NAVELEX 0967-LP-616-7020

TECHNICAL MANUAL

OPERATION AND MAINTENANCE INSTRUCTIONS WITH PARTS LIST

KEYBOARD SEND-RECEIVE (KTR) AND RECEIVE-ONLY (ROTR) TYPING REPERFORATOR SETS MODEL 28

VOLUME 2

Manufactured by
Teletype Corporation

Manual Prepared by
Western Technical Associates
N00039-76-C-0153

This publication supercedes NAVSHIPS 0967-LP-173-9010, NAVSHIPS 0967-LP-173-9020, NAVSHIPS 0967-LP-173-9030, dated February 1973.

Published by direction of Commander, Naval Electronic Systems Command

27 APRIL 1978

LIST OF EFFECTIVE PAGES	INSERT LATEST CHANGED PAGES. DESTROY SUPERCEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original ... 0 ... 27 Apr 78

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 654 CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Title	0
A	0
i - xlvii	0
xlviii blank	0
6-1 - 6-347	0
6-348 blank	0
7-1 - 7-223	0
7-234 blank	0
8-1 - 8-19	0
8-20 blank	0

*Zero in this column indicates an original page.

VALIDATION PERFORMANCE

Title of Publication

Keyboard Send-Receive (KTR) and Receive-Only (ROTR) Typing Reperforator Sets Model 28 Volume 2

Contractor

Subcontractor (if performing validation):

WESTERN TECHNICAL ASSOCIATES

Contract No.(s) and Purchase Orders, if applicable

Contract No. N00039-76-0153

Chapter	Section	Paragraph	Date Validation Completed	Check here if not validated
6	I - V	6-1 - 6-9.3	4/10/78	
7		7-1 - 7-5	4/10/78	
8		8-1 - 8-6	4/10/78	

Name & Authority of Validating Officer:

Kenneth S. Brown
Publications Supervisor

Signature of Validating Officer:

Kenneth S. Brown

RECORD OF CHANGES

CHANGE NO.	DATE	TITLE OR BRIEF DESCRIPTION	ENTERED BY

TABLE OF CONTENTS

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLF OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF ILLUSTRATIONS - Continued

LIST OF TABLES

CHAPTER 6
CORRECTIVE MAINTENANCE

6-1. INTRODUCTION. This chapter provides information regarding adjustment and repair of Keyboard Send-Receive (KTR) and Receive-Only (ROTR) Typing Reperforator Sets Model 28. The chapter is divided into five sections as follows:

a. Section I - provides adjustment procedures for basic units.

b. Section II - provides additional adjustment procedures required for variable features of basic units.

c. Section III - provides adjustment procedures for basic units (earlier designs) that differ from those in Section I.

d. Section IV - provides additional adjustment procedures required for variable features of basic units (earlier designs) that differ from those in Section II.

e. Section V - provides repair information in the form of disassembly and reassembly procedures.

6-2. GENERAL. Adjustment procedures provided in this chapter are those required to be performed as a result of an abnormal indication in a periodic mechanical check (Chapter 4), to correct a fault discovered during troubleshooting (Chapter 5), or to be performed after reassembly (section V of this chapter).

SECTION I - ADJUSTMENTS (BASIC UNITS)

6-3. TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 ADJUSTMENTS. The following paragraphs contain information necessary for making required adjustments to the typing reperforator and tape printer units of the Typing Reperforator and Tape Printer Teletypewriter Sets Model 28 for high-level and low-level operation.

6-3.1 TYPING REPERFORATOR AND TAPE PRINTER UNIT ADJUSTMENTS (HIGH-LEVEL). Perform the following procedures to ensure proper adjustment of the typing reperforator units.

NOTE

When the adjustment procedure calls for the clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latchlever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch shoes are wedged firmly against the clutch drum. When the main shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve the drag on the clutch and permit the main shaft to rotate freely, apply pressure on a lug of the clutch disc with a screwdriver to cause it to engage its latchlever and thus disengage the internal expansion clutch shoes from the clutch drum.

a. Chad Chute Assemblies Adjustments for Fully Perforated Tape. Perform chad chute (fully perforated tape) adjustments in accordance with the following paragraphs.

(1) Chad Chute for Self-Contained Typing Reperforator Set. Adjust as follows:

(a) Refer to figure 6-1.

(b) Chad chute should be flush with top of punch block.

(c) To adjust, loosen mounting screws friction tight, reposition chad chute, and tighten screws.

(2) Chad Chute for Multiple Typing Reperforator Set Adjust as follows:

(a) Refer to figure 6-2.

(b) Chad chute should be flush with top of punch block.

(c) Chad chute assembly should be adjusted so clearance is maximum in all directions between each chad chute and reperforator casting.

(d) Tape guide should fit in mounting slots so that top of roller is parallel to and above the tape exit of the punch block.

(e) To adjust, loosen mounting screws friction tight. Reposition chad chute and chad chute assembly by means of elongated slots. Tighten screws.

b. Function Mechanism Adjustments. Perform function mechanism adjustments in accordance with the following paragraphs.

(1) Clutch Shoe Lever. Adjust as follows:

NOTE

This adjustment should be made for both selector and function clutches.

(a) Refer to figure 6-3.

(b) Disengage clutch.

(c) Measure clearance between clutch shoe lever and stop lug.

(d) Clearance should be between 0.055 and 0.085 inch. Clearance should be greater when clutch is engaged than when disengaged.

(e) Engage wrench or screwdriver with lug on adjusting disc.

(f) Rotate disc with clamp screws loosened until proper tolerance specified in step (d) is achieved.

(g) Tighten screws.

(2) Function Clutch Drum End Play For One-Shaft Units. Adjust as follows:

(a) Refer to figure 6-3.

(b) With clutch shoe lever held in disengaged position, measure clearance between collar and function cam sleeve.

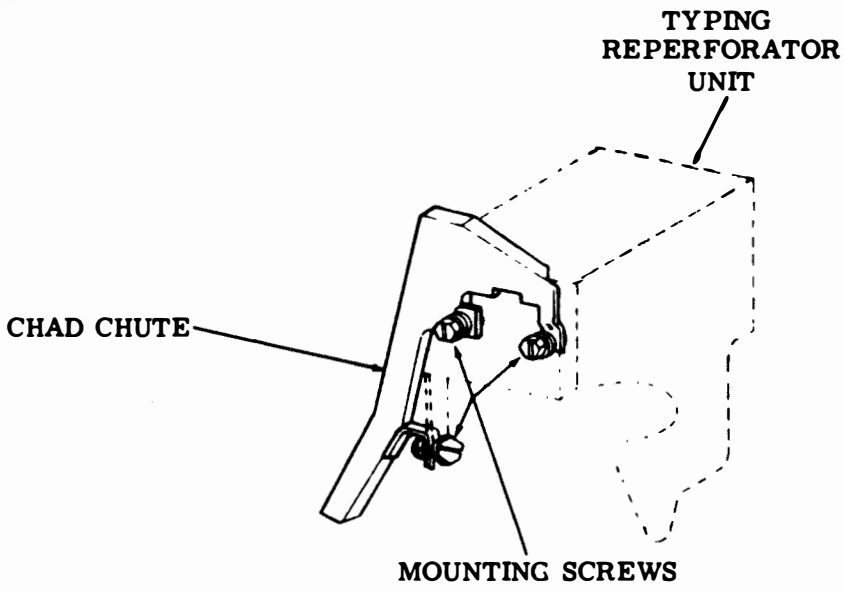


Figure 6-1. Chad Chute for Self-Contained Typing Reperforator Set (Left Side View)

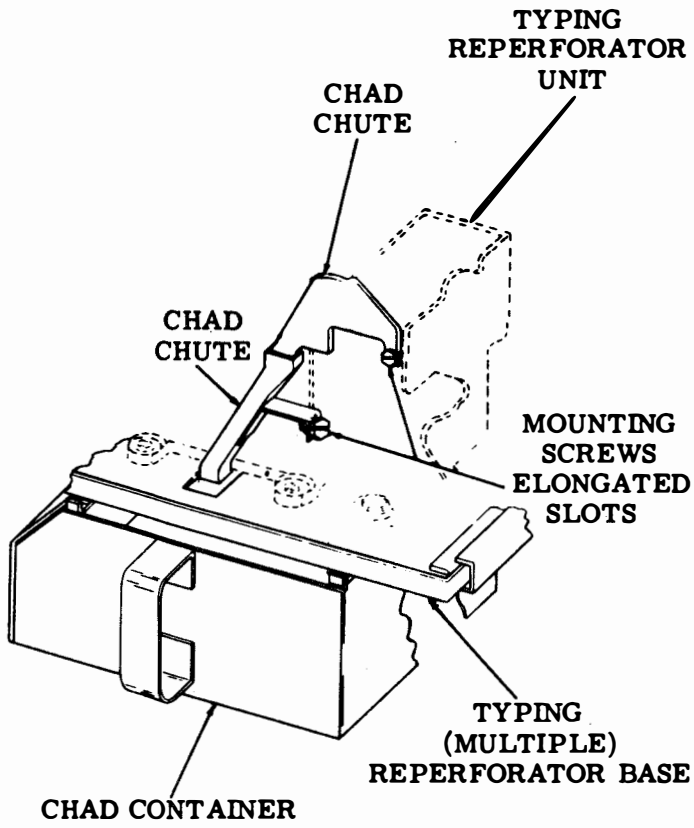


Figure 6-2. Chad Chute for Multiple Typing Reperforator Set

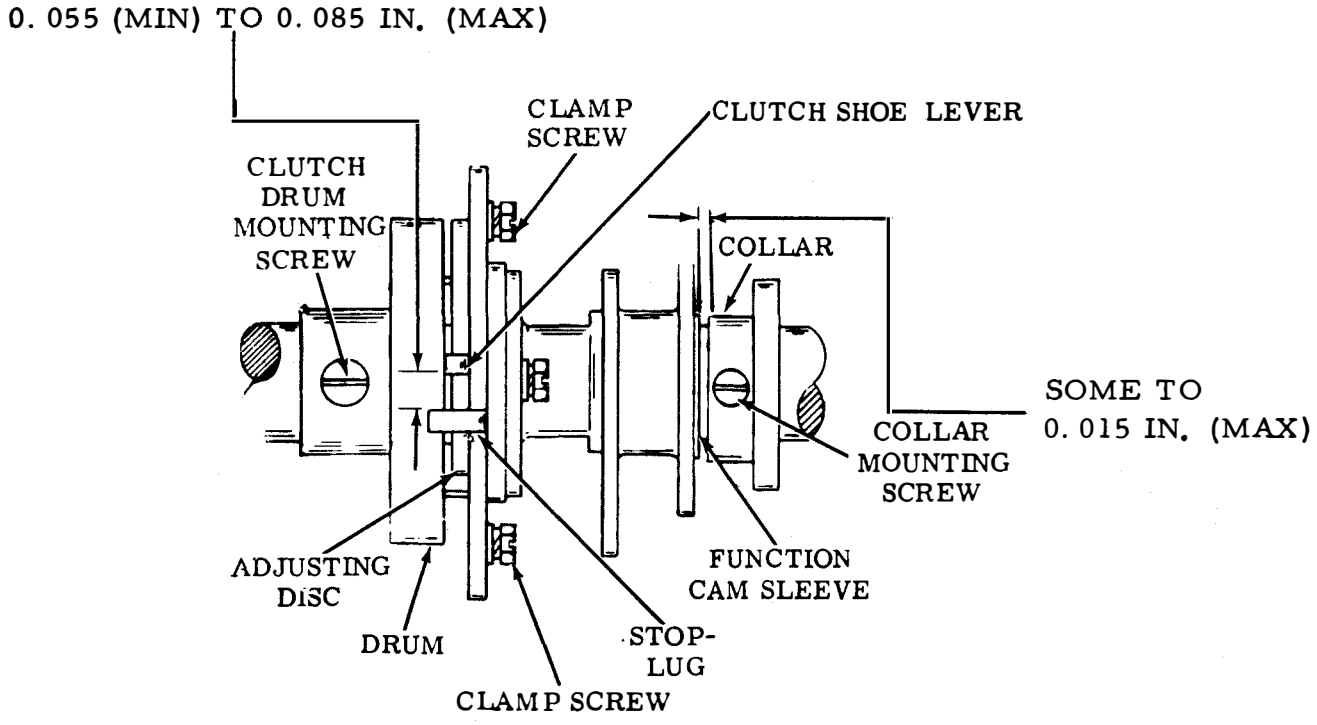


Figure 6-3. Clutch Shoe Lever and Function Clutch Drum End Play For One-Shaft Units - Right Side View

(c) There should be some clearance, not to exceed 0.015 inch.

(d) If clearance is not correct, loosen collar mounting screw and drum mounting screws.

(e) Move drum to extreme front position to achieve tolerance specified in step (c).

(f) Tighten drum mounting screw.

(g) Position collar with mounting screw loosened.

(h) Tighten screw.

(3) Function Clutch Drum End Play For Two-Shaft Units. Adjust as follows:

(a) Refer to figure 6-4.

(b) With function clutch disengaged, measure tolerance between collar and cam sleeve.

(c) When play is taken up to make clearance maximum, there should be some clearance, not to exceed 0.015 inch.

(d) To adjust, position collar to step (c) tolerance with mounting screw loosened.

(e) Tighten screw.

(4) Clutch Shoe Lever Spring. Adjust as follows:

(a) Refer to figure 6-5.

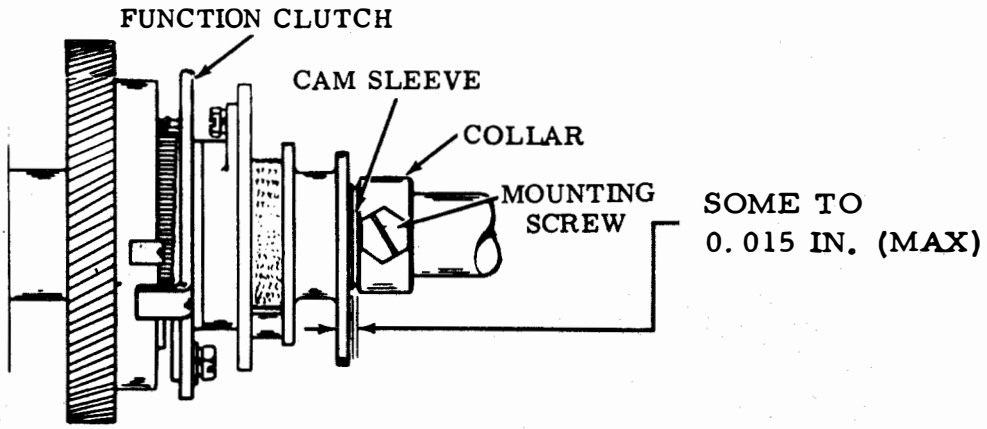
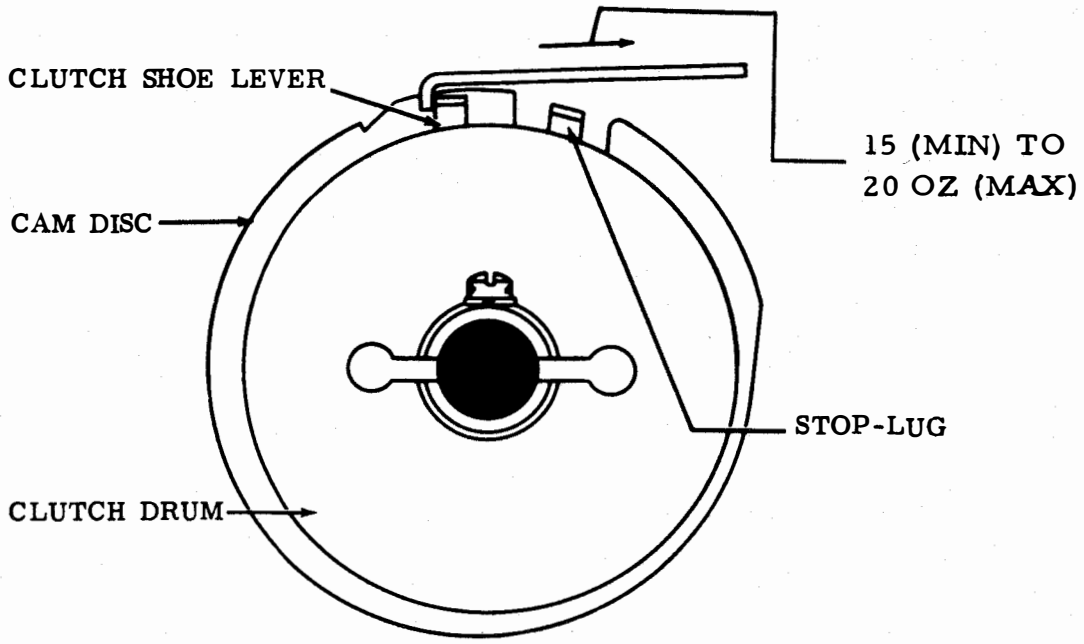


Figure 6-4. Function Clutch Drum End Play For Two-Shaft Units - Right Side View



Note: These spring tensions apply to both clutches.

Figure 6-5. Clutch Shoe Lever Spring

(b) Engage clutch.

(c) Hold cam disc to prevent turning.

(d) Hook spring scale gauge over clutch shoe lever and pull.

(e) The force required to pull shoe lever in contact with stop-lug should be between 15 and 20 ounces.

(f) If spring tension is incorrect, replace spring.

(5) Clutch Shoe Spring. Adjust as follows:

NOTE

To check this spring tension, it is necessary to remove the clutch from the main shaft. Therefore, it should not be checked unless there is reason to believe it will not meet its requirement.

(a) Refer to figure 6-6.

(b) Remove clutch from drum.

(c) Hook spring scale gauge over primary clutch shoe.

(d) The force required to start primary shoe moving should be between 3 and 5 ounces.

(e) If spring tension is incorrect, replace spring.

(6) Function Clutch Trip Lever. Adjust as follows:

(a) Refer to figure 6-7.

(b) With release resting on main trip lever, function clutch trip lever should engage full thickness of shoe lever.

(c) Trip lever end play should be between some and 0.006 inch.

(d) To adjust, loosen clamp screw and position trip lever on its shaft to required specification.

(e) Tighten clamp screw.

(7) Reset Arm. Adjust as follows:

(a) Refer to figure 6-8.

(b) With function clutch and main shaft positioned so that reset arm is held in its highest position by the cam pin, measure clearance between release and reset bail trip lever.

(c) The clearance should be between 0.005 and 0.030 inch.

(d) With reset lever resting fully on the cam pin, measure clearance between release and reset bail trip lever.

(e) There should be some clearance.

(f) With mechanism positioned as in step (d), measure the latchlever end play.

(g) There should be some clearance, not to exceed 0.010 inch.

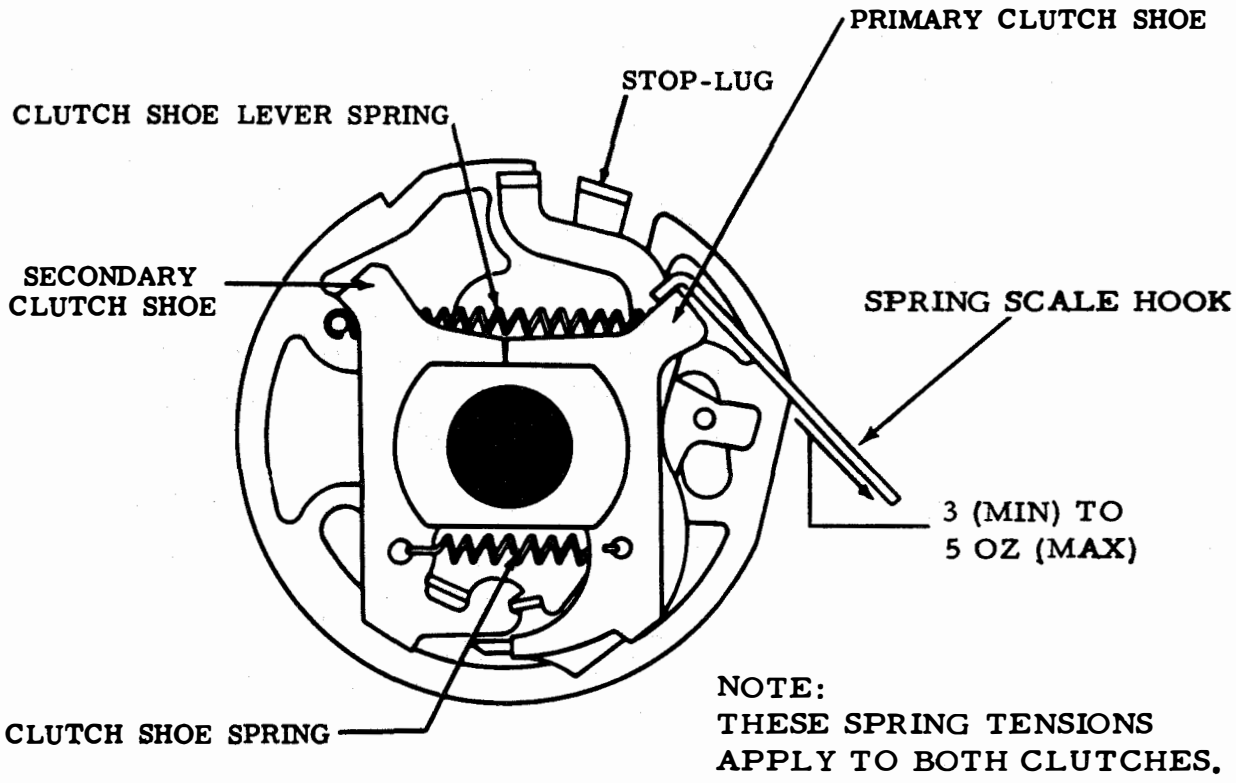


Figure 6-6. Clutch Shoe Spring

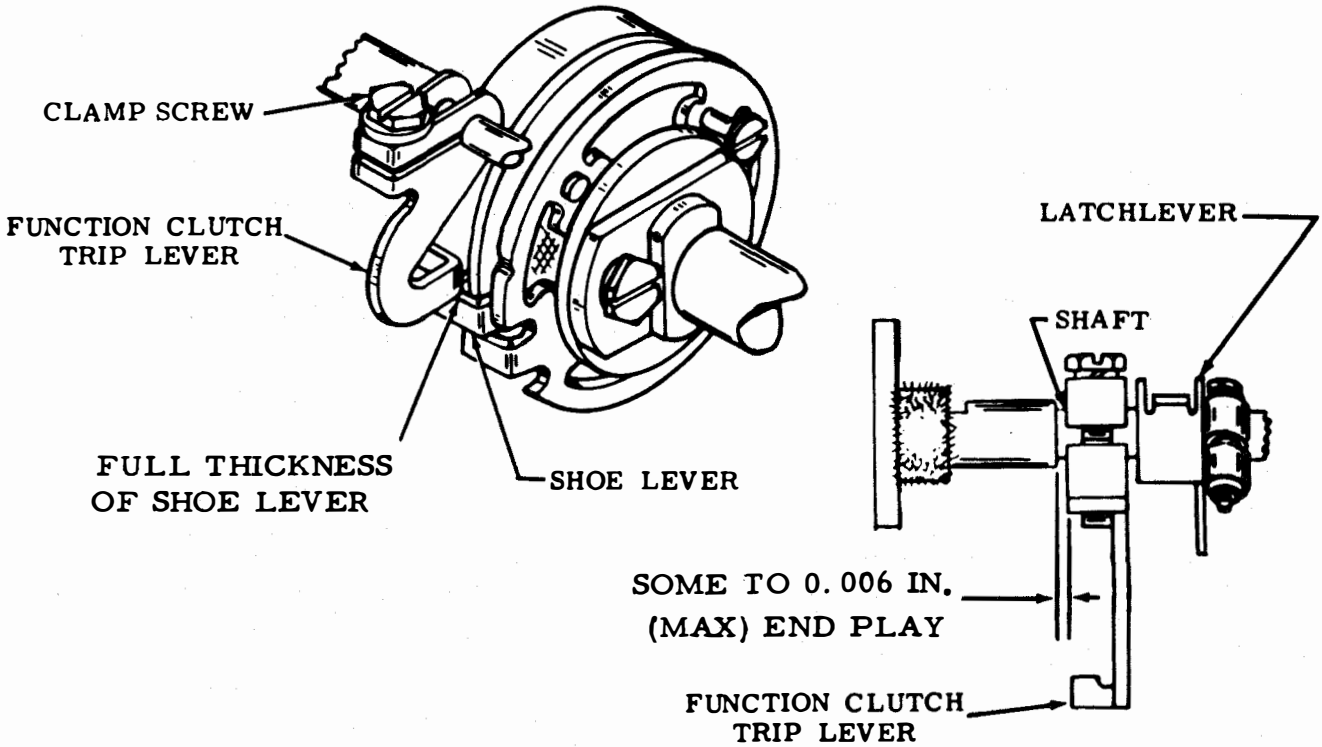


Figure 6-7. Function Clutch Trip Lever - Right Side View

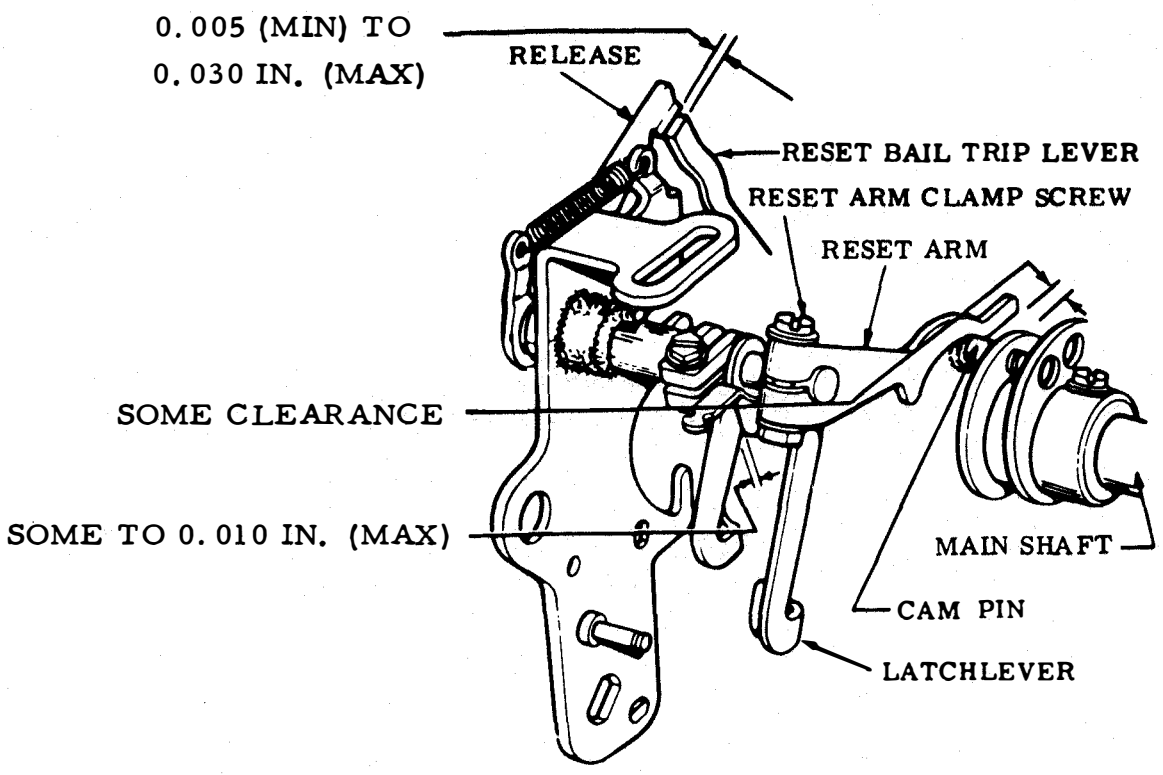


Figure 6-8. Reset Arm - Right Side View

(h) To adjust, loosen clamp screw, position reset arm, and tighten screw.

(8) Function Clutch Latchlever Spring. Adjust as follows:

(a) Refer to figure 6-9.

(b) With function clutch turned to stop position and latchlever unlatched, attach spring scale hook and measure force required to start latchlever moving.

(c) The force should be between 12 and 15 ounces.

(d) Replace latchlever spring if not as specified in step (c).

(9) Trip Cam Follower Lever (Preliminary). Adjust as follows:

(a) Refer to figure 6-10.

(b) With trip cam follower lever on high part of cam, measure clearance between clutch release lever and reset bail trip lever.

(c) The clearance should be between 0.010 and 0.030 inch.

(d) Measure clearance between reset bail

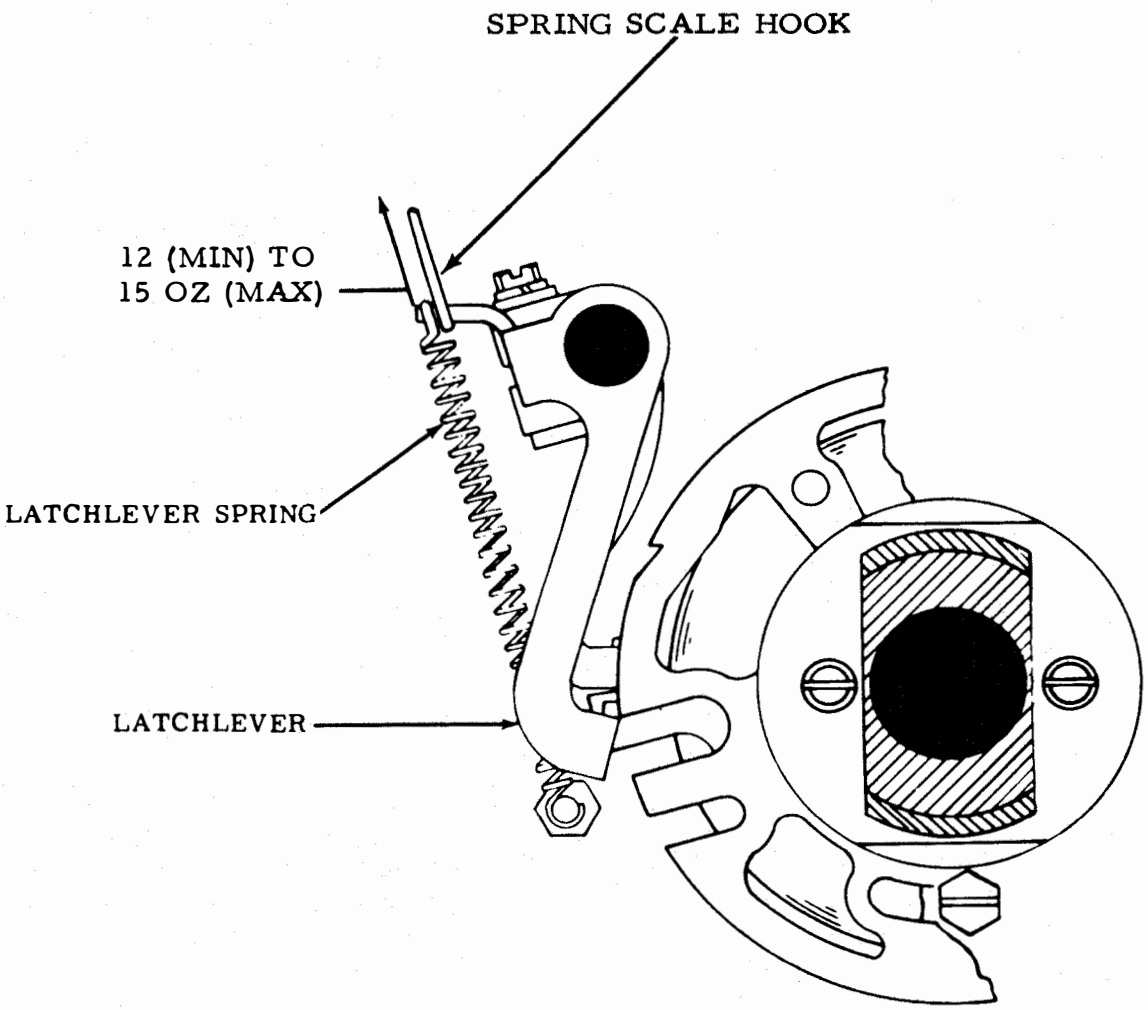


Figure 6-9. Function Clutch Latchlever Spring - Rear View

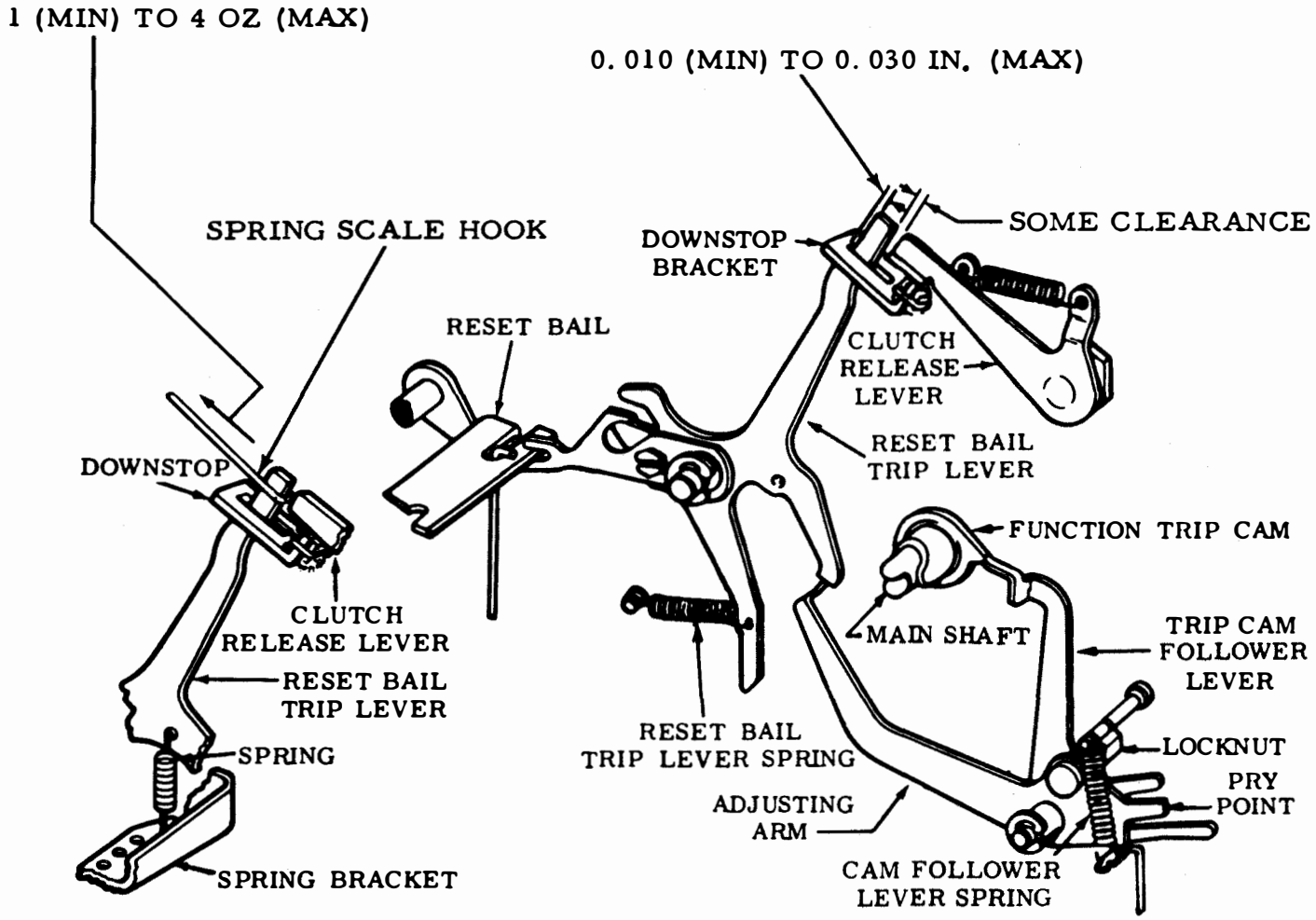


Figure 6-10. Trip Cam Follower Lever and Reset Bail Trip Lever Spring

trip lever and left end of slot in downstop bracket.

(e) There should be some clearance.

(f) To adjust, loosen locknut and, by means of pry point, position adjusting arm on follower lever. Tighten nut.

(10) Reset Bail Trip Lever Spring. Adjust as follows:

(a) Refer to figure 6-10.

(b) With spring scale hook pulling at top of reset bail trip lever, trip the lever and measure the force required to start lever moving.

NOTE

It may be necessary to remove ribbon feed mechanism when checking this tension.

(c) The scale should read between 1 and 4 ounces.

(d) Replace spring if reading is not within prescribed limits.

(11) Cam Follower Lever Spring. Adjust as follows:

(a) Refer to figure 6-11.

(b) With cam follower lever on low part of trip cam and reset bail trip lever held away from adjusting arm, attach spring scale hook to cam follower lever and measure force required to start the adjusting arm moving.

(c) The scale should read between 1 and 4 ounces.

(12) Cam Follower Roller. Adjust as follows:

(a) Refer to figure 6-12.

(b) With rocker bail positioned to its extreme left and upper roller in contact with function cam, measure clearance between cam and lower roller at point of least clearance.

(c) There should be some clearance, not to exceed 0.004 inch.

(d) To adjust, loosen locknut, position lower roller mounting screw in elongated slot, and tighten nut.

(13) Cam Follower Roller Alignment. Adjust as follows:

(a) Refer to figure 6-13.

(b) Check rocker bail roller and function cam alignment.

(c) Rocker bail rollers should engage full thickness of function cam.

(d) Lifter roller should be in full engagement with rocker bail camming surface.

(e) To adjust, loosen guide bracket mounting screws, position rocker bail and guide bracket, and tighten screws.

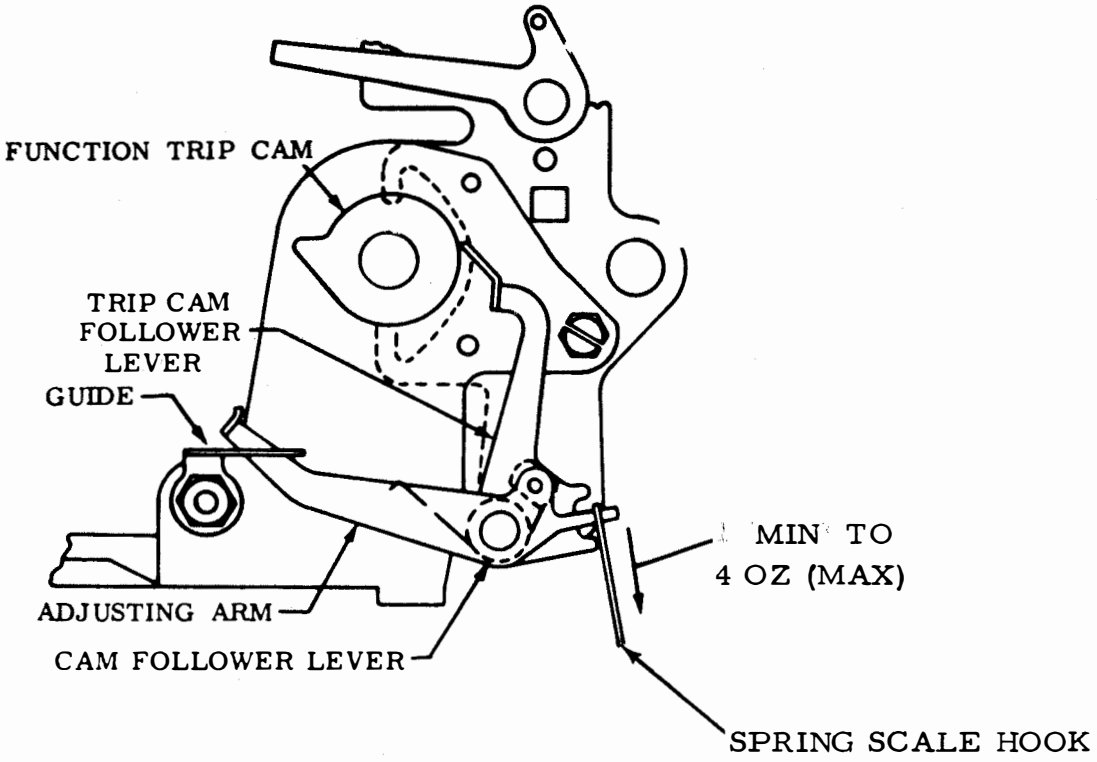


Figure 6-11. Cam Follower Lever Spring

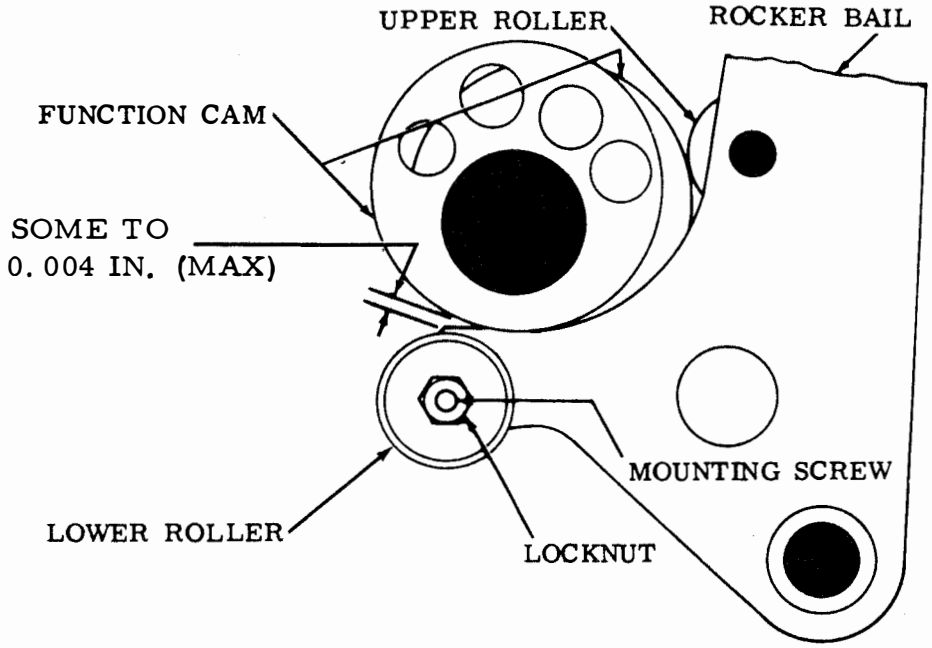


Figure 6-12. Cam Follower Roller - Rear View

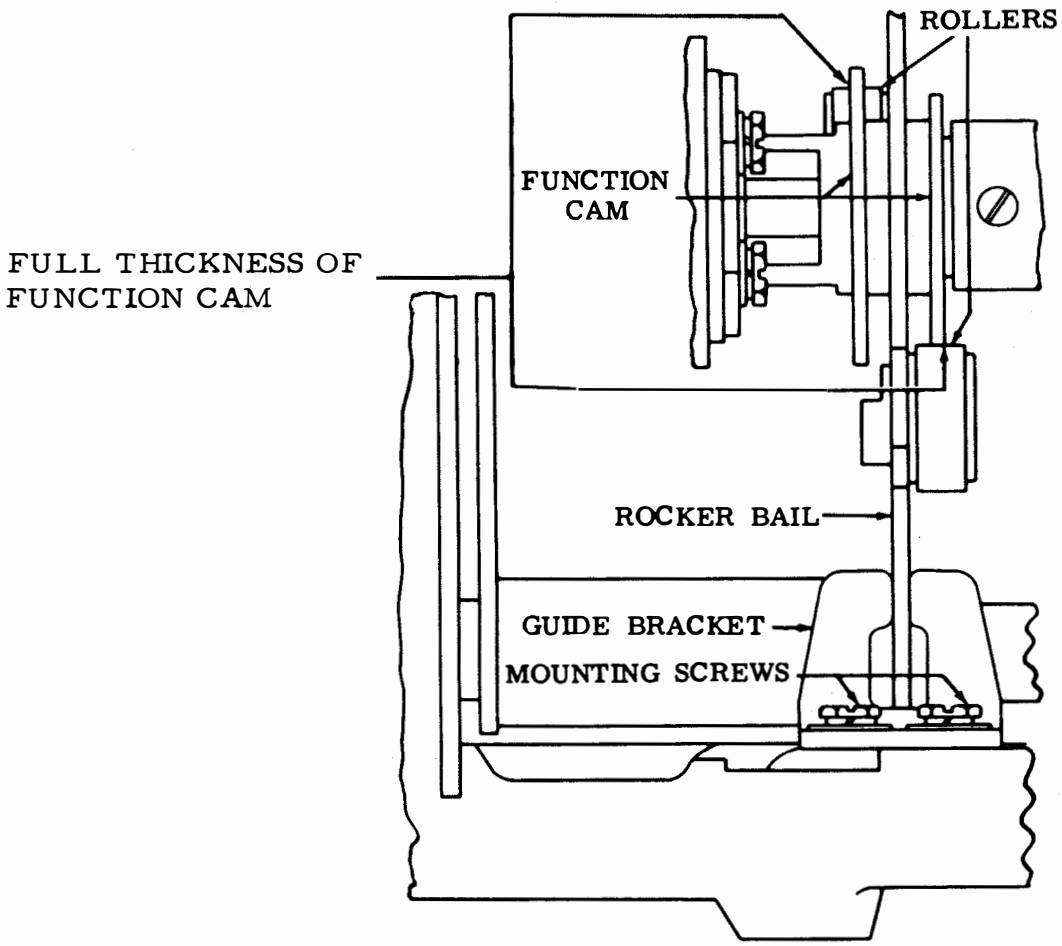


Figure 6-13. Cam Follower Roller Alignment - Right Side View

(14) Function Clutch Release Lever Spring. Adjust as follows:

(a) Refer to figure 6-14.

(b) Trip function clutch, rotate main shaft until release lever is reset on reset bail trip lever, and attach spring scale hook to function clutch release lever.

(c) The force required to start release lever moving should be between 5 and 8 ounces. If not within these limits, replace spring and recheck.

(15) Release Lever Downstop Bracket. Adjust as follows:

(a) Refer to figure 6-15.

(b) With function clutch tripped, rotate shaft until clearance between function clutch disc stop-lug and clutch stop lever is at a minimum. With release lever resting against downstop bracket, measure clearance between function clutch disc stop-lug and stop lever.

(c) Clearance should be between 0.002 and 0.045 inch.

(d) To adjust:

1. Remove tape guide.

2. With downstop bracket mounting screws friction tight, position bracket.

3. Tighten screws.

4. Recheck for some clearance between trip lever extension and left end of slot in release lever downstop bracket.

c. Punch Mechanism Adjustments. Perform punch mechanism adjustments in accordance with the following paragraphs.

(1) Punch Mounting Plate (Preliminary). Adjust as follows:

(a) Refer to figure 6-16.

(b) Observe punch mechanism mounting screw and mounting screw at lower edge of punch mechanism backplate.

NOTE

The mounting holes are oversized to facilitate use of punch mechanism on the typing reperforator.

(c) Screws should be centrally located in their elongated mounting slots.

(d) To adjust:

1. Remove mounting screws at lower edge of punch mechanism backplate.

2. Loosen two remaining backplate mounting screws and mounting bracket screw until they are friction tight.

3. Position mechanism so that tapped hole of frame is centrally located (as gauged by eye) within large body hole of punch mechanism backplate.

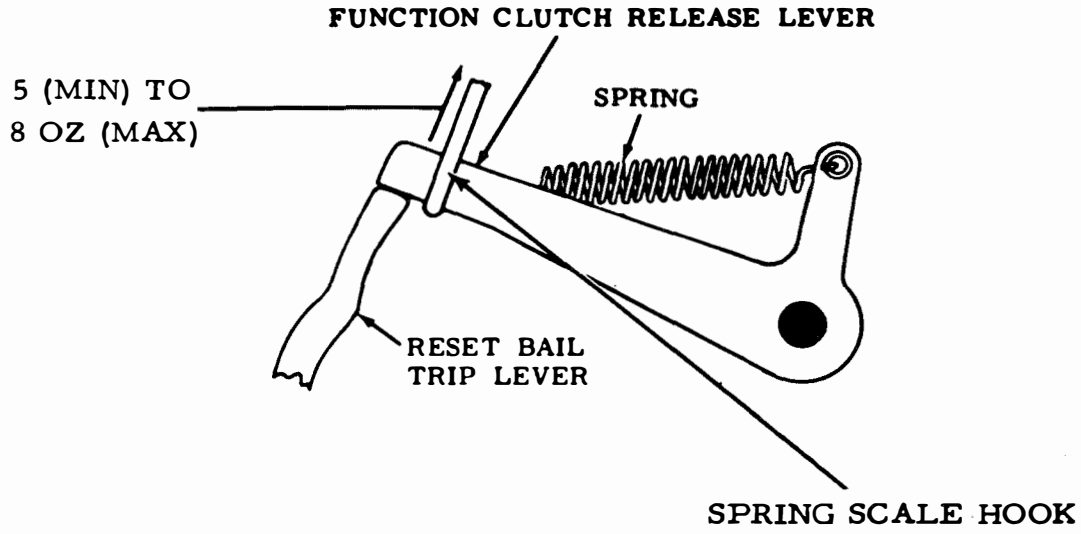


Figure 6-14. Function Cltuch Release Lever Spring

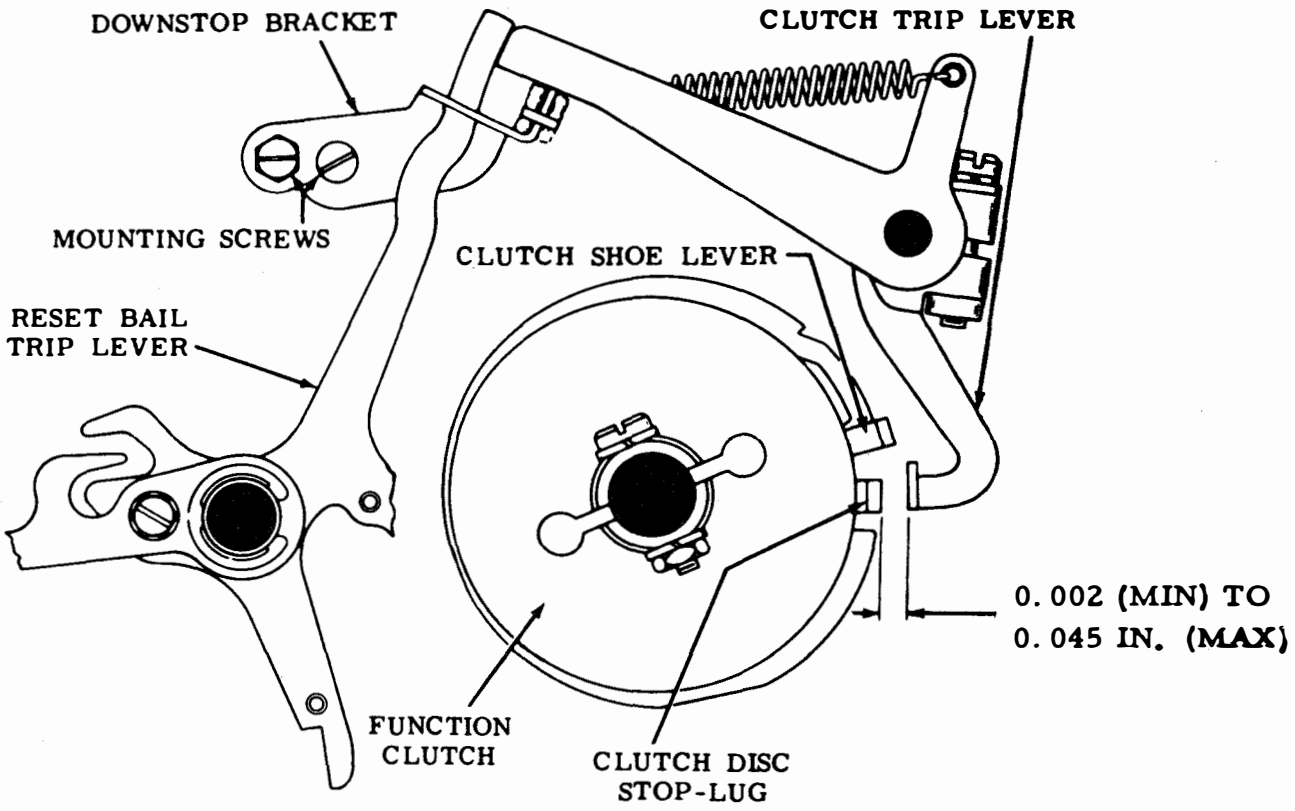


Figure 6-15. Release Lever Downstop Bracket

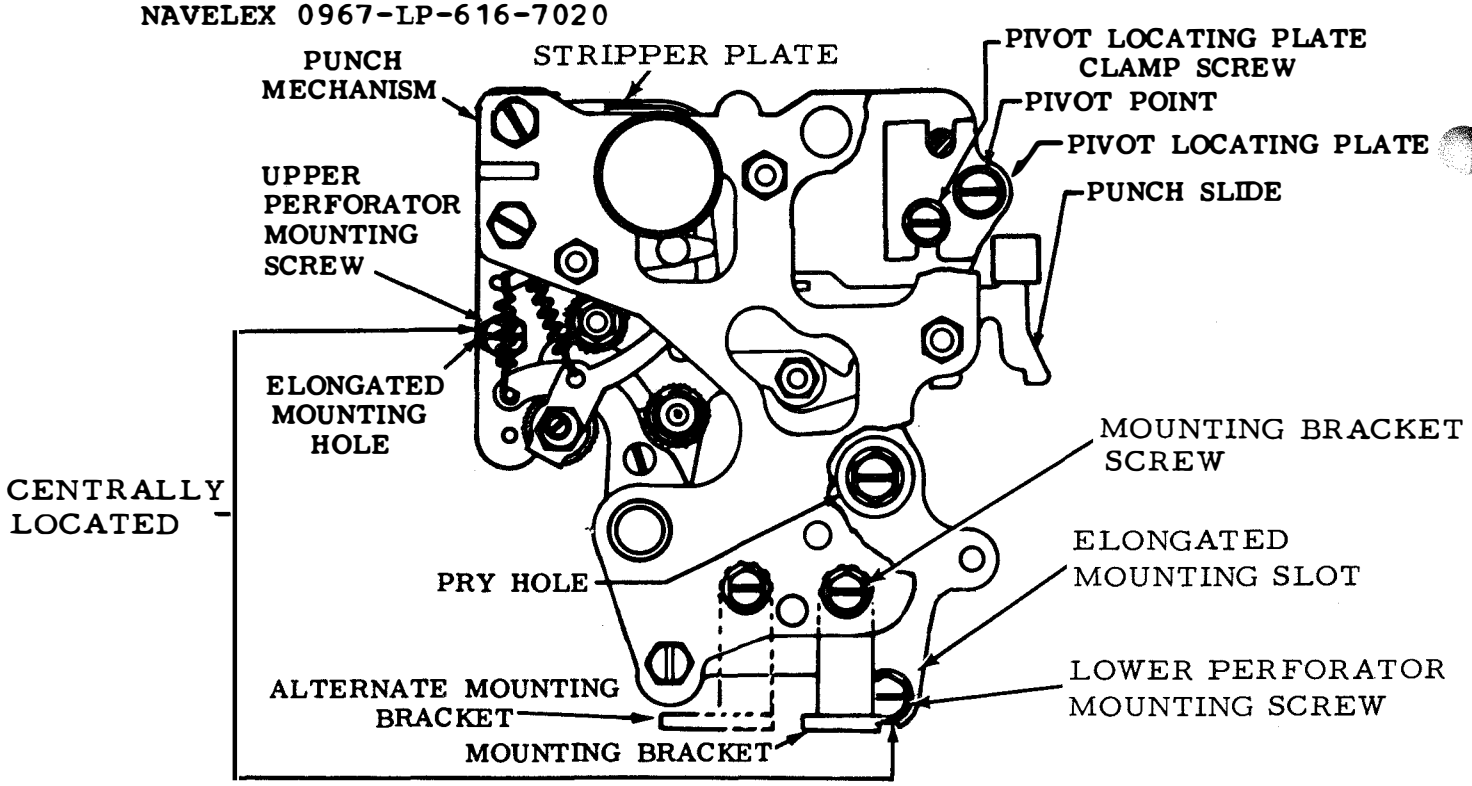


Figure 6-16. Punch Mounting Plate (Preliminary)

4. Tighten two backplate mounting screws.

5. Recheck position.

6. Replace and tighten lower backplate mounting screw.

7. Tighten bracket mounting screw.

(2) Punch Mounting Plate (Final). Adjust as follows:

(a) Refer to figure 6-17.

(b) With LETTERS code combination (12345) selected, rotate until function clutch trips with punch levers in extreme left-hand position, and measure clearance between punch slide and punch slide latch at slide where clearance is least.

(c) Clearance should be between 0.015 and 0.045 inch.

(d) To adjust:

1. Loosen perforator mounting screws, adjusting clamp lockscrew, adjusting clamp pivot screw, and anchor bracket screw until friction tight.

2. Place screwdriver tip between screw and rim of pry hole and pry perforator up or down.

3. Tighten only adjusting clamp lockscrew.

NOTE

The following adjustment is for typing reperforator with spring retracted punch unit.

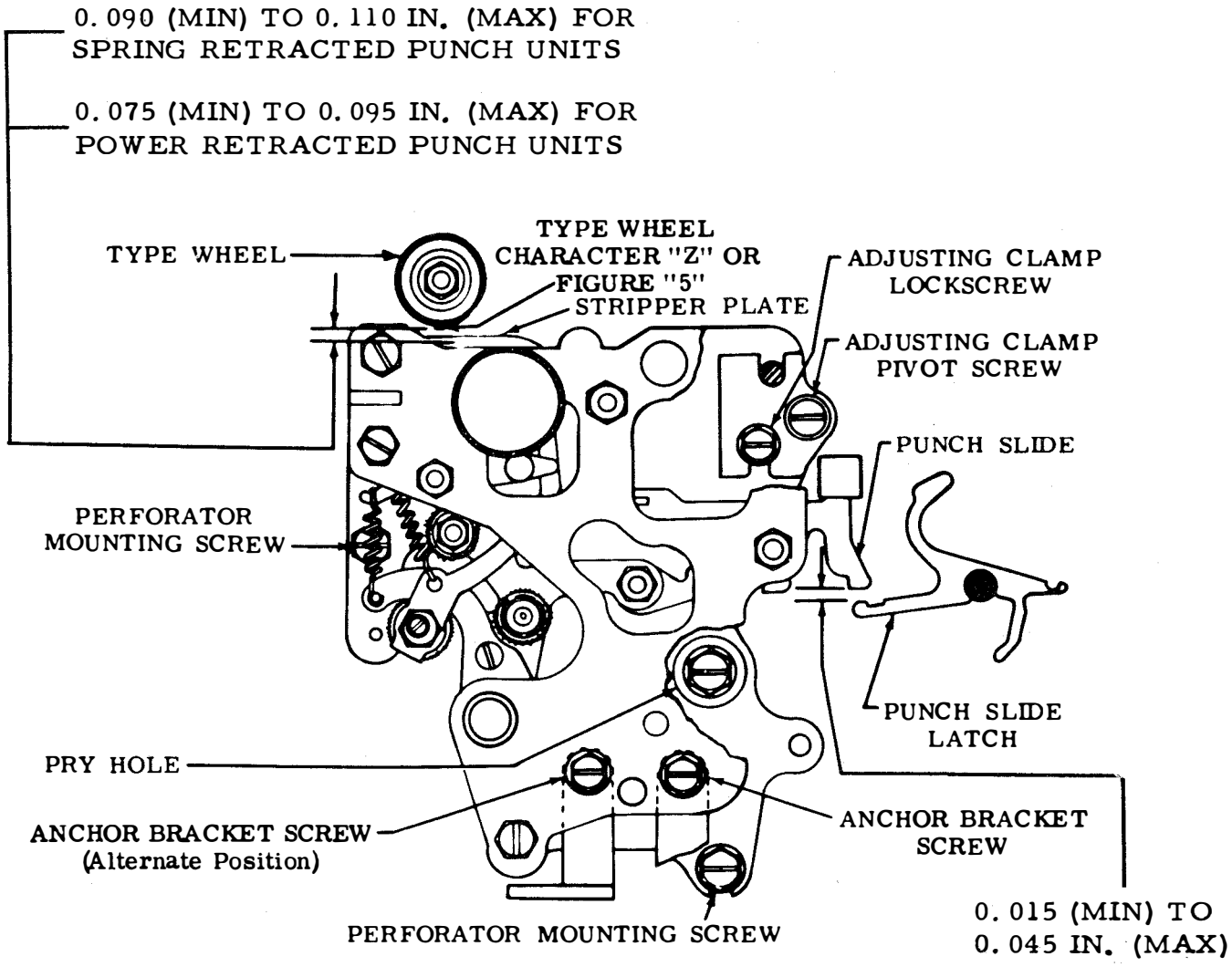


Figure 6-17. Punch Mounting Plate (Final)

(e) With unit in stop position and type wheel in letters field, measure clearance between letter "Z" on type wheel and top of stripper platform.

(f) Clearance should be between 0.090 and 0.110 inch.

(g) To adjust:

1. Remove ribbon from carrier.

2. Loosen two mounting screws, adjusting clamp pivot screw, and anchor bracket screw.

3. Position perforator as specified.

4. Tighten screws.

NOTE

The following adjustment is for typing reperforators with power retracted punch unit.

(h) With unit in stop position and type wheel in figures field, measure clearance between figure "5" on type wheel and top of stripper platform.

(i) The clearance should be between 0.075 and 0.095 inch.

(3) Toggle Bail Eccentric (Preliminary). Adjust as follows:

NOTE

Before proceeding with punch mechanism adjustment, check the Cam Follower Roller adjustment (paragraph 6-3.1b(13) and loosen punch slide downstop mounting nut and guide mounting stud.

(a) Refer to figure 6-18.

(b) Observe that indent (located on high side of eccentric) is in uppermost position.

(c) To adjust, loosen toggle bail eccentric shaft locknut until it is friction tight, position eccentric, and tighten nut.

(4) Toggle Operating Arm. Adjust as follows:

NOTE

Before proceeding with punch mechanism adjustment, check Cam Follower Roller adjustment (paragraph 6-3.1b(13)) and loosen punch slide downstop mounting nut and guide mounting stud.

(a) Refer to figure 6-19.

(b) With function clutch tripped and main shaft rotated until rocker bail roller is on high part of cam, measure clearance between feed pawl stud and TP159926 gauge.

(c) Clearance should be between 0.002 and 0.005 inch.

(5) Perforator Drive Link Spring. Adjust as follows:

(a) Refer to figure 6-20.

(b) With play taken up to make minimum clearance, measure clearance between arm and oscillating shaft bearing hub.

(c) Clearance should be between 0.002 and 0.015 inch.

(d) To adjust, loosen clamp screw until it is friction tight, position toggle bail and operating arm, and tighten screw.

NOTE

After Feed Pawl Adjustment (paragraph 6-3.1c(7)) and Punch Pin Penetration adjustment (paragraph 6-3.1e(2)) have been made, this requirement should be considered fulfilled.

(6) Latchlever Clearance. Adjust as follows:

(a) Refer to figure 6-21.

(b) With BLANK combination selected, and

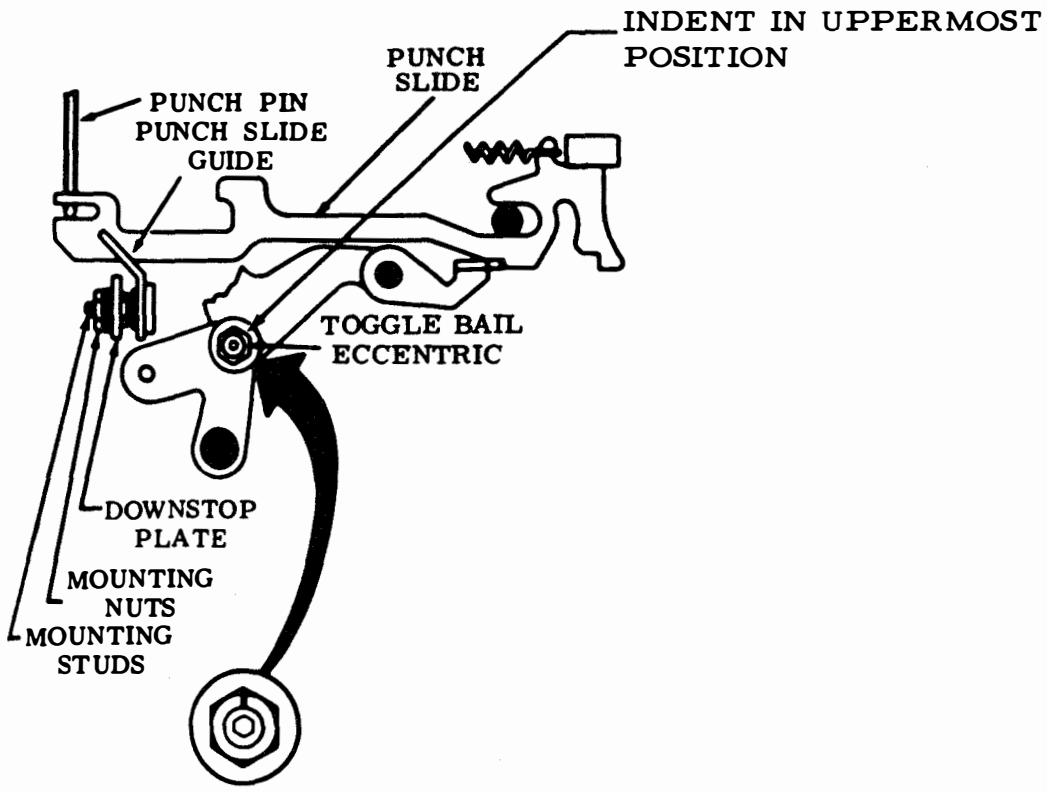


Figure 6-18. Toggle Bail Eccentric (Preliminary)

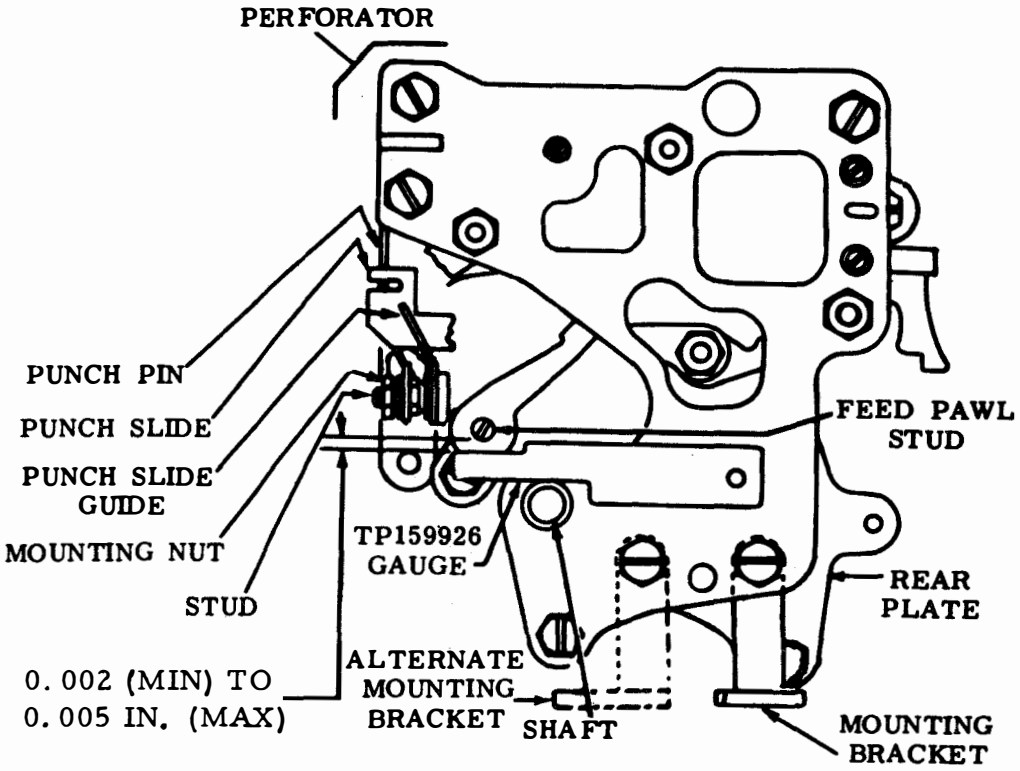


Figure 6-19. Toggle Operating Arm

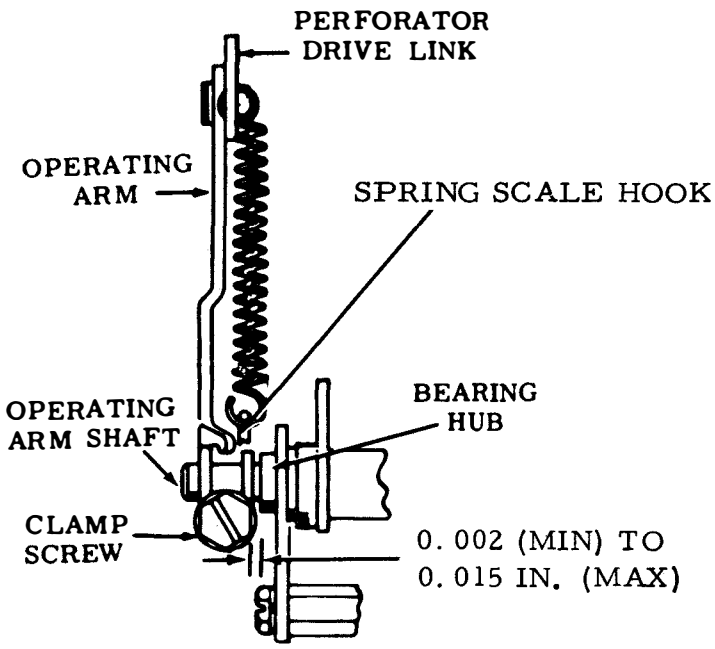


Figure 6-20. Perforator Drive Link Spring - Left Side View

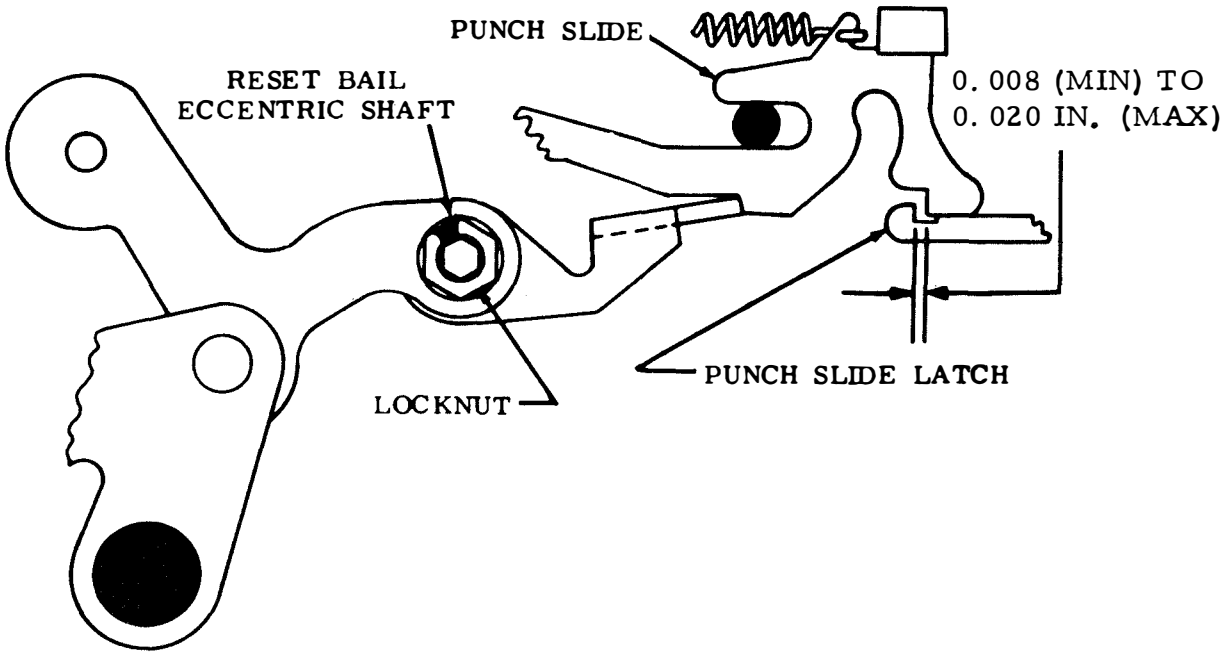


Figure 6-21. Latchlever Clearance

function clutch disengaged and latched, clearance between punch slide and associated latchlever should be from 0.008 to 0.020 inch for slide with least clearance.

(c) To adjust, loosen locknut and rotate reset bail eccentric shaft, keeping the indentation in the eccentric above the center of shaft.

(d) Tighten locknut.

(7) Feed Pawl. Adjust as follows:

NOTE

This adjustment is related to "Ten Characters per Inch" (paragraph 6-3.1d(5) and (6)) and the two adjustments should be made at the same time.

(a) Refer to figure 6-22.

(b) With function clutch disengaged, indentation in detent lever eccentric at right angle to lever, detent roller in contact with ratchet wheel, high part of feed pawl eccentric to right of lockscrew, check alignment of feed pawl and ratchet wheel.

(c) Feed pawl should engage first tooth below a horizontal centerline through ratchet wheel with no perceptible clearance.

(d) To adjust, loosen lockscrew and rotate feed pawl eccentric. Tighten screw.

(8) Feed Pawl Spring. Adjust as follows:

(a) Refer to figure 6-23.

(b) Disengage and latch function clutch.

(c) With detent spring unhooked from toggle bail, use spring scale to measure force required to start detent lever moving. This should require from 3 to 4-1/2 ounces.

(d) If force does not match specifications, replace spring.

(9) Detent Lever Spring. Adjust as follows:

(a) Refer to figure 6-24.

(b) With function clutch disengaged and latched, and feed pawl spring unhooked, use spring scale to measure force required to start detent lever moving. This should be from 7 to 10 ounces.

(c) If required force does not match specifications, replace spring.

(10) Tape Shoe Torsion Spring. Adjust as follows:

NOTE

This adjustmnet does not apply to tape printer.

(a) Refer to figure 6-25.

(b) Use spring scale to measure force required to move tape from feed wheel. This should measure from 13 to 18 ounces.

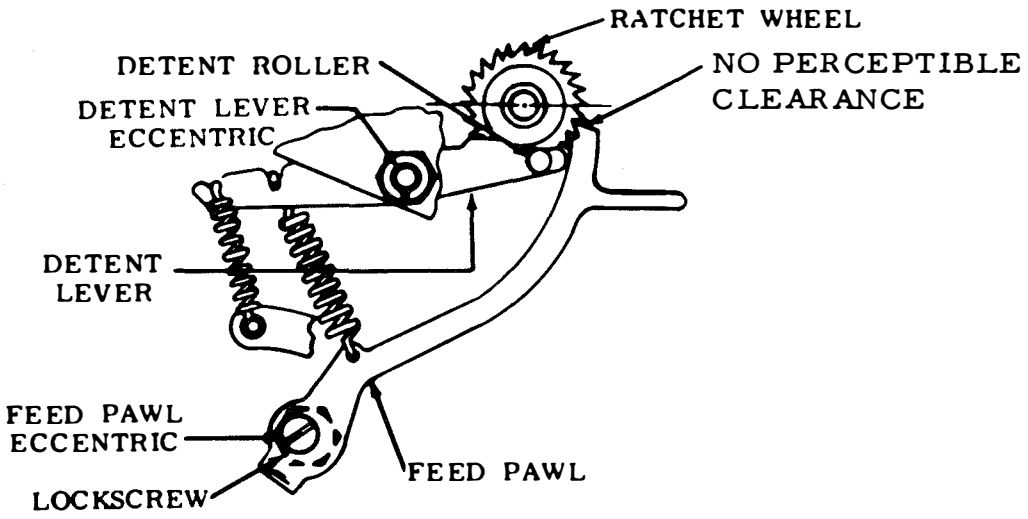


Figure 6-22. Feed Pawl

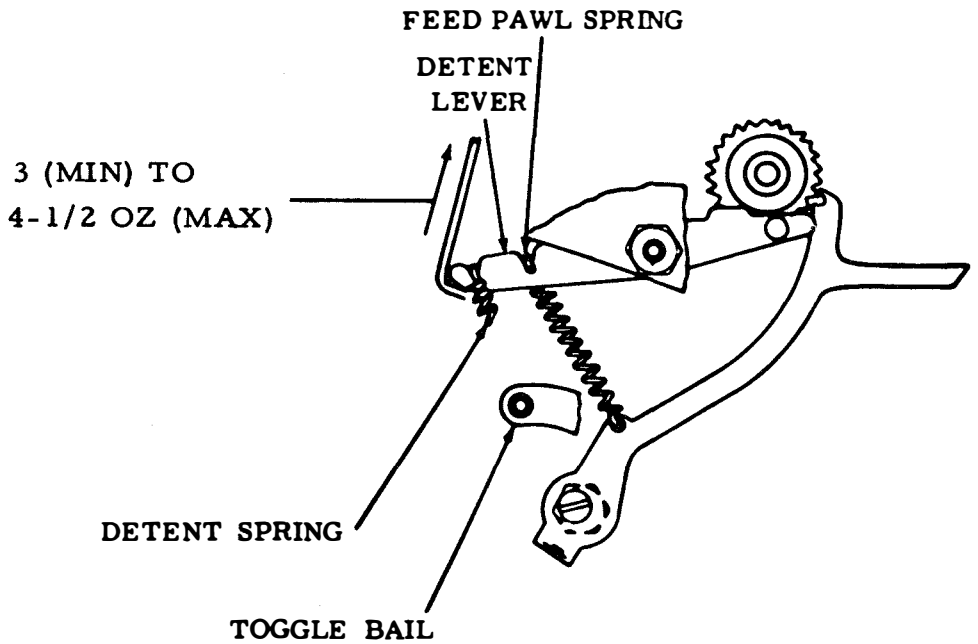


Figure 6-23. Feed Pawl Spring

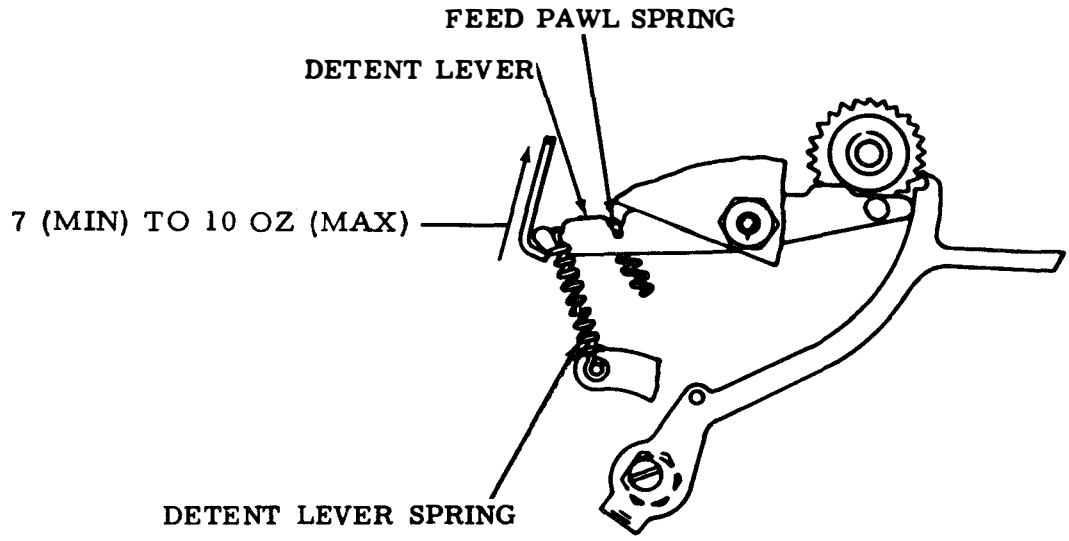


Figure 6-24. Detent Lever Spring

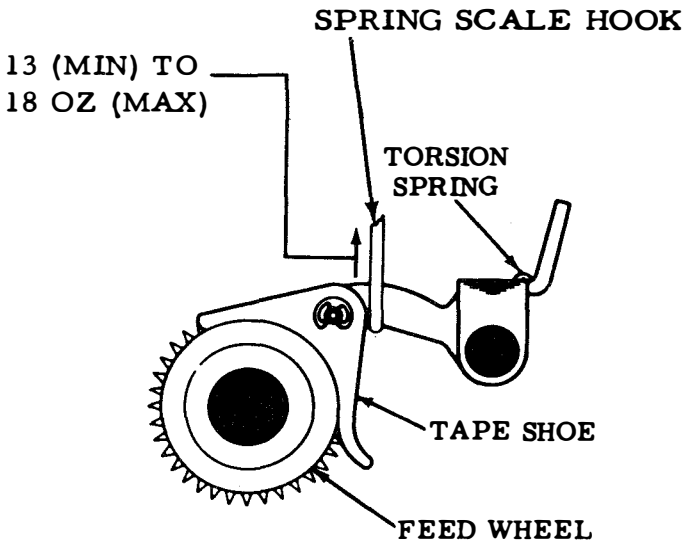


Figure 6-25. Tape Shoe Torsion Spring

(c) If force required does not match specifications, replace spring.

(11) Tape Depressor Slide Spring. Adjust as follows:

NOTE

This adjustment does not apply to tape printer.

(a) Refer to figure 6-26.

(b) With rocker bail in extreme left position, use spring scale to measure force necessary to start depressor slide moving. This should measure from 1-1/2 to 2-1/2 ounces.

(c) If force does not match requirements, replace spring.

(12) Tape Guide. Adjust as follows:

NOTE

This adjustment does not apply to tape printer.

(a) Refer to figure 6-27.

(b) Clearance under tape guide should be from 0.008 to 0.015 inch.

(c) To adjust, loosen mounting screw, to friction tight.

(d) Position tape guide, keeping it against front plate of punch.

(e) Tighten mounting screw.

(13) Tape Guide Spring. Adjust as follows:

NOTE

This adjustment does not apply to tape printer.

(a) Refer to figure 6-28.

(b) Use spring scale to measure force required to start tape guide bail moving upward. This should require 8 ounces (minimum).

(c) If force does not match requirement, replace spring.

d. Punch Mechanism Adjustments For Chadless Tape. Perform punch mechanism (chadless tape) adjustments in accordance with the following paragraphs.

NOTE

None of the following adjustments apply to tape printer.

(1) Punch Pin Penetration. Adjust as follows:

(a) Refer to figure 6-29.

(b) With LETTERS selected and function clutch engaged and rotated until punch pins have traveled the maximum distance into die plate, measure distance between lower edge of punch retractor bail and upper side of guide plate (measure next to No. 1 and No. 5

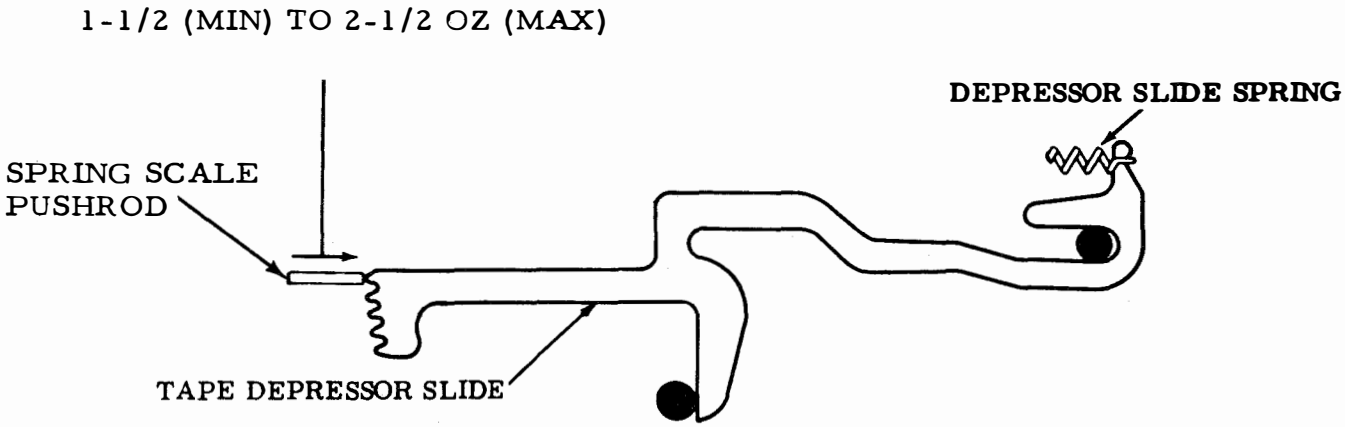


Figure 6-26. Tape Depressor Slide Spring

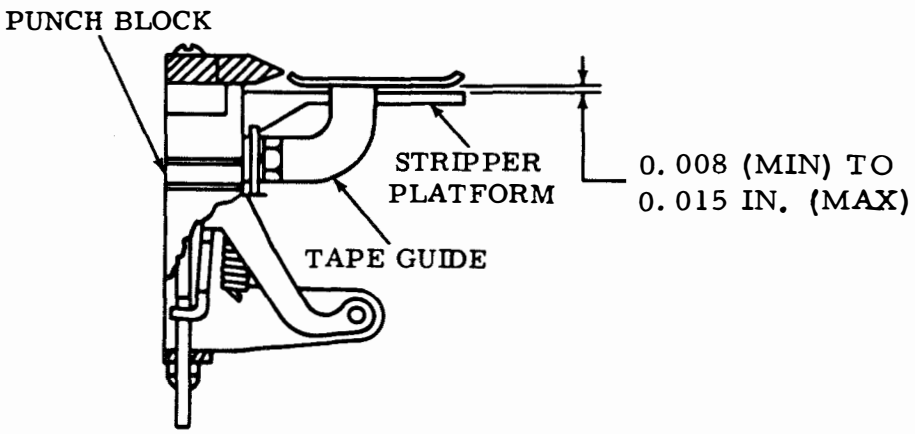
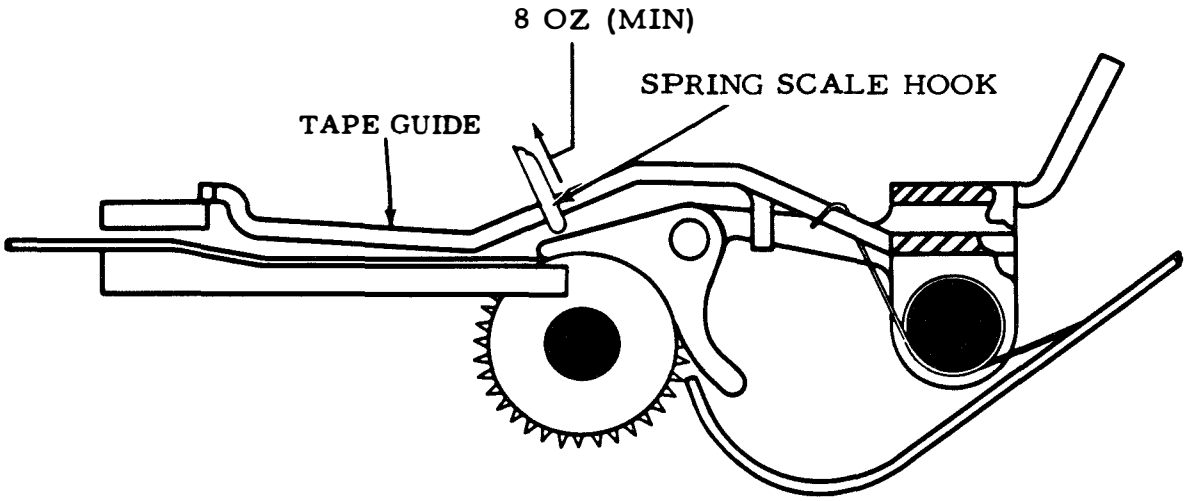


Figure 6-27. Tape Guide



Fiure 6-28. Tape Guide Spring

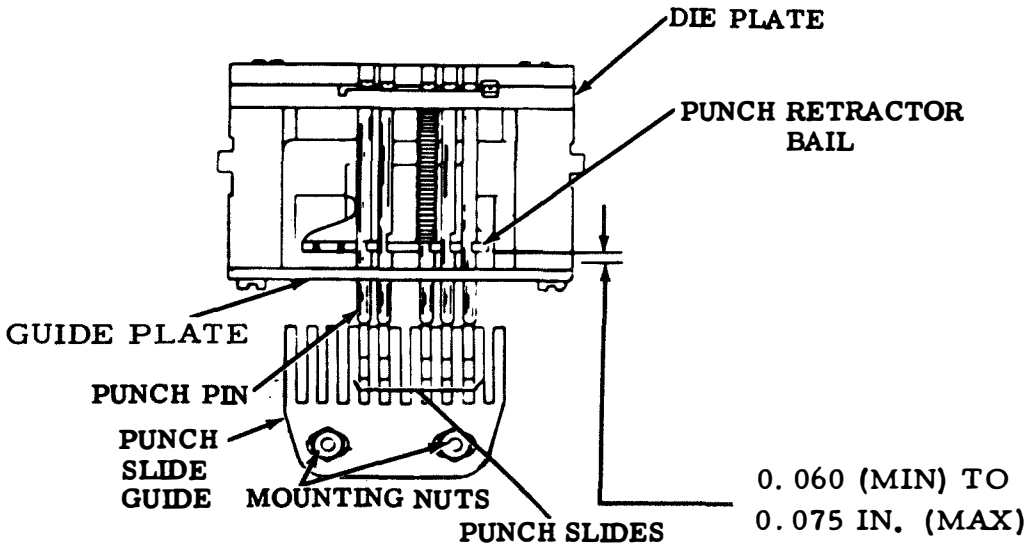


Figure 6-29. Punch Pin Penetration and Punch Slide Guide for Chadless Tape - Left Side View

punch pins where clearance is least).

(c) Clearance should be between 0.060 and 0.075 inch.

(d) To adjust, loosen locknut and rotate toggle bail eccentric shaft. Keep indentation in eccentric shaft to left of a vertical centerline through shaft. Tighten locknut.

NOTE

Code punches should punch a full tape lid with a slight amount of tear. The tear should be restricted to a minimum. Refine "Punch Pin Penetration" adjustment, if necessary.

(2) Punch Slide Guide. Adjust as follows:

(a) Refer to figure 6-29.

(b) With LETTERS selected and function clutch engaged and rotated until punch slides just touch punch pins, observe alignment of punch slides and punch pins.

(c) Punch slides should align centrally with punch pins (as gauged by eye).

(d) To adjust, loosen mounting nuts and position punch slide guide.

(3) Punch Slide Downstop Plate Position. Adjust as follows:

(a) Refer to figure 6-30.

(b) With LETTERS selected, unit in stop position (clutches disengaged), and function reset mechanism tripped, observe the clearance.

(c) There should be enough clearance to allow all punch slides to move freely during operation.

(d) There should be some clearance, not to exceed 0.008 inch between front and rear punch slides and downstop plate.

(e) To adjust:

1. Remove punch slide guide.

2. Loosen downstop plate mounting studs.

3. Position downstop plate.

4. Tighten studs and replace guide so that punch slides align with punch pins (as gauged by eye).

(4) Reperforator Mounting. Adjust as follows:

(a) Refer to figure 6-31.

(b) Mount reperforator to base and adjust in accordance with associated base section.

(5) Ten Characters per Inch (Preliminary). Adjust as follows:

(a) Refer to figure 6-31.

(b) Check indent of die wheel eccentric stud.

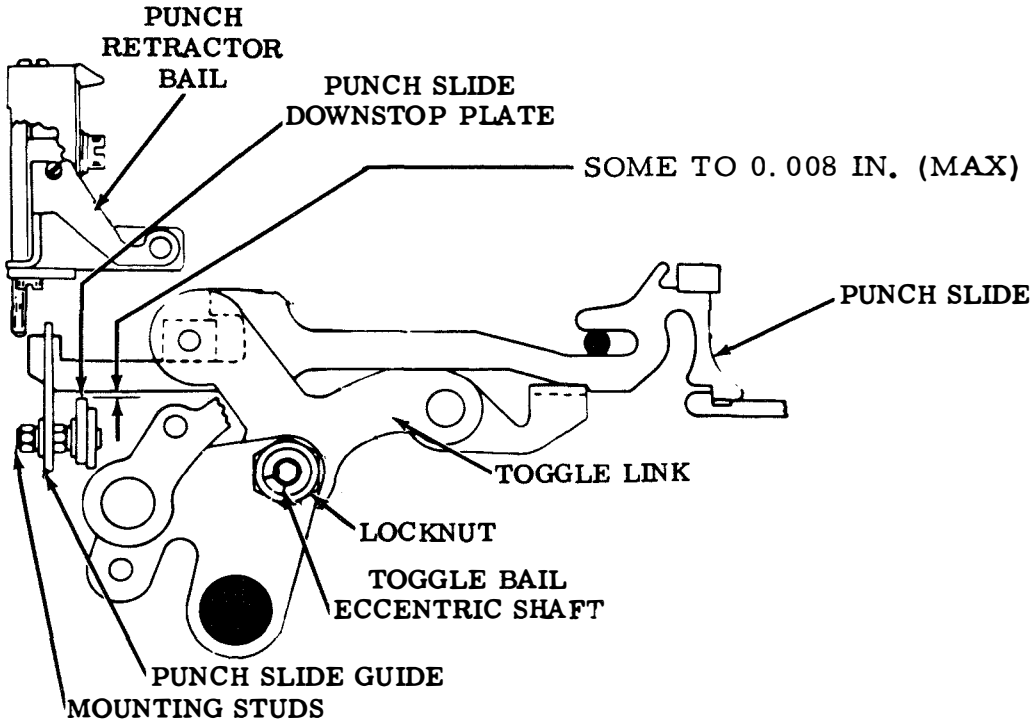


Figure 6-30. Punch Slide Downstop Plate Position (For Chadless Tape)

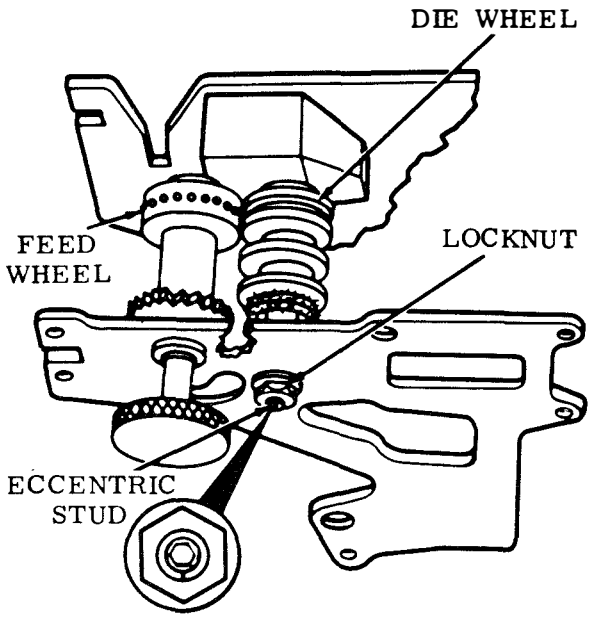


Figure 6-31. Reperforator Mounting and Ten Characters per Inch (Preliminary) For Chadless Tape

(c) Indent should point straight down.

(d) To adjust, loosen locknut, position die wheel eccentric stud, and tighten nut.

(e) With tape shoe blocked away from feed wheel, feed pawl and detent disengaged, and tape removed, feed wheel should rotate freely.

(f) Check by revolving feed wheel three or four times.

(g) Refine adjustment in step (d), if necessary to meet this requirement.

NOTE

Before proceeding with the following adjustment, check both Bias Spring tensions (paragraphs 6-3.1d(12) and (14)), and if unit is equipped with a slack tape mechanism having a clamp plate with an adjustable wear disc, loosen the mounting nut and turn a new edge of the disc toward the tape. Tighten nut.

(6) Ten Characters per Inch (Final). Adjust as follows:

(a) Refer to figure 6-32.

(b) Check a perforated tape as follows:

1. Perforate with six series of 9BLANK code combinations followed by a LETTERS combination.

2. Place tape over the TP95960 gauge or the smooth side of the TP156011 tape gauge so that the circular portion of the first number 2 code in the tape is concentric with the first hole of the tape gauge.

3. Observe alignment of tape and gauge.

(c) The next four holes in the tape, gauge should be visible through the number 2 code holes in the tape and the circular portion of the last (sixth) number 2 code hole in the tape should be entirely within the 0.086 inch diameter hole of the tape gauge.

(d) With the tape shoe held away from feed wheel, feed pawl and detent disengaged and tape removed, feed wheel should rotate freely.

CAUTION

With tape removed, make sure feed wheel and die wheel do not bind. Recheck adjustment, if necessary.

(e) To adjust:

1. Remove tape from punch mechanism.

2. Loosen eccentric locknut and rotate die wheel eccentric shaft until it binds against feed wheel.

3. Back off eccentric until die wheel is just free.

4. Check through three or four rotations.

5. Keep the indent of eccentric below

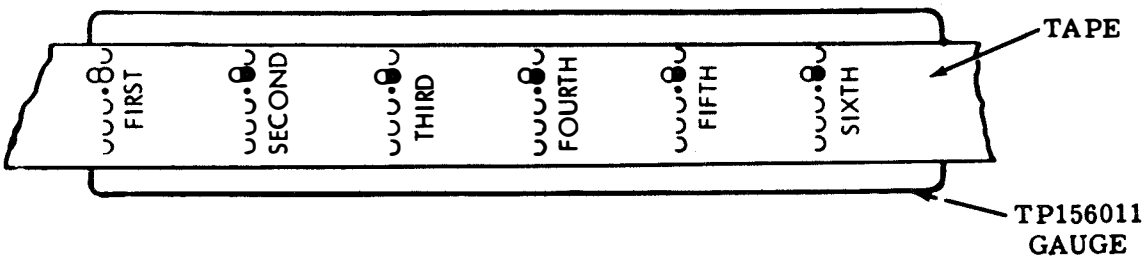


Figure 6-32. Ten Characters per Inch (Final) for Chadless Tape

the horizontal centerline of the stud.

6. Refine adjustment above, if necessary, by moving die wheel toward feed wheel to decrease character spacing and away from the wheel to increase.

7. Tighten nut.

8. Refine Feed Pawl adjustment (paragraph 6-3.1c(7)), if necessary.

NOTE

First through fifth holes in gauge are same size as code holes in tape (0.072 inch diameter). Sixth hole in gauge is larger (0.086 inch). This arrangement allows ±0.007 inch variation in 5 inches.

(7) Detent Lever. Adjust as follows:

(a) Refer to figure 6-33.

(b) Using the TP156011 tape gauge, check perforations on a piece of tape containing nine feed holes followed by a LETTERS combination.

(c) The lateral centerline through the code holes in the tape should coincide with a lateral centerline through the holes in the gauge.

(d) To adjust, rotate the detent eccentric clockwise to move feed holes toward the hinged edge of the code holes and counterclockwise to move the feed holes toward the trailing edge of the code holes. Tighten the eccentric locknut and refine the Feed Pawl Adjustment (paragraph 6-3.1c(7)).

(8) Feed Hole Lateral Alignment. Adjust as follows:

NOTE

If unit is equipped with tape guide (early design), locknut must be loosened before this adjustment is made.

(a) Refer to figure 6-34.

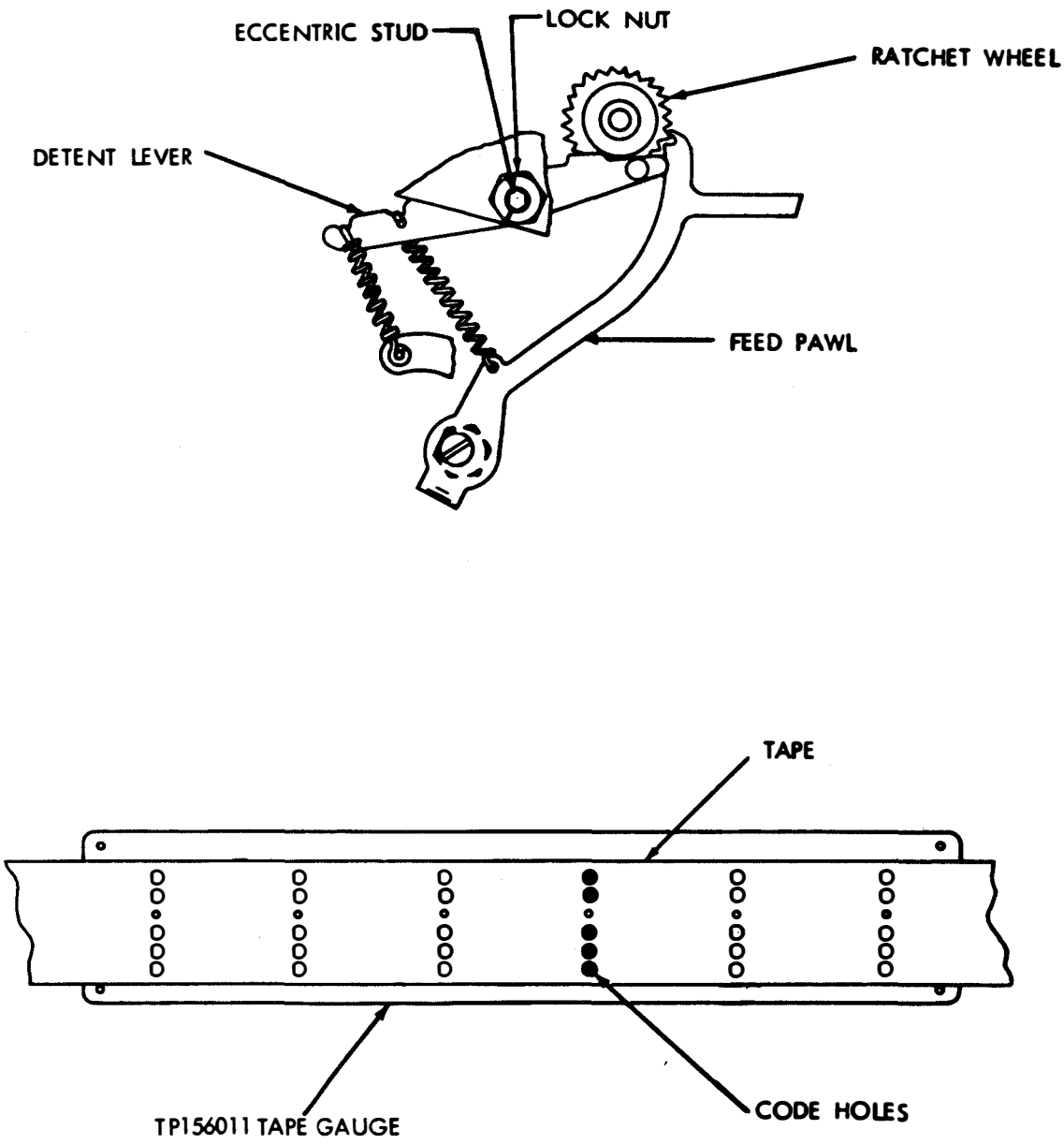


Figure 6-33. Detent Lever for Chadless Tape

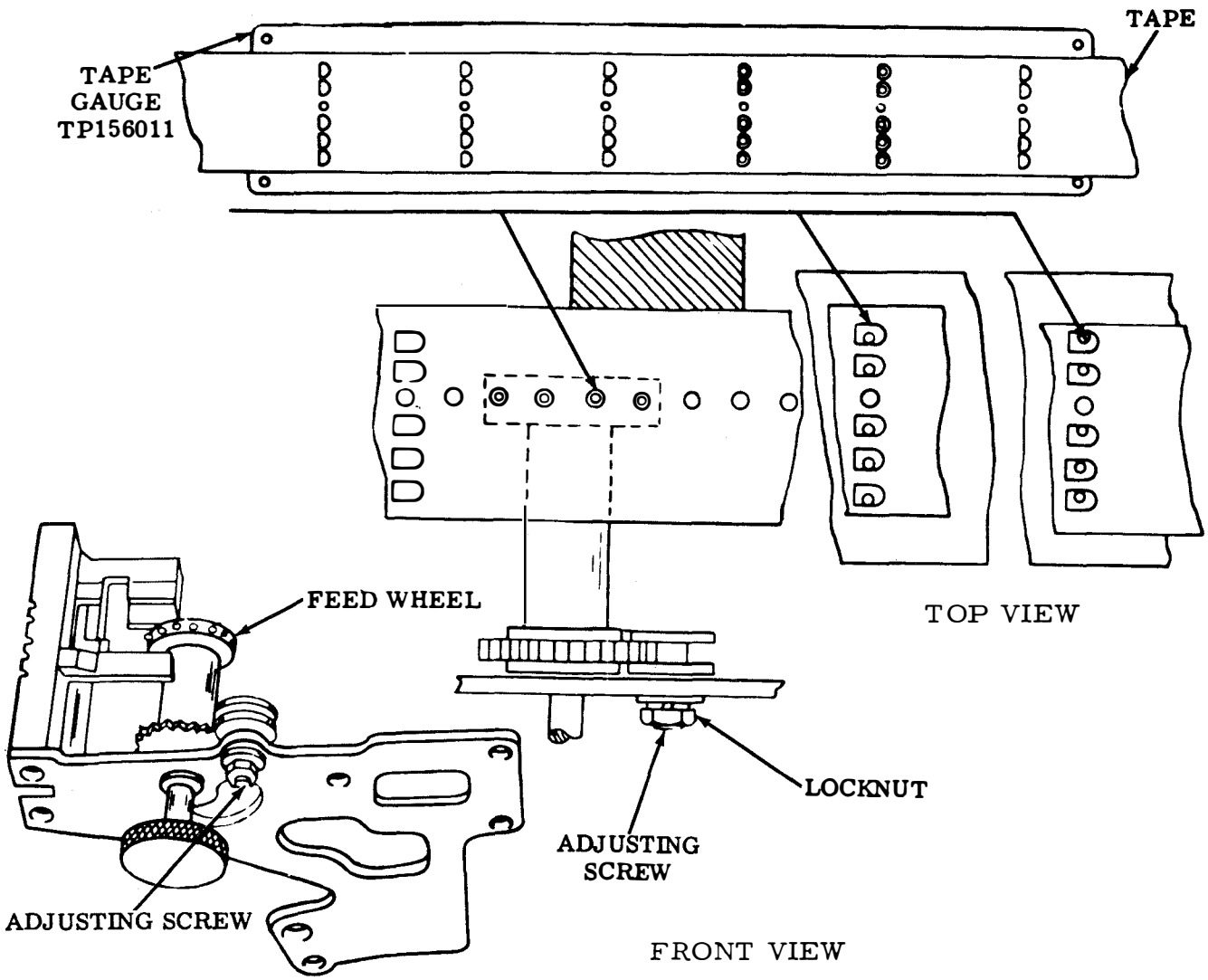


Figure 6-34. Feed Note Lateral Alignment

(b) With reperforator operating under power, obtain a tape with nine BLANK code combinations followed by a LETTER combination.

(c) Open chads so code holes are visible and place tape over TP156011 tape gauge with LETTERS combination feed holes engaging feed pins. (Large holes in gauge are same diameter as circular portion of code holes in tape. Small holes in gauge serve as guide for gauging.)

(d) Circular portion of code holes in tape should be concentric with holes in tape gauge.

(e) To adjust:

1. Loosen adjusting screw locknut and position adjusting screw.

2. To move holes of gauge away from reference edge of tape, move feed wheel towards front plate of punch mechanism by rotating adjusting screw counterclockwse.

3. To move holes of gauge towards reference edge of tape, move feed wheel towards backplate of punch mechanism by rotating adjusing screw clockwise.

4. Tighten locknut.

5. Refine Detent Lever adjustments (paragraph 6-3.1d(7)) to align lateral centerlines of code holes and feed holes, if required.

(9) Punch Slide Spring. Adjust as follows:

(a) Refer to figure 6-35.

(b) With LETTERS combination set up, function clutch tripped, and punch slides in selected position under punch pins, attach spring scale pushrod to punch slide and measure the force required to start each slide moving.

(c) The force should be between 2-1/4 and 3-1/4 ounces.

(d) Replace punch slide spring if force is not within the specified range.

(10) Retractor Bail Springs - Compression Springs Only. Adjust as follows:

(a) Refer to figure 6-36.

(b) With function clutch disengaged and tension springs unhooked, apply spring scale hook to punch pins and measure force necessary to lift retractor bail from lower guide or punch block.

(c) The force should be between 8 and 32 ounces.

(d) Replace compression spring if force is not within specified range.

(11) Retractor Bail Springs - Compression and Tension Springs (Combined). Adjust as follows:

(a) Refer to figures 6-36 and 6-37.

(b) Repeat paragraph (10) above except with tension springs hooked.

NOTE

To facilitate rehooking tension springs, place punch pins in uppermost position.

(c) The required force should be between 4 and 5 pounds.

(d) If spring scale reading is not within specified range, and compression springs check out, replace tension springs.

(12) Bias Spring (Tape Chute). Adjust as follows:

NOTE

To check this spring tension on units equipped with backspace mechanism it is necessary to remove several parts. It should not be checked unless there is reason to believe that requirements cannot be met.

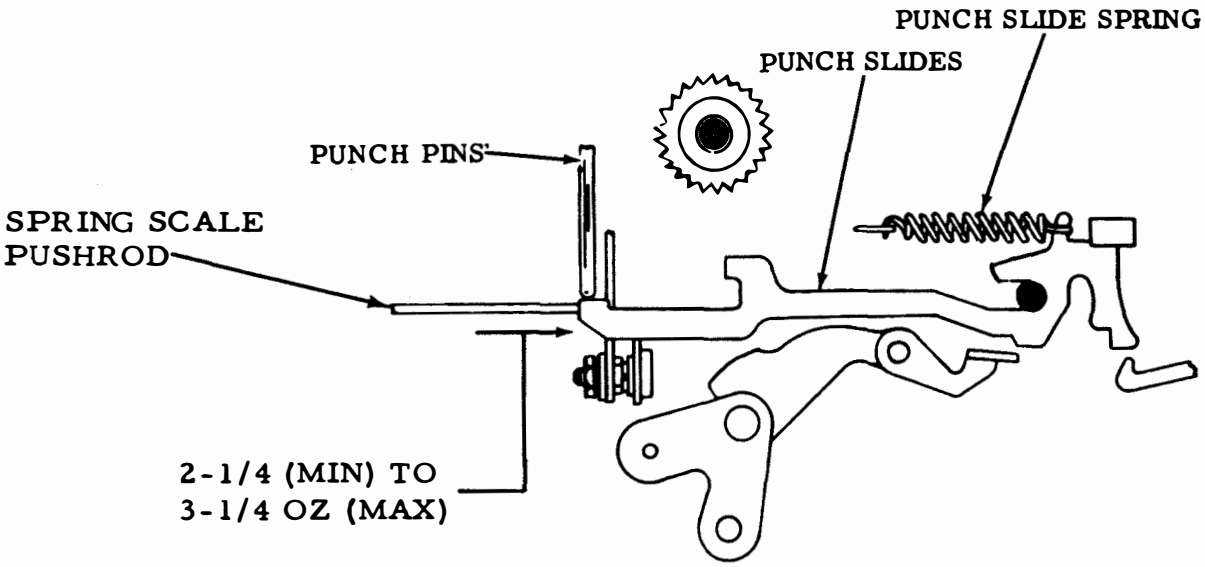


Figure 6-35. Punch Slide Spring for Chadless Tape

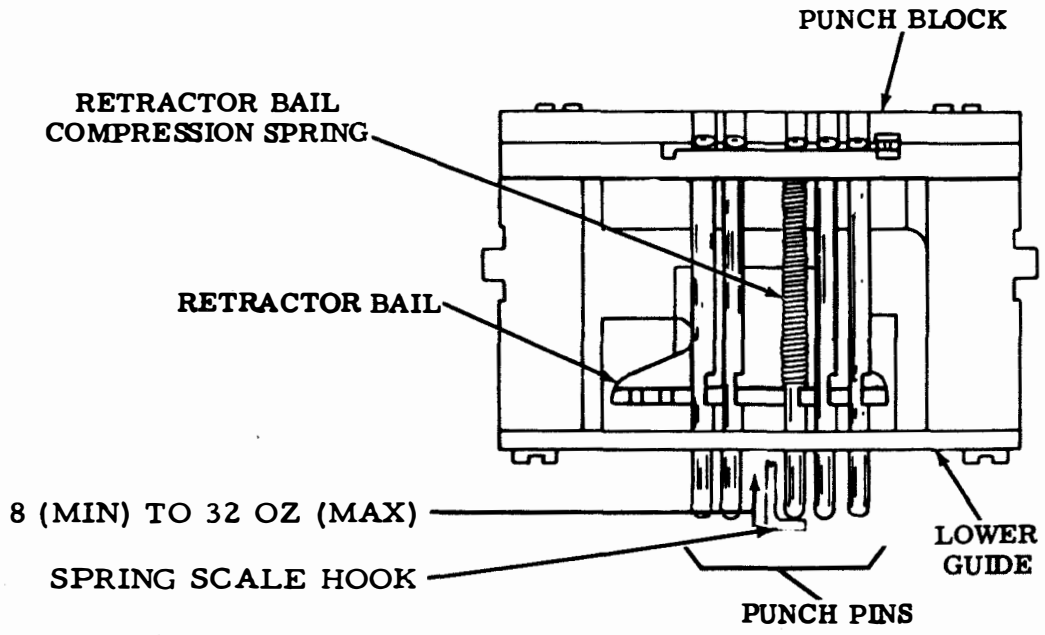


Figure 6-36. Retractor Bail Compression Spring for Chadless Tape - Left Side View

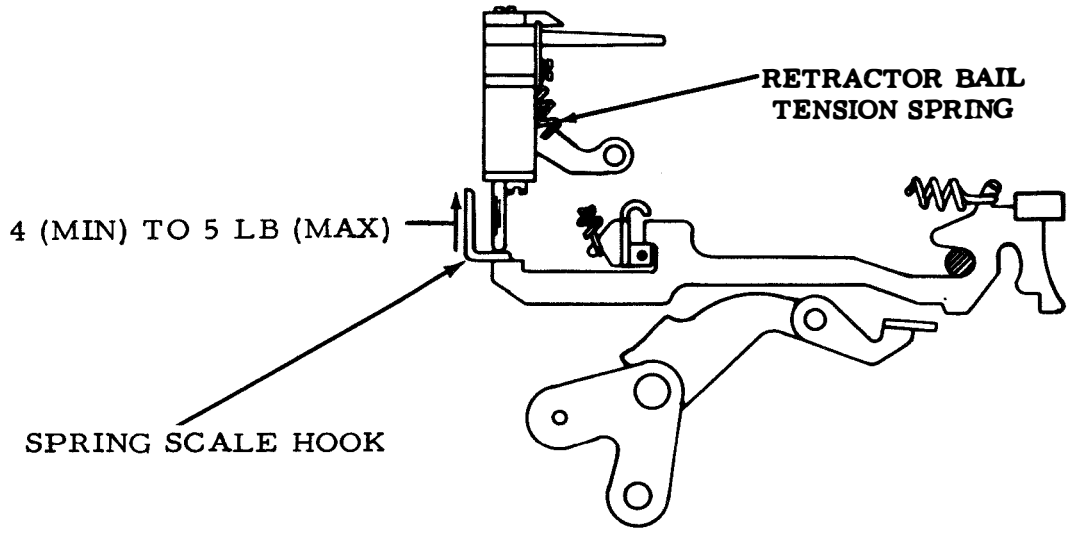


Figure 6-37. Retractor Bail Compression and Tension Springs (Combined) for Chadless Tape

(a) Refer to figure 6-38.

(b) With clutch disengaged and tape threaded through punch assembly, attach spring scale hook to bias spring.

(c) It should require 1-1/4 to 2-1/4 ounces to just move spring away from tape.

(d) To adjust, bend the spring.

(13) Tape Guide Assembly Spring. Adjust as follows:

(a) Refer to figure 6-38.

(b) Attach spring scale hook to tape guide assembly and pull tape guide assembly away from block using a minimum pull of 16 ounces.

(c) Tape guide assembly should be free to return to rest against tape guide block.

(d) To adjust:

1. Replace spring if requirement is not met.

2. If tape guide assembly is not free to return, reposition tape guide assembly mounting post to free tape guide assembly.

(14) Bias Spring (Punch Block). Adjust as follows:

(a) Refer to figure 6-39.

(b) With tape removed from punch block, bias spring should rest against clearance slot in block in a symmetrical manner.

(c) With tape in punch block and perforator

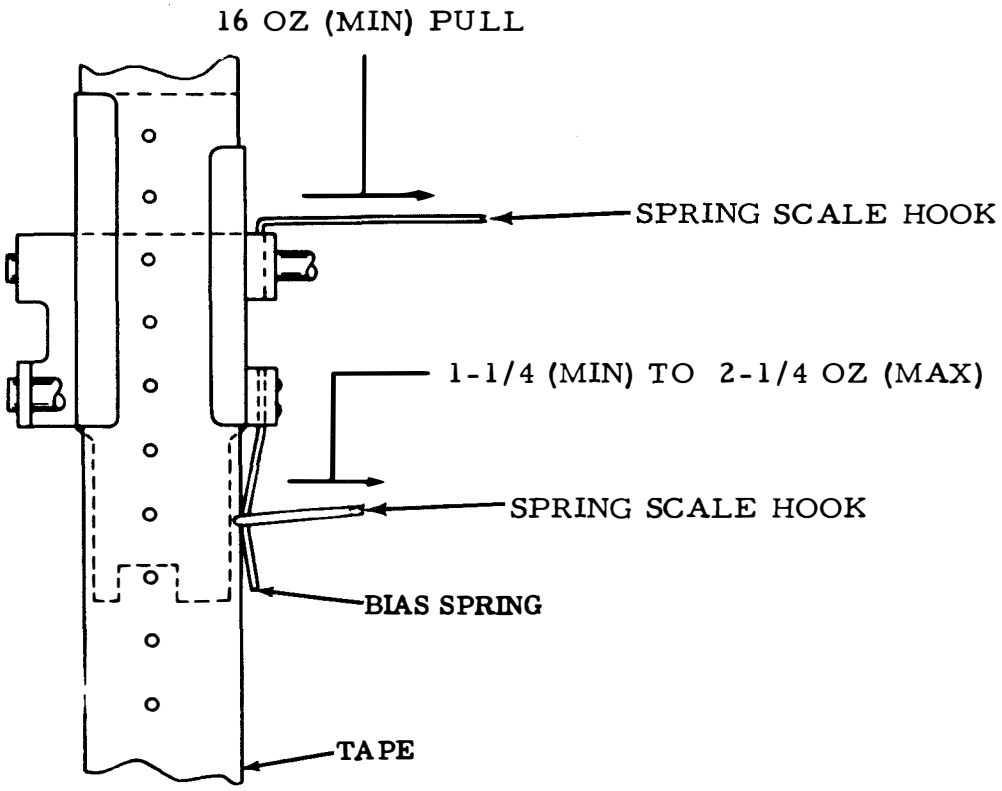


Figure 6-38. Bias Spring (Tape Chute) and Tape Guide Assembly Spring for Chadless Tape - Top View

operating under power, spring should not distort edge of tape.

(d) To adjust, bend spring and position it with its mounting screw loosened. Tighten screw.

e. Punch Mechanism Adjustments for Fully Perforated Tape. Perform punch mechanism adjustments (fully perforated tape) in accordance with the following paragraphs.

NOTE

None of the following adjustments apply to tape printer except paragraphs 6-3.1e(1) and (5).

(1) Punch Slide Latch Spring. Adjust as follows:

(a) Refer to figure 6-40.

(b) Select LETTERS code combination (12345) and position rocker bail to extreme left. Strip pushlevers from selecting levers.

(c) Use spring scale to measure force required to start latch moving This should be 1 to 3 ounces for one-shaft units and 3/4 to 2 ounces for two-shaft units.

(d) If force does not meet specifications, replace spring.

(2) Punch Pin Penetration. Adjust as follows:

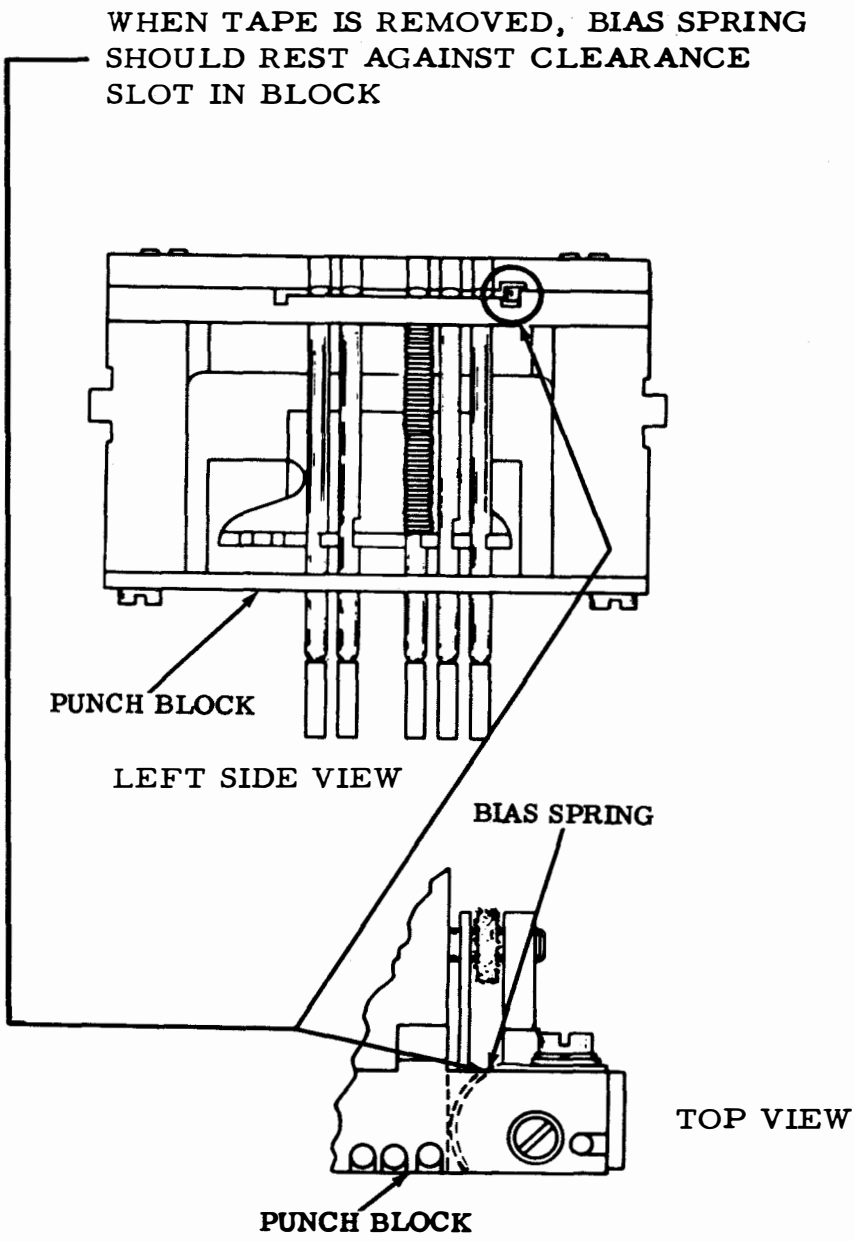


Figure 6-39. Bias Spring (Punch Block) for Chadless Tape

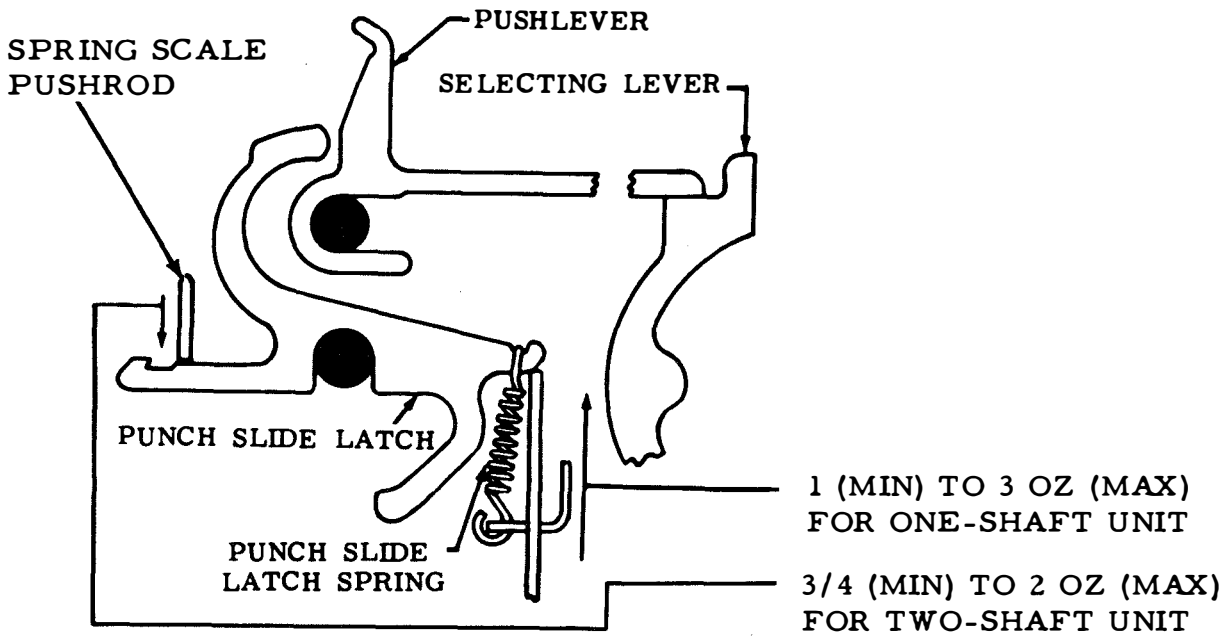


Figure 6-40. Punch Slide Latch Spring for Fully Perforated Tape

(a) Refer to figures 6-41.

(b) With the LETTERS combination (12345) selected and function clutch engaged, rotate main shaft until all punch pins are into or above the tape aperture in the punch block. With gauge TP159926 in position on top of oscillating shaft, measure clearance between feed pawl stud and the gauge.

(c) The clearance should be 0.050 inch minimum.

(d) With LETTERS combination selected, and function clutch engaged, rotate main shaft until all punch pins have cleared the punch block. With gauge TP159926 in position on top of oscillating shaft, measure clearance between feed pawl stud and the gauge.

(e) The clearance should be 0.080 inch minimum.

(f) To adjust, refine the Toggle Bail Eccentric adjustment (paragraph 6-3.1c(3)) keeping the indent to the right of a vertical centerline through the shaft, and tighten the nut.

(3) Punch Slide Downstop Position. Adjust as follows:

(a) Refer to figure 6-42.

(b) With LETTERS combination selected, function clutch disengaged and latched and play taken up toward the top, check clearance between both the front and rear punch slides and the downstop plate.

(c) There should be some clearance, not to

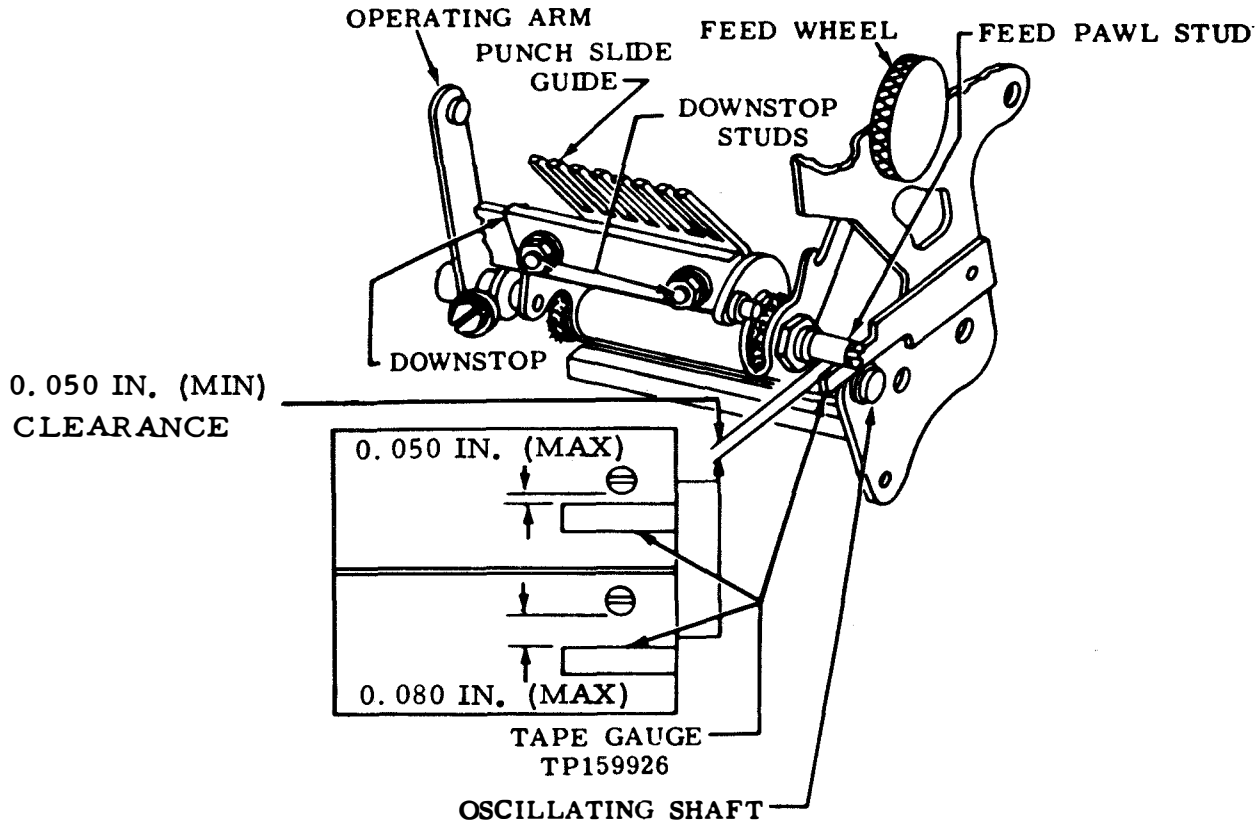


Figure 6-41. Punch Pin Penetration for Fully Perforated Tape - Left Side View

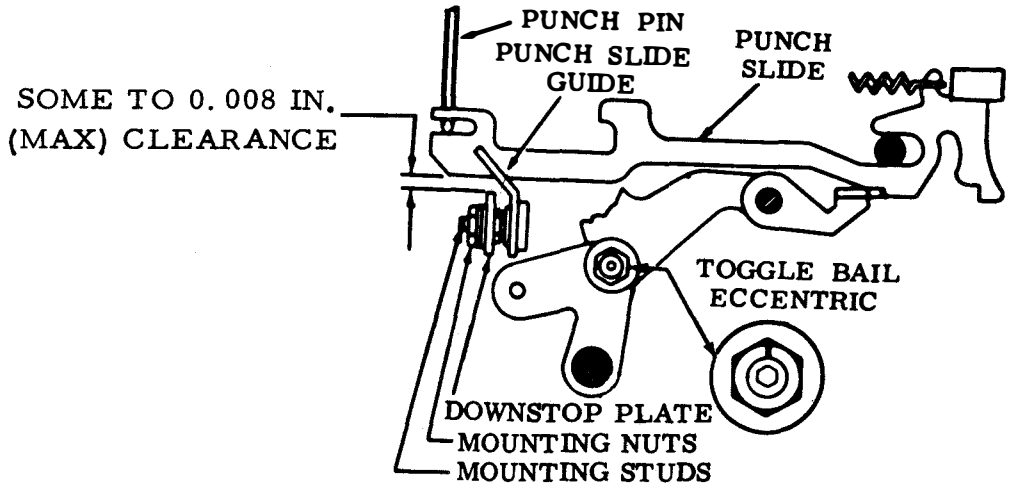


Figure 6-42. Punch Slide Downstop Position and Punch Slide Guide (Final)

exceed 0.008 inch. All other punch slides should have some clearance.

(d) To check the other punch slides for some clearance, place unit in stop position and trip function mechanism and latches. The punch slides should move fully to their operated position.

(e) To adjust, put unit in stop position, loosen two downstop plate mounting locknuts, and locate downstop plate to meet required clearance.

(4) Punch Slide Guide (Final). Adjust as follows:

(a) Refer to figure 6-42.

(b) Punch slides should align with their corresponding punch pins and be free of binds, after tightening the guide mounting studs.

(c) Each punch slide should return freely after being pushed in not more than 1/16 inch.

(d) To adjust, loosen mounting studs friction tight and position guide. Tighten studs.

(5) Punch Slide Spring. Adjust as follows:

NOTE

On units equipped with backspace mechanism, it is necessary to remove several parts to check this spring tension. It should not be checked unless there is good reason to believe that is does not meet requirements.

(a) Refer to figure 6-43.

(b) With LETTERS combination set up and punch slides in selected position, apply spring scale pushrod to punch slide.

(c) The force required to start each slide moving should be between 2-1/4 and 3-1/4 ounces.

(d) If force does not match specifications, replace spring.

(6) Tape Guide Assembly Spring. Adjust as follows:

(a) Refer to figure 6-44.

(b) Tape guide assembly should be free to return to rest against tape guide block.

(c) With spring scale hook attached to tape guide assembly, the force required to pull assembly from block should be 16 ounces minimum.

(d) If spring does not meet requirement, replace spring.

(e) If tape guide assembly is not free to return, reposition tape guide assembly mounting post to free tape guide assembly.

(7) Bias Spring (Tape Chute). Adjust as follows:

(a) Refer to figure 6-44.

(b) With clutch disengaged and tape threaded

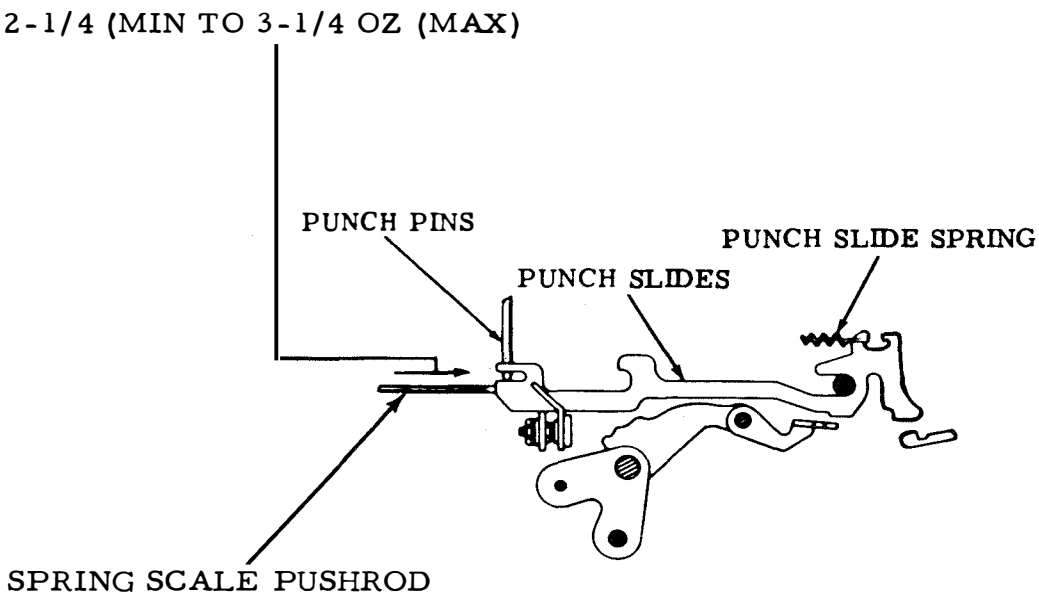


Figure 6-43. Punch Slide Spring for Fully Perforated Tape

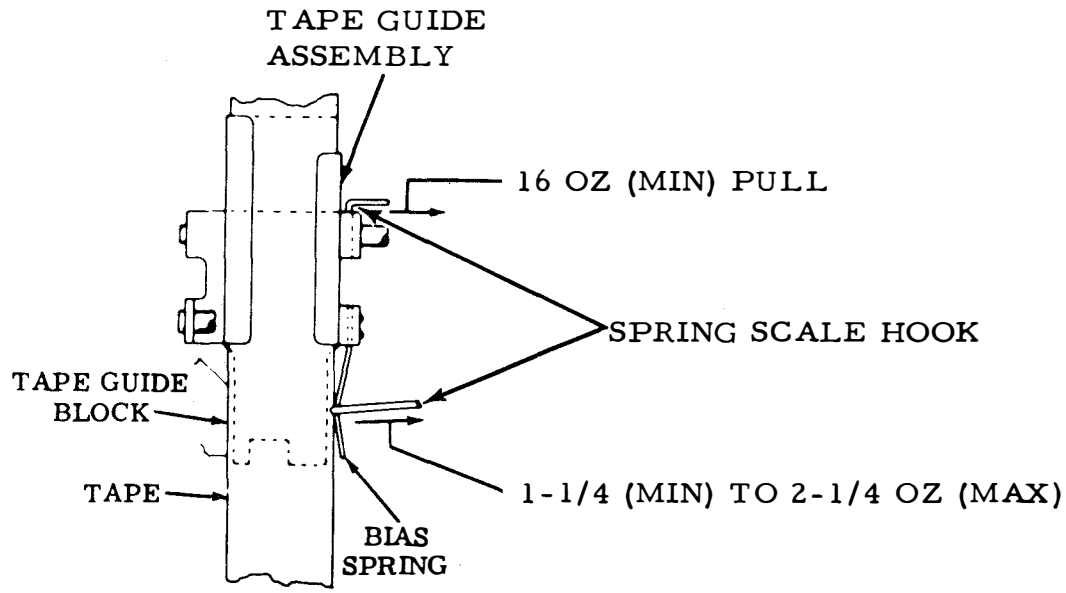


Figure 6-44. Tape Guide Assembly Spring and Tape Chute Bias Spring for Fully Perforated Tape - Top View

through punch assembly, apply spring scale hook to bias spring and pull.

(c) The force required to just move spring away from tape should be between 1-1/4 and 2-1/4 ounces.

(d) To adjust, bend spring and recheck step (c) above.

(8) Bias Spring (Punch Block). Adjust as follows:

(a) Refer to figure 6-45.

(b) With tape removed from punch block, bias spring should rest against clearance slot in block in a symmetrical manner.

(c) With tape in punch block and reperforator operating under power, spring should not distort edge of tape.

(d) To adjust, bend spring and position with mounting screws loosened. Tighten screws.

f. Punch Mechanism Adjustments For Fully Perforated Tape With Indentation of Feed Wheel Between Feed Holes. Perform punch mechanism adjustments (fully perforated tape with feed wheel indentation) in accordance with the following paragraphs.

NOTE

None of the following adjustments apply to tape printer.

Before proceeding with the following adjustments, check both tape guide spring tensions, (paragraph 6-3.1e(6) through 8)).

These adjustments are for five-level fully perforated tapes, with indentation of feed wheel between feed holes:

1. 11/16-inch wide tape with printing between feed holes.
2. 7/8-inch wide tape having a margin for printing at top of tape.
3. 7/8-inch wide tape

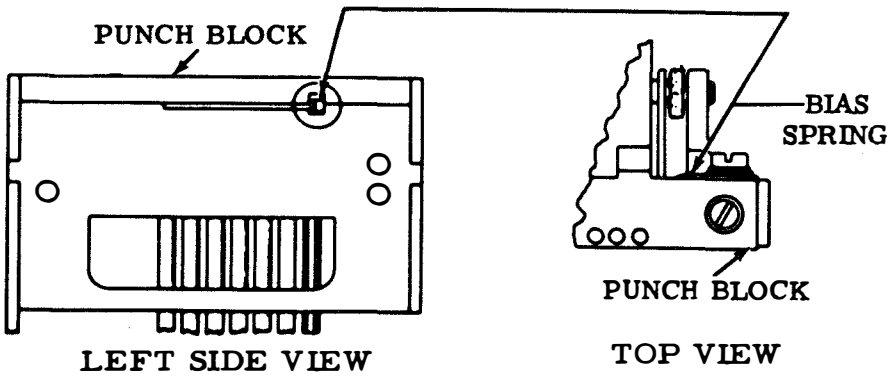


Figure 6-45. Bias Spring (Punch Block) for Fully Perforated Tape

having a margin for printing at bottom of tape (see figure 6-47).

(1) Ten Characters per Inch (Final). Adjust as follows:

(a) Refer to figure 6-46.

(b) With tape shoe blocked away from feed wheel, feed pawl and detent disengaged, and tape removed from punch mechanism, feed wheel should rotate freely. Check through three or four rotations.

(c) Perforate six series of 9 BLANK combinations followed by a LETTERS combination.

NOTE

The first five holes in gauge are the same size as code holes in tape (0.075 inch diameter), but the sixth hold in gauge is larger than the first five (0.086 inch diameter). This arrangement allows ±0.007 inch variation in inches.

(d) Place tape over smooth side of TP156011 gauge so circular portion of first number 2 code hole in tape is concentric with first 0.072 hole of gauge (see note 3 above).

(e) The next four 0.072 holes in tape gauge should be visible through the number 2 code holes in tape, and circular portion of the last (sixth) number 2 code hole in

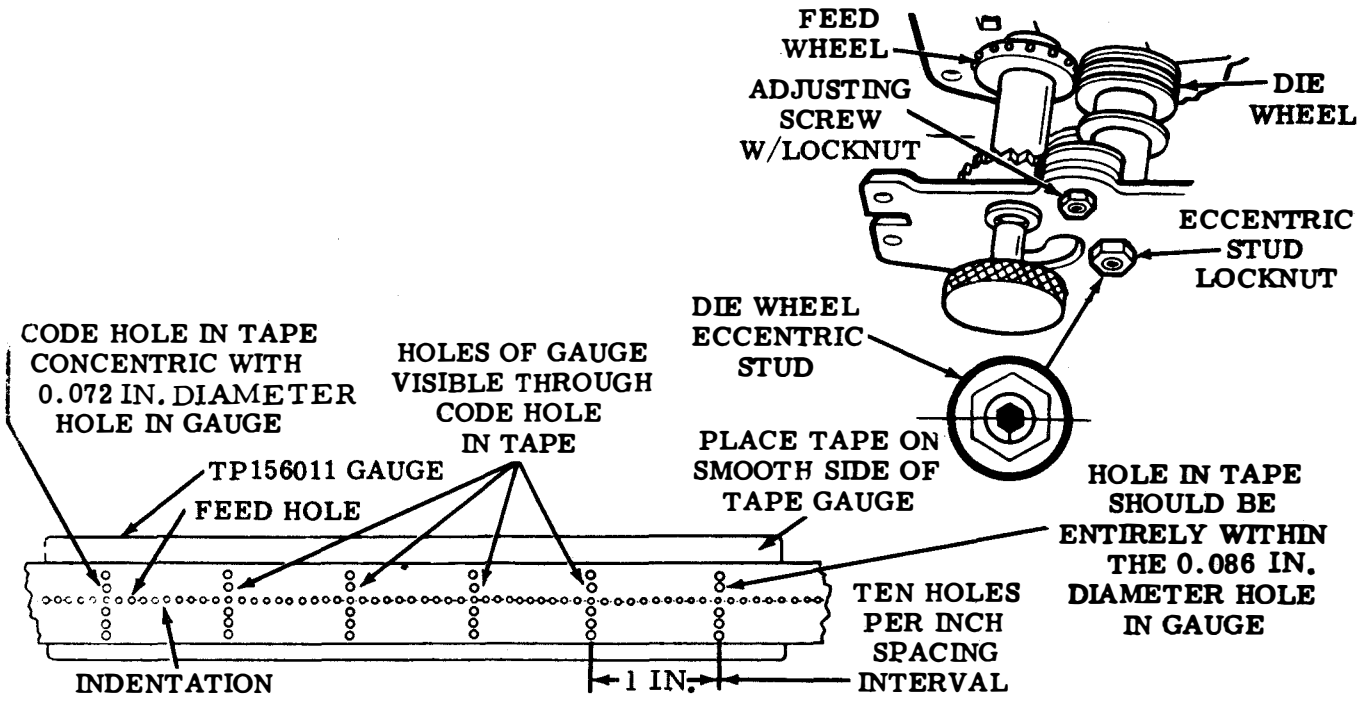


Figure 6-46. Ten Characters per Inch (Final) for Fully Perforated Tape with Indentation of Feed Wheel between Feed Holes

tape should be entirely within the 0.086 inch diameter hole of the tape gauge.

CAUTION

With tape removed from punch mechanism, be sure die wheel does not bind.

(f) To adjust:

1. Remove tape from punch mechanism.

2. Loosen die wheel eccentric stud locknut and adjust die wheel so that it just binds on feed wheel.

3. Back off eccentric so die wheel is just free (check freeness) through three or four rotations.

4. Keep indent off eccentric stud below the horizontal centerline of stud.

(g) Check step (b) and refine step (f) above to meet the requirement. (Move indent of die wheel eccentric stud towards feed wheel to decrease character spacing and away from feed wheel to increase spacing.)

(h) With tape shoe away from feed wheel, feed pawl and detent disengaged, and tape removed from punch mechanism, feed wheel should rotate freely.

(i) Failure to rotate freely indicates die wheel eccentric has been overadjusted. To correct, refine step (f) above.

(2) Lateral and Front to Rear Feed Wheel Position Detent. Adjust as follows:

(a) Refer to figure 6-47.

(b) With unit operating under power, indentations of feed wheel should be centrally located between two fully perforated feed holes, as gauged by eye.

(c) To adjust, loosen detent lever eccentric stud locknut and turn eccentric stud. (Clockwise moves indentation toward leading edge of feed hole and counterclockwise moves it toward trailing edge.)

(d) Tighten locknut and recheck Feed Pawl adjustment (paragraph 6-3.1c(7)).

(e) With unit operating under power, indentations of feed wheel should be on a centerline between fully perforated feed holes, as gauged by eye.

(f) To adjust, loosen adjusting screw locknut and turn adjusting screw. (Clockwise to move indentation toward rear and counterclockwise toward front). Tighten locknut.

g. Ribbon Mechanism Adjustments. Perform ribbon mechanism adjustments in accordance with the following paragraphs.

(1) Feed Pawl Spring. Adjust as follows:

(a) Refer to figure 6-48.

(b) With rocker bail to extreme right, use spring scale to measure force

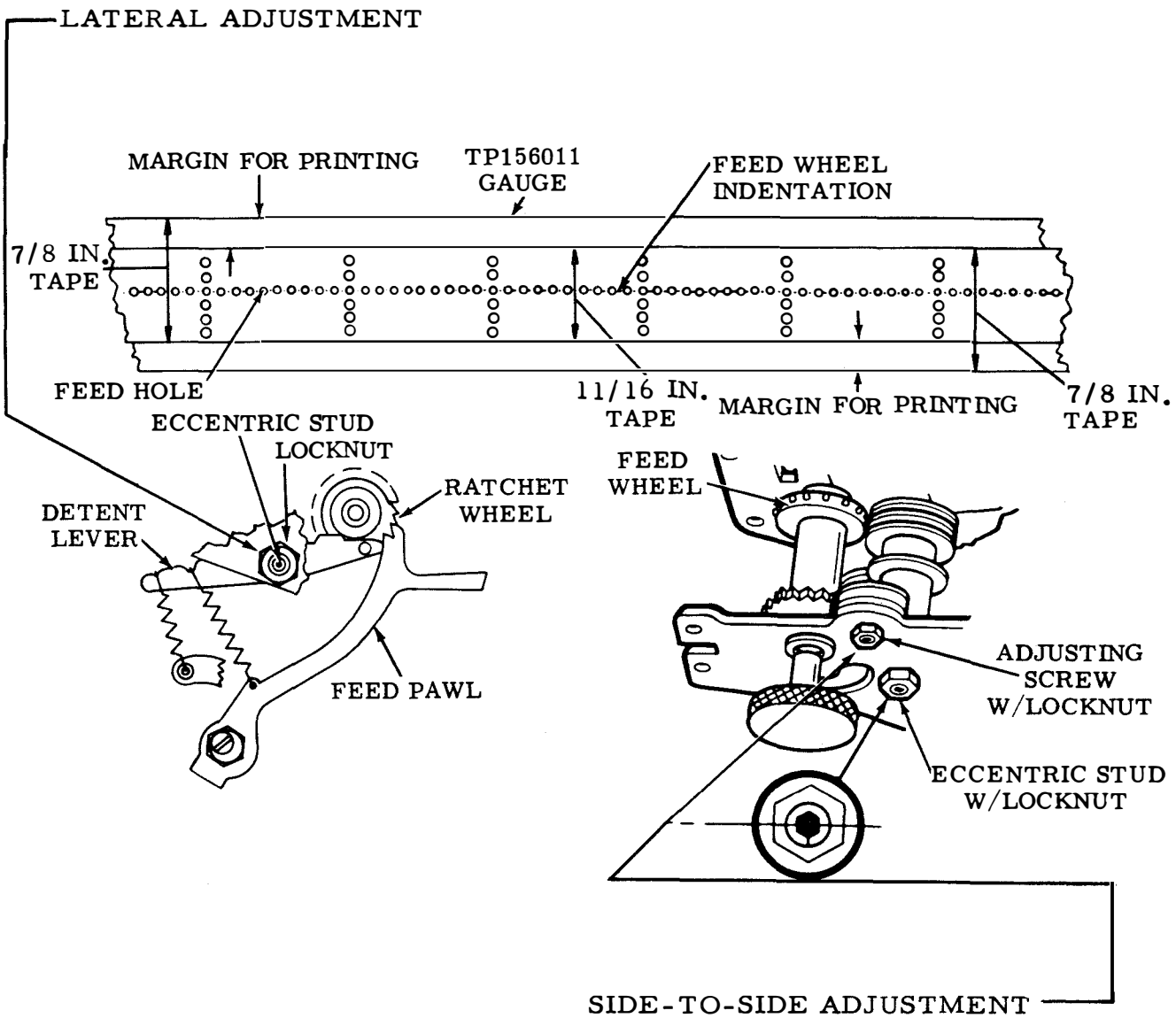


Figure 6-47. Lateral and Front-to-Rear Feed Wheel Position Detent for Fully Perforated Tape with Indentation of Feed Holes

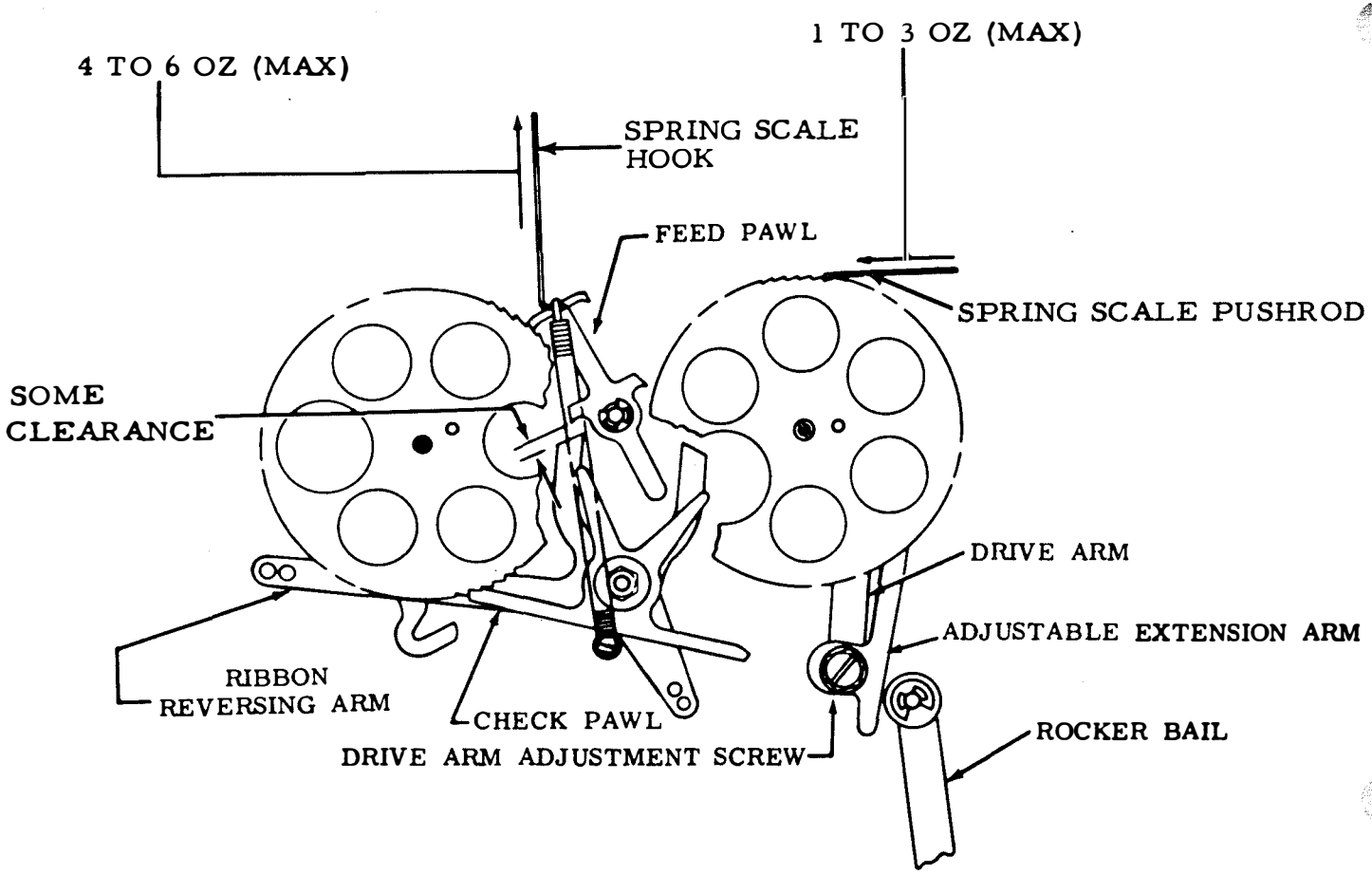


Figure 6-48. Feed Pawl Spring, Ratchet Wheel Torque Spring and Drive Arm

necessary to pull feed pawl spring to installed length. This should measure from 4 to 6 ounces.

(c) If force does not match requirements, replace spring.

(2) Ratchet Wheel Torque Spring. Adjust as follows:

(a) Refer to figure 6-48.

(b) Apply spring scale pushrod tangentially to ratchet wheel. It should require from 1 to 3 ounces force to start wheel rotation.

(3) Drive Arm. Adjust as follows:

(a) Refer to figure 6-48.

(b) With rocker bail positioned to extreme left, and ribbon reversing arm held under lower reversing extension of feed pawl, there should be some clearance between blocking edge of ribbon reverse arm and reversing extension of feed pawl, but not so great as to allow feed pawl to feed more than two teeth at a time.

(c) To adjust, loosen mounting screw and position drive arm adjustable extension lever.

(d) Tighten mounting screw.

h. Selector Mechanism Adjustments. Perform selector mechanism adjustments in accordance with the following paragraphs.

(1) Clutch Shoe Lever. (See paragraph 6-3.1b(1)).

(2) Clutch Shoe Lever Spring. (See paragraph 6-3.1b(4)).

(3) Clutch Shoe Spring. (See paragraph 6-3.1b(5)).

(4) Selector Armature. Adjust as follows:

NOTE

This adjustment need not be made or checked if the selector magnet bracket and receiving margin requirements are met.

(a) Refer to figure 6-49.

(b) Remove range finder assembly and selector magnet assembly.

NOTE

To ensure better operation, pull a piece of bond paper between the armature and the pole pieces to remove any oil or foreign matter that may be present. Make certain that no lint or pieces of paper remain between the pole pieces and the armature.

(c) Measure clearance between armature hinge clamp and the pivot edge of the magnet bracket casting at their closest point.

(d) Clearance should be 0.010 inch minimum.

(e) Measure clearance between outer edge of armature and outer edge of both pole pieces.

(f) Clearance should be flush within 0.015 inch with outer edge of both pole pieces.

(g) Start lever should drop freely into armature extension slot.

(h) To adjust, position armature spring adjusting nut to hold armature firmly against pivot edge of casting. Position armature with mounting screws loosened. Tighten screws.

(5) Selector Armature Downstop (Preliminary). Adjust as follows:

(a) Refer to figure 6-50.

(b) Magnet must be deenergized, locklevers on high part of their cam, and armature resting against its downstop.

(c) Clearance between end of armature and left edge of left pole piece should be between 0.030 and 0.035 inch.

