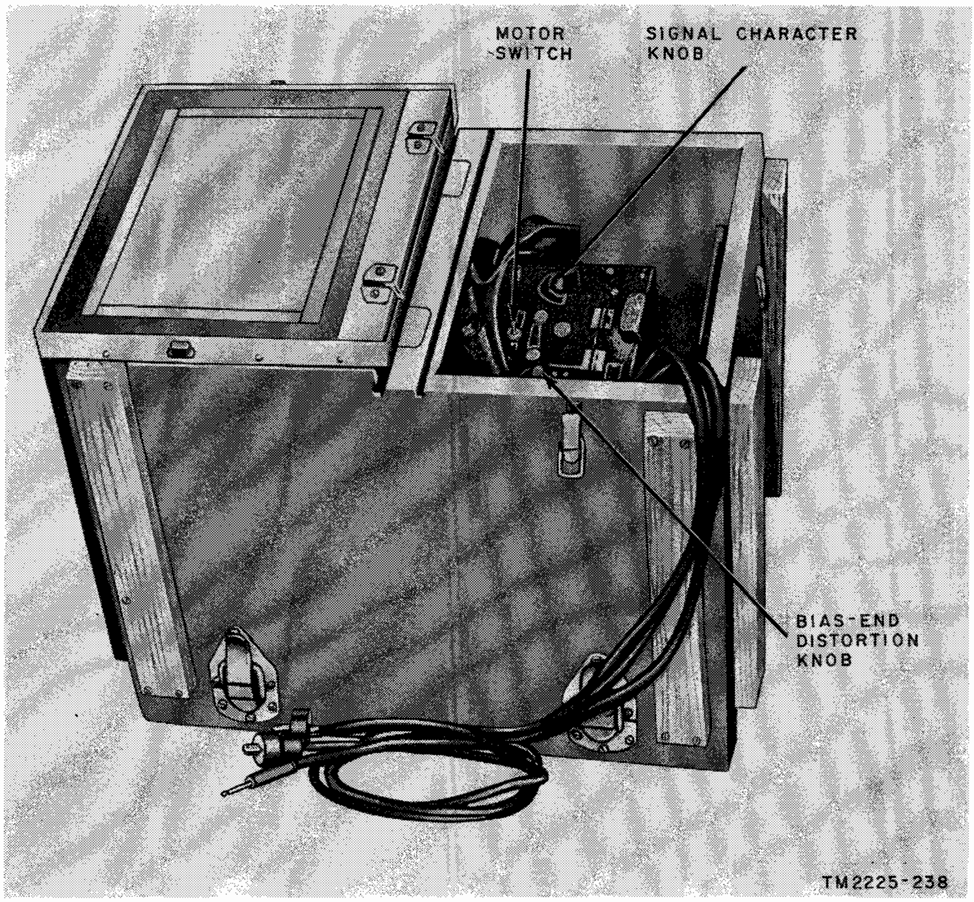


Figure 207. Test Set TS–2/TG.

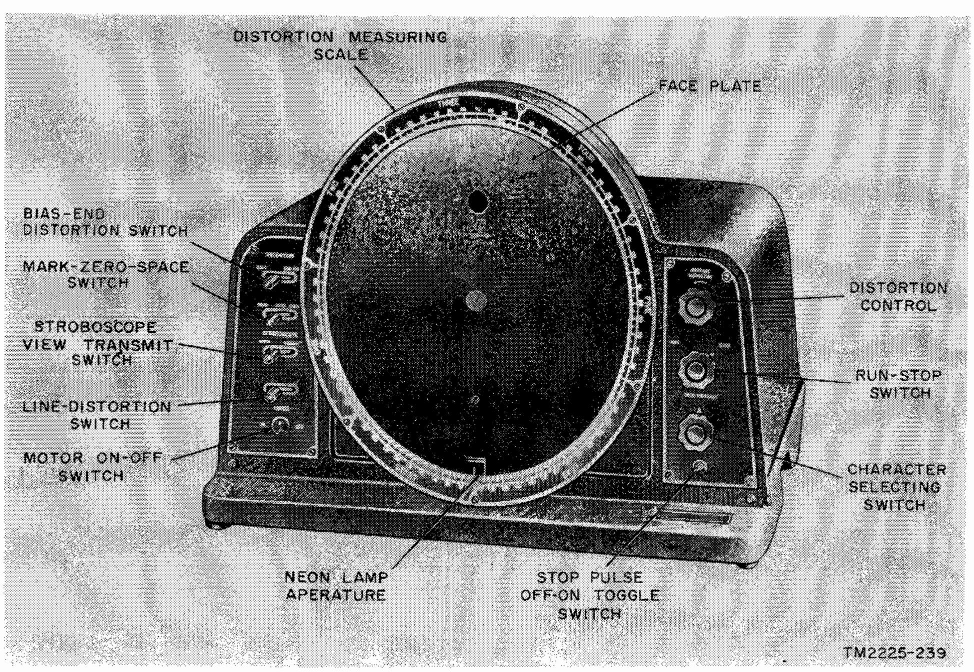


Figure 208. Distortion Test Set TS–383/GG.

204. Inspection Procedure

When Teletypewriter Reperforator-Transmitter TT–76(*)/GGC arrives at a repair shop for maintenance, the first step is to determine the nature and extent of the repairs required. A prerepair inspection of this set should include the following checks:

a. Examine the general condition of the covers.

b. See that the set contains all its components.

c. Turn the motor over by hand and check for motor bind or visual signs of overheating.

d. Check all gears for excessive wear, backlash, or looseness.

e. Examine all bearings for wear, bind, or signs of overheating.

f. Inspect all mechanical assemblies for signs of damage incurred in transit.

g. Examine all castings for signs of cracks or broken portions.

h. Check the condition of the wiring and electrical cords.

205. Cleaning Procedures

Clean the TT–76(*)/GGC thoroughly at field maintenance shops before any repair work is performed. Remove all dirt, grit, particles of paper tape, and oil or grease as described in *a* through *f* below. Preparation for cleaning includes the removal of some major assemblies.

a. Covers. Remove the dust covers (par. 13*a*) and clean the outer surfaces with a cloth slightly moistened with water. To remove oil or grease stains, moisten the cloth with solvent (SD).

b. Motor. Disconnect the motor plug. Remove loose dust and dirt from the exterior of the motor with a clean, dry, sash brush. To clean the interior of the motor, disassemble the motor as described in paragraph 273 and remove loose dirt and dust with a sash brush. Use a cloth dampened with solvent (SD) to remove oil and gummy deposits. When cleaning the interior, be sure to remove all traces of solvent (SD). Be careful not to damage the wiring.

c. Selector Magnet Assembly. Disconnect the selector magnet wiring from the terminal board. Remove the complete magnet assembly (pars. 249 and 250). The magnet coils may be cleaned with a cloth slightly dampened with solvent (SD). Oil should never be present between the magnet armature and pole pieces. To remove oil, insert a piece of Bell Seal Bond paper between the armature and pole pieces and allow the oil to soak into the paper. Repeat this procedure with fresh paper until all oil is removed. If the pole pieces are corroded, clean them with No. 0000 sandpaper and recoat them with a thin film of lacquer.

d. Ribbon Mechanism. Unhook the ribbon mechanism from the ribbon guides on each side of the type wheel and remove the inking ribbon and both ribbon spools. Remove the ribbon feed mechanism (pars. 254 and 255). Brush the loose dirt and dust from the mechanism with a sash brush and remove any oil or grease deposits with a cloth moistened with solvent (SD).

e. Main Frame Mechanisms. After the motor, selector mechanism, and the ribbon mechanism are cleaned, the main frame castings and remaining mechanisms may be cleaned with solvent (SD) or Cleaning Compound. Do *not* immerse any of the ball bearings or bronze oil-impregnated sleeve bearings in a cleaning fluid. They are self-lubricating and immersion would be harmful. Parts with a black metallic finish have a protective, corrosion-resistant finish. *These parts should never be dipped in a cleaning fluid longer than is necessary to remove the dirt. Extended immersion is harmful to the protective finish.* After such cleaning, lightly spray these parts with oil.

Note. Do not use gasoline as a cleaning fluid. If an emergency requires the use of a substitute for the recommended cleaning fluids, Fuel Oil, Diesel (D–40) may be used until the proper cleaning fluid is obtained. Never use carbon tetrachloride.

f. Base Frame and Associated Parts. After all other mechanisms (*a–c* above) are removed and cleaned, all that remains is the base frame, filter box, and tape reel assembly. Remove loose dust, dirt, and tape particles from the base with a sash brush. Remove oil and grease deposits with a cloth moistened with solvent (SD). If the base frame and filter box are extremely dirty, it may be necessary to remove the filter box (pars. 285 and 286) to clean the unit thoroughly. Use a cloth slightly dampened with water to clean the rubber-covered cords. Brush the dust and dirt from the wiring and electrical components with a clean dry sash brush.

g. Transmitter-Distributor. Remove the transmitter-distributor as directed in paragraph 230*a*. Clean the cover with a cloth moistened with water. To remove oil or grease stains, use a cloth moistened with solvent (SD). The remaining mechanisms may be cleaned with solvent (SD). Observe the same cautions in cleaning the bearings and black finished parts as stated in *e* above.

h. Keyboard-Transmitter. Disconnect the keyboard-transmitter plug from its mounting. Remove the keyboard-transmitter (par. 216*a*). Remove loose dust and dirt from the keys, key levers, code bars, and transmitting mechanisms with a clean, dry brush. Use a cloth moistened with solvent (SD) to remove oil and gummy deposits.

206. Rustproofing and Painting

a. If the finish on the dust cover or the immersionproof case becomes badly scratched or scarred, prevent rust and corrosion by touching up bared surfaces. Use No. 00 or No. 000 sandpaper to clean the surfaces down to the bare metal. Obtain a bright, smooth finish. Do not use steel wool; minute particles of steel wool can enter the electrical parts and cause harmful internal shorting and grounding of circuits.

b. When a touchup job is necessary, apply paint with a small brush. When numerous scars and scratches warrant complete repainting, remove the TT–76(*)/GGC from service. Place protective masking over all areas where paint is not required or may cause damage. Then spray paint over the entire surface. Remove slight rust from corroded metal by cleaning with solvent (SD). In severe cases, it may be necessary to use solvent (SD) to soften the rust and then sandpaper to complete the preparation for painting. The paint to be used will be authorized in accordance with existing regulations. Restore the moistureproofing and fungiproofing.

207. Lubrication, Assembly, and Operational Test

When the components are thoroughly cleaned (par. 206) all parts that are susceptible to wear should be examined carefully for traces of excessive wear. Worn parts should be replaced and adjusted according to instructions in paragraphs 215 through 296. Particular attention should be given to gear teeth, sleeve bearings and shafts, ball bearings, and surfaces of cams and associated levers.

a. Lubrication. After replacement of worn parts, lubricate each mechanical assembly as described in paragraph 43. If evidence of overheating or wear is discovered at points that are normally self-lubricating (oil-impregnated parts), restore lubrication to these parts by immersion for 20 minutes in Oil, Lubricating, Signal Corps stock No. 6G1325, heated to 140° F.

b. Assembly. As each of the disassembled mechanisms is lubricated, replace it on the TT–76(*)/GGC. Renew the coating of antiseize compound on any steel screws that are to be screwed into aluminum or magnesium castings. This coating is necessary because steel screws, unless coated with this compound, have a tendency to seize in the casting and make future removal of the screws very difficult. The recommended antiseize compound is available through regular supply channels as a Corps of Engineers item, stock No. CE–52–2724.500.080.

c. Operational Test. After the reperforator, keyboard-transmitter, and transmitter-distributor are cleaned, lubricated, and assembled, an operational test must be made of the complete unit. Prepare the reperforator-transmitter for testing (par. 24*e*) and test as described in paragraph 25. If the reperforator-transmitter operates improperly, locate the fault by using the troubleshooting chart (par. 211). If the reperforator-transmitter operates properly, it should receive a prolonged test run before installation into the communication system. Under normal conditions, equipment should be test run for at least 1 hour to minimize the possibility of failure after installation into the system.

Section III. TROUBLESHOOTING AT FIELD MAINTENANCE LEVEL

208. General

This section includes information that will help in locating and correcting faults in Teletypewriter Reperforator-Transmitter TT–76(*)/GGC. Although the instructions do not cover every possible trouble, the recommended troubleshooting procedures present a systematic approach which normally will result in the location of any trouble in the

TT–76(*)/GGC. The troubleshooting chart (par. 211) lists the symptoms, causes, and corrective actions for most common troubles.

a. Knowledge Requirements. The troubleshooter must have a thorough understanding of how the reperforator, keyboard-transmitter, and transmitter-distributor circuits and mechanisms operate. The symptoms of many operating failures often indicate the location of the fault to personnel who thoroughly understand the operation of the mechanisms. Faulty operation can be caused by wear, damage, or maladjustment of any of the large number of parts in the TT–76(*)/GGC. The troubleshooter must be able to determine quickly which part is affected, whether the trouble is electrical or mechanical, and the exact cause.

b. Sectionalizing Trouble. Sectionalizing trouble in this reperforator-transmitter means determining whether the trouble is caused by a fault in the mechanical assemblies, or a fault in the circuits of the components. To determine whether a trouble is electrical or mechanical, disconnect all power from the reperforator-transmitter and check the selector magnet armature movement manually. The armature should not bind and should move freely between the marking and spacing positions. Plug the power cord into a power outlet, place the POWER switch and the MOTOR switch to ON. Place the SELECTOR switch in position 3 LOCAL REPUNCH. Under these conditions, the motor should operate, the selector magnet armature should be electrically held in the marking position, and the selector, printing, and punching mechanisms should remain stationary (run closed).

(1) *Electrical trouble.* Under the above conditions, if the armature is not held electrically to the marking position, the trouble may be assumed to be electrical. As the motor rotates, the reperforator-transmitter runs open (mechanisms operate continuously). Manually operate the armature to the marking position. If this action causes the reperforator mechanisms to stop operating, the trouble is definitely electrical. However, if the mechanisms continue operating with the armature held in the marking position, the reperforator may have both electrical and mechanical faults. Many of the common electrical troubles and the corrective action for each are included in the troubleshooting chart (par. 211).

(2) *Mechanical trouble.* If the armature is electrically held to the marking position under the test conditions described above, and the reperforator-transmitter runs open, the trouble may be assumed to be mechanical. Not all mechanical troubles may be sectionalized by this method. Examples of this type are failure of the tape feed mechanism and the ribbon mechanism. Normally, this type of trouble is obviously mechanical and the above tests are not necessary. Refer to the troubleshooting chart for the normal symptoms and corrective actions for this type of trouble.

(3) *Localizing trouble.* After the trouble has been tentatively identified as electrical or mechanical, the next step is to localize the trouble (trace it to a particular part in the circuitry or mechanisms). Localizing electrical and mechanical troubles is described in paragraphs 209 and 210.

209. Localizing Electrical Troubles

Many electrical troubles may be located visually. Examples of this type of trouble are burned-out resistors, a wire broken loose from a connection point, and visible arcing in the circuit. Others require the methodical testing of each circuit as a whole, and the testing of individual components in each circuit. Normally, certain routine preliminary tets are made before detailed testing of any individual circuits. Be sure that the power cord plug is pressed firmly into the power outlet and that the SELECTOR switch is positioned for the type of operation required. If the motor fails to operate, or the copy light fails to light, check the fuse in the power supply and terminal unit. Check the power at the power outlet also, because the power circuit may have failed. If the motor operates properly and trouble is encountered in all three positions of the SELECTOR switch, place the SELECTOR switch in position 3 and check the LOCAL REPUNCH circuit (figs. 203 and 204) as described in *b*(1) and (2) below. If trouble is encountered only in position 1 or 2, check the circuits associated with that particular switch position as described in *a* or *b* below.

a. Ohmmeter Method. The ohmmeter is used to determine whether an open is present in a circuit and to locate the exact component that contains the open. Multimeter TS–297/U, or any similar test set may be used for this test. Arrange the test set to measure resistance (ohms), because this test is actually a resistance test of a circuit or component of a circuit. Check the continuity of a circuit in the following steps.

Caution: Disconnect all power from the reperforator-transmitter before making any continuity tests. Failure to do so will damage the meter.

(1) To check the continuity of an entire circuit, arrange the meter in series in the circuit by placing the test leads at appropriate points. Isolate the circuit under test to cause the testing current to flow through the desired circuit only. Isolation is important because adjacent circuits in parallel with a circuit under test can result in a false reading of apparent continuity in a circuit which actually is open.

(2) When it has been established definitely that a circuit contains an open (shown as infinite resistance on the meter), the open may be traced to a specific portion of the circuit by placing the meter in series with half the circuit or some other convenient subdivision. If the meter shows continuity in this portion, check the remaining portions to localize the trouble to a particular portion of the circuit. With one meter lead placed at one side of the portion containing the open, trace the open to a specific circuit component, or connection point by moving the other lead from point to point through the circuit until the meter reading shows a loss of continuity (infinite resistance).

b. Voltage Drop Method. The voltage drop method of determining the location of a short or open in an electrical circuit requires that the normal power supply to the circuit under test be operative. Before attempting to check a circuit by this method, the maintenance man should make a detailed analysis of the circuit. The circuit should be drawn out in simplified form and the voltage at each point in the circuit computed by means of Ohm's law. When meter readings are taken on the actual working circuit, any variations in voltage between the actual and the computed values will give an indication of the type of trouble (a short or open) present in the circuit. To get a voltage drop across a resistor or coil, voltage, current, and resistance must be present in the circuit. When current flows through a resistor or coil in a dc circuit, a voltage equal to the current multiplied by the dc resistance of the component is expended (dropped). If the circuit is open, no current will flow and no voltage drops will be found across any of the resistive elements in the circuit under test. If there is a short across a resistive element in a dc circuit, current will flow because a complete electrical path exists through the circuit. No voltage drop, however, will be found across the shorted element, and the voltage drops across the other resistors will be higher than computed during the initial circuit analysis. To check the LOCAL REPUNCH circuit for a short or open, follow the procedure given in (1) and (2) below:

(1) *Open circuit.* Set the voltmeter to read 400 volts dc. With the power connected to the TT–76(*)/GGC and the POWER switch in the ON position, place the meter leads across the output terminals of the selenium rectifier. The meter should indicate approximately 120 volts dc. Leave one meter lead on the negative (−) terminal of the rectifier and move the other lead point-to-point around the circuit until the voltage reading is lost. The open will be found between the last point a reading was present and the first point a reading was not present. To verify the results, place the meter lead on the positive (+) terminal of the rectifier and check the circuit point-to-point in the opposite direction.

(2) *Short circuit.* Set the voltmeter to read 400 volts dc. With the power connected to the TT–76(*)/GGC and the POWER switch in the ON position, place the meter leads across the output terminals of the selenium rectifier. The meter should indicate approximately 120 volts dc. Leave one meter lead on the negative (−) terminal of the rectifier and proceed to check the circuit point-to-point. A short is indicated when a coil or resistor fails to produce a voltage drop. To verify the results, place the meter lead on the positive (+) terminal of the rectifier and check the circuit point-to-point in the opposite direction.

c. Capacitor Test. Capacitors may cause circuit troubles by developing internal shorts, opens, or leaks. To test a capacitor, short the capacitor leads or terminals first, to remove any existing charge. Arrange the meter to read ohms (using the highest scale) and touch the capacitor terminals with the meter leads.

Caution: Be absolutely sure to remove any existing charge from a capacitor before testing. Failure to do so may result in severe electrical shock.

(1) A good capacitor causes the needle to move up the scale rapidly and slowly return to the infinity mark (maximum resistance).

(2) An open capacitor will not cause the meter to move from the maximum resistance mark.

(3) A capacitor with an internal short will cause a meter reading of constant value between zero and infinity, depending on the resistance of the short.

210. Localizing Mechanical Troubles

Most mechanical troubles may be located by a careful examination of the faulty mechanism as it operates while turning the motor manually.

a. If the trouble has definitely been established as mechanical, and the code rings are not positioned in accordance with the code group received, the fault is in the selector or transfer mechanism. The impulse recording train of parts for each code impulse must be examined carfeully while turning the motor over manually. If each code impulse is properly recorded in the selector Y-levers, check the transfer operation and associated code-ring mechanisms.

b. If the printing mechanism prints the correct character but the punching mechanism does not, the trouble may be located by a careful examination of the punching mechanism while turning the motor shaft over manually.

c. If the correct code holes are punched in the paper tape but an incorrect character is printed, the fault is in the character selection and printing mechanism. Examine the operation of this mechanism while rotating the motor manually.

d. The symptoms, causes, and corrective actions for additional common mechanical troubles are listed in the troubleshooting chart.

211. Troubleshooting Charts

The most common reperforator, transmitter-distributor, and keyboard-transmitter troubles, probable causes, and corrective actions are listed in *a* through *c* below. Both electrical and mechanical troubles are listed, but they are not separated into groups because some faulty conditions may be caused by either type of trouble. Several probable causes are listed for most troubles, but they rarely occur at the same time. The troubleshooter must determine by a thorough check of each item which one causes the particular trouble under investigation.

a. Reperforator Troubleshooting Chart.

Symptom	Probable cause	What to do
Motor fails to start	Power input fuse blown	Replace fuse (par. 14*b*).
	Failure of power source	Correct defect or use another power source (par. 14*f*).
	Governor spring loose or broken	Repair or replace spring (par. 276*b*).
	Governor electrical contacts dirty or pitted	Clean, burnish or replace electrical contacts (par. 276*b*).
	Electrical contact brushes not sealed properly or badly worn.	Adjust or replace electrical contact brush (pars. 274 and 276*b*).
	Open field or armature winding	Replace motor (par. 272).
	Bind in the shafts or bearings	Locate and correct trouble in mechanism (par. 210).
	Dirty commutator on motor	Clean commutator (par. 275).
Motor runs but speed is erratic	Governor electrical contacts dirty or pitted	Clean, burnish or replace electrical contacts (par. 276).
	Governor spring broken	Replace spring (par. 276).
	Dirty commutator on motor	Clean commutator (par. 275).
Reperforator operates properly but causes clicks and noises in local radio equipment.	Table not grounded properly	Ground table.
	Filter assemblies in motor circuit open	Check filter circuits (par. 200*b*).
	Grounding strap from base to cover not connected.	Connect grounding straps (par. 13).

Symptom	Probable cause	What to do
Reperforator runs open (mechanism does not stop operating) when line current should be steady marking.	Transfer lever trip latch spring broken or missing	Replace transfer lever trip latch spring (par. 271).
	Low line current	Check singal circuit power source and adjustment of line current control resistor (not part of reperforator).
	Space instead of *mark* impulses received (polar operation).	Reverse signal line connection.
	Receive circuit open or shorted	Check receive circuit for continuity or short and repair fault (par. 209).
	Selector magnet armature not holding stop lever.	Readjust selector magnet bracket and stop levcr (pars. 117, 125, and 126).
	Selector camshaft locking lever spring broken.	Replace spring (par. 266).
	Selector camshaft stop plate or locking lever worn or broken.	Replace stop plate or lever (par. 266 or 279).
	Bias potentiometer not adjusted properly (neutral operation).	Readjust bias potentiometer (par. 304*b* and *c*).
Motor operates but reperforator runs closed (does not respond to incoming code signals).	Motor worm gear not rotated by motor	Check for broken or missing motor shaft pin (par. 273).
	Main shaft not rotated by worm gear	Check for broken or missing gear pin on power shaft (par. 281).
	Selector friction clutch failing	Set clutch collar for proper spring tension. Tighten clutch fork setscrews (par. 129 or 130).
	Maladjusted selector camshaft lever eccentric.	Adjust eccentric (par. 125 and 126).
	Maladjusted selector magnet bracket	Adjust bracket (par. 117).
	Open component in bias circuit	Check bias potentiometer, bias windings of magnet, fixed resistor (par. 201*d*).
Reperforator prints but range (rangefinder measurement) is narrow.	Line current too high or too low	Readjust line current.
	Bias potentiometer improperly set	Readjust bias potentiometer (par. 304*b* and *c*).
	Motor speed improper at transmitting teletypewriter.	Request transmitting station to make motor speed check.
	Selector mechanism improperly adjusted	Make complete readjustment of selector mechanism (pars. 86, 92 and pars. 117—131).
Reperforator prints errors or scrambles letters and functions.	Rangefinder or bias potentiometer improperly set.	Readjust bias potentiometer and rangefinder (par. 304*b* and *c*).
	Transfer lever trip latch spring broken or missing.	Replace spring (par. 271).
	Excessive crossfire or noise pickup on line	Check line and associated equipment.
	Selector camshaft friction clutch slipping	Readjust clutch and tighten setscrews or replace worn felt washers (par. 129 or 130 and par. 279).
	Dirty, binding, or sticking selector mechanism.	Clean and adjust selector mechansim (pars. 86–92 and pars. 117–131).
	Worn or broken **Y**-or **T**-levers	Replace defective parts (par. 265 or 266 and par. 271).
	Selector lever spring broken	Replace spring (par. 266).
	Selector magnet or mounting loose	Readjust and tighten mounting screws (par. 117).
Reperforator continues to print the same character or perform the same function although no additional signals are being received.	Transfer lever trip latch spring or transfer lever spring broken.	Replace broken spring (par. 271).
Certain characters (or functions) will not print.	Stop bar sticking	Clean stop bar guide plates and code rings (par. 37*f*).
	Stop bar lever spring broken	Replace spring (par. 270)

Symptom	Probable cause	What to do
Type wheel will not stay in figures shift position.	Letters figures shift latch lever spring broken or missing.	Replace spring (par. 267).
	Letters stop bar broken	Replace stop bar (par. 270).
Type wheel cannot be prevented from returning to figures shift position or is erratic.	Figures stop bar broken	Replace stop bar (par. 270).
	Figures sensing lever spring broken	Replace spring (par. 268).
Signal bell does not operate	Clapper bent	Straighten clapper as required to sound bell (par. 79).
	Broken or loose bell sensing lever spring	Replace or attach spring (par. 267).
	Maladjusted bell stop bar adjustable fulcrum in code-ring cage.	Adjust fulcrum (par. 78).
Reperforator prints part of characters only.	Type wheel not properly adjusted on type wheel post.	Readjust post setting (par. 106).
	Ribbon feed not operating properly	Check ribbon feed (par. 25*j*).
	Type wheel hub assembly not aligned with type wheel.	Check alignment (par. 106).
Printing too light	Print hammer lever not adjusted properly	Adjust print hammer eccentric stop (par. 104).
	Worn ribbon	Replace ribbon (par. 24*c*).
Ribbon does not feed or ribbon feed does not reverse.	Ribbon spools not seated correctly	Check seating of spools (par. 24*c*).
	Ribbon reversing arm contact plunger spring missing or broken.	Replace spring (par. 256 or 257).
	Ribbon sensing-lever bent, dirty, or broken	Clean and adjust or replace parts as required (par. 256 or 257).
Reperforator operates correctly but emits grinding or whining noise.	Fouled bearings in motor, main shaft, or function shaft.	Replace bearings if necessary (par. 281 or 282, 280, and par. 277 or 278).
	Motor shaft or main shaft bent	Replace bent shaft (par. 281 or 282 and par. 280).
Tape perforations improperly spaced.	Feed sprocket detent lever not adjusted	Adjust detent lever (par. 100).
Tape breaks	Tape puller machanism improperly timed	Adjust tape puller (pars. 135 and 136).
	Tape reel binding	Remove obstacle binding tape reel.
Manual tape feed-out does not operate.	Loose lever or linkage	Adjust manual tape feed-out mechanism (pars. 132 and 133).
Tape does not feed properly	Feed pawl pivot out of adjustment	Adjust pivot (par. 99).

b. Transmitter-Distributor Troubleshooting Chart.

Symptom	Probable cause	What to do
Transmitter-distributor camshaft does not rotate.	Clutch magnet not energized	Check tape-out linkage adjustment and switch. Check clutch magnet circuit (par. 148 or 201*e*).
	Clutch magnet armature does not clear stop lever.	Check armature eccentric stud adjustment and magnet cores adjustment (pars. 145 and 146).
	Friction clutch dry or out of adjustment	Check friction clutch adjustment and lubricate (par. 160 or 161 and par. 43*d*).
	Stop-start lever not in START position	Operate lever to correct position (par. 25*o*(2)).
	Gray plug disconnected	Connect gray plug (par. 19).
Camshaft rotates but transmitter-distributor cannot transmit code signals to the line.	Signal circuit shorted	Check circuit connections and the transmitter-distributor signal circuit (par. 201*a*(2)).
	Line current not furnished by associated equipment.	Check current supply.
	Transmitter contacts dirty or out of adjustment.	Clean contacts and adjust (par. 37*c* and 147).
	Transmitter contact bail spring weak or broken.	Replace spring (par. 239).

Symptom	Probable cause	What to do
Transmitter-distributor transmits garbled copy.	Friction clutch dry or out of adjustment	Check friction clutch adjustment and lubricate (par. 160 or 161 and par. 43*d*).
	Transmitter contacts dirty or out of adjustment.	Clean contacts and adjust (pars. 37*c* and 147).
	Transmitter contact bail spring weak	Replace spring (par. 239).
	Transmitter-distributor top cover out of alignment.	Adjust top cover alignment (par. 159).
	Bind in the sensing levers or selectors levers	Free bind and readjust if necessary (par. 153).
Transmitter-distributor transmits only the blank combination.	Transmitter contacts dirty or out of adjustment.	Clean or adjust contacts (pars. 37*c* and 147).
	Selector lever comb out of adjustment	Adjust comb (par. 144).
	Code sensing lever spring weak	Replace springs (par. 236).
	Code sensing levers binding	Readjust comb to eliminate bind (par. 144).
Transmitter-distributor camshaft rotates continuously.	START-STOP switch open	Replace switch (par. 235).
	Tape-out linkage out of adjustment	Adjust tape out linkage (par. 148).
	Camshaft stop lever binding	Free bind, readjust selector lever comb if necessary (par. 144).
	Clutch magnet armature spring weak or broken.	Replace spring (par. 240).
	Stop lever spring weak or broken	Replace spring (par. 237).
Tape does not feed properly	Feed tape claw bent, broken or binding	Repair or replace if necessary (par. 236).
	Tape feed lever spring, or feed claw spring weak.	Replace springs (par. 236).
	Tape feed lever bent out of engagement with the tape feed claw.	Straighten tape feed lever and engage it with the tape feed claw (pars. 236 and 237).
Transmitter-distributor operates properly but causes clicks and noises in local radio equipment when sending.	Electrical noise suppressor shorted, open or not grounded properly.	Check suppressor; replace if necessary (par. 240).

c. Keyboard-Transmitter Troubleshooting Chart.

Symptom	Probable cause	What to do
Cannot send from keyboard-transmitter.	Black plug disconnected	Connect plug (par. 19).
	Transmitter stationary contacts out of adjustment.	Adjust contacts (par. 52).
	Keyboard-transmitter plug and jack disconnected.	Connect plug and jack (par. 216*b*).
	Transmitter universal bar adjusting screw improperly adjusted.	Readjust universal bar adjusting screw (par. 54).
	Keyboard-transmitter friction clutch dry or out of adjustment.	Lubricate and readjust if necessary (par. 43*d* and par. 55 or 56).
	Cam-stop lever spring broken or missing	Replace spring (par. 228 or 229).
Keyboard - transmitter camshaft ratates continuously.	Universal code bar return spring missing or broken.	Replace spring (par. 225 or 226).
	Universal bar adjusting screw out of adjustment.	Adjust universal bar adjusting screw (par. 54).
Keyboard-transmitter transmits garbled copy.	Friction clutch dry or out of adjustment	Lubricate and adjust if necessary (par. 43*d* and par. 55 or 56).
	Transmitter contacts dirty or out of adjustment.	Clean contacts and adjust if necessary (pars. 37*c* and 52).
	Contact bail spring weak	Replace spring (par. 222).
	Bind in sensing levers or selector levers	Free bind (par. 37*c*).
	Sensing lever locking bail spring broken or missing.	Replace spring (par. 223).

Symptom	Probable cause	What to do
Indicator carriage does not advance to the right.	Ratchet pawl spring broken or missing	Replace spring (par. 220 or 221).
	Cam follower spring broken	Replace spring (par. 220 or 221).
	Ratchet wheel detent spring broken or missing.	Replace spring (par. 220 or 221).
Indicator carriage does not return to zero when CAR. RET. key lever is depressed.	CAR. RET. finger bent or broken	Straighten finger or replace function blocking bar (par. 220 or 221).
	Indicator return spring broken	Replace spring (par. 220 or 221).
	Indicator drive shaft requires lubrication	Lubricate shaft (par. 43*e*).
END OF LINE INDICATOR lamp does not light.	END OF LINE INDICATOR lamp burned out.	Replace lamp (par. 291 or 292).
	Indicator lamp switch contacts out of adjustment.	Adjust switch contacts (par. 63 or 64).
	Short or open in lamp circuit	Locate short or open and correct fault (par. 200*d*).
End of line signal bell does not ring (TT-76A/GGC).	Indicator carriage roller missing	Replace roller (par. 219).
	Bell clapper bent	Straighten clapper (par. 64).
Keyboard - transmitter operates properly but causes clicks and noises in local radio equipment when sending.	Filter assembly shorted, open or not properly grounded.	Check filter, replace if necessary (par. 228 and 229).

Section IV. REMOVAL AND REPLACEMENT OF REPERFORATOR-TRANSMITTER COMPONENTS

212. General

a. This section describes replacement procedures required to overhaul completely a defective or inoperative Teletypewriter Reperforator-Transmitter TT-76(*)/GGC. Procedure includes replacement of all parts of the TT-76(*)/GGC except those parts for which the procedure is obviously simple.

b. Except in extreme emergency, all repairs should be made by personnel thoroughly trained in teletypewriter maintenance. It is as important to know what not to do as well as what to do. Equipment operating with minor faults may fail completely as the result of efforts by inexperienced personnel to correct apparently simple defects.

c. Follow the inspection, cleaning, and lubricating instructions in paragraphs 204 through 207. When repairs are made, the reperforator-transmitter should be completely readjusted in accordance with paragraphs 49 through 161.

213. General Disassembly Procedure

a. Preparation for Disassembly. Follow the procedures given in (1) through (3) below before disassembling the reperforator-transmitter.

(1) Arrange a clean place on a bench or table to work. Make certain that dust or dirt will not fall or be blown into the mechanism while it is disassembled.

(2) Obtain several small, clean cardboard, wood, or metal containers to store removed parts.

(3) Arrange the necessary tools and materials so that they will be readily accessible during the progress of the repair work.

b. Disassembly Procedure.

(1) Disconnect the power and signal line connections.

(2) Remove the dust cover.

(3) Remove the inking ribbon and paper tape roll.

(4) Proceed to disassemble the various parts and assemblies; use the correct tool for each specific operation. Do not disassemble the reperforator-transmitter or its assemblies beyond the point necessary to thoroughly inspect and clean the mechanism, and to repair and replace defective parts.

(5) When small parts are disassembled, place them in a container and tag them to identify their point of disassembly. Vary the sequence of disassembly to meet any particular situation.

(6) While the equipment is disassembled for checking and repair, replace any parts that are likely to cause trouble before the next scheduled overhaul of the TT–76(*)/GGC.

214. General Reassembly Procedures

All parts, subassemblies, and units should be reassembled in accordance with the following provisions:

a. Replace all worn or broken parts that may cause malfunctioning of the reperforator-transmitter and adjust them in accordance with the directions in paragraphs 49 through 161.

b. Assemble replaced parts and associated parts. Tighten all screws, nuts, and bolts carefully, but not excessively. Many of the threaded holes are tapped into aluminum or magnesium alloy castings. These threads may be stripped by the use of too much force. To prevent binding when installing steel screws in aluminum or magnesium alloy castings, it is important that they be treated with antiseize compound, stock No. CE–52–2724.500.080 before installation.

c. Be careful to replace the correct springs in the friction clutches. Although the springs are similar in appearance, they are not identical. Improper assembly could cause faulty operation and premature failure of the clutches. (Refer to the spring data charts, pars. 297–301.)

d. When parts are secured on shafts by setscrews, remove the setscrews and align the tapped holes with the flats on shafts.

e. Support parts into which taper pins are being driven with wooden or other soft supports to prevent bending or distortion.

f. If the locking edges of lockwashers are rounded, install new lockwashers.

g. Replace screws or nuts that have damaged heads or threads.

h. Some bent and distorted parts may be restored to shape and re-used provided no cracks result from the straightening process.

215. Removal and Replacement of Reperforator-Transmitter Chassis

a. Removal.

(1) On the TT–76/GGC, remove the four machine screws (1, fig. 272) and lockwashers (2) that hold the reperforator frame to the mounting table or to the alternate wooden mounting base and metal base plate.

(2) On the TT–76A/GGC, diconnect the power cable plug from the receptacle connector on the mounting base at the rear of the transmitter-distributor. Disconnect the transmitter-distributor plug from the receptacle connector on the mounting base at the rear of the transmitter-distributor. Disconnect the tape reel plug and the keyboard-transmitter plug from the receptacle connector at the right of the keyboard-transmitter. Remove the four machine screws (1, fig. 273) and lockwashers (2) that hold the reperforator frame to the mounting base.

(3) Carefully lift the reperforator-transmitter clear of the mounting base. Do not hold onto the cable, tubing, levers, or other parts that might be easily damaged when lifting the reperforator-transmitter chassis from its base.

b. Replacement. Replace the reperforator-transmitter on the mounting base by reversing the procedures outlined in *a* above.

216. Removal and Replacement of Keyboard-Transmitter

a. Removal.

(1) On the TT–76/GGC, remove the two machine screws (1, fig. 270) and lockwashers (2) that hold the keyboard guard to the mounting base.

(2) On the TT–76A/GGC, tilt the keyboard guard away from the reperforator.

(3) Remove the keyboard-transmitter plug.

(4) Remove the two machine screws (1, fig. 218) and lockwashers (2), and flat washers (3) that hold the keyboard casting to the reperforator frame.

(5) Pull the keyboard-transmitter to the front and lift it away from the reperforator.

b. Replacement.

(1) Position the keyboard-transmitter on the reperforator frame. Engage the keyboard-transmitter friction clutch yoke (2, fig. 214) with the friction clutch driver plate on the keyboard-transmitter drive shaft.

(2) Secure the keyboard-transmitter to the reperforator frame with the two machine screws and lockwashers.

(3) Connect the keyboard-transmitter plug.

(4) On the TT–76/GGC, secure the keyboard guard with the two machine screws (1, fig. 270) and lockwashers (2).

(5) On the TT–76A/GGC, tilt the keyboard guard to its locked position.

217. Removal and Replacement of Indicator Assembly (TT–76/GGC)

(fig. 209)

a. *Removal.*

(1) Unsolder and disconnect the two wires that connect the cable to the indicator lamp switch (19) .

(2) Remove the three machine screws (1) and lockwashers (2) that hold the indicator cover (4) to the indicator frame (40); remove the follower stop (3) and the indicator cover (4).

(3) Remove the two machine screws (5) and lockwashers (6) that hold the lower portion of the indicator frame (40) to the code bar guide studs.

(4) Remove the indicator assembly by carefully lifting it and moving it slightly to the right to clear the key levers.

b. *Replacement.*

(1) Replace the indicator assembly by reversing the procedures outlined in *a* above; make certain that the fingers on the function blocking bar (32) line up to the right and extend beneath their respective key levers. Replace the follower stop (3) on the right-handed side of the indicator cover and fasten in place with the machine screw (1) and lockwasher (2).

(2) Adjust the indicator assembly as described in paragraphs 57 and 65.

218. Removal and Replacement of Indicator Assembly (TT–76A/GGC)

(fig. 210)

a. *Removal.*

(1) Unsolder and disconnect the two wires which connect the cable to the indicator lamp switches (22).

(2) Remove the three machine screws (1) and lockwashers (2) that hold the follower stop (3) and the indicator cover (4) to the indicator frame (47); remove the follower stop (3) and the indicator cover (4).

(3) Remove the two machine screws (5) and lockwashers (6) that hold the lower portion of the indicator frame (47) to the Code bar guide studs.

(4) Remove the indicator assembly by carefully lifting it and moving it slightly to the right to clear the key levers.

b. *Replacement.*

(1) Replace the indicator assembly by reversing the procedures outlined in *a* above; make certain that the fingers on the function blocking bar (39) line up to the right and extend beneath their respective key levers. Replace the follower stop (3) on the right-handed side of the indicator cover and fasten in place with the machine screw (1) and lockwasher (2).

(2) Adjust the indicator assembly as described in paragraphs 57 and 65.

219. Disassembly and Reassembly of Line Indicator Drive Shaft Assembly

(fig. 211)

a. *Disassembly.*

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

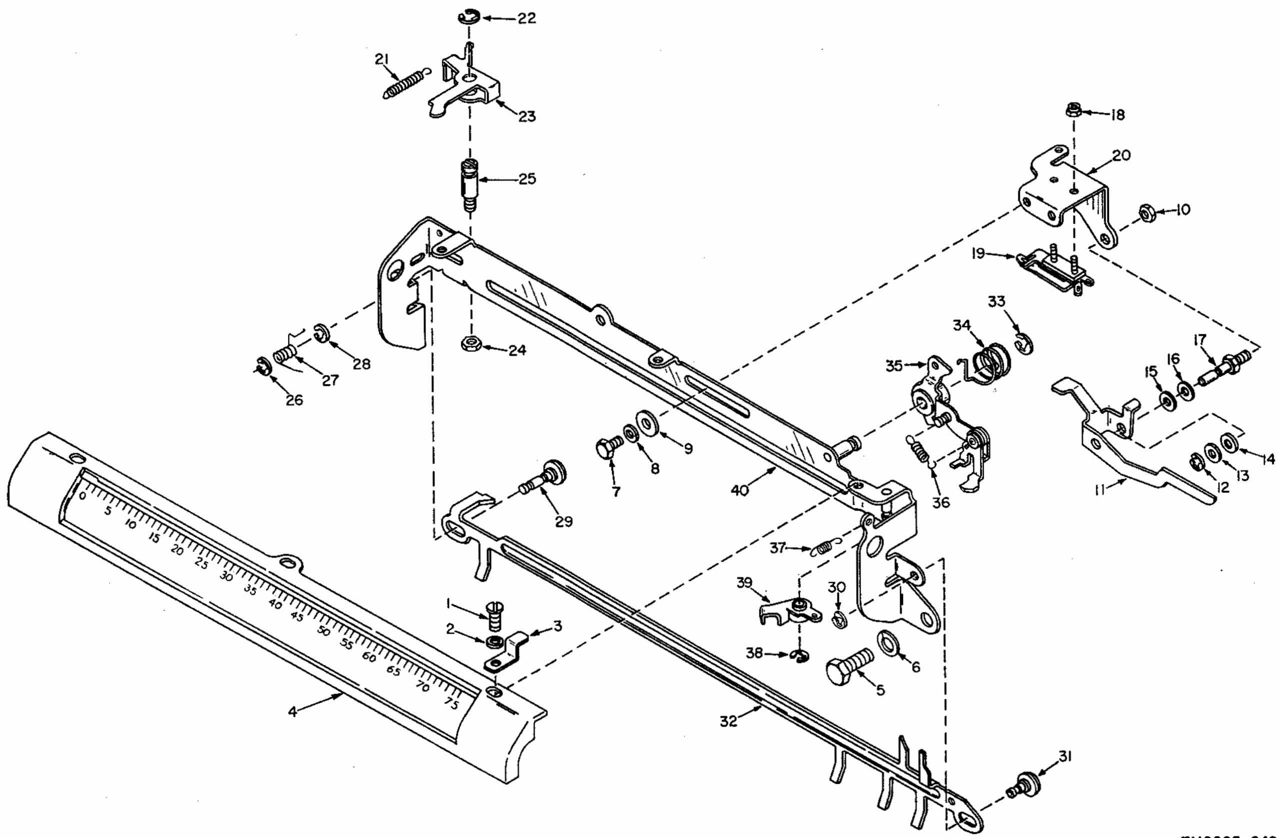
(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 217*a* or 218*a*.

(3) Remove the retainer ring (1) and the flat washer (2) from the end of the line indicator drive shaft (18).

(4) Remove the retainer ring (3) from the line indicator drive shaft (18). Remove the retainer ring (4) from the bearing (5); remove the bearing from the indicator frame assembly.

(5) Remove the retainer ring (6) from the bushing in the indicator return spring assembly (11); slide the line indicator drive shaft (18) to the right and remove the line indicator drive shaft assembly from the indicator frame assembly.

(6) Remove the guide roller (7) from the drive pin (15).



1	Machine screw, 10393	21	Return latch spring, 53312
2	Lockwasher, 10429	22	Retainer ring, 10949
3	Follower stop, 53896	23	Return latch, 53232
4	Indicator cover, 53251	24	Self-locking hexagonal nut, 10500
5	Machine screw, 10397	25	Return latch stud, 53233
6	Lockwasher, 10431	26	Retainer ring, 10969
7	Machine screw, 10503	27	Blocking bar spring, 53586
8	Lockwasher, 10429	28	Retainer ring, 10969
9	Flat washer, 10450	29	Blocking bar retaining stud, 53587
10	Self-locking hexagonal nut, 10500	30	Retainer ring, 10977
11	Switch actuating arm, 53228	31	Blocking bar retaining stud, 53249
12	Retainer ring, 10960	32	Function blocking bar, 53229
13	Flat washer, 10463	33	Retainer ring, 10949
14	Flat washer, 10463	34	Cam follower spring, 53289
15	Flat washer, 10463	35	Cam follower, 53235A
16	Flat washer, 10463	36	Ratchet pawl spring, 53283
17	Switch actuating arm stud, 53224	37	Detent spring, 53313
18	Self-locking hexagonal nut, 10535	38	Retainer ring, 10969
19	Indicator lamp switch, 53348A	39	Detent, 53240A
20	Indicator lamp switch bracket, 53219	40	Indicator frame, 53215A

Figure 209. Indicator frame assembly, exploded view (TT–76/GGC).

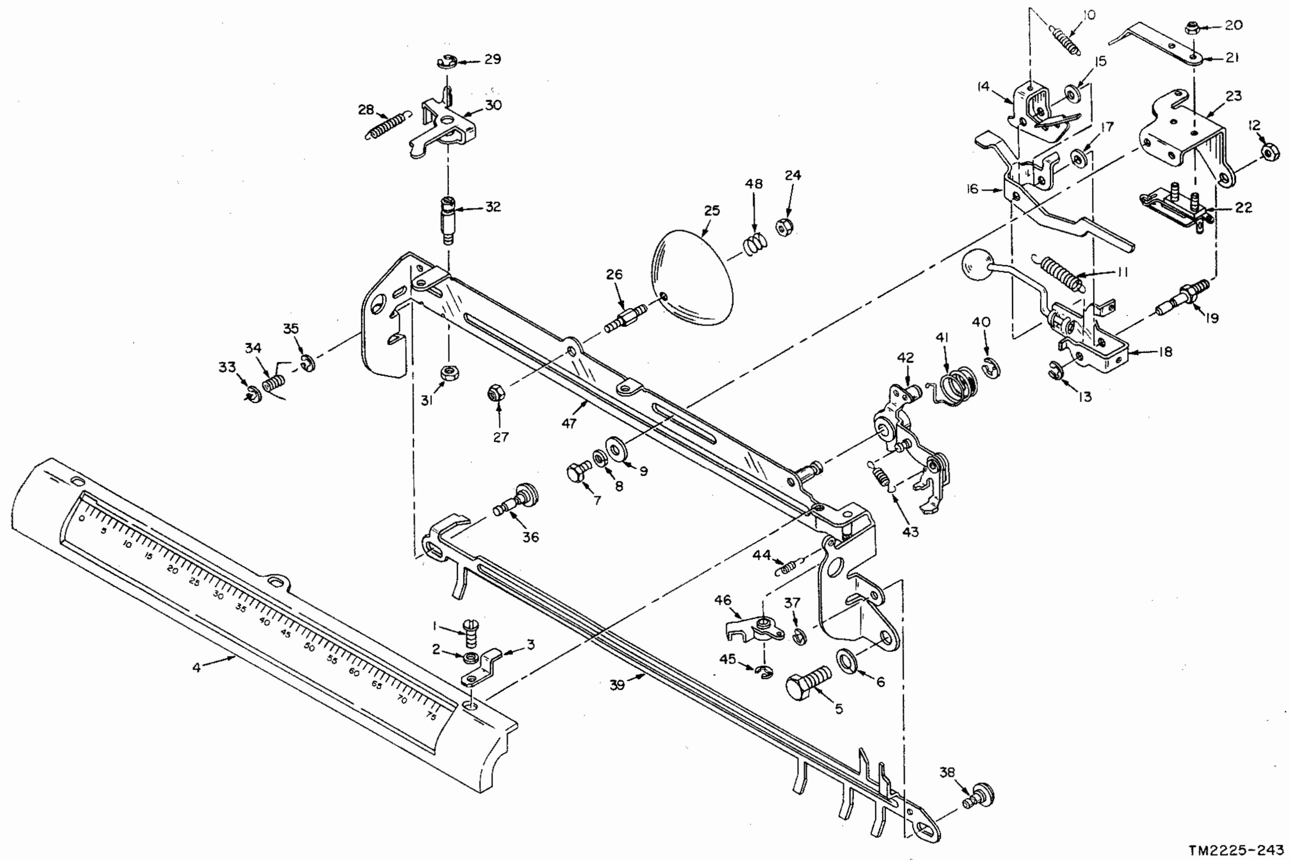
(7) On the TT–76/GGC, remove the indicator return spring assembly (11) from the line indicator drive shaft (18).

(8) On the TT–76A/GGC, remove the drive shaft sleeve (8) and the indicator return spring assembly (11) from the rivet (9); remove the drive shaft sleeve (8) and indicator return spring from the line indicator drive shaft (18).

(9) Drive the rivet (9) from the line indicator drive shaft (18) and remove the spring retainer (10).

(10) Remove the two setscrews (12) from the ratchet wheel (13); remove the ratchet wheel (13) from the line indicator drive shaft (18).

(11) Remove the indicator carriage (14) from the indicator drive shaft (18).



1	Machine screw, 10393	17	Flat washer, 50319	33	Retainer ring, 10969
2	Lockwasher, 10429	18	Clapper arm, 53243A	34	Blocking bar spring, 53586
3	Follower stop, 53896	19	Switch actuating arm stud, 53224	35	Retainer ring, 10969
4	Indicator cover, 53251	20	Self-locking hexagonal nut, 10535	36	Blocking bar retaining stud, 53587
5	Machine screw, 10397	21	Clapper stop, 53184	37	Retainer ring, 10977
6	Lockwasher, 10431	22	Indicator lamp switch, 53348A	38	Blocking bar retaining stud, 53249
7	Machine screw, 10503	23	Indicator lamp switch bracket, 53219	39	Function blocking bar, 53229
8	Lockwasher, 10429	24	Self-locking hexagonal nut, 10500	40	Retainer ring, 10949
9	Flat washer, 10450	25	Indicator bell, 51403	41	Cam follower spring, 53289
10	Pawl spring, 53311	26	Stud, 57263	42	Cam follower, 53235A
11	Clapper arm spring, 53304	27	Self-locking hexagonal nut, 10500	43	Ratchet pawl spring, 53283
12	Self-locking hexagonal nut, 10500	28	Return latch spring, 53312	44	Detent spring, 53313
13	Retainer ring, 10960	29	Retainer ring, 10949	45	Retainer ring, 10969
14	Clapper actuating pawl, 53223	30	Return latch, 53232	46	Detent, 53240A
15	Flat washer, 50319	31	Self-locking hexagonal nut, 10500	47	Indicator frame, 53215A
16	Switch actuating arm, 53228	32	Return latch stud, 53233	48	Spring, 57264

Figure 210. Indicator frame assembly, exploded view (TT–76A/GGC).

(12) Remove the drive pin (15), the plain hexagonal nut (16), and the space indicator (17) from the indicator carriage (14).

b. Reassembly.

(1) On the TT–76/GGC, reassemble by reversing the procedures outlined in *a*(12) through (9) and *a*(7) through (3) above.

(2) On the TT–76A/GGC, reverse (12), (11), (10), and (9) in *a* above.

(3) Position the end of the indicator return spring on the rivet (9); position one full coil of the indicator return spring around the line indicator drive shaft (18). Slide the drive shaft sleeve (8) over the one coil and rivet head.

(4) Complete the reassembly of the TT–76A/GGC by reversing (6) through (3) in *a* above.

(5) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 217*b* or 218*b*.

(6) Replace the keyboard-transmitter on the

reperforator frame as described in paragraph 216*b*.

(7) Adjust the line indicator drive shaft assembly as described in paragraphs 57 through 65.

220. Disassembly and Reassembly of Indicator Frame Assembly (TT–76/GGC)

(fig. 209)

a. Disassembly.

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

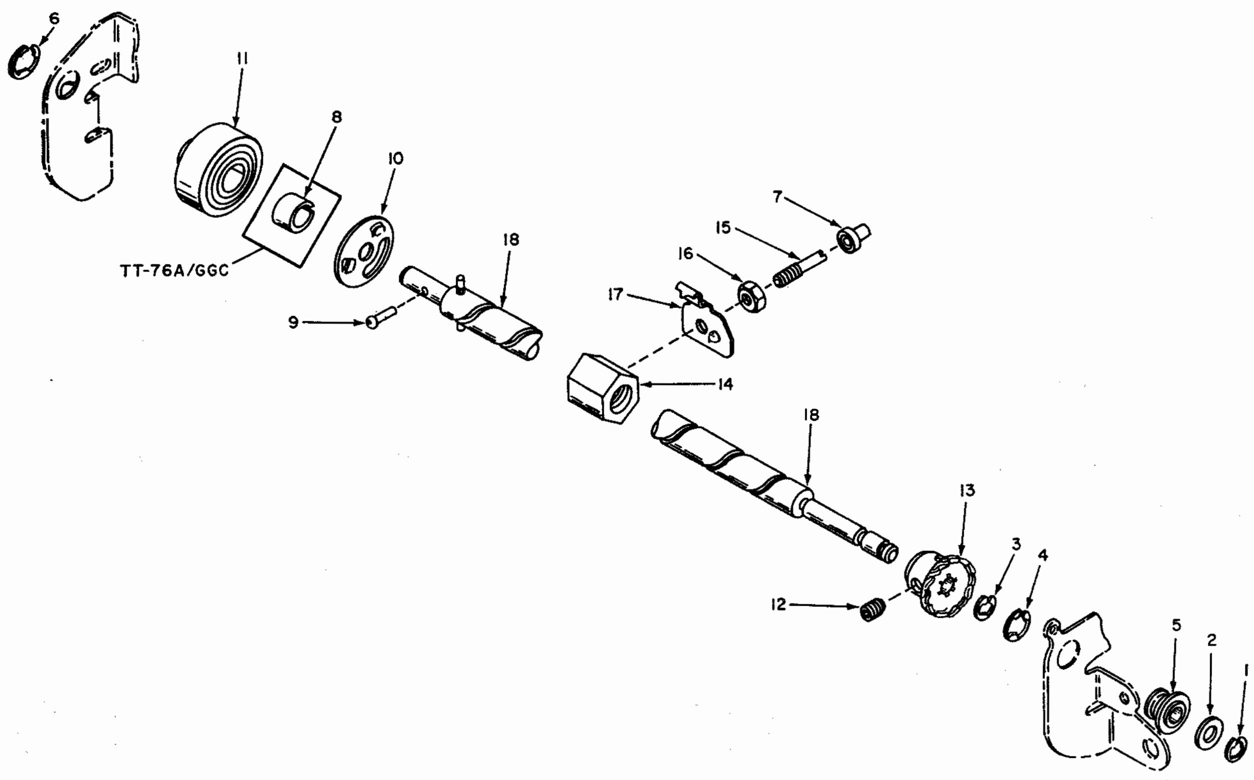
(2) Remove the indicator frame assembly from the keyboard-transmitter as described in paragraph 217*a*.

(3) Remove the two machine screws (7), lockwashers (8), and flat washers (9) that attach the indicator lamp switch bracket (20) to the indicator frame (40).

(4) Remove the self-locking hexagonal nut (10) from the switch actuating arm stud (17) and remove the assembled switch actuating arm and switch actuating arm stud from the indicator lamp switch bracket (20).

(5) Remove the retainer ring (12) and two flat washers (13 and 14); remove the switch actuating arm (11). Remove the two flat washers (15 and 16) from the switch actuating arm stud (17).

(6) Remove the two self-locking hexagonal nuts (18) from the studs on the indicator lamp switch (19); remove the indicator lamp switch (19) from the switch bracket (20).



1 Retainer ring, 10949
2 Flat washer, 50831
3 Retainer ring, 10949
4 Retainer ring, 10998
5 Bearing, 53226
6 Retainer ring, 10998
7 Guide roller, 53246
8 Drive shaft sleeve, 56534 (TT–76A/GGC only)
9 Rivet, 11316
10 Spring retainer, 53252
11 Indicator return spring assembly, 54640A (TT–76/GGC), 56597A (TT–76A/GGC)
12 Setscrew, 10201
13 Ratchet wheel, 53230A
14 Indicator carriage, 53234 (TT–76/GGC), 57191 (TT–76A/GGC)
15 Drive pin, 53247
16 Plain hexagonal nut, 10513
17 Space indicator, 53248
18 Line indicator drive shaft, 53220A (TT–76/GGC), 53220A (TT–76A/GGC)

Figure 211. Line indicator drive shaft assembly, exploded view.

(7) Remove the return latch spring (21) from the return latch (23).

(8) Remove the retainer ring (22) and the return latch (23) from the return latch stud (25).

(9) Remove the self-locking hexagonal nut (24) from the return latch stud (25); remove the return latch stud (25) from the indicator frame (40).

(10) Remove the retainer ring (26), the blocking bar spring (27), and the retainer ring (28) from the blocking bar retaining stud (29); remove the blocking bar retaining stud (29). Remove the retainer ring (30) from the blocking bar retaining stud (31); remove the blocking bar retaining stud (31) and the function blocking bar (32) from the indicator frame (40).

(11) Remove the retainer ring (33) and cam follower spring (34) from the cam follower (35); remove the cam follower from the indicator frame (40). Remove the ratchet pawl spring (36) from the cam follower (35).

(12) Unhook the detent spring (37) from the detent (39) and the indicator frame (40).

(13) Remove the retainer ring (38) from the stud on the indicator frame (40); remove the detent (39) from the indicator frame (40).

b. Reassembly.

(1) Reassemble the indicator frame assembly by reversing the procedures outlined in *a*(13) through (3) above.

(2) Replace the indicator frame assembly on the keyboard-transmitter as described in paragraph 217*b*.

(3) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.

(4) Adjust the indicator frame assembly as described in paragraphs 57 through 65.

221. Disassembly and Reassembly of the Indicator Frame Assembly (TT–76A/GGC)

(fig. 210)

a. Disassembly.

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 218*a*.

(3) Remove the two machine screws (7), lockwashers (8), and flat washers (9) that attach the indicator lamp switch bracket (23) to the indicator frame (47).

(4) Remove the pawl spring (10) from the clapper actuating pawl (14) and the clapper arm (18).

(5) Remove the clapper arm spring (11) from the clapper arm (18) and the indicator lamp switch bracket (23).

(6) Remove the self-locking hexagonal nut (12) from the switch actuating arm stud (19) and remove the assembled clapper actuating pawl (14), switch actuating arm (16), clapper arm (18), and switch actuating arm stud (19) from the indicator lamp switch bracket (23).

(7) Remove the retainer ring (13), clapper actuating pawl (14), flat washer (15), switch actuating arm (16), flat washer (17), and clapper arm (18) from the switch actuating arm stud (19).

(8) Remove the two self-locking hexagonal nuts (20) from the studs on the indicator lamp switch (22); remove the clapper stop (21) and the indicator lamp switch (22) from the indicator lamp switch bracket (23).

(9) Remove the self-locking hexagonal nut (24), spring (48), indicator bell (25), and self-locking hexagonal nut (27) from the stud (26); remove the stud (26) from the indicator frame (47).

(10) Remove the return latch spring (28) from the return latch (30).

(11) Remove the retainer ring (29) and the return latch (30) from the return latch stud (32).

(12) Remove the self-locking hexagonal nut (31) from the return latch stud (32); remove the return latch stud (32) from the indicator frame (47).

(13) Remove the retainer ring (33), the blocking bar spring (34), and the retainer ring (35) from the blocking bar retaining stud (36); remove the blocking bar retaining stud (36). Remove the retainer ring (37) from the blocking bar retaining stud (38);

remove the blocking bar retaining stud (38) and the function blocking bar (39) from the indicator frame (47).

(14) Remove the retainer ring (40) and the cam follower spring (41) from the cam follower (42); remove the cam follower (42) from the indicator frame (47). Remove the ratchet pawl spring (43) from the cam follower (42).

(15) Unhook the detent spring (44) from the detent (46) and the indicator frame (47).

(16) Remove the retainer ring (45) from the stud on the indicator frame (47); remove the detent (46) from the indicator frame (47).

b. Reassembly.

(1) Reassemble the indicator frame assembly by reversing the procedures outlined in *a*(16) through (3) above.

(2) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 218*b*.

(3) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.

(4) Adjust the indicator frame assembly as described in paragraphs 57 through 65.

222. Disassembly and Reassembly of Keyboard-Transmitter Contacts

(fig. 212)

a. Disassembly.

(1) Remove the two machine screws (1) and lockwashers (2) that attach the contact cover (3) to the keyboard frame; remove the contact cover (3) and the two lockwashers (4).

(2) Remove the machine screw (5), the three lockwashers (6) and the two electrical terminal lugs from the side of the contact mounting (15).

(3) Unsolder the two spiraled electrical wires (7) from the tops of the transmitter contacts (11) and transmitter contact terminals (10); remove the spiraled electrical wires (7).

(4) Remove the two machine screws (8) and lockwashers (9) that attach the two transmitter contact terminals (10) to the contact mounting (15); remove the two transmitter contact terminals (10).

(5) Remove the two transmitter contacts (11) from the contact mounting (15).

(6) Remove the contact bail spring (12) from the spring post on the contact mounting (15) and the transmitter contact bail (17).

(7) Remove the two machine screws (13) and lockwashers (14) from the contact mounting (15); remove the contact mounting (15).

(8) Remove the retainer ring (16) from the post (19); remove the transmitter contact bail (17).

(9) Remove the self-locking hexagonal nut (18) from the post (19); remove the post (19).

b. Reassembly.

(1) Position the post (19) in the keyboard frame and secure with the self-locking hexagonal nut (18).

(2) Position the transmitter contact bail (17) on the post (19) and secure with a retainer ring (16).

(3) Replace the contact mounting (15) on the keyboard frame and secure with the two machine screws (13) and lockwashers (14).

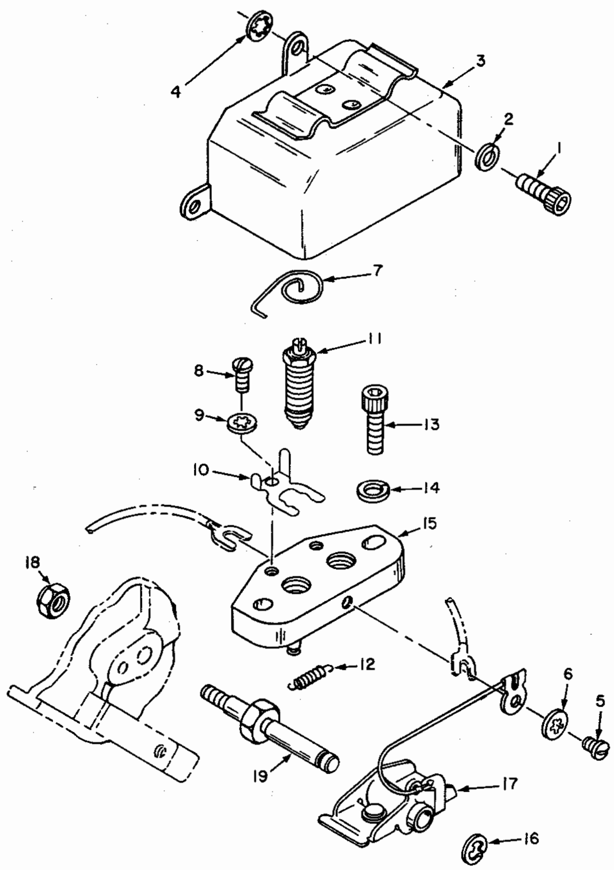
(4) Replace the contact bail spring (12) between the spring post of the transmitter contact and the contact mounting spring post. Install the transmitter contacts (11) in the contact mounting (15).

(5) Insert the transmitter contact terminals (10) in the threads of stationary contacts (11), ½ to 1½ threads above the contact mounting (15); secure the contacts in place with the machine screws (8) and lockwashers (9) but do not tighten the screws. Solder the two spiraled electrical wires (7) between the transmitter contacts (11) and the transmitter contact terminals (10).

(6) Replace the machine screw (5) and three lockwashers (6) that hold the two electrical terminal lugs to the side of the contact mounting (15).

(7) Adjust the transmitter contacts (11) as described in paragraph 142.

(8) Replace the two lockwashers (4) and contact cover (3) and secure with the two machine screws (1) and lockwashers (2).



1 Machine screw, 10055
2 Lockwasher, 10403
3 Contact cover, 51579A
4 Lockwasher, 10403
5 Machine screw, 10301
6 Lockwasher, 10403
7 Electrical wire, 51610
8 Machine screw, 10301
9 Lockwasher, 10403
10 Transmitter contact terminal, 51597
11 Transmitter contact, 51588A
12 Contact bail spring, 51548
13 Machine screw, 10009
14 Lockwasher, 10430
15 Contact mounting, 51595A
16 Retainer ring, 10949
17 Transmitter contact bail, 51582A
18 Self-locking hexagonal nut, 10501
19 Post, 51581

Figure 212. Keyboard transmitter contacts, exploded view.

223. Disassembly and Reassembly of Keyboard-Transmitter Sensing and Selector Levers

a. Disassembly.

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly as directed in paragraph 217*a* for the TT–76/GGC or paragraph 218*a* for the TT–76A/GGC.

(3) Remove the setscrew (1, fig. 213) that holds the sensing lever pivot stud (2) in the keyboard frame; remove the sensing lever pivot stud, catching the flat washers (3, 4, 6, 8, 10, 12, and 14) and sensing levers (5, 7, 9, 11, and 13) as they are released by the stud.

(4) Remove the six selector lever springs (15) from the selector levers (21, 24, 27, 30, 33, 36) and from the selector lever spring bracket (43). Remove the sensing lever locking bail spring (16) from the sensing lever locking bail (19) and from the selector lever spring bracket (43). Unhook the cam-stop lever spring (3, fig. 218) from the selector lever spring bracket (43, fig. 213).

(5) Remove the self-locking hexagonal nut (17) that holds the sensing lever locking bail bearing (18) and the sensing lever locking bail (19) to the selector lever pivot post (40); remove the sensing lever locking bail bearing (18) and the sensing lever locking bail (19).

(6) Remove the spacing collar (20), and the six selector levers (21, 24, 27, 30, 33, and 36), the six bearing shoes (22, 25, 28, 31, 34, and 37), and the six flat washers (23, 26, 29, 32, 35, and 38) from the selector lever pivot post (40), alternating selector lever, bearing shoe, and flat washer until all are removed.

(7) Remove the self-locking hexagonal nut (39) that holds the selector lever pivot post (40) to the keyboard frame; remove the selector lever pivot post (40).

(8) Remove the two machine screws (41) and lockwashers (42) that hold the selector lever spring bracket (43) to the keyboard frame; remove the selector lever spring bracket (43).

(9) Remove the two machine screws (44) and lockwashers (45) that hold the selector levers comb (50) and the adjusting plate (46) on the TT–76A/GGC keyboard frame; remove the selector levers comb (50).

(10) Remove the two machine screws (47) and lockwashers (48) that hold the stop selec-

tor lever latch (49) to the selector levers comb (50); remove the stop selector lever latch (49).

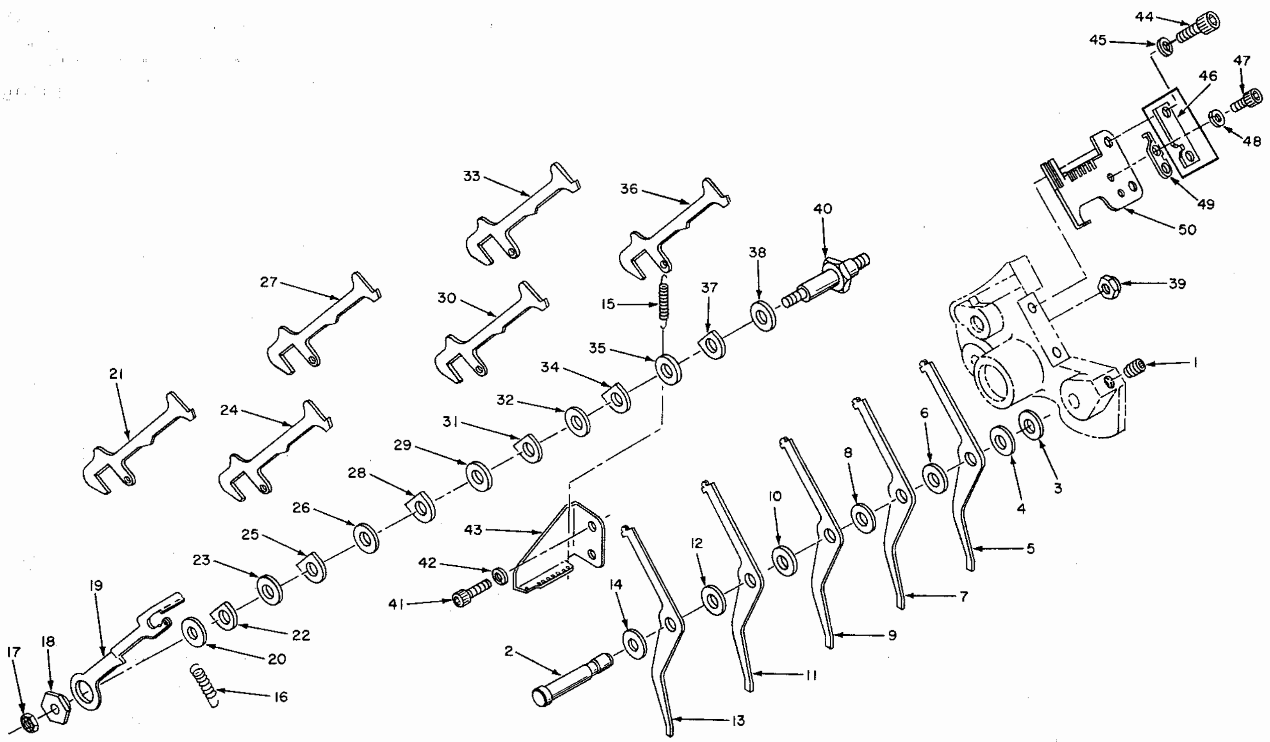
b. *Reassembly.*

(1) Reassemble the keyboard-transmitter sensing and selector levers by reversing the procedures outlined in *a*(10) through (3) above.

(2) Adjust the keyboard-transmitter sensing and selector levers as described in paragraphs 50 through 53.

(3) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 217*b* for the TT–76/GGC or 218*b* for the TT–76A/GGC.

(4) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.