(d) To adjust, position downstop bracket to

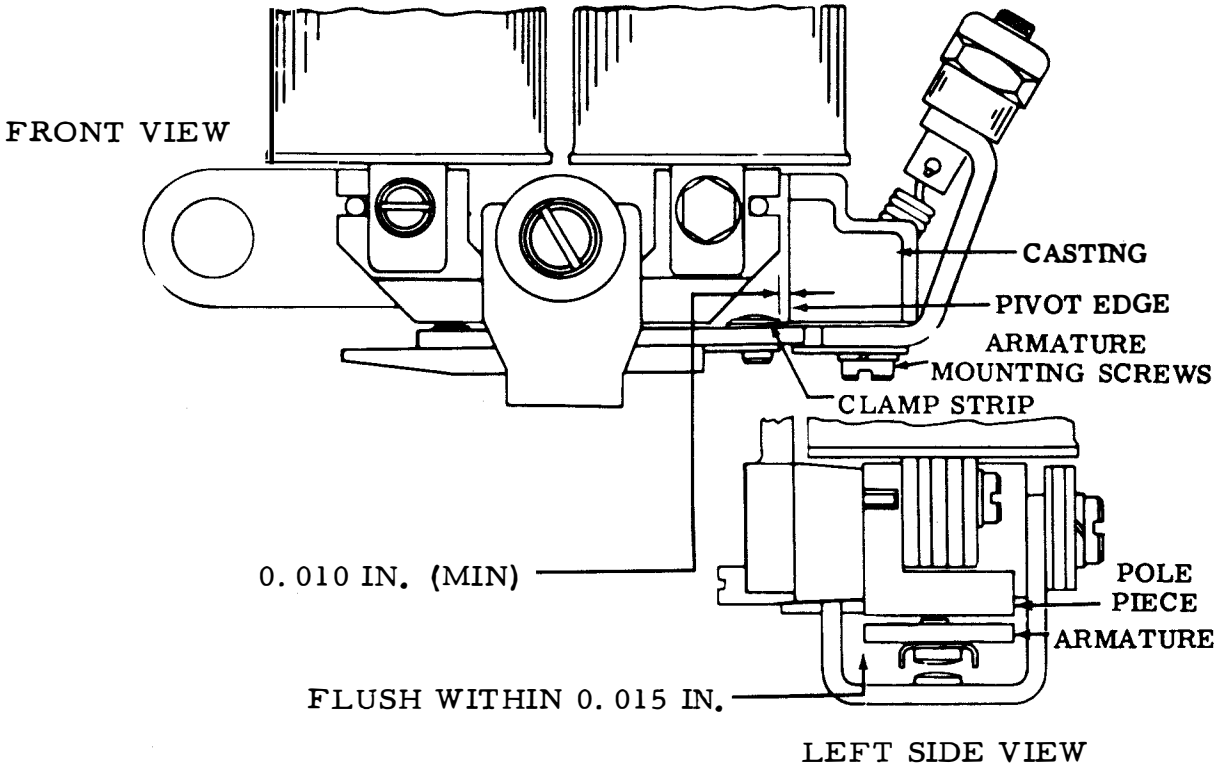


Figure 6-49. Selector Armature

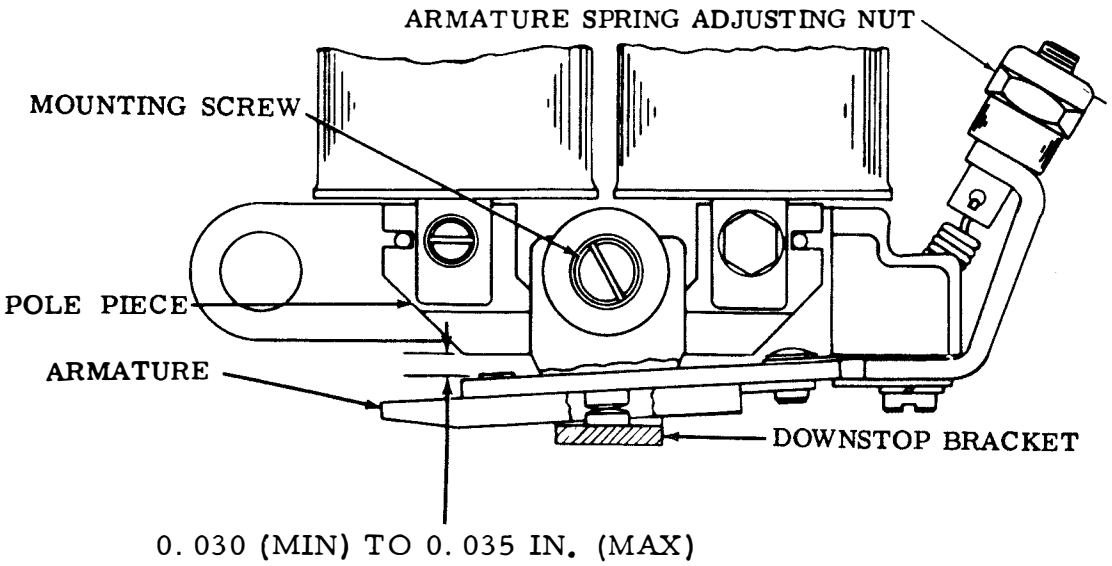


Figure 6-50. Selector Armature Downstop (Preliminary)

required clearance with mounting screw loosened. Tighten screw.

(6) Selector Armature Spring (Preliminary) (Single Antifreeze Button Units). Adjust as follows:

NOTE

This adjustment procedure is only for units employing selector armature with single antifreeze button.

(a) Refer to figure 6-51.

(b) With locking lever and start lever on high part of cams, apply spring scale as nearly vertical as possible under end of armature extension.

(c) The following tensions should be required to move the armature to the marking position: 0.020 and 0.035 ampere - 1-1/2 to 2 ounces; 0.060 ampere - 2-1/2 to 3 ounces.

NOTE

This spring can be adjusted for maximum selector performance only when printer is connected to the specific circuit over which it is to operate under service conditions. Since there are several operating speeds and since circuits vary widely, it is impossible to adjust spring for maximum performance at the factory. The foregoing spring tension requirement is given to permit operation prior to measurement of receiving margins. Readjustment made to obtain satisfactory receiving margin should not be disturbed in order to meet requirements of this adjustment. The final spring tension should be held as close as possible to the values given above, consistent with good receiving margins.

(d) To adjust, position adjusting nut to specified tolerance of step (c) above.

(e) For final adjustments, see Selector Receiving Margin (paragraph 6-3.1h(22)).

(7) Selector Armature Spring (Preliminary) (Two Antifreeze Button Unit). Adjust as follows:

NOTE

This adjustment procedure is only for units employing selector armatures with double antifreeze buttons.

(a) Refer to figure 6-52.

(b) With locking levers and start lever on high part of cams, apply spring scale as nearly vertical as possible under end of armature extension.

(c) The following tensions should be required to move the rear antifreeze button against the magnet core: 0.020 ampere - approximately 14 grams; 0.030 ampere - approximately 18 grams; 0.060 ampere - approximately 21 grams.

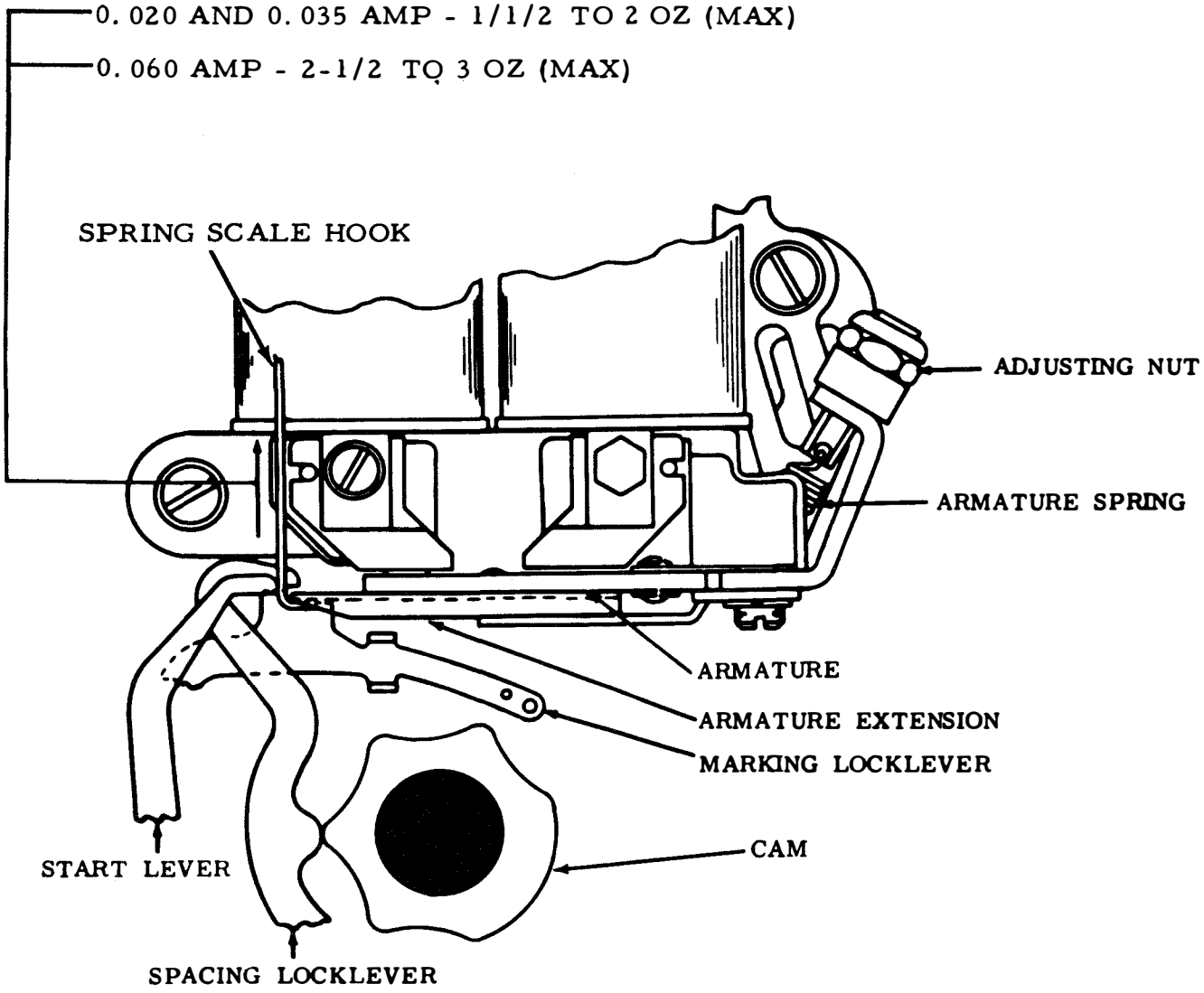


Figure 6-51. Selector Armature Spring (Preliminary) (Single Antifreeze Button Unit)

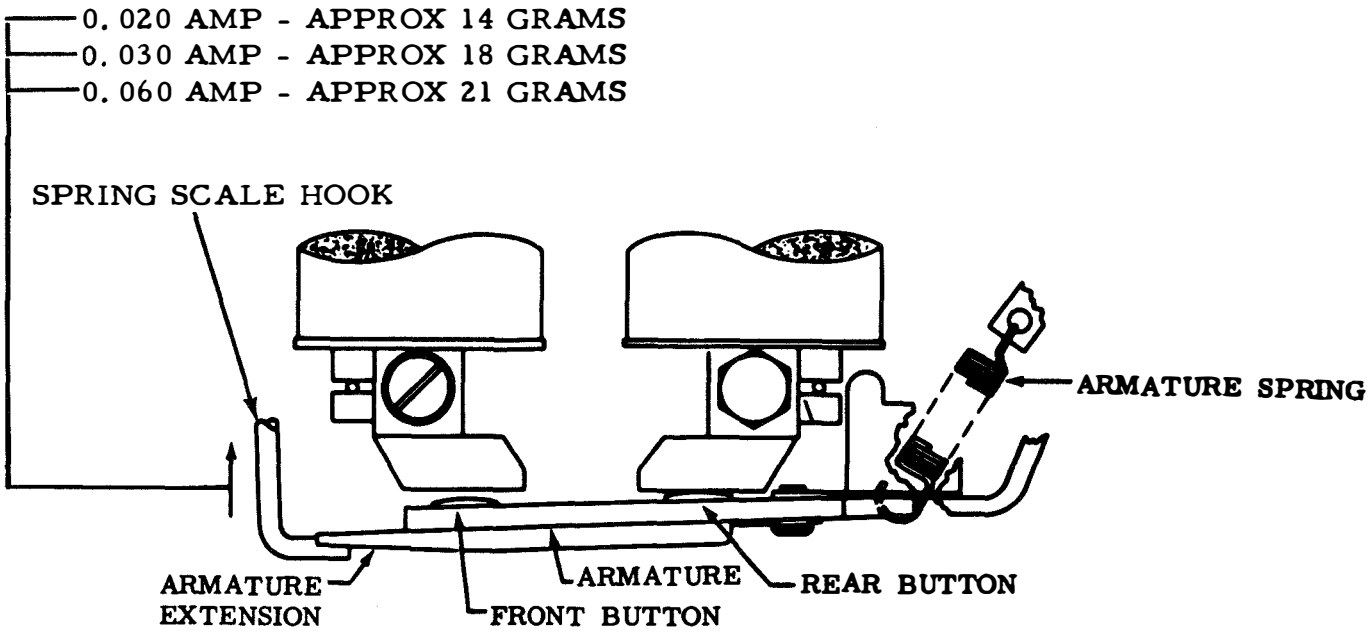


Figure 6-52. Selector Armature Spring (Preliminary and Final) (Two-Antifreeze Button Unit)

(d) To adjust, position armature spring adjusting nut to tolerance specified in step (c) above.

(e) For final adjustments see Selector Receiving Margin (paragraph 6-3.1h(23)).

(8) Selector Armature Spring (Final) Two Antifreeze Button Unit).

(a) Refer to figure 6-52.

(b) When a distortion test set is available, selector armature spring tension should be refined to obtain satisfactory receiving margins.

(c) The front antifreeze button must contact the magnet core when the magnet coils are energized.

(d) For final adjustments see Selector Receiving Margin (paragraph 6-3.1h(23)).

(9) Selector Magnet Bracket. Adjust as follows:

NOTE

The appropriate preliminary Selector Armature Spring adjustment (paragraphs 6-3.1h(6), (7), or (8)) must be made prior to this adjustment.

(a) Refer to figure 6-53.

(b) With spacing locklever on high part of cam, and armature in contact with pole piece, measure clearance between end of armature extension and shoulder on spacing locklever.

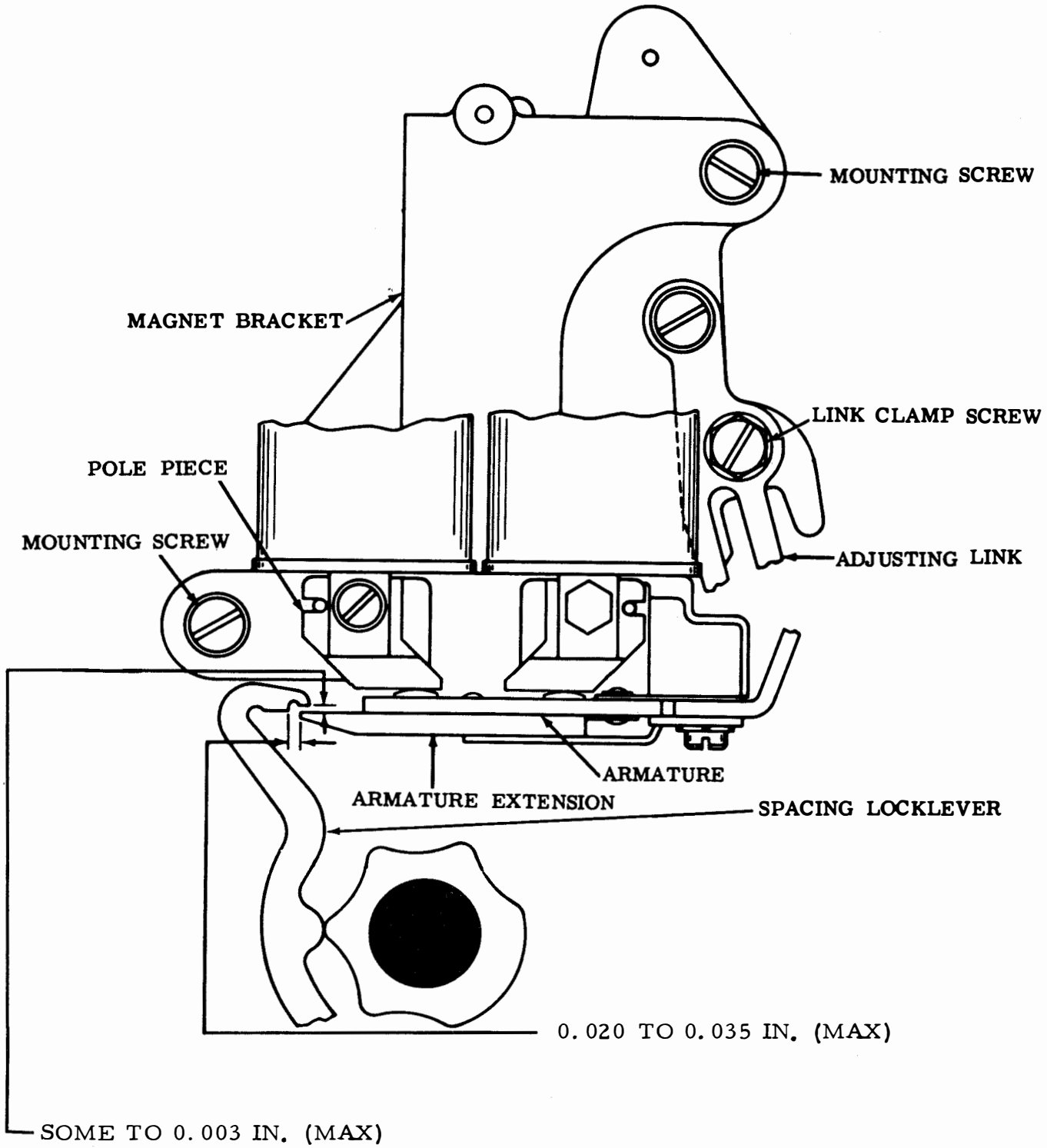


Figure 6-53. Selector Magnet Bracket

(c) The clearance should be between 0.020 and 0.035 inch.

(d) To adjust, loosen two magnet bracket mounting screws and adjusting link clamp screw. Position magnet bracket by adjusting link and tighten link clamp screw only.

(e) With spacing locklever on high part of cam, and armature in contact with pole piece, measure clearance between upper surface of the upper step of the spacing locklever when locklever is held downward.

(f) There should be some clearance, not to exceed 0.003 inch.

(g) To adjust, position upper end of magnet bracket. Tighten two magnet bracket mounting screws and recheck steps (b) and (c).

(10) Selector Magnet Bracket Marking Locklever.

(a) Refer to figure 6-54.

(b) With marking locklever on low part of cam, magnet energized, and armature in contact with left pole piece, check clearance between lower surface of armature extension and upper surface of marking locklever.

(c) There should be some clearance visible.

(d) To adjust, loosen mounting screws and position upper end of magnet bracket so there is clearance, and tighten mounting screws.

(e) Recheck adjustments in paragraph 6-3.1h(9).

(11) Marking Locklever Spring. Adjust as follows:

(a) Refer to figure 6-55.

(b) With LETTERS combination set and main shaft rotated until selector clutch is disengaged, push the spring scale pushrod against lower extension of locklever.

(c) The marking locklever should start moving when a force between 1-1/2 and 3 ounces is applied.

(d) If force does not match requirements, replace spring and recheck.

(12) Selector Armature Downstop (Final). Adjust as follows:

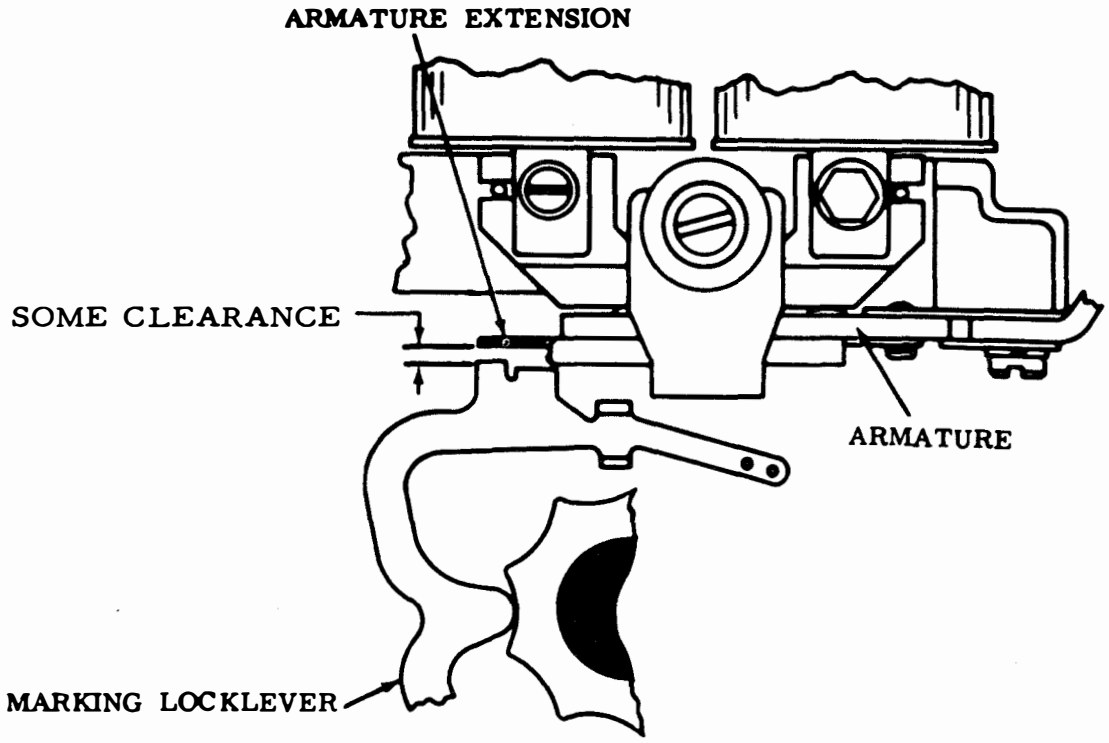
(a) Refer to figure 6-56.

(b) With selector magnet deenergized and spacing locklever on low part of cam, measure clearance between top of armature extension and bottom of lower step of spacing locklever.

(c) The clearance should be between 0.005 and 0.015 inch.

(d) To adjust, refine adjustment in Selector Armature Downstop (Preliminary) (paragraph 6-3.1h(5)).

(13) Selector Pushlever Spring. Adjust as follows:



Fiure 6-54. Selector Magnet Brakcet Marking Locklever

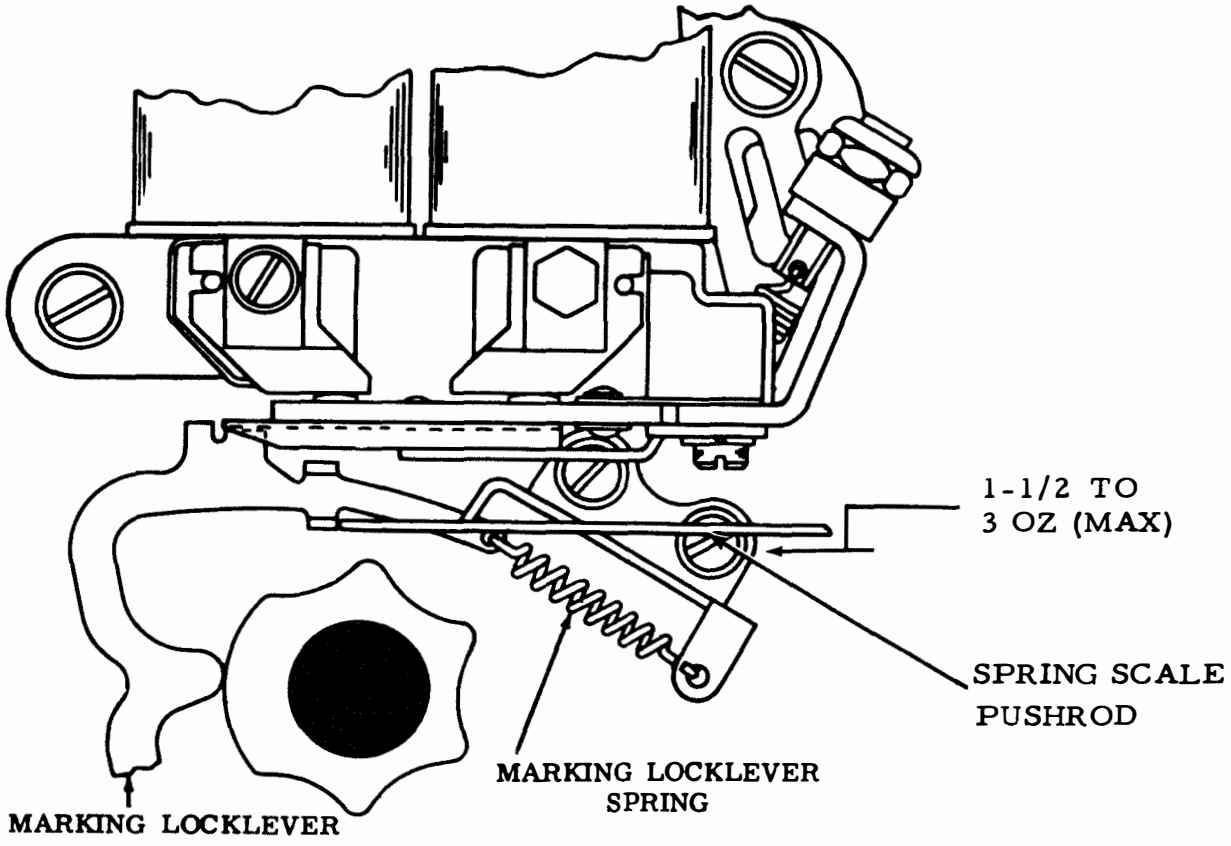


Figure 6-55. Marking Locklever Spring

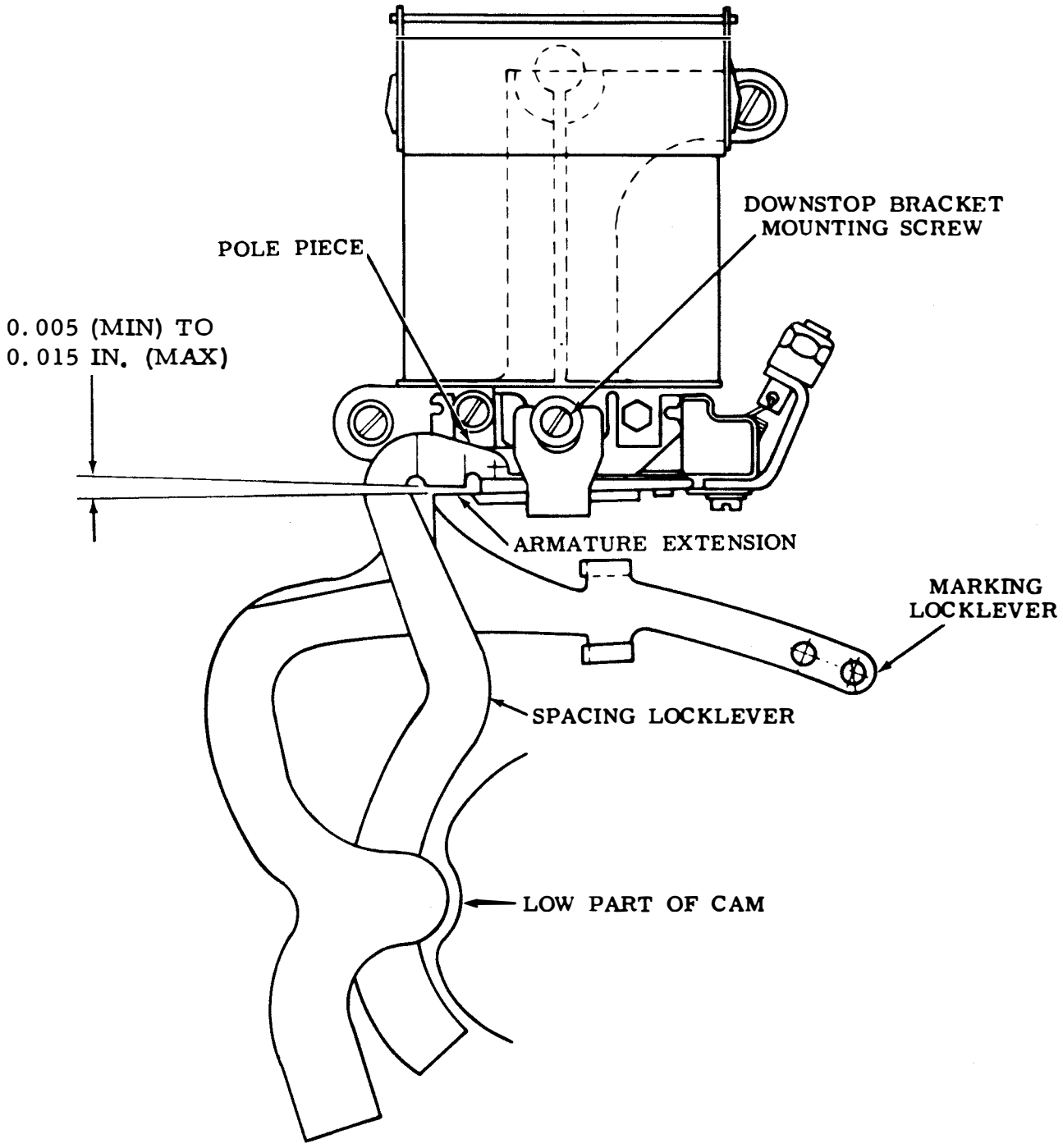


Figure 6-56. Selector Armature Downstop (Final)

(a) Refer to figure 6-57.

(b) With pushlever in spacing position, apply spring scale to pushlever to measure tension required to move pushlever from selector lever. Check five springs.

(c) Tension should be between 3/4 and 1-1/2 ounces.

(d) Replace spring if not within specified tension.

(14) Selector Lever Spring. Adjust as follows:

(a) Refer to figure 6-58.

(b) Place typing unit upside down and reset bail on peak of cam.

(c) Use spring scale to check force required to start each lever moving. Check five springs. If necessary, unhook start lever spring to check number 4 selector spring.

(d) Force required is 1-1/4 to 2-1/2 ounces.

(e) Replace springs if not within specified tension.

(15) Selector Clutch Drum End Play. Adjust as follows:

(a) Refer to figure 6-59.

(b) With clutch latched in stop position, measure cam assembly end play.

(c) Cam assembly should have some end play, not to exceed 0.010 inch.

(d) To adjust, loosen mounting screw, position clutch drum on main shaft, and tighten screw.

(16) Pushlever Reset Bail Spring. Adjust as follows:

(a) Refer to figure 6-60.

(b) With pushlever reset bail on low part of cam, apply 32-ounce spring scale to reset bail and measure force required to move bail from cam.

(c) Force should be between 4 and 8 ounces.

(d) Replace spring, if not within this tolerance.

(17) Selector Clutch Latchlever Spring. Adjust as follows:

(a) Refer to figure 6-61.

(b) With latchlever resting on low part of its cam disc, attach spring scale to latchlever and measure force required to start latchlever moving.

(c) Force should be between 2 and 3-1/2 ounces.

(d) If force does not match specifications, replace spring.

(18) Spacing Locklever Spring. Adjust as follows:

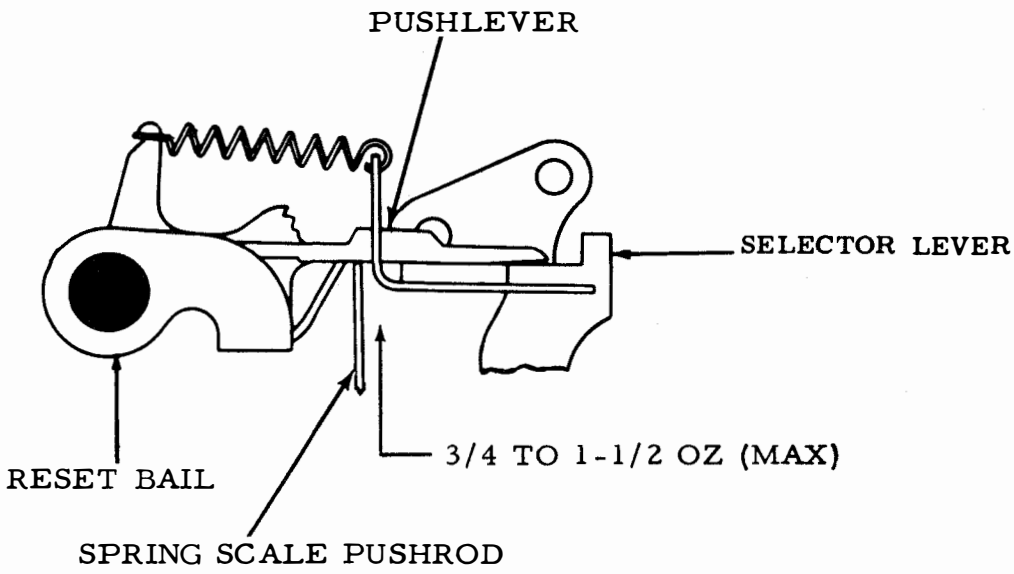


Figure 6-57. Selector Pushlever Spring

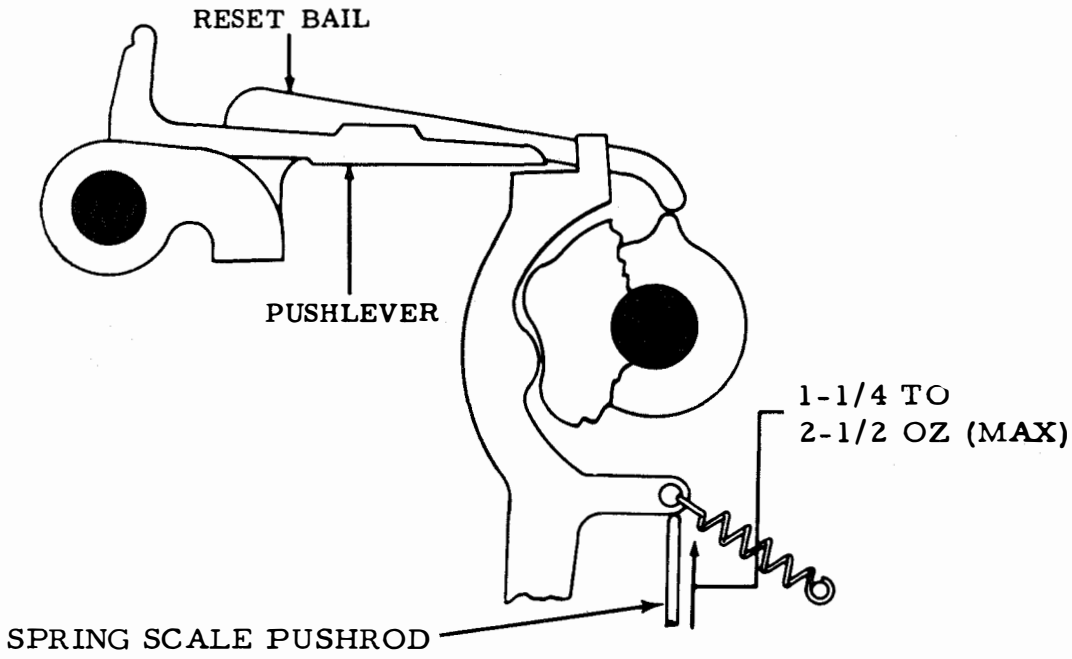


Figure 6-58. Selector Lever Spring

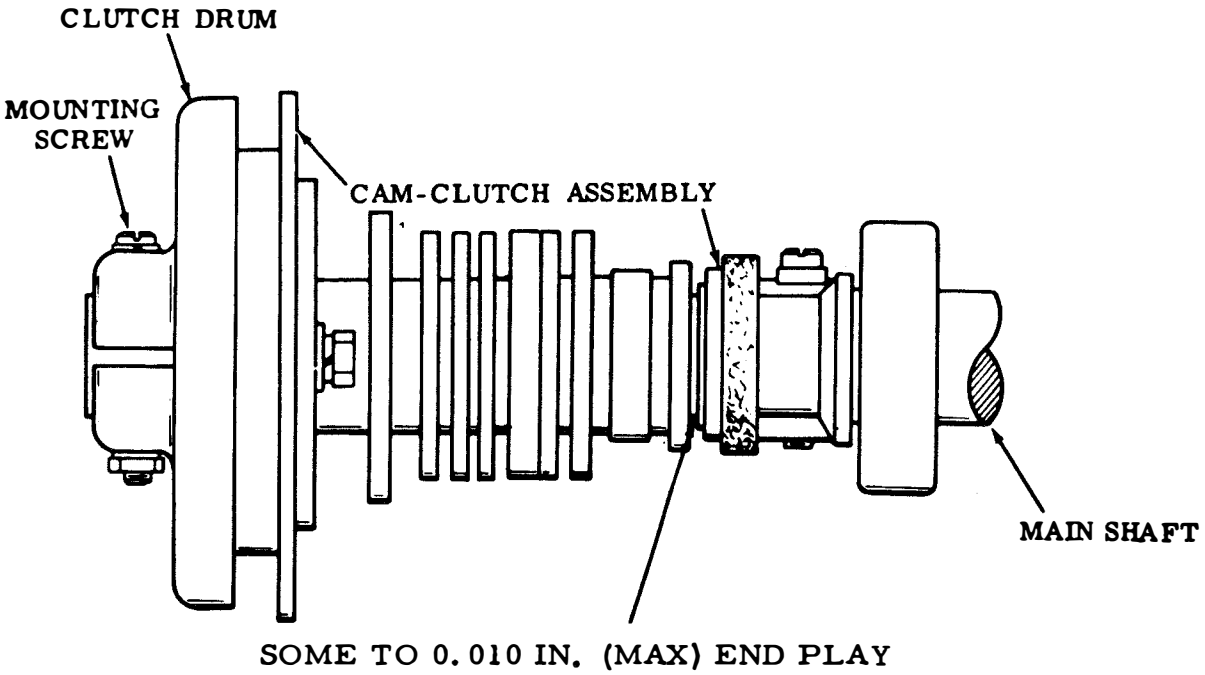


Figure 6-59. Selector Clutch Drum End Play - Right Side View

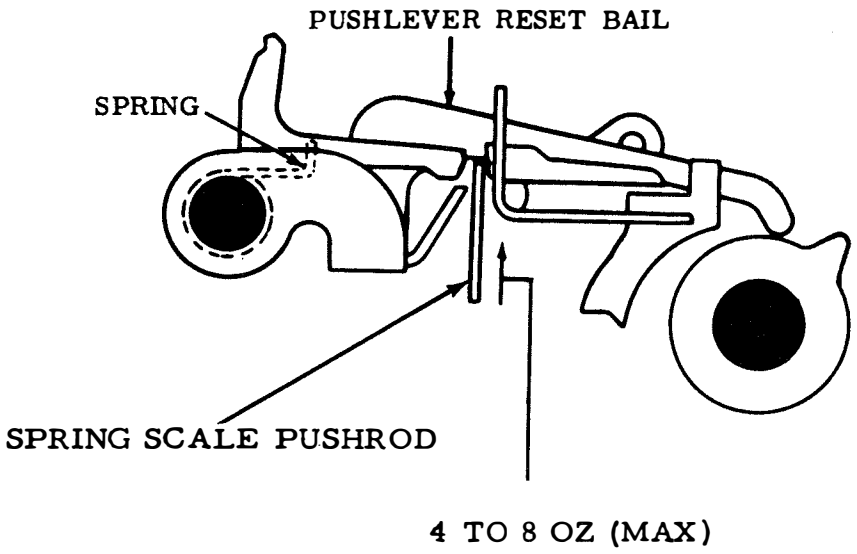


Figure 6-60. Pushlever Reset Bail Spring

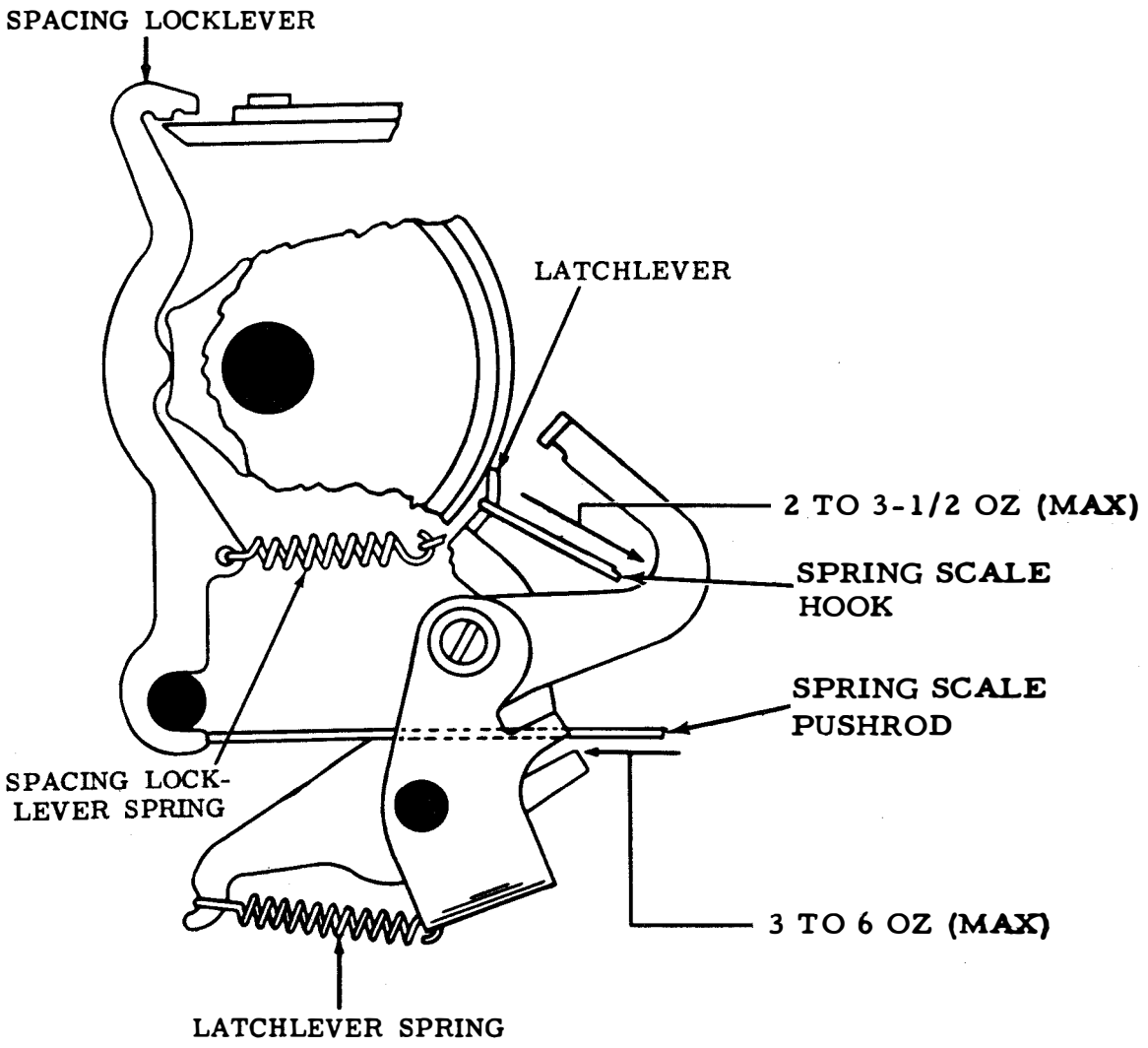


Figure 6-61. Selector Clutch Latchlever Spring and Spacing Locklever Spring

(a) Refer to figure 6-61.

(b) With selector armature released and spacing locklever on low part of cam, apply spring scale to lower end of spacing locklever. Measure force required to move spacing locklever from its pivot shaft.

(c) Force should be between 3 and 6 ounces.

(d) If force does not match specifications, replace spring.

NOTE

Replace range finder and selector magnet assembly before making adjustments in paragraph 6-3.1h(19) and (20).

(19) Range Finder Knob Phasing. Adjust as follows:

(a) Refer to figure 6-62.

(b) With range finder knob turned to either end of rack, zero mark on scale should be in line with scribed line on range finder plate (±3 points).

(c) To adjust, remove mounting nut, disengage knob from rack and position knob. Reengage knob with rack and replace mounting nut.

(20) Selector Clutch Stop Arm. Adjust as follows:

(a) Refer to figure 6-62.

(b) With range scale set at 60, selector clutch disengaged, and armature in marking position, clutch stop arm should engage clutch shoe lever by approximately full thickness of stop arm.

(c) To adjust, loosen clamp screw and position clutch stop arm on stop arm bail.

(d) Tighten clamp screw.

(21) Start Lever Spring. Adjust as follows:

(a) Refer to figure 6-63.

(b) With latchlever spring unhooked, stop arm bail in indent of cam, and range scale set at 60, apply spring scale to stop arm.

(c) Force required to start the stop arm moving should be between 2-1/2 and 4-1/4 ounces.

(d) If not within this specified tension, replace spring.

(22) Selector Receiving Margin (One Antifreeze Button Armature Unit). Adjust as follows:

(a) Refer to Selector Armature Spring adjustments (paragraph 6-3.1h(6), figure 6-51).

(b) When a signal distortion test set is available for determining the receiving margins of the selector, and where the condition of the components is equivalent to that of new equipment, the range and

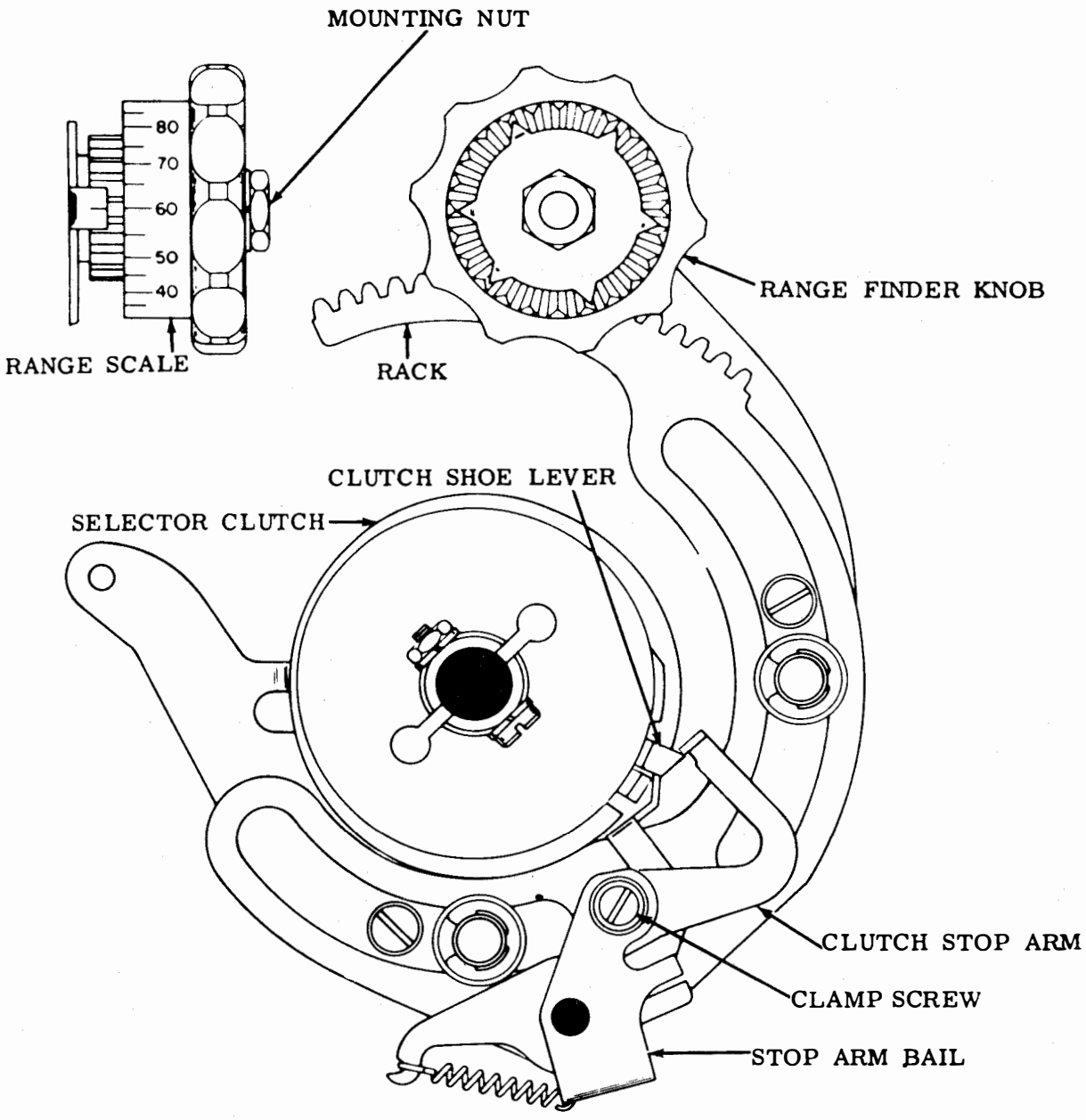


Figure 6-62. Range Finder Knob Phasing and Selector Clutch Stop Arm

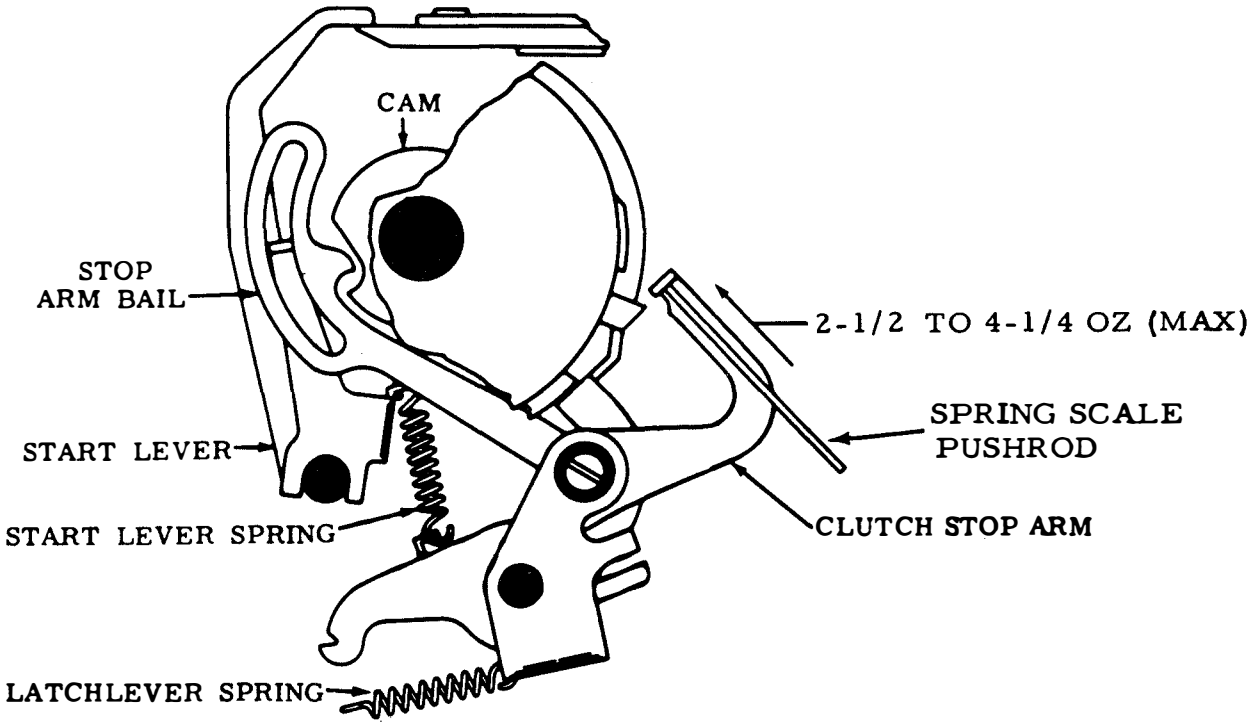


Figure 6-63. Start Lever Spring

distortion tolerances below should be met (see table 6-1).

(c) To adjust, refine the Selector Armature Spring adjustment (paragraph 6-3.1h(6).

(23) Selector Receiving Margin (Two Antifreeze Button Units). Adjust as follows:

NOTE

Typing reperforators operating with 30-milliampere selector coil current with coils in series should have receiving margin test run at, and meet the requirements for, 100 wpm speed, 60 milliampere selector coils in parallel. Testing at 30 milliamperes is not required.

(a) Refer to Selector Armature Spring adjustments (paragraph 6-3.1h(7), figure 6-52).

(b) When a distortion test set is available, the selector armature spring tension should be refined, if necessary, to obtain satisfactory receiving margins (see table 6-1). The front antifreeze button must contact the magnet core when the magnet coils are energized.

(c) To adjust, refine the Selector Armature Spring adjustment (paragraph 6-3.1h(7)).

Table 6-1. Selector Receiving Margin Minimum Requirement

Current	Speed in WPM	Points Range With Zero Distortion	Percentage of Marking and Spacing Bias Tolerated	End Distortion Tolerated With Scale at Bias Optimum Setting
0.060 Amp (windings parallel)	60 75 100	72	40	35
0.020 Amp (windings series)	60 75	72	40	35
0.035 Amp (windings series)	65 (45.5 baud) 106 (75.0 baud)	72	40	35

(24) Selector Cam Lubricator. Adjust as follows:

(a) Refer to figure 6-64.

(b) With high part of selector lever cam contacting leather wick, visually gauge amount of wick deflection.

(c) Amount of deflection should be 1/32 inch or less.

(d) With high surface of locklever cam at closest distance to edge of reservoir, measure clearance.

(e) Clearance should be 0.020 inch minimum.

(f) To adjust, loosen mounting screws and position lubricator assembly around lower screw. Tighten screws.

NOTE

There should be some clearance between the marking locklever spring and the oil reservoir.

i. Slack Tape Mechanism Adjustments. Perform slack tape mechanism adjustments in accordance with the following paragraphs.

(1) Clamp Plate Screw With Disc. Adjust as follows:

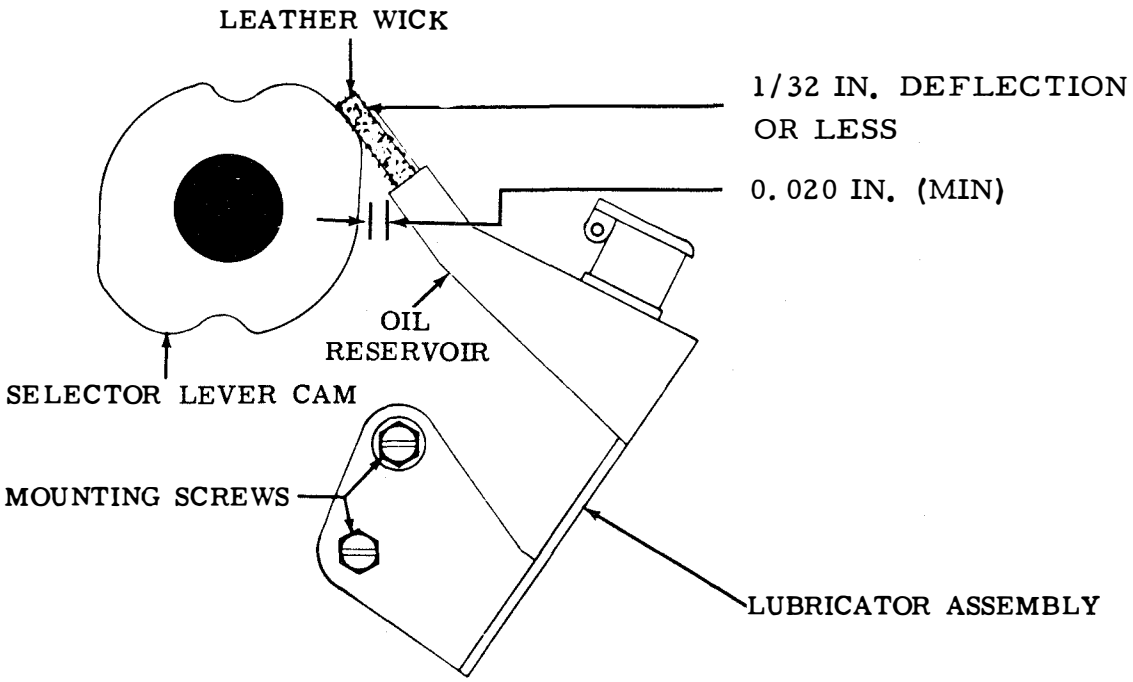


Figure 6-64. Selector Cam Lubricator

NOTE

This adjustment should be made once every lubrication period or when the ten holes per inch requirement is not being held.

(a) Refer to figure 6-65.

(b) Loosen nut and turn screw with disc so that a new area of the disc contacts tape; tighten nut.

(2) Clamp Plate Spring. Adjust as follows:

(a) Refer to figure 6-65.

(b) Apply spring scale pushrod to tab of clamp plate.

(c) A minimum of 30 grams should be required to start clamp plate moving.

(d) If scale reading does not meet specified limits, install new spring and recheck.

(3) Tape Platform. Adjust as follows:

(a) Refer to figure 6-65.

(b) Top surface of tape platform should be flush with top surface of tape guide.

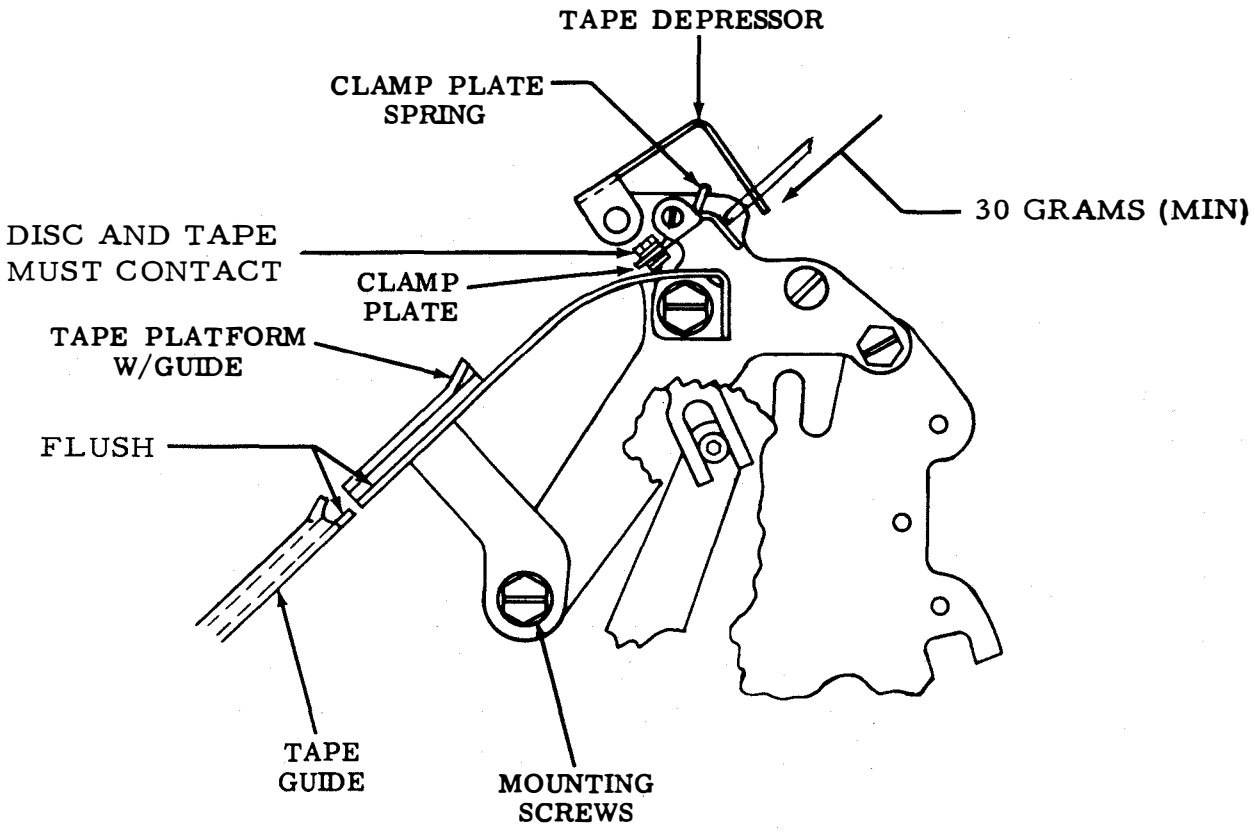


Figure 6-65. Clamp Plate Screw with Disc, Clamp Plate Spring and Tape Platform

(c) To adjust, loosen tape platform mounting screws and reposition tape platform. Tighten screws.

j. Tape Printer Unit Adjustments. Perform tape printer unit adjustments in accordance with the following paragraphs.

NOTE

If the tape printer Model 28 is used on a typing reperforator Model 28 single or double plate base, a tape reel will have to be used to accomodate the 3/8 inch tape. This tape reel consists of a disc with hub and a disc with nut.

(1) Feed Wheel. Adjust as follows:

(a) Refer to figure 6-66.

(b) Clearance between feed wheel ratchet and front plate should be between 0.085 and 0.095 inches.

(c) Printing should be centrally located on tape.

(d) To adjust, loosen locknut and turn adjusting screw. Tighten locknut.

(2) Tape Guide. Adjust as follows:

(a) Refer to figure 6-66.

(b) Tape should run in the center of tape guide (gauge by eye).

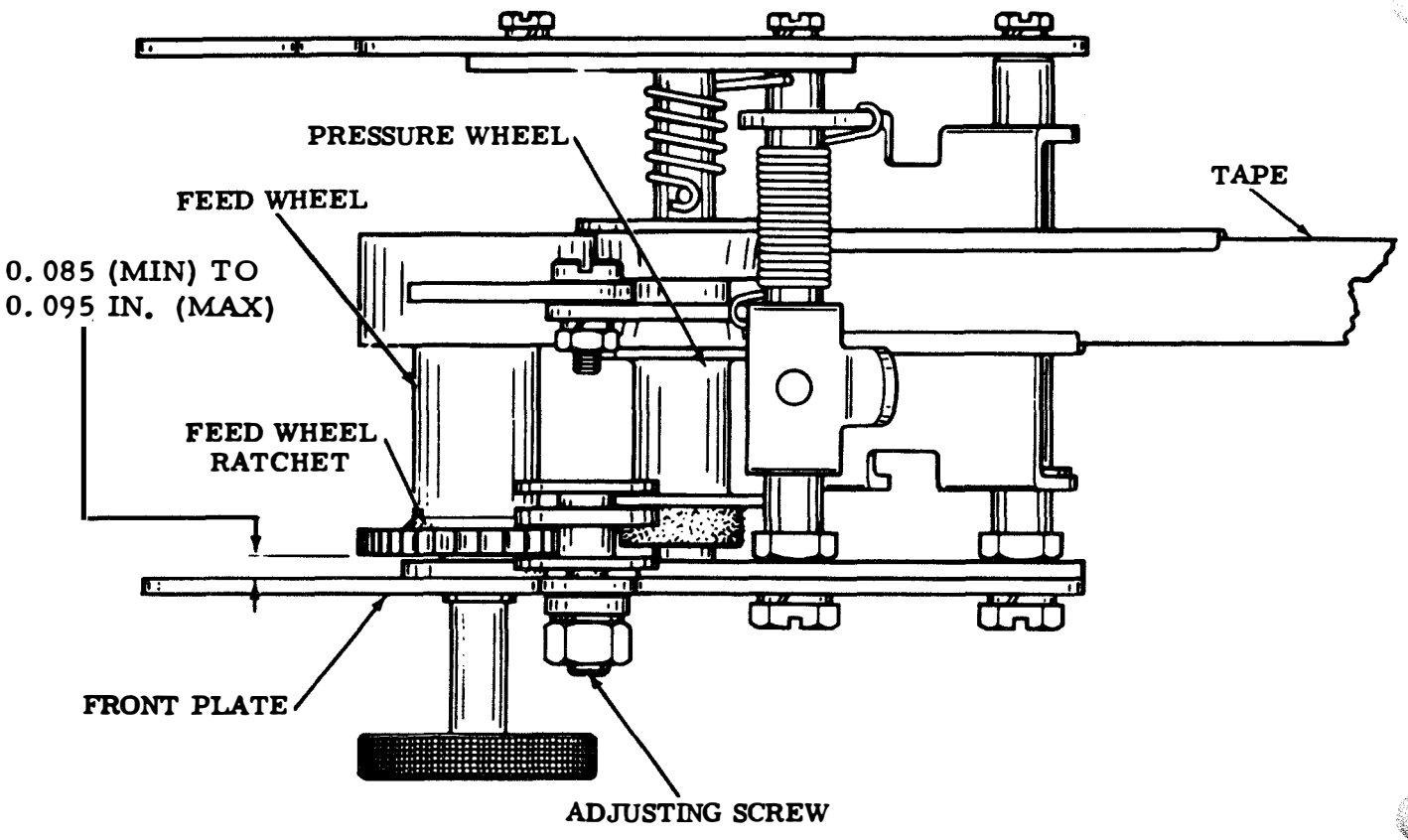


Figure 6-66. Feed Wheel and Tape Guide - Top View

(c) To adjust, loosen mounting nuts friction tight and position tape guide with roller up or down to meet requirement. Tighten nuts.

k. Typing Mechanism Adjustments. Perform typing mechanism adjustments in accordance with the following paragraphs.

(1) Pushbar Operating Blade (Preliminary). Adjust as follows:

(a) Refer to figure 6-67.

(b) Manually select LETTERS code combination (12345).

(c) Rotate main shaft until function clutch trips.

(d) Hold number 2 and 3 bellcranks against stop post and operating blade is parallel to (not necessarily flush) top of number 2 and 3 pushbar latching surfaces.

(e) To adjust:

1. Loosen mounting screws friction tight.

2. Pry transfer mounting bracket all the way to right.

3. Add or remove shims under rear leg of operating blade.

4. Place extra shims on rear mounting screw between blade and flat washer.

5. Tighten mounting screws.

(2) Bellcrank Springs. Adjust as follows:

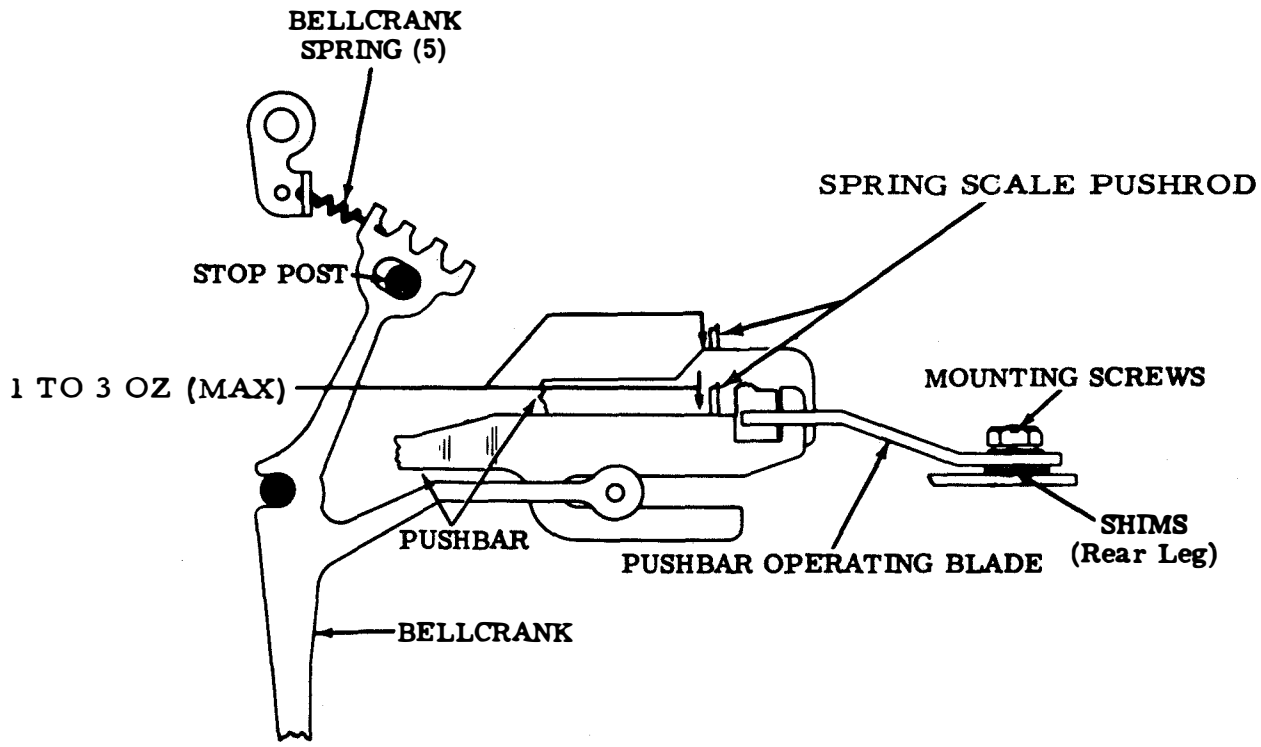


Figure 6-67. Pushbar Operating Blade (Preliminary) and Bellcrank Springs

NOTE

Check all five springs.

(a) Refer to figure 6-67.

(b) Select LETTERS code combination (12345).

(c) Rotate main shaft until function clutch trips.

(d) Apply spring scale pushrod to top of pushbar.

(e) The force required to start pushbar moving should be between 1 and 3 ounces.

(3) Shoulder Clearance. Adjust as follows:

NOTE

It may be necessary to refine this adjustment after Centering Clearance adjustment, (paragraph 6-3.1e(4)).

(a) Refer to figure 6-68.

(b) Manually select LETTERS code combination (12345).

(c) Rotate main shaft until function clutch trips.

(d) Manually seat pushbars in detented position.

(e) In bar nearest to left edge of blade, take up play to left and rear and then release.

(f) Clearance between bar and left edge of blade should be between 0.015 and 0.030 inch.

(g) There should be some clearance between the right edge of blade and pushbars when play in bars has been taken up to right and released.

(h) With unit in stop position, there should be some clearance between right edge of blade and bars when play in bars has been taken up to right and released.

(i) To adjust, loosen mounting screws and position operating blade in elongated holes. Tighten screws.

(4) Centering Clearance. Adjust as follows:

(a) Refer to figure 6-69.

(b) Select BLANK code combinations.

(c) Position rocker bail through a complete cycle to ensure clearance is a minimum.

(d) Measure the clearance between function box rear plate and pushbar operating blade at a point in the cycle where play is taken up to make minimum clearance.

(e) Clearance should be between 0.005 and 0.020 inch.

(f) To adjust, loosen locknut and position rocker bail pilot stud in elongated hole. Tighten nut.

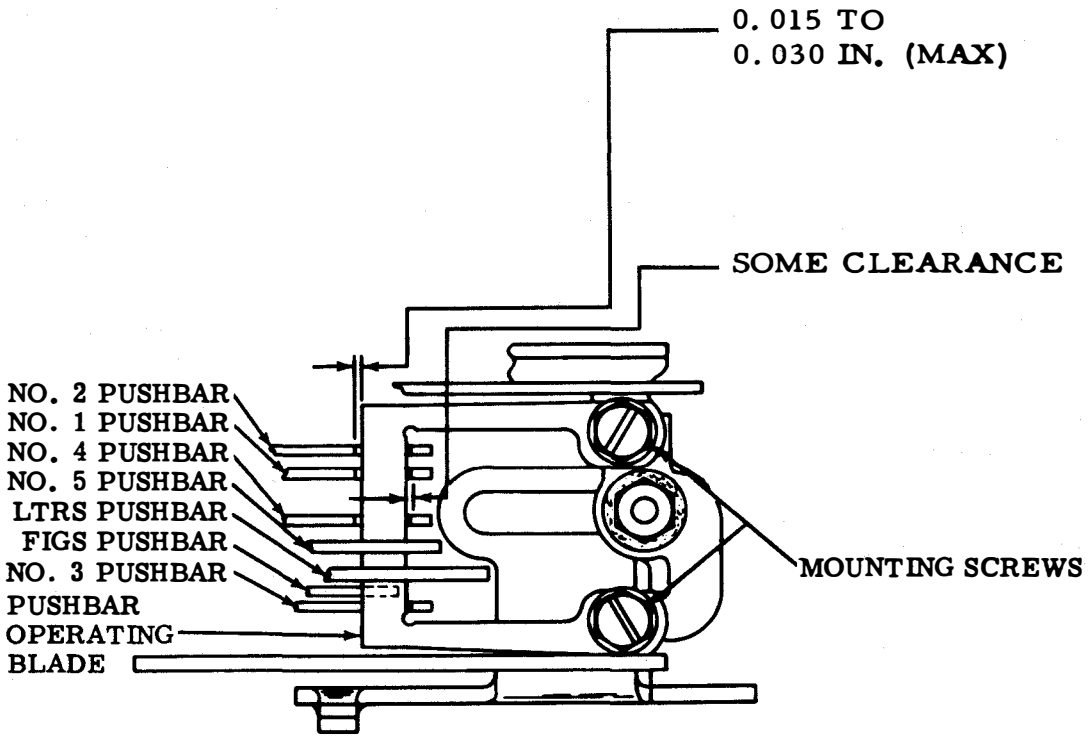


Figure 6-68. Shoulder Clearance - Top View

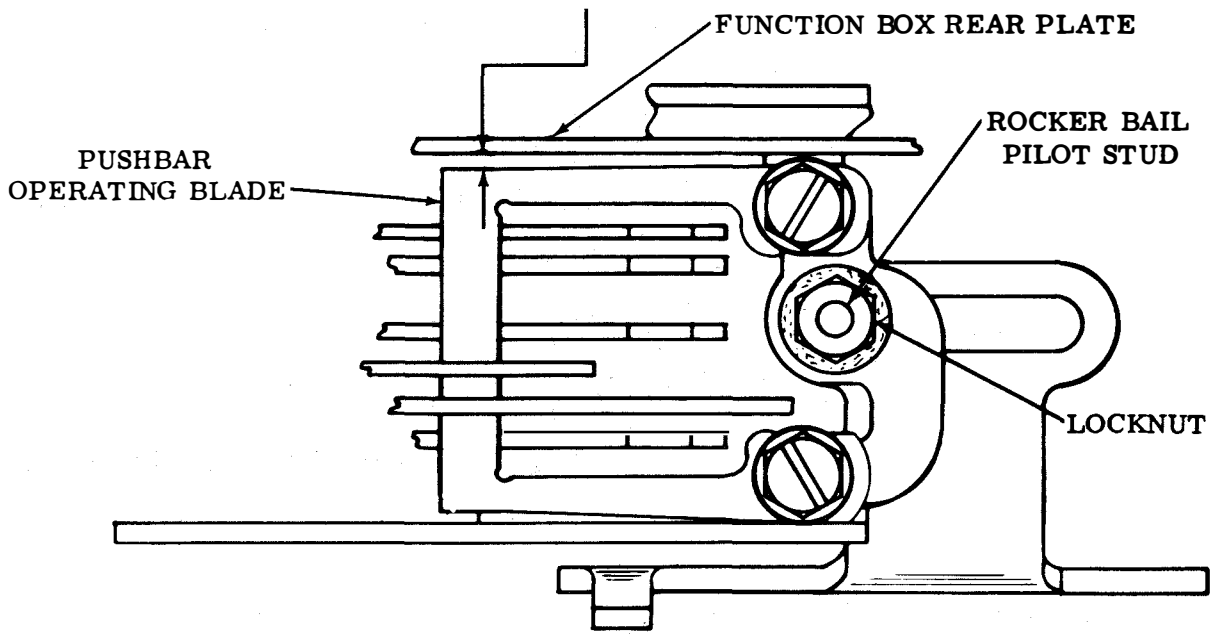


Figure 6-69. Centering Clearance - Top View

(5) Number 5 Pulse Beam Spring. Adjust as follows:

(a) Refer to figure 6-70.

(b) Attach spring scale hook to number 5 pulse beam spring and measure force required to stretch spring to 7/16 inch in length.

(c) Force required should be between 10 and 15 ounces.

(d) Replace spring if not within specified limits.

(6) Function Box. Adjust as follows:

NOTE

When unit is mounted as part of keyboard perforator, transmitter, it may be necessary to refine adjustment within its limits to increase operating margins of unit.

On units equipped with two-piece trip bracket, set above adjustment in center of its range and tighten screws. Loosen two screws which mount guide to bracket and position guide to meet the following requirement. Tighten screws.

(a) Refer to figure 6-71.

(b) Manually select LETTERS code combination (12345).

(c) Rotate main shaft until function clutch trips and punch slides are disengaged from latches.

(d) Top of operating blade should be flush to 0.020 inch maximum below tops

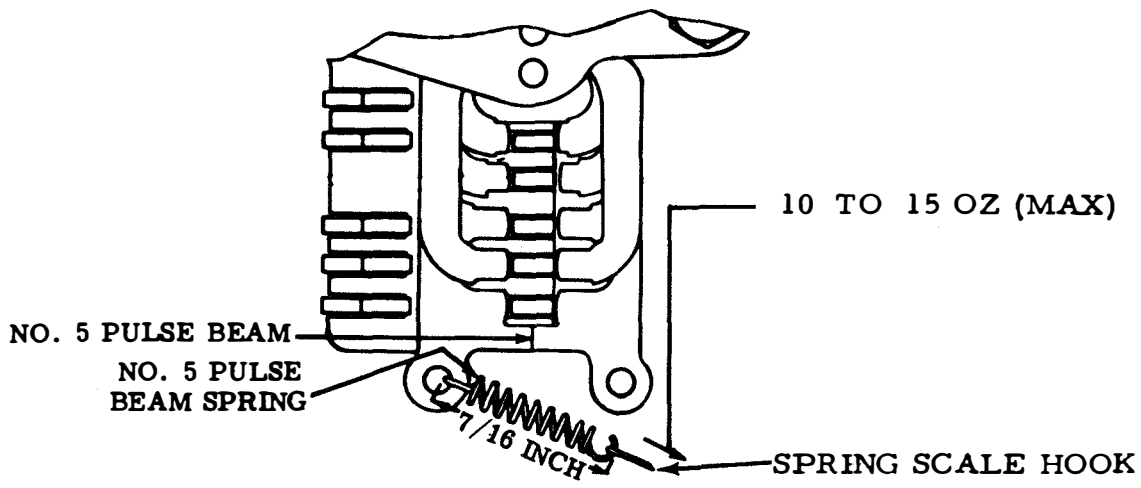
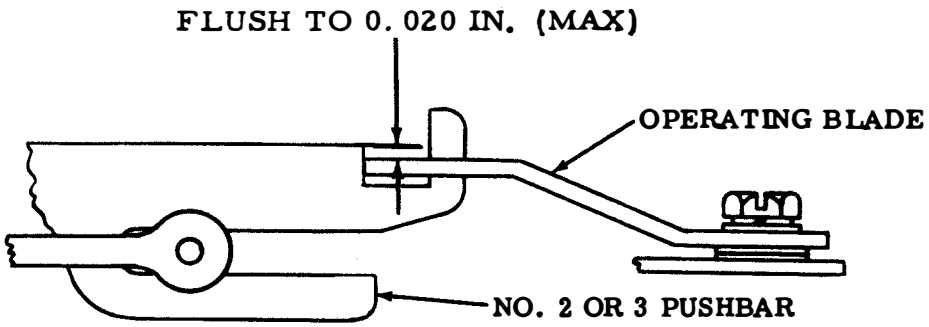
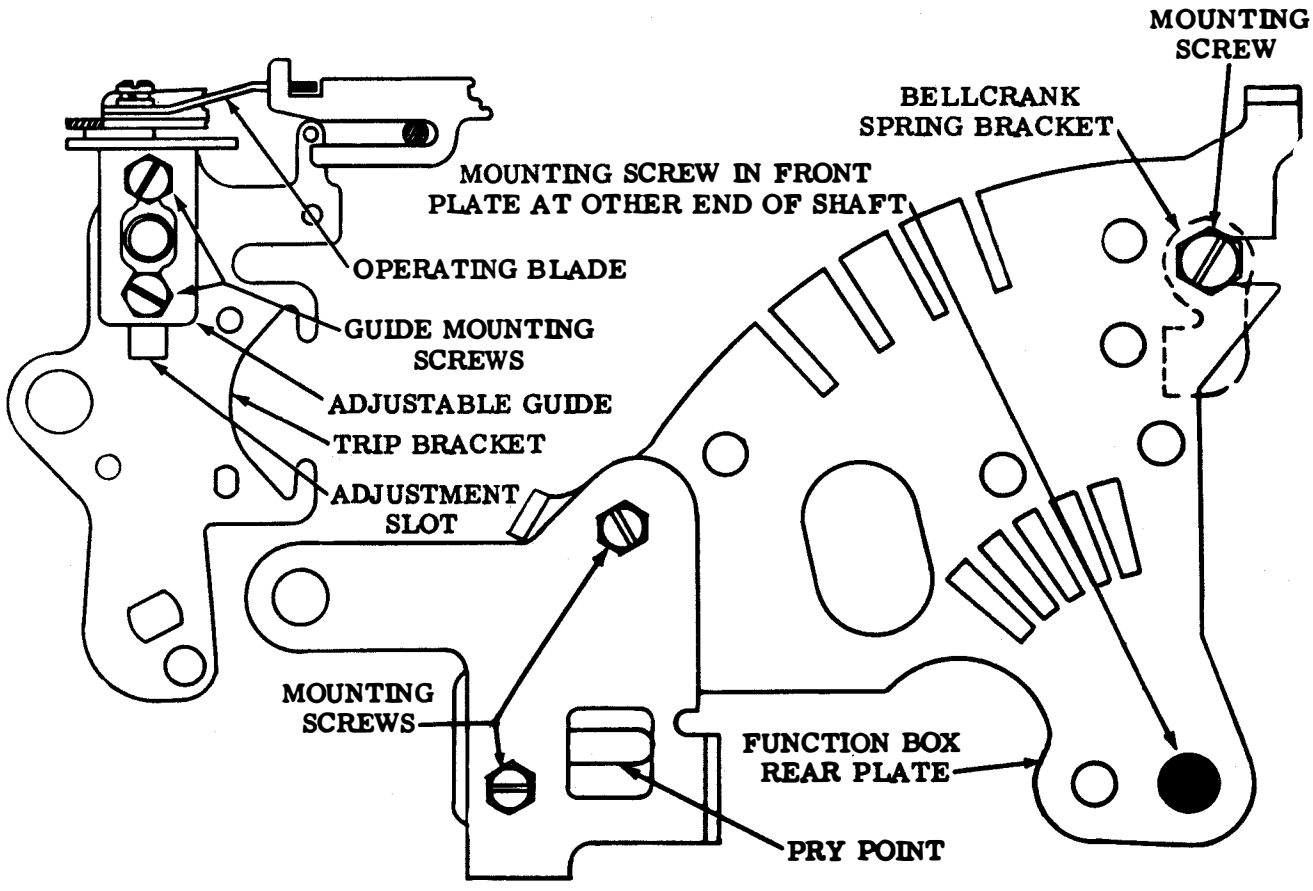


Figure 6-70. Number 5 Pulse Beam Spring - Top View



FRONT VIEW



REAR VIEW

Figure 6-71. Function Box

of number 2 and number 3 pushbars.

(e) Take up play in downward direction and release.

(f) To adjust, loosen three mounting screws in rear plate and one in front plate and position function box with a pry point. Check position of bellcrank and tighten screws.

(7) Pushbar Location. Adjust as follows:

(a) Refer to figure 6-72.

(b) Manually select BLANK code combination.

(c) Rotate main shaft until function clutch trips.

CAUTION

Bellcrank that yields most should not yield more than 0.007 inch measured at post.

NOTE

Removal of function blades will facilitate measuring clearance.

(d) With punch slides latched, clearance between the left edge of all bellcrank slots and the left flat of bellcrank stop post should be 0.018 inch maximum.

(e) To adjust, loosen mounting screws friction tight and pry transfer lever bracket to left until closest bellcrank touches stop post. Tighten mounting screws and recheck.

(8) FIGURES Arm Assembly Spring. Adjust as follows:

(a) Refer to figure 6-73.

(b) With arm assemblies in LETTERS position, attach spring scale hook and measure force required to pull spring to installed length.

(c) Force required should be between 1-1/2 and 3-1/2 ounces.

(d) If not within specified limits, replace spring and recheck.

(9) FIGURES Extension Arm Spring. Adjust as follows:

(a) Refer to figure 6-74.

(b) With arm assemblies in LETTERS position and LETTERS extension arm manually held in position, attach spring scale hook to FIGURES extension arm spring and measure force required to pull spring to installed length.

(c) Force should be between 5 and 8 ounces.

(d) If not within specified limits, replace spring and recheck.

(10) LETTERS Arm Assembly Spring. Adjust as follows:

(a) Refer to figure 6-75.

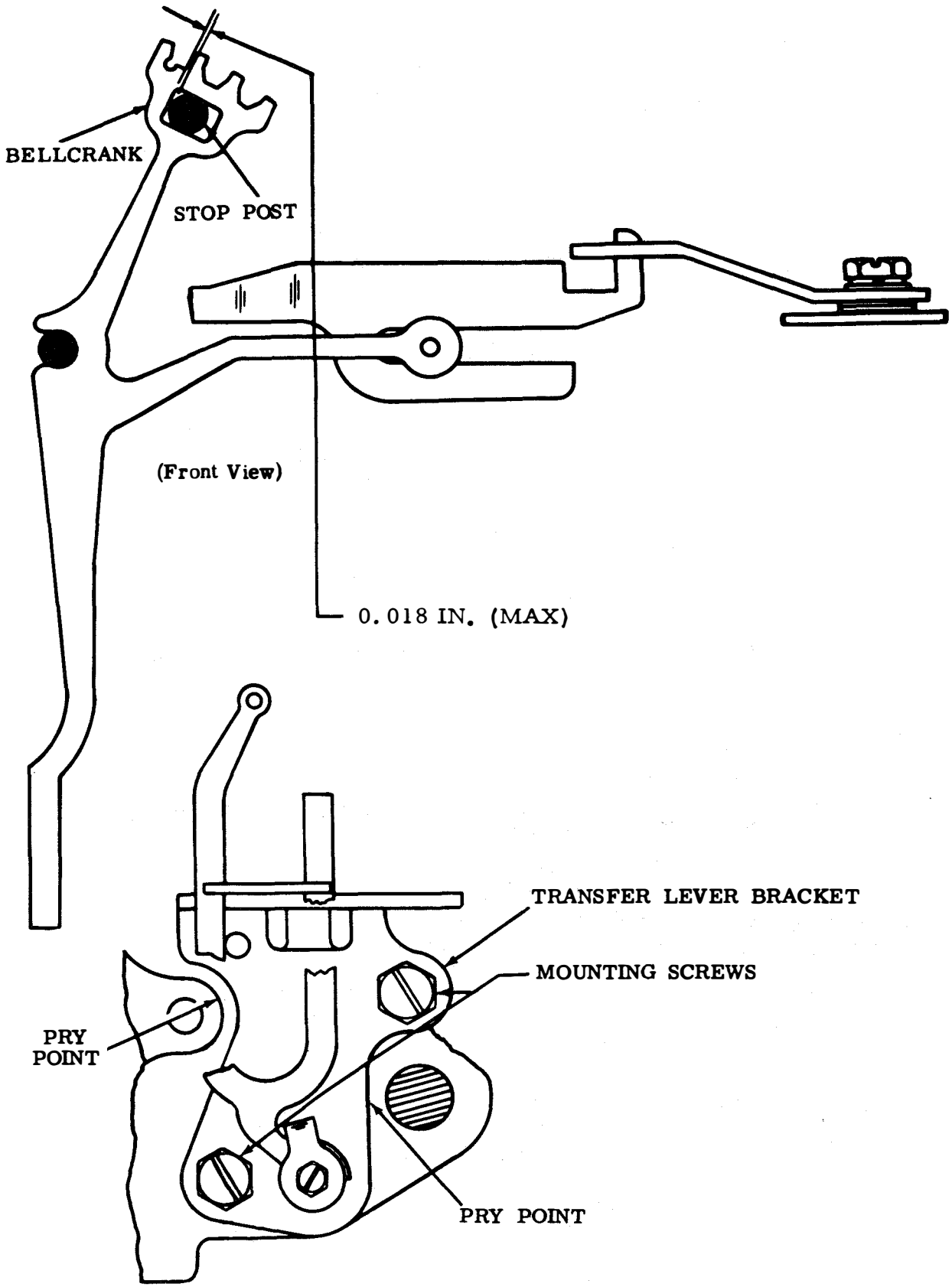


Figure 6-72. Pushbar Location

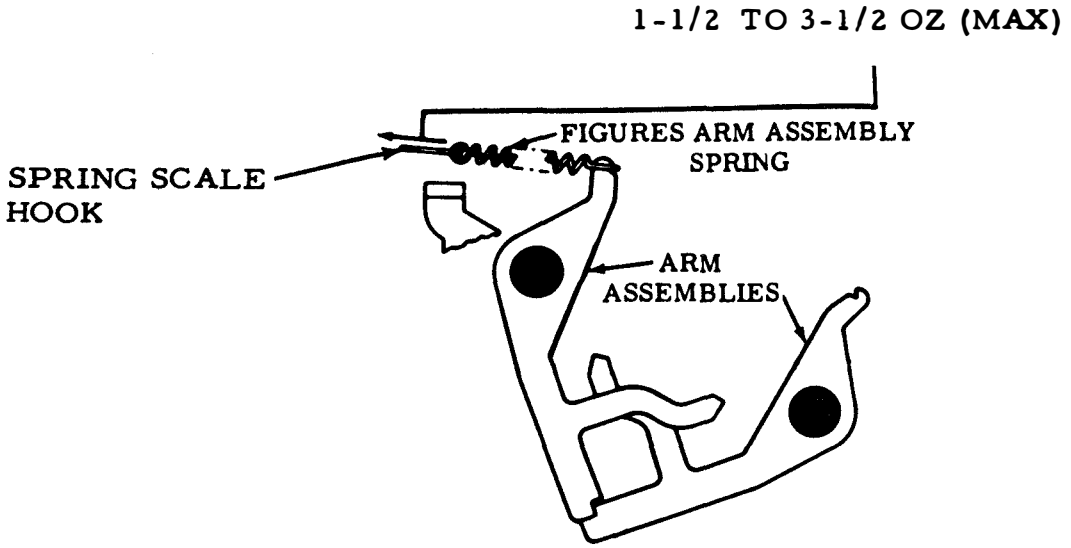


Figure 6-73. FIGURES Arm Assembly Spring

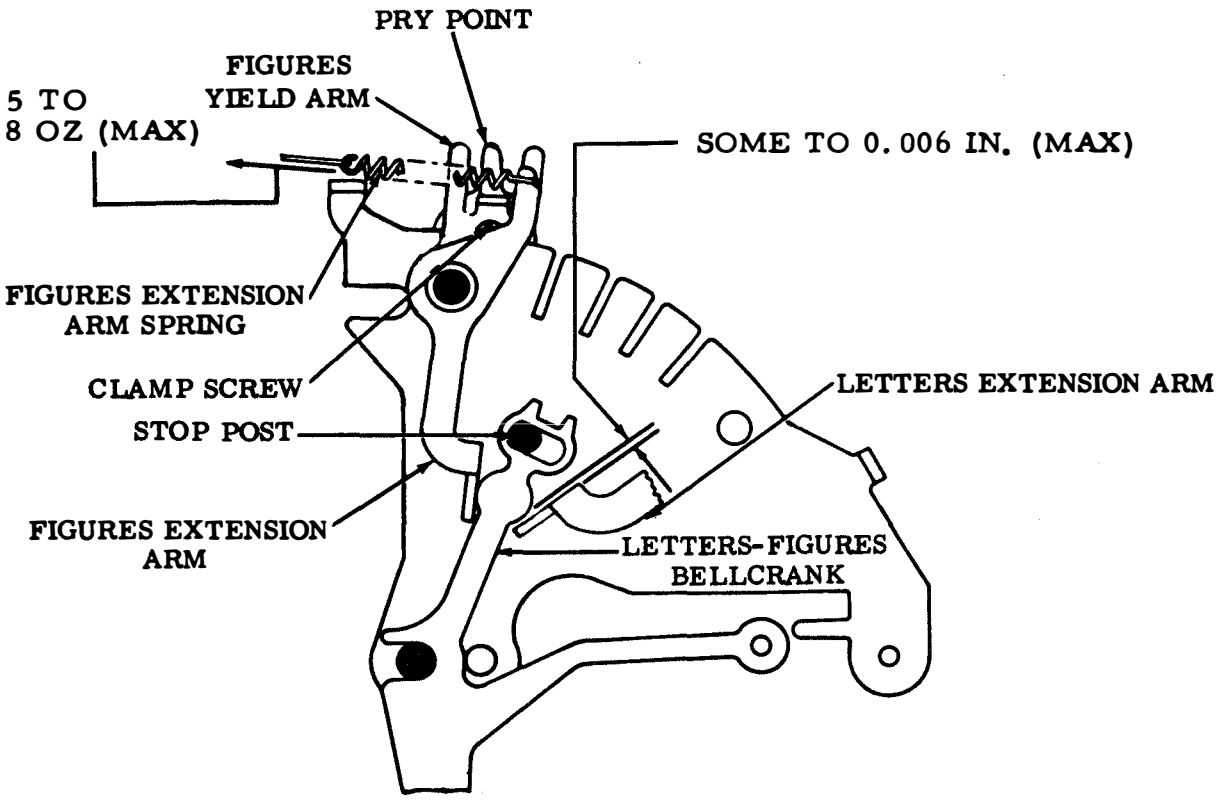


Figure 6-74. FIGURES Extension Arm Spring and FIGURES Yeild Arm

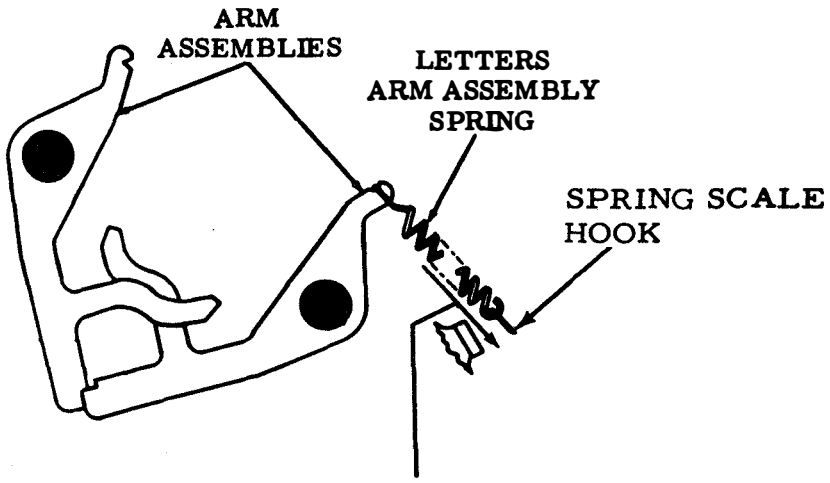


Figure 6-75. LETTERS Arm Assembly Spring

(b) With arm assemblies in FIGURES position, attach spring scale hook to LETTERS arm assembly spring and measure force required to pull spring to installed length.

(c) Required force should be between 1-1/2 and 3-1/2 ounces.

(d) If not within specified limits, replace spring and recheck.

(11) LETTERS-FIGURES Yield Arms. Adjust as follows:

CAUTION

Arm assemblies may change position during adjustment. Recheck tolerances after screws have been tightened.

(a) Refer to figures 6-74 and 6-76.

(b) Trip function clutch and rotate main shaft until rocker bail is to extreme left.

NOTE

Removing function blades will facilitate measuring clearance.

(c) For FIGURES yield arm assemblies in LETTERS position. Hold LETTERS-FIGURES bellcrank against left edge of stop post and measure clearance between bellcrank and LETTERS extension arm. (See figure 6-74.)

(d) For LETTERS yield arm, manually place arm assemblies in FIGURES position. Hold LETTERS-FIGURES bellcrank against right edge of stop post and measure clearance between

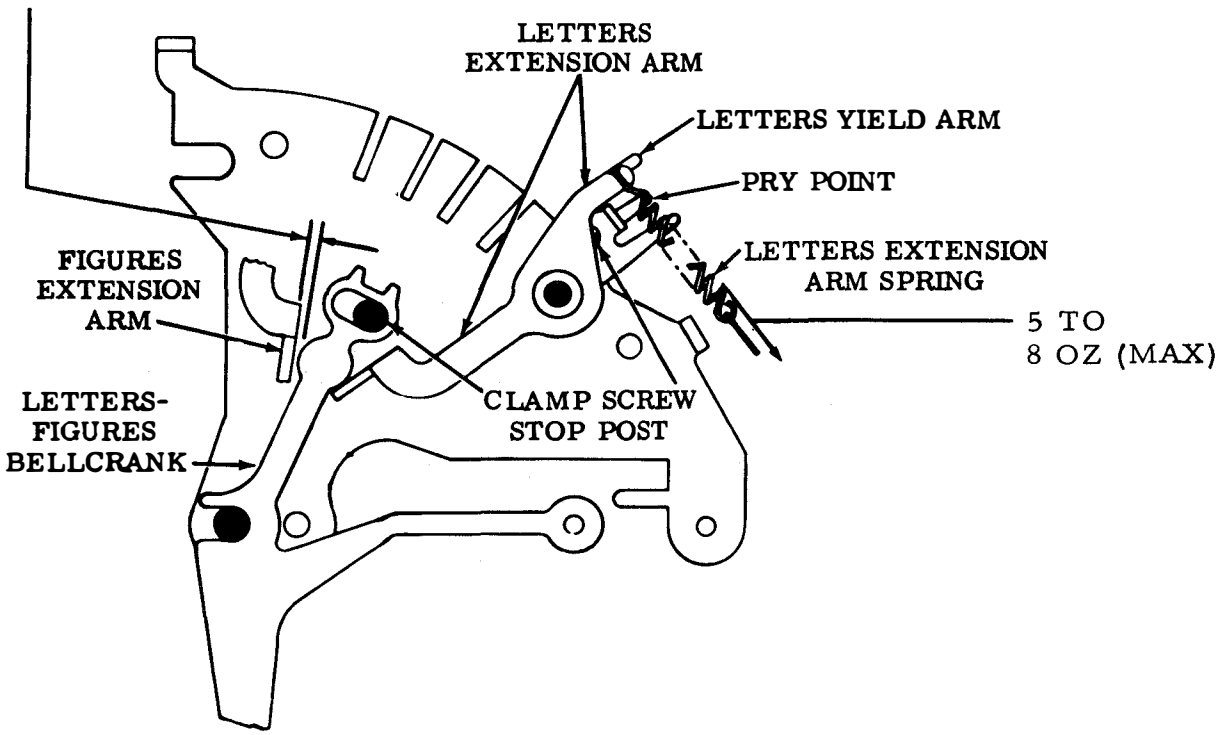


Figure 6-76. LETTERS Yield Arm and LETTERS Extension Arm Spring

bellcrank and FIGURES extension arm (see figure 6-76).

(e) There should be some clearance, not to exceed 0.006 inch, each arm.

(f) To adjust:

1. Loosen clamp screws in both LETTERS-FIGURES yield arms.

2. For FIGURES yield arm, place arm assemblies in LETTERS position and hold LETTERS-FIGURES bellcrank against left side of stop post. Using pry point, position LETTERS yield arm to specified clearance. Tighten FIGURES yield arm clamp screw (see figure 6-74).

3. For LETTERS yield arm, place arm assemblies in figures position. Using pry point, position FIGURES yield arm to specified clearance. Tighten LETTERS yield arm clamp screw (see figure 6-76).

(12) LETTERS Extension Arm Spring. Adjust as follows:

(a) Refer to figure 6-76.

(b) With arm assemblies in FIGURES position and LETTERS extension arm manually held in position, use spring scale to measure force required to pull spring to installed length.

(c) Force required should be between 5 ounces and 8 ounces.

(d) If force does not match specifications, replace spring and recheck.

(13) Cam Follower Roller Arm Position. Adjust as follows:

(a) Refer to figure 6-77.

(b) Trip function clutch.

(c) Move rocker arm to extreme left position and observe travel of lifter roller on right dwell surface. Move rocker bail to extreme right position and observe travel of roller on left dwell surface.

(d) Travel on each dwell surface should be approximately the same.

NOTE

Remove timing contact if unit is so equipped.

(e) To adjust:

1. Loosen lifter lever lock plate screw until friction tight.

2. With eccentric screw locknut friction tight, position lifter lever.

3. Tighten lifter lever lock plate screw.

4. Do not tighten locknut.

(14) Lifter Operating Range. Adjust as follows:

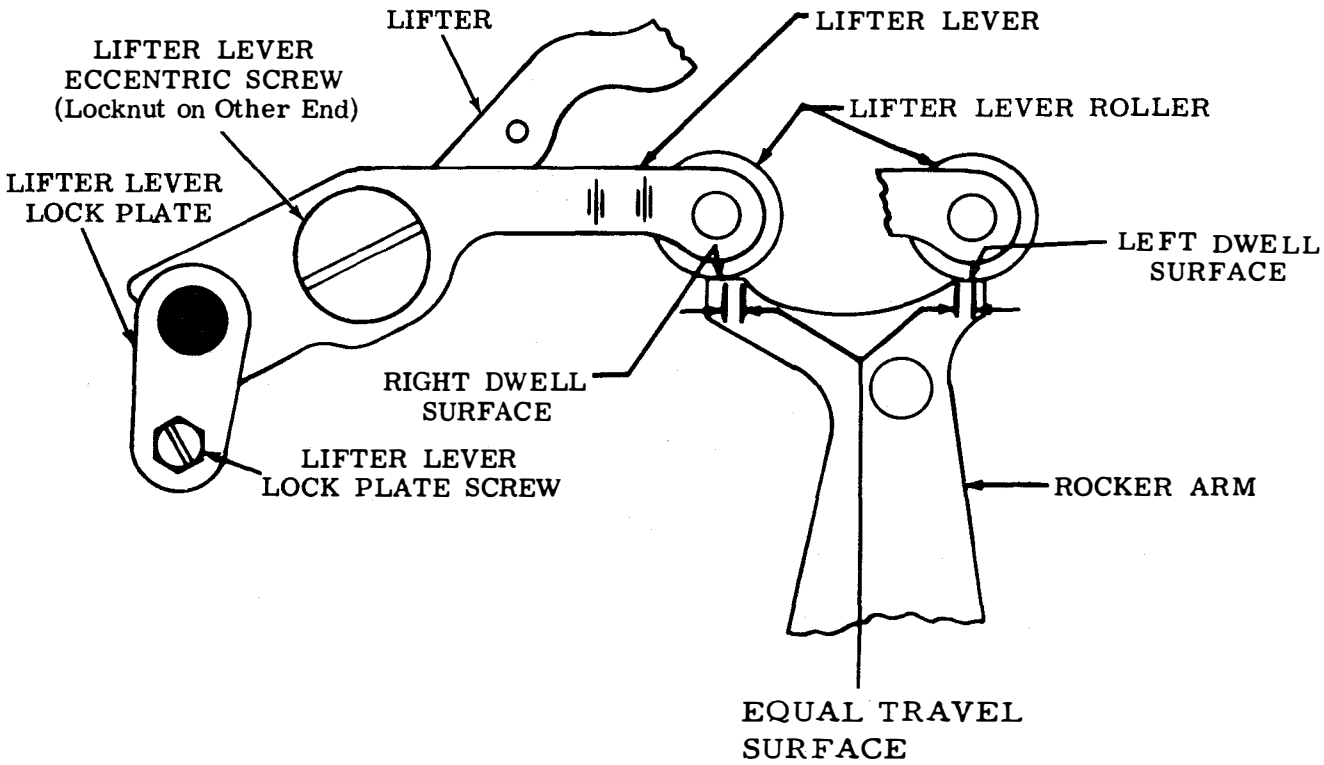


Figure 6-77. Cam Follower Roller Arm Position - Rear View

(a) Refer to figure 6-78.

(b) With function clutch disengaged, measure clearance between closest projection of bellcranks and associated function blade projection.

(c) The clearance should be between 0.008 and 0.020 inch.

NOTE

The minimum clearance for function blades other than LETTERS-FIGURES, if unit is so equipped, is 0.005 inch.

(d) To adjust, loosen locknut and position lifter lever eccentric screw. Tighten locknut.

(15) Toggle Link. Adjust as follows:

NOTE

To avoid interference with lower toggle link clamp screw and axial connector link, it may be necessary to move high part of corrector bushing above horizontal centerline.

(a) Refer to figure 6-79.

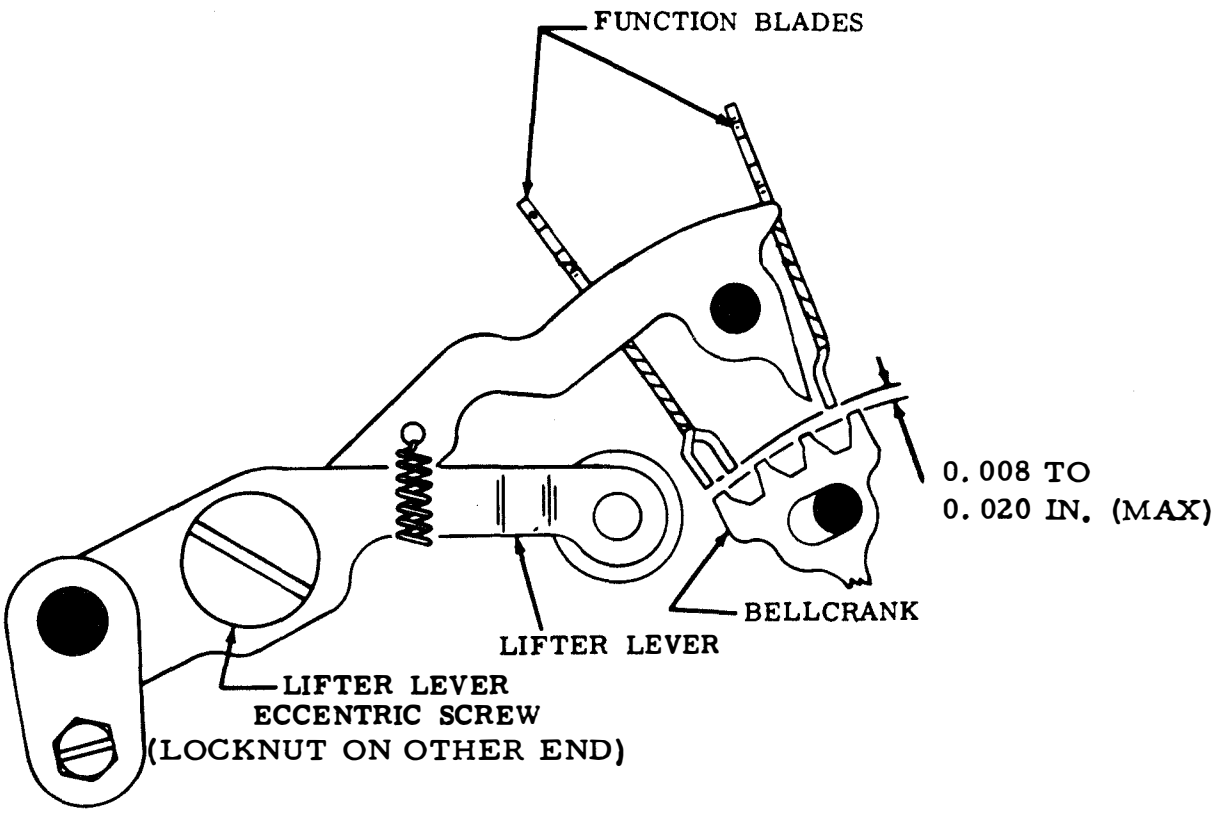


Figure 6-78. Lifter Operating Range - Rear View

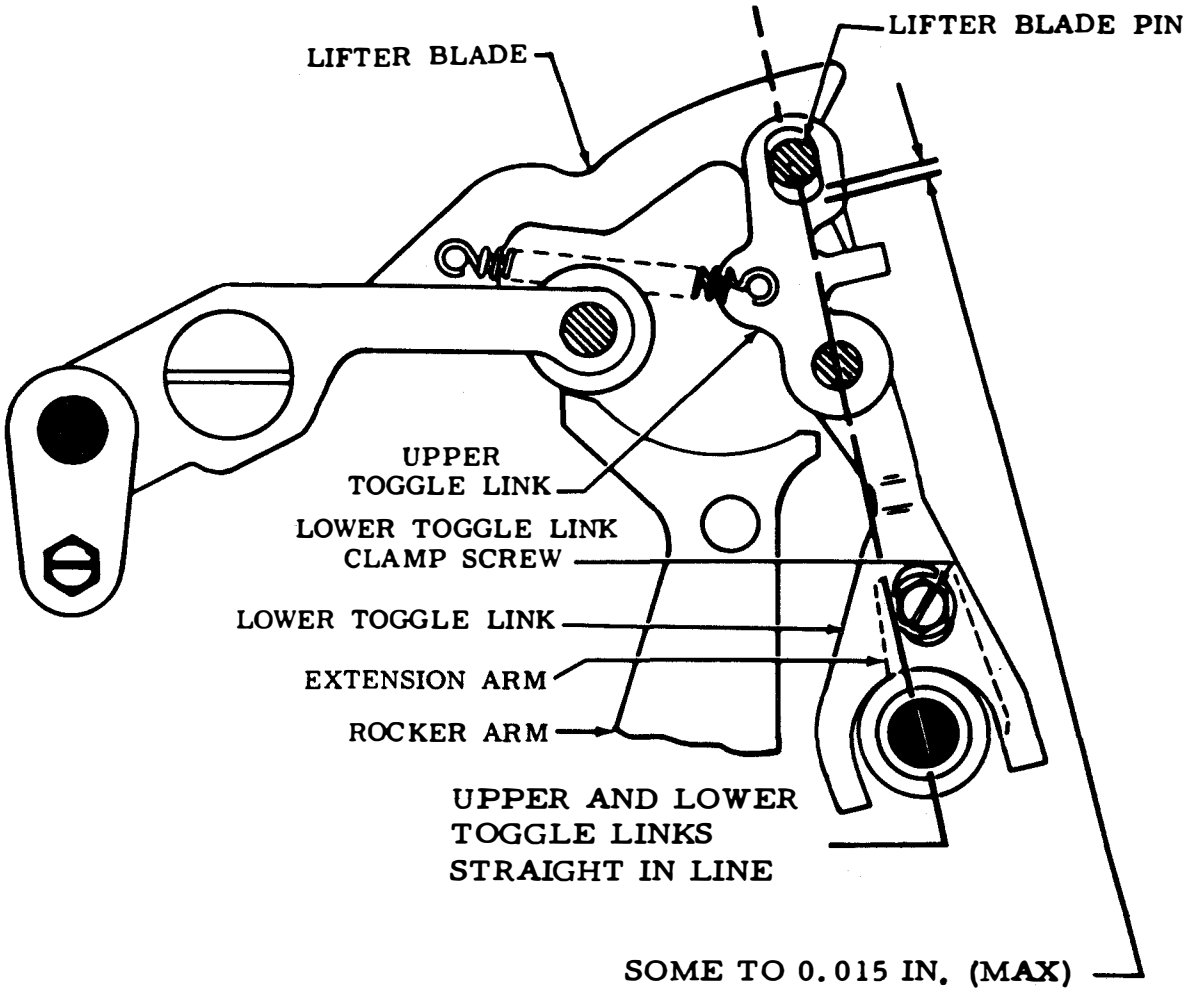


Figure 6-79. Toggle Link - Rear View

(b) With rocker arm to extreme left, select LETTERS code combination (12345).

(c) Toggle linkage should move through a point where upper and lower toggle links are in a straight line without raising lifter blade.

(d) With upper and lower toggle links in a straight line, measure clearance between the upper toggle link and lifter blade pin.

(e) There should be some clearance, not to exceed 0.015 inch.

(f) To adjust, loosen clamp screw friction tight and position toggle link by moving its extension arm up or down. Tighten clamp screw.

(16) Toggle Trip Arm. Adjust as follows:

(a) Refer to figure 6-80.

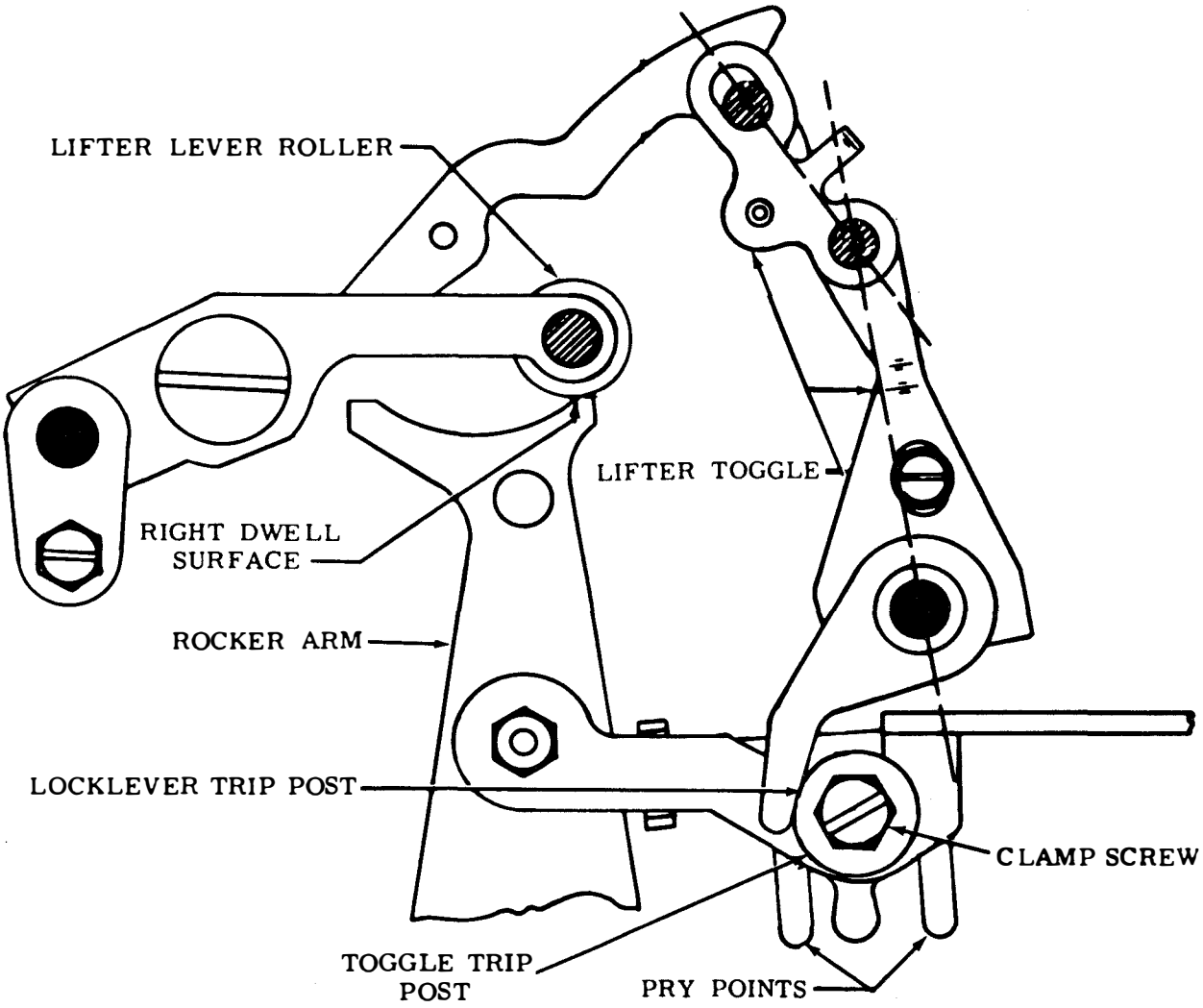


Figure 6-80. Toggle Trip Arm - Rear View

(b) Observe as rocker arm approaches extreme right position.

(c) The lifter toggle should break and lifter arm roller should drop onto right dwell surface.

(d) To adjust, loosen clamp screw and use pry points to position toggle trip post. Tighten clamp screw.

(17) Lifter Toggle Link Spring. Adjust as follows:

(a) Refer to figure 6-81.

(b) With unit in stop position, use apring scale to measure force required to pull spring to installed length.

(c) The force should be within 1-1/2 to 2-1/4 ounces.

(d) If force does not meet requirements, replace spring.

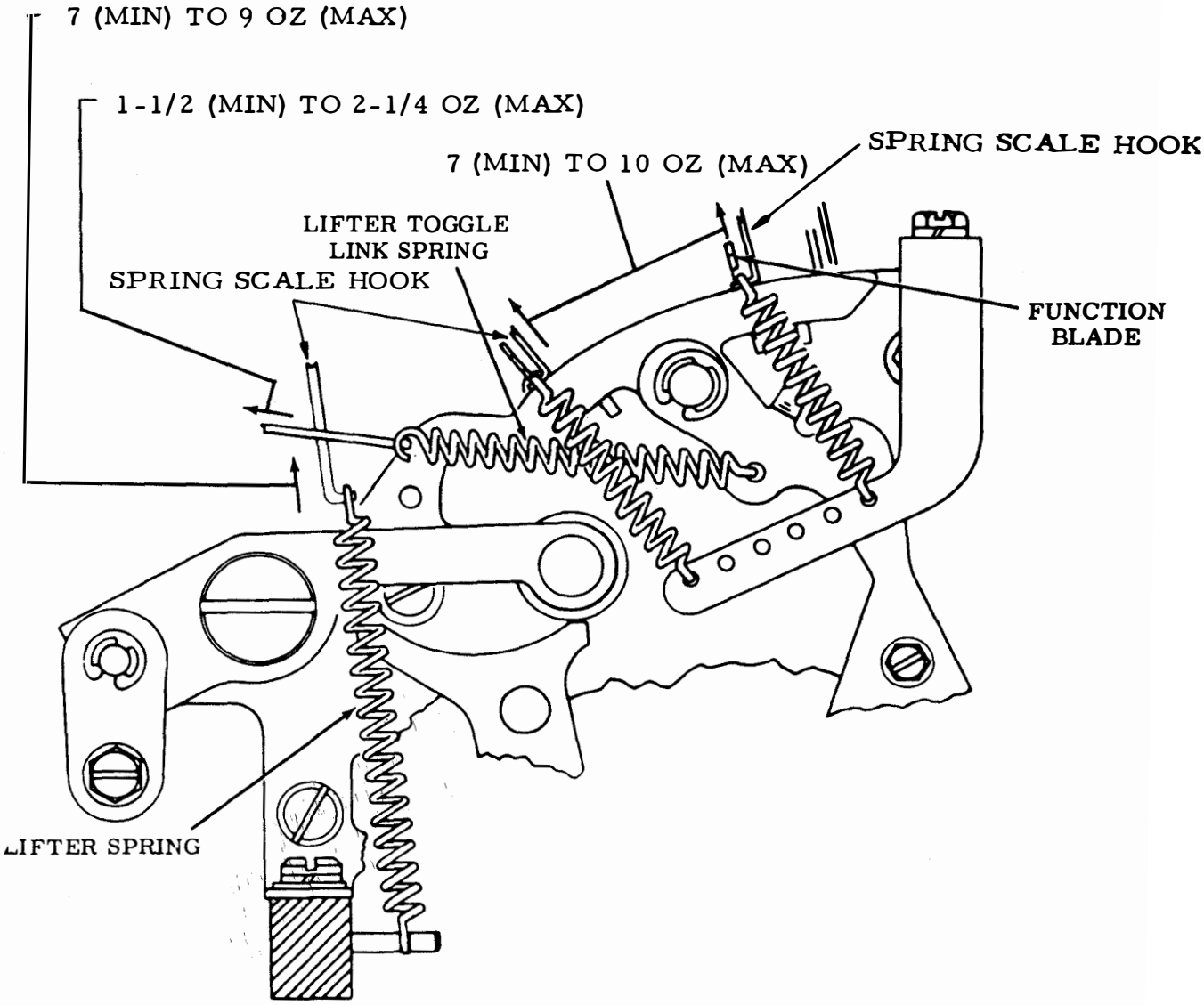


Figure 6-81. Lifter Toggle Link Spring, Function Blade Springs, and Lifter Spring - Rear View

(18) Function Blade Springs (Two or More). Adjust as follows:

(a) Refer to figure 6-81.

(b) With unit in stop position, use spring scale to measure force required to start function blade moving.

(c) The force should be between 7 and 10 ounces.

(d) If not within specified limits, replace springs.

(19) Lifter Spring. Adjust as follows:

(a) Refer to figure 6-81.

(b) With unit in stop position, use spring scale to measure force required to pull spring to installed length.

(c) Force should be from 7 to 9 ounces.

(d) If not within specified limits, replace spring.

(20) Correcting Drive Link Spring (Nonyielding). Adjust as follows:

(a) Refer to figure 6-82.

(b) With unit in stop position, use spring scale to measure force required to start drive link moving.

(c) Force should be between 5 and 9 ounces.

(d) If not within specified limits, replace spring.

(21) Oscillating Bail Drive Link. Adjust as follows:

(a) Refer to figure 6-83.

(b) Position rocker bail to extreme left. Sector mounting stud, toggle pivot screw, and oscillating bail adjusting screw should approximately line up.

(c) To adjust: with locknut friction tight, position oscillating link by means of its eccentric bushing. Tighten locknut.

(22) Oscillating Bail Pivot. Adjust as follows:

(a) Refer to figure 6-83.

(b) With BLANK code combination selected, rotate main shaft, taking up axial play in type wheel shaft toward front of unit.

(c) Axial corrector roller should enter first notch of sector centrally.

(d) To adjust:

1. With oscillating bail adjusting screw friction tight, select BLANK combination.

2. Position oscillating bail by means of elongated mounting hole so corrector roller enters first notch of sector when rocker bail moves to extreme left position.

3. Hold corrector roller firmly in first notch and take up play in

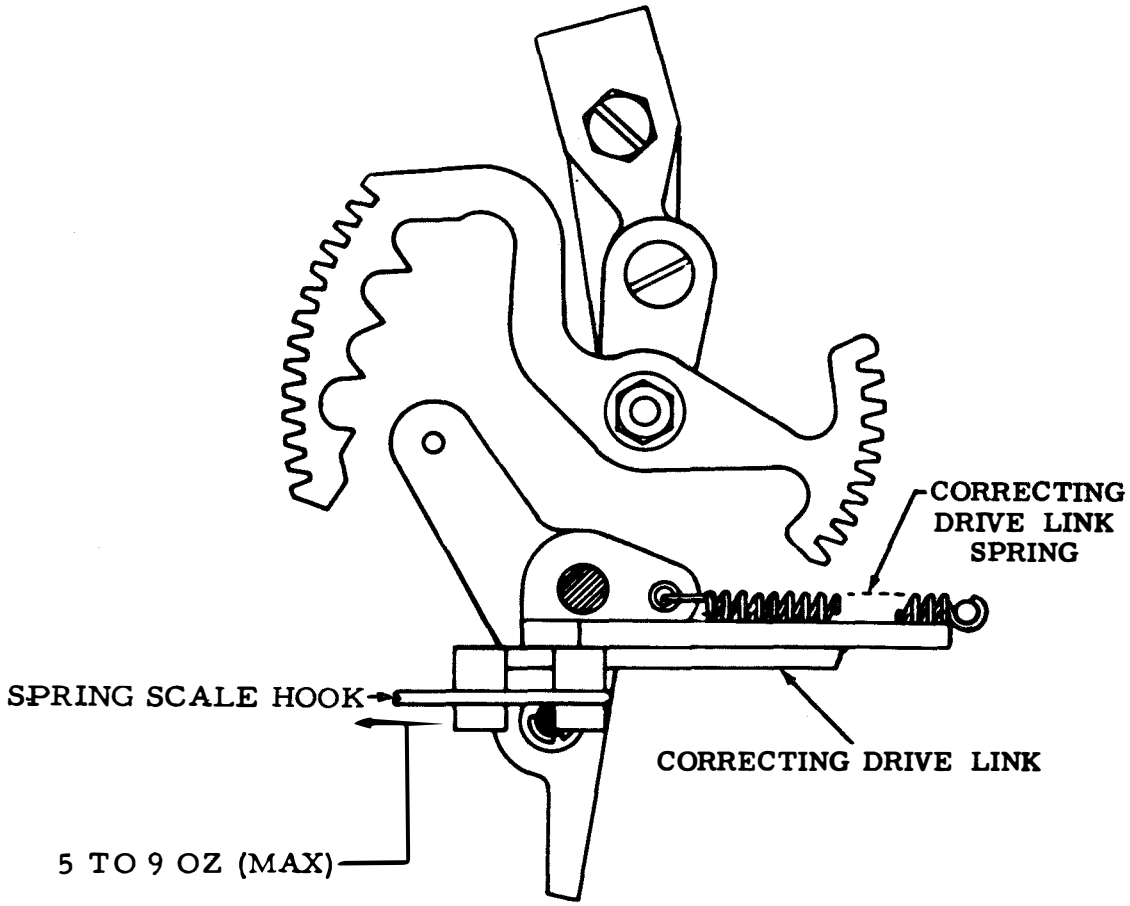


Figure 6-82. Correcting Drive Link Spring (Nonyielding) - Top View

oscillating bail linkage by applying force to oscillating bail.

4. Tighten oscillating bail adjusting screw.

(23) Axial Sector Alignment. Adjust as follows:

NOTE

On units equipped with larger (0.594 inch diameter) roller, no adjustment is required.

(a) Refer to figure 6-84.

(b) Teeth of axial sector and axial output rack should engage by their full thickness.

(c) Guide roller should be free to rotate.

(d) To adjust:

1. Loosen locknut and disengage rack.

2. Remove retaining ring and guide roller.

3. Add or remove shims and place extra shims on top of shim used to retain felt washer.

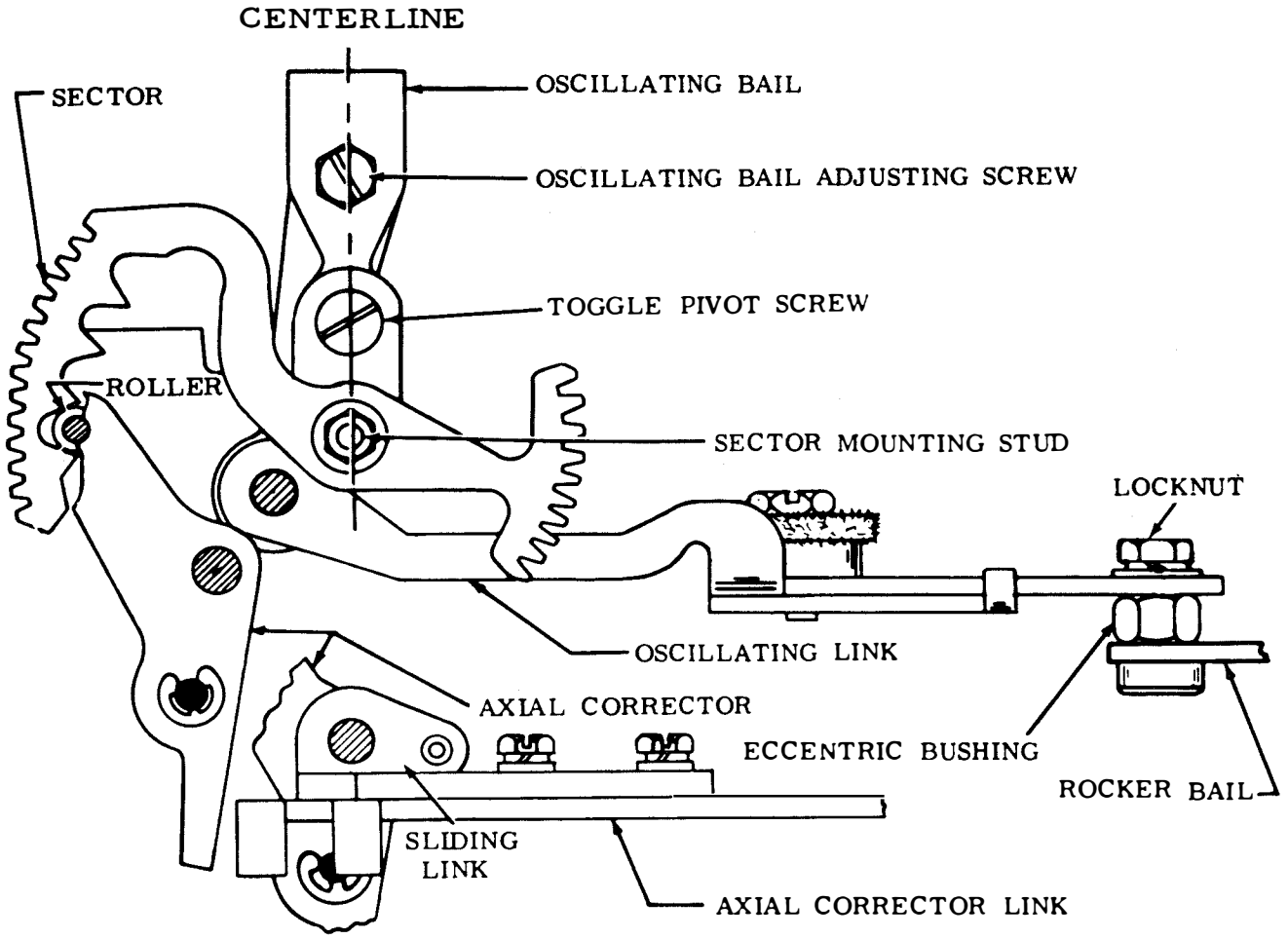


Figure 6-83. Oscillating Bail Drive Link and Oscillating Bail Pivot - Top View

4. Tighten nut.

(24) Eccentric Shaft Dentent Lever Spring. Adjust as follows:

NOTE

Check all six springs. There are two on the axial positioning mechanism and four on the rotary positioning mechanism.

(a) Refer to figure 6-85.

(b) Attach spring scale hook to detent lever and measure force required to start detent lever moving.

(c) Force should be between 7 and 10 ounces.

(d) Replace spring if not within limits.

(25) Axial Output Rack Guide Roller. Adjust as follows:

(a) Refer to figure 6-86.

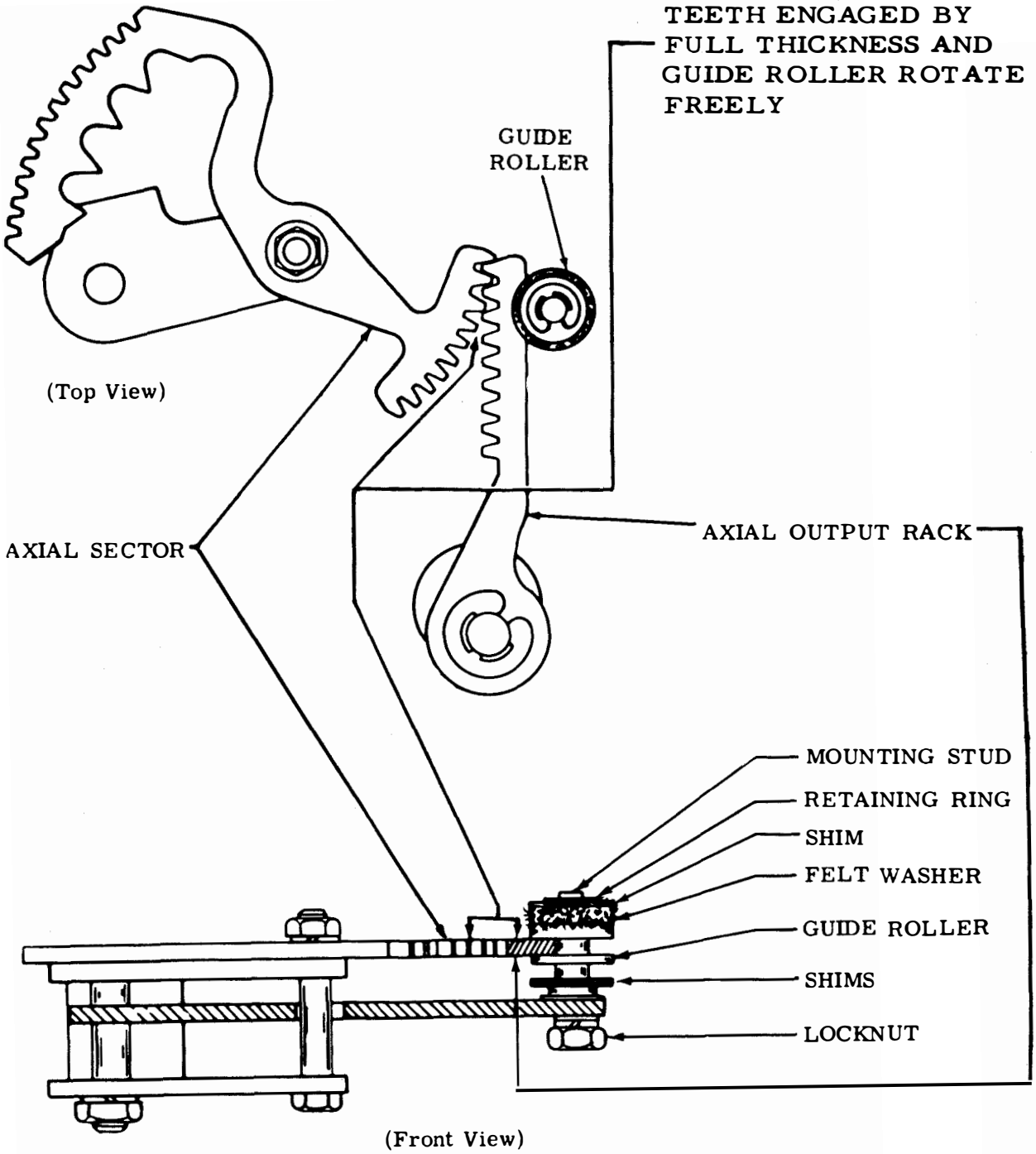


Figure 6-84. Axial Sector Alignment

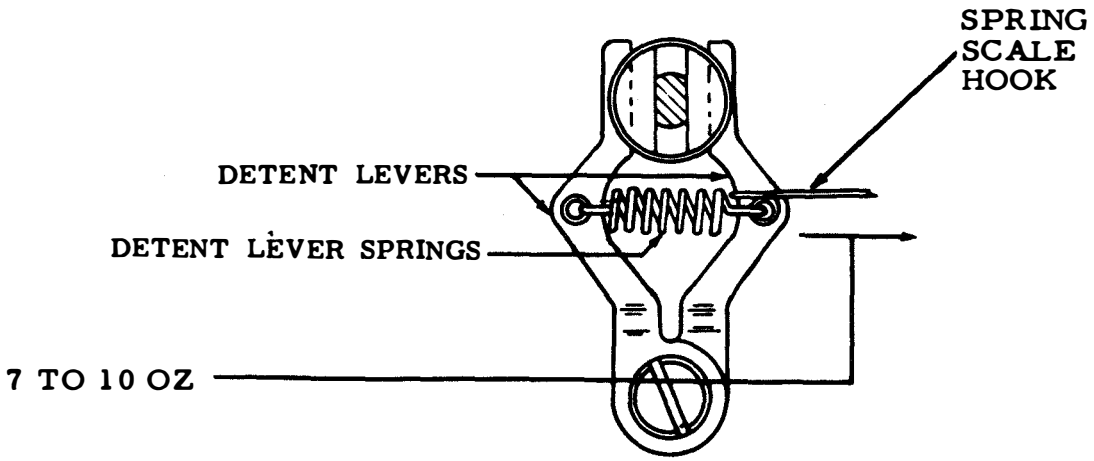


Figure 6-85. Eccentric Shaft Detent Lever Spring - Top View of Springs on Axial Positioning Mechanism

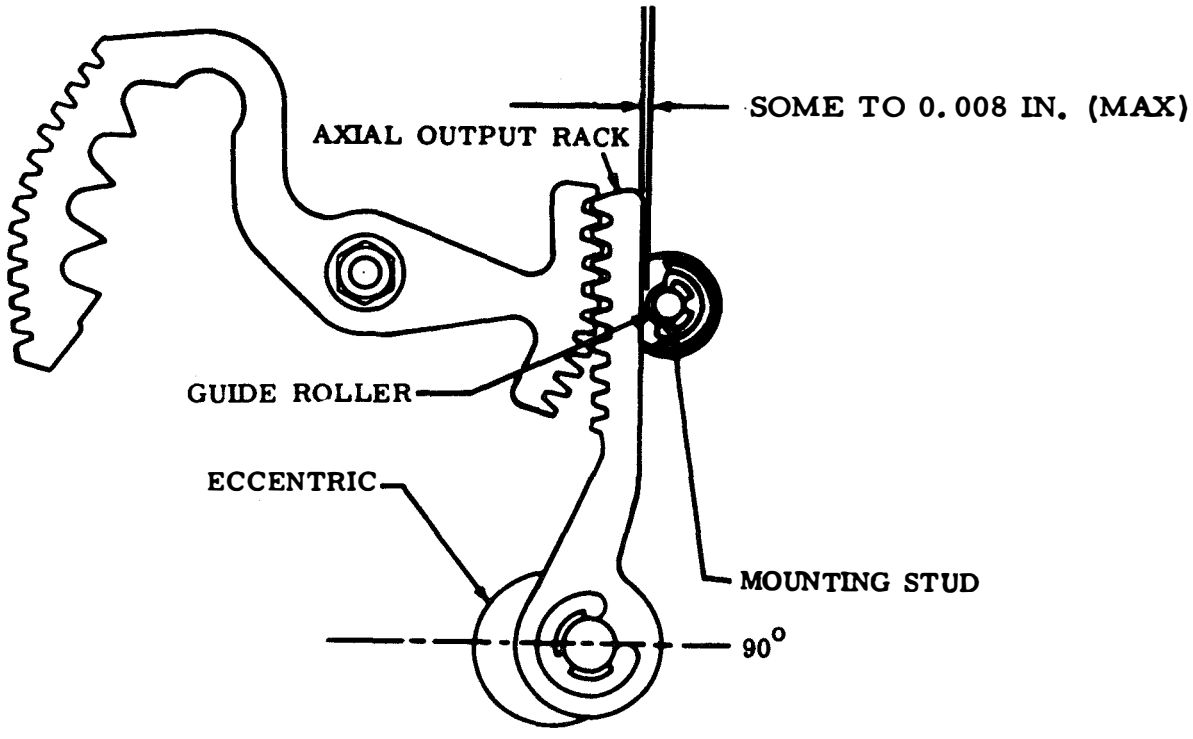


Figure 6-86. Axial Output Rock Guide Roller - Top View

(b) Select LINE FEED code combination (12---).

(c) Rotate main shaft until eccentric has rotated 90 degrees.

(d) Take up play to make maximum clearance between output rack and guide roller and measure clearance.

(e) There should be some clearance, not to exceed 0.008 inch.

(f) To adjust, position guide roller mounting stud in elongated hole with locknut loosened; tighten nut.

(26) Pushbar Guide Bracket. Adjust as follows:

(a) Refer to figure 6-87.

(b) Manually select CARRIAGE RETURN code combination (---4-).

(c) Rotate main shaft so that number 4 pushbar moves through complete range of travel.

(d) Take up play to make maximum clearance between number 4 pushbar and guide bracket throughout complete travel of pushbar. Measure clearance.

(e) There should be some clearance, not to exceed 0.008 inch.

(f) To adjust, loosen mounting screw and position guide bracket. Tighten screws.

(27) Correcting Drive Link (Nonyielding). Adjust as follows:

(a) Refer to figure 6-88.

(b) Select BLANK code combination.

(c) Trip function clutch and move rocker bail to extreme left.

(d) Observe that roller on axial correcting plate is firmly seated in first notch of axial sector.

(e) Select LETTERS code combination (12345).

(f) Trip function clutch and move rocker bail to extreme left.

(g) Observe that roller on axial correcting plate is firmly seated in fourth notch of axial sector.

(h) To adjust:

1. Loosen drive link adjusting screws.

2. Holding roller firmly seated in first notch and drive link down (bottomed) against bushing, tighten adjustment screws.

(28) Type Wheel Rack Clearance. Adjust as follows:

(a) Refer to figure 6-89.

(b) With unit in the LETTERS field and function clutch disengaged, measure clearance between idler gear and rack at closest point when all play is taken up in a direction to make a maximum clearance.

(c) There should be some clearance, not to

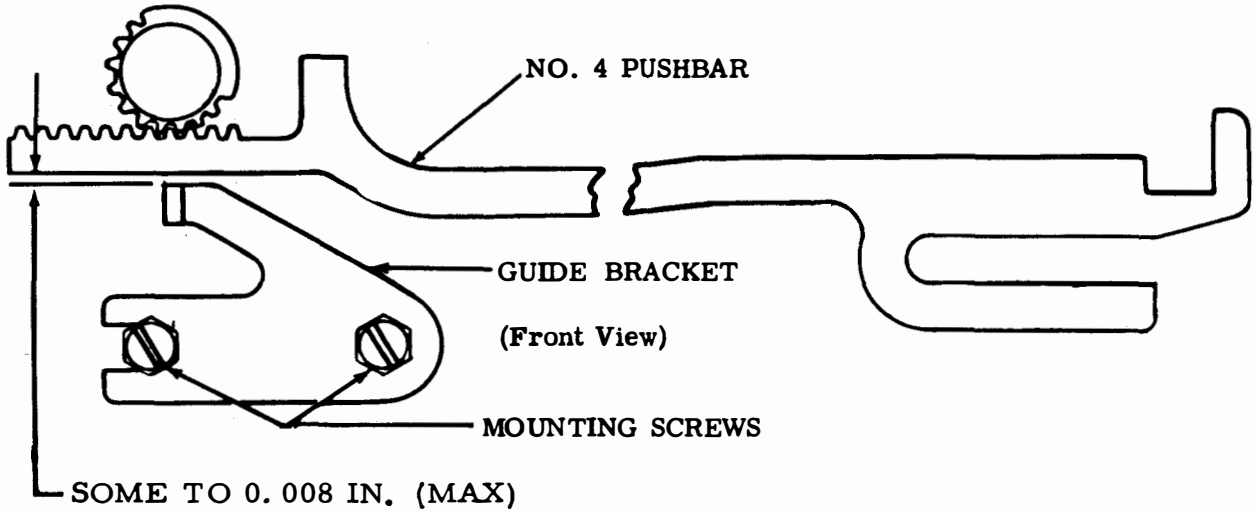


Figure 6-87. Pushbar Guide Bracket

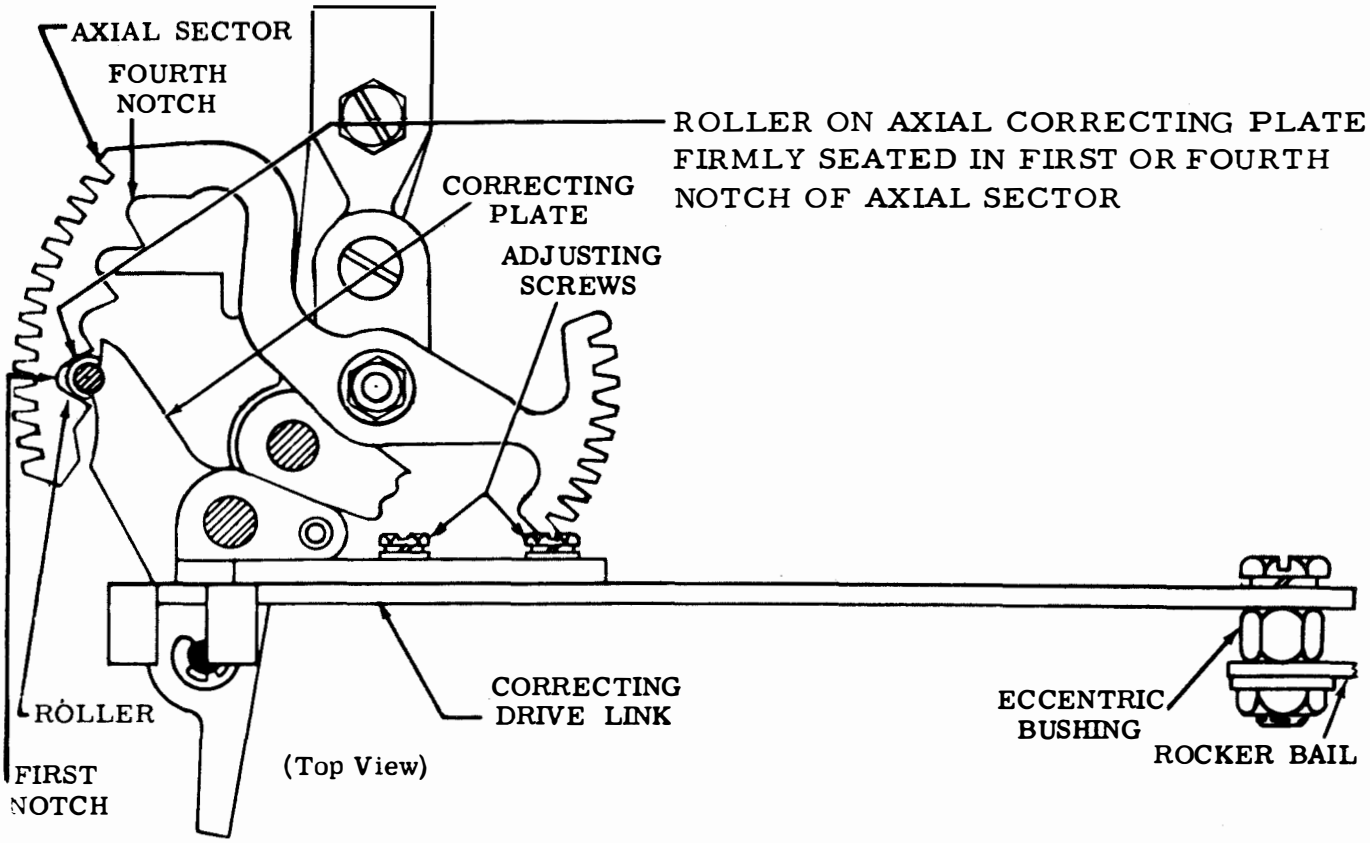


Figure 6-88. Correcting Drive Link (nonyielding) - Top View

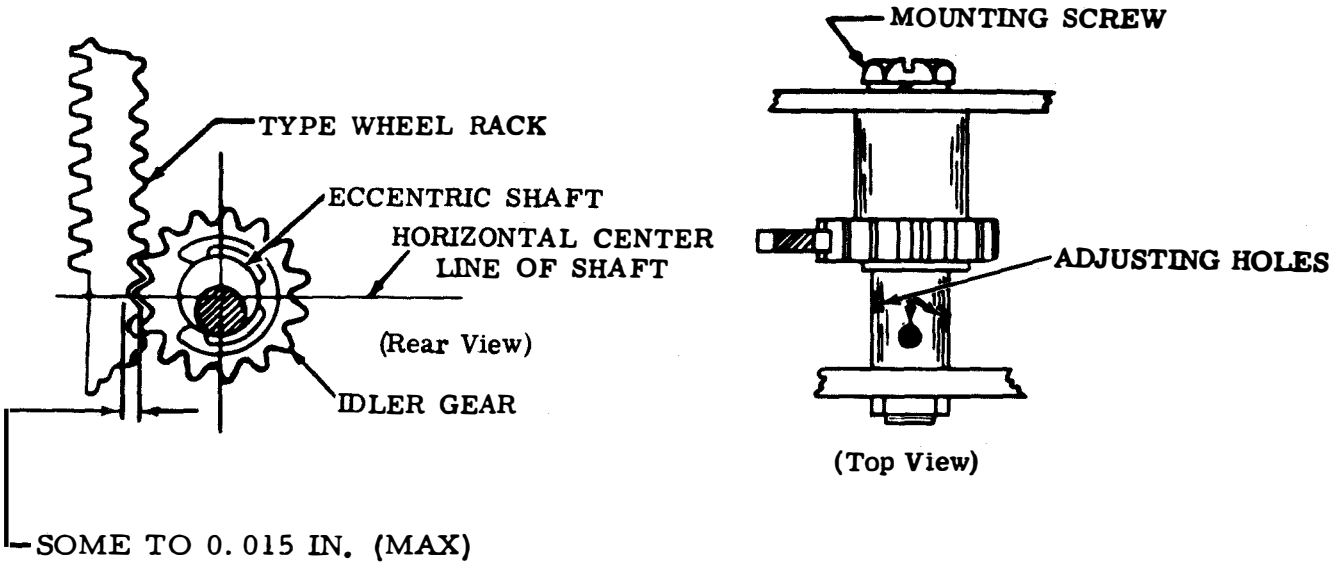


Figure 6-89. Type Wheel Rack Clearance

exceed 0.015 inch and some clearance throughout travel of the rack.

(d) To adjust, loosen mounting screw friction tight and position idler gear eccentric shaft using three adjusting holes in top of shaft. Tighten screw.

(29) Corrector Drive Link Extension Spring (Yielding) Adjust as follows:

(a) Refer to figure 6-90.

(b) With BLANK code combination selected, function clutch tripped, and rocker bail in extreme left position, attach 32-ounce spring scale hook on end of corrector axial plate.

(c) Force required to move roller from notch in sector should be between 16 and 32 ounces.

(d) If scale reading does not meet specified limits, install new spring.

(30) Axial Corrector (Yielding). Adjust as follows:

(a) Refer to figure 6-90.

(b) With BLANK code combination selected, function clutch tripped, and rocker bail in extreme left position, axial corrector roller should seat in first sector notch. Measure clearance between each end of slot and spring post.

(c) There should be a minimum of 0.005 inch.

(d) To check, turn retaining ring that fastens drive link extension to corrector plate.

(e) To adjust, loosen two drive link adjusting screw and reposition drive link. Tighten screws.

(31) Rotary Corrector Mesh. Adjust as follows:

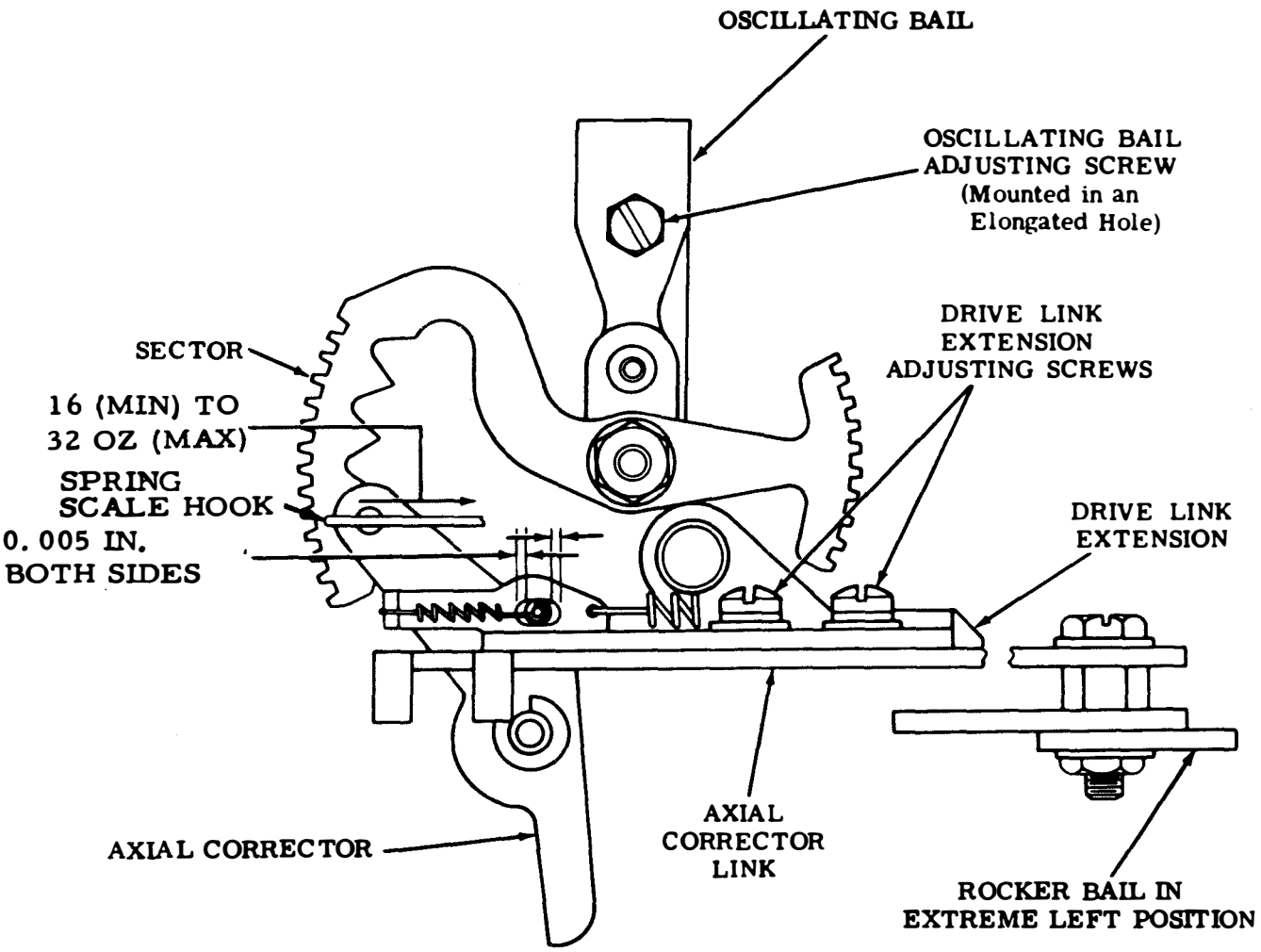


Figure 6-90. Corrector Drive Link Extension Spring and Axial Corrector (Yielding) - Top View

(a) Refer to figure 6-91.

(b) With clamp arm loosened, FIGURE 9 combination selected (number 4 and number 5 pulse marking in FIGURES position), and rocker bail in extreme left position, the second tooth from top of rotary output rack (with pushbars manually detented) should seat firmly between rotary corrector arm lobes.

(c) To adjust:

1. Loosen clamp arm screw and eccentric bushing locknut.

2. With corrector arm pivot to right of center of bushing, position rotary corrector.

3. Tighten bushing locknut but do not tighten clamp arm screw at this point.

(d) Check engagement in similar manner to step (b) of fifth tooth (number 3 and number 4 marking

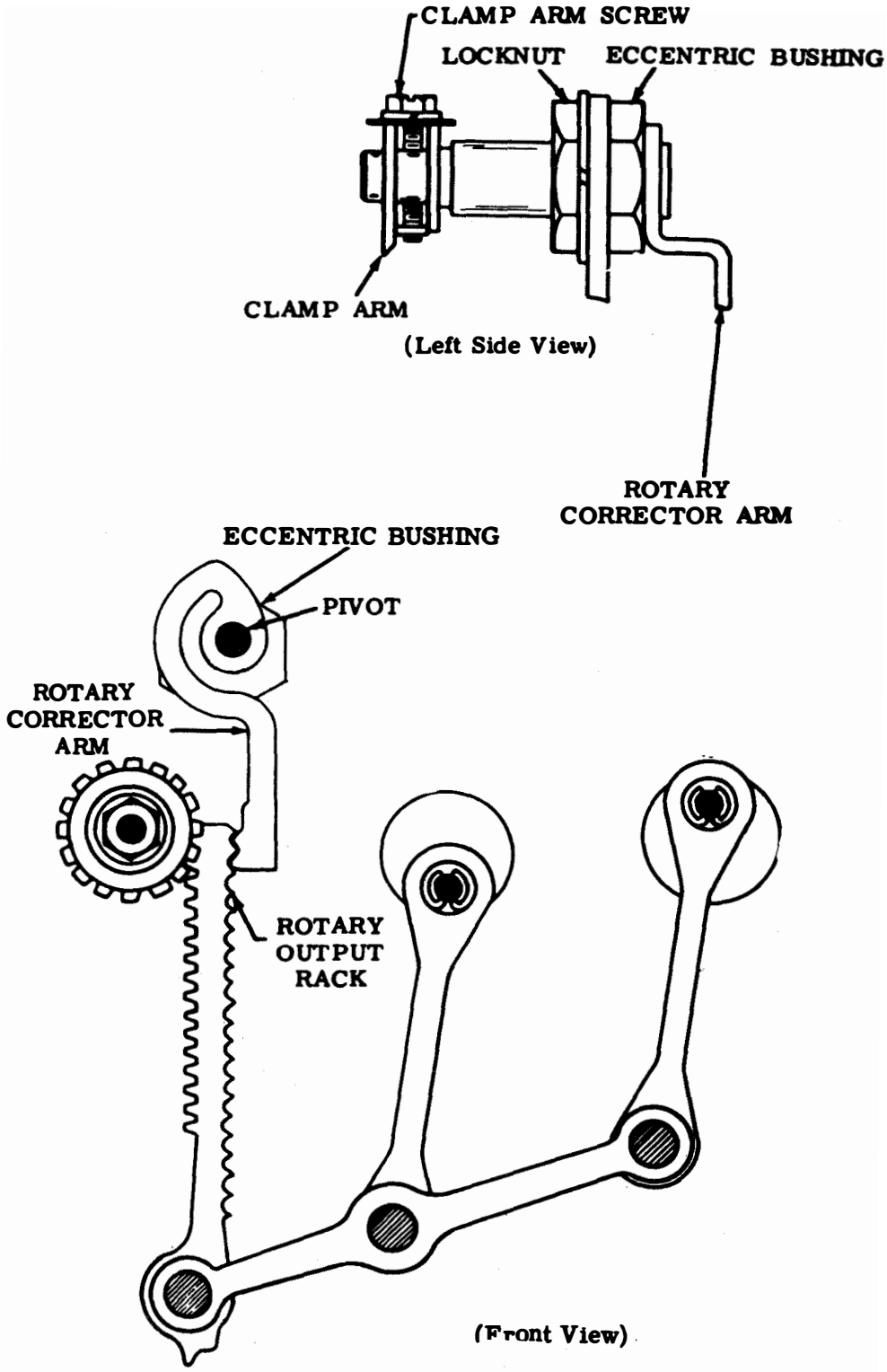


Figure 6-91. Rotary Corrector Mesh

in FIGURES position), ninth tooth (number 4 pulse marking in LETTERS position), and sixteenth tooth (number 3 and number 5 pulse marking in LETTERS field).

(e) Refine adjustment, (c) above.

(32) Rotary Corrector Arm. Adjust as follows:

(a) Refer to figure 6-92.

(b) With LETTERS combination selector in LETTERS field and rocker bail to extreme left, manually seat corrector arm in rack.

(c) Rotary corrector arm should seat firmly in rotary output rack. With unit in stop position, there should be some end play between clamp arm and bushing, not to exceed 0.006 inch maximum.

(d) To adjust units equipped with yielding axial corrector, allow rocker bail to approach extreme left and the spring post of axial corrector starts to leave end of slot, take up play of drive arm in operating fork towards main bail and position rotary corrector arm finger tight against rotary output rack. Tighten clamp arm screw.

(e) To adjust units equipped with nonyielding axial corrector, allow rocker bail to approach extreme left and measure clearance between axial corrector and sector notch. When clearance is some to 0.005 inch maximum, positioning rotary corrector arm finger tight against rotary output rack and tightening corrector clamp arm screw.

(33) Printing Latch. Adjust as follows:

NOTE

For units with adjustable printing latch mounting bracket, follow steps (a) through (h). For non-adjustable, follow steps (a), (b), (c), and (h).

(a) Refer to figure 6-93.

(b) With rocker bail in extreme left position, manually raise print hammer accelerator.

(c) Clearance between accelerator and printing latch should be some to 0.015 inch maximum.

(d) With rocker bail in extreme right position, there should be some overtravel of print hammer accelerator with respect to latching surface of printing latch and some clearance between print hammer accelerator and ribbon carrier (or accelerator blocking link if present).

(e) To adjust, position rocker bail to extreme right and with high part of eccentric to left, rotate eccentric so that clearance between print hammer accelerator and ribbon carrier is approximately 0.065 inch.

(f) With mounting screws friction tight, position printing latch mounting bracket to extreme rear.

(g) With rocker bail to extreme left, move printing latch mounting bracket toward front until print hammer

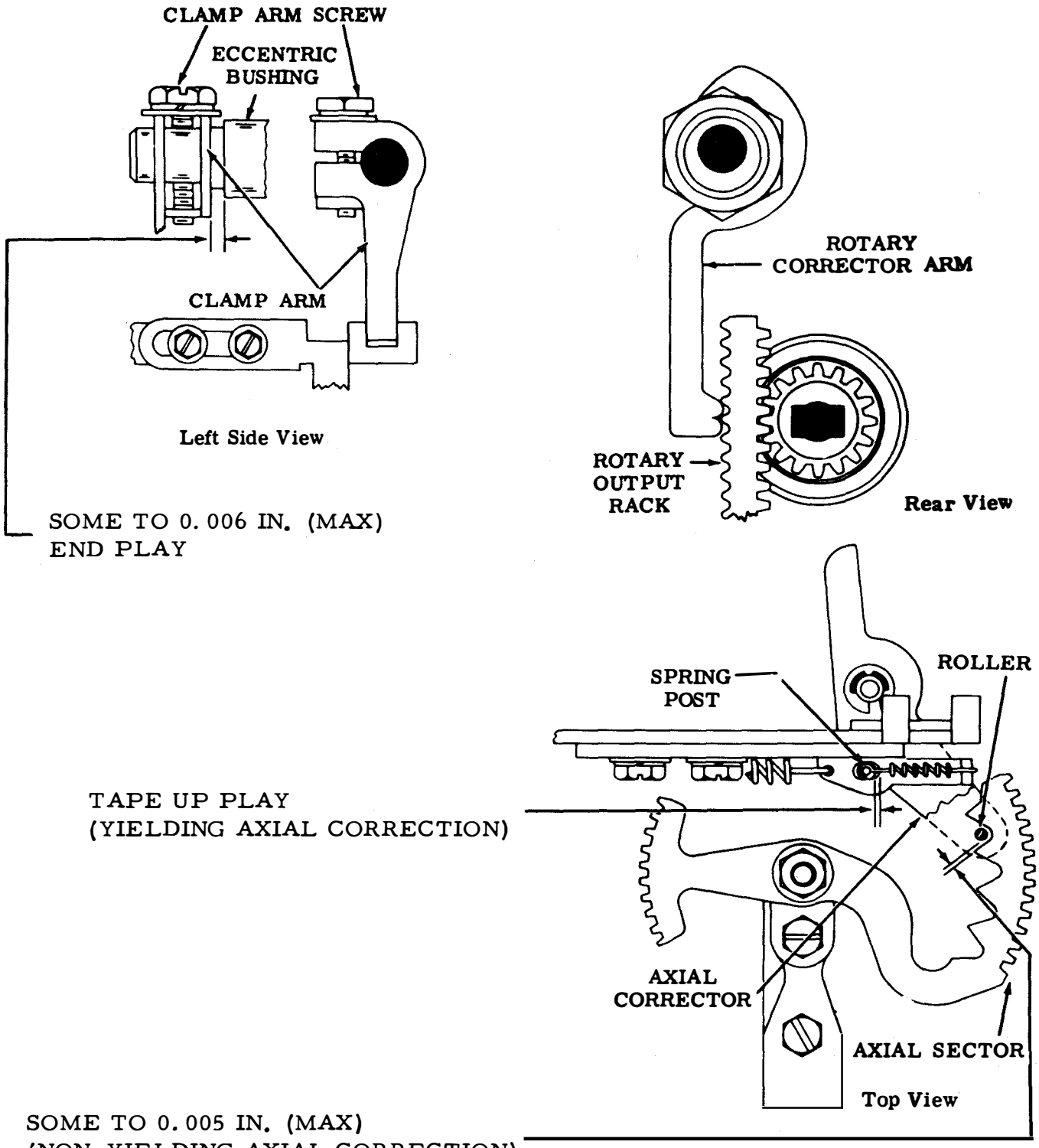


Figure 6-92. Rotary Corrector Arm

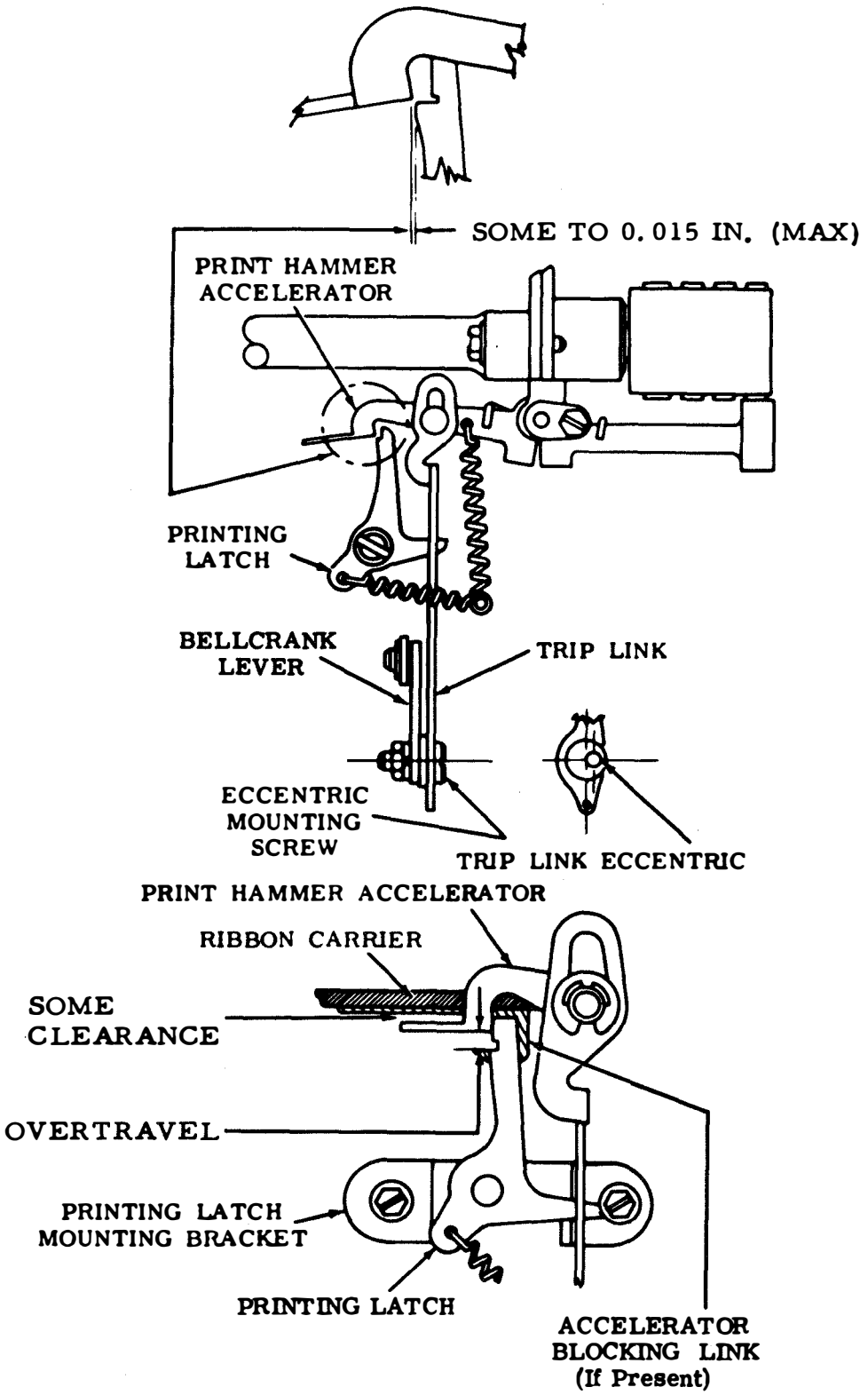


Figure 6-93. Printing Latch - Left Side View

accelerator just trips, tighten mounting screws.

(h) With rocker bail to extreme left, loosen locknut and position trip link eccentric (keeping high part to left) until clearance between printing latch and print hammer accelerator is some to 0.015 inch maximum. Tighten locknut.

(34) Print Hammer Return Spring. Adjust as follows:

(a) Refer to figure 6-94.

(b) With unit in stop position, attach spring scale hook to hammer lever.

(c) Force required to pull hammer lever so that top of hammerhead is level with type wheel should be between 1 and 3 ounces.

(d) If force does not match specifications, replace spring.

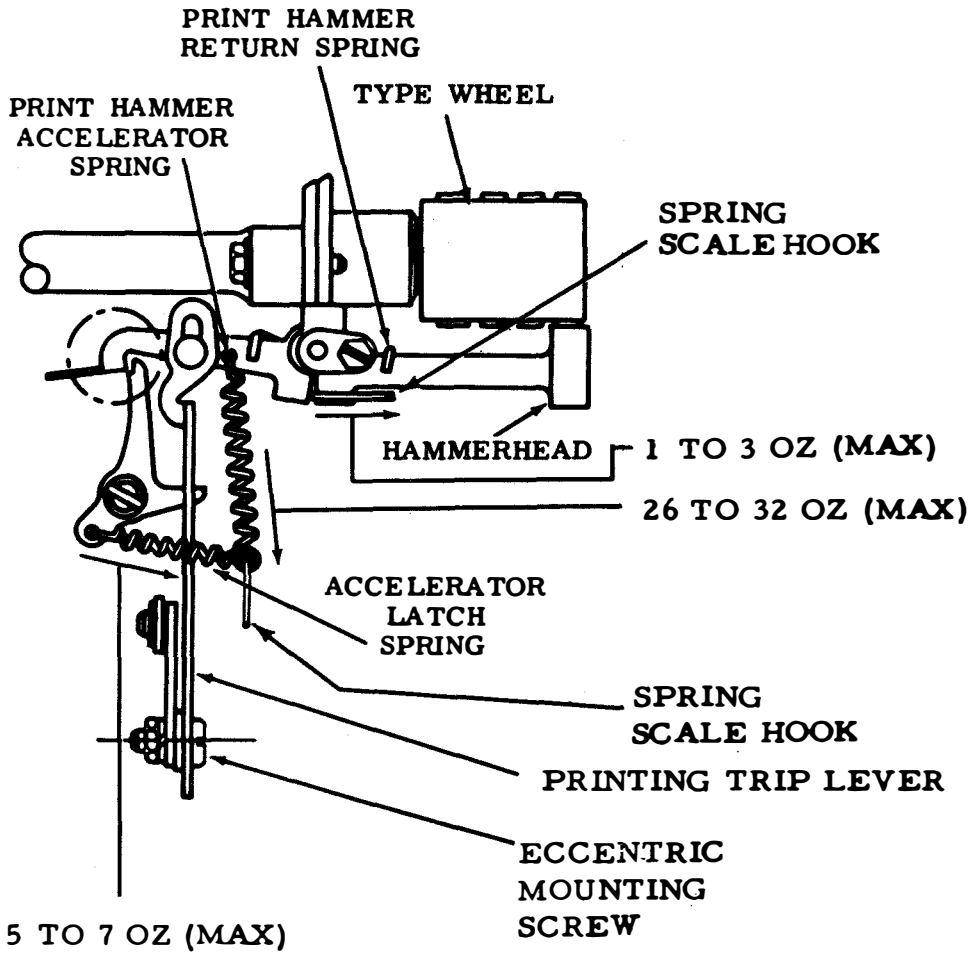


Figure 6-94. Print Hammer Return Spring, Accelerator Spring, and Accelerator Latch Spring - Left Side View

(35) Print Hammer Accelerator Spring. Adjust as follows:

(a) Refer to figure 6-94.

(b) With unit in stop position, attach spring scale hook to accelerator spring.

(c) Force required to pull spring to installed length should be between 26 and 32 ounces.

(d) If scale reading does not meet specified limits, install new spring.

(36) Print Hammer Accelerator Latch Spring. Adjust as follows:

(a) Refer to figure 6-94.

(b) With unit in stop position, attach spring scale hook to accelerator latch spring.

(c) Force required to pull spring to installed length should be between 5 and 7 ounces.

(d) If scale reading does not meet specified limits, install new spring.

(37) Print Hammer Trip Lever Spring. Adjust as follows:

(a) Refer to figure 6-95.

(b) Attach spring scale hook to print hammer trip lever spring.

(c) Force required to pull spring to installed length should be between 4 and 7 ounces.

(d) If scale reading does not meet specified limits, install new spring.

l. Typing Mechanism Adjustments for Chadless Tape. Perform typing mechanism (chadless tape) adjustments in accordance with the following paragraphs.

NOTE

There should be some end play between carrier and rear guidepost when unit is in stop position.

(1) Ribbon Carrier. Adjust as follows:

(a) Refer to figure 6-96.

(b) With unit in stop position, ribbon should overlap and last printed character, not including fractions, should be visible.

(c) To adjust, loosen lockscrew and position ribbon oscillating lever by means of adjusting slot. Tighten screw.

(2) Type Wheel (Preliminary). Adjust as follows:

NOTE

It may be necessary to proceed to next adjustment (step (3) below) then come back and refine this adjustment.

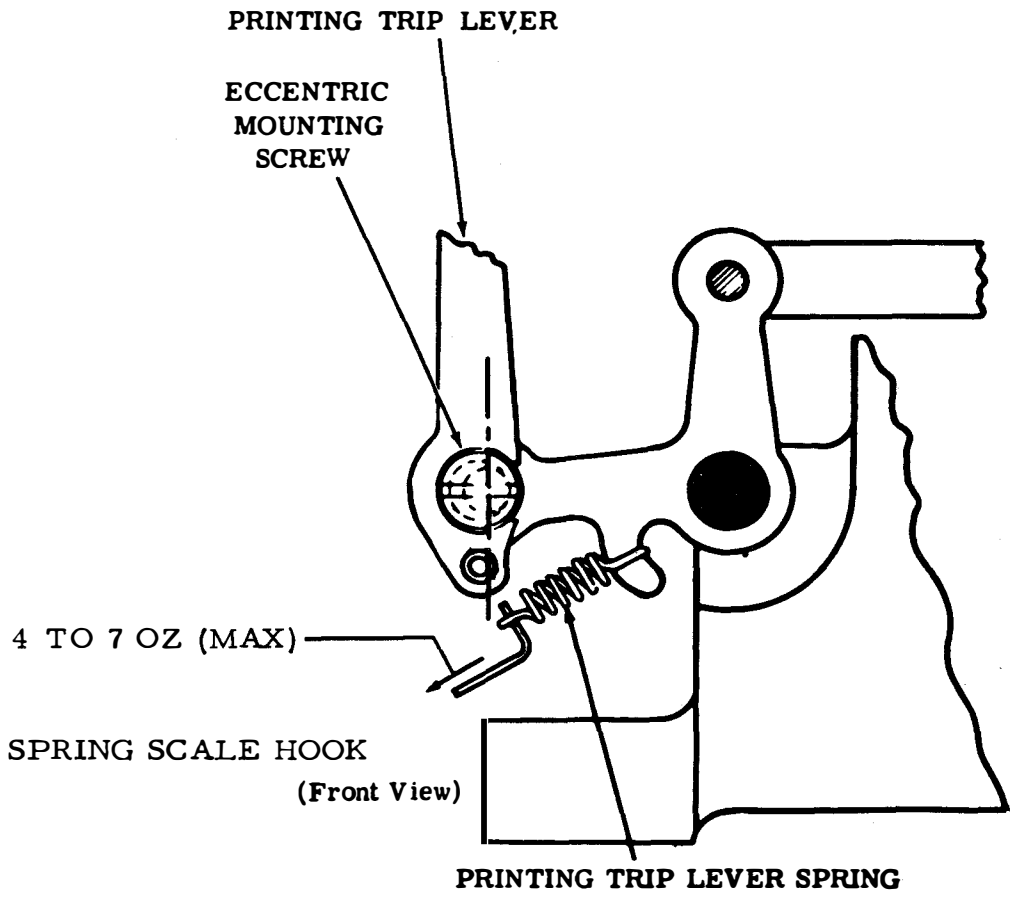


Figure 6-95. Print Hammer Trip Lever Spring

(a) Refer to figure 6-97.

(b) Select H code combination (--3-5).

(c) Place rocker bail to extreme left.

(d) Rotary corrector arm to be firmly engaged.

(e) Type wheel should be aligned so that full character is printed uniformly with 6 ±1/4 code hold spaces behind perforated code holes.

(f) To adjust, loosen locknut and position type wheel. Check printing by manually lifting accelerator to latched position and releasing it. Tighten locknut.

(3) Type Wheel (Final). Adjust as follows:

NOTE

For best results it may be necessary to make Print Hammer adjustment, (step (4) below) and then refine this adjustment.

(a) Refer to figure 6-97.

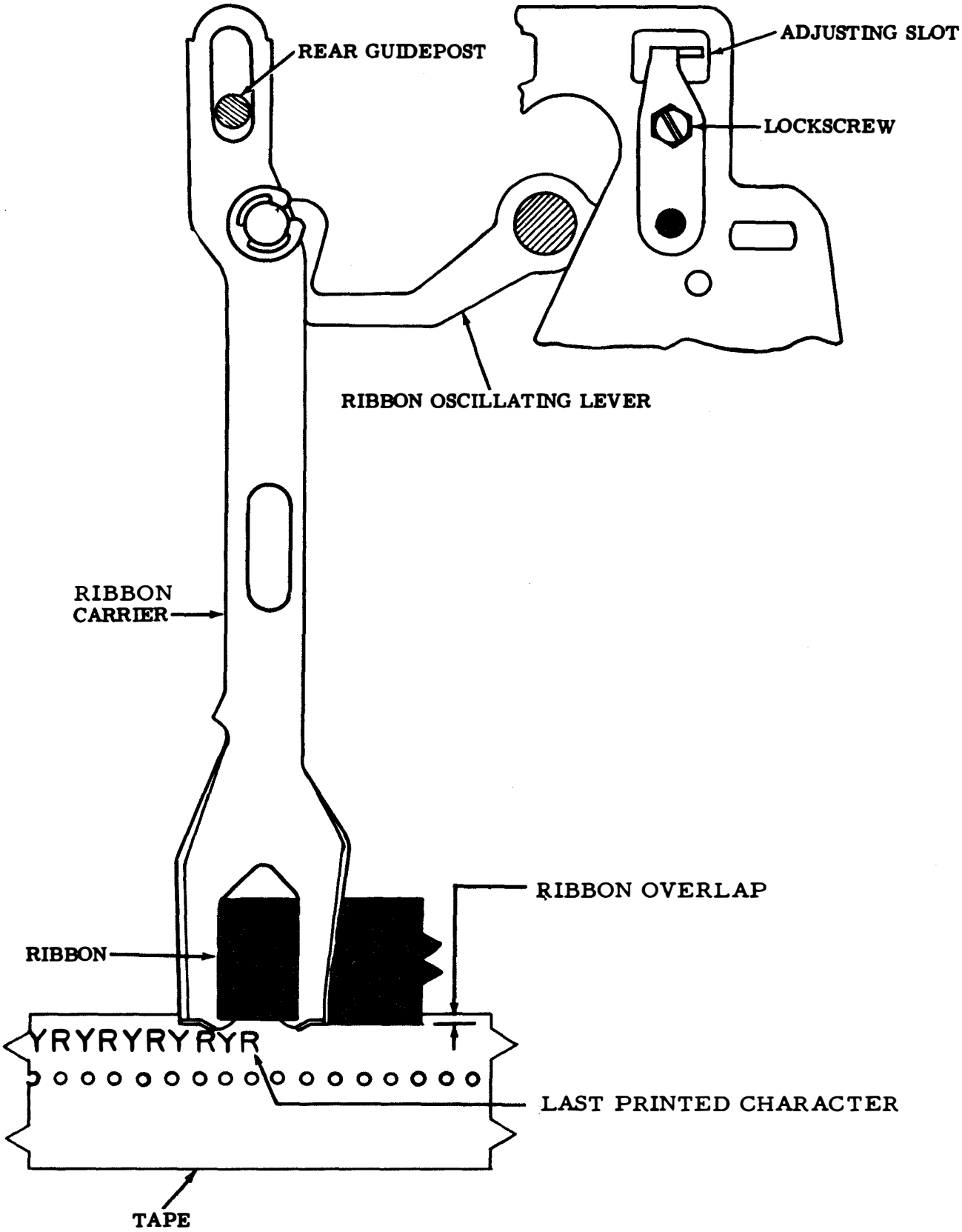


Figure 6-96. Ribbon Carrier For Chadless Tape - Top View

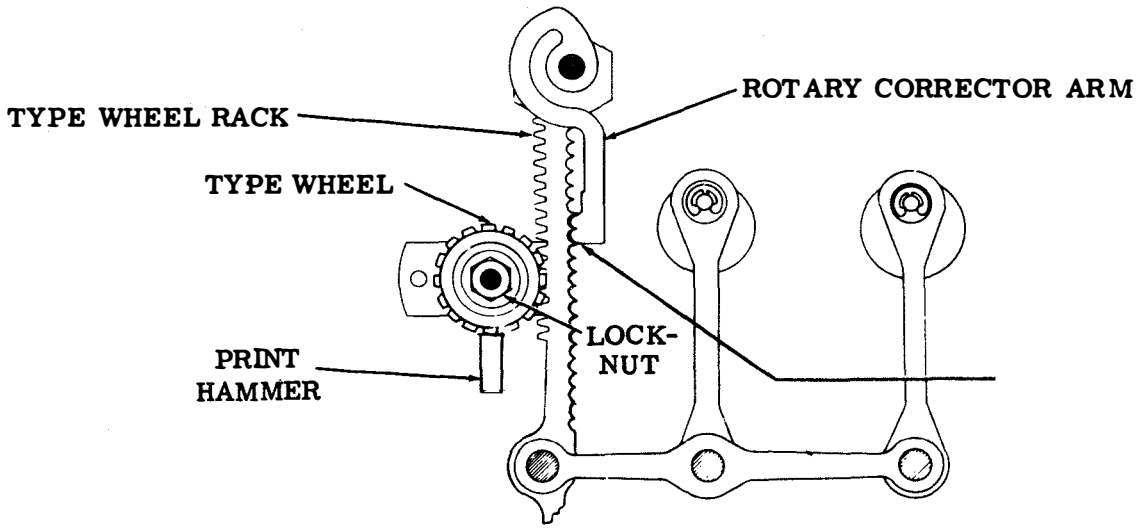


Figure 6-97. Type Wheel (Preliminary and Final) for Chadless Tape

(b) With unit operating under power, all characters should be legible, with 6 ±1/4 code hole spaces behind perforated code holes.

(c) To adjust, loosen locknut and refine type wheel position. Tighten locknut.

(4) Print Hammer. Adjust as follows:

NOTE

It may be necessary to remake Type Wheel adjustments (steps (2) and (3) above) and then refine this adjustment.

(a) Refer to figure 6-98.

(b) When operating under power, print hammer and type wheel should align to obtain best quality printing.

(c) To adjust, loosen locknut and position print hammer shaft. Tighten locknut.

m. Typing Mechanism Adjustments for Fully Perforated Tape. Perform typing mechanism (fully perforated tape) adjustments in accordance with the following paragraphs.

NOTE

The adjustments in steps (2), (3), and (4) below do not apply to tape printer.

(1) Ribbon Carrier. Adjust as follows:

NOTE

There should be some end play between carrier and rear guidepost when unit is in stop position.

(a) Refer to figure 6-99.

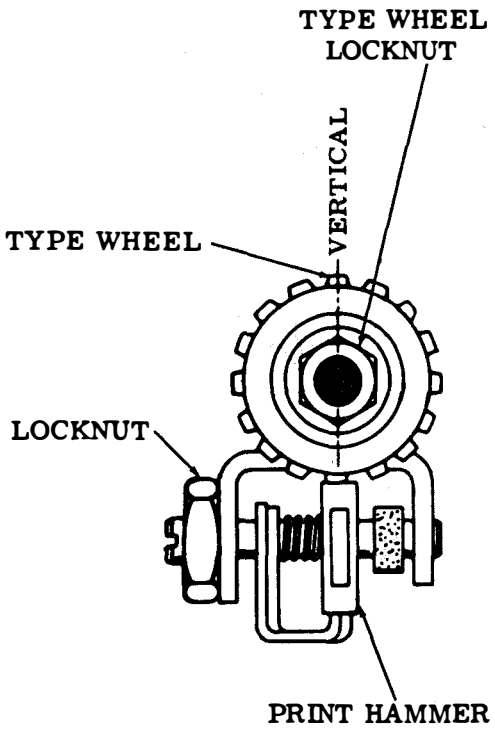


Figure 6-98. Print Hammer for Chadless Tape

(b) With unit in stop position, ribbon should overlap and last printed character should be visible.

(c) To adjust, loosen lockscrew and position ribbon oscillating lever by means of adjusting slot. Tighten screw.

NOTE

For best results, it may be necessary to make Print Hammer adjustment (paragraph 6-3.1m(4)) first and then refine adjustments in paragraphs 6-3.1m(2) and (3).

(2) Type Wheel (Preliminary). Adjust as follows:

(a) Refer to figure 6-100.

(b) Select H code combination (--3-5).

(c) Place rocker bail to extreme left.

(d) Corrector arm should be firmly seated in type wheel rack.

(e) Type wheel should be aligned so that full character is printed uniformly and 6-1/2 code hole spaces behind perforated code hole.

(f) To adjust, loosen locknut and position type wheel. Check printing by manually lifting accelerator to latched position and releasing it.

(3) Type Wheel (Final). Adjust as follows:

(a) Refer to figure 6-100.

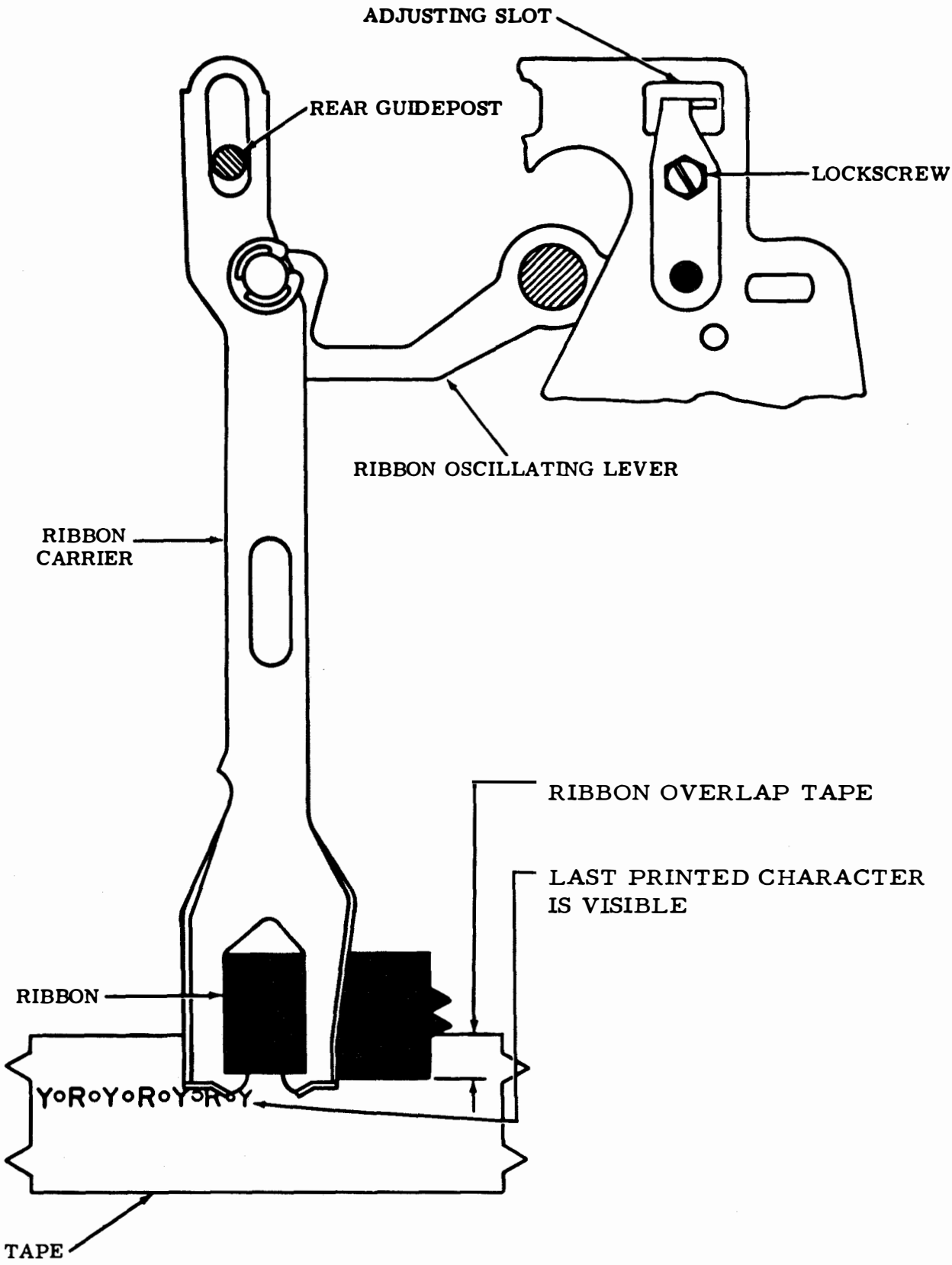


Figure 6-99. Ribbon Carrier for Fully Perforated Tape - Top View

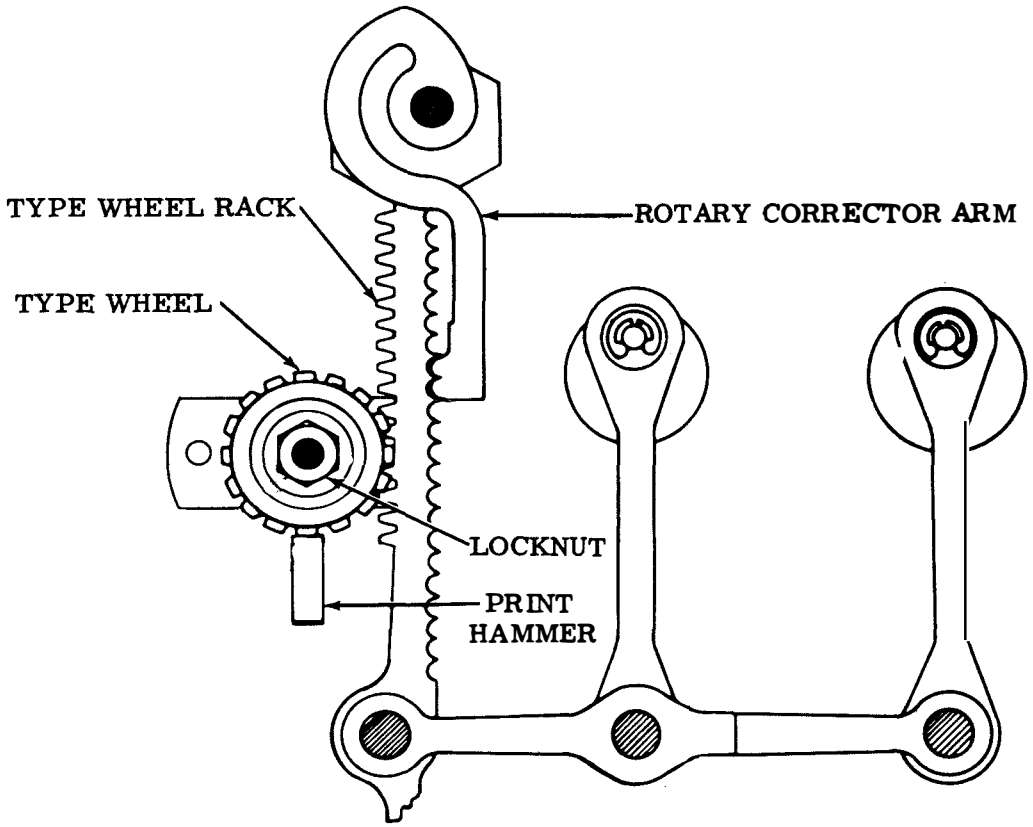


Figure 6-100. Type Wheel (Preliminary and Final) for Fully Perforated Tape

(b) With unit operating under power, all characters should be legible with 6-1/2 code hole spaces behind perforated code holes.

(c) To adjust, loosen locknut to friction tight and refine type wheel positions. Tighten locknut.

(4) Print Hammer. Adjust as follows:

NOTE

It may be necessary to make Type Wheel (final) adjustment (paragraph 6-3.1m(3)) and then refine this adjustment.

(a) Refer to figure 6-101.

(b) With unit operating under power, and print hammer aligned with type wheel check quality of printing and clearance between pin points on the feed wheel and side of print hammer head.

(c) There should be some clearance.

(d) To adjust, loosen locknut to friction tight and position print hammer shaft Tighten locknut.

6-3.2 TYPING REPERFORATOR AND TAPE PRINTER ADJUSTMENTS (LOW-LEVEL). The adjustments for high-level units are applicable to the low-level unit also,

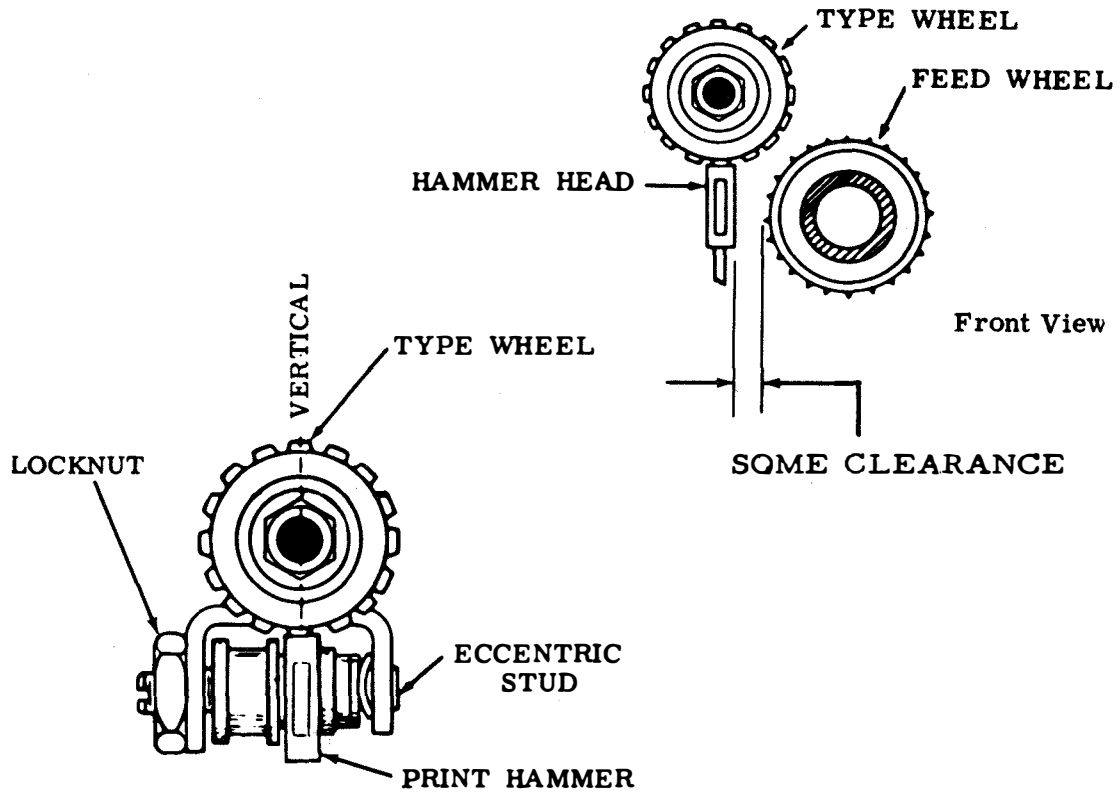


Figure 6-101. Print Hammer for Fully Perforated Tape

except for the selector mechanism.

a. Selector Mechanism. Perform Selector Mechanism adjustments in accordance with the following paragraphs.

NOTE

To facilitate the following adjustments, remove selector cam-clutch assembly and range finder assembly in accordance with disassembly and reassembly, Section V. Remove metallic container (base and cover) which house selector magnets by unscrewing magnet and base assembly mounting post from associate nut plate. Nut plate is located in rear of selector mounting plate (refer to figure 6-105). The metallic container and enclosed selector magnets will detach from selector mounting plate as an assembly. Detach coil mounting bracket from base by removing coil mounting bracket nuts.

(1) Selector Armature. Adjust as follows:

(a) Refer to figure 6-102.

(b) With magnet assembly deenergized and removed from base, and armature resting against downstop, there should be between 0.025 and 0.030 inch clearance between end of armature and left edge of left pole piece.

(c) To adjust, loosen downstop mounting screw friction tight and position downstop to requirement.

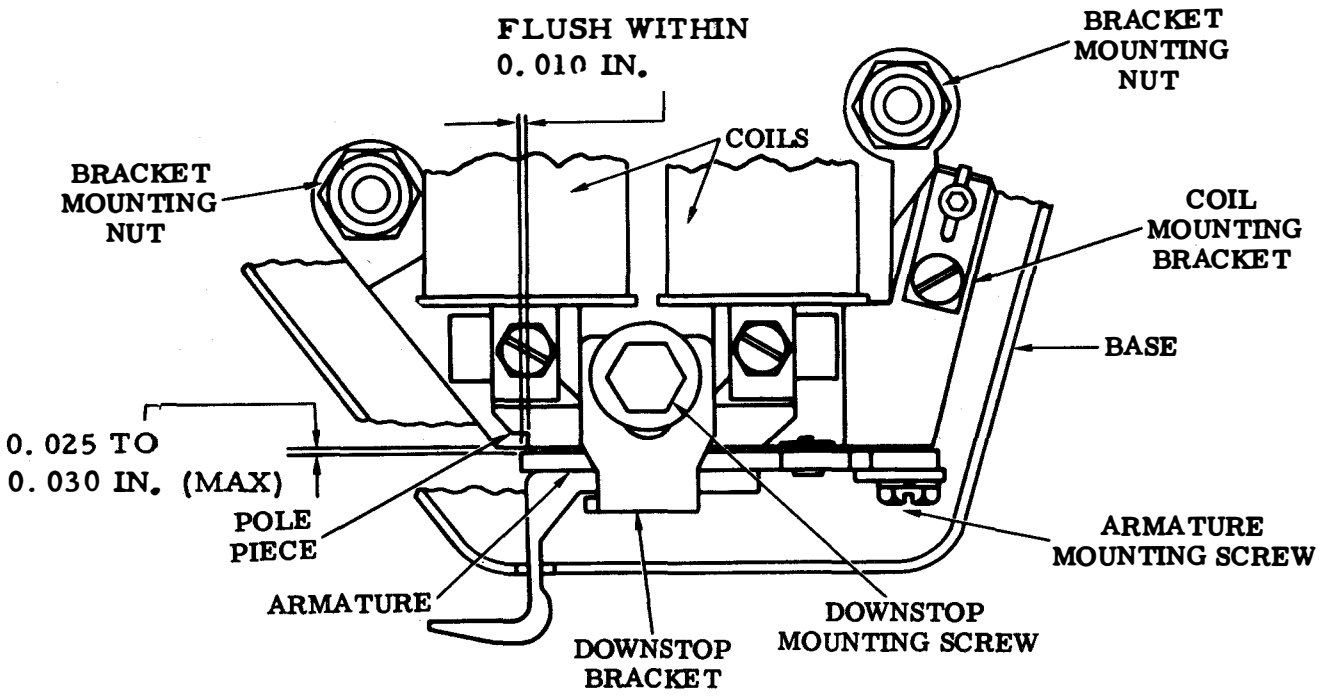


Figure 6-102. Selector Armature for Low-Level Set (Cover Removed)

(d) Tighten mounting screw.

(e) Left edge of armature should be flush within 0.010 inch with left edge of left pole piece.

(f) To adjust, loosen mounting screws and position armature.

(g) Tighten screws.

(2) Selector Armature Alignment. Adjust as follows:

(a) Refer to figure 6-103.

(b) Rear edge of armature should be flush within 0.010 inch with rear edge of pole piece.

(c) Clearance between front edge of armature and pole piece and inside of downstop bracket should be some to 0.020 inch (maximum).

(d) To adjust, loosen mounting screws and position armature.

(e) Tighten mounting screws.

(3) Selector Armature Spring. Adjust as follows:

(a) Refer to figure 6-104.

(b) Use spring scale (applied vertically) to end of armature extension, measure force necessary to pull armature to marking position. Force required should be from 1-3/4 to 2-1/4 ounces.

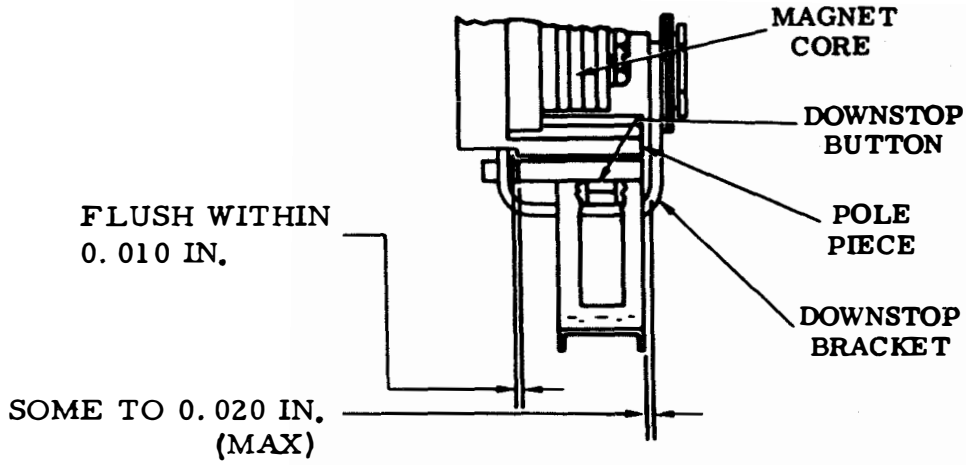


Figure 6-103. Selector Armature Alignment for Low-Level Sets - Left Side View

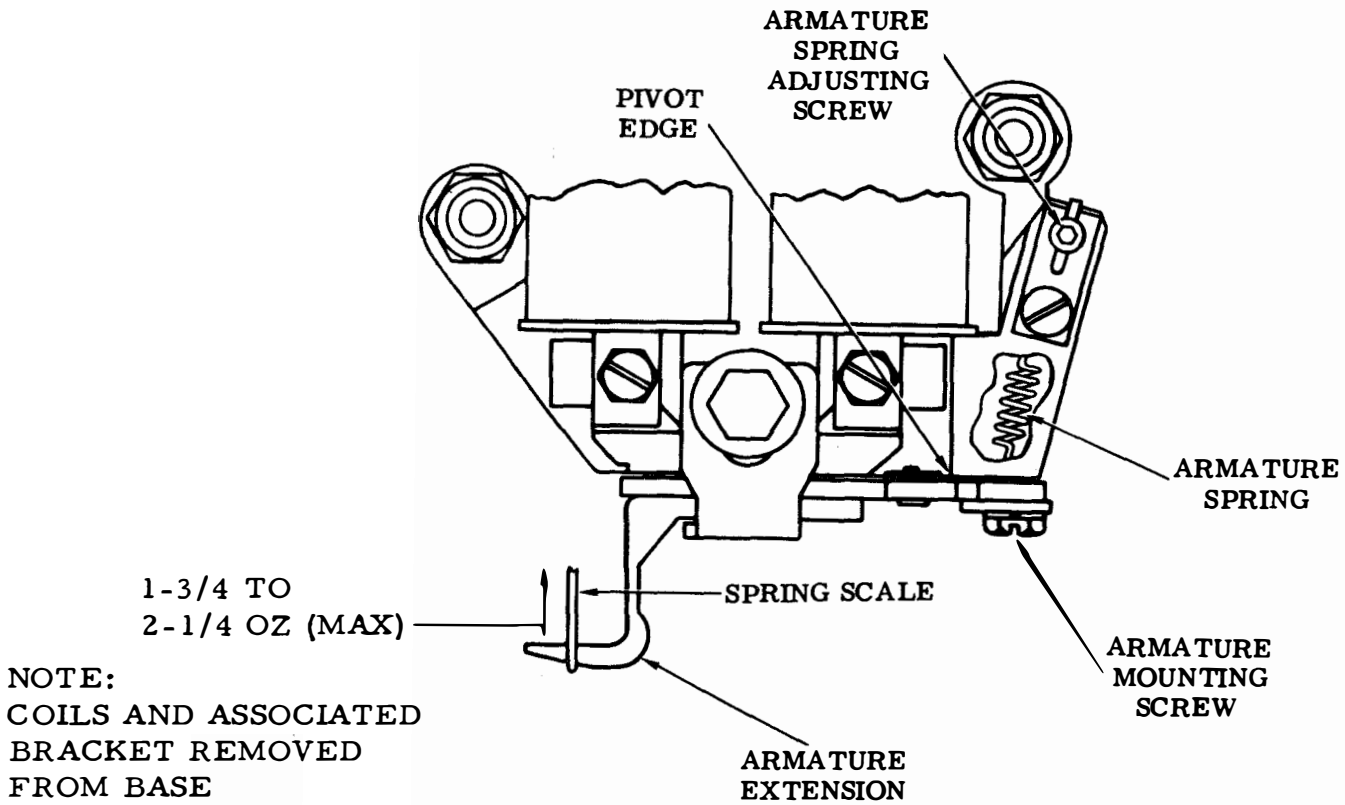


Figure 6-104. Selector Armature Spring for Low-Level Set

(c) To adjust, rotate adjusting screw (clockwise increases spring tension and counterclockwise decreases spring tension).

(d) If force does not match requirements, replace spring.

NOTE

Spring tensions given will permit operation of printer prior to measurement of receiving margins. Refine spring tension for maximum selector performance with unit connected to specific circuit in which it is to function (operating at desired speed and line current). (See paragraph 6-3.2b.)

(4) Selector Base (Magnets Energized). Adjust as follows:

(a) Refer to figure 6-105.

NOTE

Before making this adjustment, reassemble magnet assembly by reversing disassembly procedure. Reassemble and install on typing unit, cam-clutch assembly, metallic container, and range finder; then proceed with this adjustment.

(b) With spacing locklever on high part of cam, and armature in contact with left pole piece, clearance between end of armature extension and shoulder of spacing locklever should be 0.020 to 0.035 inch.

(c) When locklever is held downward, clearance between upper surface of armature extension and upper step of spacing locklever should be some to 0.003 inch (maximum).

(d) To adjust:

1. Use a 1/16 hex wrench to loosen two magnet and base mounting posts friction tight.

2. Adjust lower right eccentric to meet requirement in (b), above.

3. Adjust upper left eccentric to meet requirement in (c), above.

4. Tighten mounting posts.

NOTE

Initial positions of eccentric are: lower right at 6 o'clock; upper left at 9 o'clock.

b. Selector Receiving Margin (Low-Level. Adjust as follows:

(1) Refer to paragraphs 6-3.1h(22) and (23).

(2) Units employing TP319204 and TP327383 selector assemblies should have receiving margins performed with the selector under test being driven by a TP323810 selector magnet driver (SMD). The distortion test set must interface with the SMD; i.e., rectangular waveform with +6 volts corresponding to the marking state and -6 volts corresponding to the spacing state. The specified distortion limits apply to the signal

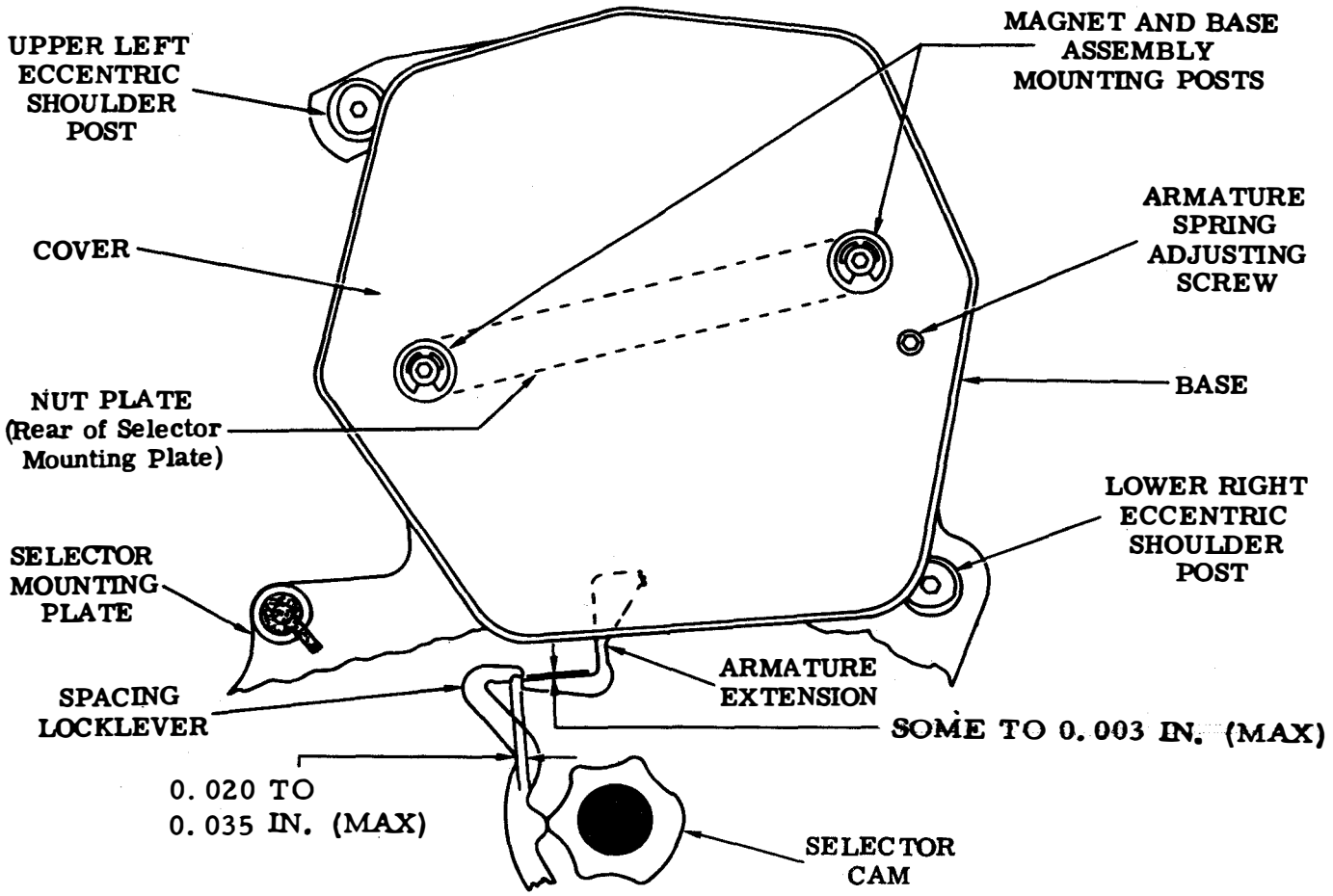


Figure 6-105. Selector Base (Magnets Energized) for Low-Level Set

driving the SMD rather than the selector coil.

(3) The receiving margin of the selector should conform to the minimum requirements as follows:.

Speed in WPM - 100

Points Range With Zero Distortion - 70

Overall Bias - 35

End Distortion Tolerated With Scale At Bias Optimum Setting - 30

6-4. TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARDS. The following paragraphs contain information necessary for making required adjustments to the typing reperforator and tape printer units of Model 28 Reperforator and Tape Printer Teletypewriter sets.

6-4.1 TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARDS (HIGH-LEVEL). Perform the following procedures to ensure proper adjustments of the KTR Keyboards.

a. Keyboard Base Casting Assembly. Perform adjustment to base casting assembly in accordance with the following paragraphs.

(1) Refer to figure 6-106.

(2) There should be barely perceptible backlash between casting assembly main shaft driven gear and its driving gear at point where backlash is least.

(3) Place front feet of casting assembly over locating studs on keyboard base.

(4) Loosen mounting screws and position casting assembly by use of oversize mounting holes.

b. Character Counter Mechanism. Perform adjustments to character counter mechanism in accordance with the following paragraphs.

(1) Ratchet Drum Assembly Return Spring. Adjust as follows:

(a) Refer to figure 6-107.

(b) Use spring scale to measure force required to start indicator moving. When indicator is at 35 on scale, force should be between 1/2 and 1-1/2 ounces. When indicator is at 70, force should be between 1-1/2 and 2-1/2 ounces.

(c) If force does not match requirements, replace spring.

(2) Character Counter End-of-Line Switch. Adjust as follows:

(a) Refer to figure 6-107.

(b) End-of-Line switch should close at a preset number of characters.

(c) Before installing counter on keyboard, tighten clamp screws and switch bracket mounting screws friction tight.

(d) With switch leaf springs approximately parallel to switch mounting bracket, clearance between leaf spring switch contacts should be from 0.005 to 0.020 inch.

(e) To adjust, bend lower leaf spring and position switch bracket until upper switch leaf spring clears low part of cam by some to 0.025 inch (maximum).

(f) Check closest point and tighten mounting screws.

(g) Set indicator to desired count and adjust cam until switch just closes.

(h) Tighten clamp screws.

(i) Recheck by moving ratchet drum until indicator traverses entire scale. Switch should close on desired count, with small amount of overtravel of both blades.

(j) It may be necessary to refine adjustments when operating at extreme ends of 65 to 80 character range.

(3) Antibounce Spring. Adjust as follows:

(a) Refer to figure 6-108.

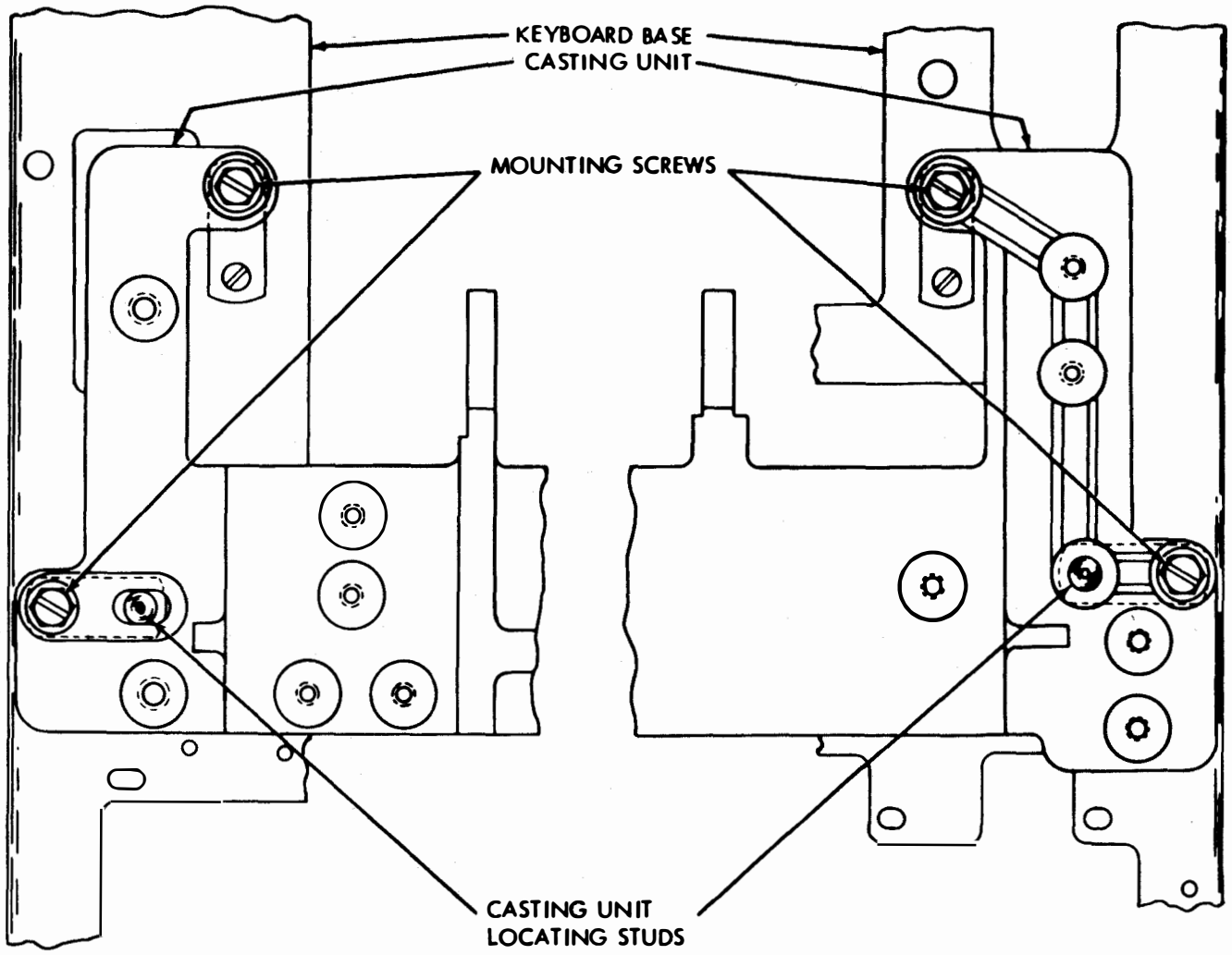


Figure 6-106. Keyboard Base Casting Assembly

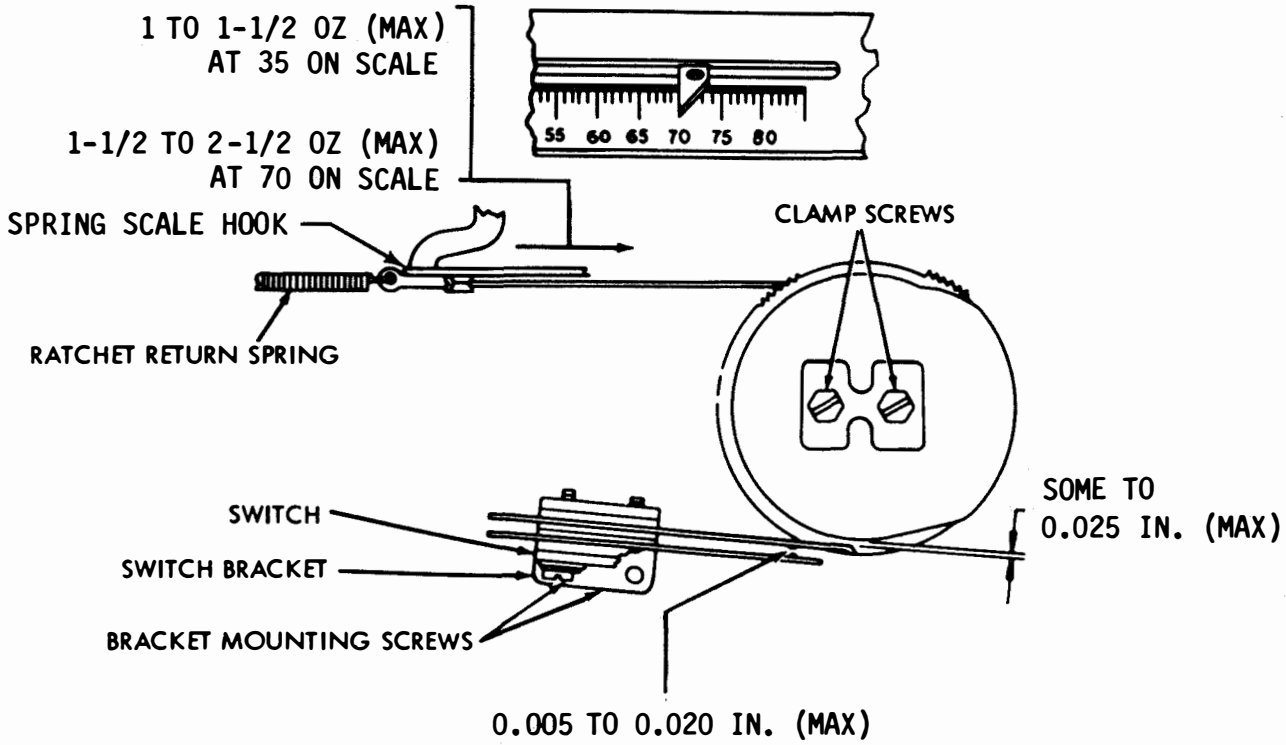


Figure 6-107. Ratchet Drum Assembly Return Spring and Character Counter End-of-Line Switch

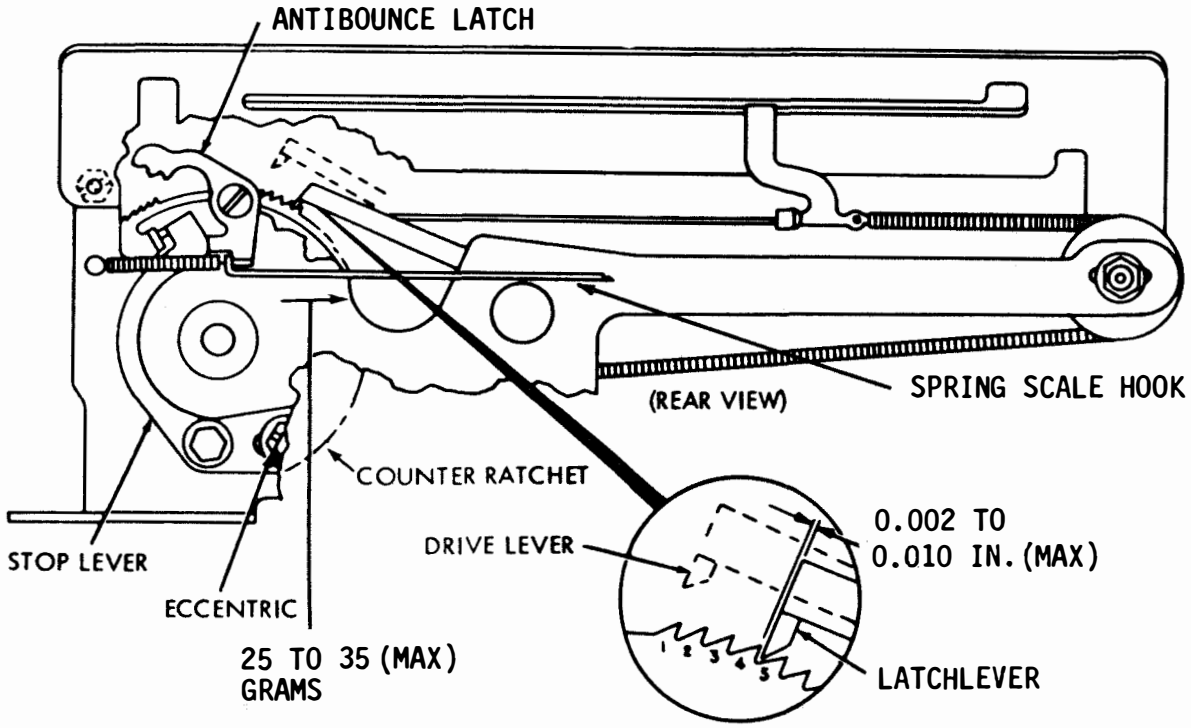


Figure 6-108. Antibounce Spring and Stop Lever

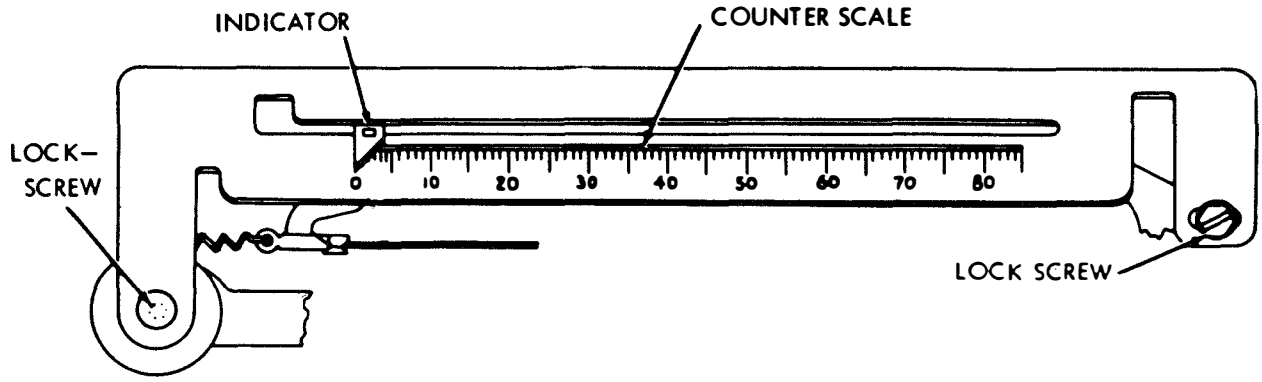


Figure 6-109. Character Counter Scale

(b) Use spring scale to measure force required to pull latch to end of its travel; this should be from 25 to 35 grams.

(c) If force does not match requirement, replace spring.

(4) Stop Lever. Adjust as follows:

(a) Refer to figure 6-108.

(b) With counter ratchet fully returned and resting against stop lever, clearance between latchlever and face of 4th ratchet tooth should be between 0.002 and 0.010 inch.

(c) Antibounce latch should not interfere with ratchet rotation.

(d) To adjust, hold drive lever out of engagement with ratchet and rotate stop lever eccentric.

(5) Character Counter Scale. Adjust as follows:

(a) Refer to figure 6-109.

(b) When indicator is at extreme left of scale, it should point to zero.

(c) Adjust by loosening lock screws and positioning scale; tighten lock screws.

(d) Indicator point should not touch scale at any point during travel.

(e) To adjust, form (bend or adjust) indicator.

(6) Character Counter Stroke. Adjust as follows:

(a) Refer to figure 6-110.

(b) Counter should operate consistently when character and repeat keys are depressed.

(c) Counter should reset without binding when CAR RET key is depressed.

(d) Upon restart after reset, counter mechanism should count first character.

(e) When counter is set near mid-point of range, clearance between drive lever and ratchet tooth should be from 0.006 to 0.015 inch.

(f) To adjust:

1. Loosen mounting screws.

2. With keyboard in T position, start motor and strike CAR RET key; then E key.

3. Turn off motor, and depress E key.

4. Position character counter frame for clearance.

(7) Reset Lever Extension Spring. Adjust as follows:

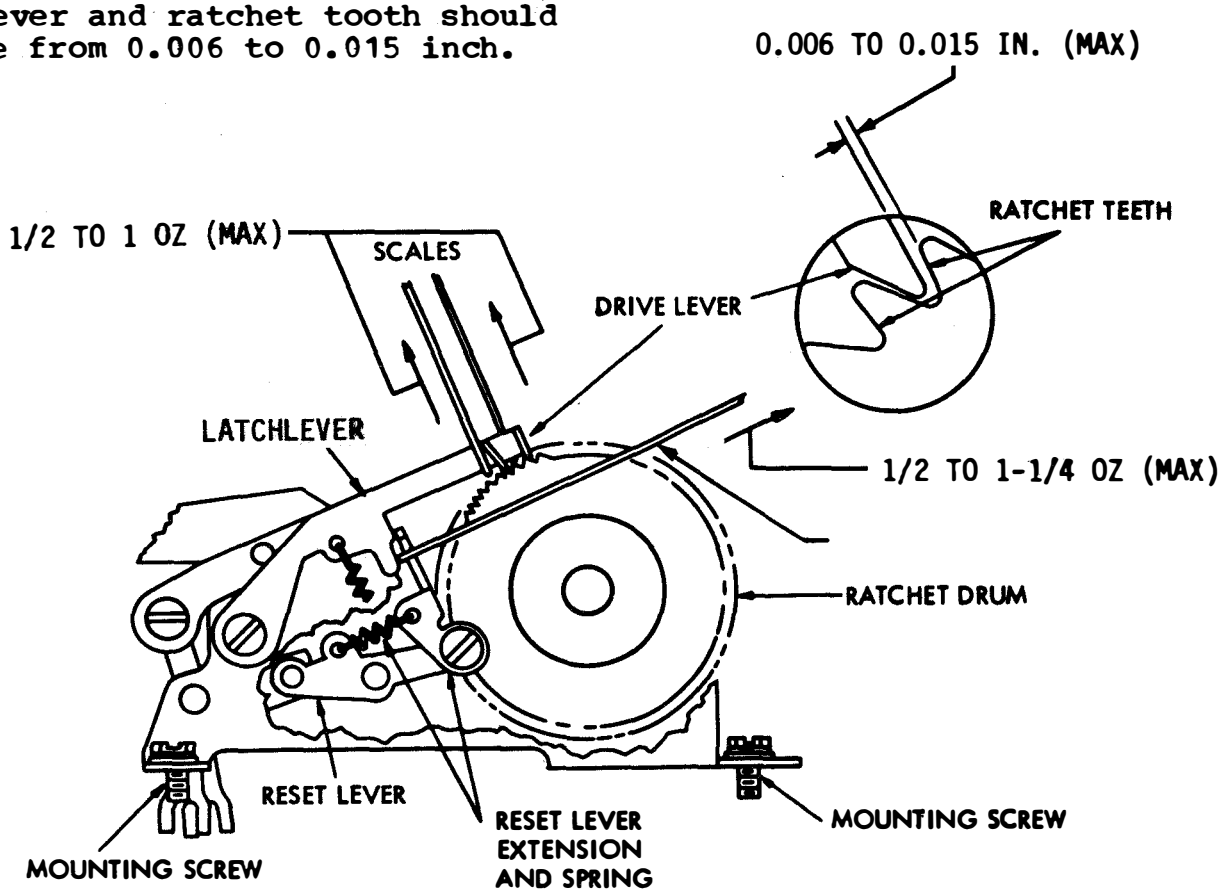


Figure 6-110. Character Counter Storke, Reset Lever Extension Spring, and Latchlever and Drive Spring

(a) Refer to figure 6-110.

(b) With code bars in latched position, use spring scale to measure force necessary to start lever moving: this should be from 1/2 to 1-1/4 ounces.

(c) If force does not match specifications, replace spring.

(8) Latchlever and Drive Spring. Adjust as follows:

(a) Refer to figure 6-110.

(b) Use spring scale to measure force necessary to move either lever: this should be between 1/2 and 1 ounce.

(c) If force does not meet requirements, replace spring.

c. Code Bar, Code Lever, Line Break, and Nonrepeat Mechanisms. Perform code bar, code lever, line break, and non-repeat mechanisms adjustments in accordance with the following paragraphs.

NOTE

Cover must be removed. (See Section V, Assembly and Disassembly.)

(1) Code Bar Guide Clearance. Adjust as follows:

(a) Refer to figure 6-111.

(b) Clutch trip bar, keyboard lock bar, and all code bars shall move freely without binding, at any point of their travel.

(c) There should be some to 0.010 inch maximum clearance between both ends of all code bars and clutch trip bar guides.

(d) To adjust, loosen mounting screws and position guides.

(e) Tighten mounting screws.

(2) Code Lever Universal Bail Spring. Adjust as follows:

(a) Refer to figure 6-111.

(b) With generator clutch disengaged, use spring scale to measure force necessary to start bail moving: this should require from 1 to 3 ounces pressure.

(c) If force does not match requirements, replace spring.

(3) Spacebar Bail Pivot. Adjust as follows:

NOTE

Bail should be so adjusted that spacebar does not bind in guide plate and frame holes.

(a) Refer to figure 6-112.

(b) Spacebar should be free from bind.

(c) There should be some to 0.010 inch maximum end play between bail and pilot screw.

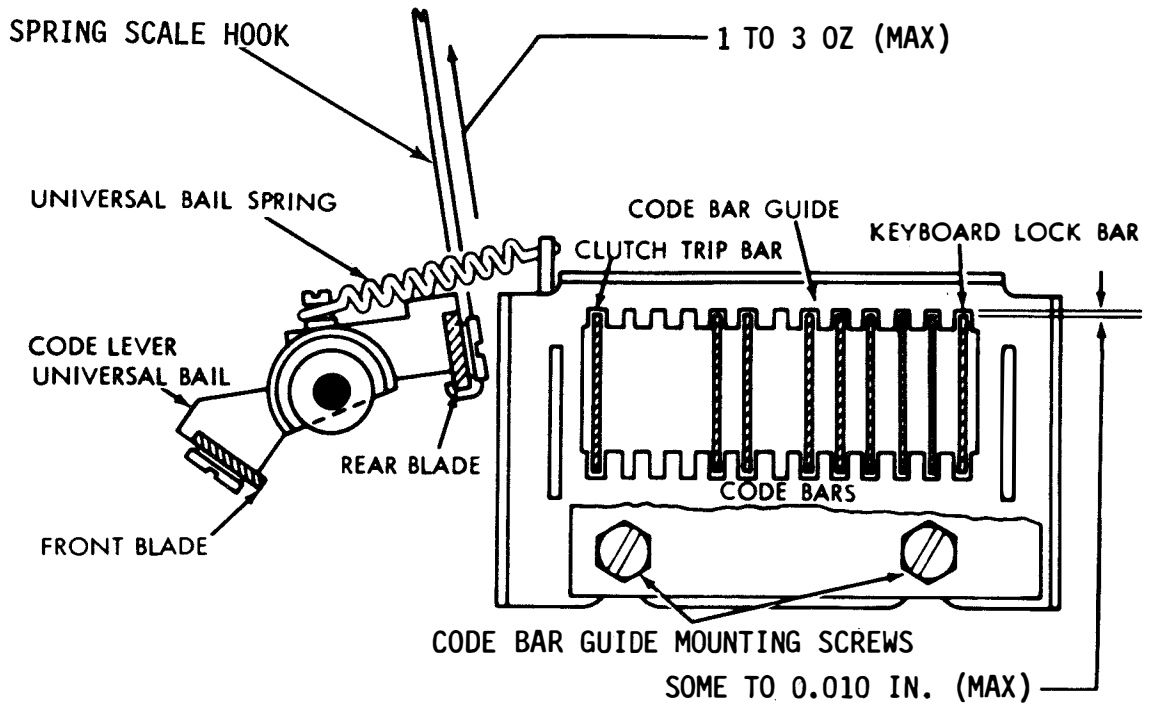


Figure 6-111. Code Bar Guide Clearance and Code Lever Universal Bail Spring

(d) To adjust, position spacebar with pilot screws.

NOTE

If necessary, remove character counter assembly (paragraph 6-9.3d) before making adjustments in paragraph 6-4.1c(4) through (9) below.

(4) Code Bar and Code Lever Clearance. Adjust as follows:

(a) Refer to figure 6-113.

(b) With CAR RET key depressed (but not enough to trip off universal bail latch or clutch bar) there should be from 0.006 to 0.017 inch clearance between code bar and code lever.

(c) Measure at code bar number 3.

(d) To adjust, loosen four mounting screws and position guide.

(e) Tighten screws.

(5) Clutch Trip Bar Spring. Adjust as follows:

(a) Refer to figure 6-113.

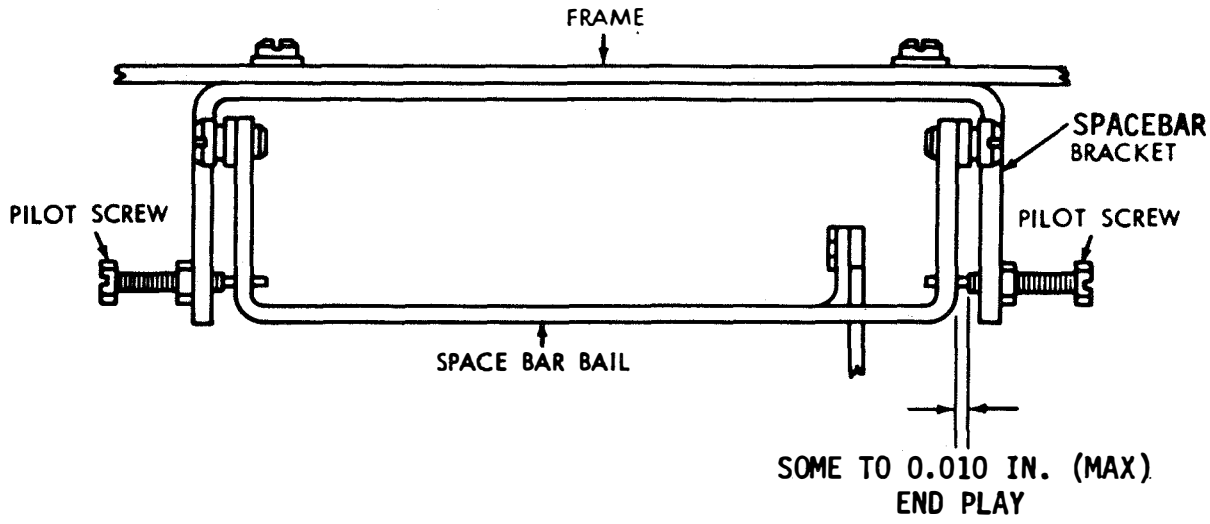


Figure 6-112. Spacebar Bail Pivot

(b) Depress BLANK key so that clutch trip bar falls to right.

(c) Unhook spring from bracket.

(d) Use spring scale to measure force required to pull spring to installed length: this should be from 8 to 12 ounces.

(e) If force does not match requirements, replace spring.

(6) Clutch Trip Bar Spring (Synchronous Pulsed Transmission). Adjust as follows:

(a) Refer to figure 6-113.

(b) Disengage and latch clutch, turn power off, and hold magnet assembly armature away from clutch trip bar.

(c) Use spring scale (push end) to measure force necessary to start tight end of clutch trip bar moving: this should require from 9 to 12 ounces.

(d) If force does not match requirements, replace spring.

NOTE

Hold contact assembly swinger away from universal code bar when measuring spring tension.

(7) Universal Code Bar Spring (Synchronous Pulsed Transmission). Adjust as follows:

(a) Refer to figure 6-113.

(b) Disengage and latch clutch; depress BLANK key to allow universal code bar to fall to right; unhook spring from bracket.

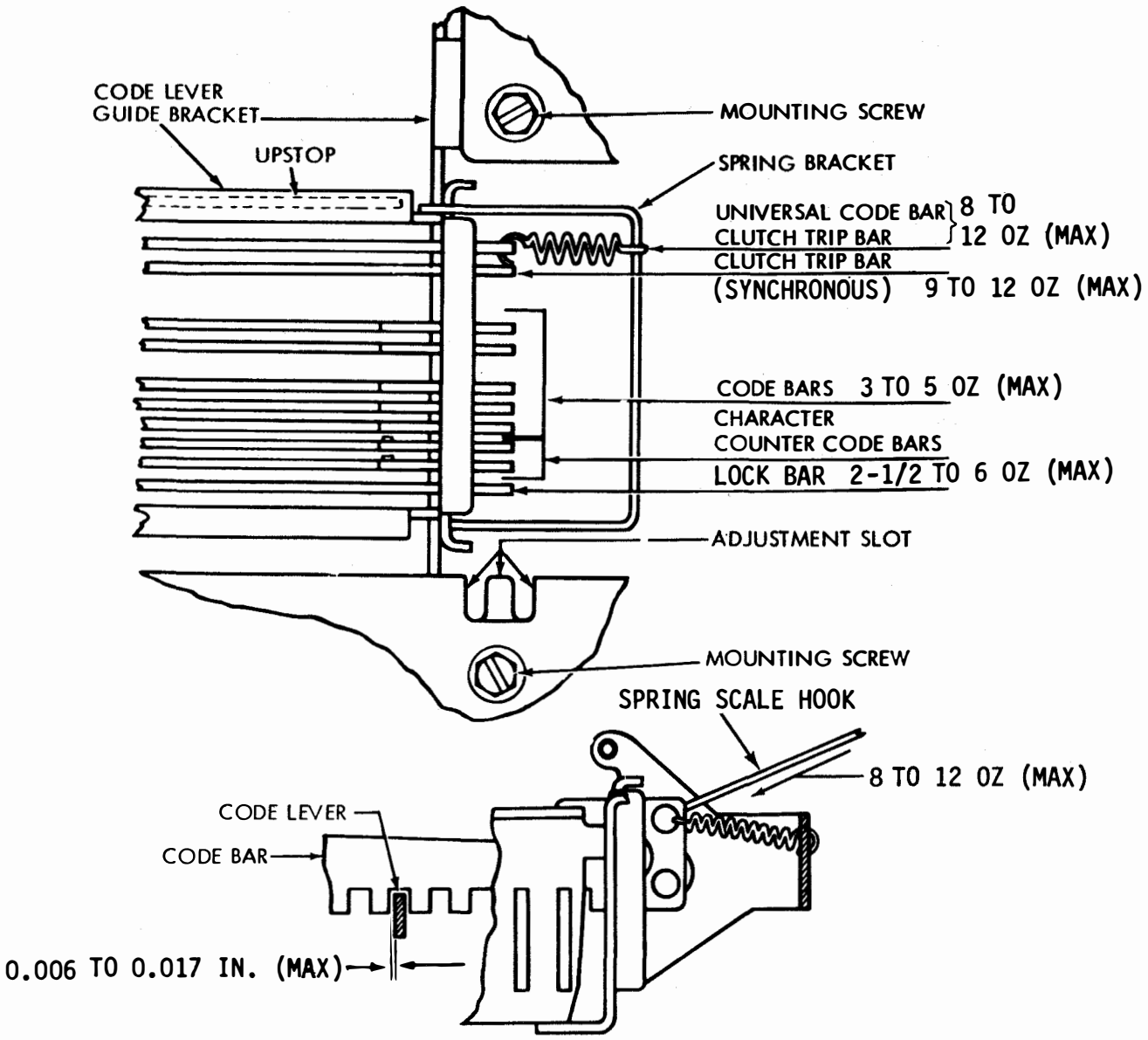


Figure 6-113. Code Bar and Code Lever Clearance Clutch Trip Bar Spring, Universal Code Bar Spring, Code Bar Spring, and Lock Bar Spring

(c) Use spring scale to measure force necessary to pull spring to installed length; this should require from 8 to 12 ounces.

(d) If force does not match requirements, replace spring.

(8) Code Bar Spring. Adjust as follows:

(a) Refer to figure 6-113.

(b) With power off and LETTER keylever depressed, hold transfer levers to the right so that they do not affect code bars.

(c) Use spring scale to measure force necessary to start code bar moving; this should require from 3 to 5 ounces.

(d) If force does not meet requirements, replace spring.

(9) Lock Bar Spring. Adjust as follows:

(a) Refer to figure 6-113.

(b) With clutch disengaged and KEYBOARD LOCK keylever depressed, apply push end of spring scale to right end of lock bar; it should require from 2-1/2 to 6 ounces to start lock bar moving.

(c) If force does not match requirements, replace spring.

(13) Code Bar Reset Bail Latch Spring. Adjust as follows:

(a) Refer to fgiure 6-114.

(b) Use spring scale to measure force necessary to start code bar bail latch moving: this should require from 1/2 ounces (minimum) to 1 1/2 ounces.

(c) If force does not match specifications, replace spring.

(11) Code Bar Reset Bail. Adjust as follows:

(a) Refer to figure 6-114.

(b) With cam eccentric and bail arm in extreme left reset position, clearance between code bar bail roller and code bar bail latch should be from 0.004 to 0.012 inch.

(c) To adjust, loosen locknut and position eccentric stud so that high point is in upper half of arc.

(d) Tighten locknut.

(12) Nonrepeat Lever Spring. Adjust as follows:

(a) Refer to figure 6-115.

(b) With any keylever depressed, use spring scale to measure force necessary to start nonrepeat lever moving downward: this should require from 2 to 3-1/2 ounces.

(c) If force does not match requirement, replace spring.

(10) Code Bar Reset Bail and Nonrepeat Lever Clearance. Adjust as follows:

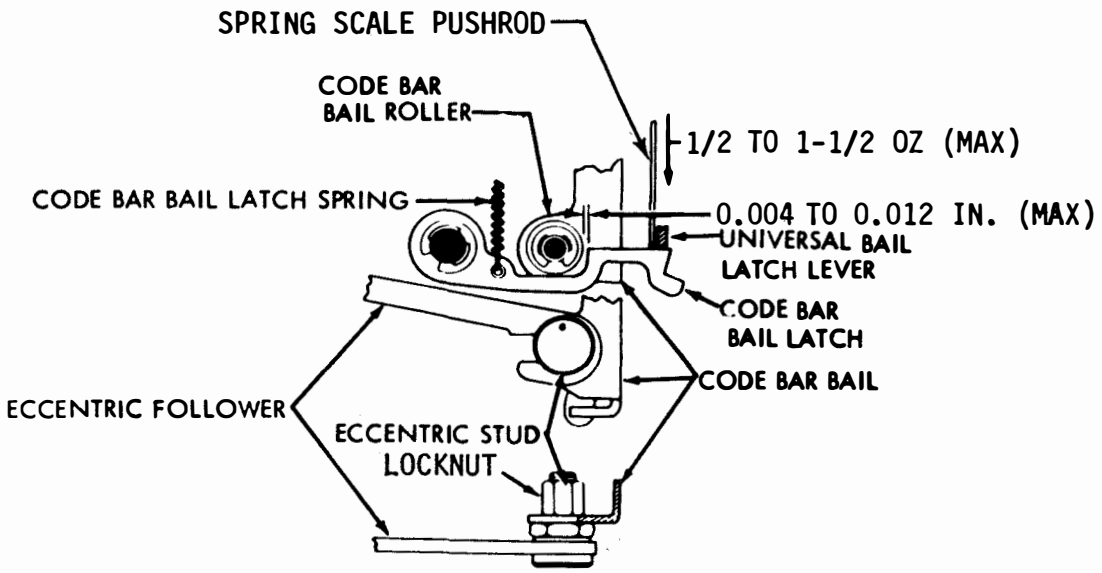


Figure 6-114. Code Bar Reset Bail Latch Spring and Code Bar Reset Bail

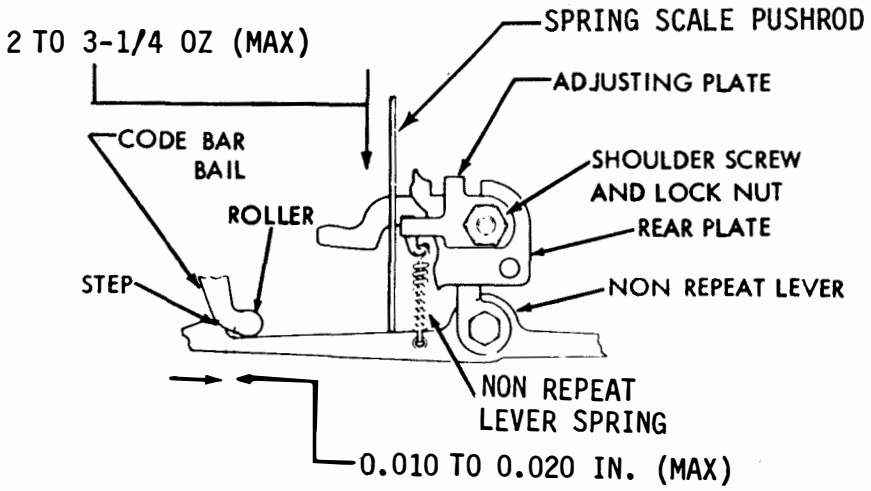


Figure 6-115. Nonrepeat Lever Spring and Code Bar Reset Bail and Nonrepeat Lever Clearance

(a) Refer to figure 6-115.

(b) With power off, mechanism in initial trip-off position, and any key depressed, clearance between code bar bail roller and non-repeat lever pick-up step should be from 0.010 to 0.020 inch.

(c) To adjust, loosen locknut and shoulder screw, and move mechanism left or right.

(d) Tighten locknut and shoulder screw.

(14) Code Bar Reset Bail Spring. Adjust as follows:

(a) Refer to figure 6-116.

(b) With clutch disengaged and spring unhooked from arm, use spring scale to measure force necessary to pull spring to installed length: this should require from 9 to 11 ounces.

(c) If force does not match requirements, replace spring.

(14) Line Break Lever Spring. Adjust as follows:

(a) Refer to figure 6-117.

(b) Use push end of spring scale to check combined action of code lever spring and break lever spring: it should require from 3 to 4 ounces to move switch break lever into contact with switch plunger, and from 6 to 8 ounces to actuate sensitive switch.

(16) Code Lever Spring. Adjust as follows:

(a) Refer to figure 6-118.

(b) Use spring scale to measure force necessary to start code lever moving downward: this should require from 1 to 2 ounces.

(c) With power on and generator clutch disengaged, it should require from 3 to 5 ounces to operate keylever or spacebar.

(d) If force does not match either requirement, replace spring.

d. Function Bail and Lock Ball Mechanism. Perform function bail and lock ball mechanism adjustments in accordance with the following paragraphs.

(1) Function Bail and Code Lever Clearance. Adjust as follows:

(a) Refer to figure 6-119.

(b) There should be 0.015 inch (minimum) clearance between any function bail and its adjacent code lever.

(c) To adjust, loosen mounting screws and casting unit locating studs, and position function bail assembly.

(d) Tighten screws and studs.

(2) Lock Ball Channel (Preliminary). Adjust as follows:

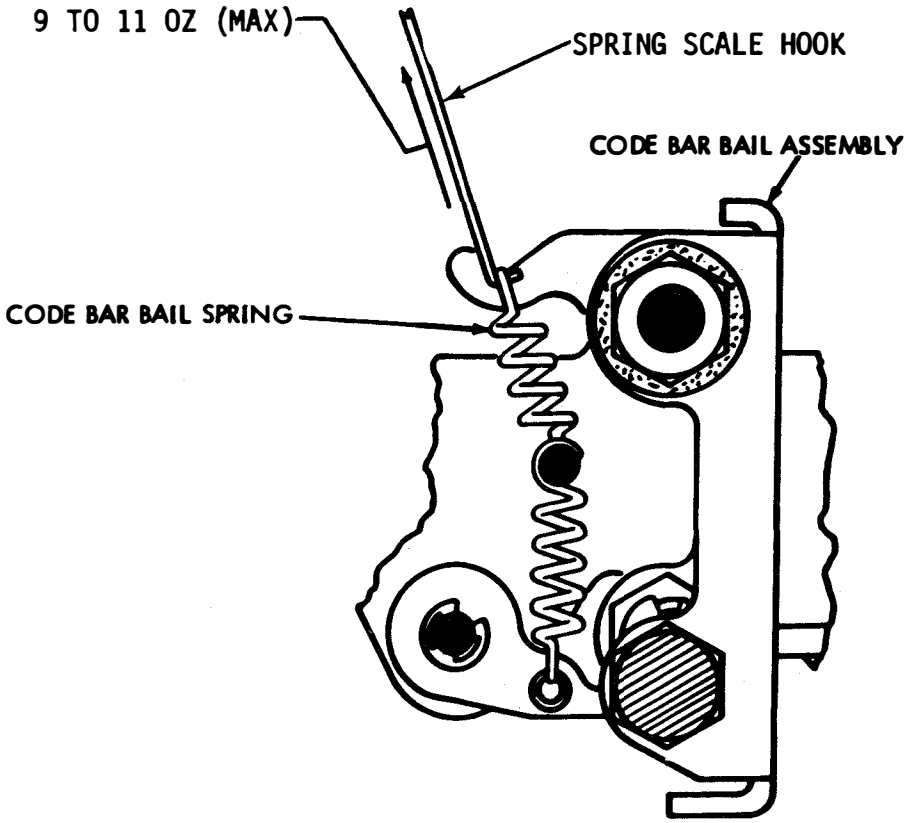


Figure 6-116. Code Bar Reset Bail Spring

NOTE

This adjustment should not be made unless lock ball channel has been disassembled.

(a) Refer to figure 6-120.

(b) Remove lock ball retainer.

(c) Remove one wedge from each end and from center to view code lever position; there should be some clearance, not to exceed 0.006 inch, between end of lock ball channel and adjusting screw when most code levers are centrally located in lock ball channel slots.

NOTE

A total of 43 balls are required in ball track assembly.

(d) To adjust, loosen lock ball channel mounting screws; back off lateral adjusting screws and position channel; turn one adjusting screw in against end of channel and lock it; turn other adjusting screw in to end of channel and back it off 1/4 turn; lock the screw; replace

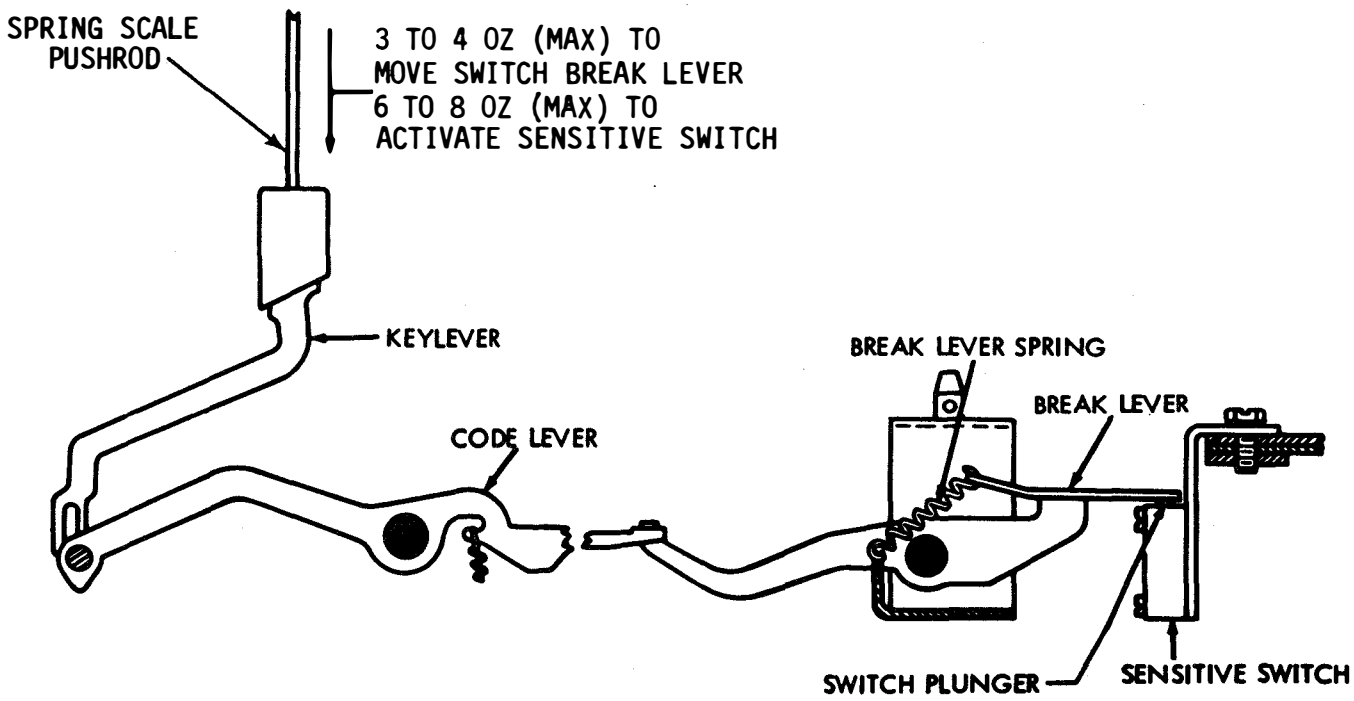


Figure 6-117. Line Break Lever Spring

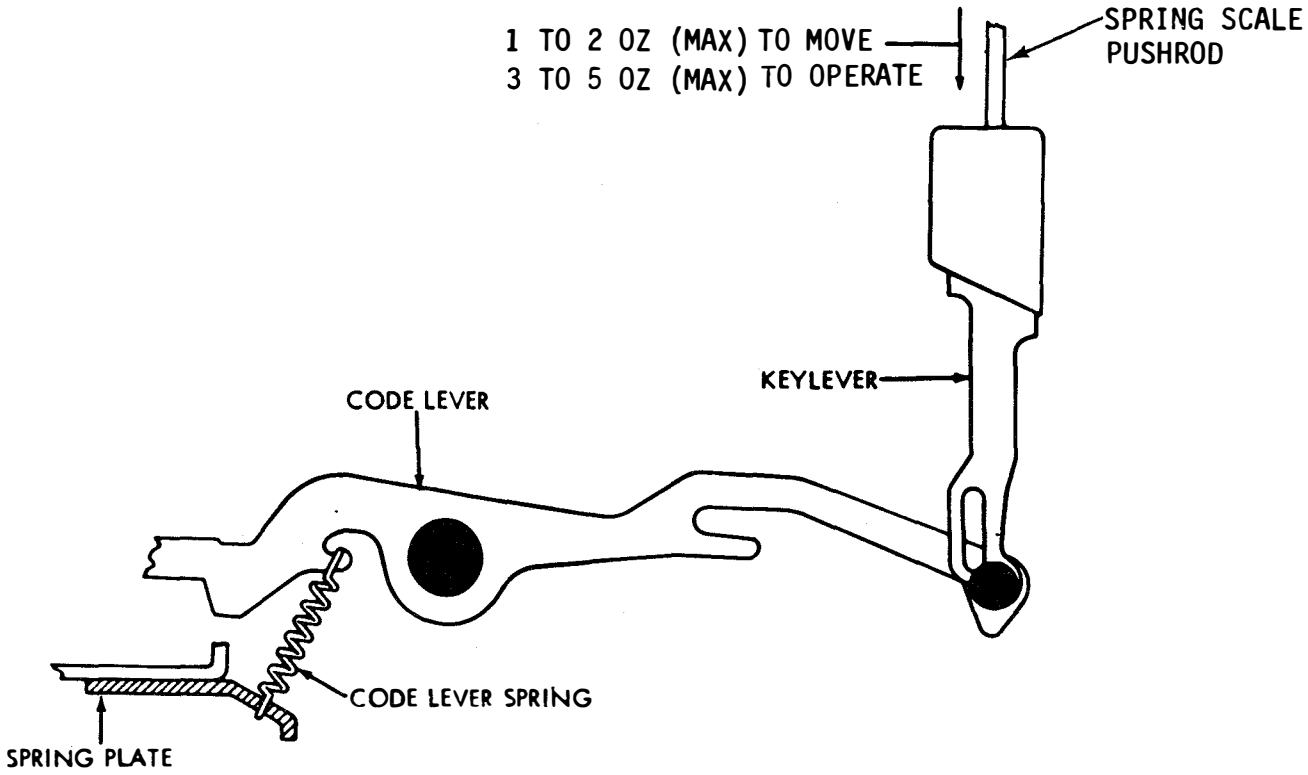


Figure 6-118. Code Lever Spring

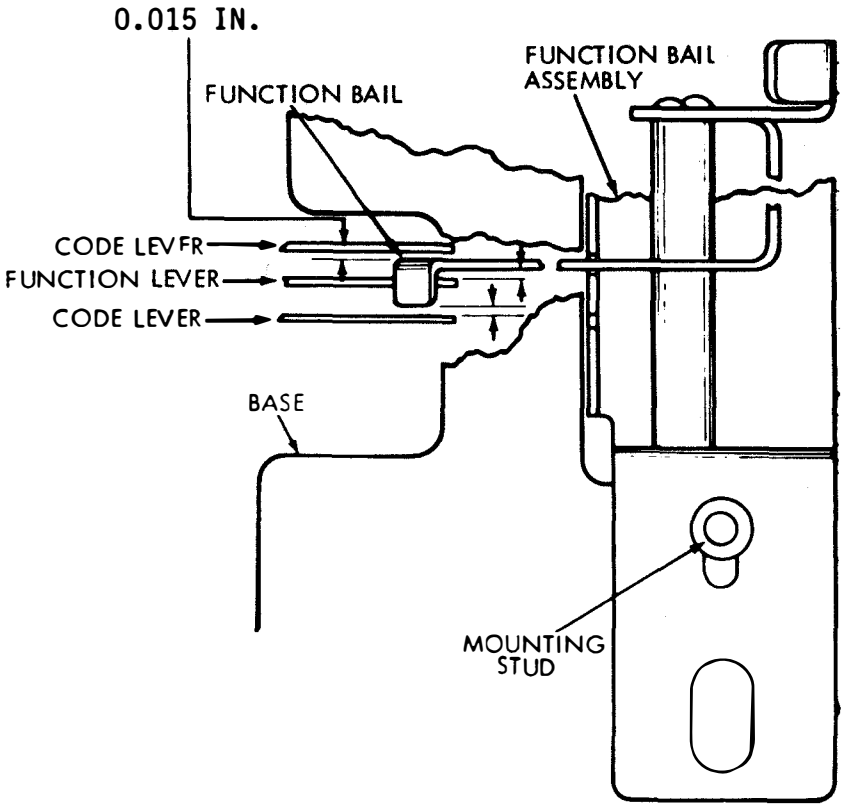


Figure 6-119. Function Bail and Code Lever Clearance

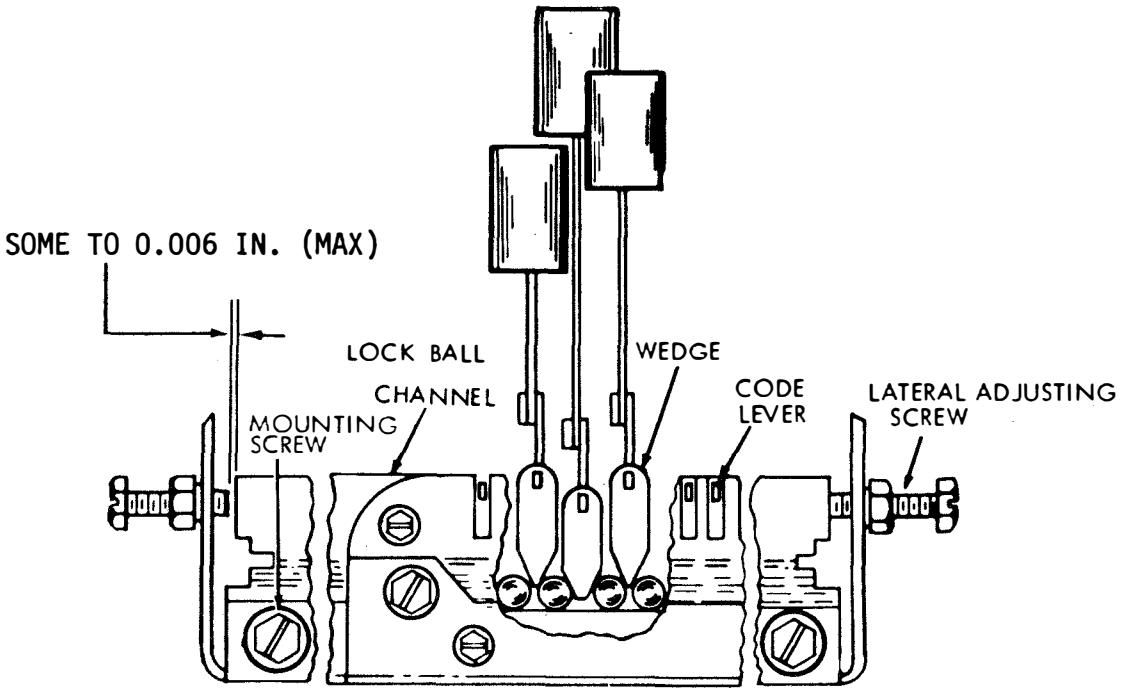


Figure 6-120. Lock Ball Channel Preliminary

wedges and check position with respect to balls; pull channel assembly downward until all code levers strike upstop without wedges jumping out of position; replace lock ball retainer back off ball-end-play adjusting screw.

e. Gear Mechanism. Perform gear mechanism adjustments in accordance with the following paragraphs.

(1) Intermediate Gear Bracket. Adjust as follows:

(a) Refer to figure 6-121.

(b) There should be barely perceptible backlash between casting assembly main shaft driven gear and casting assembly main shaft driving gear at their closest point.

(c) To adjust, loosen three hexagon head screws and position complete intermediate gear mechanim bracket by utilizing adjusting slots. Align gears at this time.

(d) There should be barely peceptible backlash between intermediate driving gear and intermediate driven gear at point where backlash is least.

(e) To adjust, raise or lower front end of intermediate gear bracket by means of filister head adjusting

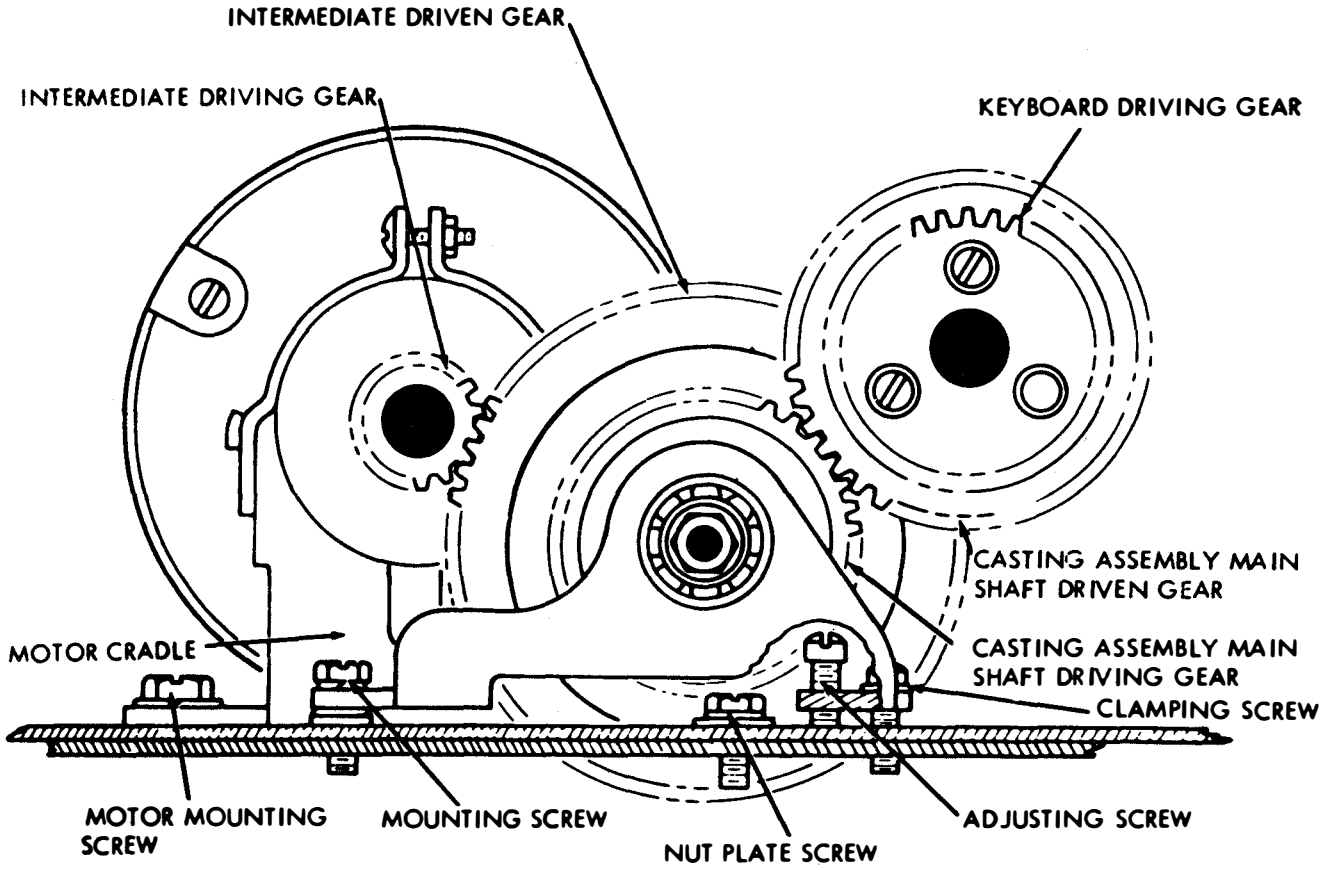


Figure 6-121. Intermediate Gear Bracket

and clamping screws located at front end of bracket. Refine requirements if necessary.

(2) Signal Generator Shaft Gear Mesh. Adjust as follows:

(a) Refer to figure 6-122.

(b) There should be barely perceptible backlash between signal generator shaft gear and driving gear at closest point.

(c) To adjust, remove signal generator and add or subtract shims at rear generator mount to obtain proper clearance.

(3) Typing Reperforator Shaft Gear Mesh. Adjust as follows:

(a) Refer to figure 6-123.

(b) Center gear on typing reperforator main shaft with gear on the casting assembly shaft.

(c) To adjust, loosen mounting screws and position typing reperforator in over size mounting holes. Adjust hub on reperforator.

f. Lock Ball Mechanism. Perform lock ball mechanism adjustments in accordance with the following paragraphs.

NOTE

When gauging these clearances make sure there is no clearance between lower edge of code lever extensions and bottom of slots in wedges. A total of 43 balls are required in ball track assembly.

(1) Ball Wedgelock and Ball Track Clearance (Preliminary). Adjust as follows:

(a) Refer to figure 6-124.

(b) Back off adjustment screw to permit maximum ball movement without balls rolling out of track.

(c) With 32 ounces pressure applied to "Q" or "P" keylever, there should be from 0.005 to 0.015 inch clearance, equal within 0.005 inch, between top of wedgelock and ball track.

(d) To adjust, loosen mounting screws at end of ball track and adjust track up or down.

(2) Lock Ball End Play (Preliminary). Adjust as follows:

(a) Refer to figure 6-125.

(b) With 32 ounces pressure applied to carriage return key, balls should have minimum clearance.

(c) To adjust, turn in ball end play adjustment screw until resistance is felt.

(d) Tighten nut on adjustment screw.

(3) Ball Wedgelock, Ball Track, and Lock Ball End Play (All Final). Adjust as follows:

(a) Refer to figure 6-126.

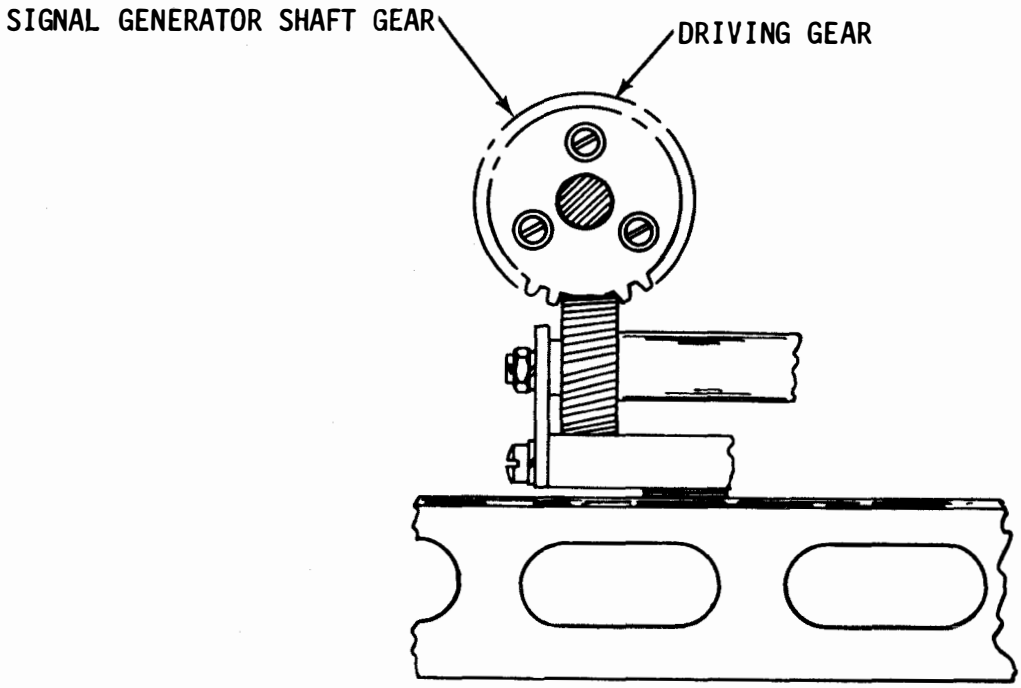


Figure 6-122. Signal Generator Shaft Gear Mesh

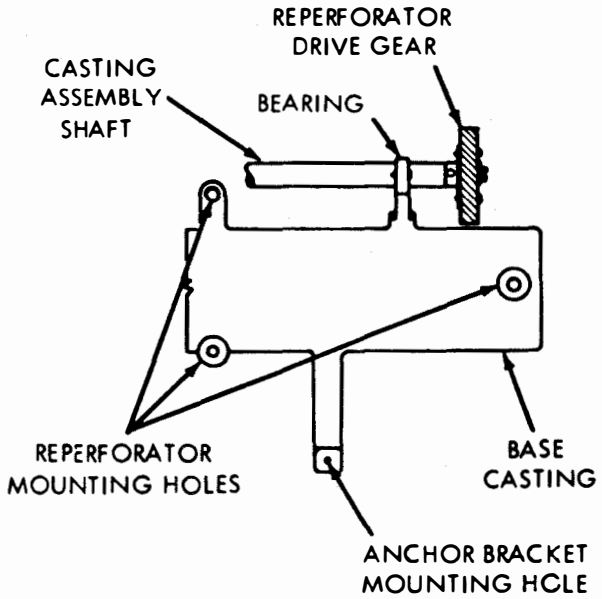


Figure 6-123. Typing Reperforator Shaft Gear Mesh

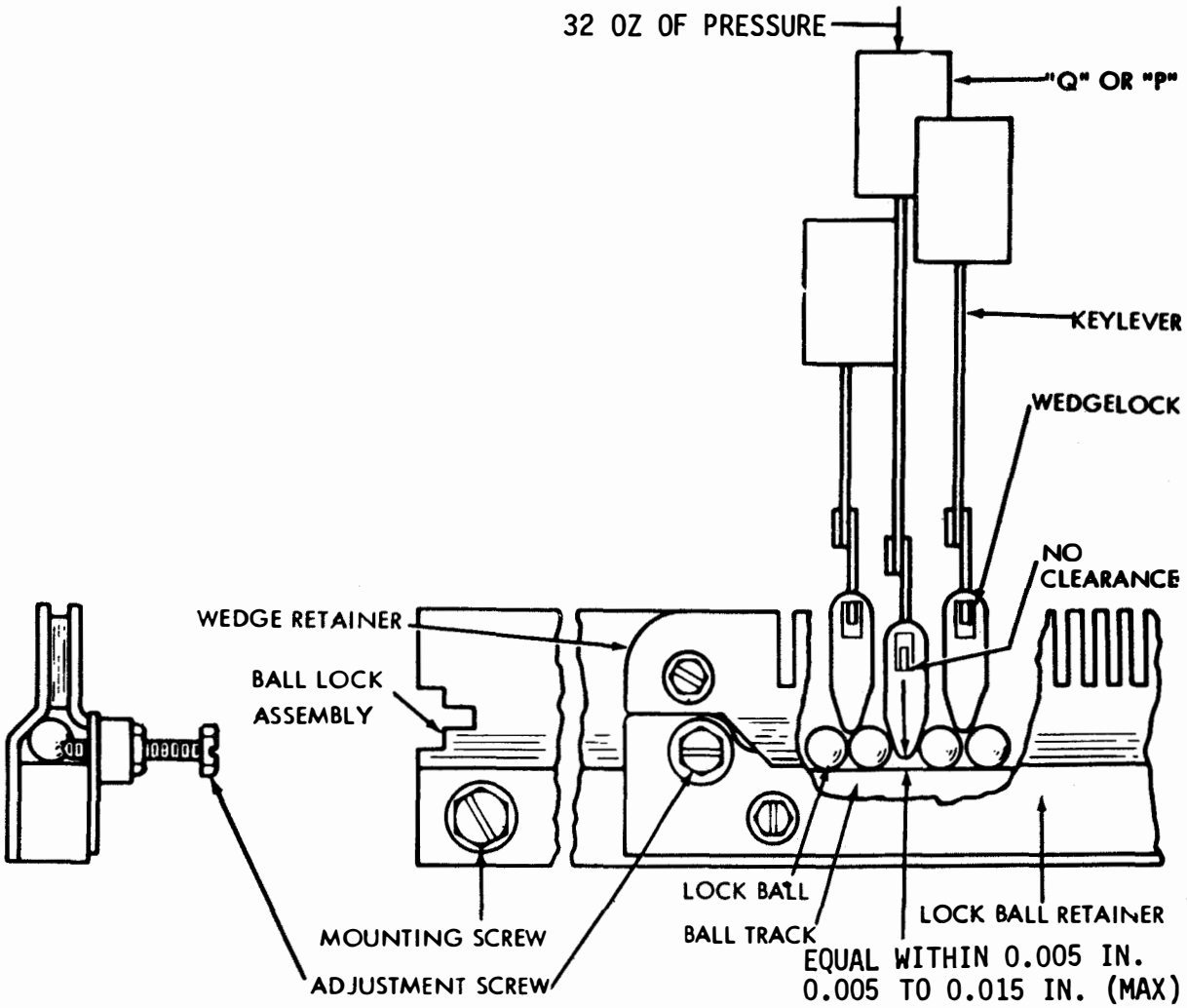


Figure 6-124. Ball Wedgelock and Ball Track Clearance (Preliminary)

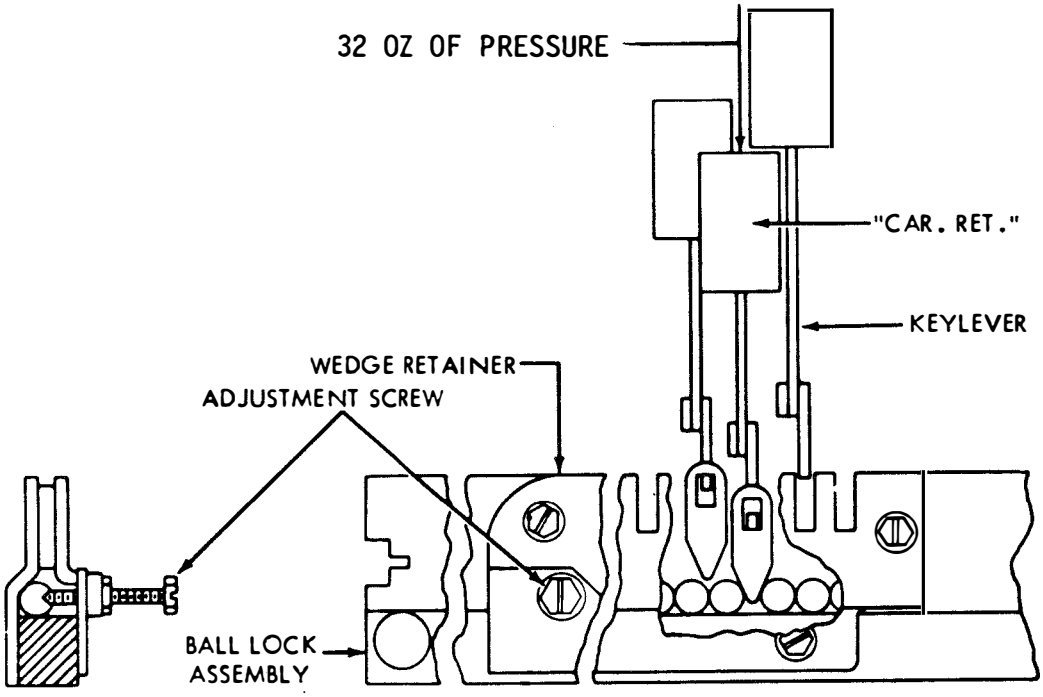


Figure 6-125. Lock Ball End Play (Preliminary)

(b) Pun check under power.

(c) Force necessary to trip any center row key should be from 2 to 6 ounces.

(d) Maintaining 6-1/2 ounces pressure on the "A" key, depress each key in the third row; the "A" key should trip each time a third row key is released.

(e) Repeat step (d) with the 6-1/2 ounces pressure maintained on the "CAR RET" key.

(f) Clutch should not trip when any two keys are depressed simultaneously.

NOTE

Disregard step (g) when unit is equipped with repeat-space feature.

(g) Apply 5-1/4 ounces, ±1/4 ounce, pressure to spacebar and depress CAR RET key; spacebar shall trip each time CAP RET key is released by moving finger off key horizontally.

(h) To adjust: If necessary, refine adjustments in paragraphs 6-4.1f(1) and (2) above, Universal Bail Latchlever (paragraph 6-4.2g(1)), and recheck Universal Bail Extension (paragraph 6-4.2g(3)).

g. Low Tape Mechanism Switch. Perform low tape mechanism switch adjustment in accordance with the following paragraph.

(1) Refer to figure 6-127.

(2) Switch should operate when tape roll diameter is between 2-5/8 and 2-3/8 inches.

(3) To adjust, loosen mounting screws and position switch assembly.

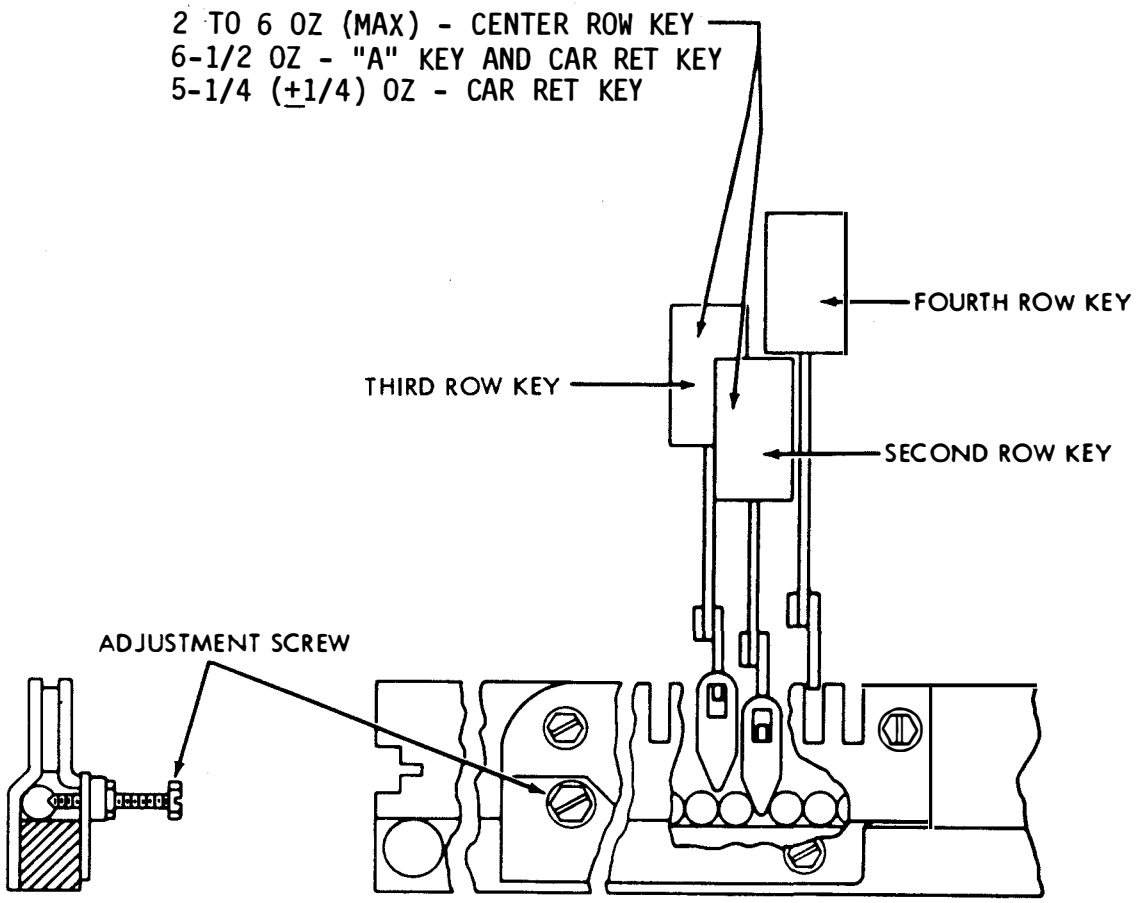


Figure 6-126. Ball Wedgelock, Ball Track, and Lock Ball End Play (All Final)

(4) Check with test lamp.

(5) Tighten mounting screws.

h. Repeat-on-Space Mechanism. Perform repeat-on-space mechanism adjustments in accordance with the following paragraphs.

(1) Space Bar. Adjust as follows:

(a) Refer to figure 6-128.

(b) Normal key top pressure should transmit single space.

(c) Sustained key top pressure should effect continuous space transmission. Adjust spacebar by performing adjustments (2), (3), and (4), immediately following.

(2) Space-Repeat Lever Spring. Adjust as follows:

(a) Refer to figure 6-128.

(b) With spring unhooked, use spring scale to measure force necessary to stretch spring to installed length; this should require from 13-1/2 to 16-1/2 ounces.

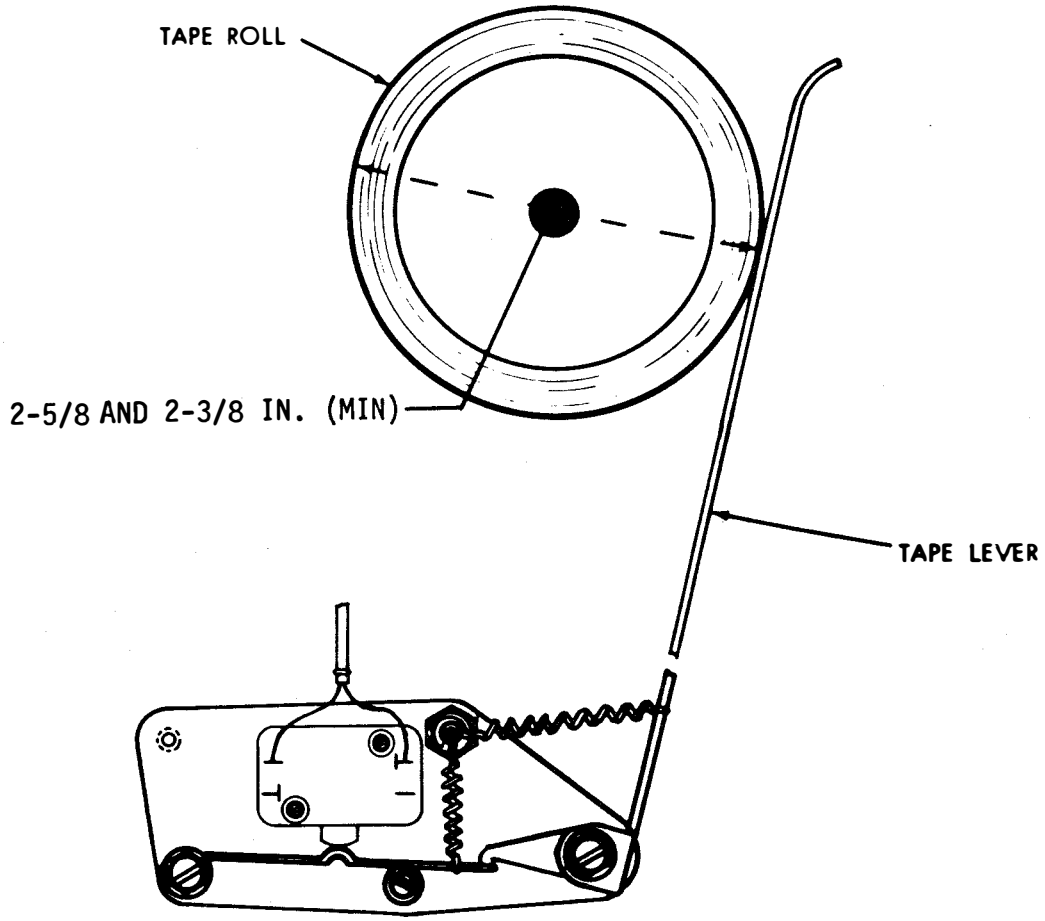


Figure 6-127. Low Tape Mechanism Switch

(c) If force does not match specifications, replace spring.

(3) Stop. Adjust as follows:

(a) Refer to figure 6-128.

(b) There should be from 0.002 to 0.020 inch clearance between space-repeat and nonrepeat levers.

(c) To adjust:

1. Trip keyboard clutch by depressing "G" keylever.

2. Loosen stop locknut and position stop.

3. Re-check and tighten locknut.

(4) Travel Screw. Adjust as follows:

(a) Refer to figure 6-128.

(b) With SPACE key fully depressed, there should be 0.035 to 0.080 inch clearance between reset bail roller and nonrepeat lever.

(c) To adjust, depress SPACE key, loosen travel

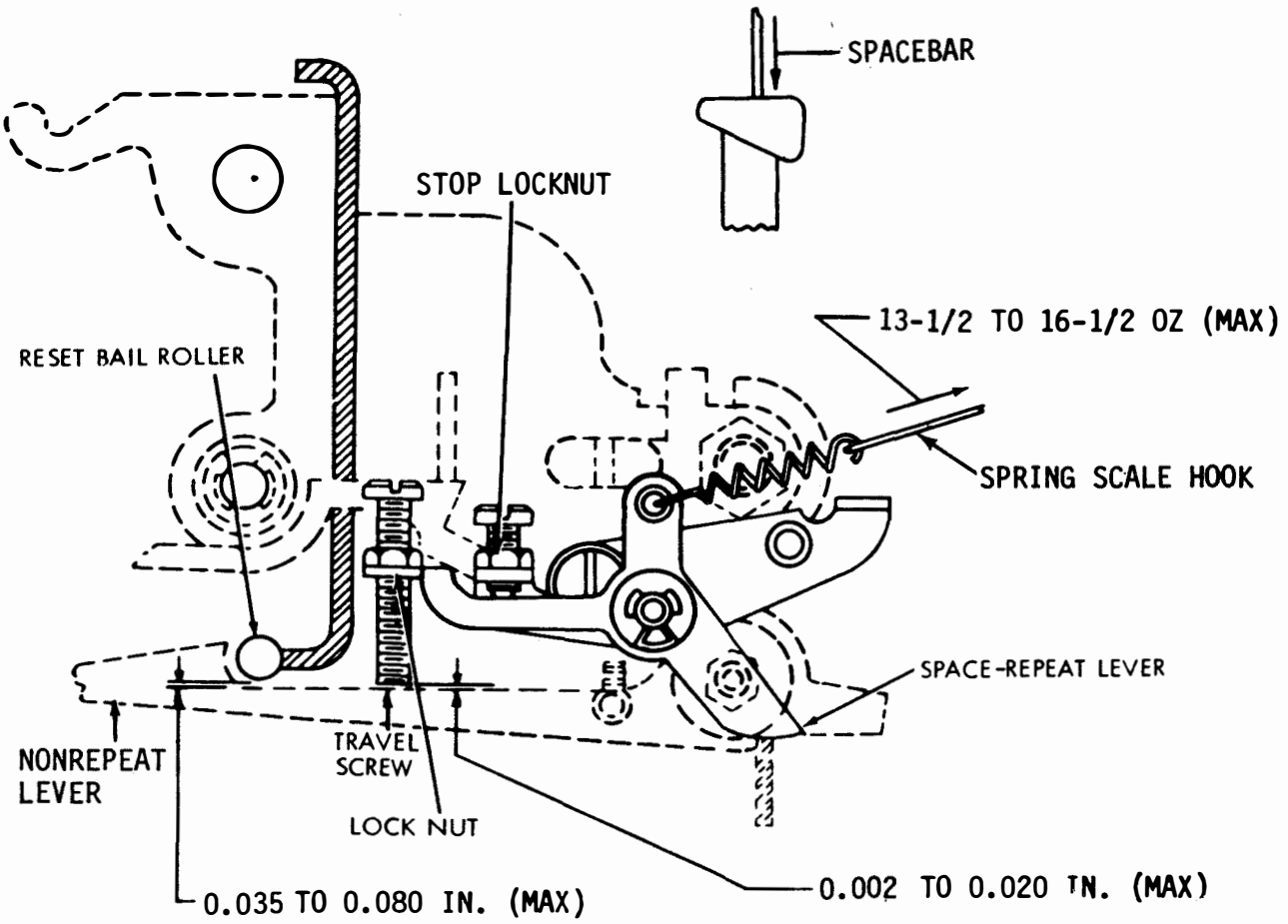


Figure 6-128. Spacebar, Space-Repeat Lever Spring, Stop and Travel Screw

screw locknut. Adjust travel screw and recheck.

(d) Tighten locknut.

6-4.2 SIGNAL GENERATOR MECHANISM (HIGH-LEVEL). Perform the following procedures to ensure proper adjustments of signal generator mechanism.

a. Clutch Mechanism. Perform clutch mechanism adjustments in accordance with the following paragraphs.

(1) Clutch Shoe Lever. Adjust as follows:

(a) Refer to figure 6-129.

(b) Latch clutch in disengaged position and measure clearance between clutch shoe lever and clutch disc stop lug.

(c) Rotate gear until oil hole is upward.

(d) Engage clutch and remeasure clearance (as in step (b)).

(e) Disengaged clearance (step (b)) should be from 0.055 inch to 0.085 inch less than engaged clearance (step (d)).

(f) Loosen adjusting disc clamp screws and position disc.

(2) Clutch Stop Lever. Adjust as follows:

(a) Refer to figure 6-130.

(b) Stop lever should engage shoe lever fully, and should not touch clutch drum at any point during rotation.

(c) To adjust, loosen clamp screw and position stop lever.

(d) Tighten clamp screw.

(3) Clutch Stop Lever Spring. Adjust as follows:

(a) Refer to figure 6-130.

(b) Engage clutch and rotate 1/4 turn.

(c) Use spring scale to measure force necessary to start lever moving; this should require from 2 to 3 ounces.

(d) If force does not match requirements, replace spring.

(4) Clutch Latch Lever Spring. Adjust as follows:

(a) Refer to figure 6-131.

(b) With clutch latchlever resting on highest point of clutch disc, use spring scale to measure force necessary to start latch lever moving; this should require from 2 to 3 ounces.

(c) If force does not match specifications, replace spring.

(5) Clutch Shoe Lever Spring. Adjust as follows:

(a) Refer to figure 6-132.

(b) Engage clutch and hold cam disc to prevent turning.

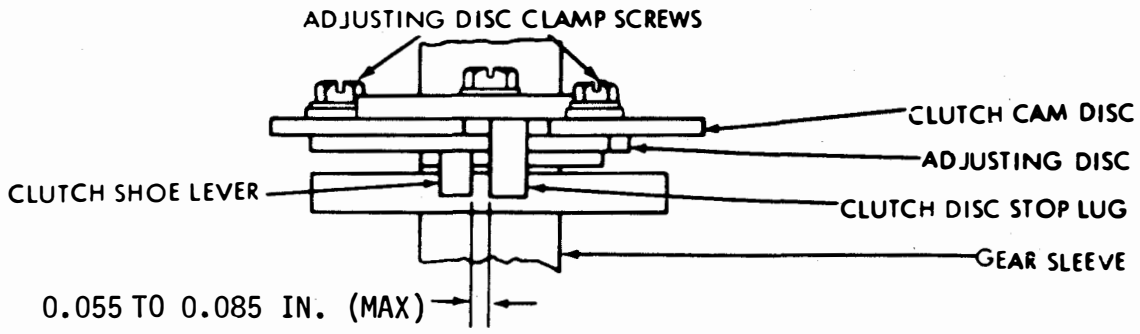


Figure 6-129. Clutch Shoe Lever - Top View

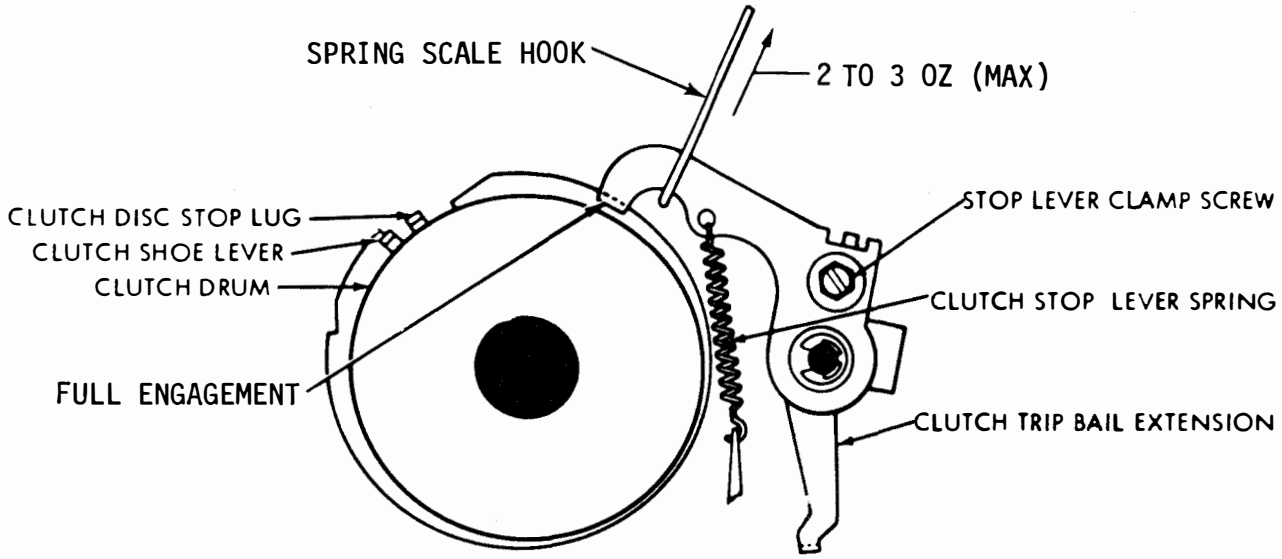


Figure 6-130. Clutch Stop Lever and Clutch Stop Lever Spring

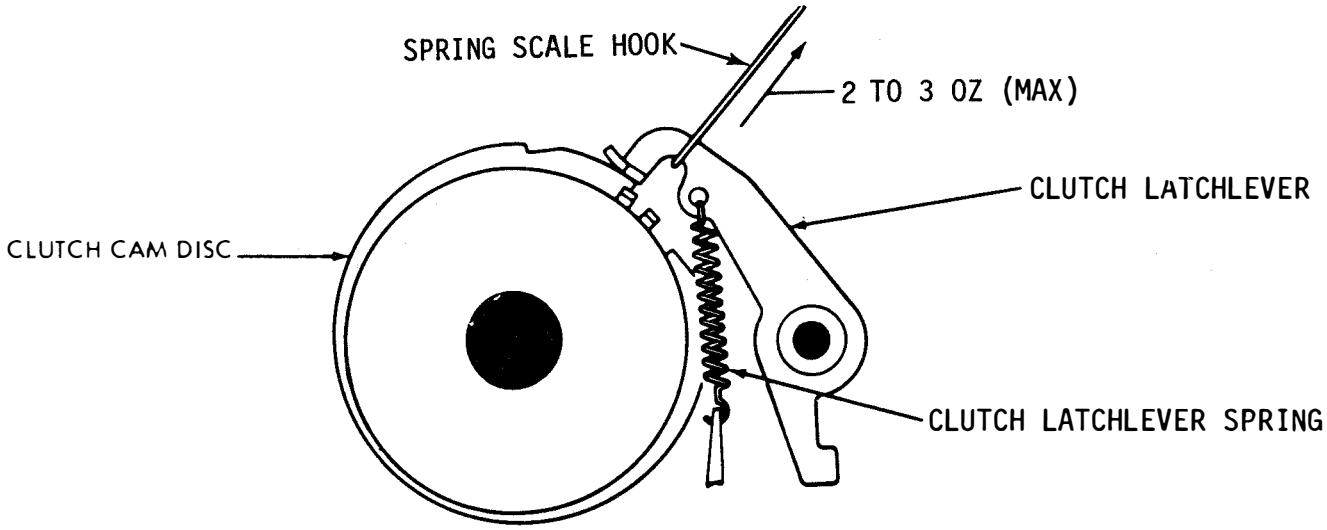


Figure 6-131. Clutch Latchlever Spring

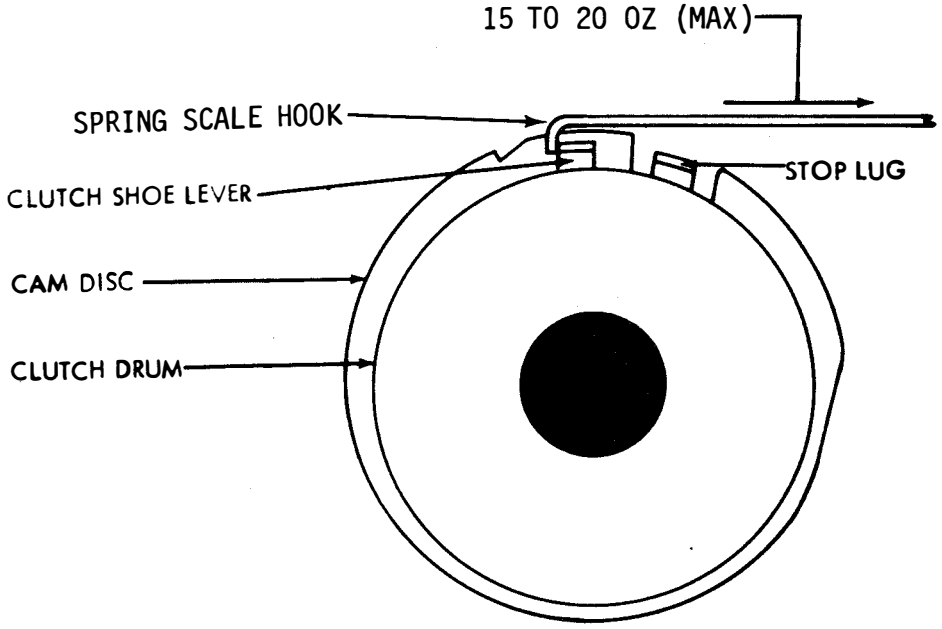


Figure 6-132. Clutch Shoe Lever Spring

(c) Use spring scale to measure force necessary to move shoe lever into contact with stop lug; this should require from 15 to 20 ounces.

(d) If force does not match requirements, replace spring.

(6) Clutch Shoe Spring. Adjust as follows:

(a) Refer to figure 6-133.

NOTE

In order to check this spring tension, it is necessary to remove clutch from main signal generator drive shaft. Therefore, it should not be checked unless there is good reason to believe that it does not meet requirement.

(b) With clutch drum removed, use spring scale to measure force necessary to start primary shoe moving away from secondary shoe; this should require from 3 to 5 ounces

(c) If force does not match requirements, replace spring.

b. Contact Box Mechanism. Perform contact box mechanism adjustments in accordance with the following paragraphs.

CAUTION

On units so equipped, clean gold contacts by pulling twill jean half way through closed contacts. Open contacts and remove twill jean. Use no other cleaning or burnishing methods. Avoid pitting or chipping contacts.

(1) Contact Box Clearance. Adjust as follows:

(a) Refer to figure 6-134.

(b) Depress "Y" keylever and rotate signal generator cam sleeve until each contact has fully opened.

(c) Marking and spacing gaps should be equal within 0.001 inch.

NOTE

Check by means of signal checking device where possible, and carefully refine adjustment to eliminate all bias from signals by equalizing current-on and current-off intervals.

(d) To adjust, loosen mounting screws and move contact box by means of eccentric.

(e) Tighten mounting screws.

(2) Contact Box Spring. Adjust as follows:

(a) Refer to figure 6-134.

(b) With transfer bail held clear of drive link, use spring scale to measure force necessary to start link moving; this should require from 2 to 3 ounces.

(c) If force does not match requirements, replace spring.

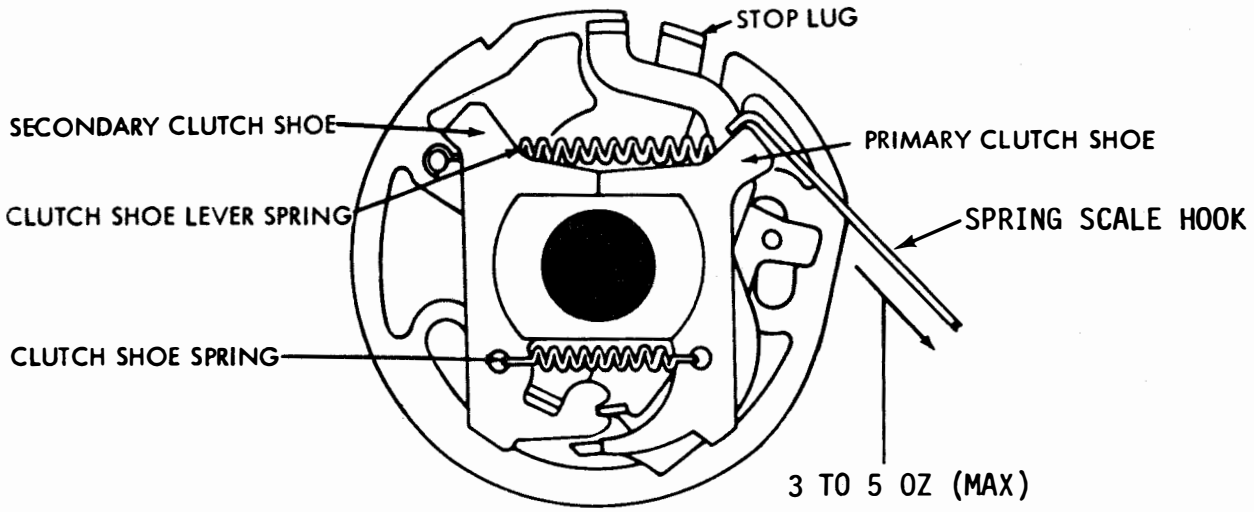


Figure 6-133. Clutch Shoe Spring

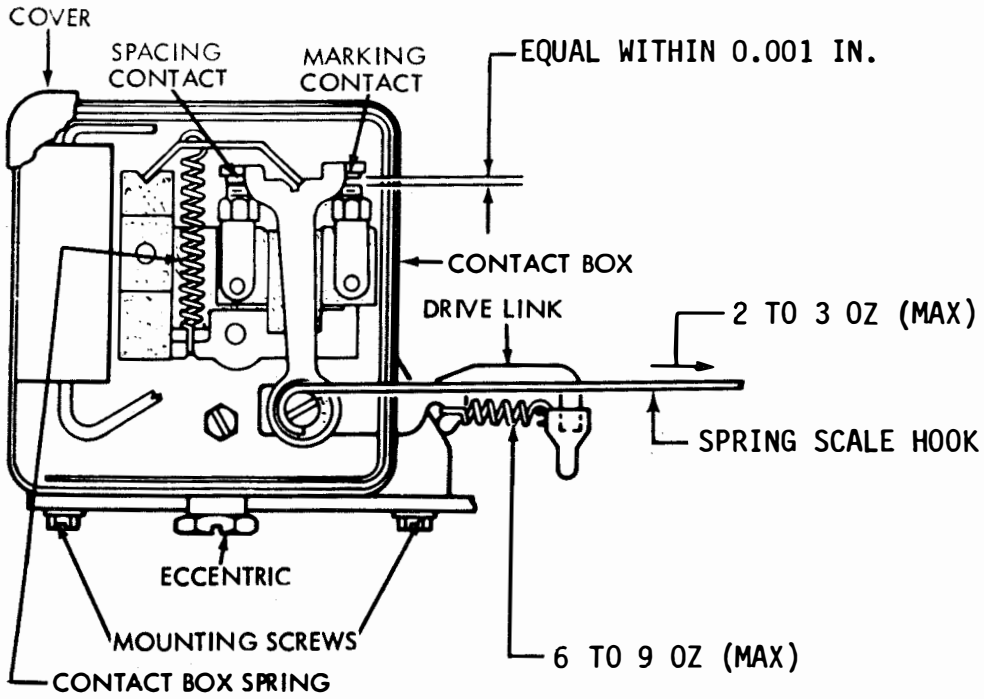


Figure 6-134. Contact Box Clearance, Contact Box Spring, and Contact Box Drive Link Spring

(3) Contact Box Drive Link Spring. Adjust as follows:

(a) Refer to figure 6-134.

(b) With main shaft in stop position and transfer bail detent latch spring unhooked, move latches away from tranfer bail extension.

(c) Hold toggle firmly against contacts.

(d) Use spring scale to measure force necessary to start transfer bail extension moving; this should require 6 to 9 ounces.

(e) If force does not match requirements, replace spring.

(4) Signal Contact Clearance. Adjust as follows:

CAUTION

For units equipped with signal regenerators, move regenerator circuit card before applying test set probes to signal contacts. Applying operating voltage of standard Distortion Test Set directly to contacts may damage gold-plating and impair special low-voltage operation. When electrically adjusting or testing contacts, use an intermediate device, keyed by the contacts to interrupt current to stroboscopic lamp of Test Set. This intermediate device must be capable of being keyed by a 3 to 20 volt change at maximum of 20 milliamperes. Normally for special low-voltage applications, contacts should be used in circuits operating between 3 and 20 volts dc at a current level not to exceed 60 milliampreres. Between 20 and 70 volts dc the current should be adjusted so as not to exceed a 120 milliwatt power level. The contacts are not normally intended for use with voltages above 70 volts dc. Exceeding this level for an appreciable length of time may result in damage to the gold plating and make them unfit for special low-voltage applications.

(a) Refer to figure 6-135.

(b) Use signal test set such as DXD/LSS, if available.

(c) Disconnect electrical noise suppressor from circuit and connect signal contacts so as to interrupt key current to strobe lamp of test set.

(d) Test set and keyboard must operate at same speed (see table 6-2).

(e) With BLANK combination selected, orient scale of test set to align zero mark of stop segment with beginning of stop pulse image. Length of trace shall be from zero mark to 141-1/2 (minimum), 142-1/2 (maximum) divisions (7.42 unit code).

(f) To adjust, if variations occur, position scale so that variations extend equally on right and left of 142 mark.

(g) Nominal length of pulses number 1, 2, 3, 4, and 5 is 100 divisions.

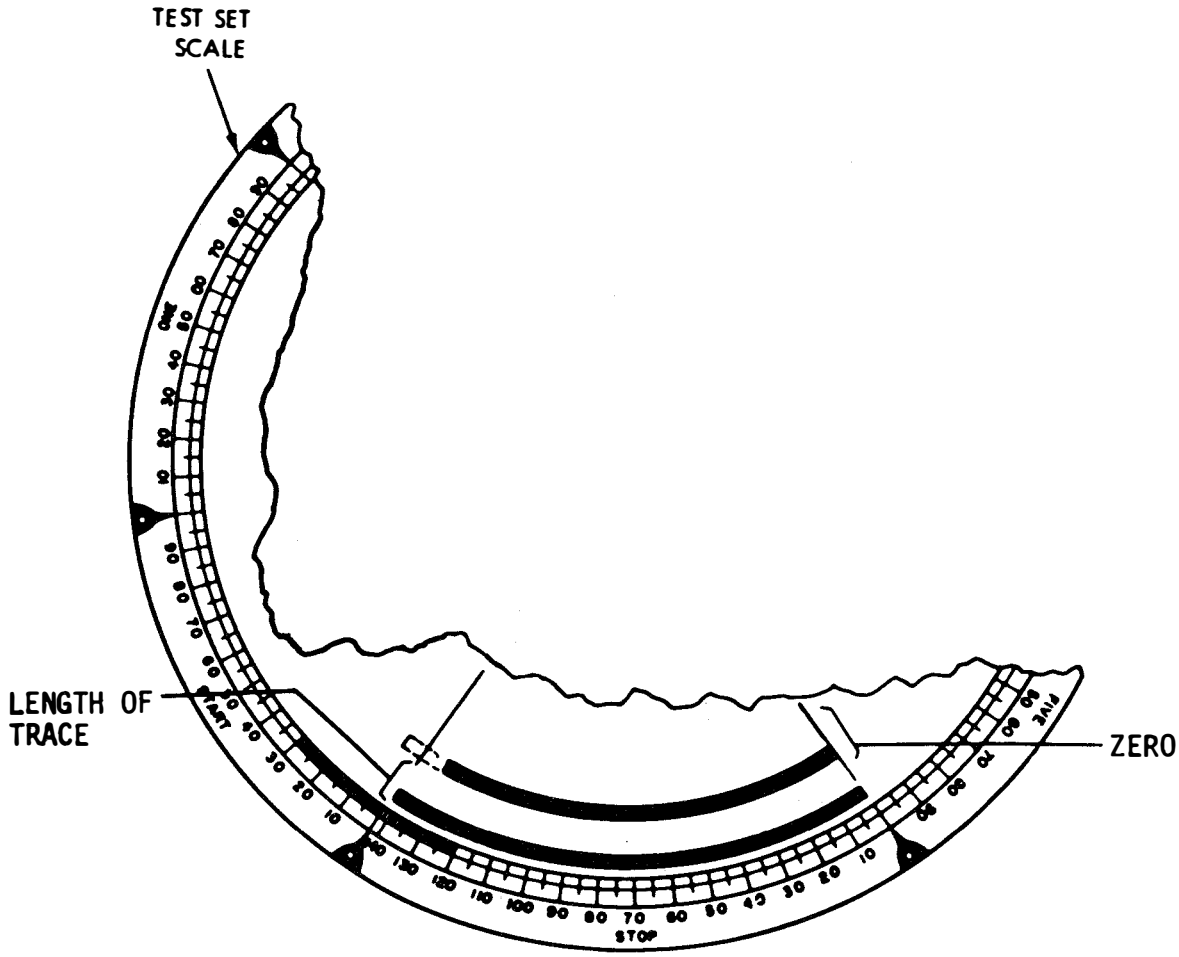


Figure 6-135. Signal Contact Clearance

(h) To adjust, recheck contact clearance requirement. Refine clearance, where necessary, to favor pulses 1 through 5 by orienting beginning of stop pulse trace up to ±5 divisions from zero mark of segment. (Refer to steps 1 and 2 below.)

(i) Each pulse trace (see step 3 below) to be free of undesirable breaks.

(j) To adjust, recheck Transfer Bail Detent Plate (paragraph 6-4.2c(2)) requirement and where necessary, refine adjustment. Detent plate may be rotated either left or right as long as detent toggle latch continues to cam off projection of transfer bail.

1. Beginning of each trace should fall between zero mark and 5th division of scale segment, and 95th division (previous segment) and zero mark (see figure 6-136).

2. End of each trace (except stop pulse) should fall between 95th division (previous segment) and zero mark, and zero mark and 5th division of scale segment (see figure 6-136).

3. Each trace of marking code pulses may have a break within tolerance limits. Break should not occur prior to 95th division of observed pulse (1 through 5) or 137th division of stop pulse. See table 6-2 for possible width of break at speed of operation.

(5) Signal Contact Clearance (Polar). Adjust as follows:

(a) Refer to figure 6-136.

(b) Spacing pulses shall start no earlier than 94th division of previous segment and no later than 6th division of pulse under observation.

(c) Trace of spacing pulse shall end no earlier than 94th division of pulse under observation and end no later than 6th division of following pulse.

(d) Trace of start pulse shall begin no earlier than 136th division of stop segment and no later than 6th division of start segment. Start pulse shall end no earlier than 94th division of start segment and end no later than 6th division of number 1 segment.

(e) Spacing pulse may have a break provided the break is not over one division wide and it does not occur prior to 95th division of pulse under observation.

c. Transfer Mechanism. Perform transfer mechanism adjustments in accordance with the following paragraphs.

(1) Transfer Bail Detent Latch Spring. Adjust as follows:

(a) Refer to figure 6-137.

(b) Use spring scale to measure force necessary to start latch moving; this should require from 2-3/4 to 4-1/4 ounces.

(c) If force does not match requirements, replace spring.