1 Setscrew, 10209
2 Sensing lever pivot stud, 51562
3 Flat washer, 53526
4 Flat washer, 51047
5 Sensing lever, 51565
6 Flat washer, 51047
7 Sensing lever, 51565
8 Flat washer, 51047
9 Sensing lever, 51565
10 Flat washer, 51047
11 Sensing lever, 51565
12 Flat washer, 51047
13 Sensing lever, 51565
14 Flat washer, 51047
15 Selector lever spring, 50902
16 Sensing lever locking bail spring, 51574
17 Self-locking hexagonal nut, 10500
18 Sensing lever locking bail bearing, 51557
19 Sensing lever locking bail, 51567
20 Spacing collar, 51555
21 Selector lever, 50016
22 Bearing shoe, 51604A
23 Flat washer, 50147
24 Selector lever, 50016
25 Bearing shoe, 51604A
26 Flat washer, 50147
27 Selector lever, 50016
28 Bearing shoe, 51604A
29 Flat washer, 50147
30 Selector lever, 50016
31 Bearing shoe, 51604A
32 Flat washer, 50147
33 Seletor lever, 50016
34 Bearing shoe, 51604A
35 Flat washer, 50147
36 Selector lever, 50016
37 Bearing shoe, 51604A
38 Flat washer, 50147
39 Self-locking hexagonal nut, 10501
40 Selector lever pivot post, 51561
41 Machine screw, 10003
42 Lockwasher, 10429
43 Selector lever spring bracket, 54672
44 Machine screw, 10003
45 Lockwasher, 10430
46 Adjusting plate, 55869 (TT–76A/GGC only)
47 Machine screw, 10002
48 Lockwasher, 10429
49 Stop selector lever latch, 55870
50 Selector levers comb, 51558

Figure 213. Keyboard-transmitter sensing and selector levers, exploded view.

224. Disassembly and Reassembly of Keyboard-Transmitter Camshaft

a. *Disassembly.*

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 217*a* (TT-76/GGC) or 218*a* (TT-76A/GGC).

(3) On the TT-76/GGC, remove the cam-stop lever (5, fig. 218) from the cam-stop lever stud (28) as described in paragraph 228*a*(9).

(4) On the TT-76A/GGC, remove the cam-stop lever (5, fig. 219) from the cam-stop lever stud (23) as described in paragraph 229*a*(9).

(5) Remove the two setscrews (1, fig. 214) that hold the clutch yoke (2) to the keyboard-transmitter camshaft (3); remove the clutch yoke (2) and camshaft (3).

(6) Remove the two machine screws (4), lockwashers (5), and flat washers (6) that hold the spacer (7), ball bearing (8), collar (9), and ball bearing (10) in the keyboard frame; remove the spacer (7), ball bearing (8), collar (9), and ball bearing (10) from the keyboard frame.

b. *Reassembly.*

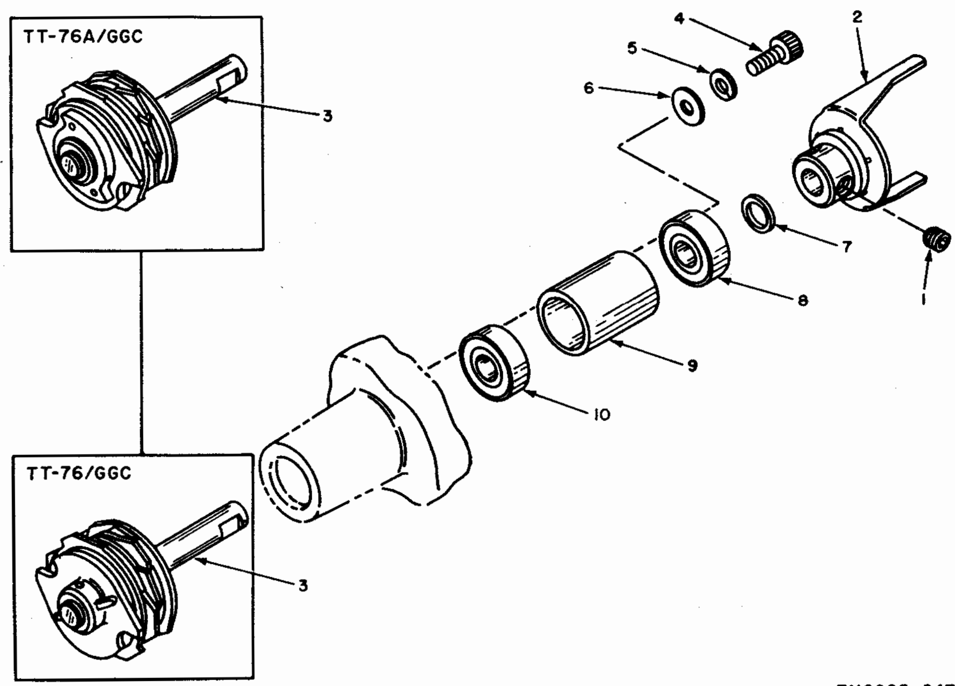
(1) Reassemble the keyboard-transmitter camshaft by reversing the procedures outlined in *a*(6) and (5) above.

(2) Adjust the keyboard-transmitter camshaft as described in paragraph 55 or 56.

(3) Replace the cam-stop lever as described in paragraph 229*b* for the TT-76A/GGC or 228*b* for the TT-76/GGC.

(4) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 218*b* for the TT-76A/GGC or 217*b* for TT-76/GGC.

(5) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.



1 Setscrew, 10209
2 Clutch yoke, 50484A
3 Keyboard-transmitter camshaft, 51545 (TT-76/GGC), 57285A (TT-76A/GGC)
4 Machine screw, 10003
5 Lockwasher, 10429
6 Flat washer, 10450
7 Spacer, 51552
8 Ball bearing, 10753
9 Collar, 51599
10 Ball bearing, 10753

Figure 214. Keyboard-transmitter camshaft, exploded view.

225. Disassembly and Reassembly of Key Levers and Code Bars (TT–76/GGC)

a. Disassembly.

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 217*a*.

(3) Remove the two retainer rings (1 and 2, fig. 215) that hold the space bar bail shaft (3) to the key lever guide (13); remove the space bar bail shaft (3) and the space bar assembly (4).

(4) Remove the 31 key lever springs (5) and the two space bar springs (6).

(5) Remove the space bar lever (7) and the repeat key lever (8).

(6) Remove the long key levers (9), medium key levers (10), and short key levers (11). Remove the keytops (27 and 28) from the key levers only if either is damaged.

(7) Remove the universal code bar return spring (12) and the key lever guide (13).

(8) Remove the four machine screws (14) and lockwashers (15) that hold the key lever mounting bracket (16) to the keyboard frame and the machine screw (9, fig. 218) and lockwasher (10) securing the keyboard filter (11) to the key lever mounting bracket (16, fig. 215); remove the key lever mounting bracket (16).

(9) Remove the two machine screws (17) and the lockwashers (18) that hold the code bar guide studs (19) to the keyboard frame; remove the code bar guide studs (19).

(10) Remove the universal bar (20), the code bars (21–25), and the middle key lever guide (26).

b. Reassembly.

(1) Reverse the procedures outlined in (10) through (7) in *a* above.

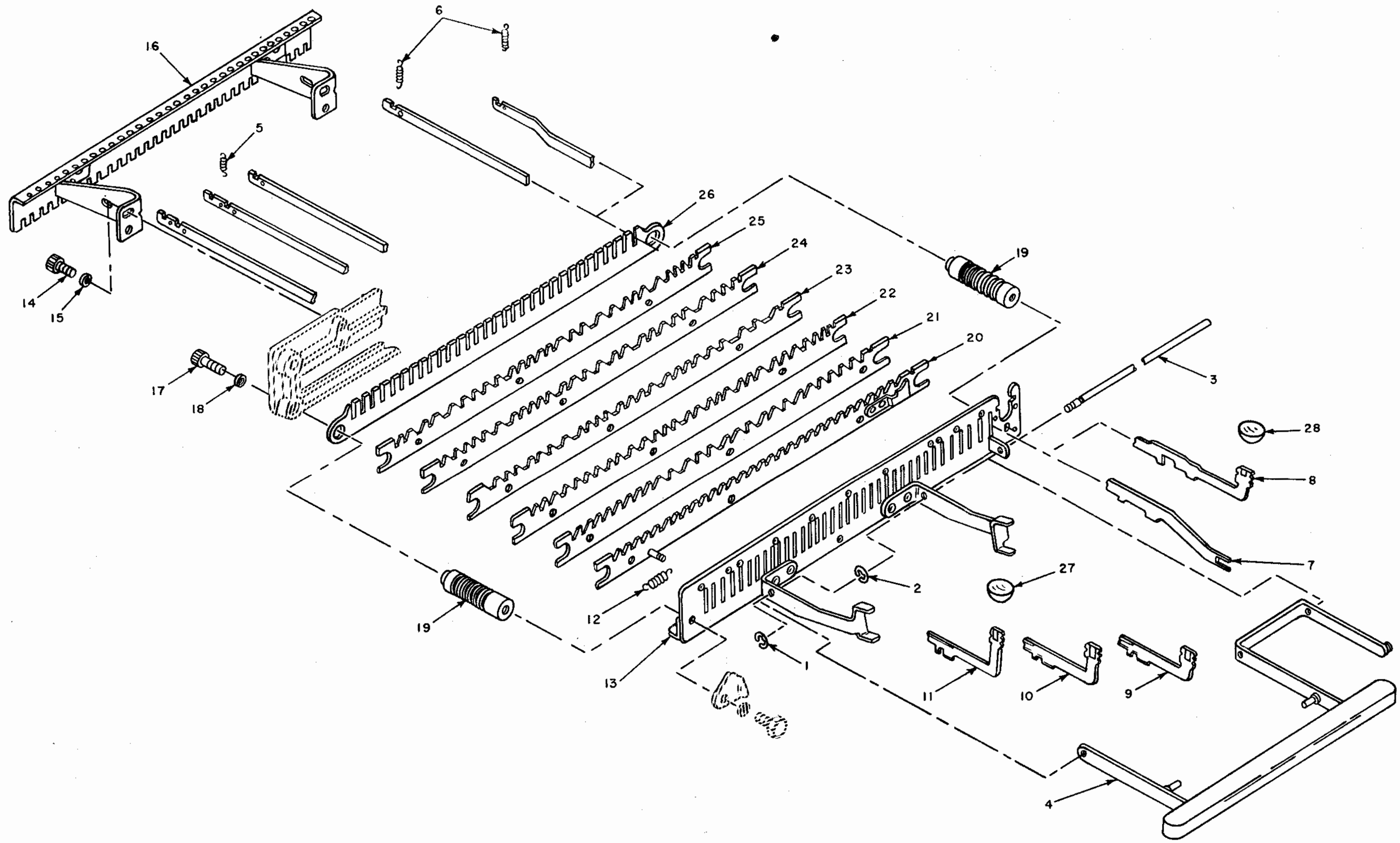
(2) Install the assembled short key levers (11) and keytops (27 and 28) from left to right in the order given in the chart below. similarly install the assembled medium key levers (10) and long key levers (9) and keytops (27) from left to right as indicated in the chart below. The chart also gives the reference symbol for each of the keytops.

Keytop Chart

Keytop reference symbols	Markings
Short key levers	
53001A	Q 1
53002A	W 2
53003A	E 3
53004A	R 4
53005A	T 5
53006A	Y 6
53007A	U 7
53008A	I 8
53009A	O 9
53010A	P ø
52912	REPEAT
Medium key levers	
53011A	A —
53012A	S BELL
53013A	D $
53034A	F !
53015A	G &
53608A	H
53017A	J ʼ
53018A	K (
53019A	L)
53020A	CAR. RET.
Long key levers	
53021A	FIGS
53022A	Z ″
53023A	X /
53024A	C :
53025A	V ;
53026A	B ?
53027A	N ,
53028A	M .
53029A	LTRS
53030A	LINE FEED
53031A	

(3) Reverse the procedures outlined in (5) through (3) in *a* above.

(4) Adjust the universal bar as described in paragraph 54.



1 Retainer ring, 10969
2 Retainer ring, 10969
3 Space bar bail shaft, 56904
4 Space bar assembly, 52906A
5 Key lever spring, 50941
6 Space bar spring, 53974
7 Space bar lever, 50809
8 Repeat key lever, 52913
9 Long key lever, 52584
10 Medium key lever, 52583
11 Short key lever, 52582
12 Universal code bar return spring, 51126
13 Key lever guide, 52905A
14 Machine screw, 10015
15 Lockwasher, 10431
16 Key lever mounting bracket, 52918A
17 Machine screw, 10017
18 Lockwasher, 10431
19 Code bar guide stud, 51560
20 Universal bar, 52916A
21 Code bar, 50737
22 Code bar, 50738
23 Code bar, 50739
24 Code bar, 50740
25 Code bar, 50741
26 Middle key lever guide, 52915
27 Keytop, 53001A–53031A
28 Keytop, 52912

Figure 215. Key levers and code bars, exploded view (TT–76/GGC).

(5) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 217*b*.

(6) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.

226. Disassembly and Reassembly of the Key Levers and Code Bars (TT–76A/GGC)

a. Disassembly.

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 218*a*.

(3) Remove the two retainer rings (1 and 2, fig. 216) that hold the space bar bail shaft (3) to the key lever guide (19); remove the space bar bail shaft (3) and the space bar bail assembly (4).

(4) Remove the two machine screws (5) and lockwashers (6) that hold the space bar (7) to the space bar bail assembly (4); remove the space bar.

(5) Remove the three machine screws (8) and lockwashers (9) that hold the key lever locking bar (10) to the key lever mounting bracket (22); remove the key lever locking bar.

(6) Remove the 31 key lever springs (11) and the two space bar springs (12).

(7) Remove the space bar lever (13) and the repeat key lever (14).

(8) Remove the long key levers (15), medium key levers (16), and short key levers (17). Remove the keytops (33) from the key levers only if either is damaged.

(9) Remove the universal code bar return spring (18) and the key lever guide (19).

(10) Remove the four machine screws (20) and lockwashers (21) that hold the key lever mounting bracket (22) to the keyboard frame and the machine screw (9, fig. 219) and lockwasher (10) that hold the keyboard filter (11) to the key lever mounting bracket (22, fig. 216); remove the key lever mounting bracket (22).

(11) Remove the two machine screws (23) and lockwashers (24) that hold the code bar guide studs (25) to the keyboard frame; remove the code bar guide studs (25).

(12) Remove the universal bar (26), the code bars (27–31), and the middle key lever guide (32).

b. Reassembly.

(1) Reverse the procedures outlined in (12) through (9) in *a* above.

(2) Install the assembled short key levers (17) and keytops from left to right in the order given in the chart below. Similarly, install the assembled medium key levers (16) and long key levers (15) and keytops (33) from left to right as indicated in the chart below. The chart also gives the reference symbols for each of the keytops.

Keytop Chart

Keytop reference symbols	Markings
Short key levers	
54001	Q 1
54002	W 2
54003	E 3
54004	R 4
54005	T 5
54006	Y 6
54007	U 7
54008	I 8
54009	O 9
54010	P ø
54011	REPEAT
Medium key levers	
54012	A —
54013	S BELL
54014	D $
54015	F !
54016	G &
57284	H
54018	J '
54019	K (
54020	L)
54021	CAR. RET.

Keytop Chart—Continued

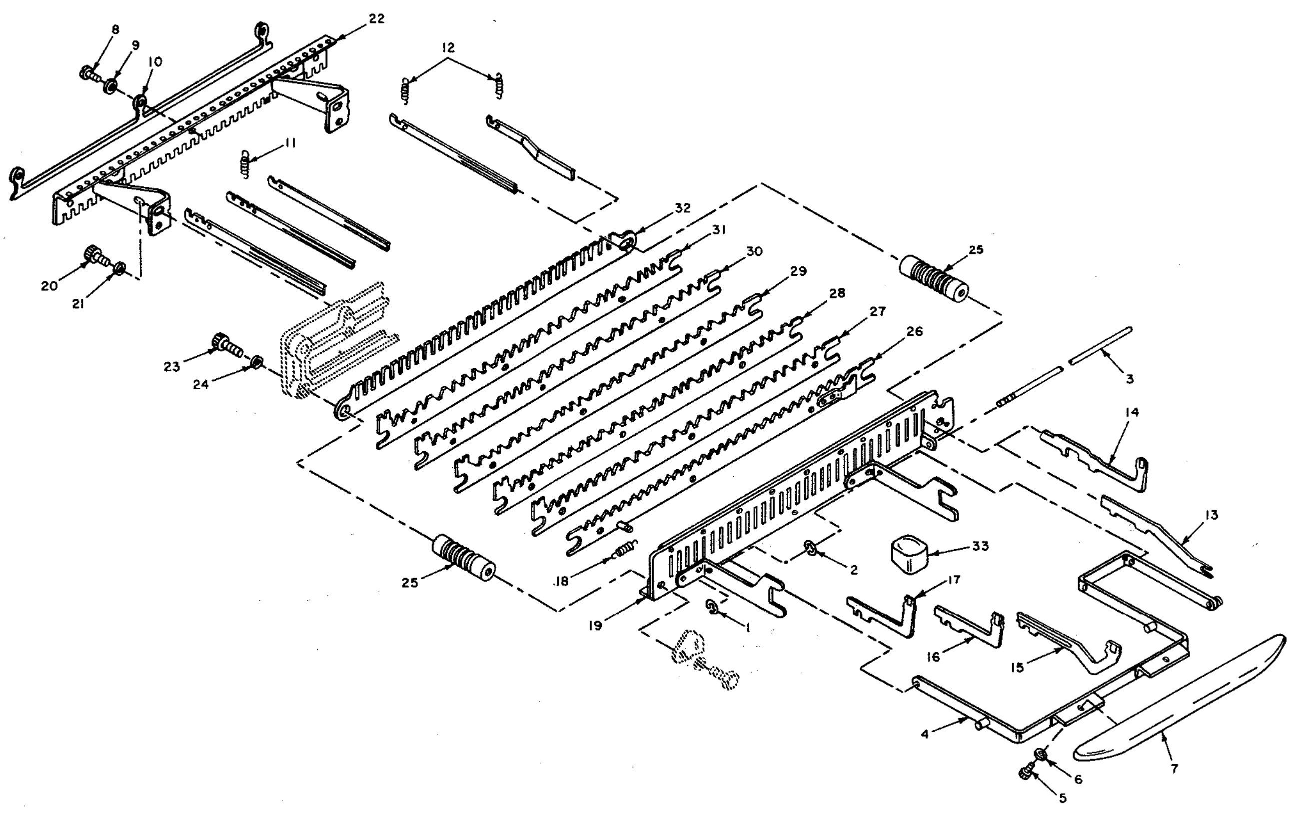
Long key levers	
Keytop reference symbols	Markings
54022	FIGS
54023	Z "
54024	X /
54025	C :
54026	V ;
54027	B ?
54028	N ,
54029	M .
54030	LTRS
54031	LINE FEED
54032	

(3) Reverse the procedures outlined in (7) through (3) in *a* above.

(4) Adjust the universal bar as described in paragraph 54.

(5) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 218*b*.

(6) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.



1 Retainer ring, 10969
2 Retainer ring, 10969
3 Space bar bail shaft, 55862
4 Space bar bail assembly, 57281A
5 Machine screw, 10001
6 Lockwasher, 10429
7 Space bar, 53944A
8 Machine screw, 10304
9 Lockwasher, 10429
10 Key lever locking bar, 53210
11 Key lever spring, 50941
12 Space bar spring, 53974
13 Space bar lever, 50809
14 Repeat key lever, 57324
15 Long key lever, 57325
16 Medium key lever, 55918
17 Short key lever, 55917
18 Universal code bar return spring, 51136
19 Key lever guide, 52905A
20 Machine screw, 10015
21 Lockwasher, 10431
22 Key lever mounting bracket, 57279A
23 Machine screw, 10017
24 Lockwasher, 10431
25 Code bar guide stud, 51560
26 Universal bar, 51134A
27 Code bar, 53295
28 Code bar, 53296
29 Code bar, 53297
30 Code bar, 53298
31 Code bar, 53299
32 Middle key lever guide, 52915
33 Keytop, 54001–54032

Figure 216. Key levers and code bars, exploded view (TT–76A/GGC).

227. Disassembly and Reassembly of Keyboard-Transmitter Cam Locking Latch Mechanism

(fig. 217)

a. Disassembly.

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 217*a* (TT–76/GGC) or 218*a* (TT–76A/GGC).

(3) Remove the sensing levers as described in paragraph 223*a*(3).

(4) Remove the cam-stop lever as described in paragraph 228*a*(9) for the TT–76/GGC or 229*a*(9) for the TT–76/GGC.

(5) Remove the locking lever latch spring (1) from the locking lever latch (10) and the spring post in the keyboard frame.

(6) Remove the repeat blocking lever spring (3) from the repeat blocking lever (6) and the locking lever latch (10).

(7) Remove the retainer ring (4) that holds the repeat blocking lever (6) and the locking lever latch (10) to the locking lever latch stud (5); remove the locking lever latch (10) and the repeat blocking lever (6) from the locking lever latch stud (5). Remove the setscrew (2) that holds the locking lever latch stud (5) in the keyboard frame; remove the locking lever latch stud (5).

(8) Remove the lockwasher (7), the plain hexagonal nut (8), and the universal bar adjusting screw (9) from the locking lever latch (10).

(9) Remove the repeat lever pivot stud (11), the repeat lever (12), and the flat washer (13) from the keyboard frame.

b. Reassembly.

(1) Reassemble the cam locking lever latch mechanism by reversing the procedures outlined in *a*(9) through (5) above.

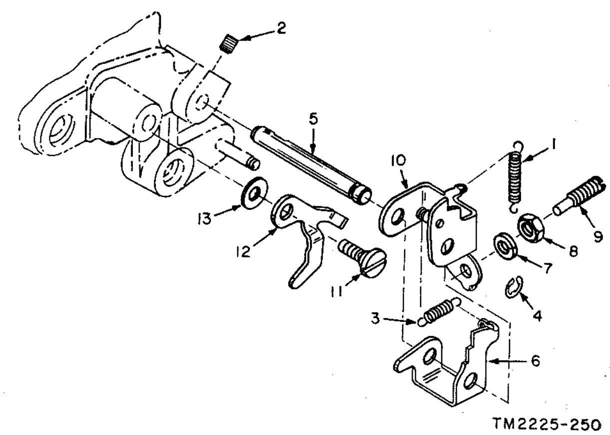
(2) Replace the cam-stop lever as described in paragraph 228*b* for the TT–76/GGC or 229*b* for the TT–76A/GGC.

(3) Replace the sensing levers as described in paragraph 223*b*.

(4) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 217*b* for the TT–76/GGC or 218*b* for the TT–76A/GGC.

(5) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.

(6) Adjust the cam locking lever mechanism as described in paragraph 54.



1 Locking lever latch spring, 51544
2 Setscrew, 10209
3 Repeat blocking lever spring, 50944
4 Retainer ring, 10949
5 Locking lever latch stud, 51564
6 Repeat blocking lever, 51569
7 Lockwasher, 10409 (TT–76A/GGC only)
8 Plain hexagonal nut, 10507
9 Universal bar adjusting screw, 50658
10 Locking lever latch, 51570A
11 Repeat lever pivot stud, 51568
12 Repeat lever, 52914
13 Flat washer, 50414

Figure 217. Cam locking lever latch mechanism, exploded view.

228. Disassembly and Reassembly of Keyboard-Transmitter Frame Assembly (TT–76/GGC)

a. Disassembly.

(1) Remove the keyboard-transmitter from the perforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 217*a*.

(3) Remove the keyboard-transmitter contacts from the keyboard frame as described in paragraph 222*a*.

(4) Remove the sensing and selector levers from the keyboard frame as described in paragraph 223*a*.

(5) Remove the keyboard-transmitter camshaft as described in paragraph 224*a*.

(6) Remove the key levers and code bars from the keyboard frame as described in paragraph 225*a*.

(7) Remove the camshaft locking mechanism as described in paragraph 227*a*.

(8) Remove the cam-stop lever spring (3, fig. 218) from the cam-stop lever (5).

(9) Remove the retainer ring (4) that holds the cam-stop lever (5) to the cam-stop lever stud (28); remove the cam-stop lever (5).

(10) Unsolder and disconnect the five electrical wires connected to the keyboard filter (11).

(11) Remove the machine screw (6) and two lockwashers (7 and 8) that hold the keyboard filter (11) to the connector mounting bracket (26) and the keyboard frame (29).

(12) Remove the machine screw (9) and lockwasher (10) that hold the keyboard filter (11) to the key lever mounting bracket (16 fig. 215); remove the keyboard filter (11, fig. 218).

(13) Remove the machine screw (12) and two lockwashers (13 and 14) that hold the cable grounding lug to the inside of the keyboard frame (29).

(14) Remove the machine screw (15) and two lockwashers (16 and 17) that hold the cable grunding lug to the outside of the keyboard frame (29).

(15) Remove the self-locking hexagonal nut (18), machine screw (19), and lockwasher (20) that hold the plug connector (21) to the connector mounting bracket (26); remove the plug connector (21).

(16) Remove the self-locking hexagonal nut (22), the machine screw (23), and lockwasher (24) that hold the connector mounting bracket (26) to the keyboard frame (29); remove the connector mounting bracket (26) and two lockwashers (25).

(17) Remove the self-locking hexagonal nut (27) that holds the cam-stop lever stud (28) to the keyboard frame (29); remove the cam-stop lever stud (28).

b. Reassembly.

(1) Reassemble the keyboard - transmitter frame assembly by reversing the procedures outlined in *a*(17) through (8) above. Solder the electrical leads to the keyboard filter (11) as indicated in figure 293.

(2) Replace the camshaft locking mechanism as described in paragraph 227*b*.

(3) Replace the key levers and code bars on the keyboard frame as described in paragraph 225*b*.

(4) Replace the keyboard-transmitter camshaft as described in paragraph 224*b*.

(5) Replace the sensing and selector levers on the keyboard frame as described in paragraph 223*b*.

(6) Replace the keyboard-transmitter contacts on the keyboard frame in paragraph 222*b*.

(7) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 217*b*.

(8) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.

229. Disassembly and Reassembly of Keyboard-Transmitter Frame Assembly (TT–76A/GGC)

a. Disassembly.

(1) Remove the keyboard-transmitter from the reperforator frame as described in paragraph 216*a*.

(2) Remove the indicator assembly from the keyboard-transmitter as described in paragraph 218*a*.

(3) Remove the keyboard transmitter contacts from the keyboard frame as described in paragraph 222*a*.

(4) Remove the sensing and selector levers from the keyboard frame as described in paragraph 223*a*.

(5) Remove the keyboard-transmitter camshaft as described in paragraph 224*a*.

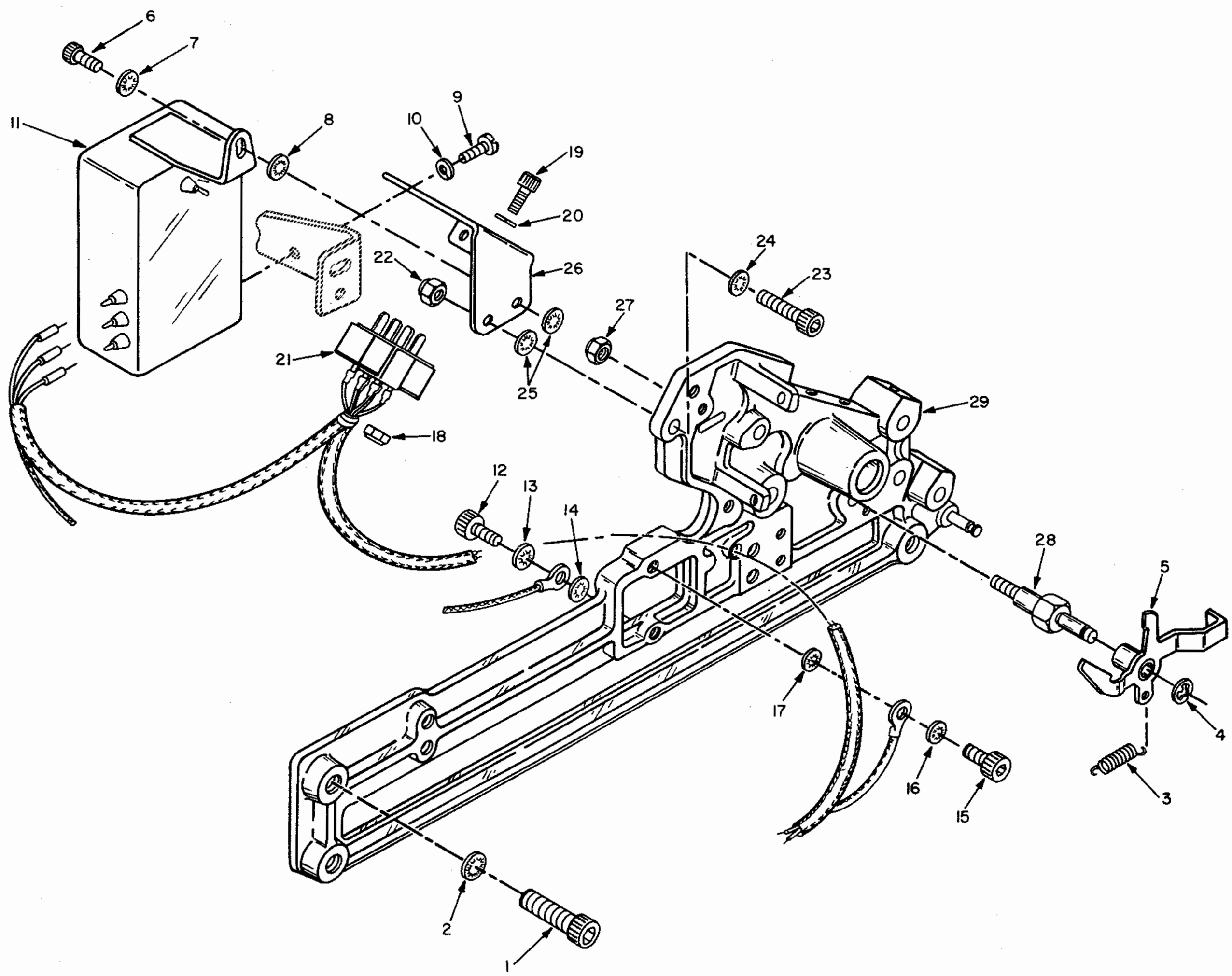
(6) Remove the key levers and code bars from the keyboard frame as described in paragraph 226*a*.

(7) Remove the camshaft locking mechanism as described in paragraph 227*a*.

(8) Remove the cam-stop lever spring (3, fig. 219) from the cam stop lever (5).

(9) Remove the retainer ring (4) that holds the cam-stop lever (5) to the cam-stop lever stud (23); remove the cam-stop lever (5).

(10) Unsolder and disconnect the five wire leads from the keyboard filter (11).



1	Machine screw, 10030	11	Keyboard filter, 52305A	21	Plug connector, 20400
2	Lockwasher, 10405	12	Machine screw, 10004	22	Self-locking hexagonal nut, 10500
3	Cam-stop lever spring, 51575	13	Lockwasher, 10403	23	Machine screw, 10005
4	Retainer ring, 10949	14	Lockwasher, 10403	24	Lockwasher, 10403
5	Cam-stop lever, 51549A	15	Machine screw, 10004	25	Lockwasher, 10403
6	Machine screw, 10004	16	Lockwasher, 10403	26	Connector mounting bracket, 52954
7	Lockwasher, 10403	17	Lockwasher, 10403	27	Self-locking hexagonal nut, 10501
8	Lockwasher, 10403	18	Self-locking hexagonal nut, 10500	28	Cam-stop lever stud, 51563
9	Machine screw, 10301	19	Machine screw, 10003	29	Keyboard frame, 51441A
10	Lockwasher, 10430	20	Lockwasher, 10429		

Figure 218. Keyboard-transmitter frame assembly, exploded view (TT-76/GGC).

(11) Remove the machine screw (6), two lockwashers (7 and 8), the machine screw (9), and lockwasher (10) that hold the keyboard filter (11) to the key lever mounting bracket (22, fig. 216); remove the keyboard filter (11, fig. 219).

(12) Remove the machine screw (12) and two lockwashers (13 and 14) that hold the cable grounding lug to the inside of the keyboard frame (24).

(13) Remove the machine screw (15) and lockwashers (16 and 17) that hold the cable grounding lug to the front of the keyboard frame (24).

(14) Remove the machine screw (18) and lockwasher (19) that hold the cable clamp (20) to the keyboard frame (24); remove the cable clamp (20) and electrical cable (21).

(15) Remove the self-locking hexagonal nut (22) that holds the cam-stop lever stud (23) in the keyboard frame (24); remove the cam-stop lever stud (23).

b. *Reassembly.*

(1) Reassemble the keyboard-transmitter frame assembly by reversing the procedures outlined in a(15) through (8) above. Use figure 294 for keyboard filter connections.

(2) Replace the camshaft locking mechanism as described in paragraph 227*b*.

(3) Replace the key levers and code bars on the keyboard frame as described in paragraph 226*b*.

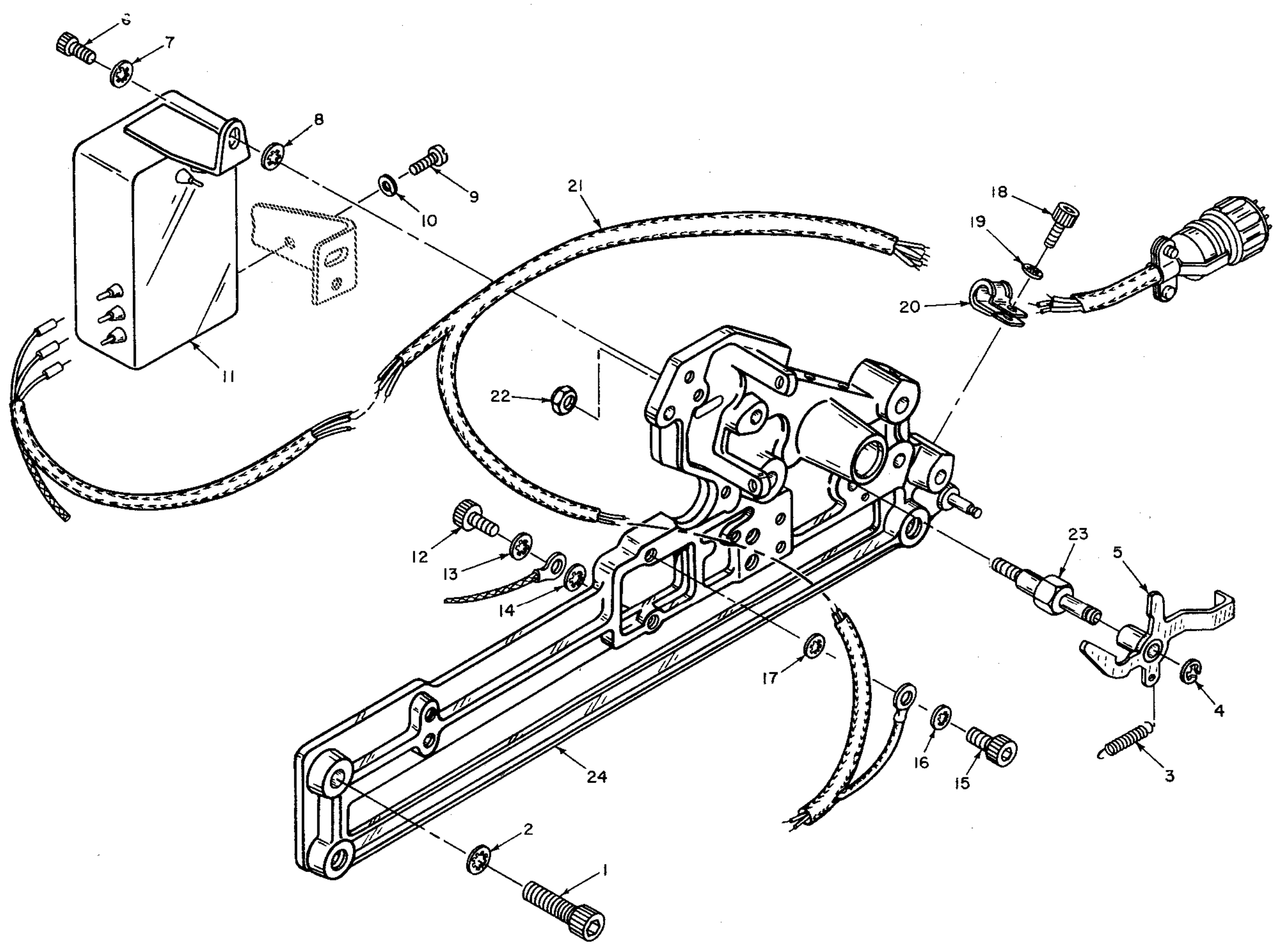
(4) Replace the keyboard-transmitter camshaft as described in paragraph 224*b*.

(5) Replace the sensing and selector levers on the keyboard frame as described in paragraph 223*b*.

(6) Replace the keyboard-transmitter contacts as described in paragraph 222*b*.

(7) Replace the indicator assembly on the keyboard-transmitter as described in paragraph 218*b*.

(8) Replace the keyboard-transmitter on the reperforator frame as described in paragraph 216*b*.



1	Machine screw, 10030	9	Machine screw, 10301	17	Lockwasher, 10403
2	Lockwasher, 10405	10	Lockwasher, 10430	18	Machine screw, 10004
3	Cam-stop lever spring, 51575	11	Keyboard filter, 54576A	19	Lockwasher, 10429
4	Retainer ring, 10949	12	Machine screw, 10064	20	Cable clamp, 20893
5	Cam-stop lever, 51549A	13	Lockwasher, 10403	21	Electrical cable, 57294A
6	Machine screw, 10004	14	Lockwasher, 10403	22	Self-locking hexagonal nut, 10501
7	Lockwasher, 10403	15	Machine screw, 10004	23	Cam-stop lever stud, 51563
8	Lockwasher, 10403	16	Lockwasher, 10403	24	Keyboard frame, 57295A

Figure 219. Keyboard-transmitter frame assembly, exploded view (TT–76A/GGC).

230. Removal and Replacement of Transmitter-Distributor

a. Removal.

(1) On the TT–76/GGC, remove the transmitter-distributor plug from the receptacle connector in the power supply and terminal unit.

(2) On the TT–76A/GGC, remove the transmitter-distributor plug from the receptacle connector in the reperforator-transmitter base.

(3) Snap off the outside cover (1, fig. 220) of the transmitter-distributor.

(4) Remove the two machine screws (1, fig. 230) and lockwashers (2) that hold the transmitter-distributor frame to the reperforator frame; remove the transmitter-distributor, carefully disengaging the friction clutch fork (8, fig. 227) on the transmitter-distributor comshaft (9) from the clutch driver plate on the transmitter-distributor drive shaft.

b. Replacement.

(1) Position the transmitter-distributor on the reperforator frame, carefully engaging the friction clutch fork (8, fig. 227) on the transmitter-distributor camshaft with the clutch driver plate on the transmitter-distributor drive shaft. Secure with the two machine screws (1, fig. 230) and lockwashers (2).

(2) Install the outside cover (1, fig. 220) on the transmitter-distributor.

(3) On the TT–76A/GGC, connect the transmitter-distributor plug to the receptacle connector in the reperforator-transmitter base.

(4) On the TT–76/GGC, connect the transmitter-distributor plug to the receptacle connector on the power supply and termnial unit.

231. Disassembly and Reassembly of Transmitter-Distributor Covers (TT–76/GGC)

(fig. 220)

a. Disassembly.

(1) Remove the transmitter-distributor as described in paragraph 230*a*.

(2) Remove the two machine screws (2), lockwashers (3), bushings (4), and grommets (5) that hold the front plate (6) to the transmitter-distributor frame; remove the front plate (6).

(3) Remove the four machine screws (7), lockwashers (8), bushings (9), and grommets (10) that hold the inside cover (11) to the transmitter-distributor frame; remove the inside cover (11).

(4) Remove the two machine screws (12), lockwashers (13), machine screw (14), and lockwasher (15) that hold the top cover (27) to the transmitter-distributor frame; remove the assembled tape cover (26) and top cover (27).

(5) Remove the two setscrews (17 and 18) that hold the tape cover spring (19) and plunger (20) in the top cover; remove the tape cover spring (19) and plunger (20).

(6) Remove the setscrew (21) that holds the pin (22) in the top cover (27). Remove the pin (22); remove the tape cover (26) from the top cover (27).

(7) Remove the machine screw (23) and setscrew (24) that hold the tape guide (25) to the tape cover (26); remove the tape guide (25).

b. Reassembly.

(1) Reassemble the transmitter-distributor covers by reversing the procedures outlined in *a*(7) through (2) above. When replacing the top cover (27), depress the tape cover (26) so that the top cover (27) and tape cover (26) are engaged by the tape cover latch (12, fig. 222).

(2) Adjust the tape cover as described in paragraphs 149 and 159.

(3) Replace the transmitter-distributor as described in paragraph 230*b*.

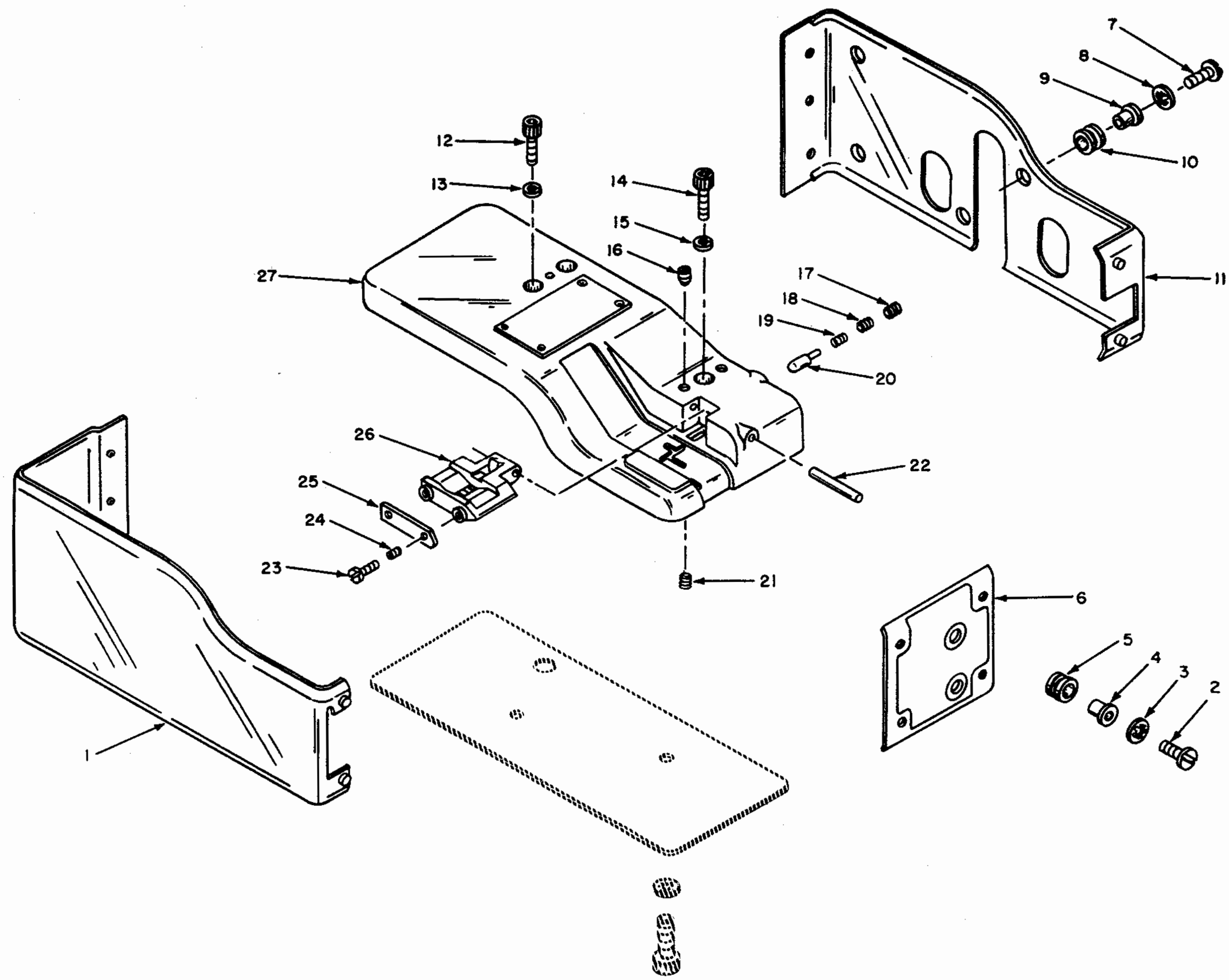
232. Disassembly and Reassembly of Transmitter-Distributor Covers (TT–76A/GGC)

(fig. 221)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator-transmitter as described in paragraph 230*a*.

(2) Remove the two machine screws (2), lockwashers (3), bushings (4), and grommets (5) that hold the front plate (6) to the



1 Outside cover, 52817A
2 Machine screw, 10357
3 Lockwasher, 10403
4 Bushing, 52860
5 Grommet, 20725
6 Front plate, 52853
7 Machine screw, 10357
8 Lockwasher, 10403
9 Bushing, 52860
10 Grommet, 20725
11 Inside cover, 52818A
12 Machine screw, 10003
13 Lockwasher, 10429
14 Machine screw, 10006
15 Lockwasher, 10429
16 Setscrew, 10224
17 Setscrew, 10209
18 Setscrew, 10209
19 Tape cover spring, 52813
20 Plunger, 52859
21 Setscrew, 10209
22 Pin, 52864
23 Machine screw, 52884
24 Setscrew, 10221
25 Tape guide, 52809
26 Tape cover, 52820
27 Top cover, 53588A

Figure 220. Transmitter-distributor covers, exploded view (TT–76/GGC).

transmitter-distributor frame; remove the front plate (6).

(3) Remove the four machine screws (7), lockwashers (8), bushings (9), and grommets (10) that hold the inside cover (11) to the transmitter-distributor frame; remove the inside cover (11).

(4) Remove the setscrew (12) that holds the tape cover latch stud (13) to the tape cover bracket (30); remove the tape cover latch stud (13), tape cover latch (14), and tape cover latch spring (15).

(5) Remove the pin (16) that holds the tape cover (21) to the tape cover bracket (30); remove the tape cover spring (17) and the assembled tape cover (21) and tape guide (20).

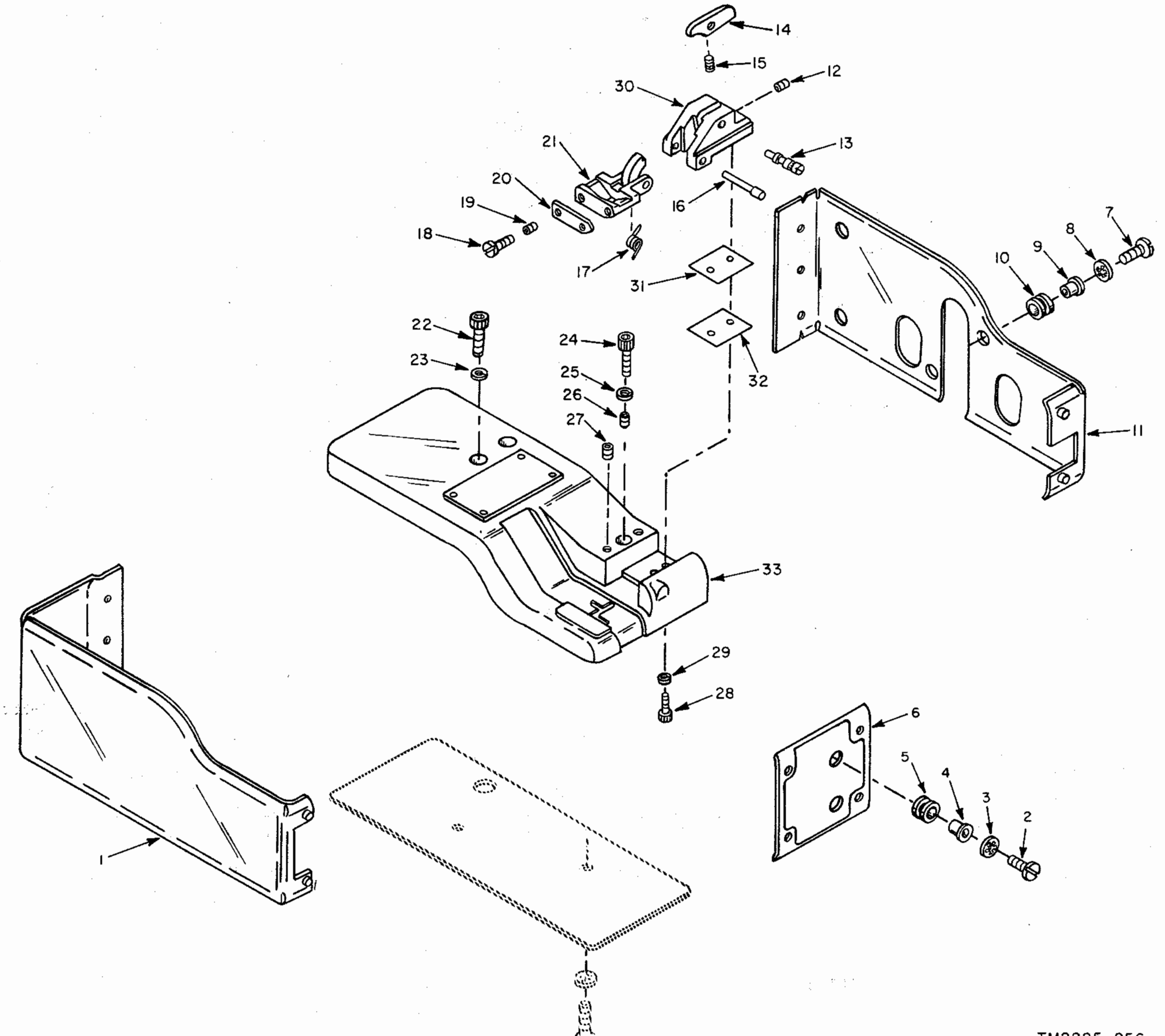
(6) Remove the two machine screws (18) and setscrews (19) that hold the tape guide (20) to the tape cover (21); remove the tape guide (20).

(7) Remove the two machine screws (22), lockwashers (23), machine screw (24), and lockwasher (25) that hold the top cover (33) to the transmitter-distributor frame; remove the top cover (33). Remove the setscrew (26) and two setscrews (27) from the top cover (33).

(8) Remove the two machine screws (28) and lockwashers (29) that hold the tape cover bracket (30) to the top cover (33); remove the tape cover bracket (30) and shims (31 and 32).

b. Reassembly.

(1) Reassemble the transmitter-distributor covers by reversing the procedures described in *a*(8) through (2) above.



1	Outside cover, 53796A	12	Setscrew, 10201	23	Lockwasher, 10429
2	Machine screw, 10357	13	Tape cover latch stud, 53952	24	Machine screw, 10006
3	Lockwasher, 10403	14	Tape cover latch, 57204	25	Lockwasher, 10429
4	Bushing, 52860	15	Tape cover latch spring, 57203	26	Setscrew, 10209
5	Grommet, 20725	16	Pin, 57214	27	Setscrew, 10224
6	Front plate, 52853	17	Tape cover spring, 56324	28	Machine screw, 10004
7	Machine screw, 10357	18	Machine screw, 52884	29	Lockwasher, 10421
8	Lockwasher, 10403	19	Setscrew, 10221	30	Tape cover bracket, 57211
9	Bushing, 52860	20	Tape guide, 52809	31	.002-inch shim, 57201
10	Grommet, 20725	21	Tape cover, 57209	32	.005-inch shim, 57202
11	Inside cover, 53795	22	Machine screw, 10003	33	Top cover, 57215A

Figure 221. Transmitter-distributor covers, exploded view (TT–76A/GGC).

(2) Adjust the tape cover and top cover as described in paragraphs 150 through 152 and 157.

(3) Replace the transmitter-distributor as described in paragraph 230*b*.

233. Disassembly and Reassembly of Tape-Out Sensing Mechanism (TT–76/GGC)

(fig. 222)

a. Disassembly.

(1) Snap off the outside cover and remove the front plate and top cover from the transmitter-distributor as described in paragraph 231*a*(2) and (4).

(2) Remove the two retainer rings (1) that hold the tape-out lever (6) in place on the tape-out lever pivot shaft (4).

(3) Remove the two plain hexagonal nuts (2 and 3) from the tape-out lever pivot shaft (4).

(4) Slide the tape-out lever pivot shaft from the code sensing lever guide (17); remove the tape-out lever spring (5) and the tape-out lever (6).

(5) Remove the tape cover latch spring (7) from the tape cover latch (12) and from the code sensing lever guide (17).

(6) Remove the two plain hexagonal nuts (8), lockwasher (9), and flat washer (10) that hold the tape cover latch eccentric (11) to the code sensing lever guide (17). Remove the tape cover latch eccentric (11) and the tape cover latch (12) from the code sensing lever guide (17).

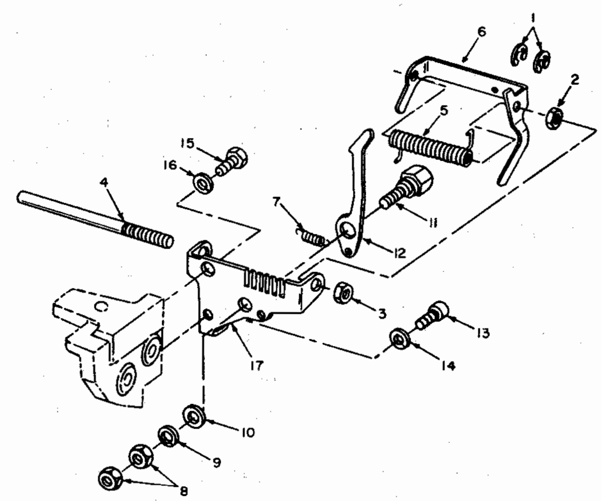
(7) Remove the machine screw (13), lockwasher (14), machine screw (15), and lockwasher (16) that hold the code sensing lever guide (17) to the transmitter-distributor frame; remove the code sensing lever guide (17).

b. Reassembly.

(1) Reassemble the tape-out sensing mechanism by reversing the procedures outlined in *a*(7) through (2) above.

(2) Adjust the transmitter-distributor as described in paragraphs 148, 149, 155, 156, and 159.

(3) Replace the transmitter-distributor covers as described in paragraph 231*b* and snap on the outside cover.



1 Retainer ring, 10969
2 Plain hexagonal nut, 10504
3 Plain hexagonal nut, 10504
4 Tape-out lever pivot shaft, 52718
5 Tape-out lever spring, 53156
6 Tape-out lever, 52824
7 Tape cover latch spring, 53123
8 Plain hexagonal nut, 10513
9 Lockwasher, 10429
10 Flat washer, 10450
11 Tape cover latch eccentric, 52847
12 Tape cover latch, 52846
13 Machine screw, 10003
14 Lockwasher, 10429
15 Machine screw, 10398
16 Lockwasher, 10429
17 Code sensing lever guide, 52861

Figure 222. Tape-out sensing mechanism, exploded view (TT–76/GGC).

234. Disassembly and Reassembly of Tape-Out Sensing Mechanism (TT–76A/GGC)

(fig. 223)

a. Disassembly.

(1) Snap off the outside cover and remove the front plate and top cover from the transmitter-distributor as described in paragraphs 232*a*(2) and (8).

(2) Remove the two plain hexagonal nuts (1 and 2) from the tape-out lever pivot shaft (5).

(3) Remove the two retainer rings (3 and 4) that hold the tape-out lever (7) in place on the tape-out lever pivot shaft (5); slide the tape-out lever pivot shaft from the code sensing lever guide (12); remove the tape-out lever spring (6) and tape-out lever (7).

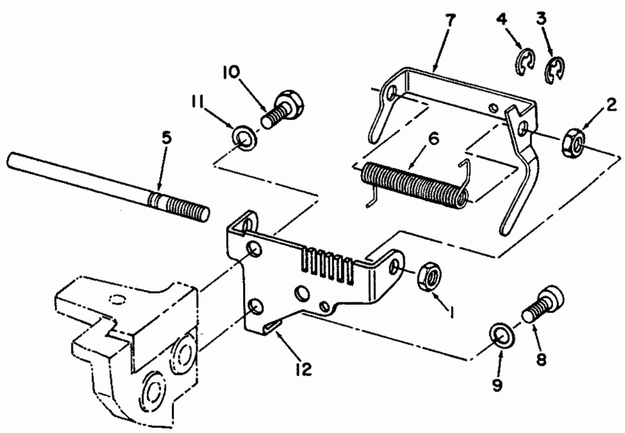
(4) Remove the machine screw (8), lockwasher (9), machine screw (10), and lockwasher (11) that hold the code sensing lever guide (12) to the frame of the transmitter-distributor; remove the code sensing lever guide (12).

b. Reassembly.

(1) Reassemble the tape-out sensing mechanism by reversing the procedures outlined in *a*(4) through (2) above.

(2) Adjust the transmitter-distributor as described in paragraphs 148, 150, 151, 152, and 157.

(3) Replace the transmitter-distributor covers as described in paragraph 232*b*.



TM 2225-258

1 Plain hexagonal nut, 10504
2 Plain hexagonal nut, 10504
3 Retainer ring, 10969
4 Retainer ring, 10969
5 Tape-out lever pivot shaft, 52718
6 Tape-out lever spring, 53156
7 Tape-out lever, 52824
8 Machine screw, 10003
9 Lockwasher, 10429
10 Machine screw, 10398
11 Lockwasher, 10429
12 Code sensing lever guide, 52861

Figure 223. Tape-out sensing mechanism, exploded view (TT–76A/GGC).

235. Disassembly and Reassembly of Transmitter-Distributor Operating Levers

(fig. 224)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator as described in paragraph 230*a*.

(2) Remove the covers from the transmitter-distributor as described in paragraph 231*a* for the TT–76/GGC or 232*a* for the TT–76A/GGC.

(3) Remove the retainer ring (1) that holds the tight-tape lever (2) to the pivot post on the transmitter-distributor frame; remove the tight-tape lever.

(4) Remove the retainer ring (3) that holds the upper switch bail lever (4) to the pivot post on the transmitter-distributor frame; remove the upper switch bail lever.

(5) Remove the self-locking hexagonal nut (5), machine screws (6) and (7), and flat washer (8) that hold the start-stop switch (11) to the transmitter-distributor frame, remove the start-stop switch.

(6) Remove the machine screw (9) and lockwasher (10) that hold the electrical clamp (13) to the frame.

(7) Unsolder the ends of the two wires in the wiring harness (12) from the solder lugs on the start-stop switch (11); tag the wires and remove the start-stop switch.

(8) Disconnect the terminal lugs of the wires at the other end of the wiring harness from the terminal board; remove the wiring harness and the electrical clamp.

(9) Remove the retainer ring (14) that holds the start-stop lever (15) to the pivot stud on the frame; remove the start-stop lever (15).

(10) Remove the retainer rings (16 and 17) from the pin (18); remove the pin from the lower switch bail lever (19) and from the transmitter-distributor frame. Remove the lower switch bail lever (19).

(11) Remove the start-stop detent lever spring (20) from the start-stop detent lever (22) and from the spring post on the transmitter-distributor frame.

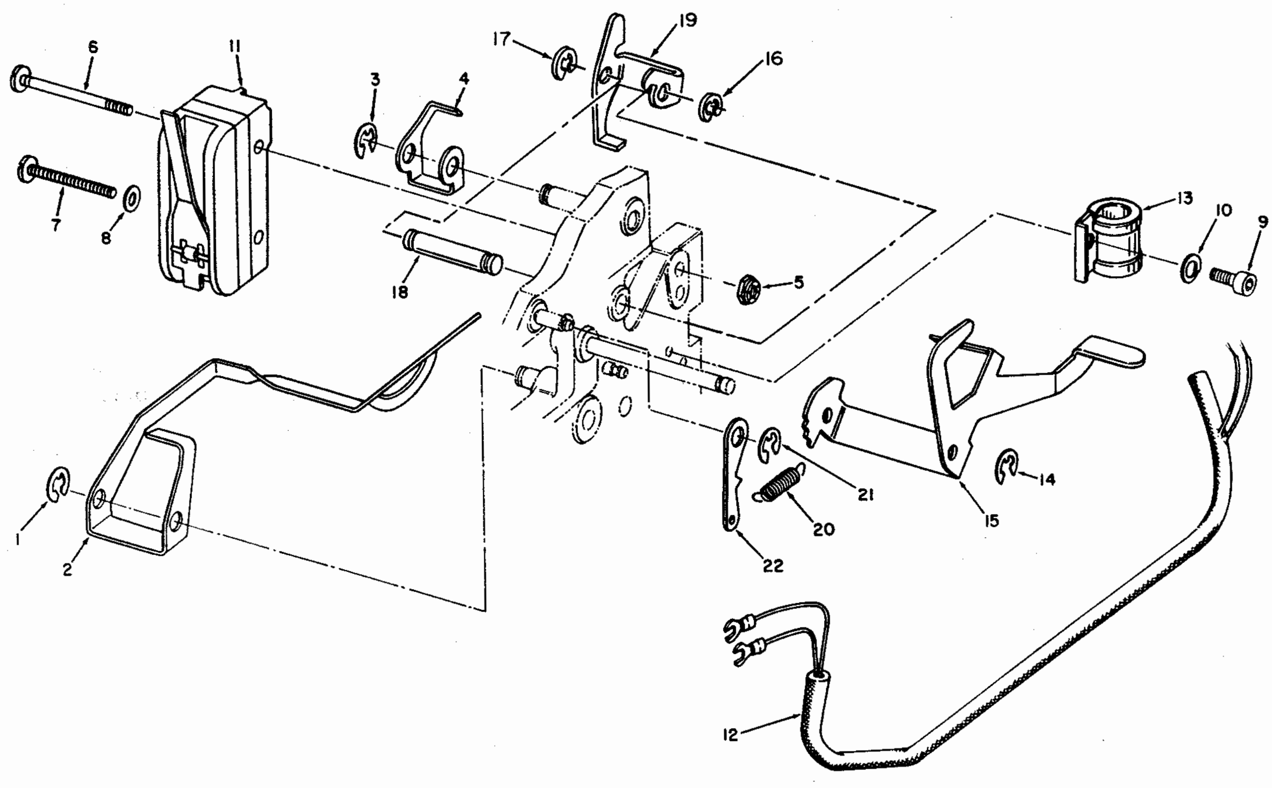
(12) Remove the retainer ring (21) and the start-stop detent lever (22) from the pivot post.

b. Reassembly.

(1) Reassemble the transmitter-distributor operating levers by reversing the procedures outlined in *a*(12) through (3).

(2) Replace the transmitter-distributor covers as described in paragraph 232*b* for the TT–76A/GGC or 231*b* for the TT–76/GGC.

(3) Replace the transmitter-distributor as described in paragraph 230*b*.



1	Retainer ring, 10949	12	Wiring harness, 53339
2	Tight-tape lever, 52810	13	Electrical clamp, 20507
3	Retainer ring, 10940	14	Retainer ring, 10949
4	Upper switch bail lever, 52811	15	Start-stop lever, 52863
5	Self-locking hexagonal nut, 10500	16	Retainer ring, 10949
6	Machine screw, 10385	17	Retainer ring, 10949
7	Machine screw, 10359	18	Pin, 52872
8	Flat washer, 10459	19	Lower switch bail lever, 52812
9	Machine screw, 10003	20	Start-stop detent lever spring, 53149
10	Lockwasher, 10429	21	Retainer ring, 10949
11	Start-stop switch, 20108	22	Start-stop detent lever, 50404

Figure 224. Transmitter-distributor operating levers, exploded view.

236. Disassembly and Reassembly of Transmitter-Distributor Code Sensing Levers

(fig. 225)

a. *Disassembly.*

(1) Remove the transmitter-distributor from the reperforator as described in paragraph 230*a*.

(2) Remove the transmitter-distributor covers as described in paragraph 231*a* for the TT-76/GGC or paragraph 232*a* for the TT-76A/GGC.

(3) Remove the five code sensing lever springs (1) from the code sensing levers (16, 17, 18, 20, and 21) and from the code sensing lever spring post (5).

(4) Remove the tape feed retracting lever spring (2) from the tape feed retracting lever (14) and from the code sensing lever spring post (5).

(5) Remove the plain hexagonal nuts (3 and 4) from the code sensing lever spring post (5); remove the code sensing lever spring post (5) from the selector lever comb.

(6) Remove the tape feed claw spring (6) from the tape feed claw (19) and from the selector lever comb.

(7) Remove the setscrew (7) that holds the code sensing lever stud (13) in the frame.

(8) Remove the retainer rings (8, 9, 10, 11, and 12) from the code sensing lever stud (13);

slide the code sensing lever stud out of the code sensing levers and the frame.

(9) Remove the tape feed retracting lever (14), sensing lever restoring bail (15), code sensing levers (16, 17, 18, 20, and 21) and the tape feed claw (19) from the selector lever comb. Tag each code sensing lever so that it may be properly reinstalled.

b. Reassembly.

(1) Reassemble the transmitter-distributor selector levers by reversing the procedures outlined in *a*(9) through (3) above.

(2) Adjust the transmitter-distributor as described in paragraphs 144 and 153.

(3) Replace the transmitter-distributor covers as described in paragraph 232*b* for the TT–76A/GGC or paragraph 231*b* for the TT–76/GGC.

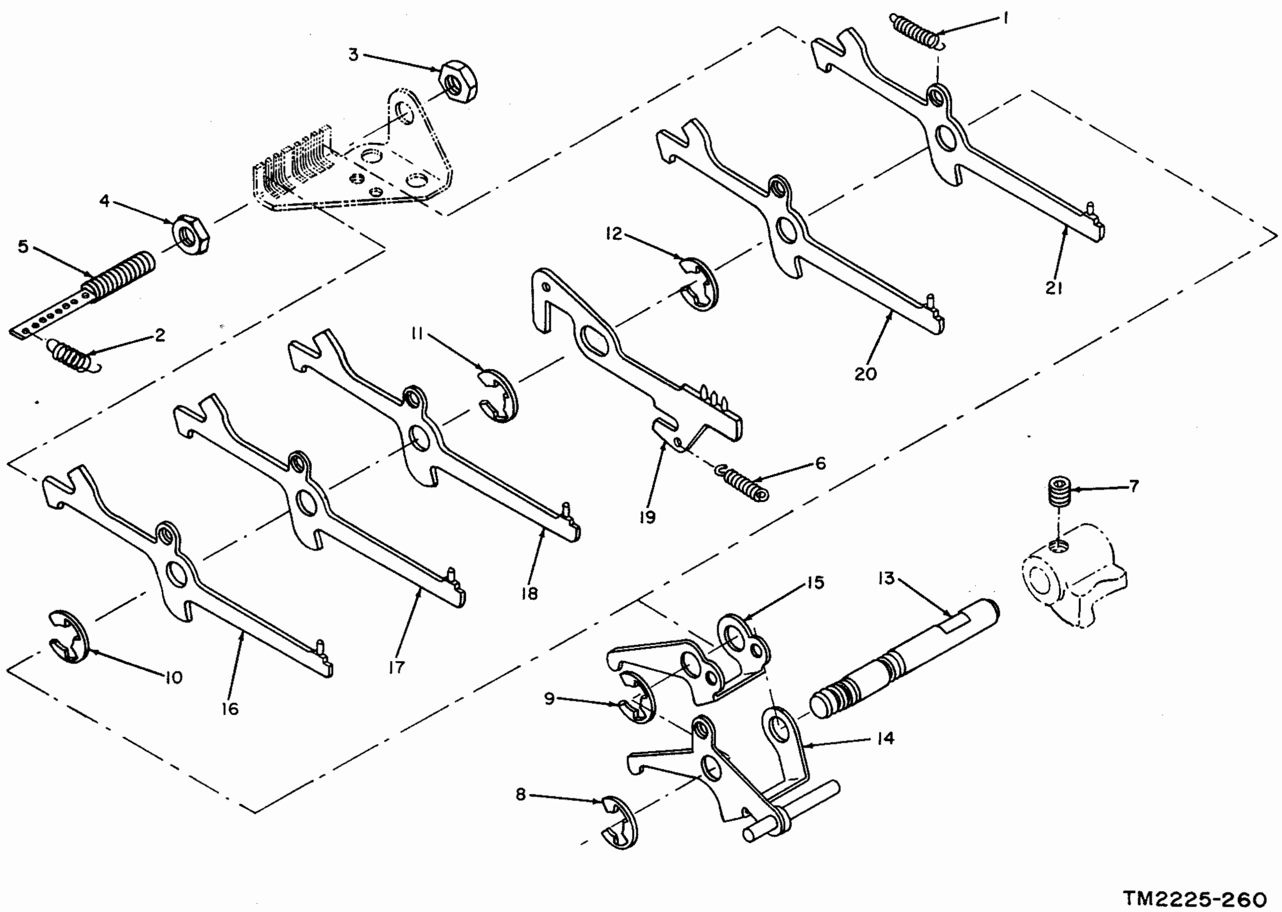
(4) Replace the transmitter-distributor as described in paragraph 230*b*.

237. Disassembly and Reassembly of Transmitter-Distributor Selector Levers

(fig. 226)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator as described in paragraph 230*a*.



1 Code sensing lever spring, 53152
2 Tape feed retracting lever spring, 53154
3 Plain hexagonal nut, 10509
4 Plain hexagonal nut, 10509
5 Code sensing lever spring post, 50325
6 Tape feed claw spring, 53153
7 Setscrew, 10209
8 Retainer ring, 10957
9 Retainer ring, 10957
10 Retainer ring, 10957
11 Retainer ring, 10957
12 Retainer ring, 10957
13 Code sensing lever stud, 52835
14 Tape feed retracting lever, 52858
15 Sensing lever restoring bail, 52858
16 Code sensing lever, 52844
17 Code sensing lever, 52844
18 Code sensing lever, 52844
19 Tape feed claw, 52836
20 Code sensing lever, 52844
21 Code sensing lever, 52844

Figure 225. Transmitter-distributor code sensing levers, exploded view.

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(2) Remove the covers from the transmitter-distributor as described in paragraph 231*a* for the TT–76/GGC or paragraph 232*a* for the TT–76A/GGC.

(3) Remove the six selector lever springs (1) from the spring post (38) and from the selector levers (4, 7, 10, 13, 16, and 19) and the camshaft stop lever (22).

(4) Remove the retainer ring (2) that holds the selector levers to the selector lever stud (25). Remove the flat washers (3, 6, 9, 15, 18, and 21), the selector levers, and bearing shoes (5, 8, 11, 14, 17, and 20) alternately. Remove the spacer collar (12) in sequence. Remove the camshaft stop lever (22) and the sleeve bearing (23).

(5) Remove the setscrew (24) that holds the selector lever stud (25) in the frame; remove the selector lever stud (25).

(6) Remove the tape feed lever spring (26) from the tape feed lever (28) and from the spring post on the transmitter-distributor frame.

(7) Remove the retainer ring (27) holding the tape feed lever (28) to the tape feed lever stud (30); remove the tape feed lever (28).

(8) Remove the two machine screws (31) and lockwashers (32) from the selector lever comb (36); remove the selector lever comb (36) from the transmitter-distributor frame.

(9) Remove the two machine screws (33), lockwashers (34), and the stop selector lever latch (35) from the selector lever comb (36).

(10) Remove the plain hexagonal nut (37) from the spring post (38); remove the spring post (38) from the transmitter-distributor frame.

b. Reassembly.

(1) Reassemble the transmitter-distributor selector levers by reversing the procedures outlined in *a*(10) through (3) above.

(2) Adjust the transmitter-distributor as described in paragraphs 144 and 153.

(3) Replace the transmitter-distributor covers as described in paragraph 232*b* for the TT–76A/GGC or paragraph 231*b* for the TT–76/GGC.

(4) Replace the transmitter-distributor as described in paragraph 230*b*.

238. Disassembly and Reassembly of Transmitter-Distributor Camshaft

(fig. 227)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator as described in paragraph 230*a*.

(2) Remove the transmitter-distributor covers as described in paragraph 231*a* for the TT–76/GGC or paragraph 232*a* for TT–76A/GGC.

(3) Remove the selector levers as described in paragraph 237*a*.

(4) Remove the two machine screws (1) and lockwashers (2) that hold the tape feed retracting lever cam (3), flat washer (4), sensing lever restoring cam (5), and flat washer (6) to the transmitter-distributor camshaft (9); remove the cams (3 and 5) and flat washers (4 and 6).

(5) Remove the two setscrews (7) that hold the fraction clutch fork (8) to the transmitter-distributor camshaft (9); remove the friction clutch fork (8).

(6) Slide the transmitter-distributor camshaft (9) from the ball bearings (15 and 17) in the transmitter-distributor frame; catch the flat washers (10 and 11) as they fall from the transmitter-distribuor camshaft (9).

(7) Remove the two machine screws (12), lockwashers (13), and flat washers (14) that hold the ball bearing (15) in the transmitter-distributor frame; remove the ball bearing (15), spacing collar (16), and ball bearing (17) from the transmitter-distributor frame.

b. Reassembly.

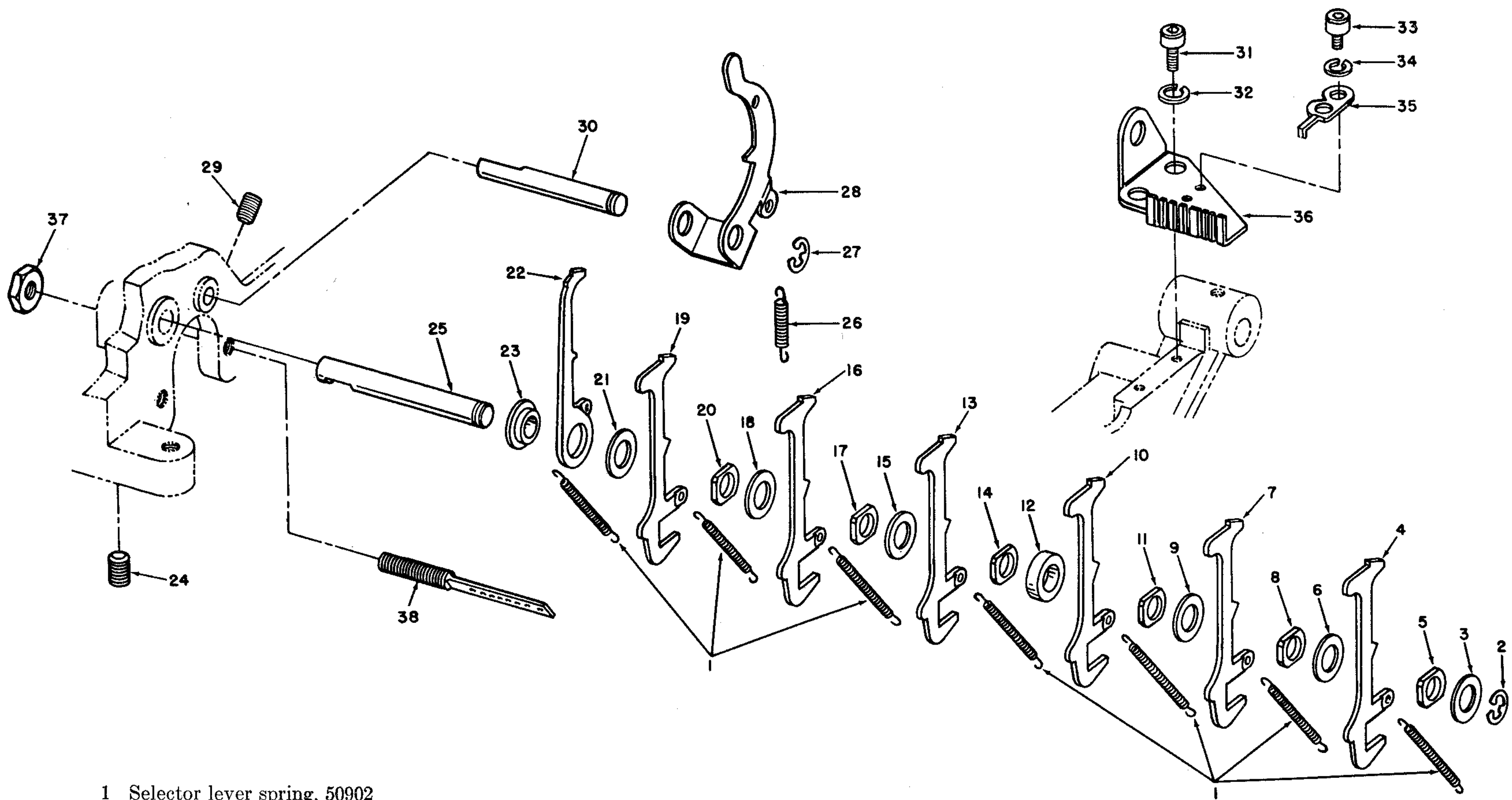
(1) Reassemble the transmitter-distributor camshaft by reversing the procedures outlined in *a*(7) through (4) above.

(2) Replace the selector levers as described in paragraph 237*b*.

(3) Adjust the transmitter-distributor as described in paragraphs 160 and 161.

(4) Replace the transmitter-distributor covers as described in paragraph 232*b* for the TT–76A/GGC or paragraph 231*b* for the TT–76/GGC.

(5) Replace the transmitter-distributor as described in paragraph 230*b*.



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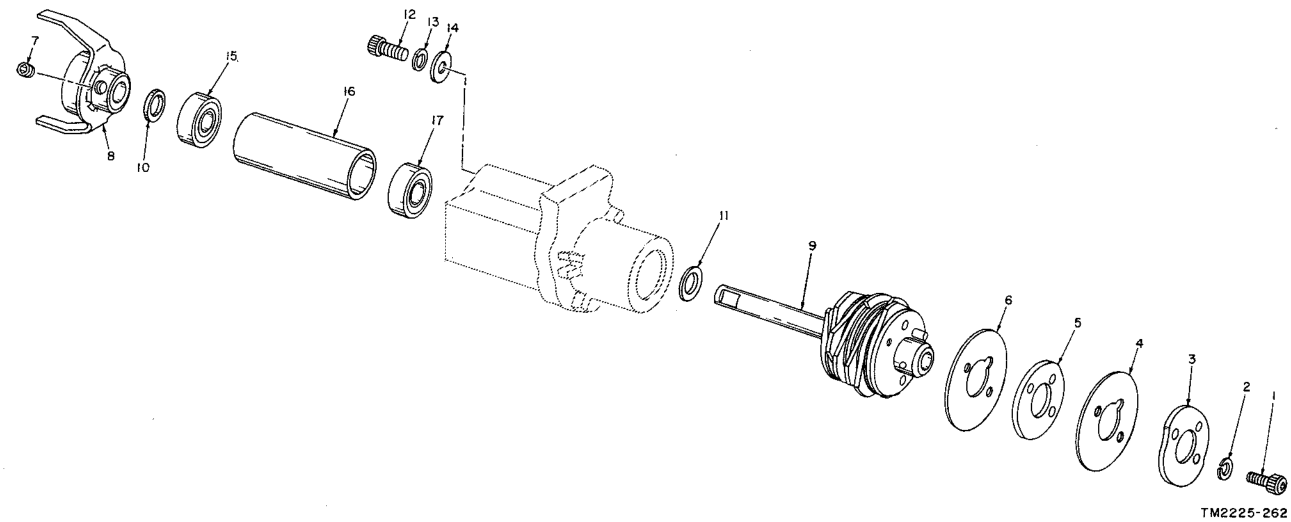
1 Selector lever spring, 50902
2 Retainer ring, 10949
3 Flat washer, 50147
4 Selector lever, 51598A (includes items 7, 10, 13, 16 and 19)
5 Bearing shoe, 51644A (includes items 8, 11, 14, 17, and 20)
6 Flat washer, 50147
7 Selector lever
8 Bearing shoe
9 Flat washer, 50147
10 Selector lever
11 Bearing shoe
12 Spacer collar, 52833
13 Selector lever
14 Bearing shoe
15 Flat washer, 50147
16 Selector lever
17 Bearing shoe
18 Flat washer, 50147
19 Selector lever
20 Bearing shoe
21 Flat washer, 50147
22 Camshaft stop lever, 53613
23 Sleeve bearing, 52834
24 Setscrew, 10210
25 Selector lever stud, 52840
26 Tape feed lever spring, 53149
27 Retainer ring, 10949
28 Tape feed lever, 52845
29 Setscrew, 10210
30 Tape feed lever stud, 52842
31 Machine screw, 10003
32 Lockwasher, 10429
33 Machine screw, 10002
34 Lockwasher, 10429
35 Stop selector lever latch, 51594
36 Selector lever comb, 52841
37 Plain hexagonal nut, 10509
38 Spring post, 50325

Figure 226. Transmitter-distributor selector levers, exploded view.



1	Machine screw, 10004	10	Flat washer, 51552
2	Lockwasher, 10429	11	Flat washer, 52210
3	Tape feed retracting lever cam, 52867	12	Machine screw, 10003
4	Flat washer, 52865	13	Lockwasher, 10429
5	Sensing lever restoring cam, 52868	14	Flat washer, 10450
6	Flat washer, 52865	15	Ball bearing, 10753
7	Setscrew, 10209	16	Spacing collar, 52852
8	Friction clutch fork, 50484A	17	Ball bearing, 10753
9	Transmitter-distributor camshaft, 52871		

Figure 227. Transmitter-distributor camshaft, exploded view.

239. Disassembly and Reassembly of Transmitter-Distributor Contacts

(fig. 228)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator as described in paragraph 230*a*.

(2) Remove the transmitter-distributor covers as described in paragraph 231*a* for the TT–76/GGC or paragraph 232*a* for the TT–76A/GGC.

(3) Remove the two machine screws (1) and four lockwashers (2) that hold the transmitter contact cover (3) to the transmitter-distributor frame; remove the transmitter contact cover (3).

(4) Remove the two machine screws (4) and lockwashers (5) that hold the contact mounting (15) to the transmitter-distributor frame.

(5) Unhook the transmitter contact bail spring (6) from the spring post on the contact mounting (15) and from the hole in the transmitter contact bail (9).

(6) Remove the machine screw (7), lockwasher (8), and two electrical terminal lugs from the side of the contact mounting (15).

(7) Remove the two machine screws (10) and lockwasher (11) that hold the transmitter contact terminals (12) to the contact mounting (15).

(8) Unsolder and disconnect the two spiraled electrical wires (14) from the top of the stationary contacts (13); remove the spiraled electrical wires (14) and the stationary contacts (13) from the contact mounting (15).

(9) Remove the retainer ring (16) that holds the transmitter contact bail (9) to the post in the transmitter-distributor frame; remove the transmitter contact bail (9).

(10) Remove the setscrew (17) that holds the post (18) in the transmitter-distributor frame; remove the post (18).

b. Reassembly.

(1) Position the post (18) in the transmitter-distributor frame; secure with a setscrew (17).

(2) Position the transmitter contact bail (9) on the post (18) in the transmitter-distributor frame; secure with a retainer ring (16).

(3) Install the two stationary contacts (13) in the contact mounting (15).

(4) Solder the electrical wires (14) in the slots in the top of the stationary contacts (13).

(5) Insert the transmitter contact terminals (12) in the threads of the stationary contacts (13), ½ to 1½ threads above the contact mounting (15); hold the contacts in place with lockwashers (11) and machine screws (10) but do not tighten the screws.

(6) Position the two electrical terminal lugs on the side of the contact mounting (15); secure with the lockwasher (8) and machine screw (7).

(7) Hook one end of the transmitter contact bail spring (6) in the hole in the transmitter contact bail (9) and the other end on the spring post on the contact mounting (15).

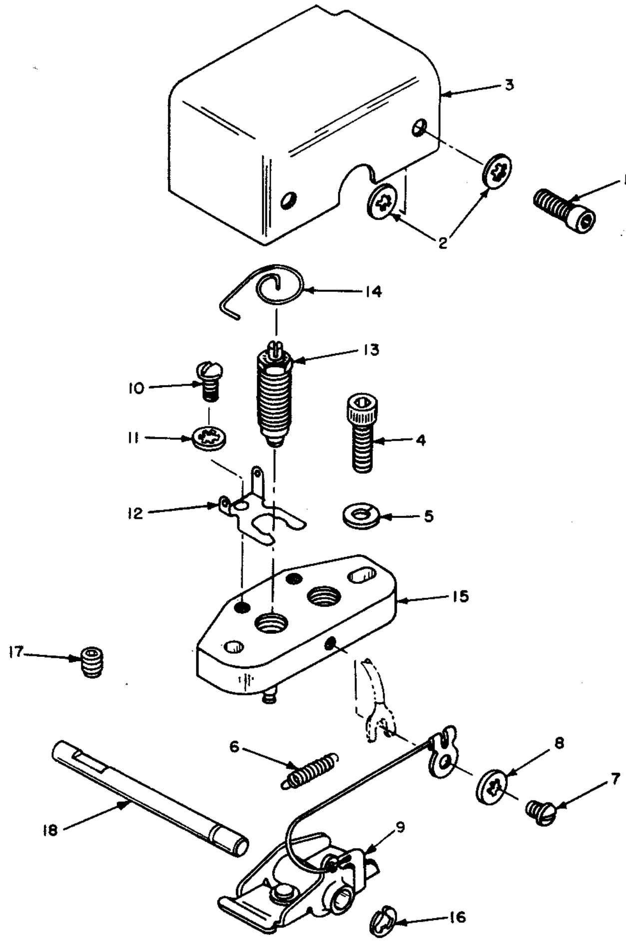
(8) Position the contact mounting (15) on the transmitter-distributor frame so that the contacts are in correct alignment; secure with two lockwashers (5) and machine screws (4).

(9) Position the transmitter contact cover (3) over the contact mounting (15); secure with two lockwashers (2) and machine screws (1).

(10) Adjust the transmitter-distributor contacts as described in paragraphs 142 and 147.

(11) Replace the transmitter-distributor covers as described in paragraph 232*b* for the TT–76A/GGC or paragraph 231*b* for the TT–76/GGC.

(12) Replace the transmitter-distributor as described in paragraph 230*b*.



1 Machine screw, 10001
2 Lockwasher, 10403
3 Transmitter contact cover, 53674
4 Machine screw, 10009
5 Lockwasher, 10403
6 Transmitter contact bail spring, 51548
7 Machine screw, 10301
8 Lockwasher, 10403
9 Transmitter contact bail, 51582A
10 Machine screw, 10301
11 Lockwasher, 10403
12 Transmitter contact terminal, 51597
13 Stationary contact, 51588A
14 Electrical wire, 51610
15 Contact mounting, 51595A
16 Retainer ring, 10949
17 Setscrew, 10209
18 Post, 52839

Figure 228. Transmitter-distributor contacts, exploded view.

240. Disassembly and Reassembly of Transmitter-Distributor Clutch Magnet and Wiring

(fig. 229)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator as described in paragraph 230*a*.

(2) Remove the transmitter-distributor covers as described in paragraph 231*a* for the TT–76/GGC or paragraph 232*a* for the TT–76A/GGC.

(3) Remove the two machine screws (1) and lockwashers (2) that hold the bottom plate (9) to the transmitter-distributor frame.

(4) Remove the plain hexagonal nut (3), lockwasher (4), and machine screw (5) that hold the cable clamp (6) to the terminal board mounting bracket (23); remove the cable clamp (6).

(5) Disconnect all wires from the electrical cable (8) at the terminal board (12); tag the wires. Pull the cable through the grommet (7) and bottom plate (9); remove the grommet (7) from the bottom plate (9).

(6) Remove the four machine screws (10) and lockwashers (11) that hold the terminal board (12) and insulating strip (13) to the terminal board mounting bracket (23); remove the terminal board (12) and insulating strip (13).

(7) Remove the four machine screws (14) and lockwashers (15) that attach the electrical noise suppressor (16) to the filter box mounting bracket (22); remove the electrical noise suppressor (16).

(8) Remove the machine screw (17) and lockwasher (18) that hold the grounding lead (19) to the transmitter-distributor frame; remove the grounding lead (19).

(9) Remove the four machine screws (20) and lockwashers (21) that hold the filter box mounting bracket (22) and the terminal board mounting bracket (23) to the transmitter-distributor frame; remove the filter box mounting bracket (22) and the terminal board mounting bracket (23).

(10) Remove the two machine screws (24) and lockwashers (25) that hold the clutch magnet (26) to the reperforator frame; remove the clutch magnet (26).

(11) Remove the clutch magnet armature spring (27) from the clutch magnet armature (29) and from the spring post on the transmitter-distributor frame.

(12) Remove the retainer ring (28) that holds the clutch magnet armature (29) to the pivot stud on the transmitter-distributor frame; remove the clutch magnet armature (29).

(13) Remove the setscrew (30) that holds the eccentric stud (31) in the transmitter-distributor frame; remove the eccentric stud (31).

b. Reassembly.

(1) Reassemble the transmitter-distributor cutch magnet and wiring by reversing the procedures outlined in *a*(13) through (3) above.

(2) Replace the transmitter-distributor covers as described in paragraph 232*b* for the TT–76A/GGC, or paragraph 231*b* for the TT–76/GGC.

(3) Replace the transmitter-distributor as described in paragraph 230*b*.

241. Disassembly and Reassembly of Transmitter-Distributor Frame

(fig. 230)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator as described in paragraph 230*a*.

(2) Remove the transmitter-distributor covers as described in paragraph 231*a* for the TT–76/GGC or paragraph 232*a* for the TT–76A/GGC.

(3) Remove the tape-out sensing mechanism as described in paragraph 233*a* for the TT–76/GGC or paragraph 234*a* for the TT–76A/GGC.

(4) Remove the transmitter-distributor operating levers as described in paragraph 235*a*.

(5) Remove the transmitter-distributor code sensing levers as described in paragraph 236*a*.

(6) Remove the transmitter-distributor selector levers as described in paragraph 237*a*.

(7) Remove the transmitter-distributor camshaft as described in paragraph 238*a*.

(8) Remove the transmitter-distributor contacts as described in paragraph 239*a*.

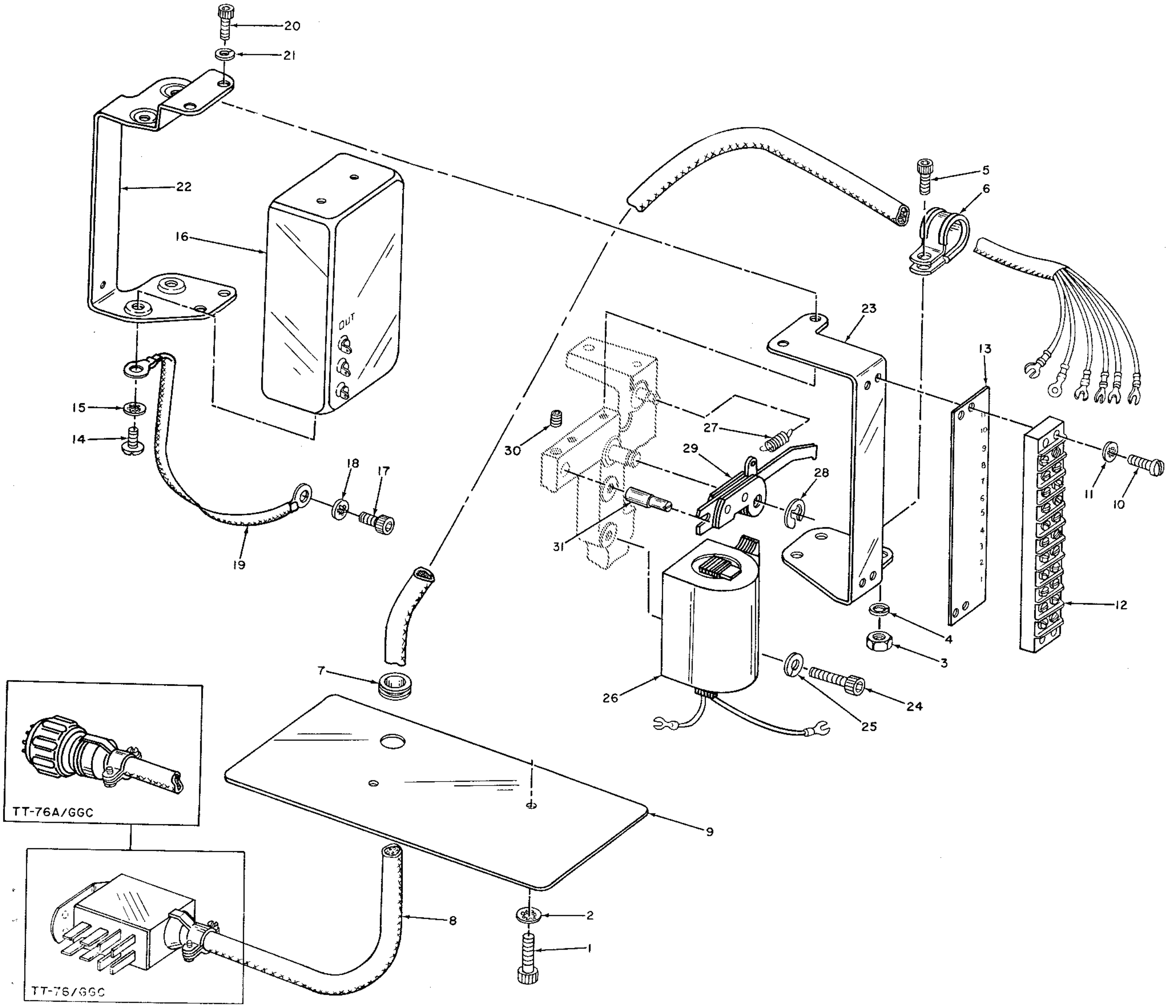
(9) Remove the two cover mounting posts (3) from the transmitter-distributor frame (12).

(10) Remove any loose or damaged spring post or pivot post from the transmitter-distributor frame (12). Support the frame near the post to be removed to prevent distortion of the frame.

b. Reassembly.

(1) Replace any spring post or pivot post that has been removed by pressing it into the transmitter-distributor frame (12) at a right angle to the plane of the frame.

(2) Install the two cover mounting posts (3) in the transmitter-distributor frame (12).



1	Machine screw, 10015	16	Electrical noise suppressor, 54577
2	Lockwasher, 10405	17	Machine screw, 10003
3	Plain hexagonal nut, 10512	18	Lockwasher, 10403
4	Lockwasher, 10429	19	Grounding lead, 53789A
5	Machine screw, 10003	20	Machine screw, 10003
6	Cable clamp, 20513	21	Lockwasher, 10429
7	Grommet, 20726	22	Filter box mounting bracket, 52869
8	Cable, 52782A (TT–76/GGC); 57218A (TT–76A/GGC)	23	Terminal board mounting bracket, 52866
9	Bottom plate, 52131 (TT–76/GGC); 57205 (TT–76A/GGC)	24	Machine screw, 10010
10	Machine screw, 10358	25	Lockwasher, 10430
11	Lockwasher, 10408	26	Clutch magnet, 53605A
12	Terminal board, 52135A	27	Clutch magnet armature spring, 53155
13	Insulating strip, 20380	28	Retainer ring, 10949
14	Machine screw, 10301	29	Clutch magnet armature, 52828A
15	Lockwasher, 10403	30	Setscrew, 10203
		31	Eccentric stud, 52838

Figure 229. Transmitter-distributor clutch magnet and wiring, exploded view.

(3) Replace the transmitter-distributor contacts as described in paragraph 239*b*.

(4) Replace the transmitter-distributor camshaft as described in paragraph 238*b*.

(5) Replace the transmitter-distributor selector levers as described in paragraph 237*b*.

(6) Replace the transmitter-distributor code sensing levers as described in paragraph 236*b*.

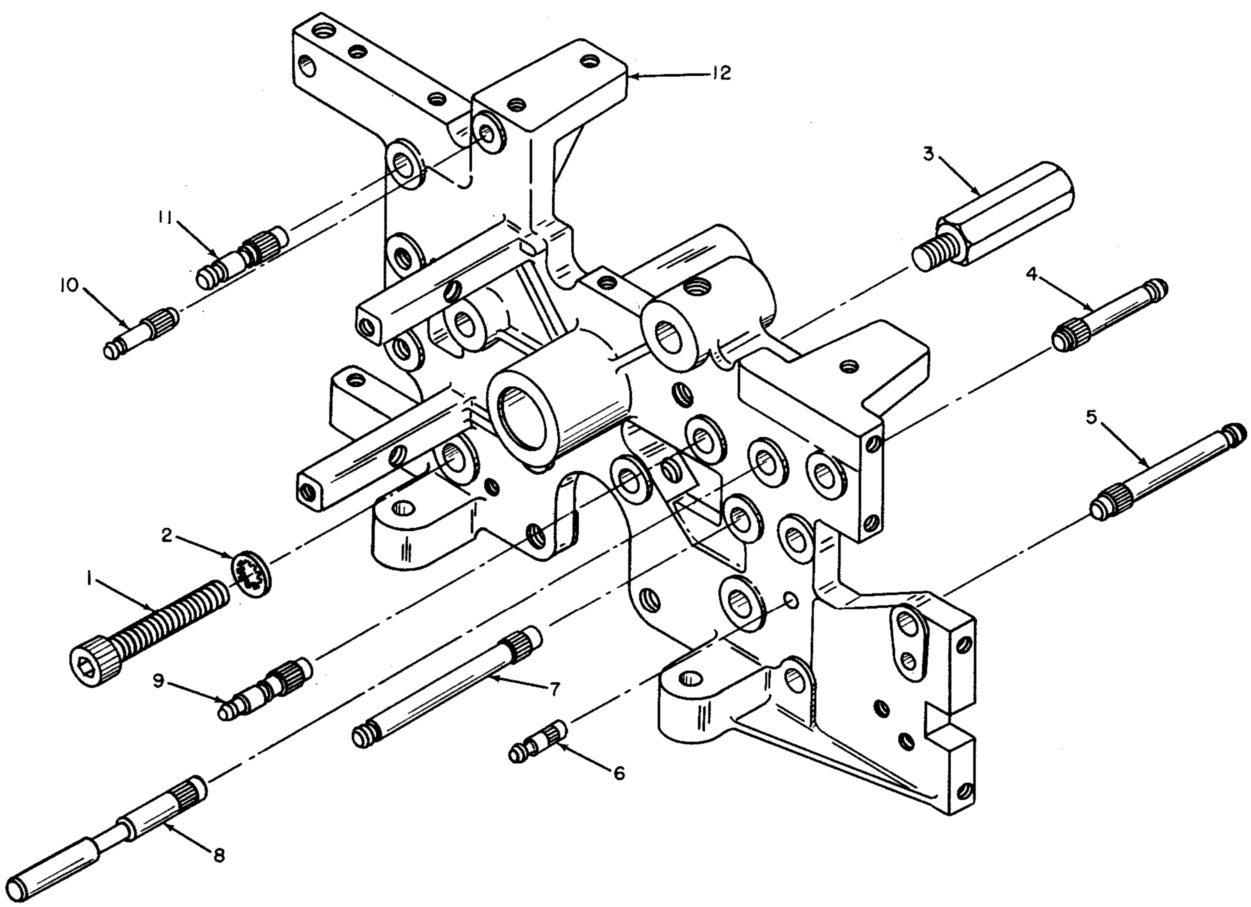
(7) Replace the transmitter-distributor operating levers as described in paragraph 235*b*.

(8) Replace the tape-out sensing mechanism as described in paragraph 234*b* for the TT–76A/GGC or paragraph 233*b* for the TT–76/GGC.

(9) Adjust the transmitter-distributor as described in paragraphs 142 through 162.

(10) Replace the transmitter-distributor covers as described in paragraph 232*b* for the TT–76A/GGC or paragraph 231*b* for the TT–76/GGC.

(11) Replace the transmitter-distributor on the reperforator frame as described in paragraph 230*b*.



1	Machine screw, 10030	7	Start-stop lever stud, 52854
2	Lockwasher, 10405	8	Stop post, 52856
3	Post, 52851	9	Detent lever stud, 52855
4	Upper switch bail post, 52873	10	Spring post, 50455
5	Tight tape stud, 52857	11	Armature pivot stud, 52837
6	Spring post, 51123	12	Transmitter-distributor frame, 52674

Figure 230. Transmitter-distributor frame, exploded view.

242. Removal and Replacement of Power Supply and Terminal Unit (TT–76/GGC)

a. Removal.

(1) Remove all plugs from the power supply and terminal unit. Unsnap the cable clamp (3, fig. 232) and remove the cables from the cable clamp.

(2) Remove the two machine screws (1, fig. 231) that hold the terminal board cover (2) to the power supply and terminal unit chassis (70, fig. 232); remove the terminal board cover (2, fig. 231) and the two lockwashers (3).

(3) Disconnect the terminal leads from the three signal cords (9, 10, and 11) at the terminal board (26). Remove the machine screw (4), lockwasher (5), machine screw (6), and lockwasher (7) that hold the cable clamp (8) to the power supply and terminal cover (22).

(4) Remove the three machine screws (12), lockwashers (13), spacer (14), machine screw (15), lockwasher (16), and spacer (17) that mount the power supply and terminal unit; remove the power supply and terminal unit and the four lockwashers (18).

b. Replacement. Replace the power supply and terminal unit by reversing the procedures outlined in *a* above.

243. Removal and Replacement of Power Supply and Terminal Unit (TT–76A/GGC)

a. Removal.

(1) Disconnect the plug connector on the selector magnet cable (18, fig. 239) from the receptacle connector on the power supply and terminal unit.

(2) Disconnect the plug connector on the power cable assembly (18, fig. 233) from the receptacle connector at the rear of the transmitter-distributor.

(3) Remove the four machine screws (1) and lockwashers (2) that hold the power supply unit to the reperforator frame; remove the power supply and terminal unit by lifting it upward.

b. Replacement. Replace the power supply and terminal unit by reversing the procedures outlined in *a* above.

244. Disassembly and Reassembly of Power Supply and Terminal Unit (TT–76/GGC)

a. Disassembly.

(1) Remove the power supply and terminal unit from the reperforator-transmitter as described in paragraph 242*a*.

(2) Remove the six machine screws (19, fig. 231), lockwashers (20), and flat washers (21) that hold the power supply and terminal cover (22) to the power supply and terminal unit chassis (70, fig. 232). Unsolder and disconnect the wire leads from the terminal board (26, fig. 231).

(3) Remove the two nut plates (23), machine screws (24), and lockwashers (25) that hold the terminal board (26) to the power supply and terminal unit chassis; remove the terminal board (26), terminal marker strip (27), and brace (28).

(4) Unsolder and disconnect the wire leads from the capacitor (39). Remove the two self-locking hexagonal nuts (29), machine screws (30), and lockwashers (31) that hold the bracket (37) to the power supply and terminal unit chassis. Remove the self-tapping screw (32) and lockwasher (33) that hold the clamp (34) to the power supply and terminal unit chassis; remove the clamp (34) from the capacitor (39).

(5) Remove the plain hexagonal nut (35) and lockwasher (36) that hold the bracket (37) to the capacitor (39); remove the bracket (37) and fiber washer (38) from the capacitor (39).

(6) Remove the plain hexagonal nut (1, fig. 232) and lockwasher (2) that hold the cable clamp (3) to the mounting stud (8); remove the cable clamp (3).

(7) Unsolder and disconnect the wire leads from the resistor (9). Remove the plain hexagonal nut (4), lockwasher (5), plain hexagonal nut (6), and lockwasher (7) that hold the mounting stud (8) to the mounting plate (12) and to the power supply and terminal unit chassis (70); remove the mounting stud (8) catching the resistor (9) as it falls free.

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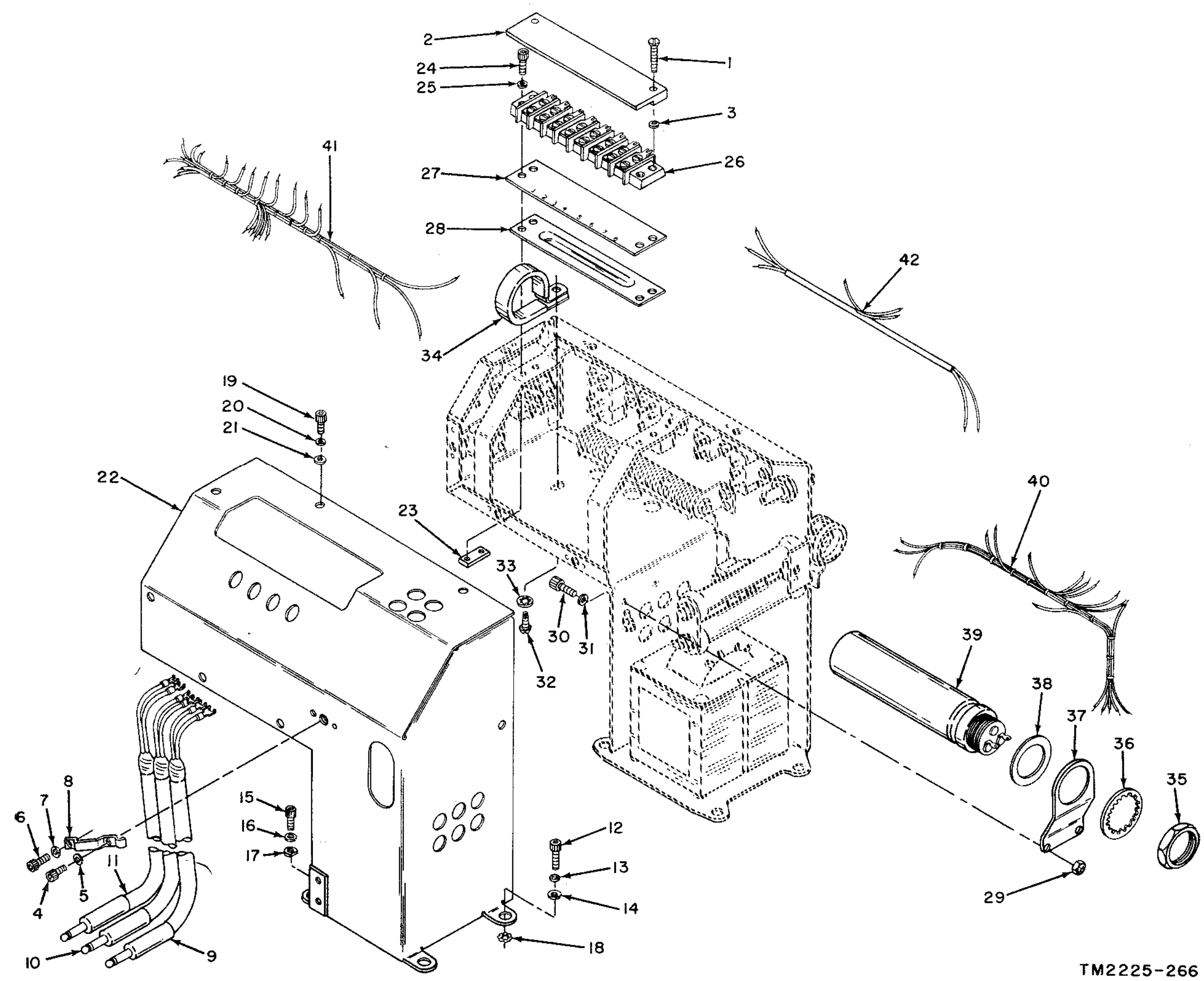


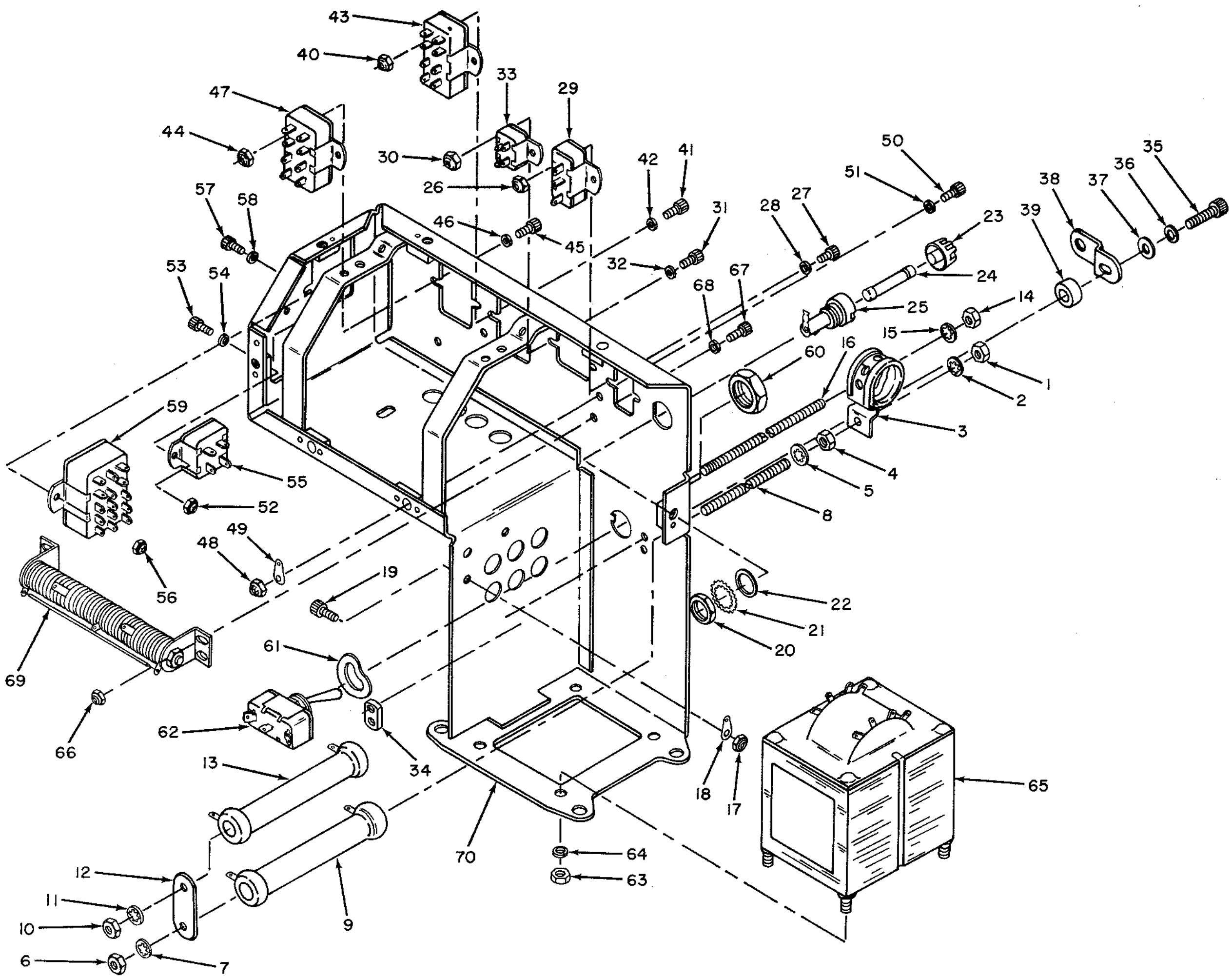
1	Machine screw, 10359	16	Lockwasher, 10431	30	Machine screw, 10003
2	Terminal board cover, 53259	17	Spacer, 54091	31	Lockwasher, 10429
3	Lockwasher, 10429	18	Lockwasher, 10406	32	Self-tapping screw, 10369
4	Machine screw, 10003	19	Machine screw, 10003	33	Lockwasher, 10405
5	Lockwasher, 10429	20	Lockwasher, 10429	34	Clamp, 20792
6	Machine screw, 10004	21	Flat washer, 10458	35	Plain hexagonal nut
7	Lockwasher, 10429	22	Power supply and terminal cover, 53637	36	Lockwasher
8	Cable clamp, 52564	23	Nut plate, 54884	37	Bracket, 52570
9	Signal cord (P9), 52661A	24	Machine screw, 10006	38	Fiber washer
10	Signal cord (P10), 52263A	25	Lockwasher, 10429	39	Capacitor (C20), 20780 (includes items 35, 36, and 38)
11	Signal cord (P11), 52662A	26	Terminal board (TB2), 20361	40	Ac power cable, 53294
12	Machine screw, 10018	27	Terminal marker strip, 20374	41	Dc power cable, 53293
13	Lockwasher, 10431	28	Brace, 52638	42	Cable, 53301
14	Spacer, 10473	29	Self-locking hexagonal nut, 10500		
15	Machine screw, 10018				

Figure 231. Power supply and terminal unit TT–76/GGC.

(8) Unsolder and disconnect the wire leads from the resistor (13). Remove the plain hexagonal nut (10), lockwasher (11), and mounting plate (12) that hold the resistor (13) to the mounting stud (16); remove the resistor (13). Remove the plain hexagonal nut (14), lockwasher (15), and mounting stud (16) from the power supply and terminal unit chassis (70).

(9) Remove the self-locking hexagonal nut (17) that holds the grounding lug (18) to the power supply and terminal unit chassis (70); remove the grounding lug (18) and machine screw (19).

(10) Remove the plain hexagonal nut (20), lockwasher (21), and flat washer (22) that hold the fuze holder (25) to the power supply and terminal unit chassis (70); re-



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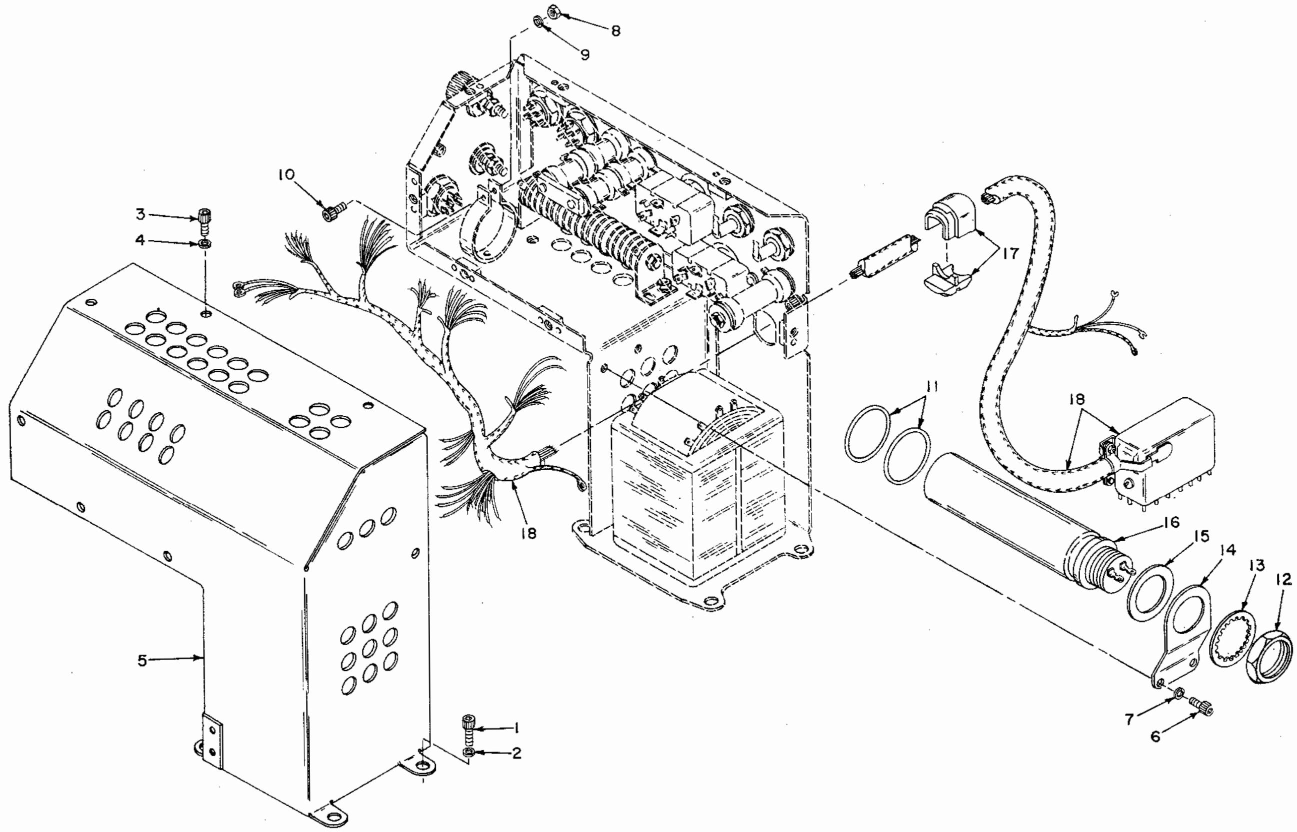
1 Plain hexagonal nut, 10515
2 Lockwasher, 10404
3 Cable clamp, 20506
4 Plain hexagonal nut, 10516
5 Lockwasher, 10404
6 Plain hexagonal nut, 10516
7 Lockwasher, 10404
8 Mounting stud, 53464
9 Resistor (R2), 20011
10 Plain hexagonal nut, 10516
11 Lockwasher, 10404
12 Mounting plate, 52572
13 Resistor (R3), 20011
14 Plain hexagonal nut, 10516
15 Lockwasher, 10404
16 Mounting stud, 53464
17 Self-locking hexagonal nut, 10500
18 Grounding lug, 20193
19 Machine screw, 10003
20 Plain hexagonal nut
21 Lockwasher
22 Flat washer
23 Fuse holder cap
24 Fuse (F1), 10455
25 Fuse holder, 20558 (includes items 20, 21, 22, and 23)
26 Self-locking hexagonal nut, 10500
27 Machine screw, 10003
28 Lockwasher, 10429
29 Receptacle connector (J1), 20258
30 Self-locking hexagonal nut, 10500
31 Machine screw, 10003
32 Lockwasher, 10429
33 Receptacle connector (J4), 20256
34 Nut plate, 52073
35 Machine screw, 10010
36 Lockwasher, 10430
37 Flat washer, 10463
38 Switch lock, 52671
39 Spacer, 52157
40 Self-locking hexagonal nut, 10505
41 Machine screw, 10003
42 Lockwasher, 10429
43 Plug connector (J5), 20259
44 Self-locking hexagonal nut, 10500
45 Machine screw, 10003
46 Lockwasher, 10429
47 Receptacle connector (J6), 20260
48 Self-locking hexagonal nut, 10500
49 Grounding lug, 20193
50 Machine screw, 10003
51 Lockwasher, 10429
52 Self-locking hexagonal nut, 10500
53 Machine screw, 10003
54 Lockwasher, 10429
55 Receptacle connector (J7), 20257
56 Self-locking hexagonal nut, 10500
57 Machine screw, 10003
58 Lockwasher, 10429
59 Receptacle connector (J8), 20261
60 Plain hexagonal nut, 10500
61 Lockwasher, 10466
62 Power selector switch (S1), 20117
63 Plain hexagonal nut, 10516
64 Lockwasher, 10430
65 Transformer, 52878
66 Self-locking hexagonal nut, 10500
67 Machine screw, 10003
68 Lockwasher, 10429
69 Rectifier (CR1), 20782
70 Power supply and terminal unit chassis, 53628

Figure 232. Power supply and terminal unit, disassembly completed, TT–76/GGC.



1	Machine screw, 10018–01	10	Machine screw, 10009
2	Lockwasher, 10406	11	O-ring, 11077
3	Machine screw, 10003	12	Plain hexagonal nut
4	Lockwasher, 10429	13	Lockwasher
5	Power supply and terminal cover, 57308	14	Bracket, 52570
6	Machine screw, 10001	15	Fiber washer
7	Lockwasher, 10429	16	Capacitor (C1), 20220
8	Plain hexagonal nut, 10505	17	Strain relief, 20886
9	Lockwasher, 10430	18	Power cable assembly, 57310A

Figure 233. Power supply and terminal unit, partial disassembly, TT–76A/GGC.

move the assembled fuse holder (25), fuse holder cap (23), and fuse (24). Remove the fuse holder cap (23) and fuse (24) from the fuse holder (25).

(11) Unsolder and disconnect the wire leads from the receptacle connector (29). Remove the two self-locking hexagonal nuts (26), machine screws (27), and lockwashers (28) that hold the receptacle connector (29) to the power supply and terminal unit chassis (70); remove the receptacle connector (29).

(12) Unsolder and disconnect the wire leads from the receptacle connector (33). Remove the two self-locking hexagonal nuts (30), machine screws (31), and lockwashers (32) that hold the receptacle connector (33) to the power supply and terminal unit chassis (70); remove the receptacle connector (33).

(13) Remove the nut plate (34), machine screw (35), lockwasher (36), and flat washer (37) that hold the switch lock (38) to the power supply and terminal unit chassis (70); remove the switch lock (38) and spacer (39).

(14) Unsolder and disconnect the wire leads from the plug connector (43). Remove the two self-locking hexagonal nuts (40), machine screws (41), and lockwashers (42) that hold the plug connector (43) to the power supply and terminal unit chassis (70); remove the plug connector (43).

(15) Unsolder and disconnect the wire leads from the receptacle connector (47). Remove the two self-locking hexagonal nuts (44), machine screws (45), and lockwashers (46) that hold the receptacle connector (47) to the power supply and terminal unit chassis (70); remove the receptacle connector (47).

(16) Remove the self-locking hexagonal nut (48) that holds the grounding lug (49) on the machine screw (50); remove the grounding lug (49), machine screw (50), and lockwasher (51).

(17) Unsolder and disconnect the wire leads from the receptacle connector (55). Remove the two self-locking hexagonal nuts (52), machine screws (53), and lockwashers (54) that hold the receptacle connector (55) to the power supply and terminal unit chassis (70); remove the receptacle connector (55).

(18) Unsolder and disconnect the wire leads from the receptacle connector (59). Remove the two self-locking hexagonal nuts (56), machine screws (57), and lockwashers (58) that hold the receptacle connector (59) to the power supply and terminal unit chassis (70); remove the receptacle connector (59).

(19) Unsolder and disconnect the wire leads from the power selector switch (62). Remove the plain hexagonal nut (60) that holds the power selector switch (62) to the power supply and terminal unit chassis (70); remove the lockwasher (61) and the power selector switch (62).

(20) Unsolder and disconnect the wire leads from the transformer (65). Remove the four plain hexagonal nuts (63) and lockwashers (64) that hold the transformer (65) to the power supply and terminal unit chassis (70); remove the transformer (65).

(21) Unsolder and disconnect the wire leads from the rectifier (69). Remove the four self-locking hexagonal nuts (66), machine screws (67), and lockwashers (68) that hold the rectifier (69) to the power supply and terminal unit chassis (70); remove the rectifier (69).

(22) Remove the cables (40, 41, and 42, fig. 231) from the power supply and terminal unit chassis.

b. *Reassembly* (figs. 231 and 293).

(1) Reassemble the power supply and terminal unit by reversing the procedures outlined in *a*(22) through (2) above.

(2) Replace the power supply and terminal unit as directed in paragraph 242*b*.

245. Disassembly and Reassembly of Power Supply and Terminal Unit (TT–76A/GGC)

a. *Disassembly.*

(1) Remove the power supply and terminal unit from the reperforator-transmitter as described in paragraph 243*a*.

(2) Remove the seven machine screws (3, fig. 233) and lockwashers (4) that hold the power supply and terminal cover (5) to the power supply and terminal unit chassis (68, fig. 234); remove the power supply and terminal cover (5, fig. 233).

(3) Unsolder and disconnect the electrical leads from the capacitor (16). Remove the two machine screws (6) and lockwashers (7) that hold the bracket (14) to the power supply and terminal unit chassis.

(4) Remove the plain hexagonal nut (8), lockwasher (9), and machine screw (10) that hold the clamp on the chassis to the capacitor (16); remove the two O-rings (11) and the assembled capacitor (16) and bracket (14).

(5) Remove the plain hexagonal nut (12) and lockwasher (13) that hold the bracket (14) to the capacitor (16); remove the bracket (14) and fiber washer (15).

(6) Unsolder and disconnect the wire leads from the four resistors (2, 4, 10, and 12, fig. 234).

(7) Unscrew the machine screw (6) from the nut plate (8); remove the centering washer (1), resistor (2), flat washer (3), resistor (4), and centering washer (5) from the machine screw (6). Remove the machine screw (6) and lockwasher (7) from the power supply and terminal unit chassis (68).

(8) Remove the machine screw (14) from the nut plate (8); remove the centering washer (9), resistor (10), flat washer (11), resistor (12), and centering washer (13) from the machine screw (14). Remove the machine screw (14) and lockwasher (15) from the power supply and terminal unit chassis (68).

(9) Unsolder and disconnect the wire leads from the switch (18). Remove the plain hexagonal nut (16) that holds the switch (18) to the power supply and terminal unit chassis (68); remove the lockwasher (17) and switch (18).

(10) Unsolder and disconnect the wire leads from the resistor (23). Remove the plain hexagonal nut (19), lockwasher (20), flat washer (21), centering washer (22), resistor (23), centering washer (24), and flat washer (25) from the machine screw (26); remove the machine screw (26) and lockwasher (27) from the power supply and terminal unit chassis (68).

(11) Remove the machine screw (28), lockwasher (29), and flat washer (30) that hold the switch locking bracket (31) to the power supply and terminal unit chassis (68); remove the switch locking bracket (31).

(12) Unsolder and disconnect the wire leads from the switch (34). Remove the plain hexagonal nut (32) that holds the switch (34) to the power supply and terminal unit chassis (68); remove the lockwasher (33) and the switch (34).

(13) Unsolder and disconnect the wire leads from the rectifier (39). Remove the four plain hexagonal nuts (35), lockwashers (36), machine screws (37), and lockwashers (38) that hold the rectifier (39) to the power supply and terminal unit chassis (68); remove the rectifier (39).

(14) Unsolder and disconnect the grounding lead (43) from the receptacle connector (46). Remove the machine screw (40) and lockwashers (41 and 42) that hold the grounding lead (43) to the power supply and terminal unit chassis (68); remove the grounding lead (43).

(15) Unsolder and disconnect the wire leads from the receptacle connector (46). Remove the plain hexagonal nut (44) and lockwasher (45) that hold the receptacle connector (46) to the power supply and terminal unit chassis (68); remove the receptacle connector (46).

(16) Unsolder and disconnect the wire leads from the two receptacle connectors (49). Remove the two plain hexagonal nuts (47) and lockwashers (48) that hold the receptacle connectors (49) to the power supply and terminal unit chassis (68); remove the two receptacle connectors (49).

(17) Remove the machine screw (50) and two lockwashers (51) that hold the grounding lug on the power cable assembly (18, fig. 233) to the power supply and terminal unit chassis (68, fig. 234).

(18) Unsolder and disconnect the wire leads from the transformer (54). Remove the four plain hexagonal nuts (52) and lockwashers (53) that hold the transformer (54) to the power supply and terminal unit chassis (68); lift the transformer (54) out of the power supply and terminal unit chassis (68).

(19) Unsolder and disconnect the wire leads from the two fuse holders (60). Remove the two plain hexagonal nuts (55), lockwashers (56), and rubber washers (57) that hold the two fuse holders (60) to the power supply and terminal unit chassis (68); remove the fuse holder caps (58), fuses (59), and fuse holders (60).

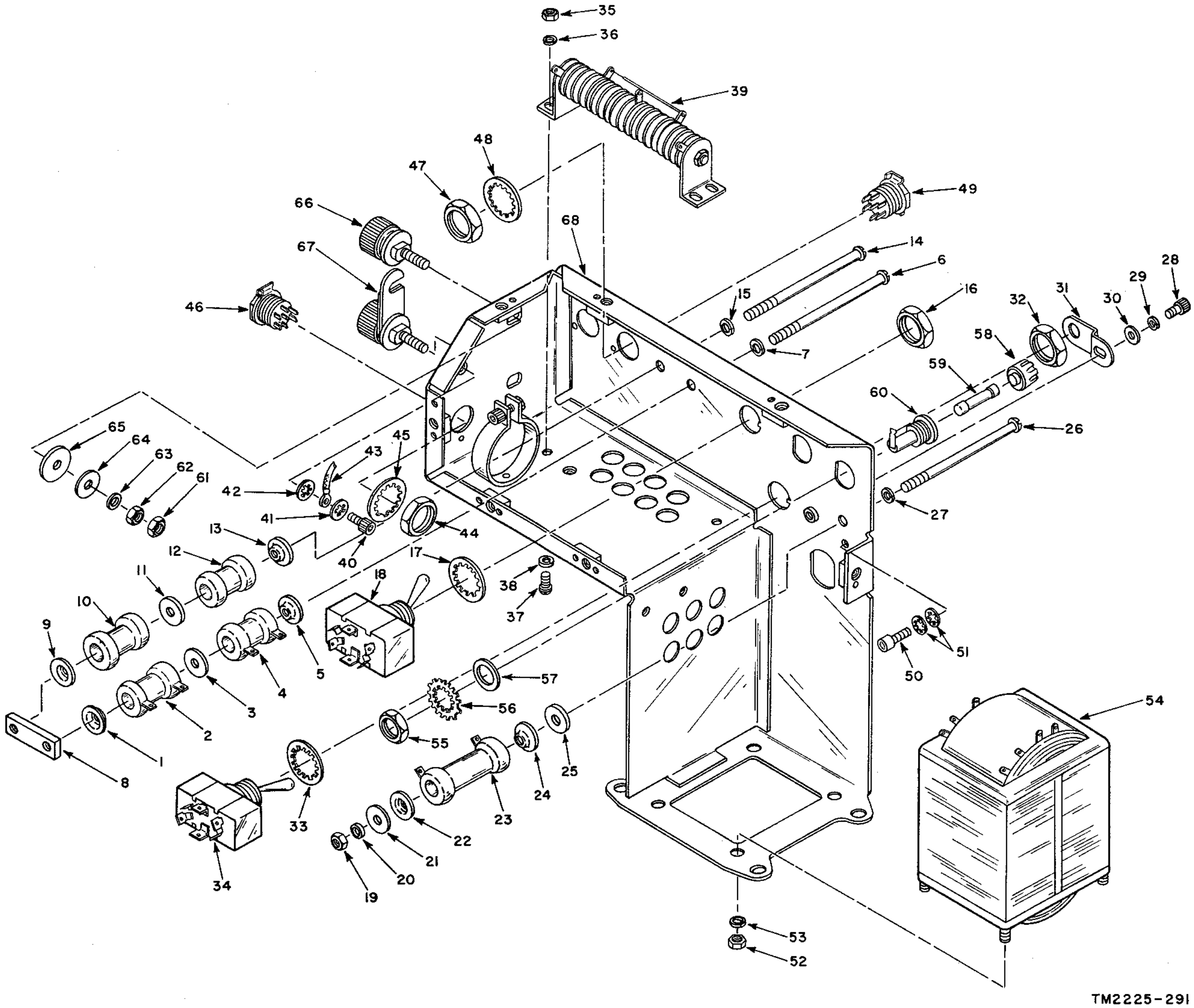
(20) Remove the two plain hexagonal nuts (61) that hold the terminal lugs to the studs on the binding post (66) and shunt assembly (67). Remove the two plain hexagonal nuts (62), flat washers (63, 64, and 65) that hold the binding post (66) and shunt assembly (67) to the power supply and terminal unit chassis (68); remove the binding post (66) and shunt assembly (67).

(21) Remove the strain relief (17, fig. 233) and power cable assembly (18) from the power supply and terminal unit chassis (68, fig. 234).

b. Reassembly (figs. 233 and 294).

(1) Reassemble the power supply and terminal unit by reversing the procedures outlined in *a*(21) through (2) above.

(2) Replace the power supply and terminal unit as described in paragraph 243*b*.



1 Centering washer, 57311
2 Resistor (R5), 20046
3 Flat washer, 54561
4 Resistor (R2), 20048
5 Centering washer, 57311
6 Machine screw, 10164
7 Lockwasher, 10430
8 Nut plate, 57309
9 Centering washer, 57311
10 Resistor (R3), 20039
11 Flat washer, 54561
12 Resistor (R4), 20040
13 Centering washer, 57311
14 Machine screw, 10164
15 Lockwasher, 10430
16 Plain hexagonal nut
17 Lockwasher
18 Switch (S4), 20131 (includes items 16 and 17)
19 Plain hexagonal nut, 10516
20 Lockwasher, 10430
21 Flat washer, 54561
22 Centering washer, 57311
23 Resistor (R1), 20047
24 Centering washer, 57311
25 Flat washer, 54561
26 Machine screw, 10164
27 Lockwasher, 10430
28 Machine screw, 10001
29 Lockwasher, 10429
30 Flat washer, 10477
31 Switch locking bracket, 52671
32 Plain hexagonal nut
33 Lockwasher
34 Switch (S7), 20117 (includes items 32 and 33)
35 Plain hexagonal nut, 50174
36 Lockwasher, 10421
37 Machine screw, 10106
38 Lockwasher, 10421
39 Rectifier (CR1), 57312A
40 Machine screw, 10001
41 Lockwasher, 10403
42 Lockwasher, 10403
43 Grounding lead, 22011
44 Plain hexagonal nut
45 Lockwasher, 10478
46 Receptacle connector (J12), 20277 (includes item 44)
47 Plain hexagonal nut
48 Lockwasher
49 Receptacle connector (J10), 20262 (includes items 47 and 48)
50 Machine screw, 10001
51 Lockwasher, 10403
52 Plain hexagonal nut, 10516
53 Lockwasher, 10404
54 Transformer (T1), 57301
55 Plain hexagonal nut
56 Lockwasher
57 Rubber washer
58 Fuse holder cap
59 Fuse (F1), 20445
60 Fuse holder, 20460 (includes items 55, 56, 57, and 58)
61 Plain hexagonal nut, 10515
62 Plain hexagonal nut, 10515
63 Flat washer, 10463
64 Flat washer, 50515
65 Flat washer, 50909
66 Binding post (E2), 20877
67 Shunt assembly (E3), 56197A
68 Power supply and terminal unit chassis, 57305A

Figure 234. Power supply and terminal unit, disassembly completed, TT–76A/GGC.

246. Disassembly and Reassembly of Tape Reel (TT–76/GGC)

(fig. 235)

a. Disassembly.

(1) Disconnect the receptacle connector from the plug connector (36) attached to the tape reel bracket (53).

(2) Remove the machine screw (1) and lockwasher (2) that hold the tape reel bracket (53) to the stud on the motor support. Remove the three machine screws (3) and lockwashers (4) that hold the tape reel bracket (53) to the reperforator frame; remove the tape reel assembly.

(3) Unhook the two springs (5) from the tape guide roller shaft (9) and from the spring posts on the outer reel support arm (14).

(4) Remove the retainer rings (6 and 7) that hold the tape guide roller shaft (9) to the outer reel support arm (14); remove the tape guide roller shaft (9) and the two guide rollers (8).

(5) Unlatch the reel support latch (46), lift the outer reel support arm (14) clear of the latch, and remove the two plain hexagonal nuts (10) from the stud on the outer reel support arm (14).

(6) Remove the two plain hexagonal nuts (11), lockwashers (12), and flat washers (13) that hold the outer reel support arm (14) to the stud on the tape reel bracket (53); remove the outer reel support arm (14) and flat washer (15).

(7) Unhook the alarm lever spring (16) from the tape reel bracket (53) and from the tape-out alarm lever (21).

(8) Remove the retainer ring (17) that holds the tape-out alarm lever (21) to the stud on the tape reel bracket (53); remove the assembled tape-out alarm lever (21) and switch actuating stud (19).

(9) Remove the self-locking hexagonal nut (18) that holds the switch actuating stud (19) to the tape-out alarm lever (21); remove the switch actuating stud (19) and the flat washer (20).

(10) Remove the three self-locking hexagonal nuts (22) and machine screws (23) that hold the tape reel hub (24) to the tape reel (28); remove the tape reel hub (24).

(11) Remove the self-locking hexagonal nut (25) and the screw (26) that hold the ball bearing (27) and the tape reel (28) to the tape reel bracket (53); remove the ball bearing (27) and the tape reel (28).

(12) Unsolder and disconnect the wire leads to the tape-out alarm switch (43). Remove the wire from the clamp (38).

(13) Remove the two self-locking hexagonal nuts (29), machine screws (30), and lockwashers (31) that hold the plug connector (36) to the tape reel bracket (53); remove the terminal lug (32).

(14) Remove the two self-locking hexagonal nuts (33) and machine screws (34) that hold the tape alarm buzzer (35) to the tape reel assembly (53); remove the tape alarm buzzer (35), plug connector (36), and connecting wire. Remove the tubing (37) from the connecting wire if necessary.

(15) Remove the clamp (38) from the tape reel bracket (53).

(16) Remove the two self-locking hexagonal nuts (39), machine screws (40), and flat washers (41) that hold the tape-out alarm switch (43) to the tape reel bracket (53); remove the tape-out alarm switch (43) and spacer (42).

(17) Unhook the reel support latch spring (44) from the reel support latch (46) and from the spring post on the tape reel bracket (53).

(18) Remove the retainer ring (45) that holds the reel support latch (46) to the stud on the tape reel bracket (53); remove the reel support latch (46).

(19) Unhook the switch operating lever spring (47) from the switch operating lever (49) and from the spring post on the tape reel bracket (53).

(20) Remove the retainer ring (48) that holds the switch operating lever (49) to the stud on the tape reel bracket (53); remove the switch operating lever (49).

(21) Unhook the lever latch spring (50) from the lever latch (52) and from the spring post on the tape reel bracket (53).

(22) Remove the retainer ring (51) that holds the lever latch (52) to the stud on the tape reel bracket (53); remove the lever latch (52).

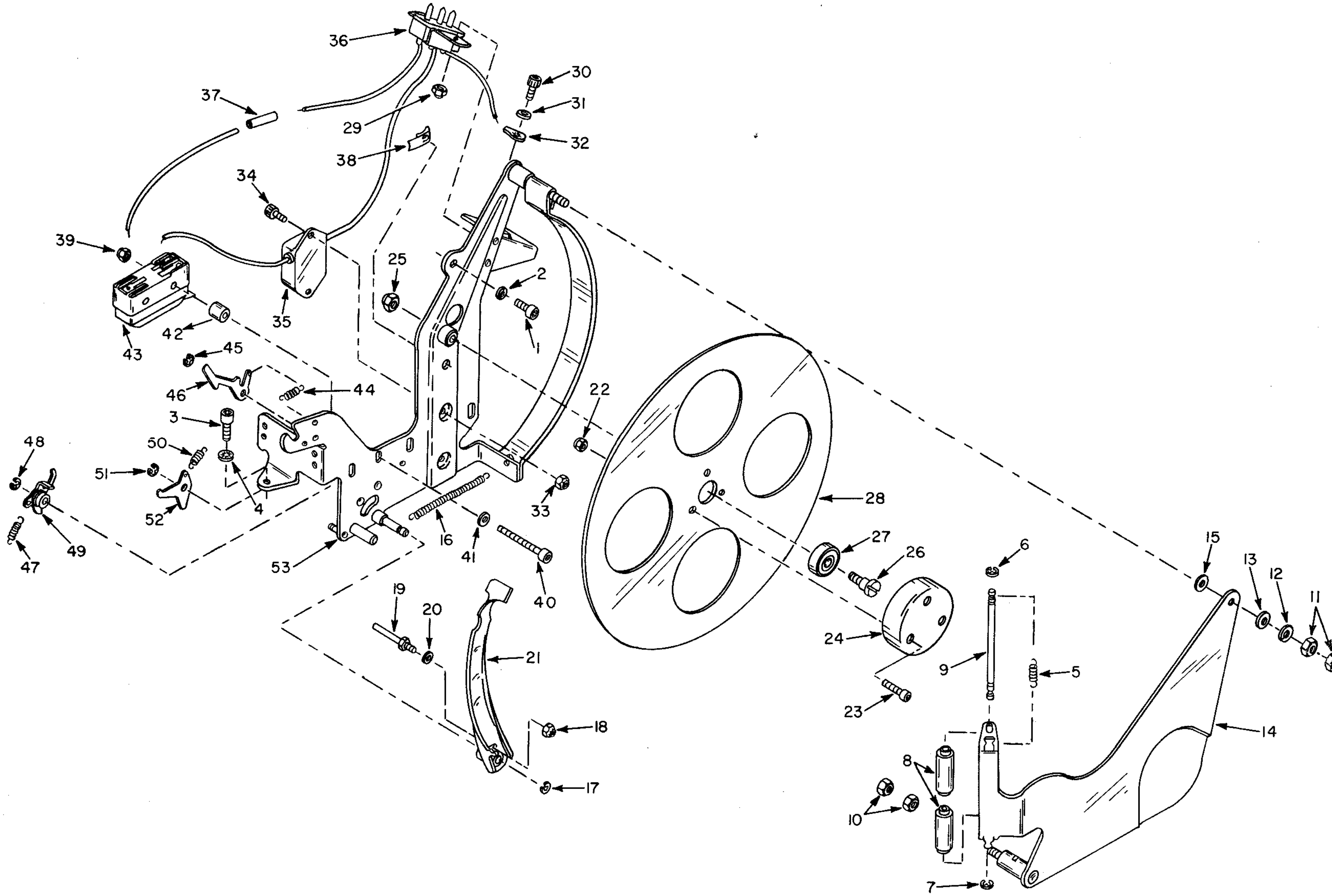


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Figure 235. Tape reel, exploded view (TT–76/GGC).

1	Machine screw, 10024–01	19	Switch actuating stud, 52278	37	Tubing, 20837
2	Lockwasher, 10431	20	Flat washer, 10450	38	Clamp, 20511
3	Machine screw, 10024–01	21	Tape-out alarm lever, 52542A	39	Self-locking hexagonal nut, 10500
4	Lockwasher, 10405	22	Self-locking hexagonal nut, 10500	40	Machine screw, 10033
5	Spring, 52212	23	Machine screw, 10006	41	Flat washer, 10450
6	Retainer ring, 10969	24	Tape reel hub, 52128	42	Spacer, 52272
7	Retainer ring, 10969	25	Self-locking hexagonal nut, 10525	43	Tape-out alarm switch, 20108
8	Guide roller, 50162	26	Screw, 52541	44	Reel support latch spring, 50912
9	Tape guide roller shaft, 53159	27	Ball bearing, 10762	45	Retainer ring, 10949
10	Plain hexagonal nut, 10509	28	Tape reel, 52296	46	Reel support latch, 52938
11	Plain hexagonal nut, 10509	29	Self-locking hexagonal nut, 10500	47	Switch operating lever spring, 52266
12	Lockwasher, 10431	30	Machine screw, 10003	48	Retainer ring, 10949
13	Flat washer, 53783	31	Lockwasher, 10458	49	Switch operating lever, 52279A
14	Outer reel support arm, 52540A	32	Terminal lug, 20807	50	Lever latch spring, 52212
15	Flat washer, 53783	33	Self-locking hexagonal nut, 10500	51	Retainer ring, 10949
16	Alarm lever spring, 52576	34	Machine screw, 10003	52	Lever latch, 52281
17	Retainer ring, 10949	35	Tape alarm buzzer, 20783	53	Tape reel bracket, 52140A
18	Self-locking hexagonal nut, 10500	36	Plug connector, 20265		

Figure 235—Continued.

b. Reassembly.