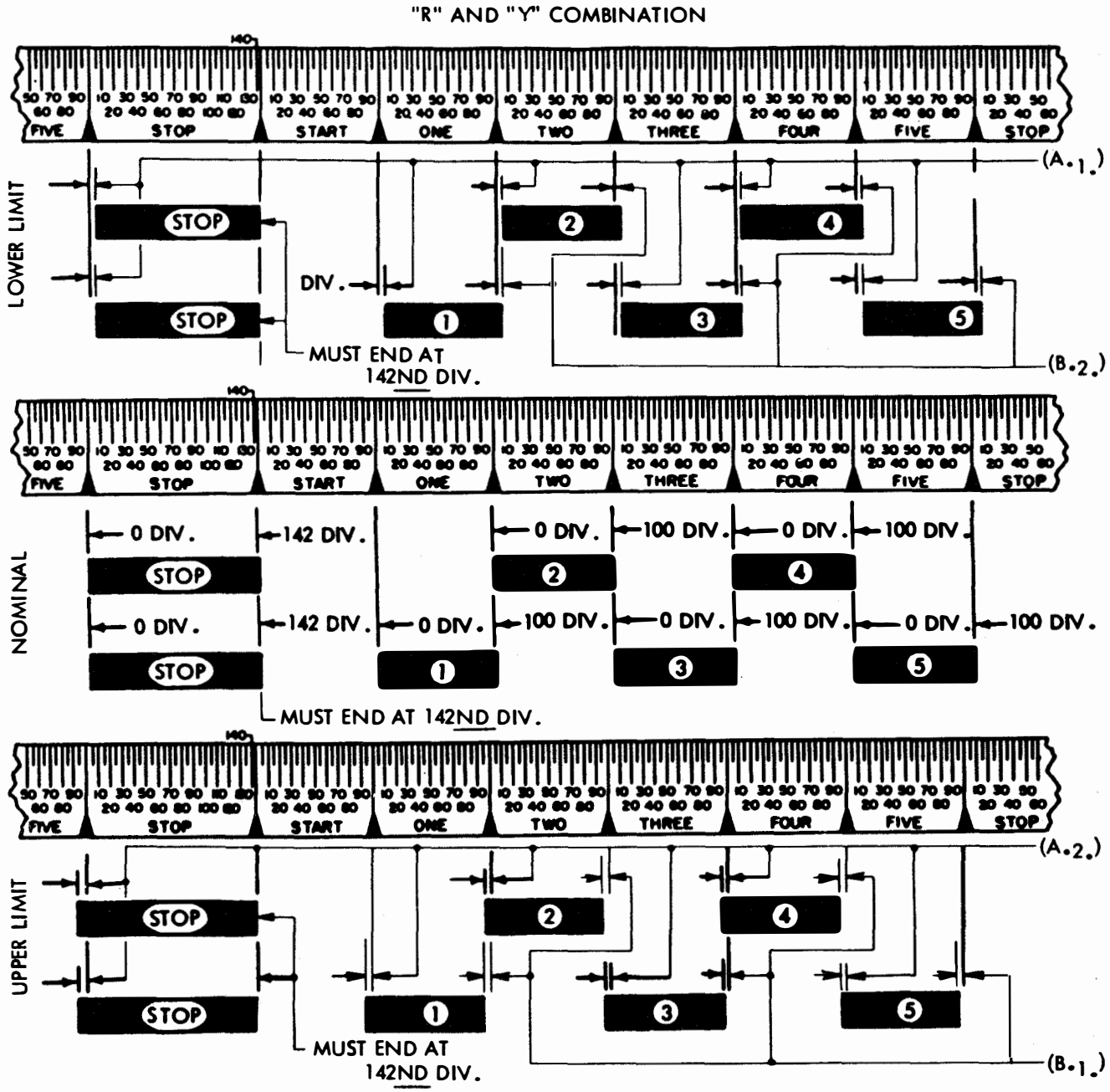


Figure 6-136. Signal Contact Clearance (Polar)

Table 6-2. Signaling Pulse Speed and Permissible Width of Break

Speed	Operations Per Minute	Width of Break Not to Exceed	Remarks
60 WPM	368.182	1 Division	Marking Pulses (1 thorugh 5 and Stop)
75 WPM	460.00	1-1/2 Divisions	Marking Pulses (1 through 5 and Stop)
100 WPM	600.00	2 Divisions	Marking Pulses (1 through 5 and Stop)

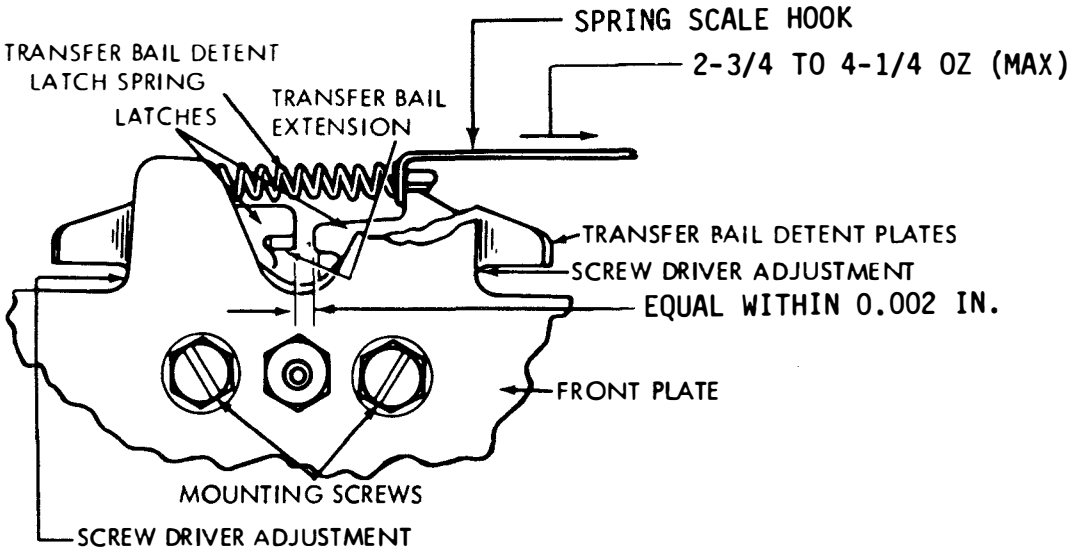


Figure 6-137. Transfer Bail Detent Latch Spring and Transfer Bail Detent Plate

(2) Transfer Bail Detent Plate. Adjust as follows:

(a) Refer to figure 6-137.

(b) Clearance should be equal within 0.002 inch when transfer bail is at extreme left hand or right hand position, as these occur in sequence to generate "Y" character on START and number 1 pulses only.

(c) To adjust, loosen mounting screws and rotate plate left or right by means of screwdriver.

(d) Tighten mounting screws.

(3) Transfer Lever Spring. Adjust as follows:

(a) Refer to figure 6-138.

(b) With clutch disengaged, use push end of spring scale to measure force necessary to start each of 7 levers moving; this should require 1-1/2 to 2-1/2 ounces.

(c) If force does not match specifications, replace spring.

(4) Transfer Lever Locking Bail Spring. Adjust as follows:

(a) Refer to figure 6-138.

(b) Use spring scale to measure force necessary to pull spring to installed length, with spring unhooked from post; this should require from 5 to 6 ounces.

(c) If force does not match specifications, replace spring.

d. Tape Feed-Out Mechanism. Perform tape feed-

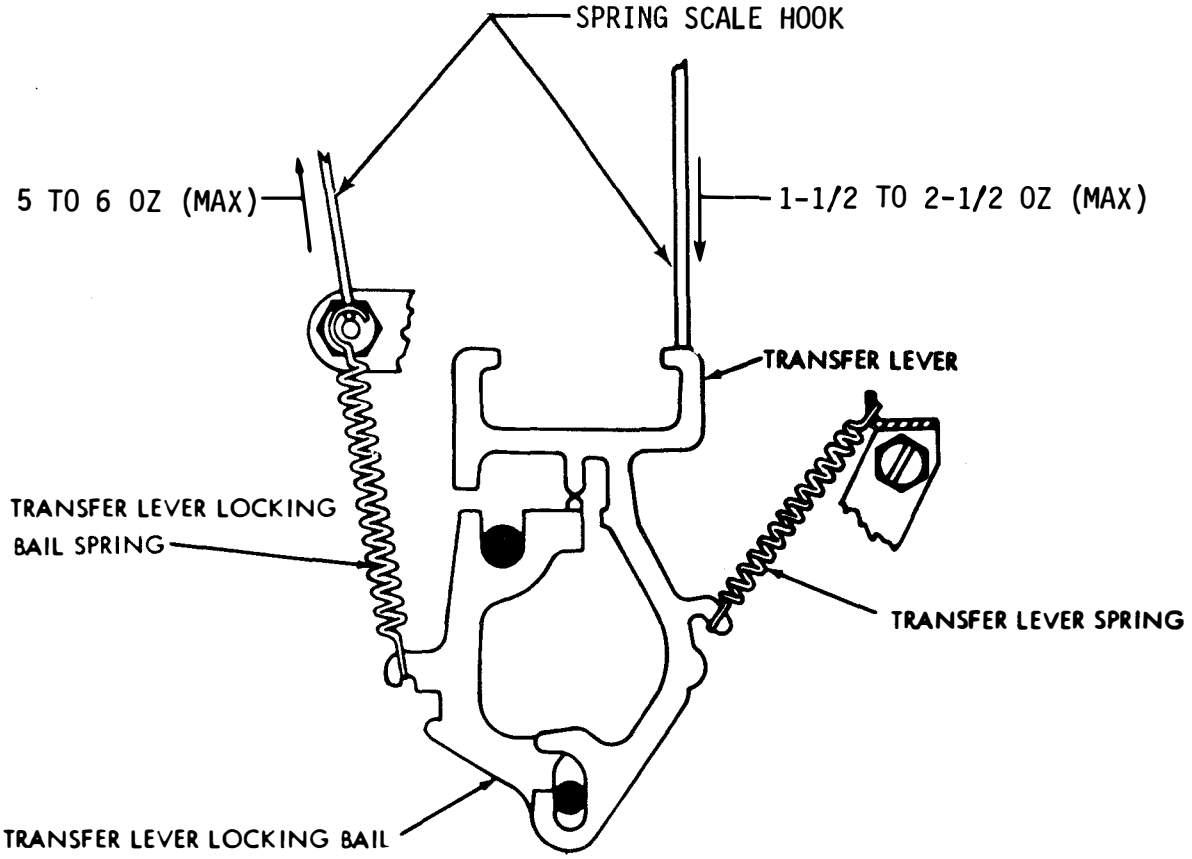


Figure 6-138. Transfer Lever Spring and Transfer Lever Locking Bail Spring

out mechanism adjustments in accordance with the following paragraphs.

(1) Tape Feed-Out Switch Bracket. Adjust as follows:

(a) Refer to figure 6-139.

(b) Tape feed-out switch should operate when TAPE F.O. key is depressed.

(c) To adjust, loosen bracket mounting screw and hexagonal post and position bracket.

(d) Tighten screw and post.

(2) Trip Link Spring. Adjust as follows:

(a) Refer to figure 6-139.

(b) Use push end of spring scale to measure force necessary to start link moving; this should measure from 4 to 10 ounces.

(c) If force does not match requirements, replace spring.

e. Tape Printer Keyboard Mechanism. Perform tape printer keyboard mechanisms adjustments in accordance with the following paragraphs.

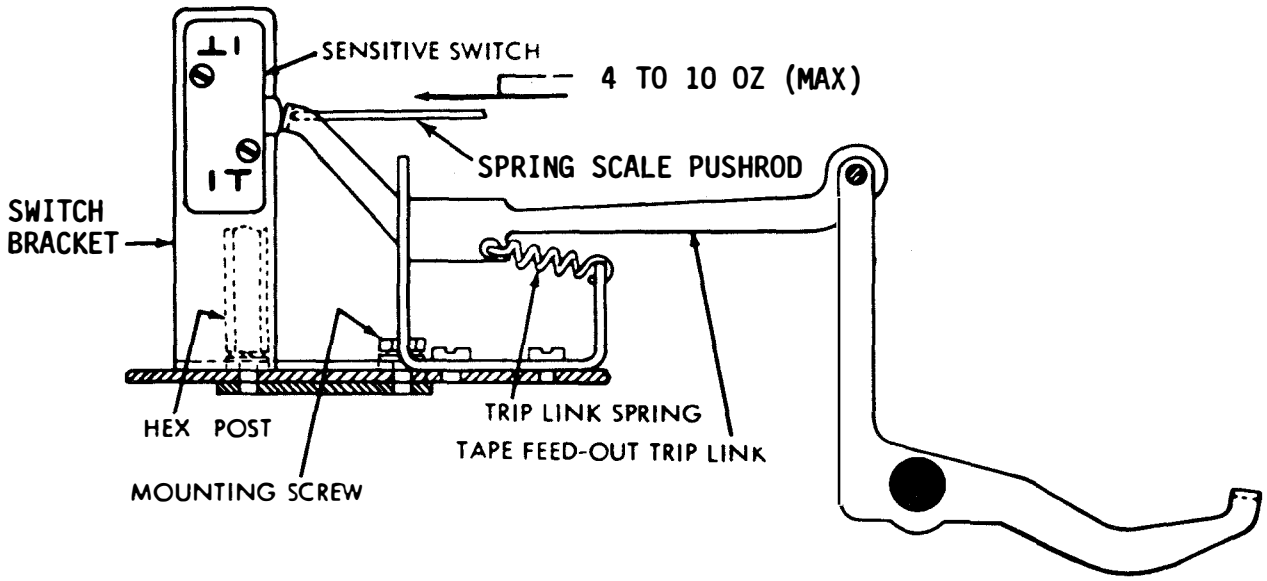


Figure 6-139. Tape Feed-Out Switch Bracket and Trip Link Spring

(1) Gearshift Assembly. Adjust as follows:

(a) Refer to figure 6-140.

NOTE

The following adjustments, plus applicable typing reperforator Model 28 keyboard adjustments, are required to adjust the tape printer Model 28 keyboard.

(b) There should be a perceptible amount of backlash between motor pinion and driven gear at point of least backlash.

(c) There should be perceptible backlash between gear bracket idler gear and driven gear at point where backlash is least.

(d) To adjust, loosen four screws which mount speedshift gear bracket assembly; loosen two locknuts which lock adjusting bushings at rear of assembly; loosen nut plate mounting screw in front of gear bracket.

(e) Move assembly backward or forward.

(f) Adjust height at rear by means of adjusting bushing nearest to the motor; the other bushing should be backed out for clearance.

(g) After correct adjustment has been obtained lock adjusting bushing nut; turn other bushing with fingers until it touches base; tighten locknuts and mounting screws.

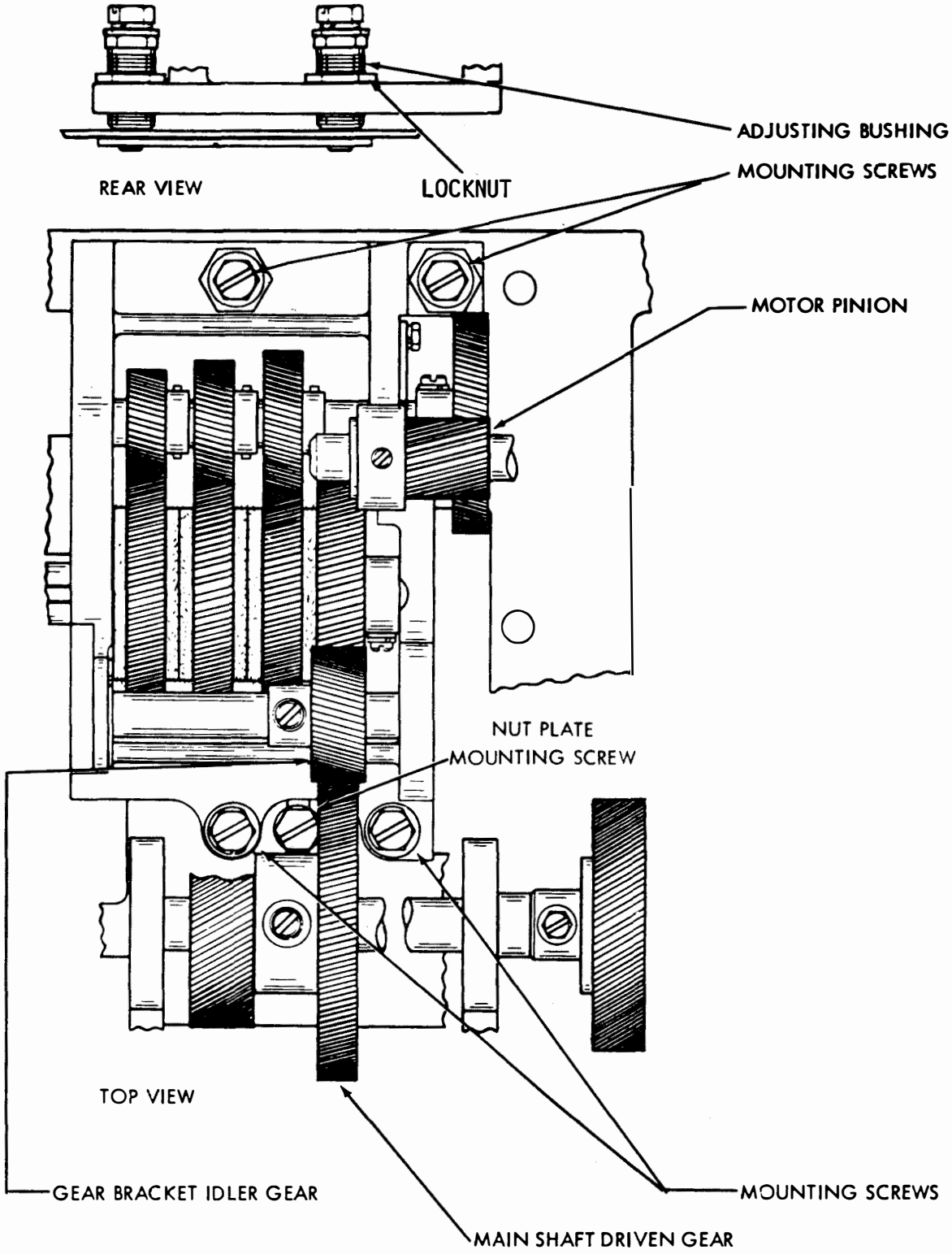


Figure 6-140. Gearshift Assembly

(2) Stop and Rear Shaft Mounting Bracket. Adjust as follows:

(a) Refer to figure 6-141.

(b) Speed shift knob should point to 60 and 100 wpm marks when gear is adjusted to these positions with any overtravel approximately equal.

(c) Rear shaft mounting bracket should be positioned so that link is parallel to flanged sleeve and bearing assembly.

(d) To adjust, loosen two screws which mount stop and rear shaft mounting bracket.

(e) Position bracket sideways for requirement (b).

(f) Position bracket backward or forward for requirement (c).

(g) Tighten mounting screws.

(3) Gearshift Knob. Adjust as follows:

(a) Refer to figure 6-141.

(b) With gear shift set at 75 wpm, pointer on knob should point to 75 wpm mark, with any play being equal on either side of mark.

(c) To adjust, loosen Allen setscrews on flexible shaft, and position shaft.

(d) Tighten setscrews.

(4) Gearshift Key Spring. Adjust as follows:

CAUTION

Pull key to left slowly. When head of spring pin begins to emerge, hold it in place until completely out; otherwise, spring and pin will fly with danger of loss.

(a) Refer to figure 6-142.

(b) Disconnect operating linkage from flange sleeve by removing retainer ring.

(c) Move spring from under gears.

(d) Use push end of spring scale to measure force necessaryto depress key to lowest position; this should require from 25 to 40 ounces.

(e) If force does not match requirements, replace spring.

f. Universal Bail Mechanism. Perform universal bail mechanism adjustments in accordance with the following paragraphs.

(1) Universal Bail Latchlever. Adjust as follows:

NOTE

On units equipped with repeat-space feature, repeat-space spring must be unhooked from signal generator rear plate before making this adjustment.

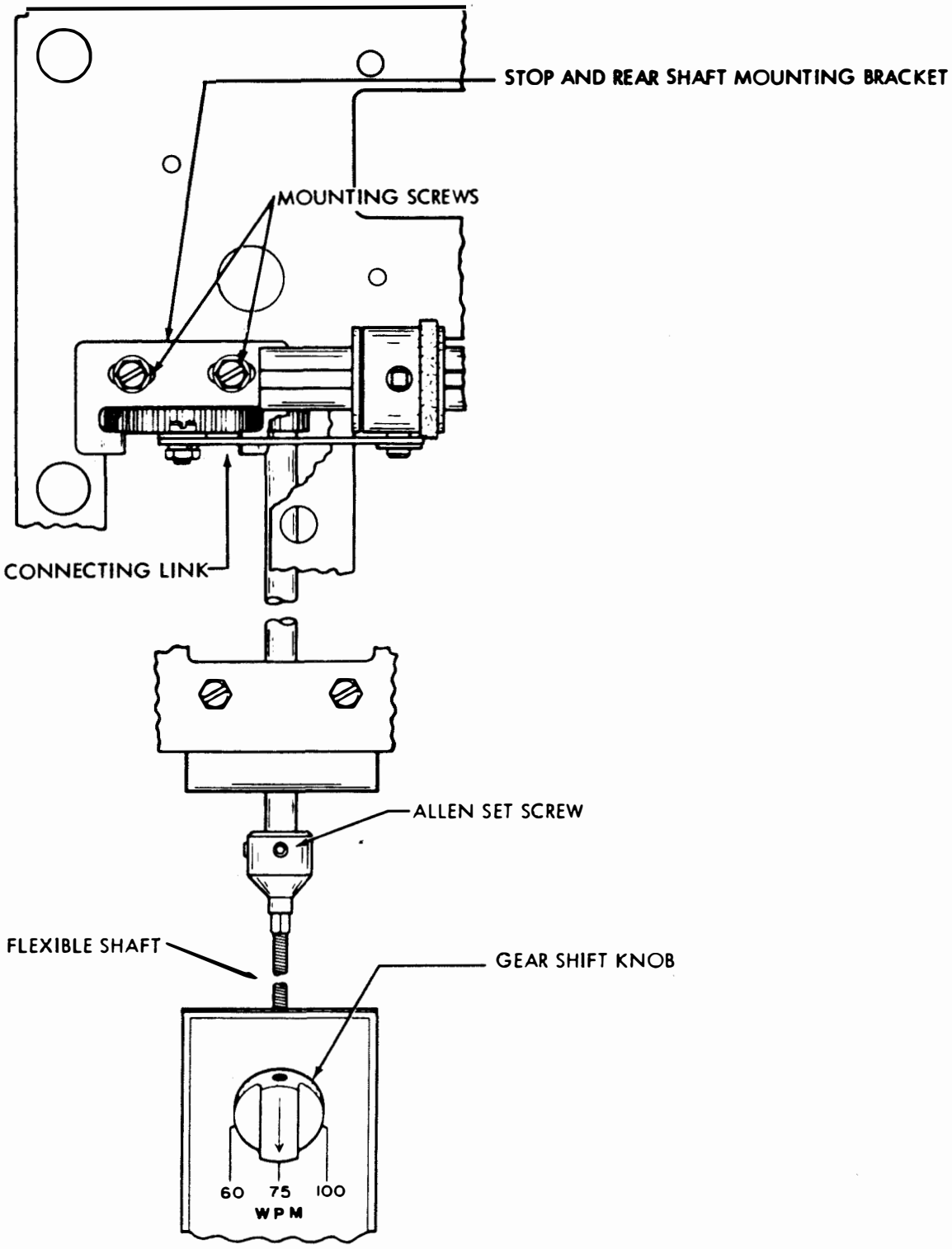


Figure 6-141. Stop and Rear Shaft Mounting Bracket and Gearshift Knob

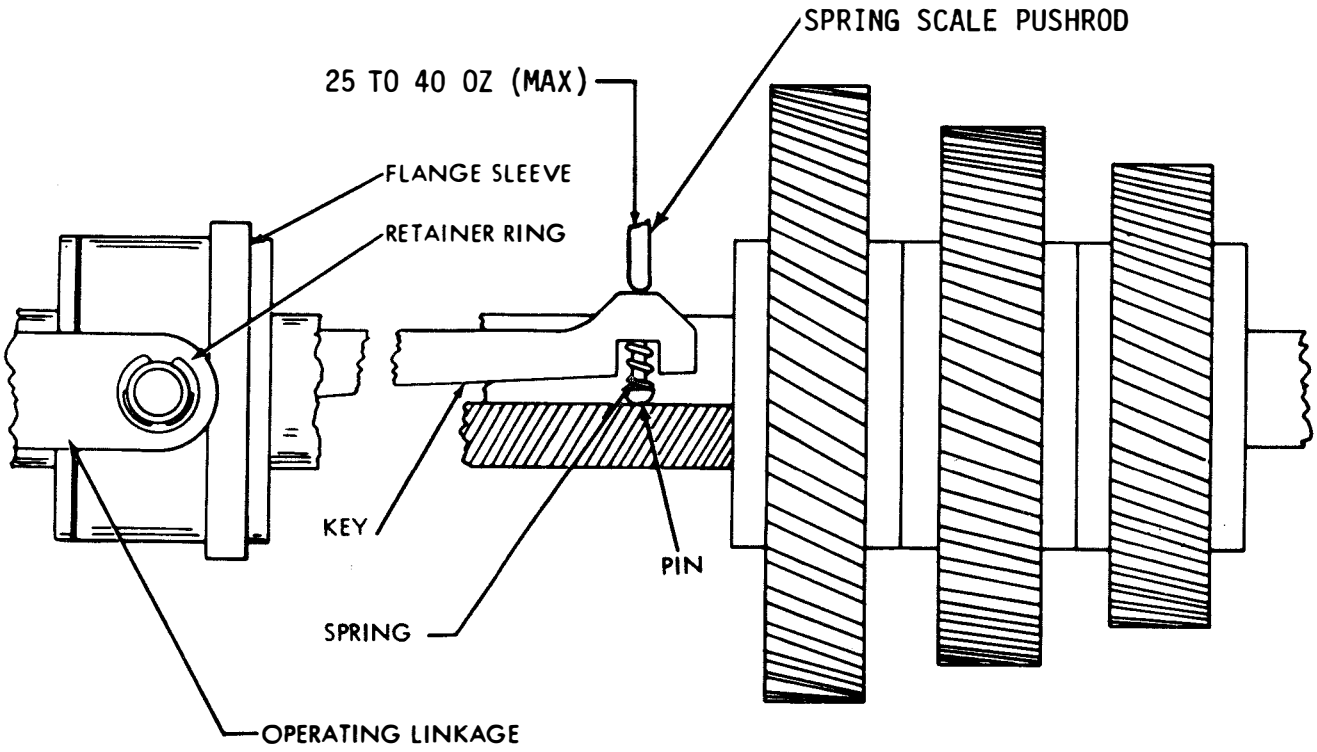


Figure 6-142. Gearshift Key Spring

(a) Refer to figure 6-143.

(b) Depress center of spacebar with 32 ounces pressure. Manually rotate universal bail backwards and quickly release.

(c) Clearance between universal bail latchlever and extension post on universal bail should be from 0.015 to 0.025 inch.

(d) To adjust, loosen three screws that fasten universal bail rear blade, and rotate eccentric bushing, keeping high part up.

(e) Tighten screws.

(2) Universal Bail Latch Spring. Adjust as follows:

(a) Refer to figure 6-143.

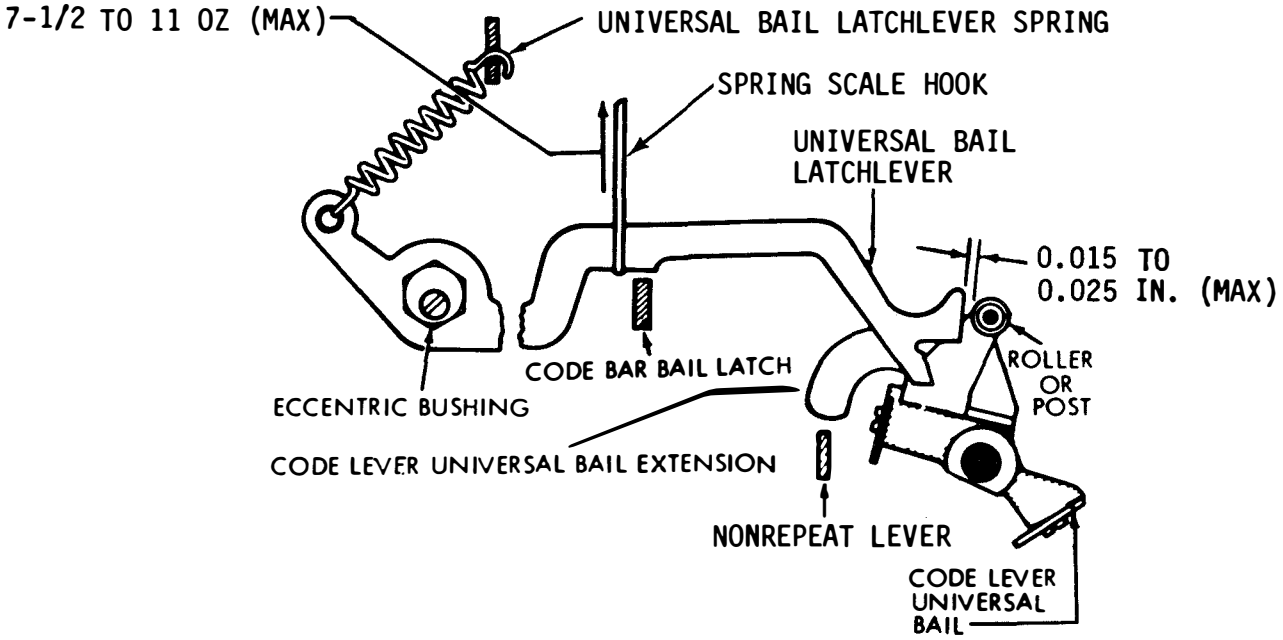
(b) With clutch disengaged and universal bail held away from latchlever, use spring scale to measure force necessary to start latchlever moving; this should require from 7-1/2 to 11 ounces.

(c) If force does not match requirements, replace spring.

(3) Universal Bail Extension. Adjust as follows:

(a) Refer to figure 6-143.

(b) With power off and universal bail extension roller resting against end of universal bail latchlever, there should be from 0.050 to 0.080 inch clearance between extension and nonrepeat lever.



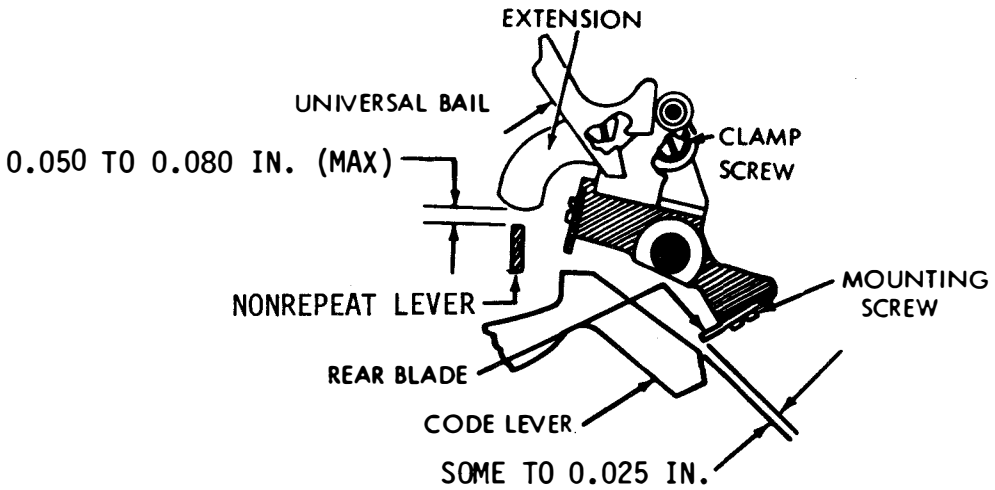


Figure 6-143. Universal Bail Latchlever, Universal Bail Latch Spring, Universal Bail Extension, and Universal Bail Rear Blade

(c) To check, depress LETTERS keylever and release it, and check clearance.

(d) To adjust, loosen two screws friction tight and position extension.

(e) Tighten screws.

(4) Universal Bail Rear Blade. Adjust as follows:

(a) Refer to figure 6-143.

(b) With unit in initial trip-off condition, no key depressed and no power, and universal bail extension post resting against end of latch, there should be some clearance (not to exceed 0.025 inch) between universal bail rear blade any any code lever.

(c) To adjust, loosen mounting screws and position rear blade.

(d) Tighten mounting screws.

6-4.3 TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARDS (LOW-LEVEL). There are no low-level keyboard adjustments.

6-5. TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 BASES ADJUSTMENTS. The following paragraphs contain information necessary for making required adjustments to the reperforator and tape printer bases of Reperforator and Tape Printer Teletypewriter Sets Model 28.

6-5.1 REPERFORATOR AND TAPE PRINTER MODEL 28 BASES ADJUSTMENTS (HIGH LEVEL). Perform the following procedures to ensure proper adjustment of typing reperforator bases.

a. Receive-Only Bases. Perform receive-only adjustment in accordance with the following paragraphs.

(1) Intermediate Drive Mechanism. Perform intermediate drive mechanism adjustments in accordance with the following paragraphs.

(a) Timing Belt. Adjust as follows:

CAUTION

Belt should not be tight.

1. Refer to figure 6-144.

2. Slight pressure (8 ±1 ounces) at center span should deflect belt from 3/34 to 5/32 inch.

3. To adjust, loosen mounting screws and position intermediate drive assembly.

4. Tighten mounting screws.

(b) Gear Mesh. Adjust as follows:

1. Refer to figure 6-145.

2. Motor drive gear and intermediate shaft driven gear should mesh at right angles.

3. To adjust, loosen mounting screws and position drive assembly.

4. Tighten mounting screws.

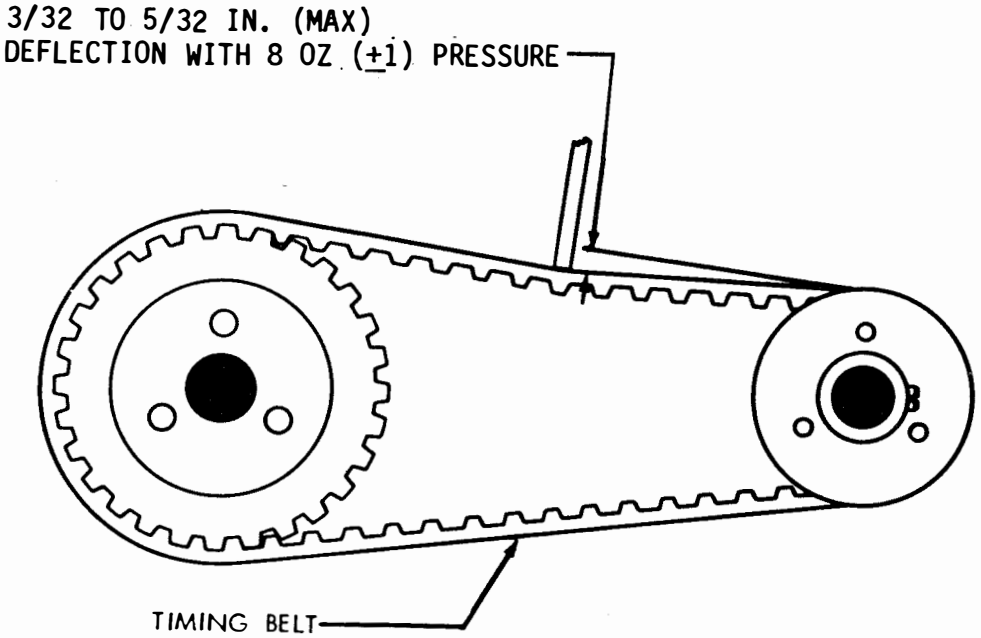


Figure 6-144. Timing Belt for Receive-Only Base

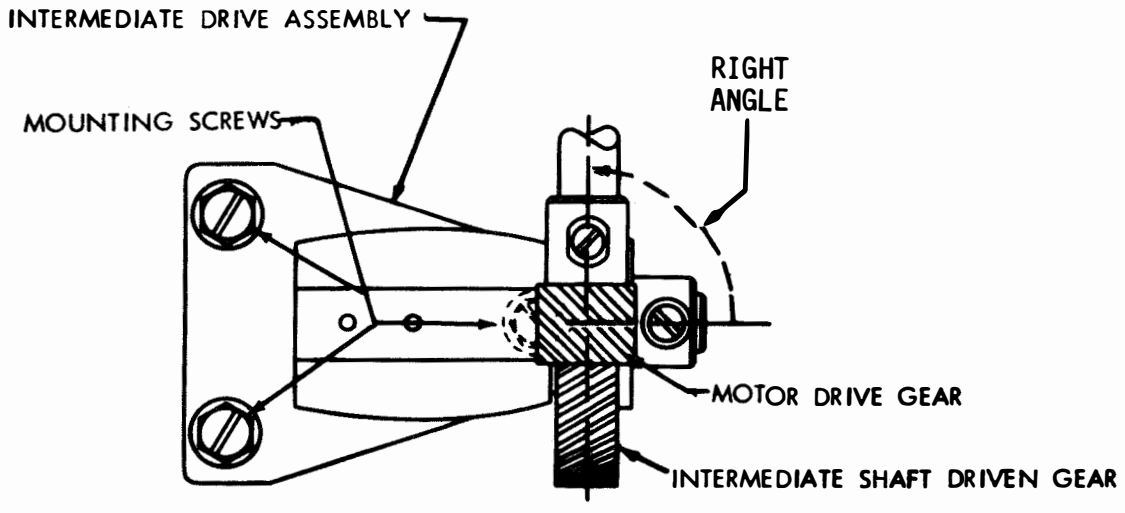


Figure 6-145. Gear Mesh - Top View

5. Recheck Timing Belt adjustment (paragraph 6-5.1a(1)(a)).

(c) Wire Tape Guide. Adjust as follows:

1. (No figure reference.)

2. Tape should pass through guide freely and in alignment with perforator guide assembly.

3. To adjust, bend or position wire guide.

(2) Tape-Out Mechanism. Perform tape-out mechanism adjustments in accordance with the following paragraphs.

(a) Switch Lever Springs. Adjust as follows:

1. Refer to figure 6-146.

2. Use spring scale to pull spring to length of 1-5/16 inches; this should require from 1-3/4 to 2-1/4 ounces.

3. If force does not match requirements, replace spring(s).

(b) Tape-Out Lever. Adjust as follows:

1. Refer to figure 6-146.

2. Tape-out lever should be able to push both switch levers away from switch actuators, but unable to lift wood filler and depleted tape roll out of slots.

3. If requirements is not met, check Tape-Out Lever Spring and Switch Lever Spring Tensions paragraphs 6-5.1a(2)(a) and (c)).

(c) Tape-Out Lever Spring. Adjust as follows:

1. Refer to figure 6-146.

2. Use spring scale to pull spring to length of 1-17/32 inches: this should require from 6 ounces to 8 ounces.

3. If force does not match specifications, replace spring.

(d) Switch Lever. Adjust as follows:

NOTE

The inner elements are those nearer, and outer elements are farther from mounting plate.

1. Refer to figure 6-147.

2. Outer switch should operate before inner switch.

3. Both switches should operate within limits of motion of tape-out lever and when diameter of tape roll is reduced to first 1-5/16 inches diameter, then to 1-3/16 inches diameter when using a 1-inch diameter core; first 2-7/16 inches diameter, then to 2-5/16 inches diameter when using a 2-inch diameter core.

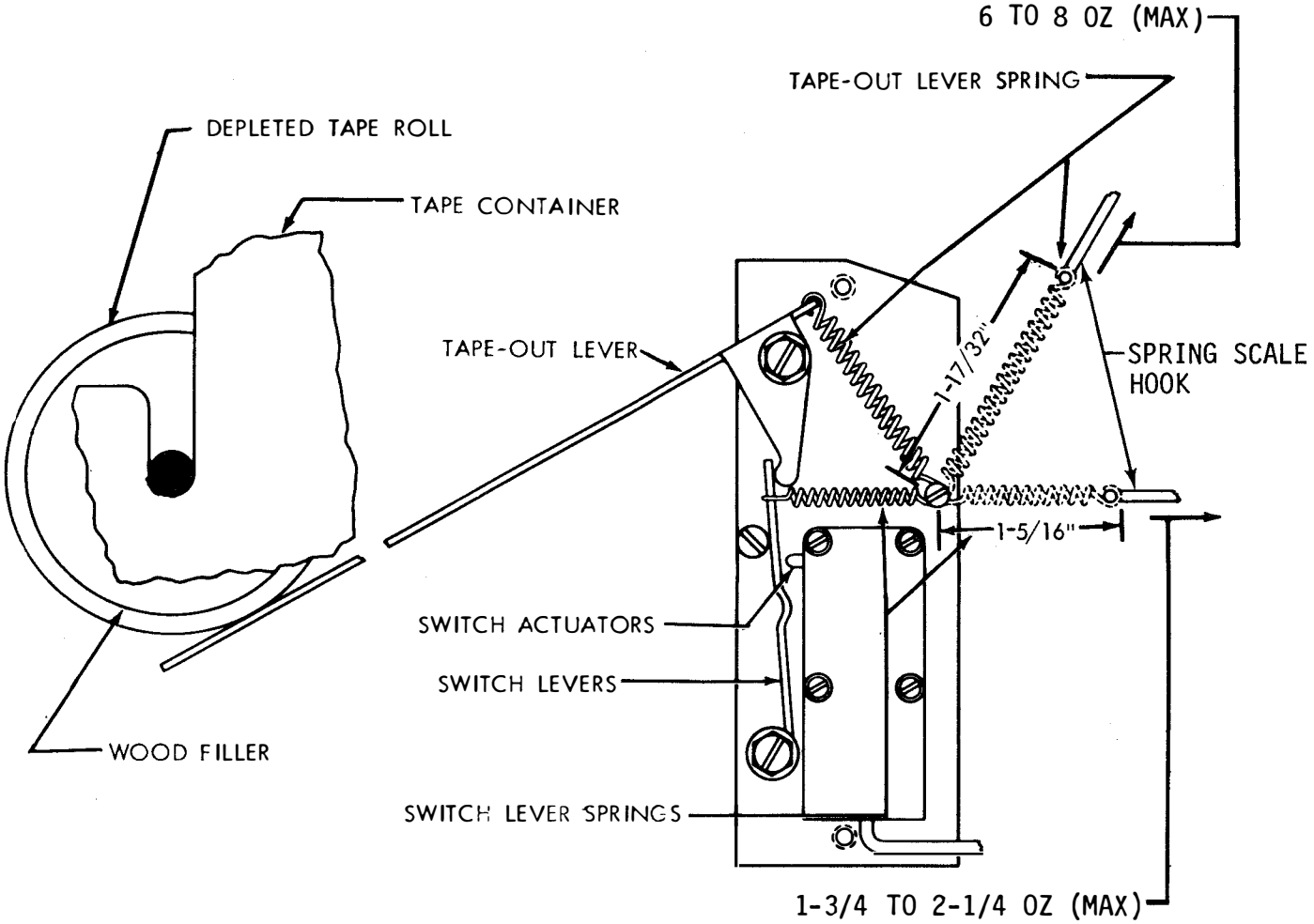


Figure 6-146. Switch Lever Springs, Tape-Out Lever and Tape-Out Lever Spring - Right Side View

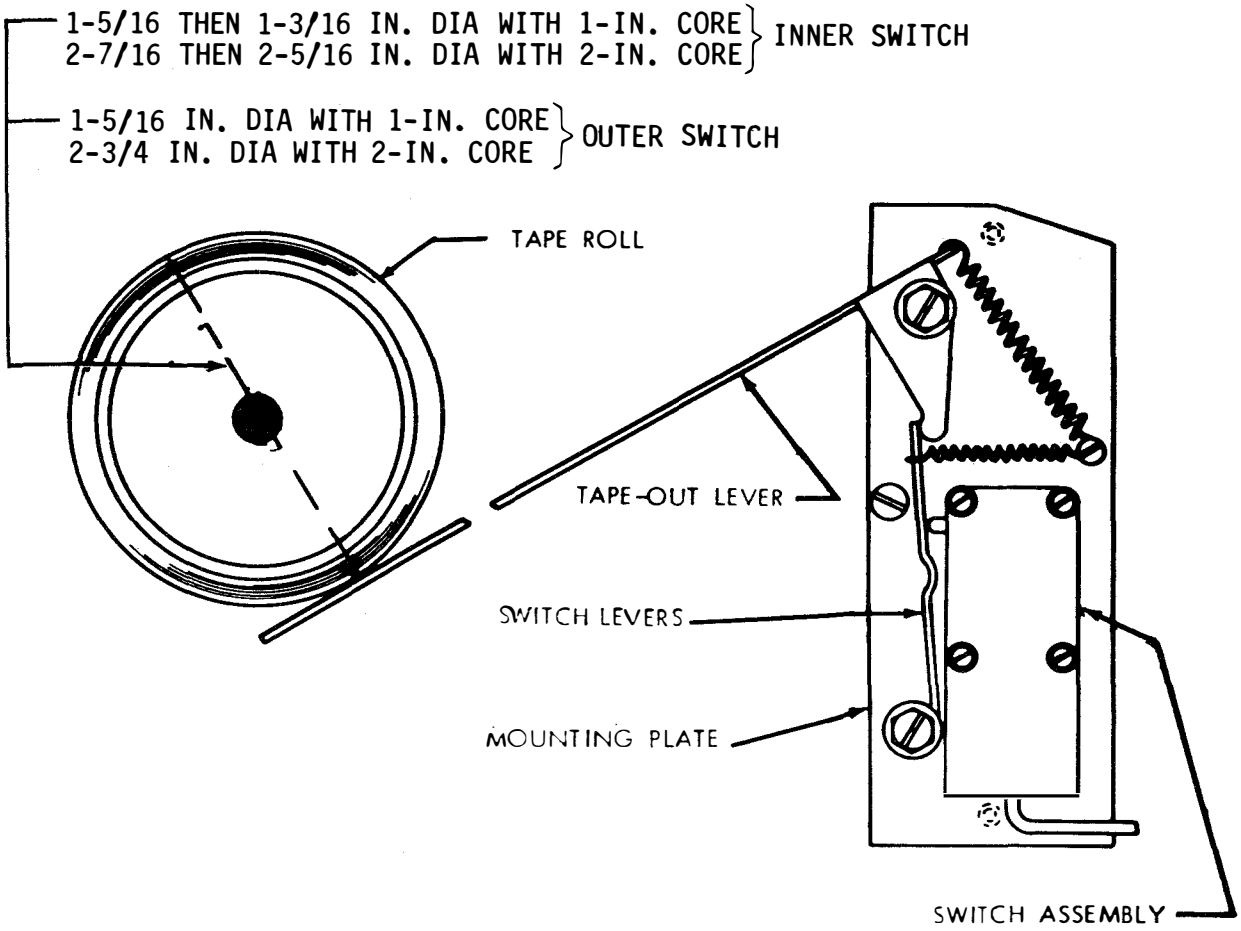


Figure 6-147. Switch Lever - Right Side View

NOTE

Adjustment can be facilitated by removing switch mechanism from tape container.

4. To adjust, bend outer switch lever toward switch assembly.

(e) Switch Mechanism Mounting Plate. Adjust as follows:

1. Refer to figures 6-147 and 6-148.

2. Outer switch should just operate when tape roll diameter is reduced to 1-5/16 inches with 1-inch diameter core, or 2-3/8 inches with 2-inch diameter core.

3. To adjust, loosen mounting screws and position mounting plate.

(f) Tighten mounting screws.

(3) Variable Speed Drive Mechanism. Perform variable-speed drive mechanism adjustments in accordance with the following paragraphs.

(a) Gearshift Guide Plate. Adjust as follows:

1. Refer to figure 6-149.

2. With speed selector lever detented in center, 100 wpm driving and driven gear should mesh fully, and edge of each gear should be approximately in line.

3. To adjust, loosen mounting screws friction tight and position guide plate left or right.

4. Tighten mounting screws.

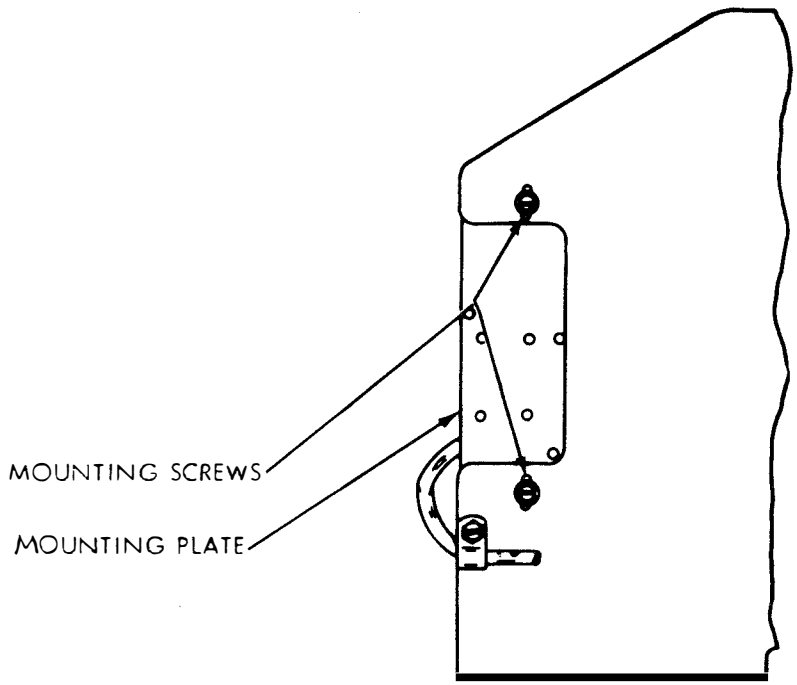


Figure 6-148. Switch Mechanism Mounting Plate - Left Side View

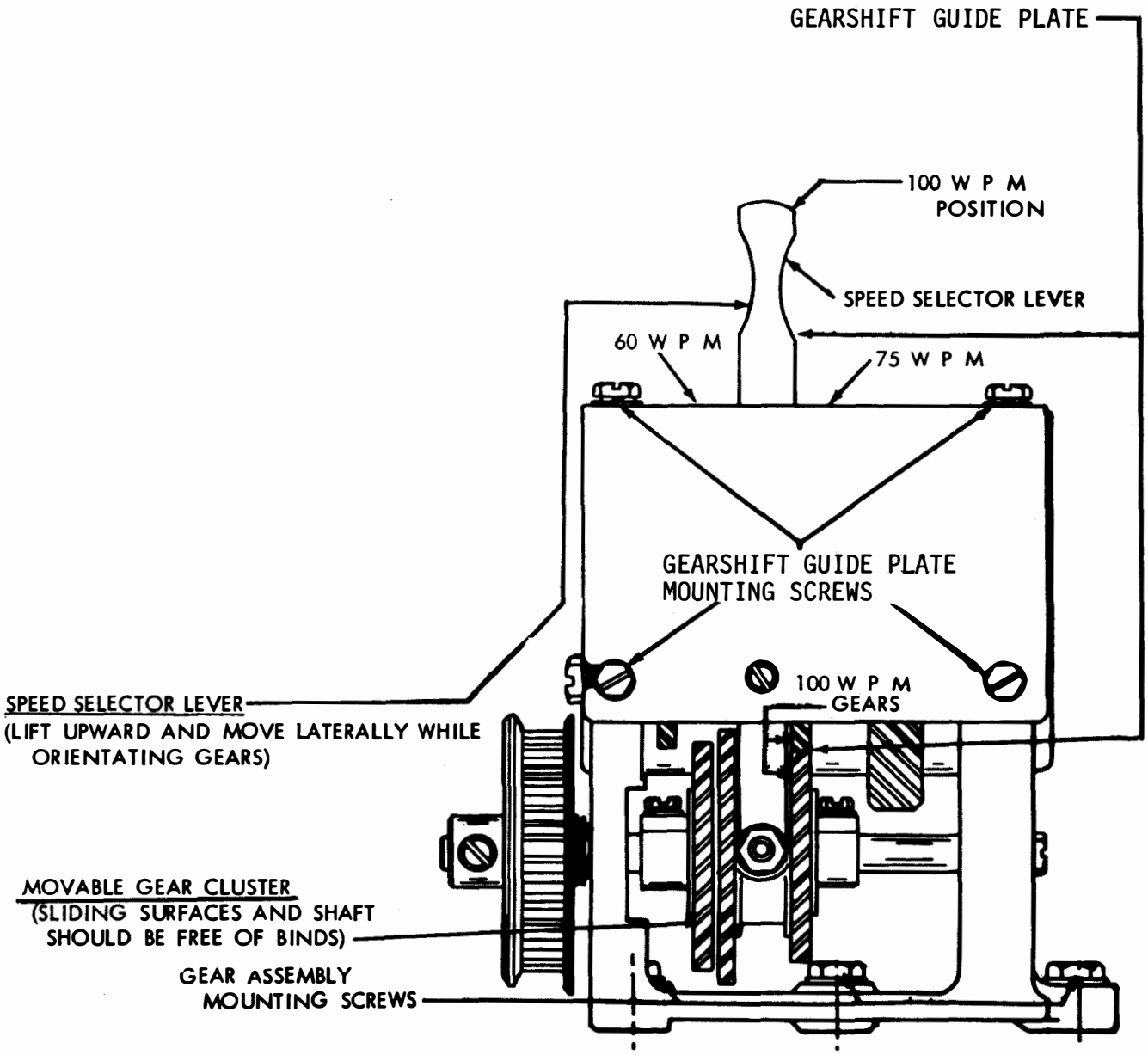


Figure 6-149. Gearshift Guide Plate

(b) Gear Assembly. Adjust as follows:

1. Refer to figure 6-150.

2. Centerline of motor shaft should be in a plane perpendicular to centerline of gear shaft, as gauged by eye.

3. To adjust, loosen mounting screws friction tight and position gear assembly.

4. Tighten mounting screws.

(c) Grease Retainer Plate. Adjust as follows:

1. Refer to figure 6-150.

2. Plate should align with gearshift guide plate.

3. To adjust, loosen mounting screws and position plate.

4. Tighten mounting screws.

(d) Timing Belt. Adjust as follows:

1. Refer to figure 6-144.

2. See paragraph 6-5.1a(1)(2)2.

3. To adjust, loosen mounting screws and position gear assembly.

4. Tighten mounting screws.

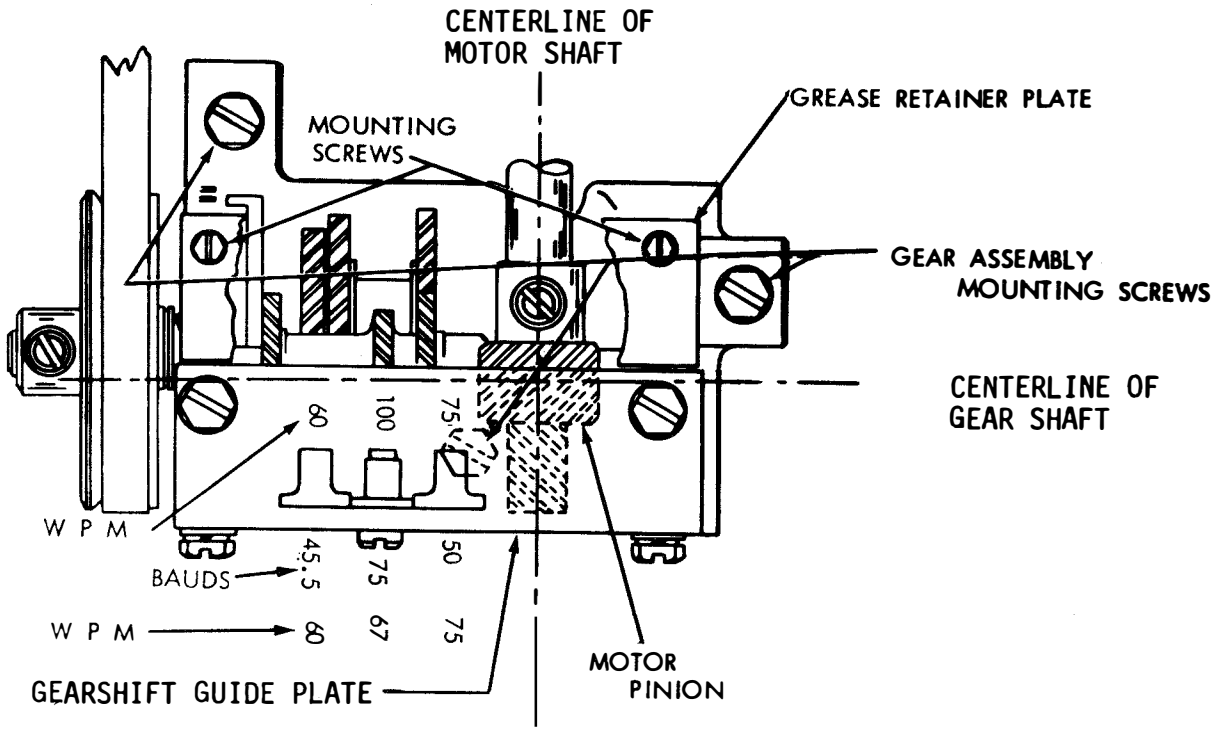


Figure 6-150. Gear ASsembly and Grease Retainer Plate

(e) Motor Adjusting Stud. Adjust as follows:

1. See paragraph 6-5.1b(1)(b) for adjustments.

b. Multiple Receive-Only Bases. Perform multiple receive-only base adjustments in accordance with the following paragraphs.

(1) Drive Mechanism. Perform drive mechanism adjustment in accordance with the following paragraphs.

NOTE

This adjustment should be made for each typing reperforator unit.

(a) Timing Belt. Adjust as follows:

CAUTION

Belt should not be tight.

1. Refer to figure 6-151.

2. Slight pressure (8 ±1 ounces) at center span should deflect belt from 3/32 to 5/32 inch.

3. To adjust, loosen bracket screws and three mounting screws.

4. Position typing reperforator unit.

5. Tighten three mounting screws.

6. Press anchor bracket against base plate and tighten screw holding bracket to reperforator.

7. Tighten screw holding bracket to base.

(b) Motor Adjusting Stud. Adjust as follows:

CAUTION

If motor becomes blocked for several seconds, thermal cut-out switch will break circuit. Should this happen, allow motor to cool at least 5 minutes before depressing red reset button; check unit to see why motor was blocked.

1. Refer to figure 6-152.

2. There should be barely perceptible backlash between drive gear and driven gear at closest point.

3. Loosen locknut and posiiton adjusting stud.

4. Hold stud in position and tighten nut.

(2) Tape-Out Mechanism. Perform tape-out mechanism adjustment in accordance with the following paragraph.

(a) Tape-Out Switch Assembly. Adjust as follows:

1. Refer to figure 6-153.

2. Switch should operate when tape roll

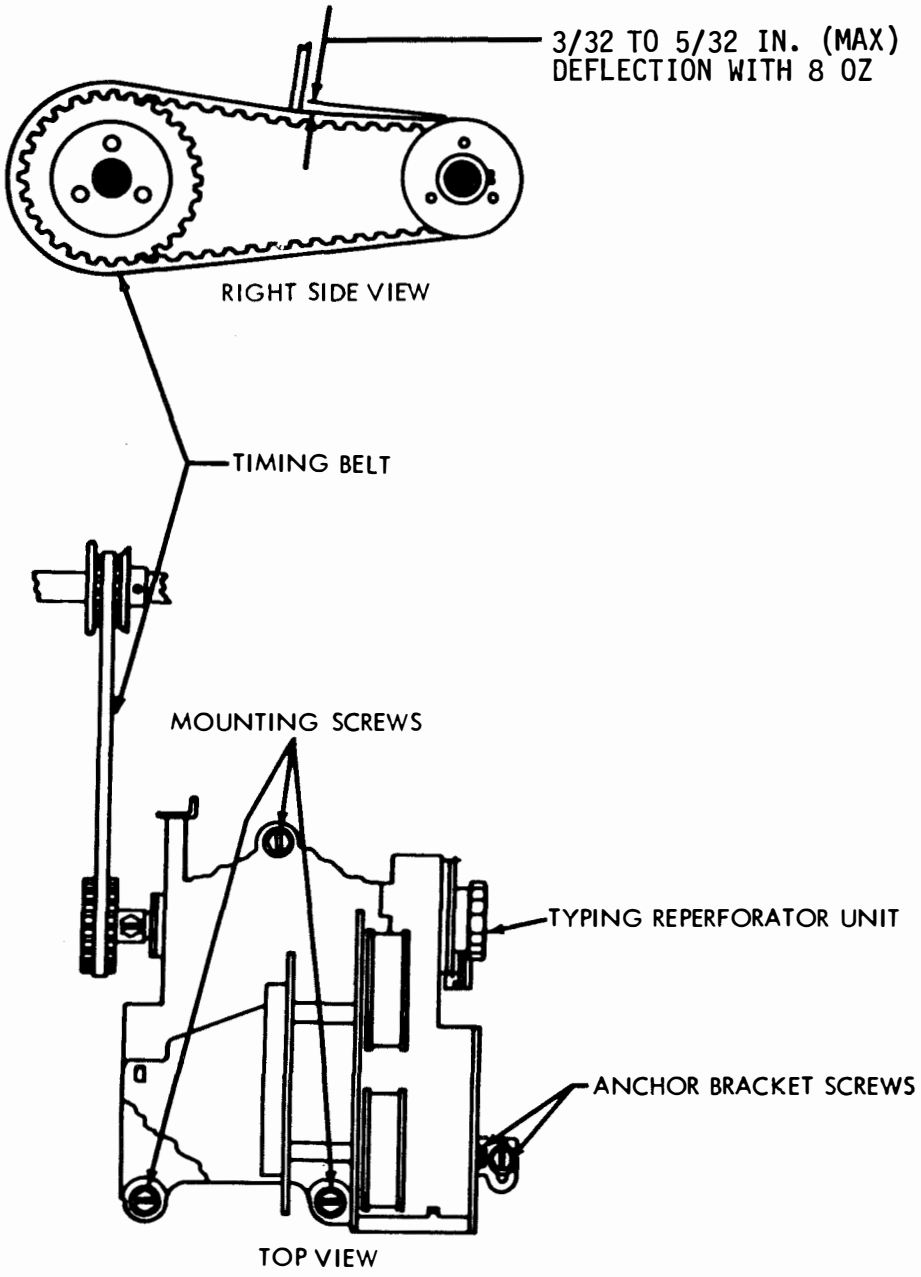


Figure 6-151. Timing Belt for Multiple Receive-Only Base

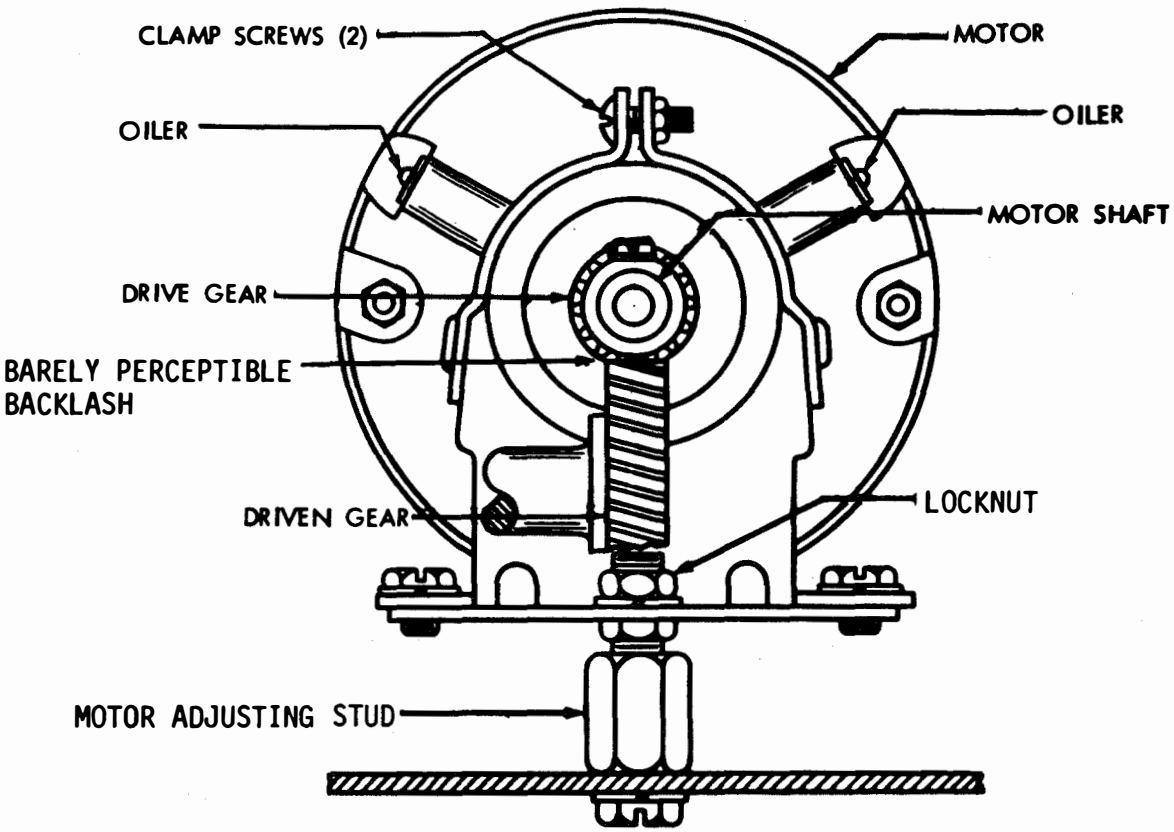


Figure 6-152. Motor Adjusting Stud

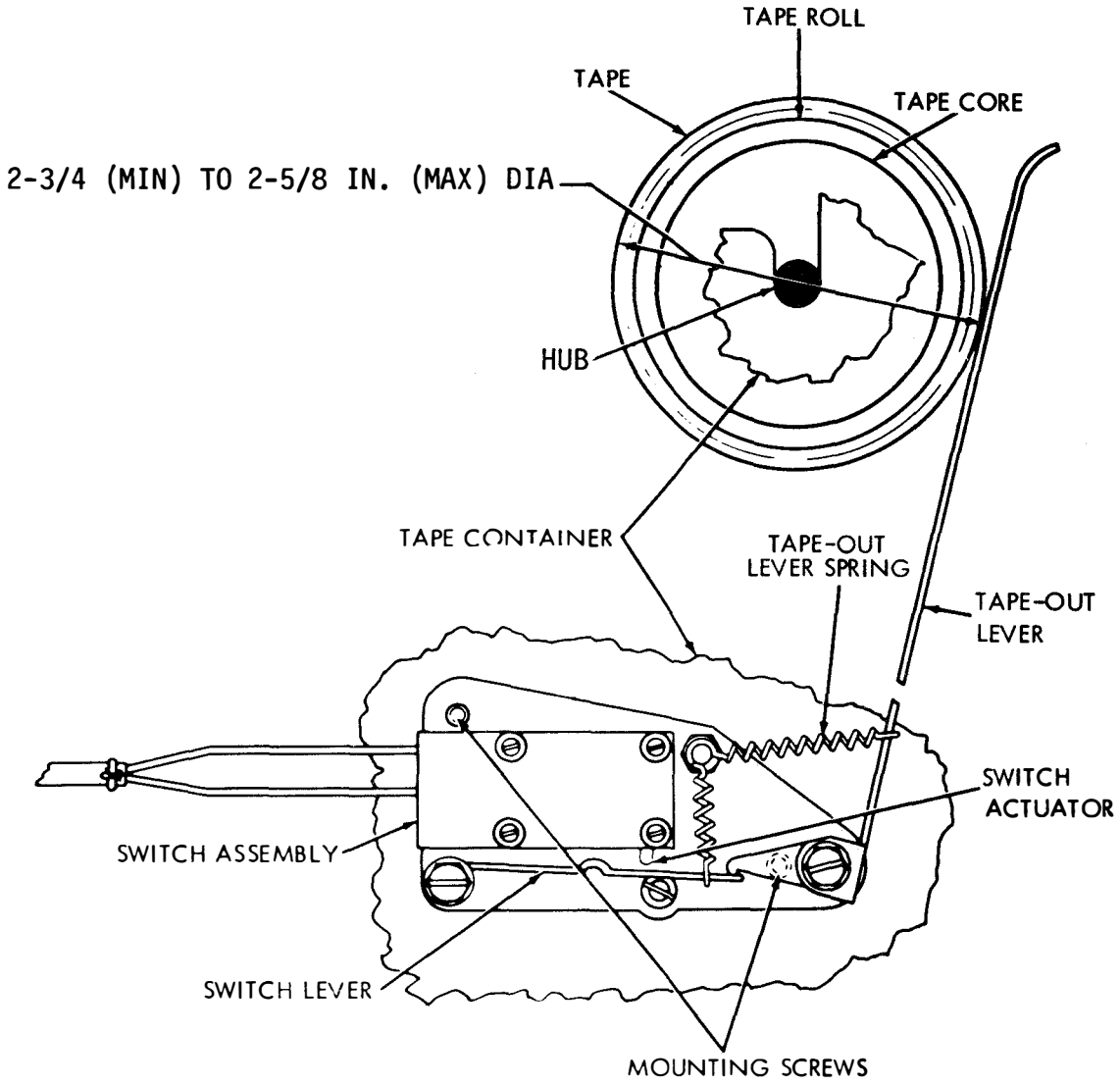


Figure 6-153. Tape-Out Switch Assembly

diameter is from 2-3/8 to 2-5/8 inch. Check with test lamp.

3. To adjust, loosen two mounting screws and position assembly on tape container.

(b) Tape-Out Lever Spring. Adjust as follows:

1. Refer to figure 6-153.

2. Tape-out lever is capable of pushing switch lever away from switch actuator but incapable lifting disc with hub with depleted cardboard tape roll out of slots in container.

3. If necessary, hand form right stob tab on sprocket guard so it will stop on top of bearing mounting plate.

c. Auxiliary Receive-Only Bases. Perform auxiliary receive-only adjustments in accordance with the following paragraphs.

(1) Drive Mechanism. Perform drive mechanism adjustments in accordance with the following paragraphs.

(a) Inmediate Drive Assembly. Adjust as follows:

1. Refer to figure 6-154.

2. There should be barely perceptible backlash between motor drive gear and driven gear at their closest point.

3. To adjust, loosen three mounting screws and position intermediate drive assembly.

(b) Tape Container. Adjust as follows:

1. Refer to figure 6-154.

2. It should be possible to load full tape roll in container through access door.

3. To adjust, loosen mounting screws and position container.

4. Tighten screws.

(c) Timing Belt. Adjust as follows:

1. Refer to figure 6-154.

2. There should be minimal slack in belt.

3. To adjust, loosen two anchor bracket screws and three mounting screws, and position reperforator unit.

4. Tighten three mounting screws.

5. Press anchor bracket against base plate and tighten screw holding bracket to reperforator.

6. Tighten screw holding bracket to base.

(2) Tape-Out Mechanism. Perform tape-out mechanism adjustments in accordance with the following paragraphs.

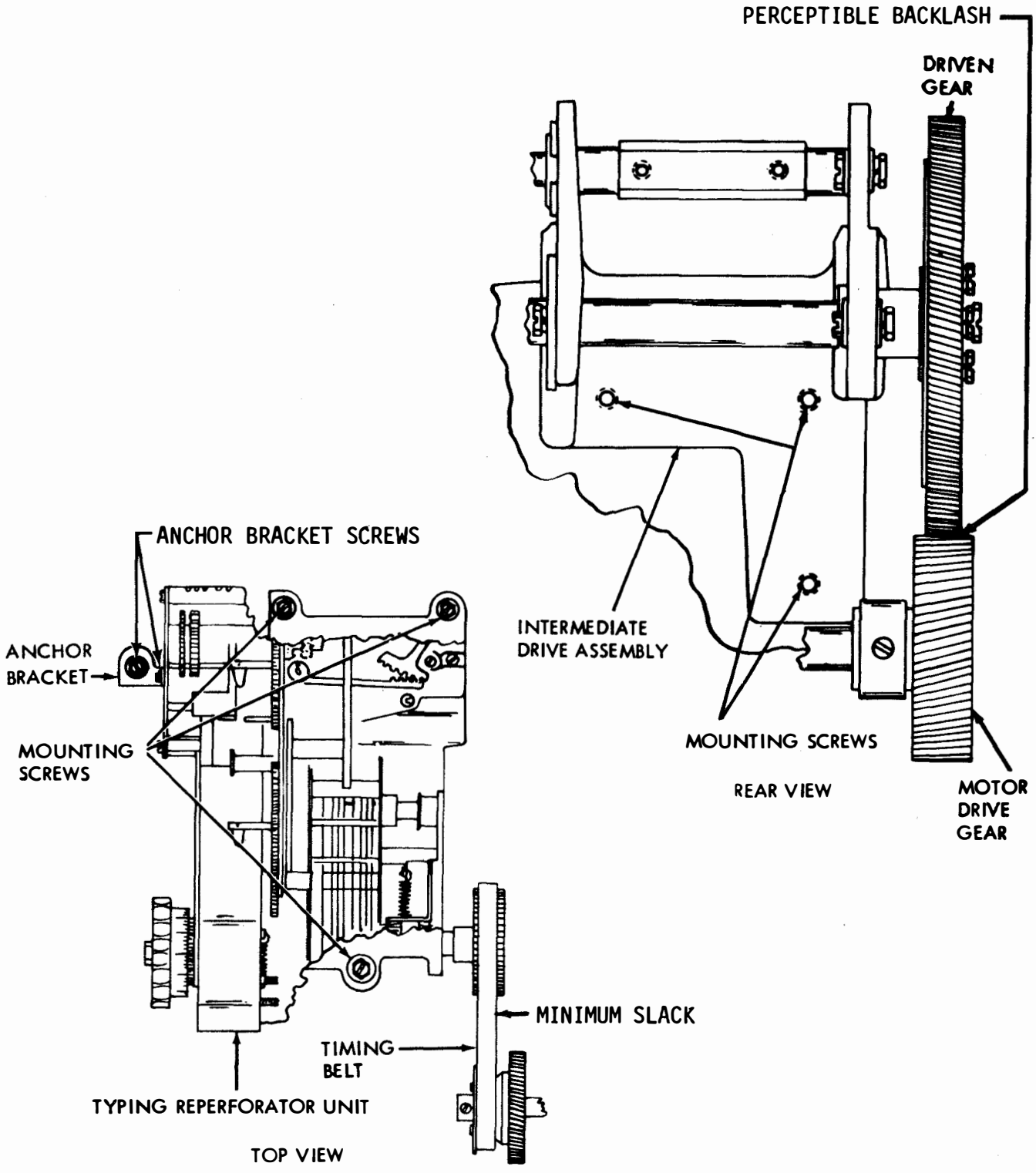


Figure 6-154. Intermediate Drive Assembly, Tape Container and and Timing Belt

(a) Tape-Out Switch Assembly. Adjust as follows:

1. Refer to figure 6-155.

2. Switch just closes when tape roll is reduced to 2-3/8 inch.

3. To adjust, loosen mounting screws and position switch assembly.

(b) Switch Lever Spring. Adjust as follows:

1. Refer to figure 6-155.

2. Use spring scale to measure force necessary to pull spring to 1-1/4 inches; this should require from 8-1/2 to 10 ounces.

3. If force does not match specifications, replace spring.

(c) Tape-Out Lever Spring.

1. Refer to figure 6-155.

2. Use spring scale to measure force necessary to pull spring to 1-17/32 inches; this should require from 6 to 8 ounces.

3. If force does not match specifications, replace spring.

(d) Tape-Out Lever. Adjust as follows:

1. Refer to figure 6-155.

2. Switch lever should be out of engagement with switch actuator when tape roll is removed.

3. To adjust, check steps (b) and (c) above.

4. Replace spring(s) that do not meet specifications.

d. Receive-Only Miniaturized Tape Printer Base. Perform receive-only miniaturized tape printer base adjustments in accordance with the following paragraphs.

(1) Pinion and Gear. Perform pinion and gear adjustment in accordance with the following paragraphs.

(a) Refer to figure 6-156.

(b) There should be barely perceptible backlash between motor pinion and driven gear mounted in single speed drive assembly.

(c) To adjust, loosen four mounting screws securing motor to upper base plate.

(d) Increase or decrease backlash by rotating middle nuts on mounting screws opposite pinion end.

(e) To ensure motor is properly aligned with driven gear, bottom edge of motor mount bracket opposite pinion end should be parallel with upper base plate.

(f) Tighten motor mounting screws.

e. Receive-Only Miniaturized Typing Reperforator Base. Perform receive-only miniaturized typing reperforator

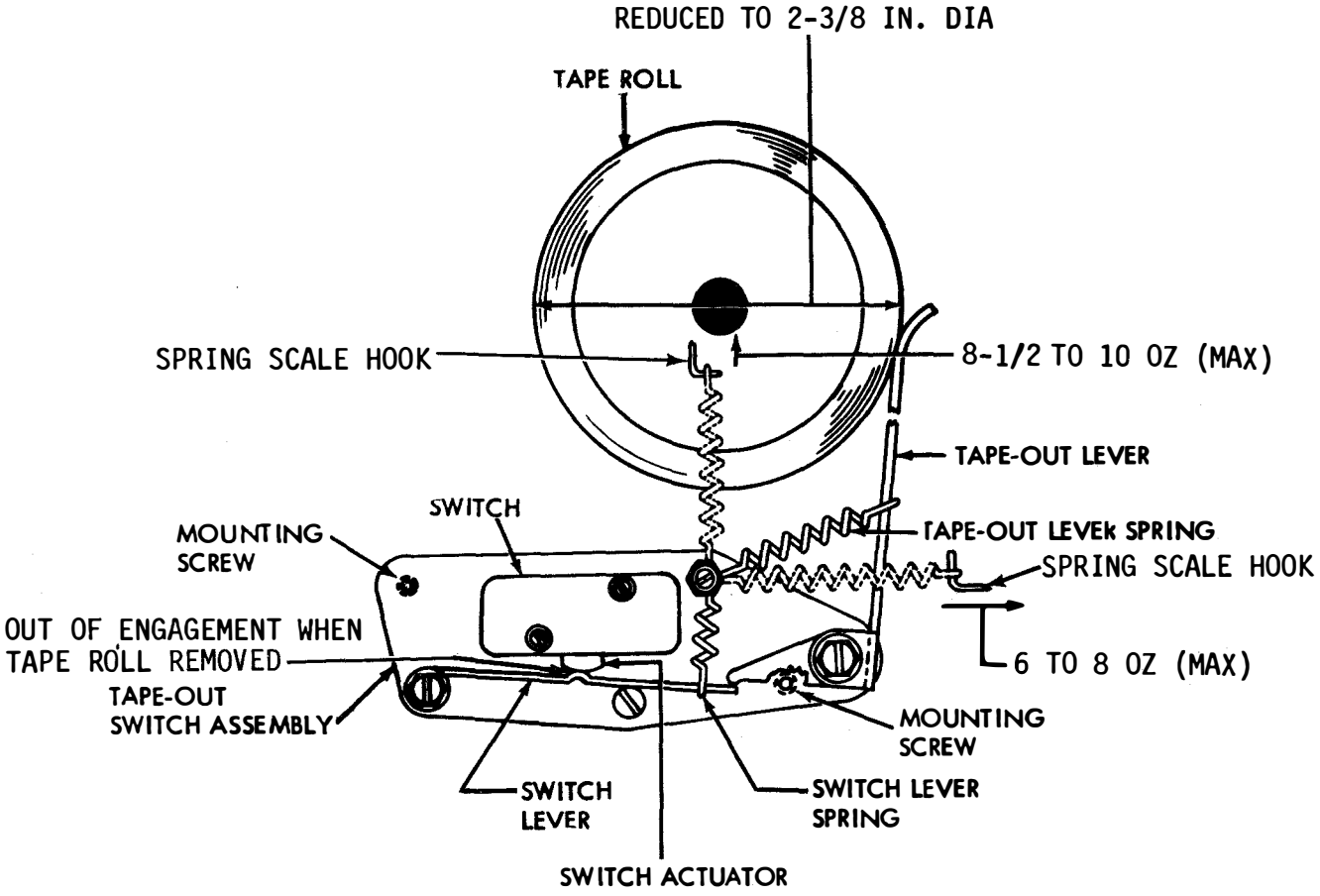


Figure 6-155. Tape-Out Switch Assembly, Switch Lever Spring, Tape-Out Lever Spring and Tape-Out Lever

base adjustments in accordance with the following paragraphs.

(1) Base Assembly and Variable Speed Mechanism. Perform base assembly and variable speed mechanism adjustments as follows:

(a) Vibration Isolator Immobilization. Adjust as follows:

1. Refer to figure 6-157.

2. There should be no clearance between top of rubber isolator and bottom of metal washer, with no compression of rubber.

3. To adjust, turn elastic stop nut.

(b) Variable Speed Mechanism. Adjust as follows:

1. Refer to figures 6-149, 150 and 156.

2. Cross-refer to paragraph 6-5.1a(3).

3. There should be barely perceptible backlash between motor pinion and driven gear at their closest point.

4. To adjust, loosen four mounting

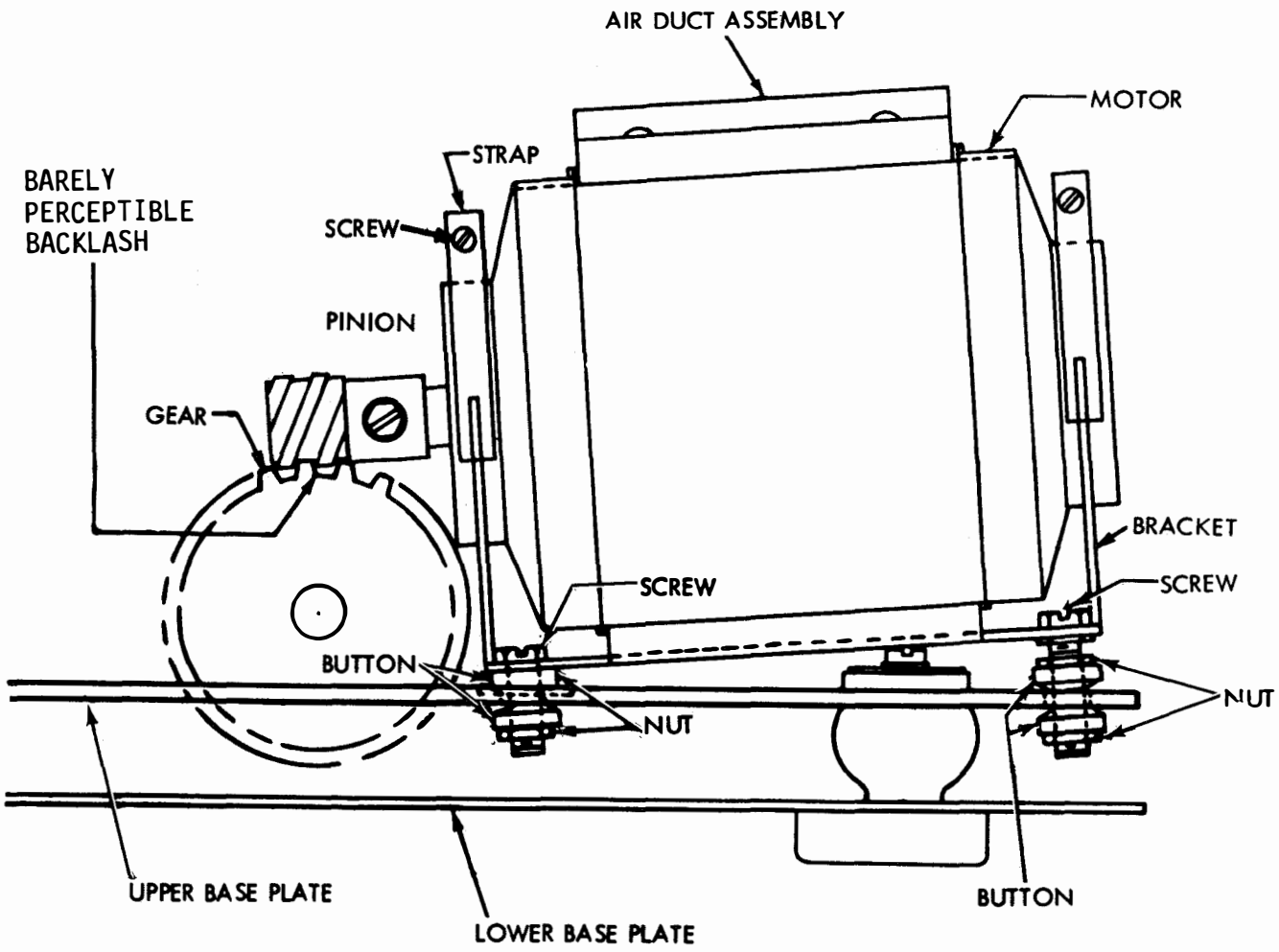


Figure 6-156. Pinion and Gear

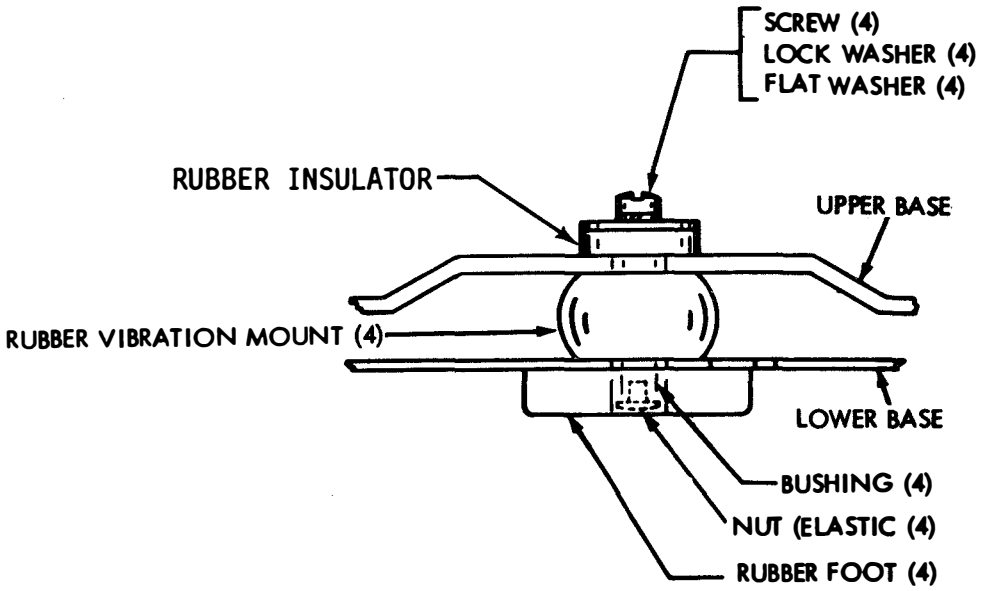


Figure 6-157. Vibration Isolator Immobilization and Variable Speed Mechanism

screws attaching variable speed device to vibration isolators, and position variable speed assembly.

5. With variable speed lever center detented at 100 wpm, there should be full mesh between gears.

6. To adjust, position gear shift bracket with mounting screws friction tight.

(2) Tape Container Assembly. Perform tape container assembly adjustments in accordance with the following paragraphs.

(a) Tape Container. Adjust as follows:

1. Refer to figure 6-158.

2. Clearance between reperforator and tape container assembly at any point, should be from 0.063 to 0.125 inch.

3. To adjust, loosen mounting screws to friction tight and position tape container assembly.

4. Tighten mounting screws.

(b) Low-Tape Switch. Adjust as follows:

NOTE

This switch is not supplied with this base, however, provision is made to accept the low tape switch. If the switch is provided the adjustment is as follows:

1. Refer to figure 6-159.

2. Top switch located on tape container assembly should operate when

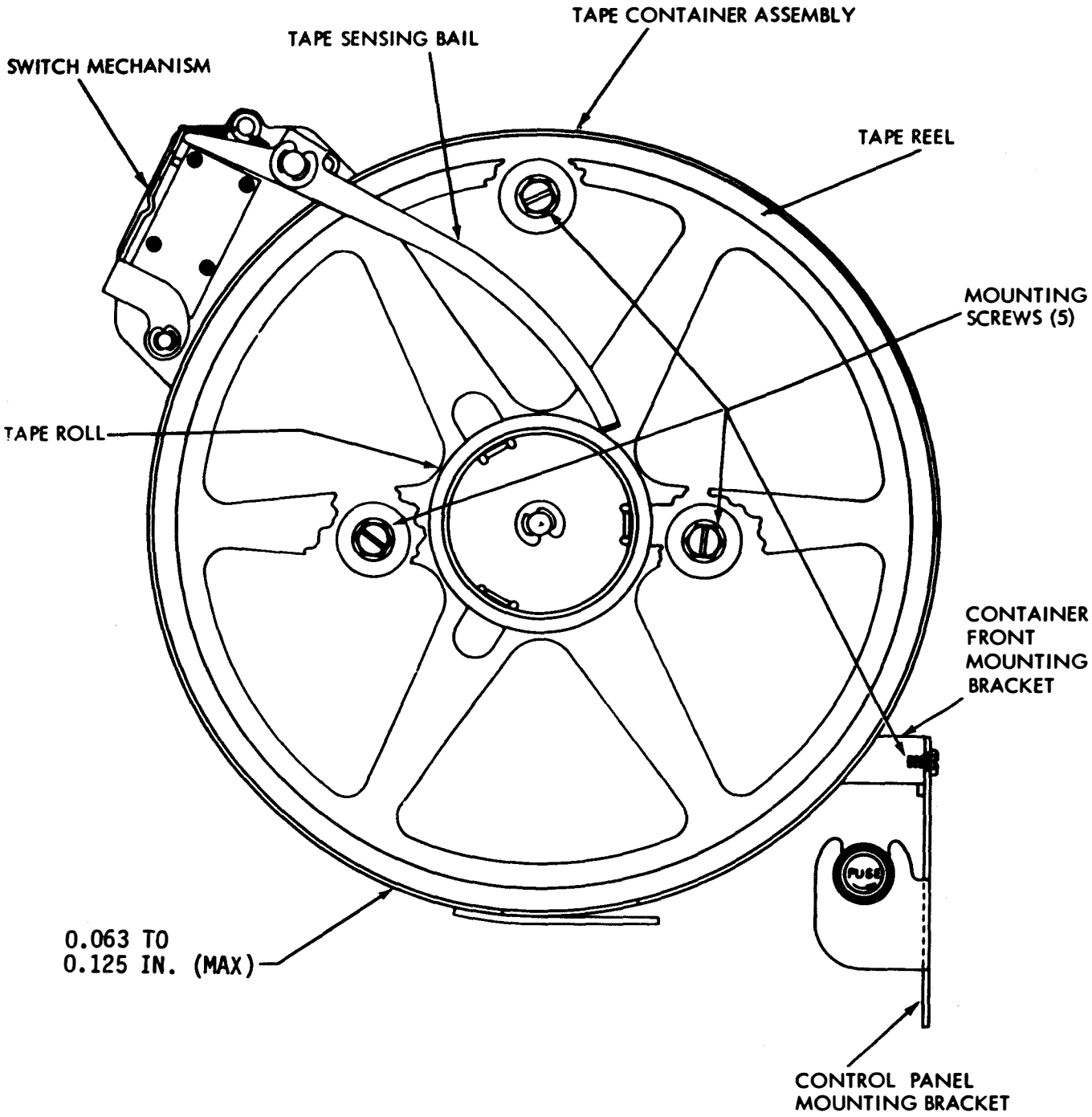


Figure 6-158. Tape Container

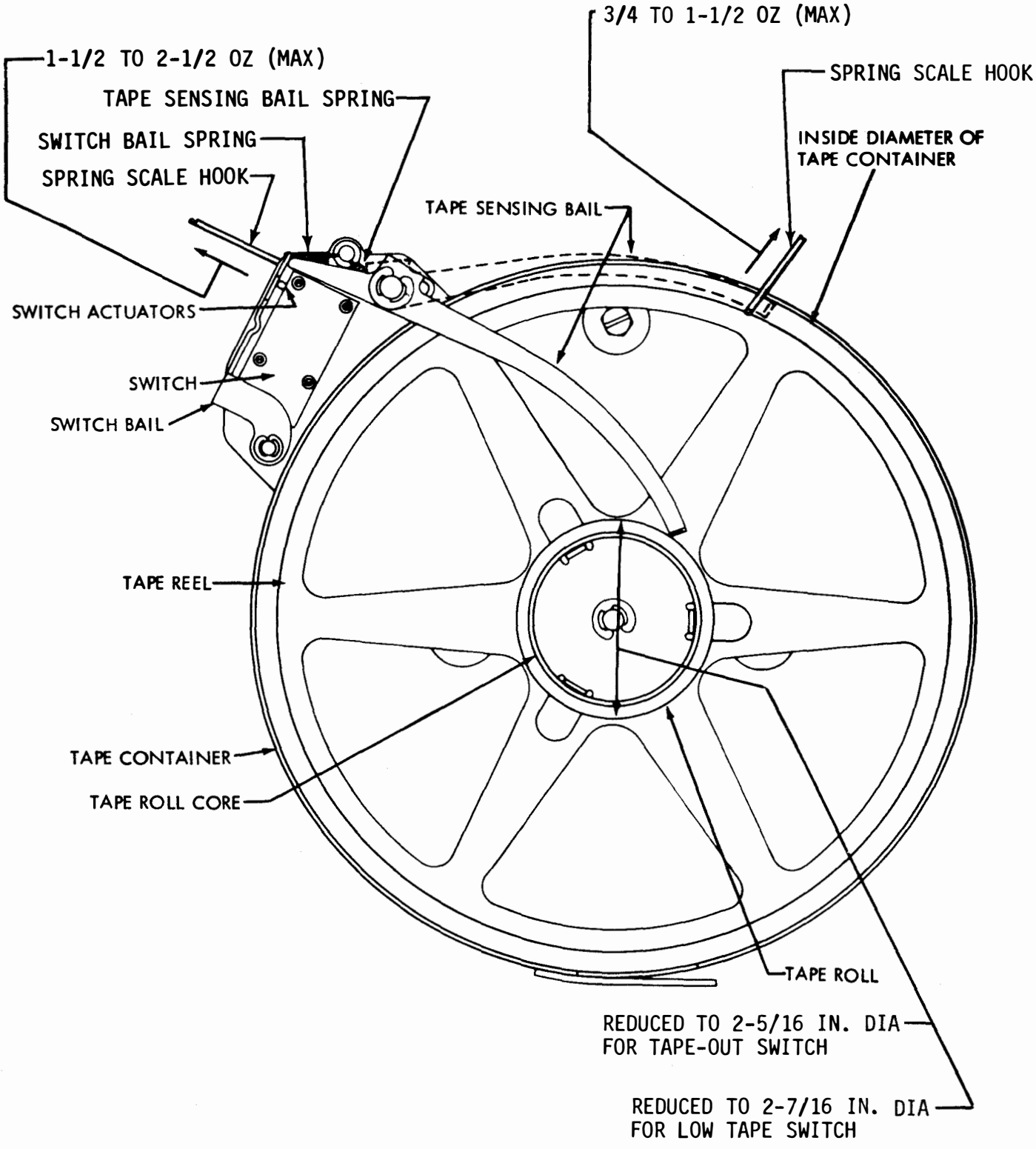


Figure 6-159. Low-Tape Switch, Switch, Switch Bail Spring, Tape-Out and Tape-Sensing Bail Spring

tape roll is reduced to 2-7/16 inch diameter.

3. Adjust by bending upper prong of switch bail.

4. Check Tape-Out Switch adjustment (paragraph 6-5.1e.(2)(c) below).

(c) Tape-Out Switch. Adjust as follows:

1. Refer to figure 6-159.

2. Switch should operate when tape roll is reduced to 2-5/16 inch diameter.

3. Adjust by bending lower prong of switch bail.

(d) Switch Bail Spring. Adjust as follows:

1. Refer to figure 6-159.

2. Tape sensing bail should not touch switch bail.

3. Hook spring scale under tip of switch bail, and rotate away from switch; it should require from 1-1/2 to 2-1/2 ounces to open normally-closed switch.

4. If force does not match requirement, replace spring.

(e) Tape-Sensing Bail Spring. Adjust as follows:

1. Refer to figure 6-159.

2. Use spring scale to measure force necessary to move tape sensing bail the inside diameter of tape container; this should require from 3/4 to 1-1/2 ounces.

3. If force does not match requirement, replace spring.

(3) Control Panel Bracket and Tape Guide. Perform control panel bracket and tape guide adjustments in accordance with the following paragraphs.

(a) Control Panel Bracket. Adjust as follows:

1. Refer to figure 6-160.

2. There should be some clearance (not to exceed 0.094 inch) between angular face of control panel bracket and switch identification plate mounted to cover plate.

3. To adjust, loosen mounting screws friction tight and position bracket.

4. Tighten mounting screws.

(b) Tape Guide. Adjust as follows:

1. Refer to figure 6-161.

2. Clearance between long segment of tape guide and tape container should be approximately 1/4 inch.

3. To adjust, loosen mounting screws that hold tape guide to tape container, and position guide.

4. Tighten mounting screws.

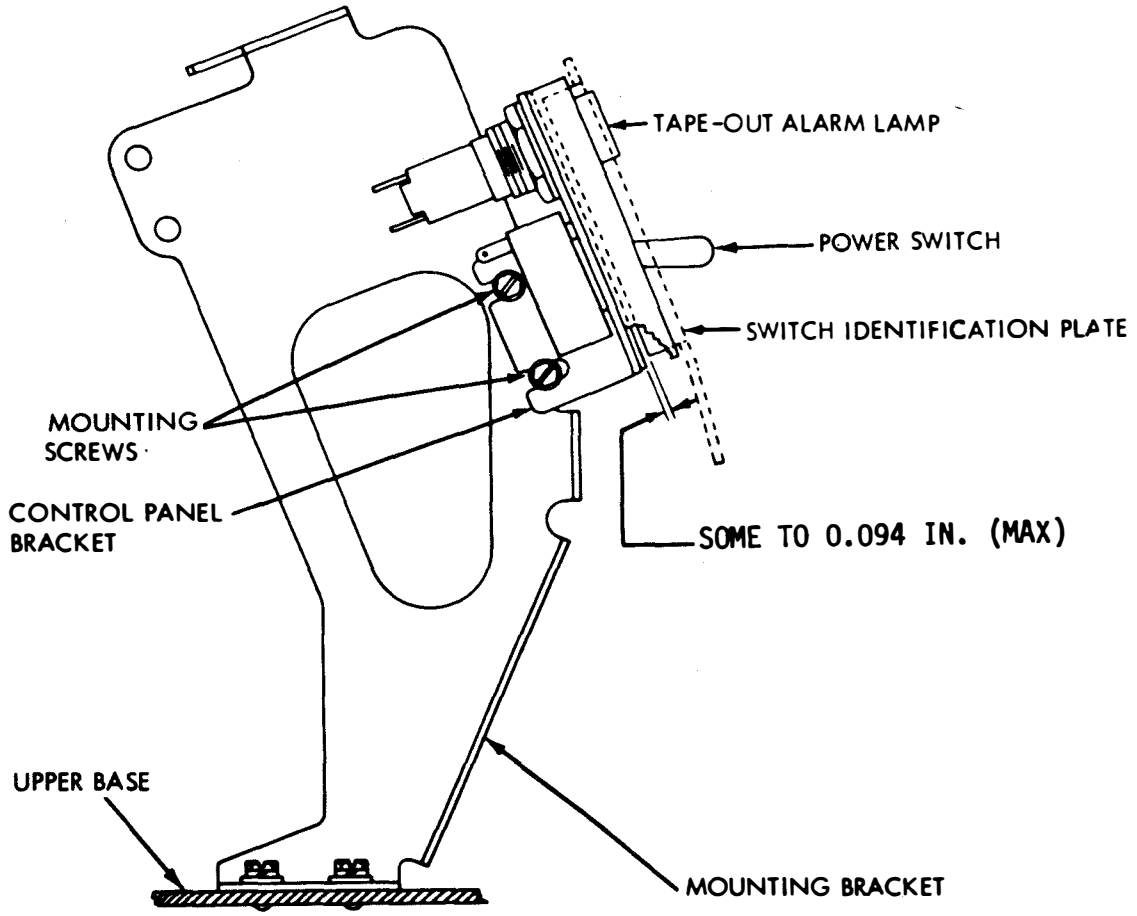


Figure 6-160. Control Panel Bracket

(4) Sliding Subbase. Perform sliding subbase adjustments in accordance with the following paragraphs.

(a) Quick-Disconnect Knob. Adjust as follows:

NOTE

Knob locking cylinder assembly must snap into locked position when knobs are released from an angular displacement of approximately 45 degrees from horizontal.

1. Refer to figure 6-162.

2. With knobs in open position, there should be from 0.093 to 0.140 inch clearance between cover and locking device knobs.

3. To adjust, loosen two set screws in each knob and position knobs.

4. Tighten set screws.

(b) Quick-Disconnect Latch. Adjust to follows:

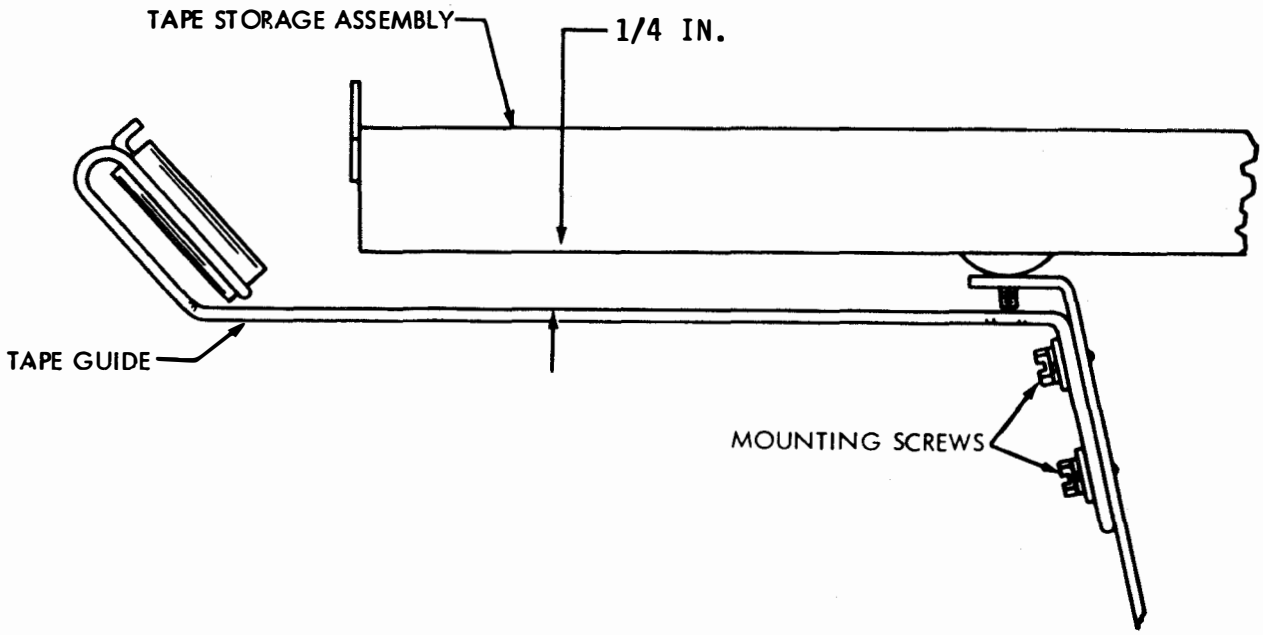


Figure 6-161. Tape Guide

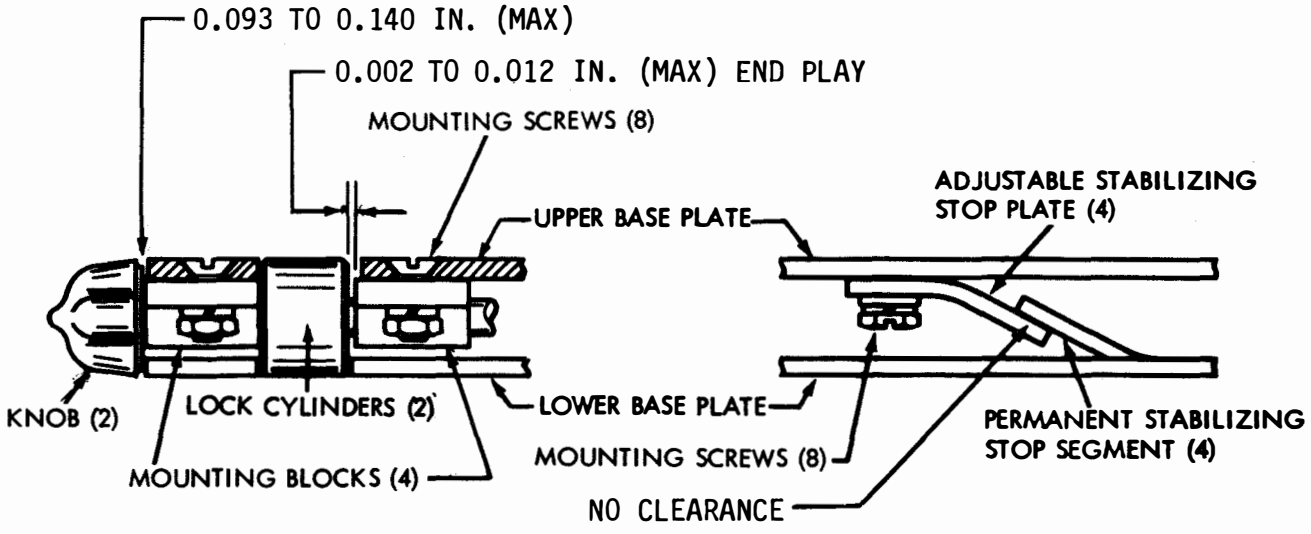


Figure 6-162. Quick-Disconnect Knob, Quick-Disconnect Latch, and Stabilizing Bracket

1. Refer to figure 6-162.

2. With slide fully retracted locking cylinder of quick-disconnect device shall seal firmly against stop surface of bottom plate.

3. There should be from 0.002 to 0.012 inch end play between locking cylinder and mounting blocks.

4. To adjust, position blocks with mounting screws friction tight and slide fully depressed.

5. Tighten mounting screws.

(c) Stabilizing Bracket. Adjust as follows:

1. Refer to figure 6-162.

2. When slide is fully retracted and locked, there should be no clearance between permanent stabilizing segment of lower base plate and adjustable stabilizing stop plate of upper base plate.

3. To adjust, position each stabilizing stop plate with mounting screws friction tight.

4. Check to ensure there is no rotation when top and bottom plates are rotated toward each other without bending either plate.

6-5.2 TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 BASES (LOW-LEVEL). There are no low-level Typing Reperforator and Tape Printer Model 28 Bases adjustments.

SECTION II - ADJUSTMENTS (VARIABLE FEATURES)

6-6. VARIABLE FEATURES. The following paragraphs contain information necessary for making adjustments to variable feature mechanisms of Typing Reperforator and Tape Printer Model 28 Units.

6-6.1 VARIABLE FEATURES (HIGH-LEVEL). Perform the following procedures to ensure proper adjustments of variable features (high-level).

a. Automatic and Remote Control Noninterfering LTRS and BLANK Tape Feed-Otu Mechanisms. Perform adjustments in accordance with the following paragraphs.

(1) Rear Check Pawl. Adjust as follows:

(a) Refer to figure 6-163.

(b) With unit in feed-out cycle and feed pawl at extreme left, there should be from 0.008 to 0.020 inch.

(c) To adjust, loosen clamp screw and position pawl with pry point.

(d) Tighten screw.

(2) Rear Check Pawl Spring. Adjust as follows:

(a) Refer to figure 6-163.

(b) Use spring scale to measure force necessary to start rear check pawl moving; this should require from 28 to 56 grams.

(c) If force does not match requirements, replace spring.

(3) Feed Pawl and Front Check Pawl Springs. Adjust as follows:

(a) Refer to figure 6-163.

(b) With unit in feed out cycle and feed pawl at extreme left, use spring scale to measure force necessary to pull each pawl spring to installed length; this should require from 1 to 3 ounces.

(c) If force does not match requirements, replace spring(s).

NOTE

Perform Front Ratchet Stop Position adjustment next. (paragraph 6-6.1a(4), below).

(4) Front Ratchet Stop Position. Adjust as follows:

NOTE

See Rear Check Pawl adjustment (paragraph 6-6.1a(1)) before making this adjustment.

(a) Refer to figure 6-164.

(b) With unit in stop position, place release lever on lower step of latchlever.

(c) Allow stop on front ratchet to rest against stop block and rotate main shaft

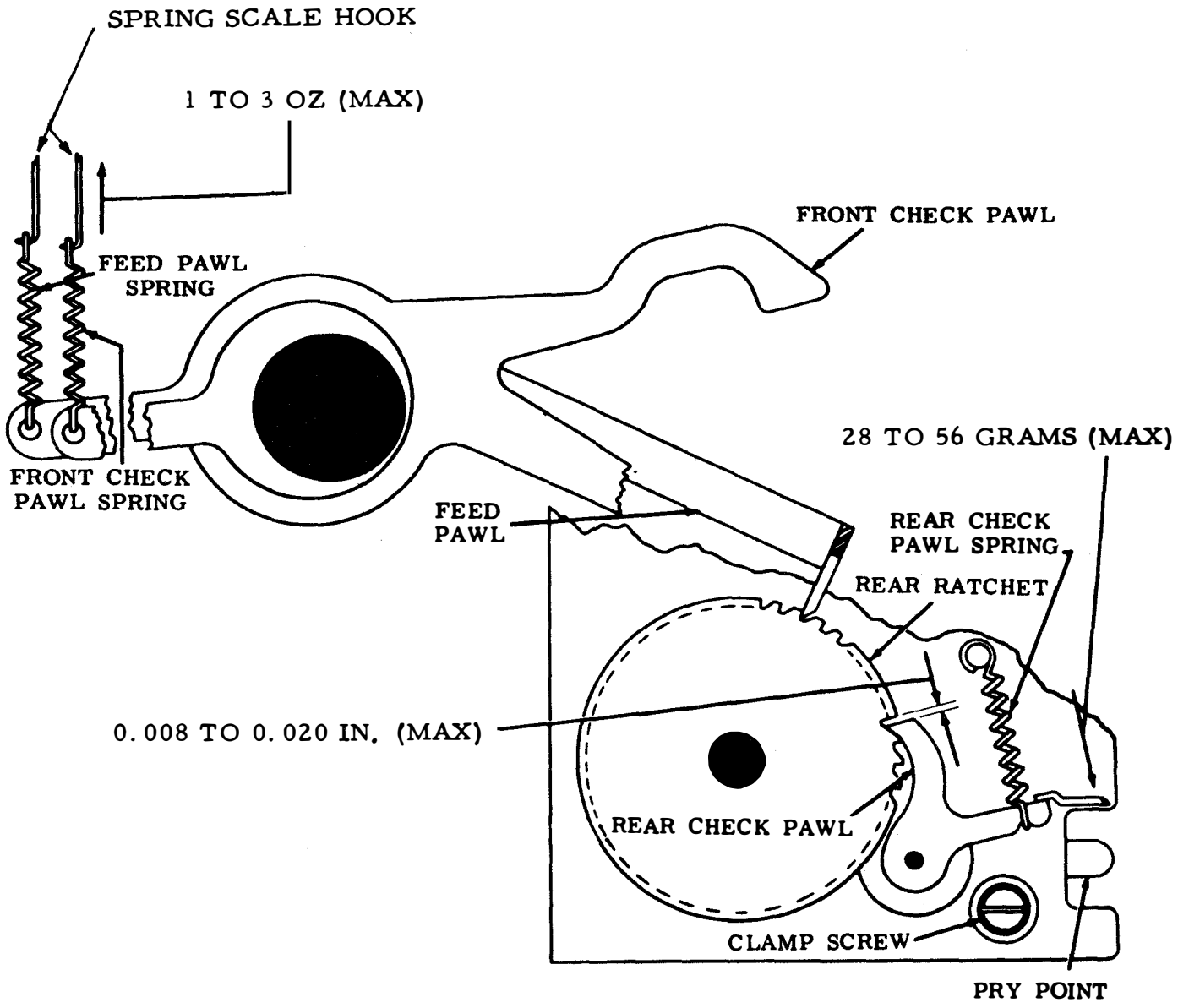


Figure 6-163. Rear Check Pawl, Rear Check Pawl Spring, and Feed Pawl and Front Check Pawl Springs

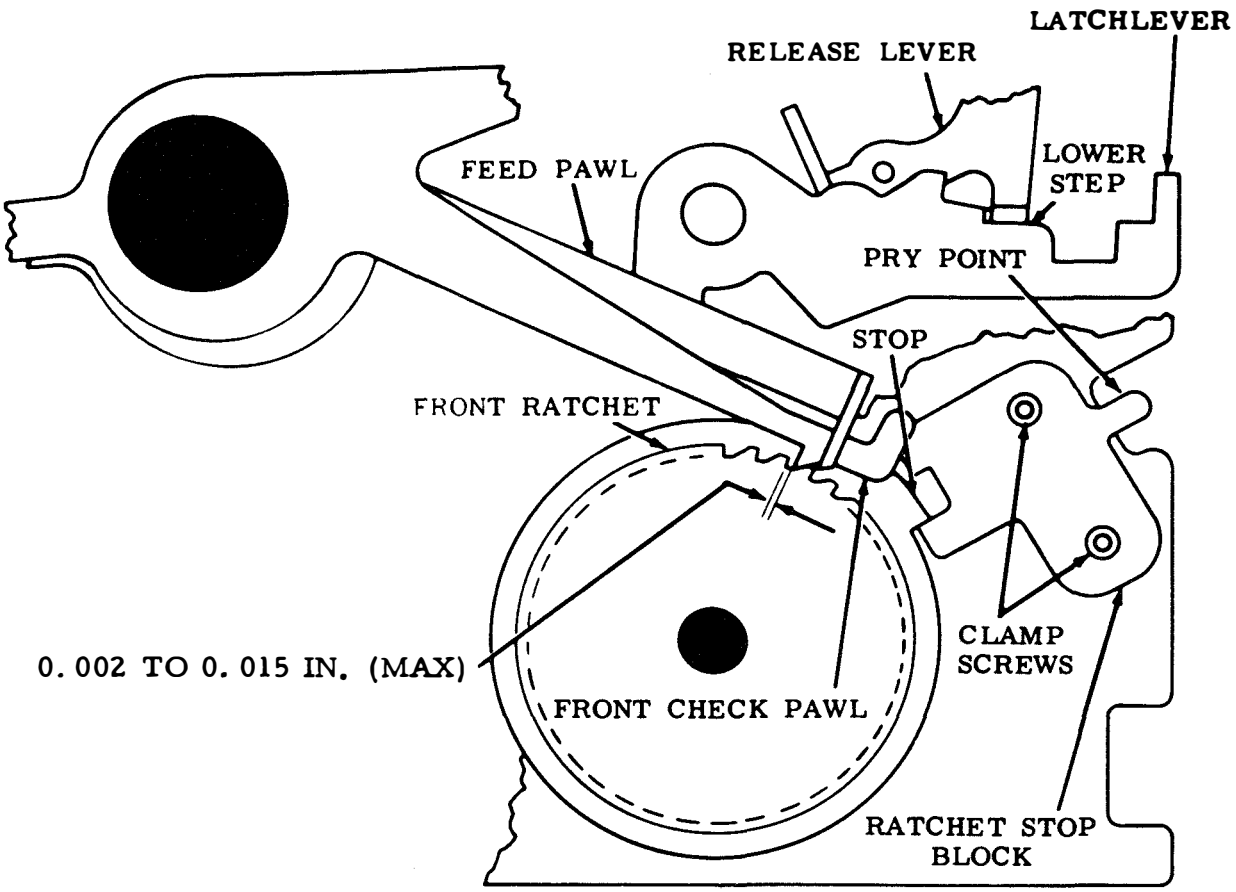


Figure 6-164. Front Ratchet Stop Position

until feed pawl is at extreme right.

(d) There should be from 0.002 to 0.015 inch clearance between front check pawl and front ratchet tooth.

(e) To adjust, loosen two clamp screws and position stop block by means of pry points.

(f) Tighten clamp screws.

(5) Time Delay Lever. Adjust as follows:

(a) Refer to figure 6-165.

(b) With selector clutch tripped and main shaft rotated until reset cam follower is on high part of reset bail cam, there should be from 0.040 to 0.060 inch clearance between time delay lever and high part of time delay cam.

(c) With unit in stop position, there should

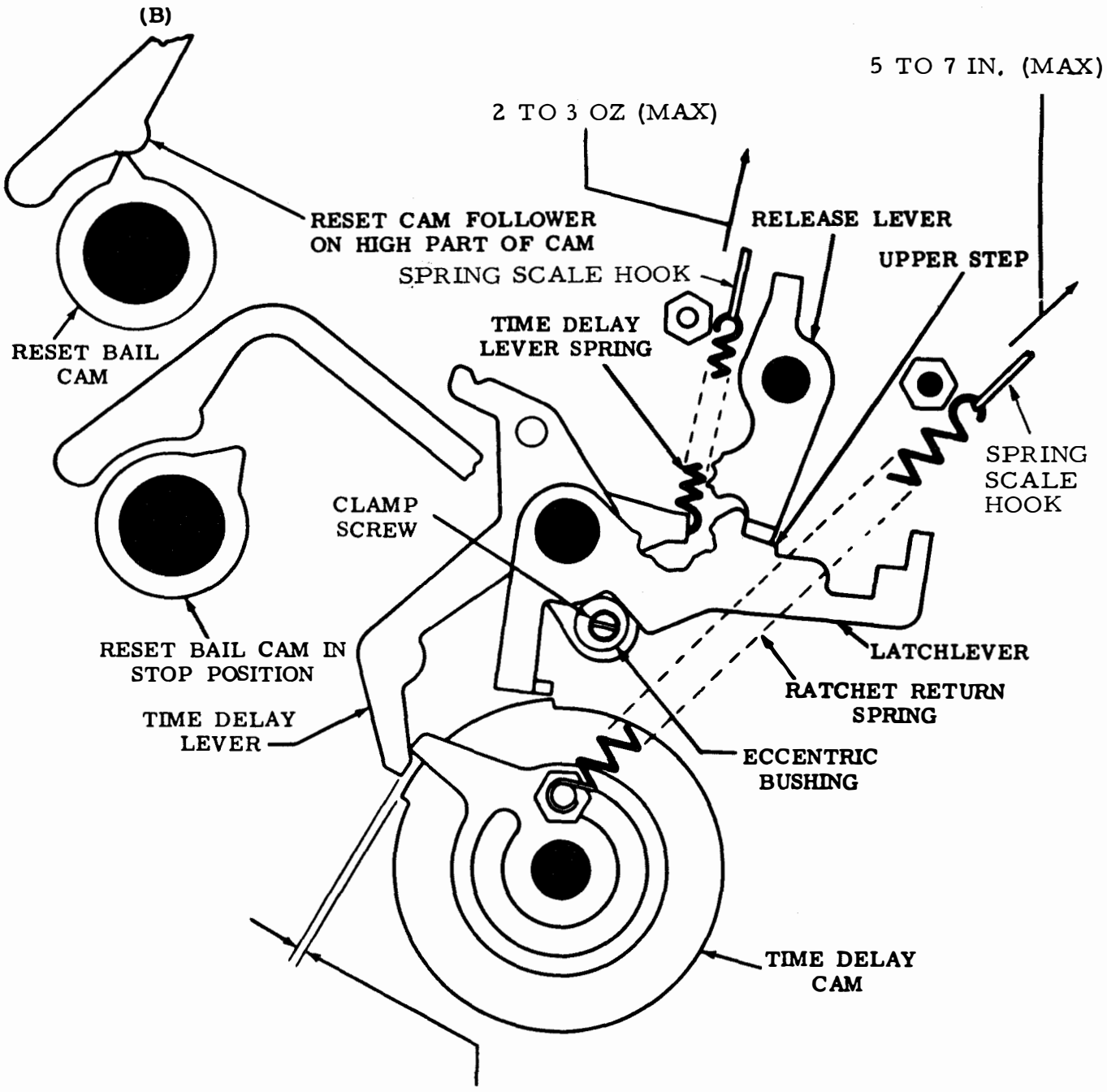


Figure 6-165. Time Delay Lever, Time Delay Lever Spring, and Ratchet Return Spring

be some clearance between time delay lever and high part of time delay cam.

(d) To adjust, loosen clamp screw and position eccentric bushing.

(e) Tighten screw.

(6) Time Delay Lever Spring. Adjust as follows:

(a) Refer to figure 6-165.

(b) With unit in stop position, use spring scale to measure force necessary to pull spring to installed length; this should require between 2 and 3 ounces.

(c) If force does not match specifications, replace spring.

(7) Ratchet Return Spring. Adjust as follows:

(a) Refer to figure 6-165.

(b) With unit in stop position, use spring scale to measure force necessary to pull spring to installed length; this should require from 5 to 7 ounces.

(c) If force does not match specifications, replace spring.

(8) Drive Arm Spring. Adjust as follows:

(a) Refer to figure 6-166.

(b) With unit in feed-out cycle and drive arm roller held firm against cam indent, use spring scale to measure force necessary to pull spring to installed length; this should require from 42 to 50 ounces.

(c) If force does not match requirements, replace spring.

(9) Punch Slide Latch. Adjust as follows:

(a) Refer to figure 6-166.

(b) Set up BLANK code combination in selector.

(c) Place unit in feed-out cycle, with ratchets advanced beyond time delay and drive arm on low part of cam.

(d) Ensure that reset bail is tripped.

(e) There should be from 0.010 to 0.030 inch clearance between punch slide and punch slide latch at slide where clearance is least.

(f) To adjust, loosen clamp screw and position drive arm adjusting plate by means of pry point.

(g) Tighten clamp screw.

(10) Trip Cam Follower. Adjust as follows:

(a) Refer to figure 6-167.

(b) With follower lever on high part of trip cam, there should be from 0.010 to 0.030 inch clearance between release and main trip lever.

(c) There should be some clearance between

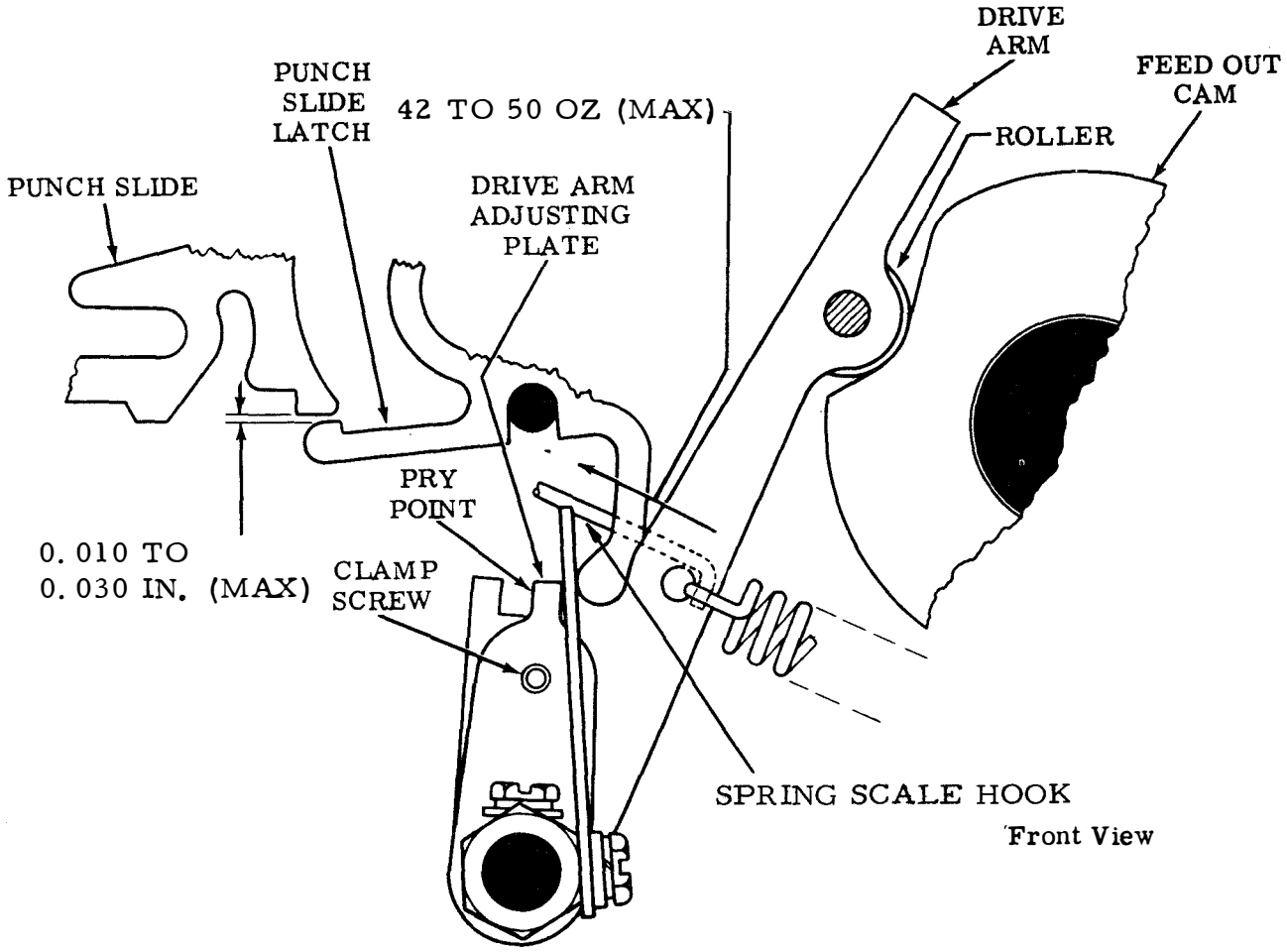


Figure 6-166 Drive Arm Spring and Punch Slide Latch

main trip lever and downstop bracket.

(d) To adjust, loosen locknut and position adjusting arm by means of pry point.

(e) Tighten locknut.

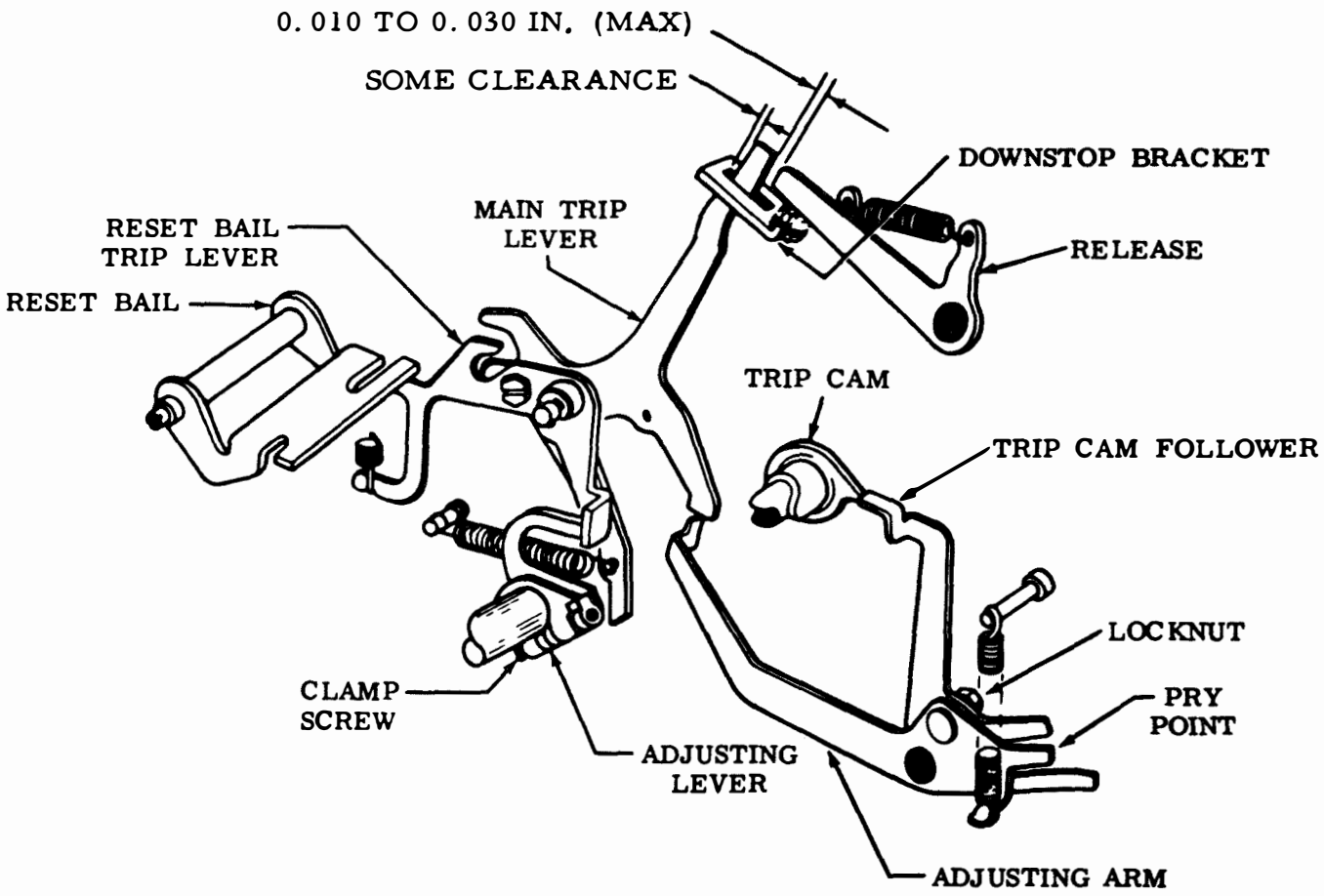
(11) Adjusting Lever. Adjust as follows:

(a) Refer to figure 6-167.

(b) Place unit in feed-out cycle by positioning release lever on lower step of latchlever and advancing high part of time delay cam beyond time delay lever.

(c) Position main shaft so that drive arm roller is on low part of cam; there shold be from 0.010 to 0.030 inch clearance between release and main trip lever.

(d) There should be some clearance between main trip lever and release.



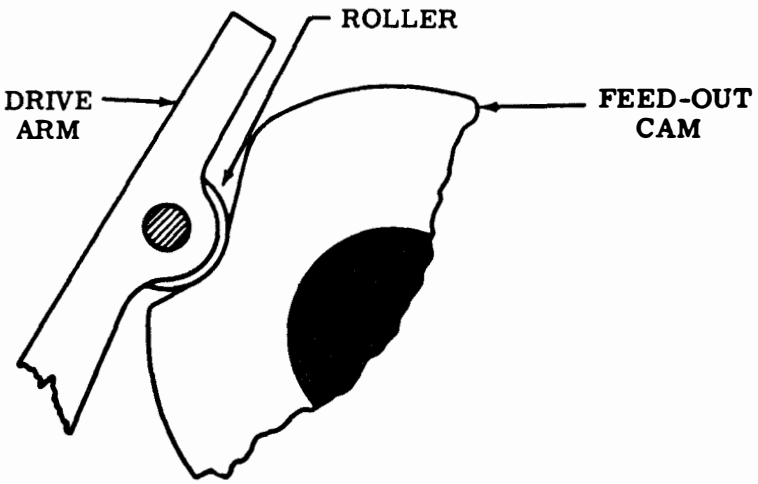


Figure 6-167. Trip Cam Follower and Adjusting Lever

(e) To adjust, loosen clamp screw and position adjusting lever, making sure adjusting lever rides fully on slide trip lever.

(f) Tighten clamp screw.

(12) Reset Bail Trip Lever. Adjust as follows:

(a) Refer to figure 6-168.

(b) Select LETTERS code combination (12345) and rotate main shaft until function clutch trips.

(c) Position punch slides against downstop, with trip cam follower on high part of cam.

(d) There should be from 0.008 to 0.020 inch clearance between punch slide and reset bail.

(e) With clutches fully disengaged and latched, reset bail should fully engage notches in punch slides.

(f) To adjust, loosen clamp screw and position reset bail trip lever by means of adjusting slot.

(g) Tighten clamp screw.

(13) Tape Length Adjusting Plate. Adjust as follows:

(a) Refer to figure 6-169.

(b) Place unit in feed-out cycle by positioning release lever on lower step of latchlever.

(c) Advance ratchets manually so that front ratchet is in tooth preceeding trip off.

(d) Rotate main shaft until feed pawl is at extreme left.

(e) Clearance between adjusting plate and latchlever projection should be from 0.002 to 0.020 inch.

(f) Under power, unit should feed out correct length of tape; length of tape can be set up to 18 inches.

(g) To adjust, position adjusting plate with spring post friction tight.

(h) Tighten spring post.

(14) Blocking Link (Horizontal Clearance). Adjust as follows:

(a) Refer to figure 6-170.

(b) With unit in stop position and release lever in upper step of latchlever, manually trip function clutch.

(c) Clearance between right edge of punch slide reset bail and blocking link should be between 0.005 and 0.018 inch.

(d) With selector range scale set at 120, the blocking link should be centered between the clutch disc mounting screws and the selector stop arm bail.

(e) To adjust, loosen adjusting lever clamp

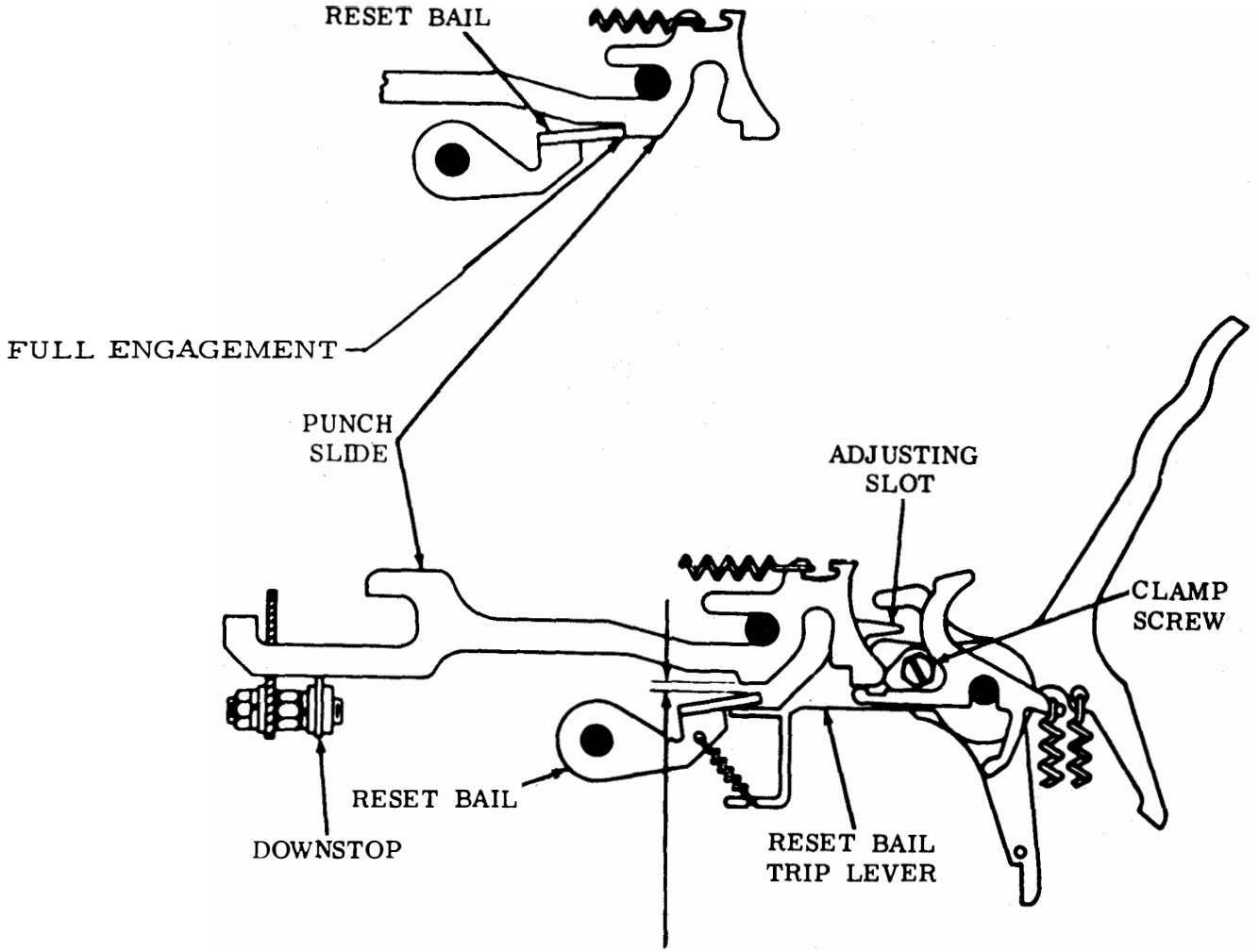


Figure 6-168. Reset Bail Trip Lever

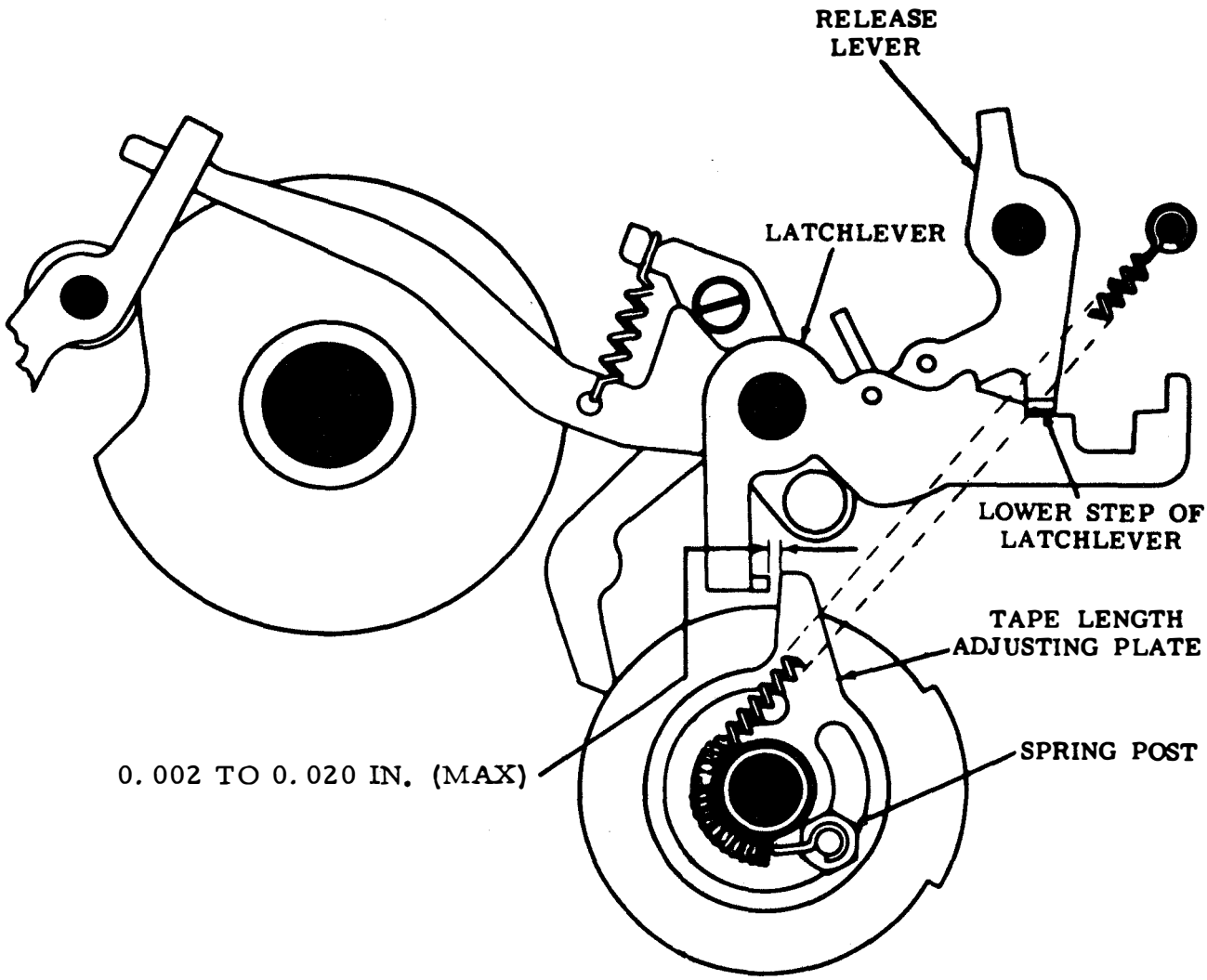


Figure 6-169. Tape Length Adjusting Plate

screw and position blocking link.

(f) Tighten screw.

(15) Blocking Link Torsion Spring. Adjust as follows:

(a) Refer to figure 6-170.

(b) With unit in stop position and release lever on lower step of latchlever, use spring scale to measure force necessary to start block link moving; this should require from 25 to 45 grams.

(c) If force does not match requirements, replace spring.

(16) Reset Bail Latch. Adjust as follows:

(a) Refer to figures 6-171 and 6-172.

(b) For vertical clearance, select LETTERS code combination (12345), rotate main shaft until

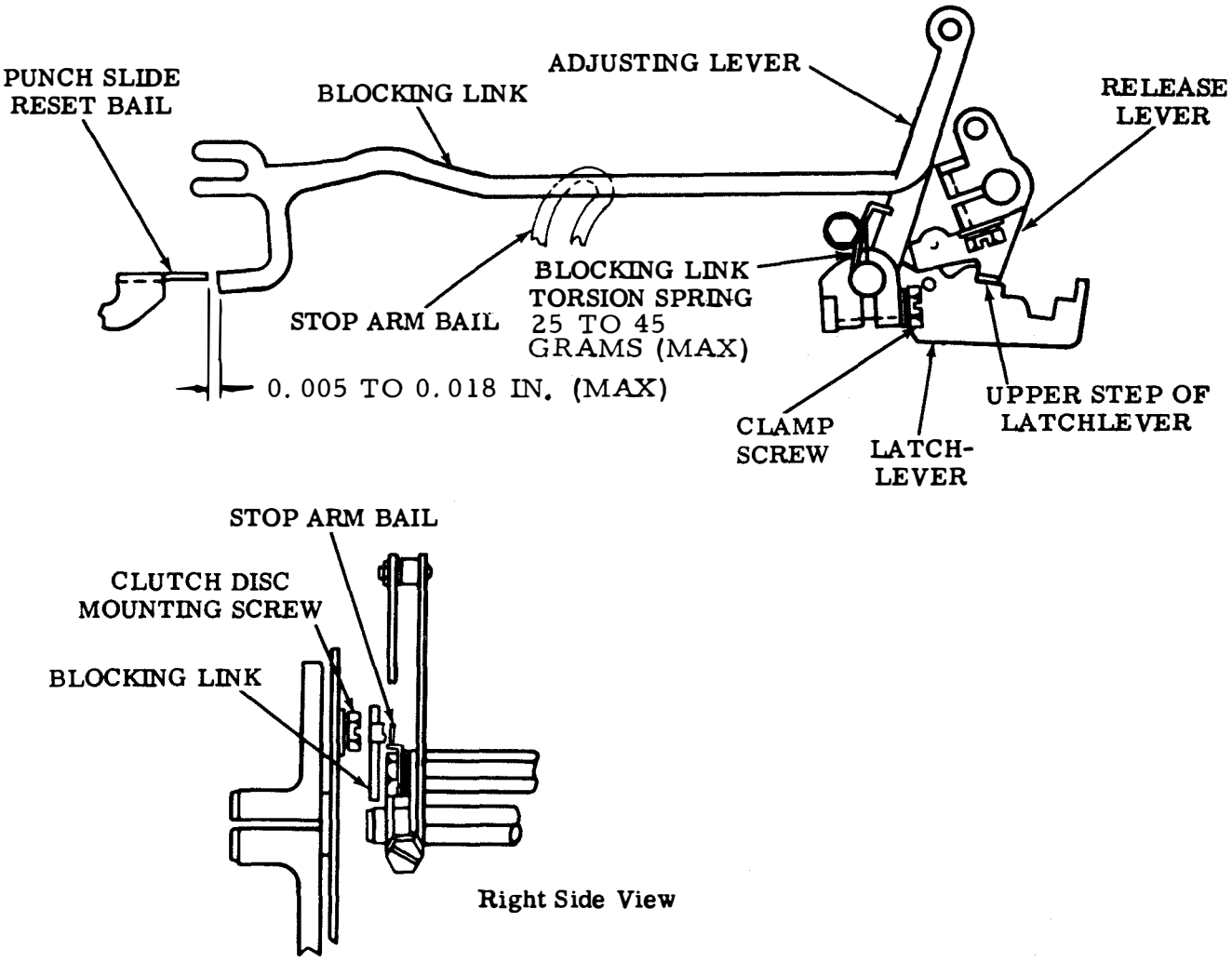


Figure 6-170. Blocking Link and Blocking Link Torsion Spring

function clutch trips and punch slides are to extreme left.

(c) Manually set up BLANK (-----) code combination in selector and rotate main shaft until punch slides are just latched.

(d) Clearance between reset bail and reset bail latch should be from 0.008 to 0.020 inch.

(e) To adjust, loosen mounting screws and position mounting plate at pry points. Tighten screws.

(f) For horizontal clearance, disengage clutches and measure clearance.

(g) Clearance between reset bail and reset bail latch should be from 0.005 and 0.020 inch.

(h) To adjust, loosen clamp screw and position bail latch at pry points so latching surface is approximately at midpoint in thickness of reset bail. Tighten screws.

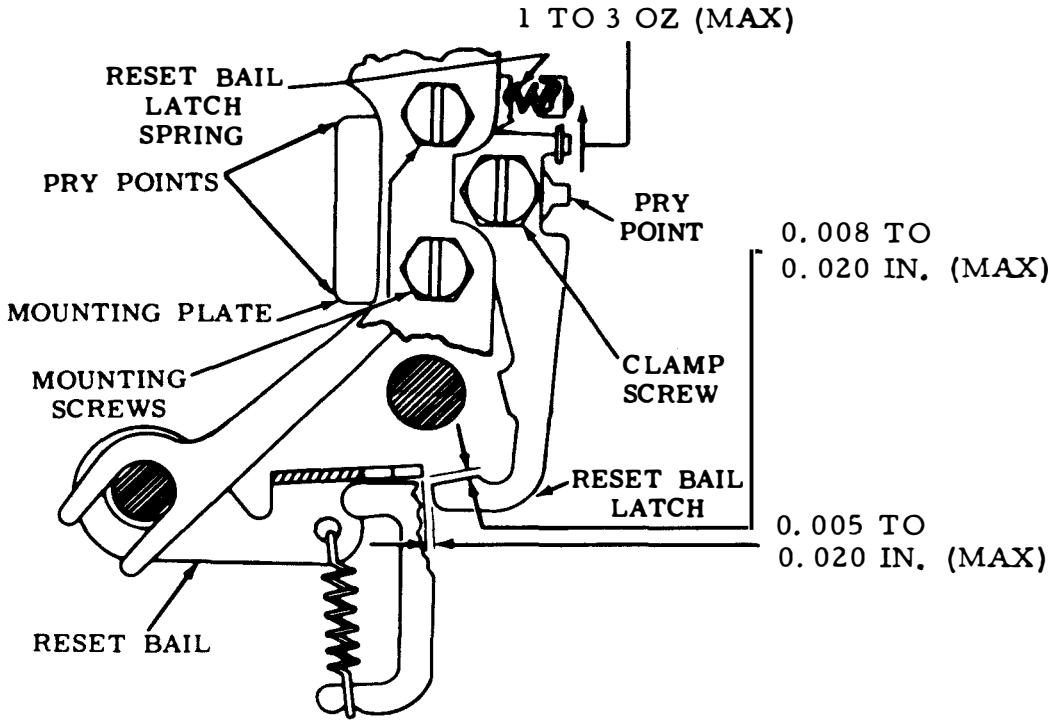


Figure 6-171. Reset Bail Latch and Reset Bail Latch Spring

(i) Select LETTERS code combination (12345) and rotate main shaft until function clutch trips.

(j) Manually set up BLANK (-----) code combination and rotate main shaft to stop position.

(k) Punch slides latched by punch slide latches (see figure 6-172).

(l) To adjust, refine steps (b) through (h).

(17) Reset Bail Latch Spring. Adjust as follows:

(a) Refer to figure 6-171.

(b) With unit in stop condition, use spring scale to measure force necessary to start reset bail latch moving; this should require from 1 to 3 ounces.

(c) If force does not match requirement, replace spring.

(18) Reset Bail Trip Lever Spring. Adjust as follows:

(a) Refer to figure 6-172.

(b) Disengage both clutches and trip function clutch by pivoting main trip lever counterclockwise. Hold reset bail trip lever up against reset bail.

(c) Use spring scale to measure force necessary to pull spring to installed length; this should require from 18 to 24 ounces.

b. Automatic Noninterfering LTRS and BLANK Tape Feed-Out Mechanisms. Perform adjustments in

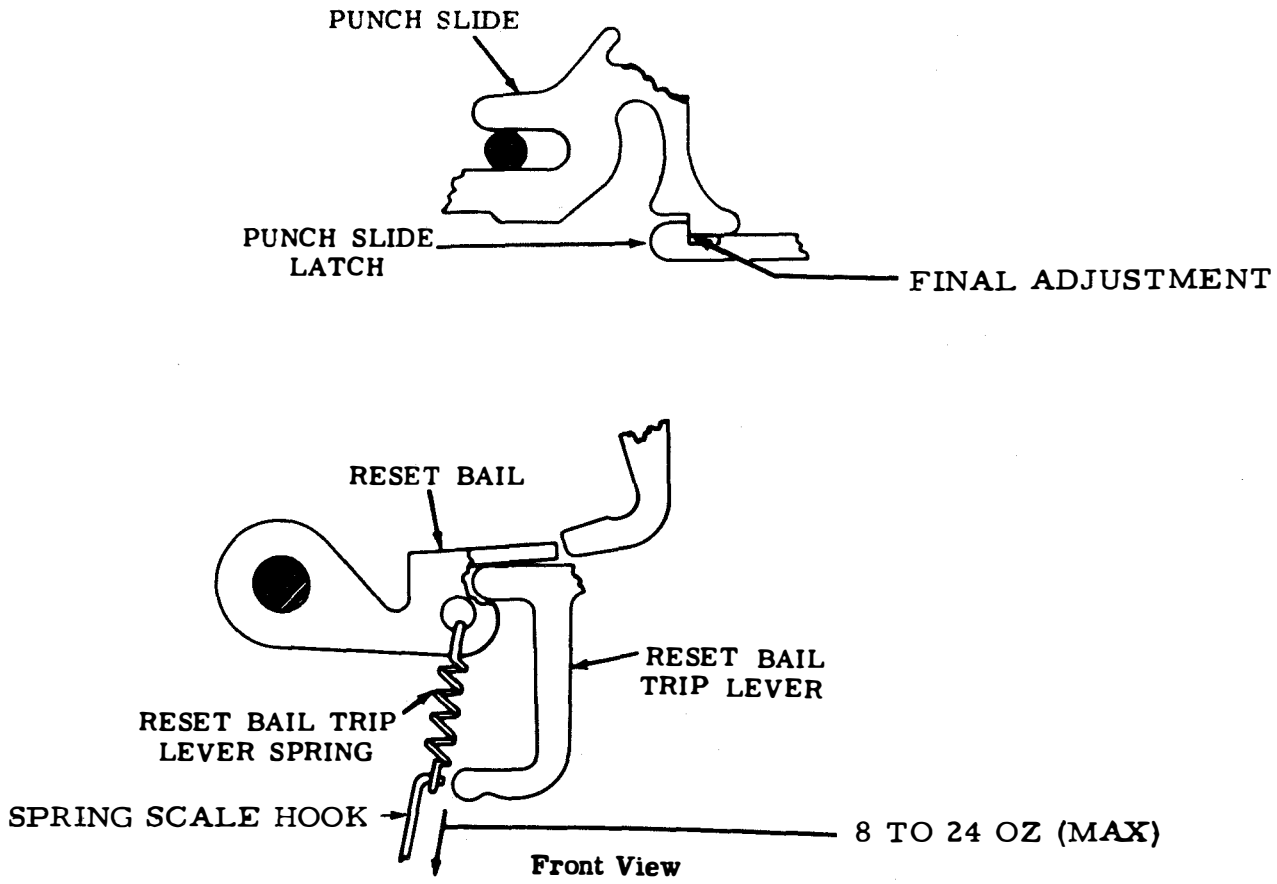


Figure 6-172. Reset Bail Trip Lever Spring

accordance with the following paragraphs.

(1) Latchlever. Adjust as follows:

(a) Refer to figure 6-173.

(b) Trip selector clutch and rotate main shaft until reset cam follower is on peak of reset bail cam, where clearance is minimum; there should be from 0.018 to 0.028 inch clearance between release lever and latchlever.

(c) There should be some to 0.008 inch end play between cam follower and bushing.

(d) To adjust, loosen reset cam follower clamp screw and recheck.

(2) Release Lever Spring. Adjust as follows:

(a) Refer to figure 6-173.

(b) Trip selector clutch and rotate main

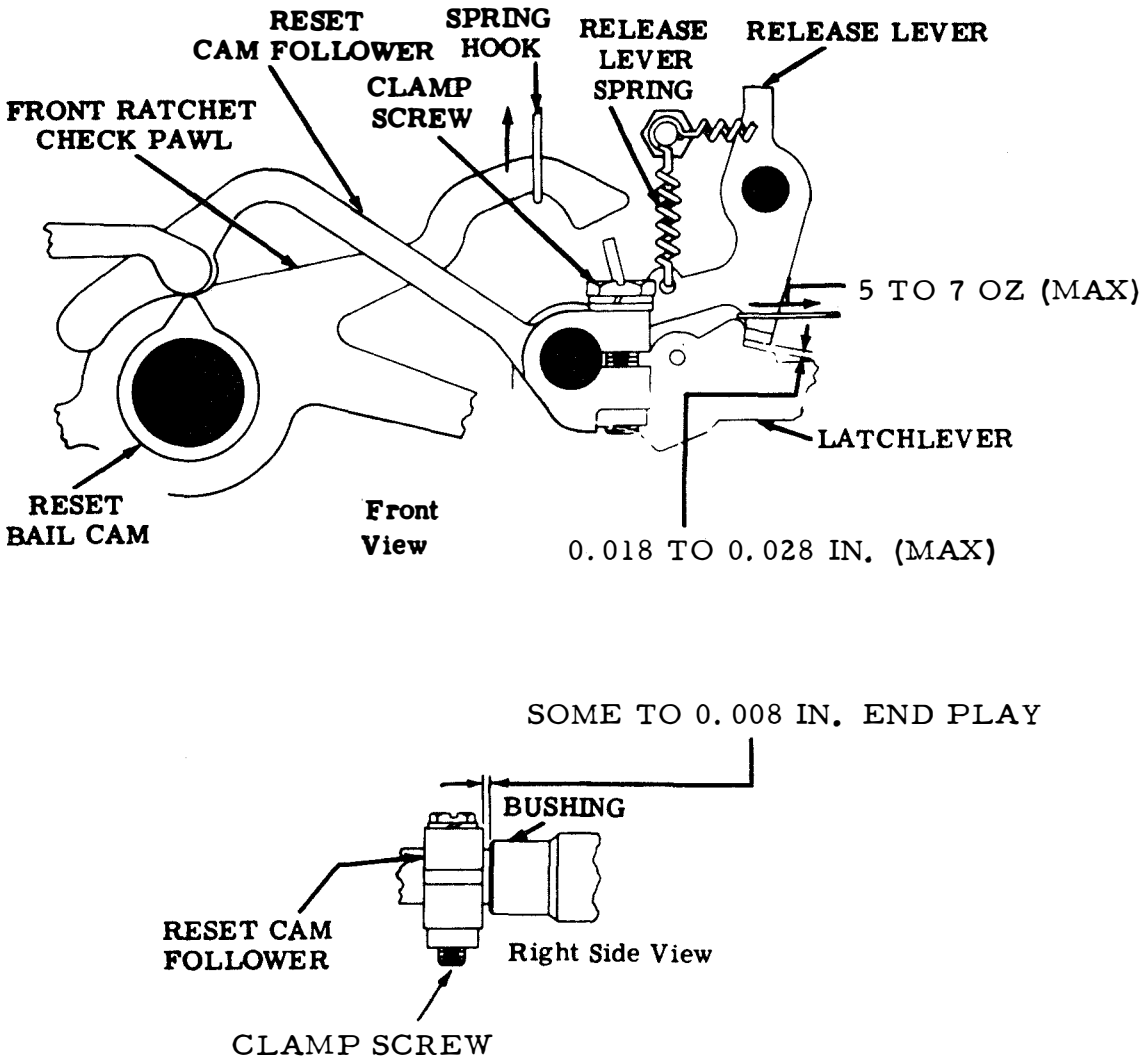


Figure 6-173. Latchlever and Release Lever Spring

shaft until reset cam follower is on peak of reset bail cam.

(c) With spring scale hook, hold front ratchet check pawl away from release lever.

(d) Measure force necessary to start release lever moving; this should require from 5 to 7 ounces.

(e) If force does not match specifications, replace spring.

(3) Safety Latch. Adjust as follows:

(a) Refer to figure 6-174.

(b) Trip function clutch by rotating main trip lever counterclockwise and rotate main shaft until drive link is to extreme left.

(c) Trip selector clutch and rotate main shaft until reset cam follower is on peak of cam where clearance between safety latch and latchlever is minimum.

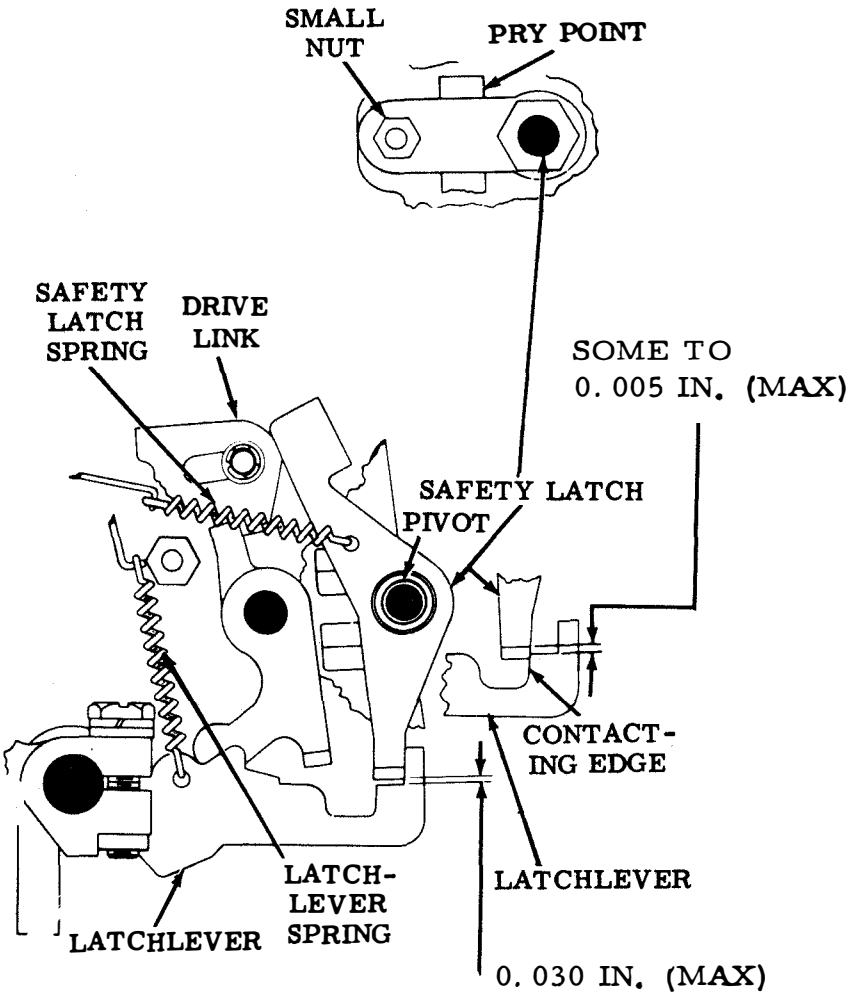


Figure 6-174. Safety Latch - Rear View

(d) Take up play in safety latch to minimize clearance; clearance at this point should be some to 0.005 inch (maximum).

(e) To adjust, loosen small nut and position safety latch pivot by means of pry point.

(f) Trip selector clutch and rotate main shaft until right edge of safety latch and contacting edge of latchlever are in line.

(g) A maximum of 0.030 inch of the safety latch should be unengaged by latchlever.

(h) To adjust, refine adjustments (b) through (e), above, and Latchlever adjustment (paragraph 6-6.1b(1)).

(4) Safety Latch Spring. Adjust as follows:

(a) Refer to figure 6-175.

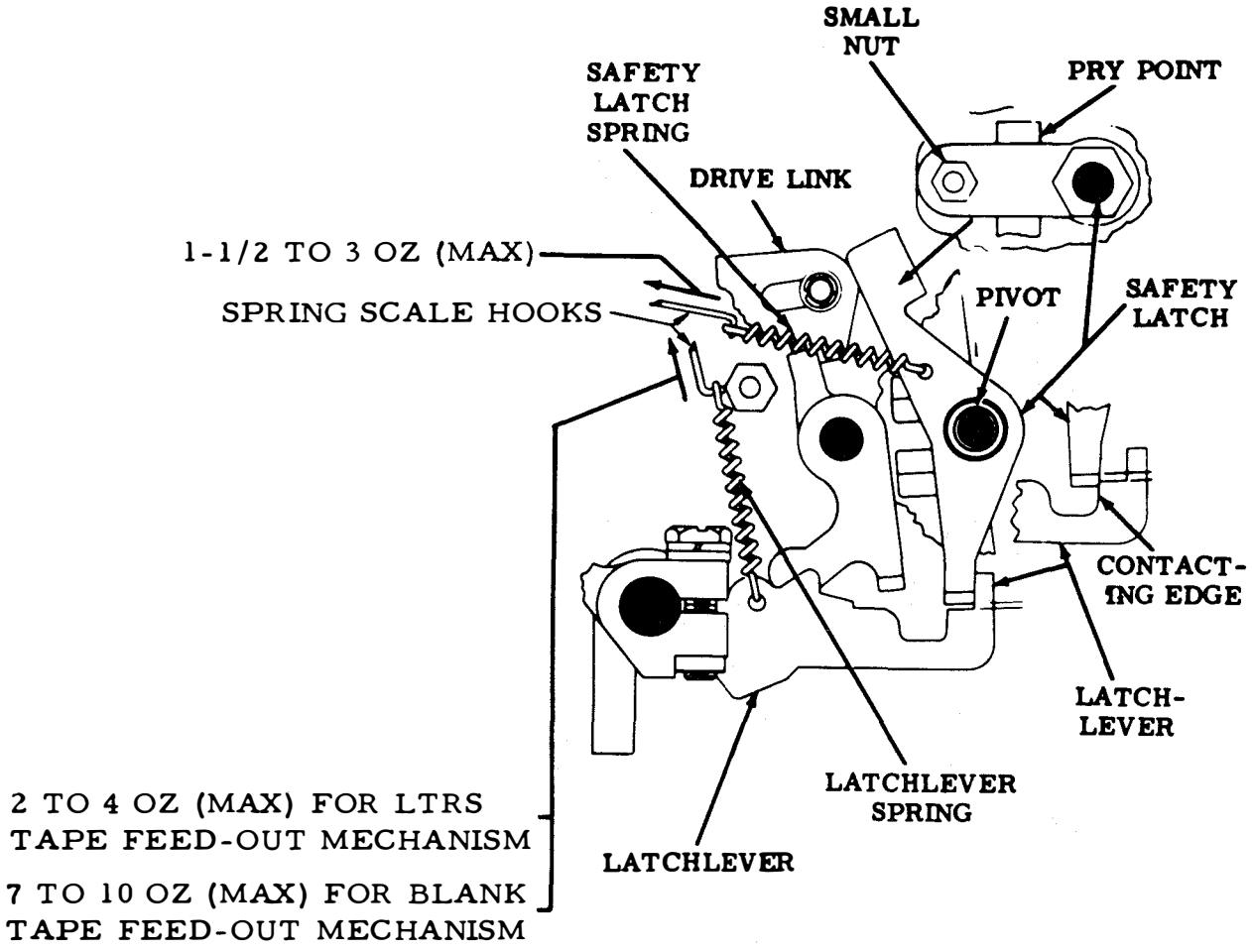


Figure 6-175. Safety Latch Spring and Latchlever Spring - Rear View

(b) Trip function clutch by pivoting main trip lever counterclockwise, rotate main shaft until drive link is at extreme left and trip selector clutch and rotate main shaft until reset cam follower is on peak of cam.

(c) Use spring scale to measure force necessary to pull spring to installed length; this should require from 1-1/2 to 3 ounces.

(d) If force does not match specifications, replace spring.

(5) Latchlever Spring. Adjust as follows:

(a) Refer to figure 6-175.

(b) Trip selector clutch and rotate main shaft until reset cam follower is on peak of reset bail cam.

(c) Use spring scale to measure force necessary to pull spring to installed length.

(d) For LTRS tape feed-out, force should be from 2 to 4 ounces.

(e) For BLANK tape feed-out, force should be from 7 to 10 ounces.

(f) If force does not match specifications, replace spring.

(6) Release Arm. Adjust as follows:

(a) Refer to figure 6-176.

(b) Place unit in feed-out cycle by positioning release lever on lower step of latchlever.

(c) Advance ratchets beyond time delay (high part of time delay cam beyond time delay lever).

(d) There should be from 0.010 to 0.030 inch clearance between drive arm and release arm.

(e) With unit in stop position, a maximum 0.015 inch of drive bail should be unengaged by release arm.

(f) To adjust, loosen clamp nut and posiiton release arm by means of eccentric screw on time delay lever.

(g) Tighten clamp nut.

(7) Release Arm Spring. Adjust as follows:

(a) Refer to figure 6-176.

(b) With clutches disengaged and drive arm latched by release arm, use spring scale to measure force necessary to pull spring to installed length; this should require from 2 to 5 ounces.

(c) If force does not match specifications, replace spring.

c. Auxiliary Contact Assembly. Perform auxiliary contact assembly adjustments in accordance with the following paragraphs.

NOTE

The following adjustments should be made prior to installation of contact bracket assembly on unit.

(1) Normally-Open Contact Spring. Adjust as follows:

(a) Refer to figure 6-177.

(b) Use spring scale to measure force necessary to move contact spring away from stiffener; this should require from 4-1/2 to 5-1/2 ounces.

(c) To adjust, bend contact spring.

(d) Recheck contact gap (adjustment (2), following).

(2) Normally-Open Contact Gap. Adjust as follows:

(a) Refer to figure 6-177.

(b) Gap should be between 0.020 to 0.025 inch.

(c) To adjust, bend stiffener.

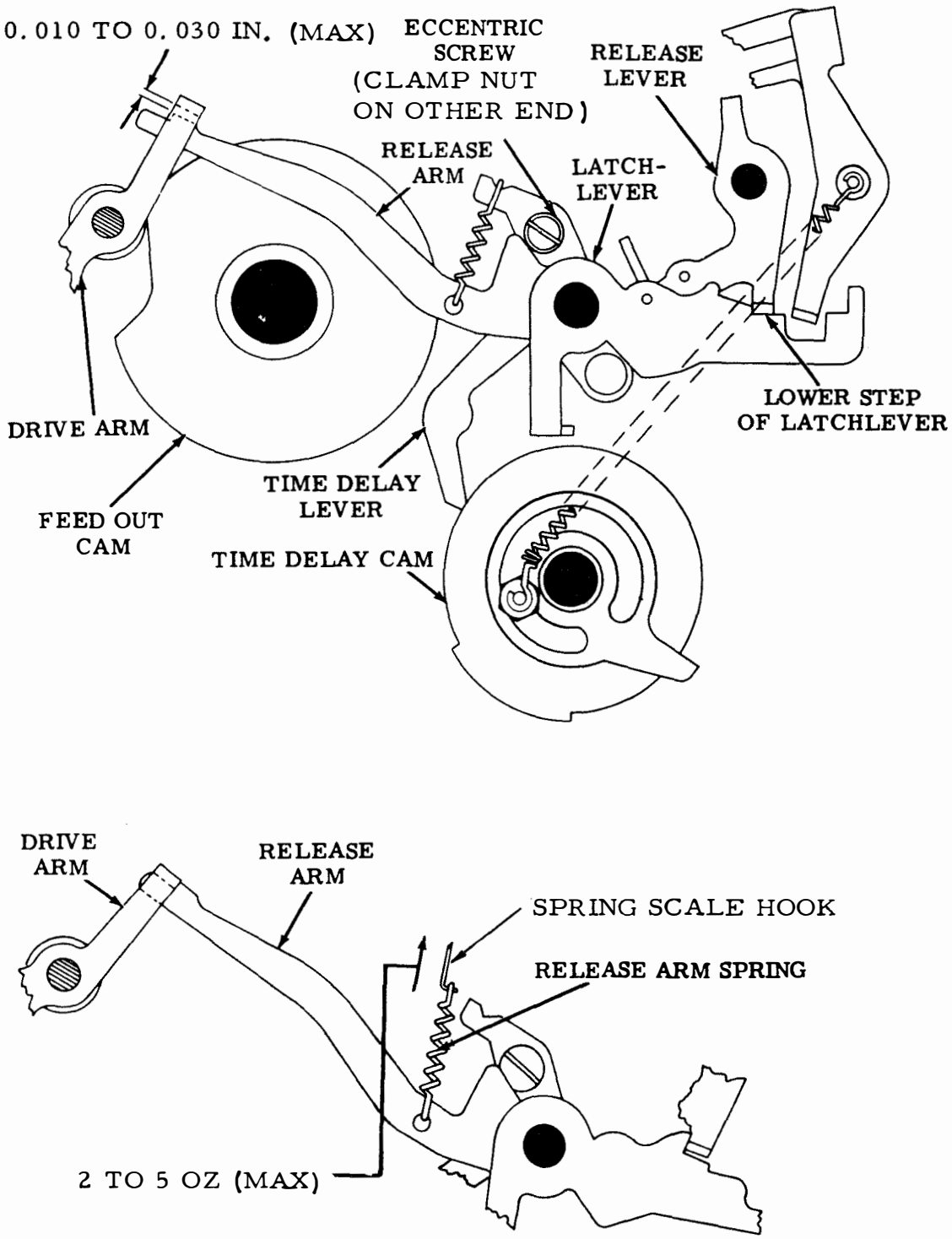


Figure 6-176. Release Arm and Release Arm Spring - Rear View

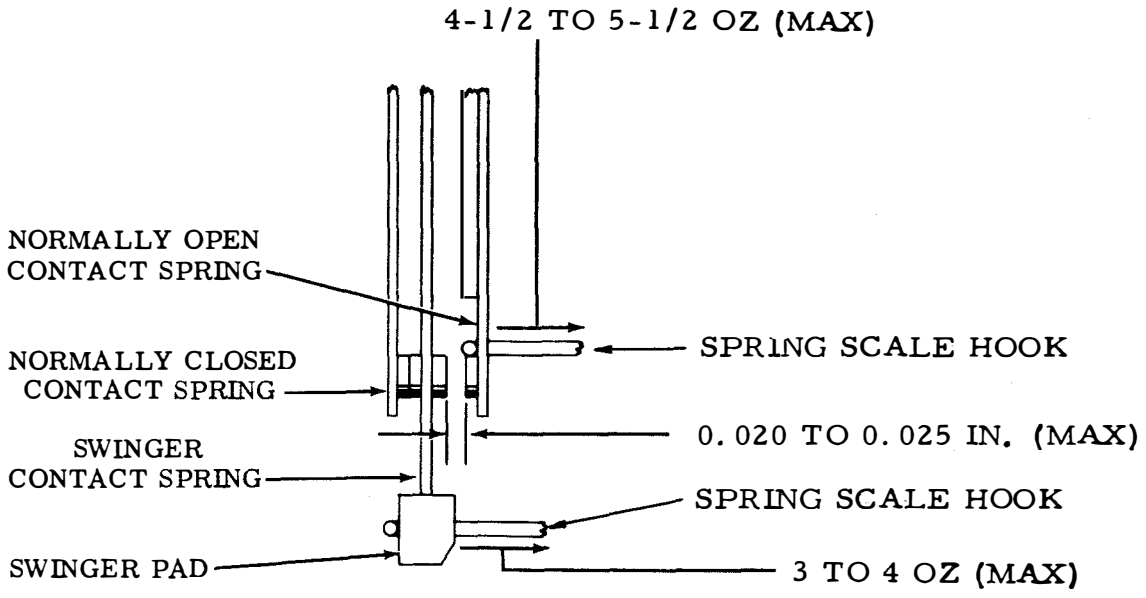


Figure 6-177. Normally-Open Contact Spring, Normally-Open Contact Gap, and Normally-Closed Contact - Rear View

(3) Normally-Closed Contact. Adjust as follows:

(a) Refer to figure 6-177.

(b) Use spring scale to measure force necessary to move swinger contact away from normally-closed contact; this should require from 3 to 4 ounces.

(c) To adjust, bend swinger contact.

(4) Auxiliary Contact Assembly. Adjust as follows:

(a) Refer to figure 6-178.

(b) Trip function clutch and rotate until clearance between pad and actuator is maximum.

(c) There should be some to 0.008 inch (maximum) clearance between swinger pad and actuating lever when play is taken up to minimize clearance.

(d) To adjust, loosen mounting screws and position contact bracket assembly on mounting bracket.

(e) Tighten screws.

d. Auxiliary Timing Contact Mechanisms (Single-Contact and Double-Contact Types). Perform adjustments in accordance with the following paragraphs.

NOTE

There are two types of timing contact assemblies, single and double. Single-contact assemblies have a

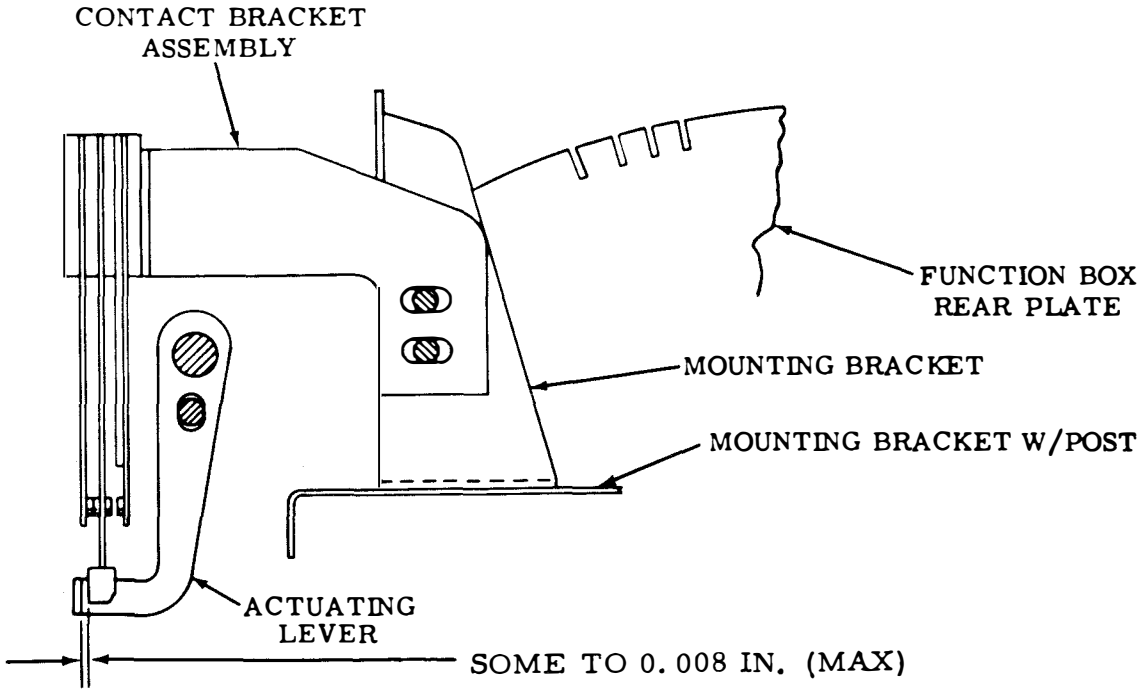


Figure 6-178. Auxiliary Contact Assembly - Rear View

front contact only, no rear contact. If unit is equipped with a double-contach assembly, the following adjustments apply to both front and rear contacts. In case of single-contact assembly, make certain contact bracket mounting screws are centrally located in elongated slots.

(1) Contact Backstop (Double-Contact Assembly). Adjust as follows:

(a) Refer to figure 6-179.

(b) With each contact swinger held against backstop by operating bail and spring, and bracket mounting screws located in center of elongated slots, clearance between operating bails should be from 0.040 to 0.045 inch on units equipped with one-cycle cams, at point of least clearance.

(c) To adjust, bend front backstop leg.

(2) Contact Alignment. Adjust as follows:

(a) Refer to figure 6-179.

(b) When parts are engaged, the operating bail should be centrally located with respect to swinger, and mating contact points should be aligned.

(c) To adjust, loosen mounting screws and position contact springs.

(d) Tighten screws.

(3) Right Contact Gap. Adjust as follows:

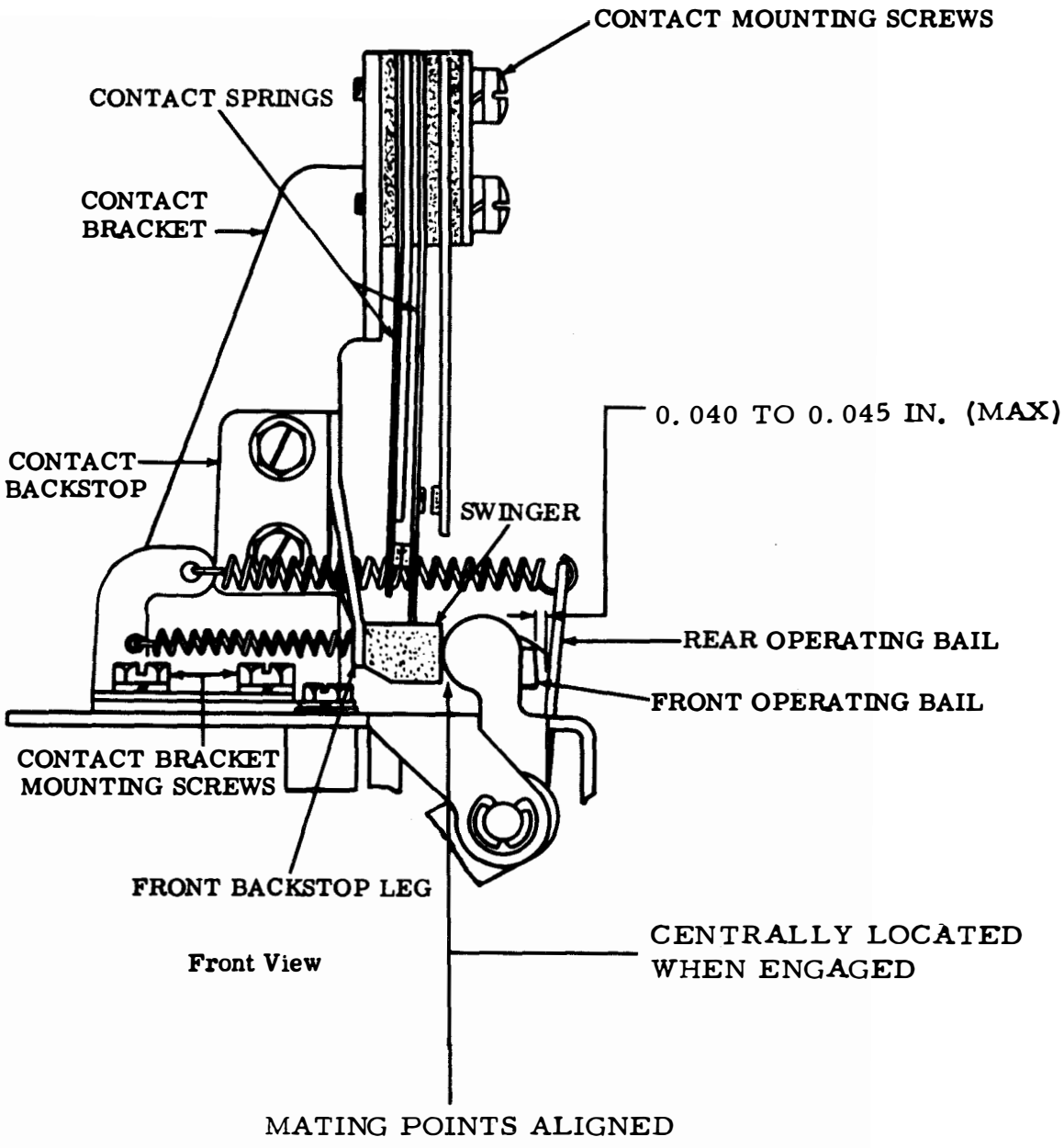


Figure 6-179. Contact Backstop and Contact Alignment

(a) Refer to figure 6-180.

(b) With swinger held against its backstop, gap between contacts should be from 0.020 to 0.025 inch.

(c) To adjust, bend right contact spring.

(4) Swinger Contact Spring (Preliminary). Adjust as follows:

(a) Refer to figure 6-181.

(b) With operating bail held away from swinger, use spring scale to measure force necessary to open right side of contact; this should require from 4-1/2 to 5-1/2 ounces.

(c) To adjust, bend swinger contact spring.

(d) Recheck Right Contact Gap (adjustment (3), above).

(5) Left Contact Gap. Adjust as follows:

(a) Refer to figure 6-181.

(b) With operating bail held away from swinger, gap between contacts should be from 0.020 tp 0.025 inch.

(c) To adjust, bend stiffener.

(6) Left Contact Spring (Preliminary). Adjust as follows:

(a) Refer to figure 6-182.

(b) With swinger held against backstop by operating bail and spring, use spring scale to measure force necessary to open left side of contact; this should require from 4-1/2 to 5-1/2 ounces.

(c) To adjust, bend left contact spring.

(d) Recheck Right Contact Gap (adjustment (3), above) and Left Contact Gap (adjustment (5), above).

NOTE

The following two adjustments (steps (7) and (8)) should be made with contact assembly mounted on unit.

(7) Operating Bail Springs. Adjust as follows:

(a) Refer to figure 6-183.

(b) With operating bail held so that swinger is against backstop, use spring scale to measure force necessary to pull spring to installed length; this should require from 7 to 12 ounces.

(c) If force does not match specifications, replace spring(s).

(8) Contact Bracket (Preliminary) (For Units with One-Cycle Cams). Adjust as follows:

(a) Refer to figure 6-183.

(b) Loosen locking screw and position cam follower arm to minimum length on operating bail, by means of

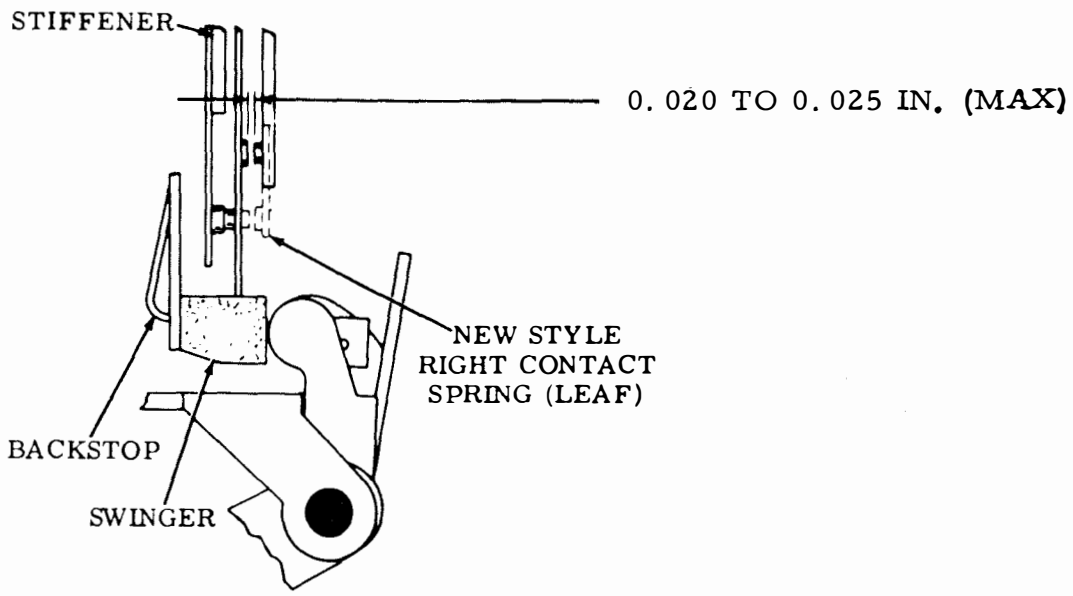


Figure 6-180. Right Contact Gap

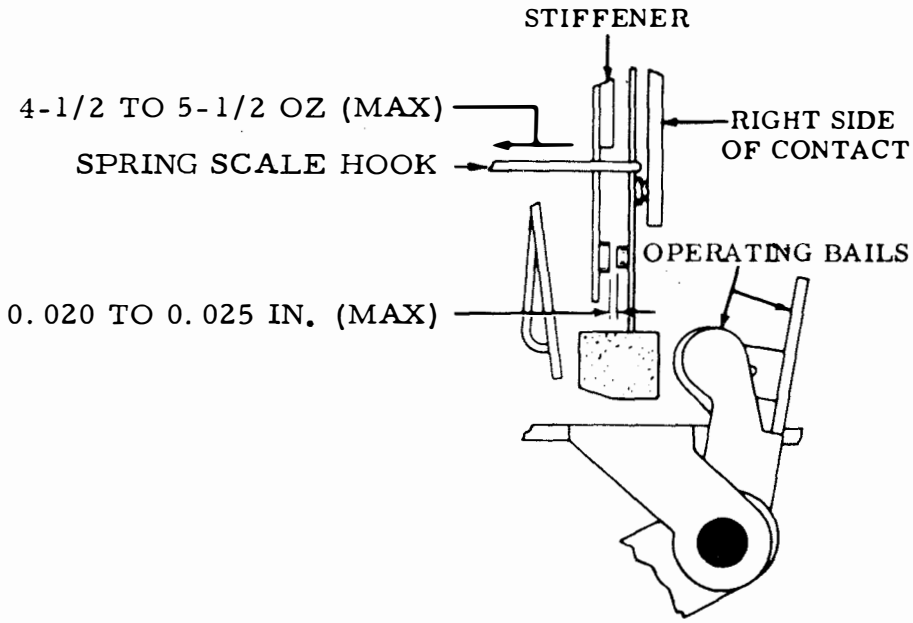


Figure 6-181. Swinger Contact Spring and Left Contact Gap

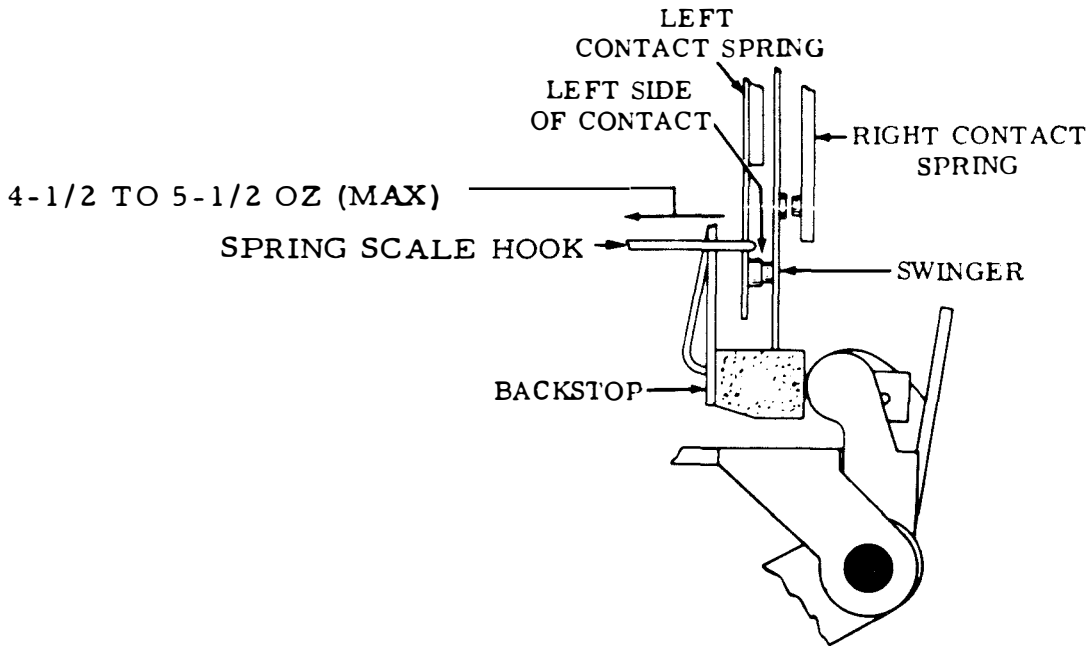


Figure 6-182. Left Contact Spring

elongated mounting hole. Tighten locking screw.

(c) With selector and function clutches disengaged and latched, clearance between cam follower roller and function cam should be between 0.050 to 0.055 inch.

(d) To adjust, loosen mounting screws and position contact brakcet.

(e) Tighten screws.

NOTE

On units equipped with double contact assemblies, recheck Contact Backstop adjustment (paragraph 6-6.1d(1)). If requirement is not met, refine Contact Bracket adjustment (8), above.

e. Blank Delete Mechanism. Perform blank delete mechanism adjustments in accordance with the following paragraphs.

(1) Blank Function Blade. Adjust as follows:

(a) Refer to figure 6-184.

(b) Take up play in LETTERS function blade to maximize gap.

(c) Select BLANK code combination.

(d) With BLANK function blade in selected position, clearance between BLANK function blade and LETTERS function blade should be from some to 0.020 inch (maximum).

(e) To adjust, loosen mounting screw and position eccentric bushing,

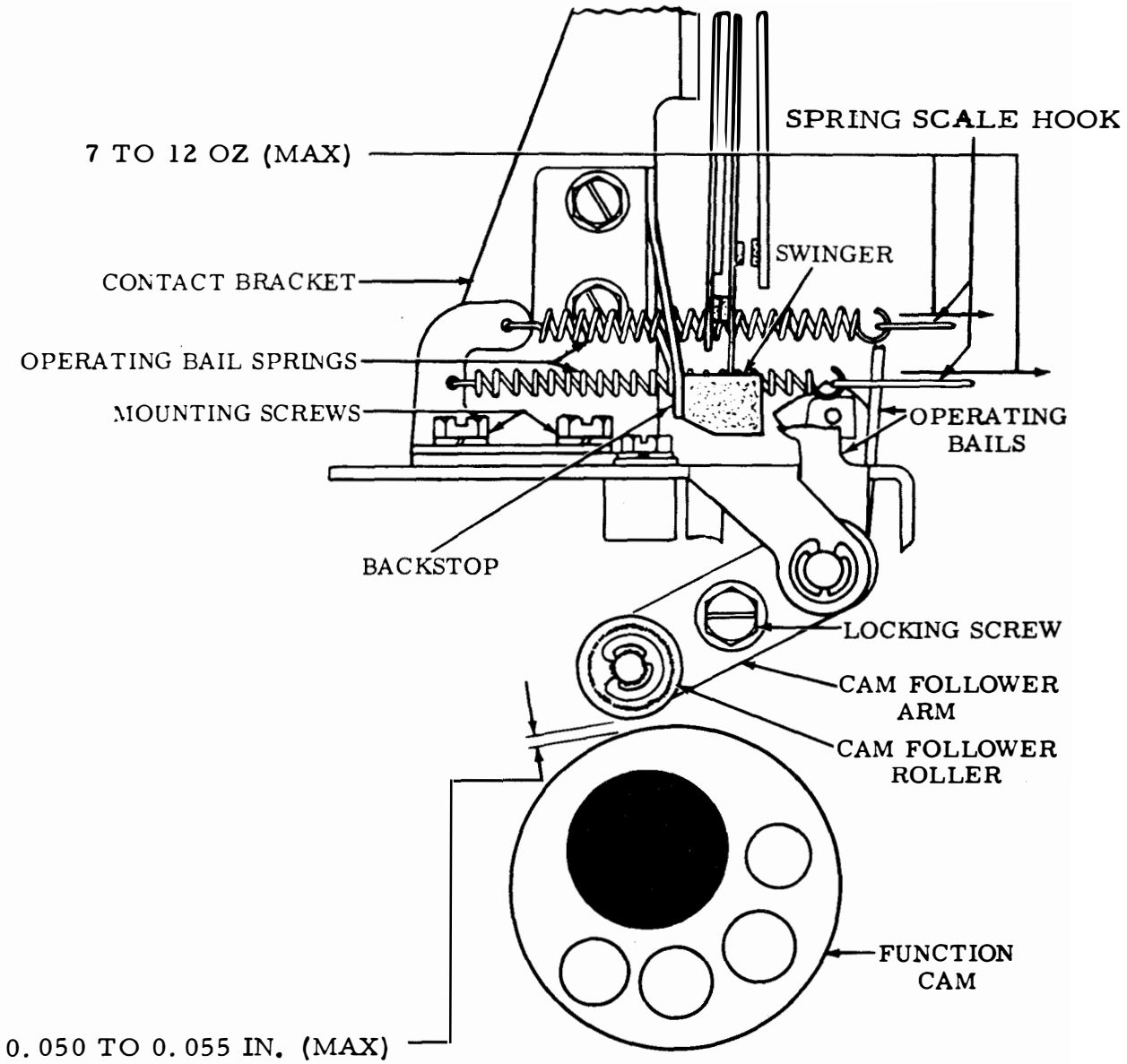


Figure 6-183. Operating Bail Springs and Contact Bracket

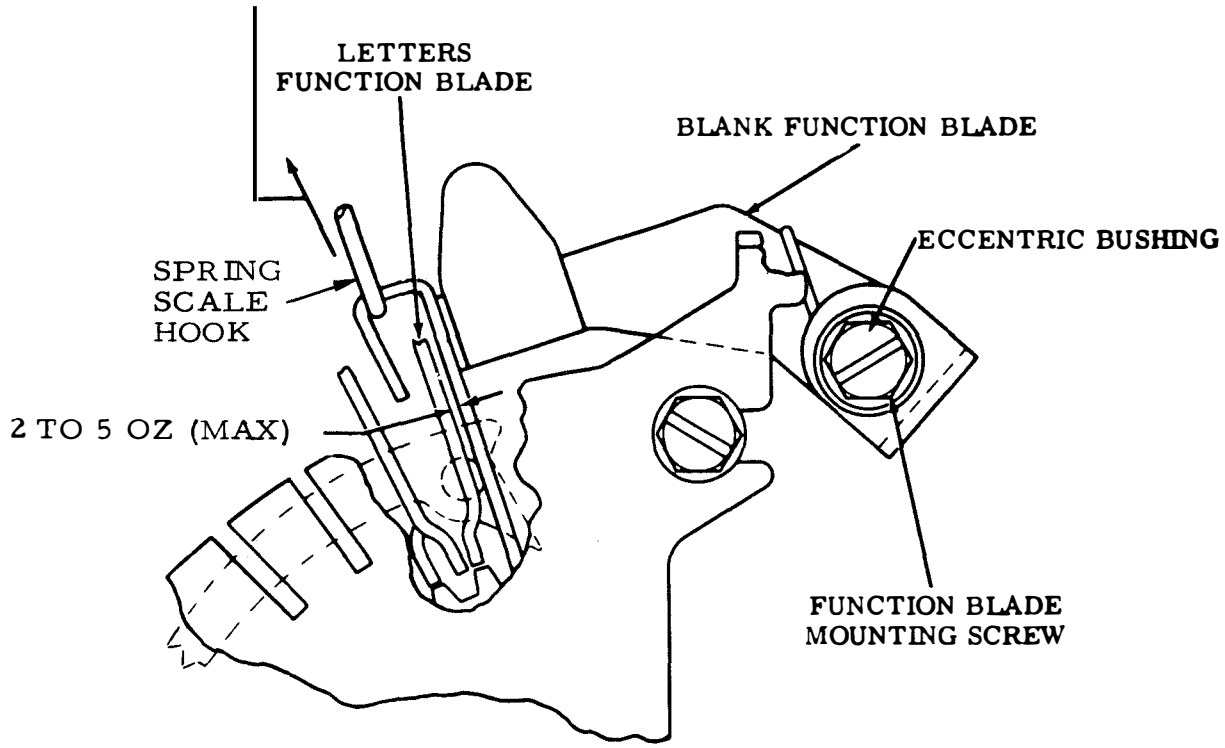


Figure 6-184. Blank Function Blade and Function Blade Torsion Spring - Rear View

keeping high part of eccentric towards top of unit.

(f) Tighten screw.

(2) Function Plade Torsion Spring. Adjust as follows:

(a) Refer to figure 6-184.

(b) Use spring scale to measure force necessary to start lifting BLANK function blade from blank sensing position without BLANK function blade contact interference; this should require from 2 to 5 ounces.

(c) If force does not match requirements, replace spring.

(3) Feed Pawl Readjustment. Adjust as follows:

NOTE

Eccentric stud should be backed off to eliminate any interference with this adjustment.

(a) Refer to figure 6-185.

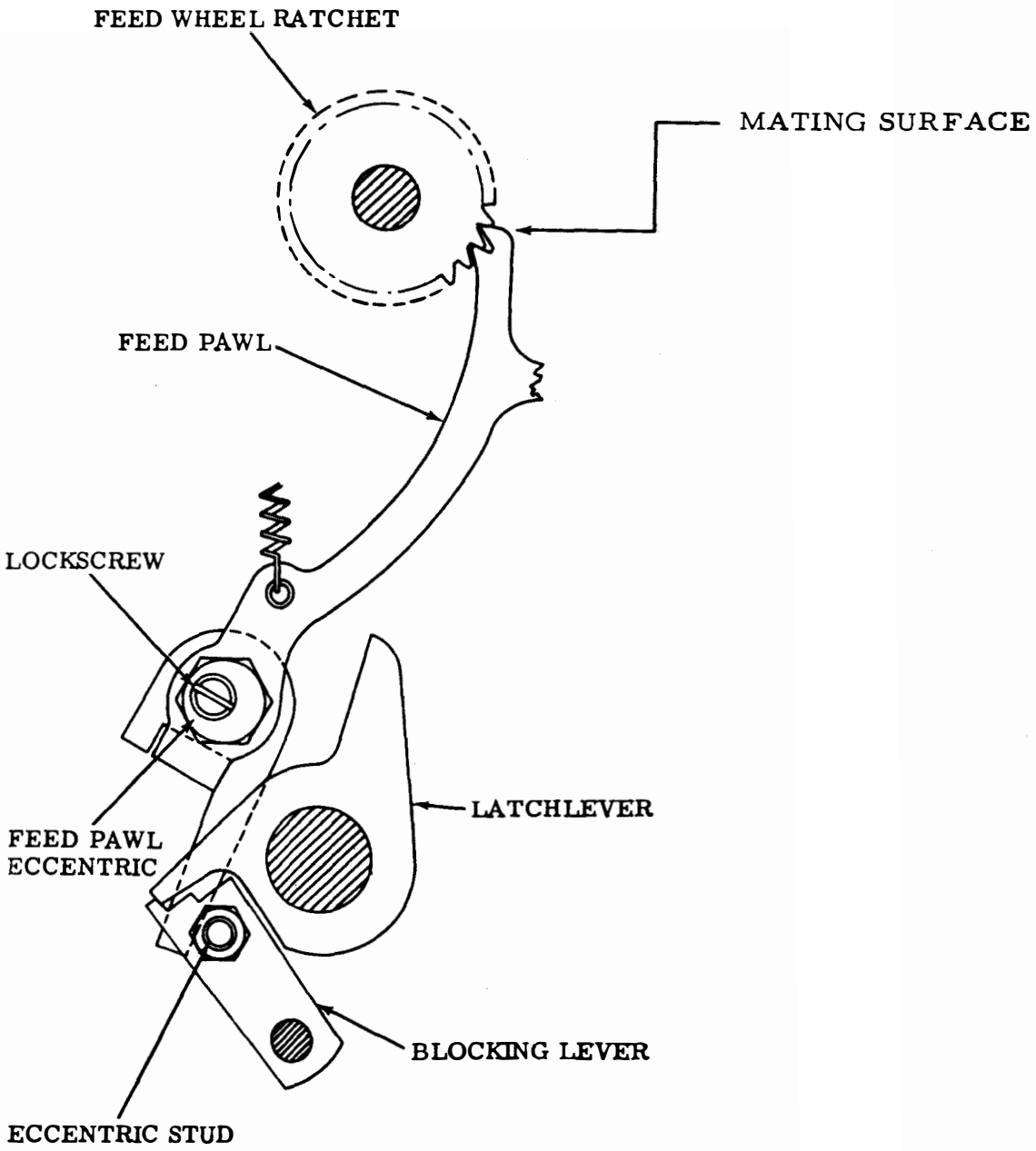


Figure 6-185. Feed Pawl Readjustment

(b) With feed wheel ratchet fully detented, feed pawl in uppermost position must just touch lower part of a tooth on ratchet.

(c) To adjust, loosen lockscrew and rotate feed pawl eccentric, keeping high part of eccentric to right of lockscrew.

(d) Tighten screw.

(4) Blocking Lever With Shaft Mounting Plate. Adjust as follows:

(a) Refer to figure 6-186.

(b) With unit in stop position (all clutches latched) there should be from 0.015 to 0.030 clearance between blocking lever and latchlever.

(c) To adjust, loosen mounting screws and position blocking lever with shaft mounting plate.

(d) Tighten screws.

NOTE

Check that hub on stud with bushing does not rub against rear punch plate, causing blocking lever shaft to bind.

(5) Armature Hinge. Adjust as follows:

(a) Refer to figure 6-187.

(b) Armature should be flush with magnet pole face and magnet bracket extension.

(c) To adjust, loosen adjusting screw and spring post, and position hinge.

(d) Tighten screw and post

(6) Magnet Assembly. Adjust as follows:

(a) Refer to figure 6-187.

(b) With function blades in sensing position and armature manually held operated, rod should fully contact adjusting screw.

(c) To adjust, loosen mounting screws and position magnet assembly.

(d) Tighten screws.

(7) Latchlever Torsion Spring. Adjust as follows:

(a) Refer to figure 6-188.

(b) Use spring scale to measure force necessary to lift latchlever from blocking lever; this should be from 2 to 5 ounces.

(c) If force does not match requirements, replace spring.

(8) Blocking Lever. Adjust as follows:

NOTE

If unit is equipped with feed suppression, level on tape shoe arm should be pivoted out of position when making this adjustment.

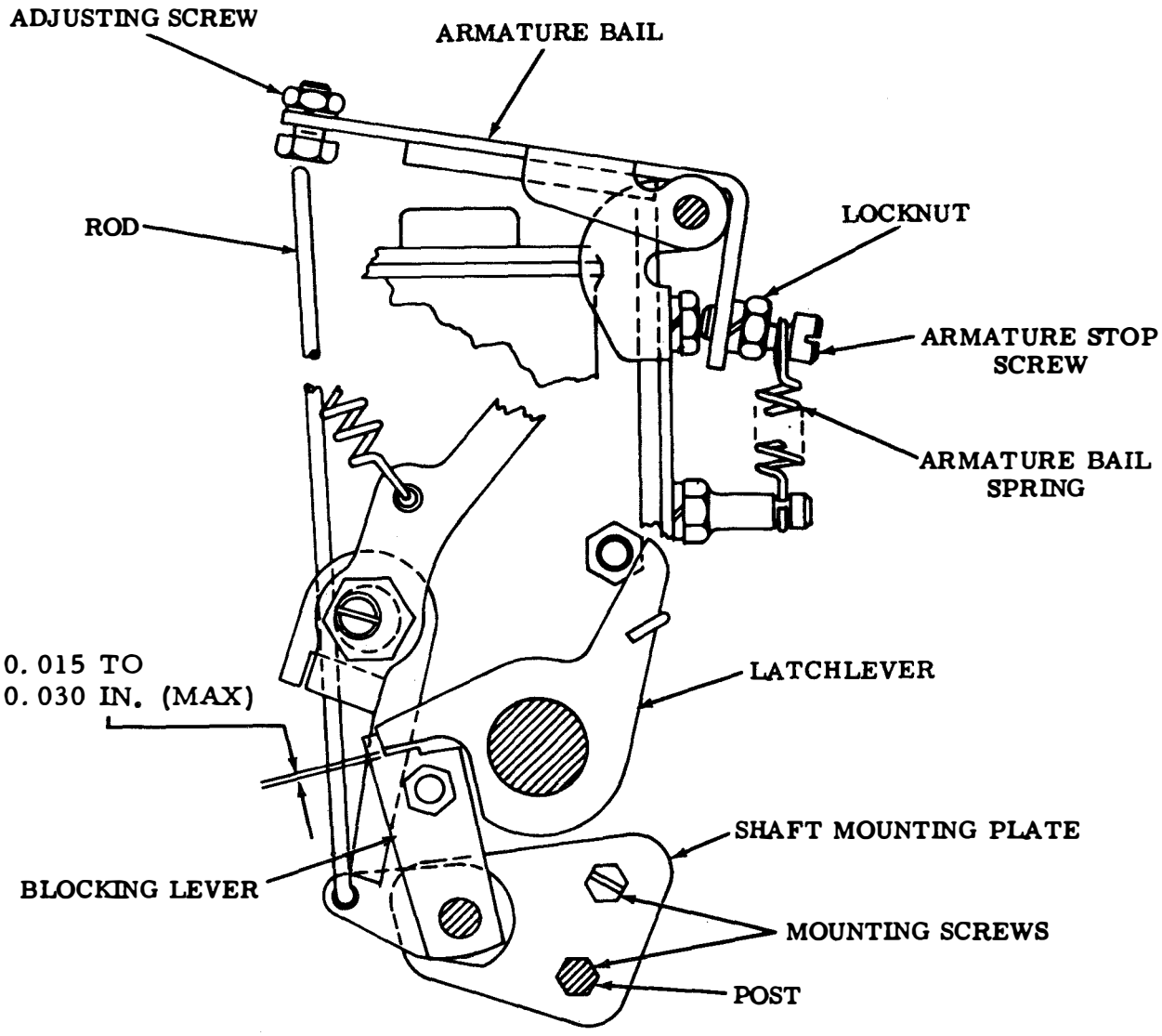


Figure 6-186. Blocking Lever with Shaft Mounting Plate

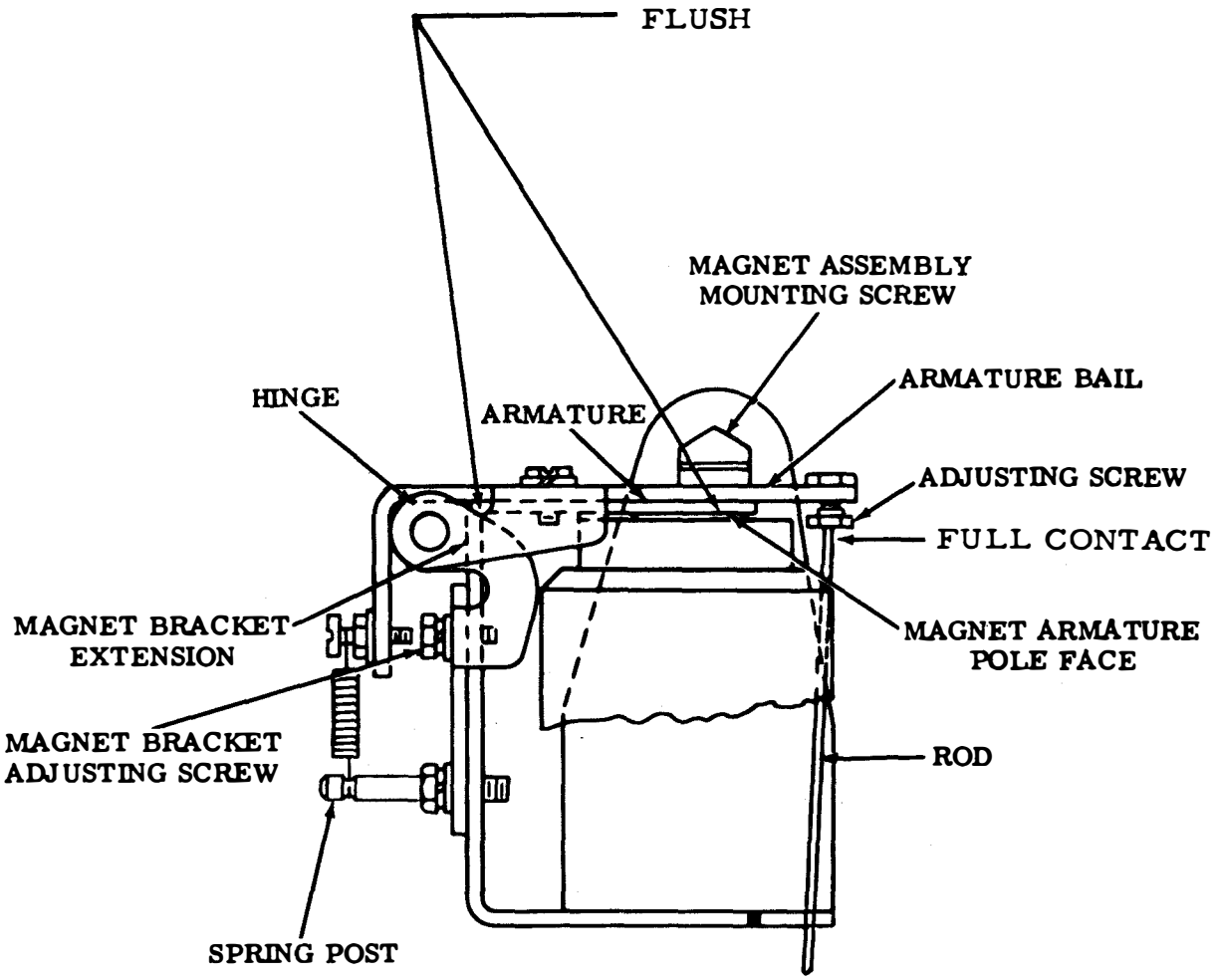


Figure 6-187. Armature Hinge and Magnet Assembly - Rear View

(a) Refer to figure 6-188.

(b) With function blades in sensing position and magnet armature manually held operated, clearance between blocking lever and latchlever should be from some to 0.005 inch (maximum).

(c) To adjust, with magnet armature manually held operated and locknut on adjusting screw loosened, rotate adjusting screw to meet requirement.

(d) Tighten locknut and recheck adjustment.

(9) Armature Stop. Adjust as follows:

(a) Refer to figure 6-189.

(b) With function blades in sensing position and blocking lever unlatched, clearance between end of rod and adjusting screw should be from 0.010 to 0.020 inch.

(c) To adjust, loosen locknut and adjust armature stop screw.

(d) Tighten locknut.

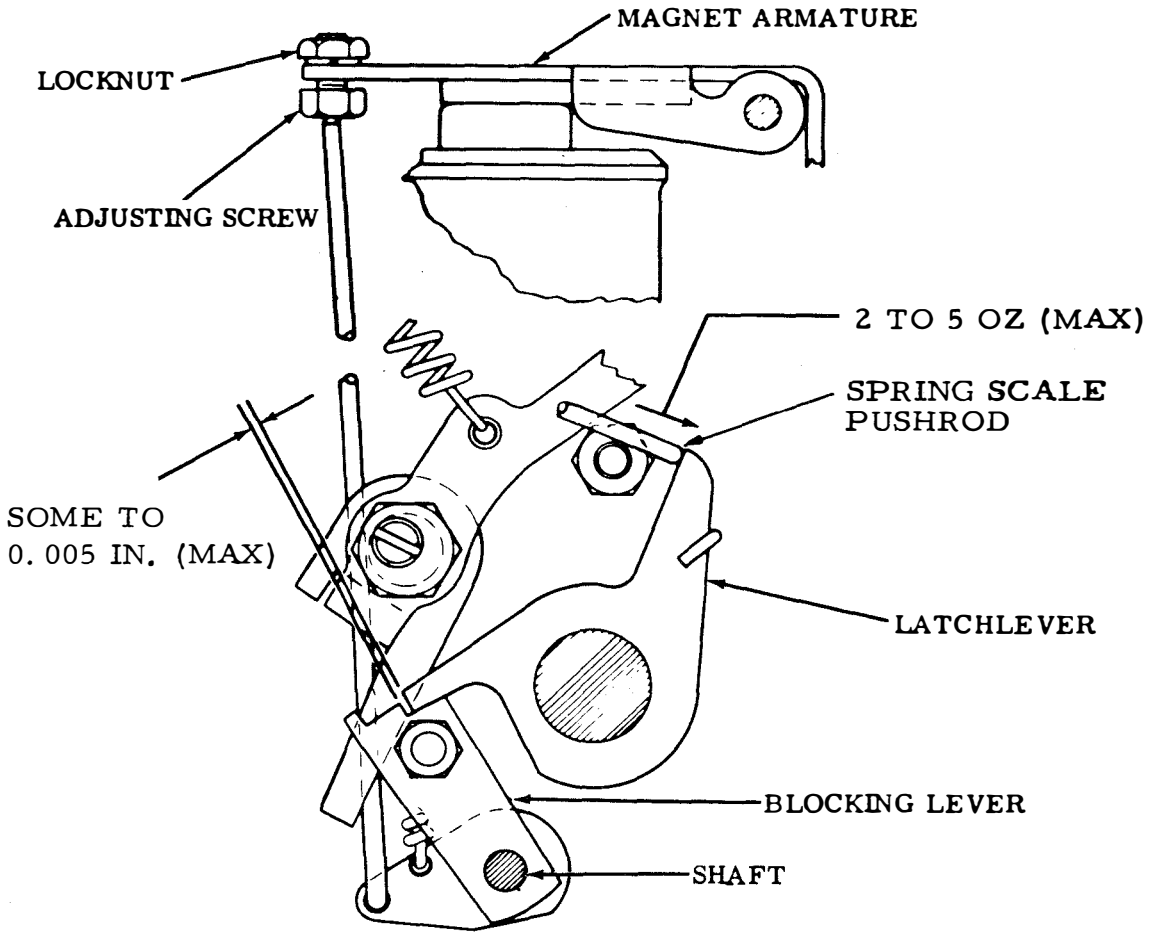


Figure 6-188. Latchlever Torsion Spring and Blocking Lever

(10) Armature Bail Spring. Adjust as follows:

(a) Refer to figure 6-189.

(b) With rod moved out of interfering position, use spring scale to measure force necessary to start armature bail moving; should require from 1 to 3 ounces.

(c) If force does not match requirements, replace spring.

(11) Transfer Shaft Spring. Adjust as follows:

(a) Refer to figure 6-189.

(b) With unit in stop position and feed pawl extension held away from interfering, use spring scale to measure force necessary to start shaft moving; this should require from 20 to 50 grams.

(c) If force does not meet requirements, replace spring.

(12) Print Suppressor Blocking Arm. Adjust as follows:

(a) Refer to figure 6-190.

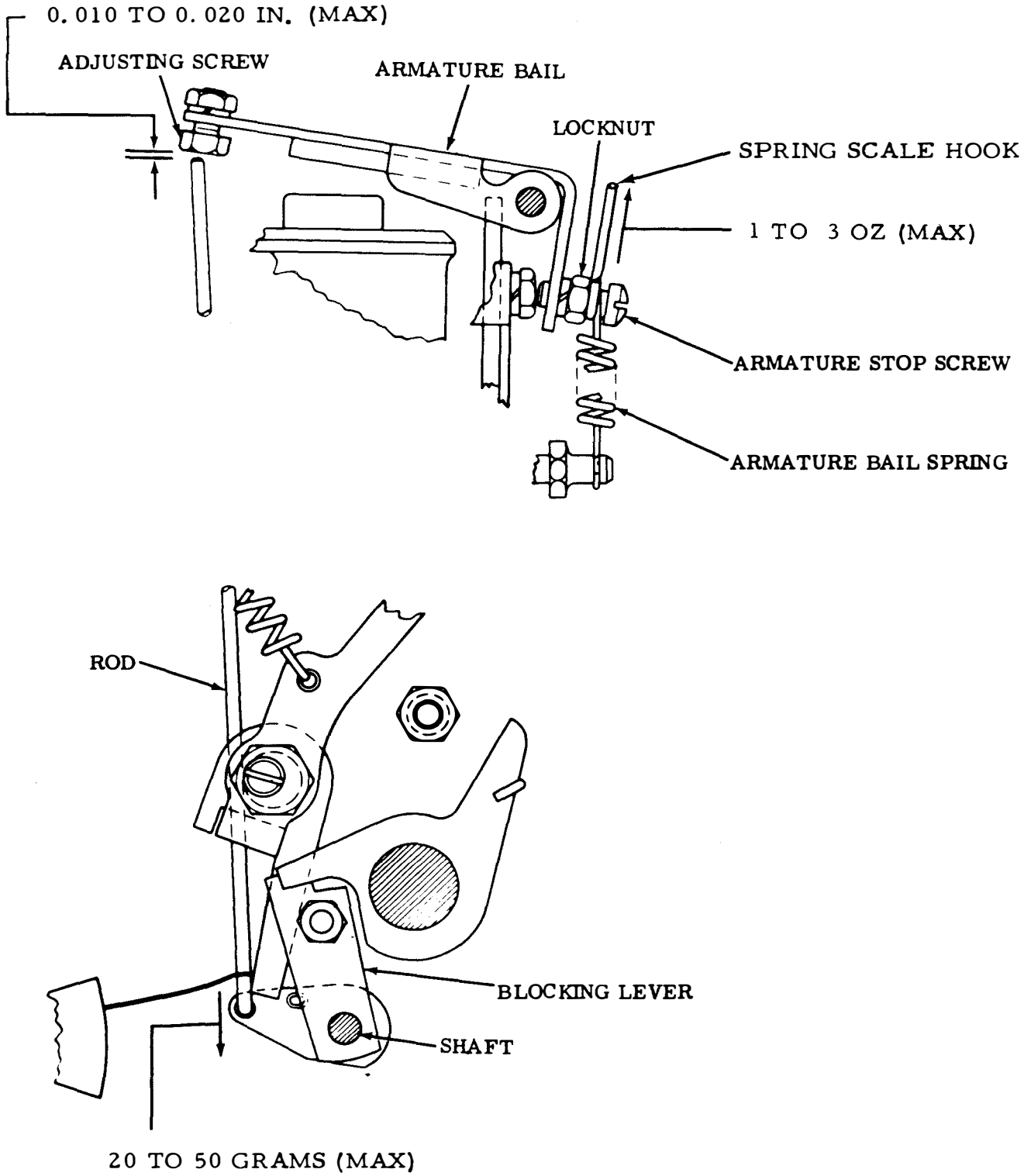


Figure 6-189. Armature Stop, Armature Bail Spring, and Transfer Shaft Spring

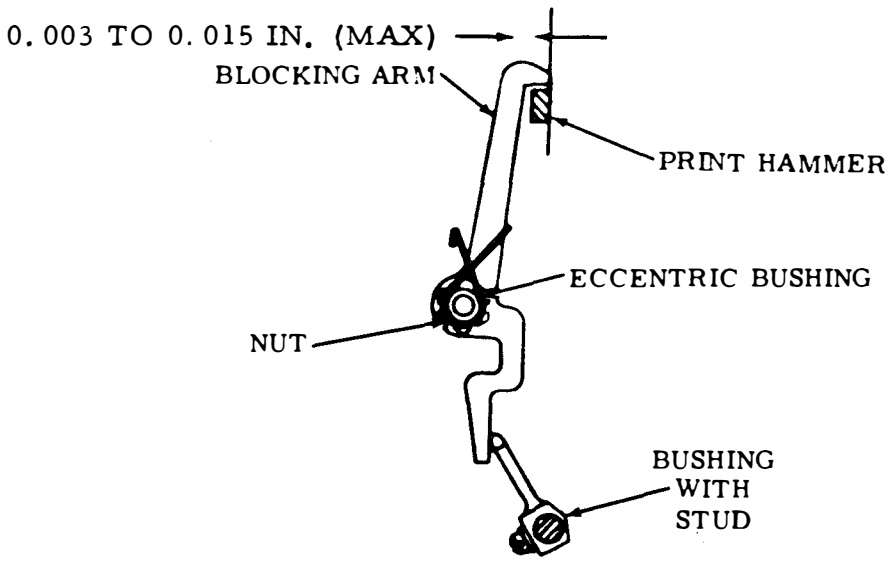


Figure 6-190. Print Suppressor Blocking Arm

(b) With function blades in sensing position, blocking lever latched, and clearance minimized by taking up play in print hammer lever, clearance between left side of print hammer lever and blocking arm should be from 0.003 to 0.015 inch.

(c) To adjust, loosen nut and position eccentric shoulder screw.

(d) Tighten nut.

NOTE

It may be necessary to favor position of eccentric shoulder screw in mounting hole to meet requirement.

(13) Print Suppressor Stop. Adjust as follows:

(a) Refer to figure 6-191.

(b) With blocking lever unlatched, clearance between blocking arm and print hammer should be some to 0.030 inch (maximum), when print hammer play is taken up to minimize clearance.

(c) To adjust, loosen locknut and position stop.

(d) Tighten locknut.

(e) Recheck Print Suppressor Blocking Arm (adjustment (12), above).

(14) Blocking Arm Spring. Adjust as follows:

(a) Refer to figure 6-191.

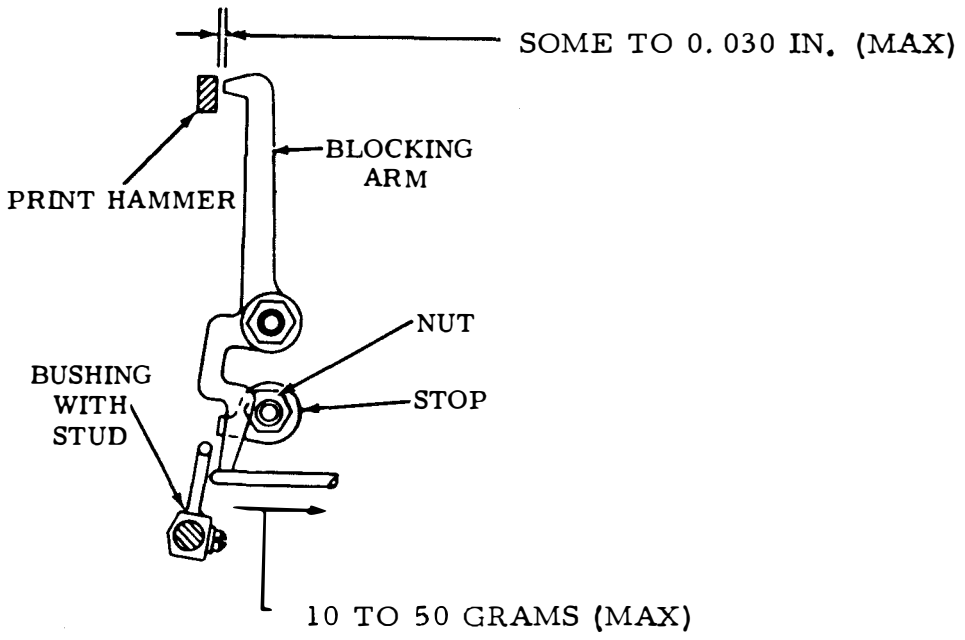


Figure 6-191. Print Suppressor Stop and Blocking Arm Spring - Rear View

(b) With unit in stop position, use spring scale to measure force necessary to start blocking arm moving away from stop; this should require from 10 to 50 grams.

(c) If force does not match specifications, replace spring.

(15) Eccentric Stud. Adjust as follows:

(a) Refer to figure 6-192.

(b) With latchlever and blocking lever in latched position, and feed pawl in upward travel, clearance between tip of engaging feed wheel ratchet tooth and feed pawl tooth at closest point should be from 0.010 to 0.020 inch.

NOTE

Eccentric should be toward top of unit in fully adjusted position.

(c) To adjust, loosen locknut and adjust eccentric stud on blocking lever.

(d) Tighten locknut and recheck adjustment.

NOTE

Following adjustments (steps (16) through (18)) should be made before installing contact bracket assembly on unit.

(16) Open Contact Gap. Adjust as follows:

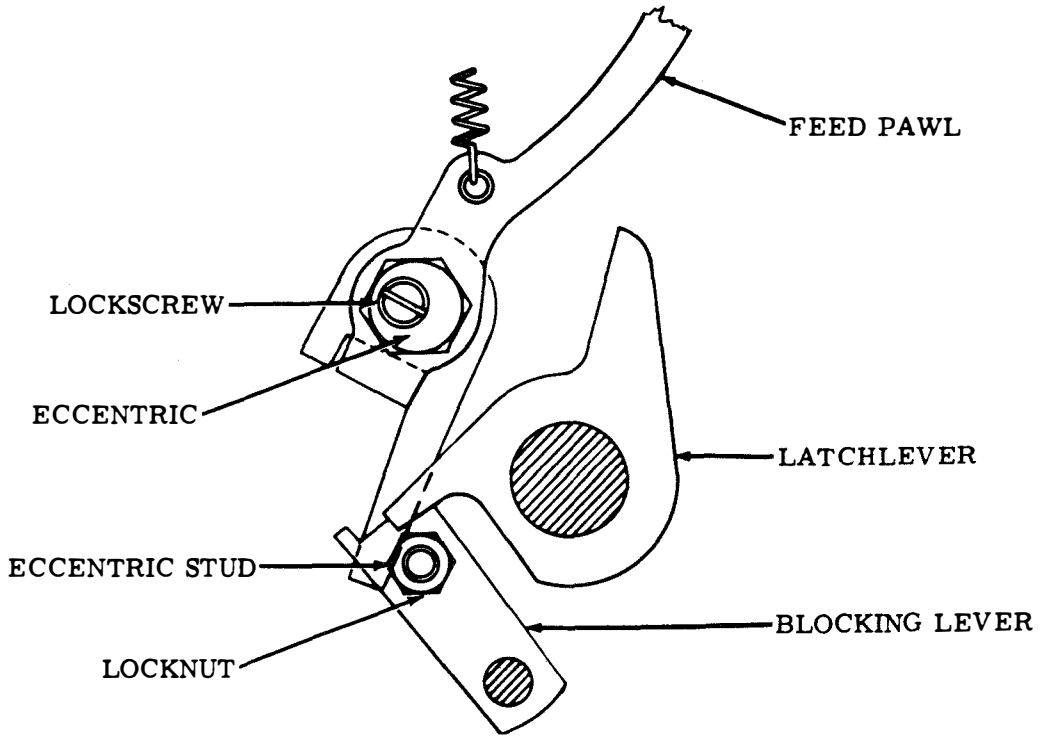


Figure 6-192. Eccentric Stud

(a) Refer to figure 6-193.

(b) Normally-open contact gap should measure from 0.010 to 0.015 inch.

(c) To adjust, bend stiffener.

(17) Contact Spring. Adjust as follows:

(a) Refer to figure 6-193.

(b) Use spring scale to measure force necessary to move contact spring away from stiffener; this should require from 4-1/2 to 5-1/2 ounces.

(c) To adjust, bend contact spring.

(d) Recheck Open Contact Gap (adjustment (16), above).

(18) Swinger Contact Spring. Adjust as follows:

(a) Refer to figure 6-193.

(b) Use spring scale to measure force necessary to move swinger contact spring away from normally-closed contact; this should require from 2 to 3 ounces.

(c) To adjust, bend contact spring.

NOTE

Following adjustments (steps (19) and (20)) should be made after contact bracket assembly is mounted on unit.

(19) Contact Assembly. Adjust as follows:

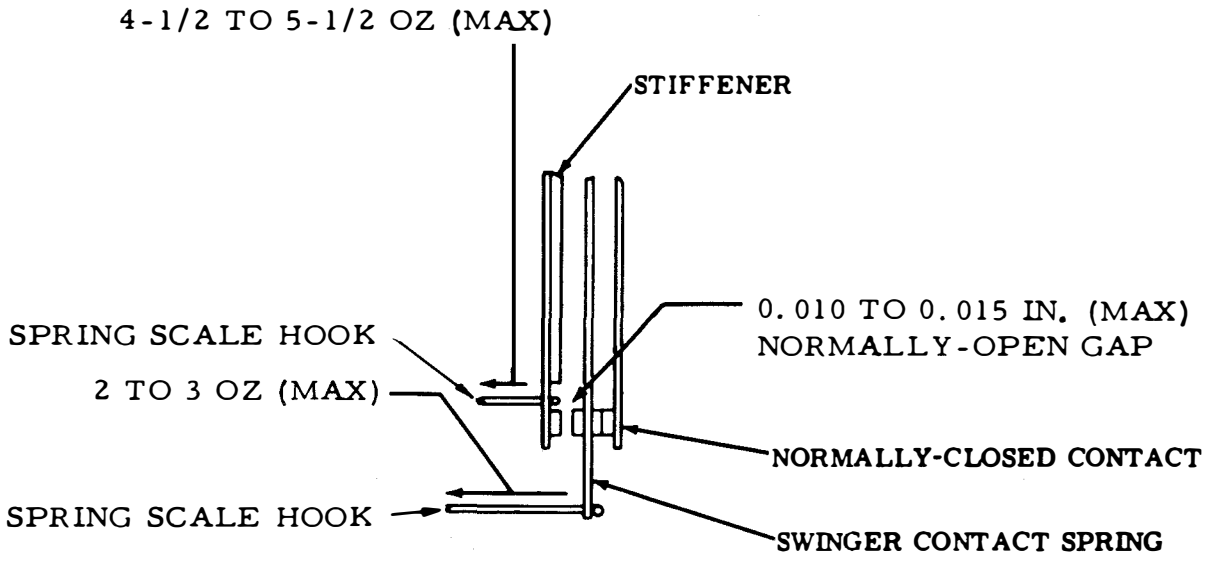


Figure 6-193. Open Contact Gap, Contact Spring, and Swinger Contact Spring

NOTE

Assembly should be equipped with a guard under the plate to eliminate shock hazard.

(a) Refer to figure 6-194.

(b) Contact assembly should line up centrally with insulator on blank function blade.

(c) To adjust, loosen mounting screws and line up contact assembly.

(d) Tighten screws.

(20) Contact Gap. Adjust as follows:

(a) Refer to figure 6-194.

(b) Select SPACING combination (--3--) and rotate main shaft until blank function blade drops into sensing position.

(c) Clearance between contact springs should be between 0.010 and 0.015 inch.

(d) To adjust, loosen mounting screws and position contact mounting bracket.

(e) Tighten screws.

f. Code - Reading Contact Mechanism (Make-Only and Transfer Lever Types). Perform adjustments in accordance with the following paragraphs.

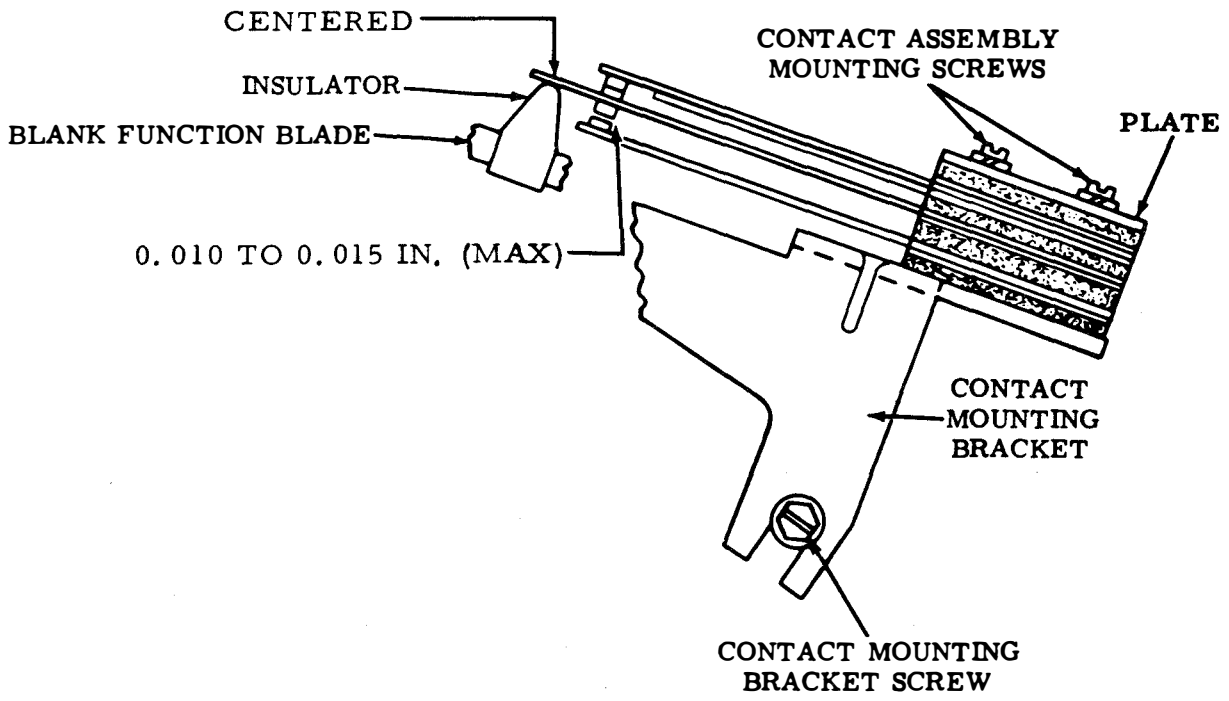


Figure 6-194. Contact Assembly and Contact Gap - Right Side View

NOTE

Unless specifically stated otherwise, the following code reading contact adjustments apply to both the transfer (break before make) type and make type contacts. When an adjustment is applicable to both types, transfer type contacts are used in illustrations. Adjustments should be made with code reading contact assembly removed from unit.

(1) Marking Contact Backstops. Adjust as follows:

(a) Refer to figure 6-195.

(b) As gauged by eye, five marking contact springs should align with each other and be parallel with mounting plate.

(c) To adjust, bend marking contact backstops.

(2) Marking Contact Springs (Preliminary). Adjust as follows:

NOTE

When using contact spring bender, start with contact pile-up farthest from handle of tool and work toward handle so as not to disturb adjustments already made.

(a) Refer to figure 6-195.

(b) With swinger contact spring held away, use spring scale to measure force necessary to move each spring away from backstop; this should require 2 to 6 ounces.

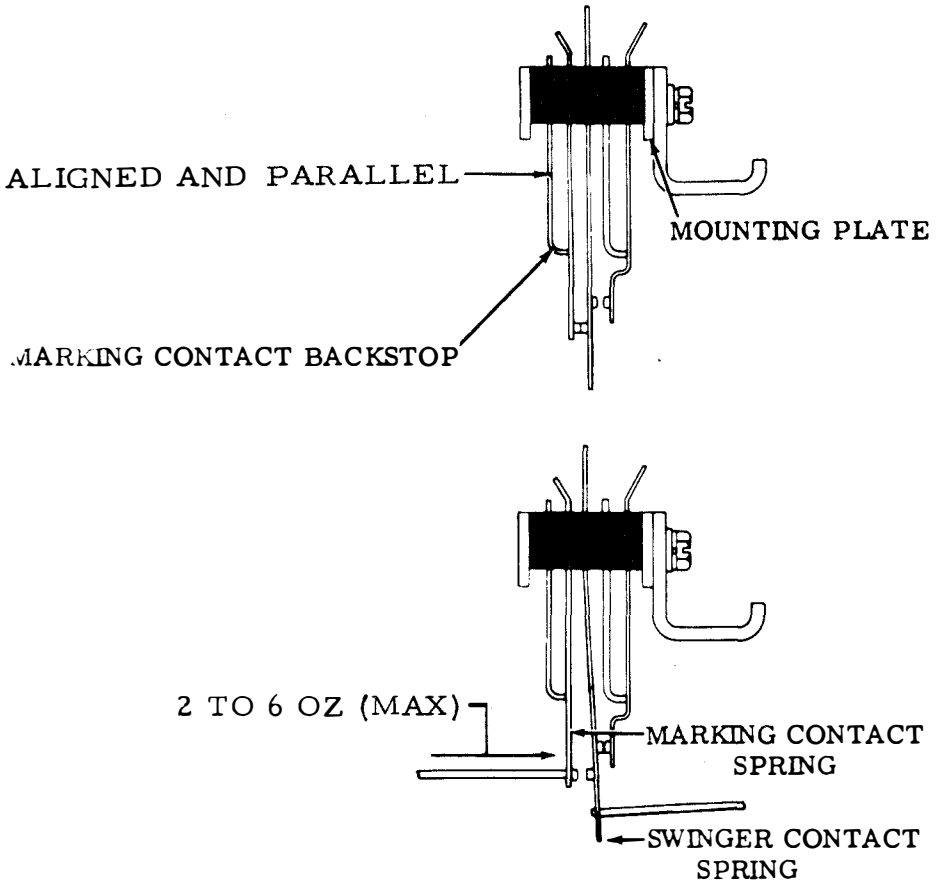


Figure 6-195. Marking Contact Backstops and MarKing Contact Springs

(c) To adjust, bend marking contact springs.

NOTE

To increase tension of marking contact spring, it may be necessary to bend backstop away from spring, bend spring and then rebend backstop to meet requirement of Marking Contact Backstop (step (1) above).

(3) Swinger Contact Springs (Preliminary). Adjust as follows:

(a) Refer to figure 6-196.

(b) Use spring scale to measure force necessary to open marking contacts; this should require from 30 to 40 grams.

(c) To adjust, bend swinger contact springs.

NOTE

Spacing contacts (on transfer type contact assemblies only) are normally-open when contact assembly is removed from unit.

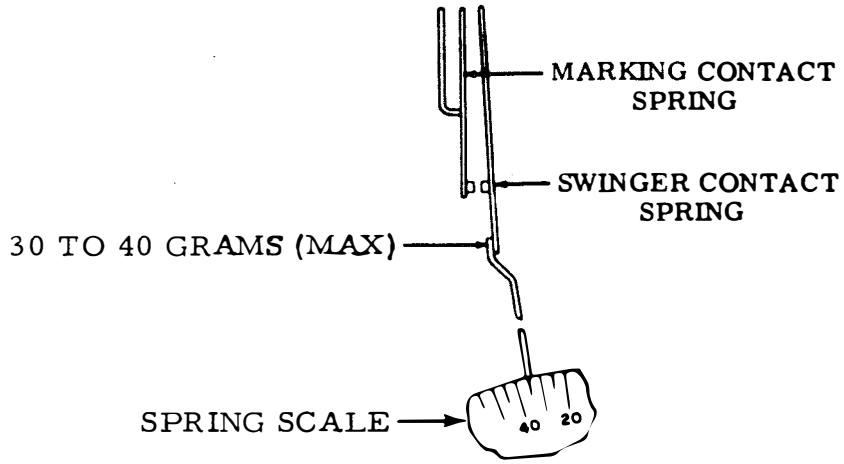


Figure 6-196. Swinger Contact Springs

(4) Spacing Contact Backstops (Preliminary) (Transfer Type Contact Only). Adjust as follows:

(a) Refer to figure 6-197.

(b) Gap between spacing contacts should measure from 0.018 to 0.025 inch.

(c) To adjust, bend spring contact backstops.

(5) Spacing Contact Springs (Preliminary) (Transfer Type Contacts Only). Adjust as follows:

(a) Refer to figure 6-197.

(b) Use spring scale to measure force necessary to move each contact spring away from backstop; this should require from 35 to 50 grams.

(c) To adjust, bend spacing contact springs.

NOTE

To increase tension of spring, it may be necessary to bend backstop away from spring, bend spring, and then rebend backstop to meet requirement of Spacing Contact Backstop (step (4) above.

(6) Contact Mounting Bracket. Adjust as follows:

(a) Refer to figure 6-198.

(b) With function clutch disengaged and latched, there should be 0.015 inch (minimum) clearance between closest normallyclosed contact spring (marking contact) and punch slide insulator.

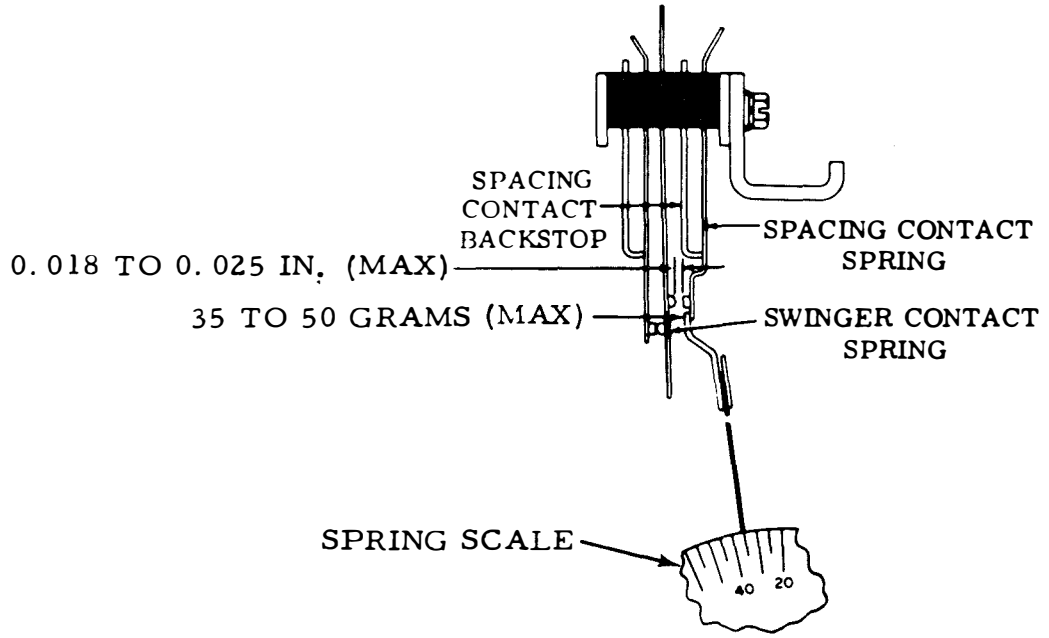


Figure 6-197. Spacing Contact Backstops and Spacing Contact Springs

(c) With LETTERS combination selected and punch pins in uppermost position, swinger should be parallel to right end of punch slide and extend below its center, as gauged by eye.

(d) Loosen mounting screws and position contact mounting bracket.

(e) Tighten screws.

(7) Contact Mounting Plate. Adjust as follows:

(a) Refer to figure 6-199.

(b) Each swinger contact spring should align with its associated punch slide insulator as gauged by eye.

(c) To adjust, loosen mounting screws and position contact mounting plate.

(d) Tighten screws.

(8) Contact Bracket (Preliminary) (Transfer Type Contacts Only). Adjust as follows:

(a) Refer to figure 6-200.

(b) Manually select BLANK code combination and rotate main shaft until function clutch trips.

(c) Clearance between spacing contact spring and backstop should be from some to 0.008 inch (maximum).

(d) With selector and function clutches disengaged and latched, manually

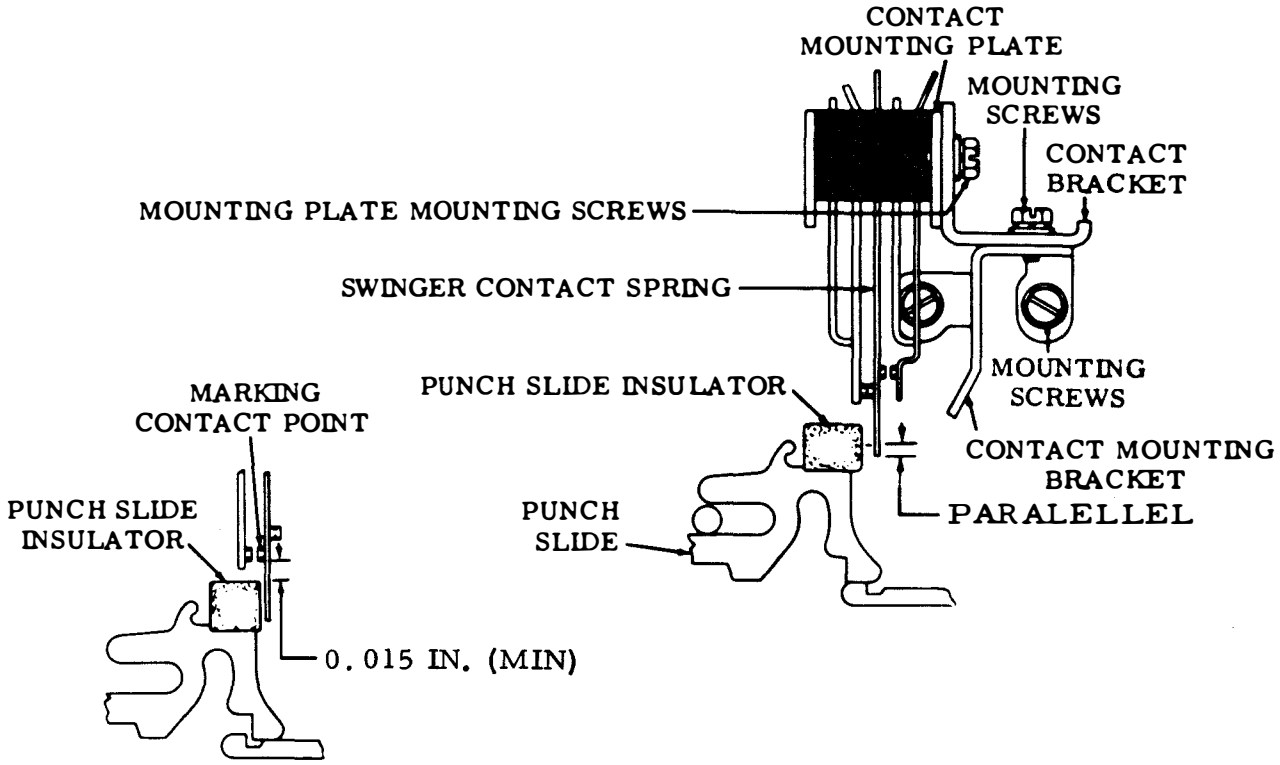


Figure 6-198. Contact Mounting Bracket

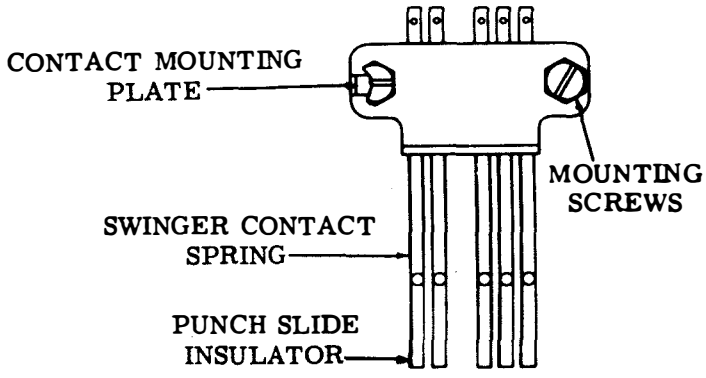


Figure 6-199. Contact Mounting Plate - Left Side View

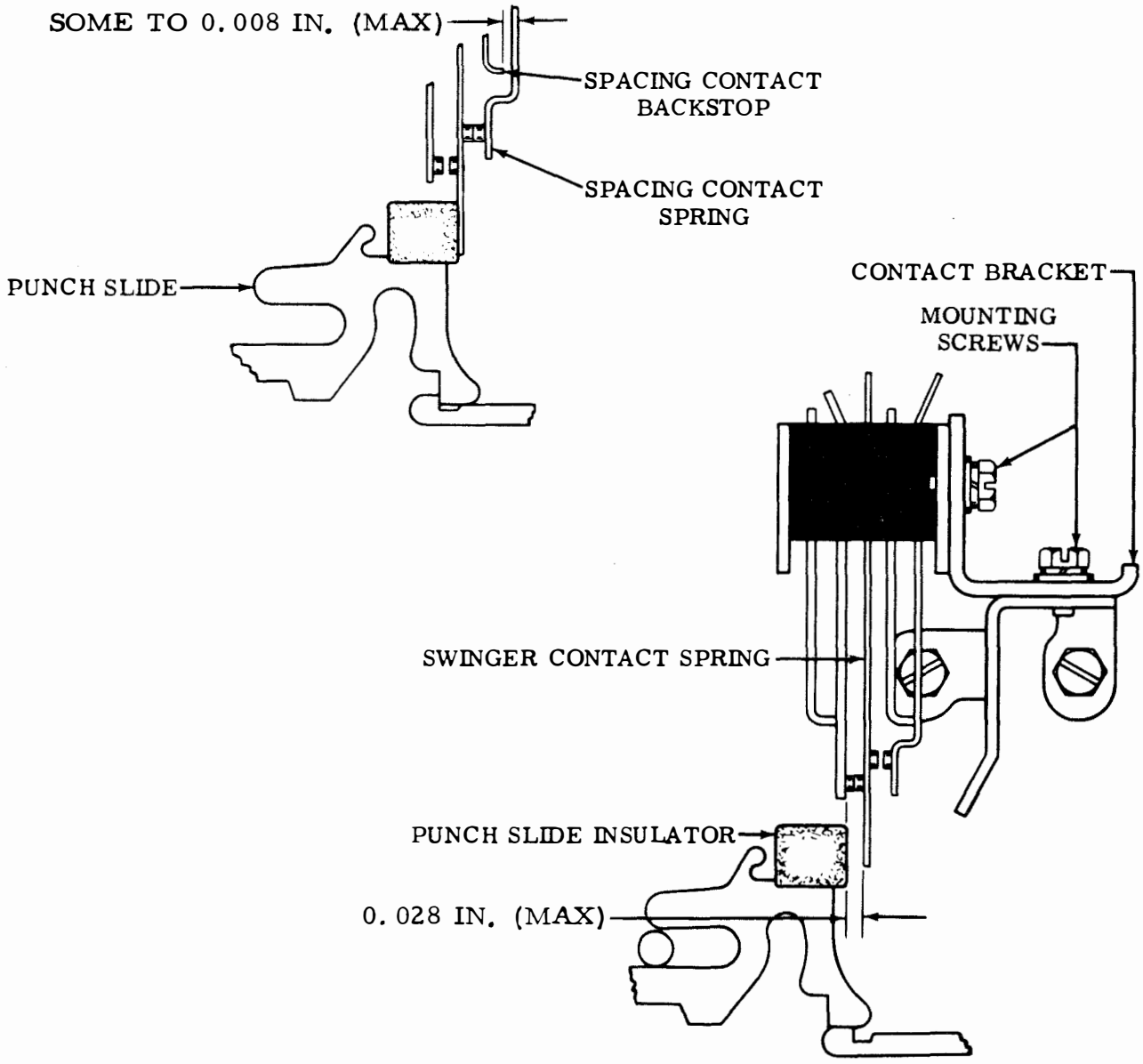


Figure 6-200. Contact Bracket (Transfer Type Contacts)

select LETTERS code combination and trip function clutch.

(e) Clearance between punch slide insulator and swinger contact spring should be 0.028 inch (minimum).

(f) To adjust, position contact bracket with its mounting screws loosened. To pry bracket to left, insert screwdriver between bracket and left edge of mounting screws; to pry bracket to right, insert screwdriver between bracket and right edge of mounting screws.

(g) Recheck step (e) above, and refine adjustment, if necessary. Tighten screw.

(9) Contact Bracket (Preliminary) (Make-Type Contact Only). Adjust as follows:

(a) Refer to figure 6-201.

(b) Manually select BLANK code combination and rotate main shaft unitl function clutch trips and punch slides are against respective latches.

(c) Contact gap should be from 0.010 to 0.015 inch.

NOTE

Where a typing reperforator is part of a perforator transmitter Model 28 base, contact gap should be from 0.020 to 0.025 inch.

(d) With selector and function clutches disengaged and latched, manually select LETTERS code combination and trip function clutch.

(e) Clearance between punch slide insulator and swinger contact spring should be 0.028 inch (minimum).

(f) To adjust, position contact bracket with mounting screws friction tight. To pry bracket to left, insert screwdriver between bracket and left edge of mounting screw; to pry bracket to right, insert screwdriver between bracket and right edge of mounting screw.

(g) Tighten screws.

g. Contact Timing Measurements. Perform contact timing measurements in accordance with the following paragraphs.

(1) Zero Test Set. To perform the test, proceed as follows:

(a) Refer to figure 6-202.

(b) The following tests require the use of a teletype signal distortion test set. They should be made after the contact assemblies have been adjusted. Where requirements are not met, designated adjustments must be refined, and/or related lengths may have to be changed to meet timing requirements.

(c) Tests on 600-operation per minute (opm) units or lower should be made with perforator or reperforator and test set operating at 600 opm. Tests on 1200-opm units should be made with reperforator operating at 1200-opm and test set equipped with a two-cycle scale and operating at 600 opm.

(d) Observations are to be made of a neon

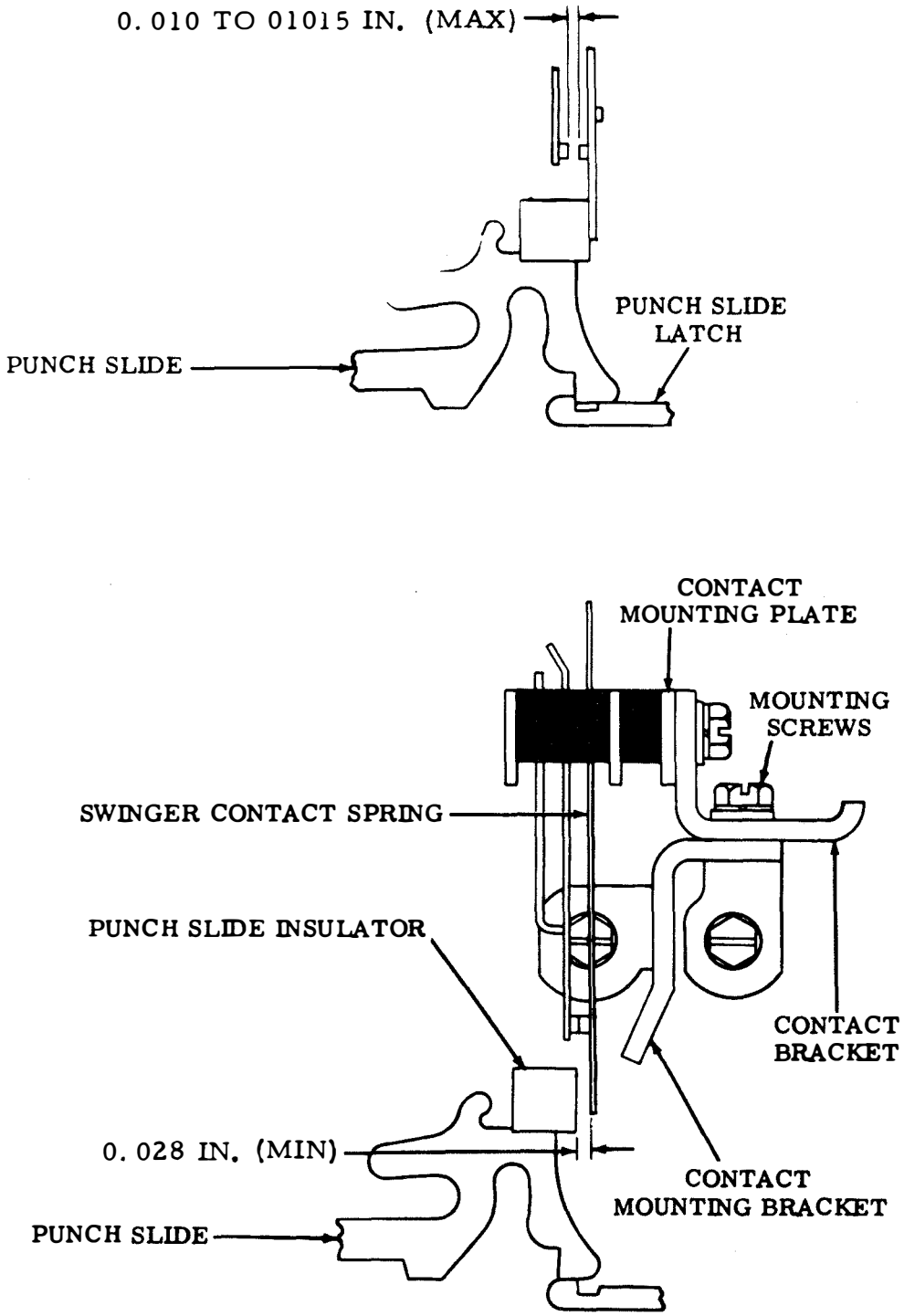


Figure 6-201. Contact Bracket (Make-Type Contacts)

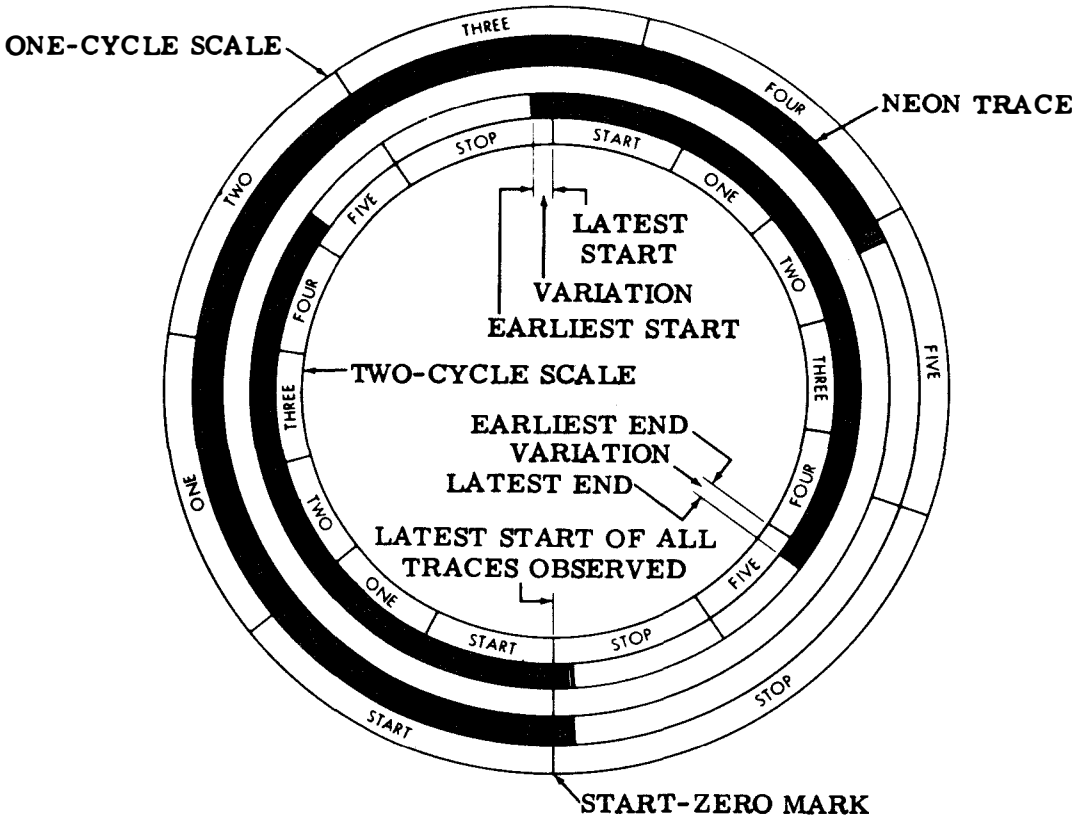


Figure 6-202. Zero Test Set

trace on the graduated disc of the test set. Trace will have tendency to jump; that is, it will not be steady enough to be accurately measured. Variation may be as high as ten divisions on scale. Minimum signal length is measured between latest start and earliest end of all traces. Maximum signal length is measured between earliest start and latest end of all traces.

(e) Connect neon trace to number 1 code reading contact (rearmost). With unit receiving LETTERS code combination, observe and note point at which trace ends. Traces will jump as described above; note earliest end of traces. Repeat for remaining contacts. Of all traces observed, choose one that starts the latest. Set start-zero mark of scale at latest start of chosen trace. Record earliest end of chosen trace for future adjustment references.

(2) Code Reading Contacts. Adjust as follows:

NOTE

The following procedures apply to 600-opm (or lower) units only.

(a) Refer to figure 6-203.

(b) Zero test set and connect neon trace to marking side of a code reading contact (normally-open when unit is in idle condition).

(c) With unit receiving continuous LETTERS code combinations, observe trace. Repeat for all five contacts.

(d) Signal length for each contact trace and combined contact traces should be minimum 450 divisions --- maximum 594 divisions.

(e) Bounce should end within maximum of 20 divisions of earliest start and latest end of all traces.

NOTE

The following steps, (f) through (i), apply to transfer contacts only.

(f) Connect neon trace to both sides of contact. With unit receiving LETTERS code combinations, observe trace.

(g) Break in trace indicating break before make should be a minimum of 3 divisions.

(h) Signal length of spacing side of contact should be a minimum of 100 divisions.

(i) Bounce should end within 30 divisions of earliest start and latest end of trace.

(j) If requirements in paragraphs (d), (g), or (h), above, are not met, refine Contact Bracket (paragraph 6-6.1f(8)) adjustment. Attempt to adjust toward maximum signal length.

(k) If bounce requirements in paragraph (e) and (i), above, are not met, refine Marking Contact Spring adjustment (paragraph 6-6.1f(2)), Swinger Contact Spring (paragraph 6-6.1f(3)) and Spacing Contact Spring

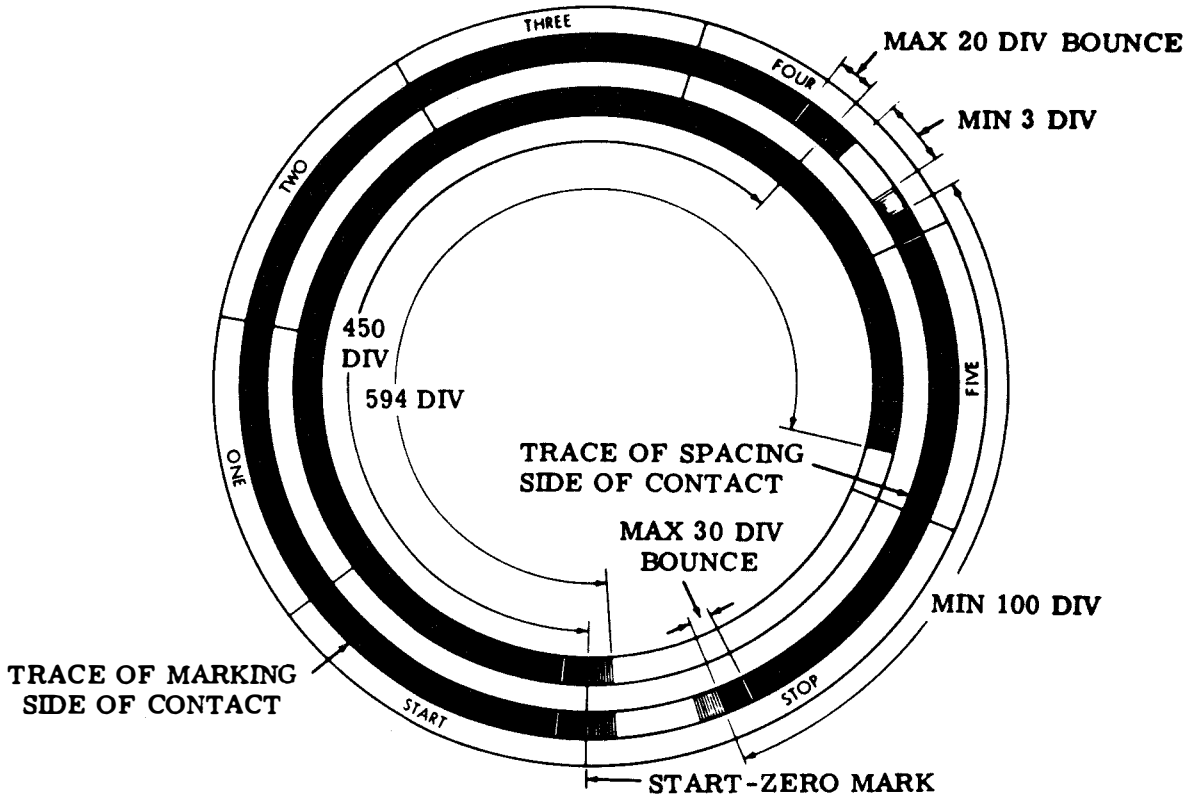


Figure 6-203. Code Reading Contacts

(paragraph 6-6.1f(5)) adjustments.

(1) If refinements prove necessary, repeat complete test procedure.

(3) Timing Contacts. Adjust as follows:

NOTE

The following procedures apply only to 600-opm units (Bell 82B1 System) using one-cycle cams.

(a) Refer to figure 6-204.

(b) Zero test set.

(c) Connect neon trace to right side of rear contact (normally-open when unit is in idle condition). With unit receiving LETTERS code combinations, observe trace.

(d) Earliest start minimum of 35 divisions after start zero mark.

(e) Latest end minimum of 35 divisions before earliest end of code reading contact traces recorded when zeroing test set.

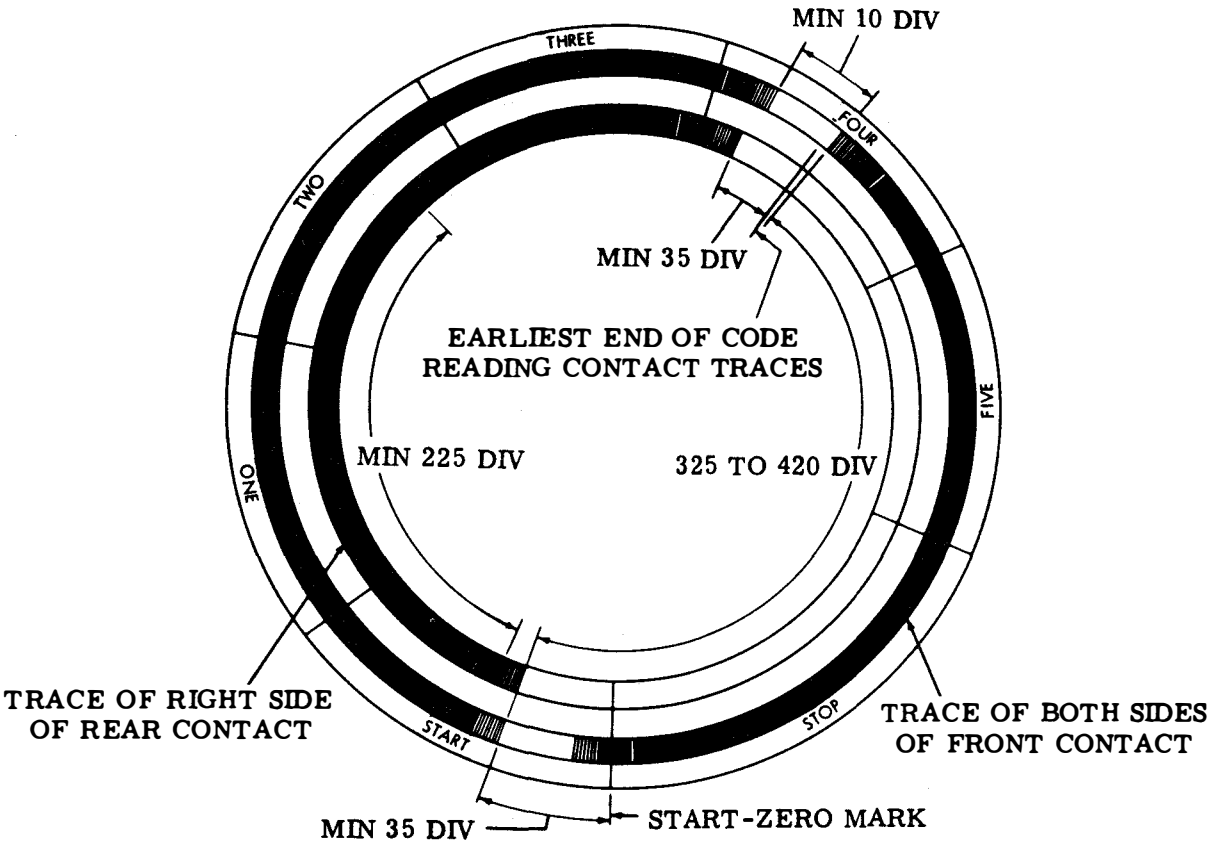


Figure 6-204. Timing Contacts (Code Reading)

(f) Minimum trace length 225 divisions.

(g) Bounce should end within maximum 5 divisions of start and end of any trace.

(h) Connect neon trace to both sides of front contact. With unit receiving LETTERS code combinations, observe trace.

(i) Break in trace to indicate break before make should be minimum 10 divisions.

(j) Between earliest starts of traces of right and left (normally-open and normally-closed) side of contact, there should be a minimum of 325 divisions and a maximum of 420 divisions.

(k) Bounce should end within maximum 5 divisions of earliest start and latest end of any trace.

(l) If timing requirements in paragraphs (d), (e), (f), (i), and (j), above, are not met, refine Contact Bracket (Paragraph 6-6.1f(9), Right Contact Gap (paragraph 6-6.1d(3)), Left Contact Gap (paragraph 6-6.1d(5)), Swinger Contact Spring (paragraph 6-6.1d(4)), and Left Contact

Spring (paragraph 6-6.1d(6)) adjustments.

(m) If bounce requirements in paragraphs (g) and (k), above, are not met, refine Swinger Contact Spring (paragraph 6-6.1d(4)) and Left Contact Spring (paragraph 6-6.1d(6)) adjustments.

(n) If any refinements are necessary, repeat complete test procedure.

(4) LETTERS - FIGURES Contact Test. Perform as follows:

NOTE

If unit is equipped with code reading and/or timing contacts, test is to be made after installation and adjustment of these contacts.

(a) Refer to figure 6-205.

(b) Connect cable leads of LETTERS-FIGURES contact to neon trace lamp of signal distortion test set. Set control switches of test set to following positions: (1) VIEW-TRANSMIT switch to VIEW; (2) LINE-DIST. switch to LINE; and (3) MOTOR switch to ON. Alternately select LETTERS (12345) and FIGURES (12-45). Set START-ZERO MARK of test set scale at start of contact trace. Connect right side of front timing contact (probe) to neon trace lamp; record start and end of trace. Reconnect LETTERS-FIGURES contact to trace lamp and alternately select LETTERS and FIGURES.

(c) There should be no chatter or bounce of LETTERS-FIGURES contact during time when timing contact is closed.

(d) If requirement is not met, refine Middle Contact Spring (paragraph 6-6.1j(1)), and Lower Contact Spring (paragraph 6-6.1j(2)) adjustments.

(e) Trace of LETTERS-FIGURES contact should start a minimum of 40 divisions before start of trace of timing contact, and end of a minimum of 4 divisons after end of timing contact.

(f) If requirements is not met, refine Mounting Bracket (paragraph 6-6.1j(4)) adjustment.

(5) Timing Contact. Proceed as follows:

NOTE

Following test procedures apply only to 600-opm units (Western Union Plan 55 System) using one-cycle cams.

(a) Refer to figure 6-206.

(b) Zero test set.

(c) Connect neon trace to right side of front contact (normally-open when unit is in idle condition). With unit receiving continuous LETTERS code combinations, observe trace.

(d) Latest end minimum of 35 divisions before earliest end of code reading contact traces.

(e) Earliest start minimum of 35 divisions

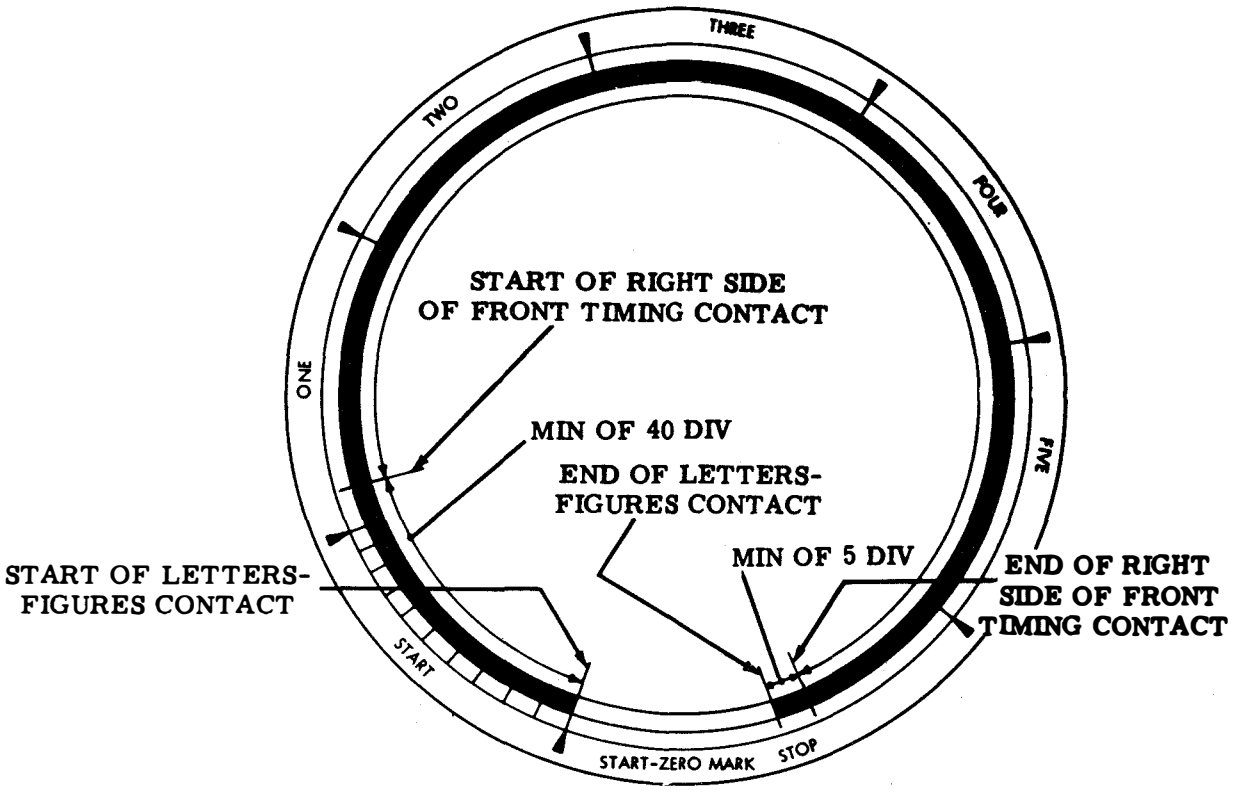


Figure 6-205. LETTERS-FIGURES Contacts

after latest start of code reading contact traces.

(f) Minimum trace length 200 divisions.

(g) Bounce should end within maximum 5 divisions of earliest start and latest end of any trace.

(h) Record latest start and earliest end of trace.

(i) Connect neon trace to both sides of contact. Observe trace. Break in trace at two places to indicate break before make is 10 divisions (minimum). (Applies only if complete transfer contact used.)

(j) Connect neon trace to right side of rear contact (normally-open when unit is in idle condition). With unit receiving LETTERS code combinations, observe trace.

(k) Latest end of trace minimum of 35 divisons before earliest end of trace of right side of front contact recorded in requirement of paragraph (h) above.

(l) Minimum trace length should be 111 divisions.

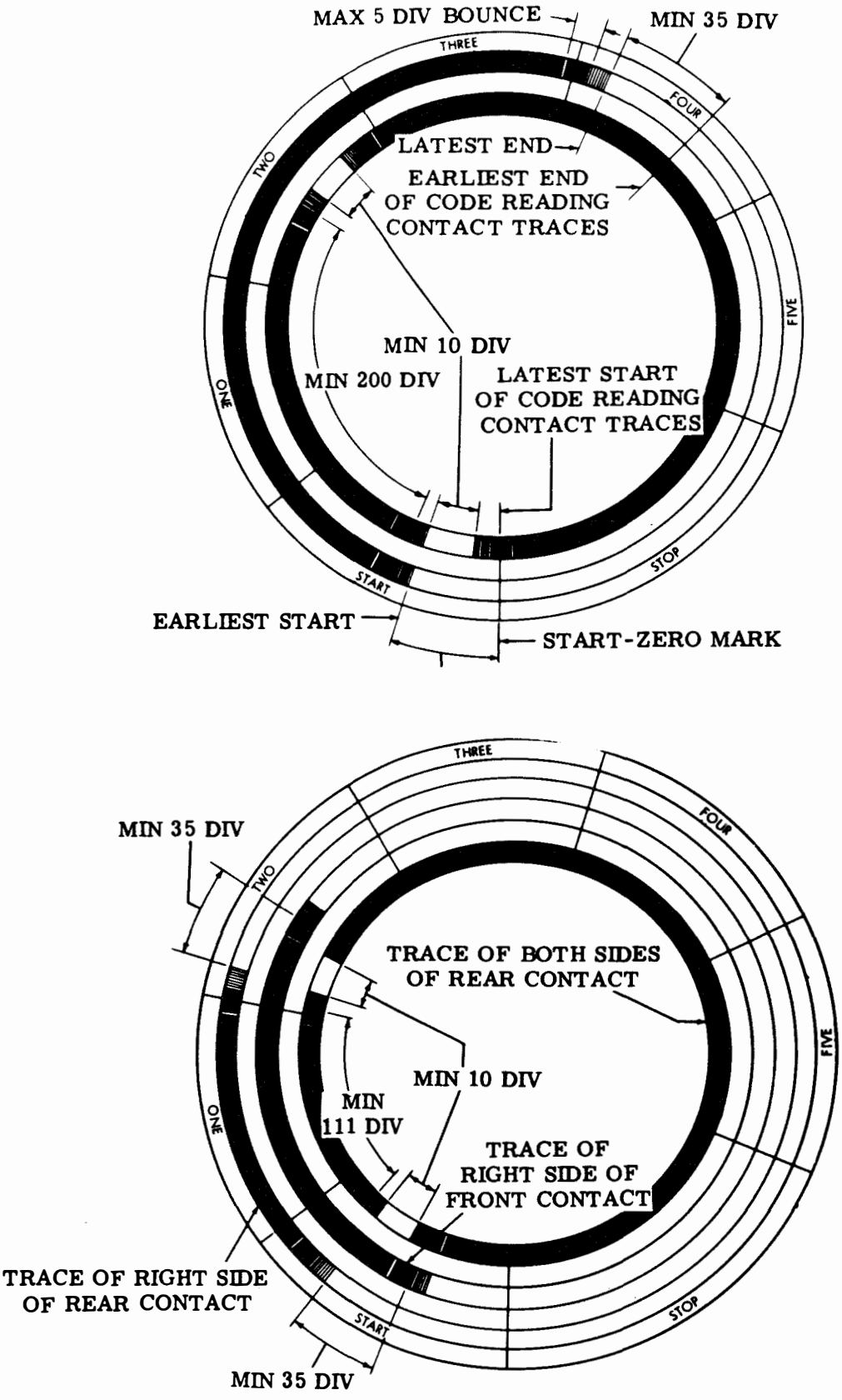


Figure 6-206. Timing Contacts (LETTERS-FIGURES)

(m) Earliest start of trace should be a minimum of 35 divisions after latest start of trace of right side of front contact recorded in requirement of paragraph (c) above.

(n) Bounce should end within maximum 5 divisions of earliest start and latest end of any trace.

(o) Connect neon trace to both sides of rear contact. Observe trace. Break in trace at two places to indicate break before make is 10 divisions (minimum). (Applies only if complete transfer contact is used.)

(p) If trace lengths in paragraphs (f) and (l) above, are both short, refine Contact Bracket adjustment (paragraph 6-6.1d(9)). If only one trace is short, refine Contact Backstop (paragraph 6-6.1d(1)), Right Contact Gap (paragraph 6-6.1d(3)), Left Contact Gap (paragraph 6-6.1d(5)), Swinger Contact Spring (paragraph 6-6.1d(4)) and Left Contact Spring (paragraph 6-6.1d(6)) adjustments.

(q) If break before make requirements of paragraphs (i) and (o) above, are not met, refine Right Contact Gap (paragraph 6-6.1d(3)), Left Contact Gap (paragraph 6-6.1d(5)), Swinger Contact Spring (paragraph 6-6.1d(4)), and Left Contact Spring (paragraph 6-6.1d(6)) adjustments.

(r) If any refinements are necessary, repeat complete test procedure.

h. End of Feed-Out Timing Contacts for Noninterfering LTRS and BLANK Tape Feed-Out Mechanism. Perform adjustment in accordance with the following paragraphs.

(1) Contact Swinger (Preliminary). Adjust as follows:

(a) Refer to figure 6-207.

(b) Use spring scale to measure force necessary to open normally-closed contact; this should require from 1-1/2 to 2-1/2 ounces.

(c) To adjust, bend swinger.

(2) Contact Spring Gap (Preliminary). Adjust as follows:

(a) Refer to figure 6-207.

(b) Normally-open contact gap is from 0.012 to 0.020 inch.

(c) To adjust, bend contact spring.

(3) Contact Assembly. Adjust as follows:

(a) Refer to figure 6-208.

(b) Insulator button on swinger should be centrally located in bail extension yoke.

(c) To adjust, loosen mounting screws and position contact assembly.

(d) Tighten screws.

(4) Tape Length Adjusting Plate. Adjust as follows:

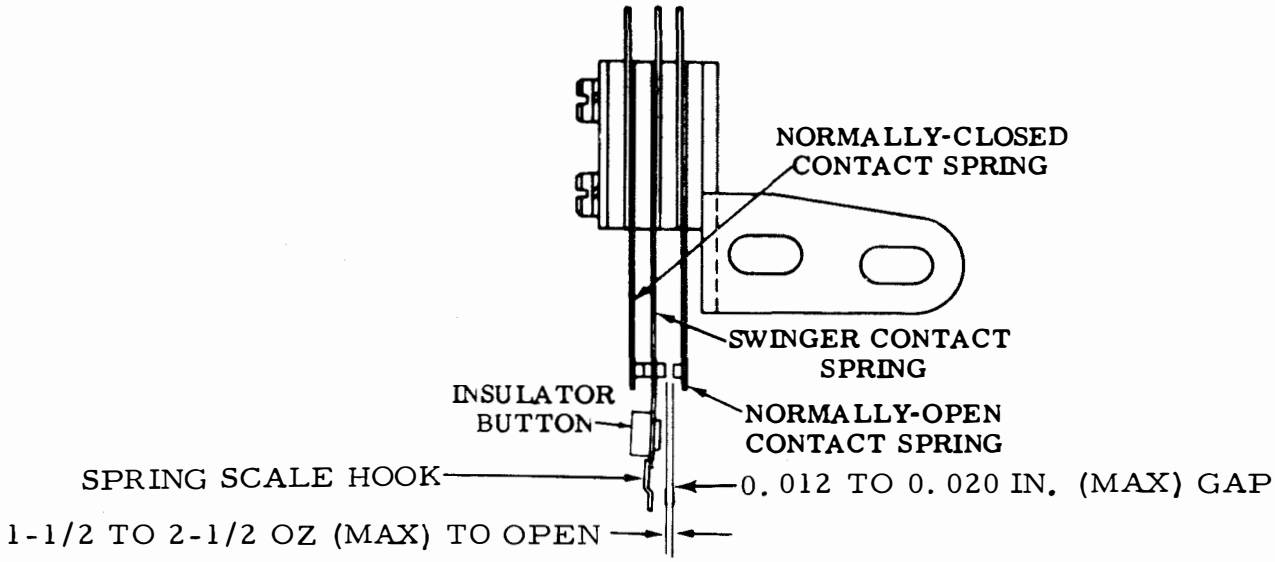


Figure 6-207. Contact Swinger and Contact Spring Gap

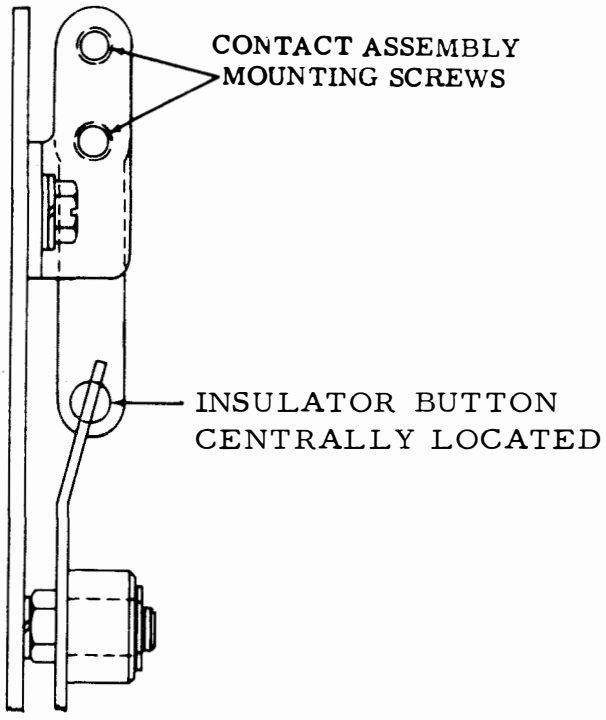


Figure 6-208. Contact Assembly - Right Side View

(a) Refer to figure 6-209.

(b) With unit in stop position, BLANK combination selected, and release lever positioned on lower step of latchlever, manually advance ratchets so that feed pawl is in front ratchet tooth preceeding trip off.

(c) Turn main shaft until feed pawl is in extreme left position and hold bail against adjusting plate lightly.

(d) There should be from 0.030 to 0.040 inch clearance between bail and latchlever extension.

(e) When operating under power, unit should feed out correct length of tape.

(f) To adjust, loosen spring post and position adjusting plate.

(g) Tighten spring post.

(5) Contact Assembly Mounting Bracket. Adjust as follows:

(a) Refer to figure 6-209.

(b) Place unit in STOP position and place release lever on lower step of latchlever.

(c) Position bail so clearance is minimal.

(d) There should be from 0.030 to 0.040 inch clearance between latchlever extension and bail.

(e) To adjust, loosen mounting screws and position contact bracket.

(f) Tighten screws.

i. External Manual Interfering LTRS Tape Feed-Out Mechanism. Perform adjustments in accordance with the following paragraphs.

(1) Lever. Adjust as follows:

(a) Refer to figure 6-210

(b) Lever should not touch sides of guide.

(c) To adjust, bend lever.

(d) Recheck Trip Lever (Manually Operated) (paragraph 6-6.1m(2)) and Trip Lever Spring (paragraph 6-6.1m(4)) adjustments.

(2) Arm. Adjust as follows:

(a) Refer to figure 6-210.

(b) Remove cover.

(c) With arm just touching lever, handle should be approximately horizontal.

(d) To adjust, loosen adjusting nut and position arm.

(e) Tighten nut.

(f) Replace cover, positioning it properly in accordance with requirements.

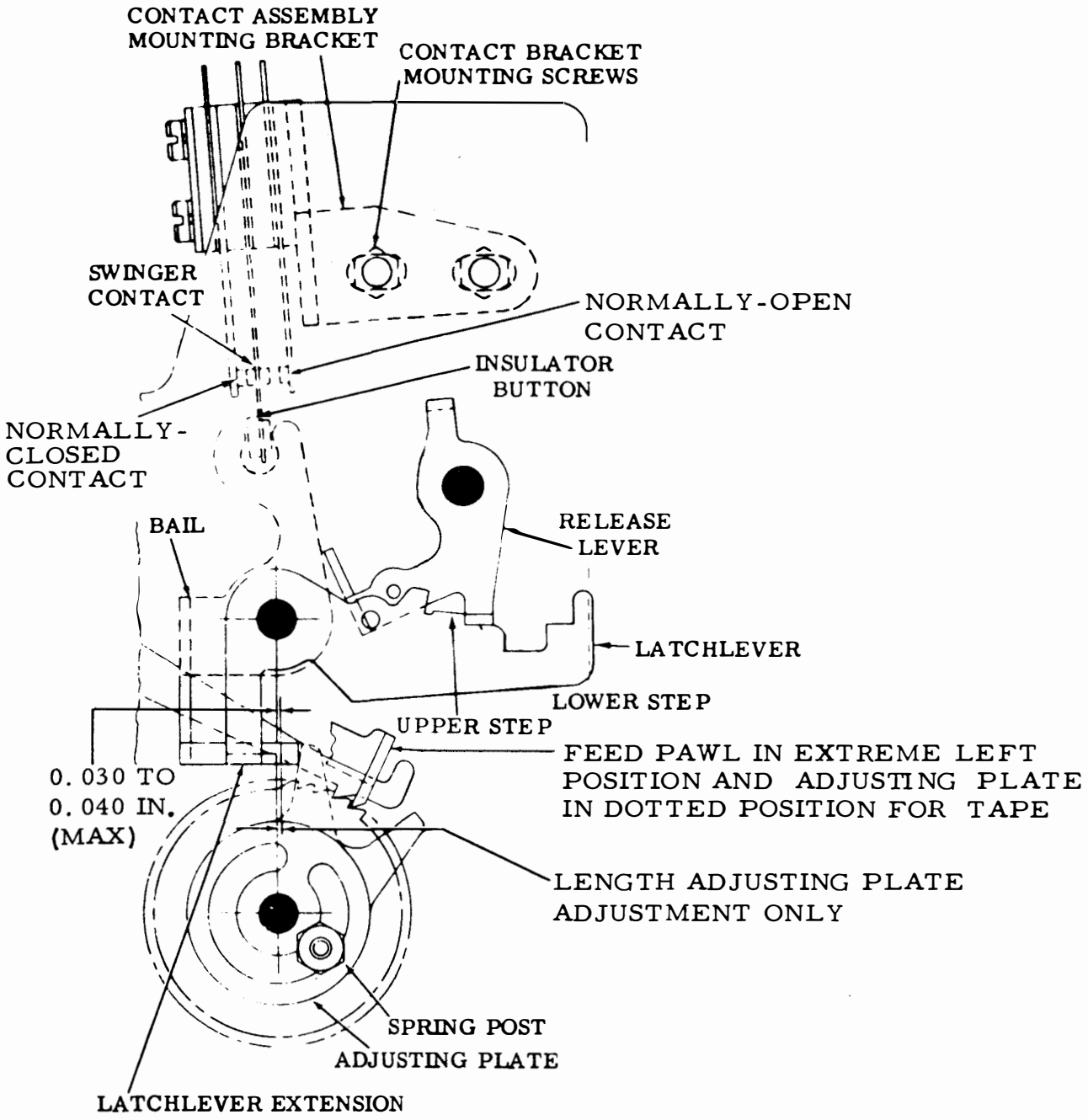


Figure 6-209. Tape Length Adjusting Plate and Contact Assembly Mounting Bracket

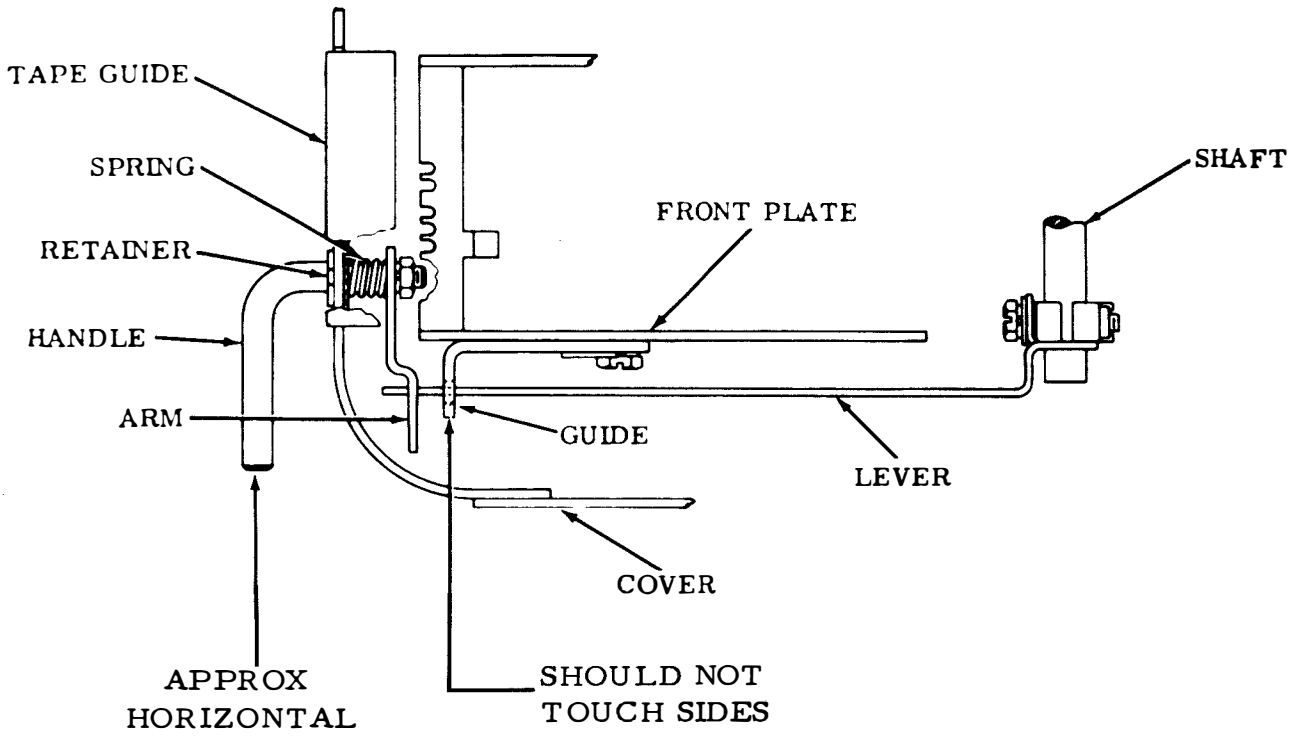


Figure 6-210. Lever and Arm - Top View

j. LTRS-FIGS Contact Mechanism. Perform adjustments in accordance with the following paragraphs.

(1) Middle Contact Spring. Adjust as follows:

(a) Refer to figure 6-211.

(b) Use spring scale to measure force necessary to open upper side of contact; this should require from 25 to 40 grams.

(c) To adjust, bend middle contact spring.

(2) Lower Contact Spring. Adjust as follows:

(a) Refer to figure 6-211.

(b) With upper side of contact closed, there should be a gap of from 0.012 to 0.020 inch at lower side of contact.

(c) To adjust, bend lower contact spring.

(3) Operating Lever Spring. Adjust as follows:

(a) Refer to figure 6-211.

(b) Use spring scale to measure force necessary to start operating lever moving; this should require from 1 to 2 ounces.

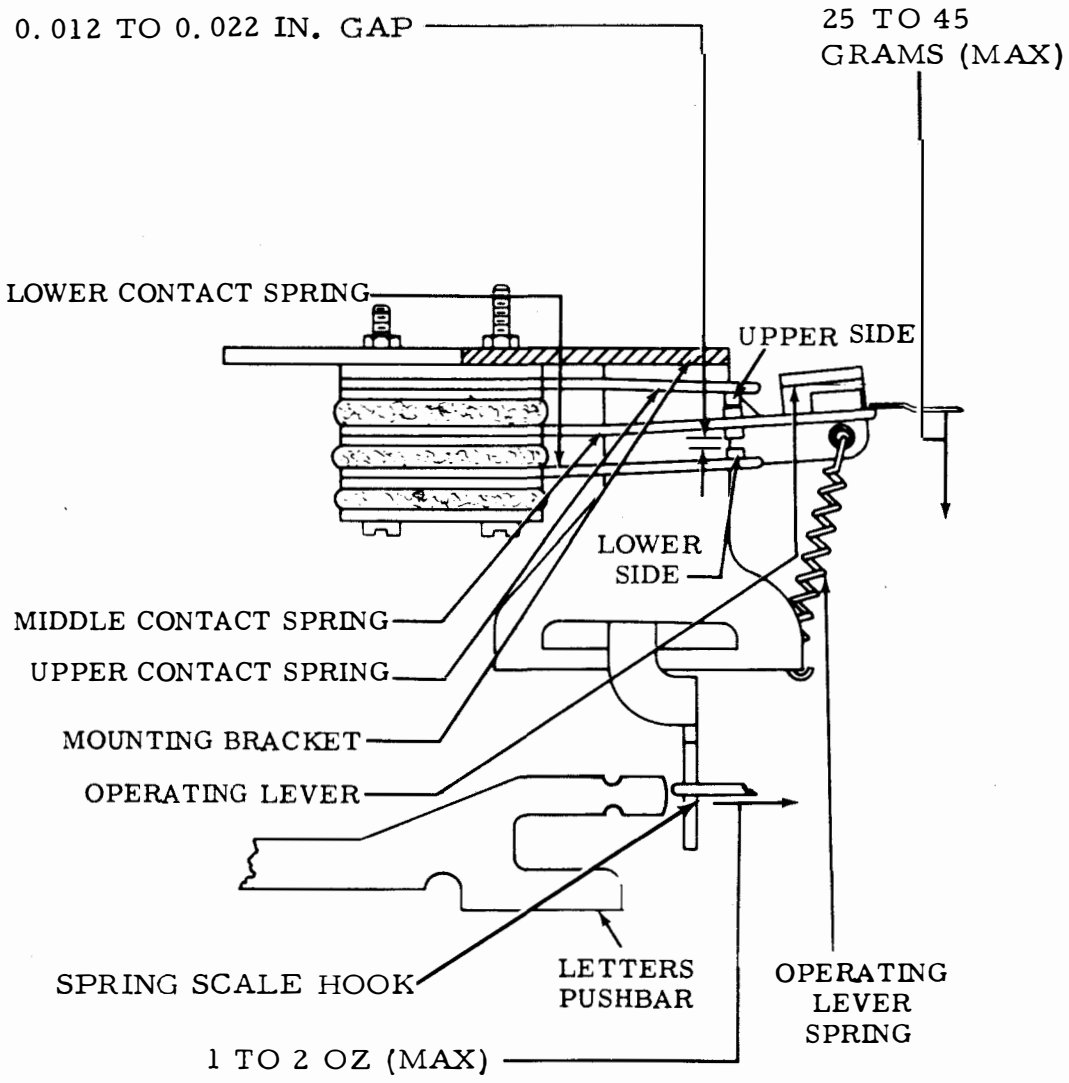


Figure 6-211. Middle Contact Spring, Lower Contact Spring, Operating Lever Spring, and Mounting Bracket

(c) If force does not match specifications, replace spring.

(4) Mounting Bracket. Adjust as follows:

(a) Refer to figure 6-211.

NOTE

Contact assembly should be mounted on unit before adjustment is made.

(b) With unit in LETTERS condition and function clutch disengaged, there should be from 0.005 to 0.015 inch clearance between operating lever and insulator on middle contact spring.

(c) To adjust, loosen mounting nut and upper mounting screw and position mounting bracket.

(d) Tighten nut and screw.

k. Manual and Power Drive Backspace Mechanism For Chadless Tape. Perform manual and power drive backspace mechanism adjustments in accordance with the following paragraphs.

(1) Rake. Adjust as follows:

(a) Refer to figures 6-212 and 6-213.

(b) Remove two mounting screws from rear plate.

(c) Position rake shaft gear so that with rotational play in rake taken up to left, bottom surface of rake teeth is within 0.040 inch of the same vertical plane as left side of punch block or slightly to the right.

(d) Remove mounting screw from front plate.

(e) Loosen eccentric mounting screw, leaving screw friction tight.

(f) Unhook bellcrank spring.

(g) With bellcrank handle depressed, position front and rear plates until left edges of both plates are approximately in line with vertical plane of punch block.

(h) With bellcrank unhooked and rake in operated position, between 0.007 and 0.011 inch clearance should exist between bottom of rake teeth and lower surface of tape slot (check at number 1 and number 5 pins).

(i) Tighten eccentric mounting screw, replace and tighten mounting screws, and hook up bellcrank spring.

(2) Feed Pawl Adjusting Plate. Adjust as follows:

(a) Refer to figure 6-213.

(b) Loosen mounting screw; then tighten friction tight.

(c) Position adjusting plate so that feed pawl misses first tooth and engages second tooth by at least one-half of right surface of feed pawl (as gauged by eye) when feed pawl first contacts ratchet tooth.

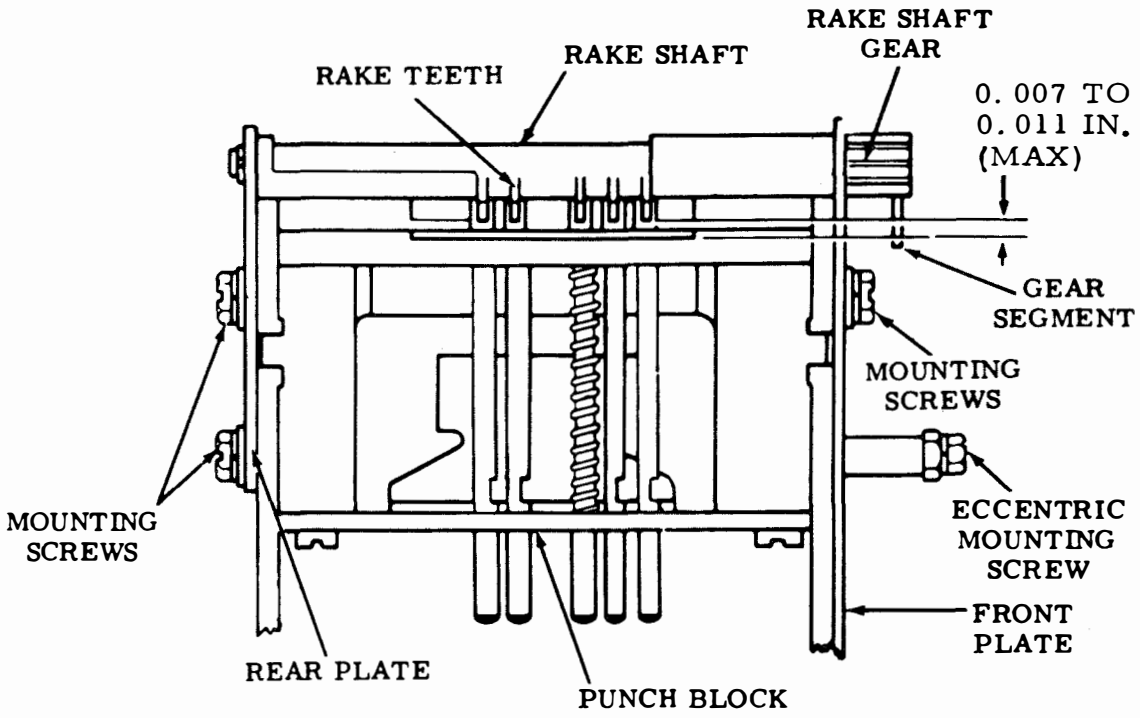


Figure 6-212. Rake Assembly - Left Side View

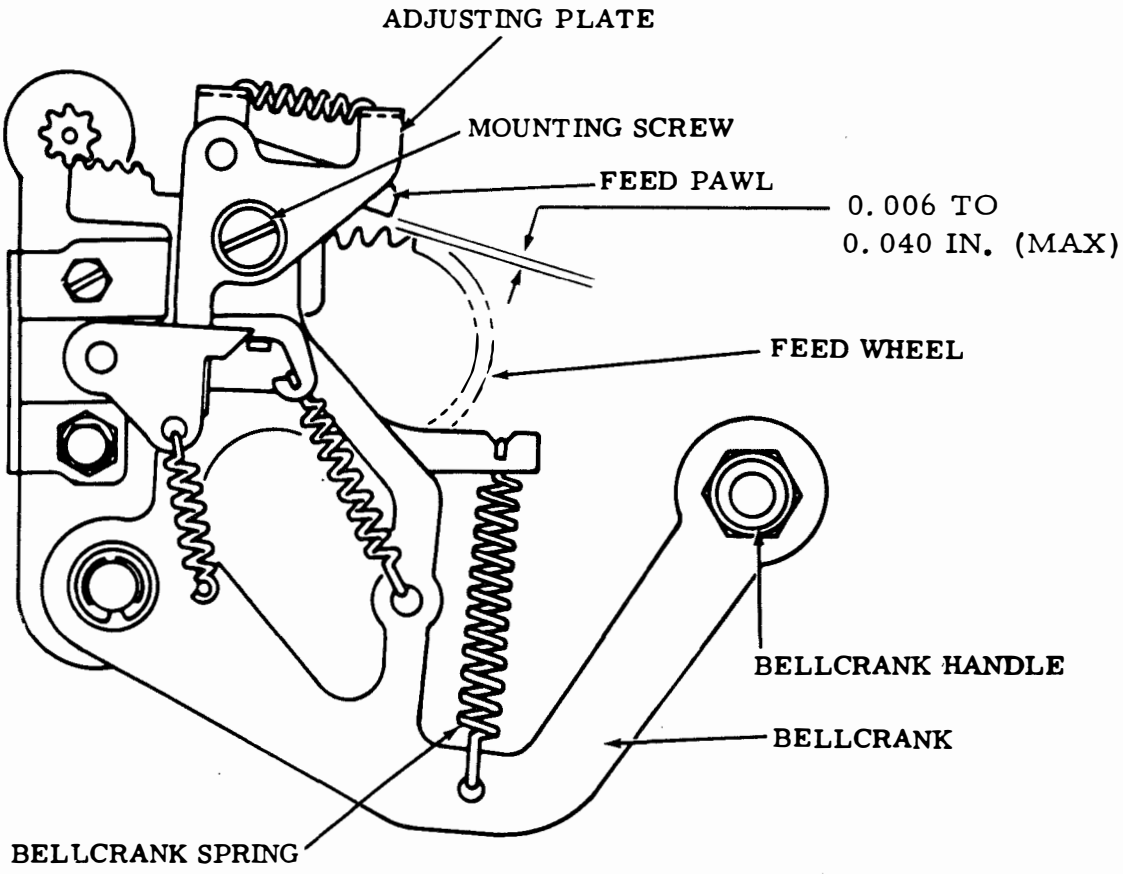


Figure 6-213. Feed Pawl Adjusting Plate

(d) Between 0.006 and 0.040 inch should exist between feed pawl and first mounting tooth.

(e) Tighten mounting screw.

(3) Return Latch. Adjust as follows:

(a) Refer to figure 6-214.

(b) Loosen eccentric, with mounting screw tight; then tighten eccentric friction tight.

(c) Adjust eccentric so that with backspace mechanism in unoperated position, clearance between return latch and feed pawl extension shall be between 0.004 and 0.020 inch.

(d) Tighten eccentric.

(4) Feed Pawl Eccentric (Preliminary). Adjust as follows:

(a) Refer to figure 6-215.

(b) Loosen nut post; then tighten friction tight.

(c) Using hex wrench, rotate eccentric so that with backspace bell crank in its operated position, high side of the eccentric is in its uppermost position.

(d) With the backspace bell crank in its operated position and the feed wheel detented back one space, some clearance, but not over 0.003 inch should exist between the feed wheel ratchet tooth and backspace feed pawl.

(e) Tighten nut post.

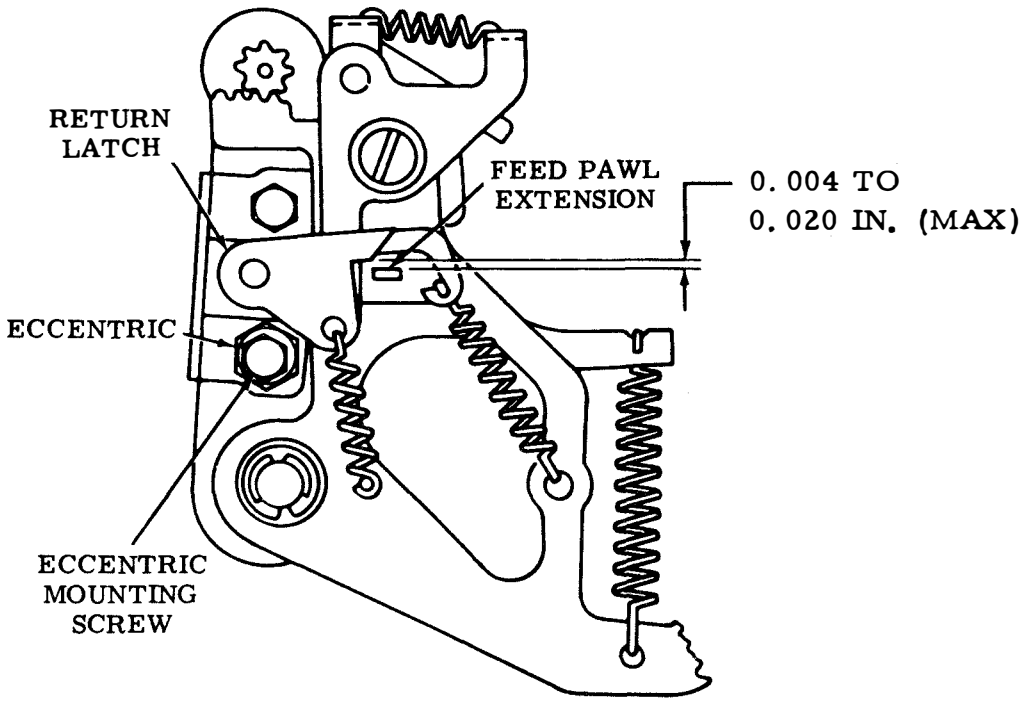


Figure 6-214. Return Latch

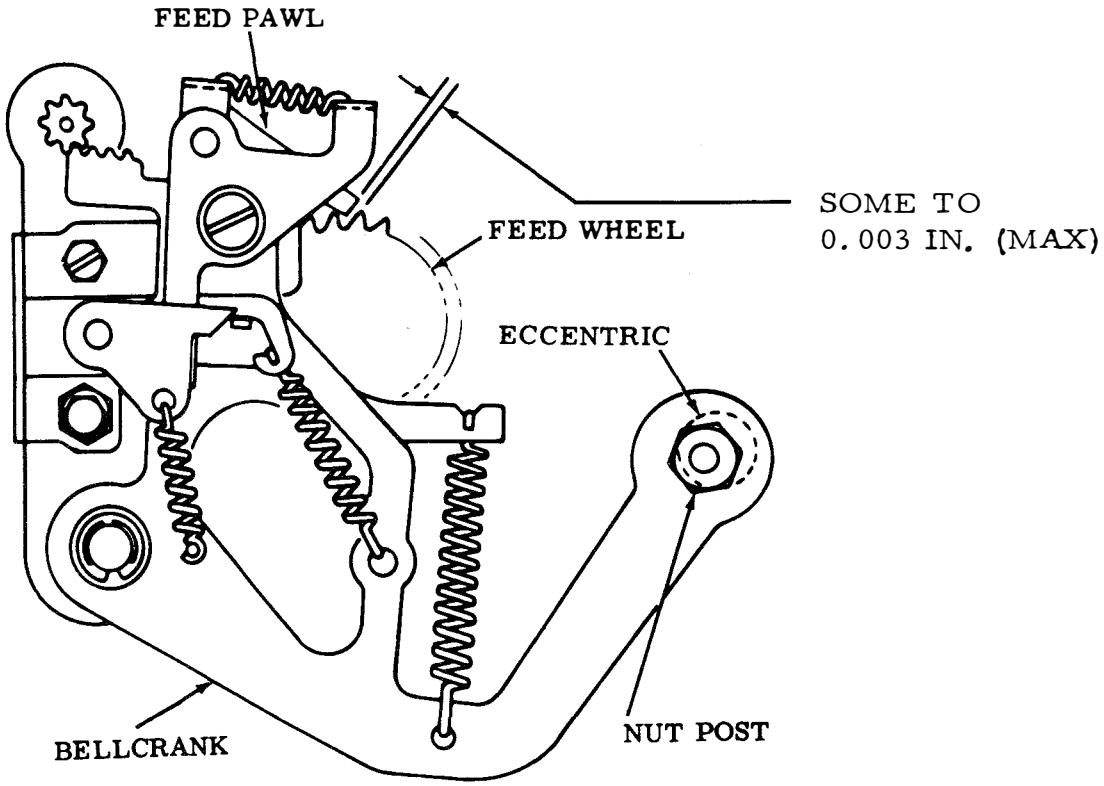


Figure 6-215. Feed Pawl Eccentric (Preliminary) (for Chadless Tape)

1. Manual and Power Drive Backspace Mechanism For Fully Perforated Tape. Perform manual and power drive backspace mechanism adjustments in accordance with the following paragraphs.

(1) Backspace Ratchet. Adjust as follows:

(a) Refer to figure 6-216.

(b) Loosen mounting screw; then tighten friction tight.

(c) Rotate backspace ratchet so that teeth of backspace and feed wheel ratchets line up (visual alignment) when feed wheel ratchet is in detented position.

(d) Tighten mounting screw.

(2) Backspace Pawl Clearance. Adjust as follows:

(a) Refer to figures 6-216 and 6-217.

(b) Loosen mounting screw; then tighten friction tight.

(c) Take up all rotational play of backspace ratchet in relation to feed ratchet by rotating it clockwise

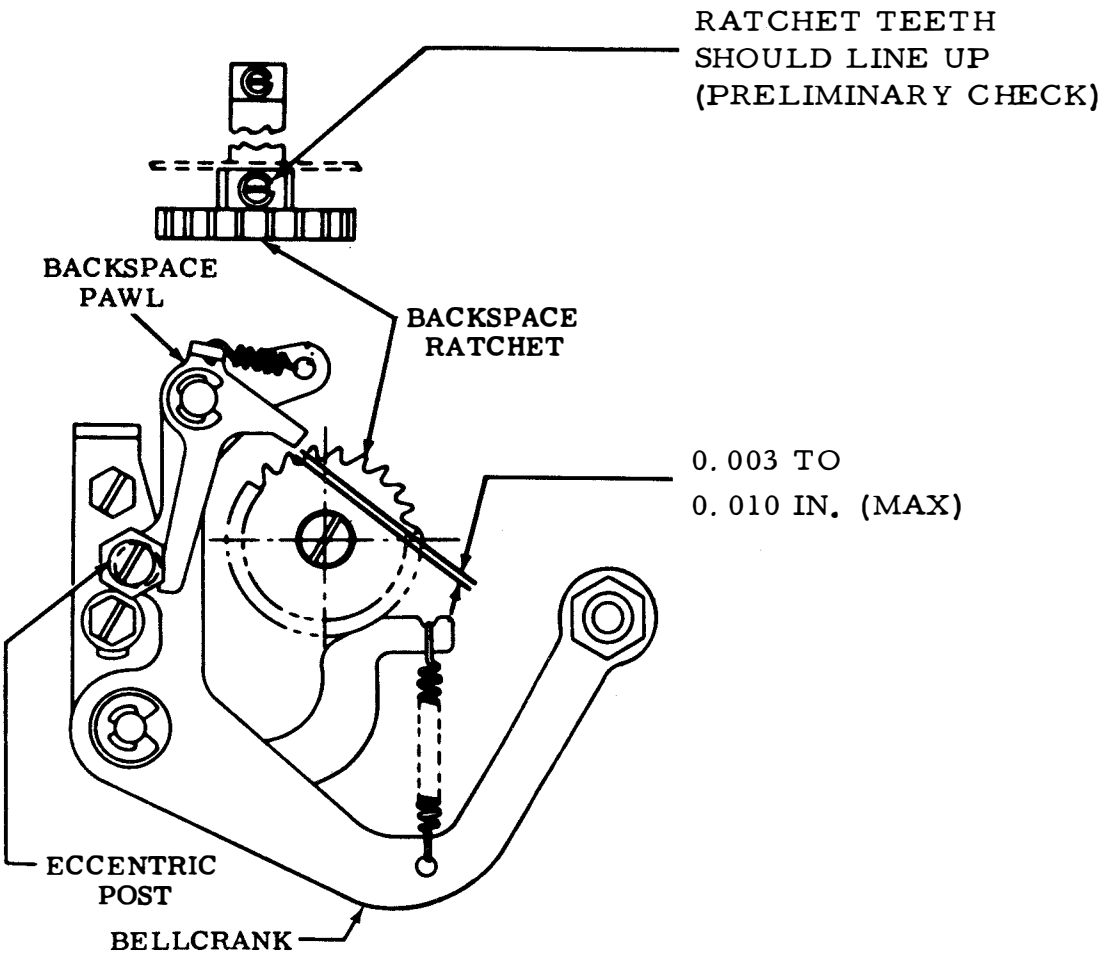


Figure 6-216. Backspace Ratchet - Top View

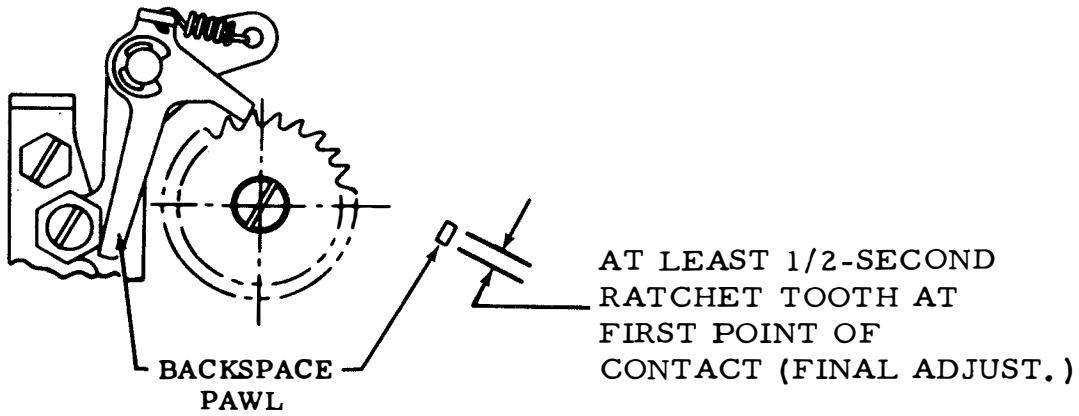


Figure 6-217. Backspace Pawl

and the bellcrank clockwise simultaneously.

(d) With backspace bell crank rotated clockwise, the backspace pawl should miss the first tooth by between 0.003 and 0.010 inch at point of least clearance.

(e) When the backspace pawl first contacts ratchet tooth, backspace pawl should miss the first ratchet tooth and engage the second tooth by at least one-half of the right engaging surface of backspace pawl (as guaged by eye).

(f) Tighten mounting screw.

(3) Feed Pawl Eccentric (Preliminary). Adjust as follows:

(a) Refer to figure 6-218.

(b) Loosen nut post; then tighten friction tight.

(c) Using a hex wrench, rotate eccentric so that with the backspace bellcrank in its operated position the high side of the eccentric is in its uppermost position.