(1) Reassemble the tape reel by reversing the procedures outlined in *a* above.

(2) Adjust the tape reel as described in paragraphs 138 and 139.

247. Disassembly and Reassembly of Tape Reel (TT–76A/GGC)

(fig. 236)

a. Disassembly.

(1) Disconnect the plug connector (61) of the tape-out alarm cable assembly (62) from the receptacle connector at the right of the keyboard-transmitter. Lift the assembled tape roll retaining plate (1) and tape reel (8) from the pivot stud bracket (16).

(2) Unlock the tape roll retaining plate (1) from the hub on the tape reel (8); remove the tape roll retaining plate.

(3) Remove the retainer ring (2) that holds the release plunger (3) to the tape reel hub; remove the release plunger (3) and spring (4).

(4) Remove the guide nut (5), lockwasher (6), and pivot stud (7) from the tape reel (8).

(5) Remove the two machine screws (9), lockwashers (10), two machine screws (11), lockwashers (12), and flat washers (13) that hold the tape reel bracket (60) to the reperforator frame; remove the tape reel bracket (60) from the reperforator.

(6) Remove the two machine screws (14) and lockwashers (15) that hold the pivot stud bracket (16) to the tape reel bracket (60); remove the pivot stud bracket (16).

(7) Remove the self-locking hexagonal nut (17) and machine screw (18) that hold the cable clamp (19) to the tape reel bracket (60); remove the cable clamp (19).

(8) Remove the self-locking hexagonal nut (20), lockwasher (21), and machine screw (22) that hold the grounding lug on the tape-out alarm cable assembly (62) to the tape reel bracket (60).

(9) Disconnect the wire leads from the tape-out alarm switch (35).

(10) Unhook the alarm lever spring (23) from the alarm lever (52) and from the spring post on the tape reel bracket (60).

(11) Remove the two self-locking hexagonal nuts (24) and machine screws (25) that hold the switch bracket (53) to the tape reel bracket (60); remove the assembled switch bracket and the cable clamp (26).

(12) Remove the two self-locking hexagonal nuts (27) and machine screws (28) that hold the tape alarm buzzer (29) to the tape reel bracket (60); remove the tape alarm buzzer (29) and the tape-out alarm cable assembly (62).

(13) Remove the two self-locking hexagonal nuts (30) that retain the alarm switch cover (31); remove the alarm switch cover (31).

(14) Remove the two self-locking hexagonal nuts (32), machine screws (33), and lock-

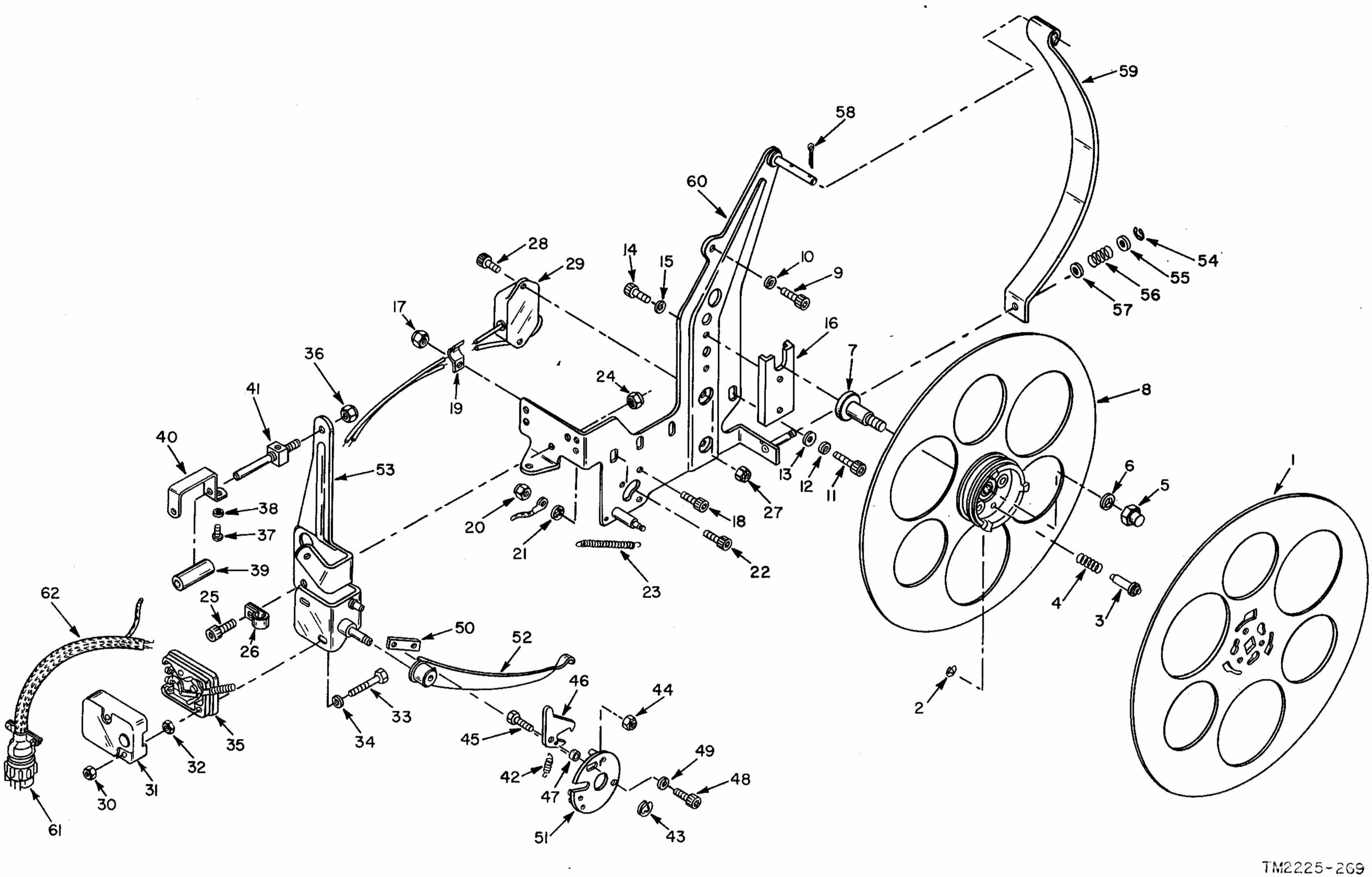


Figure 236. Tape reel, exploded view (TT-76A/GGC).

1	Tape roll retaining plate, 57351	22	Machine screw, 10055	43	Retainer ring, 10949
2	Retainer ring, 10969	23	Alarm lever spring, 57394	44	Self-locking hexagonal nut, 10500
3	Release plunger, 57389	24	Self-locking hexagonal nut, 10501	45	Machine screw, 10090
4	Spring, 57391	25	Machine screw, 10025	46	Lever latch, 57395
5	Guide nut, 57314	26	Clamp, 20521	47	Spacer, 57380
6	Lockwasher, 10431	27	Self-locking hexagonal nut, 10500	48	Machine screw, 10003
7	Pivot stud, 57390	28	Machine screw, 10004	49	Lockwasher, 10429
8	Tape reel, 57350A	29	Tape alarm buzzer, 20783	50	Nut plate, 52561
9	Machine screw, 10024–01	30	Self-locking hexagonal nut, 10500	51	Switch alarm, 57374A
10	Lockwasher, 10405	31	Alarm switch cover, 55372A	52	Alarm lever, 57397A
11	Machine screw, 10024–01	32	Self-locking hexagonal nut, 10513	53	Switch bracket, 57371A
12	Lockwasher, 10431	33	Machine screw, 10091	54	Retainer ring, 10960
13	Flat washer, 10473	34	Lockwasher, 10429	55	Flat washer, 50319
14	Machine screw, 10008	35	Tape-out alarm switch, 56821A	56	Tape retainer spring, 57391
15	Lockwasher, 10430	36	Self-locking hexagonal nut, 10525	57	Flat washer, 50319
16	Pivot stud bracket, 57377	37	Machine screw, 10357	58	Cotter pin, 10802
17	Self-locking hexagonal nut, 10501	38	Lockwasher, 10429	59	Tape retainer, 57392
18	Machine screw, 10025	39	Guide roller, 50162	60	Tape reel bracket, 57367A
19	Clamp, 20521	40	Retainer, 57379	61	Plug connector, 20419
20	Self-locking hexagonal nut, 10500	41	Tape guide roller stud, 57378	62	Tape-out alarm cable assembly, 57393A
21	Lockwasher, 10403	42	Lever latch spring, 53312		

Figure 236—Continued.

washers (34) that hold the tape-out alarm switch (35) to the switch bracket (53); remove the tape-out alarm switch (35).

(15) Remove the two self-locking hexagonal nuts (36) that hold the two tape guide roller studs (41) to the switch bracket (53); remove the two guide roller assemblies.

(16) Remove the two machine screws (37) and lockwashers (38) that hold the two retainers (40) to the two tape guide roller studs (41); remove the guide roller (39) and retainer (40) from each of the tape guide roller studs (41).

(17) Unhook the lever latch spring (42) from the switch arm (51) and from the lever latch (46).

(18) Remove the retainer ring (43) that holds the switch arm (51) to the stud on the switch bracket (53); remove the assembled switch arm (51), lever latch (46), and alarm lever (52).

(19) Remove the self-locking hexagonal nut (44) and machine screw (45) that hold the lever latch (46) to the switch arm (51); remove the lever latch (46) and spacer (47).

(20) Remove the machine screws (48), lockwashers (49), and nut plate (50) that hold the switch arm (51) to the alarm lever (52); remove the switch arm (51).

(21) Remove the retainer ring (54), flat washer (55), tape retainer spring (56), and flat washer (57) that hold the tape retainer (59) to the stud on the tape reel bracket (60). Remove the two cotter pins (58) from the stud at the top of the tape reel bracket (60); remove the tape retainer (59).

(22) Disconnect the plug connector (61) from the tape-out alarm cable assembly (62).

b. Reassembly.

(1) Reassemble the tape reel by reversing the procedures outlined in *a* above.

(2) Adjust the tape reel as described in paragraphs 140 and 141.

248. Disassembly and Reassembly of Tape Puller Mechanism (TT–76A/GGC)

(fig. 237)

a. Disassembly.

(1) Remove the two machine screws (1), flat washers (2), and lockwashers (3) that hold the tape puller bracket (17) to the reperforator frame; remove the tape puller assembly.

(2) Remove the tape puller arm roller (4) from the tape roller puller stud (8).

(3) Remove the retainer ring (5) and slide the assembled tape puller arm (13), tape puller spring (12), and tape puller roller stud (8) off the arm pivot stud (15). Remove the flat washer (6) from the arm pivot stud (15).

(4) Remove the self-locking hexagonal nut (7) that holds the tape puller roller stud (8) to the tape puller arm (13); remove the tape puller roller stud (8).

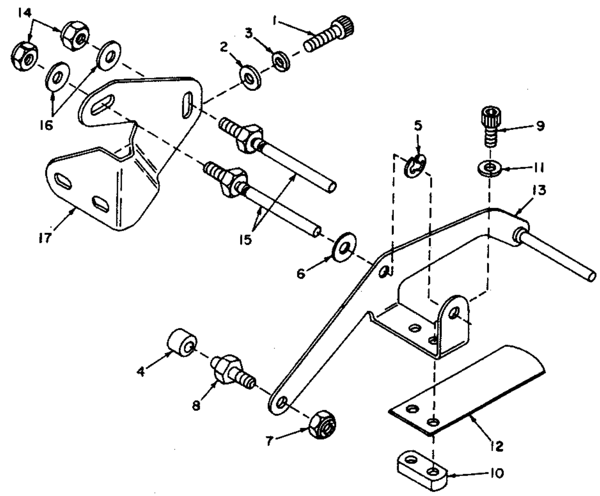
(5) Remove the two machine screws (9), the nut plate (10), and two lockwashers (11) that hold the tape puller spring (12) to the tape puller arm (13); remove the tape puller spring (12).

(6) Remove the two self-locking hexagonal nuts (14) that hold the arm pivot studs (15) to the tape puller bracket (17); remove the arm pivot studs (15) and flat washers (16).

b. Reassembly.

(1) Reassemble the tape puller mechanism by reversing the procedures outlined in *a* above.

(2) Adjust the tape puller mechanism as described in paragraphs 135 and 136.



1 Machine screw, 10008
2 Flat washer, 10454
3 Lockwasher, 10430
4 Tape puller arm roller, 50843
5 Retainer ring, 10949
6 Flat washer, 50827
7 Self-locking hexagonal nut, 10501
8 Tape puller roller stud, 56539
9 Machine screw, 10003
10 Nut plate, 54884
11 Lockwasher, 10429
12 Tape puller spring, 56540
13 Tape puller arm, 56536A
14 Self-locking hexagonal nut, 10501
15 Arm pivot stud, 56538
16 Flat washer, 50827
17 Tape puller bracket, 56541

Figure 237. Tape puller mechanism, exploded view (TT–76A/GGC).

249. Disassembly and Reassembly of Selector Magnet (TT–76/GGC)

a. Disassembly.

(1) Remove the two machine screws (10, fig. 268) and lockwashers (12) securing the terminal board cover (11) to the terminal board (14); remove the terminal board cover (11). Unsolder and disconnect the six electrical wire terminals leading from the selector magnet (15, fig. 238) to the terminal board mounted on the reperforator frame directly behind the selector magnet.

(2) Remove the two machine screws (1), lockwashers (2), and flat washers (3) that attach the selector magnet bracket (35) to the reperforator frame; remove the selector magnet assembly from the reperforator.

(3) Unsolder the two electrical leads of the cable on the selector magnet (15) from the two terminal lugs on the potentiometer (11); tag the leads. Remove the two pieces of tubing (4) from the electrical leads at the potentiometer (11).

(4) Remove the two machine screws (5) and lockwashers (6) that hold the potentiometer mounting bracket (12) to the selector magnet bracket (35); remove the assembled potentiometer (11) and bracket (12).

(5) Remove the knob (7) and plain hexagonal nut (8) that hold the potentiometer (11) to the potentiometer mounting bracket (12); remove the potentiometer (11), lockwasher (9), and flat washer (10).

(6) Remove the two machine screws (13) and lockwashers (14) that hold the magnet bracket (16) and selector magnet (15) to the selector magnet bracket (35); remove the selector magnet (15) and magnet bracket (16).

(7) Remove the setscrew (17) that holds the armature mounting shaft (20) in the selector magnet bracket (35).

(8) Remove the two retainer rings (18 and 19) from the armature mounting shaft (20);

slide the armature mounting shaft (20) from the armature (21) and from the selector magnet bracket (35). Remove the armature (21) from the selector magnet bracket (35).

(9) Remove the setscrew (22) that holds the bar magnet (23) in the selector magnet bracket (35); remove the bar magnet (23).

(10) Remove the machine screw (24) and lockwasher (25) that hold the armature stop bracket (26) on the selector magnet bracket (35); remove the assembled armature stop bracket (26), machine screws (27), and plain hexagonal nuts (28).

(11) Remove the two machine screws (27) and plain hexagonal nuts (28) from the armature stop bracket (26).

(12) Remove the two armature leaf spring stop screws (29 and 31) and plain hexagonal nuts (30 and 32) from the selector magnet bracket (35).

(13) Remove the setscrews (33 and 34) from the selector magnet bracket (35).

b. Reassembly.

(1) Install the four setscrews (34 and 33) in the selector magnet bracket (35) with the leading ends flush with the surface of the mounting bracket.

(2) Install the plain hexagonal nuts (32 and 30) on the armature leaf spring stop screws (31 and 29) about halfway up the threads; install the machine screws (31 and 29) in the selector magnet bracket (35).

(3) Install the plain hexagonal nuts (28) on the machine screws (27); install the machine screws in the armature stop bracket (26) with the ends of the machine screws approximately flush with the face of the armature stop bracket (26).

(4) Position the bar magnet (23) on the selector magnet bracket (35) with the north pole protruding from the magnet bracket. See paragraph 118 for adjustment and positioning of the bar magnet. The north pole of the bar magnet is designated by a red dot. Secure the bar magnet (23) with a setscrew (22).

(5) Reassemble the selector magnet by reversing the procedures outlined in (12) through (2) in *a* above.

(6) Adjust the selector magnet as described in paragraphs 121 and 123.

(7) Install the selector magnet bracket (35) on the frame of the reperforator with two flat washers (3), lockwashers (2), and machine screws (1). Connect and solder the terminal leads from the selector magnet (15). Install the terminal board cover (11, fig. 268) on the terminal board (14); secure with two machine screws (10) and lockwashers (12).

(8) Adjust the selector magnet as described in paragraphs 117, 119, 125, 127, and 128.

250. Disassembly and Reassembly of Selector Magnet (TT–76A/GGC)

(fig. 239)

a. Disassembly.

(1) Unplug the electrical cable (18) and remove the two machine screws (1), lockwashers (2), and flat washers (3) that attach the selector magnet bracket (45) to the reperforator frame; remove the selector magnet assembly from the reperforator.

(2) Remove the two cotter pins (4) that hold the cover (5) on the two studs of the selector magnet (25); remove the cover (5) and the two cover springs (6).

(3) Unsolder the two electrical leads of the selector magnet cable (18) from the two terminal lugs on the potentiometer (13); tag the leads. Remove the two pieces of tubing (7) from the electrical leads at the potentiometer (13).

(4) Remove the two machine screws (8) and lockwashers (9) that hold the potentiometer mounting bracket (14) to the selector magnet bracket (45); remove the assembled potentiometer (13) and mounting bracket (14).

(5) Remove the two plain hexagonal nuts (10 and 11) that hold the potentiometer (13) to the potentiometer mounting bracket (14); remove the potentiometer (13) and lockwasher (12).

(6) Remove the plain hexagonal nut (15) and lockwasher (16) that hold the cable clamp (17) to the selector magnet cable stud (19); remove the cable clamp (17).

(7) Unsolder the eight electrical wire leads of the selector magnet cable (18) from the

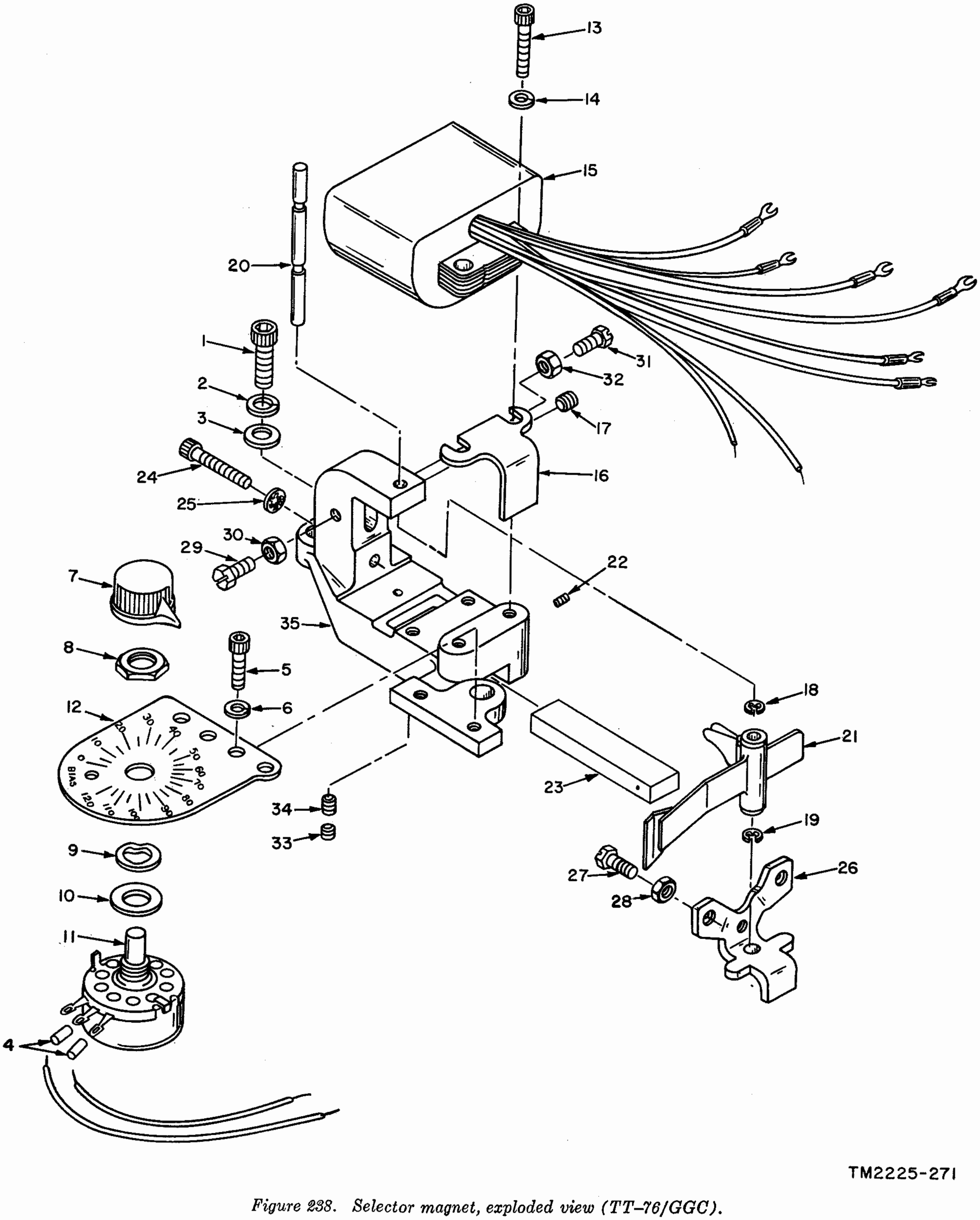


Figure 238. Selector magnet, exploded view (TT–76/GGC).

1 Machine screw, 10018
2 Lockwasher, 10420
3 Flat washer, 10464
4 Tubing, 20732-01
5 Machine screw, 10032
6 Lockwasher, 10430
7 Knob, 20815
8 Plain hexagonal nut, 10529
9 Lockwasher, 10465
10 Flat washer, 10468
11 Potentiometer, 20019
12 Potentiometer mounting bracket, 53327
13 Machine screw, 10011
14 Lockwasher, 10430
15 Selector magnet, 52740A
16 Bracket, 52296
17 Setscrew, 10225
18 Retainer ring, 10969
19 Retainer ring, 10969
20 Armature mounting shaft, 52288
21 Armature, 53103A
22 Setscrew, 10220
23 Bar magnet, 52289
24 Machine screw, 10010
25 Lockwasher, 10404
26 Armature stop bracket, 52529
27 Machine screw, 53183
28 Plain hexagonal nut, 10507
29 Armature leaf spring stop screw, 53183
30 Plain hexagonal nut, 10507
31 Armature leaf spring stop screw, 53183
32 Plain hexagonal nut, 10507
33 Setscrew, 10221
34 Setscrew, 10235
35 Selector magnet bracket, 52528

Figure 238—Continued.

eight terminal posts of the selector magnet (25); tag the leads. Remove the selector magnet cable (18) from the cable clamp (17).

(8) Remove the selector magnet cable stud (19), lockwasher (20), flat washer (21), machine screw (22); lockwasher (23), and flat washer (24) that hold the magnet bracket (26) and selector magnet (25) to the selector magnet bracket (45); remove the selector magnet (25) and magnet bracket (26).

(9) Remove the setscrew (27) that holds the armature mounting shaft (30) in the selector magnet bracket (45).

(10) Remove the two retainer rings (28 and 29) from the armature mounting shaft (30); slide the armature mounting shaft (30) from the armature (31) and from the selector magnet bracket (45); remove the armature (31) from the selector magnet bracket (45).

(11) Remove the setscrew (32) that holds the bar magnet (33) in the selector magnet bracket (45); remove the bar magnet (33).

(12) Remove the machine screw (34) and lockwasher (35) that hold the armature stop bracket (36) on the selector magnet bracket (45); remove the assembled armature stop bracket (36), machine screws (37), and plain hexagonal nuts (38).

(13) Remove the two machine screws (37) and plain hexagonal nuts (38) from the armature stop bracket (36).

(14) Remove the two armature leaf spring stop screws (39 and 41) and plain hexagonal nuts (40 and 42) from the selector magnet bracket (45).

(15) Remove the four setscrews (43 and 44) from the selector magnet bracket (45).

b. Reassembly.

(1) Install the four setscrews (44 and 43) in the selector magnet bracket (45) with the leading ends flush with the surface of the mounting bracket.

(2) Install the plain hexagonal nuts (42 and 40) on the armature leaf spring stop screws (41 and 39) about halfway up the threads; install the machine screws (41 and 39) in the selector magnet bracket (45).

(3) Install the plain hexagonal nuts (38) on the machine screws (37); install the machine screws in the armature stop bracket (36) with the ends of the machine screws approximately flush with the face of the armature stop bracket (36).

(4) Position the bar magnet (33) on the selector magnet bracket (45); see paragraph 118 for adjustment and positioning of the bar magnet. The north pole of the bar magnet is designated by a red dot. Secure the bar magnet (33) with a setscrew (32).

(5) Reassemble the selector magnet by reversing the procedures outlined in (12) through (2) in *a* above.

(6) Adjust the selector magnet attractive force and armature clearance as described in paragraphs 122 and 124.

(7) Install the selector magnet bracket (45) on the frame of the reperforator with the two flat washers (3), lockwashers (2), and machine screws (1). Plug the selector magnet cable (18) into the socket.

(8) Adjust the selector magnet as described in paragraphs 117, 120, 126, 127 and 128.

251. Disassembly and Reassembly of Rangefinder (TT–76/GGC)

(fig. 240)

a. Disassembly.

(1) Remove the selector magnet assembly from the reperforator frame as described in paragraph 249*a*(1) and (2).

(2) Remove the two machine screws (1) and lockwashers (2) that hold the rangefinder and comb bracket (17) to the frame of the reperforator; remove the rangefinder mechanism and shims (3 and 4).

(3) Remove the rangefinder dial lock (5) (or the alternate knurled nut (6) and lockwasher (7)), and the flat washer (8) from the rangefinder dial clamp (13).

(4) Remove the two setscrews (9) that hold the rangefinder cam (10) to the shaft on the rangefinder dial (12); remove the rangefinder cam (10).

(5) Remove the retainer ring (11) that holds the rangefinder dial (12) to the rangefinder and comb bracket (17); remove the rangefinder dial (12) and rangefinder dial clamp (13).

(6) Remove the two machine screws (14) and lockwashers (15) that hold the selector lever stop comb (16) to the rangefinder and comb bracket (17); remove the selector lever stop comb (16).

b. Reassembly.

(1) Reassemble the rangefinder by reversing the procedures described in *a*(6) through (2) above.

(2) Adjust the rangefinder mechanism as described in paragraph 86.

(3) Replace the selector magnet assembly as described in paragraph 249*b*(7).

(4) Adjust the selector magnet assembly as described in paragraphs 117, 118, 119, 121, and 123.

252. Disassembly and Reassembly of Rangefinder (TT–76A/GGC)

(fig. 241)

a. Disassembly.

(1) Remove the machine screw (1), lockwasher (2), machine screw (3), and lockwasher (4) that hold the rangefinder and comb bracket (17) to the nut plate (5); remove the rangefinder assembly and shims (6 and 7).

(2) Remove the two machine screws (8) and lockwashers (9) that hold the selector lever stop comb (10) to the rangefinder and comb bracket (17); remove the selector lever stop comb (10).

(3) Remove the two setscrews (11) that hold the rangefinder cam (12) on the shaft of the rangefinder dial assembly (14); remove the rangefinder cam (12).

(4) Remove the retainer ring (13) that holds the rangefinder dial assembly (14) to the rangefinder and comb bracket (17); remove the rangefinder dial assembly (14).

(5) Remove the setscrew (15) that holds the rangefinder dial detent (16) to the rangefinder and comb bracket (17); remove the rangefinder dial detent (16).

b. Reassembly.

(1) Reassemble the rangefinder by reversing the procedures outlined in *a* above.

(2) Adjust the rangefinder as described in paragraphs 74 and 75.

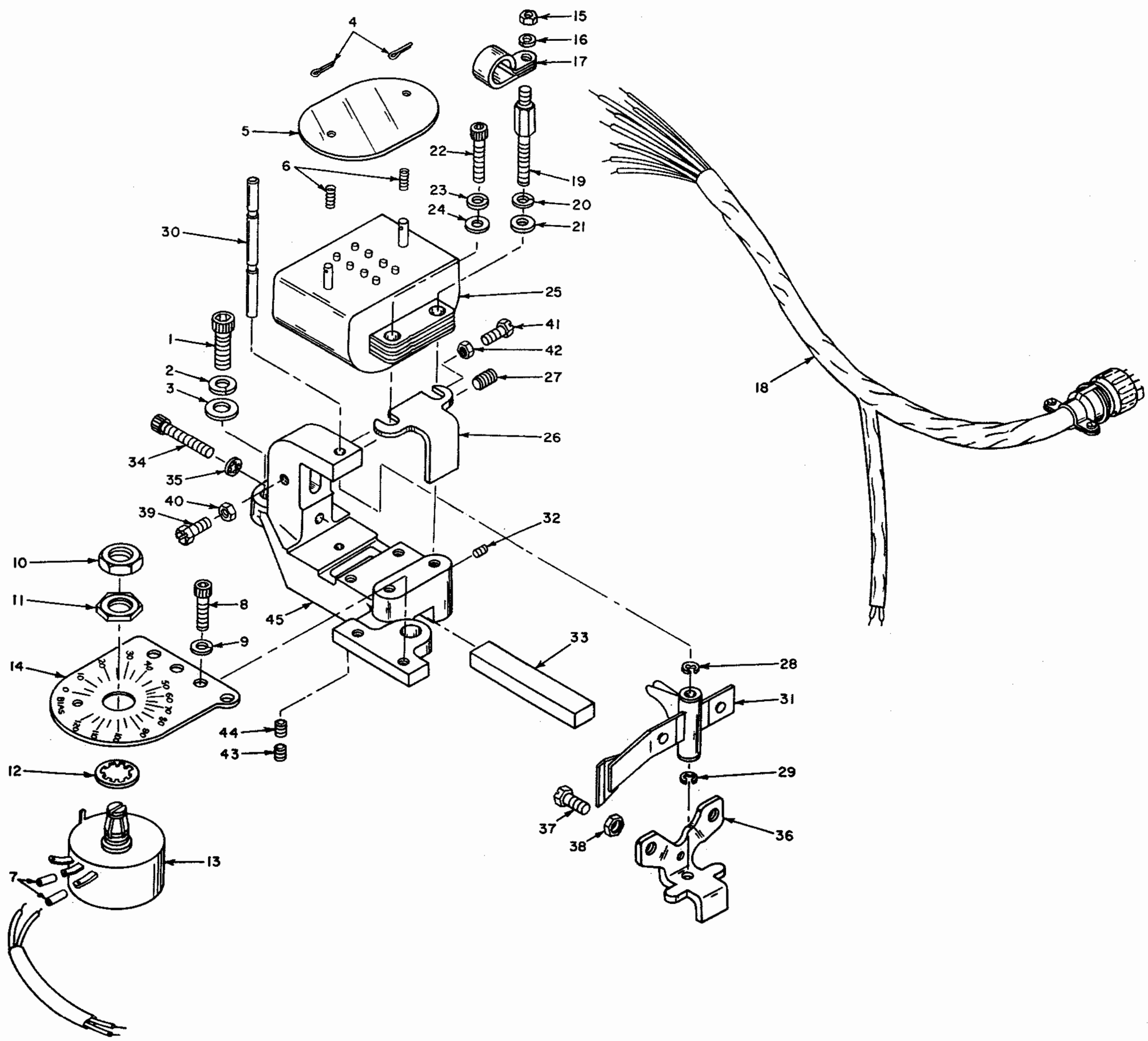
253. Disassembly and Reassembly of Manual Tape Feed-Out Mechanism

(fig. 242)

a. Disassembly.

(1) Remove the machine screw (1), nut plate (2), and flat washer (3) that hold the tape feed-out lever (4) to the tape feed-out shaft (22); remove the tape feed-out lever (4).

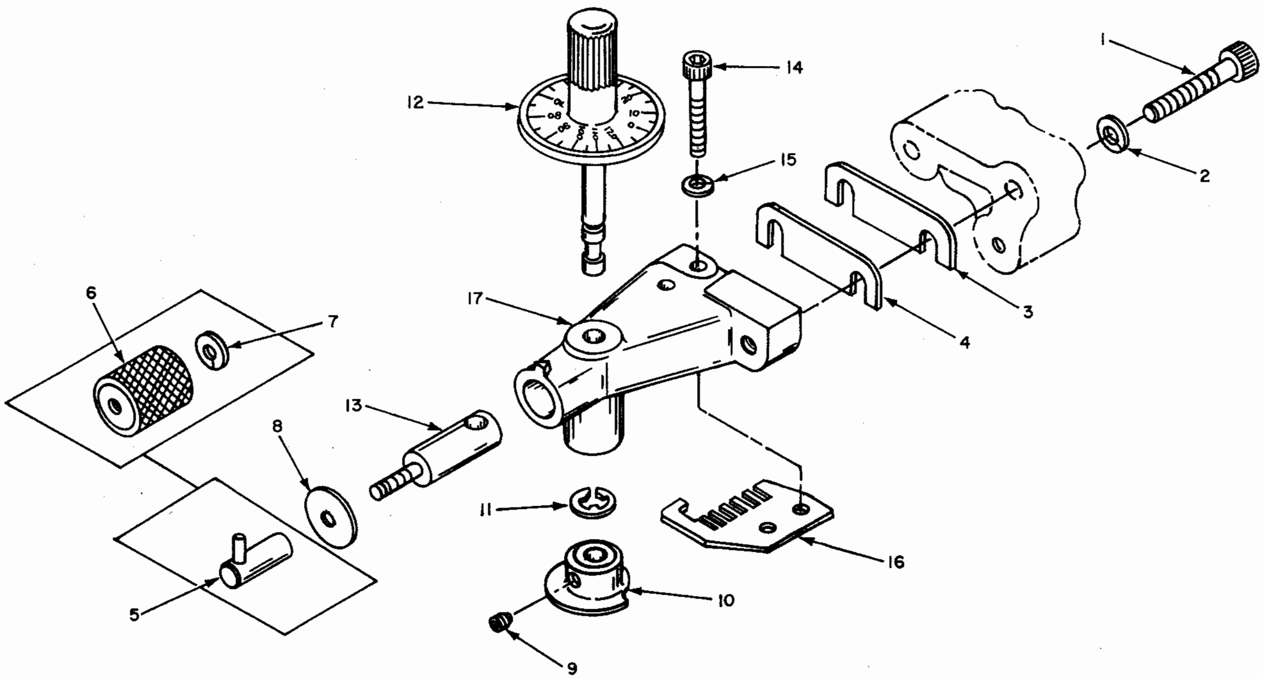
(2) Remove the machine screw (5), nut plate (6), and flat washer (7) that hold the limit



TM2225-272

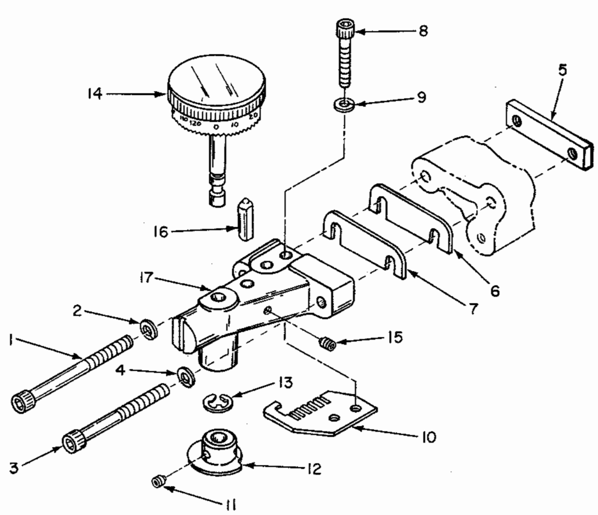
1	Machine screw, 10018	24	Flat washer, 50315
2	Lockwasher, 10420	25	Selector magnet, 56126A
3	Flat washer, 10464	26	Magnet bracket, 52292
4	Cotter pin, 10806	27	Setscrew, 10225
5	Cover, 56089	28	Retainer ring, 10969
6	Cover spring, 56091	29	Retainer ring, 10969
7	Tubing, 20732	30	Armature mounting shaft, 52288
8	Machine screw, 10032	31	Armature, 54092A
9	Lockwasher, 10430	32	Setscrew, 10220
10	Plain hexagonal nut	33	Bar magnet, 52289
11	Plain hexagonal nut, 10529	34	Machine screw, 10010
12	Lockwasher, 10419	35	Lockwasher, 10404
13	Potentiometer, 20025 (includes item 10)	36	Armature stop bracket, 52529
14	Potentiometer mounting bracket, 53327	37	Machine screw, 53183
15	Plain hexagonal nut, 10507	38	Plain hexagonal nut, 10507
16	Lockwasher, 10430	39	Armature leaf spring stop screw, 53183
17	Cable clamp, 20513	40	Plain hexagonal nut, 10507
18	Selector magnet cable, 53545A	41	Armature leaf spring stop screw, 53183
19	Selector magnet cable stud, 56127	42	Plain hexagonal nut, 10507
20	Lockwasher, 10430	43	Setscrew, 10221
21	Flat washer, 50315	44	Setscrew, 10235
22	Machine screw, 10011	45	Selector magnet bracket, 52528
23	Lockwasher, 10430		

Figure 239. Selector magnet, exploded view (TT–76A/GGC).



1	Machine screw, 10029	7	Lockwasher, 52179	13	Rangefinder dial clamp, 52323
2	Lockwasher, 10431	8	Flat washer, 51555	14	Machine screw, 10046
3	.002 in. shim, 52578	9	Setscrew, 10201	15	Lockwasher, 10429
4	.005 in. shim, 52577	10	Rangefinder cam, 50317	16	Selector lever stop comb, 50511
5	Rangefinder dial lock, 50895A	11	Retainer ring, 10949	17	Rangefinder and comb bracket, 52326
6	Knurled nut, 53819	12	Rangefinder dial, 52381A		

Figure 240. Rangefinder, exploded view (TT–76/GGC).



1 Machine screw, 10060
2 Lockwasher
3 Machine screw, 10067
4 Lockwasher, 10431
5 Nut plate, 57165
6 .002 in. shim, 52578
7 .005 in. shim, 52577
8 Machine screw, 10006
9 Lockwasher, 10429
10 Selector lever stop comb, 50511
11 Setscrew, 10201
12 Rangefinder cam, 50317
13 Retainer ring, 10949
14 Rangefinder dial assembly, 57161A
15 Setscrew, 10203
16 Rangefinder dial detent, 53306A
17 Rangefinder and comb bracket, 57163

Figure 241. Reperforator rangefinder, exploded view (TT–76A/GGC).

stop lever (8) to the tape feed-out shaft (22); remove the limit stop lever (8) and flat washer (9).

(3) Remove the two machine screws (10) and lockwashers (11) that hold the front support bracket (12) to the tape feed-out shaft (22); remove the front support bracket (12).

(4) Remove the retainer ring (13) that holds one end of the manual tape feed-out link

(15) to the link lever (19). Remove the retainer ring (14) that holds the other end of the manual tape feed-out link (15) to the latching lever (29). Remove the manual tape feed-out link (15).

(5) Remove the machine screws (16), nut plate (17), and flat washer (18) that hold the link lever (19) to the tape feed-out shaft (22); remove the link lever (19).

(6) Remove the two setscrews (20) that hold the collar (21) to the tape feed-out shaft (22); remove the collar (21). Remove the tape feed-out shaft (22) from the reperforator frame.

(7) Remove the latching lever stop spring (23) from the disabling latch (25) and from the latching lever (29).

(8) Remove the retainer ring (24) that holds the disabling latch (25) to the stud on the latching lever (29); remove the disabling latch (25).

(9) Remove the latching lever spring (26) from the latching lever (29) and from the spring post on the reperforator frame.

(10) Remove the tape feed-out operating arm spring (27) from the tape feed-out operating arm (32) and from the spring post on the reperforator frame.

(11) Remove the two setscrews (28) that hold the collar (30) to the mounting post on the reperforator frame. Remove the latching lever (29), collar (30), spacer (31), tape feed-out operating arm (32), and flat washer (33) from the mounting post on the reperforator frame.

(12) Remove the plain hexagonal nut (34) that holds the eccentric spindle (36) to the tape feed-out operating arm (32); remove the eccentric spindle (36) and lockwasher (35).

b. Reassembly.

(1) Reassemble the manual tape feed-out mechanism by reversing the procedures outlined in *a* above.

(2) Adjust the manual tape feed-out mechanism as described in paragraph 132.

254. Removal and Replacement of Ribbon Supply Group (TT–76/GGC)

(fig. 243)

a. Removal.

(1) Remove the ribbon spools (1) from the ribbon spool shaft (37).

(2) Remove the machine screw (2) and lockwasher (3) that hold the ribbon feed brace (8) to the reperforator frame.

(3) Remove the two machine screws (4) and lockwashers (5) that hold the ribbon feed mounting bracket (38) to the front support frame. Disengage the ribbon feed cam follower (13) from the print and register cam on the function shaft and remove the ribbon supply group from the reperforator.

b. Replacement.

(1) Position the ribbon supply group on the reperforator; be careful to engage the ribbon feed cam follower (13) with the print and register cam on the function shaft. Secure the ribbon feed mounting bracket (38) to the front support frame with two machine screws (4) and lockwashers (5).

(2) Position the ribbon feed brace (8) on the reperforator frame; secure with a machine screw (2) and lockwasher (3).

(3) Install the ribbon spool (1) on the reperforator ribbon spool shaft (37).

(4) Adjust the ribbon supply group as described in paragraphs 109 and 111.

255. Removal and Replacement of Ribbon Supply Group (TT–76A/GGC)

(fig. 244)

a. Removal.

(1) Remove the ribbon spools (1) from the ribbon spool shaft (35).

(2) Remove the machine screw (2) and lockwasher (3) that hold the ribbon feed brace (8) to the reperforator frame.

(3) Remove the two machine screws (4) and lockwashers (5) that hold the ribbon feed mounting bracket (36) to the front support frame. Disengage the ribbon feed cam follower (12) from the print and register cam on the function shaft and remove the ribbon supply group from the reperforator.

b. Replacement.

(1) Position the ribbon supply group on the reperforator; be careful to engage the ribbon feed cam follower (12) with the print and register cam on the function shaft. Secure the ribbon feed mounting bracket (36) to the front support frame with two machine screws (4) and lockwashers (5).

1 Machine screw, 10006
2 Nut plate, 50174
3 Flat washer, 10459
4 Tape feed-out lever, 52646
5 Machine screw, 10006
6 Nut plate, 50174
7 Flat washer, 10459
8 Limit stop lever, 52211 (TT-76/GGC) 56593 (TT-76A/GGC)
9 Flat washer, 50827
10 Machine screw, 10035
11 Lockwasher, 10405
12 Front support bracket, 52686
13 Retainer ring, 10960
14 Retainer ring, 10960
15 Manual tape feed-out link, 52145
16 Machine screw, 10006
17 Nut plate, 50174
18 Flat washer, 10459
19 Link lever, 52142A
20 Setscrew, 10201
21 Collar, 50391
22 Tape feed-out shaft, 52144
23 Latching lever stop spring, 53141
24 Retainer ring, 10949
25 Disabling latch, 52155
26 Latching lever spring, 53140
27 Tape feed-out operating arm spring, 53139
28 Setscrew, 10208
29 Latching lever, 52152 (TT-76/GGC); 56738A (TT-76A/GGC)
30 Collar, 50149
31 Spacer, 52157
32 Tape feed-out operating arm, 52149
33 Flat washer, 50544
34 Plain hexagonal nut, 10509
35 Lockwasher, 10431
36 Eccentric spindle, 52151

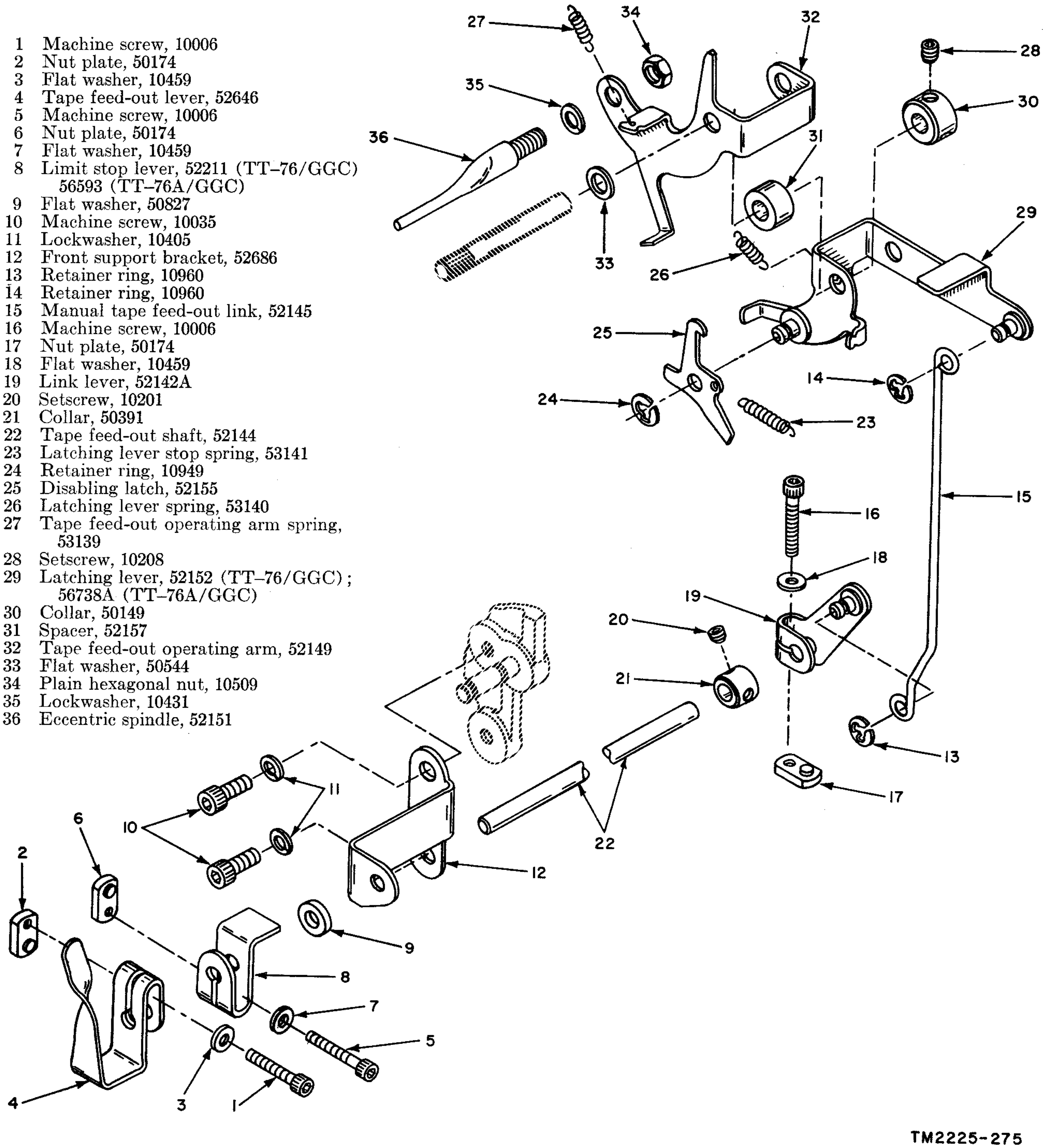
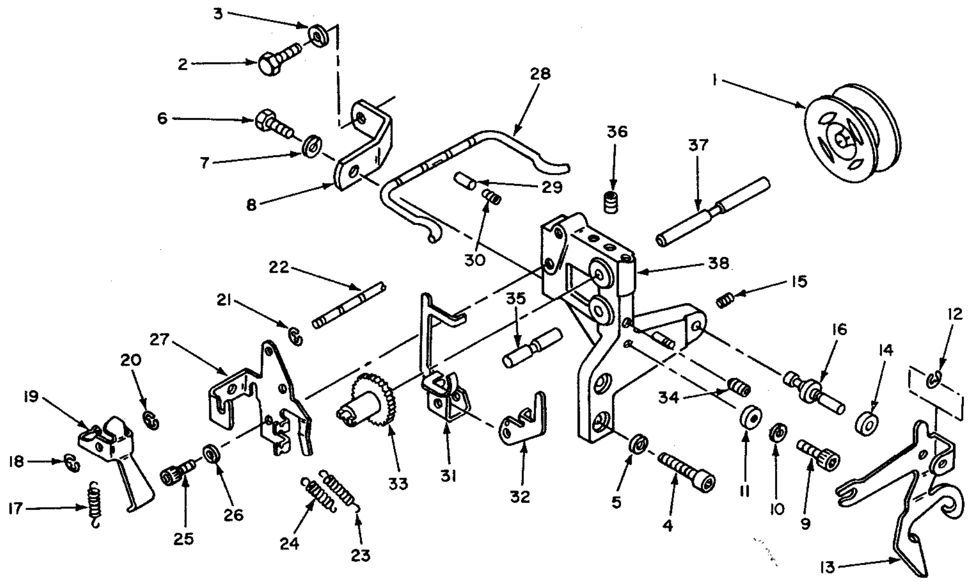


Figure 242. Manual tape feed-out mechanism, exploded view.

(2) Position the ribbon feed brace (8) on the reperforator frame. Secure the ribbon feed brace with a machine screw (2) and lockwasher (3).

(3) Install the ribbon spools on the ribbon spool shaft (35).

(4) Adjust the ribbon supply group as described in paragraphs 110, 111, 112, 113, and 114.



TM2225-276

1 Ribbon spool
2 Machine screw, 10397
3 Lockwasher, 10431
4 Machine screw, 10028
5 Lockwasher, 10430
6 Machine screw, 10397
7 Lockwasher, 10431
8 Ribbon feed brace, 52581
9 Machine screw, 10008
10 Lockwasher, 10430
11 Spacer, 53334
12 Retainer ring, 10949
13 Ribbon feed cam follower, 52586
14 Spacer, 50827
15 Setscrew, 10210
16 Eccentric stud, 52585
17 Ribbon retainer lever spring, 52603
18 Retainer ring, 10969
19 Ribbon retainer lever, 52708
20 Retainer ring, 10969
21 Retainer ring, 10969
22 Ribbon retainer shaft, 53178
23 Ratchet feed detent spring, 52604
24 Sensing lever sring, 52603
25 Machine screw, 10001
26 Lockwasher, 10429
27 Left holding clip bracket, 52599 and right holding clip bracket, 52594
28 Ribbon spool holding clip, 52615
29 Holding clip detent, 53179
30 Holding clip detent spring, 53256
31 Left sensing lever, 52597 and right sensing lever, 52596
32 Left ratchet feed detent, 52610A and right ratchet feed detent, 52611A
33 Left ribbon feed detent wheel, 52591A and right ribbon feed detent wheel, 52590A
34 Setscrew, 10210
35 Sensing lever shaft, 52595
36 Setscrew, 10210
37 Ribbon spool shaft, 52589
38 Ribbon feed mounting bracket, 52512

Figure 243. Ribbon feed mechanism, exploded view (TT–76/GGC).

256. Disassembly and Reassembly of Ribbon Supply Group (TT–76/GGC)

a. Disassembly.

(1) Remove the ribbon supply group from the reperforator as described in paragraph 254*a*.

(2) Remove the machine screw (6, fig. 243) and lockwasher (7) that hold the ribbon feed brace (8) to the ribbon feed mounting bracket (38); remove the ribbon feed brace (8).

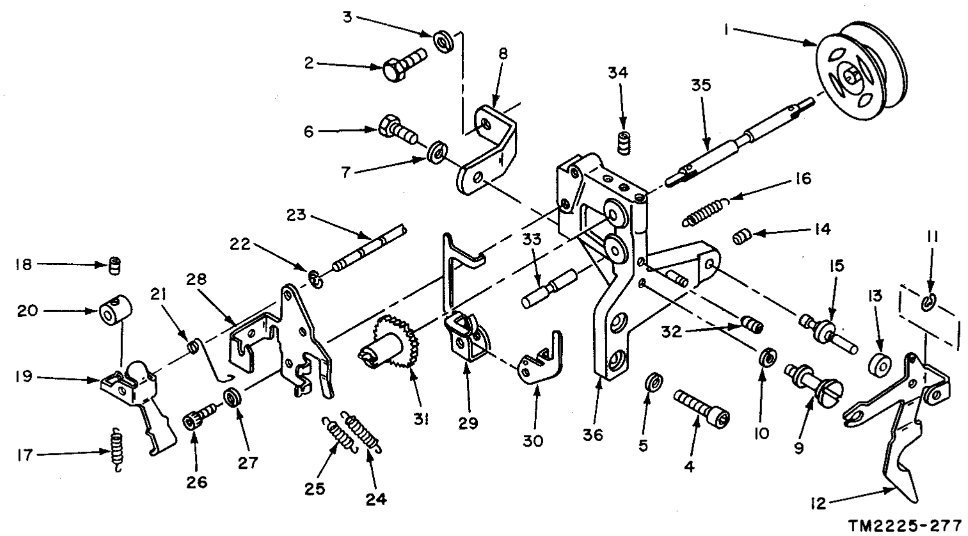
(3) Remove the machine screw (9), lockwasher (10), and spacer (11) from the ribbon feed mounting bracket (38).

(4) Remove the retainer ring (12) that holds the ribbon feed cam follower (13) to the eccentric stud (16); remove the ribbon feed cam follower (13) and spacer (14).

(5) Remove the setscrew (15) that holds the eccentric stud (16) to the ribbon feed mounting bracket (38); remove the eccentric stud (16).

(6) Remove the two ribbon retainer lever springs (17) from the two ribbon retainer levers (19) and the ribbon spool holding clip (28).

(7) Remove the retainer rings (18) that hold the ribbon retainer levers (19) to the ribbon retainer shaft (22); remove the ribbon retainer levers (19).



1	Ribbon spool	21	Left sensing lever retracting lever, 57059. Right sensing lever retracting lever, 57060
2	Machine screw, 10397	22	Retainer ring, 10969
3	Lockwasher, 10431	23	Ribbon retainer shaft, 53178
4	Machine screw, 10028	24	Ratchet feed detent spring, 52604
5	Lockwasher, 10430	25	Sensing lever spring, 52603
6	Machine screw, 10397	26	Machine screw, 10001
7	Lockwasher, 10431	27	Lockwasher, 10429
8	Ribbon feed brace, 52581	28	Left holding clip bracket, 56226. Right holding clip bracket, 56228
9	Stud, 57063	29	Left sensing lever, 52597 and right sensing lever, 52596
10	Lockwasher, 10430	30	Left ratchet feed detent, 52610A and right ratchet feed detent, 52611A
11	Retainer ring, 10949	31	Left ribbon feed detent wheel, 52591A. Right ribbon feed detent wheel, 52590A
12	Ribbon feed cam follower, 56234	32	Setscrew, 10210
13	Spacer, 50827	33	Sensing lever shaft, 52595
14	Setscrew, 10210	34	Setscrew, 10210
15	Eccentric stud, 52585	35	Ribbon spool shaft, 56231A
16	Ribbon feed cam follower spring, 52602	36	Ribbon feed mounting bracket, 52512A
17	Ribbon retainer lever spring, 52603		
18	Setscrew, 10201		
19	Ribbon retainer lever, 57062		
20	Collar, 57061		

Figure 244. Ribbon feed mechanism, exploded view (TT–76A/GGC).

(8) Remove the retainer rings (20 and 21) that hold the ribbon retainer shaft (22) to the left and right holding clip brackets (27); remove the ribbon retainer shaft (22).

(9) Remove the two ratchet feed detent springs (23) from the left and right holding clip brackets (27) and the left and right ratchet detents (32). Remove the two sensing lever springs (24) from the left and right holding clip brackets (27) and the left and right sensing levers (31).

(10) Remove the four machine screws (25) and lockwashers (26) that hold the left and right holding clip brackets (27) to the ribbon feed mounting brackets (38); remove the left and right holding clip brackets (27).

(11) Remove the ribbon spool holding clip (28) from the left and right holding clip brackets (27); catch the holding clip detent (29) and holding clip detent spring (30) as they are released from the ribbon feed mounting bracket (38).

(12) Remove the left and right sensing levers (31) and the left and right ratchet feed detents (32) from the sensing lever shaft (35). Remove the left and right ribbon feed detent wheels (33) from the ribbon spool shaft (37).

(13) Remove the setscrew (34) that holds the sensing lever shaft (35) in the ribbon feed mounting bracket (38); remove the sensing lever shaft (35).

(14) Remove the setscrew (36) that holds the

ribbon spool shaft (37) in the ribbon feed mounting bracket (38); remove the ribbon spool shaft.

(15) Remove the two machine screws (1, fig. 245) and lockwashers (2) that hold the roller bracket (19) to the ribbon feed mounting bracket (38, fig. 243); remove the upper ribbon feed and reversing mechanism from the ribbon feed mounting bracket (38).

(16) Remove the two retainer rings (3, fig. 245) that hold the two ribbon rollers (4) to the ribbon roller shaft (6); remove the ribbon rollers (4).

(17) Remove the two retainer rings (5) that hold the ribbon roller shaft (6) to the roller bracket (19); remove the ribbon roller shaft (6).

(18) Remove the two retainer rings (7) that hold the left and right ribbon reversing arms (11 and 12) to the reversing arm shaft (13); remove the left and right ribbon reversing arms (11 and 12).

(19) Remove the two spring washers (8), contact plunger springs (9), and two spring washers (10) from the left and right ribbon reversing arms (11 and 12).

(20) Remove the reversing arm shaft (13) from the driving link lever (18).

(21) Remove the two retainer rings (14) that hold the left and right ribbon feed levers (15 and 16) to the ribbon feed pawl shaft (17); remove the left and right ribbon feed levers (15 and 16) and the ribbon feed pawl shaft (17).

(22) Remove the driving link lever (18) from the roller bracket (19).

b. Reassembly.

(1) Reassemble the ribbon supply group by reversing the procedure outlined in *a*(22) through (2) above.

(2) Replace the ribbon supply group on the reperforator as described in paragraph 254*b*.

257. Disassembly and Reassembly of Ribbon Supply Group (TT–76A/GGC)

a. Disassembly.

(1) Remove the ribbon supply group from the reperforator as described in paragraph 255*a*.

(2) Remove the machine screw (6, fig. 244) and lockwasher (7) that hold the ribbon feed brace (8) to the ribbon feed mounting bracket (36); remove the ribbon feed brace (8).

(3) Remove the stud (9) and lockwasher (10) from the ribbon feed mounting bracket (36).

(4) Remove the ribbon feed cam follower spring (16) from the ribbon feed cam follower (12) and from the spring post on the ribbon feed mounting bracket (36).

(5) Remove the retainer ring (11) that holds the ribbon feed cam follower (12) to the eccentric stud (15); remove the ribbon feed cam follower (12) and spacer (13).

(6) Remove the setscrew (14) that holds the eccentric stud (15) to the ribbon feed mounting bracket (36); remove the eccentric stud (15).

(7) Remove the two ribbon retainer lever springs (17) from the left and right ribbon retainer levers (19) and from the left and right holding clip brackets (28).

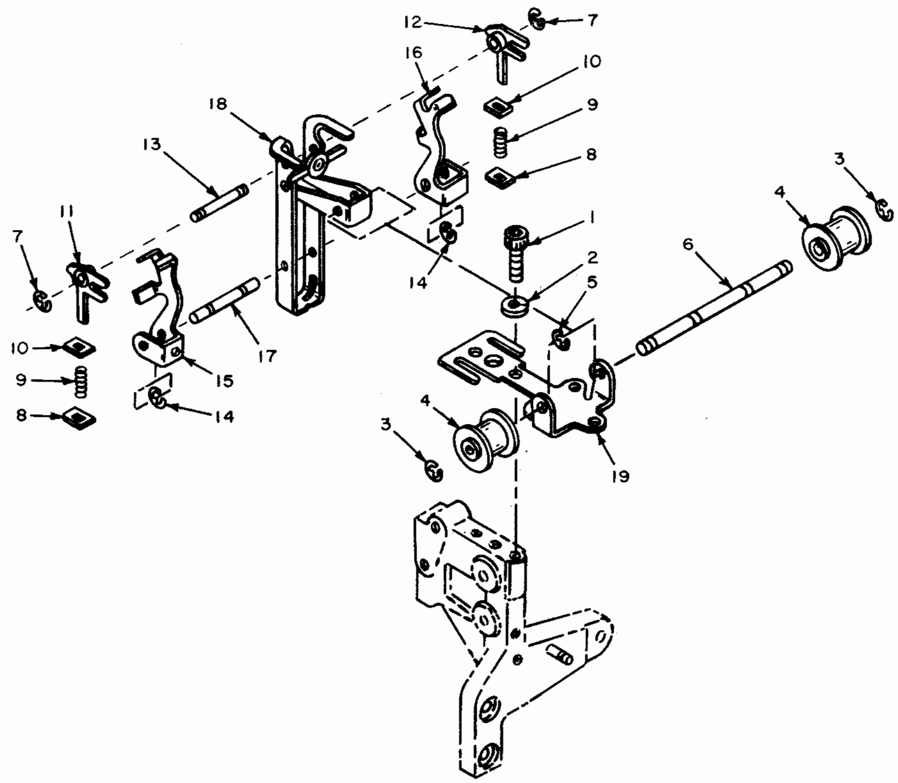
(8) Remove the setscrews (18) from the two collars (20); remove the two ribbon retainer levers (19) and collars (20) from the ribbon retainer shaft (23).

(9) Remove the left and right sensing lever retracting levers (21) from the left and right sensing levers (29) and from the ribbon retainer shaft (23).

(10) Remove the two retainer rings (22) that hold the ribbon retainer shaft (23) to the left and right holding clip brackets (28); remove the ribbon retainer shaft (23).

(11) Remove the two ratchet feed detent springs (24) from the left and right holding clip brackets (28) and from the left and right ratchet feed detents (30). Remove the two sensing lever springs (25) from the left and right holding clip brackets (28) and from the sensing levers (29).

(12) Remove the four machine screws (26) and lockwashers (27) that hold the left and right holding clip brackets (28) to the ribbon feed mounting bracket (36); remove the left and right holding clip brackets (28).



1 Machine screw, 10008
2 Lockwasher, 10430
3 Retainer ring, 10949
4 Ribbon roller, 52608
5 Retainer ring, 10949
6 Ribbon roller shaft, 52601
7 Retainer ring, 10969
8 Spring washer, 53427
9 Contact plunger spring, 51593
10 Spring washer, 53427
11 Left ribbon reversing arm, 52705A
12 Right ribbon reversing arm, 52704A
13 Reversing arm shaft, 52703
14 Retainer ring, 10969
15 Left ribbon feed lever, 52605
16 Right ribbon feed lever, 52607
17 Ribbon feed pawl shaft, 52609
18 Driving link lever, 52622A
19 Roller bracket, 52598

Figure 245. Upper ribbon feed and reversing mechanism, exploded view.

(13) Remove the left and right sensing levers (29) and the left and right ratchet feed detents (30) from the sensing lever shaft (33). Remove the left and right ribbon feed detent wheels (31) from the ribbon spool shaft (35).

(14) Remove the setscrew (32) that holds the sensing lever shaft (33) in the ribbon feed mounting bracket (36); remove the sensing lever shaft (33).

(15) Remove the setscrew (34) that holds the ribbon spool shaft (35) in the ribbon feed mounting bracket (36); remove the ribbon spool shaft (35).

(16) Remove the two machine screws (1, fig. 245) and lockwashers (2) that hold the roller bracket (19) to the ribbon feed mounting bracket (36, fig. 244); remove the upper ribbon feed and reversing mechanism from the ribbon feed mounting bracket (36).

(17) Remove the two retainer rings (3, fig. 245) that hold the two ribbon rollers (4) to the ribbon roller shaft (6); remove the ribbon rollers (4).

(18) Remove the two retainer rings (5) that hold the ribbon roller shaft (6) to the roller bracket (19); remove the ribbon roller shaft (6).

(19) Remove the two retainer rings (7) that hold the left and right ribbon reversing arms (11 and 12) to the reversing arm shaft (13); remove the left and right ribbon reversing arms (11 and 12).

(20) Remove the two spring washers (8), contact plunger springs (9), and two spring

washers (10) from the left and right ribbon reversing arms (11 and 12).

(21) Remove the reversing arm shaft (13) from the driving link lever (18).

(22) Remove the two retainer rings (14) that hold the left and right ribbon feed levers (15 and 16) to the ribbon feed pawl shaft (17); remove the left and right ribbon feed levers (15 and 16) and the ribbon feed pawl shaft (17).

(23) Remove the driving link lever (18) from the roller bracket (19).

b. Reassembly.

(1) Reassemble the ribbon supply groups by reversing the procedures outlined in *a*(23) through (2) above.

(2) Replace the ribbon supply group on the reperforator as described in paragraph 255*b*.

258. Removal and Replacement of Front Support Assembly (TT–76/GGC)

a. Removal.

(1) Remove the power supply and terminal unit from the reperforator frame as described in paragraph 243*a*.

(2) Remove the ribbon supply group from the reperforator frame as described in paragraph 254a.

(3) Remove the two setscrews (1, fig. 258) that hold the print and register cam (2) to the function shaft (33).

(4) Remove the two setscrews (3, fig. 255) that hold the type wheel driven gear (4) to the stop arm shaft (8).

(5) Remove the two machine screws (1 and 3, fig. 246) and lockwashers (2 and 4) that hold the chad tube (8) to the front support frame (67); remove the chad tube (8).

(6) Remove the three machine screws (13) and lockwashers (14) that hold the front support frame (67) to the reperforator frame.

(7) Loosen the four machine screws (1, fig. 272) that hold the reperforator frame to the base casting. Lift the front of the reperforator frame about one-quarter inch so that the front support assembly can drop far enough to allow the punch interference levers to clear the code rings; remove the front support assembly.

b. Replacement.

(1) Replace the front support assembly by reversing the procedures outlined in *a*(7) through (3) above. Be sure that each of the punch interference levers engages a code ring in the code ring cage.

(2) Replace the ribbon supply group as described in paragraph 256*b*.

(3) Replace the power supply and terminal unit as described in paragraph 254*b*.

259. Removal and Replacement of Front Support Assembly (TT–76A/GGC)

a. Removal.

(1) Remove the power supply and terminal unit from the reperforator frame as described in paragraph 244*a*.

(2) Remove the tape puller mechanism as described in paragraph 248*a*.

(3) Remove the ribbon supply group from the reperforator frame as described in paragraph 255*a*.

(4) Remove the machine screw (1, fig. 246), lockwasher (2), machine screw (5), and lockwasher (6) that hold the chad tube (7) to the front support frame (68); remove the chad tube (7).

(5) Remove the two machine screws (9) and lockwashers (10) that hold the bearing block (11) to the front support frame (68).

(6) Remove the three machine screws (13) and lockwashers (14) that hold the front support frame (68) to the reperforator frame.

(7) Loosen the four machine screws (1, fig. 273) that hold the reperforator frame to the base casting. Lift the front of the base reperforator frame about one-quarter inch so that the front support assembly can drop far enough to allow the punch interference levers to clear the code rings; remove the front support assembly.

b. Replacement.

(1) Replace the front support frame assembly by reversing the procedures outlined in *a*(7) through (4) above. Be sure that each of the punch interference levers engage a code ring in the code ring cage.

(2) Replace the ribbon supply group as described in paragraph 255*b*.

(3) Replace the tape puller mechanism as described in paragraph 248*b*.

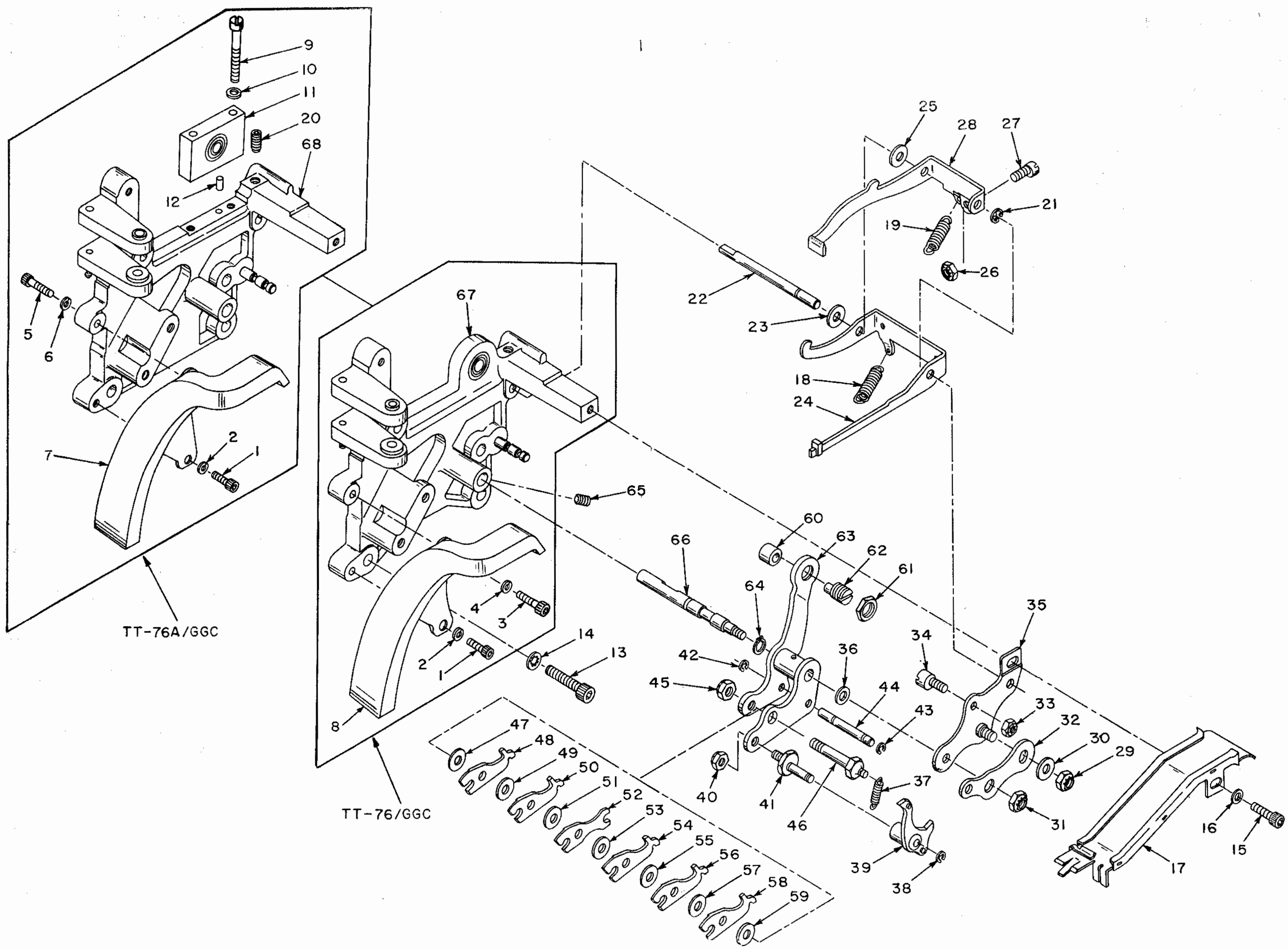


Figure 246. Front support assembly, exploded view.

1	Machine screw, 10025	35	Support plate, 52321A
2	Lockwasher, 10430	36	Flat washer, 52651
3	Machine screw, 10010 (TT-76/GGC)	37	Feed pawl spring, 52164
4	Lockwasher, 10430	38	Retainer ring, 10960
5	Machine screw, 10010	39	Feed pawl assembly, 52331A
6	Lockwasher, 10430	40	Self-locking hexagonal nut, 10501
7	Chad tube, 53515	41	Feed pawl pivot, 52329
8	Chad tube, 53485	42	Retainer ring, 10960
9	Machine screw, 10063	43	Retainer ring, 10960
10	Lockwasher, 10430	44	Code and feed hole punch lever stop pin, 52327
11	Bearing block, 55131	45	Self-locking hexagonal nut, 10525
12	Dowel (Order B)	46	Pivot stud, 52409
13	Machine screw, 10035–01	47	Flat washer, 52446
14	Lockwasher, 10405	48	Code hole punch lever, 52346
15	Machine screw, 10009	49	Flat washer, 52446
16	Lockwasher, 10430	50	Code hole punch lever, 52346
17	Tape chute, 52489A	51	Flat washer, 52446
18	Print hammer lever spring, 52163	52	Feed punch lever, 52347
19	Register lever spring, 52163	53	Flat washer, 52446
20	Setscrew, 10211	54	Code hole punch lever, 52346
21	Retainer ring, 10949	55	Flat washer, 52446
22	Print and register levers shaft, 52486	56	Code hole punch lever, 52346
23	Flat washer, 52651	57	Flat washer, 52446
24	Print hammer lever, 52436A	58	Code hole punch lever, 52346
25	Flat washer, 52651	59	Flat washer, 52446
26	Self-locking hexagonal nut, 10501	60	Cam roller. 52354
27	Print hammer eccentric stop, 52485	61	Plain hexagonal nut, 10526
28	Type wheel register lever, 52432	62	Eccentric stud, 52365
29	Self-locking hexagonal nut, 10525	63	Punch arm assembly, 52337A
30	Flat washer, 10464	64	Retainer ring, 10971
31	Self-locking hexagonal nut, 10525	65	Setscrew, 10211
32	Adjusting plate, 52493	66	Punch arm pivot post, 52345
33	Self-locking hexagonal nut, 10501 (TT-76/GGC)	67	Front support frame, 52438A
34	Print hammer eccentric stop, 52485 (TT-76/GGC)	68	Front support frame, 57101A

Figure 246—Continued.

260. Disassembly and Reassembly of Tape Feed Mechanism

a. Disassembly.

(1) Remove the front support assembly from the reperforator as described in paragraph 258*a* or 259*a*.

(2) Remove the back space pawl spring (1, fig. 247) from the back space lever (8) and from the back space pawl (4).

(3) Remove the self-locking hexagonal nut (2) that holds the back space pawl (4) to the back space lever (8); remove the pawl eccentric screw (3) and back space pawl (4).

(4) Remove the back space lever spring (5) from the back space lever (8) and from the terminal lug (8, fig. 248) on the code die support (30).

(5) Remove the back space pivot stud (6, fig. 247) that holds the back space lever (8) to the front support frame; remove the collar (7) and the back space lever (8).

(6) Remove the detent lever spring (9) from the retainer mounting bracket (24) and from the detent lever (11).

(7) Remove the retainer ring (10) that holds the detent lever (11) to the eccentric stud (13); remove the detent lever (11).

(8) Remove the self-locking hexagonal nut (12) that holds the eccentric stud (13) to the code die support, remove the eccentric stud (13).

(9) Remove the retainer ring (14) that holds the tape retainer assembly (15) to the stud on the retainer mounting bracket (24); remove the tape retainer assembly (15) and the tape retainer spring (16).

(10) Remove the two machine screws (17) and lockwashers (18) that hold the tear wire (19) on the TT–76A/GGC, the tape guide (20), and retainer mounting bracket (21) to the code die support; remove the tear wire (19) on TT–76A/GGC, the tape guide (20), and the retainer mounting bracket (21).

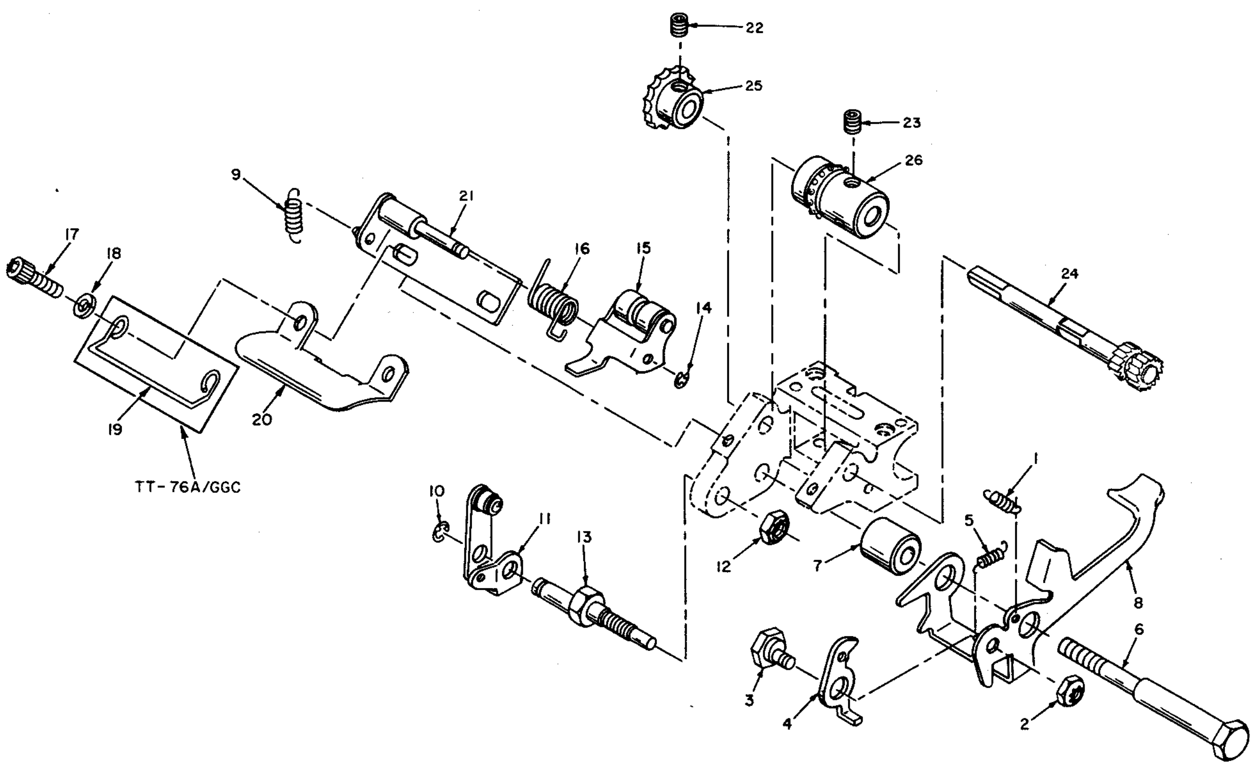
(11) Remove the two setscrews (22) that hold the detent wheel (25) to the ratchet shaft (24). Remove the two setscrews (23) that hold the tape feed sprocket (26) to the ratchet shaft (24). Remove the ratchet shaft (24) catching the detent wheel (25) and tape feed sprocket (26) as they fall from the shaft of the ratchet shaft (24).

b. *Reassembly.*

(1) Reassemble the tape feed mechanism by reversing the procedures outlined in *a*(11) through (2) above.

(2) Adjust the tape feed mechanism as described in paragraphs 97, 99, and 101.

(3) Replace the front support assembly as described in paragraph 258*b* or 259*b*.



TM2225-280

1 Back space pawl spring, 52192
2 Self-locking hexagonal nut, 10501
3 Pawl eccentric screw, 52643
4 Back space pawl, 52709
5 Back space lever spring, 52193
6 Back space pivot stud, 52644
7 Collar, 52645
8 Back space lever, 52654
9 Detent lever spring, 52166
10 Retainer ring, 10949
11 Detent lever, 52445A
12 Self-locking hexagonal nut, 10501
13 Eccentric stud, 52342
14 Retainer ring, 10969
15 Tape retainer assembly, 52126A
16 Tape retainer spring, 52422
17 Machine screw, 10003 (TT–76/GGC) or 10004 (TT–76A/GGC)
18 Lockwasher, 10429 (TT–76/GGC)
19 Tape tear wire, 56164 (TT–76A/GGC only)
20 Tape guide, 52519
21 Retainer mounting bracket, 56298A
22 Setscrew, 10201
23 Setscrew, 10201
24 Ratchet shaft, 52442A
25 Detent wheel, 52384
26 Tape feed sprocket, 52377

Figure 247. Tape feed mechanism, exploded view.

261. Disassembly and Reassembly of Punch and Die Support Assembly

(fig. 248)

a. Disassembly.

(1) Remove the front support assembly from the reperforator as described in paragraph 258*a* for the TT–76/GGC or paragraph 259*a* for the TT–76A/GGC.

(2) Remove the tape feed mechanism as described in paragraph 260*a*.

(3) Remove the machine screw (1) and lockwasher (2) that hold the code die support (30) to the front support frame; remove the punch and die support assembly and shims (3 and 4).

(4) Remove the self-locking hexagonal nut (5) and machine screw (6) from the comb (11).

(5) Remove the machine screw (7), terminal lug (8), machine screw (9), and lockwasher (10) that hold the comb (11) to the bottom of the code die support (30); remove the comb (11) and the six code punch bars (12, 13, 14, 15, 16, and 17).

(6) On the TT–76/GGC, remove the machine screws (18 and 19) and the lockwasher (20) that hold the code die assembly to the code die support (30); remove the code die assembly (21).

(7) On the TT–76A/GGC, remove the retainer ring (22) that holds the tape guide lever (23) to the tape guide lever pivot (25). Unhook the tape guide lever spring (24) from the tape guide lever (23) and from the indicator plate (26); remove the tape guide lever (23) and tape guide lever spring (24) from the tape guide lever pivot (25). Remove the tape guide lever pivot (25), indicator plate (26), machine screw (27) and lockwasher (28) that hold the code dies assembly (29) to the code die support (30).

b. Reassembly.

(1) Reassemble the punch and die support assembly by reversing the procedures outlined in *a*(7) through (3) above.

(2) Adjust the punch and die support assembly as described in paragraphs 96 and 98.

(3) Replace the tape feed mechanism as described in paragraph 260*b*.

(4) Replace the front support assembly as described in paragraph 259*b* for the TT–76A/GGC or paragraph 258*b* for the TT–76/GGC.

262. Disassembly and Reassembly of Type Wheel Group

(fig. 249)

a. Disassembly.

(1) Remove the cotter pin (1) that holds the ribbon guide (3) to the stud on the type wheel lower bell crank lever (13); remove the flat washer (2), ribbon guide (3), and flat washer (4).

(2) Remove the machine screw (5), nut plate (6), and flat washer (7) that hold the type wheel upper bell crank lever (8) to the reciprocating lever shaft (16); remove the type wheel upper bell crank lever (8).

(3) Remove the type wheel bell crank lever spring (12) from the type wheel lower bell crank lever (13) and from the spring post on the front support frame.

(4) Remove the machine screw (9), nut plate (10), and flat washer (11) that hold the type wheel lower bell crank lever (13) to the reciprocating lever shaft (16); remove the type wheel lower bell crank lever (13).

(5) Remove the two setscrews (14) that hold the shaft collar (17) to the reciprocating lever shaft (16). Remove the two setscrews (15) that hold the shaft collar (18) to the reciprocating lever shaft (16); remove the reciprocating lever shaft (16), catching the shaft collars as they fall from the shaft.

(6) Remove the assembled type wheel hub assembly (22) and type wheel (21) from the type wheel post (24). Remove the three machine screws (19) that hold the type wheel clamp plate mounting disk (20) to the type wheel hub assembly (22); remove the type wheel clamp late mounting disk (20) and the type wheel (21).

(7) Remove the setscrew (23) that holds the type wheel post (24) to the front support frame; remove the type wheel post (24).

b. Reassembly.

(1) Reassemble the type wheel group by reversing the procedures outlined in *a* above.

(2) Adjust the type wheel group as directed in paragraphs 103, 105, 106, 107, and 115.

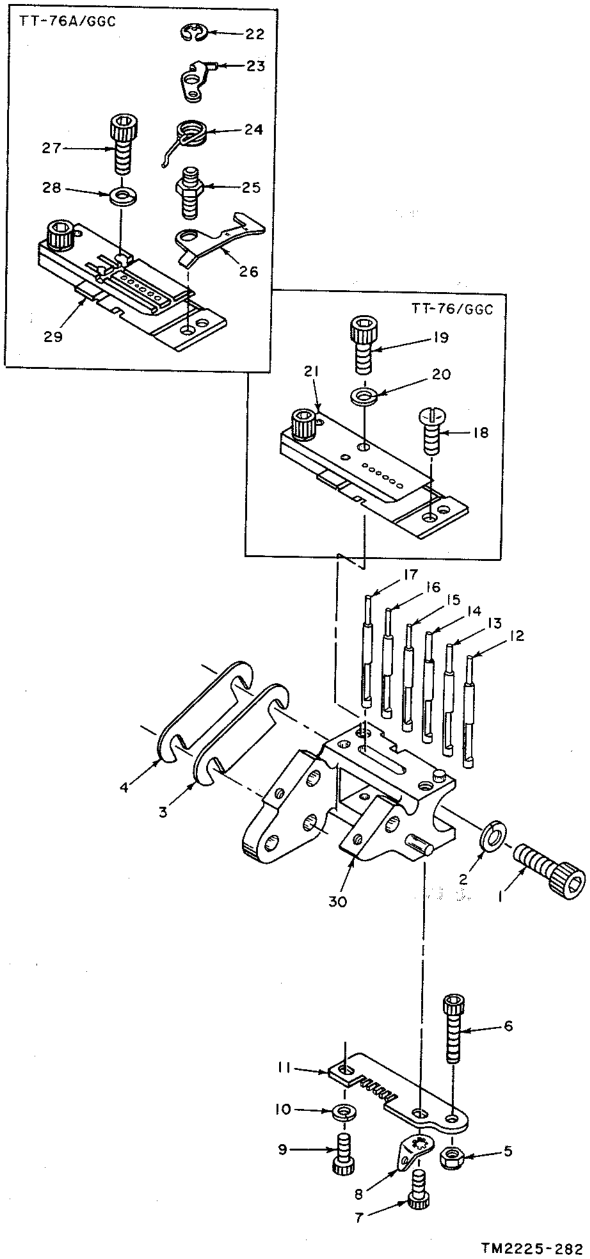


Figure 248. Punch and die support assembly, exploded view.

1 Machine screw, 10017–01
2 Lockwasher, 10431
3 .005 in. shim, 52578
4 .002 in. shim, 52577
5 Self-locking hexagonal nut, 10500
6 Machine screw, 10006
7 Machine screw, 10003
8 Terminal lug, 20795
9 Machine screw, 10003
10 Lockwasher, 10429
11 Comb, 52355
12 Code punch bar, 52369
13 Code punch bar, 52369
14 Code punch bar, 52369
15 Feed hole punch bar, 52389
16 Code punch bar, 52369
17 Code punch bar, 52369
18 Machine screw, 10358
19 Machine screw, 10009
20 Lockwasher, 10430
21 Code die assembly, 52521–A
22 Retainer ring, 10969
23 Tape guide lever, 56163
24 Tape guide lever spring, 56396
25 Tape guide lever pivot, 56163
26 Indicator plate, 56397
27 Machine screw, 10009
28 Lockwasher, 10430
29 Code die assembly, 56256A
30 Code die support, 52372

Figure 248—Continued.

263. Disassembly and Reassembly of Punch Interference Levers

(fig. 250)

a. Disassembly.

(1) Remove the front support assembly from the reperforator as described in paragraph 258*a* for the TT–76/GGC or paragraph 259*a* for the TT–76A/GGC.

(2) Remove the machine screw (1), flat washer (2), and lockwasher (3) that hold the interference lever shaft support plate (4) to the front support frame; remove the interference lever shaft support plate (4) and the assembled punch interference levers from the front support assembly.

(3) Remove the two retainer rings (5 and 6) that hold the punch interference levers (13, 14, 15, 16, and 17) to the interference lever shaft (7); remove the punch interference lever shaft (7) to release the five flat washers (8, 9, 10, 11, and 12) and the five punch interference levers (13, 14, 15, 16, and 17).

b. Reassembly.

(1) Reassemble the punch interference levers by reversing the procedures outlined in *a*(2) and (3) above.

(2) Replace the front support assembly as described in paragraph 258*b* for the TT–76/GGC or paragraph 259*a* for the TT–76A/GGC.

(3) Adjust the punch interference levers as directed in paragraph 94.

1 Cotter pin, 10806
2 Flat washer, 50320
3 Ribbon guide, 52416A
4 Flat washer, 50320
5 Machine screw, 10006
6 Nut plate, 50174
7 Flat washer, 10459
8 Type wheel upper bell crank lever, 52482A
9 Machine screw, 10006
10 Nut plate, 50174
11 Flat washer, 10459
12 Type wheel bell crank lever spring, 52161
13 Type wheel lower bell crank lever, 52480A
14 Setscrew, 10201
15 Setscrew, 10201
16 Reciprocating lever shaft, 52414
17 Shaft collar, 50391
18 Shaft collar, 50391
19 Machine screw, 10305
20 Type wheel clamp plate mounting disk, 52407
21 Type wheel, 55132
22 Type wheel hub assembly, 52380
23 Setscrew, 10210
24 Type wheel post, 52418

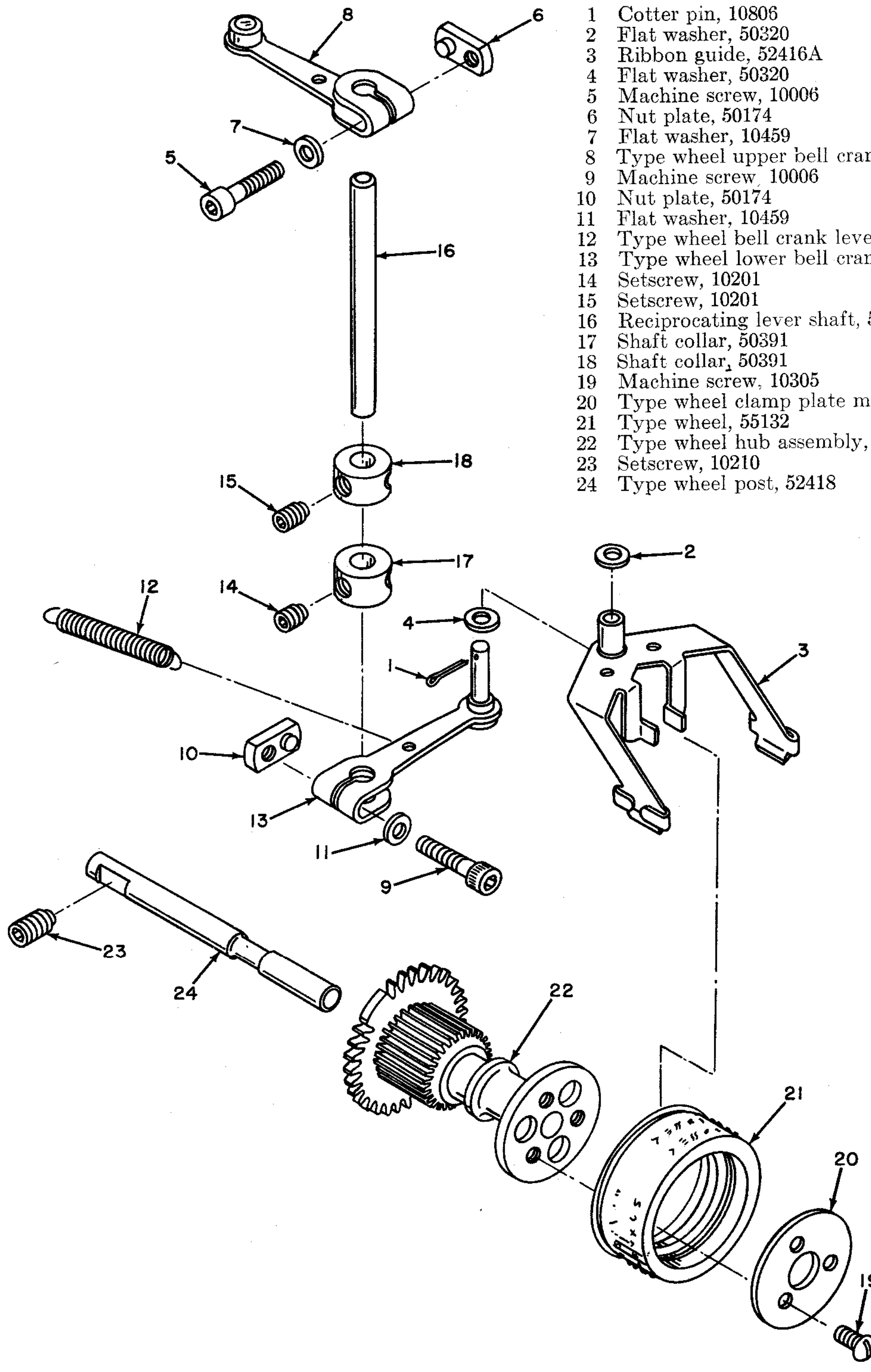
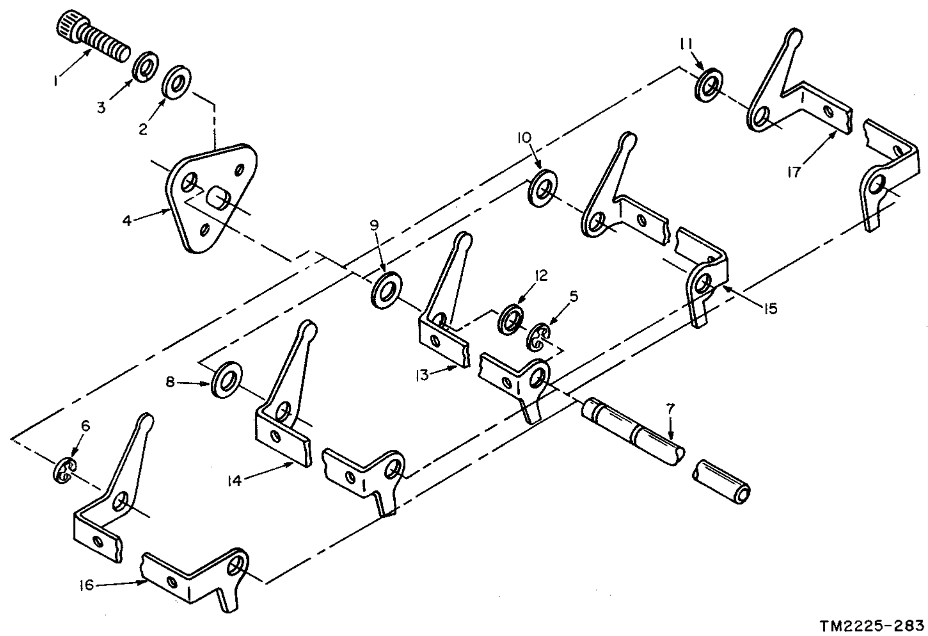


Figure 249. Type wheel group, exploded view.



1 Machine screw, 10009
2 Flat washer, 10463
3 Lockwasher, 10430
4 Interference lever shaft support plate, 52334
5 Retainer ring, 10949
6 Retainer ring, 10949
7 Interference lever shaft, 52452
8 Flat washer, 52430
9 Flat washer, 52430
10 Flat washer, 52430
11 Flat washer, 52430
12 Flat washer, 50831
13 Punch interference lever, No. 1, 52424
14 Punch interference lever, No. 3, 52427
15 Punch interference lever, No. 2, 52426
16 Punch interference lever, No. 5, 52429
17 Punch interference lever, No. 4, 52428

Figure 250. Punch interference levers, exploded view.

264. Disassembly and Reassembly of Front Support Frame
(fig. 246)

a. Disassembly.

(1) Remove the front support assembly from the reperforator as described in paragraph 258*a* for the TT–76/GGC or paragraph 259*a* for the TT–76A/GGC.

(2) Remove the tape feed mechanism from the front support assembly as described in paragraph 260*a*.

(3) Remove the punch and die support assembly from the front support assembly as described in paragraph 261*a*.

(4) Remove the type wheel group from the front support assembly as described in paragraph 262*a*.

(5) Remove the punch interference levers from the front support assembly as described in paragraph 263*a*.

(6) Remove the machine screw (15) and lockwasher (16) that hold the tape chute (17) to the front support frame (67, TT–76/GGC or 68, TT–76A/GGC); remove the tape chute (17).

(7) Remove the print hammer lever spring (18) from the print hammer lever (24) and from the register and print levers spring post on the front support frame (67, TT–76/GGC or 68, TT–76A/GGC). Remove the register lever spring (19) from the type wheel register lever (28) and from the spring post on the front support frame.

(8) Remove the setscrew (20) that holds the print and register levers shaft (22) in the front support frame (67, TT–76/GGC or 68, TT–76A/GGC); remove the assembled print hammer lever (24), type wheel register lever (28), and print and register levers shaft (22) from the front support frame (67, TT–76/GGC or 68, TT–76A/GGC).

(9) Remove the retainer ring (21) that holds the print hammer lever (24) and type wheel register lever (28), to the print and register levers shaft (22); remove the print

and register levers shaft (22), releasing the flat washer (23), print hammer lever (24), flat washer (25), and type wheel register lever (28).

(10) Remove the self-locking hexagonal nut (26) that holds the print hammer eccentric stop (27) to the type wheel register lever (28); remove the print hammer eccentric stop (27).

(11) Remove the self-locking hexagonal nut (29), flat washer (30), and self-locking hexagonal nut (31) that hold the adjusting plate (32) to the support plate (35); remove the adjusting plate (32), support plate (35), flat washer (36), and punch arm assembly (63) from the punch arm pivot post (66).

(12) Remove the feed pawl spring (37) from the pivot stud (46) and from the feed pawl assembly (39).

(13) Remove the retainer ring (38) that holds the feed pawl assembly (39) to the feed pawl pivot (41); remove the feed pawl assembly (39).

(14) Remove the self-locking hexagonal nut (40) that holds the feed pawl pivot (41) to the punch arm assembly (63); remove the feed pawl pivot (41).

(15) Remove the two retainer rings (42 and 43) that hold the code and feed hole punch lever stop pin (44) to the punch arm assembly (63); remove the code feed hole punch lever stop pin (44).

(16) Remove the self-locking hexagonal nut (45) that holds the pivot stud (46) to the punch arm assembly (63), remove the pivot stud (46), catching the seven flat washers (47, 49, 51, 53, 55, 57, and 59); code hole punch levers (48, 50, 54, 56, and 58) and the feed punch lever (52) as they fall from the pivot stud (46).

(17) Remove the cam roller (60) from the eccentric stud (62) on the punch arm assembly (63). Remove the plain hexagonal nut (61) and eccentric stud (62) from the punch arm assembly (63).

(18) Remove the retainer ring (64) from the punch arm pivot post (66). Remove the setscrew (65) that holds the punch arm pivot post (66) to the front support (67, TT–76/GGC or 68, TT–76A/GGC); remove the punch arm pivot post (66).

(19) Remove any loose or damaged spring post or dowel from the front support frame (67, TT–76/GGC or 68, TT–76A/GGC).

b. Reassembly.

(1) Reassemble the front support frame assembly by reversing the procedures outlined in *a*(19) through (2) above.

(2) Adjust the front support frame assembly as described in paragraphs 93 through 107.

(3) Replace the front support assembly as described in paragraph 258*b* for the TT–76/GGC or paragraph 259*b* for the TT–76A/GGC.

265. Disassembly and Reassembly of Selector Y-Levers and Selector Levers (TT–76/GGC)

a. Disassembly.

(1) Remove the two setscrews (1, fig. 251) that hold the Y-lever retaining collar (2) to the Y-lever pivot post stud (19); remove the Y-lever retaining collar (2), friction plate spring (3), six friction plates (4, 6, 8, 10, 12, and 14), five selector Y-levers (5, 7, 9, 11, and 13), and the Y-lever pivot post collar (15).

(2) Remove the setscrew (16) that holds the Y-lever stop (17) in the reperforator frame; remove the Y-lever stop (17).

(3) Remove the setscrew (18) that holds the Y-lever pivot post stud (19) to the reperforator frame; remove the Y-lever pivot post stud (19).

(4) Remove the friction plate guide stud (20) from the reperforator frame.

(5) Remove the six selector lever springs (21) from the selector levers (29, 32, 35, 38, and 41), and selector camshaft locking lever (26) and from the selector lever spring post (23).

(6) Unhook the transfer lever trip latch spring (36, fig. 256) from the selector lever spring post (23, fig. 251). Loosen the plain hexagonal nut (22) that locks the selector lever spring post (23) in the reperforator frame; remove the selector lever spring post (23) and plain hexagonal nut (22).

Remove the plain hexagonal nut (22) from the spring post (23).

(7) Remove the self-locking hexagonal nut (24), the selector camshaft locking lever eccentric (25), and the selector camshaft locking lever (26) from the selector lever pivot stud (44).

(8) Remove the flat washers (27, 30, 33, 36, and 39), bearings (28, 31, 34, 37, and 40), selector levers (29, 32, 35, 38, and 41), and selector lever pivot post collar (42) from the selector lever pivot stud (44).

(9) Remove the setscrew (43) that holds the selector lever pivot stud (44) in the reperforator frame; remove the selector lever pivot stud (44).

b. Reassembly.

Note. If any of the selector Y-levers, selector levers, or bearings are damaged and must be replaced, replace a complete set. These items are machined as matched sets. The unit will not function properly when operating with unmatched sets.

(1) Reassemble the selector Y-levers and selector levers by reversing the procedures described in *a* above.

(2) Adjust the selector and selector Y-levers as described in paragraphs 88 and 92.

266. Disassembly and Reassembly of Selector Y-Levers and Selector Levers (TT–76A/GGC)

(fig. 252)

a. Disassembly.

(1) Remove the five Y-lever detent springs (1, 2, 3, 4, and 5) from the Y-lever detent spring bracket (21) and from the Y-lever detents (8, 11, 13, 15, and 17).

(2) Remove the plain hexagonal nut (6) and lockwasher (7) that hold the Y-lever detent eccentric sleeve (19) to the Y-lever detent pivot (20); slide the assembled eccentric sleeve (19) and Y-lever detents from the Y-lever detent pivot (20).

(3) Remove the Y-lever detents (8, 11, 13, 15, and 17), spacer (9), and detent spacers (10, 12, 14, 16, and 18) alternately from the Y-lever detent eccentric sleeve (19).

(4) Remove the Y-lever detent pivot (20) from the reperforator frame; remove the Y-lever detent spring bracket (21).

(5) Remove the two setscrews (22) from the Y-lever retaining collar (24); remove the Y-lever retaining collar (24). Remove the flat washers (25, 27, 29, 31, and 33), selector Y-levers (26, 28, 30, 32, and 34), and the Y-lever pivot post collar (35) from the Y-lever pivot post stud (37).

(6) Remove the setscrew (36) that holds the Y-lever pivot post stud (37) in the reperforator frame; remove the Y-lever pivot post stud (37).

(7) Remove the setscrew (38) that holds the Y-lever eccentric stop (39) in the reperforator frame; remove the Y-lever eccentric stop (39). Remove the retainer ring (40) from the Y-lever eccentric stop (39).

(8) Remove the six selector lever springs (41, 42, 43, 44, 45, and 46) from the selector lever spring post (69) and from the selector camshaft locking lever (49) and the five selector levers (51, 54, 57, 60, and 63). Unhook the transfer lever trip latch spring (36, fig. 256) from the selector lever spring post (69, fig. 252).

(9) Remove the self-locking hexagonal nut (47), the selector camshaft locking lever eccentric (48), and the selector camshaft locking lever (49) from the selector lever pivot stud (67).

(10) Remove the flat washers (50, 53, 56, 59, and 62), selector levers (51, 54, 57, 60, and 63), and the bearings (52, 55, 58, 61, and 64) alternately. Remove the selector lever pivot stud collar (65) from the selector lever pivot stud (67).

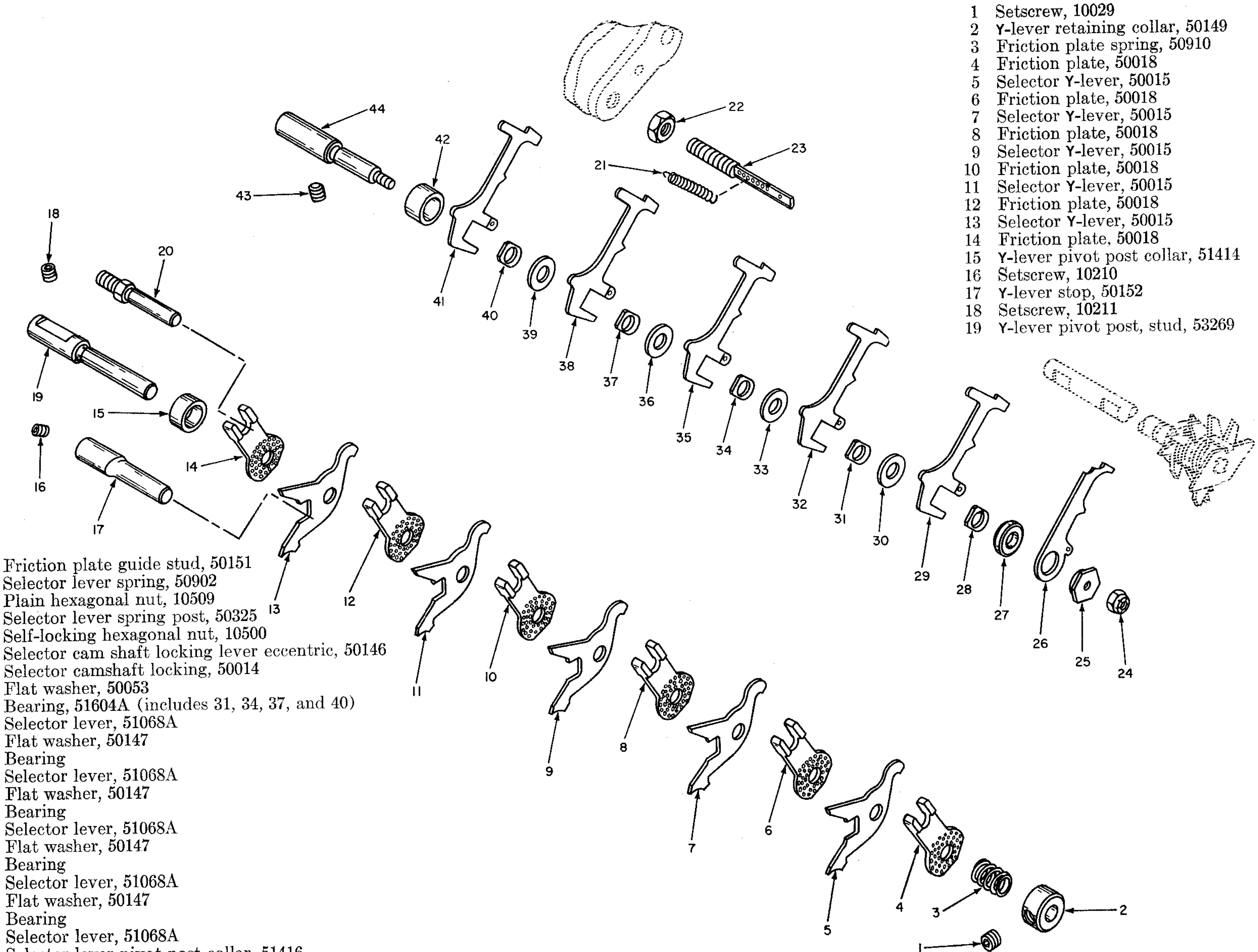
(11) Remove the setscrew (66) that holds the selector lever pivot stud (67) in the reperforator frame; remove the selector lever pivot stud (67).

(12) Loosen the plain hexagonal nut (68) that locks the selector lever spring post (69) in the frame. Remove the selector lever spring post (69) from the frame of the reperforator; remove the plain hexagonal nut (68) from the selector lever spring post (69).

b. Reassembly.

Note. If any of the selector Y-levers, selector levers, or bearings are damaged and must be replaced, replace a complete set. These items are machined as matched sets. The unit will not function properly when operating with unmatched sets.

(1) Reassemble the selector Y-levers and selector levers by reversing the procedures in *a* above.



1 Setscrew, 10029
2 Y-lever retaining collar, 50149
3 Friction plate spring, 50910
4 Friction plate, 50018
5 Selector Y-lever, 50015
6 Friction plate, 50018
7 Selector Y-lever, 50015
8 Friction plate, 50018
9 Selector Y-lever, 50015
10 Friction plate, 50018
11 Selector Y-lever, 50015
12 Friction plate, 50018
13 Selector Y-lever, 50015
14 Friction plate, 50018
15 Y-lever pivot post collar, 51414
16 Setscrew, 10210
17 Y-lever stop, 50152
18 Setscrew, 10211
19 Y-lever pivot post, stud, 53269

20 Friction plate guide stud, 50151
21 Selector lever spring, 50902
22 Plain hexagonal nut, 10509
23 Selector lever spring post, 50325
24 Self-locking hexagonal nut, 10500
25 Selector cam shaft locking lever eccentric, 50146
26 Selector camshaft locking, 50014
27 Flat washer, 50053
28 Bearing, 51604A (includes 31, 34, 37, and 40)
29 Selector lever, 51068A
30 Flat washer, 50147
31 Bearing
32 Selector lever, 51068A
33 Flat washer, 50147
34 Bearing
35 Selector lever, 51068A
36 Flat washer, 50147
37 Bearing
38 Selector lever, 51068A
39 Flat washer, 50147
40 Bearing
41 Selector lever, 51068A
42 Selector lever pivot post collar, 51416
43 Setscrew, 10211
44 Selector lever pivot stud, 53268

Figure 251. Selector Y-levers and selector levers, exploded view (TT–76/GGC).

(2) Adjust the selector levers and selector Y-levers as described in paragraphs 89, 90, 91, and 92.

267. Disassembly and Reassembly of Type Wheel Reciprocating Mechanism
(fig. 253)

a. Disassembly.

(1) Remove the code-ring locking bail cam follower spring (1), from the code-ring locking bail cam follower (5) and from the function plate (45).

(2) Remove the machine screw (2), nut plate (3), and flat washer (4) that hold the code-ring locking bail cam follower (5) to the code-ring locking bail shaft (11); remove the code-ring locking bail cam follower (5).

(3) Remove the machine screw (6), flat washer (7), and lockwasher (8) that hold the code-ring locking bail (9) to the code-ring locking bail shaft (11); remove the code-ring locking bail (9).

(4) Remove the four retainer rings (10) that hold the code-ring locking bail shaft (11)

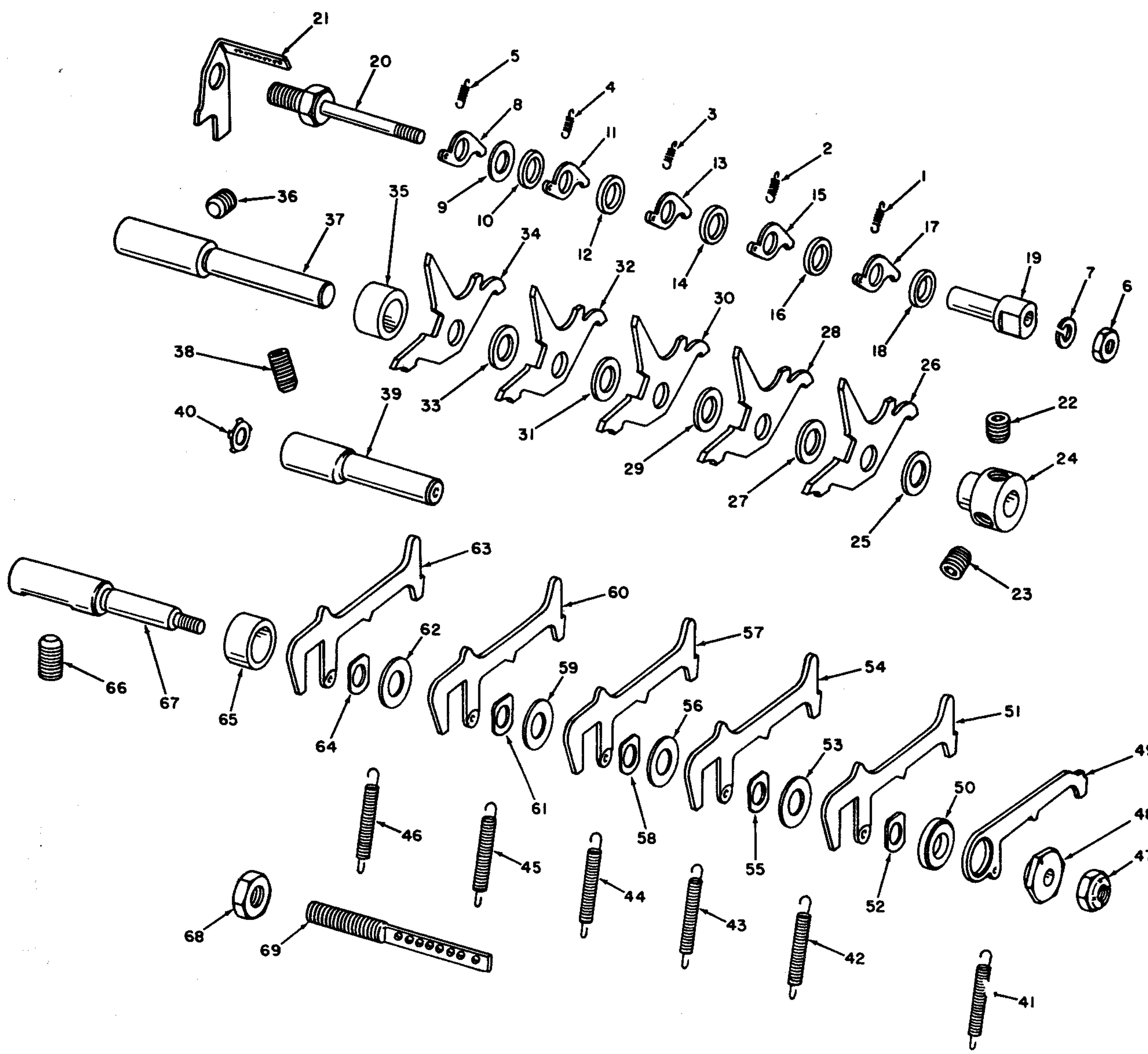


Figure 252. Y-levers and selector levers, exploded view (TT–76A/GGC).

1 Y-lever detent spring, 55009
2 Y-lever detent spring, 55009
3 Y-lever detent spring, 55009
4 Y-lever detent spring, 55009
5 Y-lever detent spring, 55009
6 Plain hexagonal nut, 10504
7 Lockwaster, 10434
8 Y-lever detent, 55004
9 Spacer, 55076
10 Detent spacer, 55001
11 Y-lever detent, 55004
12 Detent spacer, 55001
13 Y-lever detent, 55004
14 Detent spacer, 55001
15 Y-lever detent, 55004
16 Detent spacer, 55001
17 Y-lever detent, 55004
18 Detent spacer, 55001
19 Y-lever detent eccentric sleeve, 55007
20 Y-lever detent pivot, 55008
21 Y-lever detent spring bracket, 55002
22 Setscrew, 10209
23 Setscrew, 10209
24 Y-lever retaining collar, 55006
25 Flat washer, 50148
26 Selector Y-lever, 55003
27 Flat washer, 50148
28 Selector Y-lever, 55003
29 Flat washer, 50148
30 Selector Y-lever, 55003
31 Flat washer, 50148
32 Selector Y-lever, 55003
33 Flat washer, 50148
34 Selector Y-lever, 55003
35 Y-lever pivot post collar, 51416
36 Setscrew, 10210
37 Y-lever pivot post stud, 53269
38 Setscrew, 10211
39 Y-lever eccentric stop, 50152
40 Retainer ring, 10929
41 Selector lever spring, 50902
42 Selector lever spring, 50902
43 Selector lever spring, 50902
44 Selector lever spring, 50902
45 Selector lever spring, 50902
46 Selector lever spring, 50902
47 Self-locking hexagonal nut, 10500
48 Selector camshaft locking lever eccentric, 55024
49 Selector camshaft locking lever, 50014
50 Flat washer, 50147
51 Selector lever, 51068, includes items 54, 57, 60, and 63
52 Bearing, 51604, includes items 55, 58, 61, and 64
53 Flat washer, 50147
54 Selector lever
55 Bearing
56 Flat washer, 50147
57 Selector lever
58 Bearing
59 Flat washer, 50147
60 Selector lever
61 Bearing
62 Flat washer, 50147
63 Selector lever
64 Bearing
65 Selector lever pivot stud collar, 51416
66 Setscrew, 10211
67 Selector lever pivot stud, 53268
68 Plain hexagonal nut, 10509
69 Selector lever spring post, 50325

Figure 252—Continued.

to the function plate (45) and to the letters figures shift latch lever (12). Disconnect the spring (32) from the letters figures shift latch lever (12). Remove the code-ring locking bail shaft (11) and the letters figures shift latch lever (12).

(5) Remove the retainer ring (13) that holds the type wheel reciprocating transfer lever (14) to the eccentric stud (17); remove the type wheel reciprocating transfer lever (14).

(6) Remove the self-locking hexagonal nut (15) and flat washer (16) that hold the eccentric stud (17) to the function plate (45); remove the eccentric stud (17).

(7) Remove the type wheel reciprocating lever spring (18) from the spring pin (28) and from the type wheel reciprocating spring lever (25).

(8) Remove the two setscrews (19) that hold the shaft collar (20) to the type wheel shift lever stud (36); remove the shaft collar (20) and the retainer plate (21).

(9) Remove the drive pins (22) and spring pin (28) from the type wheel reciprocating drive levers (23 and 29). Remove the type wheel reciprocating drive lever (23), flat washer (24), type wheel reciprocating spring lever (25), sleeve bearing (26), flat washer (27), type wheel reciprocating drive lever (29), and two flat washers (30 and 31).

(10) Remove the spring (32) from the figures-letters shift lever (33); remove the figures-letters shift lever (33) and flat washer (34) from the type wheel shift lever stud (36).

(11) Remove the self-locking hexagonal nut (35) that holds the type wheel shift lever

stud (36) to the function plate (45); remove the type wheel shift lever stud (36).

(12) Remove the bell sensing lever spring (37), shift cam follower spring (38), letters sensing levers spring (39), and figures sensing levers spring (40) from the function plate (45) and from the function sensing levers.

(13) Remove the two machine screws (41 and 43) and lockwashers (42 and 44) that hold the function plate (45) to the reperforator frame; remove the function plate (45).

b. *Reassembly.*

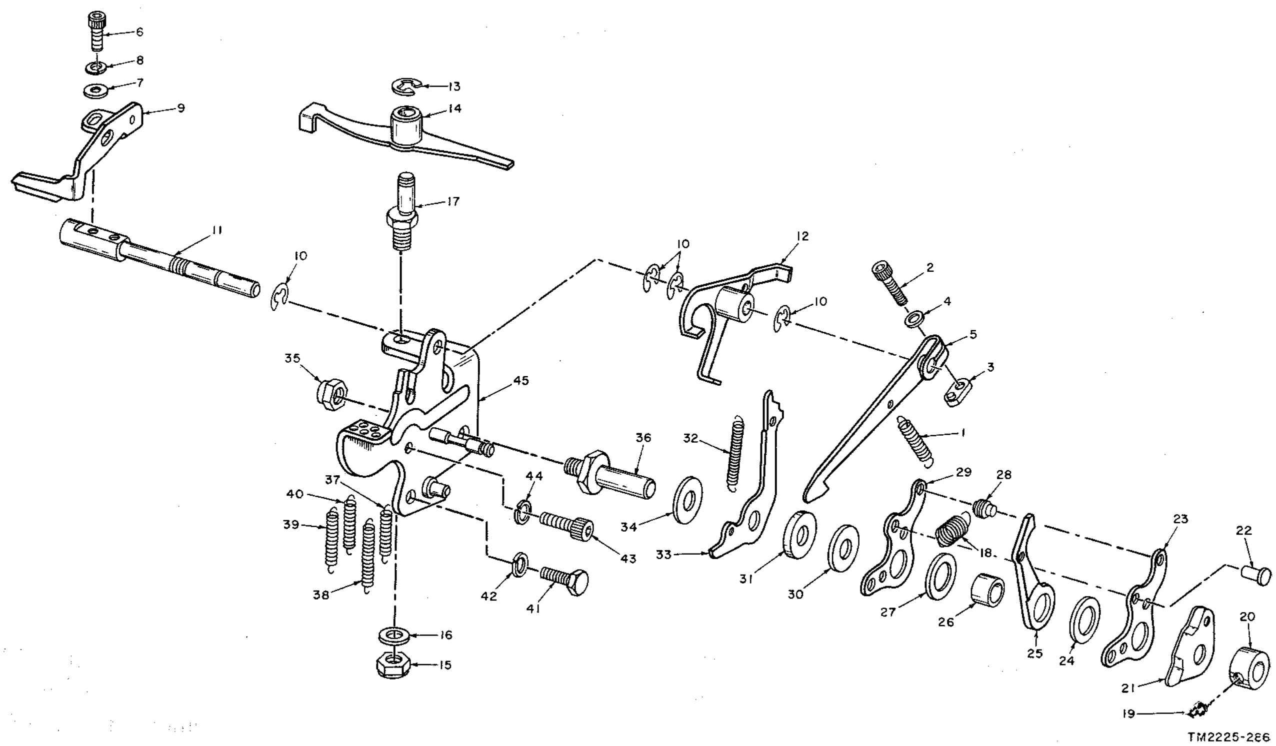
(1) Reassemble the type wheel reciprocating mechanism by reversing the procedures described in *a* above.

(2) Adjust the type wheel reciprocating mechanism as described in paragraph 70.

268. Disassembly and Reassembly of Function Sensing Mechanism
(fig. 254)

a. *Disassembly.*

(1) Remove the type wheel reciprocating mechanism as described in paragraph 253*a*.



1 Code-ring locking bail cam follower spring, 53569
2 Machine screw, 10006
3 Nut plate, 50174
4 Flat washer, 10459
5 Code-ring locking bail cam follower, 52657
6 Machine screw, 10004
7 Flat washer, 10458
8 Lockwasher, 10429
9 Code-ring locking bail, 52653
10 Retainer ring, 10949
11 Code-ring locking bail shaft, 52291
12 Letters figures shift latch lever, 52411
13 Retainer ring, 10949
14 Type wheel reciprocating transfer lever, 52478A
15 Self-locking hexagonal nut, 10525
16 Flat washer, 52430
17 Eccentric stud, 52399
18 Type wheel reciprocating lever spring, 52167
19 Setscrew, 10209
20 Shaft collar, 50209
21 Retainer plate, 53652
22 Drive pin, 52404
23 Type wheel reciprocating drive lever, 52362
24 Flat washer, 52402
25 Type wheel reciprocating spring lever, 52405
26 Sleeve bearing, 52401
27 Flat washer, 52402
28 Spring pin, 52403
29 Type wheel reciprocating drive lever, 52362
30 Flat washer, 53261
31 Flat washer, 52413
32 Spring, 52168
33 Figures-letters shift lever, 52406
34 Flat washer, 53261
35 Self-locking hexagonal nut, 10525
36 Type wheel shift lever stud, 52417
37 Bell sensing lever spring, 52173
38 Shift cam follower spring, 52172
39 Letters sensing levers spring, 52169
40 Figures sensing levers spring, 52171
41 Machine screw, 10076
42 Lockwasher, 10430
43 Machine screw, 10025
44 Lockwasher, 10430
45 Function plate, 52419A

Figure 253. Type wheel reciprocating mechanism, exploded view.

(2) Remove the two setscrews (1) that hold the stop arm shaft driven gear (2) to the stop arm shaft; remove the stop arm shaft driven gear (2) and thrust bearing (3).

(3) Remove the type wheel reciprocating cam follower (4), sensing lever spacer (5), and the assembled bell sensing lever (8) and signal bell clapper (7) from the cam lever assembly (18).

(4) Remove the setscrew (6) that holds the signal bell clapper (7) to the bell sensing lever (8); remove the signal bell clapper (7).

(5) Remove the sensing lever spacer (9), figures sensing lever (10), sensing lever spacer (11), letters sensing lever (12), and sensing lever spacer (13) from the cam lever assembly (18).

(6) Remove the plain hexagonal nut (14), lockwasher (15), and flat washer (16) that hold the restoring lever eccentric (17) to the stud on the cam lever assembly (18); remove the restoring lever eccentric (17).

(7) Remove the cam lever assembly (18) and laminated spacer (19) from the projection of the rear of the code-ring cage.

b. Reassembly.

(1) Reassemble the function sensing lever mechanism by reversing the procedures described in *a*(7) through (2) above.

(2) Replace the type wheel reciprocating mechanism as described in paragraph 253*b*.

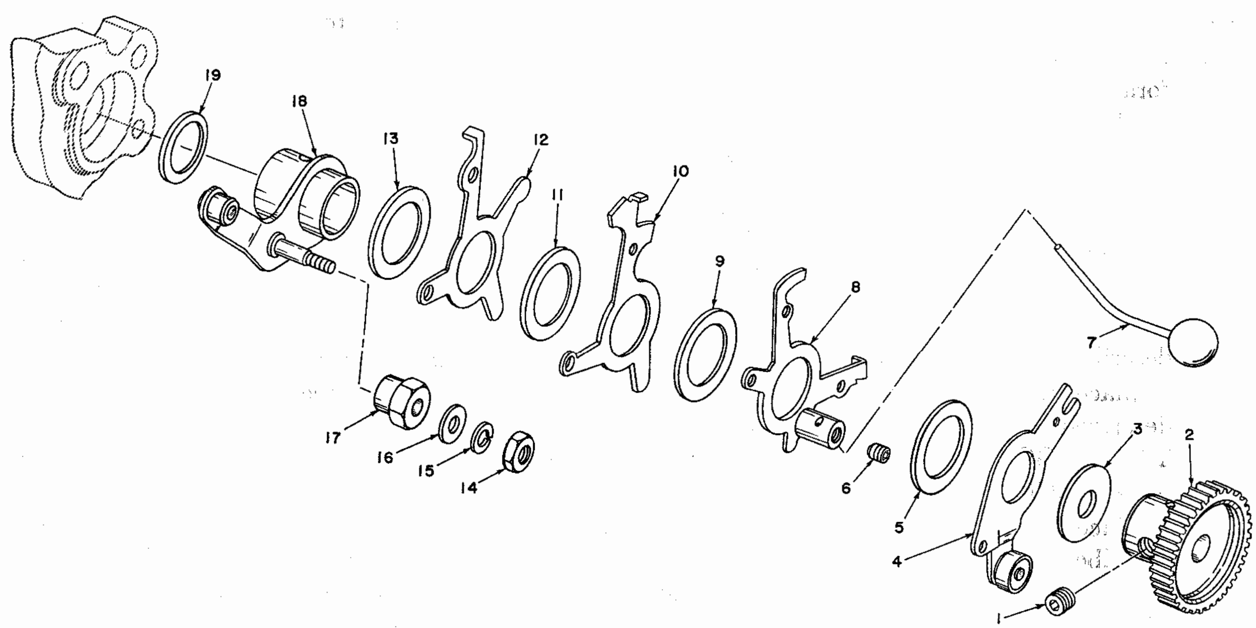
(3) Adjust the function sensing mechanism as described in paragraphs 67 and 69.

269. Removal and Replacement of Code-Ring Cage

(fig. 255)

a. Removal.

(1) Remove the power supply and terminal unit from the reperforator as described in



1 Setscrew, 10209
2 Stop arm shaft driven gear, 52344 (TT-76/GGC); 56257 (TT-76A/GGC)
3 Thrust bearing, 50374
4 Type wheel reciprocating cam follower, 52477A
5 Sensing lever spacer, 52649
6 Setscrew, 10203
7 Signal bell clapper, 52682
8 Bell sensing lever, 52368A
9 Sensing lever spacer, 52649
10 Figures sensing lever, 52483
11 Sensing lever spacer, 52649
12 Letters sensing lever, 52484
13 Sensing lever spacer, 52649
14 Plain hexagonal nut, 10512
15 Lockwasher, 10429
16 Flat washer, 50414
17 Restoring lever eccentric, 52664
18 Cam lever assembly, 52459A
19 Laminated spacer, 52679

Figure 254. Function sensing mechanism, exploded view.

paragraph 242*a* for the TT–76/GGC or paragraph 243*a* for the TT–76A/GGC.

(2) On the TT–76A/GGC, remove the tape puller mechanism as described in paragraph 248*a*.

(3) Remove the ribbon supply group from the reperforator as described in paragraph 254*a* for the TT–76/GGC or paragraph 255*a* for the TT–76A/GGC.

(4) Remove the front support assembly as described in paragraph 258*a* for the TT–76/GGC or paragraph 259*a* for the TT–76A/GGC.

(5) Remove the stop arm shaft driven gear as described in paragraph 268*a* (2).

(6) Remove the assembled type wheel driven gear (4), stop arm (7) and stop arm shaft (8).

(7) Remove the two machine screws (1) and lockwashers (2) that hold the code-ring cage to the reperforator frame; remove the code-ring cage.

b. Replacement.

(1) Position the code-ring cage on the reperforator frame, carefully engaging the tails of the T-levers in the slotted tails of the code-rings; secure with two machine screws (1) and lockwashers (2).

(2) Replace the assembled type wheel driven gear (4), stop arm (7), and stop arm shaft (8).

(3) Replace the stop arm shaft driven gear as described in paragraph 268*b*.

(4) Replace the front support assembly as described in paragraph 259*b* for the TT–76A/GGC or paragraph 258*b* for the TT–76/GGC.

(5) Replace the ribbon supply group as described in paragraph 255*b* for the TT–76A/GGC or paragraph 254*b* for the TT–76/GGC. Make sure the mounting machine screws engage the bearing bracket (5).

(6) On the TT–76A/GGC replace the tape puller mechanism as described in paragraph 248*b*.

(7) Replace the power supply and terminal unit as described in paragraph 243*b* for the TT–76A/GGC or paragraph 242*b* for the TT–76/GGC.

270. Disassembly and Reassembly of Code-Ring Cage

(fig. 255)

a. Disassembly.

(1) Remove the code-ring cage from the reperforator as described in paragraph 269*a*.

(2) Remove the two setscrews (3) that hold the type wheel driven gear (4) to the stop arm shaft (8); remove the type wheel driven gear (4) and the bearing bracket (5).

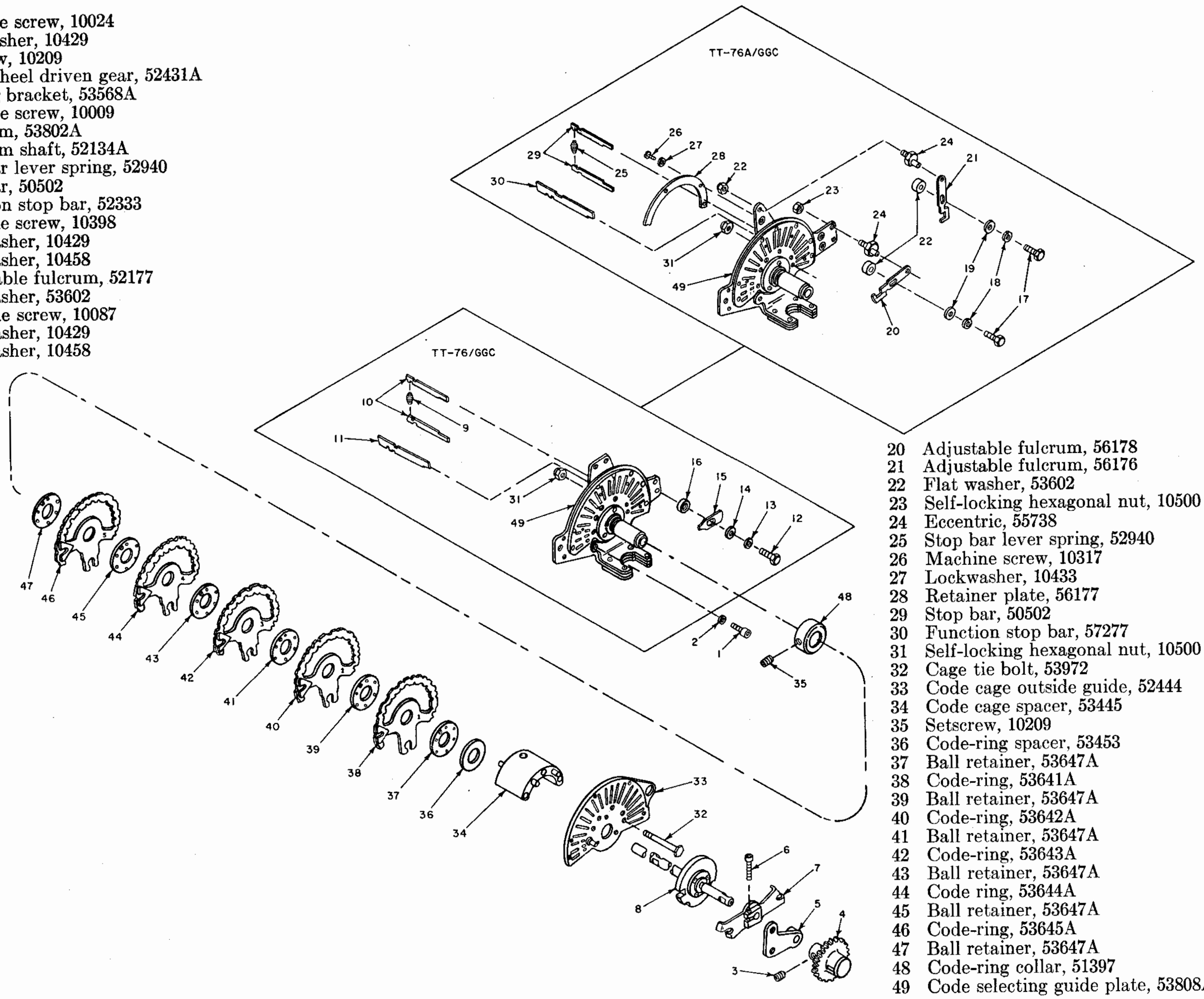
(3) Remove the machine screw (6) that holds the stop arm (7) to the stop arm shaft (8); remove the stop arm (7).

(4) On the TT–76/GGC, remove the 16 stop bar lever springs (9) from the 29 stop bars (10) and from the three function stop bars (11). Remove the stop bars (10) and the function stop bars (11) from the code-ring cage. Remove the three machine screws (12), lockwashers (13), and flat washers (14) that hold the three adjustable fulcrums (15) to the code selecting guide plate (49); remove the three adjustable fulcrums (15) and flat washers (16).

(5) On the TT–76A/GGC, remove the three machine screws (17), lockwashers (18), and flat washers (19) that hold the two adjustable fulcrums (20) and the adjustable fulcrum (21) to the code selecting guide plate (49) and to the eccentrics (24); remove the adjustable fulcrums (20 and 21) and the three flat washers (22). Remove the three self-locking hexagonal nuts (23) that hold the eccentrics (24) to the code selecting guide plate (49); remove the three eccentrics (24). Remove the 16 stop bar lever springs (25) from the 29 stop bars (29) and from the function stop bars (30). Remove the three machine screws (26) and lockwashers (27) that hold the retainer plate (28) to the code selecting guide plate (49); remove the retainer plate (28). Remove the stop bars (29) and the function stop bars (30) from the code-ring cage.

(6) Remove the three self-locking hexagonal nuts (31) and cage tie bolts (32) that hold the code cage outside guide (33) to the code selecting guide plate (49); remove

1 Machine screw, 10024
2 Lockwasher, 10429
3 Setscrew, 10209
4 Type wheel driven gear, 52431A
5 Bearing bracket, 53568A
6 Machine screw, 10009
7 Stop arm, 53802A
8 Stop arm shaft, 52134A
9 Stop bar lever spring, 52940
10 Stop bar, 50502
11 Function stop bar, 52333
12 Machine screw, 10398
13 Lockwasher, 10429
14 Flat washer, 10458
15 Adjustable fulcrum, 52177
16 Flat washer, 53602
17 Machine screw, 10087
18 Lockwasher, 10429
19 Flat washer, 10458



20 Adjustable fulcrum, 56178
21 Adjustable fulcrum, 56176
22 Flat washer, 53602
23 Self-locking hexagonal nut, 10500
24 Eccentric, 55738
25 Stop bar lever spring, 52940
26 Machine screw, 10317
27 Lockwasher, 10433
28 Retainer plate, 56177
29 Stop bar, 50502
30 Function stop bar, 57277
31 Self-locking hexagonal nut, 10500
32 Cage tie bolt, 53972
33 Code cage outside guide, 52444
34 Code cage spacer, 53445
35 Setscrew, 10209
36 Code-ring spacer, 53453
37 Ball retainer, 53647A
38 Code-ring, 53641A
39 Ball retainer, 53647A
40 Code-ring, 53642A
41 Ball retainer, 53647A
42 Code-ring, 53643A
43 Ball retainer, 53647A
44 Code ring, 53644A
45 Ball retainer, 53647A
46 Code-ring, 53645A
47 Ball retainer, 53647A
48 Code-ring collar, 51397
49 Code selecting guide plate, 53808A or 57272A

Figure 255. Code-ring cage, exploded view.

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the assembled code cage outside guide (33) and code cage spacer (34) from the shaft on the code selecting guide plate (49).

(7) Remove the two setscrews (35) that hold the code-ring collar (48) to the code selecting guide plate (49); remove the code-ring spacer (36), six ball retainers (37, 39, 41, 43, 45, and 47), five code rings (38, 40, 42, 44, and 46), and the code-ring collar (48).

b. Reassembly.

(1) Reassemble the code-ring cage by reversing the procedures described in *a*(7) through (2) above.

(2) Replace the code-ring cage as described in paragraph 269*b*.

(3) Adjust the code-ring cage, as described in paragraphs 66, 68, 78, 83, 84, and 108.

271. Disassembly and Reassembly of Transfer Lever Shaft
(fig. 256)

a. Disassembly.

(1) Remove the ribbon supply group as described in paragraph 254*a* for the TT–76/GGC or paragraph 255*a* for the TT–76A/GGC.

(2) Remove the front support assembly as described in paragraph 258*a* for the TT–76/GGC or paragraph 259a for the TT–76A/GGC.

(3) Move all the code rings either clockwise or counterclockwise. Remove the self-locking hexagonal nut (1) that holds the flat washers (2, 4, 6, 8, and 10) and T-levers (3, 5, 7, 9, and 11) to the T-lever pivot stud (30); remove the flat washers (2, 4, 6, 8, and ten) and the T-levers (3, 5, 7, 9, and 11).

(4) Remove the function clutch latch screw (12) that holds the clutch latch arm (17) to the transfer lever shaft (31); remove the clutch latch arm (17).

(5) Remove the machine screw (13), plain hexagonal nut (14), and lockwasher (15) that hold the ball bearing (16) to the clutch latch arm (17); remove the ball bearing (16).

(6) Remove the machine screw (18) that holds the shaft collar (19) to the transfer lever shaft (31); remove the shaft collar (19).

(7) Remove the transfer lever spring (20) from the transfer lever spring post (27) and from the spring post on the reperforator frame.

(8) Remove the machine screws (21 and 23) from the shaft collars (22 and 24). Remove the transfer lever shaft assembly by pulling it out from the front of the reperforator, catching the shaft collars (22 and 24) as they fall from the transfer lever shaft (31).

(9) Remove the self-locking hexagonal nut (25) that holds the transfer lever roller stud (26) to the transfer lever; remove the transfer lever roller stud (26).

(10) Remove the transfer lever spring post (27), from the transfer lever.

(11) Remove the plain hexagonal nut (28) and lockwasher (29) that hold the T-lever pivot stud (30) to the transfer lever; remove the T-lever pivot stud (30).

(12) Remove the machine screw (32), flat washer (33), and nut plate (34) that hold the trip latch lever (35) to the trip latch lever pivot stud (38); remove the trip latch lever (35 or 36).

(13) Remove the transfer lever trip latch spring (37) from the transfer lever trip latch (40). Remove the assembled trip latch lever shaft (39) and trip latch lever (40) from the reperforator frame. Remove the taper pin (38) and remove the trip latch lever shaft (39) from the transfer lever trip latch (40).

b. Reassembly.

Note. If any of the T-levers are damaged and need to be replaced, replace all five of the T-levers. These levers are supplied in matched sets, and will not function properly when operated in unmatched sets.

(1) Reassemble the transfer lever shaft by reversing the procedures in *a*(13) through (3) above.

(2) Adjust the transfer lever and T-levers as described in paragraphs 71, 73, 75 and 80 or 72, 74, and 80.

(3) Replace the front support assembly as described in paragraph 259*b* for the TT–

76A/GGC or paragraph 258*b* for the TT–76–GGC.

(4) Replace the ribbon supply group as described in paragraph 255*b* for the TT–76A/GGC or paragraph 254*b* for the TT–76/GGC.

272. Removal and Replacement of Motor

a. Removal.

(1) Remove the reperforator-transmitter from the base as described in paragraph 215*a*.

(2) Remove the cover from the motor suppression filter unit as described in paragraph 285*a*(2) for TT–76/GGC or paragraph 286*a*(2) for TT–76A/GGC.

(3) Disconnect the motor cable from the terminal board on the motor suppression filter unit.

(4) Remove the four machine screws (1, fig. 268) and lockwashers (2) that hold the gear case cover (6) to the motor support; remove the worm gear bracket (9), gear case cover (6), and gasket (3).

(5) Remove the four machine screws (1, fig. 257) and lockwashers (2) that hold the motor to the motor support; remove the assembled motor and the shims (3 and 4).

b. Replacement.

(1) Position the shims (3 and 4, fig. 257) on the motor so that the holes in the shims line up with the mounting holes on the motor. Position the motor on the motor support; secure with the four machine screws (1) and lockwashers (2).

(2) Position the gasket (3, fig. 268) gear case cover (6), and worm gear bracket (9) on the motor support; secure with four machine screws (1) and lockwashers (2).

(3) Connect the terminals on the motor cable to the terminal board on the motor suppression filter unit.

(4) Replace the cover on the motor suppression filter unit as described in paragraph 286*b* for the TT–76A/GGC or paragraph 285*b* for the TT–76/GGC.

(5) Replace the reperforator-transmitter on the base as described in paragraph 215*b*.

273. Disassembly and Reassembly of Series-Governed Motor

(fig. 257)

a. Disassembly.

(1) Remove the motor from the reperforator as described in paragraph 272*a*.

(2) Remove the machine screw (5) and lockwasher (6) that hold the worm gear (7) to the armature shaft; remove the worm gear (7).

(3) Remove the key pin (8) from the motor armature shaft; remove the grease seals (9) and (10) from the motor armature shaft.