(d) Some clearance, but not over 0.003 inch, should exist between the backspace feed pawl with all rotational play of the backspace ratchet taken up in a direction to make the clearance maximum.

(e) Tighten nut post.

m. Manual and Solenoid Operated Interfering LTRS Tape Feed. Perform these adjustments in accordance with the following paragraphs.

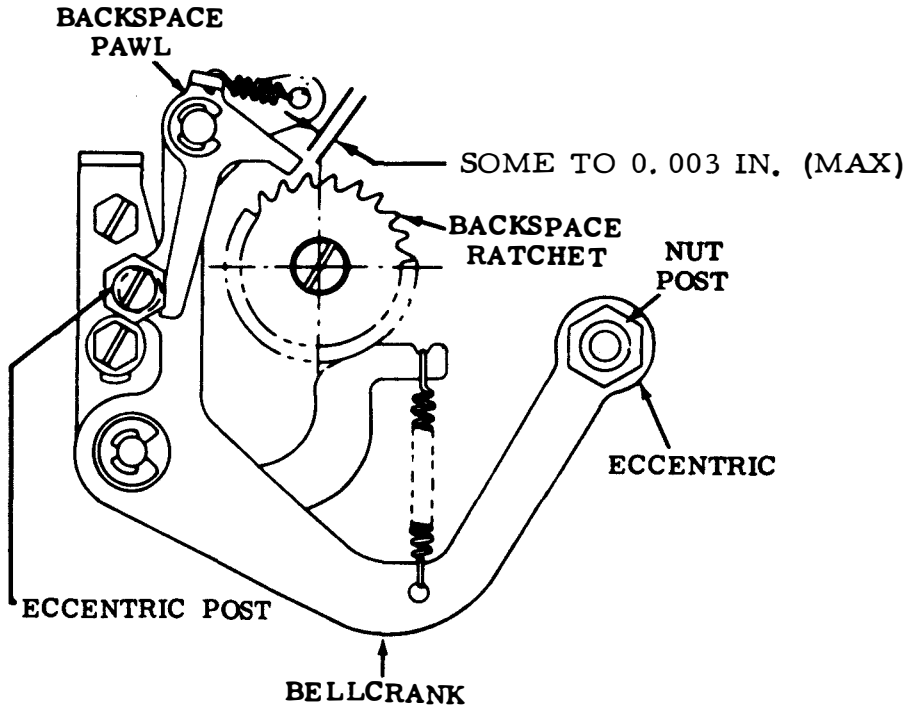


Figure 6-218. Feed Pawl Eccentric for Fully Perforated Tape

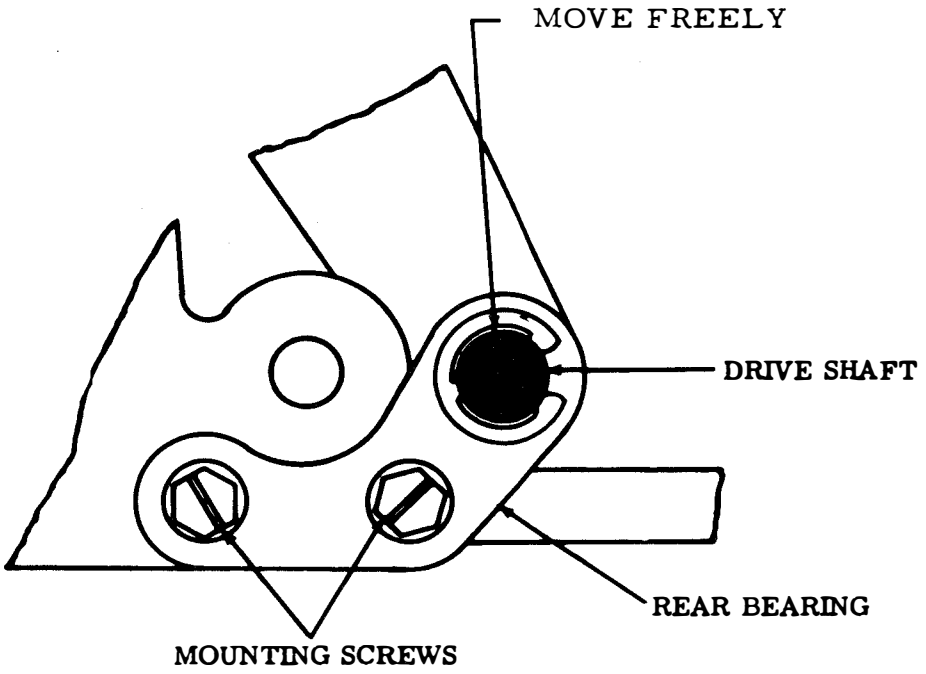


Figure 6-219. Drive Shaft Rear Bearing - Rear View

(1) Drive Shaft Rear Bearing. Adjust as follows:

(a) Refer to figure 6-219.

(b) Loosen two mounting screws.

(c) Position rear bearing so that drive shaft rotates freely inside bearing.

(d) Tighten mounting nuts.

(2) Trip Lever (Manually Operated). Adjust as follows:

(a) Refer to figure 6-220.

(b) Loosen clamp screw.

(c) With unit in stop position, trip selector clutch by positioning hand lever to left until stop lever rests against casting.

(d) At this point some clearance, but not over 0.015 inch, should exist at point of minimum clearance, with start lever engaging approximate center of trip levers operating surface.

(e) Tighten clamp screw.

(3) Trip Lever (Solenoid Operated). Adjust as follows:

(a) Refer to figure 6-220.

(b) Loosen clamp screw.

(c) With unit in stop position, trip selector clutch by energizing solenoid.

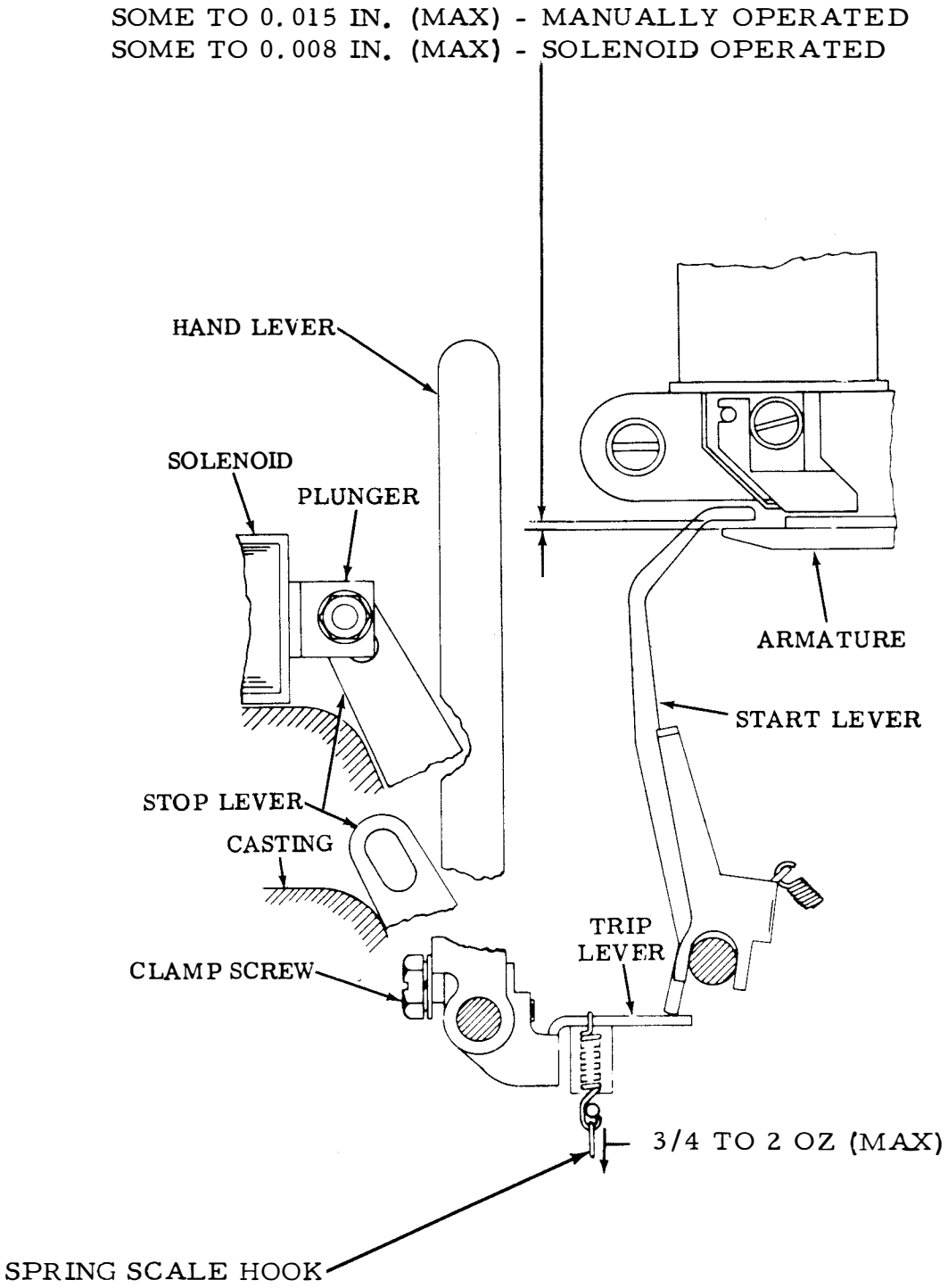


Figure 6-220. Trip Lever (Manually and Solenoid Operated) and Traip Lever Spring

(d) Take up play in stop lever to right (play between stop lever and plunger).

(e) Adjust start lever so that some clearance, but not over 0.008 inch, exists between start lever armature at point of least clearance, with start lever engaging approximate center of trip lever's operating surface.

(f) Tighten clamp screw.

(4) Trip Lever Spring. Adjust as follows:

(a) Refer to figure 6-220.

(b) Disconnect trip lever spring and check tension with a spring scale.

(c) Between 3/4 ounce and 2 ounces should be required to pull spring to its installed length.

(d) Reconnect trip lever spring.

(5) Manual Print Suppression Mechanism. Adjust as follows:

(a) Refer to figure 6-221.

(b) Loosen mounting screw; then tighten friction tight.

(c) Manually position blocking arm to non-print position.

(d) Rotate eccentric bushing so that print hammer is blocked by blocking arm.

(e) Move blocking arm to print position.

(f) Tighten mounting screw.

n. Multiple Mounted Function Blade Contact Mechanism. Perform multiple mounted function blade contact mechanism adjustments in accordance with the following paragraphs.

(1) Normally-Open Contact Gap. Before installing bracket assembly on unit, adjust as follows:

(a) Refer to figure 6-222.

(b) Bend normally-open contact spring to provide between 0.008 and 0.015 inch clearance between the open contact spring and swinger contact buttons.

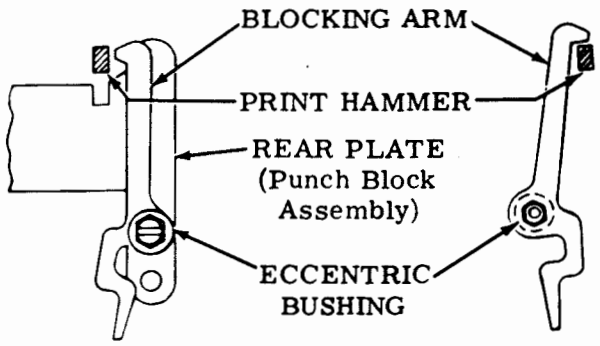
(c) Using a spring scale, measure contact tension on normally-closed contact. Between 8 and 15 grams tension should be required to move swinger contact away from normally-closed contact.

(2) Normally-Closed Contact Gap. After the multiple mounted function blade contact mechanism has been installed on the unit, adjust as follows:

(a) Refer to figure 6-223.

(b) Move function blade to its lowest position in non-selected condition.

(c) There should be some clearance between the contact swinger button and function blade.



ARM IN PRINT POSITION

REAR VIEW

ARM IN NONPRINT POSITION

FRONT VIEW

Figure 6-221. Manual Print Suppression Mechanism

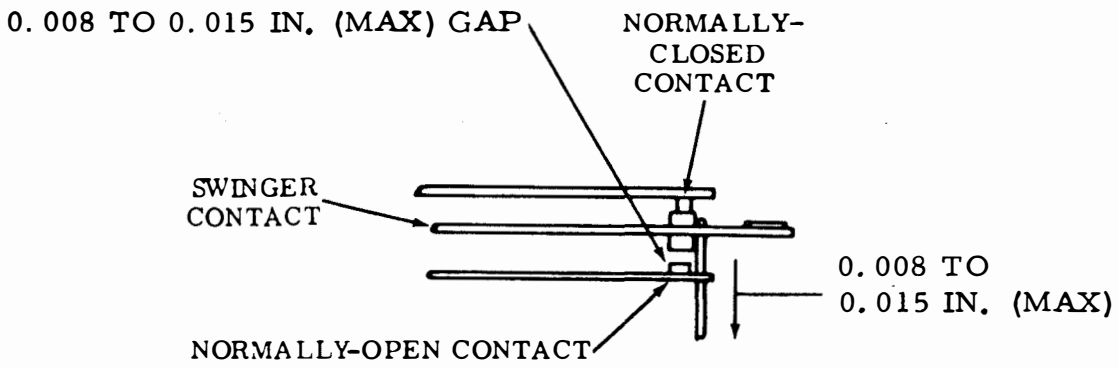


Figure 6-222. Normally-Open Contact - Left Side View

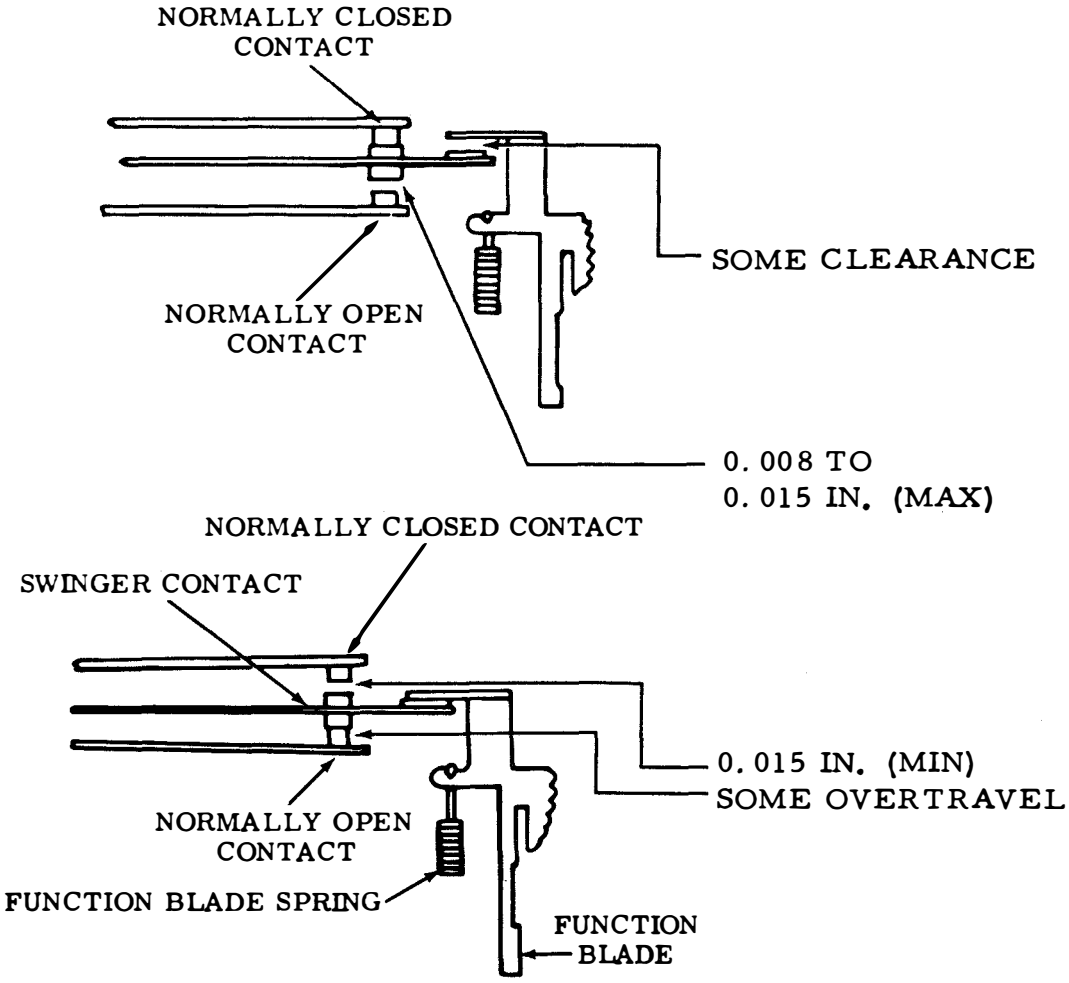


Figure 6-223. Normally-Closed Contact - Left Side View

(d) There should be between 0.008 and 0.015 inch between normally-open contact and swinger contact buttons.

(e) Bend normally-closed contact spring to adjust clearance.

(f) Move function blade to its lowest position in the selected condition.

(g) Gap between swinger contact and normally-closed (now open) contact should be at least 0.015 inch with some overtravel of normally-open contact.

(h) Bend normally-closed contact spring. Refine previous adjustments to maintain requirements.

o. Print Suppression on Function Mechanism. Perform print suppression on function mechanism adjustments in accordance with the following paragraphs.

(1) Print Hammer Stop (Preliminary). Adjust as follows:

(a) Refer to figure 6-224.

(b) Loosen two mounting screws.

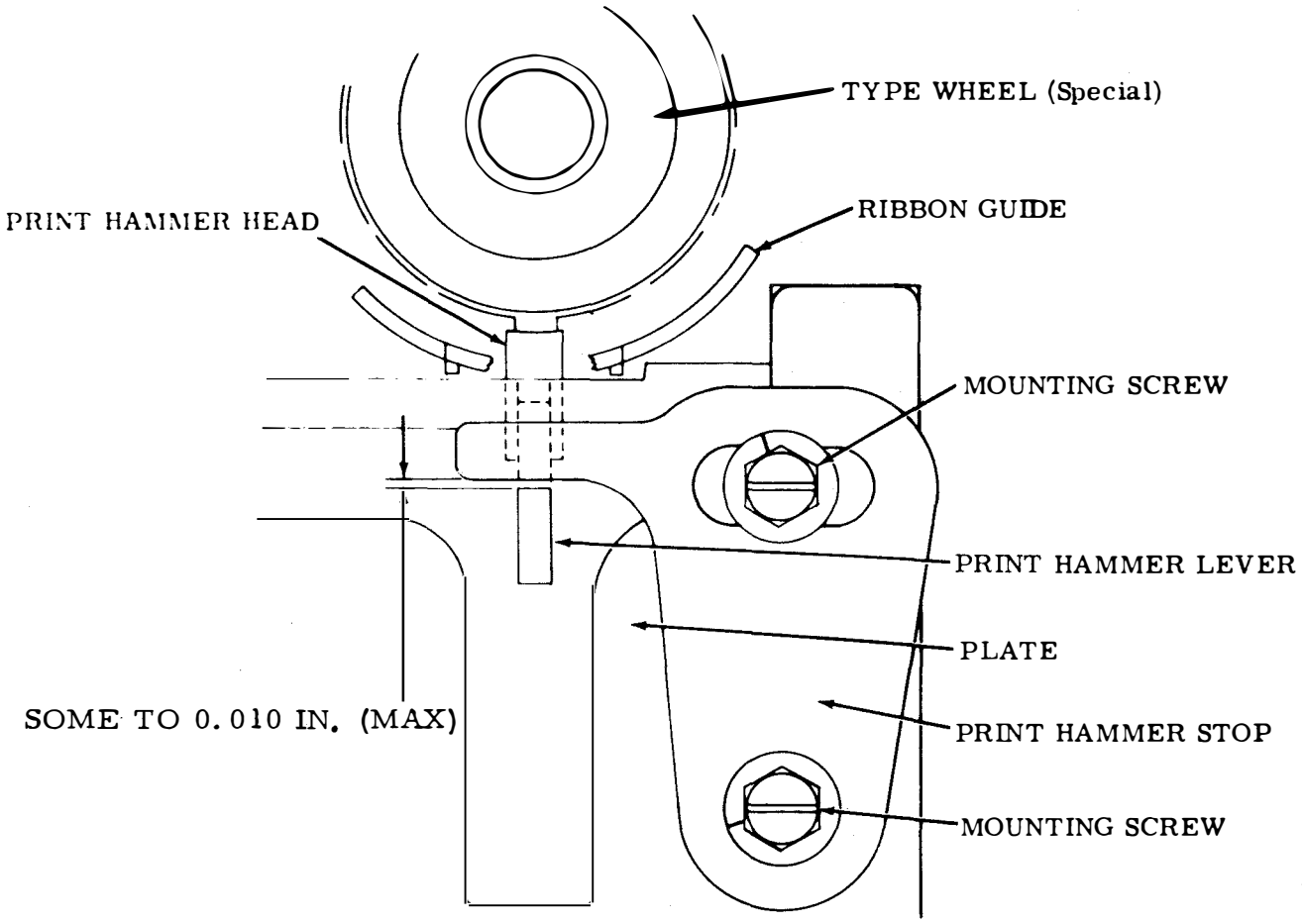


Figure 6-224. Print Hammer Stop (Preliminary and Final)

(c) Position print hammer stop by means of its elongated upper hole.

(d) With head of print hammer against character on type wheel, some clearance, but not over 0.010 inch, should exist between print hammer lever and print hammer stop.

(e) Tighten mounting screws.

(2) Print Hammer Stop (Final). Adjust as follows:

(a) Refer to figure 6-224.

(b) With unit operating under power, the amount of smudge should be held to a minimum where print suppression is required.

(c) Refine preliminary adjustment procedure as required.

p. Power Drive Backspace Mechanism. Perform power drive backspace mechanism adjustments in accordance with the following paragraphs.

(1) Armature Spring. Adjust as follows:

(a) Refer to figure 6-225.

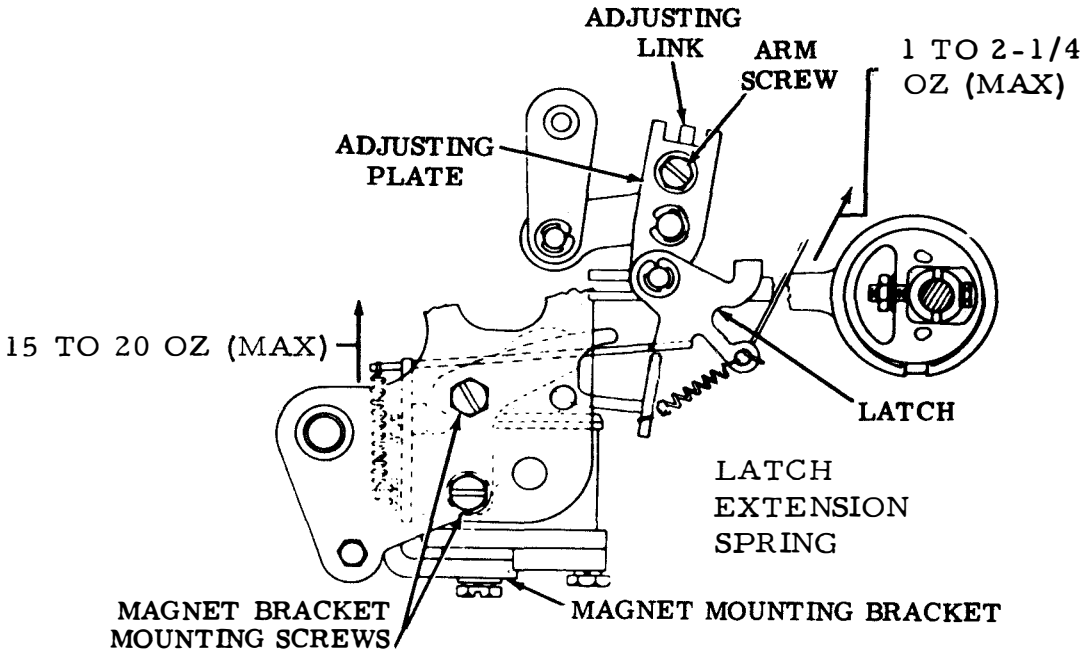


Figure 6-225. Armature Spring, Latch Extension Spring, Magnet Mounting Bracket, and Adjusting Plate

(b) Using spring scale, check tension. Between 15 and 20 ounces should be required to pull spring to installed length.

(2) Latch Extension Spring. Adjust as follows:

(a) Refer to figure 6-225.

(b) Using spring scale, check tension. Between 1 and 2-1/4 ounces should be required to start latch moving.

(3) Magnet Position. Adjust as follows:

(a) Refer to figure 6-225.

(b) Deenergize magnet.

(c) Loosen mounting screws.

(d) Position magnet assembly so that armature extension engages latch by approximately its full thickness.

(e) Tighten mounting screws.

(4) Final Manual or Power Adjustment. Adjust as follows:

NOTE

This is the final adjustment for all backspace adjustments, manual or power drive, regardless of type of unit.

(a) Refer to figure 6-225.

(b) With tape in the unit, place the feed

wheel shaft oil hole in its uppermost position.

(c) Operate backspace mechanism once.

(d) The ratchet wheel should be backed one space into a fully detented position. This is defined as; with the detent roller in contact with the ratchet wheel, punch unit feed pawl should engage the first tooth below horizontal centerline of feed wheel ratchet with no perceptible clearance.

(e) With unit operating under power, perforate approximately 2 inches of tape with LETTERS code combination selected.

(f) Backspace twelve characters in succession with unit still under power.

(g) Again perforate approximately two inches of tape with LETTERS code selected.

(h) Clipping of the code holes should be held to a minimum, and should not exceed 0.005 inches, as gauged by eye.

(i) On manual operated mechanisms, refine Feed Pawl Eccentric (preliminary) (paragraph 6.6.1(3)) adjustments.

(j) On backspace mechanisms equipped with power drive, loosen the arm adjusting screw and position adjusting plate.

(k) Tighten arm adjusting screw.

q. Remote Control Noninterfering LTRS and BLANK Tape Feed-Out Mechanism. Perform this adjustment in accordance with the following paragraphs.

(1) Armature Hinge. Adjust as follows:

(a) Refer to figure 6-226.

(b) With armature manually operated, it should be flush against pole face and magnet bracket extension.

(c) To adjust, loosen mounting screws and position armature.

(d) Tighten screws.

(2) Drive Bail Spring. Adjust as follows:

(a) Refer to figure 6-227.

(b) Rotate main shaft until drive bail is on high part of its cam.

(c) Using a spring scale, check tension. Between 23 and 32 ounces should be required to start drive bail moving.

(3) Mounting Plate. Adjust as follows:

(a) Refer to figure 6-227.

(b) Loosen clamp screw and nut.

(c) Loosen spring post and retighten friction tight.

(d) With armature in unoperated position, rotate main shaft until drive bail is on high part of its cam.

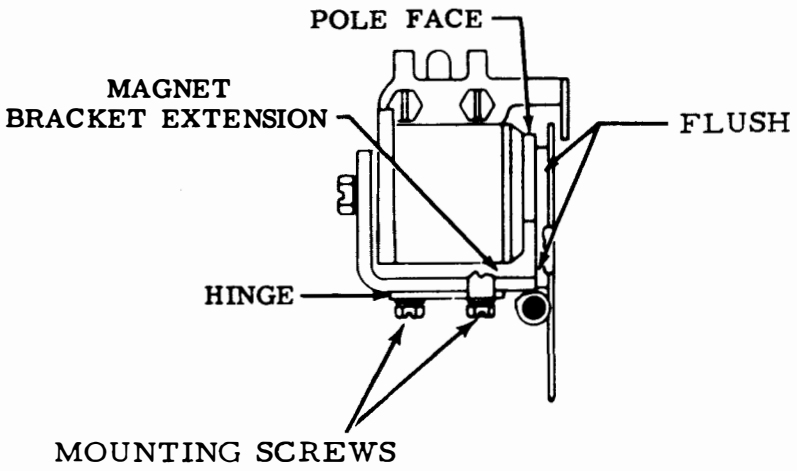


Figure 6-226. Armature Hinge

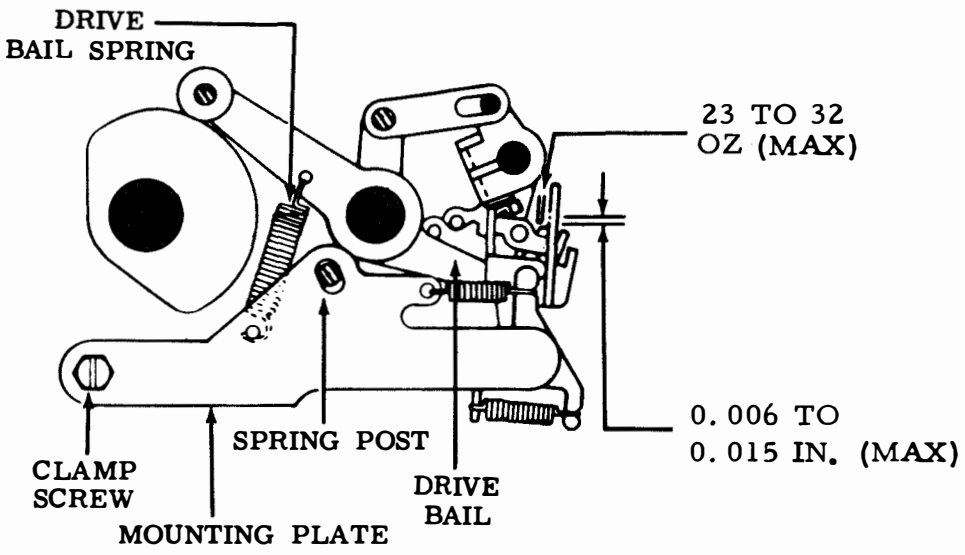


Figure 6-227. Drive Bail Spring and Mounting Plate

(e) Position blocking bail so that between 0.006 and 0.0015 inch clearance exists between blocking bail and drive bail surface.

(f) Tighten spring post, mounting screw, and nut.

(4) Magnet Assembly. Adjust as follows:

(a) Refer to figure 6-228.

(b) Loosen magnet bracket mounting screws, and retighten friction tight.

(c) With armature held in operated position, rotate main shaft until drive bail roller is on high part of cam.

(d) With armature held against pole piece, position magnet assembly so that between 0.005 and 0.015 inch clearance exists between blocking bail and right edge of drive bail at its closest point.

(e) Tighten mounting screws.

(5) Blocking Latch Torsion Spring. Adjust as follows:

(a) Refer to figure 6-229.

(b) Loosen two clamp screws.

(c) With armature in unoperated position and drive bail roller on high part of its cam, position magnet bracket extension so that between 15 grams and 40 grams will be required to start blocking latch moving.

(d) Tighten mounting screws.

(6) Blocking Bail Spring. Adjust as follows:

(a) Refer to figure 6-229.

(b) With armature in unoperated position and drive bail on high part of its cam, measure tension, with spring scale.

(c) Between 3 and 5 ounces should be required to pull spring to installed length.

(7) Nonrepeat Lever Spring. Adjust as follows:

(a) Refer to figure 6-229.

(b) With armature in unoperated position and drive bail roller on high part of its cam, measure tension with a spring scale.

(c) Between 6 and 9 ounces should be required to pull spring to installed length.

(8) Armature Backstop. Adjust as follows:

(a) Refer to figure 6-229.

(b) Loosen armature backstop mounting screws and retighten friction tight.

(c) With armature in operated position, rotate main shaft until drive bail roller is on high part of its cam.

(d) Using a pry point, adjust armature backstop

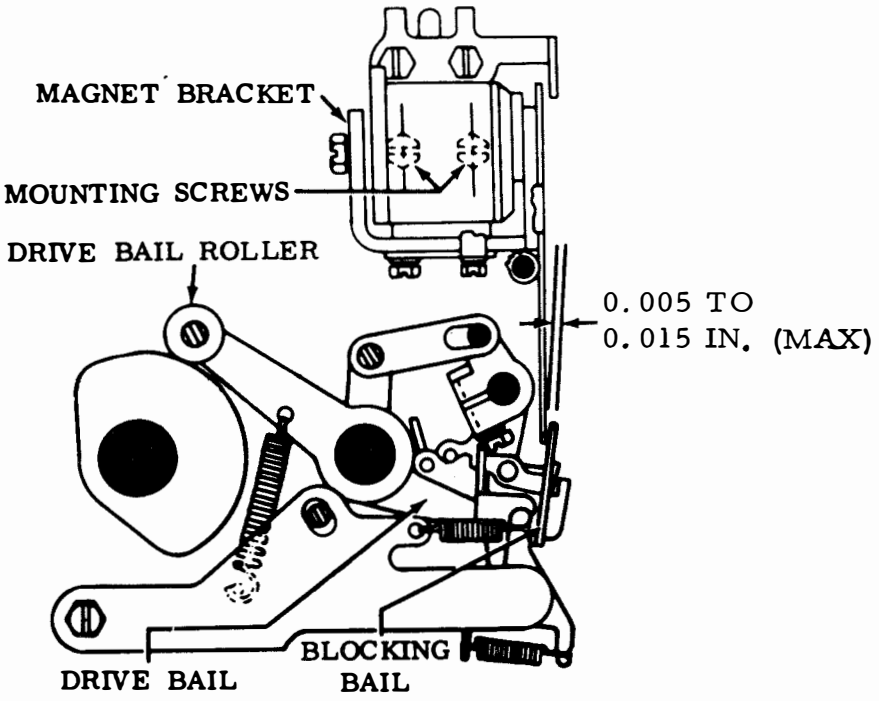


Figure 6-228. Magnet Assembly

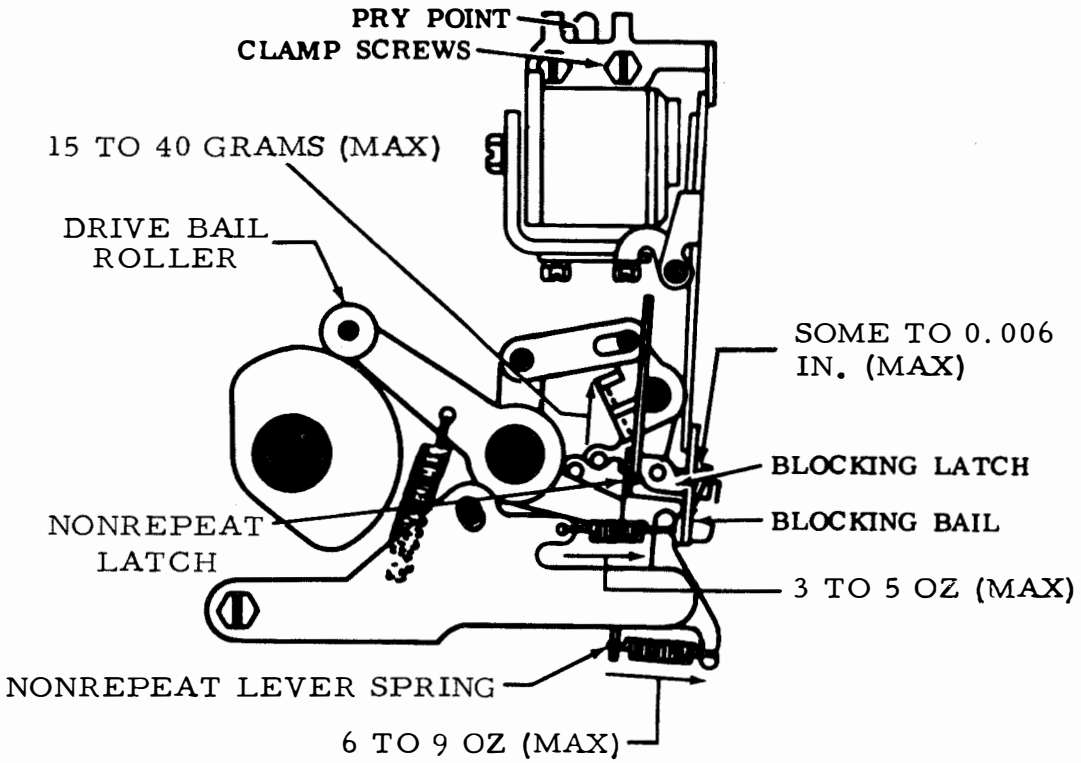


Figure 6-229. Blocking Latch Torsion Spring, Blocking Bail Spring, Nonrepeat Lever Spring, and Armature Backstop

so that the drive bail engages the blocking bail by at least two-thirds of its thickness.

(e) Some clearance, but not over 0.006 inch, should exist between blocking latch and nonrepeat latch.

(f) Tighten mounting screws.

(9) Release Lever. Adjust as follows:

(a) Refer to figure 6-230.

(b) Loosen clamp screw and retighten finger tight.

(c) With armature in operated position, rotate main shaft until drive bail roller is in detent of its cam.

(d) Position release lever until between 0.010 and 0.025 inch clearance exists between release lever and latch lever.

(e) Tighten clamp screw.

(10) Latchlever. Adjust as follows:

(a) Refer to figure 6-231.

(b) Loosen clamp screw on stripper cam follower.

(c) Trip selector clutch. Rotate main shaft until stripper cam follower is on peak of cam.

(d) Some clearance, but not over 0.008 inch, end play should exist between cam follower and bushing.

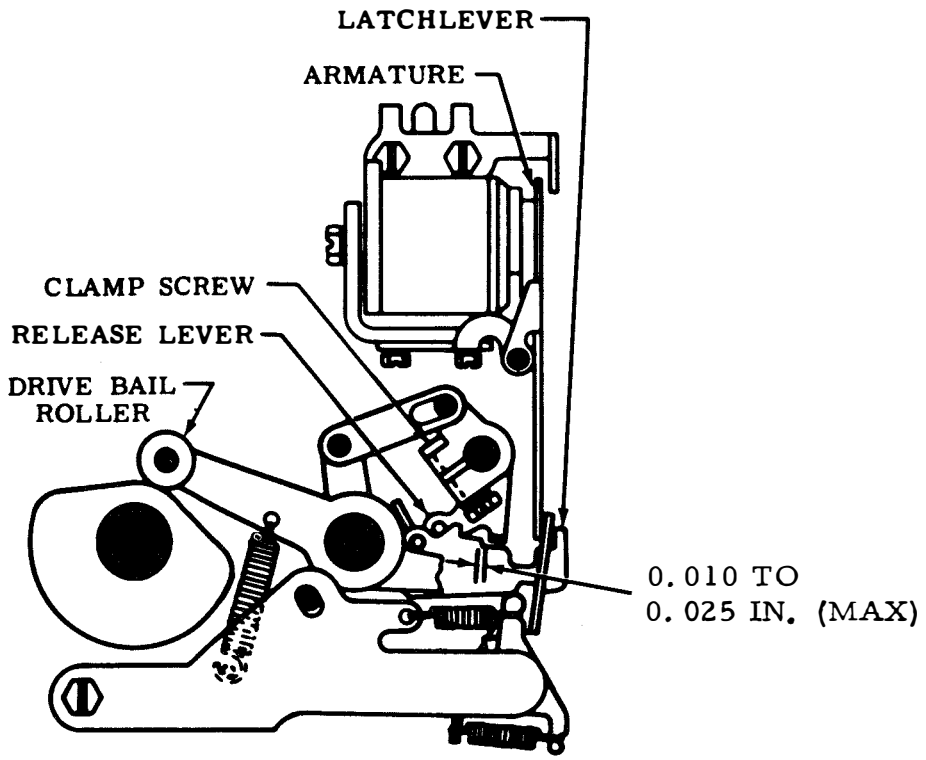


Figure 6-230. Release Lever

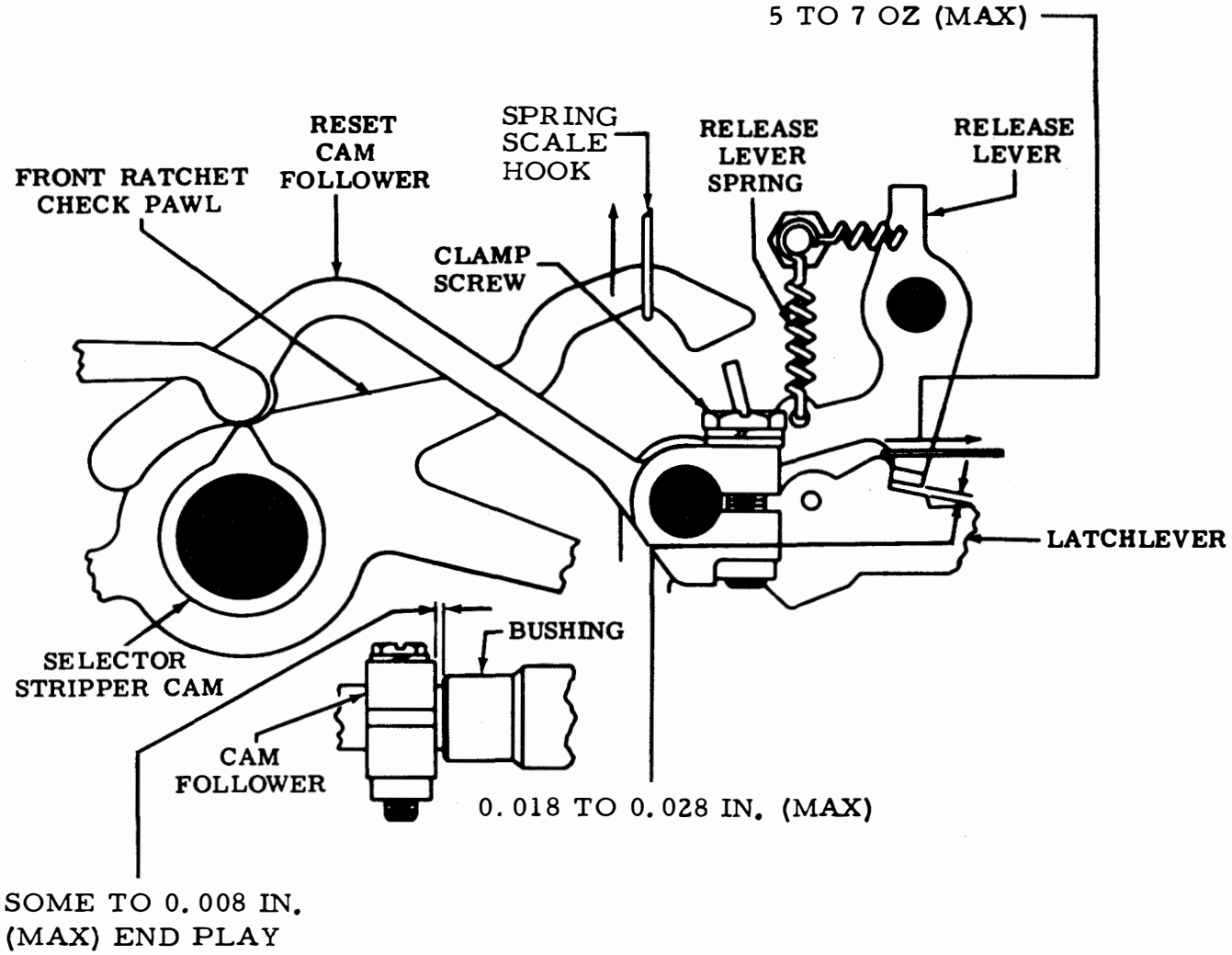


Figure 6-231. Latchlever and Release Lever Spring

(e) Position latchlever until between 0.018 and 0.028 inch clearance exists between release lever and latchlever.

(f) Tighten clamp screw.

(11) Release Lever Spring. Adjust as follows:

(a) Refer to figure 6-231.

(b) Trip selector clutch.

(c) Rotate main shaft until reset cam follower is on peak of reset bail cam.

(d) With spring hook, held ratchet check pawl away from release lever.

(e) Between 5 and 7 ounces should be required to start release lever moving.

(12) Latchlever Spring. Adjust as follows:

(a) Refer to figure 6-232.

(b) Trip selector clutch.

(c) Rotate main shaft until reset cam follower is on peak of reset bail cam.

(d) Check spring tension using spring scale.

(e) For remote control noninterfering LTPS tape feed-out mechanism, between 2 and 4 ounces should be required to pull spring to installed length.

(f) For remote control noninterfering BLANK tape feed-out mechanism, between 9 and 12 ounces should be required to pull spring to installed length.

(13) Release Arm. Adjust as follows:

(a) Refer to figure 6-233.

(b) Loosen clamp nut and tighten friction tight.

(c) Rotate cam so that the mating surfaces of the drive arm bail and release arm are approximately parallel.

(d) With the unit in feed out cycle and ratchets advanced beyond the time delay, position release arm by means of eccentric screw on time delay lever so that between 0.010 and 0.030 inch clearance exists between the drive arm and upper surface of release arm.

(e) Tighten clamp nut.

(f) With unit in stop position, not over 0.015 inch clearance should exist between the surface of drive arm bail that does not engage the release arm and the release arm.

(g) Check clearances and refine adjustment as necessary.

(14) Release Arm Spring. Adjust as follows:

(a) Refer to figure 6-233.

(b) With clutches disengaged and drive arm latched by release arm, check spring tension.

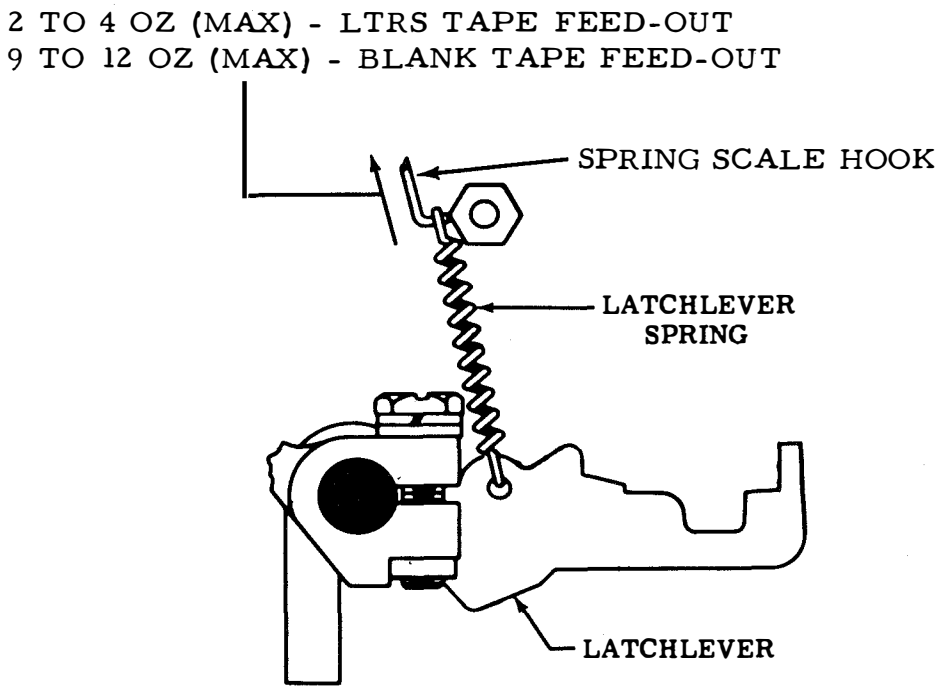


Figure 6-232. Latchlever Spring

(c) Between 2 and 5 ounces should be required to pull spring to installed length.

r. Signal Bell Contact Mechanism. Perform signal Bell contact mechanism adjustments in accordance with the following paragraphs.

(1) Contact Bracket Assembly. Adjust as follows:

(a) Refer to figures 6-234 and 6-235.

(b) Loosen bracket mounting screws.

(c) With LETTERS code combination selected (12345), rotate main shaft until bell function blade is in its lowest position (resting on bellcranks).

(d) Position bracket assembly so that between 0.015 and 0.025 inch gap between contacts.

(e) The contact assembly should be centrally located over the bell function blade insulator.

(f) With bell function blade in its selected position, contacts should be closed.

(2) Function Blade Spring. For adjustment refer to: paragraph 6-3.1k(18) and figure 6-81.

(3) Signal Bell Contact. Adjust as follows:

NOTE

Complete the following adjustments with signal bell contact assembly removed from the function box front plate.

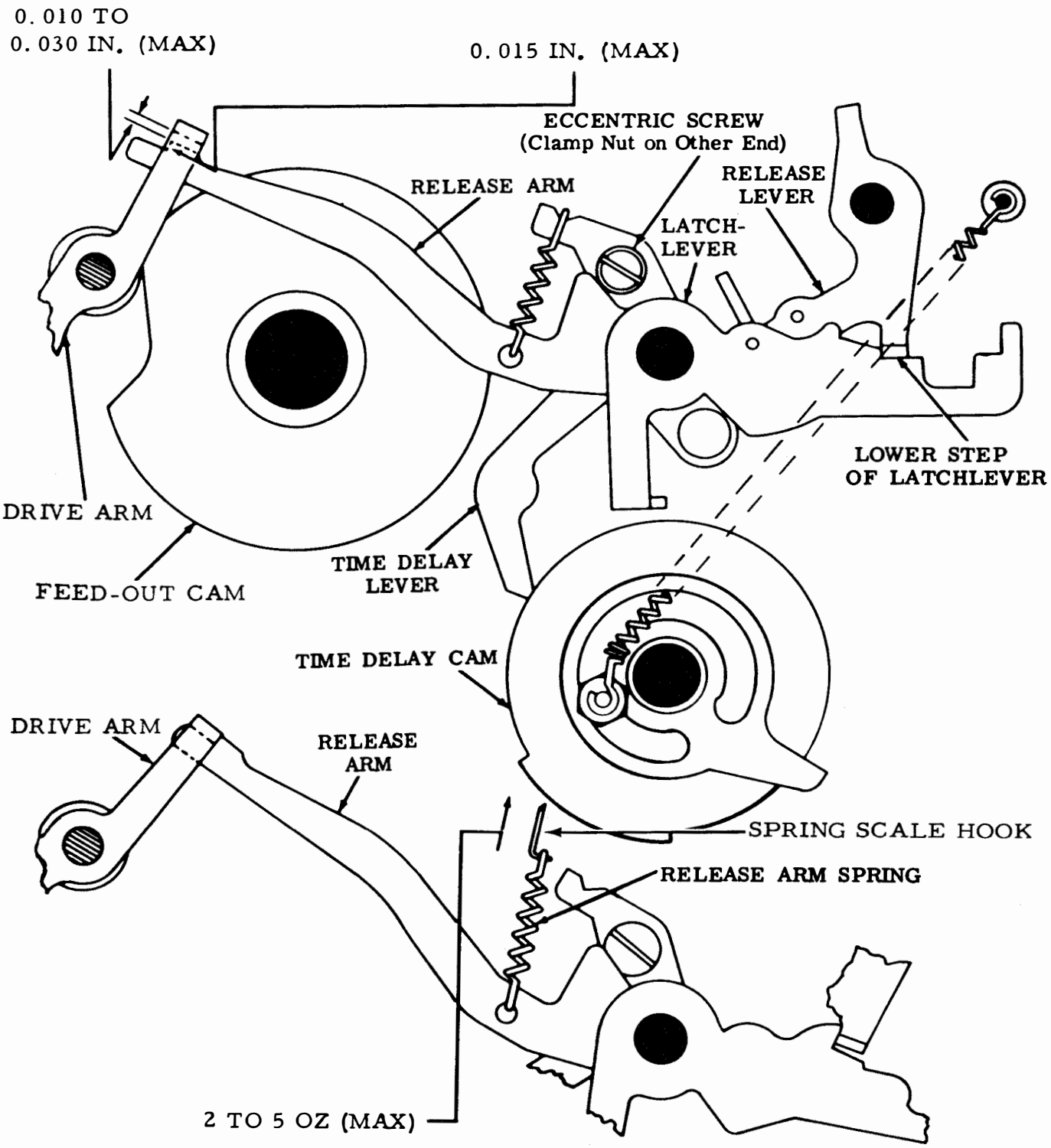


Figure 6-233. Release Arm and Release Arm Spring

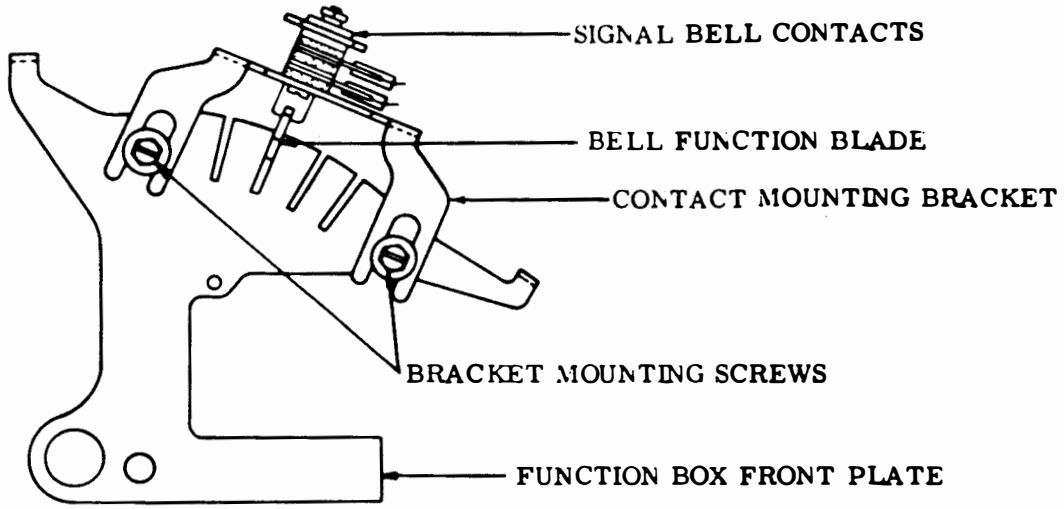


Figure 6-234. Contact Bracket Assembly

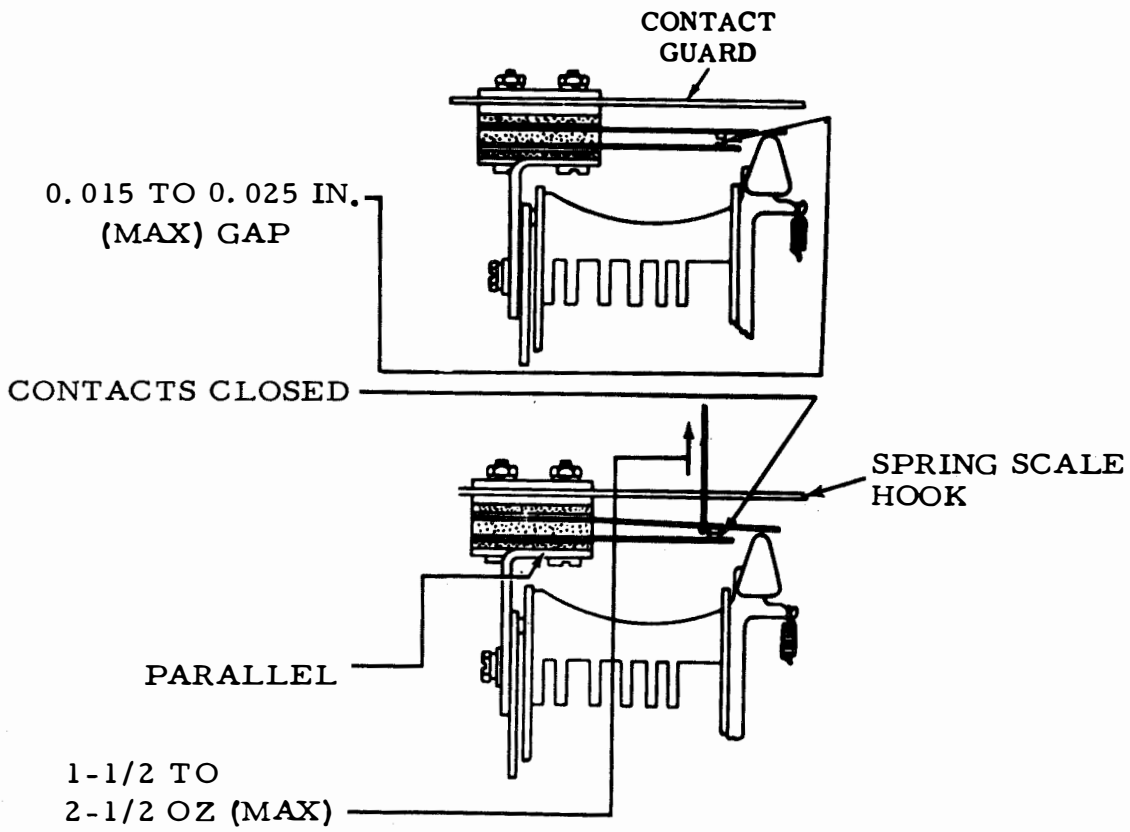


Figure 6-235. Signal Bell Contact - Left Side View

(a) Refer to figure 6-235.

(b) Bend upper contact spring so that contact springs are approximately parallel to top of bracket.

(c) Measure contact pressure using spring scale.

(d) Between 1-1/2 and 2-1/2 ounces pull should be required to open contacts.

s. Tape Absence Contact Assembly. Perform tape absence contact assembly adjustment in accordance with the following paragraphs.

(1) Tape Absence Long Contact Spring. Adjust as follows:

(a) Refer to figure 6-236.

(b) Using a spring scale, check contact pressure with tape sensing finger in its extreme counterclockwise position.

(c) Between 35 and 45 grams should be required to separate contacts.

(d) Remove guard and bend long contact spring as required.

(2) Tape Absence Contact Assembly Position. Adjust as follows:

(a) Refer to figure 6-236.

(b) Remove contact guard assembly, and loosen mounting screws.

(c) Position contact spring so that with contact points aligned, insulator on long contact spring is centrally located with sensing finger extension.

(d) Tighten mounting screws and replace contact guard assembly.

(3) Tape Absence Contact Assembly Guard Position. Adjust as follows:

(a) Refer to figure 6-236.

(b) Loosen mounting nut.

(c) Position guard so that it does not interfere with movement of sensing finger.

(d) Tighten mounting screw.

(4) Tape Absence Short Contact Spring Position. Adjust as follows:

(a) Refer to figure 6-236.

(b) Remove mounting guard.

(c) Bend short contact spring so that with tape sensing spring in its extreme counterclockwise position between 0.010 and 0.020 inch clearance exists between sensing finger extension and closest point on bakelite insulator of long contact spring.

(d) Bend short contact spring as required.

(e) Replace mounting guard.

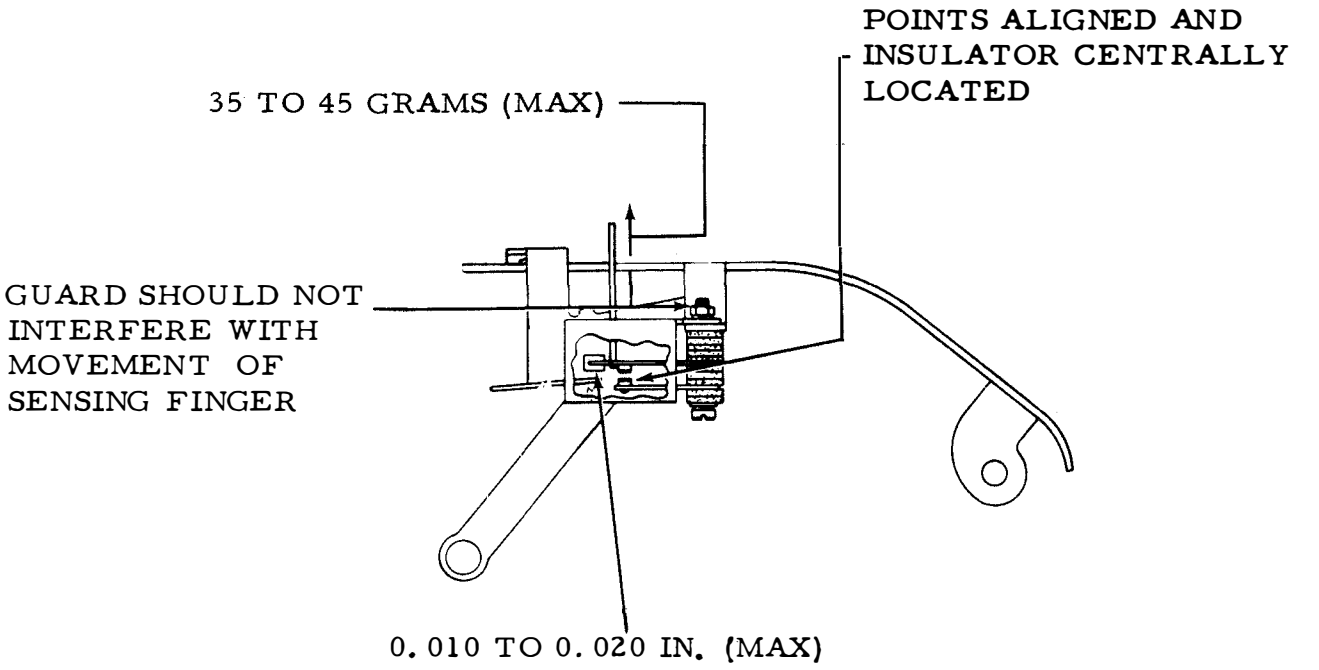


Figure 6-236. Tape Absence Long Contact Spring, Contact Assembly, and Short Contact Spring

(5) Tape Absence Contact Sensing Finger End Play. Adjust as follows:

(a) Refer to figure 6-237.

(b) Bend tape sensing finger so that end play between tape sensing finger and tape guard is between 0.006 and 0.035 inch.

(6) Tape Absence Contacts Cable Assembly Position Adjust as follows:

(a) Refer to figure 6-237.

(b) The cable assembly for the tape absence contacts should be routed together with the selector magnet cable assembly and, if present, the code reading contacts cable assembly.

(c) Form the cables so that they do not interfere with the movement of the tape sensing finger.

(d) Secure the position of the cable assemblies by means of an appropriate cable clamp located behind the selector magnets.

t. Time Delay Motor Stop Mechanism. Perform time delay motor stop mechanism adjustments in accordance with the following paragraphs.

(1) Time Delay Ratchet Wheel Tension. Adjust as follows:

(a) Refer to figure 6-238.

(b) Remove nut from ratchet wheel.

(c) Bend friction springs of ratchet

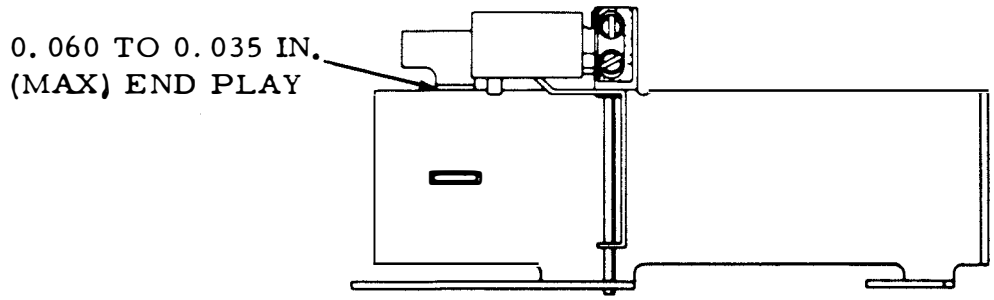


Figure 6-237. Tape Absence Contacts, Sensing Finger and Contacts Cable Assembly - Top View

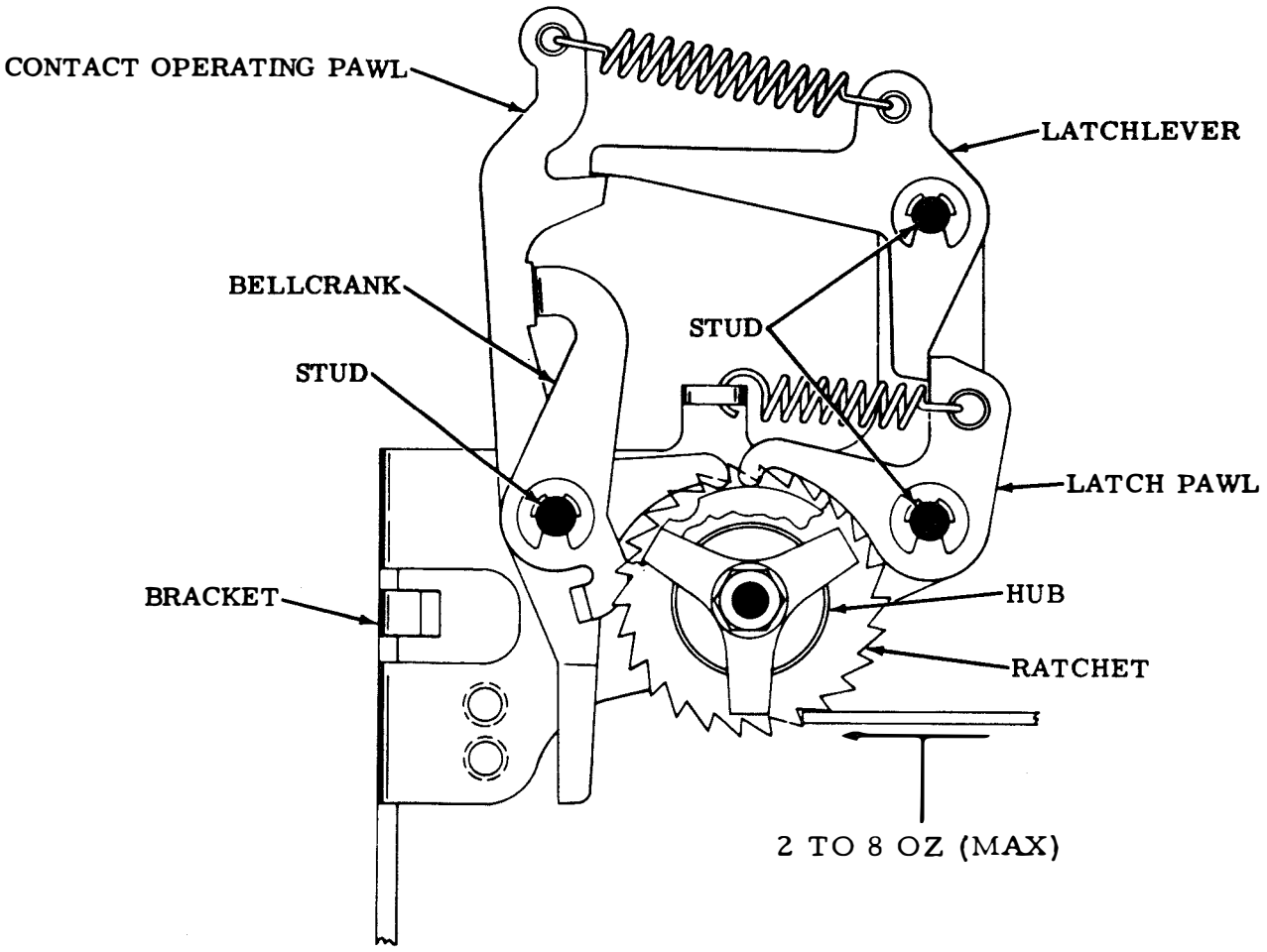


Figure 6-238. Time Delay Ratchet Wheel

wheel so that between 2 and 8 ounces are required to move each ratchet wheel.

(d) Replace and tighten nut.

(2) Time Delay Clamp Arm. Adjust as follows:

(a) Refer to figure 6-239.

(b) Loosen mounting screw.

(c) Set selector reset bail on high part of its cam, with latch pawl resting on high part of both ratchet wheel flanges.

(d) Adjust position clamp arm so that between 0.010 and 0.020 inch clearance exists between latching surfaces of contact operating pawl and latchlever.

(e) Some end play, but not over 0.006 inch, should exist between clamp arm and its adjacent bushing.

(f) Tighten mounting screw.

(3) Time Delay Clamp Arm With TP160182 Selector Armature Stop Bracket. Adjust as follows:

(a) Refer to figure 6-239.

(b) Remove nut from ratchet wheel if required.

(c) Position TP151630 arm towards rear by moving one or more shims from front of mounting bracket to back of mounting bracket.

(d) Position TP151630 arm towards front by moving one or more shims from rear of mounting bracket to front of mounting bracket.

(e) The TP151630 arm should engage selector reset bail by a minimum of three-fourths of its thickness.

(f) There should be some clearance between TP156130 arm and armature stop bracket.

(g) Replace nut on ratchet wheel if it was removed.

(4) Time Delay Contact Assembly. Adjust as follows:

(a) Refer to figure 6-240.

(b) Loosen two mounting screws.

(c) Position contact springs so that with contact points centrally aligned, insulator on long contact spring is centrally located with respect to contact operating pawl extension.

(d) Tighten mounting screws.

(5) Time Delay Long Contact Spring. Adjust as follows:

(a) Refer to figure 6-241.

(b) Set selector reset bail on high part of its cam.

(c) Bend long contact spring so that between 1- and 1-1/2-ounce-tension is required to just start insulator on long contact spring moving

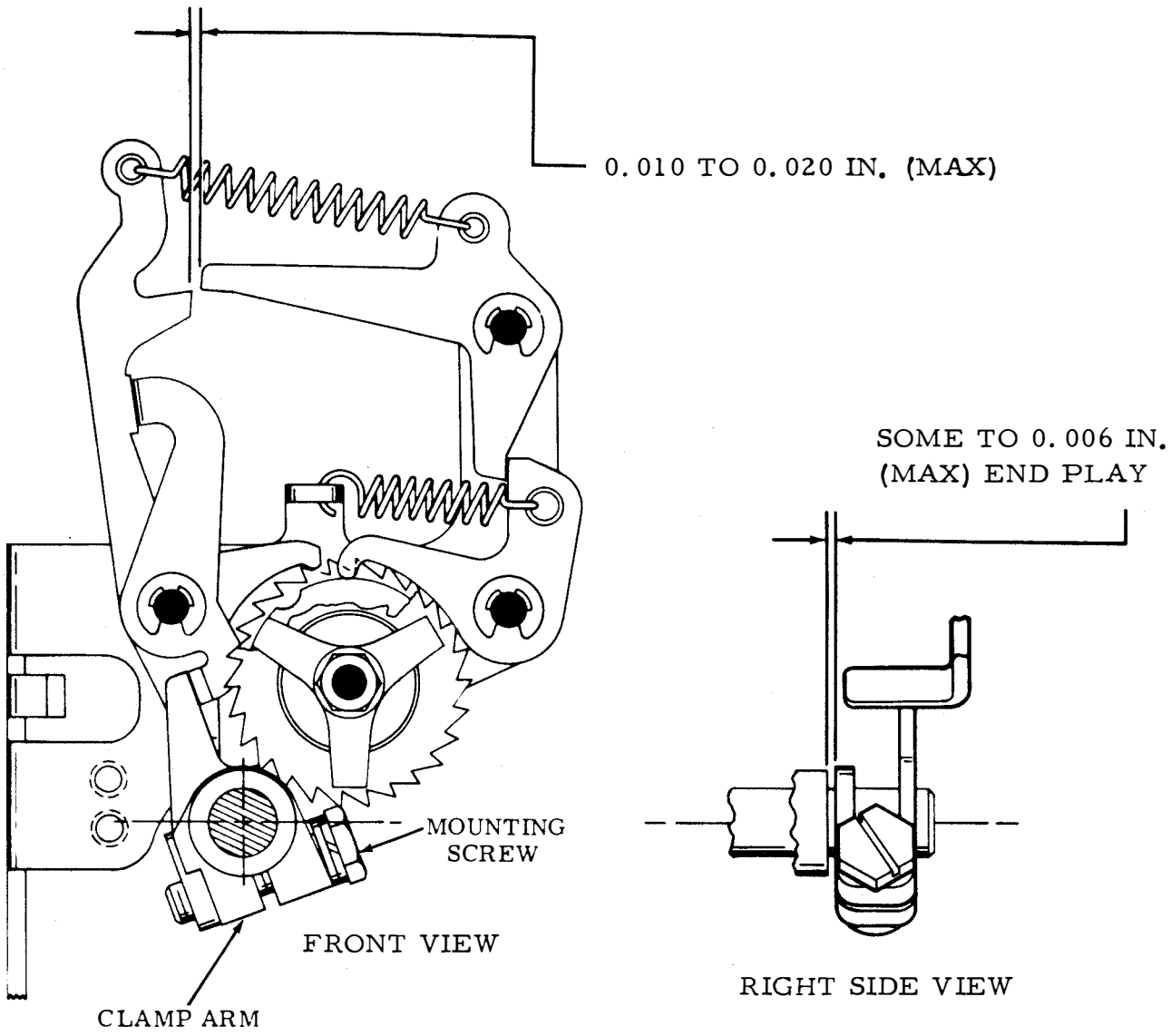


Figure 6-239. Time Delay Clamp Arm

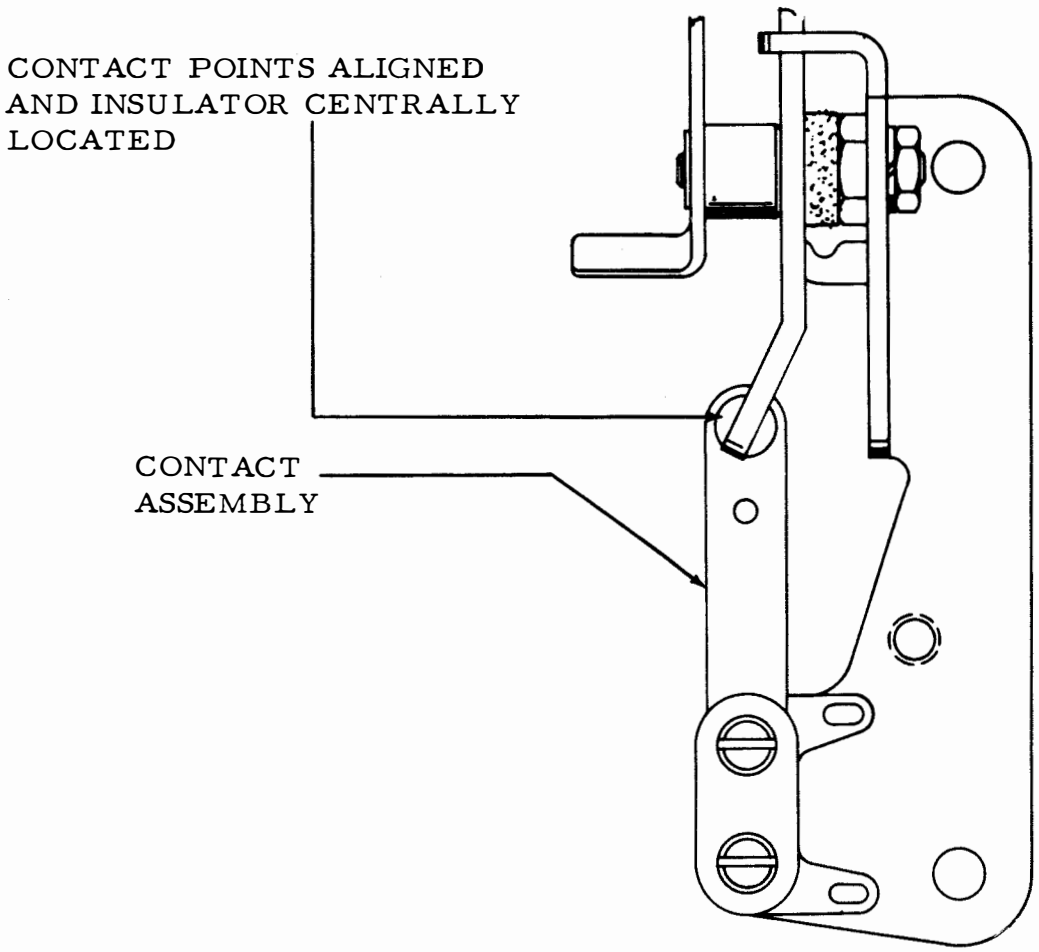


Figure 6-240. Time Delay Contact Assembly - Right Side View

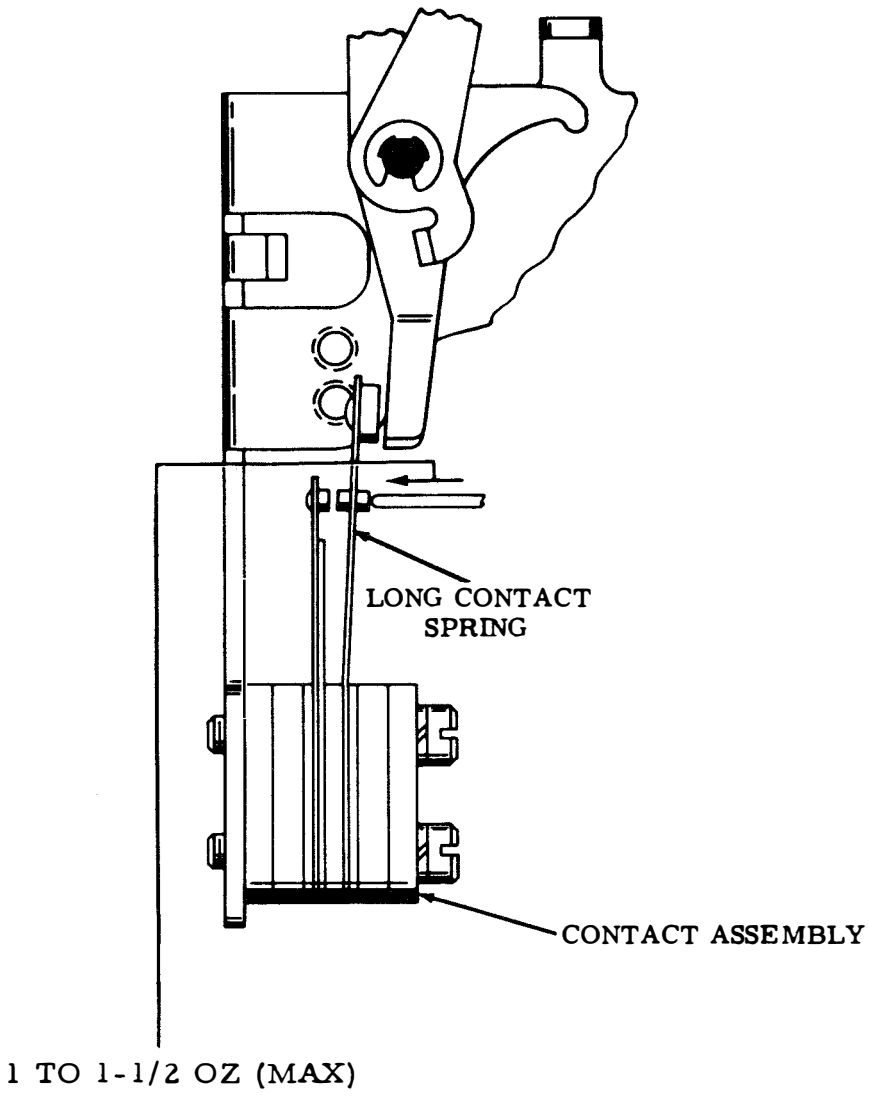


Figure 6-241. Time Delay Long Contact Spring

away from contact operating pawl extension.

(6) Time Delay Short Contact Spring. Adjust as follows:

(a) Refer to figure 6-242.

(b) Disengage and latch selector and function clutches. Contact operating pawl should rest on high part of both ratchet wheel flanges.

(c) Bend short contact spring so that between 2- and 3-ounce-tension is required to just separate contact points of long and short contact springs.

(7) Time Delay Contact Gap. Adjust as follows:

(a) Refer to figure 6-243.

(b) Disengage and latch selector and function clutches. Contact operating pawl should rest on high part of both ratchet wheel flanges.

(c) Bend short contact spring stiffener so that between 0.010 and 0.015 inch clearance exists between contact points of long and short contact springs.

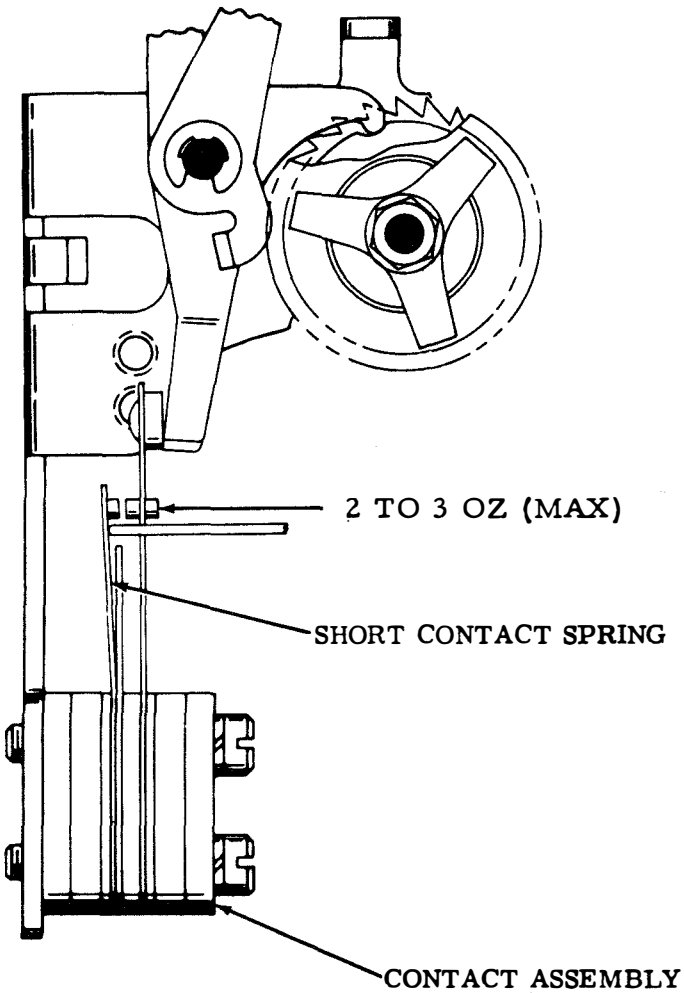


Figure 6-242. Time Delay Short Contact Spring

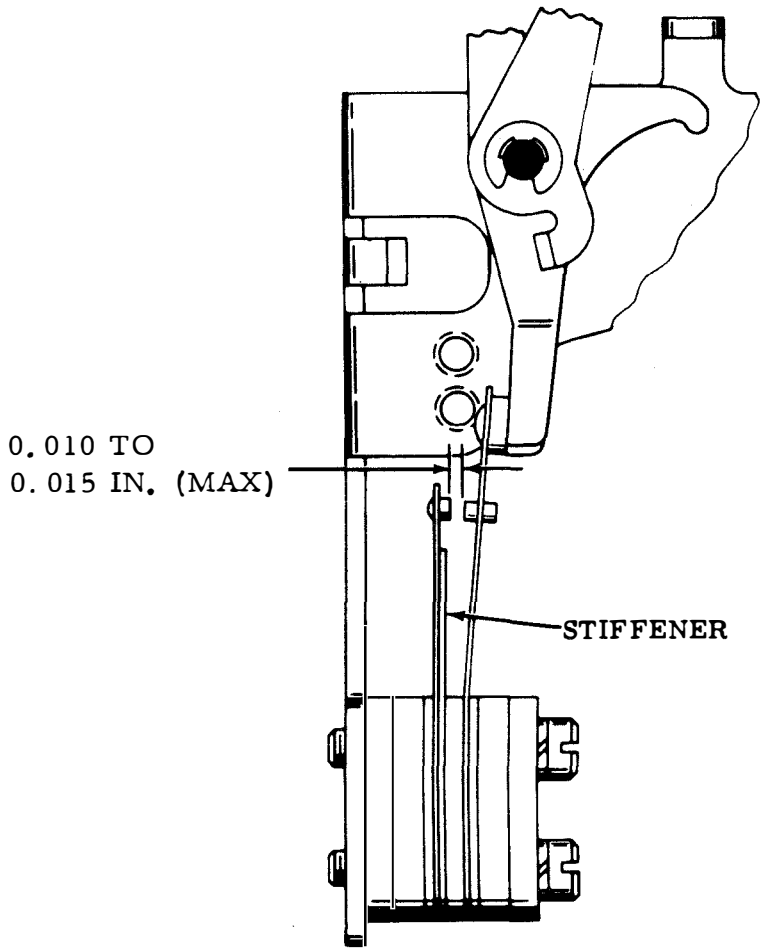


Figure 6-243. Time Delay Contact Gap

(8) Time Delay Latch Pawl Spring. Adjust as follows:

(a) Refer to figure 6-244.

(b) Unhook latch pawl spring from pawl.

(c) Position latch pawl so that it is held on high part of both ratchet wheel flanges.

(d) Between 12- and 15-ounce-tension should be required to pull spring to installed length.

(e) Reconnect latch pawl spring to latch pawl.

(9) Time Delay Contact Operating Spring. Adjust as follows:

(a) Refer to figure 6-244.

(b) Unhook contact operating pawl spring from latchlever. Contact operating pawl should be held blocked by latchlever.

(c) Using spring scale, check tension. Between 2-1/4 and 3-1/4 ounces should be required to pull spring to installed length.

(10) Time Delay Drive Pawl. Adjust as follows:

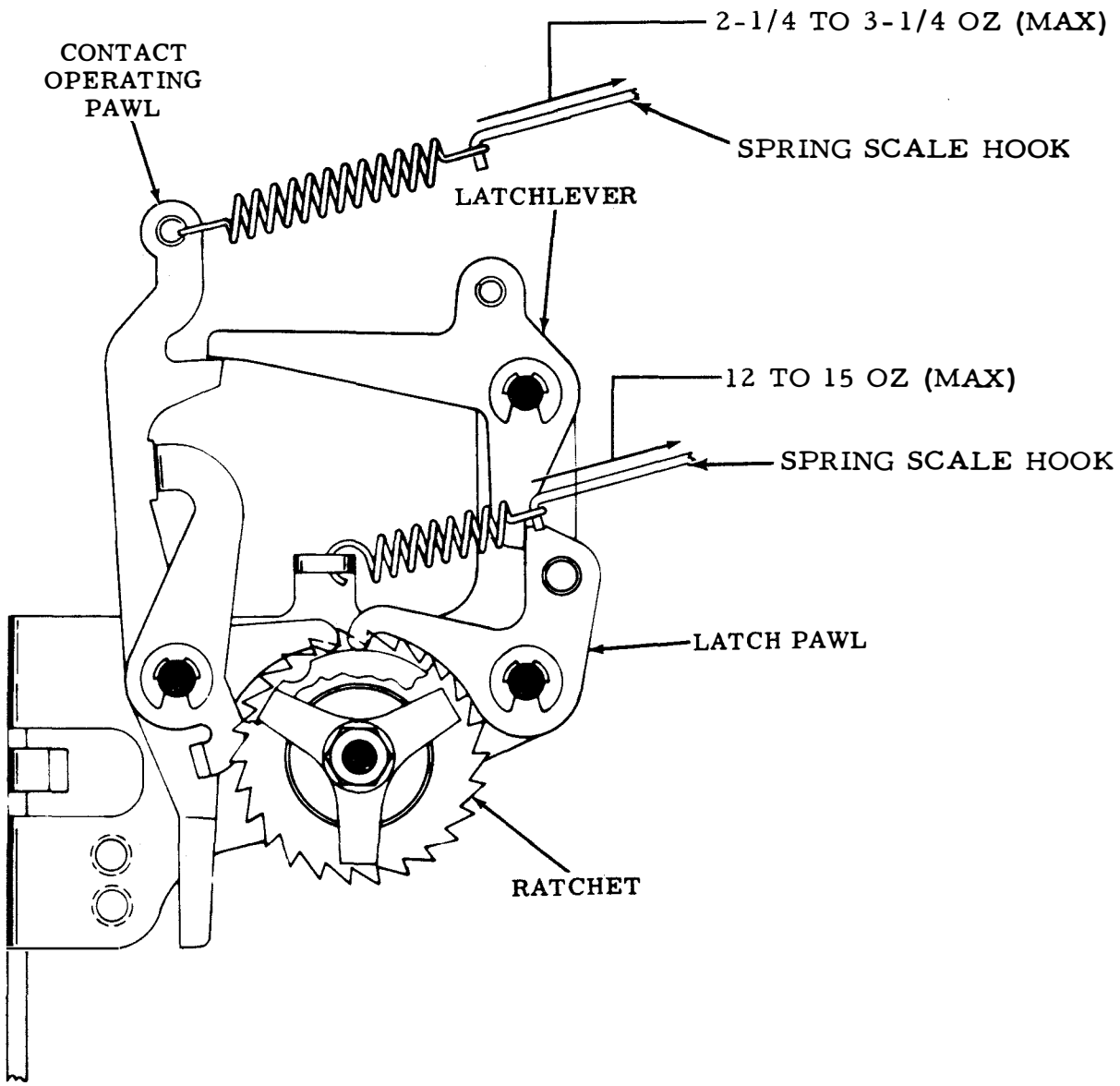


Figure 6-244. Time Delay Latch Pawl Spring and Contact Operating Pawl Spring

(a) Refer to figure 6-245.

(b) Loosen mounting screws.

(c) Rotate both ratchet wheels until latch pawl drops into indentations of both ratchet wheel flanges.

(d) Depress drive pawl downward out of engagement with ratchet teeth and take up play between latch pawl and ratchet wheels by moving ratchet wheels backward (counterclockwise).

(e) With eccentric follower drive arm at the end of its extreme left travel, position drive pawl on its drive arm so that point of upper beveled edge of pawl rests on peak of first ratchet wheel tooth to right of vertical centerline through ratchet wheels or over tranvels peak.

(f) Some clearance, but not over 0.010 inch, should exist between drive pawl and ratchet tooth.

(g) Tighten mounting screws.

(11) Time Delay Eccentric Follower Drive Arm Spring. Adjust as follows:

(a) Refer to figure 6-246.

(b) Move eccentric follower drive arm to extreme right end of its travel.

(c) Check tension using spring scale. Between 3 and 4 ounces should be required to just start drive pawl pawl moving away from ratchet wheels.

(12) Time Delay Disabling Device. Adjust as follows:

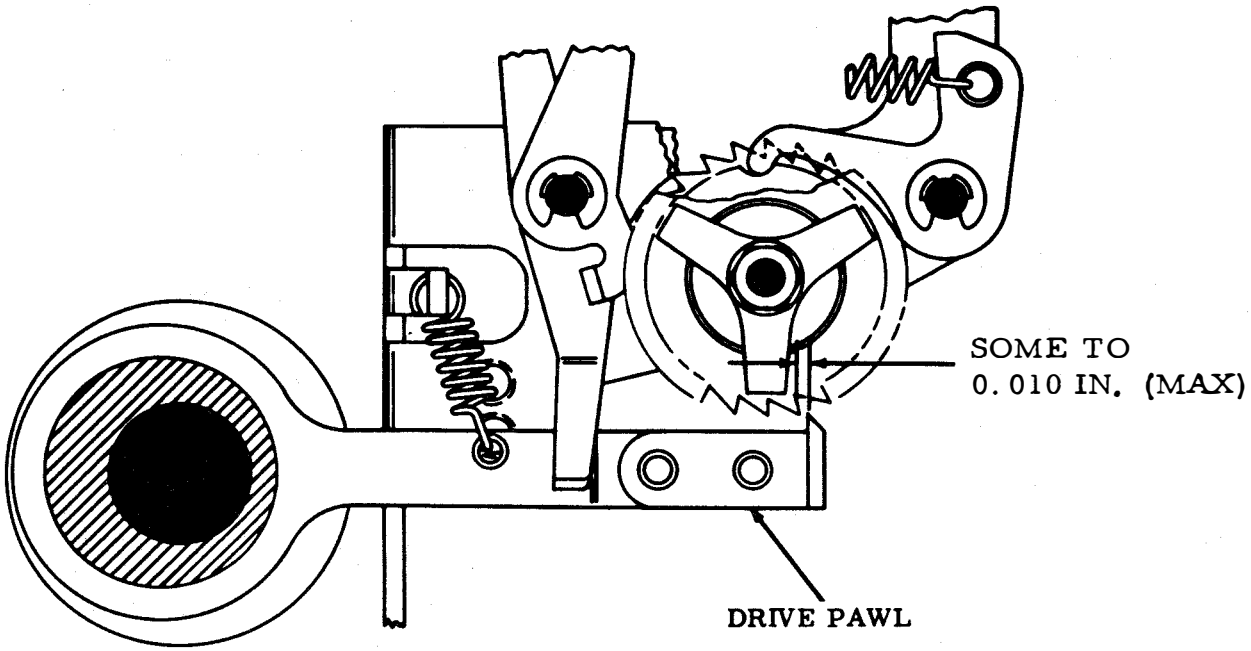


Figure 6-245. Time Delay Drive Pawl

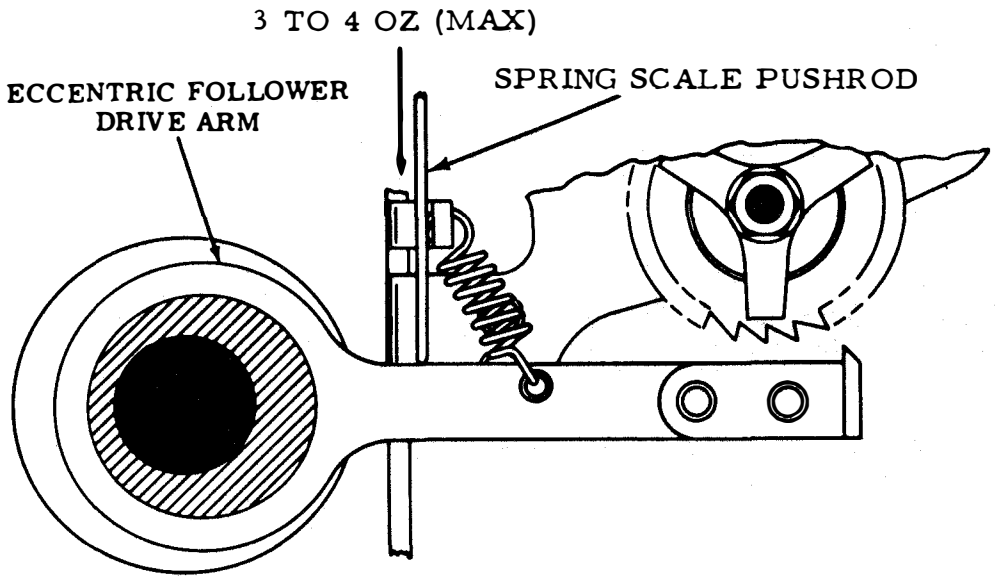


Figure 6-246. Time Delay Eccentric Follower Drive Arm Spring

(a) Refer to figure 6-247.

(b) Remove pilot screw from its upper mounting hole in ratchet wheel bracket and reinstall it in its lower mounting hole so that it holds drive pawl out of engagement with ratchet wheels.

(c) The time delay motor stop contact mechanism should be disabled when not required.

u. Timing Contact Mechanism (Operated by Selector). Perform timing mechanism adjustments in accordance with the following paragraphs.

NOTE

In this text, the letters S, B and M are used to devote respectively the swinger, break (normally-closed with lever riding cam depression), and make (normally-open; closed only with lever riding cam peak) contact springs. Parts should be well aligned and free of sharp bends. Contact points misalignment should not exceed 1/4 the diameter of points.

(1) M Contact Springs. Adjust as follows:

(a) Refer to figure 6-248.

(b) Measure contact pressure with a spring scale. A minimum of 4-ounce tension should be required to move contact spring away from its stiffener.

(c) Bend contact spring as required.

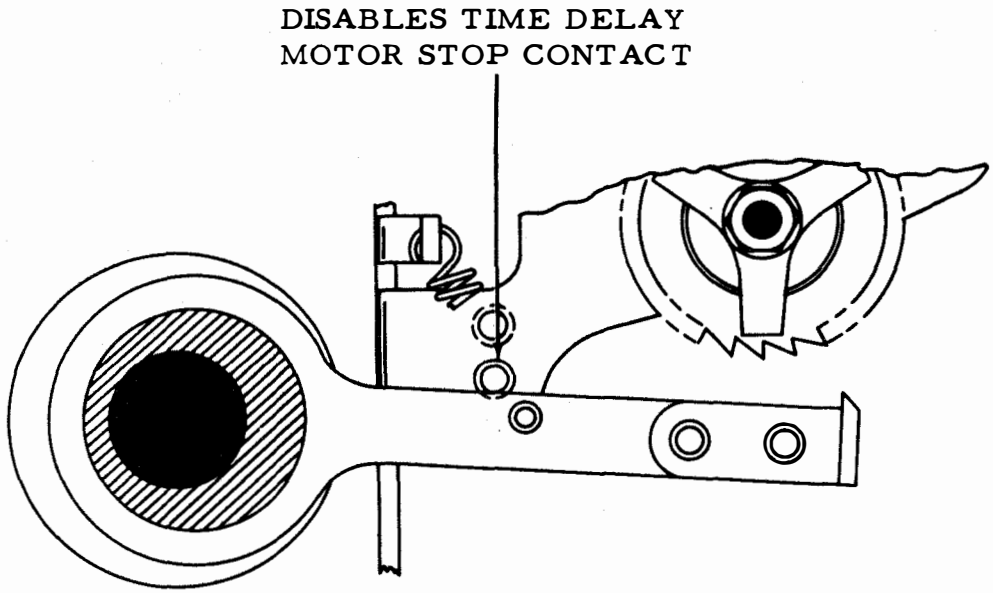


Figure 6-247. Time Delay Disabling Device

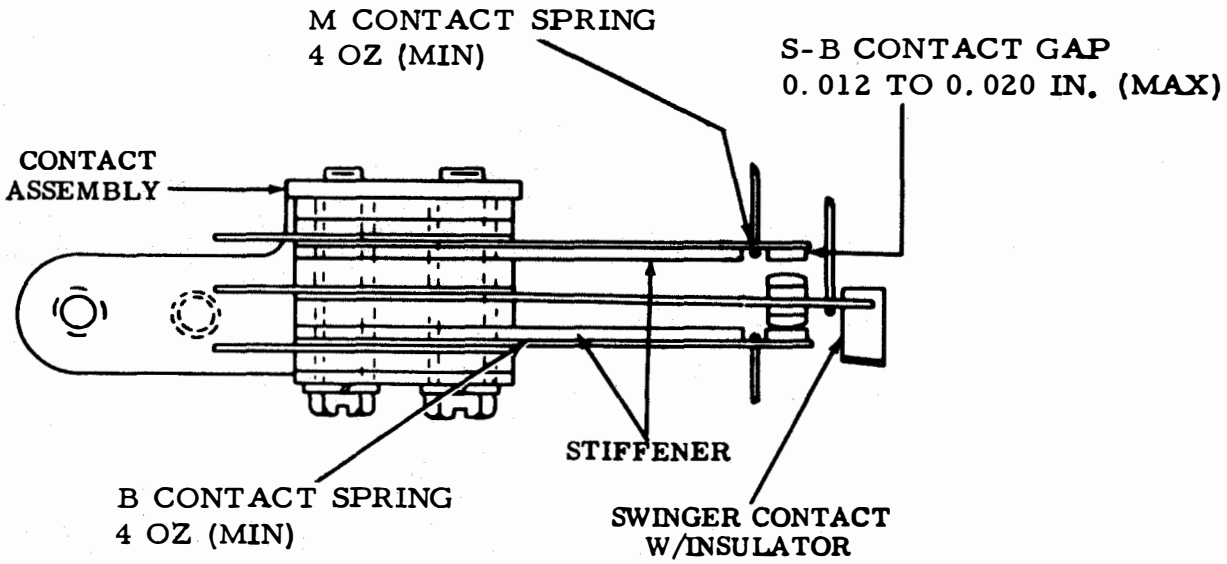


Figure 6-248. M, B, and S Contact Springs and S-M Contact Gap

(2) B Contact Springs. Adjust as follows:

(a) Refer to figure 6-248.

(b) Measure stiffener contact pressure with spring scale. At least 4-ounce tension should be required to move the contact spring away from its stiffener.

(c) Bend contact spring as required.

(3) S-B Contact Springs. Adjust as follows:

(a) Refer to figure 6-248.

(b) Measure swinger contact pressure with spring scale. Between 3-1/2 and 4-1/4 ounces should be required to move swinger contact away from normally break contact.

(c) Bend swinger contact as required.

(4) S-M Contact Gap. Adjust as follows:

(a) Refer to figure 6-248.

(b) Measure gap between S and M contacts with a feeler gauge. Between 0.012 and 0.020 inch clearance should exist between contacts.

(c) Bend stiffener as required.

(5) Twin-B Contact Spring. Adjust as follows:

NOTE

When making adjustments (5) through (8) make certain the S spring insulator is clear of the operating lever.

(a) Refer to figure 6-249.

(b) Insert 0.008-inch feeler gauge between each pair of twin contact points in turn.

(c) Insertion of feeler gauge in one pair of contact points should not cause the other pair of contacts to separate.

(d) Both pairs of contact points should separate simultaneously.

(e) Bend springs or twist stiffener slightly as required.

(f) Recheck sequence of contact separation.

(6) Twin-M Contact Springs. Adjust as follows:

(a) Refer to figure 6-249.

(b) Insert 0.008-inch feeler gauge between each pair of twin contact points in turn.

(c) Insertion of feeler gauge in one pair of contacts should not cause the other pair of contact points to separate.

(d) Both break and swinger contacts should open at the same time.

(e) Bend break contacts or slightly twist stiffener as required.

(7) Contact Assembly Position. Adjust as follows:

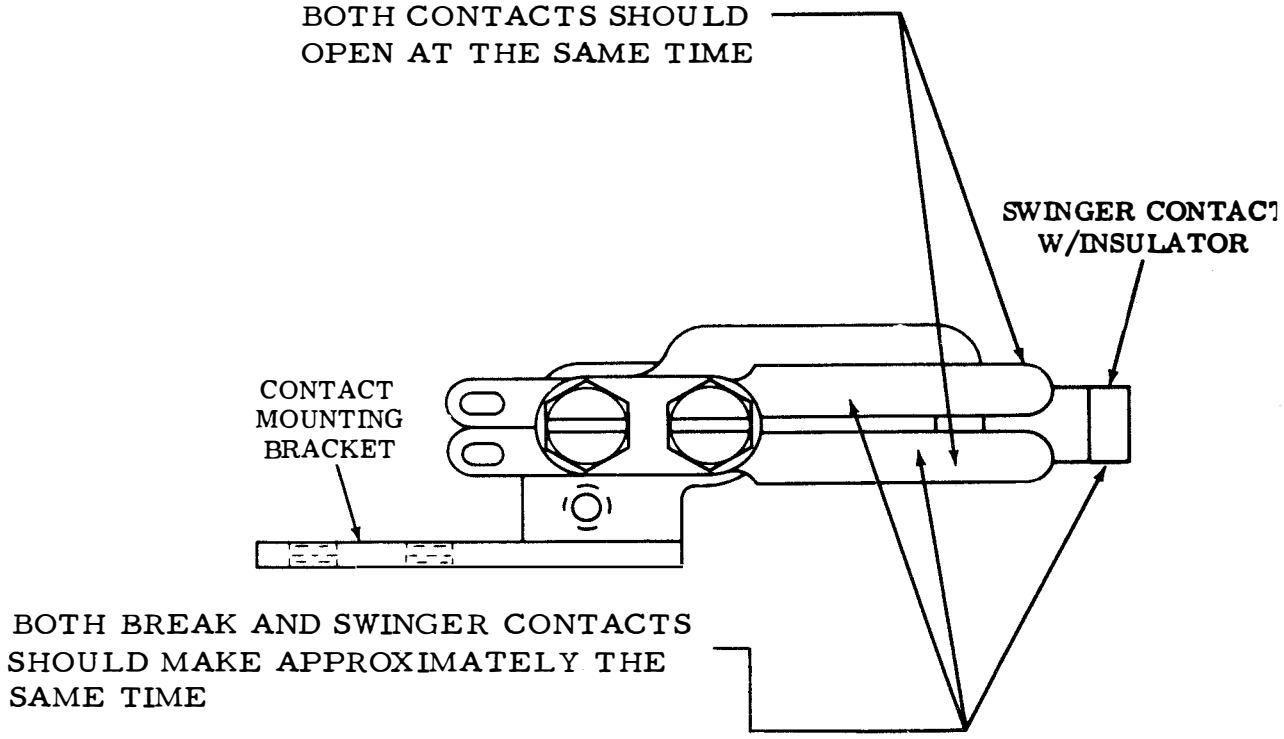


Figure 6-249. Twin-B and Twin-M Contact Springs

(a) Refer to figures 6-249 and 6-250.

(b) Set range scale at 50 (important).

(c) Rotate shaft so that operating arm is on lowest part of cam.

(d) Loosen two mounting bracket screws.

(e) Position contact assembly be means of its oversize mounting holes so that between 0.002 and 0.006 inch clearance exists before it touches the swinger spring.

(f) First touch should be on lower half of spring stud wearing plate.

NOTE

At higher settings, movement will be larger. Disregard excessive movement.

(g) Tighten two mounting screws and recheck.

(h) Rotate shaft and notice that high part of cam causes both M contacts to move at least 0.012 inch.

(i) If this contact movement is not met at settings 60 and 90, check for insecure parts and refine contact gap between swinger and make contact.

(j) If still not met, replace range selector scale selector rack.

(8) Alignment of Operating Lever with Cam. Adjust as follows:

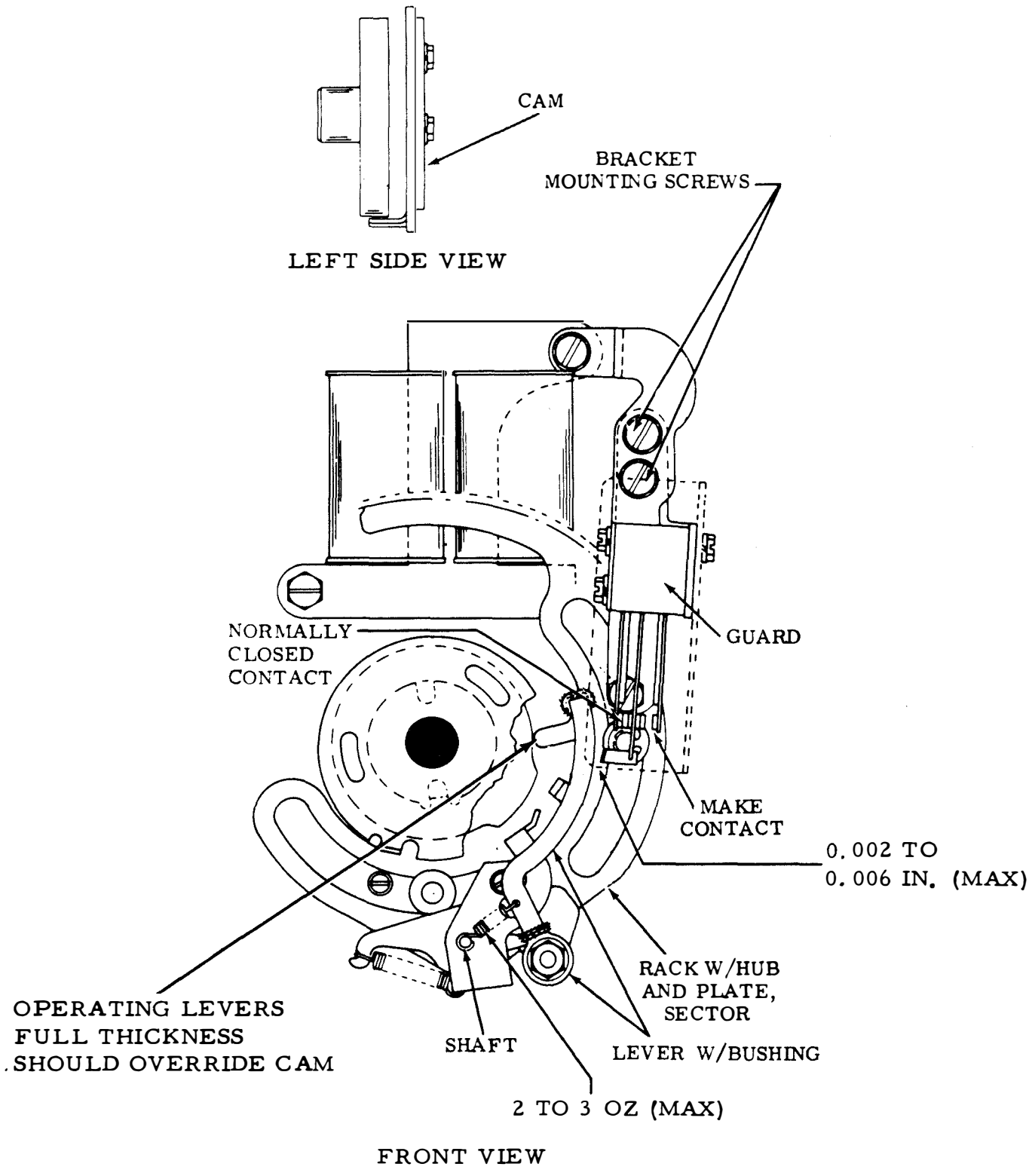


Figure 6-250. Contact Assembly, Alignment of Operating Lever with Cam, and Operating Lever Spring

(a) Refer to figure 6-250.

(b) Take up all cam end play toward selector clutch drum; all operating lever end play (at its bearing) in opposite direction.

(c) Operating lever's full thickness should ride cam.

(d) Lever should not exert pressure against face of clutch disc.

(e) To adjust, refine Clutch Drum End Play as outlined in paragraph 6-2.1h(15).

(9) Operating Lever Spring. Adjust as follows:

(a) Refer to figure 6-250.

(b) Remove spring from operating lever.

(c) Measure tension with spring scale. Between 2 and 3 ounces should be reuqired to stretch spring to 5/8 inch length.

(d) Reconnect spring to operating lever. The spring should hold operating lever against cam with light pressure.

v. Unshift-On-Space Mechanism. Perform unshift-on-space mechanism adjustments in accordance with the following paragraphs.

(1) Unshift-On-Space Function Blade. Adjust as follows:

(a) Refer to figures 6-251 and 6-252.

(b) Remove signal bell contact assembly with bracket and signal bell function blade.

(c) Select FIGURES code combination (12-45).

(d) Rotate main shaft until lifter roller is on low part of rocker bail's camming surface and unshift-on-space function blade rests on bellcranks.

(e) Some clearance, but not over 0.015 inch, should exist between stripper blade and letters extension arm.

(f) Select SPACE combination (--3--).

(g) Rotate main shaft until stripper blade touches letters extension arm.

(h) When play is taken up in either direction, stripper blade should engage an equal thickness of LETTERS extension arm.

(i) To adjust mechanism, loosen two function blade mounting screws.

(j) With mounting screws loosened, position stripper blade on function blade to meet above requirements.

(k) Tighten two mounting screws.

(l) Reinstall signal bell contact assembly with bracket and signal bell contact blade.

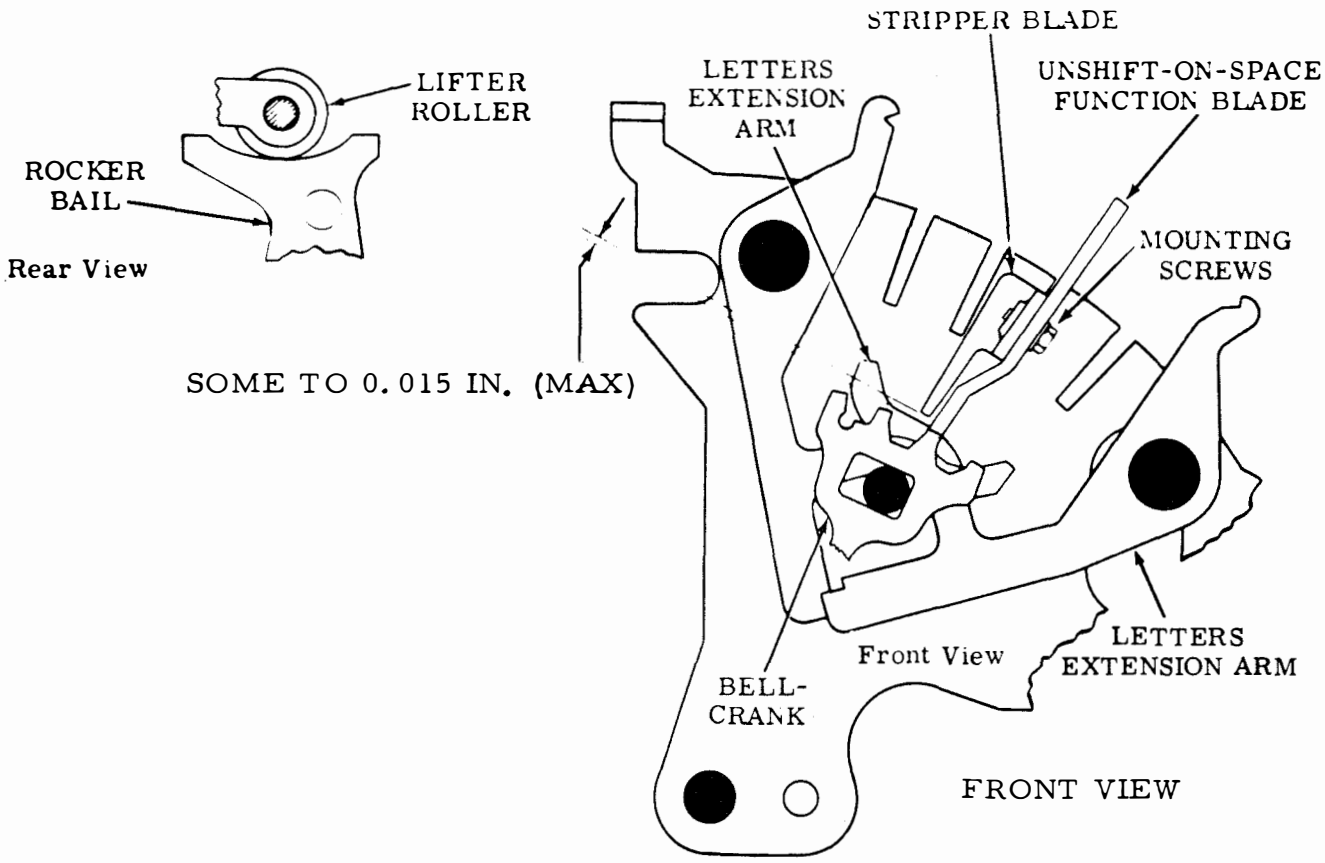


Figure 6-251. Unshift-On-Space Function Block

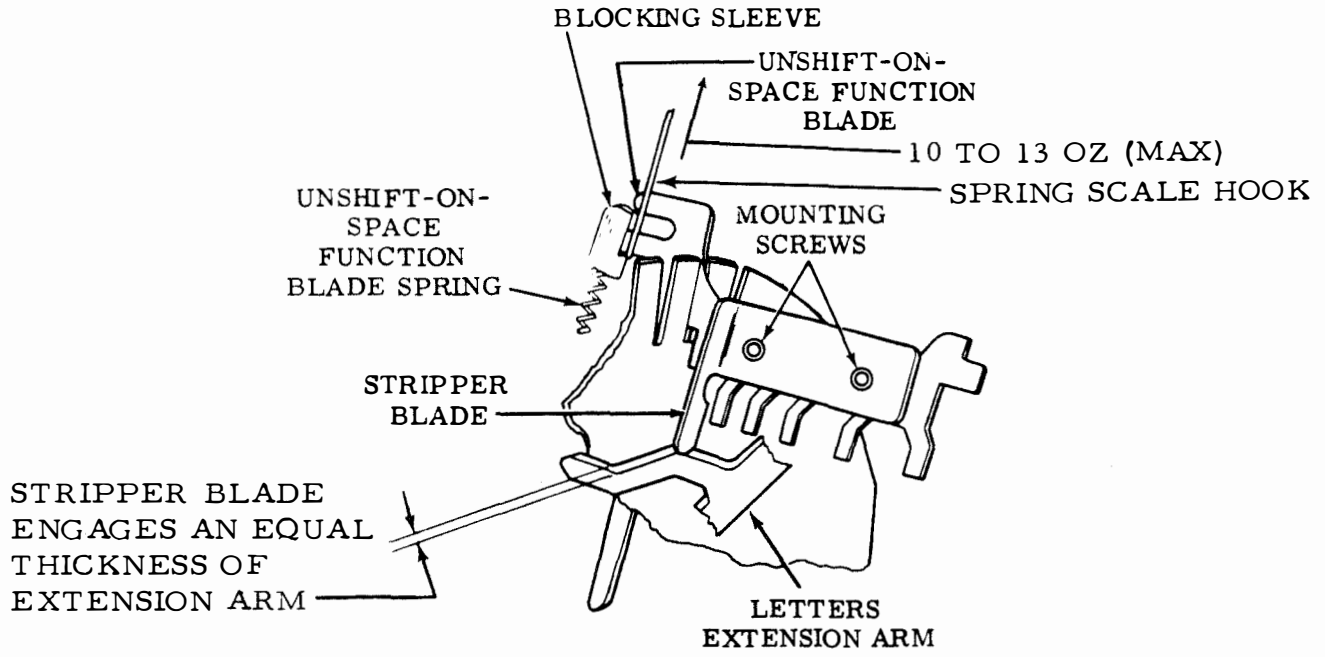


Figure 6-252. Unshift-On-Space Function Blade Spring - Left Side View

NOTE

Make Signal Bell Contact Mounting Adjustment as outlined in paragraphs 6-6.1r(1) and (3).

(2) Unshift-On-Space Function Blade Spring. Adjust as follows:

(a) Refer to figure 6-252.

(b) Move unit to stop position with long slot in blocking sleeve engaging function blade.

(c) Check blade contact pressure with spring scale.

(d) Between 10 and 13 ounces should be required to start blade moving.

6-6.2 TYPING PERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARD (HIGH-LEVEL). Perform the following procedures to ensure proper adjustments of KTR Keyboard (Variable Features).

a. Power Backspace Switch Mechanism. Perform power backspace switch mechanism adjustemnts as follows:

NOTE

This is not a routine adjustment and should be checked only if trouble in its operation is encountered or parts are disassembled and replaced.

(1) Refer to figure 6-253.

(2) Position switch operating lever parallel to the top of its mounting bracket.

(3) With the operating lever depressed to the limit of its travel, verify that the switch is operated.

(4) With switch in unoperated condition and operating lever held parallel to top of its mounting bracket, there should be some clearance between the operating lever and top of the curved slot in the bracket.

(5) Loosen switch bracket mounting screws and position switch bracket as required to meet above conditions.

(6) Tighten mounting screws.

b. Synchronous Pulse Mechanisms. Perform synchronous pulse mechanism adjustments according to the following paragraphs.

(1) Armature Clamp. Adjust as follows:

NOTE

To make keyboard operable without electrical pulse to operate stepping magnet, loosen clamp mounting screw and rotate clamp counterclockwise to hold the armature in operating position. Maintain between 0.005 and 0.015 inch clearance between clutch trip bar lever and armature lever.

(a) Refer to figure 6-254.

(b) Loosen mounting screw.

(c) Position clamp so that with armature

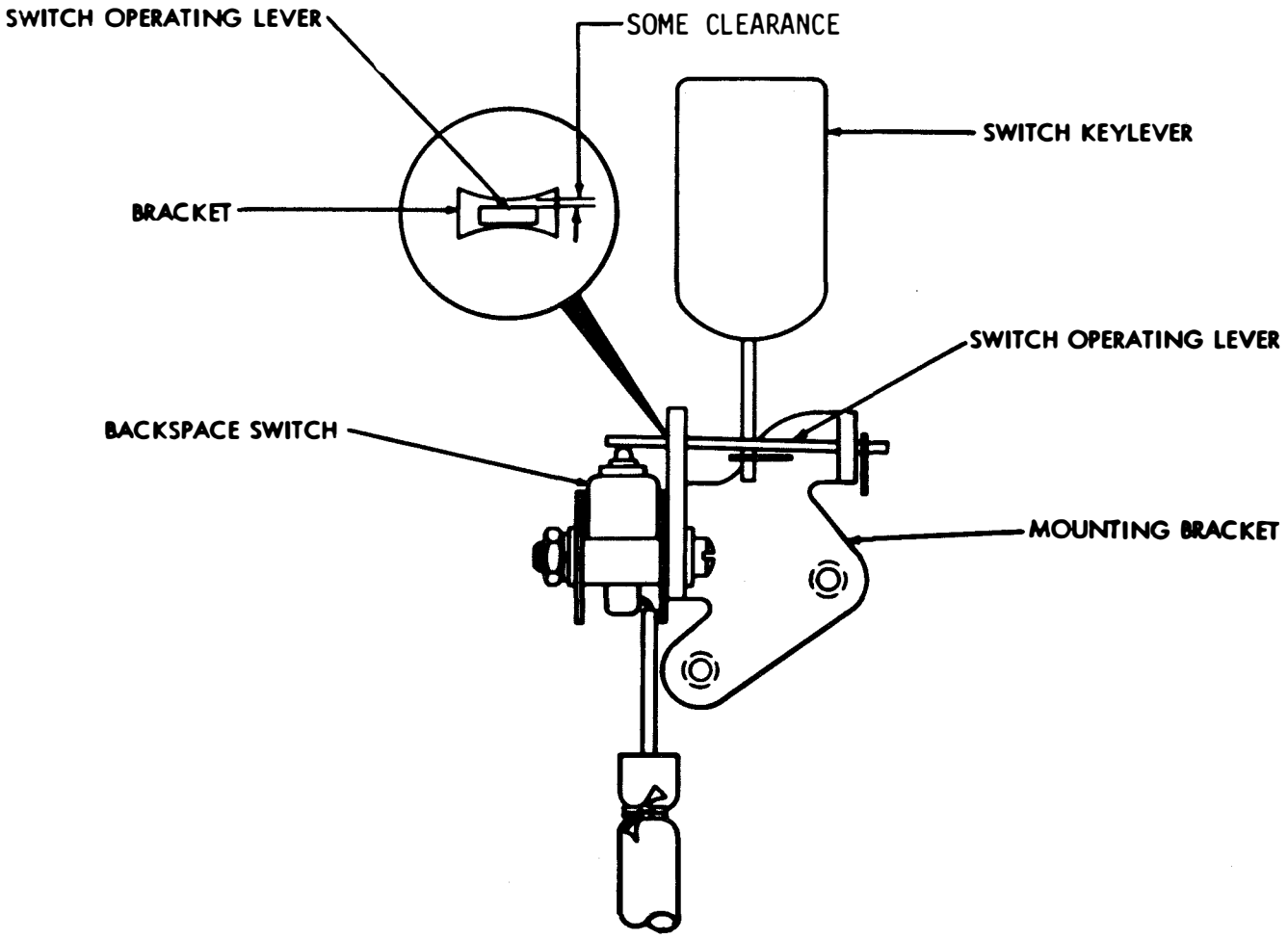


Figure 6-253. Power Backspace Switch Mechanism

operated approximately 3/8 inch clearance exists between the armature clamp and armature.

(d) Tighten mounting screw on clamp.

(2) Magnet Armature. Adjust as follows:

(a) Refer to figure 6-255.

(b) With clutch trip bar in extreme left position, hook 32-ounce scale to armature lever as shown.

(c) Measure at right angle to armature lever as indicated. Between 3 and 5 ounces should be required to pull armature lever from clutch trip bar.

(3) Mounting Bracket (Preliminary). Adjust as follows:

(a) Refer to figure 6-255.

(b) Loosen three mounting screws.

(c) With magnet not attracted and clutch trip bar in furthest left position, position mounting bracket by means of a pry point so that between 0.005 and 0.015 inch

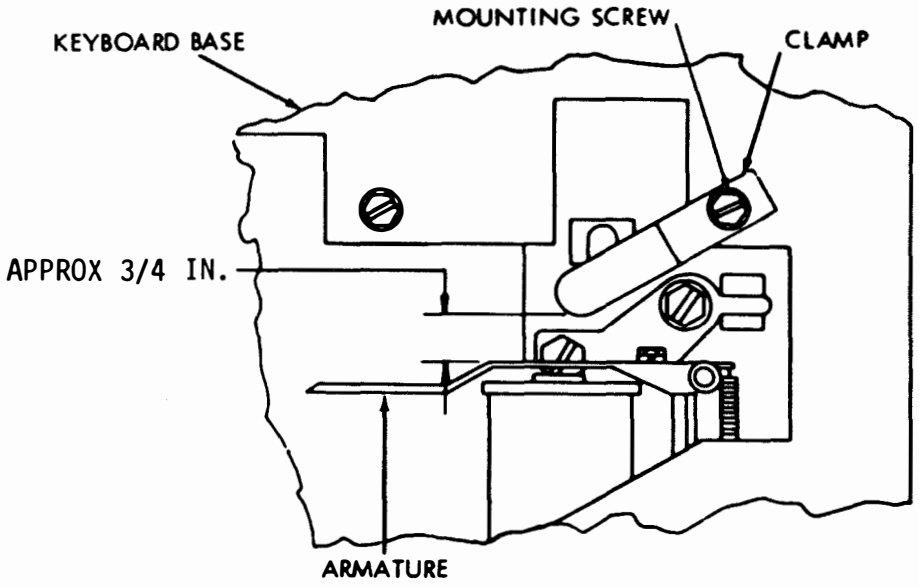


Figure 6-254. Armture Clamp

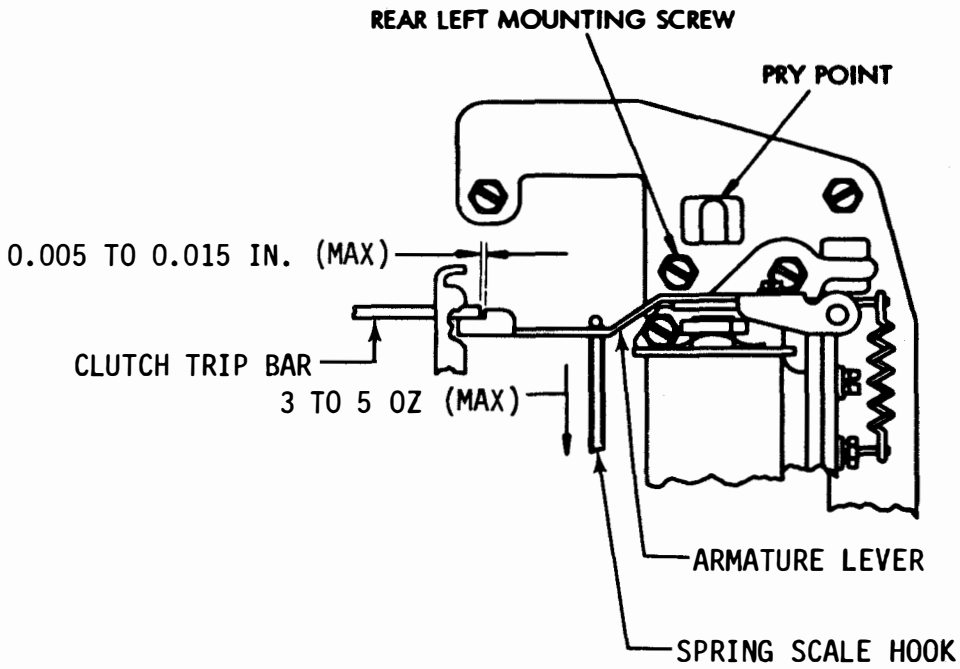


Figure 6-255. Magnet Armature and Mounting Bracket (Preliminary)

clearance exists between clutch trip bar and armature lever.

(d) Tighten left rear mounting screw and make final mounting bracket adjustment as described in step (5), below.

(4) Armature Hinge. Adjust as follows:

(a) Refer to figure 6-256.

(b) Loosen spring post and mounting screw.

(c) Position armature so that it is flush with pole face and magnet bracket extension when in attracted position.

(d) Tighten mounting screw and spring post.

(5) Mounting Bracket (Final). Adjust as follows:

(a) Refer to figure 6-256.

(b) With right rear and left front mounting bracket screws loose, position mounting bracket by means of pry point.

(c) With armature lever held against magnet pole face and clutch trip bar in furthest right position, between 0.005 and 0.015 inch clearance should exist between clutch trip bar and armature lever.

(6) Contact Gap. Adjust as follows:

(a) Refer to figure 6-257.

(b) Loosen mounting screws.

(c) With universal code bar in stop

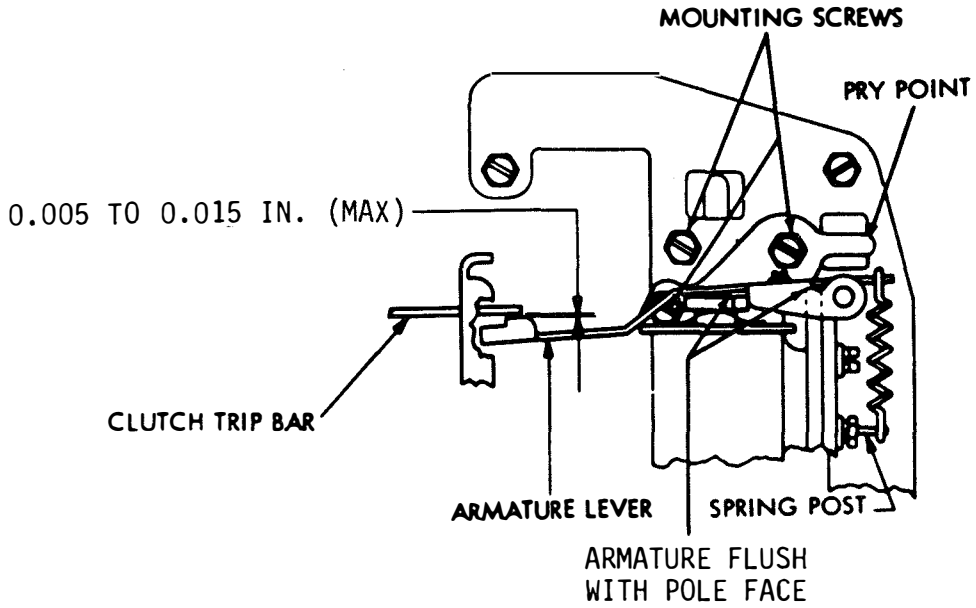


Figure 6-256. Armature Hinge and Mounting Bracket (Final)

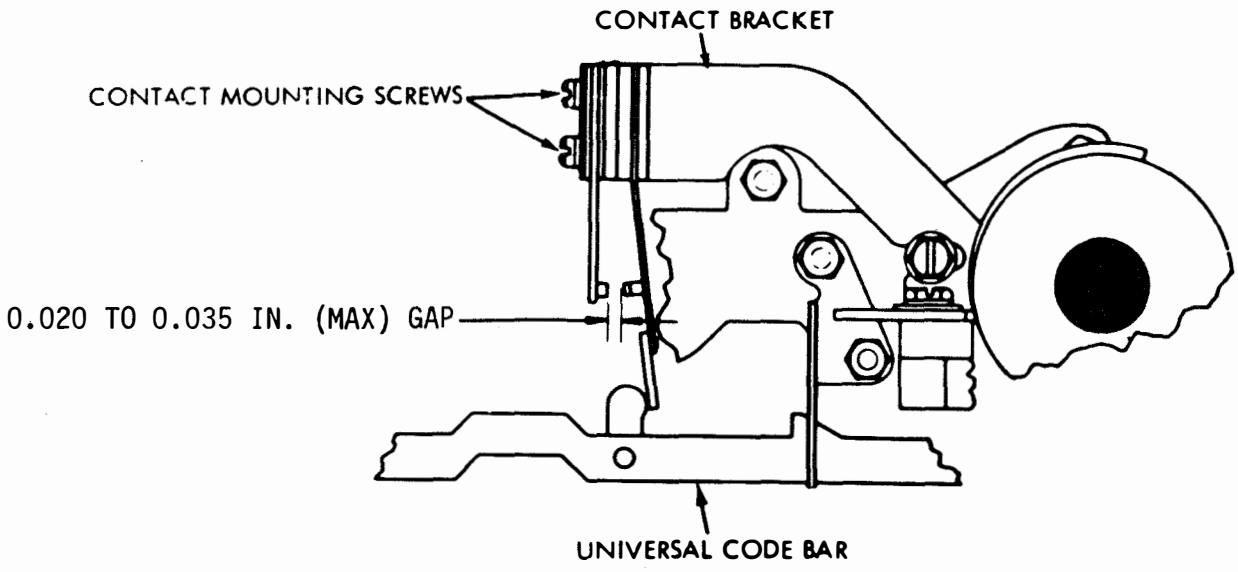


Figure 6-257. Contact Gap

position (to right as viewed from rear), position contact mounting bracket so that contact gap is between 0.020 and 0.035 inch.

(d) Tighten mounting screws.

(7) Universal Code Bar Contact. Adjust as follows:

(a) Refer to figure 6-258.

(b) With universal code bar in operated position (to the left as viewed from rear), bend contact swinger so that between 3-1/2 and 4-1/2 ounces of pressure is required to open contacts.

6.6.3 TYPING PERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARD (LOW-LEVEL). There are no low-level adjustments to be made on the unit.

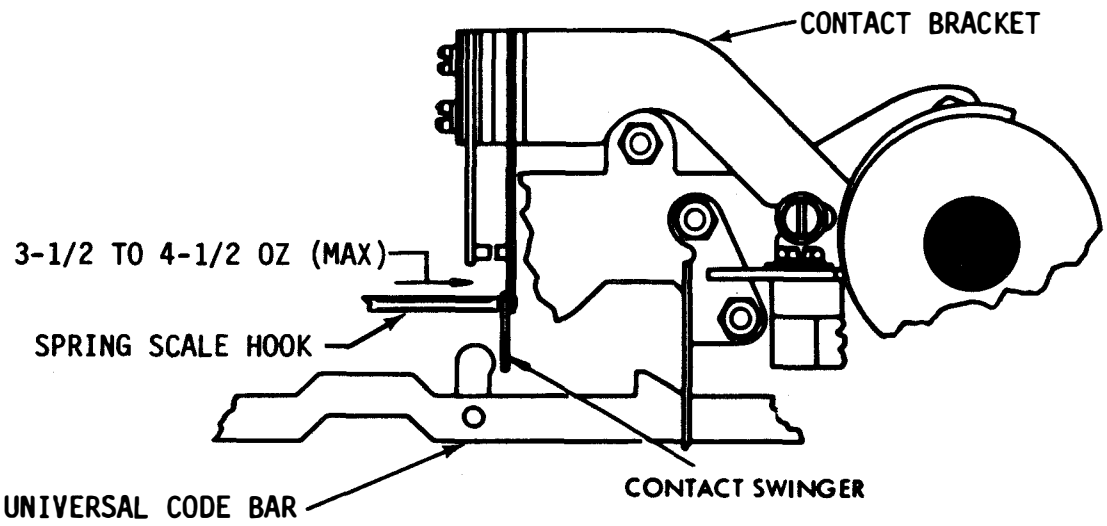


Figure 6-258. Universal Code Bar Contact

SECTION III - ADJUSTMENT - EARLIER DESIGN, BASIC UNITS

6-7. TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 ADJUSTMENTS The following paragraphs contain information necessary for making required adjustment to the typing reperforator and tape printer units (earlier design) (high-level and low-level).

6-7.1 TYPING REPERFORATOR AND TAPE PRINTER UNIT ADJUSTMENTS (HIGH-LEVEL). Perform the following procedures to ensure proper adjustments of the typing reperforator units (high-level).

a. Function Mechanism. Perform Function Mechanism adjustments in accordance with the following paragraphs.

(1) Cam Follower Lever Spring. Adjust as follows:

(a) Refer to figure 6-259.

(b) Adjust trip cam follower lever so that it rests on the high part of cam.

(c) Loosen locknut.

(d) By means of a pry point, position adjustment arm on follower lever so that between 0.010 and 0.030 inch exists between clutch release lever and reset bail trip lever.

(e) There should be some clearance between reset bail trip lever and left end of slot in downstop bracket.

NOTE

For units equipped with automatic noninterfering letters tape feed out mechanism, substitute adjustment outlined in Section IV, Variable Features.

(2) Reset Bail Trip Lever Spring. Adjust as follows:

(a) Refer to figure 6-259.

(b) With follower lever on high part of trip cam, measure tension on trip lever spring.

(c) Between 2 1/2 and 4 1/2 ounces should be required to start trip lever moving.

b. Punch Mechanism For Fully Perforated Tape (Indentations of Feed Wheel Fully Punched Out). Perform adjustments in accordance with the following paragraphs.

NOTE

None of the following adjustments apply to tape printer.

(1) Ten Characters Per Inch (Preliminary). Adjust as follows:

(a) Refer to figure 6-260.

(b) Loosen locknut.

(c) Position eccentric stud so that indent on die wheel is pointing downward.

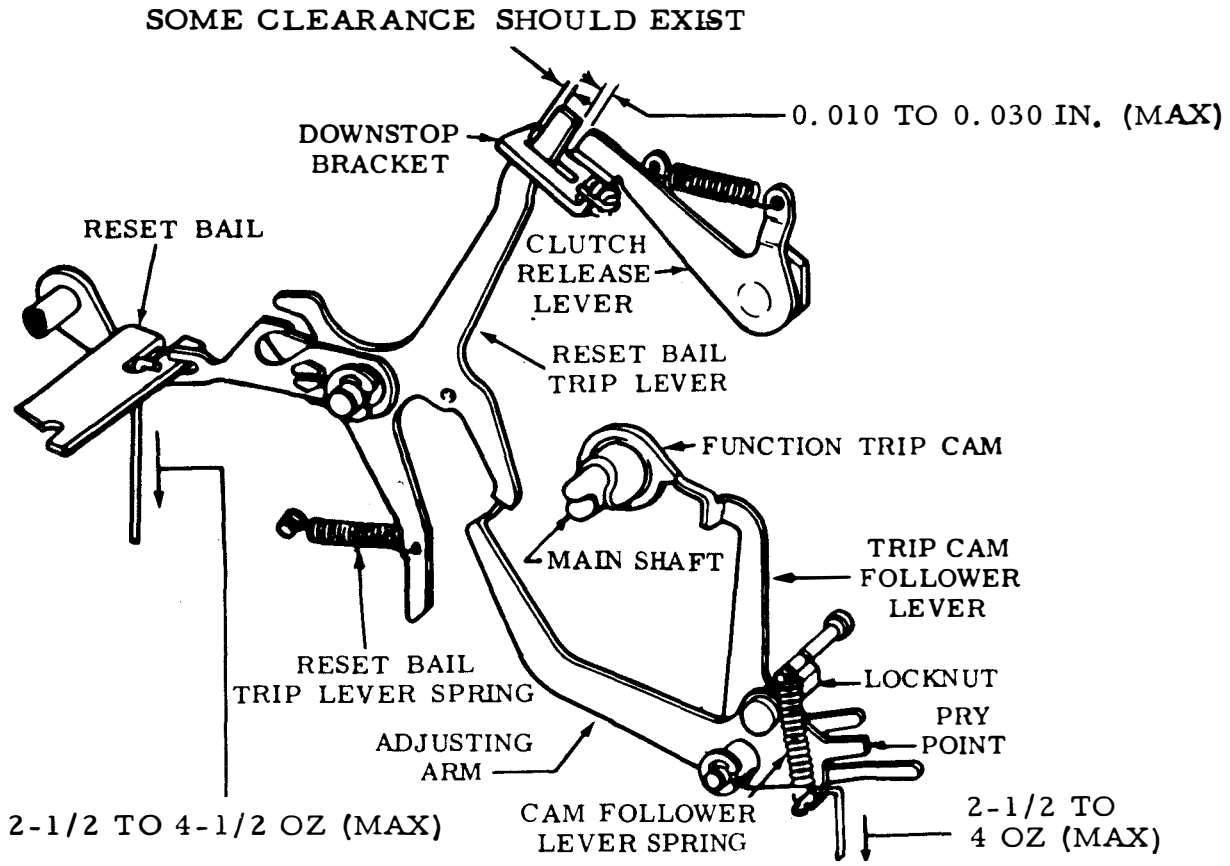


Figure 6-259. Cam Follower Lever Spring and Reset Bail Trip Lever Spring

(d) Tighten locknut.

(e) With tape shoe blocked away from feed wheel, feed pawl and detent disengaged, and tape removed, feed wheel should rotate freely.

(f) Check through three or four rotations of feed wheel.

(g) Refine preliminary adjustment to meet requirement.

NOTE

Before proceeding with final adjustment, check spring bias tensions as outlined in paragraphs 6-3.1e(7) and (8). If t unit is equipped with a slack tape mechanism having a clamp plate with an adjustable wear disc, loosen the mounting nut and turn a new edge of the disc toward the tape. Tighten nut.

(2) Ten Characters Per Inch (Final. Adjust as follows:

(a) Refer to figure 6-261.

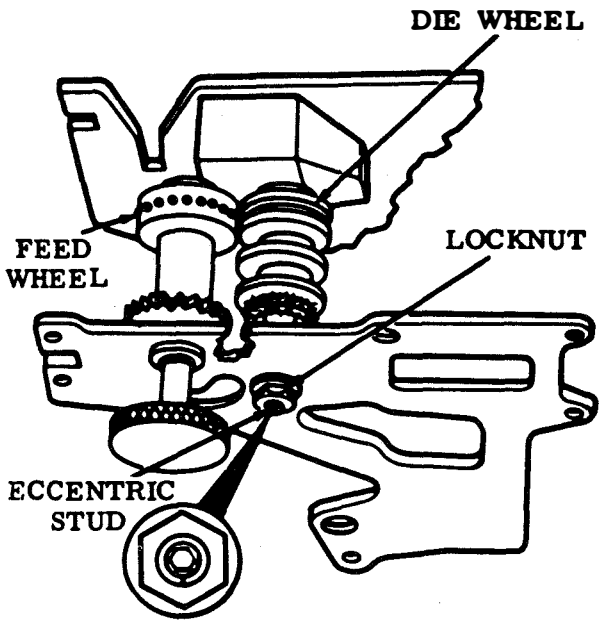


Figure 6-260. Ten Characters Per Inch (Preliminary)

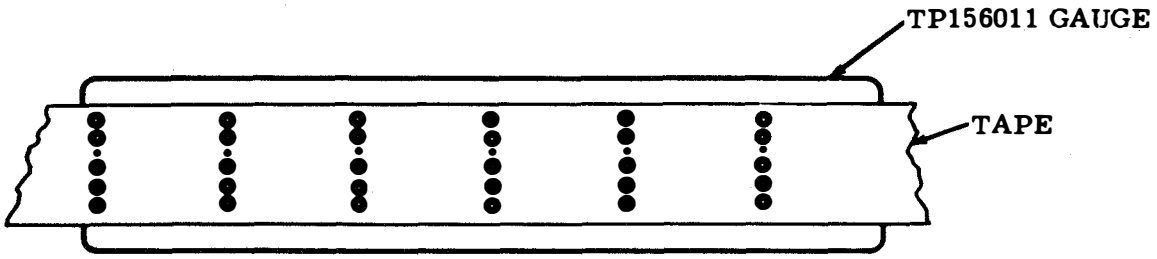


Figure 6-261. Ten Characters Per Inch (Final)

(b) Place a piece of tape perforated with six series of 9 BLANK code combinations followed by a LETTERS combination over the TP95960 gauge or the smooth side of TP156011 tape gauge so that the circular portion of the first number 2 code hole in the tape is concentric with the first hole in the tape gauge.

(c) The next four holes in the tape gauge should be visible through the number 2 code holes in the tape, and the circular portion of the last (sixth) number 2 code hole in the tape should be entirely within the 0.086 diameter hole in the tape gauge.

(d) With tape shoe held away from feed wheel, and with feed pawl and detent disengaged and tape removed, feed wheel should rotate freely.

(e) If feed wheel does not turn freely, loosen eccentric locknut and rotate die wheel eccentric shaft (with tape removed) until it binds against feed wheel.

(f) Back off eccentric until die wheel is just free.

(g) Check through three or four rotations of die wheel.

(h) Keep the indent of eccentric below the horizontal centerline of the stud.

NOTE

First through fifth holes in gauge are same size as code holes in tape (0.072 inch diameter). Sixth hole in gauge is larger (0.086 inch). This allows for ±0.007 inch variation in 5 inches.

(i) If necessary, refine adjustment by moving die wheel toward the feed wheel to decrease the character spacing or away from the feed wheel to increase the character spacing.

(j) Tighten nut.

(k) Refine Feed Pawl adjustment as necessary, as described in paragraph 6-3.1c(7).

CAUTION

With tape removed, make sure feed wheel and die wheel do not bind. Repeat final adjustment and refine if necessary.

(3) Lateral and Front-to-Rear Wheel Position Detent. Adjust as follows:

(a) Refer to figure 6-262.

(b) With the reperforator operating under power obtain a tape sample consisting of a series of BLANK code perforations.

(c) Verify by visual inspection of the perforated feed holes, laterally and front-to-rear, that the indentations of the feed wheel are fully punched out.

(d) Adjustment, Lateral. Adjust as follows:

1. Loosen detent eccentric stud locknut and position adjusting screws.

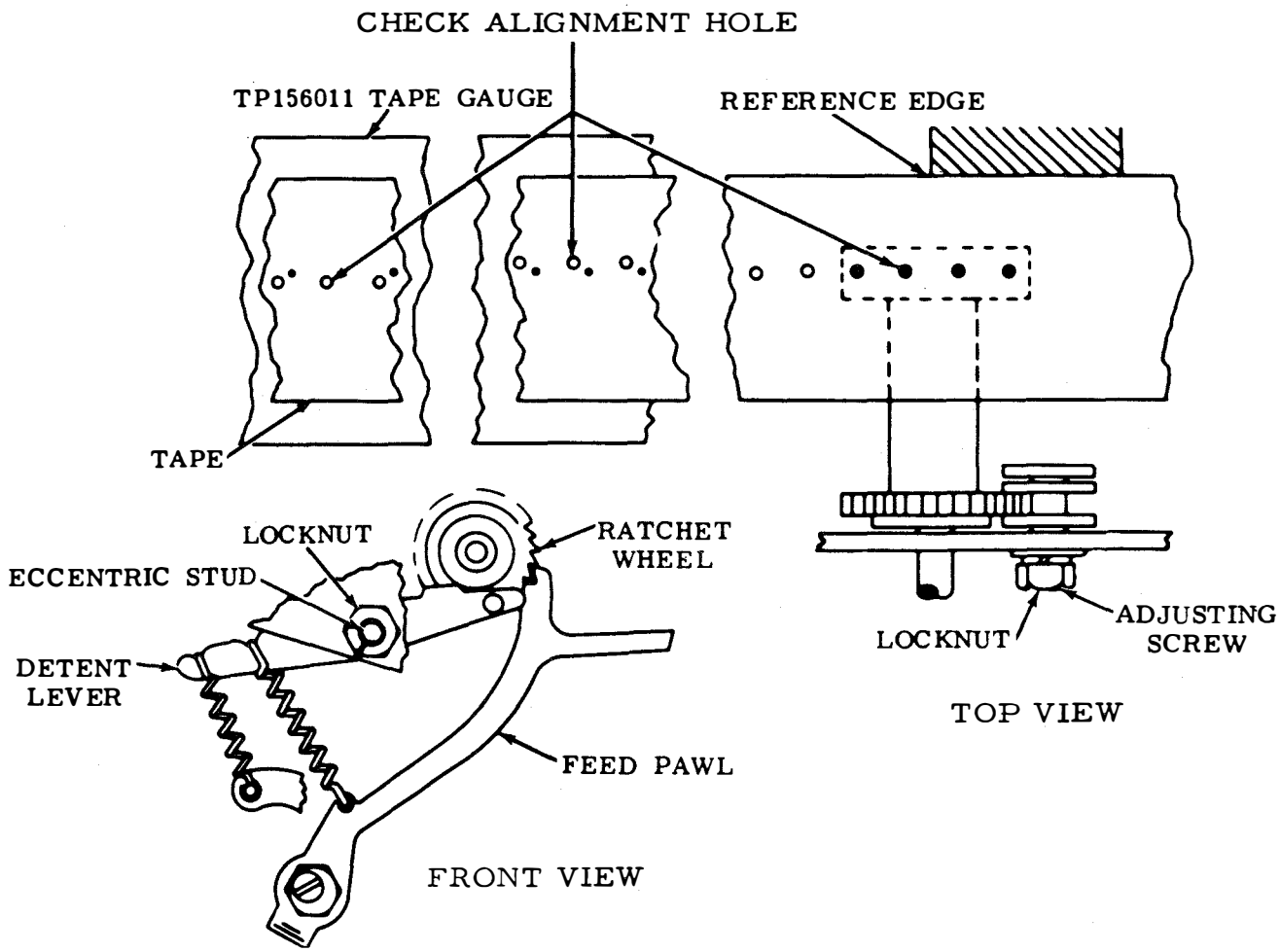


Figure 6-262. Lateral and Fonrt-to-Rear Wheel Position Detent

2. Rotate detent eccentric clockwise to move the feed wheel perforations toward leading edge of feed hole.

3. Rotate detent eccentric counterclockwise to move feed wheel perforations toward trailing edge of feed hole.

4. Tighten locknut.

5. Refine Feed Pawl adjustment as in paragraph 6-3.1c(7).

(e) Adjustment, Front to Rear:

1. Loosen adjusting screw locknut and position screw.

2. To move the indentations in the tape away from the reference edge of the tape, move the wheel towards the front plate of the punch mechanism by rotating the adjusting screw counterclockwise.

3. To move the indentations in the tape towards the reference edge of the tape, move the feed wheel towards the back plate of the punch mechanism by rotating the adjusting screw clockwise.

4. Tighten locknut.

5. Refine the previous adjustment if required.

c. Ribbon Mechanism. Perform ribbon mechanism adjustments in accordance with the following paragraphs.

(1) Detent Spring. Adjust as follows:

(a) Refer to figure 6-263.

(b) With reversing arm in its extreme right or left position, measure spring tension with spring scale.

(c) Between 2 and 4 ounces should be required to pull detent spring to its installed length.

(2) Drive Arm Spring. Adjust as follows:

(a) Refer to figure 6-263.

(b) With rocker bail in extreme right position, measure spring tension with a spring scale.

(c) Between 9 and 14 ounces should be required to pull drive arm spring to its installed length.

d. Slack Tape Mechanism. Perform slack tape mechanisms adjustment in accordance with the following paragraphs:

(1) Clamp Plate Spring. Adjust as follows:

(a) Refer to figure 6-264.

(b) Disengage and latch function clutch, with

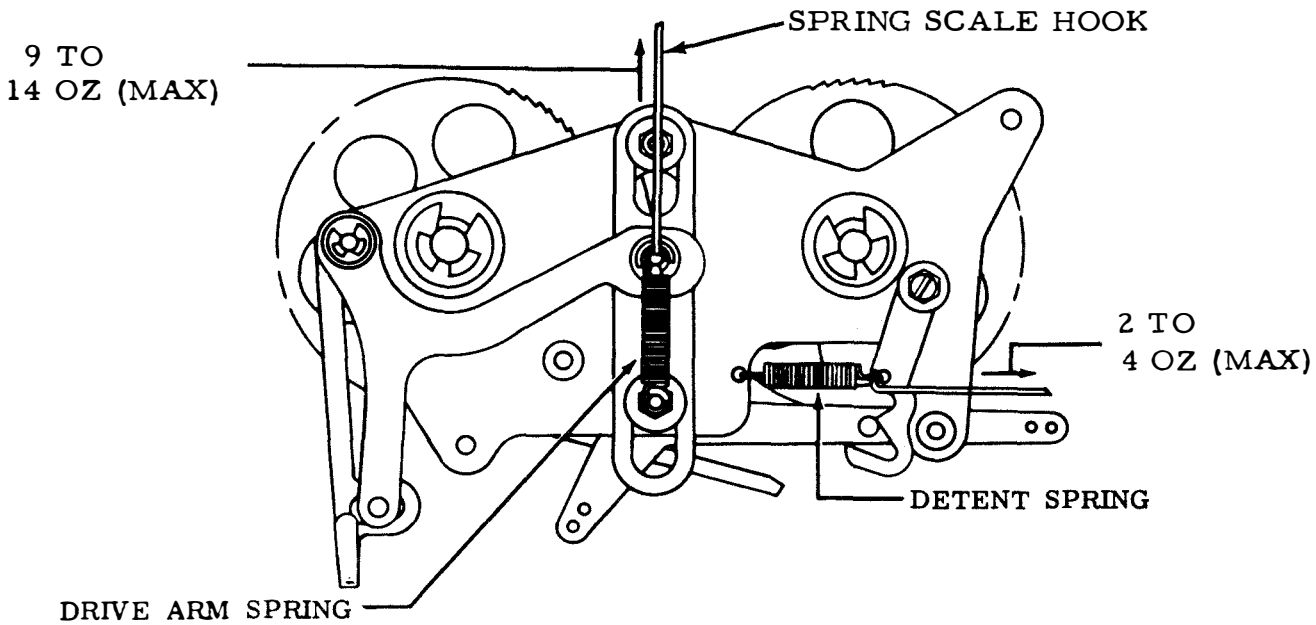


Figure 6-263. Drive Arm Spring and Detent Spring

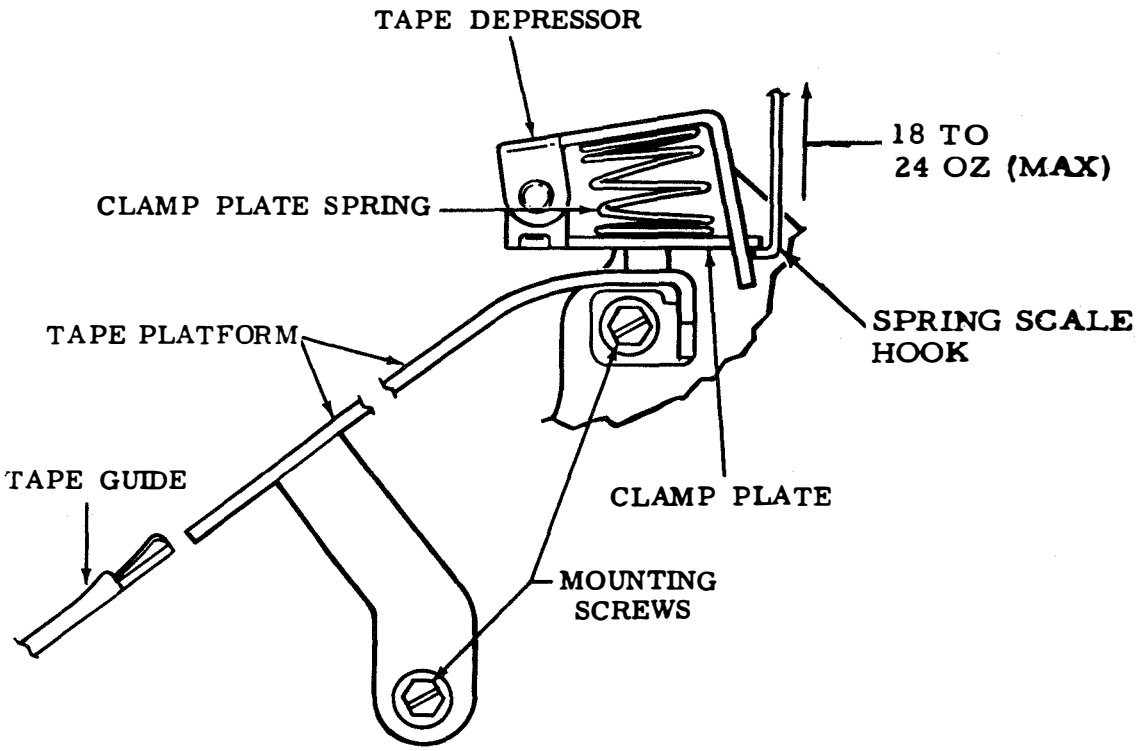


Figure 6-264. Clamp Plate Spring and Tape Platform

clamp plate spring bowed to the right.

(c) Measure tension using spring scale.

(d) Between 18 and 24 ounces should be required to move clamp plate from bottom of slot in tape depressor.

(2) Tape Platform. Adjust as follows:

(a) Refer to figure 6-264.

(b) Loosen tape platform mounting screws.

(c) Position tape platform so that top surface of tape platform is flush with top surface of tape guide.

(d) Tighten mounting screws:

6-7.2 EARLIER DESIGN MECHANISMS (HIGH-LEVEL). Perform the following procedures to ensure proper adjustments of earlier design mechanism (high-level).

a. LETTERS-FIGURES Contact Mechanism. Perform LETTERS-FIGURES Contact Mechanism adjustment in accordance with the following paragraphs.

(1) LETTERS-FIGURES Contact Test. Adjust as follows:

(a) Refer to figure 6-265.

(b) Record start and end of trace of right side of front timing contact.

(c) Connect neon trace lamp across left side of letters-figures contact.