(4) Remove the setscrew (11) that holds the motor governor target (12) to the shaft of the motor speed governor base (37); remove the motor governor target (12).

(5) Remove the two machine screws (13) and lockwashers (14) that hold the motor governor cover (15) to the motor (4); remove the motor governor cover (15).

(6) Remove the two setscrews (16) that hold the motor speed governor base (37) to the motor armature shaft; remove the assembled motor governor.

(7) Remove the spring (17) and the governor worm (18) from the motor governor.

(8) Remove the electrical contact brush (19) from the motor governor.

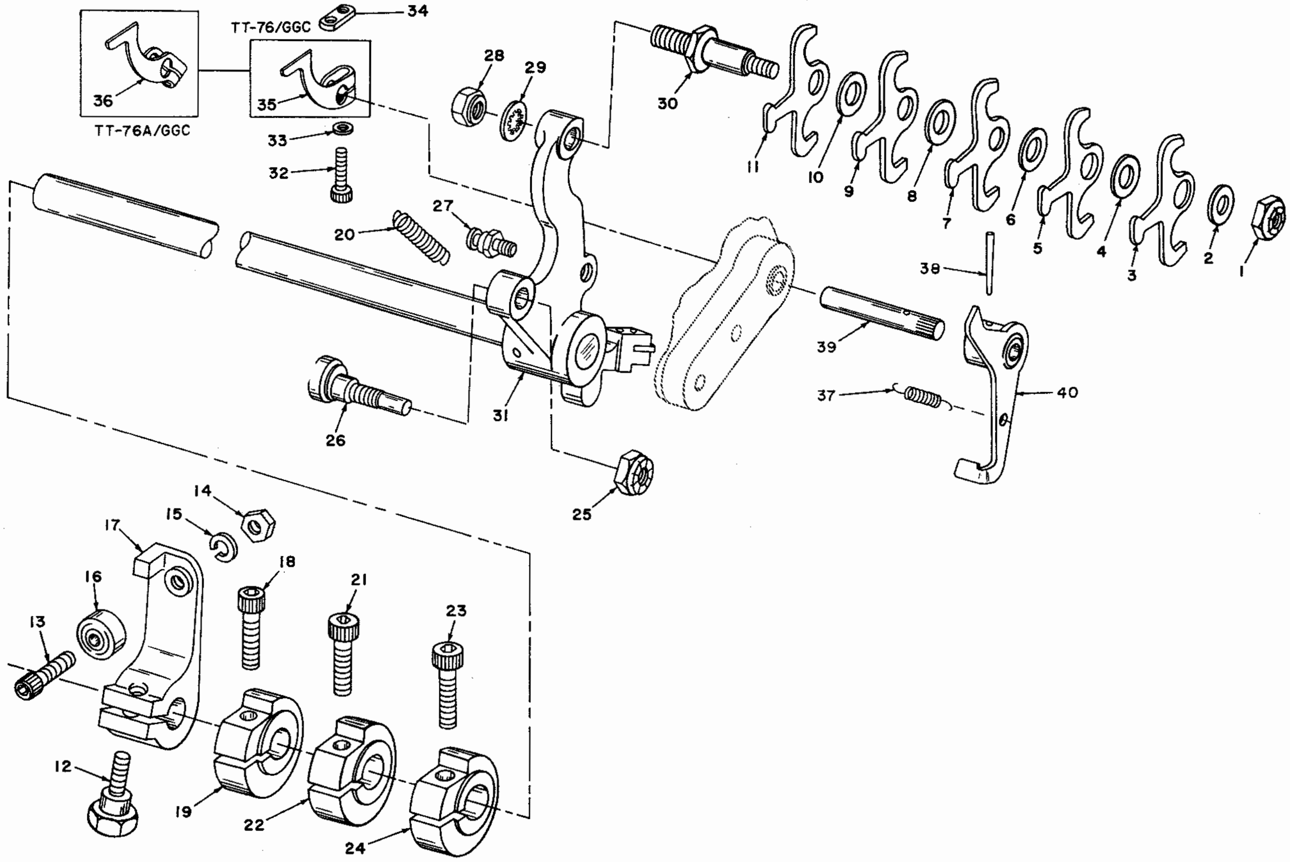
(9) Remove the two electrical contact brushes (20), the brush caps (38), spring (39) and the electrical contact brush (40) from the motor (41).

b. Reassembly. Check the motor governor electrical contact brushes. Clean them if they are dirty or glazed; replace them if they are worn, chipped or saturated with oil.

(1) Reassemble the motor by reversing the procedures described in *a*(9) through (2) above.

(2) Replace the motor as described in paragraph 272*b*.

(3) Adjust the motor speed as described in paragraph 16*a*.



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1 Self-locking hexagonal nut, 10500
2 Flat washer, 50414
3 T-lever, 51066A (includes items 5, 7, 9, and 11)
4 Flat washer, 50414
5 T-lever
6 Flat washer, 50414
7 T-lever
8 Flat washer, 50414
9 T-lever
10 Flat washer, 50414
11 T-lever
12 Function clutch latch screw, 52176
13 Machine screw, 10000
14 Plain hexagonal nut, 10504
15 Lockwasher, 10434
16 Ball bearing, 10754
17 Clutch latch arm, 50535
18 Machine screw, 10010
19 Shaft collar, 53973
20 Transfer lever spring, 55674
21 Machine screw, 10010
22 Shaft collar, 53973
23 Machine screw, 10010
24 Shaft collar, 53973
25 Self-locking hexagonal nut, 10501
26 Transfer lever roller stud, 56185
27 Transfer lever spring post, 50647
28 Plain hexagonal nut, 50651
29 Lockwasher, 10404
30 T-lever pivot stud, 50650
31 Transfer lever shaft, 54745A
32 Machine screw, 10006
33 Flat washer, 10459
34 Nut plate, 50174
35 Trip latch lever, 52147
36 Trip latch lever, 56736
37 Transfer lever trip latch spring, 50904
38 Taper pin, 10857
39 Trip latch lever shaft, 52148
40 Transfer lever trip latch, 50020A

Figure 256. Transfer lever shaft, exploded view.

274. Removal and Replacement of Motor Brushes

a. Removal.

(1) Operate the POWER switch, LIGHT switch, and MOTOR switch to OFF.

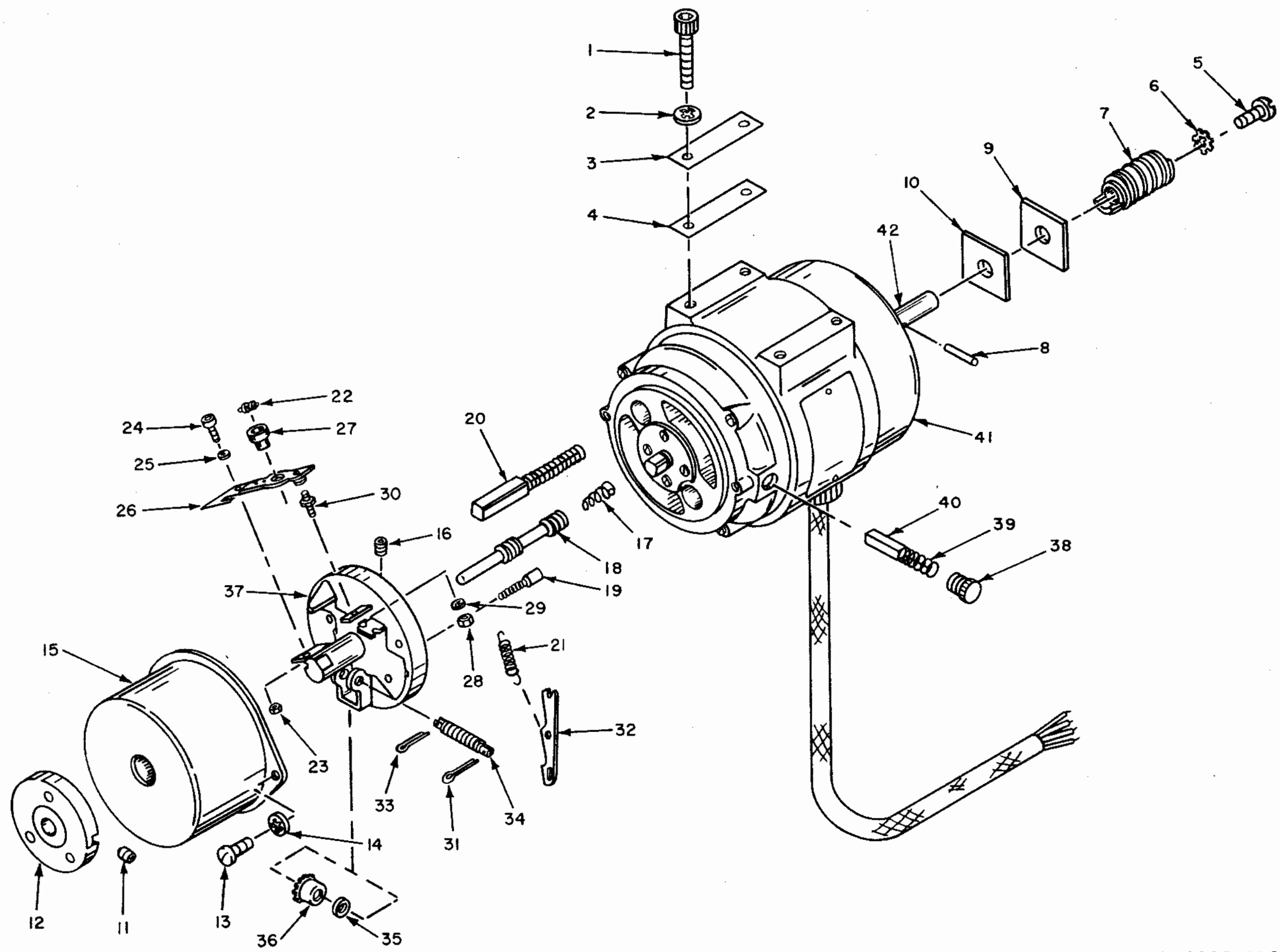
(2) Disconnect the reperforator - transmitter from the local power source.

(3) Remove the dust cover.

(4) Remove the tape from the tape supply reel.

(5) Remove the motor brush caps (fig. 257, item 38).

(6) Remove the motor brushes and springs (fig. 257, items 39 and 40).



TM2225-295

1	Machine screw, 10017	22	Grooved pin, 50302
2	Lockwasher, 10405	23	Self-locking hexagonal nut, 10500
3	.002–in. shim, 51509	24	Machine screw, 10001
4	.005–in. shim, 51510	25	Lockwasher, 10403
5	Machine screw, 50207	26	Electrical contact, 50281A
6	Lockwasher, 10406	27	Sleeve, 50293
7	Worm gear, 50350	28	Plain hexagonal nut, 10507
8	Key pin, 50359	29	Lockwasher, 10404
9	Grease seal, 50949	30	Electrical contact, 50338
10	Grease seal, 50949	31	Cotter pin, 10800
11	Setscrew, 10204	32	Governor adjustment lever, 50301
12	Motor governor target, 50303A	33	Cotter pin, 10800
13	Machine screw, 10321	34	Governor adjustment screw, 50299
14	Lockwasher, 10412	35	Flat washer, 50148
15	Motor governor cover, 50311	36	Motor governor adjustment gear, 50278A
16	Setscrew, 10203	37	Motor speed governor base, 51249A
17	Spring, 51855	38	Brush cap, 20747
18	Governor worm, 56555	39	Spring, 11070
19	Electrical contact brush, 51154	40	Electrical contact brush, 56834A
20	Electrical contact brush, 51543A	41	Motor, 51861A (includes field coil 51188A)
21	Spring, 50334	42	Armature, 51187A (includes bearings 10760 and 10761)

Figure 257. Motor, exploded view.

b. Replacement.

(1) Insert the motor brushes and springs in the motor brush guide.

(2) Replace the motor brush caps.

(3) Replace the tape in the tape supply reel.

(4) Replace the dust cover.

(5) Connect the reperforator-transmitter to the local power source.

(6) Operate the POWER switch, LIGHT switch, and MOTOR switch to ON.

275. Repair of Motor Commutator

a. Cleaning Commutator.

(1) If there is excessive sparking under the motor brushes when the motor is running, disassemble the motor and clean the commutator with a cloth dampened with cleaning compound. Reassemble and run the motor.

(2) If there is still excessive sparking, remove the armature from the motor and clean the commutator lightly with No. 0000 sandpaper.

Caution: Do not use emery cloth. Wrap the sandpaper around the armature and turn the armature in a lathe or between fixed centers, holding the sandpaper lightly by hand. The copper commutator segments frequently become dark because particles of carbon from the brushes become embedded in the copper commutator segments. This is a desirable condition. Do not polish merely to remove the discoloration.

b. Undercutting Mica Separators between Commutator Segments. Excessive sparking between the commutator and the motor brushes results when the copper segments of the commutator are worn down below the level of the mica separators. To insure adequate contact between the copper segments and the brushes, the top of the mica separators should be cut down one-sixty-fourth inch to one-thirty-second inch below the surface of the copper segments. Repeat for all segments.

Caution: After the mica has been undercut between all segments, check to see that no particles of metal remain in the slots. Such metal particles may short the commutator segments and burn out the windings when the motor is started.

c. Resurfacing Motor Commutator. The commutator may be resurfaced as follows by experienced personnel, but only with the specific approval of supervisory personnel responsible for the equipment:

(1) Mount the motor armature on a lathe so that the shaft does not run out of line more than .0005 inch. Make a series of light cuts across the entire width of the commutator with a sharp cutting tool. Continue the cuts until enough metal is removed to eliminate the pits, grooves, and rough spots in the surfaces. Do not remove more metal than necessary.

(2) Polish the commutator with a strip of fine sandpaper (#000 or #0000) held in flat contact with the commutator as it revolves in the lathe.

Caution: Do not attempt to smooth a rough commutator with sandpaper unless a lathe is available. Do not use emery cloth or carborundum paper because particles of these abrasives may cause trouble in electrical circuits.

(3) After the commutator is resurfaced, check to see that the surfaces of the mica separators are below the surfaces of the copper segments of the commutator as described in *b*(2) above.

276. Disassembly and Reassembly of Motor Governor

(fig. 257)

a. Disassembly.

(1) Remove the motor governor from the motor as described in paragraphs 272*a*(4) through (8).

(2) Remove the spring (21) from the governor adjustment lever (32) and from the grooved pin (22). Remove the grooved pin (22).

(3) Remove the self-locking hexagonal nut (23), machine screw (24), and lockwasher (25) that hold the electrical contact (26) to the motor speed governor base (37); remove the electrical contact (26) and sleeve (27).

(4) Remove the plain hexagonal nut (28) and lockwasher (29) that hold the electrical contact (30) to the motor speed governor base (37); remove the electrical contact (30).

(5) Remove the cotter pin (31) that holds the governor adjustment lever (32) to the governor adjustment screw (34); remove the governor adjustment lever (32).

(6) Remove the cotter pin (33) from the opposite end of the governor adjustment screw (34); turn out the governor adjustment screw from the mounting on the motor speed governor base (37); catch the flat washer (35) and the motor governor adjustment gear (36) as they fall from the motor speed governor base.

b. Reassembly. If necessary, clean or burnish the governor electrical contacts points before reassembly. Remove any built up or pitted portions of the contacts with a contact file. Do not remove any more metal than is necessary.

(1) Reassemble the motor governor by reversing the procedures described in *a*(6) through (2) above.

(2) Replace the motor as described in paragraph 272*b*.

(3) Adjust the speed of the motor as described in paragraph 16*a*.

277. Disassembly and Reassembly of Function Shaft (TT–76/GGC)

(fig. 258)

a. Disassembly.

(1) Remove the ribbon supply groups as described in paragraph 254*a*.

(2) Remove the front support assembly as described in paragraph 258*a*. Remove the ball bearing (3) from the front support frame.

(3) Remove the transfer lever shaft as described in paragraph 271*a*.

(4) Remove the two setscrews (4) that hold the transfer lever cam (5) to the function shaft (33); remove the transfer lever cam (5).

(5) Remove the two setscrews (6) that hold the sliding clutch coupling (7) to the function shaft (33); remove the sliding clutch coupling (7), sliding clutch spring (8), and sliding drum clutch (9).

(6) Remove the retainer ring (10) that holds the gear (12) to the function shaft (33); remove the flat washer (11), gear (12), and flat washer (13). Remove the retainer ring (14).

(7) Remove the two machine screws (15), lockwashers (16), and flat washers (17) that hold the ball bearing (23) in the rear frame of the reperforator. Remove the two machine screws (18), lockwashers (19), and flat washers (20) that hold the ball bearing (32) in the front frame of the reperforator.

(8) Remove the two setscrews (21) that hold the type wheel and function cam (30) to the function shaft (33). Remove the two setscrews (22) that hold the drive shaft collar (24) to the function shaft (33); slide the assembled function shaft and ball bearings (23 and 32) out from the front, catch the ball bearing (23), drive shaft collar (24), friction clutch spring (25), friction clutch plate (26), friction plate (27), function shaft drive gear (28), friction plate (29), type wheel and function cam (30), and flat washer (31) as they fall free of the function shaft (33).

(9) Remove the ball bearing (32) from the function shaft (33).

b. Reassembly.

(1) Reassemble the function shaft by reversing the procedures outlined in *a*(9) through (4) above.

(2) Replace the transfer lever shaft as described in paragraph 271*b*.

(3) Replace the front support assembly as described in paragraph 258*b*.

(4) Replace the ribbon supply group as described in paragraph 254*b*.

(5) Adjust the function shaft as described in paragraphs 69, 75, and 76.

278. Disassembly and Reassembly of Function Shaft (TT–76A/GGC)

a. Disassembly.

(1) Remove the tape puller mechanism as described in paragraph 248*a*.

(2) Remove the ribbon supply group as described in paragraph 255*a*.

(3) Remove the two machine screws (27, fig. 269) and lockwashers (28) that hold the function shaft bearing cap (29) to the frame (39); remove the bearing cap.

(4) Remove the two setscrews (1, fig. 259) that hold the sliding clutch coupling (2) to the function shaft (27); remove the sliding clutch coupling (2), sliding clutch spring (3), and sliding clutch drum (4).

(5) Remove the retainer ring (5) that holds the gear (7) to the function shaft; remove the flat washer (6), gear (7), and flat washer (8).

(6) Remove the retainer ring (9) that holds the ball bearing (10) to the function shaft; remove the ball bearing (10).

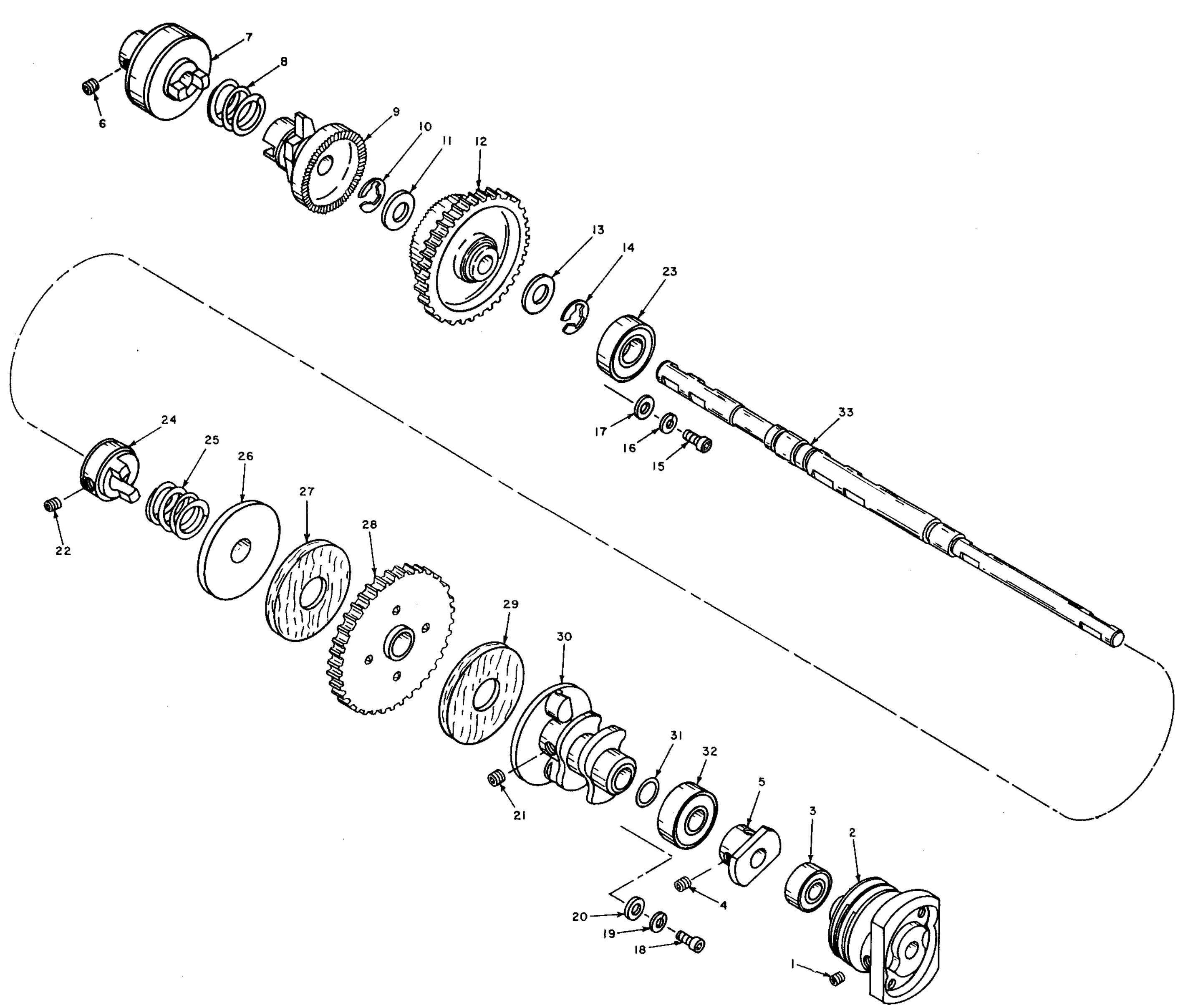


Figure 258. Function shaft, exploded view (TT–76/GGC).

1	Setscrew, 10209	12	Gear, 50512A	23	Ball bearing, 10763
2	Print and register cam, 52456A	13	Flat washer, 50515	24	Drive shaft collar, 50492
3	Ball bearing, 10753	14	Retainer ring, 10959	25	Friction clutch spring, 50847
4	Setscrew, 10209	15	Machine screw, 10004	26	Friction clutch plate, 50491
5	Transfer lever cam, 50536	16	Lockwasher, 10429	27	Friction plate, 56273
6	Setscrew, 10209	17	Flat washer, 10450	28	Function shaft drive gear, 50496A
7	Sliding clutch coupling, 51167A	18	Machine screw, 10004	29	Friction plate, 56273
8	Sliding clutch spring, 50848	19	Lockwasher, 10429	30	Type wheel and function cam, 52398A
9	Sliding drum clutch, 50516	20	Flat washer, 10450	31	Flat washer, 52283
10	Retainer ring, 10959	21	Setscrew, 10209	32	Ball bearing, 10756
11	Flat washer, 50515	22	Setscrew, 10209	33	Function shaft, 52383

Figure 258—Continued.

(7) Remove the two setscrews (11) that hold the print and register cam (12) to the function shaft; remove the print and register cam (12) and the bearing block.

(8) Remove the two setscrews (13) that hold the transfer lever cam (14) to the function shaft; remove the transfer lever cam (14).

(9) Pull the function shaft to the rear through the ball bearing (31) in the reperforator frame; remove the flat washer (15).

(10) Remove the two setscrews (16) that hold the type wheel and function lever cam (17) to the function shaft; remove the type wheel and function lever cam (17), friction plate (18), function shaft drive gear (19), friction plate (20), friction clutch plate (21), and friction clutch spring (22).

(11) Remove the two machine screws (23) that hold the friction adjusting collar (24) to the drive shaft collar (26); remove the two halves of the friction adjusting collar (24).

(12) Remove the two setscrews (25) that hold the drive shaft collar (26) to the function shaft (27); remove the drive shaft collar (26).

(13) Remove the two machine screws (28), lockwashers (29), and flat washers (30) that hold the ball bearing (31) to the reperforator frame; remove the ball bearing (31).

b. Reassembly.

(1) Reassemble the function shaft by reversing the procedures described in *a*(13) through (4) above.

(2) Position the angled bearing cap (29, figure 269) on the frame (39); secure with two machine screws (27) and lockwashers (28).

(3) Replace the ribbon supply group as described in paragraph 255*b*.

(4) Replace the tape puller mechanism as described in paragraph 248*b*.

(5) Adjust the function shaft as described in paragraphs 69, 75, and 76.

279. Disassembly and Reassembly of Selector Camshaft

(fig. 260)

a. Disassembly.

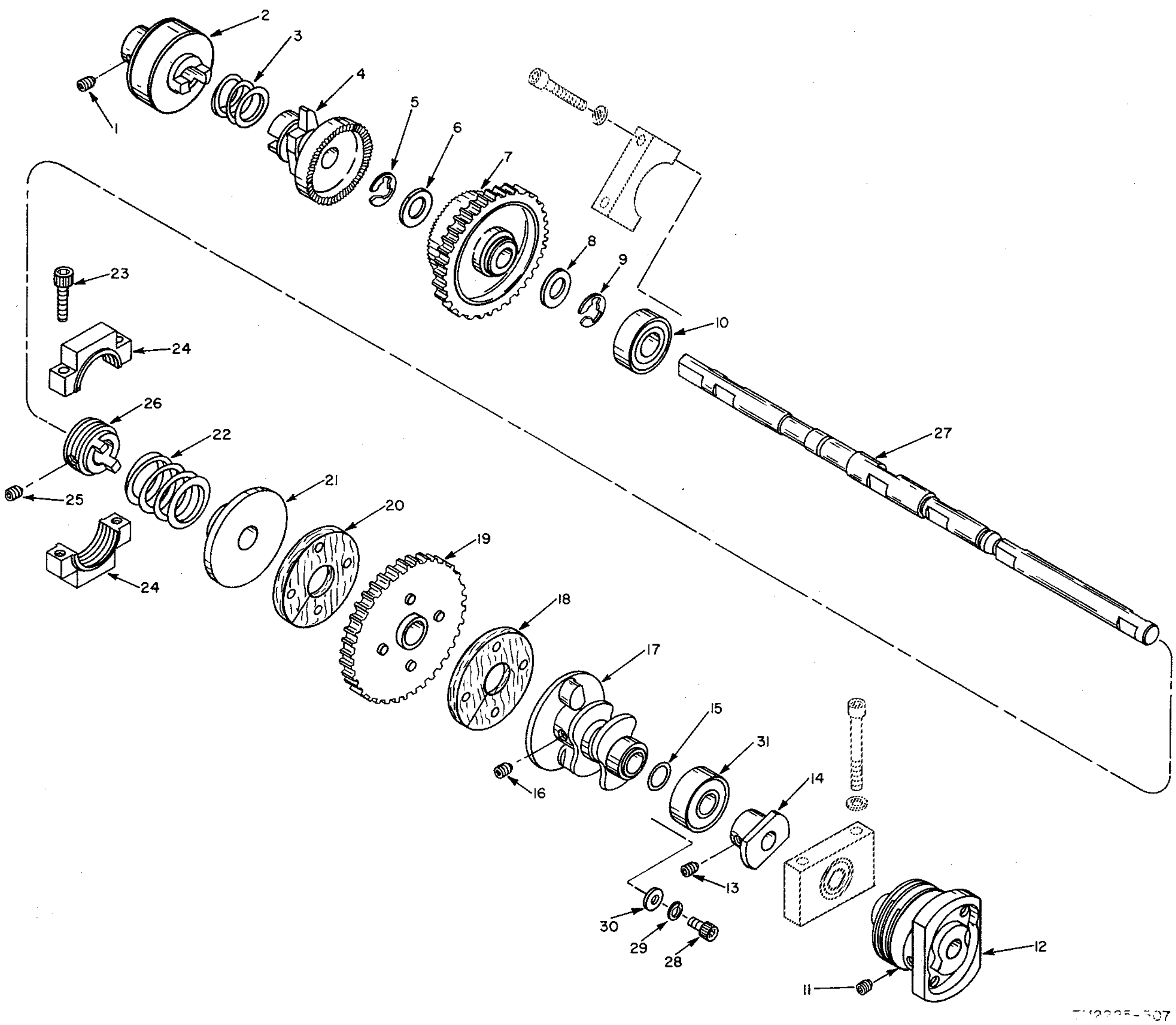
(1) On the TT–76A/GGC, remove the tape puller mechanism from the front support frame as described in paragraph 248*a*(1).

(2) Remove the rangefinder from the reperforator-transmitter as described in paragraph 251*a* for the TT–76/GGC and 252*a* for the TT–76A/GGC.

(3) Remove the two machine screws (1) and lockwashers (2) that hold the selector camshaft (30) to the reperforator frame.

(4) Remove the two setscrews (3) and setscrew seats (4) that hold the manual tape feed-out cam (25) to the selector camshaft (30).

(5) On the TT–76/GGC, remove the two setscrews (5) that hold the friction clutch disk (7) to the selector camshaft (30). Remove the two setscrews (6) that hold the drive shaft collar (13) to the selector camshaft (30). Remove the assembled selector camshaft (30) and ball bearing (27) from the reperforator frame; catch the friction clutch disk (7), friction plate (8), driving disk (9), friction plate (10), friction clutch plate (11), friction clutch spring (12), drive shaft collar (13), and manual tape feed-out cam (25) as they fall from the selector camshaft (30).



1 Setscrew, 10209
2 Sliding clutch coupling, 51167A
3 Sliding clutch spring, 50848
4 Sliding clutch drum, 50516
5 Retainer ring, 10959
6 Flat washer, 50515
7 Gear, 50512A
8 Flat washer, 50515
9 Retainer ring, 10959
10 Ball bearing, 10763
11 Setscrew, 10209
12 Print and register cam, 52456A
13 Setscrew, 10209
14 Transfer lever cam, 50536
15 Flat washer, 52283
16 Setscrew, 10209
17 Type wheel and function lever cam, 52398
18 Friction plate, 56764
19 Function shaft drive gear, 56330A
20 Friction plate, 56764
21 Friction clutch plate, 56248
22 Friction clutch spring, 56249
23 Machine screw, 10034
24 Friction adjusting collar, 56382
25 Setscrew, 10208
26 Drive shaft collar, 56246
27 Function shaft, 57159
28 Machine screw, 10003
29 Lockwasher, 10429
30 Flat washer, 10405
31 Ball bearing, 10756

Figure 259. Function shaft, exploded view (TT–76A/GGC).

(6) On the TT–76A/GGC, remove the two setscrews (14) that hold the friction clutch disk (18) to the selector camshaft (30). Remove the two machine screws (15) that hold the friction clutch adjusting collar (16) to the drive shaft collar (24); remove the two halves of the friction clutch adjusting collar (16). Remove the two setscrews (17) that hold the drive shaft collar (24) to the selector camshaft (30). Remove the assembled selector camshaft (30) and ball bearing (27) from the reperforator frame; catch the friction clutch disk (18), friction plate (19), driving disk (20), friction plate (21), friction clutch plate (22), friction clutch spring (23), drive shaft collar (24) and manual tape feedout cam (25) as they fall from the selector camshaft (30).

(7) Remove the retainer ring (26) that holds the ball bearing (27) to the selector camshaft (30); remove the ball bearing (27).

(8) Remove the grooved spindle (28) and plate (29) from the end of the selector camshaft (30).

b. Reassembly.

(1) Reassemble the selector camshaft by reversing the procedures outlined in *a*(8) through (3) above. Make certain that the friction clutch driving disk (9, TT–76/GGC or 20, TT–76A/GGC) on the selector camshaft is engaged by the friction clutch drive assembly on the main shaft.

(2) Adjust the selector camshaft as described in paragraph 129 or 130.

(3) Replace the rangefinder as described in paragraph 252*b* for the TT–76A/GGC or paragraph 251*b* for the TT–76/GGC.

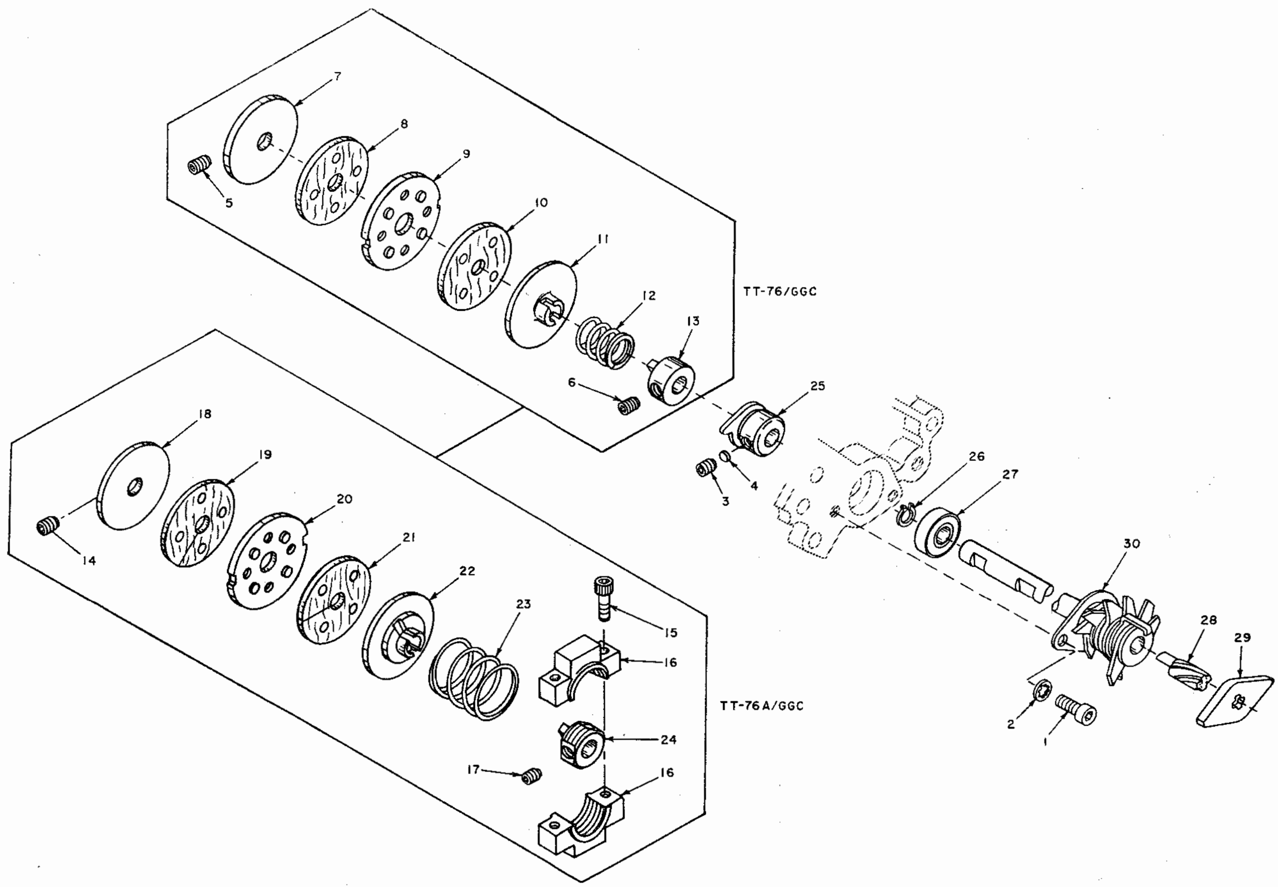
(4) On the TT–76A/GGC, replace the tape puller mechanism as described in paragraph 248*b*.

280. Disassembly and Reassembly of Main Shaft

(fig. 261)

a. Disassembly.

(1) Remove the selector camshaft from the reperforator as described in paragraph 279*a*.



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1 Machine screw, 10003
2 Lockwasher, 10403
3 Setscrew, 10208
4 Setscrew seat, 52159
5 Setscrew, 10209
6 Setscrew, 10208
7 Friction clutch disk, 50200
8 Friction plate, 50013
9 Driving disk, 5117
10 Friction plate, 50013
11 Friction clutch plate, 50148
12 Friction clutch spring, 50914
13 Drive shaft collar, 54928
14 Setscrew, 10209
15 Machine screw, 10006
16 Friction clutch adjusting collar, 56381
17 Setscrew, 10208
18 Friction clutch disk, 50200
19 Friction plate, 56765
20 Driving disk, 51117
21 Friction plate, 56765
22 Friction clutch plate, 54931
23 Friction clutch spring, 54932
24 Drive shaft collar, 54928
25 Manual tape feed-out cam, 52158
26 Retainer ring, 10462
27 Ball bearing, 10753
28 Spindle, 50133
29 Plate, 50134
30 Selector camshaft, 51398A

Figure 260. Selector camshaft, exploded view.

(2) On the TT–76/GGC, remove the machine screw (1) and lockwasher (2) that hold the main shaft driven gear (3) to the main shaft (15); remove the main shaft driven gear (3).

(3) On the TT–76A/GGC, remove the machine screw (1) and lockwasher (2) that hold the main shaft driven gear (3) to the main shaft (16); remove the main shaft driven gear (3) and gear key (4).

(4) Remove the two machine screws (5), lockwashers (6), and flat washers (7) that hold the ball bearing (8) in the bearing bracket; remove the ball bearing (8).

(5) Remove the two setscrews (9) that hold the friction clutch drive assembly (10) to the main shaft; remove the friction clutch drive assembly (10) from the main shaft.

(6) On the TT–76/GGC, remove the gear pin (11) from the main shaft (15); slide the flat washer (12) off the main shaft (15).

(7) On the TT–76A/GGC, slide the flat washer (12) off the main shaft (16).

(8) Remove the taper pin (13) that holds the function shaft driving gear (14) to the main shaft; slide the main shaft to the rear of the reperforator and remove the function shaft driving gear (14) from the main shaft. Remove the main shaft from the bearing bracket.

(9) Remove the two machine screws (17), lockwashers (18), and flat washers (19) that hold the ball bearing (20) in the reperforator frame; remove the ball bearing (20).

b. Reassembly.

(1) Reassemble the main shaft by reversing the procedures outlined in *a*(9) through (2) above.

(2) Replace the selector camshaft on the reperforator as described in paragraph 279*b*.

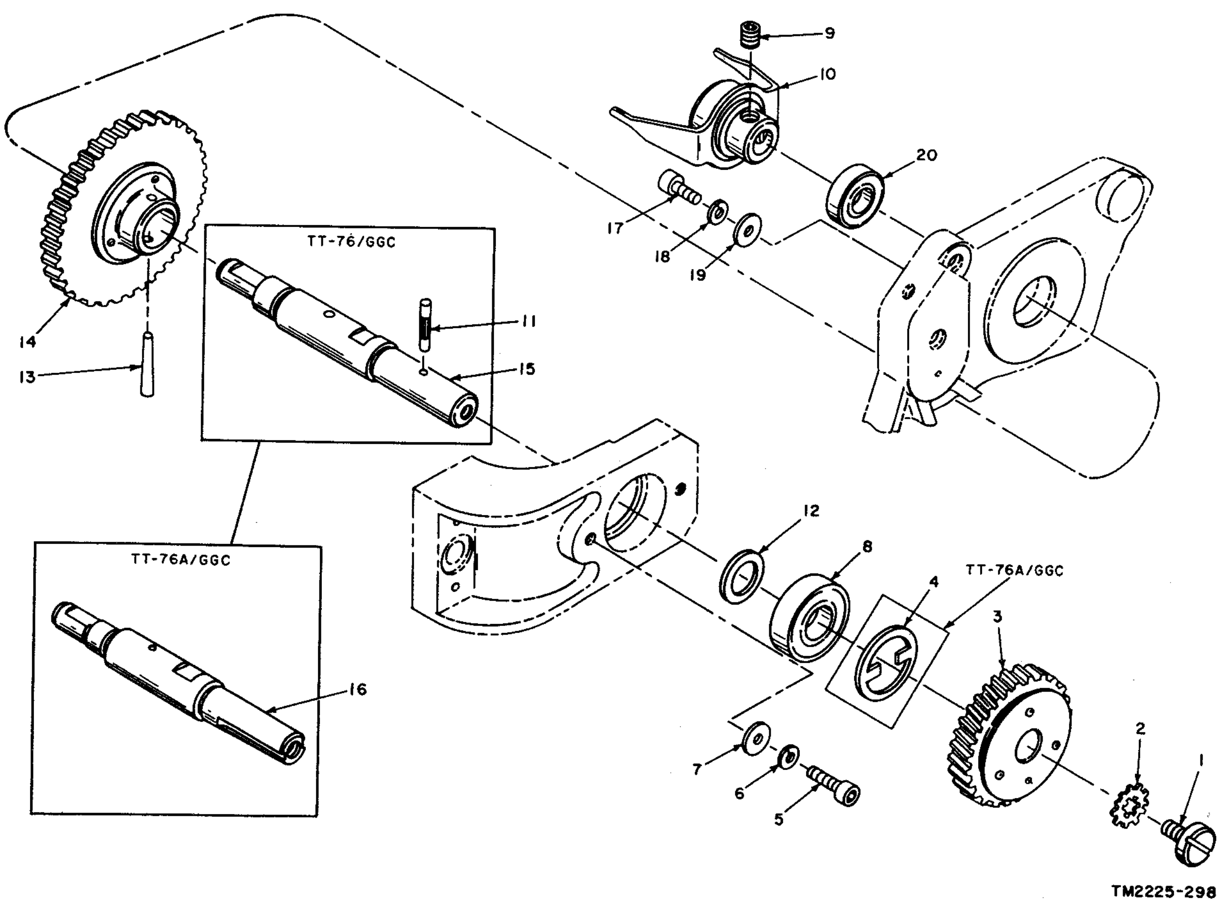


Figure 261. Reperforator main shaft, exploded view.

1	Machine screw, 50207	11	Gear pin, 50359
2	Lockwasher, 10406	12	Flat washer, 50146
3	Main shaft driven gear, 52513A	13	Taper pin, 10852
4	Gear key, 54566	14	Function shaft driving gear, 50354A
5	Machine screw, 10004	15	Main shaft, 52338
6	Lockwasher, 10429	16	Main shaft, 57142
7	Flat washer, 10450	17	Machine screw, 10004
8	Ball bearing, 10758	18	Lockwasher, 10429
9	Setscrew, 10209	19	Flat washer, 10450
10	Friction clutch drive assembly, 50484A	20	Ball bearing, 10757

Figure 261—Continued.

281. Disassembly and Reassembly of Power Shaft (TT–76/GGC)

a. Disassembly.

(1) Remove the tape reel assembly from the reperforator as described in paragraph 246*a*(1) and (2).

(2) Remove the gear case cover (6, fig. 269) from the motor support as described in paragraph 272*a*(4).

(3) Remove the machine screw (1, fig. 262) and lockwasher (2) that hold the power shaft drive gear (3) to the power shaft (14); remove the power shaft drive gear (3).

(4) Remove the two machine screws (4), lockwashers (5), and flat washers (6) that hold the ball bearing (7) in the bearing bracket (22); remove the ball bearing (7).

(5) Remove the gear pin (8); slide the assembled power shaft (14) and drive gears (11) and (13) toward the bearing bracket (22) and remove the flat washer (9) from the power shaft (14).

(6) Remove the taper pin (10) that holds the keyboard shaft drive gear (11) to the power shaft (14); remove the keyboard shaft drive gear (11).

(7) Remove the taper pin (12) that holds the main shaft drive gear (13) to the power shaft (14); remove the main shaft drive gear (13).

(8) Remove the power shaft (14) by sliding it clear of the gear case and lifting it free of the bearing bracket (22, fig. 262).

(9) Remove the two machine screws (15), lockwashers (16), and flat washers (17) that hold the ball bearing (18) in the gear case; remove the ball bearing (18).

(10) Remove the two machine screws (19) and lockwashers (20) that hold the bearing bracket (22) to the reperforator frame; remove the bearing bracket (22). Remove the two taper pins (21) and shims (23 and 24).

b. Reassembly.

(1) Reassemble the power shaft by reversing the procedures outlined in *a*(10) through (3) above.

(2) Replace the gear case cover as described in paragraph 272*b*.

(3) Replace the tape reel assembly as described in paragraph 246*b*.

282. Disassembly and Reassembly of Power Shaft (TT–76A/GGC)

a. Disassembly.

(1) Remove the tape reel assembly from the reperforator as described in paragraph 247*a*.

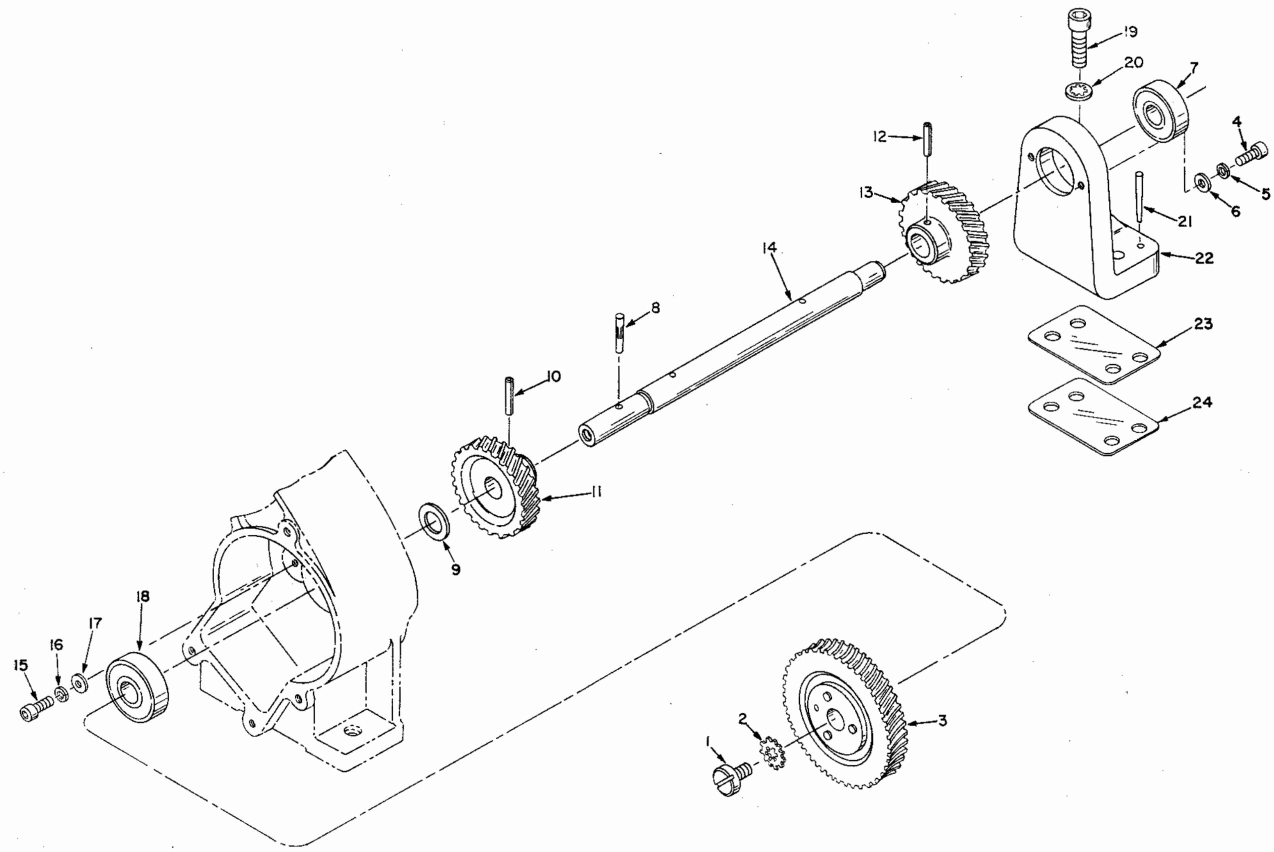
(2) Remove the gear case cover (6, fig. 269) from the motor support as described in paragraph 272*a*(3).

(3) Remove the machine screw (1, fig. 263) and lockwasher (2) that hold the power shaft drive gear (3) to the power shaft (18); remove the power shaft drive gear (3) and gear key (4).

(4) Remove the two machine screws (5), lockwashers (6), and flat washers (7) that hold the ball bearing (8) in the gear case; remove the ball bearing (8).

(5) Remove the two machine screws (9) and lockwashers (10) that hold the bearing cap (11) to the bearing bracket (22); remove the bearing cap (11) and slide the ball bearing (12) off the power shaft (18).

(6) Slide the assembled power shaft (18) and gears (15) and (17) toward the bearing bracket (22); remove the flat washer (13) from the power shaft (18).



1	Machine screw, 50207	9	Flat washer, 50746	17	Flat washer, 10450
2	Lockwasher, 10406	10	Taper pin, 10852	18	Ball bearing, 10758
3	Power shaft drive gear, 50352A	11	Keyboard shaft drive gear, 52510	19	Machine screw, 10018–01
4	Machine screw, 10003	12	Taper pin, 10852	20	Lockwasher, 10405
5	Lockwasher, 10429	13	Main shaft drive gear, 52509	21	Taper pin, 10860
6	Flat washer, 10450	14	Pcwer shaft, 52518	22	Bearing bracket, 52619
7	Ball bearing, 10757	15	Machine screw, 10003	23	.002–in. shim, 52502
8	Gear pin, 50359	16	Lockwasher, 10429	24	.005–in. shim, 52503

Figure 262. Power shaft assembly, exploded view (TT–76/GGC).

(7) Tap out the gear pin (14) that holds the keyboard shaft drive gear (15) to the power shaft (18); remove the keyboard shaft drive gear (15).

(8) Tap out the gear pin (16) that holds the main shaft drive gear (17) to the power shaft (18); remove the main shaft drive gear (17).

(9) Remove the power shaft (18) by sliding it clear of the gear case and lifting it free of the bearing bracket (22).

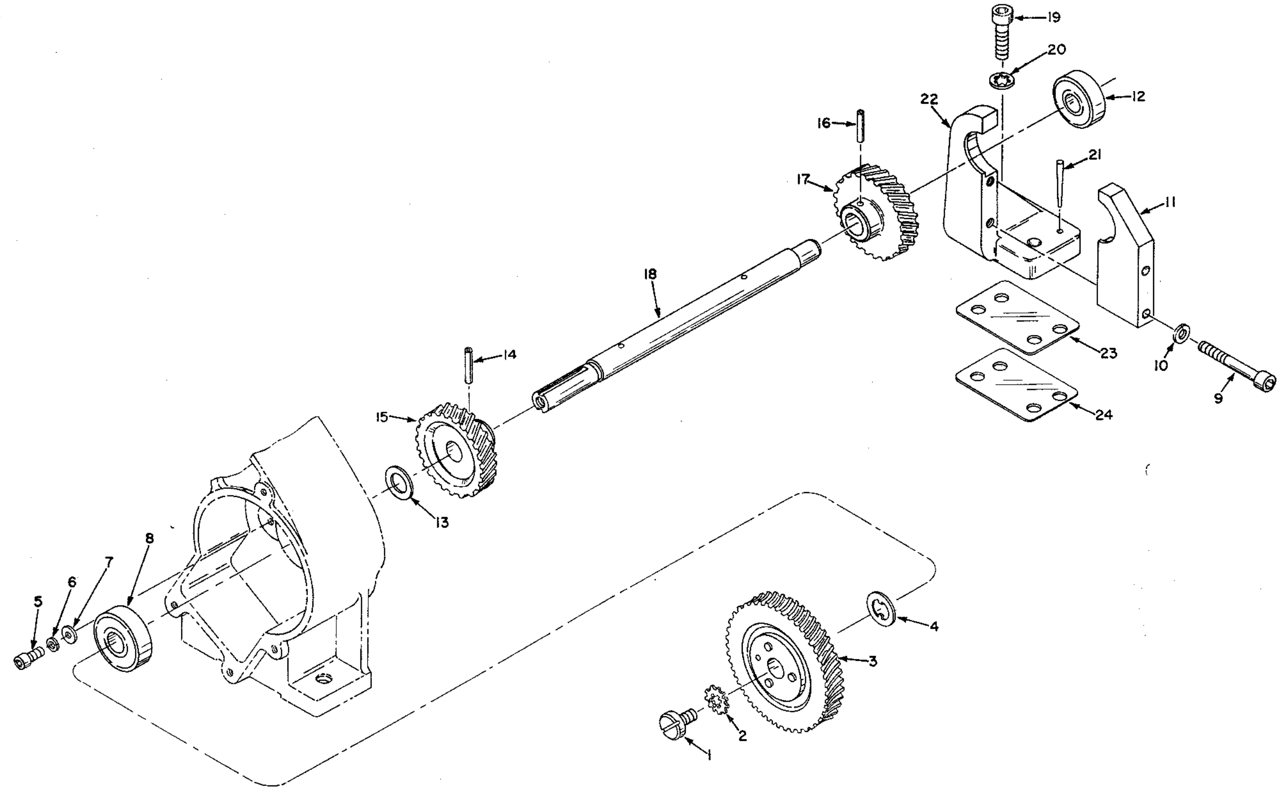
(10) Remove the two machine screws (19) and lockwashers (20) that hold the bearing bracket (22) to the reperforator frame; remove the bearing bracket (22). Tap out the two taper pins (21) and remove the shims (23 and 24).

b. Reassembly.

(1) Reassemble the power shaft by reversing the procedures outlined in *a*(10) through (3) above.

(2) Replace the gear case cover as described in paragraph 272*b*.

(3) Replace the tape reel assembly as described in paragraph 247*b*.



1	Machine screw, 50207	9	Machine screw, 10063	17	Main shaft drive gear, 57223
2	Lockwasher, 10406	10	Lockwasher, 10430	18	Power shaft, 57222
3	Power shaft drive gear, 50352A	11	Bearing cap, 57230	19	Machine screw, 10018
4	Gear key, 54566	12	Ball bearing, 10757	20	Lockwasher, 10405
5	Machine screw, 10003	13	Flat washer, 50746	21	Taper pin, 10860
6	Lockwasher, 10429	14	Gear pin, 11015	22	Bearing bracket, 57228
7	Flat washer, 10450	15	Keyboard shaft drive gear, 57224	23	.002–in. shim, 52502
8	Ball bearing, 10758	16	Gear pin, 11015	24	.005–in. shim, 52503

Figure 263. Power shaft assembly, exploded view (TT–76A/GGC).

283. Disassembly and Reassembly of Keyboard-Transmitter Drive Shaft

(fig. 264)

a. Disassembly.

(1) Remove the transmitter-distributor chassis from the base as described in paragraph 230*a*.

(2) Remove the keyboard-transmitter from the reperforator as described in paragraph 216*a*.

(3) On the TT–76/GGC, remove the two setscrews (1) that hold the friction clutch disk (3) to the keyboard-transmitter drive shaft (31). Remove the two setscrews (2) that hold the drive shaft collar (9) to the keyboard-transmitter drive shaft (31). Remove the friction clutch disk (3), friction plate (4), clutch driver plate (5), friction plate (6), friction clutch plate (7) friction clutch spring (8), and drive shaft collar (9) from the keyboard-transmitter drive shaft (31).

(4) On the TT–76A/GGC, remove the setscrew (10) that holds the friction clutch disk (14) to the keyboard-transmitter drive shaft (31). Remove the two machine screws (11) that hold the friction adjusting collar (12) to the drive shaft collar (20); remove the friction adjusting collar (12). Remove the two setscrews (13) that hold the drive shaft collar (20) to the keyboard-transmitter drive shaft (31). Remove the friction clutch disk (14), friction plate (15), clutch driver plate (16), friction plate (17), friction clutch plate (18), friction

clutch spring (19), and drive shaft collar (20) from the keyboard-transmitter drive shaft (31).

(5) Remove the self-locking hexagonal nut (21), flat washer (22), and two setscrews (23) that hold the keyboard-transmitter shaft driven gear (24) to the keyboard-transmitter drive shaft (31); remove the keyboard-transmitter shaft driven gear (24).

(6) Remove the two machine screws (25), lockwashers (26), and flat washers (27) that hold the ball bearing (28) in the bearing support of the frame; remove the ball bearing (28).

(7) Remove the two setscrews (29) that hold the transmitter-distributor drive gear (30) to the keyboard-transmitter drive shaft (31); remove the keyboard-transmitter drive shaft (31) catching the transmitter-distributor drive gear (30) as it falls free. Remove the flat washer (32).

(8) Remove the two machine screws (33), lockwashers (34), and flat washers (35), that hold the ball bearing (36) to the bearing bracket; remove the ball bearing (36).

b. Reassembly.

(1) Reassemble the keyboard-transmitter drive shaft by reversing the procedures outlined in *a*(8) through (3) above.

(2) Replace the keyboard-transmitter as described in paragraph 216*b*.

(3) Adjust the keyboard-transmitter drive shaft as described in paragraphs 55 or 56.

(4) Replace the transmitter-distributor chassis on the base as described in paragraph 230*b*.

284. Disassembly and Reassembly of Transmitter-Distributor Drive Shaft

(fig. 265)

a. Disassembly.

(1) Remove the reperforator-transmitter chassis from the mounting base as described in paragraph 215*a*.

(2) Remove the transmitter-distributor from the reperforator-transmitter as described in paragraph 230*a*.

(3) On the TT–76/GGC, remove the two setscrews (1) that hold the friction clutch disk (2) to the transmitter-distributor drive shaft (27). Remove the friction clutch disk (2), friction plate (3), clutch drive plate (4), friction plate (5), friction clutch plate (6), and friction clutch spring (7) from the transmitter-distributor drive shaft (27). Remove the two setscrews (8) that hold the drive shaft collar (9) to the transmitter-distributor drive shaft (27); remove the drive shaft collar (9).

(4) On the TT–76A/GGC, remove the two setscrews (10) that hold the friction clutch disk (11) to the transmitter-distributor drive shaft (27). Remove the friction clutch disk (11), friction plate (12), clutch driver plate (13), friction plate (14), friction clutch plate (15), and friction clutch spring (16) from the transmitter-distributor drive shaft (27). Remove the two machine screws (17) that hold the friction adjusting collar (18) to the drive shaft collar (20); remove the two halves of the friction adjusting collar (18). Remove the two setscrews (19) that hold the drive shaft collar (20) to the transmitter-distributor drive shaft (27); remove the drive shaft collar (20).

(5) Remove the two machine screws (21), lockwashers (22), and flat washers (23) that hold the ball bearing (28) in the bearing bracket.

(6) Remove the two setscrews (24) that hold the transmitter-distributor driven gear (25) to the transmitter-distributor drive shaft (27). Slide the transmitter-distributor drive shaft to the left, catching the transmitter-distributor driven gear (25) as it falls free; remove the bearing (26) from the transmitter-distributor drive shaft.

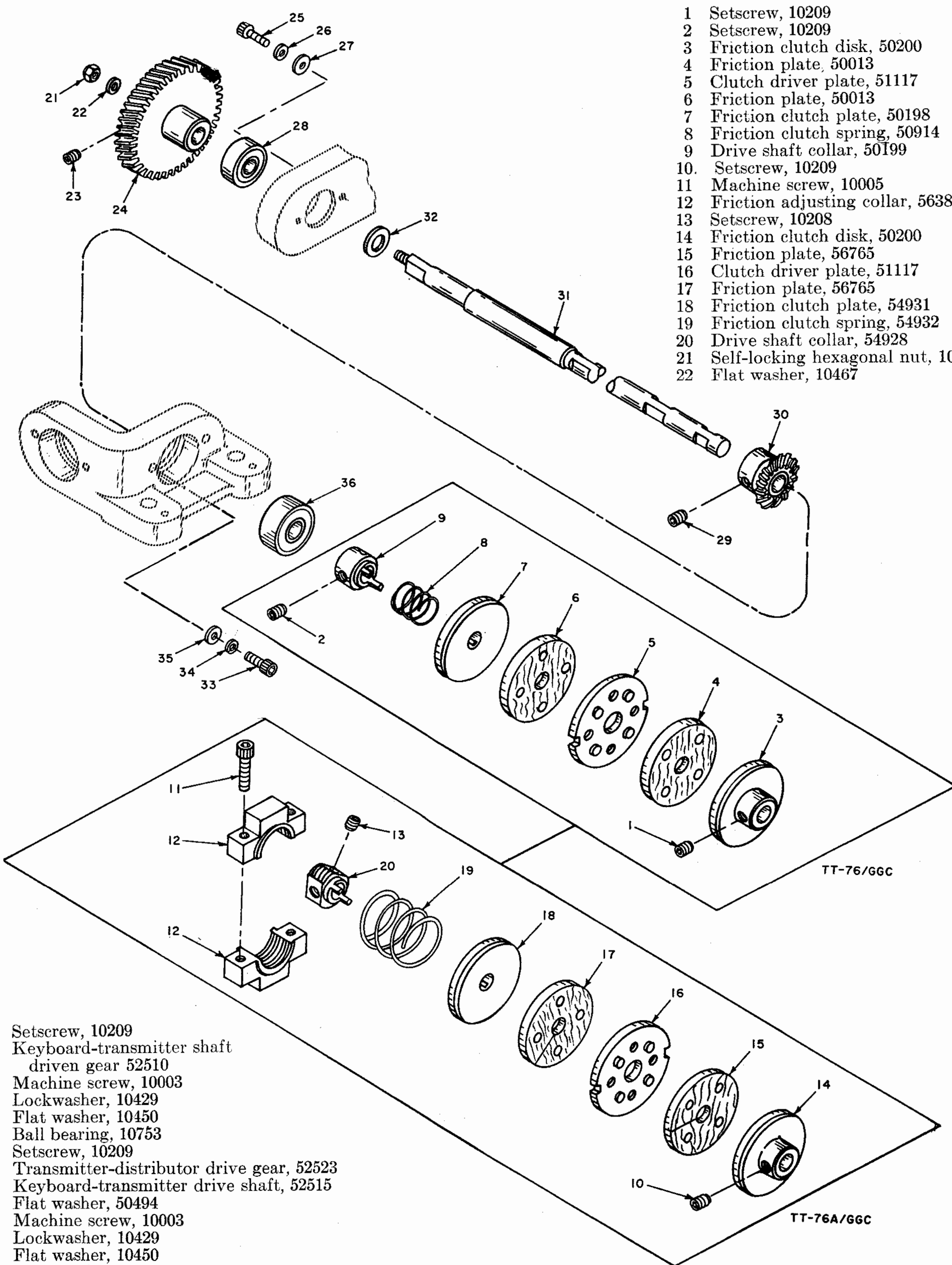
(7) Remove the bearing (28) from the bearing support.

b. Reassembly.

(1) Reassemble the transmitter-distributor drive shaft by reversing the procedures outlined in *a*(7) through (3) above.

(2) Replace the transmitter-distributor as described in paragraph 230*b*.

1 Setscrew, 10209
2 Setscrew, 10209
3 Friction clutch disk, 50200
4 Friction plate, 50013
5 Clutch driver plate, 51117
6 Friction plate, 50013
7 Friction clutch plate, 50198
8 Friction clutch spring, 50914
9 Drive shaft collar, 50199
10. Setscrew, 10209
11 Machine screw, 10005
12 Friction adjusting collar, 56381
13 Setscrew, 10208
14 Friction clutch disk, 50200
15 Friction plate, 56765
16 Clutch driver plate, 51117
17 Friction plate, 56765
18 Friction clutch plate, 54931
19 Friction clutch spring, 54932
20 Drive shaft collar, 54928
21 Self-locking hexagonal nut, 10501
22 Flat washer, 10467

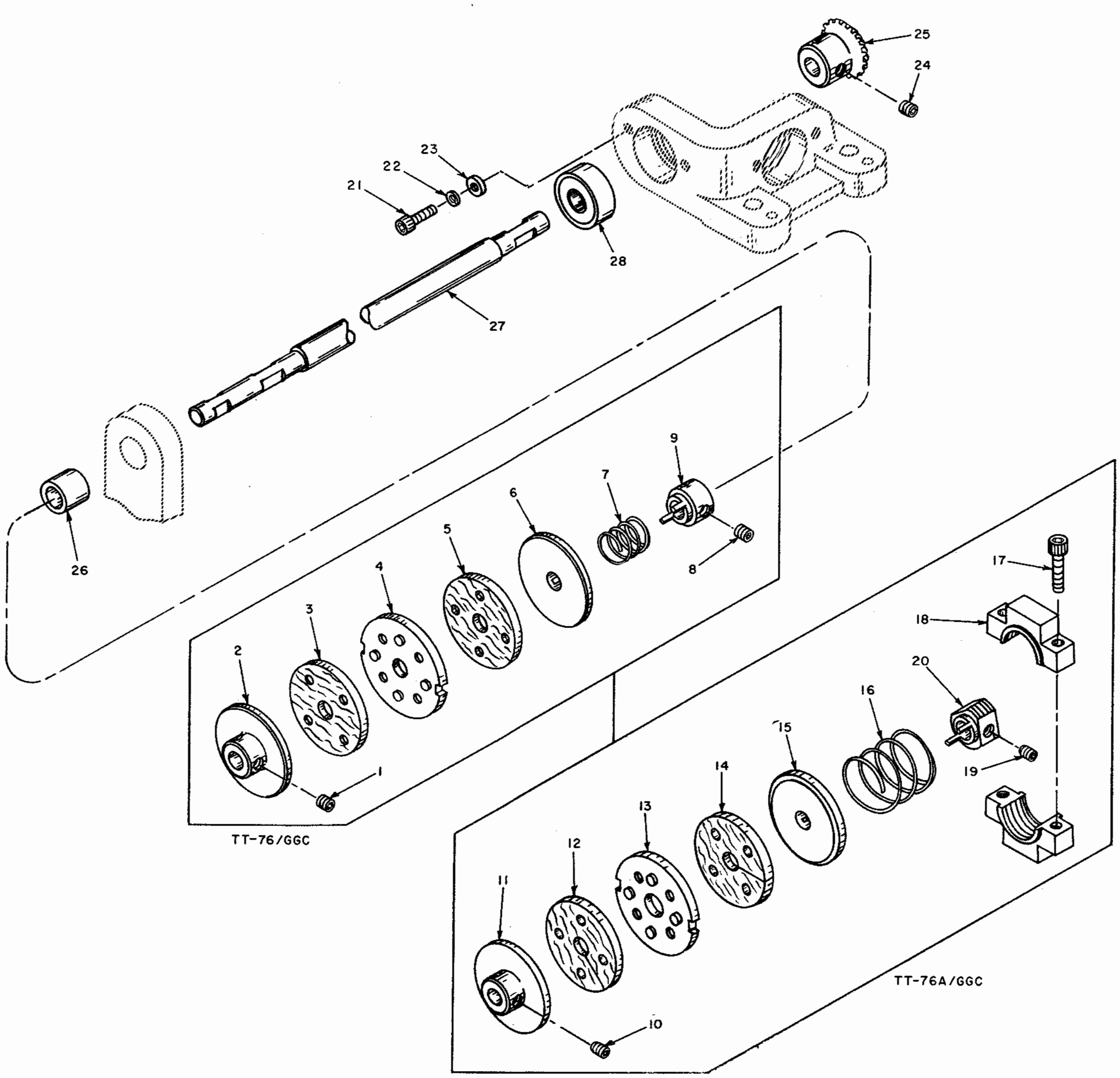


23 Setscrew, 10209
24 Keyboard-transmitter shaft driven gear 52510
25 Machine screw, 10003
26 Lockwasher, 10429
27 Flat washer, 10450
28 Ball bearing, 10753
29 Setscrew, 10209
30 Transmitter-distributor drive gear, 52523
31 Keyboard-transmitter drive shaft, 52515
32 Flat washer, 50494
33 Machine screw, 10003
34 Lockwasher, 10429
35 Flat washer, 10450
36 Ball bearing, 10761

Figure 264. Keyboard-transmitter drive shaft, exploded view.

(3) Adjust the transmitter-distributor drive shaft as described in paragraphs 160 and 161.

(4) Replace the reperforator-transmitter chassis on the base as described in paragraph 215*b*.



1 Setscrew, 10209	15 Friction clutch plate, 54931
2 Friction clutch disk, 50200	16 Friction clutch spring, 54932
3 Friction plate, 50013	17 Machine screw, 10005
4 Clutch driver plate, 51117	18 Friction adjusting collar, 56381
5 Friction plate, 50013	19 Setscrew, 10208
6 Friction clutch plate, 50198	20 Drive shaft collar, 54928
7 Friction clutch spring, 50914	21 Machine screw, 10003
8 Setscrew, 10209	22 Lockwasher, 10429
9 Drive shaft collar, 50199	23 Flat washer, 10450
10 Setscrew, 10209	24 Setscrew, 10209
11 Friction clutch disk, 50200	25 Transmitter-distributor driven gear, 52522
12 Friction plate, 50013	26 Bearing, 10717
13 Clutch driver plate, 50013	27 Transmitter-distributor drive shaft, 52514
14 Friction plate, 56765	28 Ball bearing, 10761

Figure 265. Transmitter-distributor drive shaft, exploded view.

285. Disassembly and Reassembly of Motor Suppression Filter Unit (TT–76/GGC)

(fig. 266)

a. Disassembly.

(1) Remove the reperforator-transmitter from the base as described in paragraph 215*a*.

(2) Remove the four machine screws (1) and lockwashers (2) that hold the cover (3) to the mounting studs (5); remove the cover (3).

(3) Disconnect the electrical leads to and from the filter box.

(4) Remove the four lockwashers (4), mounting studs (5), and lockwashers (6) that hold the filter box assembly (48) to the reperforator frame; remove the assembled filter box assembly (48) and electrical components.

(5) Remove the plain hexagonal nuts (7 and 14), lockwashers (8 and 15), terminal lugs (9 and 16), lockwashers (10 and 17), machine screws (11 and 18), lockwashers (12 and 19), and terminal lug (13) that attach the capacitor (20) to the bracket on the filter box assembly (48); remove the capacitor (20).

(6) Remove the two machine screws (21) and lockwashers (22) that hold the terminal board (23) to the filter box assembly (48); remove the terminal board (23).

(7) Remove the plain hexagonal nut (24), lockwasher (25), and resistor mounting stud (26) that hold the resistor (28) to the brackets on the filter box assembly (48); remove the centering washer (27), resistor (28), and centering washer (29).

(8) Remove the two machine screws (30) and lockwashers (31) that hold the terminal board (32) to the filter box assembly (48); remove the terminal board (32).

(9) Remove the two plain hexagonal nuts (33), lockwashers (34), machine screws (35), and lockwashers (36) that hold the filter (37) to the filter box assembly (48); remove the filter (37).

(10) Remove the two machine screws (38) and lockwashers (39) that hold the terminal board (42) to the filter box assembly (48); remove the terminal board (42).

(11) Remove the two machine screws (40) that hold the jumper (41) to the terminal board (42); remove the jumper (41).

(12) Remove the two plain hexagonal nuts (43), lockwasher (44), machine screws (45), and lockwashers (46) that hold the capacitor (47) to the bracket on the filter box assembly (48); remove the capacitor (47).

(13) Remove the grommet (48) from the filter box assembly (49).

b. Reassembly.

(1) Reassemble the motor suppression filter unit by reversing the procedures outlined in *a*(13) through (4) above.

(2) Reconnect all electrical leads that have been disconnected and coat the electrical components with fungus resistant compound.

(3) Replace the reperforator-transmitter as described in paragraph 215*b*.

286. Disassembly and Reassembly of Motor Suppression Filter Unit (TT–76A/GGC)

(fig. 267)

a. Disassembly.