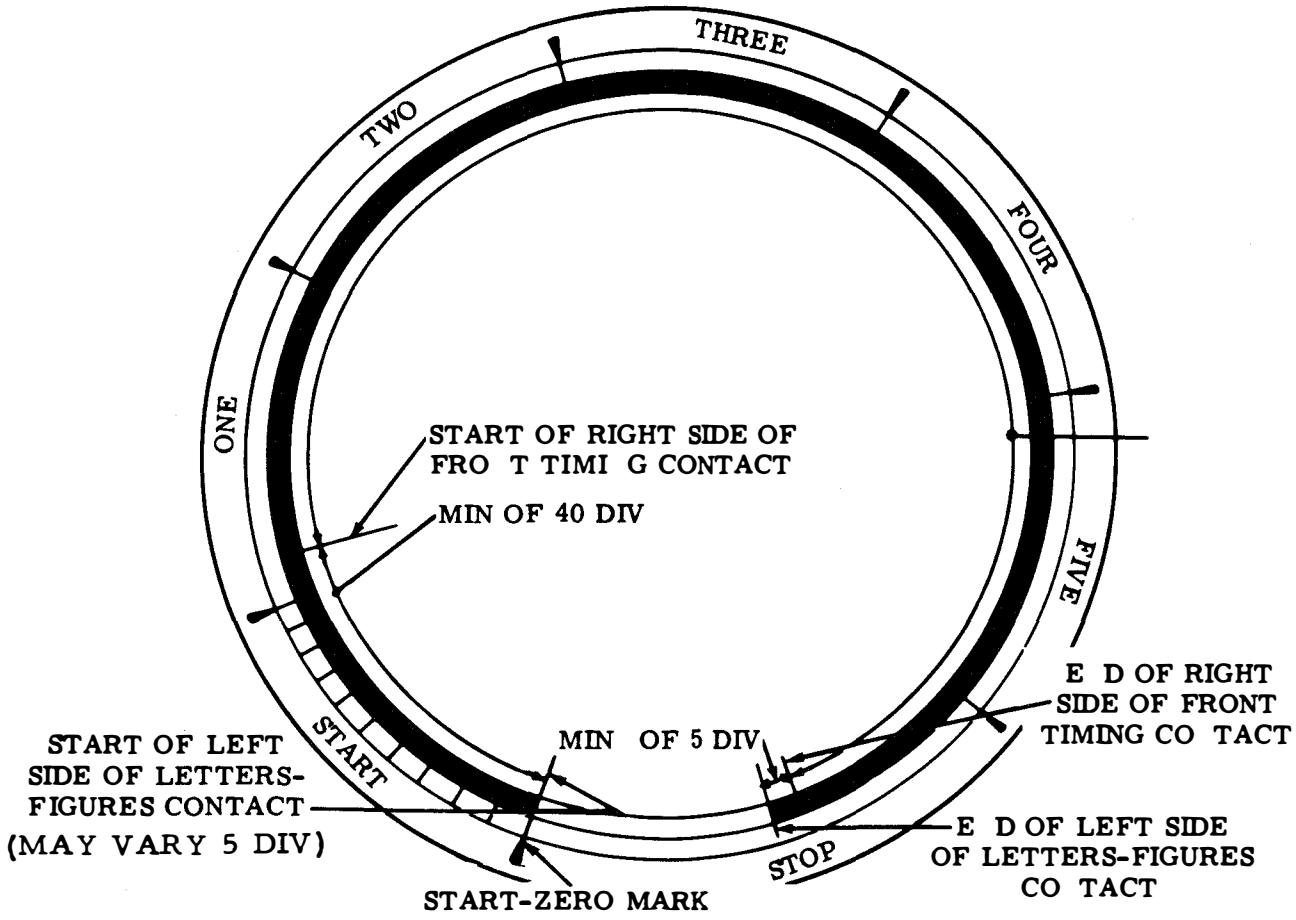


Figure 6-265. FIGURES-LETTERS Contact

(d) Alternately select LETTERS (12345) and FIGURES (12-45) code combinations and observe trace.

(e) Set START-ZERO mark of test set scale at start of trace.

(f) Left side of LETTERS-FIGURES contact should close before right side of timing contacts close and should open after right side of contacts open.

(g) There should be no bounce or chatter of LETTERS-FIGURES contact during part of function cycle when right side of timing contacts are closed.

(2) Adjustment of Mounting Bracket: Adjust as follows:

(a) Refer to figure 6-266.

(b) With mounting nuts loosened, rotate mounting bracket until left side of contact just closes and note position of actuating blade.

(c) Rotate bracket farther until actuating blade is approximately 0.020 inch beyond noted position. Tighten nuts.

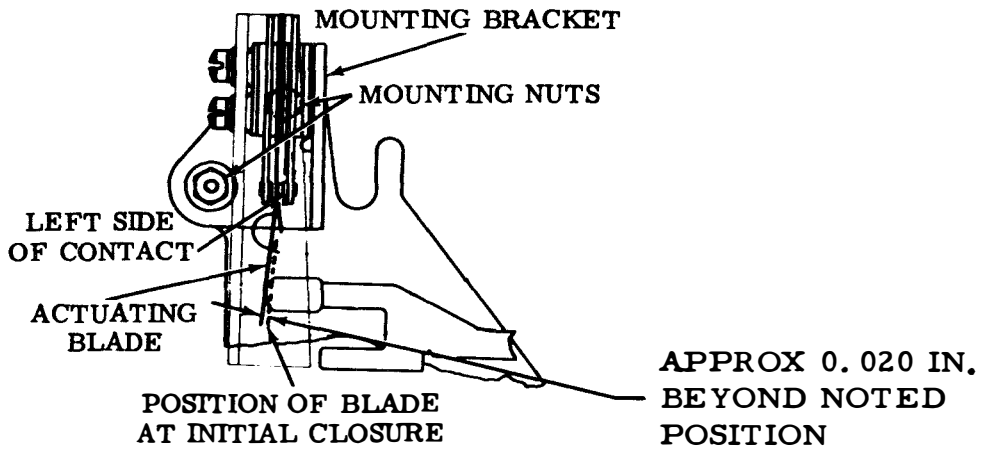


Figure 6-266. Mounting Bracket - Rear View

(d) With unit in LETTERS condition and function clutch disengaged, left side of contact should be closed.

b. Multiple Mounted Function Blade Contacts. Perform the multiple mounted function blade contacts adjustments in accordance with the following paragraphs.

NOTE

The following adjustment should be made prior to installing the contact bracket assembly on unit.

(1) Normally-Open Contact Gap. Adjust as follows:

(a) Refer to figure 6-267.

(b) Bend stiffener as shown to provide between 0.010 and 0.020 inch clearance between contact points.

(2) Normally-Open Contact Spring. Adjust as follows:

(a) Refer to figure 6-267.

(b) Using a spring scale, measuere pressure required to move contact spring away from its stiffener. This should be from 3 to 4-1/2 ounces.

(c) To adjust, bend contact spring and recheck gap.

(3) Normally-Closed Contact Spring. Adjust as follows:

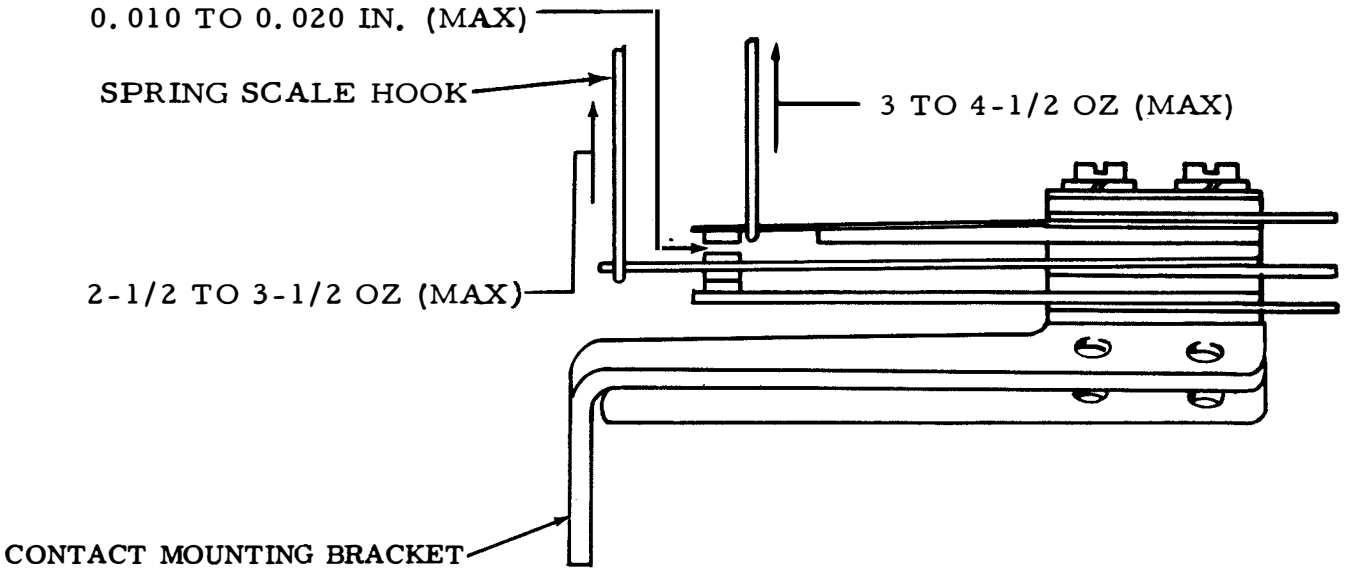


Figure 6-267. Normally-Open Contact Gap, Normally-Open and Normally-Open and Normally-Closed Springs - Right Side View

(a) Refer to figure 6-267.

(b) Using a spring scale, measure pressure required to move swinger contact away from normally-closed contact. This should be from 2-1/2 to 3-1/2 ounces.

(c) To adjust, bend swinger contact spring.

NOTE

The following adjustments should be made after the contact bracket assembly has been mounted to the unit.

(4) Normally-Closed Contact Gap. Adjust as follows:

(a) Refer to figure 6-268.

(b) Bend lower contact spring to provide between 0.010 and 0.020 inch clearance between contact points.

NOTE

Bend each function blade in turn and determine that there is a definite transfer from make to break contact. Refine adjustment of normally closed contact gap as required

c. Noninterfering BLANK Tape Feed-Out Mechanism. Perform the noninterfering BLANK tape feed-out mechanism adjustments according to the following paragraphs.

(1) Feed-Out Bracket. Adjust as follows:

(a) Refer to figure 6-269.

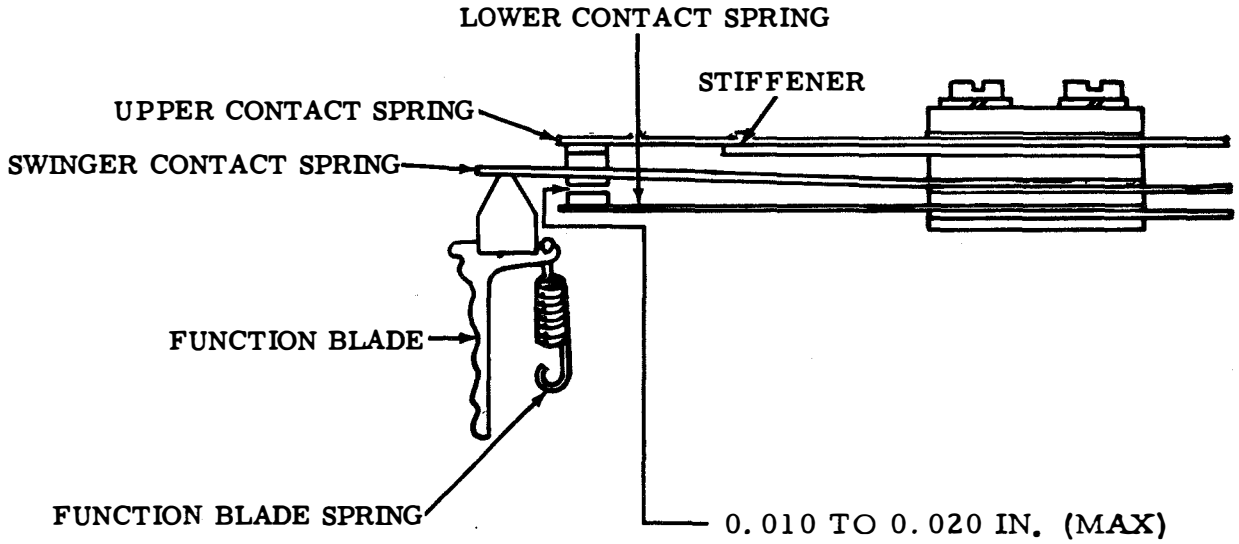


Figure 6-268. Normally-Closed Contact Gap - Right Side View

(b) Loosen mounting screws.

(c) Position feed out bracket so that outer racket pawl is riding fully on ratchet when play is taken up in either direction.

(d) Tighten mounting screws.

(2) Drive Arm Shaft Rear Bearing. Adjust as follows:

(a) Refer to figure 6-270.

(b) Loosen mounting screws.

(c) Position rear bearing so that drive arm shaft bearing is finger-free in its bearings.

(d) Tighten mounting screws.

(3) Drive Arm. Adjust as follows:

(a) Refer to figure 6-271.

(b) Loosen clamp screw.

(c) Position drive arm on shaft so that when play is taken up to make it minimum, at least some clearance exists between drive arm and function cam.

(d) Drive arm should engage full thickness of release arm.

(e) Tighten clamp screw.

(4) Release Arm. Adjust as follows:

(a) Refer to figure 6-272.

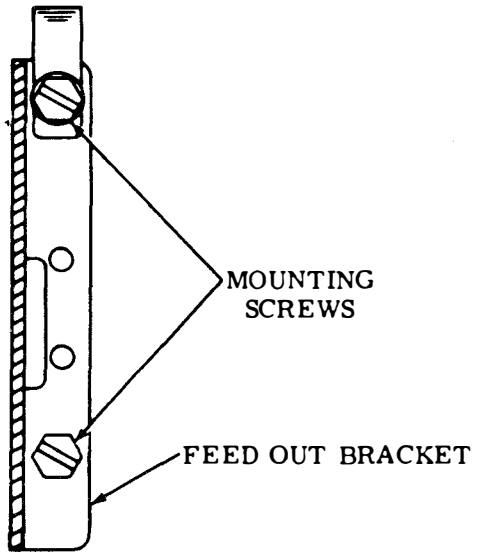


Figure 6-269. Feed-Out Bracket - Right Side View

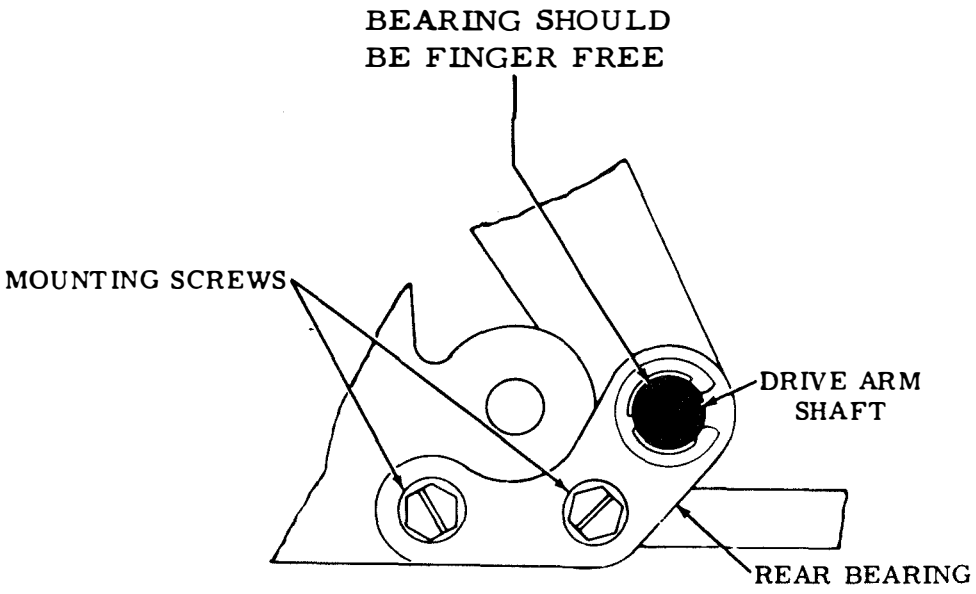


Figure 6-270. Drive Arm Shaft Rear Bearing

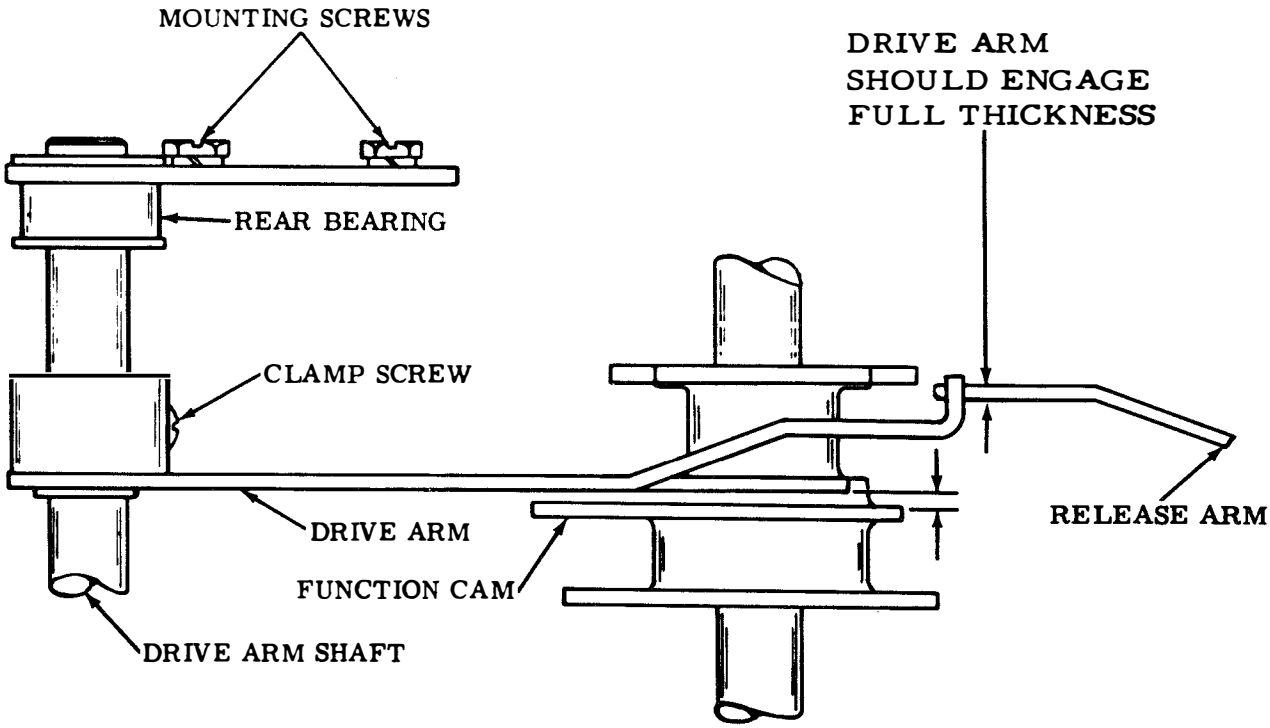


Figure 6-271. Drive Arm - Top View

(b) Loosen clamp nut.

(c) Position release arm pivot shaft in elongated mounting hole with clamp nut loosened. Tighten nut.

(d) With drive arm on high part of eccentric collar, clearance between drive arm and release arm should be between 0.003 and 0.010 inch when nut has been tightened.

NOTE

Feed pawl must be disengaged from feed wheel ratchet.

(5) Feed-Out Pawl. Adjust as follows:

(a) Refer to figure 6-273.

(b) Turn power off and check detent roller for full engagement with ratchet.

(c) Latch feed-out mechanism in operated position.

(d) Position shaft so that drive arm is on high part of eccentric collar.

(e) With clamp screw loosened, position feed-out pawl against first ratchet tooth to left of vertical center-line.

(f) Tighten clamp screw friction tight.

(g) Rotate main shaft until feed-out pawl has retracted. Feed holes and code holes of first character should be on the same center-line, within 0.020 to 0.030 inch.

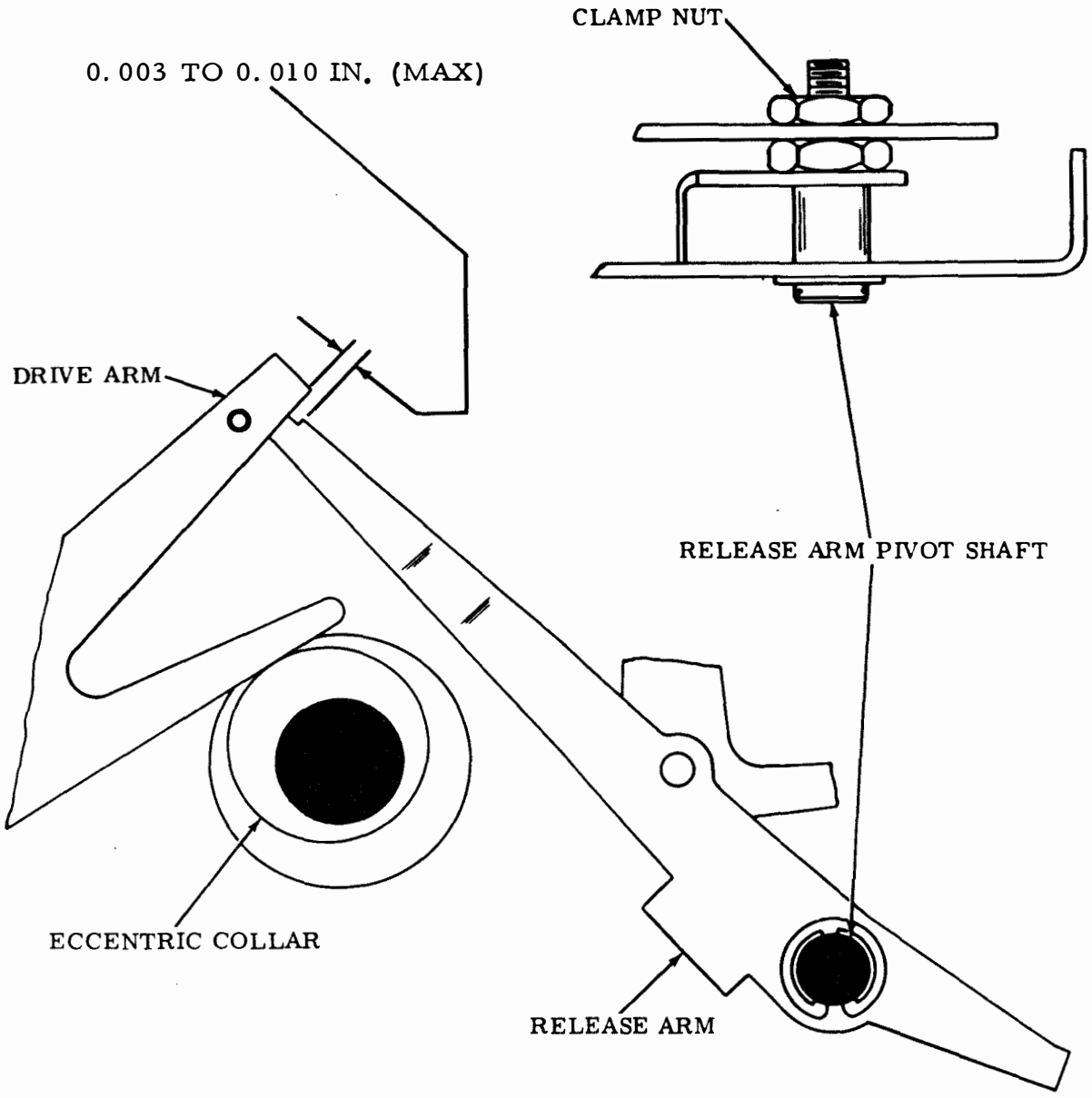
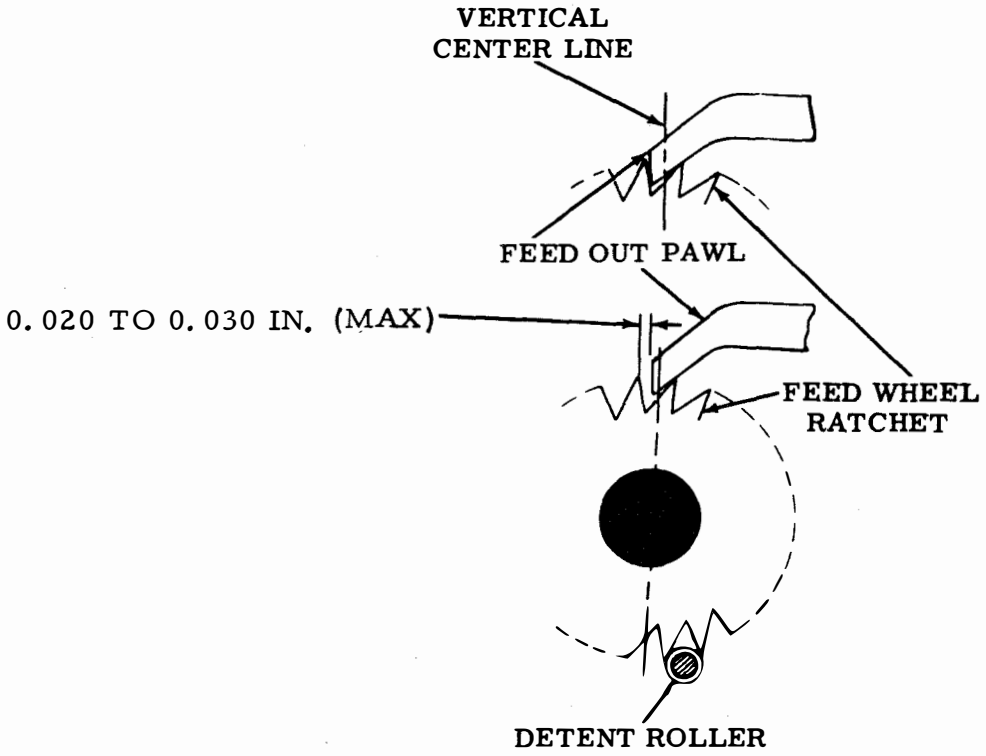


Figure 6-272. Release Arm



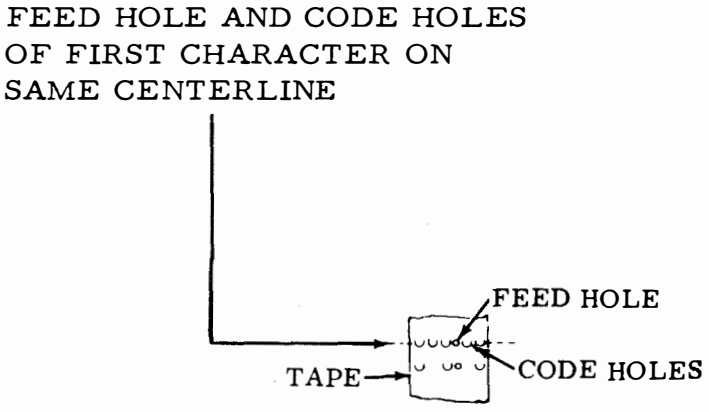


Figure 6-273. Feed-Out Pawl

(h) Reposition pawl against tooth, tighten clamp screw, and repeat alignment check.

(i) To check operation of the feed-out pawl, apply power and allow feed out operation to be interrupted by an incoming message.

(6) Feed-Out Pawl Spring. Adjust as follows:

(a) Refer to figure 6-274.

(b) After completion of a message (feed-out mechanism unlatched), feed-out pawl should rest on upper portion of a feed wheel ratchet tooth and should not engage vertical face of any tooth.

(c) A tension of between 1/2 and 2 ounces should be required to start pawl moving. Use spring scale to check tension.

(d) Loosen clamp screw and move feed-out pawl arm to refine adjustment if necessary. Tighten clamp screw.

(7) Armature Hinge. Adjust as follows:

(a) Refer to figure 6-275.

(b) Loosen armature spring post and hinge mounting screw.

(c) With armature held against magnet core, a maximum clearance of 0.003 inch should exist between armature and magnet mounting bracket.

(d) Position armature hinge and tighten spring post and screw.

(8) Armature Spring. Adjust as follows:

(a) Refer to figure 6-275.

(b) Using spring scale, verify that between 7 and 8 ounces are required to pull spring to installed length.

(9) Magnet Mounting Bracket. Adjust as follows:

(a) Refer to figure 6-276.

(b) Place tape-out mechanism in unoperated condition (Magnet deenergized and drive arm latched by release arm).

(c) Loosen two mounting screws.

(d) By means of a pry point, position magnet mounting bracket to take up all clearance between locklever roller and armature bail. Clearance between magnet core and armature antifreeze button should be between 0.020 and 0.025 inch.

(e) Tighten two mounting screws.

(10) Release Arm Latch. Adjust as follows:

(a) Refer to figure 6-277.

(b) Loosen locknut.

(c) With locknut loosened, position latch shaft in elongated hole.

(d) With kick-out roller positioned away from locklever and magnet is released

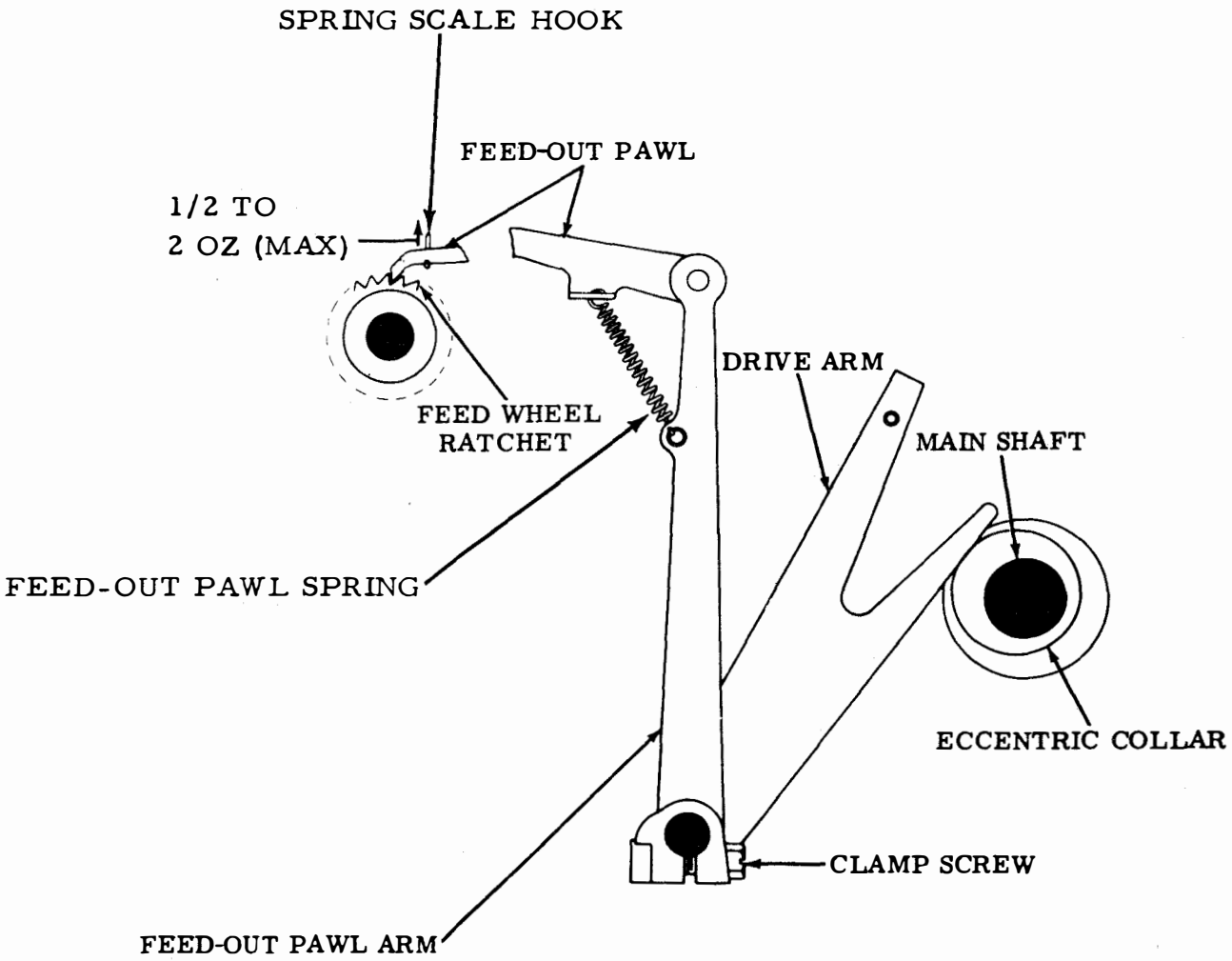


Figure 6-274. Feed-Out Pawl Spring

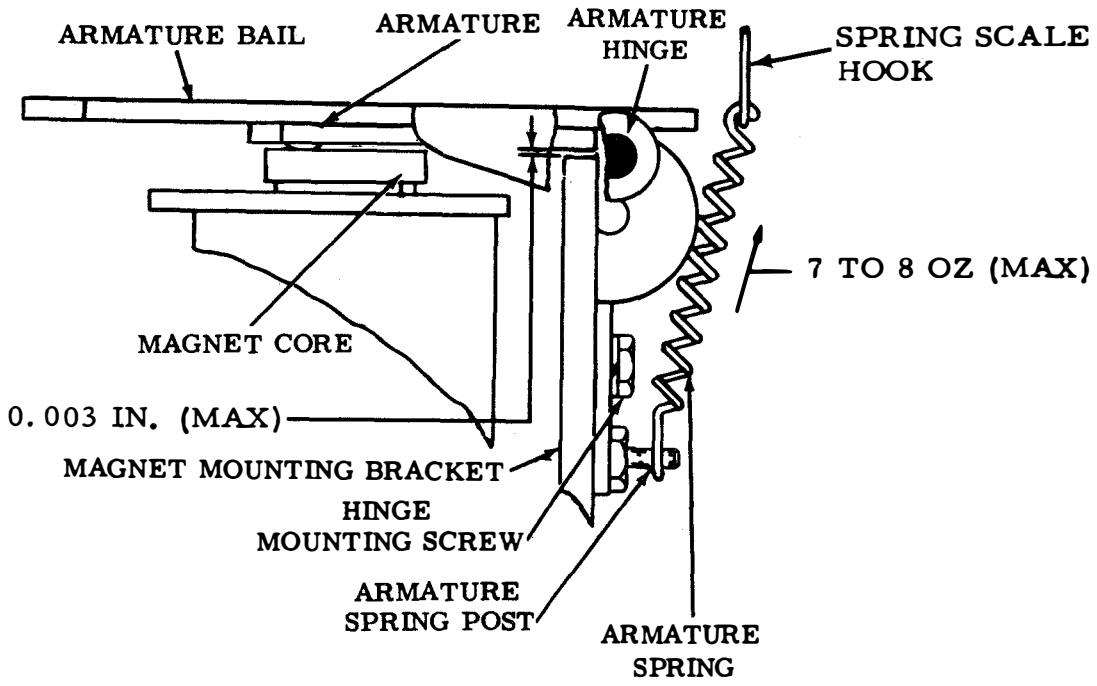


Figure 6-275. Armature Hinge and Spring

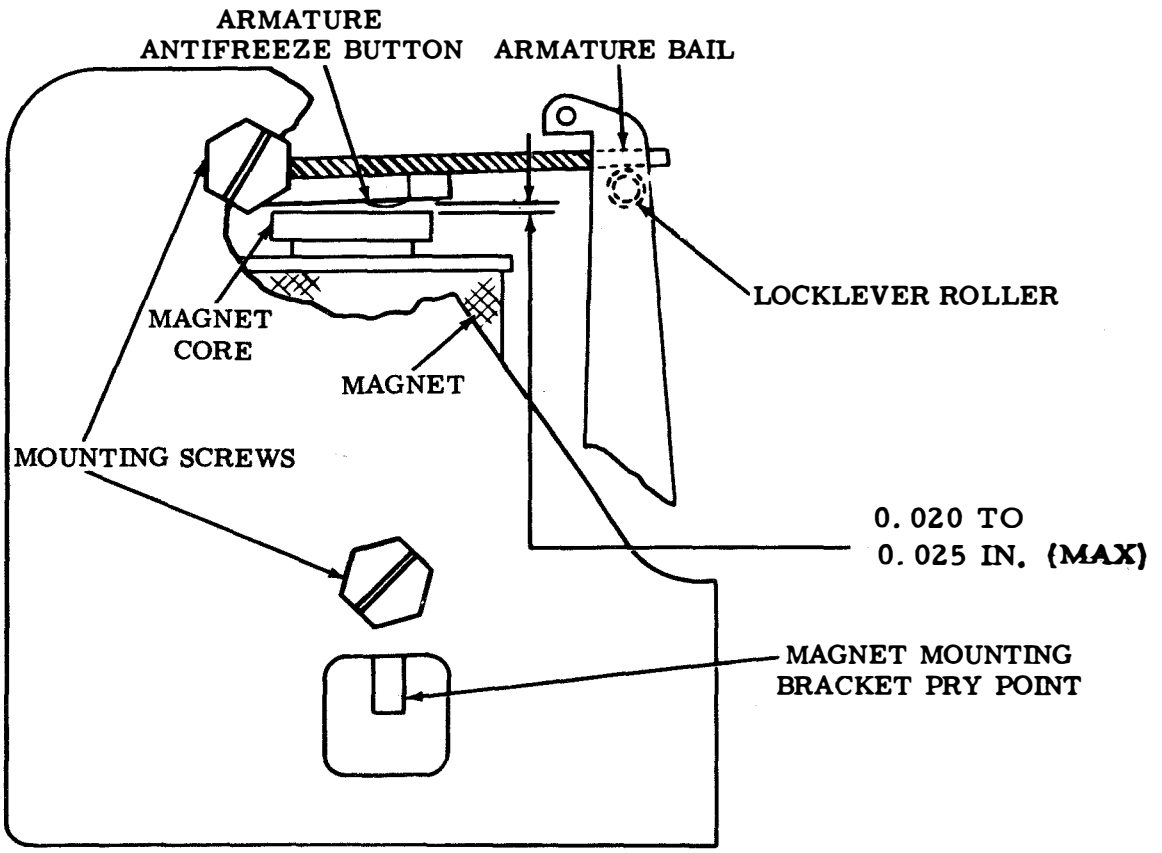


Figure 6-276. Magnet Mounting Bracket - Rear View

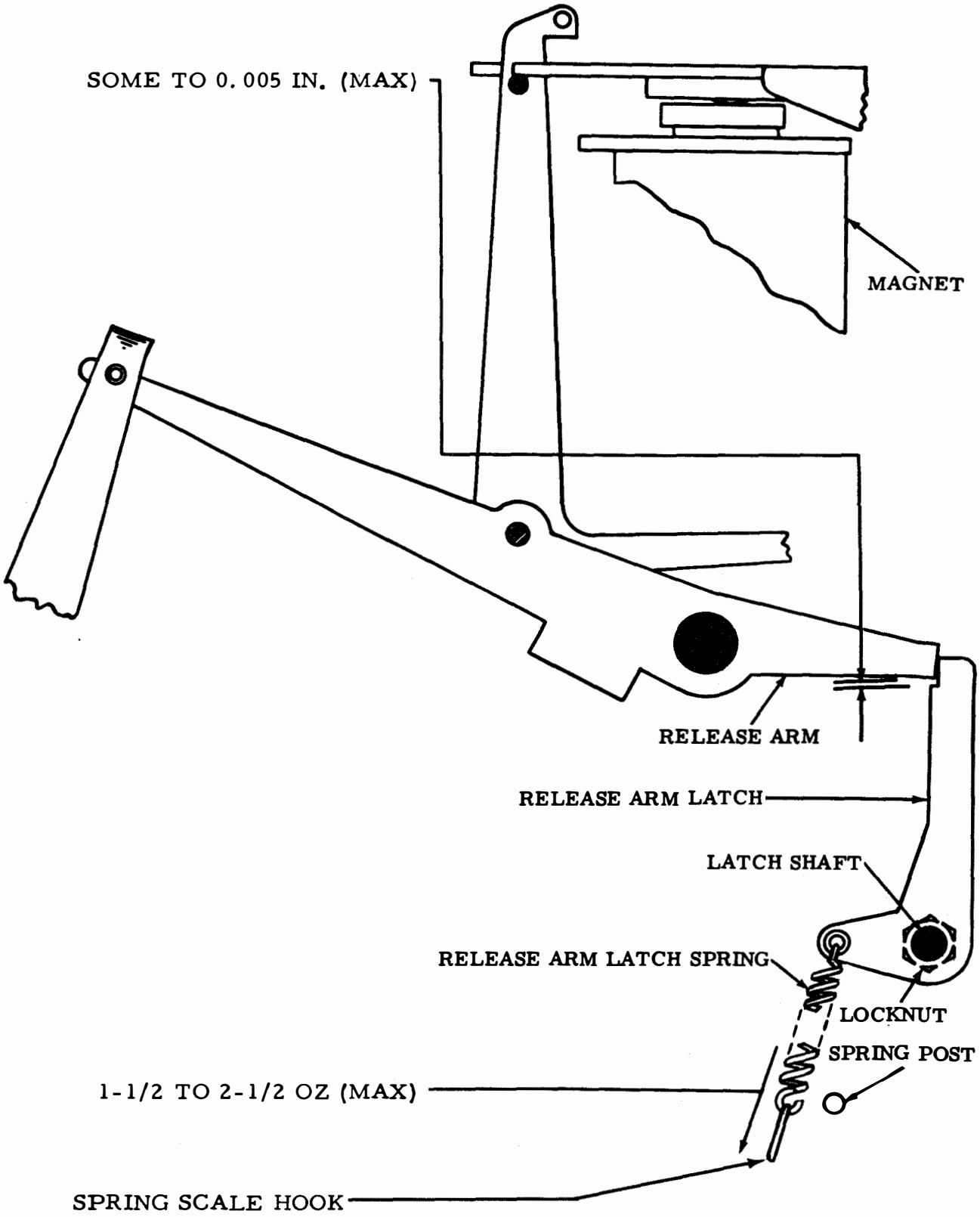


Figure 6-277. Release Arm Latch and Latch Spring

clearance between release arm and release arm latch should be some to 0.005 inch.

(e) When feed-out pawl is to extreme right, it should fully engage a ratchet tooth when magnet is energized.

(f) Tighten locknut.

(11) Release Arm Latch Spring. Adjust as follows:

(a) Refer to figure 6-277.

(b) With a spring scale, ensure that between 1-1/2 and 2-1/2 ounces is required to pull spring to installed length.

(12) Lifter Lever. Adjust as follows:

(a) Refer to paragraph 6-278.

(b) Place feed-out mechanism in operated condition (release arm actuated).

(c) Loosen locknut.

(d) Position lifter lever by means of its eccentric shaft so that the metering feed pawl is fully seated in deep notches of inner metering ratchet.

(e) Some clearance should exist between release arm and lifter lever when play in lifter lever is taken up to make maximum clearance.

(f) With release arm unlatched, metering feed pawl should clear all ratchet teeth.

(g) Tighten locknut and recheck clearances.

(13) Metering Feed Pawl Spring. Adjust as follows:

(a) Refer to figure 6-278.

(b) Check spring tension with spring scale. With drive arm latched by release arm, between 2-1/2 and 4-1/2 ounces of tension should be required to pull spring to installed length.

(14) Outer Ratchet Check Pawl Spring.

(a) Refer to figure 6-278.

(b) Check spring tension with spring scale. Between 2-1/2 and 4-1/2 ounces should be required to pull spring to installed length.

(15) Inner Ratchet Check Pawl. Adjust as follows:

(a) Refer to figure 6-279.

(b) Loosen two mounting screws.

(c) With mounting screws loosened, position check pawl mounting plate. With feed-out mechanism in operated condition (drive arm unlatched), clearance between inner ratchet pawl and ratchet tooth should be between 0.005 and 0.015 inch.

(d) Tighten mounting screws.

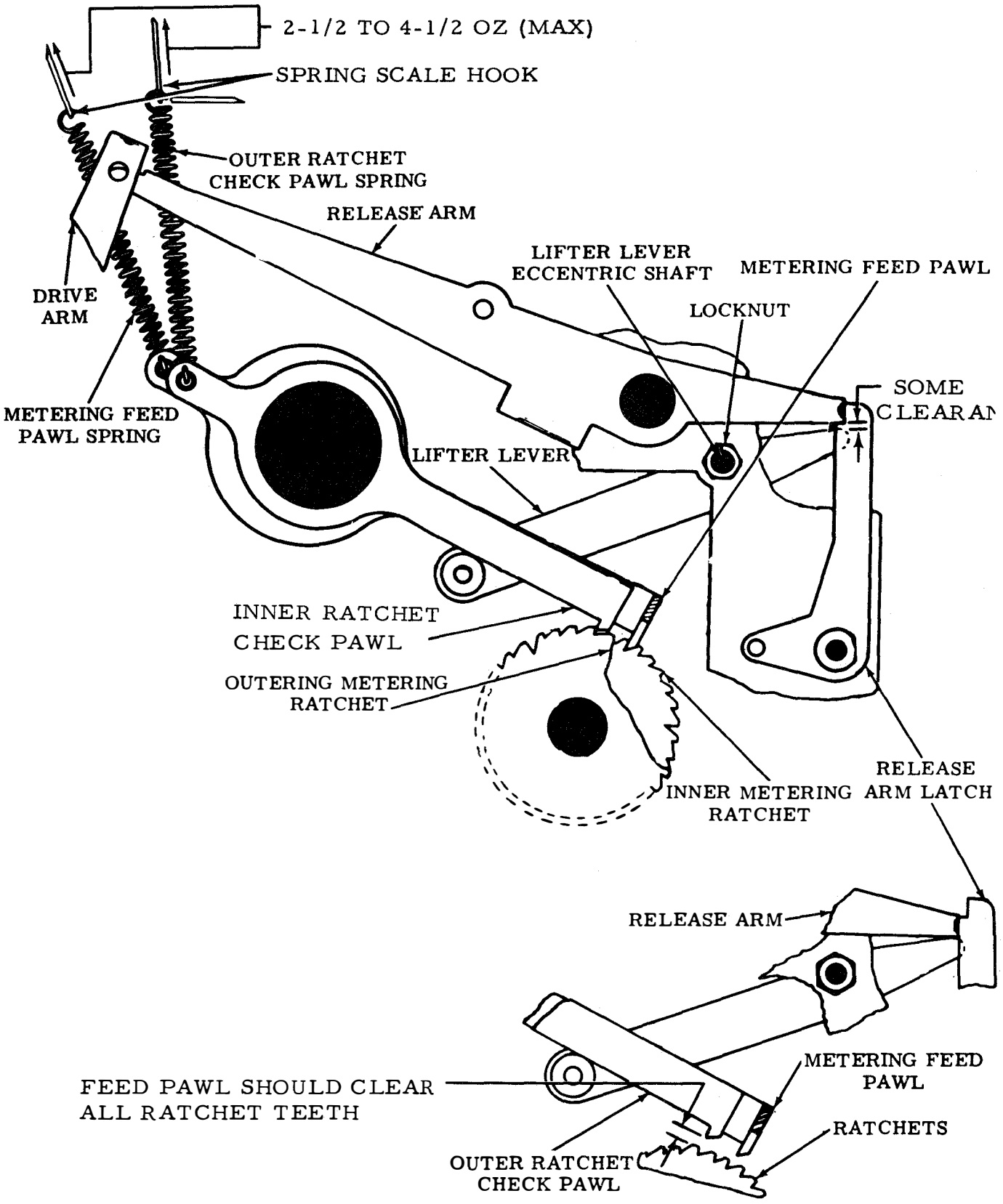


Figure 6-278. Lifter Lever, Metering Feed Pawl Spring and Outer Ratchet Check Pawl Spring

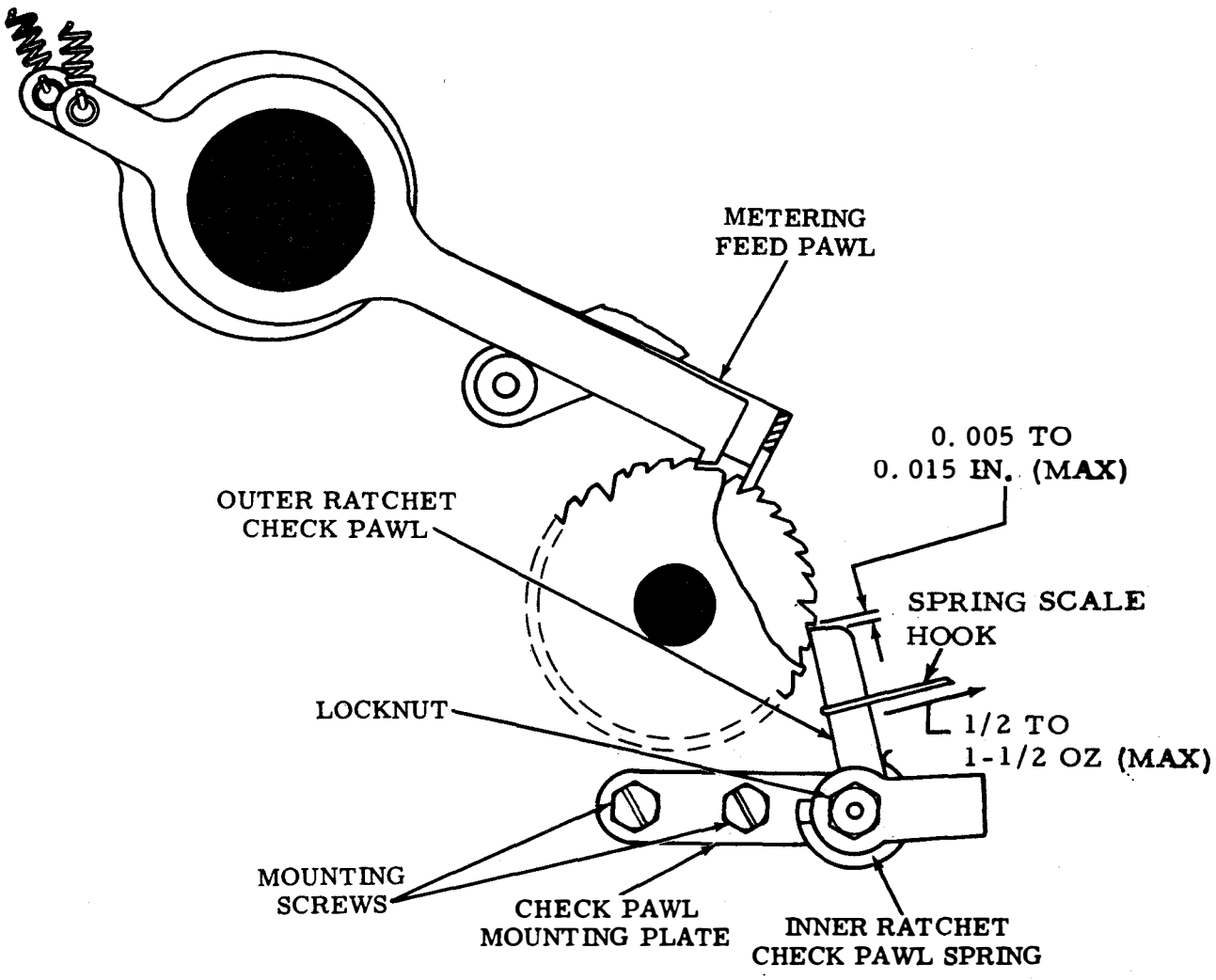


Figure 6-279. Inner Ratchet Check Pawl and Check Pawl Spring

(16) Inner Ratchet Check Pawl Spring. Adjust as follows:

(a) Refer to figure 6-279.

(b) Loosen locknut.

(c) Position spring with locknut loosened. Rotating spring clockwise increases tension. Rotating spring counterclockwise decreases tension.

(d) Using spring scale, check spring tension. between 1/2 and 1-1/2 ounces should be required to pull check pawl away from ratchet.

(e) Tighten locknut.

(17) Noninterfering Clamp Arm. Adjust as follows:

NOTE

Loosen the stripper bail clamp and take up the play between the stripper bail and the shaft in a clockwise direction before making the following adjustment. Tighten the stripper bail clamp screw.

(a) Refer to figure 6-280.

(b) Loosen mounting screw.

(c) With mounting screw loosened, take up play in noninterfering arm in clockwise direction.

(d) Tighten mounting screw.

(e) Position reset bail on high part of its cam. Between 0.002 and 0.015 inch clearance should exist between release arm and release arm latch.

(f) Some clearance, but not over 0.006 inch, end play should be present between clamp arm and bushing.

(g) To adjust end play, loosen clamp screw and position clamp arm. Tighten clamp screw.

(18) Outer Ratchet Return Spring. Adjust as follows:

(a) Refer to figure 6-280.

(b) Check spring tension using a spring scale. With drive arm latched by release arm, between 2 and 3 ounces tension should be required to pull spring to installed length.

(19) Kick-Out Arm. Adjust as follows:

(a) Refer to figure 6-281.

(b) Loosen clamp screw.

(c) With clamp screw loosened position kick-out arm and tighten clamp screw.

(d) With the selector reset bail on high part of cam and magnet deenergized, some clearance should exist between kick-out roller and armature locklever.

(e) With magnet energized, locklever roller should disengage from armature bail as bail approaches high part of cam.

(20) Latch Arm Spring. Adjust as follows:

(a) Refer to figure 6-281.

(b) Using a spring scale, check spring tension. Between 1-1/2 and 2-1/2 ounces should be required to pull spring to installed length.

(21) Armature Locklever Spring. Adjust as follows:

(a) Refer to figure 6-281.

(b) Using a spring scale, check spring tension. Between 1 and 2-1/2 ounces should be required to pull spring to installed length.

(22) Tape Length Adjusting Plate. Adjust as follows:

NOTE

Amount of tape feed out can be set for any length up to 17 inches.

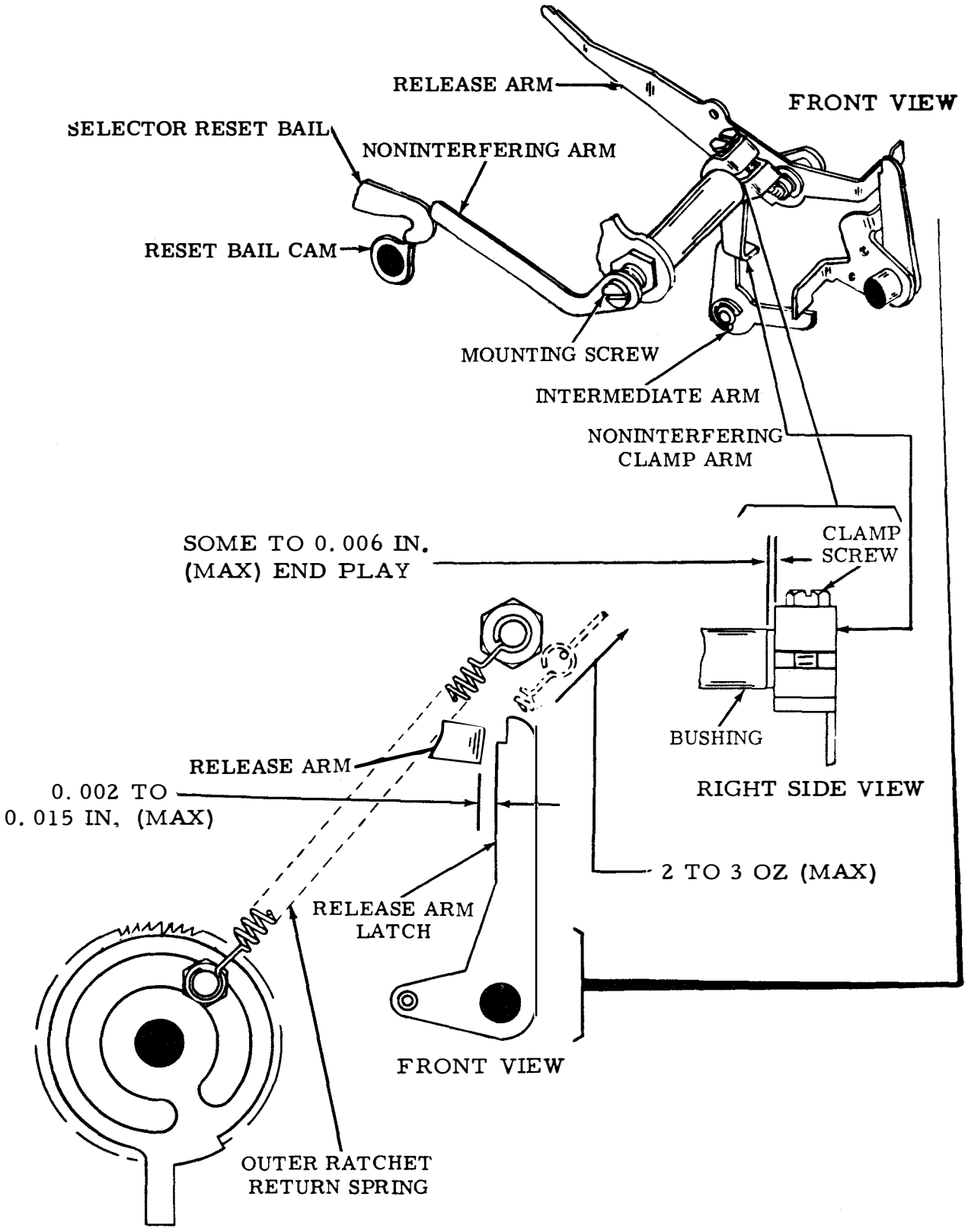


Figure 6-280. Noninterfering Clamp Arm and Outer Ratchet Return Spring

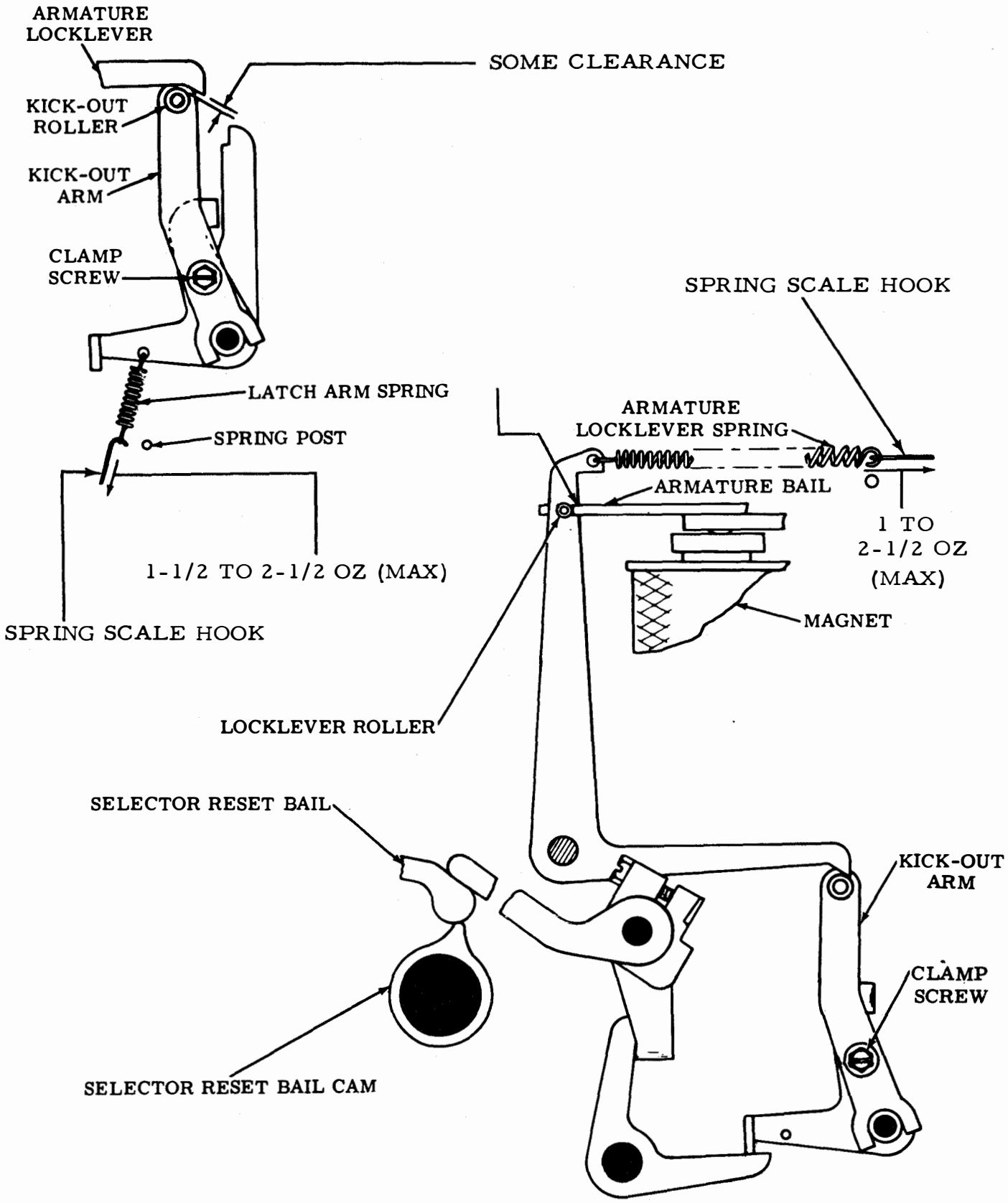


Figure 6-281. Kick-Out Arm, Latch Arm Spring, and Armature Locklever Spring

(a) Refer to figure 6-282.

(b) Loosen spring post.

(c) With spring post loosened, adjust tape length adjusting plate for desired length of tape. Tighten spring post.

(d) When unit is not operating under power and feed-out mechanism is in latched position, manually position mechanism to STOP.

(e) Manually holding feed pawl against the ratchet, rotate main shaft until release arm latch releases release arm and feed pawl is in its extreme left position.

(f) Some clearance, but not over 0.080 inch, should exist between release arm and release arm latch.

(23) Drive Arm Spring. Adjust as follows:

(a) Refer to figure 6-283.

(b) Check tension with spring scale. With drive arm on low part of eccentric collar, between 3 and 5 ounces should be required to start arm moving.

(24) Release Arm Spring. Adjust as follows:

(a) Refer to figure 6-283.

(b) With drive arm latched by release arm, between 12 and 15 ounces should be required to pull spring to installed length.

(25) Contact Springs. Adjust as follows:

(a) Refer to figure 6-284.

(b) Loosen two mounting screws.

(c) With mounting screws loosened, position springs.

(d) With all springs parallel to rear edge of mounting brackets, adjust so that a minimum of 75 percent of the contact button engages the contact actuating lever.

(e) Tighten two mounting screws.

(f) Left contact spring should be approximately parallel to face of mounting bracket. Bend left contact spring as necessary to meet this requirement.

(g) With contact lever away from center contact spring, between 0.010 and 0.018 inch gap should exist at right side of contact; secondly, 20 to 40 grams to just open left side of contact. Bend contact spring as required.

(26) Contact Lever. Adjust as follows:

(a) Refer to figure 6-285.

(b) Loosen clamp screw (refer to figure 6-284).

(c) With clamp screw loosened, position contact lever.

(d) To check operation of contact lever:

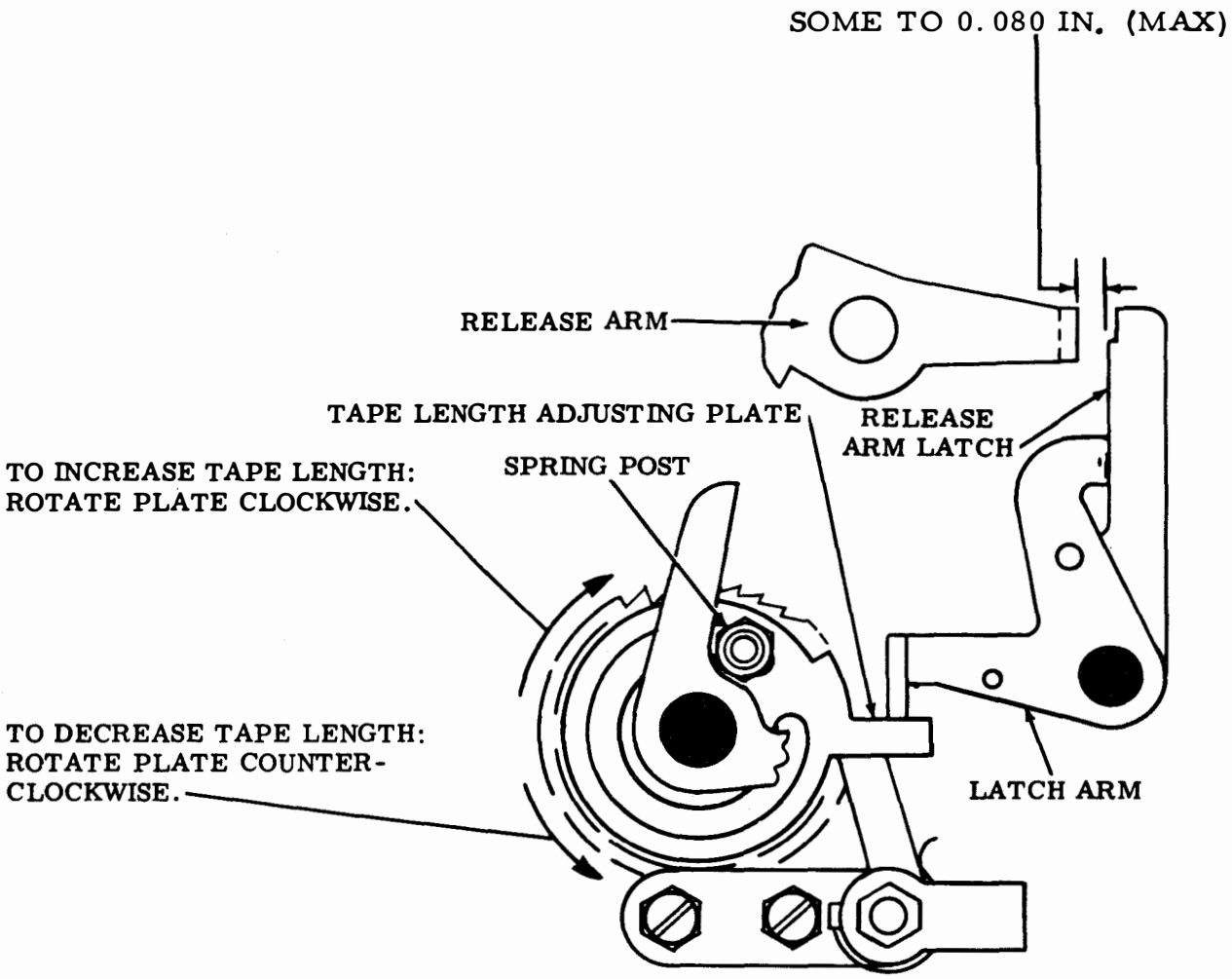


Figure 6-282. Tape Length Adjusting Plate

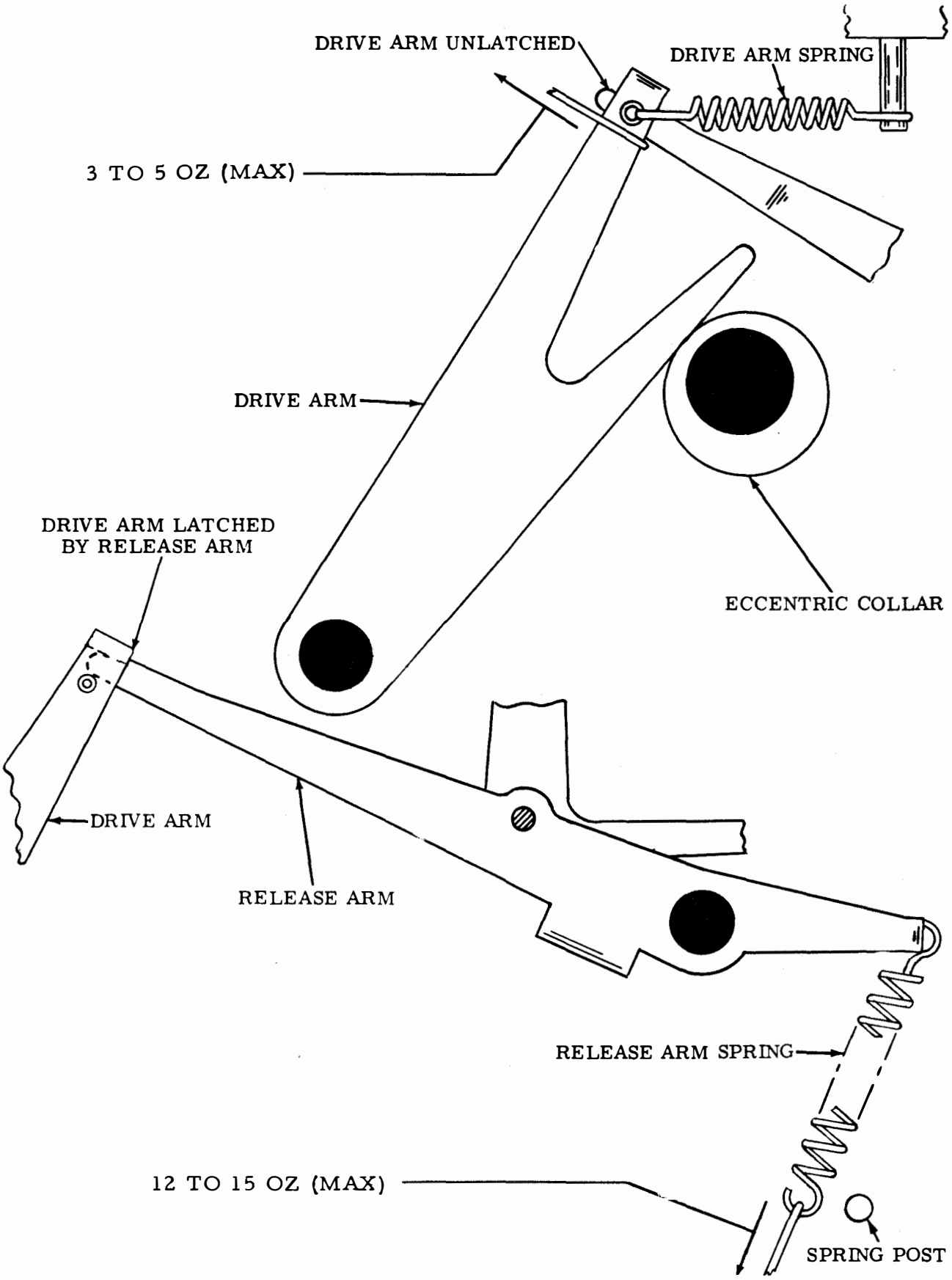


Figure 6-283. Drive Arm and Release Arm Springs

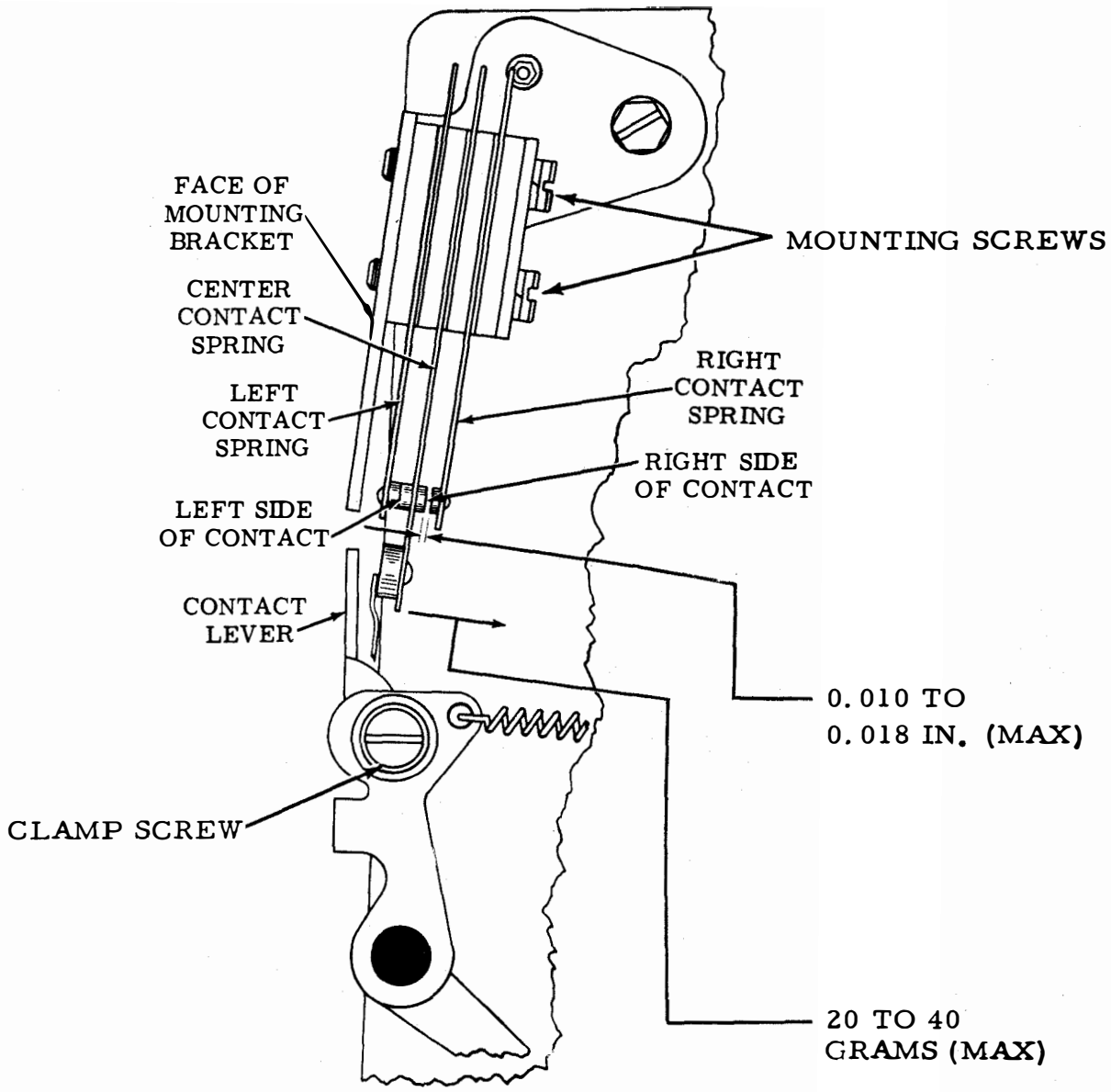


Figure 6-284. Contact Springs - Rear View

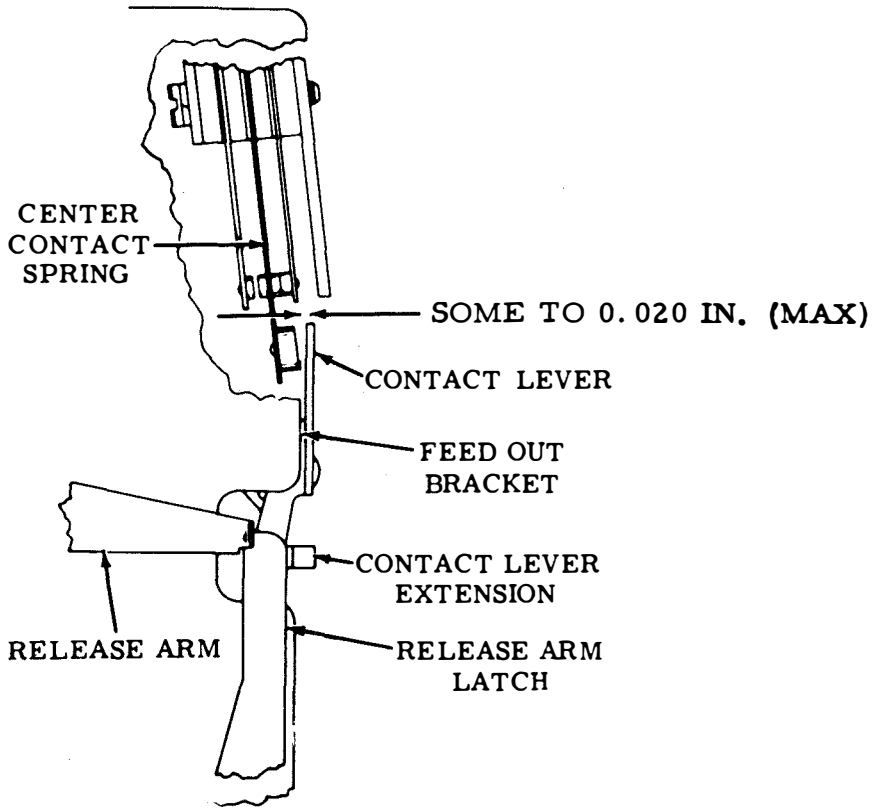


Figure 6-285. Contact Lever

1. Fully latch release arm on release arm latch.

2. Hold lever contact spring away from contact spring.

3. Allow contact lever to rest against latch.

4. Measure clearance between bracket and contact lever at top of lever.

(e) When contact lever is correctly adjusted, some clearance, but not over 0.020 inch should exist between feed out bracket and contact lever at top of lever.

(f) Tighten clamp screw.

(27) Contact Mounting Bracket. Adjust as follows:

(a) Refer to figure 6-286.

(b) Loosen mounting screw and nut.

(c) With clamp screw friction tight, adjust the mounting bracket.

(d) With release arm unlatched, between

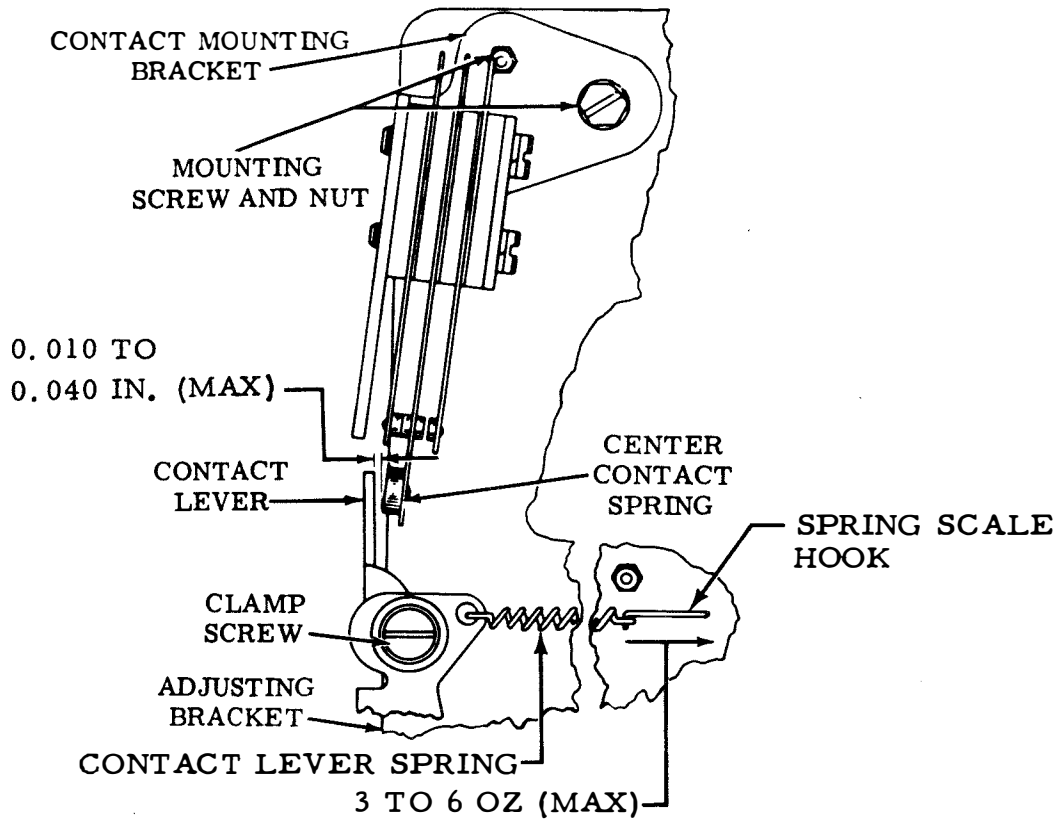


Figure 6-286. Contact Mounting Bracket, Contact Lever Spring and Contact Pulse Closure

0.010 and 0.040 inch clearance should exist between contact lever and center contact spring.

(e) Tighten mounting nut and screw.

(f) By means of test lamp, check continuity of contact with contact lever in each position.

(28) Contact Lever Spring. Adjust contact lever spring as follows:

(a) Refer to figure 6-286.

(b) Using a spring scale, check tension. Between 3 and 6 ounces should be required to pull spring to installed length.

(29) Contact Pulse Closure. Adjust as follows:

(a) Refer to figure 6-286.

NOTE

Ensure that preceding adjustments and checks have been made prior to making this adjustment.

(b) External circuitry may require a pulse at

end of feed out operation. To obtain this condition:

1. Remove clamp screw and adjusting bracket.

2. Hook contact lever spring in tapped hole.

3. Contacts will be open or closed, depending on the choice of contact, except for short period at end of feed-out operation.

(30) Feed-Out Switch. Adjust as follows:

(a) Refer to figure 6-287.

(b) Loosen mounting screws and position switch as required.

(c) To check switch operation:

1. Place 0.045 inch feeler gauge between mounting frame and switch lever.

2. Determine if switch operates. This can be done by means of a continuity test lamp or by listening for a barely audible click.

3. Repeat procedure with 0.020-inch feeler gauge inserted between frame and lever.

4. Switch should not operate when 0.045 inch feeler gauge is inserted, but should operate when 0.020-inch feeler gauge is in same position.

(d) Tighten mounting screws when switch has been positioned.

(31) Switch Lever Spring. Check as follows:

(a) Refer to figure 6-287.

(b) Check tensions using spring scale. Between 3 and 6 ounces should be required to pull spring to installed length.

(32) Switch Lever Adjusting Bracket. Adjust as follows:

(a) Refer to figure 6-288.

(b) Loosen clamp screw.

(c) With clutches disengaged and feed-out mechanism in unoperated condition (drive arm latched by release arm), some clearance but not over 0.010 inch, should exist between switch lever and switch actuator.

(d) Tighten clamp screw when bracket has been positioned.

(33) Feed-Out Switch (With Pulse Closure). Adjust as follows:

(a) Refer to figure 6-289.

NOTE

Ensure that preceding adjustment has been made before making this adjustment.

(b) External circuitry may require a pulse at end of feed out operation. To obtain this condition:

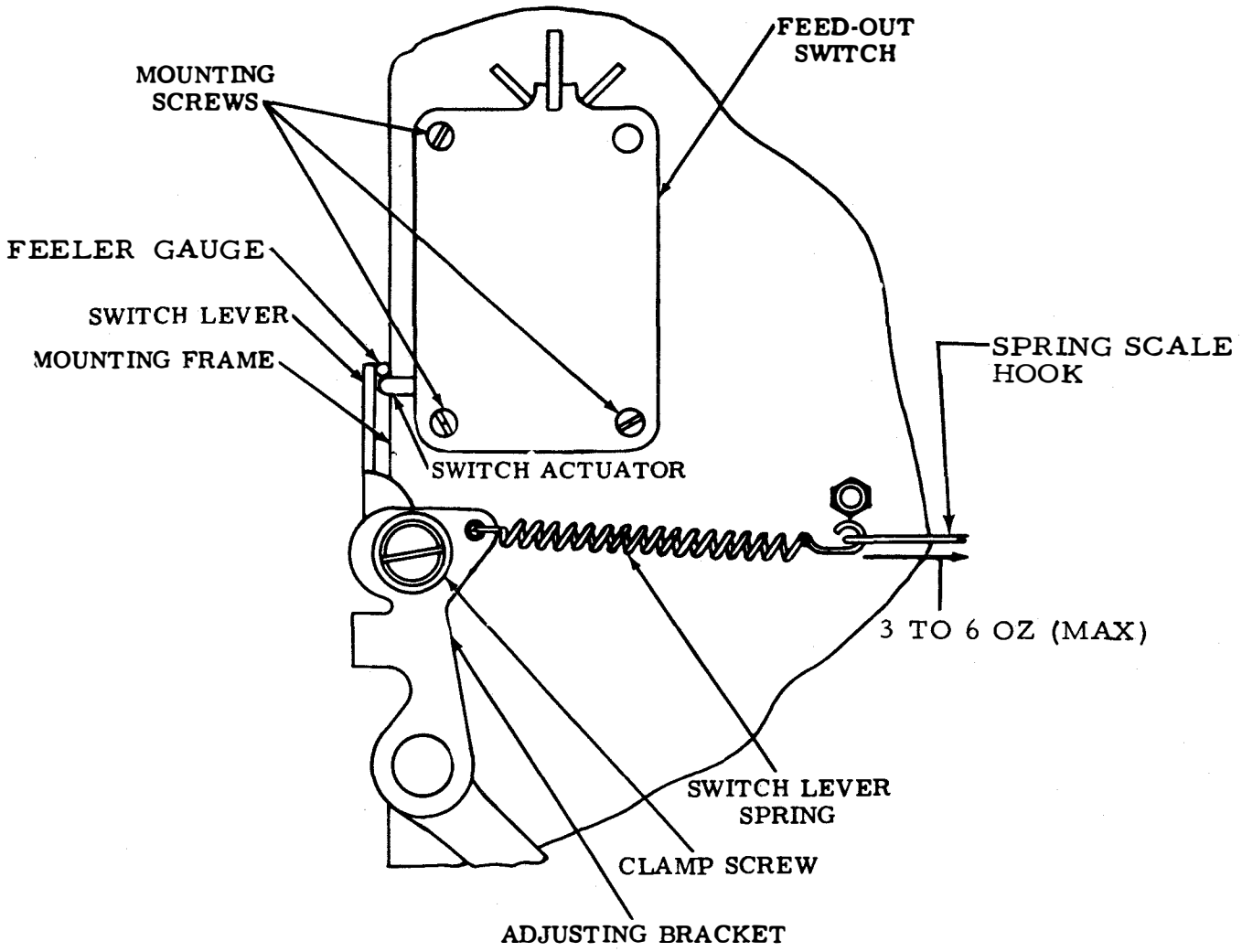


Figure 6-287. Feed-Out Switch and Switch Lever Spring

1. Remove clamp screw and adjusting bracket.

2. Hook spring in tapped hole in switch lever.

3. Switch will be closed except for short period at end of feed-out operation.

4. For reverse condition (switch open except for short period at end of operation), remove blue and white lead and solder to spare terminal.

(c) Tighten mounting screws when switch has been positioned.

(d) To check switch operation:

1. Place 0.040 inch feeler gauge between mounting frame and switch lever.

2. Determine if switch operates. This can be done by means of continuity test lamp or by listening for a barely audible click.

3. Switch should not operate when 0.040 inch feeler gauge is inserted

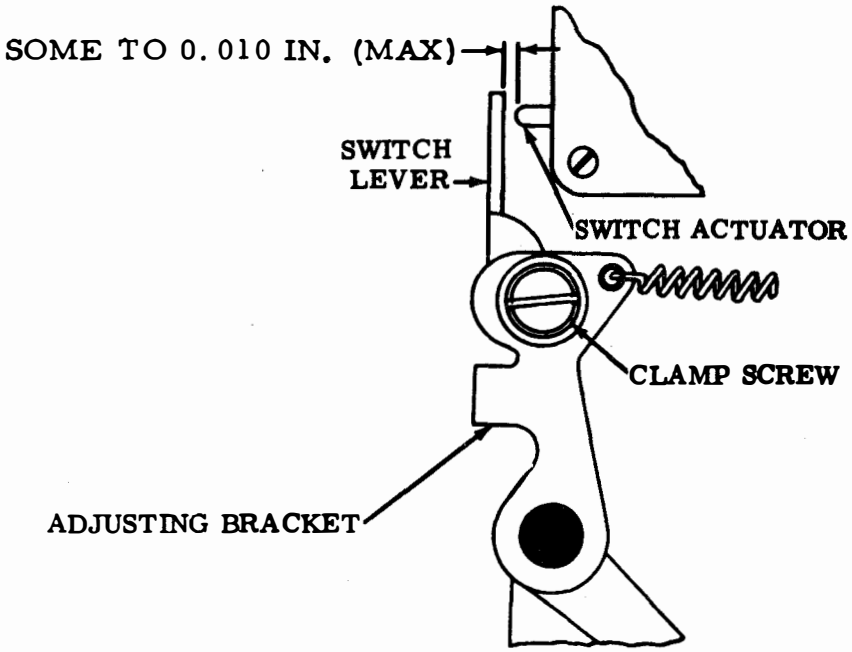


Figure 6-288. Switch Lever Adjusting Bracket

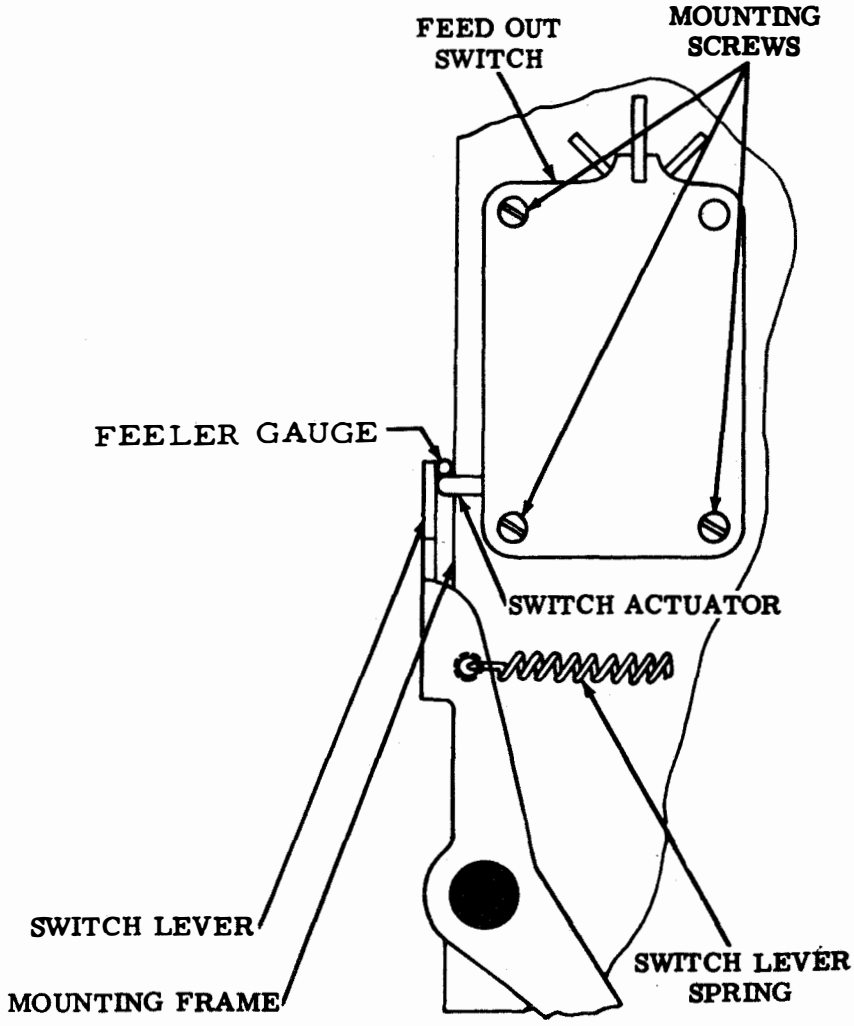


Figure 6-289. Feed-Out Switch (with Pulse Closure)

but should operate when 0.020 inch feeler gauge is in same position.

d. Ribbon-Feed Mechanism for Chadless and Fully Perforated Tape. Perform ribbon feed assembly adjustments in accordance with the following paragraphs.

(1) Ribbon-Feed Pawl Spring. Adjust as follows:

(a) Refer to figure 6-290.

(b) Using a spring scale, check tension. With rocker bail set to extreme left, between 10 and 14 ounces should be required to pull spring to installed length.

(2) Ribbon-Feed Eccentric Stud. Adjust as follows:

(a) For units eqipped with eccentric stud:

1. Refer to figure 6-290.

2. Loosen eccentric stud locknut.

3. Position eccentric stud so that with rocker bail to extreme left, there should be between 0.012 and 0.028 inch clearance between retaining pawl and ratchet on side with least clearance.

4. Tighten locknut when adjustment has been made.

(b) For units equipped with adjustable arm:

1. Refer to figures 6-290 and 6-291.

2. Loosen mounting screws, leaving screws friction tight.

3. Using a pry point position adjustable arm so that with rocker bail to extreme left there should be from 0.012 to 0.028 inch clearance between retaining pawl and ratchet tooth on side with least clearance.

4. Tighten mounting screws when adjustment has been made.

NOTE

In units using the old style rocker bail, position the eccentric in its neutral position and make the adjustment with the adjustable drive arm.

(3) Ribbon-Feed Drive Arm Spring. Adjust as follows:

(a) Refer to figure 6-292.

(b) Using spring scale, check tension with unit in STOP position. Between 3 and 5 ounces should be required to pull spring to installed length.

(4) Ribbon-Feed Pawl Downstop Eccentric. Adjust as follows:

(a) Refer to figure 6-292.

(b) Loosen downstop eccentric locknut.

(c) Position downstop eccentric so that between 0.020 and 0.040 inch

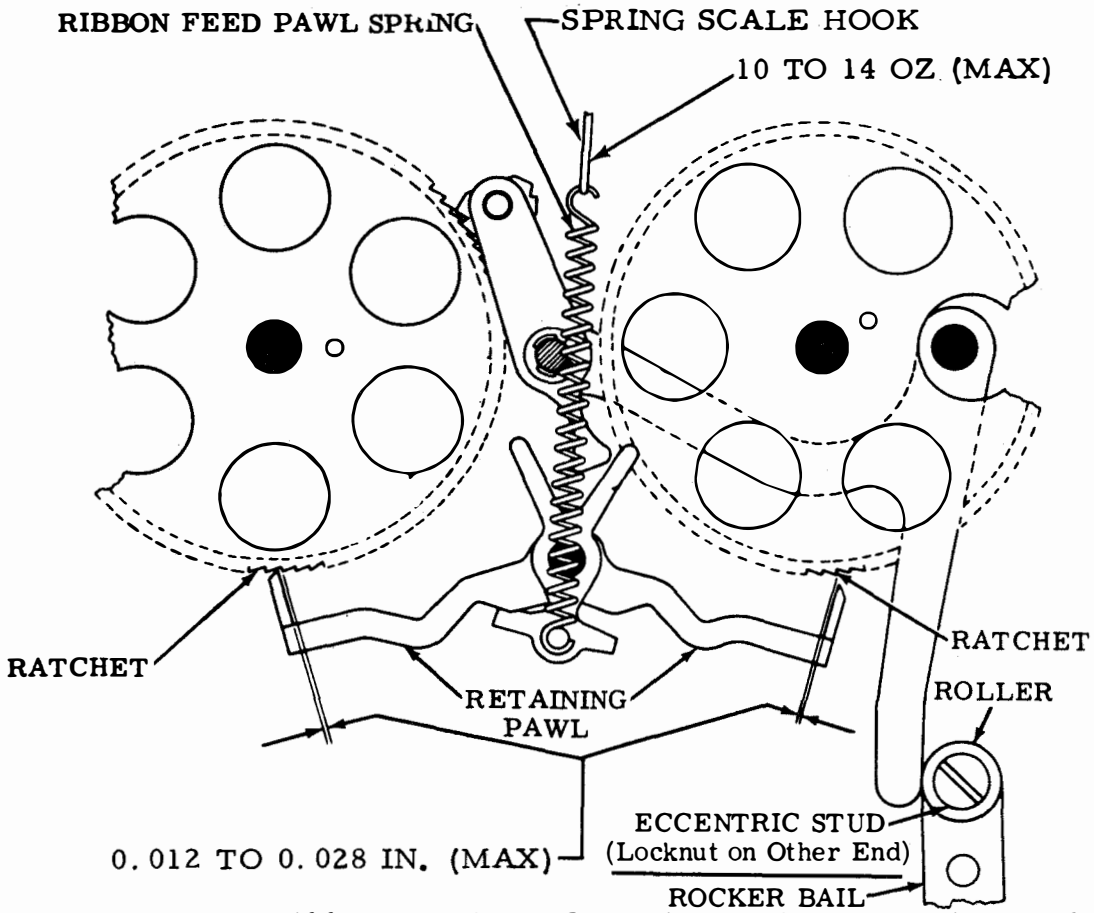


Figure 6-290. Ribbon-Feed Pawl Spring and Eccentric Stud

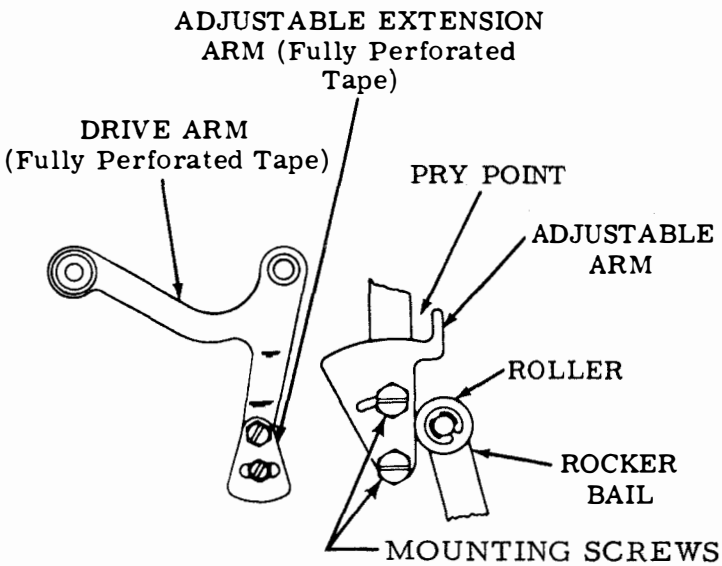


Figure 6-291. Ribbon-Feed Eccentric Stud (For Units with Adjustable Arm)

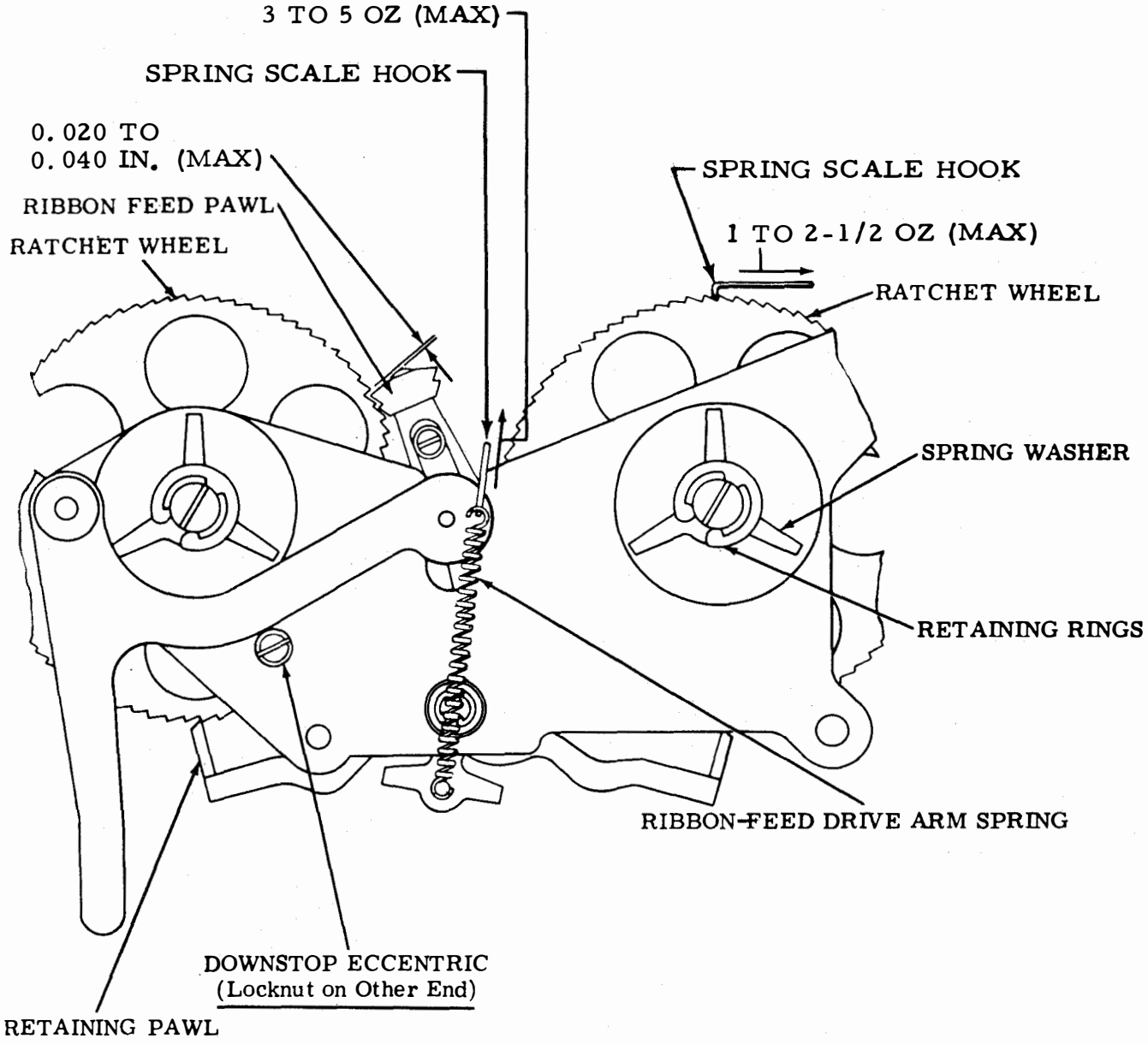


Figure 6-292. Ribbon-Feed Drive Arm Spring and Pawl Downstop Eccentric and Ribbon Ratchet Wheel Spring Washer - Rear View

clearance exists on side with least clearance.

(d) Tighten locknut when adjustment has been made.

(e) To check operation of feed pawl:

1. Disengage function clutch.

2. Take up backlash in ratchet wheel so that clearance between feed pawl and ratchet tooth is at minimum.

3. Measure clearance. This should be within limits previously described.

4. Repeat for other ratchet wheel.

5. Pawl should feed one tooth at a time.

(5) Ribbon Ratchet Wheel Spring Washers. Adjust as follows:

(a) Refer to figure 6-292.

(b) With feed pawl and retaining pawl shifted to opposite ratchet wheel, measure tension using spring scale.

(c) Between 1 and 2-1/2 ounces should be required to start wheel turning.

(d) If tension is not within limits, remove retaining ring and bend spring washer.

(e) Replace retaining ring and recheck tension.

(f) Repeat procedure for both ratchet wheels.

(6) Ribbon Reversing Plate. Adjust as follows:

(a) Refer to figure 6-293.

(b) Loosen clamp screw.

(c) Position rocker bail to extreme left.

(d) Hold reversing arm under reversing plate and measure clearance. Between 0.010 and 0.020 inch clearance should exist at reversing arm with least clearance.

(e) Position reversing plate with clamp loosened.

(f) Tighten clamp screw and recheck clearance on both reversing arms.

(7) Ribbon-Feed Reversing Arm Spring. Adjust as follows:

(a) Refer to figure 6-293.

(b) Using spring scale, measure tension. Between 10 and 30 grams should be required to start reversing arm moving.

e. Signal Bell Contact Mechanism. Perform adjustment of the signal bell contact mechanism as follows:

(1) Contact Mounting Bracket. Adjust as follows:

(a) Refer to figure 6-294 and 6-295.

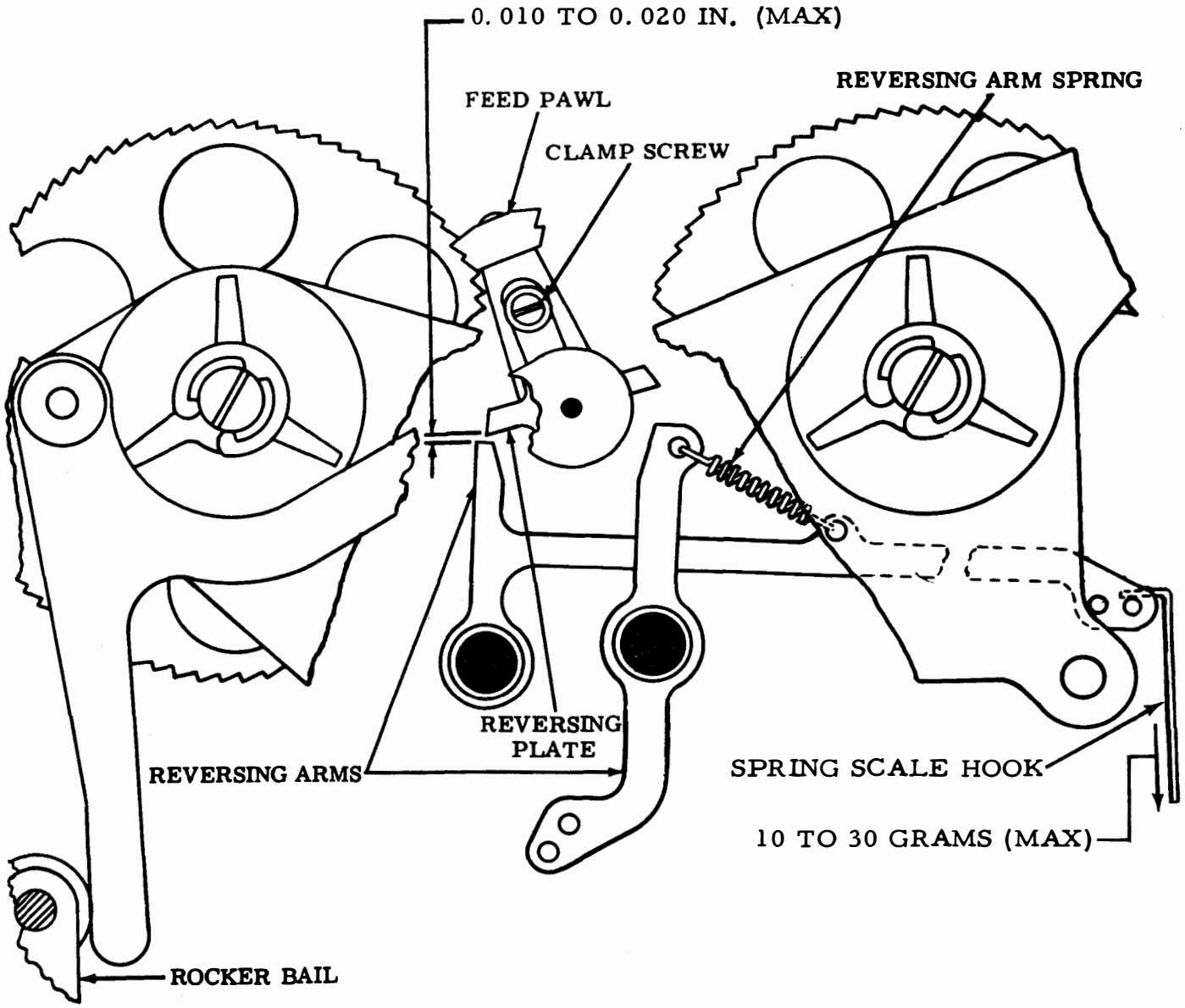


Figure 6-293. Ribbon Reversing Plate and Ribbon-Feed Reversing Arm Spring

(b) Disconnect contact.

(c) Select LETTERS code combination (12345).

(d) Rotate main shaft bell function blade until bell function blade is in lowest position (resting on bellcranks).

(e) Normally-open contact should be open.

(2) Function Blade Spring. Adjust as follows:

(a) Refer to figure 6-295.

(b) Loosen mounting screws.

(c) Select BELL code combination and rotate main shaft until bell function blade is in lowest position.

(d) Position bell function blade in slots of bellcranks so that normally-open contacts are closed.

(e) Tighten mounting screws.

(f) Measure tension with spring scale. Between 7 and 10 ounces should be required to start function blade moving.

CAUTION

There should be some clearance between ribbon feed drive roller and contact mounting bracket when unit is in stop position. If necessary, refine above adjustment.

(3) Unshift-on-Space Blade and Function Blade Spring. Adjust as follows:

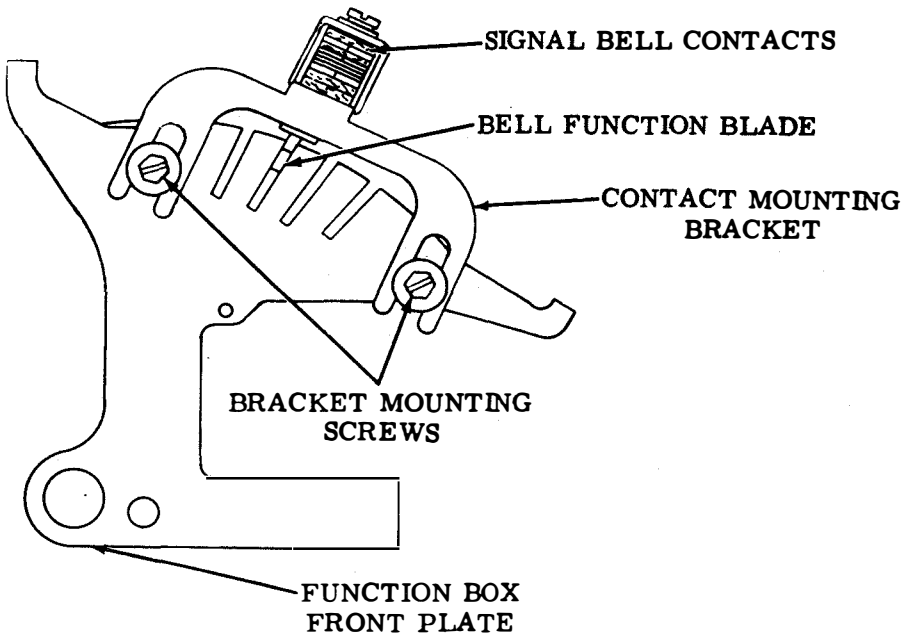


Figure 6-294. Contact Mounting Bracket

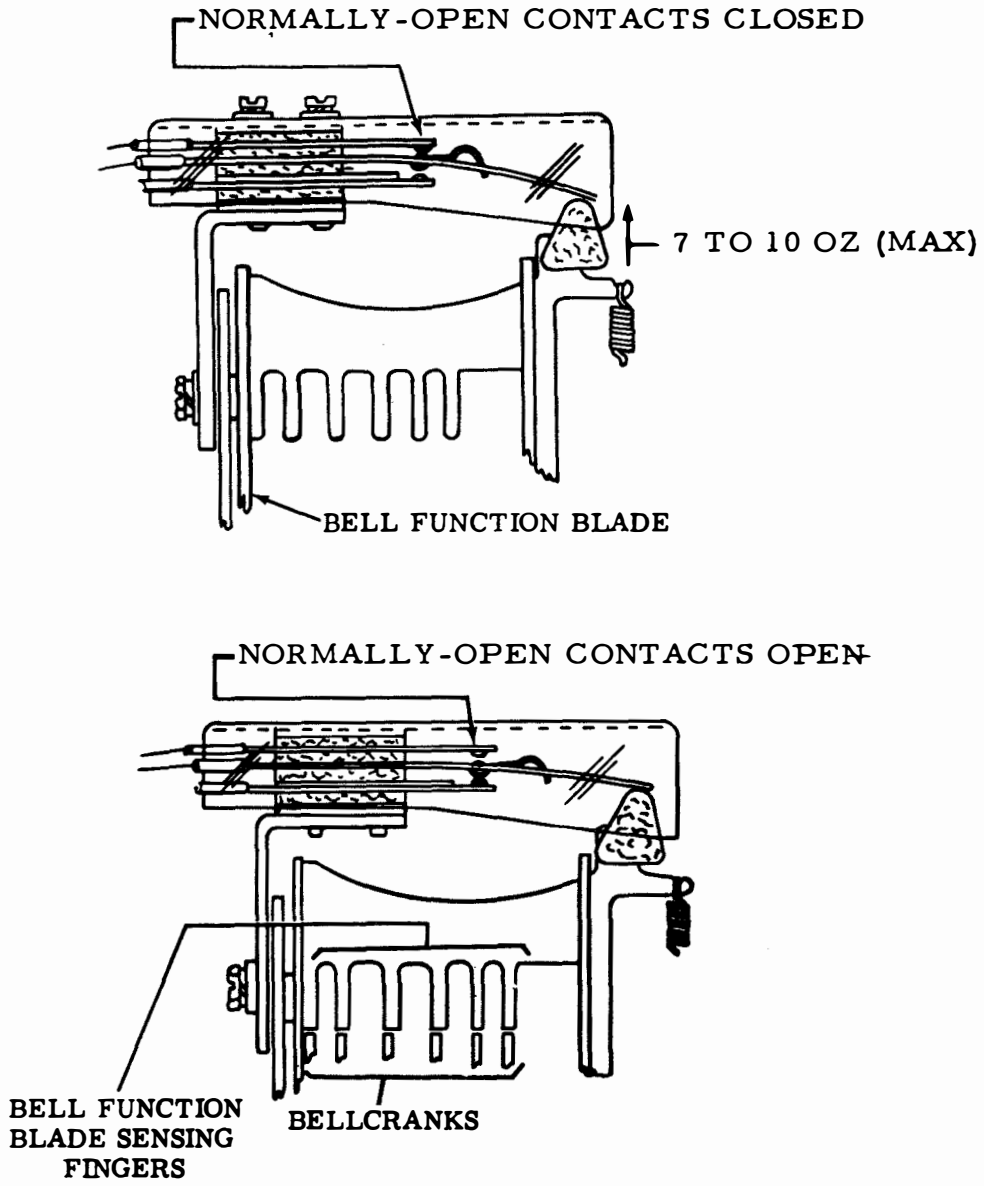


Figure 6-295. Function Blade Spring - Right Side View

(a) Refer to paragraphs 6-6.1v(1) and (2), figures 6-251 and 6-252.

f. Vacuum Chad Removal. Perform vacuum chad removal adjustments according to the following paragraphs.

(1) Requirements. Requirements for chad removal include:

(a) Directs punched chads to convenient disposal outside set.

(b) Synchronous motor with open tines of fan wheel facing away from motor provides power for chad disposal.

(c) A nylon bag or nylon chute attached to exhaust end of fan wheel assembly furnished as alternate means of chad disposal outside of cabinet.

(2) Vacuum Chad Removal Equipment. Adjust as follows:

(a) Refer to figure 6-296.

(b) Loosen mounting hardware and tighten friction tight.

(c) Position chad chute assembly, tubing, and fan wheel casing assembly so there is no interference with adjacent units.

(d) Tighten mounting hardware.

6-7.3 TYPING REPERFORATOR AND TAPE MODEL 28 ADJUSTMENTS (LOW-LEVEL). There are no further low-level adjustments to be performed.

6-7.4 MODEL 28 TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARD ADJUSTMENTS (HIGH-LEVEL). Perform the following procedures to ensure proper adjustments of KTR Keyboard (early design, high-level).

a. Character Counter Mechanism. Perform character counter mechanism adjustments in accordance with the following paragraphs.

(1) Cord Assembly. Adjust as follows:

(a) Refer to figure 6-297.

(b) Rotate pulley until indicator points to 75 on the scale.

(c) To adjust, view the end of pulley and adjust as shown.

(2) Character Counter End-Of-Line Switch. Adjust as follows:

(a) Refer to figure 6-298.

(b) Loosen switch mounting screws.

(c) Set counter to the desired count.

(d) Loosen cam clamp screws and position cam so that switch closes at the preset number of characters with a small amount of overtravel by both contact springs.

(e) Position bracket so that between 0.012 and 0.025 inches of clearance exists between long contact spring and low part of cam.

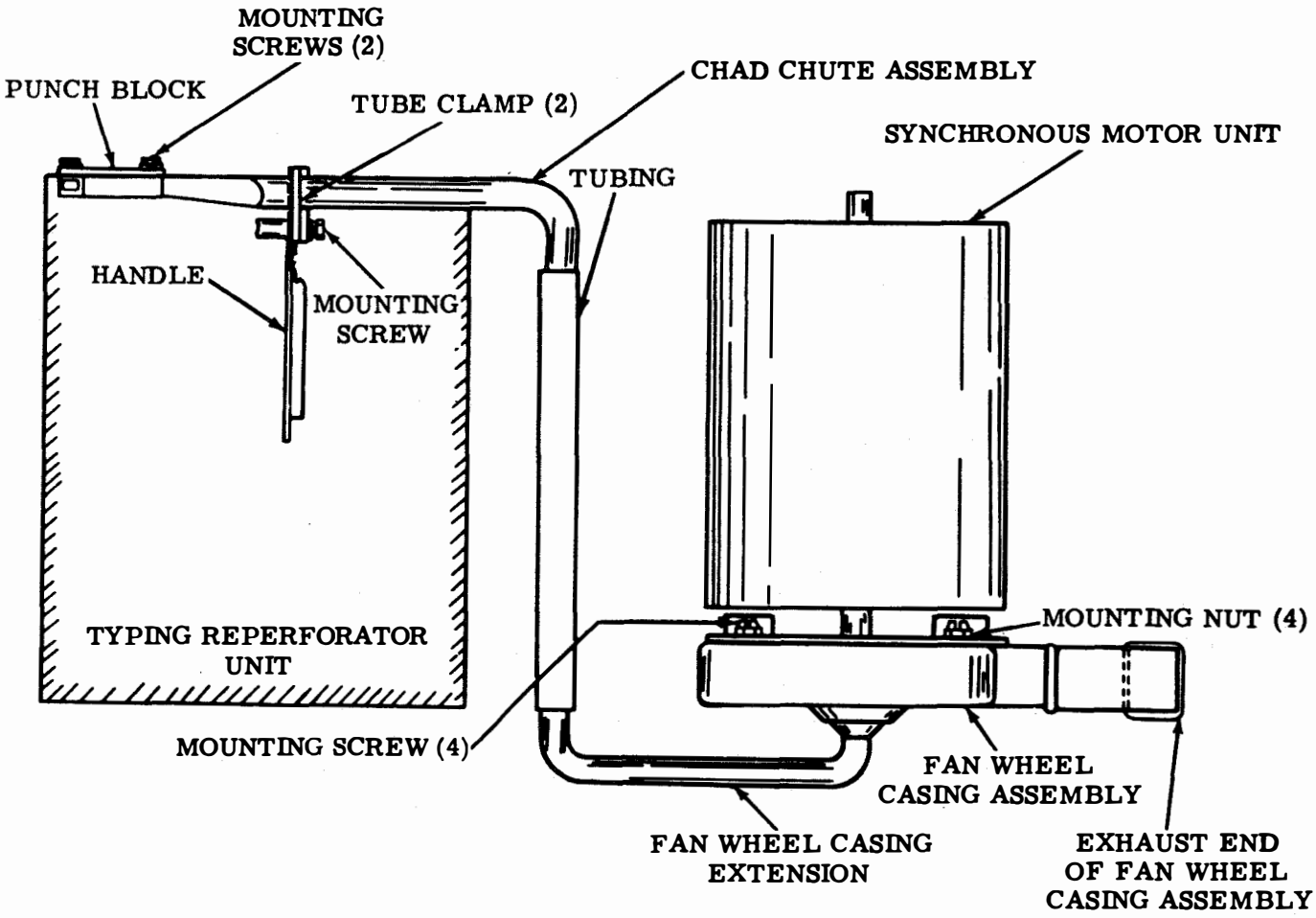


Figure 6-296. Vacuum Chad Disposal Equipment - Top View

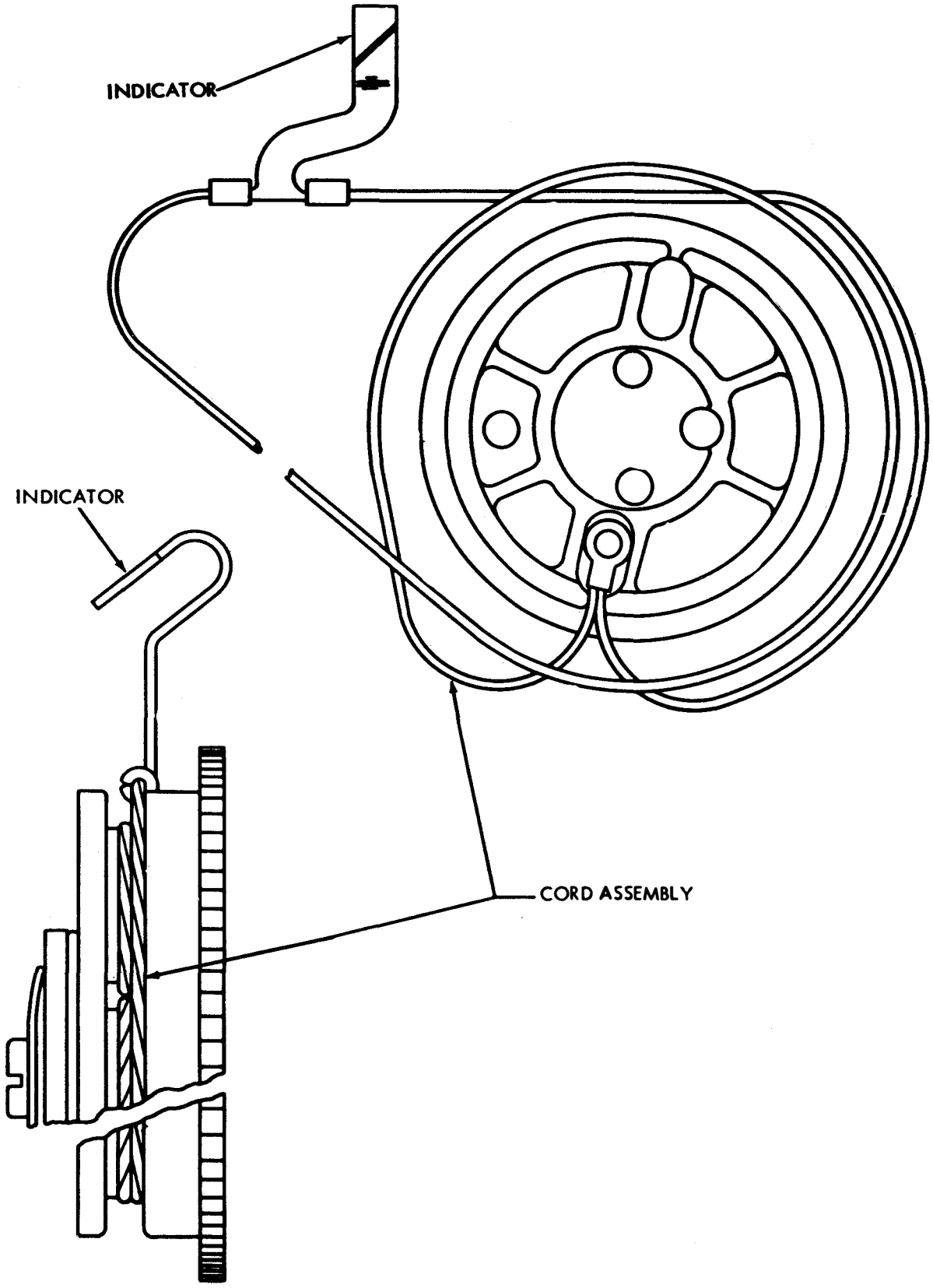


Figure 6-297. Cord Assembly

(f) Tighten cam clamp screws and bracket mounting screws.

(3) Ratchet Drum Assembly Return Spring. Adjust as follows:

(a) Refer to figure 6-298.

(b) Move indicator to 0 position and measure tension. Between 1-1/2 and 2-1/2 ounces should be required to start eyelet moving.

(c) Move indicator to 70 position and measure tension. Between 3-1/2 to 6-1/2 ounces should be required to start eyelet moving.

(4) Character Counter Scale Bracket. Adjust as follows:

(a) Refer to figure 6-299.

(b) Adjust character counter bracket to uppermost position.

(c) Loosen lock screws.

(d) Position bracket so that cord remains in a straight line.

(e) Tighten lock screws.

(5) Character Counter Idler Pulley. Adjust as follows:

NOTE

Hold pawls away and rotate drum to make certain that it does not bind at its bearing.

(a) Refer to figure 6-300.

(b) Loosen adjusting stud mounting screw and position pulley.

(c) With indicator in returned zero position and scale applied perpendicular to lower cord at a point under number 30 on the indicator scale, between 1 and 2 ounces of tension should be required to pull the lower cord approximately parallel to the scale bracket.

(d) Tighten adjusting stud mounting screw.

(6) Stop Lever. Adjust as follows:

(a) Refer to figure 6-300.

(b) Hold the feed lever out of engagement with ratchet.

(c) Rotate stop lever eccentric so that with the counter ratchet fully returned and resting against its stop lever, the clearance between the latchlever and face of ratchet fourth tooth is between 0.002 and 0.010 inch.

(d) The anti-bounce latch should not interfere with rotation of the ratchet.

(7) Antibounce Spring. Adjust as follows:

(a) Refer to figure 6-300.

(b) With anti-bounce latch resting against stop lever, measure tension using a spring scale.

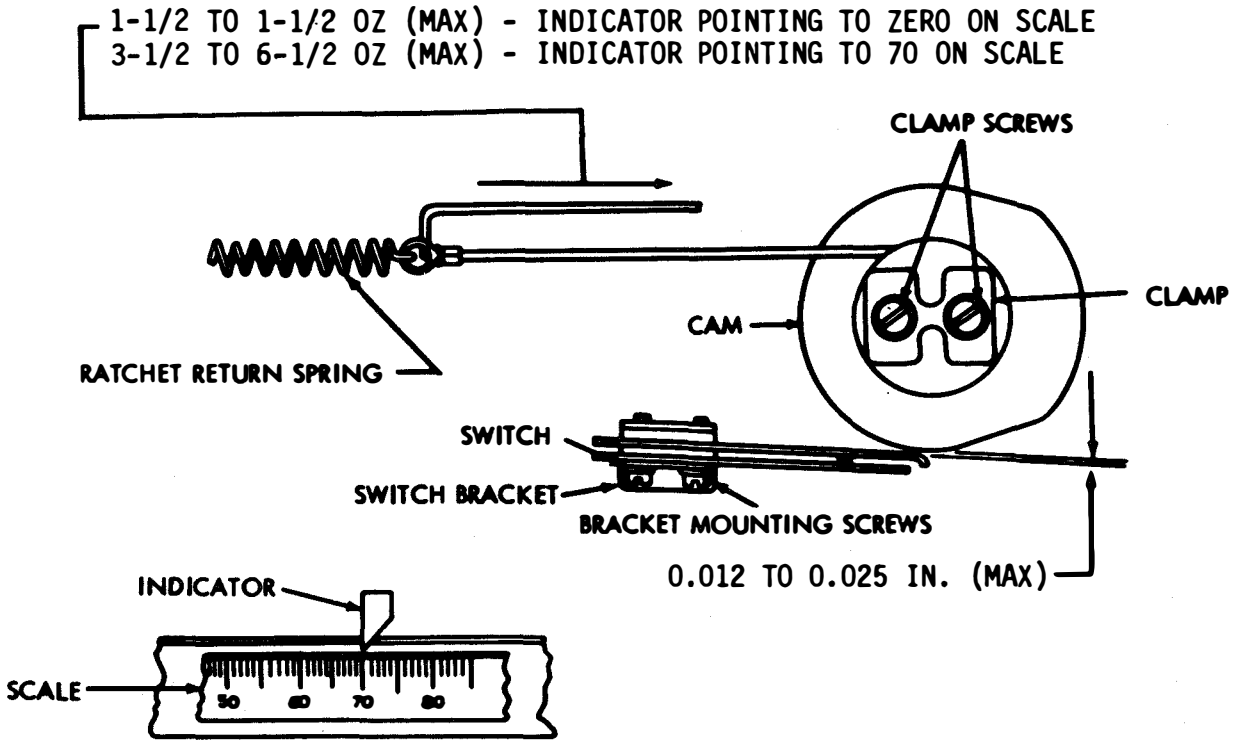


Figure 6-298. Character Counter End-of-Line Switch and Ratchet Drum Assembly Return Spring

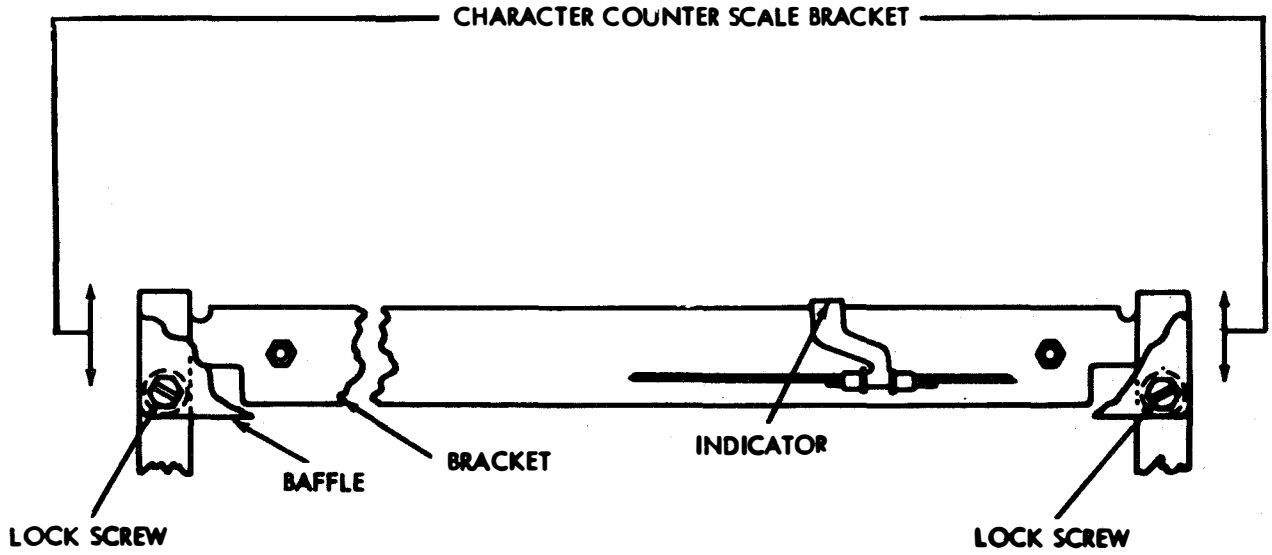


Figure 6-299. Character Counter Scale Bracket

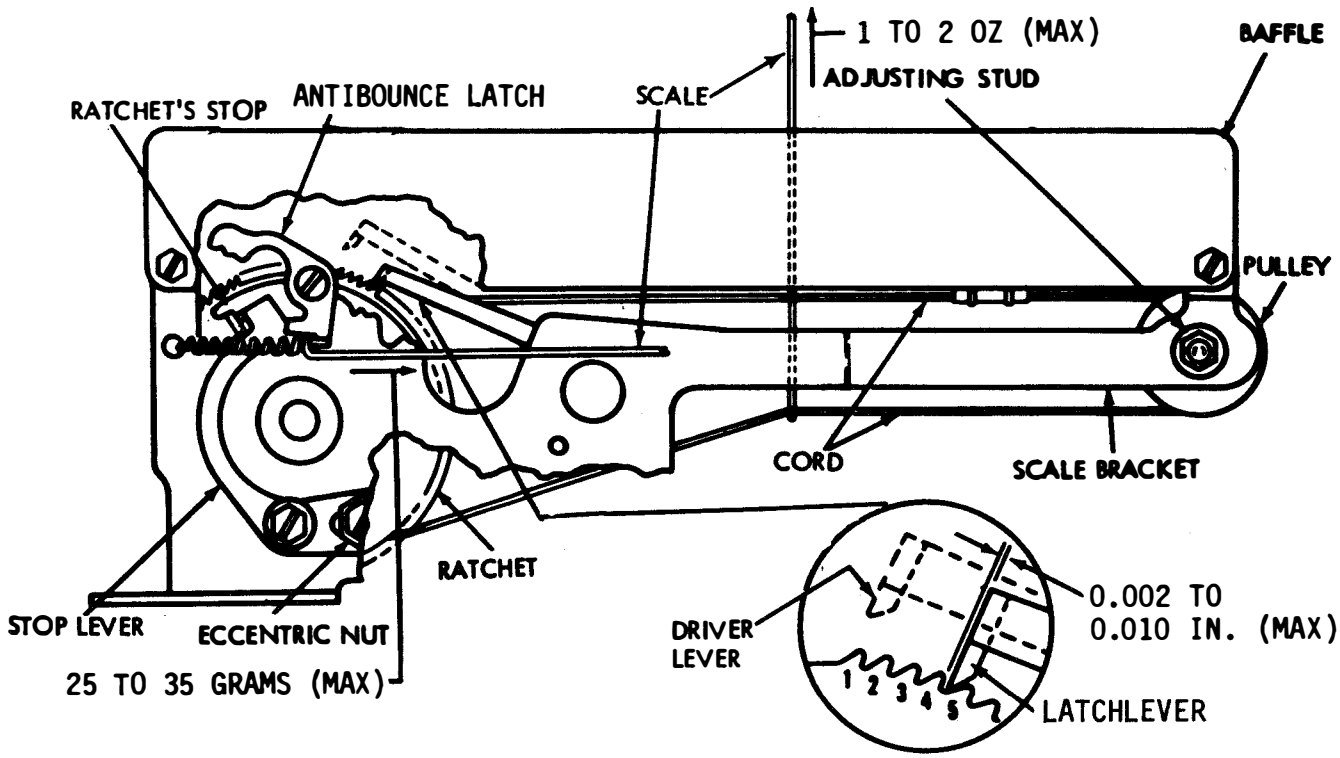


Figure 6-300. Character Counter Idler Pulley, Stop Lever and Antibounce Spring - Rear View

(c) Between 25 and 35 grams should be required to move latch to end of its operating travel.

(8) Character Counter Scale. Adjust as follows:

(a) Refer to figure 6-301.

(b) Set indicator to left.

(c) Loosen lock screws.

(d) Position counter scale so that when indicator is set to left end of scale it should point to zero.

(e) Tighten lock screws.

b. Repeat-On-Space Mechanisms. Perform adjustment of the repeat-on-space mechanism in accordance with the following paragraphs.

(1) Travel Screw. Adjust as follows:

NOTE

Spacebar touch to obtain a repeat is affected by this adjustment. To get a lighter touch, adjust the upper limit. To obtain a heavier touch, adjust the lower limit.

(a) Refer to figure 6-302.

(b) Loosen position travel screw locknut.

(c) Adjust travel screw so that when space key is fully depressed between 0.035 and 0.080 inch clearance exists between reset bail roller and nonrepeat lever.

(d) Tighten locknut.

(2) Stop. Adjust as follows:

(a) Refer to figure 6-302.

(b) Loosen stop locknut.

(c) Depress G keylever to trip the keyboard clutch.

(d) Position the stop so that between 0.002 and 0.020 inch clearance exists between space-repeat and nonrepeat levers.

(e) Tighten stop locknut.

(3) Space Repeat Lever Spring. Adjust as follows:

(a) Refer to figure 6-302.

(b) Remove right-hand end of the TP7613 spring.

(c) Using an 8-ounce spring scale measure tension.

(d) Between 4 and 5-1/2 ounces should be required to pull scale to its installed length.

(e) Reconnect spring.

6-7.5 TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARD ADJUSTMENTS (LOW-LEVEL). There are no low-level adjustments to be performed.

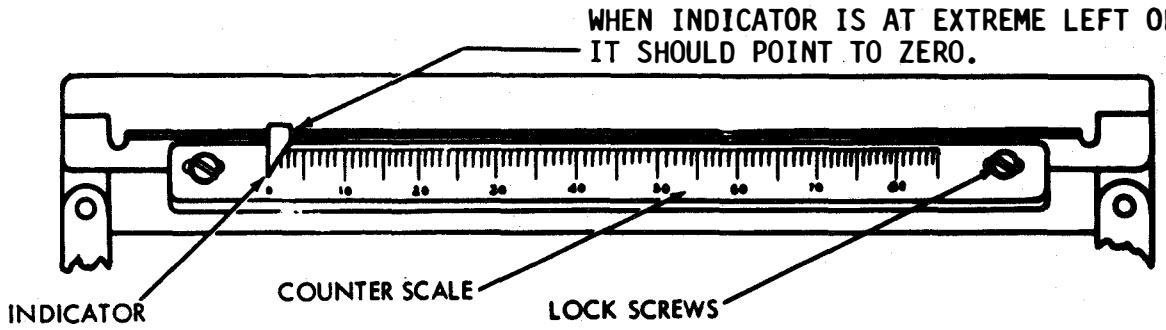


Figure 6-301. Character Counter Scale

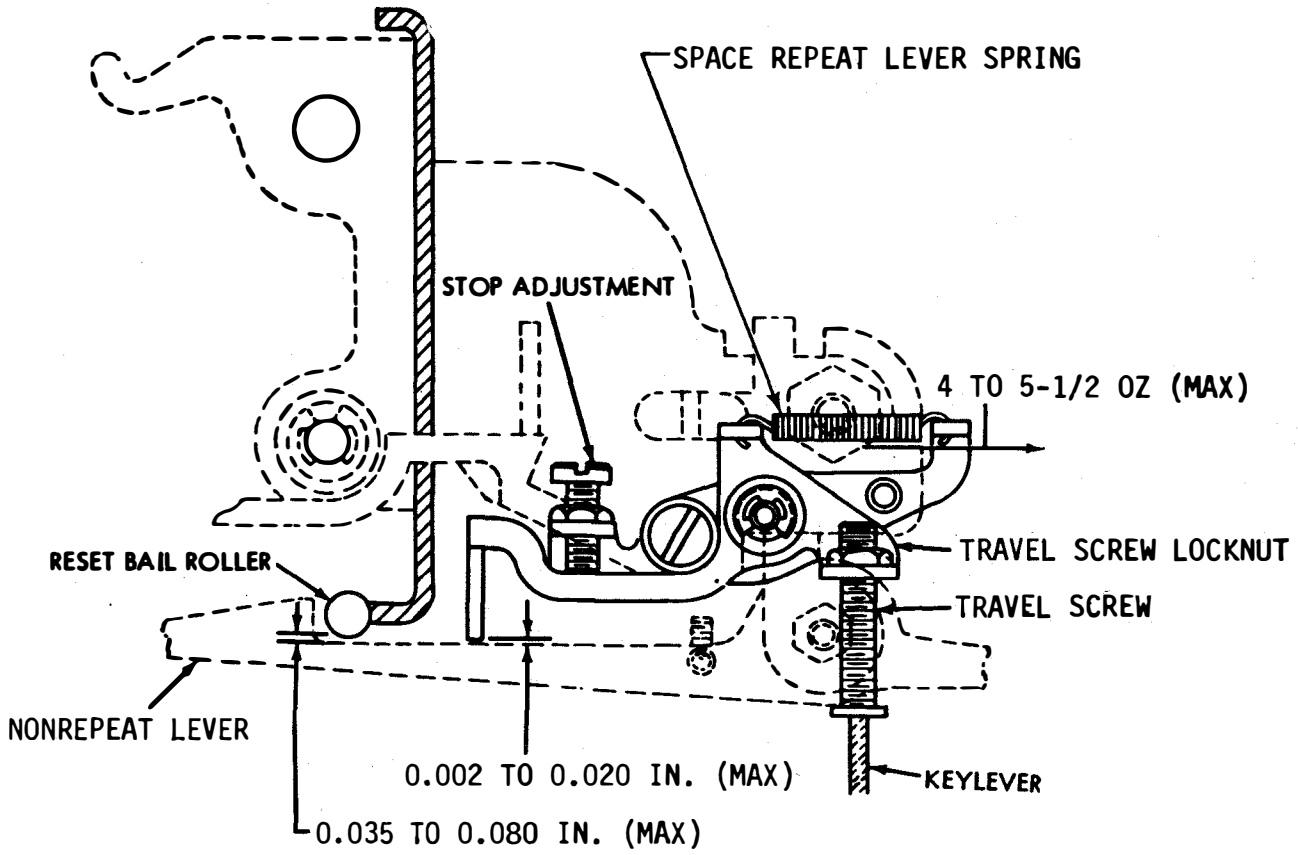


Figure 6-302. Travel Screw, Stop, and Space Repeat Lever Spring

SECTION IV - ADJUSTMENTS - EARLY DESIGN, VARIABLE FEATURES

6-8. TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 ADJUSTMENTS. The following paragraphs contain information necessary for making required adjustment to the typing reperforator and tape printer unit - early design (high-level and low-level).

6-8.1 TYPING REPERFORATOR AND TAPE PRINTER UNIT MODEL 28 ADJUSTMENTS (HIGH-LEVEL). Perform the following procedures to ensure proper adjustmnet to the typing reperforator units.

a. Blank Delete Mechanism. Perform blank delete mechanism adjustments in accorance with the following paragraphs.

(1) Contact Assembly. Adjust as follows:

(a) Refer to figure 6-303.

(b) Loosen mounting screws.

(c) Line up contact assembly so that it lines up centrally with insulator on blank function blade.

(d) Tighten mounting screws.

(2) Contact Gap. Adjust as follows:

(a) Refer to figure 6-303.

(b) Loosen mounting screws.

(c) Select spacing combination (--3--) and rotate main shaft until blank function blade drops into sensing position.

(d) Position contact mounting bracket so clearance between contact springs is between 0.010 and 0.015 inch.

b. Manual and Power Drive Backspace Mechanism For Chadless Tape. Perform these adjustments in accordance with the following paragraphs.

(1) Drive Arm (Preliminary). Adjust as follows:

(a) Refer to figure 6-304.

(b) Loosen drive arm screw and tighten friction tight.

(c) Move adjusting plate so that with drive arm latchlever engaged with eccentric link, main shaft rotated to place eccentric in its extreme right-hand position, and feed wheel detented back one space, some clearance, but not over 0.003 inch shall exist between the backspace feed pawl and the ratchet tooth.

(d) Check with feed wheel shaft oil hole in the uppermost position and recheck each 90 degrees around the periphery of the feed wheel.

(e) Tighten drive arm screw.

(2) Latch Spring. Adjust as follows:

(a) Refer to figure 6-305.

(b) With backspace mechanism in

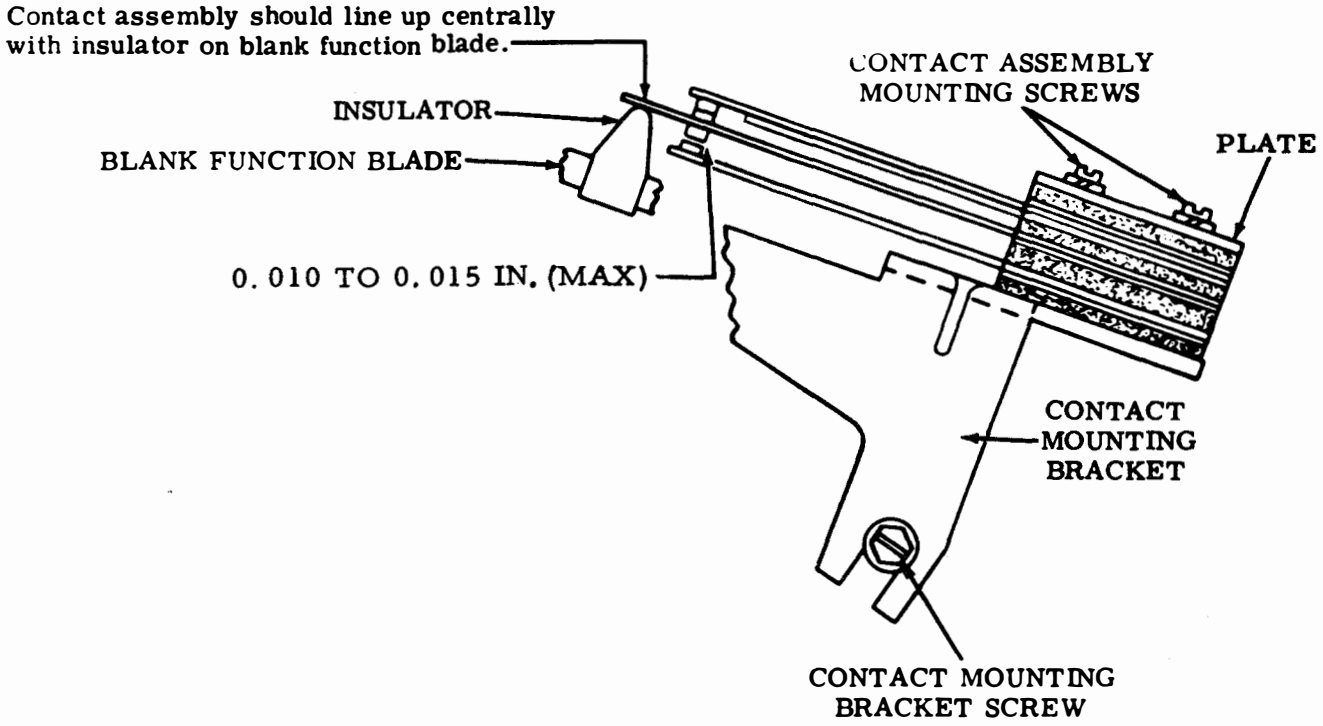


Figure 6-303. Contact Assembly and Contact Gap - Right Side View

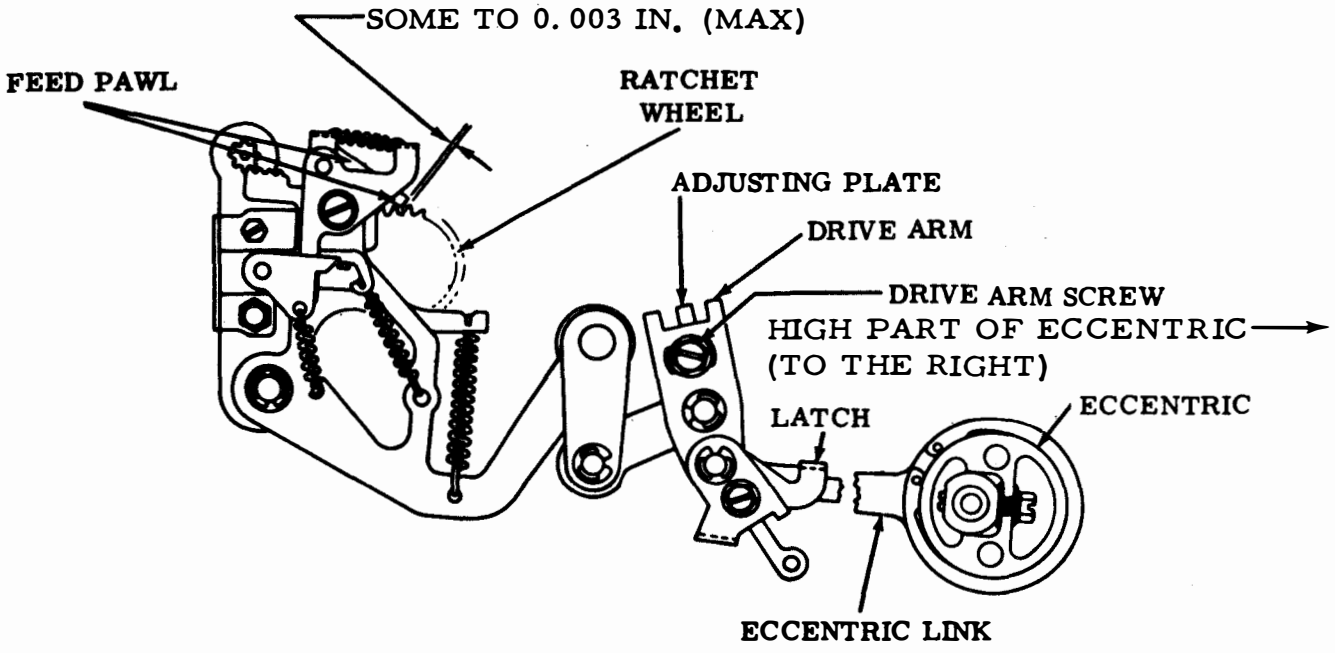


Figure 6-304. Drive Arm (Preliminary)

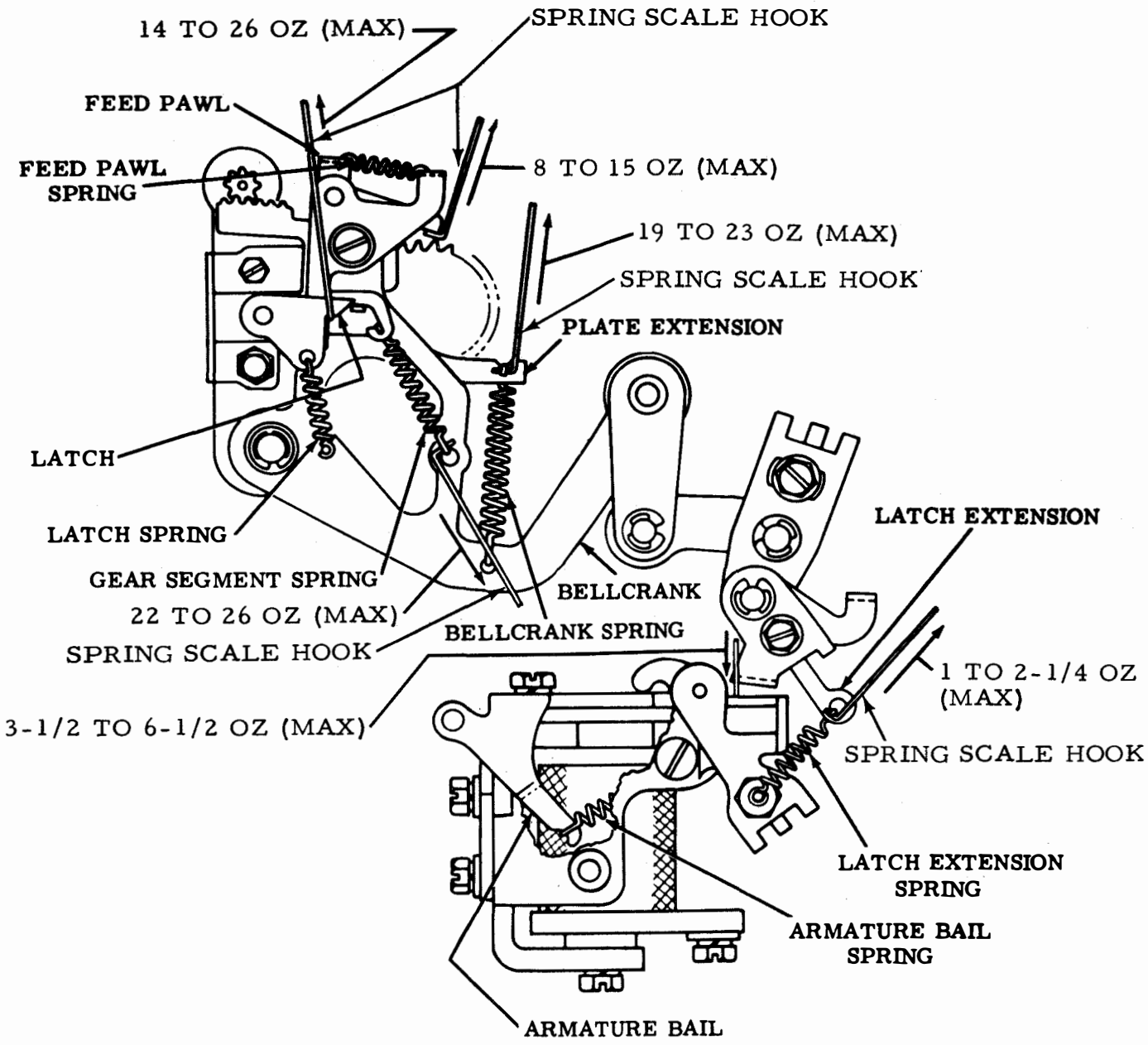


Figure 6-305. Latch, Feed Pawl, Bellcrank, Gear Segment, Armature Bail, and Latch Extension Springs

unoperated position, measure tension with spring scale.

(c) Between 14 and 26 ounces tension should be required to start latch moving.

(3) Feed Pawl Spring. Adjust as follows:

(a) Refer to figure 6-305.

(b) With backspace mechanism in unoperated position, measure tension with spring scale.

(c) Between 8 and 15 ounces tension should be required to start feed pawl moving.

(4) Bellcrank Spring. Adjust as follows:

(a) Refer to figure 6-305.

(b) Unhook spring from plate extension and measure tension with spring scale.

(c) Between 19 and 23 ounces should be required to pull spring to installed length.

(d) Reconnect bellcrank spring.

(5) Gear Segment Spring. Adjust as follows:

(a) Refer to figure 6-305.

(b) Unhook spring from bellcrank spring post and measure tension with spring scale.

(c) Between 22 and 26 ounces should be required to pull spring to its installed length.

(d) Reconnect gear segment spring.

(6) Armature Bail Spring. Adjust as follows:

(a) Refer to figure 6-305.

(b) Unhook spring and measure tension with spring scale.

(c) Between 3-1/2 and 6-1/2 ounces tension should be reuqird to start armature bail moving.

(d) Reconnect armature bail spring.

(7) Latch Extension Spring (Power Driven Only). Adjust as follows:

(a) Refer to figure 6-305.

(b) Unhook spring from latch extension and measure tension with spring scale.

(c) Between 1 and 2-1/4 ounces should be required to pull spring to its installed length.

(d) Reconnect latch extension spring.

c. Power Drive Backspace Mechanism. Perform these adjustments in accordance with the following paragraphs.

(1) Latch. Adjust as follows:

(a) Refer to figure 6-306.

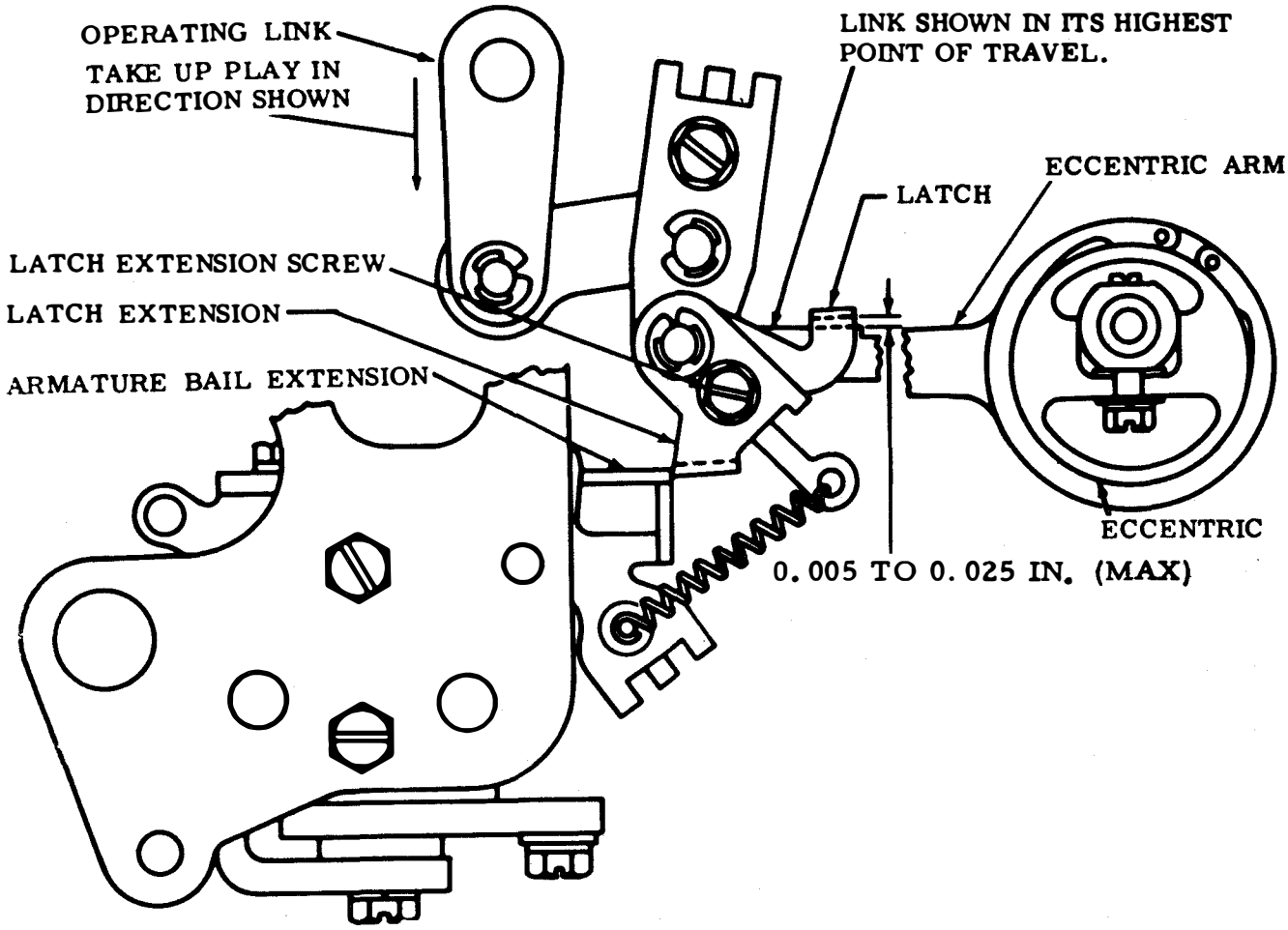


Figure 6-306. Power Drive Backspace Mechanism Latch

(b) Loosen latch extension screw and retighten friction tight.

(c) With backspace extension in unoperated position, place armature off pole face (de-energized) against end of armature.

(d) Eccentric arm should be at its closest point to underside of latchlever.

(e) Position latch so that with play in the links taken up, clearance between latch and eccentric arm is between 0.005 and 0.025 inch.

(f) Tighten latch extension screw.

(2) Nonrepeat Arm. Adjust as follows:

(a) Refer to figure 6-307.

(b) Loosen arm screw and retighten friction tight.

(c) With backspace mechanism in unoperated position, position adjusting arm so that between 0.002 and 0.010 inch clearance exists between top surface of nonrepeat arm and lower point of latch extension.

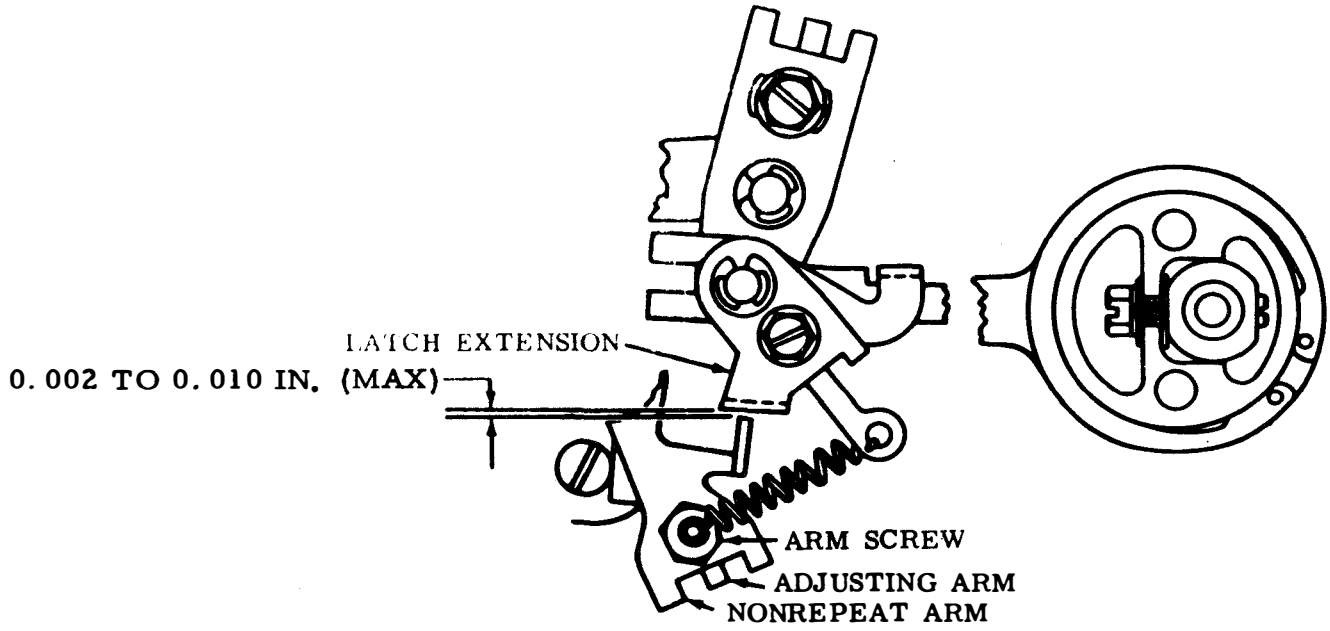


Figure 6-307. Power Driven Backspace Mechanism Nonrepeat Arm

(d) Tighten arm screw.