(1) Remove the reperforator-transmitter from the base as described in paragraph 215*a*.

(2) Remove the four machine screws (1) and lockwashers (2) that hold the cover (3) to the mounting studs (5); remove the cover (3).

(3) Disconnect all electrical leads to and from the filter box.

(4) Remove the four lockwashers (4), mounting studs (5), and lockwashers (6) that hold the filter box (30) to the reperforator frame; remove the assembled filter box (30) and electrical components.

(5) Remove the two self-locking hexagonal nuts (7) and machine screws (8) that hold the terminal board (9) to the filter box (30); remove the terminal board (9) and the terminal marker strip (10).

(6) Remove the plain hexagonal nut (11), lockwasher (12), and resistor mounting stud (13) that hold the resistor (15) to the brackets on the filter box (30); remove the centering washer (14), resistor (15), and centering washer (16).

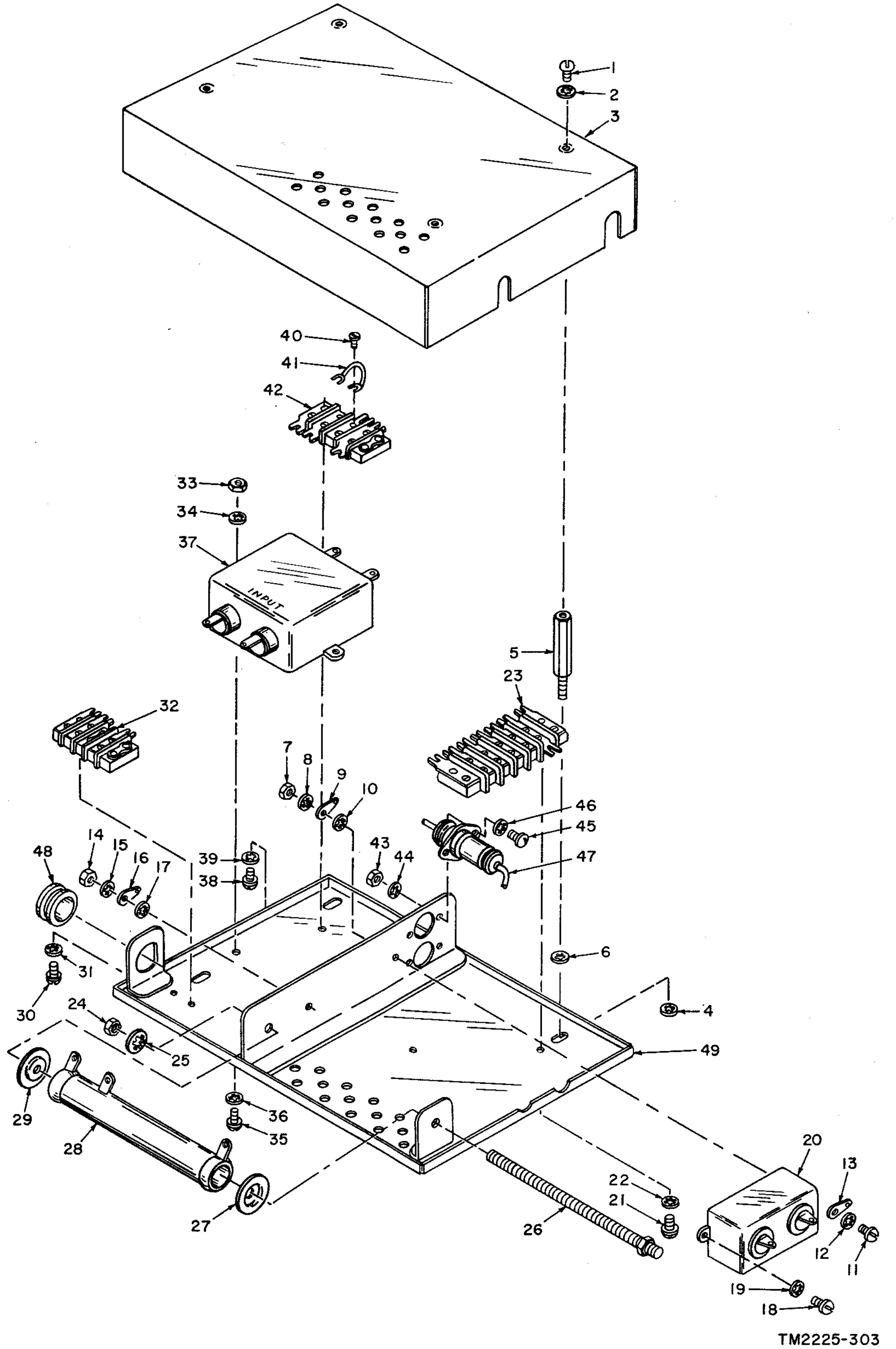


Figure 266. Motor suppression filter unit, exploded view (TT–76/GGC).

1	Machine screw, 10308	18	Machine screw, 10308	34	Lockwasher, 10403
2	Lockwasher, 10403	19	Lockwasher, 10403	35	Machine screw, 10301
3	Cover, 51654	20	Capacitor, 20200	36	Lockwasher, 10403
4	Lockwasher, 10406	21	Machine screw, 10301	37	Filter, 20210
5	Mounting stud, 51058	22	Lockwasher, 10402	38	Machine screw, 10301
6	Lockwasher, 10404	23	Terminal board, 20360	39	Lockwasher, 10402
7	Plain hexagonal nut, 10511	24	Plain hexagonal nut, 10516	40	Machine screw
8	Lockwasher, 10403	25	Lockwasher, 10404	41	Jumper, 53254A
9	Terminal lug, 20735	26	Resistor mounting stud, 56220A	42	Terminal board, 20358 (includes item 48)
10	Lockwasher, 10403	27	Centering washer, 10456	43	Plain hexagonal nut, 10511
11	Machine screw, 10308	28	Resistor, 51628	44	Lockwasher, 10403
12	Lockwasher, 10403	29	Centering washer, 10456	45	Machine screw, 10301
13	Terminal lug, 20735	30	Machine screw, 10301	46	Lockwasher, 10403
14	Plain hexagonal nut, 10511	31	Lockwasher, 10402	47	Capacitor, 20208
15	Lockwasher, 10403	32	Terminal board, 20359A	48	Grommet, 21000
16	Terminal lug, 20735	33	Plain hexagonal nut, 10511	49	Filter box assembly, 51647A
17	Lockwasher, 10403				

Figure 266—Continued.

(7) Remove the four self-locking hexagonal nuts (17) and machine screws (18) that hold the filter (19) to the filter box (30); remove the filter (19) and the four lockwashers (20).

(8) Remove the two self-locking hexagonal nuts (21) and machine screws (22) that hold the capacitor (23) to the filter box (30); remove the capacitor (23).

(9) Remove the two self-locking hexagonal nuts (24) and machine screws (25) that hold the terminal board (26) to the filter box (30); remove the terminal board (26) and terminal marker strip (27).

(10) Remove the grommets (28 and 29) from the filter box (30).

b. Reassembly.

(1) Reassemble the motor suppression unit by reversing the procedures outlined in *a*(10) through (4) above.

(2) Reconnect all electrical leads (fig. 294) that have been disconnected and coat the electrical components with fungus resistant compound.

(3) Replace the reperforator-transmitter on the base as described in paragraph 215*b*.

287. Disassembly and Reassembly of Reperforator Frame (TT–76/GGC)

a. Disassembly.

(1) Remove the reperforator-transmitter chassis from the base as described in paragraph 215*a*.

(2) Remove the keyboard-transmitter as described in paragraph 216*a*.

(3) Remove the transmitter-distributor as described in paragraph 230*a*.

(4) Remove the power supply and terminal unit as described in paragraph 242*a*.

(5) Remove the tape reel as described in paragraph 246*a*(1) and (2).

(6) Remove the selector magnet and terminal board cover (11, fig. 268) as described in paragraph 249*a*(1) and (2).

(7) Remove the rangefinder as described in paragraph 251*a*(1) and (2).

(8) Remove the manual tape feed-out mechanism as described in paragraph 253*a*(1) through (6).

(9) Remove the ribbon supply group as described in paragraph 254*a*.

(10) Remove the front support frame as described in paragraph 258*a*.

(11) Remove the Y-levers and selector levers as described in paragraph 265*a*.

(12) Remove the type wheel reciprocating mechanism as described in paragraph 267*a*.

(13) Remove the function sensing mechanism as described in paragraph 268*a*(2) through (7).

(14) Remove the code-ring cage as described in paragraph 269*a*(6) and (7).

(15) Remove the transfer lever shaft as described in paragraph 271*a*.

(16) Remove the motor as described in paragraph 272*a*.

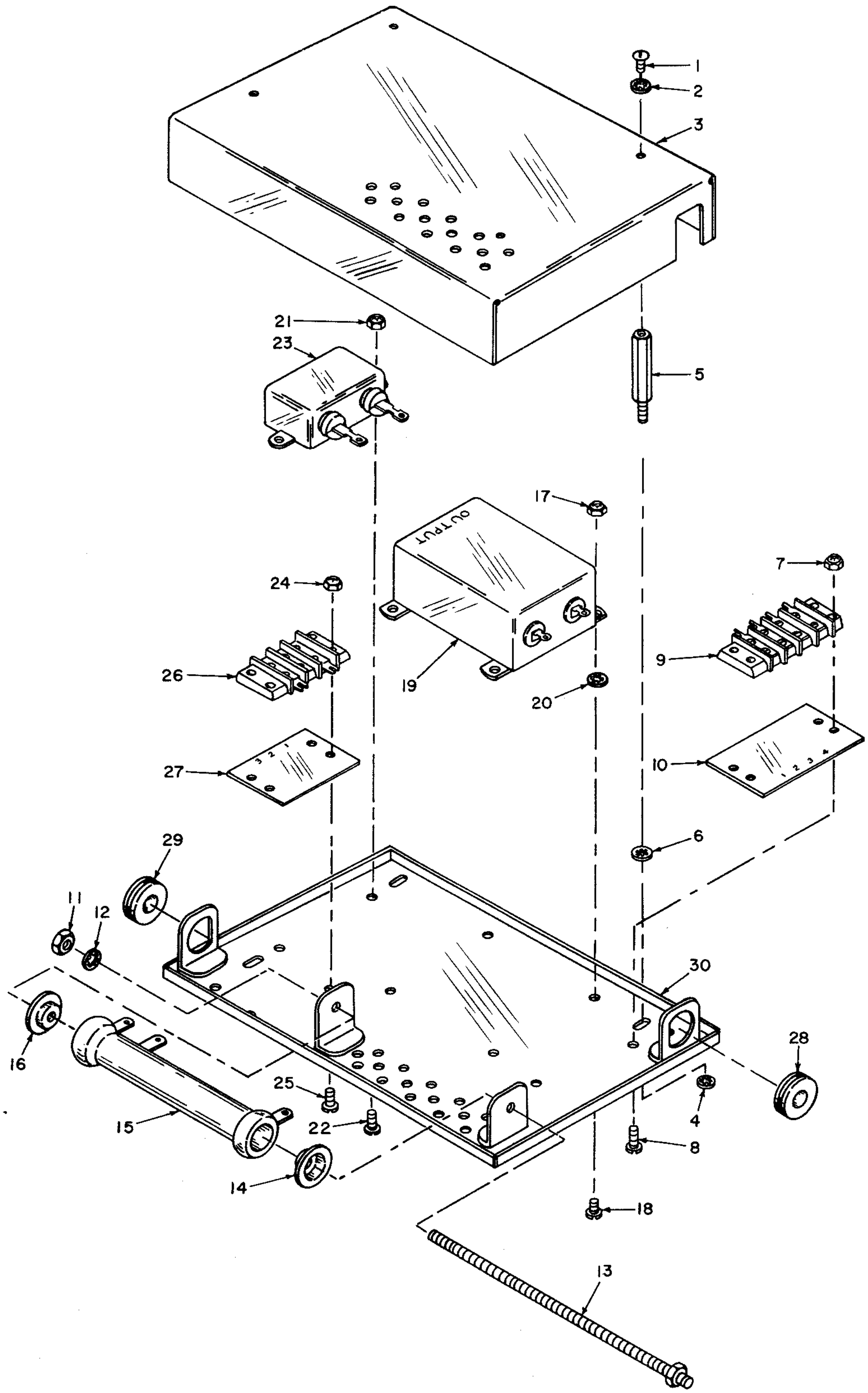


Figure 267. Motor suppression filter unit, exploded view (TT–76A/GGC).

1	Machine screw, 10308	11	Plain hexagonal nut, 10516	21	Self-locking hexagonal nut, 10500
2	Lockwasher, 10403	12	Lockwasher, 10404	22	Machine screw, 10106
3	Cover, 57237	13	Resistor mounting stud, 56220A	23	Capacitor, 20214
4	Lockwasher, 10406	14	Centering washer, 10456	24	Self-locking hexagonal nut, 10540
5	Mounting stud, 51058	15	Resistor, 51628	25	Machine screw, 10109
6	Lockwasher, 10404	16	Centering washer, 10456	26	Terminal board, 20398
7	Self-locking hexagonal nut, 10540	17	Self-locking hexagonal nut, 10500	27	Terminal marker strip, 20383
8	Machine screw, 10109	18	Machine screw, 10106	28	Grommet, 21000
9	Terminal board, 20368	19	Filter, 54581	29	Grommet, 21000
10	Terminal marker strip, 20388	20	Lockwasher, 10403	30	Filter box, 57238A

Figure 267—Continued.

(17) Remove the function shaft as described in paragraph 277*a*.

(18) Remove the selector camshaft as described in paragraph 279*a*.

(19) Remove the main shaft as described in paragraph 280*a*.

(20) Remove the power shaft as described in paragraph 281*a*.

(21) Remove the keyboard-transmitter drive shaft as described in paragraph 283*a*.

(22) Remove the transmitter-distributor drive shaft as described in paragraph 284*a*.

(23) Remove the motor suppression filter unit as described in paragraph 285*a*(1) through (4).

(24) If the alternate power shaft drive gear (5) is needed, remove the cotter pin (4) that holds gear (5) to the gear case cover (6). Remove the worm gear (8) by extracting the cotter pin (7) that holds the gear (8) to the worm gear bracket (9).

(25) Remove the terminal board cover (11) and disconnect the terminal leads from the power cable (15, fig. 272) at the terminal board (14, fig. 268). Remove the two machine screws (13) that hold the terminal board (14) to the selector frame of the reperforator (39); remove the terminal board (14) and terminal marker strip (15).

(26) Remove the two machine screws (17) and lockwashers (18) that hold the detents (19) to the selector frame of the reperforator (39); remove the detents (19). Remove the two selector-magnet adjusting screws (20).

(27) Remove the four machine screws (21) and lockwashers (22) that hold the assembled selector and rear frames (39) and (50) to the base frame (74); remove the assembled selector and rear frames (39 and 50).

(28) Remove the three machine screws (23) and lockwashers (24) that hold the selector frame (39) and rear frame (50) together; separate the two frames.

(29) Remove the retainer ring (25) that holds the spring guide (26) to the selector frame (39); remove the spring guide (26) and the spring (27).

(30) Remove the self-locking hexagonal nut (28) and setscrew (29) from the selector frame (39). Remove the spring posts (30 and 31) and the bearings (32, 33, and 34) if any of these parts need to be repaired or replaced.

(31) Remove the machine screw (35), lockwashers (36 and 37), and the cable clamp (38) from the selector frame (39).

(32) Remove the machine screw (40) and lockwasher (41) that hold the signal bell (42) to the rear frame (50); remove the signal bell (42).

(33) Remove the machine screw (43) and lockwasher (44) and two taper pins (45) that hold the bearing bracket (46) to the rear frame (50); remove the bearing bracket (46).

(34) Remove the jack (47), taper pin (48), and bearing (49) from the rear frame (50).

(35) Remove the three machine screws (51) and lockwashers (52) that hold the motor support (63) to the base frame (74); remove the shims (53 and 54) and the motor support (63) from the base frame (74). Remove the stud (55) from the motor support (63).

(36) Remove the plain hexagonal nut (56), lockwasher (57), and cable clamp (58) from the banana plug (59); remove the banana plug (59) from the jack (62). Remove the plain hexagonal nut (60) and lockwasher (61) that hold the jack (62) in the motor support (63); remove the jack (62).

(37) Remove the four machine screws (64), grommets (65), grounding straps (66), and lockwashers (67) from the base frame (74).

(38) Remove the two machine screws (68) and lockwashers (69) that hold the bearing bracket (70) to the base frame (74); remove the bearing bracket (70).

(39) Remove the taper pins (71, 72, and 73) from the base frame if they are damaged.

b. Reassembly.

Note. If any of the spring posts, pins, or studs are loose or damaged, they must be replaced. Support the frame near the post to be removed to prevent damage to the frame. Press new posts in at right angles to the plane of the frame. Replace a frame that has worn threads, enlarged holes, or is otherwise damaged.

(1) Reassemble the reperforator frame by reversing the procedures outlined in *a*(39) through (24) above.

(2) Replace the motor suppression filter unit as described in paragraph 285*b*.

(3) Replace the transmitter-distributor drive shaft as described in paragraph 284*b*.

(4) Replace the keyboard-transmitter drive shaft as described in paragraph 283*b*.

(5) Replace the power shaft as described in paragraph 281*b*.

(6) Replace the main shaft as described in paragraph 280*b*.

(7) Replace the selector camshaft as described in paragraph 279*b*.

(8) Replace the function shaft as described in paragraph 277*b*.

(9) Replace the motor as described in paragraph 272*b*.

(10) Replace the transfer lever shaft as described in paragraph 271*b*.

(11) Replace the code-ring cage as described in paragraph 269*b*(1) and (2).

(12) Replace the function sensing mechanism as described in paragraph 268*b*.

(13) Replace the type wheel reciprocating mechanism as described in paragraph 267*b*.

(14) Replace the selector Y-levers and selector levers as described in paragraph 265*b*.

(15) Replace the front support frame as described in paragraph 258*b*.

(16) Replace the ribbon supply group as described in paragraph 254*b*.

(17) Replace the manual tape feed-out mechanism as described in paragraph 253*b*.

(18) Replace the rangefinder as described in paragraph 251*b*.

(19) Replace the selector magnet and terminal board cover (11) as described in paragraph 249*b*(6) through (8).

(20) Replace the tape reel as described in paragraph 246*b*.

(21) Replace the power supply and terminal unit as described in paragraph 242*b*.

(22) Replace the transmitter-distributor as described in paragraph 230*b*.

(23) Replace the keyboard-transmitter as described in paragraph 216*b*.

(24) Replace the reperforator-transmitter chassis on the mounting base as described in paragraph 215*b*.

288. Disassembly and Reassembly of Reperforator Frame (TT–76A/GGC)

(fig. 269)

a. Disassembly.

(1) Remove the reperforator-transmitter from the mounting base as described in paragraph 215*a*.

(2) Remove the keyboard-transmitter as described in paragraph 216*a*.

(3) Remove the transmitter-distributor as described in paragraph 230*a*.

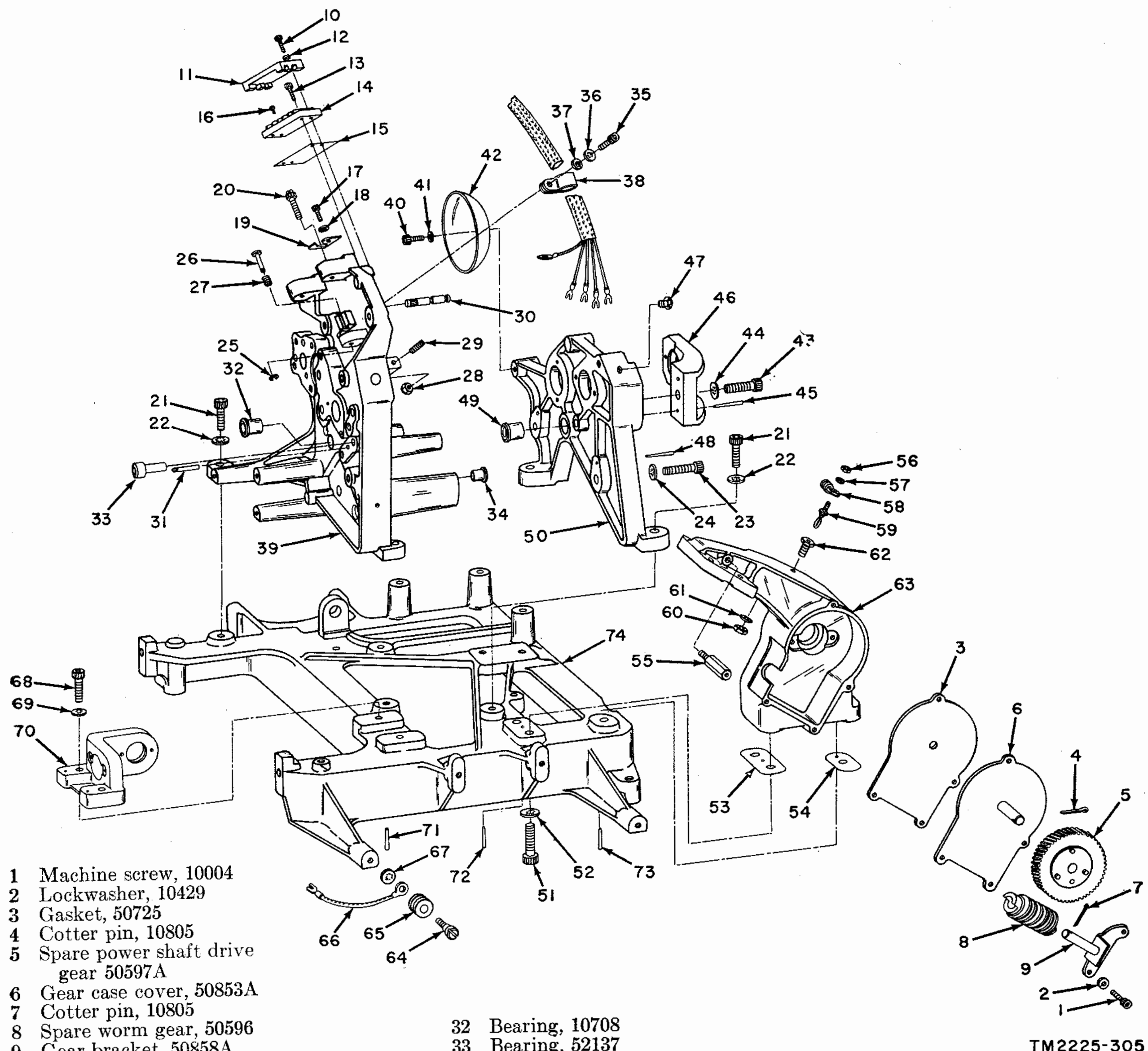
(4) Remove the power supply and terminal unit as described in paragraph 245*a*.

(5) Remove the tape reel as described in paragraph 247*a*.

(6) Remove the tape puller mechanism as described in paragraph 248*a*(1).

(7) Remove the selector magnet as described in paragraph 250*a*(1).

(8) Remove the rangefinder as described in paragraph 252*a*(1).



1 Machine screw, 10004
2 Lockwasher, 10429
3 Gasket, 50725
4 Cotter pin, 10805
5 Spare power shaft drive gear 50597A
6 Gear case cover, 50853A
7 Cotter pin, 10805
8 Spare worm gear, 50596
9 Gear bracket, 50858A
10 Machine screw, 10044
11 Terminal board cover, 53653
12 Lockwasher, 10432
13 Machine screw, 10043
14 Terminal board, 20375
15 Terminal marker strip, 20381
16 Machine screw, 10362
17 Machine screw, 10004
18 Lockwasher, 10429
19 Detent, 52687
20 Selector magnet adjusting screw, 52688
21 Machine screw, 10035
22 Lockwasher, 10405
23 Machine screw, 10035–01
24 Lockwasher, 10405
25 Retainer ring, 10981
26 Spring guide, 53099
27 Spring, 52188
28 Self-locking hexagonal nut, 10501
29 Setscrew, 10207
30 Spring post, 52451
31 Spring post, 50326
32 Bearing, 10708
33 Bearing, 52137
34 Bearing, 10716
35 Machine screw, 10008–01
36 Lockwasher, 10404
37 Lockwasher, 10430
38 Cable clamp, 20513
39 Frame, 52497
40 Machine screw, 10008
41 Lockwasher, 10430
42 Signal bell, 51080
43 Machine screw, 10021–01
44 Lockwasher, 10400
45 Taper pin, 10860
46 Bearing bracket, 52341
47 Jack, 20827
48 Taper pin, 10860
49 Bearing, 10708
50 Frame, 52499
51 Machine screw, 10021
52 Lockwasher, 10400
53 .002–in. shim, 52310 or 52311
54 .005–in. shim. 52312 or 52313
55 Stud, 52537
56 Plain hexagonal nut, 10521
57 Lockwasher, 10402
58 Cable clamp, 20513
59 Banana plug, 20826
60 Plain hexagonal nut, 10502
61 Lockwasher, 10400
62 Jack, 20827
63 Motor support, 52626A
64 Machine screw, 52701
65 Grommet, 52254
66 Grounding strap, 53907A
67 Lockwasher, 10405
68 Machine screw, 10018–01
69 Lockwasher, 10405
70 Bearing bracket, 52618
71 Taper pin, 10860
72 Taper pin, 10859
73 Taper pin, 10859
74 Frame, 52546A

Figure 268. Reperforator frame assembly, exploded view (TT–76/GGC).

(9) Remove the manual tape feed-out mechanism as described in paragraph 253*a*(1) through (6).

(10) Remove the ribbon supply group as described in paragraph 255*a*.

(11) Remove the front support frame as described in paragraph 258*a*.

(12) Remove the Y-levers and selector levers as described in paragraph 266*a*.

(13) Remove the type wheel reciprocating mechanism as described in paragraph 267*a*.

(14) Remove the function sensing mechanism as described in paragraph 268*a*(2) through (7).

(15) Remove the code-ring cage as described in paragraph 269*a*(6) and (7).

(16) Remove the transfer lever shaft as described in paragraph 271*a*.

(17) Remove the motor as described in paragraph 272*a*.

(18) Remove the function shaft as described in paragraph 278*a*.

(19) Remove the selector camshaft as described in paragraph 279*a*.

(20) Remove the main shaft as described in paragraph 280*a*.

(21) Remove the power shaft as described in paragraph 282*a*.

(22) Remove the key-board transmitter drive shaft as described in paragraph 283*a*.

(23) Remove the transmitter-distributor drive shaft as described in paragraph 284*a*.

(24) Remove the motor suppression filter unit as described in paragraph 286*a*(1) through (4).

(25) If the alternate power shaft drive gear (5) is needed, remove the cotter pin (4) that holds the gear (5) to the gear case cover (6). Remove the alternate worm gear (8) by extracting the cotter pin (7) that holds the worm gear to the worm gear bracket (9).

(26) Remove the two machine screws (10) and lockwashers (11) that hold the detents (12) to the selector frame (26); remove the detents (12). Remove the selector magnet adjusting screws (13).

(27) Remove the four machine screws (14) and lockwashers (15) that hold the assembled selector and rear frames (26 and 39) to the base frame (56); remove the assembled selector and rear frames (26 and 39).

(28) Remove the three machine screws (16) and lockwashers (17) that hold the selector frame (26) to the rear frame (39); separate the two frames.

(29) Remove the adjusting machine screw (18), lockwasher (19), flat washer (20), spring post (21), bearings (22), (23), and (24), and spring post (25) from the selector frame (26) if any of these parts need to be repaired or replaced.

(30) Remove the machine screw (30) and lockwasher (31) that hold the signal bell (32) to the rear frame (39); remove the signal bell (32).

(31) Remove the machine screw (33) and lockwasher (34) that hold the bearing bracket (35) to the rear frame (39); remove the bearing bracket (35).

(32) Remove the pins (36 and 37) and the bearing (38) from the rear frame (39).

(33) Remove the three machine screws (40) and lockwashers (41) that hold the motor support (45) to the base frame (56); remove the shims (42 and 43) and the motor support (45) from the base frame (56). Remove the stud (44) from the motor support (45).

(34) Remove the four machine screws (46), grommets (47), grounding straps (48), and lockwashers (49) from the base frame (56).

(35) Remove the two machine screws (50) and lockwashers (51) that hold the bearing bracket (52) to the base frame (56); remove the bearing bracket (52).

(36) Remove the pins (53, 54, and 55) from the base frame if they are damaged.

b. Reassembly.

Note. If any of the spring posts, pins, or studs are loose or damaged, they must be replaced. Support the frame near the post to be removed to prevent damage to the frame. Press new posts in at right angles to the plane of the frame. Replace a frame that has worn threads, enlarged holes, or is otherwise damaged.

(1) Reassemble the reperforator frame by reversing the procedures outlined in *a*(36) through (25) above.

(2) Replace the motor filter suppression unit as described in paragraph 286*b*.

(3) Replace the transmitter-distributor drive shaft as described in paragraph 284*b*.

(4) Replace the keyboard-transmitter drive shaft as described in paragraph 283*b*.

(5) Replace the power shaft as described in paragraph 282*b*.

(6) Replace the main shaft as described in paragraph 280*b*.

(7) Replace the selector camshaft as described in paragraph 279*a*.

(8) Replace the function shaft as described in paragraph 278*b*.

(9) Replace the motor as described in paragraph 272*b*.

(10) Replace the transfer lever shaft as described in paragraph 271*b*.

(11) Replace the code-ring cage as described in paragraph 269*b*.

(12) Replace the function sensing mechanism as described in paragraph 268*b*.

(13) Replace the type wheel reciprocating mechanism as described in paragraph 267*b*.

(14) Replace the Y-levers and selector levers as described in paragraph 266*b*.

(15) Replace the front support frame as described in paragraph 258*b*.

(16) Replace the ribbon supply group as described in paragraph 255*b*.

(17) Replace the manual tape feed-out mechanism as described in paragraph 253*b*.

(18) Replace the rangefinder as described in paragraph 252*b*.

(19) Replace the selector magnet as described in paragraph 250*b*.

(20) Replace the tape puller mechanism as described in paragraph 248*b*.

(21) Replace the tape reel as described in paragraph 247*b*.

(22) Replace the power supply and terminal unit as described in paragraph 245*b*.

(23) Replace the transmitter-distributor as described in paragraph 230*b*.

(24) Replace the keyboard-transmitter as described in paragraph 216*b*.

(25) Replace the reperforator - transmitter chassis on the mounting base as described in paragraph 215*b*.

289. Removal and Replacement of Keyboard Guard Assembly (TT–76/GGC)

(fig. 270)

a. Removal.

(1) Remove the two machine screws (1) and lockwashers (2) that hold the keyboard guard (58) to the mounting base.

(2) Remove the machine screw (3) and lockwasher (4) that hold the cable clamp (6) and electrical terminal lug to the right side of the keyboard guard (58); remove the cable clamp (6), electrical terminal lug, and lockwasher (5).

(3) Remove the machine screws (7 and 11) and lockwashers (8 and 12) that hold the cable clamps (10 and 14) and electrical terminal lugs to the left side of the keyboard guard (58); remove the cable clamps (10 and 14), electrical terminal lugs, and lockwashers (9 and 13).

(4) Unsolder and disconnect all electrical wire leads from terminals on the switches, connectors, and indicator lamp mounted on the keyboard guard (58).

(5) Remove the keyboard guard assembly from the reperforator base.

b. Replacement. Replace the keyboard guard assembly by reversing the procedures outlined in *a* above.

290. Removal and Replacement of Keyboard Guard Assembly (TT–76A/GGC)

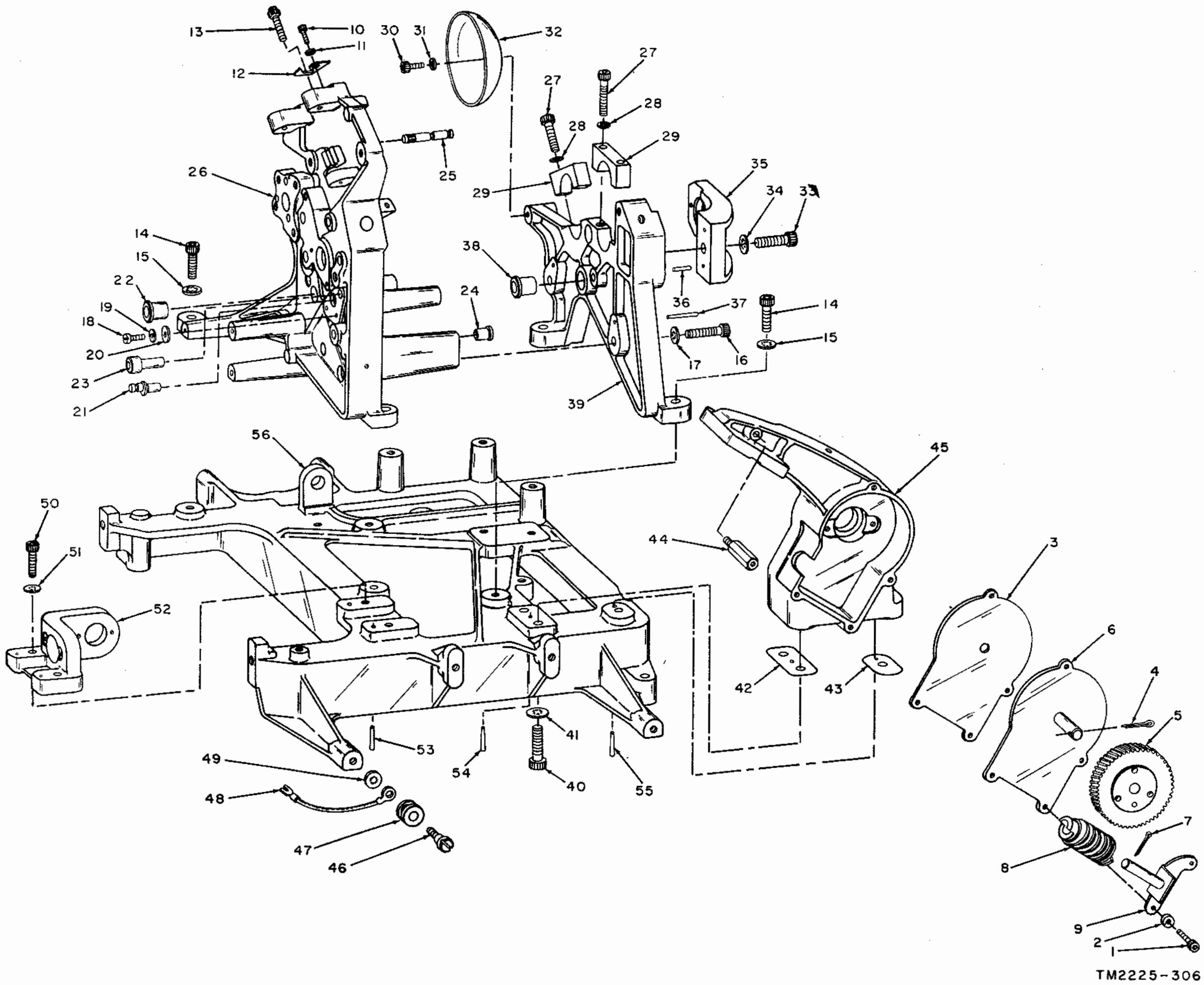
(fig. 271)

a. Removal.

(1) Unsnap the ball catches on the keyboard guard from the reperforator-transmitter mounting table. Tilt the keyboard guard away from the reperforator-transmitter and unsolder and disconnect all electrical leads from the selector cable assembly (6) at the selector, keyboard, and break switches and jacks.

(2) Unsolder and disconnect the electrical leads from the power cable assembly (37) at the motor, light, and power switches and indicator lamp bracket.

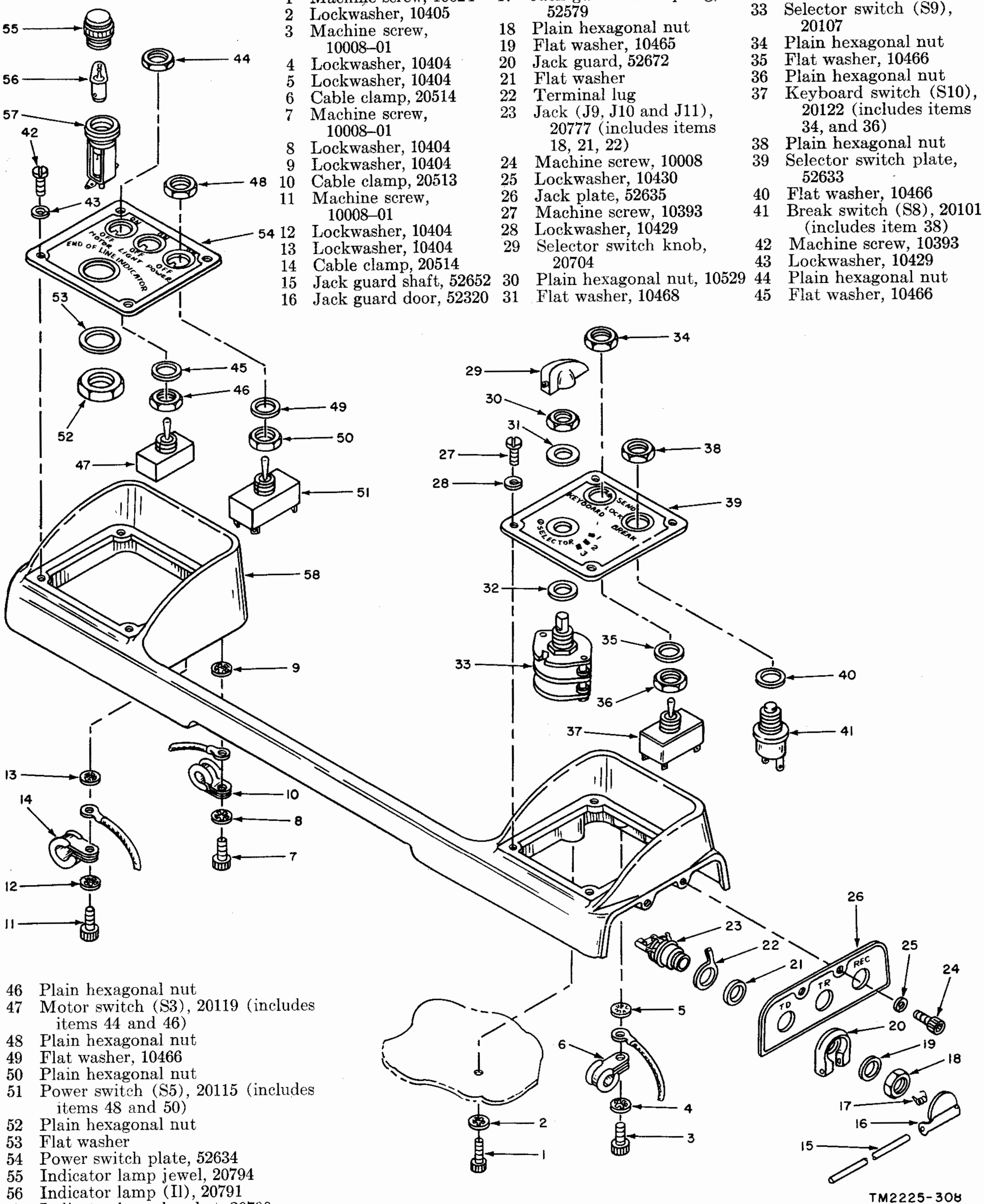
(3) Remove the three machine screws (55) and lockwashers (56) that hold the keyboard guard (57) to the keyboard guard hinge. Remove the keyboard guard assembly.



1	Machine screw, 10004	20	Flat washer, 50839	39	Frame, 57146A
2	Lockwasher, 10429	21	Spring post, 56076	40	Machine screw, 10021
3	Gasket, 50725	22	Bearing, 10708	41	Lockwasher, 10400
4	Cotter pin, 10805	23	Bearing, 52137	42	.002–in. shim, 52310 or 52311
5	Spare power shaft drive gear, 50597A	24	Bearing, 10716	43	.005–in. shim, 52312 or 52313
6	Gear case cover, 50853A	25	Spring post, 52451	44	Stud, 52537
7	Cotter pin, 10805	26	Frame, 57152A	45	Motor support, 52626A
8	Spare worm gear, 50596	27	Machine screw, 10012	46	Machine screw, 52701
9	Worm gear bracket, 50858A	28	Lockwasher, 10430	47	Grommet, 52254
10	Machine screw, 10004	29	Bearing cap, 57150	48	Grounding strap, 53907A
11	Lockwasher, 10429	30	Machine screw, 10008	49	Lockwasher, 10405
12	Detent, 52687	31	Lockwasher, 10430	50	Machine screw, 10018–01
13	Selector magnet adjusting screw, 56288	32	Signal bell, 51080	51	Lockwasher, 10405
14	Machine screw, 10035	33	Machine screw, 10021–01	52	Bearing bracket, 52618
15	Lockwasher, 10405	34	Lockwasher, 10400	53	Taper pin, 10860
16	Machine screw, 10035–01	35	Bearing bracket, 52341	54	Taper pin, 10859
17	Lockwasher, 10405	36	Taper pin, 10932	55	Taper pin, 10859
18	Machine screw, 55511	37	Taper pin, 10860	56	Frame, 52546A
19	Lockwasher, 10429	38	Bearing, 10708		

Figure 269. Reperforator frame assembly (TT–76A/GGC).

1 Machine screw, 10024
2 Lockwasher, 10405
3 Machine screw, 10008–01
4 Lockwasher, 10404
5 Lockwasher, 10404
6 Cable clamp, 20514
7 Machine screw, 10008–01
8 Lockwasher, 10404
9 Lockwasher, 10404
10 Cable clamp, 20513
11 Machine screw, 10008–01
12 Lockwasher, 10404
13 Lockwasher, 10404
14 Cable clamp, 20514
15 Jack guard shaft, 52652
16 Jack guard door, 52320
17 Jack guard door spring, 52579
18 Plain hexagonal nut
19 Flat washer, 10465
20 Jack guard, 52672
21 Flat washer
22 Terminal lug
23 Jack (J9, J10 and J11), 20777 (includes items 18, 21, 22)
24 Machine screw, 10008
25 Lockwasher, 10430
26 Jack plate, 52635
27 Machine screw, 10393
28 Lockwasher, 10429
29 Selector switch knob, 20704
30 Plain hexagonal nut, 10529
31 Flat washer, 10468
32 Flat washer, 10465
33 Selector switch (S9), 20107
34 Plain hexagonal nut
35 Flat washer, 10466
36 Plain hexagonal nut
37 Keyboard switch (S10), 20122 (includes items 34, and 36)
38 Plain hexagonal nut
39 Selector switch plate, 52633
40 Flat washer, 10466
41 Break switch (S8), 20101 (includes item 38)
42 Machine screw, 10393
43 Lockwasher, 10429
44 Plain hexagonal nut
45 Flat washer, 10466



46 Plain hexagonal nut
47 Motor switch (S3), 20119 (includes items 44 and 46)
48 Plain hexagonal nut
49 Flat washer, 10466
50 Plain hexagonal nut
51 Power switch (S5), 20115 (includes items 48 and 50)
52 Plain hexagonal nut
53 Flat washer
54 Power switch plate, 52634
55 Indicator lamp jewel, 20794
56 Indicator lamp (I1), 20791
57 Indicator lamp bracket, 20790 (includes items 52 and 53)
58 Keyboard guard, 52495

Figure 270. Keyboard guard assembly, exploded view (TT–76/GGC).

b. Replacement. Replace the keyboard guard assembly by reversing the procedures outlined in *a* above.

291. Disassembly and Reassembly of Keyboard Guard Assembly (TT–76/GGC)

(fig. 270)

a. Disassembly.

(1) Remove the keyboard guard assembly from the mounting base as described in paragraph 289*a*.

(2) Remove the four machine screws (27) and lockwashers (28) that hold the selector switch plate (39) to the keyboard guard (58); remove the assembled selector switch plate from the keyboard guard.

(3) Loosen the setscrew in the selector switch knob (29) and remove the selector switch knob from the shaft of the selector switch (33).

(4) Remove the plain hexagonal nut (30) and

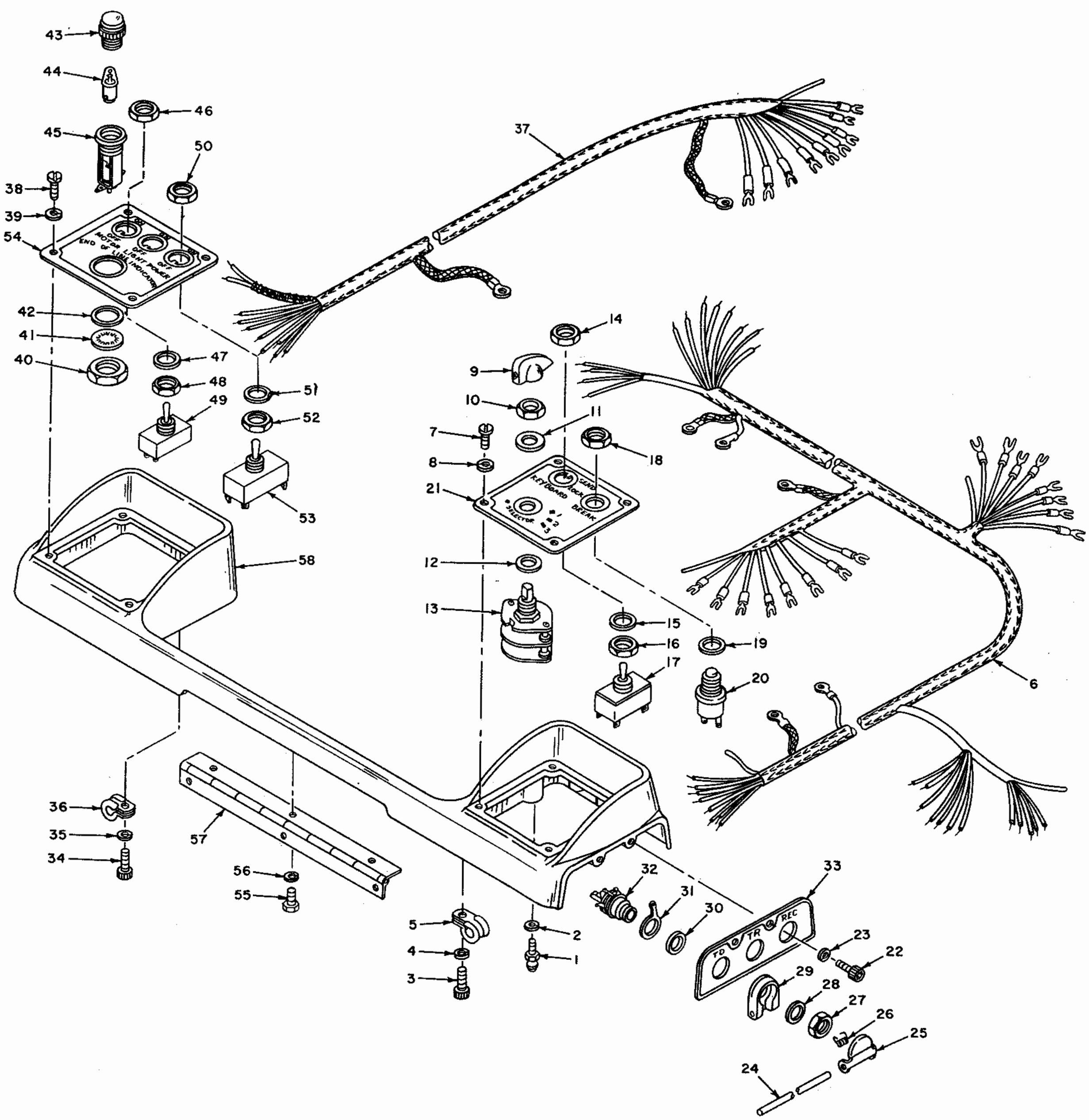


Figure 271. Keyboard guard assembly, exploded view (TT–76A/GGC.)

1 Ball catch, 57253
2 Lockwasher, 10426
3 Machine screw, 10008–01
4 Lockwasher, 10430
5 Cable clamp, 20514
6 Selector cable assembly, 57245A
7 Machine screw, 10393
8 Lockwasher, 10429
9 Selector switch knob, 20704
10 Plain hexagonal nut, 10529
11 Flat washer, 10468
12 Flat washer, 10465
13 Selector switch, 20107
14 Plain hexagonal nut
15 Flat washer, 10466
16 Plain hexagonal nut
17 Keyboard switch, 20122 (includes item 14, 16)
18 Plain hexagonal nut
19 Flat washer, 10466
20 Break switch, 20101 (includes item 18)
21 Selector switch plate, 52633
22 Machine screw, 10008
23 Lockwasher, 10430
24 Jack guard shaft, 52652
25 Jack guard door, 52320
26 Jack guard door spring, 52579
27 Plain hexagonal nut
28 Flat washer, 10465
29 Jack guard, 52675
30 Flat washer
31 Terminal lug
32 Jack, 20777 (includes items 27, 30, and 31)
33 Jack plate, 52635
34 Machine screw, 10008–01
35 Lockwasher, 10430
36 Cable clamp, 20513
37 Power cable assembly, 57246A
38 Machine screw, 10395
39 Lockwasher, 10429
40 Plain hexagonal nut
41 Lockwasher
42 Fibre washer
43 Indicator lamp jewel, 20771
44 Indicator lamp, 20791
45 Indicator lamp bracket, 20770 (includes items 40, 41, and 42)
46 Plain hexagonal nut
47 Flat washer
48 Plain hexagonal nut
49 Motor switch, 20119 (includes items 46, 47, and 48)
50 Plain hexagonal nut
51 Flat washer
52 Plain hexagonal nut
53 Power switch, 20115 (includes items 50, 51, and 52)
54 Power switch plate, 52634
55 Machine screw, 10399
56 Lockwasher, 10430
57 Keyboard guard hinge, 57252
58 Keyboard guard, 57251

Figure 271—Continued.

flat washer (31) that hold the selector switch (33) to the selector switch plate; remove the selector switch and the flat washer (32).

(5) Remove the plain hexagonal nut (34) that holds the keyboard switch (37) to the selector switch plate (39); remove the keyboard switch, flat washer (35), and plain hexagonal nut (36).

(6) Remove the plain hexagonal nut (38) that holds the break switch (41) to the selector switch plate; remove the break switch and flat washer (40).

(7) Remove the two machines screws (24) and lockwashers (25) that hold the jack plate (26) to the keyboard guard; remove the jack plate from the keyboard guard.

(8) Remove the jack guard shaft (15) that holds the three jack guard doors (16) and jack guard door springs (17) to the jack guards (20); remove the jack guard doors and jack guard door springs.

(9) Remove the three plain hexagonal nuts (18) and flat washers (19) that hold the three jack guards (20) and jacks (23) to the jack plate (26); remove the three jack guards, jacks, flat washers (21), and terminal lugs (22).

(10) Remove the four machine screws (42) and lockwashers (43) that hold the power switch plate (54) to the keyboard guard; remove the assembled power switch plate from the keyboard guard.

(11) Remove the plain hexagonal nut (52) and flat washer (53) that hold the indicator lamp bracket (57) to the power switch plate; remove the indicator lamp bracket. Remove the indicator lamp jewel (55) from the indicator lamp bracket.

(12) Remove the indicator lamp (56) from the indicator lamp bracket.

(13) Remove the two plain hexagonal nuts (44) that hold the motor switch (47) and light switch to the power switch plate;

remove the motor switch, light switch, two plain hexagonal nuts (46), and flat washers (45).

(14) Remove the plain hexagonal nut (48) that holds the power switch (51) to the power switch plate; remove the power switch, flat washer (49), and plain hexagonal nut (50).

b. *Reassembly.*

(1) Reassemble the keyboard guard assembly by reversing the procedures outlined in *a*(14) through (2) above.

(2) Replace the keyboard guard assembly on the mounting base as described in paragraph 289*b*.

292. Disassembly and Reassembly of Keyboard Guard Assembly (TT–76A/GGC) (fig. 271)

a. *Disassembly.*

(1) Remove the two ball catches (1) and lockwashers (2) from the keyboard guard (58).

(2) Remove the machine screw (3) and lockwashers (4) that hold the cable clamp (5) to the right side of the keyboard guard; remove the cable clamp.

(3) Remove the four machine screws (7) and lockwashers (8) that hold the selector switch plate (21) to the keyboard guard; remove the assembled selector switch plate.

(4) Loosen the setscrew in the selector switch knob (9) and remove the knob from the shaft on the selector switch (13).

(5) Remove the plain hexagonal nut (10) and flat washer (11) that hold the selector switch (13) to the selector switch plate (21); remove the selector switch (13) and the flat washer (12).

(6) Remove the plain hexagonal nut (14) that holds the keyboard switch (17) to the selector switch plate; remove the keyboard switch (17), flat washer (15), and plain hexagonal nut (16).

(7) Remove the plain hexagonal nut (18) that holds the break switch (20) to the selector switch plate; remove the break switch and flat washer (19).

(8) Remove the two machine screws (22) and lockwashers (23) that hold the jack plate (33) to the keyboard guard; remove the assembled jack plate (33).

(9) Remove the jack guard shaft (24) that holds the three jack guard doors (25) and jack guard door springs (26) to the jack guards (29); remove the jack guard doors and jack guard door springs.

(10) Remove the three plain hexagonal nuts (27) and flat washers (28) that hold the jack guards (29) and jacks (32) to the jack plate (33); remove the jack guards (29), jacks (32), flat washers (30) and terminals (31).

(11) Remove the machine screw (34) and lockwasher (35) that hold the cable clamp (36) to the left side of the keyboard guard (58); remove the cable clamp.

(12) Remove the four machine screws (38) and lockwashers (39) that hold the power switch plate (54) to the keyboard guard; remove the assembled power switch plate (54).

(13) Remove the plain hexagonal nut (40), lockwasher (41), and fibre washer (42) that hold the indicator lamp bracket (45) to the power switch plate; remove the indicator lamp bracket. Remove the indicator lamp jewel (43) and the indicator lamp (44) from the indicator lamp bracket.

(14) Remove the two plain hexagonal nuts (46) that hold the motor switch (49) and light switch to the power switch plate; remove the motor switch, light switch, flat washers (47), and two plain hexagonal nuts (48).

(15) Remove the plain hexagonal nut (50) that holds the power switch (53) to the power switch plate; remove the power switch (53), flat washer (51), and plain hexagonal nut (52).

b. *Reassembly.* Reassemble the keyboard guard assembly by reversing the procedures outlined in *a* above.

293. Disassembly and Reassembly of Reperforator-Transmitter Base Components (TT–76/GGC) (fig. 272)

a. *Disassembly.*

(1) Remove the transmitter-distributor from the reperforator-transmitter as described in paragraph 230*a*.

(2) Disconnect the connectors, terminal leads, and grounding lugs on the electrical cables (10, 11, and 15) from their respective connecting points.

(3) Remove the reperforator-transmitter chassis from the base as described in paragraph 215*a*.

(4) Remove the keyboard guard from the reperforator base as described in paragraph 289*a*.

(5) Remove the seven self-locking hexagonal nuts (3), machine screws (4), and flat washers (5) that hold the base board (6) to the base plate (46); remove the base board (6).

(6) Remove the self-locking hexagonal nut (7), machine screw (8), and cable clamp (9) that hold the power cord (10) and the cable (11) to the base plate (46); remove the power cord (10) and cable (11).

(7) Remove the self-locking hexagonal nut (12), machine screw (13), and cable clamp (14) that hold the cable (15) to the base plate (46); remove the cable (15).

(8) Remove the self-locking hexagonal nuts (16 and 21) and machine screws (17 and 22) that hold the grounding straps (18, 19, 23, and 24) to the base plate (46); remove the grounding straps (18, 19, 23, and 24) and the lockwashers (20 and 25).

(9) Remove the four self-locking hexagonal nuts (26), machine screws (27), and flat washers (28) that hold the two retaining clips (29) to the base plate (46); remove the retaining clips (2) and the tape storage guide (30).

(10) Remove the lock nuts (31 and 37), lockwashers (32 and 38), and machine screws (33 and 39), that hold the vibration mount limit stops (34 and 40) and the vibration mounts (35 and 41) to the base plate (46); remove the vibration mount limit stops (34 and 40), vibration mounts (35 and 41), and flat washers (36 and 42).

(11) Remove the plain hexagonal nut (43) and lockwasher (44) that hold the grounding post (45) to the base plate (46); remove the grounding post (45).

b. Reassembly.

(1) Reassemble the reperforator-transmitter base components by reversing the procedures described in *a*(11) through (5) above.

(2) Replace the keyboard guard as described in paragraph 289*b*.

(3) Connect the connectors, terminal leads, and grounding lugs on the electrical cables (10, 11, and 15) to their respective connecting points.

(4) Replace the transmitter-distributor as described in paragraph 230*b*.

294. Disassembly and Reassembly of Reperforator-Transmitter Base Components (TT–76A/GGC)

(fig. 273)

a. Disassembly.

(1) Remove the transmitter-distributor from the reperforator transmitter as described in paragraph 230*a*.

(2) Remove the reperforator-transmitter from the base as described in paragraph 215*a*.

(3) Remove the keyboard guard from the reperforator-transmitter base as described in paragraph 291*a*.

(4) Remove the three machine screws (3) and lockwashers (4) that hold the three cable clamps (5) to the mounting base (80). Disconnect the terminal lugs on the three electrical cables (7) from the terminal board (78); remove the three cable clamps (5), strain reliefs (6), and cables (7).

(5) Remove the machine screw (8) and lockwasher (9) that hold the cable clamp (10) to the mounting base (80). Disconnect the terminal leads from the power cable (15) at the terminal board (74) and disconnect the grounding lug by removing the machine screw (11) and lockwashers (12 and 13); remove the cable clamp (10), strain relief (14), and power cable (15).

(6) Remove the four self-locking hexagonal nuts (16 and 22), machine screws (17 and 23), and lockwashers (18 and 24) that hold the four vibration mounts (19 and 25), four flat washers (20 and 26), three vibration mount limit stops (21), and the vibration mount limit stop (27) to the mounting base (80); remove the vibration mounts (19 and 25), flat washers (20 and 26), and vibration mount limit stops (21 and 27).

(7) Remove the machine screws (28 and 32) and lockwashers (29 and 33) that hold the two grounding leads (30 and 34) to the mounting base (80); remove the grounding leads (30 and 34) and lockwashers (31 and 35).

(8) Remove the two machine screws (36) and lockwashers (37) that hold the mounting plate (41) to the mounting base (80); remove the assembled receptacle connectors (40) and mounting plate (41).

(9) Remove the two plain hexagonal nuts (38)

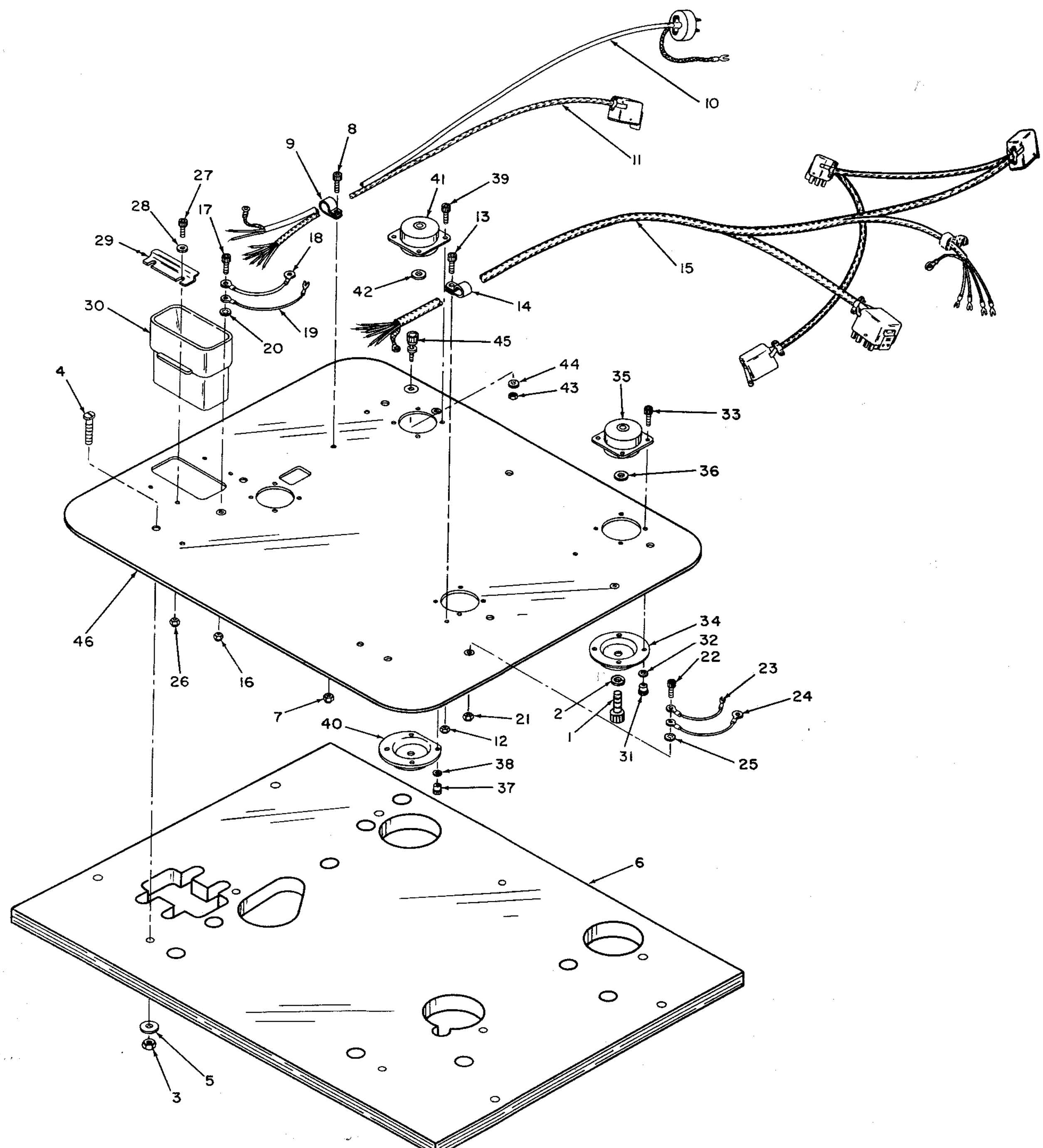


Figure 272. Reperforator-transmitter base components, exploded view (TT-76/GGC).

1	Machine screw, 10040	24	Grounding strap
2	Lockwasher, 10427	25	Lockwasher, 10404
3	Self-locking hexagonal nut, 10534	26	Self-locking hexagonal nut, 10500
4	Machine screw, 53821	27	Machine screw, 10004
5	Flat washer, 10470	28	Flat washer, 10450
6	Base board, 52711	29	Retaining clip, 53166
7	Self-locking hexagonal nut, 10501	30	Tape storage guide, 52778
8	Machine screw, 10003	31	Lock nut, 10537
9	Cable clamp	32	Lockwasher, 10430
10	Power cord, 52571A	33	Machine screw, 10025
11	Cable, 53466A	34	Vibration mount limit stop, 53175
12	Self-locking hexagonal nut, 10501	35	Vibration mount, 52095
13	Machine screw, 10003	36	Flat washer, 53181
14	Cable clamp, 20516	37	Lock nut, 10537
15	Cable, 53467A	38	Lockwasher, 10430
16	Self-locking hexagonal nut, 10501	39	Machine screw, 10025
17	Machine screw, 10009	40	Vibration mount limit stop, 53398A
18	Grounding strap	41	Vibration mount, 52095
19	Grounding strap, 53494A	42	Flat washer, 53181
20	Lockwasher, 10404	43	Plain hexagonal nut, 10511
21	Self-locking hexagonal nut, 10501	44	Lockwasher, 10403
22	Machine screw, 10009	45	Grounding post, 20825
23	Grounding strap, 53585A	46	Base plate, 52710

Figure 272—Continued.

and lockwashers (39) that hold the two receptacle connectors (40) to the mounting plate (41); remove the two receptacle connectors (40).

(10) Remove the two self-locking hexagonal nuts (42), machine screws (43), and flat washers (44) that hold the chad tube extension (45) to the mounting base (80); remove the chad tube extension (45).

(11) Remove the three clinch nuts (46), lockwashers (47) and machine screws (48) that hold the keyboard guard hinge to the mounting base.

(12) Remove the four self-locking hexagonal nuts (49), machine screws (50), flat washers (51), and two tape storage guide clips (52) that hold the tape storage guide (53) to the mounting base (80); remove the tape storage guide (53).

(13) Remove the four self-locking hexagonal nuts (54), machine screws (55), and flat washers (56) that hold the two detent springs (57) to the mounting base (80); remove the two detent springs (57).

(14) Remove the five machine screws (58), lockwashers (59), cable clamps (60), and lockwashers (61) that hold the power cable (15) to the mounting base (80).

(15) Remove the two grommets (62) from the mounting base (80).

(16) Remove the two self-locking hexagonal nuts (63) and machine screws (64) that hold the receptacle connector (65) to the mounting base (80); remove the receptacle connector (65).

(17) Remove the two machine screws (66) and lockwashers (67) that hold the mounting plate (71) to the mounting base (80); remove the assembled receptacle connector (70) and mounting plate (71).

(18) Remove the plain hexagonal nut (68) and lockwasher (69) that hold the receptacle connector (70) to the mounting plate (71); remove the receptacle connector (70).

(19) Remove the four machine screws (72) and lockwashers (73) that hold the terminal board (74) and terminal marking strip (75) to the mounting base (80); remove the terminal board (74) and terminal marking strip (75).

(20) Remove the two machine screws (76) and lockwashers (77) that hold the terminal board (78) and terminal marking strip (79) to the mounting base (80); remove the terminal board (78) and terminal marking strip (79).

b. Reassembly.

(1) Reassemble the reperforator-transmitter base components by reversing the procedures outlined in *a*(21) through (4) above.

(2) Replace the keyboard guard as described in paragraph 290*b*.

(3) Replace the reperforator-transmitter on the mounting base as described in paragraph 215*b*.

(4) Replace the transmitter-distributor as described in paragraph 230*b*.

295. Disassembly and Reassembly of Dust Cover (TT–76/GGC)

(fig. 274)

a. Disassembly.

(1) Disconnect the plug connector on the copy light cable (52) from the receptacle connector on the power supply and terminal unit. Lift the dust cover off the reperforator-transmitter.

(2) Remove the four machine screws (1) and lockwashers (2) that hold the copy holder brackets (13 and 15) to the dust cover (53); remove the copy holder assembly.

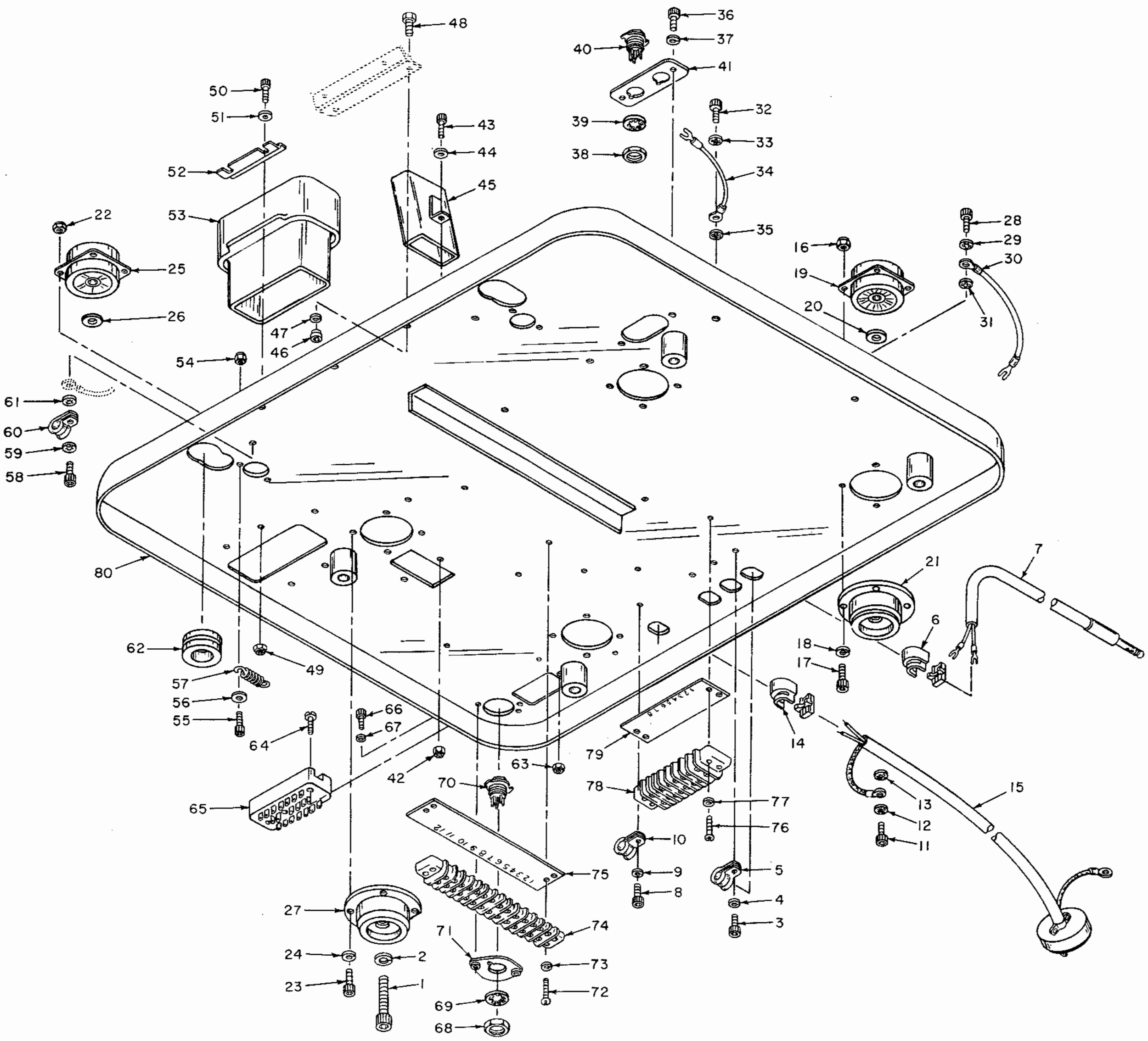


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Figure 273. Reperforator-transmitter base components, exploded view (TT–76A/GGC).

1 Machine screw, 10040
2 Lockwasher, 10427
3 Machine screw, 10008
4 Lockwasher, 10430
5 Cable clamp, 20887
6 Strain relief, 20886
7 Electrical cable,
Red–57241A, Black–57243A, Gray–57242A
8 Machine screw, 10008
9 Lockwasher, 10430
10 Cable clamp, 20887
11 Machine screw, 10008–01
12 Lockwasher, 10404
13 Lockwasher, 10404
14 Strain relief, 20886
15 Power cable, 57244A
16 Self-locking hexagonal nut, 10501
17 Machine screw, 10025
18 Lockwasher, 10430
19 Vibration mount, 52095
20 Flat washer, 53181
21 Vibration mount limit stop, 53175A
22 Self-locking hexagonal nut, 10501
23 Machine screw, 10025
24 Lockwasher, 10430
25 Vibration mount, 52095
26 Flat washer, 53181
27 Vibration mount limit stop, 53398
28 Machine screw, 10008
29 Lockwasher, 10404
30 Grounding lead, 53494A
31 Lockwasher, 10404
32 Machine screw, 10008
33 Lockwasher, 10404
34 Grounding lead, 53585A
35 Lockwasher, 10404
36 Machine screw, 10008
37 Lockwasher, 10430
38 Plain hexagonal nut
39 Lockwasher, 10478
40 Receptacle connector, 20262 (includes item 38)
41 Mounting plate, 57249A
42 Self-locking hexagonal nut, 10500
43 Machine screw, 10004
44 Flat washer, 10450
45 Chad tube extension, 57260A
46 Clinch nut, 10531
47 Lockwasher, 10430
48 Machine screw, 10399
49 Self-locking hexagonal nut, 10500
50 Machine screw, 10004
51 Flat washer, 10450
52 Tape storage guide clip, 56931
53 Tape storage guide, 52778
54 Self-locking hexagonal nut, 10500
55 Machine screw, 10004
56 Flat washer, 10450
57 Detent spring, 57247
58 Machine screw, 10008
59 Lockwasher, 10404
60 Cable clamp, 20888
61 Lockwasher, 10404
62 Grommet, 21006
63 Self-locking hexagonal nut, 10540
64 Machine screw, 10125
65 Receptacle connector, 20444
66 Machine screw, 10004
67 Lockwasher, 10421
68 Plain hexagonal nut
69 Lockwasher, 10478
70 Receptacle connector, 20262 (includes item 68)
71 Mounting plate, 57248A
72 Machine screw, 10114
73 Lockwasher, 10429
74 Terminal board, 20389
75 Terminal marking strip, 20390
76 Machine screw, 10114
77 Lockwasher, 10429
78 Terminal board, 20397
79 Terminal marking strip, 20374
80 Mounting base, 57255A

Figure 273—Continued.

(3) Remove the copy retaining arm spring (3) from the copy retaining arm (7) and from the bracket (10). Remove the two retainer rings (4 and 5) that hold the pin (6) to the bracket (10); remove the pin (6) and the copy retaining arm (7).

(4) Remove the self-locking hexagonal nut (8) and the machine screw (9) from the copy holder; slide the bracket (10) off the guide bar on the copy holder (23).

(5) Remove the clamping nut (11) and pull the copy holder adjusting shaft (17) to the right; catch the key (12), copy holder bracket (13), spacer (14), copy holder bracket (15), and key (16) as they fall free. Remove the copy holder adjusting shaft (17).

(6) Remove the retainer rings (18 and 19) that hold the pin (22) to the copy holder (23). Remove the copy holder clip spring (20), copy holder clip (21), and pin (22).

(7) Remove the latch spring (24) from the cover latches (25 and 26); remove the cover latches from the dust cover (53).

(8) Remove the two machine screws (27), lockwashers (28), and nut plate (29) that hold the latch plate (30) to the dust cover (53).

(9) Remove the self-tapping screw (31) that holds the clamp (32) to the dust cover (53); remove the clamp and the copy light director (33). Remove the copy lamp (34) from the copy light holder.

(10) Remove the two plain hexagonal nuts (35), lockwashers (36), grounding straps (37), lockwashers (38), machine screws (39), and lockwashers (40) from the dust cover (53).

(11) Remove the self-locking hexagonal nut (41), fastener (42), self-locking hexagonal nut (43), flat washer (44), and machine screw (45) that hold the power cord retaining strap (46) to the dust cover (53); remove the power cord retaining strap (46).

(12) Remove the plain hexagonal nut (47), lockwasher (48), and grounding post (49) from the dust cover (53).

(13) Remove the cover springs (50 and 51) from the dust cover (53).

b. Reassembly. Reassemble the dust cover by reversing the procedures described in *a* above.

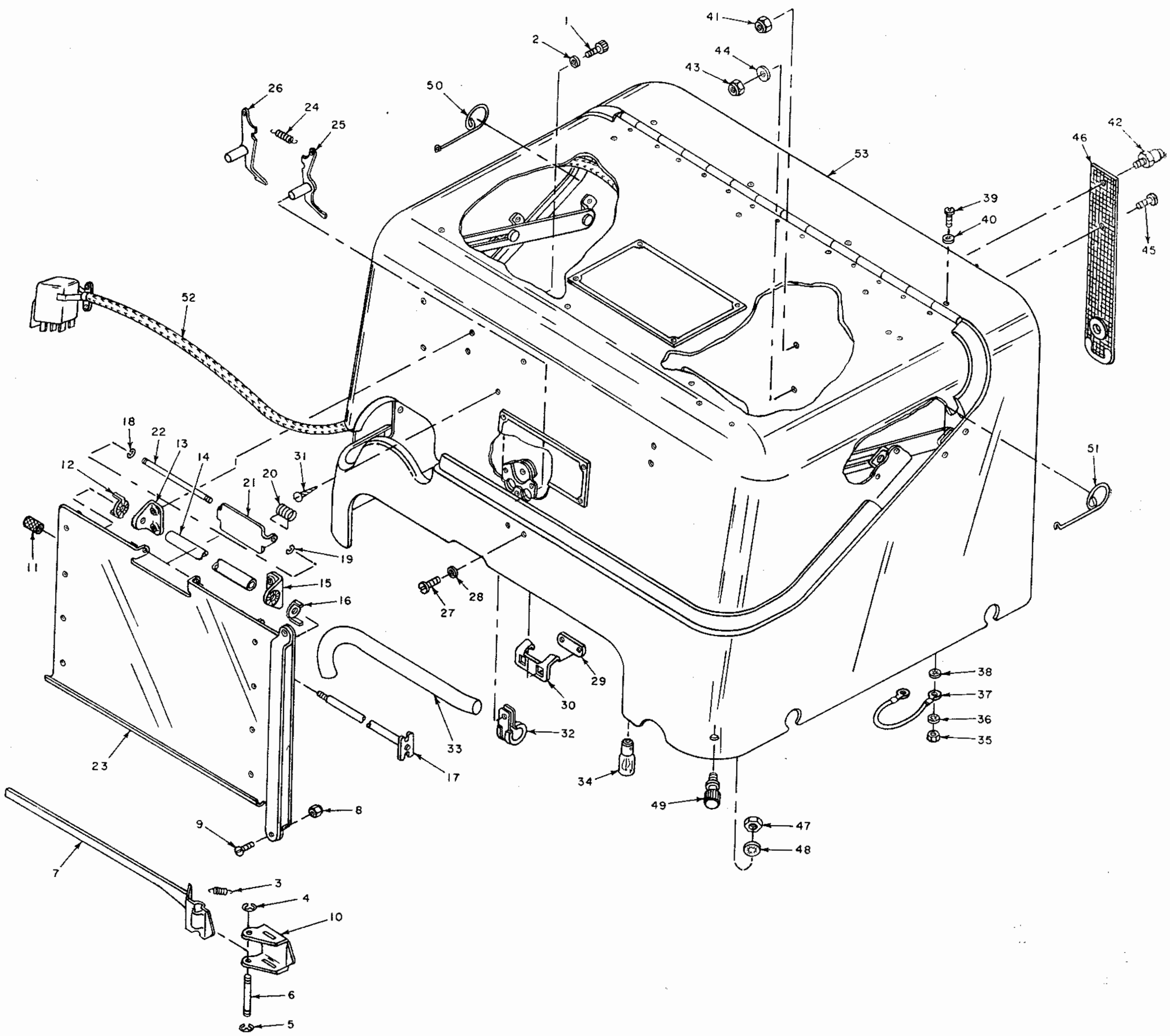

Figure 274. Dust cover, exploded view (TT–76/GGC).

1 Machine screw, 10001
2 Lockwasher, 10429
3 Copy retaining arm spring, 50678
4 Retainer ring, 10960
5 Retainer ring, 10960
6 Pin, 53193
7 Copy retaining arm, 53192
8 Self-locking hexagonal nut, 10500
9 Machine screw, 10304
10 Bracket, 50675
11 Clamping nut, 53819
12 Key, 52267
13 Copy holder bracket, 52555
14 Spacer, 52317
15 Copy holder bracket, 52555
16 Key, 52267
17 Copy holder adjusting shaft, 52314
18 Retainer ring, 10969
19 Retainer ring, 10969
20 Copy holder clip spring, 52551
21 Copy holder clip, 52446
22 Pin, 52258
23 Copy holder, 52286A
24 Latch spring, 53148
25 Cover latch, 52302A
26 Cover latch, 52301A
27 Machine screw, 10357
28 Lockwasher, 10429
29 Nut plate, 52561
30 Latch plate, 52562
31 Self-tapping screw, 10379
32 Clamp, 20500
33 Copy light director, 52744
34 Copy lamp, 20701
35 Plain hexagonal nut, 10517
36 Lockwasher, 10408
37 Grounding strap, 51191A
38 Lockwasher, 10408
39 Machine screw, 10335
40 Lockwasher, 10408
41 Self-locking hexagonal nut, 10501
42 Fastener, 10912
43 Self-locking hexagonal nut, 10501
44 Flat washer, 51338
45 Machine screw, 10376
46 Cord retaining strap, 53791A
47 Plain hexagonal nut, 10511
48 Lockwasher, 10403
49 Grounding post, 20825
50 Cover spring, LH, 53889
51 Cover spring, RH, 53888
52 Copy light cable, 52784A
53 Dust cover, 52500A

Figure 274—Continued.

296. Disassembly and Reassembly of the Dust Cover (TT–76A/GGC)

(fig. 275)

a. Disassembly.

(1) Disconnect the plug connector on the copy light cable assembly (38) from the receptacle connector on the reperforator-transmitter mounting base.

(2) Remove the four machine screws (1) and lockwashers (2) that hold the copy holder brackets (13 and 15) to the dust cover (60); remove the copy holder assembly.

(3) Remove the copy retaining arm spring (3) from the copy retaining arm (7) and from the bracket (10). Remove the two retainer rings (4 and 5) that hold the pin (6) to the bracket (10); remove the pin (6) and the copy retaining arm (7).

(4) Remove the self-locking hexagonal nut (8) and the machine screw (9) from the copy holder (23); slide the bracket (10) off the guide bar on the copy holder (23).

(5) Remove the clamping nut (11) and pull the copy holder adjusting shaft (17) to the right; catch the key (12), copy holder bracket (13), spacer (14), copy holder bracket (15), and key (16) as they fall free. Remove the copy holder adjusting shaft (17).

(6) Remove the retainer rings (18 and 19) that hold the pin (22) to the copy holder (23). Remove the copy holder clip spring (20), copy holder clip (21), and pin (22).

(7) Remove the four machine screws (24) and lockwashers (25) and the two nut plates (26) that hold the two latch brackets (27) and the latch (28) to the dust cover (60); remove the latch brackets (27) and the latch (28).

(8) Remove the two machine screws (29) and lockwashers (30) and the nut plate (31) that hold the latch spring (32) to the dust cover (60); remove the latch spring (32).

(9) Remove the self-tapping screw (33) that holds the clamp (34) to the dust cover (60); remove the clamp (34) and the copy light director (35).

(10) Remove the two self-locking hexagonal nuts (36) and machine screws (37) that

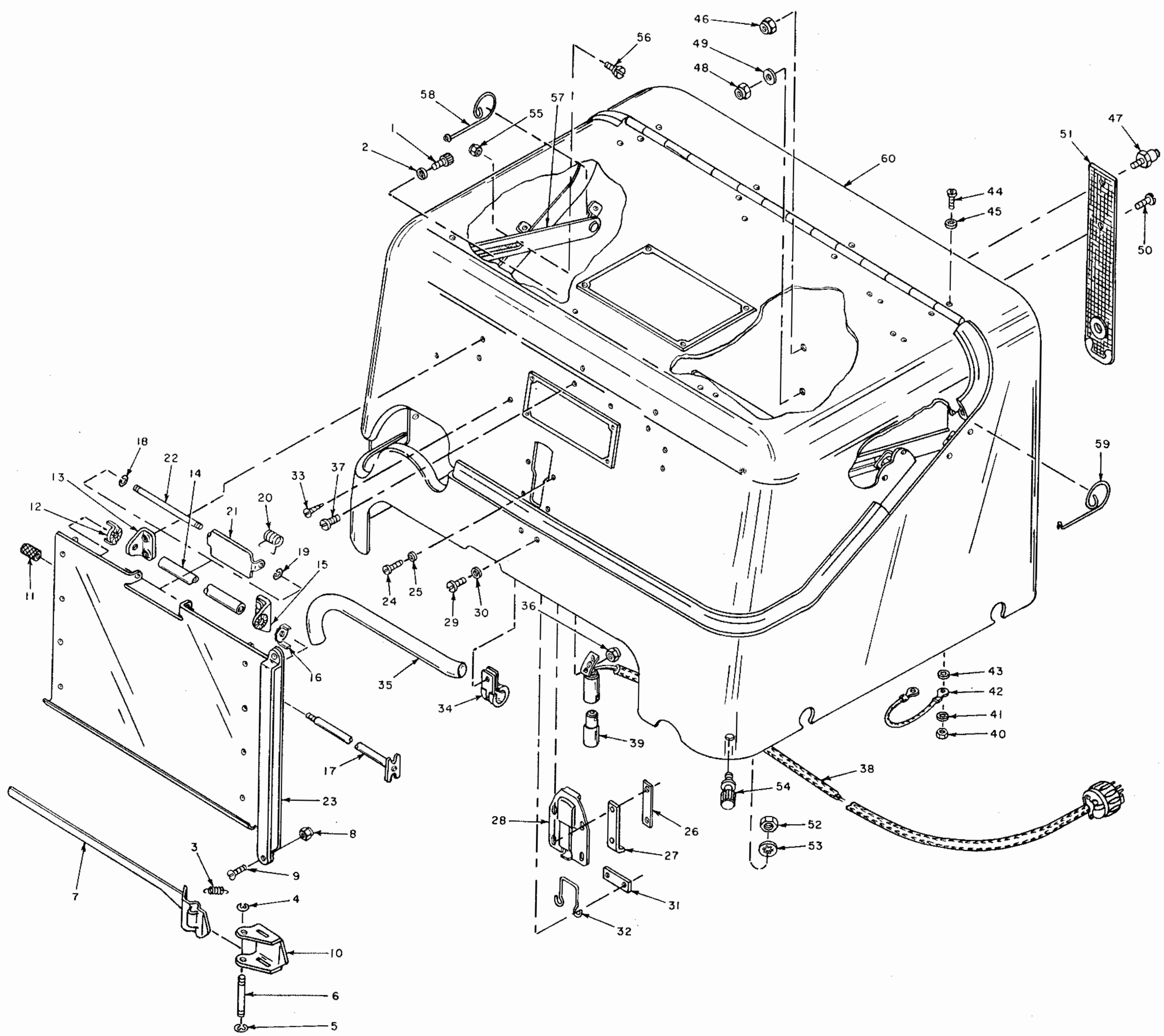

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Figure 275. Dust cover, exploded view (TT–76A/GGC).

1	Machine screw, 10001	21	Copy holder clip, 53446	41	Lockwasher, 10408
2	Lockwasher, 10429	22	Pin, 52258	42	Grounding strap, 51191A
3	Copy retaining arm spring, 54948	23	Copy holder, 57181	43	Lockwasher, 10408
4	Retainer ring, 10960	24	Machine screw, 10124	44	Machine screw, 10335
5	Retainer ring, 10960	25	Lockwasher, 10435	45	Lockwasher, 10408
6	Pin, 52068	26	Nut plate, 57179	46	Self-locking hexagonal nut, 10501
7	Copy retaining arm, 53191	27	Latch bracket, 57176	47	Fastener, 10912
8	Self-locking hexagonal nut, 10500	28	Latch, 57175A	48	Self-locking hexagonal nut, 10501
9	Machine screw, 10304	29	Machine screw, 10393	49	Flat washer, 51338
10	Bracket, 53436	30	Lockwasher, 10429	50	Machine screw, 10376
11	Clamping nut, 57183	31	Nut plate, 52561	51	Cord retaining strap, 53791A
12	Key, 52267	32	Latch spring, 57177	52	Plain hexagonal nut, 10511
13	Copy holder bracket, 57184	33	Self-tapping screw, 10329	53	Lockwasher, 10403
14	Spacer, 52317	34	Clamp, 20500	54	Grounding post, 20825
15	Copy holder bracket, 57184	35	Copy light director, 57178	55	Self-locking hexagonal nut, 10500
16	Key, 52267	36	Self-locking hexagonal nut, 10500	56	Adjusting stud, 56206
17	Copy holder adjusting shaft, 52314A	37	Machine screw, 10393	57	Dust cover stay, 52694
18	Retainer ring, 10969	38	Copy light cable assembly, 57173A	58	Cover spring, LH, 53889
19	Retainer ring, 10969	39	Copy lamp, 20701	59	Cover spring, RH, 53888
20	Copy holder clip spring, 52551	40	Plain hexagonal nut, 10517	60	Dust cover, 57170A

Figure 275—Continued.

hold the copy lamp holder of the copy light cable assembly (38) to the dust cover (60); remove the copy light cable assembly (38). Remove the copy lamp (39) from the copy lamp holder.

(11) Remove the plain hexagonal nut (40), lockwasher (41), grounding strap (42), lockwasher (43), machine screw (44), and lockwasher (45) from the dust cover (60).

(12) Remove the self-locking hexagonal nut (46), fastener (47), self-locking hexagonal nut (48), flat washer (49), and machine screw (50) that hold the cord retaining strap (51) to the dust cover (60); remove the cord retaining strap (51).

(13) Remove the two plain hexagonal nuts (52), lockwashers (53), and grounding posts (54) from the dust cover (60).

(14) Remove the four self-locking hexagonal nuts (55) and adjusting studs (56) that hold the two dust cover stays (57) to the dust cover (60); remove the dust cover stays (57). Remove the cover springs (58 and 59).

b. Reassembly. Reassemble the dust cover by reversing the procedures outlined in *a* above.

Section V. SPRING DATA

297. General

a. This sections contains data on the coil springs used in Reperforator-Transmitter TT–76(*)/GGC. This information is useful when inspecting or overhauling the equipment to determine which springs must be replaced. It is also useful as a check list when reassembling, adjusting, or troubleshooting, and as a means of identifying springs.

b. The charts in paragraphs 298 through 301 give the dimensional and strength characteristics required of each spring used in the reperforator. Each type of spring is illustrated in figures 276 through 290. The free length is measured between the inside surfaces of the end hooks. If a spring fails to pass its strength check, it should be replaced.

Note. In some cases, spring tensions are indicated in grams for more accurate adjustments than are possible with ounce scales. To convert from ounces to grams or from grams to ounces, remember that 1 ounce equals 28.35 grams.

298. Crossed-End Spring Data
(fig. 276)

Reference No.	Name	A Free length (in.)	B Extended length (in.)	Required tension, extended length (oz)	C Wire thickness (in.)	D No. of coils	E Diameter (OD) (in.)
50904	Transfer lever trip latch	11/16	13/16	2 1/2 ±3/4	.012 ±.0003	33 3/4	.156
50912	Reel support latch	1/2	21/32	17 1/2 ±1 1/2	.018 ±.0005	12 3/4	.156
50941	Key lever	1/2	5/8	20 ±2	.020 ±.0003	8 3/4	.182
51136	Universal code bar return	11/16	1	15 to 20 grams	.009 ±.0003	46	.150
51544	Locking lever latch	7/8	1 1/8	1 1/2 ±1/4	.010 ±.0003	57	.125
51575	Cam-stop lever	13/16	1 3/16	3 ±1/2	.012 ±.0003	43	.156
52161	Type wheel bell crank lever	1 3/32	1 3/8	4 1/2 to 5	.016 ±.0003	45	.187
52167	Type wheel reciprocating lever	23/32	13/16	30 to 36	.033 ±.0005	8	.250
52169	Letters sensing levers	13/16	1	33 to 36	.022 ±.0003	26 1/4	.141
52171	Figures sensing levers	15/16	1 3/16	26 to 30	.020 ±.0003	33	.141
52172	Shift cam follower	1 5/32	1 5/16	38 to 42	.026 ±.0003	33	.162
52173	Bell sensing lever	13/16	1	24 to 28	.020 ±.0003	28	.141
52212	Lever latch	5/8	3/4	36 to 44 grams	.010 ±.0003	27	.156
52602	Ribbon feed cam follower	13/16	1	33 1/2 ±1 1/2	.025 ±.0003	19	.197
52604	Ratchet feed detent	11/16	7/8	1 3/8 ±1/8	.009 ±.0003	48 3/4	.125
53123	Tape cover latch	7/16	1/2	9 to 11	.018 ±.0003	....	.156
53149	Start-stop lever detent	25/32	7/8	19 to 21	.020 ±.0003	27	.156
53152	Code sensing lever	33/64	45/64	12 ±1	.012 ±.0003	29	.085
53153	Tape feed claw	1/2	21/32	2 3/4 to 3 1/4	.012 ±.0003	23	.125
53154	Tape feed retracting lever	15/32	3/4	11 to 13	.014 ±.0003	12	.156
53155	Clutch magnet armature	19/32	25/32	4 to 6	.012 ±.0003	32 1/4	.125
53283	Ratchet pawl spring	13/32	1/2	1/2 to 1	.022 ±.0005	14	.125
53312	Indicator return latch	19/32	3/4	3 1/4 to 3 3/4	.012 ±.0003	....	.141
53313	Detent spring	11/32	1/2	2 3/4 ±1/4	.010 ±.0003	10	.125
53569	Code-ring locking bail cam follower.	15/16	1 11/32	11 ±1	.018 ±.0003	32	.191
53974	Space bar	1/2	5/8	86 ±9	.031 ±.0005	5 3/4	.218
55009	Y-lever detent	1/4	.342	90 to 130 grams	.009 ±.0003	12 3/4	.083

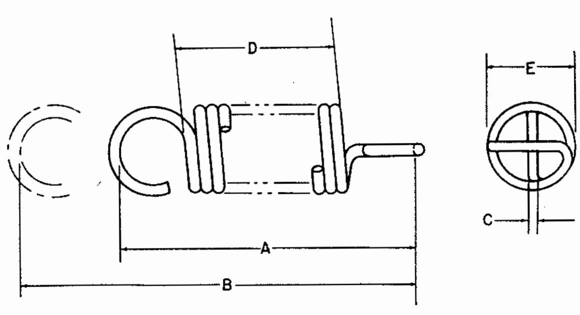

Figure 276. Crossed-end spring.

299. Parallel-End Spring Data
(fig. 277)

Reference No.	Name	A Free length (in.)	B Extended length (in.)	Required tension, extended length (oz)	C Wire thickness (in.)	D No. of coils	E Diameter (OD) (in.)
50334	Governor adjusting	15/16	1	32 ±3	.026 ±.0005	26 1/2	.156
50678	Copy retaining arm	11/16	7/8	32 ±4	.025 ±.0005	17	.172
50944	Repeat blocking lever	15/32	9/16	2 1/2 ±1/2	.010 ±.0003	21	.125
51548	Contact bail	7/16	9/16	11 ±1	.015 ±.0003	16	1/8

Reference No.	Name	A Free length (in.)	B Extended length (in.)	Required tension, extended length (oz)	C Wire thickness (in.)	D No. of coils	E Diameter (OD) (in.)
51574	Sensing lever locking bail.....	5/8	27/32	2 1/2 ±1/4	.012 ±.0003	31	.156
52163	Print hammer lever..........	7/8	1 1/16	18 to 22	.025 ±.0003	16 1/2	.250
52166	Detent lever................	7/16	1/2	25 ±2	.020 ±.0003	10 1/4	.156
52168	Figures-letters lever..........	1 1/4	1 7/16	3 1/2 ±1/4	.012 ±.0003	74	.125
52192	Back space pawl............	9/32	11/32	5 1/2 ±1	.011 ±.0003	5	.125
52193	Back space lever............	15/32	9/16	9 to 11	.016 ±.0003	11 1/4	.156
52266	Switch operating lever.......	5/8	13/16	11 to 13	.018 ±.0003	15	.187
52576	Alarm lever................	3 13/16	4 3/16	18 to 22	.025 ±.0003	140	.197
52603	Ribbon retainer lever........	5/8	1	2 1/4 to 2 3/4	.012 ±.0003	27	.165
53139	Tape feed-out operating arm..	27/32	1 1/8	9 to 11	.020 ±.0003	....	.250
53140	Latching lever..............	27/32	1	7 to 9	.020 ±.0003	....	.250
53148	Latch spring................	9/16	5/8	12 to 14	.022 ±.0003	....	.187
53304	Clapper arm spring..........	1 1/16	1 1/4	3 3/4 to 4 1/4	.015 ±.0003	....	.187
53311	Pawl spring................	17/32	5/8	.9 to 1.1	.010 ±.0003	....	.125
54948	Copy retaining arm..........	7/16	5/8	2 lb ±4	....	....	172

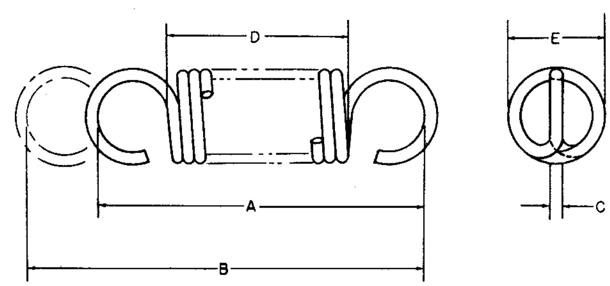

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Figure 277. Parallel-end spring.

300. Extension Spring Data

(fig. 278)

Reference No.	Name	A Free length (in.)	B Extended length (in.)	Required tension, extended length (oz)	C Wire thickness (in.)	D No. of coils	E Diameter (in.)
50847	Friction clutch.............	1/2 ±1/32	9/32	10 lbs ±8	.053 ±.0005	4	.453 ID
50848	Sliding clutch..............	3/4 ±1/16	7/16	28 ±3	.041 ±.0005	5 1/2	.578 ID
50910	Friction plate..............	17/32	5/16	32 ±3	.028 ±.0005	6 1/2	.250 ID
50914	Friction clutch.............	13/32	9/32	6 lbs ±10	.049 ±.001	4 1/2	.390 ID
51593	Contact plunger............	5/8 ±3/64	5/16	7 ±1	.012 ±.0003	11	.125 ID
51855	Governor adjusting pressure..	5/8 ±1/32	.047	....	.014 ±.0003	6	.240 OD
52813	Tape cover................	7/16 ±1/32	9/32	28 ±3	.018 ±.0003	13 1/2	.125 OD
52940	Stop bar lever..............	37/64 ±1/64	.375	8 ±1/2	.016 ±.0003	11 1/2	.183 OD
53256	Holding clip detent..........	17/32	3/8	9 to 11 lbs.	.028 ±.0005	....	.141 OD
54932	Friction clutch.............	13/32±3/64	9/32	6 lbs ±10	.067 ±.0001	3 1/2	.6875 ID
56091	Selector magnet cover........	5/16 ±3/64	.100	....	.012 ±.0003	5	.125 ID
56249	Friction clutch.............	1/2 ±3/64	9/32	10 lbs 8 ±8	.076 ±.001	3 1/2	.891 ID
57203	Tape cover latch............	1/2	.281	20 ±2	.013 ±.0003	20	.086 OD
57391	Release plunger............	1	1/4	1 1/4 ±1/4	.010	12 1/2	.203 ID

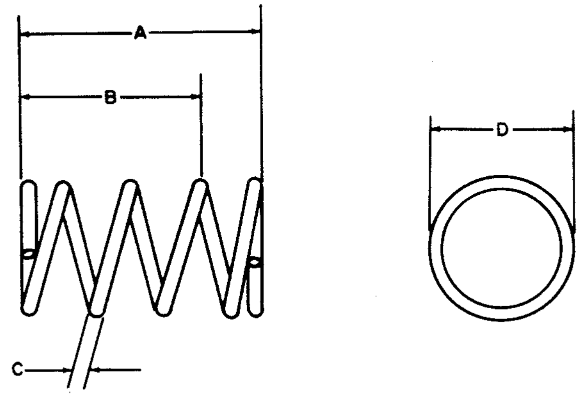

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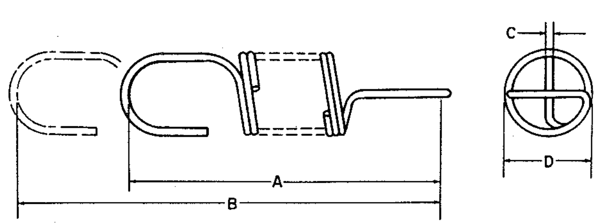
Figure 278. Extension spring.

301. Special Spring Data
(fig. 279)

Fig. No.	Reference No.	Name	A Free length (in.)	B Extended length (in.)	Required tension, extended length (oz)	C Wire thickness (in.)	D No. of coils	E Diameter (in.)
279	50902	Selector lever	1	1¼	8 ±1	.012 ±.0003	55 max.	.085 OD
280	52422	Tape retainer	⅜			.033 ±.0005	10	.265 ID
281	52551	Copy holder clip	½ ±1/32			.045 ±.0005	10	.172 ID
282	52579	Jack guard door	9/16			.016 ±.0003		.109 OD
283	53156	Tape-out lever	1 1/16 ±1/16			.016 ±.0003	52	.188 OD
284	53289	Cam follower	⅛ ±1/32		5 ±½	.0220 ±.0005	3	7/16 ID
285	53586	Blocking bar	5/32			.016	9⅛	.140 ID
286	53888	Cover, R H	¼			.0625 ±.0005	1	
287	53889	Cover, L H	¼			.0625 ±.0005	1	
288	55674	Transfer lever	1 3/32	1¼	3¾ lbs ±4	.035 ±.0005	14	9/32 OD
289	56324	Tape cover	5/32			.024 ±.0003	6	5/32 ID
290	56396	Tape guide lever			35 grams ±10 grams	.012 ±.0005	3	.258 ID



TM2225-319

Figure 279. Selector lever spring.

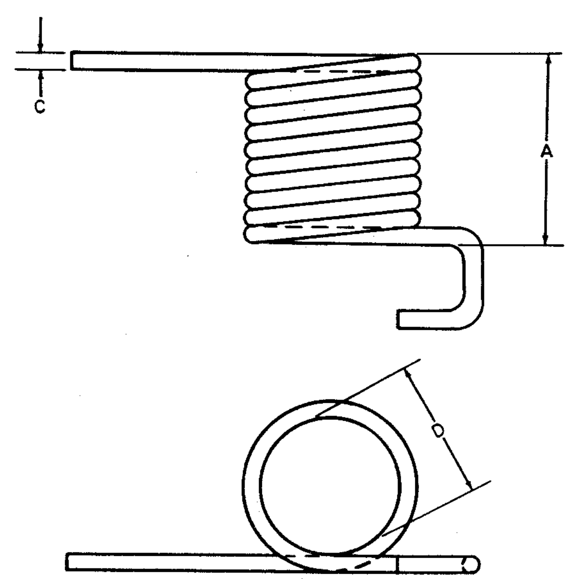


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Figure 280. Tape retainer spring.

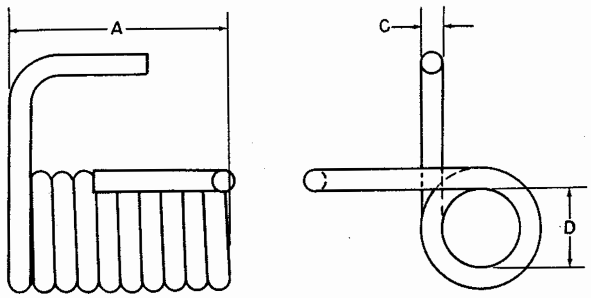

Figure 281. Copy holder clip spring.

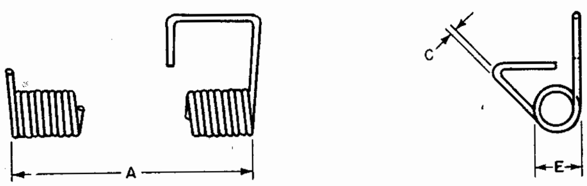

Figure 282. Jack guard door spring.

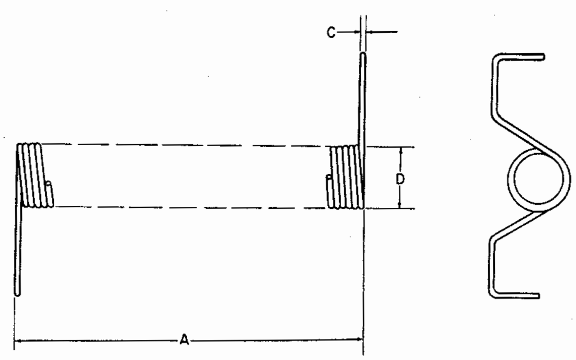

Figure 283. Tape-out lever spring.

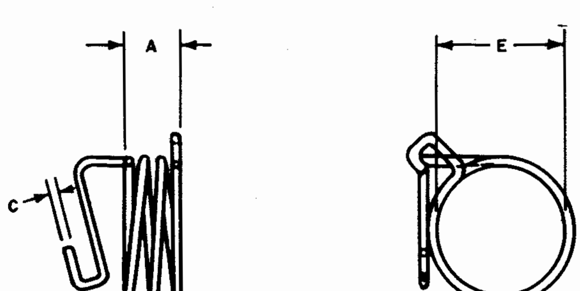

Figure 284. Cam follower spring.

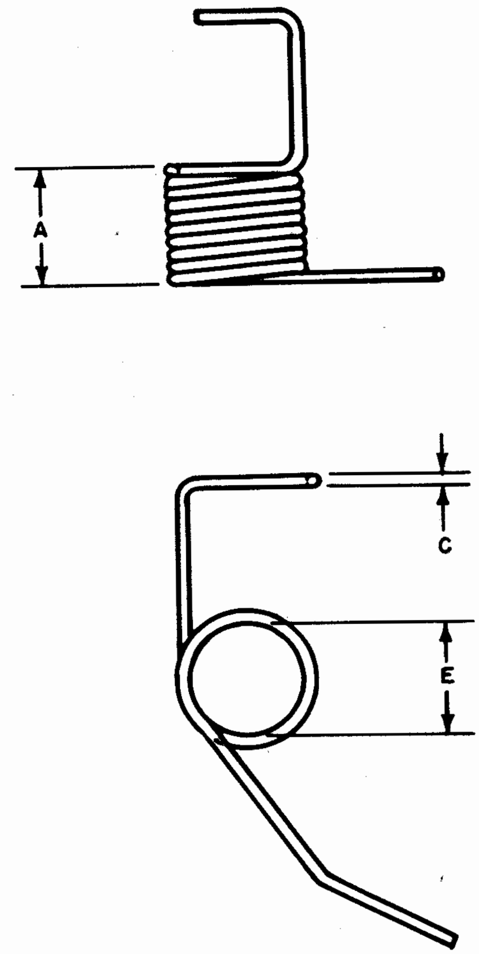

Figure 285. Blocking bar spring.

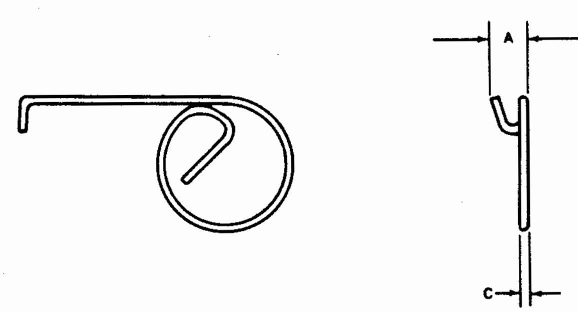

Figure 286. Cover spring, right hand.

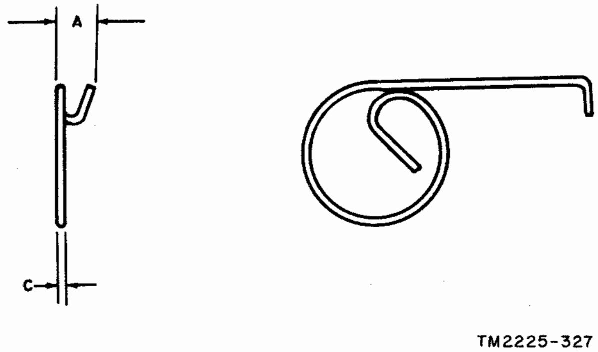

Figure 287. Cover spring, left hand.

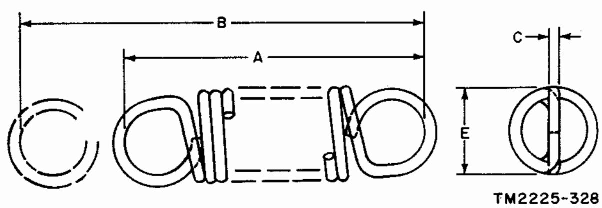

Figure 288. Transfer lever spring.

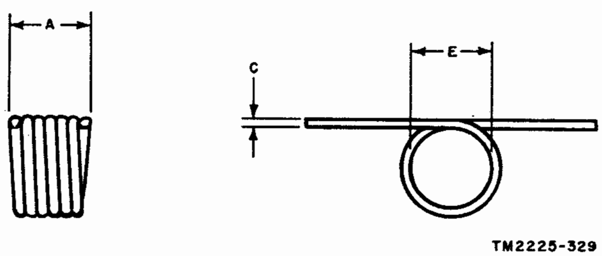

Figure 289. Tape cover spring.

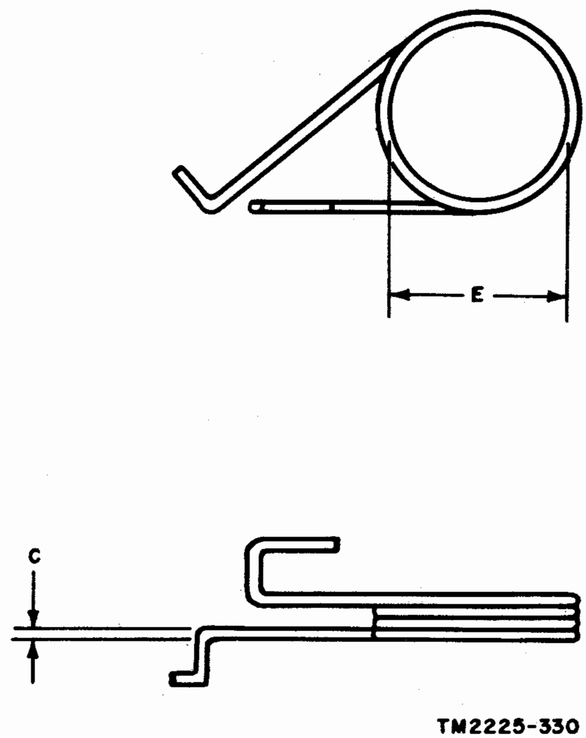

Figure 290. Tape guide lever spring.

Section VI. FINAL TESTING

302. General

Reperforator-Transmitter TT–76(*)/GGC should meet certain performance requirements before it is returned to operational service. This section describes the procedures for final testing the operational limits of the set.

303. Test Sets

The equipment used most frequently for teletypewriter final testing at the field maintenance level is described below.

a. Test Set TS–2/TG. This test set (fig. 207) is a portable, motor-driven unit which transmits test signals of controlled distortion. It is normally used to test the ability of teletypewriter receiving mechanisms to operate with distorted signals. It provides test signals with either marking or spacing bias and marking or spacing end distortion. Bias and end distorition in the test signals are adjustable from 0 to 50 per cent. Four test signals (R, Y, space, or test message) can be transmitted continuously by this test set. TM 11–2208, Test Sets TS–2/TG, TS–2A/TG and TS–2B/TG, contains detailed information on the use of this set.

b. Distortion Test Set TS–383/GG. This test set (fig. 208) is a motor-driven set used for analyzing distortion in signals transmitted by a teletypewriter and, like Test Set TS–2/TG, for testing the effects of distortion on receiving mechanisms. It is not as portable as Test Set TS–2/TG and normally is used in the larger repair shops. The set can transmit a test message or Y. T. O. M. V. R. BLK (blank) and LET (letters) code groups with controlled distortion for testing the operational limits of teleypewriter selector mechanisms. The signals provided by this set can be either undistorted or distorted to a controlled degree up to 100 per cent. Signals transmitted by a transmitter under test can be visually analyzed to detect any deviations from undistorted signals. TM 11–2217, Distortion Test Sets TS–383/GG and TS–383A/GG, gives detailed information on the use of this test set.

304. Receiving Test

a. Preparation.

(1) Position the reperforator-transmitter selector switch to LOCAL REPUNCH.

(2) Turn the motor switch to ON and adjust the motor speed as directed in paragraph 16*a*.

(3) Insert the send cord from the TS–2/TG or TS–383/GG into the TD or TR jack located in the keyboard guard assembly.

(4) Arrange the test set to send the test message with undistorted signals.

(5) Check the tape for incorrect printing and punching.

b. Range Test (TT–76/GGC).

(1) Connect the reperforator-transmitter as described in *a*(1) above. Arrange the test set to transmit the test message with undistorted signals.

(2) While receiving the test message, set the rangefinder dial at 60. Slowly turn the bias potentiometer knob for maximum and minimum good copy positions. Note the dial reading and set the potentiometer 5 points above the midpoint between the two readings.

(3) While still receiving the test message, determine the upper limit of the range with the rangefinder dial.

(4) After the upper limit is established, determine the lower limit.

(5) Calculate the difference between the upper and lower limits. This difference (range of the reperforator) should be at least 72 units on the dial.

(6) Set the range dial at the midpoint between the two limits. Tighten the rangefinder dial lock on TT–76/GGC.

c. Range Test (TT–76A/GGC).

(1) Connect the reperforator-transmitter as described in *a*(1) above. Arrange the test set to transmit the test message with undistorted signals.

(2) Remove the strap across the BIAS TEST MA terminals on the power supply and terminal unit. Connect a milliameter in series with the terminal posts.

(3) Loosen the locknut on the shaft of the bias potentiometer and turn the shaft with a screwdriver until a reading of 8.75 ma is obtained for 20-ma operation or a reading of 12.25 ma is obtained for 60-ma operation. Tighten the locknut and rcheck the adjustment.

(4) Disconnect the milliameter and reconnect the strap between the BIAS TEST MA terminals.

(5) Complete the range test as described in *b*(3) through *b*(6) above.

d. Bias Tolerance Test. Within certain minimum limits of distortion, this reperforator-transmitter should normally operate properly while receiving signals that contain bias distortion. The bias tolerance of a properly adjusted reperforator-transmitter operating at 60 words per minute should be a minimum of 40 per cent, computed as described in (5) below. The bias tolerance of a properly adjusted reperforator-transmitter operating at 100 words per minute should be a minimum of 35 per cent, computed as described in (6) below. When signal distortion test sets are arranged to transmit test signals with bias distortion, the set changes the beginning time of each marking impulse with respect to the beginning time of the start impulse. When adjusted to transmit signals with *marking bias,* the test set *advances* the *beginning* of each marking impulse, when adjusted to transmit signals with *spacing bias,* the set *retards* the *beginning* of each marking *impulse.* The bias tolerance of a reperforator-transmitter may be tested in the following manner:

(1) Interconnect the reperforator and a distortion test set in a test circuit as described in *a* above. Arrange the test set to transmit the test message.

(2) Set the bias potentiometer dial at the optimum point as determined in *b* above.

(3) Adjust the test set to transmit signals with a *marking* bias of 35 per cent for 60 words per minute operation or 30 per cent for 100 words per minute operation. Use these test signals to determine the upper range limit with the rangefinder.

(4) Adjust the test set to transmit signals with a *spacing* bias of 35 per cent for 60 words per minute or 30 per cent for 100 words per minute operation. Determine the lower limit of the range with the rangefinder.

(5) Compute the bias tolerance of the reperforator operating at 60 words per minute using the following formula:

$$\text{Bias tolerance} = 35 + \left(\frac{\begin{matrix}\text{Upper limit} \\ \text{marking bias}\end{matrix} - \begin{matrix}\text{Lower limit} \\ \text{spacing bias}\end{matrix}}{2} \right)$$

(6) Compute the bias tolerance of the reperforator operating at 100 words per minute using the following formula:

$$\text{Bias tolerance} = 30 + \left(\frac{\begin{matrix}\text{Upper limit} \\ \text{marking bias}\end{matrix} - \begin{matrix}\text{Lower limit} \\ \text{spacing bias}\end{matrix}}{2} \right)$$

e. End Distortion Test. The reperforator-transmitter should operate properly while receiving signals containing end distortion within certain minimum limits. The end distortion tolerances of a properly adjusted reperforator-transmitter operating at 60 words per minute should be a minimum of 35 per cent computed as described in (5) below. The end distortion tolerances of a properly adjusted reperforator-transmitter operating at 100 words per minute should be 30 per cent, computed as described in (6) below. When signal distortion test sets are arranged to transmit signals with end distortion, the set changes the ending time of each marking impulse with respect to the beginning time of the start impulse. When adjusted to transmit test signals with *spacing* end distortion, the test set *advances* the *end* of each marking code impulse. When adjusted to transmit test signals with *marking* end distortion, the test set *retards* the end of each marking code impulse. The end distortion tolerance of a reperforator-transmitter may be tested in the following manner:

(1) Interconnect the reperforator-transmitter and a distortion test set in test circuit as described in *a* above. Arrange the test set to transmit test message signals.

(2) Set the bias potentiometer at the optimum point as determined in *b* above.

(3) Adjust the test set to transmit test signals with 35 per cent spacing end distortion for 60 words per minute operation or with 30 per cent spacing end distortion for 100 words per minute operation. Use the test signals to determine the upper range limit with the rangefinder.

(4) Adjust the test set to transmit test signals with 35 per cent marking end distortion for 60 words per minute operation or with 30 per cent marking end distortion for 100 words per minute operation. Use the test signals to determine the lower limit of the range with the rangefinder.

(5) Compute the end distortion tolerance of the reperforator-transmitter operating at 60 words per minute using the following formula:

$$\begin{matrix}\text{End distortion} \\ \text{tolerance}\end{matrix} = 35 + \left(\frac{\begin{matrix}\text{Upper limit} \\ \text{spacing end} \\ \text{distortion}\end{matrix} - \begin{matrix}\text{Lower limit} \\ \text{marking end} \\ \text{distortion}\end{matrix}}{2} \right)$$

(6) Compute the end distortion tolerance of the reperforator-transmitter operating at 100 words per minute using the following formula:

$$\begin{matrix}\text{End distortion} \\ \text{tolerance}\end{matrix} = 30 + \left(\frac{\begin{matrix}\text{Upper limit} \\ \text{spacing end} \\ \text{distortion}\end{matrix} - \begin{matrix}\text{Lower limit} \\ \text{marking end} \\ \text{distortion}\end{matrix}}{2} \right)$$

f. Internal Bias. Internal bias of a teletypewriter receiving unit is a computed measurement of the effect of maladjustment, wear, or some other mechanical fault within the mechanism. It is used as a measure of mechanical efficiency of a receiving unit. The internal bias of the reperforator-transmitter is found by calculating the difference between the bias tolerance orientation point (midpoint between the high and low range limits (as described in *c* above) and the end distortion orientation point as described in *d* above. If the difference between the two orientation points at 60 words per minute operation is greater than six points, some mechanical fault is present in the reperforator-transmitter and the mechanism should be rechecked for maladjustment or other mechanical fault.

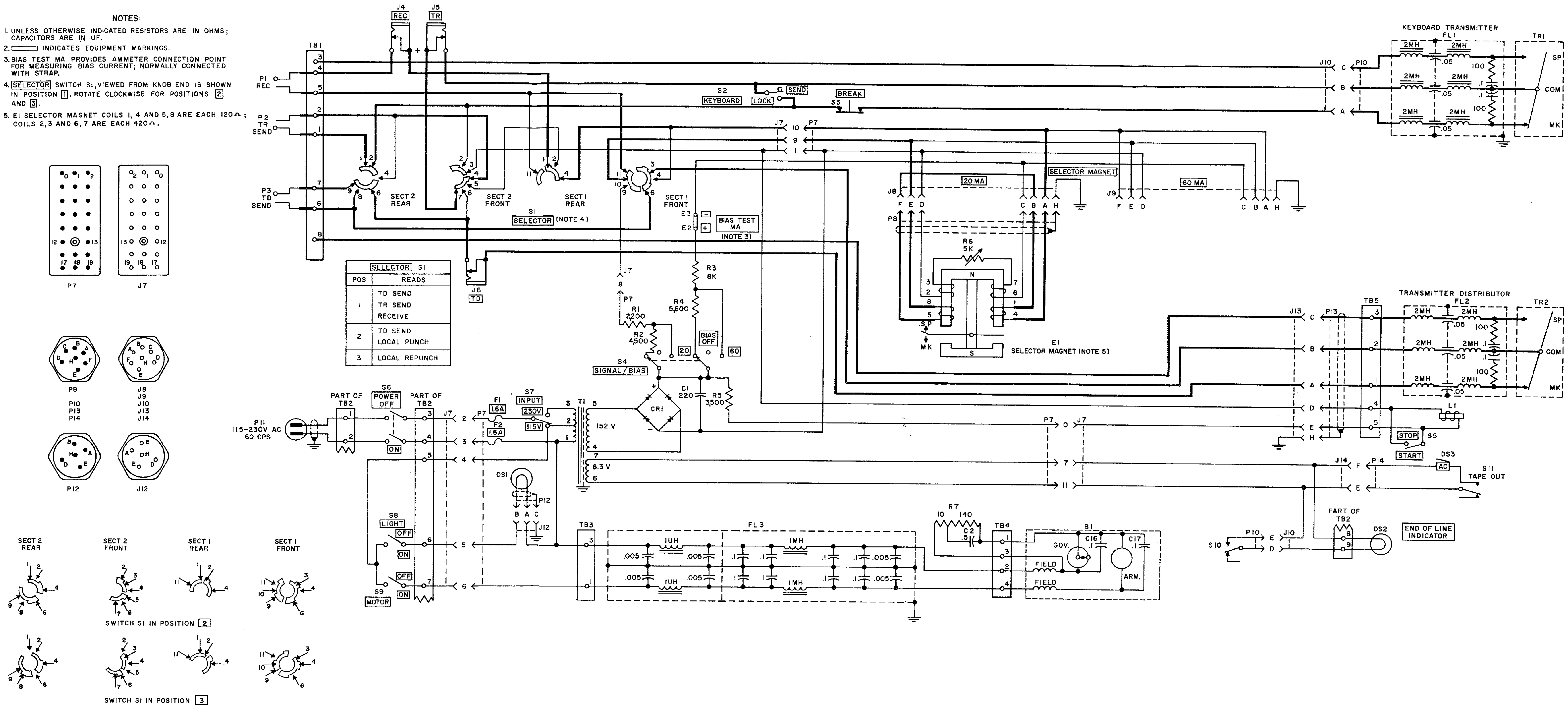

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Figure 292. Reperforator-Transmitter schematic diagram (TT-76A/GGC).

NOTES:

1. UNLESS OTHERWISE INDICATED RESISTORS ARE IN OHMS; CAPACITORS ARE IN UF.
2. [ ] INDICATES EQUIPMENT MARKINGS.
3. [SELECTOR] SWITCH S9, VIEWED FROM KNOB END IS SHOWN IN POSITION [1]. ROTATE CLOCKWISE FOR POSITIONS [2] AND [3].
4. E2 SELECTOR MAGNET COILS 1,4 AND 5,8 ARE EACH 125 Ω; COILS 2,3 AND 6,7 ARE EACH 420 Ω.

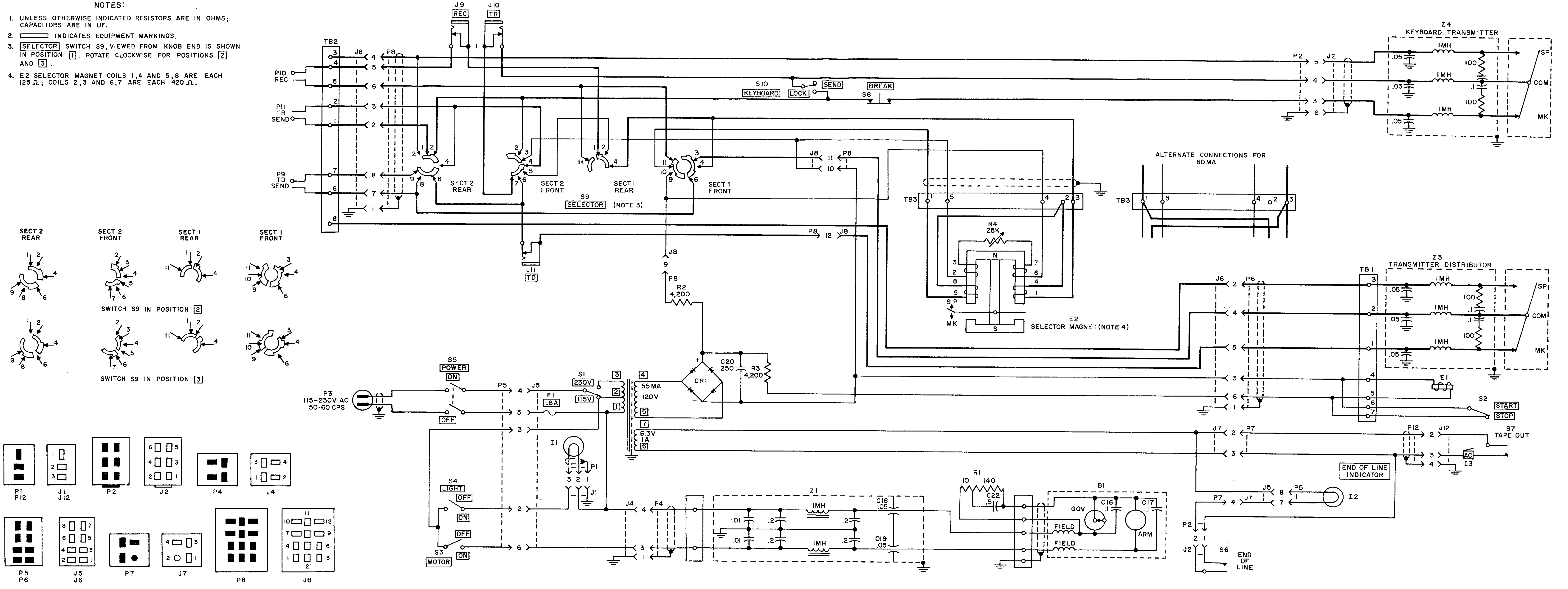


Figure 291. Teletypewriter Set schematic diagram (TT-76/GGC).

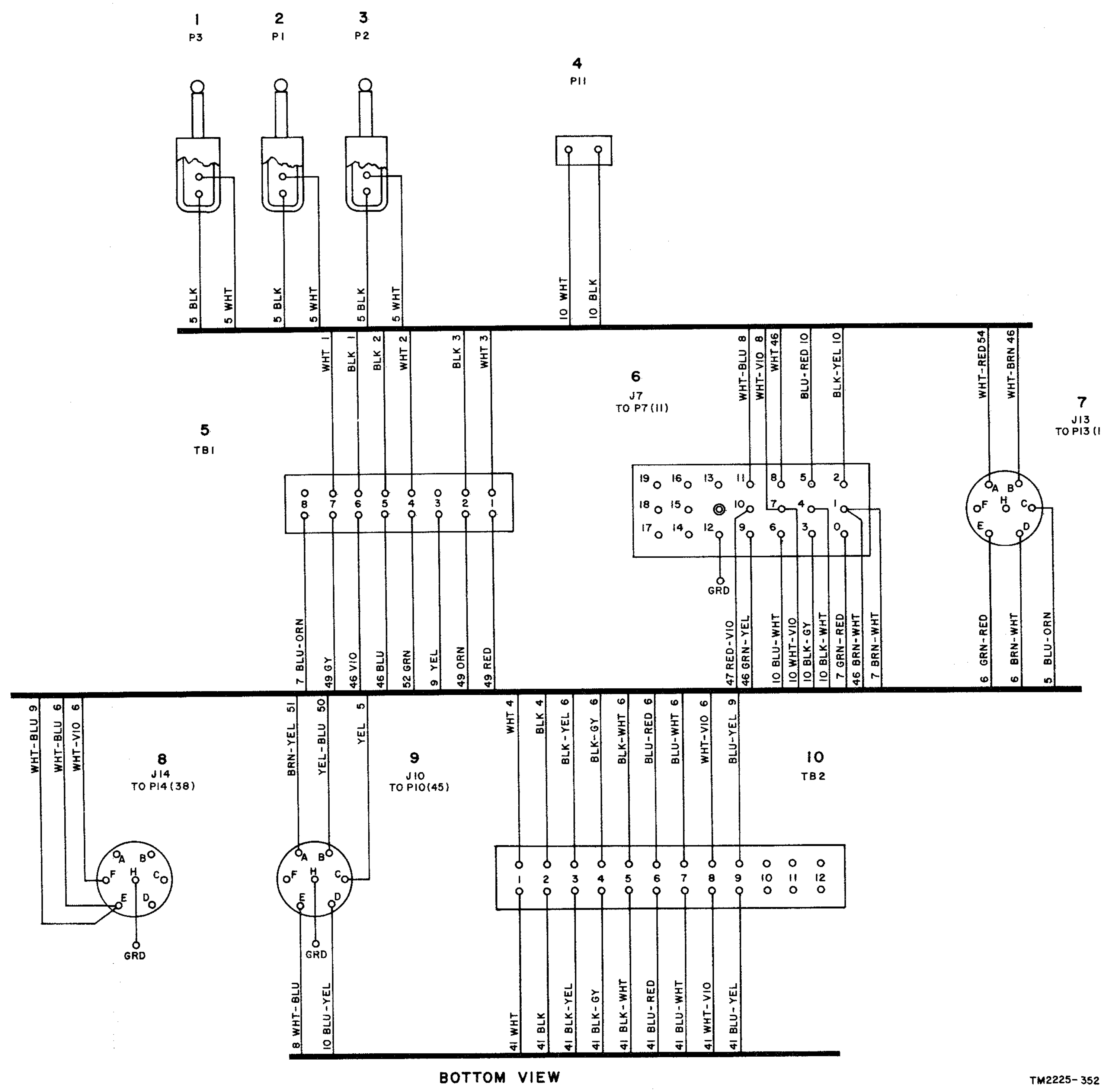
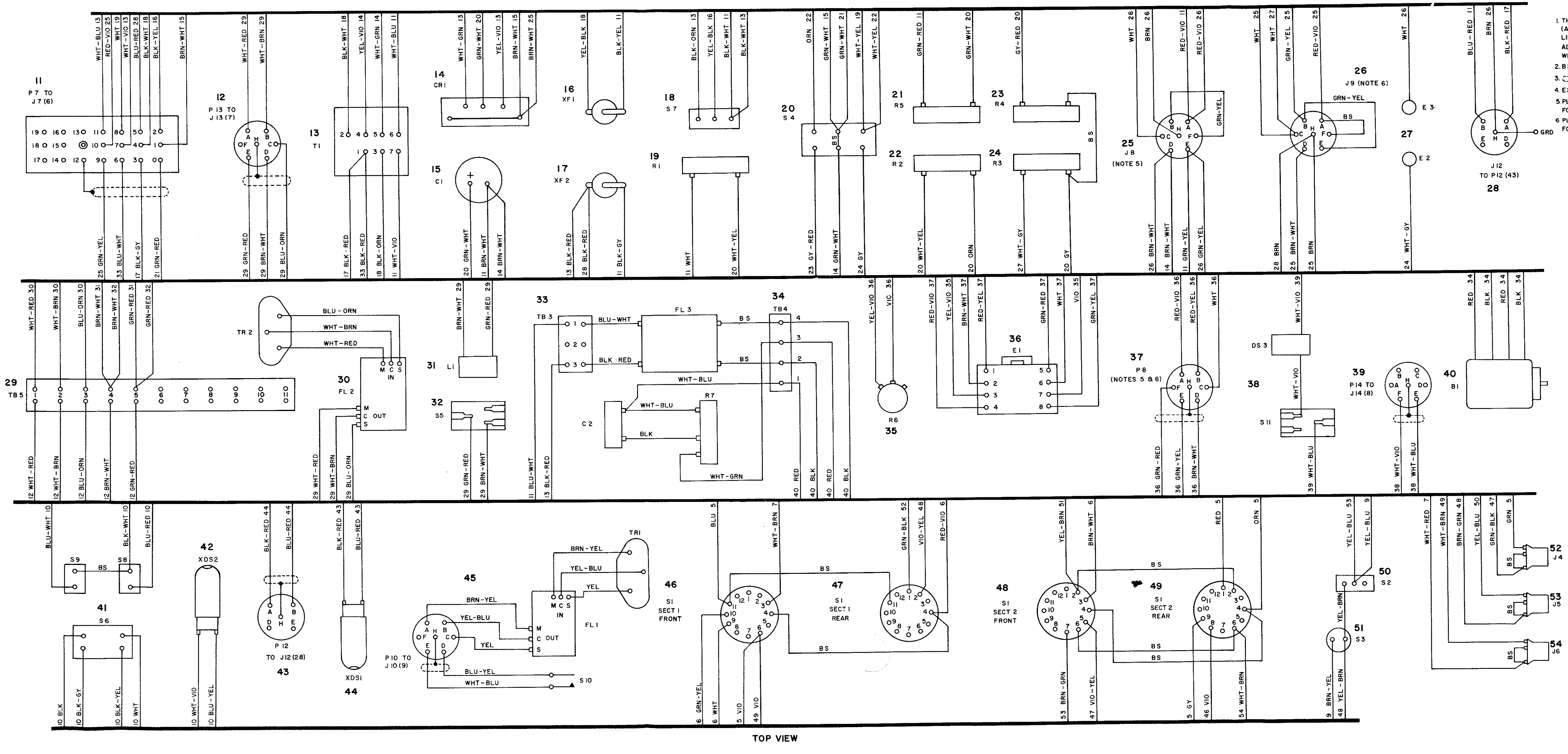


Figure 294. Reperforator-Transmitter airline diagram (TT-76A/GGC).



NOTES:

1. THE SMALL NUMBER ON EACH WIRE (ADJACENT TO THE COMMON OR BASE LINE) CORRESPONDS TO THE LARGE NUMBER ADJACENT TO THE STATION TO WHICH THE WIRE RUNS.
2. BS DENOTES TINNED COPPER PER ASA H4.4.
3. DENOTES SHIELDED CONNECTIONS
4. E2 AND E3 ARE FOR TEST BIAS MA
5. PLUG P8 (37) IS INSERTED INTO JACK J8 (25) FOR 20 MA OPERATION.
6. PLUG P8 (37) IS INSERTED INTO JACK J9 (26) FOR 60 MA OPERATION.

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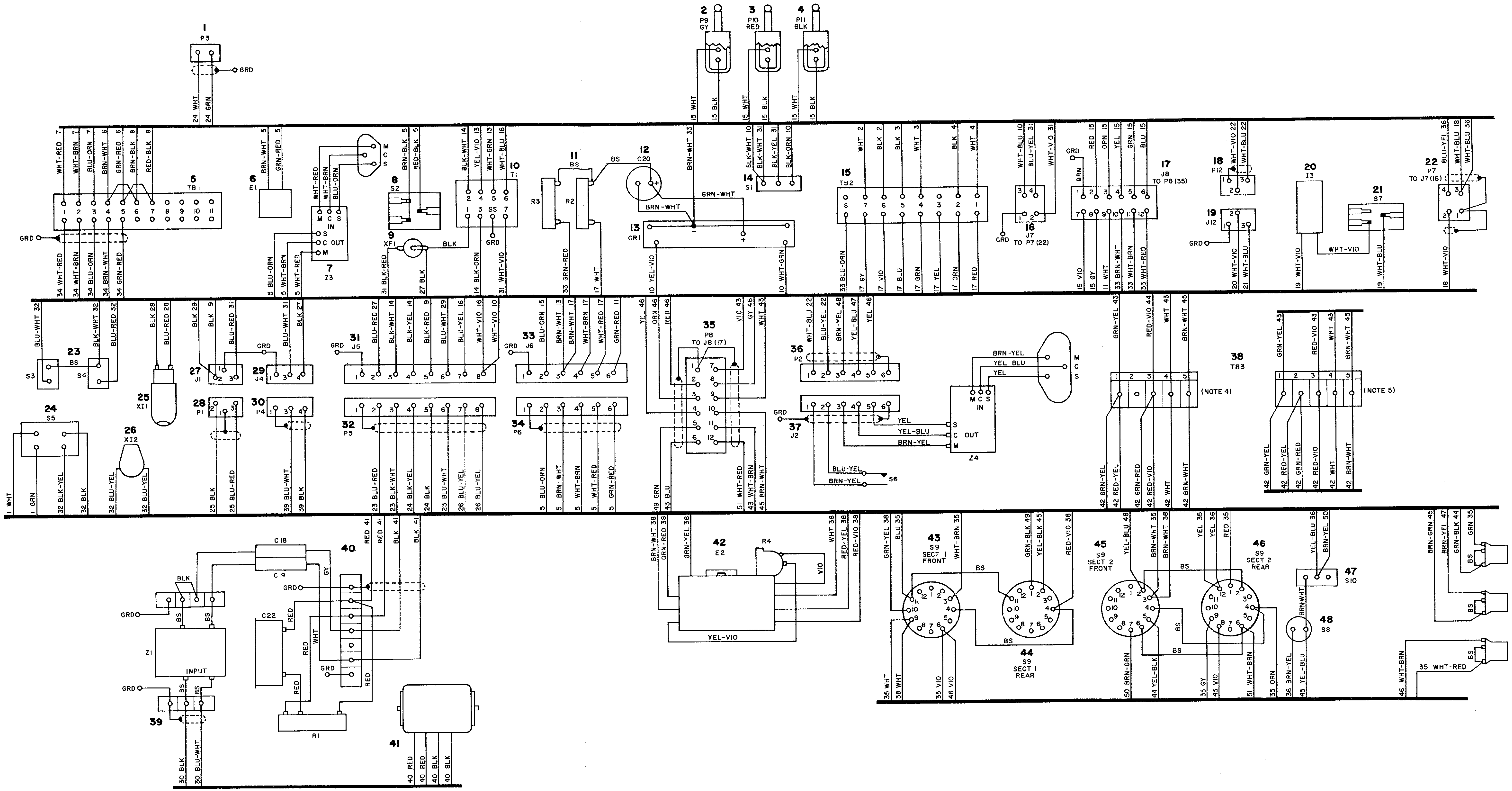
Figure 294—Continued.



NOTES:

1. THE SMALL NUMBER ON EACH WIRE (ADJACENT TO THE COMMON OR BASE LINE) CORRESPONDS TO THE LARGE NUMBER ADJACENT TO THE STATION TO WHICH THE WIRE RUNS.
2. BS DENOTES TINNED COPPER PER ASA H4.4.
3. ⊂⊃— DENOTES SHIELDED CONNECTION.
4. TERMINAL BLOCK TB3 CONNECTED FOR 60MA OPERATION.
5. TERMINAL BLOCK TB3 CONNECTED FOR 20MA OPERATION.

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Figure 293. Teletypewriter Set airline diagram (TT–76/GGC).

305. Sending Sets

The keyboard-transmitter and transmitter-distributor may be tested by either of two methods. The first method requires the use of Distortion Test Set TS–383/GG. The second method requires the use of a teletypewriter receiving unit, known to be in good operating condition, and a source of undistorted teletypewriter signals.

a. When Test Set TS–383/GG is available proceed as follows:

(1) Place the SELECTOR switch in the LOCAL REPUNCH position.

(2) Connect the receive cord from the test set to the TD jack in the keyboard guard assembly.

(3) Connect the test set to power and set the controls and test as directed in TM 11–2217 for testing transmitting contacts of teletypewriters.

b. If Test Set TS–383/GG is not available, determine whether the receiving unit of the set is operating according to the instructions in paragraph 304, and proceed as follows:

(1) Place the SELECTOR switch in the LOCAL REPUNCH position.

(2) Send from the keyboard-transmitter and the transmitter-distributor, in turn, five copies of the following: THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890, LTRS, CAR. RET., LINE FEED, then follow by all the remaining upper case characters.

(3) Inspect the tap reproduced by the reperforator for errors in printing or punching.

(4) Check the range of the reperforator as described in paragraph 304*b*. If there is a difference of more than 10 points between the range of the reperforator-transmitter when receiving from either the keyboard-transmitter or transmitter-distributor and the range when receiving from a known source of undistorted signals such as Test Set TS–2/TG, the transmitting mechanism must be readjusted.

CHAPTER 7

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

306. Disassembly

a. Prepare Teletypewriter Set AN/GGC–3 for storage in the following steps:

(1) Disconnect the signal and power cords from the teletypewriter set.

(2) Remove the chad bin.

(3) Remove the legs from the table.

(4) Remove the roll of paper tape from the tape reel.

b. Prepare Teletypewriter Reperforator-Transmitter TT–76(*)/GGC for storage in the following steps:

(1) Disconnect the signal and power cords.

(2) Remove the chad bin, chad bin mounting equipment, the tape guide, tape storage bin assembly, and the tape storage bin mounting equipment.

(3) Remove the screws, plain washer, lockwashers, and nuts which hold the reperforator-transmitter to the table; remove the reperforator-transmitter.

307. Repacking for Shipment and Limited Storage

a. If the original packing materials are on hand, use them and reverse the unpacking procedures given in paragraph 10. General repacking information is usually available at depots.

b. The prime requirement is to pack the equipment so as to prevent damage during transit or limited storage. Package the equipment securely and use sufficient wadding to minimize the effects of severe jolting. Make sure that the equipment is protected from rain or snow.

Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

308. General

Demolition of the equipment will be accomplished only upon the order of the commander. The demolition procedures outlined in paragraph 309 will be used to prevent the enemy from using or salvaging the equipment.

309. Destruction of Components

a. Smash. Smash the reperforator, keyboard-transmitter and transmitter-distributor covers, frames, accessories, controls, switches, and all parts; use sledges, crowbars, axes, handaxes, pickaxes, hammers, or heavy tools.

b. Cut. Cut all cords and wiring; use axes, handaxes, or matchetes.

c. Burn. Burn technical manuals, circuit labels, other diagrams, resistors, coils, capacitors, cords and wiring; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Explosives. If explosives are necessary, use firearms, grenades, or TNT.

e. Disposal. Bury or scatter the destroyed parts in slit trenches, fox holes, or throw them in streams.

f. Destroy. Destroy everything.

INDEX

[AG 413.48 (27 Mar 57)]

By order of the Secretaries of the Army and the Air Force:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:
HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

N. F. TWINING,
Chief of Staff, United States Air Force.

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J. L. TARR,
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Div
Ft & Cp
Sp Wpn Com
Army Cml Cen
Gen & Br Svc Sch
Gen Depots
Sig Sec, Gen Depots
Sig Depots
US Army Tng Cen
AMS
POE (OS)
Trans Terminal Comd
Army Terminals
OS Sup Agencies
Army Elct PG
Sig Fld Maint Shops
Sig Lab
WRAMC
ACS
Mil Dist
JBUSMC
Units org under fol TOE:
10–377
11–7
11–15
11–16
11–17
11–57
11–95
11–97
11–98
11–117
11–127
11–128
11–500
11–557
11–587
11–592
11–597

NG: State AG; units—same as Active Army.

USAR: None.

For explanation of abbreviations used, see SR 320–50–1.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1957—423364

TM 11–2225/TO 31W4–2GGC–101 TELETYPEWRITER SET AN/GGC TELETYPEWRITER REPERFORATOR-TRANSMITTERS TT–76/GGC AND TT–76A/GGC—1957