NOTE

On units equipped with one-piece nonadjustable latch-lever, the requirements of paragraph 6-6.1p(4) must be me

d. Power Drive backspace Mechanism For Fully Perforated Tape. Perform these adjustments in accordance with the following paragraph:

(1) Armature Hinge. Adjust as follows:

NOTE

For dc operation, the armature should be positioned so that the side marked "C" faces pole face of magnet core. For ac operation, unmarked side faces pole face of magnet core.

(a) Refer to figure 6-308.

(b) Loosen hinge mounting screws and tighten friction tight.

(c) Remove armature bail spring.

(d) With armature held against pole face, take up play at hinge in a downward direction.

(e) Position armature hinge so that with armature touching front and rear of pole face some clearance, but not more than 0.004 inch, should exist between the armature and magnet bracket.

(f) Tighten mounting screws and reconnect armature bail spring.

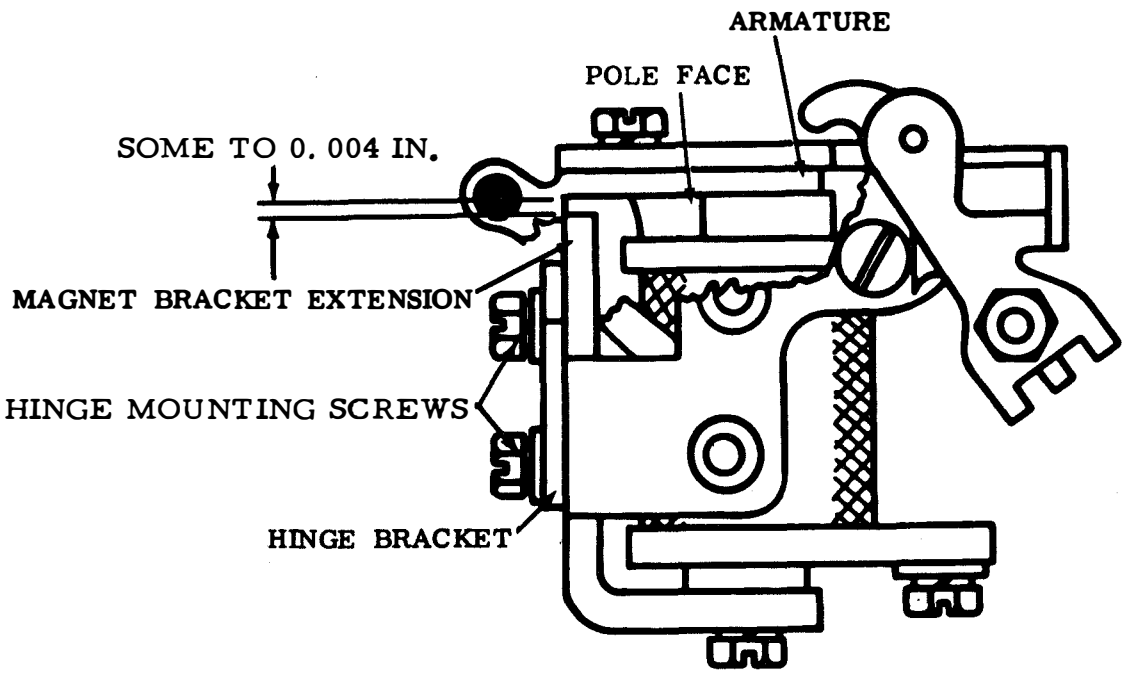


Figure 6-308. Armature Hinge

NOTE

Adjustments (2) and (4), below, should not be disturbed unless a reassembly of the unit is undertaken. If necessary to make these adjustments the punch must be removed. Refer to Disassembly and Assembly instructions in Section V.

(2) Armature Upstop. Adjust as follows:

(a) Refer to figure 6-309.

(b) Loosen eccentric mounting nut.

(c) With armature in unoperated position, rotate eccentric, keeping high part of eccentric to left, until between 0.025 and 0.030 inch clearance exists between armature and pole piece.

(d) Tighten eccentric mounting nut.

(3) Drive Link. Adjust as follows:

(a) Refer to figure 6-310.

(b) Loosen drive arm screw and retighten friction tight.

(c) With high part of eccentric arm in left position, armature should be against pole face to allow drive arm latchlever to reset against eccentric link.

(d) With play taken up to make gap a minimum, position adjusting link so that between 0.040 and 0.045 inch clearance exists between step on eccentric arm and latchlever.

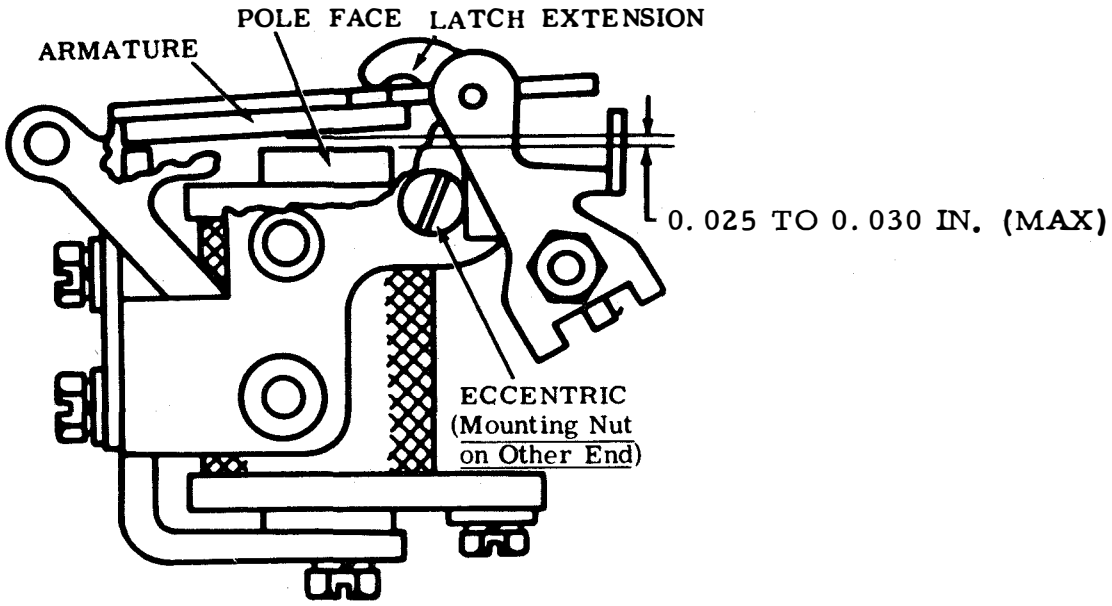


Figure 6-309. Armature Upstop

(e) Tighten screw.

(4) Latch Extension. Adjust as follows:

(a) Refer to figure 6-310.

(b) Loosen magnet mounting screws and tighten friction tight.

(c) With backspace mechanism in unoperated position, swing magnet right or left so that between 0.005 and 0.020 inch exists between top of armature bail extension and latch extension.

(d) Armature should be against pole face with latch resting on the eccentric arm notch.

(e) Tighten screws.

(5) Feed Pawl Spring. Adjust as follows:

(a) Refer to figure 6-311.

(b) Check tension with spring scale.

(c) With backspace mechanism in unoperated position, between 4 and 6 ounces should be required to start pawl moving.

(6) Bellcrank Spring. Adjust as follows:

(a) Refer to figure 6-311.

(b) Measure tension with spring scale. Between 9 and 12 ounces should be required to pull spring to installed length.

(7) Armature Latch Spring. Adjust as follows:

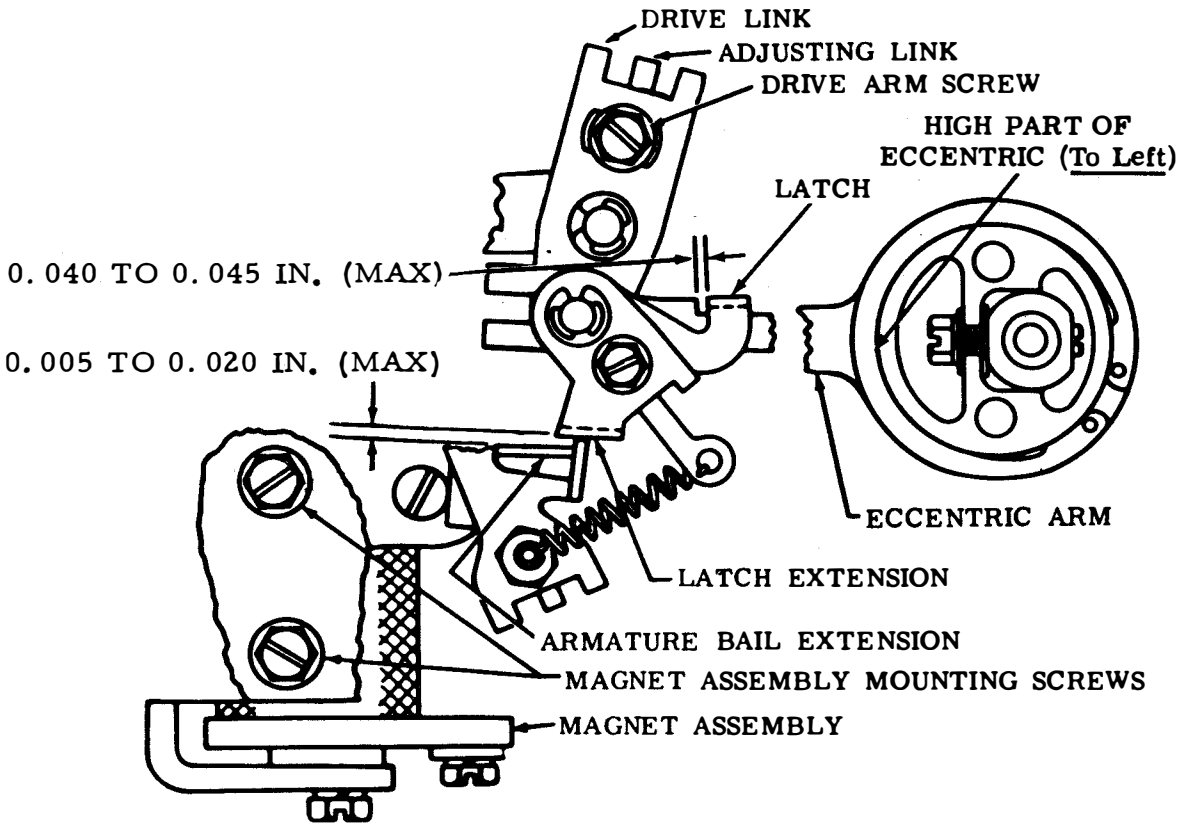


Figure 6-310. Drive Link and Latch Extension

(a) Refer to figure 6-311.

(b) Measure tension with spring scale. Between 1 and 2-1/4 ounces should be required to pull spring to installed length.

(8) Armature Bail Spring. Adjust as follows:

(a) Refer to figure 6-311.

(b) Unhook armature latch spring and measure tension with spring scale.

(c) Between 3-1/2 and 6-1/2 ounces should be required to start armature moving.

(d) Reconnect armature latch spring.

6-8.2 TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 ADJUSTMENTS (LOW-LEVEL). There are no low-level adjustments to be performed.

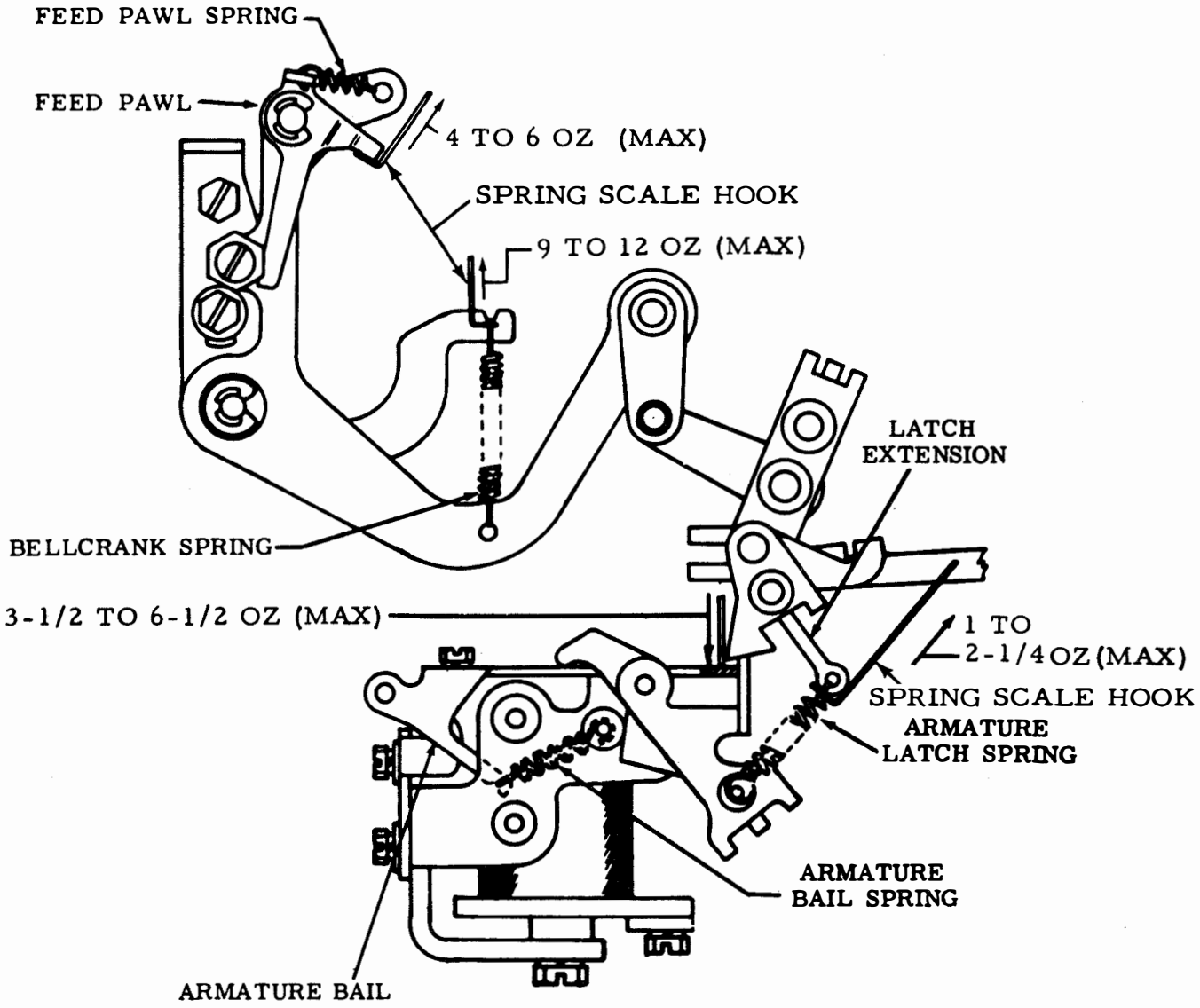


Figure 6-311. Feed Pawl, Bellcrank, Armature Latch, and Armature Bail Springs

SECTION V - REPAIR

6-9. TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 DISASSEMBLY AND ASSEMBLY PROCEDURES. The following paragraphs contain information necessary to disassemble and reassemble the units when repair operations are required.

6-9.1 GENERAL. When a fault has been isolated to a specific mechanical function and the trouble cannot be corrected by performing an adjustment, a defective mechanical part is indicated. Repair action will then consist of removal and replacement of the defective component. This section provides instructions for disassembly and reassembly of typical typing reperforators and tape printers Model 28, and associated keyboards. Disassembly and reassembly consists of procedures for removing and replacing principal subassemblies. Procedures are provided to enable the technician to gain access to a defective component, reassemble the set after a defective component has been replaced, and to disassemble and reassemble the equipment for inspection, cleaning, and lubrication.

a. Most maintenance, lubrication, and adjustments can be accomplished by removing the unit from the base. If possible, disassembly should be confined to subassemblies, which can, in some cases, be removed without disturbing adjustments. When reassembling the subassemblies, be sure to check all associated adjustments, clearances and spring tensions. Refer to adjustment procedures in Sections I through IV of this chapter.

b. If a part that is mounted on shims is removed, the number of shims used at each of its mounting screws should be noted so that the same shim pile-up can be replaced when the part is remounted.

c. Retaining rings are made of spring steel and have a tendency to release suddenly when being removed. Loss of these retainers can be minimized as follows: hold the retainer with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the retainer. Rotate the screwdriver in a direction to increase the diameter of the retainer for removal.

d. Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs in removing them.

e. In removing a subassembly from the unit, the procedure followed and the location from which parts are removed must be carefully noted so that reassembly can be done correctly. Where no specific instructions are given for reassembly, reverse the procedure used in removing it.

6-9.2 DISASSEMBLY AND REASSEMBLY - TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 UNIT. The following paragraphs provide removal and replacement procedures for components of a typical typing reperforator and tape printer unit Model 28: selector mechanism, ribbon feed mechanism, perforator mechanism, transfer mechanism, typing mechanism, function box mechanism, axial plate assembly, rocker bail assembly, main shaft

assembly, and pushbars. Figures 6-312 and 6-313, respectively, show a typical typing reperforator unit with remote control blank tape feed-out mechanism and a typical tape printer unit with manual LETTERS tape feed-out mechanism. Refer to parts list in Chapter 7 for detailed assembly illustrations.

WARNING

Hazardous voltages are present which can cause injury to personnel. Disconnect external ac or dc power source before working on reperforator and tape-printer units.

a. Removal of Selector Mechanism. Remove Selector Mechanism as follows:

(1) Remove the screw, lockwasher, and nut from the TP150001 selector clutch drum. Place the TP152410 reset bail in its raised position. Holding the TP152432 stop arm and the TP152405 marking locklever to the left, grasp the cam-clutch by the cam disc (not by the drum) and pull forward rotating the cam-clutch slowly. The cam-clutch should come off easily.

CAUTION

Do not force removal of cam-clutch. Damage to equipment may result.

(2) Unhook the function clutch latchlever spring. Remove the TP156472 spring post by removing its nut and lockwasher. Remove the screw and lockwasher that pass through the TP156867 frame and the TP152400 selector mounting plate into the TP152402 selector lever guide. Remove the TP152457 oil wick, screw, lockwasher, and TP159467 wick holder. Remove the selecting mechanism.

b. Removal of Ribbon Feed Mechanism. Remove ribbon feed mechanism as follows:

(1) Remove ribbon.

(2) Disconnect two mounting screws and lockwashers.

(3) Remove ribbon feed mechanism.

c. Removal and Replacement of Perforator Mechanism. Remove and replace perforator mechanism as follows:

(1) Removal. To remove perforator mechanism:

(a) Remove the TP90573 spring and disconnect the TP192709 perforator drive link from the TP156884 rocker arm.

(b) Remove the TP159621 shoulder screw with lockwasher from the TP159622 clamp. Remove the two mounting screws, lockwashers, and flat washers, that fasten the TP156024 rear plate to the TP159472 main plate. Remove the perforator mechanism.

(2) Replacement. To replace perforator mechanism, reverse the removal procedure in the preceding paragraph.

NOTE

When remounting the perforator mechanism, make certain that the TP156059 reset bail fits in the fork of the

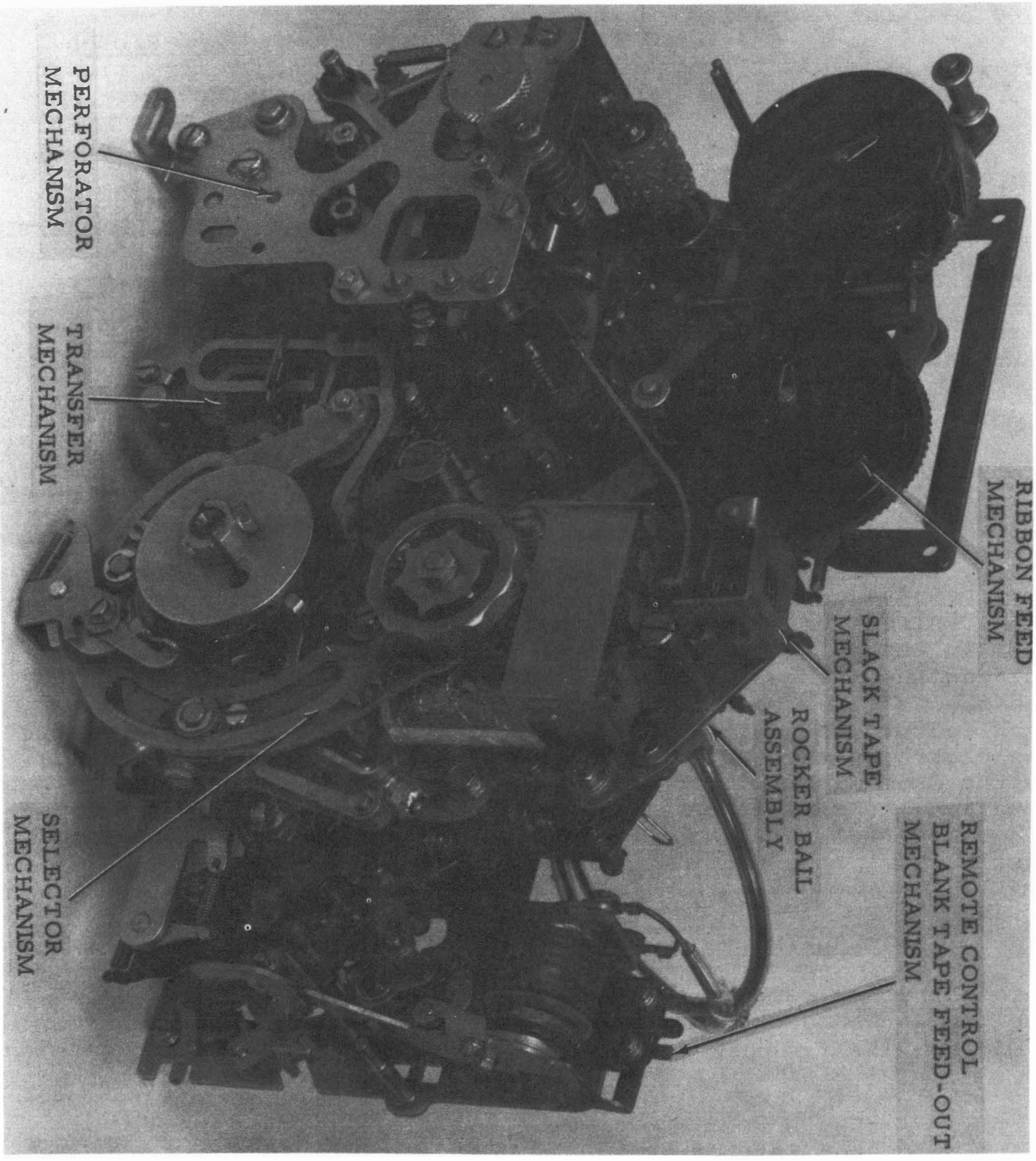


Figure 6-312. Typing Reperforator Unit with Remote Control Blank Tape Feed-Out Mechanism (Fully Perforated Tape)

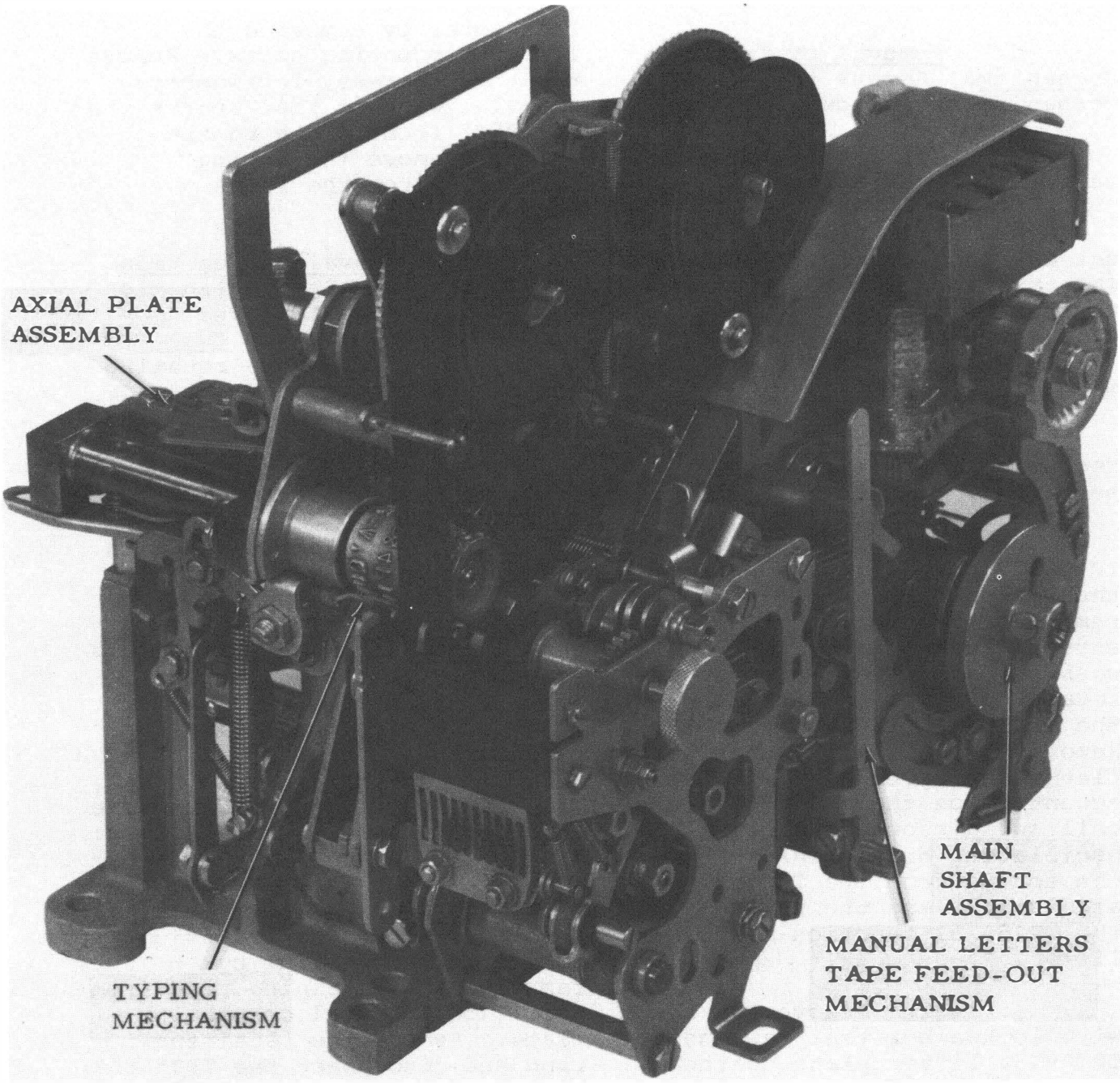


Figure 6-313. Tape Printer Unit with Manual Letters Tape Feed-Out Mechanism

TP159430 reset bail trip lever and that the print hammer fits in its slot in the mechanism.

d. Removal of Transfer Mechanism. Remove transfer mechanism as follows:

(1) Remove TP49084 main trip lever spring.

(2) Remove mounting screws, lockwashers, and flat washers from TP159488 transfer mounting bracket.

(3) Remove transfer mechanism.

e. Removal of Typing Mechanism. To remove typing mechanism, proceed as follows:

(1) Remove the TP156872 operating blade from the rocker bail assembly by removing the two mounting screws, lockwashers, flat washers, and shims. Remove the retaining ring and disconnect the TP159512 printing trip link. Remove the nut, lockwasher, and flat washer from the TP156396 eccentric on the TP156368 rocker bail and disconnect the TP159526 oscillating drive link. Remove the spring from the TP156478 accelerator and the spring from the TP156252 function blade lifter.

(2) Remove the screw with lockwasher that fastens the TP159434 lifter plate to the TP156474 mounting bar on the frame. Remove the screw and lockwasher that secure the TP159525 axial bracket to the TP159404 post on the frame. Remove the screw, lockwasher, and flat washer that fasten the TP159487 function box front plate to the TP159472 main plate. Remove the retaining ring from the TP159659 idler gear eccentric shaft. Remove the eccentric shaft, the TP159536 idler gear, the TP151629 special nut and lockwasher by removing the TP159658 mounting screw. Remove the three screws, lockwashers, and flat washers that secure the TP159535 front plate to the frame. Remove the typing mechanism from the frame assembly.

f. Removal of Function Box Mechanism. Remove function box mechanism as follows:

(1) Remove mounting screw, lockwasher, and flat washer that pass through the TP156316 function box rear plate and the TP159483 spring bracket into the TP159535 front plate.

(2) Remove function box from typing mechanism.

g. Removal and Replacement of Axial Plate Assembly. Remove and replace axial plate assembly in accordance with the following paragraphs.

(1) Removal. Remove axial plate assembly as follows:

(a) Remove the TP3870 correcting drive link spring. Remove the TP156413 correcting drive link by removing the retaining ring from the TP156378 axial correcting plate. Remove the retaining ring and disconnect the TP156869 ribbon guide from the TP156870 ribbon oscillating lever. Remove the screw and lockwasher that fastens the TP159525 axial plate to the TP160943 type wheel shaft housing.

(b) Remove the three mounting screws and lockwashers from the TP159525

axial plate. Remove the axial plate assembly.

(2) Replacement. Remount the axial plate assembly by reversing the procedure used to remove it.

NOTE

The last tooth on the type wheel shaft shall mesh with the last full tooth space of the TP156294 gear sector. (If a partial space occurs at the rear of the section, disregard it.) Also, the first tooth of the gear sector shall mesh with the second tooth space on the type wheel shaft. There is an extra tooth space on the forward portion of the type wheel shaft. The correct axial output rack sector engagement is when the last tooth on the TP156313 axial output rack and the last tooth space of the TP156294 gear sector shall mesh. Also, the first tooth of the axial output rack and the first tooth space on the gear sector shall mesh.

h. Removal of Rocker Bail Assembly. Remove rocker bail assembly as follows:

(1) Disconnect the TP156937 printing drive-line by removing the retaining ring at its left end. Remove the nut, lockwasher, flat washer, felt washer, bushing, and screw from the TP156871 operating blade mounting bail.

(2) Remove the nut, lockwasher and the TP156921 adjusting lever guide, and remove the TP156366 rocker bail shaft. Remove the rocker bail.

i. Removal and Replacement of Main Shaft Assembly. Remove and replace main shaft assembly in accordance with the following paragraphs.

(1) Removal. Remove main shaft assembly as follows:

(a) Remove the spring from the TP150355 clutch latchlever. Remove the retaining ring, spring washer, and flat washers from the forward end of the TP154397 main shaft.

(b) Remove the screw and lockwasher (if present) from the TP150000 function clutch drum. Remove the screw and lockwasher from the TP173340 collar. Remove the screw and lockwasher from the TP158745 bearing clamp. Pull the main shaft out of rear of unit, removing the cam clutch and the collar.

(c) Note the location of the main shaft TP154398 needle bearings as shown in the parts section. Move the main shaft toward the rear of the unit a small amount at a time and exercise care not to drop or contaminate the 20 needle bearings in each race. A rubber band, string, or spring may be stretched around the shaft and needle bearings with the ends of the spring hooked together. The spring in conjunction with the grease will hold the needle bearings in place.

(2) Replacement. Replace main shaft assembly by reversing the procedure used to remove it. Make sure the needle bearings are clean. Lubricate the race and bearings with TP195298 (Beacon 325) grease or its equivalent. Apply a liberal

amount of MIL-L-17672 oil at each end of the bearing sleeve. When the main shaft is inserted into the cam-clutch, hold the cam-clutch firmly so that the drum is not pushed off the clutch, and compress the drum and cam disc together so that the holes in drum and clutch bearings are aligned.

j. Removal and Replacement of Pushbars. Remove and replace pushbars in accordance with the following procedures.

(1) Removal. Remove pushbars as follows:

(a) Remove typing mechanism.

(b) Remove function box mechanism from typing mechanism.

(c) Remove pushbar by disengaging the pushbar rack from its associated pinion.

(2) Replacement. Replace pushbars by reversing the procedure used for removal. Verify correct gear tooth engagement of racks on pushbars as follows:

(a) When assembling the pushbars (no. 1 to no. 5 inclusive) to the various eccentric assemblies, exercise great care to assure the correct rack-pinion gear mesh. The correct mesh is such that the first tooth space on the rack is meshed. On later units this is identified by a mark on the pushbar and a mark on the eccentric. The last tooth on the pinion and the last tooth space on the rack should therefore also mesh; avoid misalignment.

CAUTION

Misalignment of the mesh by as little as one tooth will produce a jam in the machine and cause part breakage if the machine is put under power while this condition exists.

(b) The assembly of the LETTERS and FIGURES pushbars to the left eccentric assembly must follow the assembly of the detents on the same eccentric. Starting with the left eccentric in the lower detented position, locate the gear tooth of the pinion which is at top dead center. (Using the oil hole in the eccentric housing as a reference may help since it also is located at top dead center.) The first tooth space of the rack of the LETTERS pushbar must engage the tooth directly below. This requirement is met when the indicating mark on the pushbar and eccentric shaft are in line. Pull the LETTERS pushbar all the way on the pinion. The eccentric shaft should now be in the upper detented position. Now locate the tooth at bottom dead center. The first tooth space of the rack on the FIGURES pushbar should engage the tooth just located. The full travel of either pushbar should result in the eccentric shaft being rotated from one detented position to the other without jamming. Avoid misalignment.

CAUTION

As before, a misalignment of the mesh by one tooth will cause a jam and parts breakage if the machine is put under power while this condition exists.

6-9.3 DISASSEMBLY AND REASSEMBLY - TYPING REPERFORATOR AND TAPE PRINTER MODEL 28 KEYBOARDS. The following paragraphs provide procedures for removing and disassembling the basic units of typical typing reperforator and tape printer Model 28 keyboards. Basic keyboard units include a signal generator, keyboard assembly, character counter, and tape container. Refer to the parts list in Chapter 7 for detailed assembly illustrations.

WARNING

Hazardous voltages are present which can cause injury personnel. Disconnect external ac or dc to power source before working on keyboard unit.

NOTE

In the following paragraphs no specific procedures are addressed to replacing and reassembling the unit. When reassembling and replacing units, reverse the removal and disassembly procedures. When removing a subassembly from the unit and when disassembling the subassembly, the procedure followed and the locations from which parts are removed must be carefully noted so that reassembly and reinstallation can be done correctly.

a. Removal of Signal Generator Assembly. Remove signal generator assembly as follows:

(1) Remove the subcasting assembly with the typing reperforator.

(2) Remove the TP154131 contact box cover and disconnect the signal line leads. Pull up on the line cable, with its strain relief and grommet intact, and push it aside out of the way.

(3) Remove two mounting screws at front of the TP170385 signal generator frame casting and one at the rear.

(a) Lift the signal generator carefully, while holding the universal bail back so that the nonrepeat lever clears and its spring is not excessively stretched.

CAUTION

Prevent the nonrepeat lever from being pulled too far downward. If it is pulled downward as much as 90 degrees from its operating position, the spring will be stressed beyond its elastic limit. Make sure the lever is in its slot before setting it down.

b. Disassembly of Signal Generator. To disassemble the signal generator for replacing parts, use the following procedure:

(1) Disconnect the suppressor leads at the contact terminals.

(2) Unhook the drive link spring. Remove the two contact box bracket mounting screws. Disengage the drive link from the transfer bail and lift the contact box off.

(3) Remove the locknut from the top of the phenolic block. Turn the box over and remove the two screws

which secure the contact assembly in place. Slip the drive link out through the slot in the contact box and disconnect the link from the contact toggle by removing the connecting screw and insulator bushing.

(4) To remove the TP154034 clutch stop lever, unhook the spring and unscrew the adjusting screw.

(a) To remove the TP154237 nonrepeat lever, unscrew the locknut and remove the shoulder mounting screw.

(5) To remove the TP154010 transfer bail, unhook the drive link spring. Remove the locknut at the end of the transfer bail shaft on the front plate of the signal generator. Disengage the drive link from the transfer bail and pull the bail and shaft toward the rear.

(6) To remove the TP154036 detent plate, after the transfer bail and shaft have been taken out, remove the two detent plate mounting screws on the front plate of the signal generator. Disengage the drive link from the transfer bail and pull the bail and shaft toward the rear.

(7) To remove the TP158268 code bar bail latch, remove the retainer from the end of its stud. Unhook the spring from the latch. Strip the latch off to allow the code bar bail to move to its extreme right-hand position. Work the latch to the front of its stud.

(8) To remove the TP154236 universal bail latchlever after the nonrepeat lever mechanism is removed, unhook the spring. Remove the mounting screw and eccentric bushing. Move the latchlever toward the rear to extract it from its slot.

(9) To remove the TP154040 transfer levers:

(a) Trip the clutch and rotate the shaft approximately 270 degrees. Unhook the locking bail spring. The locking bail can be dropped down and unhooked from the guide post under the cam. Reach underneath the assembly and turn the locking bail clockwise. It may be necessary to move the gear back and forth to get clearance to drop the locking bail out of the upper guidepost through the bottom of the assembly.

(b) Remove the screws from the upper right-hand TP170391 transfer lever guide, and rotate the guide about the locking bail spring post so that it does not interfere with removing the transfer lever.

(c) Remove the transfer lever springs. Remove the screw and lockwasher from the right angle clamp in back of rear plate. Remove the nut and lockwasher from the TP154018 locking bail post. Remove the nut from the rear of the TP154014 guidepost. The nut on the rear end of the TP154015 code bar bail mounting post should be loosened to the end of the threads on the post.

(d) Drop the transfer lever. Reach under the cam with a pair of tweezers and remove the oil wicks.

(e) Unhook the transfer levers from the lower guidepost and pull them up out of the assembly one at a time from rear to front. If the same levers are to go back into the

assembly, number them in a manner to ensure replacement in the same sequence.

(10) To remove the cam shaft assembly:

(a) With the locking bail removed, remove the two screws from the TP154101 rear gear plate, and the nut from the front end of the shaft.

(b) Hold the stop lever and latchlever out of the way and pull rearward on the shaft assembly to disengage it from the front plate. The entire cam clutch and shaft assembly can be removed toward the rear by gently rotating rearward. The eccentric follower arm and spacer washers will fall free and must be carefully positioned when reassembling.

(c) To remove the cam (with clutch) from the shaft, disengage the clutch by holding the clutch shoe lever against the stop-lug and sliding the cam off the shaft. For ease of reassembly, tie the clutch shoe lever and stop-lug together with wire. Place the shaft in first.

(d) After the cam and clutch assembly are removed, the clutch itself may be disassembled from the cam. To do so, carefully remove the springs. Remove the clutch shoes. Remove the two clamp screws in the clutch disc, and then remove the disc. The clutch disc can then be removed from the cam by removing the two screws securing it to the cam.

CAUTION

If a new cam is being installed, the clutch shoes and disc should be tried in their respective grooves to see that they move freely before reassembly.

(11) To remove the TP154234 code bar bail, unhook its spring. Remove the locknut at the front and rear ends of the TP154015 pivot shaft. Remove the locknut from the rear end of the TP154014 transfer lever guide post (if these nuts have not already been removed). Pull the rear plate toward the rear until the code bar bail pivot post clears sufficiently to be removed.

c. Disassembly of Keyboard. To disassemble the keyboard assembly for replacing parts, two procedures may be followed: with keyboard removed from base; with keyboard attached to base.

(1) Keyboard removed from base:

(a) To remove the keyboard from the base, remove the four screws which hold the front frame to the front of the base.

(b) From the top of the base remove the two screws with flat washers at the right and left rear side of the code bar assembly brackets. Remove the two screws at the extreme left and right ends of the right-angle bracket at the front of the code bar assembly. Remove the screw and cable clamp at the left of this bracket.

(c) When these eight screws have been removed the keyboard assembly can be

removed from the base by tipping it forward so as to disengage the function bails, so that they may be replaced correctly when reassembling.

(d) Remove the four screws from the spacebar. Lift spacebar out. Remove the four screws from the plastic keylever guide plate. Lift the guide plate out.

(e) To remove a keylever assembly, hook the end lug of the TP151383 keylever remover over the top of its associated code lever and the other lug in the slot of the keylever. A pull forward will snap each keylever from its pivot stud on the code lever.

(f) Disconnect the TP154021 space bail link at its code lever by removing its retainer. Remove the screw at each end of the lockball track to remove the track. The 154080 wedge locks (32 in number) may then be removed from their code levers.

(g) To remove the code bars after the signal generator has been removed, unhook the code bar springs from the spring bracket at the right end. Leave springs on code bars. Loosen the adjusting screws at the right and the left end bracket. Lift the code bar guides to the top limit of their adjusting slots. Move the code bar to the right until it clears the left-hand guide. Lift the code bar slightly and move it to the left until it clears the right-hand guide.

(h) To remove a function lever or code lever after the keyboard assembly has been dismantled to the keylever guide assembly stage and the code bars have been removed, turn the assembly upside down. Remove all code lever springs. Remove the inner retainer from the pivot shaft and pull the shaft out until the levers are free. Remove the levers toward the front.

(2) With keyboard attached to base:

(a) To remove a keylever assembly, hook the end lug of the TP151383 keylever remover over the top of its associated code lever and the other lug in the slot of the keylever. A pull forward will snap each keylever from its pivot stud on the code lever.

(b) To remove the lockball channel, remove the screws at each end of the wedge retainer plate. Loosen the clamp at the center. As the wedge retainer is removed note the number of spacer washers at each end. Remove the mounting screws at each end of the lockball bar assembly to free it from the keyboard.

(c) The 43 lockballs can be removed by taking the adjusting screw out at the end channel and permitting the balls to roll out.

(d) Remove the pivot screws which fasten the spacebar assembly to the spacebar bail. Remove the hold-down screw located under the spacebar, and the two screws at each end of the keylever guide plate. Work the guide plate upward and off the keylevers.

(e) To remove the universal bail, set the keyboard up vertically on its rear side using the motor as a prop. Remove the bail spring. Loosen the locknut on each

universal bail pilot screw. Back off one pivot screw and lift the bail out.

(f) To reinstall the keylever guide plate with the keylevers attached, flip them all toward the rear. Place the front edge of the guide plate on the frame and push the keylevers of the front row into their respective holes. Then work in the second and third rows in a similar manner.

d. Disassembly of Character Counter. To disassemble the character counter from the keyboard base, remove the two hold-down screws, lift up the character counter and remove the two screws holding the end-of-line switch to its bracket.

NOTE

While performing the disassembly procedure on the character counter, the various pivot points of the mechanism should be inspected carefully to determine whether any signs of wear or deficient lubrication (red rust) can be detected. The cord assembly should be inspected for signs of wear (fraying) and to be sure that the drive and latchlevers do not strike the cord.

(1) To disassemble the ratchet drum assembly:

(a) Remove the two screws holding clamp to assembly and remove clamp.

(b) Remove the cam plate. The indicator and cord assembly may be removed at this point.

(c) Remove the retaining ring and washer. The ratchet and drum can now be removed.

(2) To remove the idler pulley, remove the locknut holding the idler pulley bearing stud to the frame.

(3) To disassemble the reset bail and feed bail from the character counter frame, remove the retaining ring and slide the bails from the pivot stud. Note carefully the position of the spacing washer between the feed and reset bail and replace accordingly.

(4) To remove the reset lever assembly, remove the bearing stud. Note the position of the spacing washer and replace accordingly.

e. Removal of Tape Container. To remove the tape container assembly, remove the two screws, lockwashers, and flat washers that secure it to the base.

CHAPTER 7
PARTS LIST

7-1. SCOPE. This chapter provides a list of maintenance parts and parts location diagrams for Reperforator and Tape Printer Sets Model 28.

7-2. MAINTENANCE PARTS LIST. Maintenance parts are listed by major units, in table 7-1 through 7-5. The parts are listed for each unit in numerical part number sequence. Reference to the applicable parts location diagram is included for each part listed.

7-3. LIST OF MANUFACTUREPS. Reperforator and Tape Printer Sets Model 28 are manufactured by Teletype Corporation, Skokie, Illinois.

7-4. PARTS LOCATION DIAGRAMS. Figures 7-1 through 7-123 show location of all parts listed in tables 7-1 through 7-5. The parts location diagrams are used to locate and identify a particular part which is indexed by part number. The user then refers to the part number in the applicable table to obtain a description of the part to be ordered.

7-5. LIST OF ABBREVIATIONS. Table 7-6 contains the explanations of a list of abbreviations used throughout the parts list.

Table 7-1. Typing Reperforator (LPR)

Part Number	Figure Number(s)	Description	Notes
0254M	7-15	Coil, Magnet	
0298M	7-32	Coil, Magnet	
1020	7-4	Screw, 6-40 x 1/4 Hex	
1036	7-5,-33	Nut, 6-40 Hex	
1039	7-33	Screw, 6-40 Shoulder	
1256	7-18	Setscrew, 6-40	
2034	7-14	Washer, Flat	
2191	7-1 thru -18, -20 thru -23, -26,-27,-29, -31 thru -37	Lockwasher	
2199	7-8	Nut, 7/16-32 Hex	
2407	7-8	Lockwasher	
2438	7-15	Washer, Flat	
2539	7-18	Nut, 3/8-32 Hex	
2669	7-2,-12	Lockwasher	
3598	7-1,-2,-4,-5,-6 -8,-9,-12,-14, -16,-17,-23,-29, -31,-35	Nut, 6-40 Hex	
3599	7-1,-4,-5,-7,-9, -10,-13,-14,-15, -18,-21,-34	Nut 4-40 Hex	
3603	7-32	Nut, 1/4-32 Hex	
3606	7-2,-17	Nut, 6-40 Hex	
3640	7-1,-2,-3,-7,-8, -9,-11,-17,-18, -23,-27	Lockwasher	
3870	7-17	Spring	
5363	7-5	Spring, Compression	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
6801	7-21	Screw, 4-40 Pilot	
7002	7-1,-2,-4,-5,-7, -8,-9,-11,-13, -14,-17,-23,-29, -31,-33,-36	Washer, Flat	
7655	7-23	Spring	
7835	7-20	Ribbon w/Spool, Black	
8330	7-1,-2,-4,-6,-10, -12,-14,-16,-17, -18,-20,-27,-31	Washer, Flat	
22746	7-8,-18	Spring	
33765	7-26	Washer, Flat	
36273	7-31	Washer, Flat	
41382	7-12	Spring	
41732	7-21,-23	Plate, Clamp	
42823	7-1,-3	Washer, Flat	
47024	7-9	Washer, Flat	
49084	7-1	Spring	
55063	7-19,-26	Spring	
71437	7-6	Washer, Flat	
71681	7-20	Spool, Ribbon	
72522	7-5	Wick, Felt	
73175	7-18	Lockwasher	
74283	7-12	Washer, Spring	
74553	7-8	Wick, Felt	
74952	7-21	Screw, 4-40 x 5/8 Fil	
76081	7-15	Washer, Flat	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
76099	7-15	Washer, Flat	
76246	7-21	Bushing, Insulating	
78533	7-14,-31	Spring	
78824	7-21	Spring	
79012	7-15	Insulator	
80516	7-31	Pin, Cotter	
80531	7-20	Washer, Flat	
80755	7-23	Bushing, Insulating	
81726	7-23	Terminal	
81731	7-20	Spring	
81778	7-15	Screw, 4-40 x 3/6 Fil	
82392	7-2	Shim, 0.004" Thk	
82463	7-21	Spring	
82547	7-21,-23	Insulator, 0.094" Thk	
82548	7-21,-23	Insulator, 0.062" Thk	
84226	7-20	Spring	
85823	7-16,-20,-27	Spacer, 0.188" Thk	
86079	7-9	Washer, Felt	
86283	7-16	Spring	
86304	7-26	Spring	
86506	7-1	Post, Spring	
86714	7-20	Washer, Flat	
86774	7-9	Screw, 6-40 Shoulder	
87401	7-1	Spring	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
90052	7-13	Screw, 4-40 x 5/8 Hex	
90361	7-6	Washer, Felt	
90517	7-18	Spring	
90535	7-11	Washer, Felt	
90560	7-26	Washer, Flat	
90573	7-2	Spring	
90606	7-1,-16	Spring	
90615	7-17	Spring	
90789	7-14,-29	Washer, Flat	
90791	7-5	Lockwasher	
90951	7-11,-21	Lockwasher	
92260	7-17	Lockwasher	
93356	7-1,-5,-28	Washer, Felt	
94669	7-5	Screw, 4-40 Shoulder	
94674	7-31,-32	Washer, Cup	
94712	7-8	Washer, Flat	
96717	7-2,-14,-23	Screw, 4-40 Shoulder	
97266	7-23	Plate, Clamp	
97516	7-20	Bushing	
101123	7-9	Washer, Felt	
104824	7-15,-26	Spring	
109356	7-23	Washer, Flat	
110434	7-1,-12,-14,-31	Screw, 4-40 x 3/16 Fil	
110435	7-23	Nut, 4-40 Hex	
110437	7-11	Spring	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
110743	7-1,-3,-4 thru -16,-18 thru -21,-26,-28,-29 -31,-32,-34	Lockwasher	
110879	7-7,-10,-17	Spring	
111017	7-17	Screw, 6-40 x 5/16 Fil	
111410	7-1	Washer, Flat	
111777	7-25	Connector, 4-Pt Receptacle	
111784	7-36	Spacer, 7/32" Thk	
112509	7-21	Insulator, 0.031" Thk	
112626	7-8,-12,-27	Nut, 10-32 Hex	
112631	7-1	Spring	
112634	7-11	Spring	
114876	7-11	Washer, Flat	
115122	7-8	Washer, Felt	
115134	7-9	Washer, Felt	
119647	7-5	Ring, Retaining	
119648	7-2,-5,-12,-19, -26,-29	Ring, Retaining	
119649	7-5,-8,-9,-11, -16,-20,-27	Ring, Retaining	
119650	7-6,-16,-17,-20, -29	Ring, Retaining	
119651	7-1,-8,-10,-11, -17,-20,-21,-26, -27,-31,-32	Ring, Retaining	
119652	7-1,-5,-6,-12, -29	Ring, Retaining	
119653	7-8,-16,-20	Ring, Retaining	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
119656	7-18	Ring, Retaining	
119662	7-33	Screw, 6-40 Spl	
121100	7-11	Spring	
121242	7-14	Clamp, 1/8" ID Cable	
121243	7-14,-24	Clamp, 3/16" ID Cable	
121245	7-14,-24	Clamp, 5/16" ID Cable	
121246	7-14,-24	Clamp, 3/8" ID Cable	
122149	7-26	Screw, 4-40 Spl	
124177	7-2,-4,-12,-14, -24,-32	Lockwasher	
125011	7-1,-4,-7,-9 thru -12,-16 thru -19,-26, -32	Washer, Flat	
125015	7-2,-6,-7,-15, -17,-29,-37	Washer, Flat	
125231	7-2	Nut, 10-32 Hex	
125268	7-18	Spring	
125802	7-18,-20	Washer, Flat	
126241	7-32	Lockwasher	
128357	7-6,-11	Ring, Retaining	
130330	7-9	Washer, Felt	
130667	7-32	Lockwasher	
130683	7-31	Lockwasher	
130696	7-10	Washer, Felt	
131016	7-9	Washer, Felt	
135716	7-1	Spring	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
135901	7-8	Washer, Cup	
139752	7-1	Screw, 4-40 x 11/64 Fil	
144539	7-18	Shim, 0.005" Thk	
144793	7-5	Shaft, Eccentric	
144794	7-5	Spring, Torsion	
144795	7-4	Plate, Rear	
144796	7-5	Plate, Front	
144797	7-5	Shaft, Feed Wheel	
144998	7-5	Post	
144999	7-5	Shoe, Tape	
145353	7-5	Wheel, Pressure	
145356	7-5	Wheel, Feed	
145357	7-5	Guide, Tape	
145358	7-4	Bracket, Tape Guide	
150000	7-3	Drum, Clutch	
150001	7-1	Drum, Clutch	
150013	7-1,-3	Disc, Adjusting	
150026	7-3	Lever, Shoe Release	
150029	7-1,-3	Wick, Felt	
150040	7-3	Screw, 6-40 x 5/8 Fil	
150043	7-1,-3	Shoe, Secondary Clutch	
150044	7-1,-3	Shoe, Primary Clutch	
150048	7-1,-14,-31	Spring	
150089	7-15	Screw, 4-40 x 1/2 Fil	

Table 7-1. Typing Reperforator (LPP) - Continued

Part Number	Figure Number(s)	Description	Notes
150241	7-1,-3	Spring	
150327	7-16,-20	Roller, Ribbon	
150355	7-1	Latchlever	
150356	7-1	Lever, Trip	
150411	7-1	Washer, Flat	
150507	7-16	Spring	
150687	7-12,-14,-31	Stud	
150923	7-6	Washer, Felt	
150978	7-15	Screw, 6-40 x 1-1/8 Fil	
150990	7-7	Washer, Felt	
151073	7-1,-6,-19,-26, -28	Screw, 4-40 x 5/32 Fil	
151103	7-14,-31	Spring	
151152	7-1,-9,-11,-13, -17,-19,-28	Screw, 4-40 x 3/16 Hex	
151222	7-6	Washer, Felt	
151234	7-21	Ratchet, 27T	
151235	7-21	Ratchet, 28T	
151236	7-21	Hub	
151237	7-21	Spring, Flat	
151240	7-21	Pawl, Latch	
151241	7-21	Lever, Latching	
151246	7-2	Washer, Flat	
151336	7-14,-31	Oiler	
151362	7-2	Wick, Felt	
151398	7-11	Spring	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
151416	7-5,-6	Nut, 6-40 Hex	
151442	7-2,-3,-8,-9, -14,-15,-23,-29	Screw, 6-40 x 1/2 Hex	
151603	7-15	Spacer	
151629	7-1,-6,-8,-18	Nut, 6-40 Lug	
151630	7-1,-5,-7,-8,-10, -14,-16,-17,-18, -21,-23,-31,-33, -35	Screw 6-40 x 1/4 Hex	
151631	7-1,-2,-4,-5,-7, -11,-13,-15,-17, -29,-33	Screw, 6-40 x 5/16 Hex	
151632	7-2,-3,-4,-13, -14,-21,-22,-27, -29,-37	Screw, 6-40 x 3/8 Hex	
151637	7-4,-16	Screw, 4-40 x 1/4 Fil	
151640	7-1	Lever, Shoe Release	
151657	7-2,-12,-14,-31	Screw, 6-40 x 1/4 Fil	
151658	7-1,-2,-24	Screw, 6-40 x 5/16 Fil	
151686	7-15	Screw, 4-40 x 3/8 Fil	
151687	7-32	Screw, 4-40 x 7/16 Fil	
151688	7-15	Screw, 4-40 x 5/8 Fil	
151689	7-23	Screw, 4-40 x 3/4 Fil	
151690	7-3	Screw, 10-32 x 5/16 Fil	
151692	7-17	Screw, 6-40 x 3/16 Fil	
151693	7-1	Screw, 6-40 x 9/16 Fil	
151700	7-10	Screw, 6-40 Shoulder	
151701	7-14,-31	Spring, Torsion	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
151714	7-14,-31	Spring	
151715	7-15	Screw, 6-40 x 3/4 Hex	
151722	7-4,-20,-27,-29	Screw, 6-40 x 3/16 Hex	
151728	7-3	Spring	
151731	7-23	Screw, 4-40 x 7/8 Fil	
151732	7-32	Screw, 4-40 x 11/32 Fil	
151737	7-1,-3,-6,-18,-20	Screw, 4-40 x 11/64 Hex	
151879	7-21	Stud	
151880	7-13,-20,-23,-29	Nut, 4-40 Hex	
151886	7-21	Stud	
152400	7-14,-15,-27,-29	Plate, Selector Mounting	
152401	7-14,-31	Guide	
152402	7-12,-14,-31	Guide, Selector lever	
152403	7-14	Bracket, Guide	
152404	7-14,-31	Bracket, Spring	
152405	7-14	Locklever, Marking	
152406	7-14,-31	Bracket, Spring	
152407	7-14,-31	Locklever, Spacing	
152409	7-14,-31	Lever, Selecting	
152410	7-14,-31	Bail, Reset	
152411	7-14,-31	Lever, Push	
152412	7-14	Link	
152415	7-15	Stud, Adjusting	
152420	7-15	Lamination, Magnet	
152421	7-15	Bracket, Shield Mounting	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
152423	7-15	Bracket, Armature Stop Mtg	
152425	7-15	Post, Spring	
152426	7-15	Nut, 6-40 Self Locking	
152427	7-12	Latch w/Hub	
152429	7-12	Rack, Sector	
152432	7-12	Arm, Stop	
152436	7-12	Knob, Range Scale	
152438	7-12	Bail, Stop Arm	
152441	7-12	Washer, Flat	
152445	7-12	Spring, Compression	
152457	7-14,-29	Wick, Felt	
152458	7-15	Shield, Terminal	
152634	7-6	Washer, Flat	
152887	7-13	Screw, 4-40 x 7/16 Hex	
152890	7-32	Washer, Flat	
152891	7-14,-31	Spring	
152893	7-1,-2,-4,-5,-6, -8,-11,-14,-18, -19,-27,-28,-31	Screw, 4-40 x 1/4 Hex	
153184	7-15	Post	
153239	7-2,-29	Roller	
153267	7-19	Washer, Felt	
153489	7-12	Detent	
153537	7-29	Screw, 6-40 x 9/32 Hex	
153538	7-14,-29,-33	Screw, 6-40 x 7/16 Hex	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
153543	7-15	Armature	
153799	7-18,-32	Screw, 4-40 x 21/64 Hex	
153806	7-17	Spring	
153817	7-26	Screw, 4-40 x 3/8 Hex	
153819	7-24	Lockwasher	
153839	7-1,-6,-8,-14, -18,-36	Screw, 6-40 x 5/8 Hex	
153841	7-20,-27	Screw, 6-40 x 9/16 Hex	
154235	7-11	Spring	
154242	7-2	Screw, 6-40 x 5/16 Hex	
154244	7-9	Nut, 6-40 Shoulder	
154396	7-3	Cam w/Pin	
154397	7-1,-2,-3,-18, -22	Shaft w/Bearing	
154398	7-3,-22	Bearing, Needle	
154620	7-14,-31	Wick, Leather	
154621	7-14,-31	Retainer, Wick	
154622	7-14,-31	Lubricator	
154694	7-1,-3	Disc, Clutch Cam	
155090	7-14,-31	Lubricator Assembly	
155096	7-12	Plate, Range Finder Mounting	
155750	7-18,-25	Sleeve, 3/32" ID x 1/2" Lg Insulating	
155751	7-24,-25	Sleeve, 1/8" ID x 1" Lg Insulating	
155752	7-18,-24,-33	Sleeve, 5/64" ID x 1/2" Lg Insulating	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
155753	7-15,-24	Sleeve, 1/8" ID x 1/2" Lg Insulating	
155754	7-34	Sleeve, 1/16" ID x 1/2" Lg Insulating	
156008	7-19	Wheel, Feed	
156012	7-19,-28	Spring, Punch Block	
156013	7-6	Screw, 4-40 Spl	
156015	7-4	Plate, Spring	
156016	7-6	Link, Front Drag	
156017	7-6	Shaft, Eccentric	
156019	7-5,-28	Washer, Felt	
156020	7-4	Slide	
156024	7-4,-5,-6,-28	Plate, Rear	
156028	7-4,-5,-19,-28	Plate, Front	
156036	7-5	Guide, Tape	
156040	7-5	Post	
156042	7-5	Post, Spacing	
156043	7-6	Bushing	
156044	7-5	Stud, Die Wheel	
156045	7-5	Shaft, Feed Wheel	
156046	7-4	Block, Tape Guide	
156047	7-5	Spring, Torsion	
156050	7-5	Stud, Eccentric	
156051	7-6	Bushing, Eccentric	
156052	7-5	Shoe, Tape	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
156054	7-5	Lever, Detent	
156055	7-5	Wheel, Die	
156057	7-11	Washer, Flat	
156058	7-6	Link, Rear	
156060	7-6	Shaft, Eccentric	
156061	7-5	Arm, Tape Shoe	
156062	7-5	Post, Pivot	
156067	7-6	Guide, Slide Post	
156069	7-4	Plate	
156070	7-6	Bail, Toggle	
156077	7-6	Plate w/Post	
156089	7-4	Slide w/Insulator	
156090	7-5	Screw, 6-40 Adjusting	
156093	7-6	Washer, Felt	
156094	7-6	Link, Front	
156095	7-6	Bushing	
156099	7-6	Link, Rear Drag	
156103	7-6	Strip, Felt	
156104	7-19	Shaft	
156125	7-18	Shaft	
156128	7-18	Bushing	
156130	7-18	Lever	
156132	7-18	Bearing, Eccentric	
156136	7-18	Bracket, Shaft Mounting	
156137	7-18	Washer, Felt	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
156147	7-18	Arm, Drive	
156152	7-18	Shaft, Feed-Out Drive	
156153	7-18	Collar, Eccentric	
156154	7-18	Collar	
156162	7-6	Washer, Flat	
156163	7-4	Guide	
156165	7-1,-6	Washer, Felt	
156167	7-25	Cable w/Terminals	
156168	7-4	Spring	
156169	7-6	Washer, Felt	
156172	7-19	Rod	
156173	7-4	Stud	
156183	7-5	Bracket, Anchor	
156184	7-5	Bracket, Anchor	
156221	7-13	Lock	
156230	7-17	Stud, Lifter Pivot	
156235	7-1	Guidepost	
156236	7-22	Collar	
156241	7-8	Link, Front	
156242	7-8	Link, Rear	
156243	7-17	Roller, Lifter Arm	
156248	7-1	Latch	
156250	7-22	Cam	
156252	7-17	Lifter, Function Blade	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
156264	7-7,-10	Lifter, Detent	
156265	7-10	Bushing, Shoulder	
156266	7-7,-10	Bushing, Shoulder	
156268	7-11	Bracket, Spring	
156276	7-7	Eccentric, Right Rotary	
156277	7-7	Eccentric, Left Rotary	
156278	7-10	Eccentric	
156286	7-7	Shaft, Right Eccentric	
156287	7-7	Shaft, Left Eccentric	
156288	7-10	Shaft, Axial Eccentric	
156289	7-7	Bearing, Left Front	
156290	7-7	Bearing, Right Front	
156291	7-7	Bearing, Rear	
156292	7-10	Bearing, Upper Axial	
156293	7-10	Bearing, Lower Axial	
156294	7-9	Sector, Axial	
156296	7-11	Post, Retainer	
156300	7-11	Shaft	
156306	7-8	Rod, Right Connecting	
156311	7-8	Rod, Left Connecting	
156313	7-10	Rack, Axial Output	
156316	7-11	Plate, Rear	
156318	7-1	Lever, Reset	
156321	7-9	Shaft, Oscillating	
156322	7-9	Link, Axial Toggle	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
156332	7-8	Shaft, Type Wheel	
156366	7-2	Shaft, Rocker Bail	
156369	7-9	Lever, Adjusting	
156382	7-9	Roller, Guide	
156387	7-1	Lever, Trip	
156388	7-1	Lever, Adjusting	
156389	7-8	Gear, 16T	
156390	7-8	Washer, Flat	
156396	7-17	Eccentric	
156397	7-9	Post	
156399	7-2	Nut, 6-40 Shoulder	
156403	7-2	Disc, Bearing	
156408	7-8	Arm, Clamp	
156412	7-2	Link, Drive	
156413	7-17	Link, Drive	
156414	7-16	Plate, Ribbon Feed Mounting	
156419	7-16	Shaft, Left Ribbon Ratchet	
156421	7-16	Shaft, Right Ribbon Ratchet	
156426	7-16	Washer, Spring	
156427	7-16	Disc, Friction	
156428	7-16	Washer, Felt	
156433	7-16	Pawl, Ribbon Feed	
156436	7-16	Arm, Front Ribbon Reversing	
156437	7-16	Arm, Rear Ribbon Reversing	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
156440	7-16	Lever, Ribbon Reversing	
156442	7-16	Pawl, Ribbon Reversing	
156462	7-9	Bail, Oscillating	
156465	7-2	Washer, Spring	
156466	7-8	Rack, Type Wheel	
156467	7-2	Ring, Retaining	
156472	7-14	Post, Spring	
156473	7-22	Shaft, Main	
156476	7-8	Hammer, Print	
156478	7-8	Accelerator, Hammer	
156484	7-17	Bracket	
156488	7-17	Post, Spring	
156489	7-8,-27	Bushing, Ribbon Guide	
156490	7-1	Guidepost	
156492	7-7	Bracket, Guide	
156493	7-9	Stud	
156501	7-7,-8,-27	Screw, 6-40 x 7/32 Fil	
156515	7-20	Washer, Felt	
156536	7-11,-14,-31	Screw, 4-40 x 1/8 Fil	
156558	7-8	Washer, Felt	
156576	7-2	Washer, Felt	
156577	7-5	Roller, Detent Lever	
156740	7-4	Screw, 6-40 x 7/32 Hex	
156835	7-8	Ring, Retaining	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
156867	7-1,-2,-7,-10, -14,-17,-21	Frame, Main	
156869	7-8,-9	Guide, Ribbon	
156870	7-9	Lever, Ribbon Oscillating	
156871	7-2	Bail, Operating Blade	
156872	7-2	Blade, Operating	
156874	7-7,-10	Screw, 4-40 x 15/16 Fil	
156875	7-10	Screw, 6-40 x 5/32 Fil	
156876	7-2	Bushing	
156877	7-2	Washer, Felt	
156880	7-15	Jumper, 2-3/8" Black	
156881	7-15	Jumper, 1-1/2" Black	
156884	7-6	Arm, Rocker	
156899	7-2	Stud, Eccentric	
156900	7-2	Roller	
156901	7-16	Post, Eccentric	
156905	7-8	Block, Rack Guide	
156908	7-9	Post, Sector Pivot	
156909	7-9	Post, Toggle Link	
156921	7-2	Guide, Adjusting Lever	
156922	7-11	Arm, Lock Release	
156924	7-10	Plate, Drive Link	
156925	7-10	Roller, Drive Link	
156931	7-8,-27	Bracket, Hammer Mounting	
156937	7-2,-17	Link, Printing Drive	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
156938	7-17	Screw, 6-40 Eccentric Shldr	
156941	7-1	Cam, Selector	
156948	7-9	Wick, Felt	
156976	7-25	Connector, 32-Pt Plug	
156987	7-2	Screw, 6-40 Spl	
156988	7-2	Race, Outer	
156989	7-2	Bearing	
156990	7-2	Race, Inner	
156991	7-18	Pawl, Feed	
156994	7-2	Strip, Felt	
156995	7-2	Post	
156998	7-2	Retainer, Roller	
157194	7-15	Retainer, Spring	
157237	7-15	Shield, Terminal	
157252	7-20	Bushing	
157261	7-12	Shaft, Stop Arm	
158701	7-3	Gear, 35T	
158745	7-2	Clamp, Bearing	
158772	7-13	Screw, 4-40 x 5/8 Hex	
158777	7-32	Holder, Screw	
158807	7-24	Screw, 3-48 x 11/64 Fil	
158816	7-21,-23	Spring, Contact	
158817	7-21	Stiffener	
158925	7-4	Slide, Tape Depressor	
158946	7-25	Cable Assembly	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
159011	7-1	Bracket, Spring	
159180	7-31	Lubricator Assembly	
159181	7-31	Lubricator	
159184	7-31	Wick, Lubricating	
159185	7-31	Retainer, Wick	
159233	7-4	Stud	
159341	7-2	Camsleeve	
159363	7-26	Modification Kit	
159365	7-4	Modification Kit	
159404	7-10	Post	
159406	7-18	Bracket, Spring	
159411	7-2	Bearing Assembly	
159413	7-16	Plate, Ribbon Reversing	
159427	7-1	Bracket, Stop	
159430	7-1	Lever, Slide Trip	
159431	7-1	Lever, Main Trip	
159434	7-17	Plate, Lifter Mounting	
159437	7-11	Arm, Figs Yield	
159438	7-11	Arm, Ltrs Yield	
159441	7-1	Guide, Bellcrank	
159447	7-11	Bellcrank	
159448	7-11	Bellcrank	
159450	7-11	Bellcrank	
159459	7-13	Spring	

Table 7-1. Typing Reperfcrator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
159460	7-11	Link, Toggle	
159467	7-14,-29	Holder, Wick	
159468	7-11	Arm, Lock	
159470	7-11	Shaft, Lock Arm	
159471	7-11	Bellcrank, Ltrs-Figs	
159472	7-1,-8,-11,-13, -14	Plate, Main	
159476	7-11	Arm, Figs	
159477	7-11	Arm, Ltrs	
159480	7-8	Bushing, Eccentric	
159481	7-11	Arm, Figs Extension	
159482	7-11	Arm, Ltrs Extension	
159483	7-11	Bracket, Spring	
159487	7-11	Plate, Function Box Front	
159488	7-13	Bracket, Transfer Mounting	
159489	7-13	Plate, No. 1	
159490	7-13	Plate, No. 4	
159491	7-13	Plate, No. 2	
159492	7-13	Plate, No. 0	
159493	7-13	Plate, No. 5	
159494	7-13	Plate, No. 3	
159495	7-13	Beam, No. 5 Pulse	
159496	7-13	Beam, No. 3 Pulse	
159497	7-13	Beam, No. 2 Pulse	
159498	7-13	Lever, No. 5 Pulse	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
159499	7-13	Lever, No. 3, No. 4, No. 5 Transfer	
159500	7-13	Beam, No. 4 Pulse	
159501	7-13	Beam, No. 1 Pulse	
159502	7-13	Guide, Transfer Lever	
159503	7-11	Shaft	
159504	7-13	Spacer, 0.037" Thk	
159506	7-2	Post	
159508	7-13	Lever, No. 1 and No. 2 Transfer	
159512	7-17	Link, Printing Trip	
159514	7-11	Blade, Blank Function	
159515	7-11	Blade, Figs Function	
159516	7-11	Blade, Ltrs Function	
159517	7-11	Blade, Function	
159518	7-11	Blade, Function	
159519	7-9	Bushing, Drive Bail	
159522	7-9	Bushing, Drive Bails	
159523	7-9,-10	Bail, Oscillating Drive	
159525	7-8,-9,-10	Bracket, Axial Mounting	
159526	7-10,-17	Link, Oscillating	
159528	7-7	Pushbar, No. 5	
159529	7-7	Pushbar, No. 3	
159530	7-7	Pushbar, No. 4	
159531	7-7	Pushbar, Ltrs	
159532	7-7	Pushbar, Figs	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
159535	7-7,-8,-10,-11, -16,-20,-27	Plate, Front	
159536	7-8	Gear, 15T	
159539	7-17	Arm, Printing Pivot	
159544	7-1	Release, Clutch	
159560	7-4,-28	Spring	
159563	7-7	Pushbar, Letters	
159597	7-9	Washer, Flat	
159613	7-18	Arm, Clamp	
159621	7-4	Screw, 6-40 Shoulder	
159622	7-4	Clamp, Adjusting	
159625	7-2	Bracket, Bail Guide	
159642	7-7	Shim, 0.008" Thk	
159643	7-10	Shim, 0.008" Thk	
159654	7-17	Latch, Printing	
159655	7-25	Cable w/Terminals	
159656	7-19	Block Assembly, Punch	
159658	7-8	Screw, 6-40 x 1-3/32 Hex	
159659	7-8	Shaft, Eccentric	
159900	7-26	Plate	
159901	7-26	Plate w/Post	
159902	7-26	Shaft, Rake	
159903	7-26	Bellcrank	
159909	7-26	Pawl, Feed	
159910	7-26	Latch, Return	

Table 7-1. Typing Reperforator (LPF) - Continued

Part Number	Figure Number(s)	Description	Notes
159911	7-26	Plate	
159912	7-26	Gear, Segment	
159913	7-26	Screw, 6-40 Eccentric	
159916	7-26	Eccentric	
159981	7-4	Spacer, 0.109" Thk	
159987	7-26	Bracket, Guide	
159993	7-16	Bracket, Spring	
159994	7-17	Plate, Lifter Arm Lock	
159995	7-17	Arm, Lifter	
159997	7-17	Screw, 6-40 Eccentric	
160182	7-15	Bracket w/Button	
160184	7-15	Plate, Stop	
160186	7-15	Bushing, Shoulder	
160404	7-23	Spring, Contact	
160480	7-6	Pusher, Tape	
160583	7-21,-23	Spring, Contact	
160593	7-21	Terminal	
160674	7-26	Nut, 6-40 Shoulder	
160839	7-2	Spacer, Shoulder	
160842	7-18	Washer, Spring	
160843	7-20	Spring	
160846	7-9	Bushing, Shoulder	
160943	7-8,-27	Housing, Type Wheel Shaft	
160948	7-5	Screw, 2-56 Spl	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
160987	7-29	Pad, Tape Container	
161107	7-5	Stud	
161108	7-4	Stud	
161109	7-5,-6	Guidepost	
161139	7-5	Nut, 6-40 Hex	
161237	7-24	Cable Assembly	
161238	7-24	Connector, 36-Pt Receptacle	
161239	7-24	Connector, 36-Pt Receptacle	
161240	7-24	Bracket, Connector	
161305	7-24	Cable Assembly	
161318	7-23	Bracket	
161319	7-23	Lever	
161320	7-23	Contact Assembly	
161321	7-23	Contact Assembly, Ltrs-Figs	
161323	7-8,-27	Housing, Gear	
161324	7-8	Washer, Flat	
161342	7-14,-31	Lever, Start	
161347	7-11,-21	Washer, Felt	
161355	7-23	Cable w/Terminals	
161431	7-8	Lever, Rotary Correcting	
161440	7-10,-17	Spring	
161443	7-10	Detent, Axial Shaft	
161444	7-7	Detent, Rotary Shaft	
161524	7-8	Shaft, Hammer	
161770	7-37	Bracket, Mounting	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
162064	7-24	Cable w/Terminals	
162247	7-23	Contact Assembly, Ltrs-Figs	
162248	7-3	Hub	
162340	7-22	Sleeve	
162341	7-22	Bearing	
162347	7-16	Arm, Ribbon Drive	
162350	7-2,-17	Bail, Rocker	
162763	7-6	Bail, Reset	
162765	7-31	Bracket	
162850	7-20,-27,-34	Handle	
162862	7-1,-18	Bar, Mounting	
162886	7-11	Screw, 4-40 x 7/32 Hex	
163113	7-8	Washer, Flat	
163303	7-17	Bracket, Spring	
163327	7-18	Ring, Retaining	
163429	7-17	Screw, 6-40 Shoulder	
163476	7-3	Gear, 42T	
163587	7-37	Bracket, Mounting	
163674	7-28	Chute, Chad	
163675 thru 163690	7-30	Type Wheel	
164386	7-15	Bracket, Magnet Mounting	
164402	7-11	Blade, Uncoded Function	
164511	7-5	Lever w/Hub	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
164513	7-6	Pawl, Feed	
164514	7-4	Guide, Tape	
164515	7-5	Spring, Torsion	
164520	7-16,-20	Feed Assembly, Ribbon	
164521	7-20,-27	Plate w/Studs	
164525	7-20	Post, Spring	
164526	7-20	Slide w/Post	
164528	7-20	Bushing	
164529	7-20	Lever, Ribbon Reverse	
164530	7-20	Bushing	
164531	7-20	Pawl, Check	
164532	7-20	Pawl, Feed	
164535	7-20	Shaft, Right Ribbon Ratchet	
164538	7-20	Shaft, Left Ribbon Ratchet	
164539	7-20	Spring, Compression	
164540	7-20	Detent	
164541	7-20,-27	Arm, Ribbon Drive	
164543	7-20	Lever, Adjustable Extension	
164958	7-32	Screw, 4-40 x 1/2 Hex	
164963	7-4	Modification Kit	
164964	7-20	Washer, Felt	
164965	7-20	Washer, Flat	
165027	7-15	Network, Spark Suppression	
170219	7-5,-28	Stud, Die Wheel	
170239	7-6	Bracket, Spring	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
170241	7-4,-5,-28	Screw, 6-40 Adjusting	
170242	7-4,-28	Slide, Feed Hole Punch	
170243	7-4,-28	Slide, Code Hole Punch	
170246	7-4	Slide w/Insulator	
170247	7-4,-28	Guide	
170248	7-28	Pin, Feed Hole Punch	
170249	7-28	Pin, Feed Hole Punch	
170778	7-19	Block Assembly, Punch	
170779	7-19,-28	Wheel, Feed	
170788	7-5,-28	Wheel, Die	
170803	7-19	Bail, Retractor	
170879	7-4	Slide, Feed Hole Punch	
171954	7-32	Connector, Blue Shielding	
172631	7-3	Gear, 42T	
172638	7-4	Screw, 6-40 x 9/32 Hex	
172640	7-26	Modification Kit	
172983	7-6	Bracket, Spring	
172984	7-19,-28	Bracket, Spring	
172993	7-19,-28	Spring	
173125	7-18	Spacer, 0.050" Thk	
173126	7-18	Arm	
173128	7-21	Bracket, Mounting	
173129	7-21	Stud	
173130	7-21	Pawl, Contact	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
173131	7-21	Bellcrank	
173133	7-18	Pawl, Feed	
173134	7-18	Cable	
173150	7-21	Bracket, Supporting	
173200	7-3,-22	Sleeve, Bearing	
173336	7-3,-22	Modification Kit	
173340	7-3,-22	Collar	
173754	7-8,-27	Spacer	
173755	7-8,-27	Guide, Ribbon	
173756	7-8,-27	Lever, Print Hammer	
173770	7-19,-28	Block Assembly, Punch	
173775	7-8,-27	Shaft, Type Wheel	
173965	7-30	Type Wheel	
173967 thru 173971	7-30	Type Wheel	
173977	7-8,-27	Shaft, Print Hammer	
173978	7-8,-27	Spring, Torsion	
173979	7-8,-27	Head, Hammer	
173980	7-8	Lever, Print Hammer	
173981	7-8,-27	Accelerator, Hammer	
174150	7-19	Block Assembly, Punch	
174151	7-4	Guide, 7/8" Tape	
174152	7-5	Guide, Tape	
174155	7-5	Guide, Tape	
174317	7-11	Blade, Function	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
174357	7-19	Block Assembly, Punch	
175500 thru 175507	7-30	Type Wheel	
175510 thru 175529	7-30	Type Wheel	
175531 thru 175539	7-30	Type Wheel	
175543	7-30	Type Wheel	
175544	7-30	Type Wheel	
175546	7-30	Type Wheel	
175547	7-30	Type Wheel	
175550	7-30	Type Wheel	
175552 thru 175574	7-30	Type Wheel	
175576 thru 175579	7-30	Type Wheel	
175581 thru 175593	7-30	Type Wheel	
175595 thru 175634	7-30	Type Wheel	
175636 thru 175640	7-30	Type Wheel	
175642 thru 175653	7-30	Type Wheel	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
175655 thru 175667	7-30	Type Wheel	
175669 thru 175672	7-30	Type Wheel	
175674 thru 175701	7-30	Type Wheel	
175705 thru 175710	7-30	Type Wheel	
175712 thru 175716	7-30	Type Wheel	
175718 thru 175724	7-30	Type Wheel	
175727 thru 175736	7-30	Type Wheel	
175739 thru 175752	7-30	Type Wheel	
176092	7-35	Bracket	
176138	7-8	Modification Kit	
176151	7-28	Pin, Guide	
176252	7-2,-33	Washer, Flat	
176254	7-11	Blade, Function	
176266	7-1	Spring, Torsion	
176489	7-1,-2	Guide	
176490	7-1,-14,-18	Bracket w/Hubs	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
176491	7-1	Bracket Assembly	
176640	7-14,-27	Guard, Tape	
176673	7-15	Suppressor Assembly, Spark	
178178	7-20,-27	Lever, Adjusting	
178834	7-27,-28	Modification Kit	
179274	7-5,-19	Wheel, Feed	
179462	7-11	Blade, Uncoded Function	
179579	7-20	Decalcomania, Arrow	
179628	7-24	Cable Assembly	
180718	7-5	Spring	
181204	7-32	Washer, Flat	
181284	7-1	Spring	
192661	7-2	Post	
192709	7-2	Link w/Hub	
192849	7-10	Pushbar, No. 2	
192877	7-8	Bushing, Guide	
193879	7-10	Pushbar, No. 1	
193966	7-29	Bracket w/Stud	
193968	7-29	Post	
193969	7-29,-33	Post	
193972	7-29	Extension w/Stud	
193973	7-14	Platform, Tape	
193974	7-29	Depressor, Tape	
193983	7-29	Guide, Tape	
193987	7-29,-33	Bracket, Roller	

Table 7-1. Typing Reperforator (LPF) - Continued

Part Number	Figure Number(s)	Description	Notes
193988	7-14,-29	Modification Kit	
194076	7-29	Modification Kit	
194081	7-37	Guide, Tape	
194117	7-29	Plate, Clamp	
194118	7-29	Spring, Torsion	
194122	7-29	Platform w/Guide, Tape	
194123	7-29	Screw, 4-40 Spl	
194992	7-4	Modification Kit	
194993	7-4,-19	Guide, Tape	
195231	7-29	Spring, Compression	
195233	7-29	Roller	
195235	7-2	Bail, Rocker	
195251	7-15	Armature, Selector	
195284	7-8	Ring	
195401	7-24	Cable w/Terminals	
195634	7-15	Modification Kit	
199417	7-28	Screw, 2-56 x 5/32 Fil	
199506	7-19	Gasket	
304515	7-5	Modification Kit	
304516	7-5	Shaft, Feed Wheel	
304542	7-17	Extension, Drive Link	
304543	7-10	Plate, Corrector	
305638	7-6	Bracket, Guide	
306755	7-14,-31	Lever, Marking Lock	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
307300 thru 307312	7-30	Type Wheel	
307314 thru 307323	7-30	Type Wheel	
307326 thru 307338	7-30	Type Wheel	
307340 thru 307351	7-30	Type Wheel	
307353 thru 307358	7-30	Type Wheel	
307360 thru 307384	7-30	Type Wheel	
311717	7-33	Adapter, Wick	
311718	7-32	Bushing, Shoulder	
319202	7-32	Insulator	
319204	7-31,-32	Selector Assembly	
319207	7-32	Cover	
319208	7-32	Post	
319209	7-32	Plate, Nut	
319211	7-32	Bracket, Coil Mounting	
319212	7-32	Bracket w/Button	
319213	7-32	Bushing	
319214	7-32	Screw, 6-40 Spl	
319215	7-32	Anchor, Spring	
319216	7-32	Wedge	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
319217	7-32	Screw, Adjusting	
319219	7-32	Base w/Bushing	
319220	7-32	Armature	
319221	7-32	Spring	
319223	7-32	Lamination, Magnet	
319224	7-31	Plate, Tie	
319225	7-31,-32	Plate, Selector Mounting	
319226	7-31	Link	
319227	7-31	Link	
319228	7-31	Post	
319229	7-31	Screw, 4-40 Shoulder	
319234	7-33	Guide, Tape	
319235	7-33	Platform, Tape	
319236	7-33	Depressor, Tape	
319237	7-33	Post	
319238	7-32	Nut, 12-32 Hex	
319240	7-32,-34	Cable Assembly	
319241	7-32	Washer, Captive	
319242	7-32	Bushing, Slotted	
319243	7-32	Strip, 5" Shielded	
319246	7-32	Bushing	
319247	7-33	Cable Assembly	
319248	7-32	Strap	
320408	7-15	Terminal, Spade Type	

Table 7-1. Typing Reperforator (LPR) - Continued

Part Number	Figure Number(s)	Description	Notes
320410	7-23,-24,-25	Terminal, Spade Type	
320418	7-15,-24,-25	Terminal, Ring Type	
321235	7-32	Connector, 3 pt Receptacle	
321236	7-32	Coupling, Connector	
321237	7-32	Nut, 3/8-32 Spl	
321238	7-32	Sleeve	
321239	7-34	Bracket, Connector Mounting	
321283	7-35	Bracket, Connector Mounting	
326457	7-34	Bracket	
327120	7-29	Post	
327383	7-31,-32	Selector Assembly	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB)

Part Number	Figure Number(s)	Description	Notes
1156	7-58	Screw, 2-56 x 9/16 Fil	
1163	7-44	Screw, 4-40 x 3/16 Fil	
1164	7-65	Screw, 2-56 x 3/16 Fil	
1178	7-54,-65	Screw, 2-56 x 7/16 Fil	
1210	7-49,-60	Screw, 2-56 x 5/8 Fil	
1245	7-57	Screw, 10-32 x 1" Fil	
1264	7-63	Screw, 10-32 x 1/2 Flat	
2191	7-38 thru -59, -61 thru -71	Lockwasher	
2263	7-59	Nut, 8-32 Hex	
2382	7-64	Lockwasher	
2449	7-40,-41,-49,-53	Lockwasher	
2669	7-39 thru -42, -44 thru -50, -57,-59,-62 thru -65,-68	Lockwasher	
2836	7-60	Spring	
3438	7-40,-41,-46,-48, -49,-57,-59,-64	Washer, Flat	
3598	7-38,-42,-43,-47, -49,-59,-61,-62, -65,-69,-71	Nut, 6-40 Hex	
3599	7-38	Nut, 4-40 Hex	
3606	7-49,-50,-66,-68	Nut, 6-40 Hex	
3624	7-45,-54,-60,-66	Washer, Flat	
3640	7-39,-41,-45,-48, -51,-52,-57,-58, -60,-66,-71	Lockwasher	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
3646	7-41,-57,-59,-64, -73	Lockwasher	
3649	7-57	Washer, Flat	
3870	7-49	Spring	
3899	7-66	Spacer, 0.188" Thk	
6345	7-38	Nut, 6-32 Hex	
6565	7-41,-57,-59,-64	Screw, 8-32 x 1-1/4 Fil	
7002	7-38,-40 thru -43,-45,-46,-47, -49,-54,-57,-58, -59,-61,-62,-64, -65,-66,-68,-71	Washer, Flat	
7599	7-51	Spring, Compression	
8449	7-45,-49,-54,-66, -67	Spacer, 0.094" Thk	
22015	7-58	Spring	
25123	7-53	Screw, 1/4-32 x 7/16 Hex	
35503	7-68	Foot, Rubber	
35551	7-63	Screw, 10-32 x 3/8 Flat	
42062	7-57	Washer, Flat	
44048	7-59,-69	Washer, Flat	
45815	7-54,-59,-64	Lockwasher	
70314	7-58	Washer, Flat	
71073	7-49	Washer, Flat	
71858	7-49	Washer, Flat	
74100	7-54	Washer, Leather	
74479	7-67	Bushing	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
74805	7-57	Screw, 10-32 x 3/4 Hex	
74807	7-47,-62	Nut, 10-32 Shoulder Hex	
75750	7-43	Washer, Insulating	
76081	7-47	Washer, Flat	
76379	7-45	Spring	
76461	7-49,-67,-68	Washer, Flat	
77902	7-43	Screw, 6-40 x 2-3/8 Rd	
78596	7-47	Washer, Friction	
80342	7-67	Screw, 6-40 x 23/64 Hex	
82725	7-47,-62	Spring	
82832	7-49	Lockwasher	
83877	7-45,-66	Spring	
84354	7-53	Washer, Flat	
90560	7-71	Washer, Flat	
90606	7-49,-66	Spring	
90790	7-45	Washer, Flat	
91683	7-41,-42,-44,-55, -70	Nut, 15/32-32 Hex	
91684	7-41,-42,-44,-55, -70	Nut, 15/32-32 Ring	
91768	7-57,-59,-70	Jumper, 3-1/2" Black	
92146	7-49	Nut, 1/4-20 Hex	
92260	7-47,-59,-73	Lockwasher	
92265	7-49	Screw, 2-56 x 1/8 Rd	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
93117	7-45,-49,-54,-58, -60,-65,-66	Lockwasher	
95320	7-41,-42,-70	Switch, SP-ST Toggle	
97981	7-66	Spacer	
98659	7-39	Bracket, Switch	
98718	7-67	Washer, Flat	
98726	7-64,-65	Screw, 3-48 x 1/4 Fil	
98736	7-44	Switch, SP-ST Toggle	
99381	7-41,-57,-59,-64	Foot, Pubber	
99978	7-55	Connector, 4-Pt Plug	
101633	7-50	Washer, Flat	
102465	7-61	Screw, 6-40 x 37/64 Fil	
103033	7-67	Lid, Tape Reel	
103323	7-58	Washer, Flat	
104124	7-40,-41	Screw, 1/4-32 x 11/32 Hex	
104807	7-71	Washer, Flat	
107116	7-38	Lockwasher	
107393	7-39	Switch, SP-ST Toggle	
110126	7-67,-69	Lockwasher	
110191	7-67	Lockwasher	
110435	7-49,-54	Nut, 4-40 Hex	
110437	7-54	Spring	
110438	7-60	Spring	
110664	7-59	Switch, SP-ST Toggle	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LPB) - Continued

Part Number	Figure Number(s)	Description	Notes
110743	7-38,-44,-47,-49, -51,-54,-62,-68, -71	Lockwasher	
111017	7-39,-41,-44,-57, -59,-65,-68	Screw, 6-40 x 5/16 Fil	
111289	7-68	Block, Terminal	
111427	7-67	Washer, Flat	
111516	7-54	Washer, Flat	
111776	7-66	Connector, 4-Pt Plug	
111777	7-65,-66	Connector, 4-Pt Receptacle	
112080	7-67	Washer, Flat	
112626	7-39,-54,-57,-63	Nut, 10-32 Hex	
113850	7-47	Washer, Flat	
114125	7-47,-51,-62	Screw, 6-40 x 3/8 Hex	
114347	7-57	Post	
114466	7-39,-41,-64	Connector, 3-Pt Receptacle	
114467	7-39,-41,-64	Connector, 3-Pt Plug	
115130	7-58	Spacer, 0.062" Thk	
115594	7-68	Nut, Speed	
116669	7-64	Lens, Red	
116699	7-64	Lamp, 1/25 Watt Neon	
116783	7-41,-42,-44,-57, -59,-65	Holder, Fuse	
116785	7-38	Fuse, 0.3 Amp	
117227	7-61,-62	Bearing, Ball	
117535	7-44,-49,-59,-63	Washer, Flat	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
118511	7-42	Fuse, 1/8 Amp	
118589	7-42	Switch, Black Pushbutton	
118609	7-57	Holder, Fuse	
119467	7-45,-54,-60,-66	Insulator, 0.032" Thk	
119634	7-57	Button, Plug	
119649	7-66	Ring, Retaining	
119651	7-47,-51,-62	Ring, Retaining	
119652	7-51,-58,-60,-62	Ring, Retaining	
119653	7-47,-60	Ring, Retaining	
119654	7-46,-61	Ring, Retaining	
119655	7-46,-58,-61	Ring, Retaining	
119658	7-67	Ring, Retaining	
120175	7-39,-41,-42,-44, -55,-64,-68	Plate, ON-OFF	
120206	7-64	Socket, Lamp	
121242	7-41,-42,-57,-64	Clamp, 1/8" ID Cable	
121243	7-45,-67	Clamp, 3/16" ID Cable	
121244	7-40,-42,-59	Clamp, 1/4" ID Cable	
121245	7-41,-67	Clamp, 5/16" ID Cable	
121246	7-59	Clamp, 3/8" ID Cable	
121247	7-59	Clamp, 7/16" ID Cable	
121249	7-54	Clamp, 5/8" ID Cable	
121416	7-67	Roller	
121418	7-67	Screw, 6-40 Shoulder	
121551	7-67	Screw, 8-32 x 1/4 Hex	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
122245	7-42	Capacitor, 43 to 48 Mfd	
123539	7-57	Clamp, Cable	
123706	7-40,-63	Screw, 10-32 x 1/4 Flat	
124177	7-47,-51,-62	Lockwasher	
124396	7-41,-64,-68	Switch Assembly	
124611	7-59	Screw, 8-32 x 3/8 Hex	
124612	7-69	Screw, 8-32 x 1/2 Hex	
124999	7-45,-54,-58,-60, -66	Switch, Sensitive	
125011	7-38,-44,-58,-60, -66,-71	Washer, Flat	
125015	7-41,-43,-45,-49, -50,-53,-59,-61, -62,-66,-67,-68, -69	Washer, Flat	
125205	7-46,-61	Screw, 6-40 x 7/16 Fil	
125224	7-40,-41	Nut, 1/4-32 Hex	
125229	7-58	Nut, 6-32 Hex	
125250	7-54	Spring	
126959	7-44	Washer, Flat	
129919	7-41,-44	Fuse, SI-BL 4 Amp	
129933	7-43	Resistor, 1200 Ohm	
130499	7-47,-50,-51	Bearing, Ball	
130892	7-47,-51,-62	Washer, Felt	
136148	7-41	Modification Kit	
138538	7-42,-59	Fuse, SI-BL 2 Amp	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LPB) - Continued

Part Number	Figure Number(s)	Description	Notes
142269	7-57	Fuse, SI-BL 3 Amp	
142612	7-66	Guide	
142615	7-66	Guide, Tape	
142622	7-66	Reel, Tape	
142623	7-66	Reel, Tape	
142624	7-66	Roller	
142625	7-66	Shaft	
142626	7-66	Bracket	
142636	7-66	Spacer, 1.078" Thk	
142637	7-66	Spacer, 1.203" Thk	
142648	7-66	Retainer	
142665	7-41,-57,-59,-64	Nut, 8-32 Spl	
142709	7-65	Fuse, 2 Amp	
144727	7-65	Keytop w/Shaft	
144729	7-65	Bracket	
144731	7-65	Plate, Switch Actuator	
144732	7-65	Insulator	
144733	7-65	Spring, Compression	
144734	7-65	Plate, Retaining	
145320	7-55	Connector, 4-Pt Receptacle	
148318	7-38	Board, Terminal	
148641	7-43	Bracket, Mounting	
148644	7-43	Plate, Lower Base	
150089	7-47,-48,-51,-62	Screw, 4-40 x 1/2 Fil	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
150336	7-66	Bushing	
150456	7-47,-62	Spacer, 0.050" Thk	
150652	7-51	Screw, 4-40 x 37/64 Fil	
150711	7-67	Washer, Flat	
150949	7-49	Plate, Serial	
150950	7-49	Plate, Code	
150966	7-39,-65	Insulator, Terminal	
150992	7-49,-54	Stud	
151073	7-58	Screw, 4-40 x 5/32 Fil	
151152	7-51-71	Screw, 4-40 x 3/16 Hex	
151229	7-49,-64	Washer, Flat	
151245	7-60	Washer, Felt	
151335	7-39,-41,-57,-59, -65,-68,-69	Stud	
151346	7-46,-48,-50,-51, -58,-61	Screw, 6-40 x 3/8 Fil	
151411	7-39,-41,-44,-59	Block, Terminal	
151412	7-39,-41,-44,-59	Insulator	
151415	7-39,-65	Block, Terminal	
151416	7-39,-41,-44,-57, -59,-65	Nut, 6-40 Hex	
151442	7-38,-47,-50,-58, -59,-61	Screw, 6-40 x 1/2 Hex	
151453	7-64	Nut, 10-32 Hex	
151540	7-42	Lampholder	
151556	7-63	Knob w/Setscrew	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
151562	7-42	Lamp, 115V Incandescent	
151572	7-53,-64	Lockwasher	
151606	7-41,-42,-50,-64, -65,-68	Screw, 10-32 x 1/4 Hex	
151610	7-45,-46,-54,-59, -61	Washer, Flat	
151618	7-51	Screw, 6-40 x 7/16 Fil	
151630	7-39,-41,-42,-45 thru -50,-54, -57,-58,-59,-61 thru 66,-68,-71, -73	Screw, 6-40 x 1/4 Hex	
151631	7-38,-40,-41,-42, -43,-45,-46,-49, -50,-53,-57,-58, -59,-67	Screw, 6-40 x 5/16 Hex	
151632	7-38,-46,-49,-50, -53,-54,-57,-59, -61,-62,-65,-69, -71	Screw, 6-40 x 3/8 Hex	
151637	7-39,-41,-57	Screw, 4-40 x 1/4 Fil	
151657	7-48,-51,-65,-66, -68	Screw, 6-40 x 1/4 Fil	
151658	7-41,-50,-52,-68	Screw, 6-40 x 5/16 Fil	
151660	7-59	Screw, 6-40 x 7/8 Fil	
151685	7-66,-68	Screw, 4-40 x 5/16 Fil	
151686	7-44	Screw, 4-40 x 3/8 Fil	
151688	7-67	Screw, 4-40 x 5/8 Fil	
151690	7-47	Screw, 10-32 x 5/16 Fil	
151691	7-59	Screw, 10-32 x 3/8 Fil	
151692	7-47,-64,-69	Screw, 6-40 x 3/16 Fil	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
151693	7-44	Screw, 6-40 x 9/16 Fil	
151694	7-48,-58	Screw, 6-40 x 11/32 Fil	
151712	7-57	Button, Pivot	
151721	7-45,-62,-66	Screw, 6-40 x 3/4 Hex	
151722	7-38,-39,-41,-58, -67,-68	Screw, 6-40 x 3/16 Hex	
151723	7-40,-44,-49,-59, -63,-64	Screw, 10-32 x 3/8 Hex	
151724	7-59,-64	Screw, 10-32 x 5/8 Hex	
151731	7-52	Screw, 4-40 x 7/8 Fil	
151732	7-42,-47,-51,-62	Screw, 4-40 x 11/32 Fil	
151733	7-47,-49,-51,-54	Screw, 4-40 x 9/16 Fil	
151737	7-60	Screw, 4-40 x 11/64 Hex	
151819	7-57,-59,-70	Jumper, 3" Black	
151827	7-41,-59	Strap, Terminal	
151880	7-47,-52,-66	Nut, 4-40 Hex	
151922	7-57	Clamp	
151925	7-57	Clamp	
152495	7-38	Bushing	
152890	7-67	Washer, Flat	
152893	7-71	Screw, 4-40 x 1/4 Hex	
153442	7-39,-44,-49,-54	Screw, 10-32 x 1/4 Hex	
153459	7-69	Block, Terminal	
153484	7-69	Screw, 6-32 Spl	
153537	7-67	Screw, 6-40 x 9/32 Hex	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
153538	7-54,-58	Screw, 6-40 x 7/16 Hex	
153539	7-45,-49,-54,-66	Screw, 6-40 x 11/16 Hex	
153819	7-49,-64,-65,-69	Lockwasher	
153839	7-67	Screw, 6-40 x 5/8 Hex	
153841	7-68	Screw, 6-40 x 9/16 Hex	
154076	7-53	Plate, Nut	
154406	7-68	Block, Terminal	
154437	7-69	Insulator, Terminal	
154438	7-69	Insulator, Terminal	
154446	7-69	Cover	
154697	7-57	Grommet, Rubber	
155023	7-55	Switch, DP-DT Toggle	
155750	7-39,-42,-55,-70	Sleeve, 3/32" ID x 1/2" Lg Insulating	
155751	7-39,-45,-66	Sleeve, 1/8" ID x 1" Lg Insulating	
155752	7-42,-64,-70	Sleeve, 5/64" ID x 1/2" Lg Insulating	
155753	7-38,-42,-44,-45, -55,-60,-70	Sleeve, 1/8" ID x 1/2" Lg Insulating	
155754	7-42,-59,-64,-70	Sleeve, 1/16" ID x 1/2" Lg Insulating	
155755	7-38,-41,-57,-58, -64	Sleeve, 11/64" ID x 5/8" Lg Insulating	
155861	7-67	Lockwasher	
155954	7-65	Switch, Sensitive	
156057	7-51	Washer, Flat	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
156226	7-46,-48,-58,-61	Hub	
156334	7-40,-41	Stud	
156336	7-40,-41	Post	
156337	7-41,-57,-59,-64	Washer, Flat	
156338	7-40,-41	Post	
156339	7-41,-57,-59,-64	Bushing	
156340	7-39	Bracket	
156342	7-45	Plate	
156343	7-48	Hub	
156344	7-40,-41	Bracket, Adjusting	
156398	7-48	Holder, Bearing	
156400	7-48,-51	Pulley, 28T	
156444	7-41	Plate, Lower Base	
156445	7-41	Bracket, Switch	
156446	7-41	Handle	
156448	7-45,-49,-54,-66	Bushing	
156449	7-45,-49,-54,-66	Lever, Switch	
156451	7-45,-49,-54,-66	Bushing	
156452	7-45,-66	Lever, Tape	
156460	7-40,-42,-45	Container, Tape	
156470	7-45	Guide, Tape	
156501	7-66	Screw, 6-40 x 7/32 Fil	
156588	7-50	Ring, Retaining	
156656	7-64	Jumper, 2-3/4" Black	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
156768	7-59,-67,-73	Screw, 8-32 x 9/32 Hex	
156769	7-49	Plate, Teletype Ident	
156807	7-50	Disc	
156808	7-50	Disc	
156861	7-46,-48,-61	Ring, Retaining	
156864	7-48	Pulley, 16T	
156866	7-46,-48,-61	Belt, 55T	
156887	7-40,-41,-46,-48, -57,-59	Screw, 10-32 x 9/16 Hex	
156898	7-39	Cable w/Terminals	
156904	7-48	Guard	
156936	7-40,-41	Screw, 1/4-32 x 5/16 Hex	
156949	7-46,-61	Gear, 36T	
156950	7-47	Shaft w/Bearing	
156951	7-47	Link	
156952	7-47,-62	Lever, Guide	
156953	7-47	Hub, Sprocket	
156954	7-47,-62	Stud	
156955	7-47	Pulley, 24T	
156956	7-47	Retainer, Belt	
156958	7-46	Pulley, 21T	
156959	7-47	Bushing	
156960	7-47	Screw, 6-40 Shoulder	
156961	7-47	Screw, 6-40 Shoulder	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
156962	7-47,-62	Ring, Retaining	
156964	7-46,-61	Pinion, 9T	
156965	7-46	Frame, Gearshift	
156966	7-39,-40,-48	Plate, Base	
156967	7-46	Shaft, Drive	
156968	7-46	Plate, Guide	
156971	7-45,-66	Screw, 2-56 x 3/4 Fil	
156972	7-45	Cable Assembly	
156974	7-45	Container Assembly, Tape	
156975	7-39	Bracket, Connector Mounting	
156976	7-39,-70	Connector, 32-Pt Plug	
156978	7-39	Cable Assembly	
156981	7-48	Gear, 44T	
156982	7-48	Pinion, 9T	
156983	7-48	Gear, 47T	
156984	7-48	Pinion, 12T	
156985	7-48	Gear, 42T	
156986	7-48	Pinion, 14T	
158163	7-49	Switch, Sensitive	
158215	7-42,-71	Plate, Nut	
158238	7-54	Plate	
158239	7-49,-54,-58	Lever, Tape	
158250	7-57	Block, Terminal	
158252	7-57	Insulator, Terminal	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRE) - Continued

Part Number	Figure Number(s)	Description	Notes
158289	7-45,-49,-54	Reel, Tape	
158640	7-67	Motor, 115 VAC Shaded Pole	
158712	7-46,-51	Gear, 26T	
158716	7-47,-51	Gear, 39T	
158723	7-47,-51,-62	Roller	
158732	7-46,-51	Gear, 24T and 18T	
158733	7-47,-51,-62	Gear, 44T	
158734	7-47,-51	Gear, 47T	
158736	7-51	Nut, 6-40 Cap	
158740	7-47,-51,-62	Block	
158741	7-47,-51,-62	Bar	
158745	7-46,-48,-50	Clamp, Bearing	
158795	7-58	Plate	
158807	7-49,-69	Screw, 3-48 x 11/64 Fil	
159287	7-50	Retainer, Pinion	
159341	7-46,-50,-58	Bearing, Ball	
159377	7-48	Modification Kit	
159417	7-46,-47	Modification Kit	
159433	7-46	Plate, Grease Retainer	
159540	7-45,-66	Post, Spring	
159541	7-41,-70	Connector, 16-Pt Plug	
159542	7-41,-42,-70	Connector, 16-Pt Receptacle	
159543	7-45,-66	Washer, Flat	
159551	7-39	Cable w/Terminals	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
159589	7-41,-42	Bracket, Mounting	
159592	7-42	Cable Assembly	
159600	7-48	Shaft w/Bearing	
159603	7-45	Washer, Captive	
159604	7-45	Screw, 10-32 x 1/2 Hex	
159610	7-41,-57,-59,-64	Mount, Vibration	
159611	7-68	Bell	
159929	7-42	Bracket, Light Mounting	
159931	7-41	Clamp	
159932	7-41	Keeper	
159991	7-47	Plate, Clamp	
160307	7-42	Diode	
160369	7-55	Switch, NO Pushbutton	
161103	7-48	Gear, 49T	
161104	7-48	Pinion, 11T	
161238	7-44,-49,-64,-65, -69,-70	Connector, 36-Pt Receptacle	
161239	7-42,-59,-64,-65, -69,-70	Connector, 36-Pt Plug	
161301	7-50	Post	
161505	7-49	Stud	
161511	7-48,-51,-52	Retainer, Belt	
161519	7-48	Gearset, 67 WPM	
161523	7-54	Panel	
161527	7-54	Container Assembly, Tape	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
161529	7-54	Guide, Tape	
161654	7-48	Gearset, 60 WPM	
161655	7-48	Gearset, 75 WPM	
161656	7-48	Gearset, 100 WPM	
161682	7-68	Clip, Cover	
161770	7-49,-69	Bracket, Mounting	
161772	7-50,-51	Bracket	
161773	7-49	Container, Tape	
161777	7-53	Stud, Mounting	
161778	7-53	Stud, Mounting	
161779	7-50 thru -52	Shaft w/Bearing	
161780	7-50	Retainer	
161781	7-50	Hub	
161782	7-50	Gear, 90T	
161783	7-50	Pinion, 45T	
161784	7-52	Pinion, 18T	
161785	7-52	Pinion, 24T	
161786	7-52	Pinion, 26T	
161787	7-50,-51	Shaft w/Bearing	
161788	7-51,-52	Hub	
161789	7-51,-52	Pulley, 16T	
161790	7-52	Gear, 44T	
161791	7-52	Gear, 47T	
161792	7-52	Gear, 39T	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
161793	7-51	Block	
161794	7-51	Block, Slide	
161795	7-51	Stud	
161796	7-51	Stud	
161797	7-51	Plate, Index	
161798	7-53	Guide w/Bracket, Tape	
161800	7-53	Bracket	
161801	7-44	Bracket, Mounting	
161803	7-49	Guide, Tape	
161805	7-50	Guard, Gear	
161806	7-51	Belt, 48T	
161807	7-51	Gearshift Assembly	
161809	7-50	Stud	
161811	7-52	Gearset, 60 WPM	
161812	7-52	Gearset, 75 WPM	
161813	7-52	Gearset, 100 WPM	
161815	7-53	Modification Kit	
161817	7-44	Connector, 2-Pt Plug	
161818	7-70	Connector, 2-Pt Receptacle	
161819	7-50	Guard, Gear	
161821	7-49	Cable Assembly	
161824	7-50,-51	Stud	
161826	7-49	Plate	
161827	7-69	Modification Kit	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
161873	7-42	Resistor, 5000 Ohm	
161889	7-69	Cable Assembly	
161911	7-57	Knob, Black	
161912	7-57	Switch, SP-ST	
161914	7-69	Cable Assembly	
161959	7-69	Plate, Mounting	
161964	7-42	Clamp, Tube	
162072	7-57	Capacitor, 88 to 108 Mfd	
162075	7-45,-49,-54	Reel, Tape	
162077	7-40	Handle, Base	
162079	7-45	Container Assembly, Tape	
162181	7-42	Plate, Lower Base	
162182	7-42	Handle w/Strike	
162183	7-42	Bushing	
162185	7-42	Bracket, Switch	
162187	7-42	Bracket, Lampholder	
162218	7-48	Pulley, 29T	
162225	7-68	Bracket, Mounting	
162226	7-68	Bracket, Terminal Strip	
162228	7-68	Insulator, Terminal Block	
162230	7-68	Cover, Service Assembly	
162283	7-68	Plate, Lower Base	
162284	7-68	Insulator, Terminal	
162286	7-68	Cable	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
162287	7-68	Plate, Lower Base	
162288	7-68	Bar, Cover	
162373	7-45	Cable Assembly	
162574	7-42	Cable Assembly, Control	
162653	7-58,-61,-62	Retainer	
162730	7-49	Screw, 1/4-20 x 7/16 Hex	
162846	7-68	Modification Kit	
162900	7-64,-65	Plate, Lower Base	
162901	7-64,-65	Plate, Upper Base	
162902	7-64	Bracket, Switch	
162903	7-64	Bracket, Connector	
162904	7-64	Post	
162905	7-64	Post	
162906	7-64	Stud	
162920	7-71	Chute, Chad	
162957	7-67	Winder Assembly, Tape	
162958	7-67	Switch, Mercury	
162978	7-67	Disc, Tape Reel	
162980	7-67	Hub w/Balls	
162983	7-67	Arm, Tape Tension	
162985	7-67	Arm, Tape Guide	
162986	7-67	Cable	
163256	7-46,-47	Modification Kit	
163260	7-46	Gear, 36T	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
163261	7-46	Gear, 22T	
163262	7-47,-51,-62	Gear, 49T	
163263	7-47	Roller	
163264	7-46	Shaft, Gearshift	
163265	7-47	Block	
163280	7-41	Bracket, Mounting	
163281	7-41	Bracket	
163328	7-46	Plate, Guide	
163446	7-52	Pinion, 22T	
163447	7-52	Gear, 49T	
163448	7-52	Gearset, 70 WPM	
163449	7-52	Pinion, 27T	
163450	7-52	Gear, 40T	
163451	7-52	Gearset, 107 WPM	
163587	7-49,-69	Bracket, Mounting	
163674	7-71	Chute, Chad	
164272	7-71	Modification Kit	
164273	7-71	Chute, Chad	
164275	7-71	Chute, Chad	
164278	7-71	Chute, Chad	
164279	7-71	Chute, Chad	
164305	7-64	Plate	
164590	7-70	Connector, 24-Pt Plug	
164766	7-64	Bracket, Lamp Socket	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
164767	7-64	Cable w/Terminal	
164768	7-66	Panel, Left	
164769	7-66	Panel, Right	
164770	7-66	Plate, Left	
164771	7-66	Plate, Right	
164772	7-66	Cable Assembly	
164773	7-66	Plate, Mounting	
164781	7-64	Cable Assembly	
164782	7-56	Pinion, 6T	
164783	7-56	Gear, 52T	
164784	7-56	Gearset, 120 WPM	
164873	7-66	Container Assembly, Tape	
164958	7-38	Screw, 4-40 x 1/2 Hex	
165082	7-68	Clamp, Cable	
165083	7-68	Keeper, Clamp	
170306	7-71	Modification Kit	
172973	7-68	Bracket, Mounting	
173425	7-57	Relay, Motor Starting	
173820	7-52	Gearset, 65 WPM	
173821	7-52	Pinion, 20T	
173822	7-52	Gear, 49T	
173974	7-39,-41,-42	Screw, 10-32 x 5/16 Hex	
174459	7-63	Modification Kit	
174492	7-60	Container Assembly, Tape	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
176050	7-60	Container, Tape	
176056	7-60	Bail, Tape Sensing	
176057	7-60	Bail, Switch Actuating	
176058	7-60	Reel, Tape	
176060	7-60	Spacer	
176061	7-60	Retainer	
176062	7-59	Bracket, Front	
176063	7-59	Bracket, Rear	
176065	7-61,-62	Bracket	
176066	7-63	Cylinder, Locking	
176068	7-61	Shaft	
176069	7-62	Shaft	
176071	7-51,-62	Gear, 52T	
176072	7-51,-61	Gear, 35T	
176073	7-61	Pulley, 21T	
176074	7-62	Pulley, 24T	
176075	7-58	Belt, 40T	
176076	7-62	Stud	
176077	7-62	Stud	
176078	7-61,-62	Bracket, Guide	
176079	7-59	Isolator, Vibration	
176082	7-59	Plate, Lower Base	
176085	7-59	Nut, 10-32 Self-Locking	
176086	7-59	Bracket	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
176088	7-59	Plate, Upper Base	
176090	7-59,-73	Bracket	
176092	7-59	Bracket	
176093	7-59	Plate	
176094	7-59	Guide, Tape	
176095	7-57,-59	Lamp, Red Tape-Out	
176099	7-61	Gear, 22T and 18T	
176100	7-61,-62	Modification Kit	
176112	7-63	Plate w/Spacer	
176113	7-63	Plate, Top	
176114	7-63	Plate, Stop	
176115	7-63	Block	
176116	7-63	Bracket, Stop	
176117	7-59	Bracket	
176118	7-63	Spring, Left Torsion	
176119	7-63	Spring, Right Torsion	
176120	7-63	Post	
176121	7-63	Slide	
176123	7-59	Cable Assembly	
176124	7-60	Cable Assembly	
176287	7-53	Modification Kit	
176288	7-53	Guide, Tape	
176295	7-48	Gearset, 107 WPM	
176296	7-48	Pinion, 15T	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
176297	7-48	Gear, 43T	
176417	7-58	Ring, Retaining	
176422	7-53	Bracket, Mounting	
176610	7-62	Lever	
176612	7-59	Washer, Flat	
176613	7-59	Grommet, Rubber	
177006	7-59	Cable Assembly	
177113	7-38	Insulator	
178306	7-41	Relay, Power	
178363	7-38	Post	
178426	7-49	Plate, Nut	
178427	7-49	Plate, Nut	
178696	7-67	Cover, Tape Winder	
178706	7-67	Bracket, Mounting	
178709	7-65	Bracket, Locking Cover	
178710	7-67	Spacer, Tape Arm	
178713	7-67	Bracket, Switch	
178714	7-67	Switch, Rocker Type	
178715	7-67	Stud, Tape	
178837	7-55	Plate, Control	
178838	7-55	Modification Kit	
178844	7-72	Resistor	
178869	7-51	Gearshift Assembly	
178870	7-46,-51	Gear, 22T and 18T	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
178885	7-51	Plate, Index	
178910	7-47,-51	Spacer	
179134	7-59	Bushing	
179252	7-71	Modification Kit	
179256	7-71	Chute, Chad	
179492	7-53	Modification Kit	
179657	7-58	Pulley, 28T	
179962	7-47,-51	Gear, 40T	
179963	7-46,-51	Gear, 27T	
179965	7-46,-47	Modification Kit	
179969	7-46	Plate, Gearshift Guide	
181619	7-72	Diode	
181669	7-72	Resistor, 330 Ohm	
181671	7-72	Transistor	
181675	7-38	Transistor, Power	
181717	7-72	Resistor, 8 Ohm	
181821	7-38,-72	Card, Circuit	
181823	7-72	Card, Circuit	
181994	7-38	Bracket, Guide	
182067	7-38	Plate, Name	
182284	7-38	Insulator, 0.015" Thk	
182501	7-38	Capacitor, 1500 Mfd	
182520	7-72	Rectifier	
182523	7-38	Clamp, 1-3/8" ID Mounting	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
182536	7-38	Connector, 15-Pt Circuit Card	
182627	7-72	Resistor, 390 Ohm	
182628	7-72	Capacitor, 10 Mfd	
182661	7-38	Holder, Fuse	
182770	7-72	Resistor, 270 Ohm	
182772	7-72	Resistor, 14 Ohm	
182773	7-72	Potentiometer	
182774	7-72	Diode	
182776	7-72	Resistor, 150 Ohm	
182778	7-72	Resistor, 0.82 Ohm	
182779	7-72	Resistor, 420 Ohm	
182797	7-72	Resistor, 135 Ohm	
183111	7-38	Label	
185684	7-41,-44	Plate, Identification	
192678	7-51	Gearshift Assembly	
192680	7-51	Plate, Index	
192684	7-47	Plate, Clamp	
192685	7-46	Frame, Gearshift	
192788	7-56	Gear, 47T	
192789	7-56	Pinion, 6T	
192790	7-56	Gear, 49T	
192791	7-56	Pinion, 5T	
192864	7-45	Reel, Tape	
192865	7-45	Container, Tape	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
192867	7-45	Container Assembly, Tape	
192868	7-45	Spacer, 1.197" Lg	
193620	7-56	Gearset, 53 WPM	
193621	7-56	Gearset, 66 WPM	
193628	7-65	Bracket, Lampholder	
193629	7-65	Cable w/Terminals	
193630	7-65	Cable w/Terminals	
193631	7-65	Bracket	
193632	7-65	Switch Assembly	
193634	7-65	Bracket, Fuse	
193635	7-65	Indicator, Neon	
193636	7-65	Indicator, Neon	
193637	7-65	Insulator, Terminal	
193641	7-56	Pinion, 6T	
193642	7-56	Gear, 40T	
193643	7-56	Gearset, 77.7 WPM	
193676	7-56	Gear, 42T	
193677	7-56	Pinion, 8T	
193678	7-56	Gearset, 100 WPM	
193679	7-56	Gear, 39T	
193680	7-56	Pinion, 5T	
193681	7-56	Gearset, 67 WPM	
193705	7-65	Cable w/Terminals	
193706	7-65	Jumper, 3" White-Orange	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
193707	7-65	Jumper, 3" White-Blue	
193708	7-65	Jumper, 3" Black	
193727	7-41,-42	Plate, Upper Base	
193778	7-42	Cable Assembly	
193779	7-42	Bracket, Fuse Mounting	
193780	7-42	Shield, Fuse	
193783	7-65	Cable Assembly	
193794	7-66	Container Assembly, Tape	
193837	7-45	Guide, Tape	
194077	7-49	Modification Kit	
194081	7-49	Guide, Tape	
194082	7-49	Guide w/Roller, Tape	
194221	7-45	Cable Assembly	
194862	7-71	Extension	
194991	7-48	Guard	
195110	7-57,-58	Plate, Lower Base	
195111	7-57,-58	Plate, Upper Base	
195112	7-57	Bracket	
195113	7-57	Cable Assembly	
195114	7-57	Plate, Identification	
195115	7-58	Shaft w/Bearing	
195116	7-57	Bracket	
195117	7-57	Cable Assembly	
195118	7-58	Cable Assembly	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRP) - Continued

Part Number	Figure Number(s)	Description	Notes
195119	7-57	Bracket	
195120	7-58	Container, Tape	
195121	7-58	Lever w/Hub	
195122	7-58	Guide, Tape	
195123	7-58	Handle w/Post	
195128	7-58	Brace	
195139	7-58	Bracket Assembly, Intermediate Shaft	
195219	7-58	Bracket	
195400	7-58	Pulley, 16T	
195637	7-48	Modification Kit	
195658	7-45	Guide Assembly, Tape	
195777	7-60	Reel, Tape	
196718	7-38	Screw, 6-32 x 2 Flat	
196819	7-38	Cover	
197879	7-45	Guide, Tape	
197880	7-45	Bracket, Tape Guide	
199398	7-44	Insulator	
199506	7-38	Gasket	
199812	7-46,-47	Modification Kit	
199814	7-46	Plate, Guide	
199894	7-56	Pinion, 13T	
199895	7-56	Gear, 68T	
199896	7-56	Gearset, 100 WPM	
199908	7-70	Jumper, 3-1/2" White	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRE) - Continued

Part Number	Figure Number(s)	Description	Notes
199909	7-70	Jumper, 6-7/8" Black	
199910	7-41	Insulator	
207223WU	7-45	Spacer	
304915	7-41	Connector, 2-Pt Receptacle	
304916	7-41	Connector, 2-Pt Plug	
304918	7-55	Plate, Identification	
305575	7-50	Pinion, 51T	
305576	7-50	Gear, 85T	
305580	7-51	Bracket Assembly, Gearshift	
308195	7-56	Pinion, 10T	
308196	7-56	Gear, 41T	
308197	7-56	Gearset, 60 WPM	
308204	7-56	Pinion, 15T	
308205	7-56	Gear, 67T	
308206	7-56	Gearset, 67 WPM	
310050	7-59	Bracket	
311272	7-48	Pinion, 14T	
311273	7-48	Gear, 52T	
311283	7-48	Gearset, 67 WPM	
312475	7-55	Cable Assembly	
312476	7-55	Cable Assembly	
315536	7-51	Modification Kit	
315893	7-38	Key, Polarizing	
319259	7-46	Pinion, 12T	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
319260	7-46	Gear, 40T	
319262	7-46,-47	Modification Kit	
319918	7-52	Pinion, 25T	
319919	7-52	Gear, 51T	
319920	7-52	Gearset, 65 WPM	
319921	7-52	Pinion, 28T	
319922	7-52	Gear, 52T	
319923	7-52	Gearset, 71 WPM	
319924	7-52	Pinion, 21T	
319925	7-52	Gear, 26T	
319926	7-52	Gearset, 107 WPM	
320410	7-38,-39,-42,-45, -49,-55,-57,-58, -59,-60,-64,-65, -67,-68,-69,-70	Terminal, Spade Type	
320416	7-65,-70	Terminal, Ring Type	
320418	7-38,-39,-41,-42, -57,-64,-70,-73	Terminal, Ring Type	
320420	7-39,-70	Terminal, Ring Type	
320422	7-70	Terminal, Ring Type	
321061	7-73	Fan	
321062	7-73	Bracket	
321063	7-73	Bracket	
321072	7-73	Cable w/Terminals	
321074	7-73	Insulator	
321080	7-73	Container, Chad	

Table 7-2. Receiving-Only Reperforator or Tape Printer Base (LRB) - Continued

Part Number	Figure Number(s)	Description	Notes
321456	7-38	Bracket	
321461	7-45	Container Assembly, Tape	
321547	7-48	Gearset, 100 WPM	
321548	7-48	Pinion, 37T	
321549	7-48	Gear, 49T	
324468	7-38,-43	Plate	
324470	7-38	Bracket	
324471	7-48	Pinion, 9T	
324476	7-38	Bracket	
324477	7-38	Cable Assembly	
324478	7-38	Power Supply Assembly	
324479	7-48	Gear, 36T	
324480	7-48	Gearset, 150 WPM	
329071	7-50	Gearset	
329072	7-50	Gearset	
330781	7-38	Shield, Transformer	
330782	7-38	Shield, Transformer	
330792	7-38	Transformer	

Table 7-3. Send-Receive Reperforator Base (LTRK)

Part Number	Figure Number(s)	Description	Notes
1020	7-88	Screw, 6-40 x 1/4 Hex	
1118	7-91	Screw, 6-40 Shoulder	
1210	7-75,-77	Screw, 2-56 x 5/8 Fil	
1293	7-90	Screw, 4-40 x 1/8 Fil	
2191	7-74 thru -79 -82,-85,-88 thru -98,-101, -102	Lockwasher	
2322	7-76	Lockwasher	
2415	7-82	Spring	
2449	7-76	Lockwasher	
2481	7-91	Washer, Flat	
2669	7-74,-76,-78,-85 -94,-95,-96	Lockwasher	
2846	7-76	Washer, Flat	
3438	7-74,-76,-78,-94, -96	Washer, Flat	
3598	7-74,-79,-82,-84, -85,-88,-89,-91, -95,-97,-98,-102	Nut, 6-40 Hex	
3599	7-90,-93,-101	Nut, 4-40 Hex	
3606	7-75,-76,-89,-91, -95,-96	Nut, 6-40 Hex	
3624	7-92	Washer, Flat	
3640	7-74,-84,-90	Lockwasher	
3646	7-101	Lockwasher	
3870	7-77,-82,-85	Spring	
4702	7-85	Spring	
6968	7-94	Washer, Flat	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
6970	7-94,-102	Nut, 3/8-32 Hex	
7002	7-74,-75,-77,-79, -82,-89 thru -92 -95,-97,-98,-102	Washer, Flat	
7603	7-89	Spring	
8330	7-78,-94	Washer, Flat	
8449	7-77,-89	Spacer, 0.094" Thk	
22746	7-91	Spring	
36273	7-95	Washer, Flat	
42823	7-86	Washer, Flat	
45815	7-77	Lockwasher	
49420	7-82	Spring, Torsion	
49653	7-78	Screw, 10-32 x 13/16 Fil	
70388	7-88	Spring	
74755	7-85	Washer, Flat	
74805	7-78,-85	Screw, 10-32 x 3/4 Hex	
75750	7-97	Washer, Insulating	
76081	7-82,-91	Washer, Flat	
76099	7-85,-94,-102	Washer, Flat	
76279	7-76	Screw, 1/4-32 x 5/8 Hex	
76422	7-93	Spring	
76461	7-76,-101	Washer, Flat	
76964	7-92	Pin, Cotter	
76968	7-79	Setscrew, 6-32	
79890	7-76	Screw, 1/4-32 x 7/8 Hex	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
80581	7-88,-89	Spring	
81596	7-94	Screw, 10-32 x 1-3/8 Hex	
83497	7-101	Washer, Flat	
86283	7-82	Spring	
86304	7-90	Spring	
86742	7-89	Nut, 4-40 Hex	
86774	7-102	Screw, 6-40 Shoulder	
90606	7-77	Spring	
90679	7-89	Washer, Flat	
90790	7-102	Washer, Flat	
90791	7-90,-101	Lockwasher	
93117	7-75,-77,-92	Lockwasher	
94072	7-78	Bushing	
97393	7-91	Screw, 6-40 Shoulder	
100657	7-75,-96	Connector, 2-Pt Receptacle	
100658	7-77	Connector, 2-Pt Plug	
104710	7=84	Ball, Bearing	
104807	7-91,-92	Washer, Flat	
104827	7-78	Bearing, Ball	
105054	7-97	Resistor, 5 Ohm	
108370	7-88	Washer, Felt	
108450	7-95	Lockwasher	
108809	7-96	Screw, 10-32 x 27/32 Hex	
108953	7-75,-96	Connector, 3-Pt Receptacle	
110435	7-77	Nut, 4-40 Hex	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
110743	7-77,-83,-85,-86, -88,-90,-91,-92, -93,-98,-101	Lockwasher	
111017	7-74,-75,-95,-102	Screw, 6-40 x 5/16 Fil	
111343	7-84	Clamp, Retaining	
111516	7-77	Washer, Flat	
111767	7-89	Washer, Flat	
112626	7-78,-85	Nut, 10-32 Hex	
112627	7-92	Nut, 2-56 Hex	
112630	7-74	Spring	
112663	7-95	Screw, 6-40 Shoulder	
114876	7-91	Washer, Flat	
115122	7-85,-89	Washer, Felt	
115141	7-91	Screw, 6-40 Shoulder	
117416	7-85	Post	
117608	7-79,-80	Nut, Speed	
118384	7-79	Lens, Clear Indicator Light	
118759	7-97	Block, Terminal	
119648	7-88,-92,-93	Ring, Retaining	
119650	7-82	Ring, Retaining	
119651	7-74,-79,-88,-89	Ring, Retaining	
119652	7-85,-91,-95,-102	Ring, Retaining	
119653	7-91,-99	Ring, Retaining	
119654	7-82	Ring, Retaining	
119655	7-94,-102	Ring, Retaining	

Table 7-3. Send-Receive Reperforator Base (LTPK) - Continued

Part Number	Figure Number(s)	Description	Notes
120824	7-86	Washer, Felt	
120870	7-88	Wick, Felt	
121242	7-82,-92,-95	Clamp, 1/8" ID Cable	
121244	7-74	Clamp, 1/4" ID Cable	
121246	7-102	Clamp, 3/8" ID Cable	
121248	7-95	Clamp, 1/2" ID Cable	
122245	7-75	Capacitor, 43 to 48 Mfd	
124177	7-91	Lockwasher	
125011	7-83,-85,-98,-101	Washer, Flat	
125015	7-76,-79,-89	Washer, Flat	
125126	7-90,-101	Screw, 2-56 x 9/32 Fil	
125181	7-74	Screw, 2-56 x 3/8 Fil	
125220	7-101	Nut, 8-40 Hex	
125247	7-92	Spring, Compression	
125250	7-88	Spring	
128271	7-91	Screw, 6-40 Shoulder	
129919	7-82,-97	Fuse, SL-BL 4 Amp	
130499	7-102	Bearing, Ball	
138166	7-95	Setscrew, 8-32	
139564	7-95	Nut, 3/8-32 Hex	
139752	7-91	Screw, 4-40 x 11/64 Fil	
142269	7-97	Fuse, SL-BL 3 Amp	
142379	7-102	Pin, Roll	
145307	7-96	Plate, Nut	
145308	7-96	Bracket	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
145309	7-95	Bracket	
145310	7-74,-95,-96,-97	Base	
145311	7-95	Plate, Stop	
145313	7-94,-102	Washer, Felt	
145314	7-95	Bracket, Right	
145315	7-95	Bracket, Left	
145316	7-95	Screw, 6-40 Shoulder	
145321	7-74	Tie, Cable	
145333	7-77	Disc w/Hub	
145335	7-77	Disc w/Knob	
145336	7-95	Plate	
145364	7-94,-96	Bracket w/Bearing	
145365	7-94	Pinion, 20T	
145366	7-94	Gear, 56T	
145367	7-94,-102	Shaft, Drive	
145368	7-94,-102	Gear, 27T	
145369	7-94	Gear, 24T	
145370	7-94,-102	Gear, 42T	
145372	7-94,-102	Shaft	
145373	7-94,-102	Gear, 66T	
145374	7-94	Gear, 47T	
145375	7-94,-102	Gear, 63T	
145376	7-94,-102	Gear, 48T	
145381	7-94,-102	Washer, Thrust	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
145383	7-94,-102	Key	
145384	7-94,-102	Pin, Guide	
145385	7-94,-102	Spring, Compression	
145386	7-94,-95,-102	Sleeve	
145389	7-94,-102	Shaft, Idler	
145390	7-94,-102	Pinion, 25T	
145392	7-94	Post	
145393	7-94,-102	Bushing	
145394	7-95	Knob	
145397	7-95	Bracket	
145398	7-95	Shaft, Flexible	
145399	7-95	Shaft w/Gear	
145403	7-95	Gear w/Link, 36T	
145406	7-95	Bracket, Front	
145407	7-95	Bracket, Rear	
145408	7-95	Link	
145412	7-96,-100	Cable Assembly	
145855	7-76	Guide, Tape	
145856	7-76	Guide, Tape	
148128	7-83	Washer, Flat	
150013	7-86	Disc, Adjusting	
150026	7-86	Lever, Shoe Release	
150029	7-86	Wick, Felt	
150043	7-86	Shoe, Secondary Clutch	
150044	7-86	Shoe, Primary Clutch	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
150241	7-86	Spring	
150411	7-91	Washer, Flat	
150440	7-76	Hub	
150441	7-76	Gear, 21T	
150507	7-91	Spring	
150710	7-97	Screw, 6-40 x 1-1/4 Fil	
150923	7-88,-89	Washer, Felt	
150966	7-74,-102	Insulator, Terminal Block	
150979	7-97	Capacitor, 1/2 Mfd	
150990	7-89	Washer, Felt	
150991	7-82,-85	Washer, Felt	
150992	7-77	Stud	
151036	7-89	Screw, 4-40 Shoulder	
151045	7-79	Bar, Spacing	
151060	7-87	Gearset, 60 WPM	
151075	7-87	Gearset, 75 WPM	
151080	7-84	Washer, Flat	
151100	7-87	Gearset, 100 WPM	
151113	7-74	Strip, Mounting	
151118	7-74,-75	Plate, Spacing	
151126	7-78	Spacer, 0.250" Thk	
151130	7-87	Pinion, 14T	
151131	7-87	Gear, 96T	
151132	7-87	Pinion, 17T	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
151133	7-87	Gear, 93T	
151134	7-87	Pinion, 20T	
151135	7-87	Gear, 84T	
151146	7-74,-75	Strap, Mounting	
151152	7-83,-85,-90,-91, -92,-93,-98	Screw, 4-40 x 3/16 Hex	
151171	7-90	Toggle, Contact	
151180	7-90	Link, Toggle	
151182	7-90,-101	Washer, Insulating	
151223	7-79	Screw, 4-40 Shoulder	
151224	7-79	Screw, 6-40 Pilot	
151228	7-78	Bracket w/Bearing	
151245	7-94,-95,-102	Washer, Felt	
151253	7-79	Keytop	
151286 thru 151289	7-80	Keylever Assembly	
151290	7-80	Keylever Assembly	
151291 thru 151300	7-80	Keylever Assembly	
151301	7-81	Keylever Assembly	
151302 thru 151306	7-80	Keylever Assembly	
151307	7-81	Keylever Assembly	
151308 thru 151322	7-80	Keylever Assembly	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
151329	7-74	Switch, Sensitive	
151335	7-74,-75,-95,-97, -102	Stud	
151346	7-94	Screw, 6-40 x 3/8 Fil	
151411	7-75,-95	Block, Terminal	
151412	7-75,-95	Insulator, Terminal Block	
151415	7-74,-102	Block, Terminal	
151416	7-74,-75,-95,-102	Nut, 6-40 Hex	
151442	7-76,-85	Screw, 6-40 x 1/2 Hex	
151572	7-75	Lockwasher	
151610	7-94,-102	Washer, Flat	
151616	7-74	Screw, No. 2 Self-Tapping	
151630	7-74 thru -79, -94,-95,-97,-102	Screw, 6-40 x 1/4 Hex	
151631	7-74,-75,-76,-78, -79,-82,-85,-91, -92,-94,-102	Screw, 6-40 x 5/16 Hex	
151632	7-74,-76,-78,-82 -90,-94,-95,-96, -97,-101,-102	Screw, 6-40 x 3/8 Hex	
151637	7-74,-91	Screw, 4-40 x 1/4 Fil	
151642	7-76	Screw, 6-40 x 3/4 Fil	
151658	7-94,-96,-102	Screw, 6-40 x 5/16 Fil	
151659	7-79,-91	Screw, 6-40 x 1/2 Fil	
151678	7-74	Screw, 1/4-32 Pilot	
151685	7-91	Screw, 4-40 x 5/16 Fil	
151686	7-93	Screw, 4-40 x 3/8 Fil	
151687	7-101	Screw, 4-40 x 7/16 Fil	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
151690	7-76	Screw, 10-32 x 5/16 Fil	
151692	7-93	Screw, 6-40 x 3/16 Fil	
151693	7-76	Screw, 6-40 x 9/16 Fil	
151694	7-102	Screw, 6-40 x 11/32 Fil	
151695	7-76	Screw, 6-40 x 5/8 Hex	
151712	7-78,-96	Button, Pivot	
151721	7-98	Screw, 6-40 x 3/4 Hex	
151722	7-82,-88,-97	Screw, 6-40 x 3/16 Hex	
151723	7-74,-76,-77	Screw, 10-32 x 3/8 Hex	
151724	7-78	Screw, 10-32 x 5/8 Hex	
151725	7-78	Screw, 10-32 x 3/4 Fil	
151728	7-86	Spring	
151731	7-93	Screw, 4-40 x 7/8 Fil	
151733	7-77	Screw, 4-40 x 9/16 Fil	
151737	7-86	Screw, 4-40 x 11/16 Hex	
151739	7-80	Screw, 6-40 Identification	
151818	7-75	Jumper, 4-1/4" Black	
151819	7-75,-97	Jumper, 3" Black	
151820	7-90	Spring, Contact	
151827	7-75,-95,-102	Strap, Terminal	
151843	7-84	Screw, 6-40 Adjusting	
151880	7-90,-91	Nut, 4-40 Hex	
151901 thru 151910	7-80	Keylever Assembly	

Table 7-3. Send-Receive Reperforator Base (LTPK) - Continued

Part Number	Figure Number(s)	Description	Notes
151934	7-80	Modification Kit	
152001 thru 152006	7-80	Keylever Assembly	
152007	7-81	Keylever Assembly	
152008 thru 152016	7-80	Keylever Assembly	
152017 thru 152020	7-81	Keylever Assembly	
152045	7-74	Guard, Gear	
152130 thru 152139	7-81	Keylever Assembly	
152760	7-97	Stud	
152764	7-87	Gear, 81T	
152765	7-87	Pinion, 13T	
152766	7-87	Gearset, 67 WPM	
152839	7-91	Spring, Latch	
152893	7-83,-84	Screw, 4-40 x 1/4 Hex	
152904	7-80	Modification Kit	
152905	7-80	Modification Kit	
152906	7-80	Modification Kit	
153116	7-80	Plug, Button	
153252	7-74	Link	
153283	7-81	Keylever Assembly	
153284	7-81	Keylever Assembly	
153455	7-97	Resistor, 600 Ohm	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
153484	7-97	Screw, 6-32 Spl	
153538	7-77,-91	Screw, 6-40 x 7/16 Hex	
153539	7-77	Screw, 6-40 x 11/16 Hex	
153577	7-102	Washer, Felt	
153799	7-91	Screw, 4-40 x 21/64 Hex	
153817	7-90	Screw, 4-40 x 3/8 Hex	
153841	7-85	Screw, 6-40 x 9/16 Hex	
154000	7-74,-82	Base	
154001	7-82	Code Bar, No. 1	
154002	7-82	Code Bar, No. 2	
154003	7-82	Code Bar, No. 3	
154004	7-82	Code Bar, No. 4	
154005	7-82	Code Bar, No. 5	
154008	7-82	Guide, Code Bar	
154009	7-88	Plate, Front	
154010	7-88	Bail, Transfer	
154013	7-82	Bracket, Spring	
154014	7-88	Guidepost	
154015	7-89	Post	
154016	7-82	Shaft	
154018	7-88	Post, Locking Bail	
154019	7-86	Follower, Eccentric	
154021	7-79	Link	
154023	7-82	Latch, Lockbar	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
154025	7-89	Plate, Adjusting	
154027	7-89	Bellcrank	
154029	7-86	Wick, Felt	
154030	7-86	Shaft, Signal Generator	
154032	7-86	Sleeve, Gear	
154033	7-85	Latchlever, Clutch	
154034	7-85	Lever, Clutch Stop	
154036	7-88	Plate, Detent	
154037	7-99	Lever	
154039	7-74	Bracket	
154040	7-88	Lever, Transfer	
154041	7-88	Post, Stop	
154042	7-90	Terminal	
154043	7-90	Terminal	
154045	7-90	Screw, 6-40 Spl	
154046	7-85	Stud	
154047	7-88	Post, Spring	
154051	7-89	Screw, 6-40 Shoulder	
154052	7-82	Bar, Locking	
154053	7-85	Bail, Clutch Trip	
154056	7-90	Bracket, Contact Box	
154059	7-99	Bracket, Function Bail	
154066	7-99	Lever, Loc - LF	
154068	7-82	Bracket, Right Guide	
154069	7-82	Bracket, Left Guide	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
154070	7-82	Guide, Code Lever	
154071	7-82	Screw, 1/4-32 Pilot	
154076	7-74,-97	Plate, Nut	
154079	7-89	Stud	
154080	7-82	Lock, Wedge	
154081	7-84	Plate, Retainer	
154083	7-86	Spacer, Cam	
154084	7-89	Bearing, Needle	
154085	7-74,-78	Plate	
154086	7-84	Retainer, Wedge	
154087	7-74	Plate, Nut	
154088	7-74	Plate, Nut	
154089	7-89	Post, Spring	
154091	7-89	Guide, Nonrepeat Lever	
154092	7-99	Shaft	
154094	7-85	Clamp	
154095	7-90	Eccentric, Contact Box	
154096	7-85	Bushing, Eccentric	
154101	7-85	Plate, Rear	
154102	7-89	Plate, Rear	
154105	7-88	Post, Transfer, Bail	
154106	7-74	Bracket	
154117	7-79	Bail, Spacebar	
154119	7-79	Bracket, Spacebar	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
154120	7-82	Lever, Code Bar	
154121	7-82	Lever, Space Code Bar	
154122	7-82	Lever, Keyboard Lock Function	
154123	7-82	Lever, Function	
154124	7-82	Lever, Keyboard Repeat & Unlock	
154125	7-82	Spring	
154127	7-89	Nut, 6-40 Hex	
154129	7-82	Trip Bar, Clutch	
154130	7-90	Box, Contact	
154131	7-90	Cover, Contact	
154138	7-86	Washer, Felt	
154140	7-88	Bail, Locking	
154154	7-86	Cam, Signal Generator	
154156	7-96,-100	Grommet, Rubber	
154165	7-90	Contact Box Assembly	
154166	7-90	Suppressor, Arc	
154173	7-96,-100	Plate	
154178	7-88	Spring	
154179	7-83	Bail, Universal	
154183	7-83	Blade, Front	
154184	7-83	Blade, Rear	
154189	7-90	Insulator	
154191	7-89	Spring	
154194	7-90	Base	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
154197	7-79	Plug, Button	
154199	7-74	Shim, 0.005" Thk	
154201	7-74	Shim, 0.014" Thk	
154210	7-79	Bracket, Left	
154211	7-79	Bracket, Right	
154212	7-79	Frame, Front	
154215	7-89	Spring	
154217	7-88	Wick, Leather	
154225	7-90	Contact Box Assembly	
154226	7-90	Box w/Strap	
154236	7-85	Latchlever	
154237	7-89	Lever, Nonrepeat	
154238	7-83	Extension	
154239	7-83	Extension w/Post	
154240	7-89	Bail, Code Bar	
154241	7-89	Stud	
154350	7-89	Modification Kit	
154386	7-89	Plate, Adjusting	
154520 thru 154535	7-81	Keylever Assembly	
154662	7-78	Spacer	
154663	7-78	Shaft	
154694	7-86	Disc, Clutch Cam	
155025 thru 155040	7-81	Keylever Assembly	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
155750	7-97,-100	Sleeve, 3/32" ID x 1/2" Lg Insulating	
155751	7-100	Sleeve, 1/8" ID x 1" Lg Insulating	
155752	7-100	Sleeve, 5/64" ID x 1/2" Lg Insulating	
155753	7-77,-100	Sleeve, 1/8" ID x 1/2" Lg Insulating	
155754	7-100	Sleeve, 1/16" ID x 1/2" Lg Insulating	
155755	7-82,-100	Sleeve, 11/64" ID x 5/8" Lg Insulating	
155951	7-92	Spring, Torsion	
155952	7-92	Pin	
155953	7-92	Stud	
155954	7-92	Switch, Sensitive	
155956	7-92	Bail	
155957	7-92	Bracket	
155958	7-92	Keylever	
155959	7-92	Keytop	
155960	7-91	Latch	
155964	7-91	Lever, Stop	
155965	7-91	Ratchet, 88T	
155966	7-91	Drum	
155967	7-91	Washer, Spring	
155968	7-91	Washer, Flat	
155969	7-91	Bracket	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
155990	7-91	Counter Assembly, Character	
155991	7-92	Keytop Assembly	
155992	7-92	Cable Assembly	
155994	7-92	Insulator, 0.015" Thk	
156226	7-76	Hub	
156448	7-77	Bushing	
156449	7-77	Lever, Switch	
156450	7-92	Screw, 2-56 x 1/2 Fil	
156451	7-77	Bushing	
156503	7-86	Wick, Felt	
156509	7-88	Washer, Flat	
156516	7-88	Latch	
156574	7-83	Post, Spring	
156630	7-88	Washer, Felt	
156632	7-79,-91	Screw, 6-40 x 13/32 Hex	
156644	7-90	Link, Drive	
156663	7-90,-101	Bushing, Insulating	
156740	7-78	Screw, 6-40 x 7/32 Hex	
156875	7-91	Screw, 6-40 x 5/32 Fil	
157320 thru 157323	7-81	Keylever Assembly	
157325 thru 157367	7-81	Keylever Assembly	
157940 thru 157971	7-81	Keylever Assembly	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
158019	7-91	Baffle	
158021	7-91	Bracket, Switch	
158031	7-91	Bail, Feed	
158032	7-91	Bail, Reset	
158033	7-91	Spacer, 0.055" Thk	
158036	7-91	Lever, Reset	
158038	7-91	Lever	
158040	7-91	Lever, Ratchet Drive	
158042	7-91	Latchlever	
158045	7-91	Stud	
158046	7-91	Bracket	
158047	7-91	Scale	
158050	7-91	Switch, Contact	
158051	7-91	Pulley	
158052	7-91	Cam, Switch	
158053	7-91	Clamp	
158054	7-91	Cord Assembly	
158056	7-91	Cord	
158105	7-82	Code Bar, Carriage Return	
158107	7-82	Code Bar, Character Counter	
158147	7-91	Bushing, Eccentric	
158163	7-75,-77	Switch, Sensitive	
158215	7-74,-75,-91,-97	Plate, Nut	
158239	7-77	Lever, Tape	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
158250	7-102	Block, Terminal	
158252	7-102	Insulator, Terminal Block	
158268	7-89	Latch w/Hub	
158289	7-77	Reel, Tape	
158406 thru 158445	7-81	Keylever Assembly	
158447 thru 158455	7-81	Keylever Assembly	
158745	7-76,-78,-94,-102	Clamp, Bearing	
159278	7-87	Pinion, 14T	
159279	7-87	Gear, 96T	
159281	7-87	Pinion, 17T	
159282	7-87	Gear, 93T	
159284	7-87	Pinion, 20T	
159285	7-87	Gear, 84T	
159287	7-87,-94	Retainer, Pinion	
159327	7-89	Washer, Flat	
159334	7-89	Washer, Insulating	
159340	7-91	Spring, Return	
159341	7-76,-94,-102	Bearing, Ball	
159541	7-100	Connector, 16-Pt Plug	
159542	7-74	Connector, 16-Pt Receptacle	
160307	7-75	Diode	
161215	7-79	Lamp, 110V Neon	
161239	7-100	Connector, 36-Pt Plug	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
161293	7-87	Gearset, 60 WPM	
161294	7-87	Gearset, 75 WPM	
161295	7-87	Gearset, 100 WPM	
161301	7-87	Post	
161346	7-88	Washer, Felt	
161826	7-77	Plate	
161831	7-76	Washer, Spring	
161878	7-100	Cable Assembly	
161891	7-79	Guide Plate, Keytop	
161892	7-100	Cable Assembly	
161895	7-76	Shaft	
161896	7-76	Gear, 33T	
161897	7-76	Gear, 33T	
161899	7-76	Spacer, 0.265" Thk	
161900	7-76	Bracket, Gear Guard	
161901	7-76	Bracket, Gear Guard	
161902	7-76	Plate	
161903	7-75	Bracket	
161904	7-75	Plate, Nut	
161905	7-75	Bracket	
161906	7-79	Plate	
161907	7-79	Plate	
161908	7-75	Post, Supporting	
161909	7-79	Socket, Lamp	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
161910	7-79	Cap, Amber	
161911	7-79	Knob, Black	
161912	7-79	Switch, SP-ST	
161922	7-102	Post	
161927	7-76	Guide, Tape	
161931	7-79	Keytop	
161932	7-79	Cap, Red	
161942	7-75	Plate, Transformer	
161950	7-74	Bracket	
161951	7-76,-77	Bracket	
161954	7-79	Socket, Lamp	
161957	7-79	Lamp, 6V	
161964	7-75	Clamp, Tube	
161965	7-75	Resistor, 1000 Ohm	
162333	7-99	Stud, Locating	
162659	7-94,-102	Retainer	
163440	7-78	Gear, 48T	
163442	7-77	Cable Assembly	
163459	7-76	Gear, 66T	
163460	7-78	Gear, 55T	
163461	7-87	Pinion, 18T	
163462	7-87	Gear, 117T	
163463	7-87	Pinion, 24T	
163464	7-87	Gear, 104T	
163503	7-76	Gear, 26T	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
163504	7-87	Gearset, 71 WPM	
163505	7-87	Gearset, 107 WPM	
163519	7-86	Sleeve, Gear	
163522	7-75	Transformer	
163590	7-76	Gear, 60T	
163647	7-84	Channel, Ball	
163775	7-93	Modification Kit	
163813	7-93	Plate	
163814	7-93	Lever w/Hub	
163852	7-81	Keylever Assembly	
164434	7-80	Keylever Assembly	
164435	7-80	Keylever Assembly	
164457	7-81	Keylever Assembly	
164485	7-85	Bail w/Hub	
164565	7-77	Container, Tape	
164590	7-100	Connector, 24 Pt Plug	
165082	7-102	Clamp, Cable	
165083	7-102	Keeper, Clamp	
165656	7-100	Cable w/Terminals	
165659	7-97	Bracket	
165660	7-97	Insulator, 0.062" Thk	
165661	7-97	Cable w/Terminals	
165662	7-97	Stud	
165663	7-97	Insulator, Black Terminal	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
165676	7-79	Cap, Green	
165678	7-79	Lamp, 5.5V	
165679	7-100	Cable w/Terminals	
165680	7-97	Bracket, Fuse Holder	
165681	7-97	Bracket, Mounting	
165682	7-97	Bracket	
170324	7-82,-92	Bracket, Front	
170385	7-85	Frame w/Bushing	
170386	7-88	Guide, Transfer Lever	
170391	7-88	Guide, Transfer Lever	
172721	7-100	Cable Assembly	
173096	7-89	Stud, Eccentric	
173396	7-100	Cable Assembly	
173793	7-87	Gear, 100T	
173794	7-87	Pinion, 14T	
173795	7-87	Gearset, 65 WPM	
173922	7-100	Cable Assembly	
173974	7-75	Screw, 10-32 x 5/16 Hex	
174250	7-94,-102	Pin, Roll	
174491	7-90	Modification Kit	
176352	7-90	Contact Box Assembly	
176405	7-92	Modification Kit	
176406	7-92	Bracket	
176407	7-92	Lever	
178306	7-97	Relay, Power	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
178535	7-97	Suppressor, Spark	
178725	7-91	Spring	
178726	7-91	Bracket, Spring	
178728	7-91	Modification Kit	
178839	7-79	Nut, 11/32 Hex	
178849	7-91	Cord Assembly, Indicator	
178851	7-91	Pulley	
179258	7-91	Bracket, Scale	
179278	7-91	Drum, Ratchet	
179279	7-91	Bracket w/Posts	
179491	7-92	Switch Assembly, Backspace	
179639	7-90	Contact Assembly	
182661	7-82,-97	Holder, Fuse	
185684	7-97	Plate, Identification	
192025	7-102	Washer, Flat	
192538	7-80	Plug, Button	
192797	7-98	Chute, Chad	
192798	7-98	Plate, Mounting	
192999	7-98	Modification Kit	
193560	7-98	Bag, 10" Lg Chad	
193561	7-98	Casing, Fan Wheel	
193579	7-98	Clamp, Tube	
193644	7-98	Chute, Chad	
193720	7-100	Modification Kit	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
194048	7-101	Screw, 4-40 Spl	
194170	7-76	Guide Assembly, Tape	
194171	7-76	Guide Assembly, Tape	
194901	7-101	Screw, 4-40 Spl	
195158	7-102	Bracket w/Bearings	
195160	7-102	Pinion, 20T	
195186	7-90	Screw, 4-40 x 7/8 Hex	
195263	7-102	Gear, 22T	
195264	7-102	Gear, 49T	
195327	7-102	Bracket, Terminal Block	
195364	7-102	Shaft, Drive	
195403	7-98	Tubing, 7-1/2" Lg	
195720	7-74	Plate	
195721	7-74	Plate	
195923	7-90	Filter, RF	
198580	7-102	Gear, 21T	
199401	7-82	Bracket	
304668	7-102	Gear, 49T	
306991	7-78	Bracket	
306992	7-78	Clamp	
306993	7-78	Plate	
306994	7-78	Shaft	
306995	7-78	Spacer	
306996	7-78	Shim, 0.05" Thk	
307720	7-100	Cable Assembly	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
307722	7-100	Cable Assembly	
311451	7-86	Camsleeve	
320043	7-101	Cover, Outer	
320053	7-101	Cable Assembly	
320410	7-75,-92,-96,-97, -100	Terminal, Spade Type	
320416	7-96,-100	Terminal, Ring Type	
320418	7-100	Terminal, Ring Type	
321143	7-101	Link	
321266	7-101	Box w/Bracket	
321267	7-101	Box w/Bracket	
321268	7-101	Network, Filter	
321269	7-101	Insulator	
321270	7-101	Box, Inner	
321271	7-101	Post, Nylon	
321273	7-101	Cover, Inner	
323490	7-101	Bracket, Connector Mounting	
323645	7-101	Contact Box Assembly	
325947	7-101	Contact Assembly	
325949	7-101	Screw, 8-32 x 1 Nylon Fil	
325950	7-101	Screw, 8-32 x 1/2 Nylon	
325951	7-101	Nut, 6-32 Nylon Hex	
326727	7-78	Gear Assembly, Intermediate	
326730	7-78	Gear Assembly, Intermediate	
327450	7-90	Label	

Table 7-3. Send-Receive Reperforator Base (LTRK) - Continued

Part Number	Figure Number(s)	Description	Notes
333145	7-102	Gearshift Assembly	
334750	7-76	Guard, Gear	

Table 7-4. Motor Unit

Part Number	Figure Number(s)	Description	Notes
1030	7-112	Screw, Shoulder 6-40	
2191	7-105 thru -113	Lockwasher	
2263	7-105	Nut, 8-32 Hex	
3599	7-112,-113	Nut, 4-40 Hex	
3606	7-112	Nut, 6-40 Hex	
3640	7-107,-108,-112, -113	Lockwasher	
6320	7-111,-112	Screw, 6-32 Contact	
6345	7-109,-111,-112	Nut, 6-32 Hex	
7002	7-107,-110,-111, -112	Washer, Flat	
8330	7-112	Washer, Flat	
36273	7-107	Washer, Flat	
42823	7-112	Washer, Flat	
71999	7-105,-109	Spring, Motor Thrust	
76461	7-112	Washer, Flat	
76834	7-113	Screw, 4-40 x 3/8 Flat	
82392	7-112	Shim, 0.004" Thk	
86736	7-112	Plate, Clamping	
87334	7-108	Washer, Insulating	
90560	7-112	Washer, Flat	
91228	7-104,-109	Strap Assembly, 2-1/2" Braided	
91229	7-109	Strap, 2" Braided	
91837	7-109	Washer, Insulating	
92260	7-109	Lockwasher	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
93118	7-112	Lockwasher	
96264R	7-103	Jumper, 5" Red	
98642	7-109	Lockwasher	
98712	7-111	Screw, 4-40 x 1/4 Flat	
104752	7-107	Washer, Flat	
104807	7-112	Washer, Flat	
110434	7-107	Screw, 4-40 x 3/16 Fil	
110435	7-112	Nut, 4-40 Hex	
110475	7-112	Screw, 2-64 x 5/64 Rd	
110743	7-111,-112,-113	Lockwasher	
111017	7-112	Screw, 6-40 x 5/16 Fil	
111062	7-109	Terminal	
119223	7-108	Screw, 4-40 x 1-15/32 Fil	
119648	7-112	Ring, Retaining	
119651	7-112	Ring, Retaining	
122200	7-109	Shield Assembly, End	
122201	7-105,-109	Bearing, Ball	
122202	7-109	Stud	
122204	7-109	Cap, Brush	
122205	7-109	Brush w/Spring	
122206	7-109	Holder, Brush	
122207	7-107,-108,-109	Strap Assembly	
122208	7-109	Washer, Flat	
122210	7-109	Armature, Motor	
122211	7-105,-109	Washer, Pull	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
122220	7-105,-109	Oiler, Ball	
122221	7-109	Stator	
122229	7-105	Bolt, 8-32 x 4-11/16 Fil	
122233	7-109	Capacitor Assembly	
122245	7-103,-107	Capacitor, 42 to 48 Mfd	
122249	7-103,-107	Switch, Thermostiatic, 60 Hz	
122251	7-105	Stator, Motor	
122252	7-105	Shield Assembly, End	
122253	7-109	Shield Assembly, End	
123769	7-105	Fan, Motor	
125011	7-108,-111,-112	Washer, Flat	
125143	7-109	Screw, 6-32 x 3/8 Flat	
125802	7-112	Washer, Flat	
128874	7-105	Rotor, Motor	
139697	7-113	Screw, 4-40 x 9/32 Fil	
142589	7-103,-108	Bracket w/Cradle, Motor	
150040	7-105	Screw, 6-40 x 5/8 Fil	
150701	7-104,-109	Motor Assembly, Series, Std, 1/20 Hp, 115V/60 Hz/3600 RPM	
150845	7-111	Governor Assembly	
150846	7-110	Holder Assembly, Left Brush	
150847	7-110	Holder Assembly, Right Brush	
150849	7-111,-112	Washer, Insulating	
150850	7-111,-112	Insulator, 0.031" Thk	
150856	7-111,-112	Arm, Contact	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
150857	7-111,-112	Clamp	
150858	7-111,-112	Bracket, Contact	
150859	7-111,-112	Bracket, Mounting	
150865	7-111	Screw, 4-40 Clamping	
150866	7-111	Clamp	
150868	7-111,-112	Bushing, Insulating	
150869	7-111	Spring	
150872	7-111	Stud	
150873	7-110	Collar	
150877	7-111	Bracket, Guide	
150879	7-111	Cover, Governor	
150880	7-110	Spring, Governor Brush	
150881	7-110	Spring, Governor Brush	
150882	7-110	Brush, Contact	
150884	7-110	Mounting, Brush	
150885	7-110	Plate, Brush	
150886	7-110	Plate, Clamp	
150997	7-111	Fan, Governor	
151152	7-111,-112,-113	Screw, 4-40 x 3/16 Hex	
151346	7-105,-110	Screw, 6-40 x 3/8 Fil	
151453	7-109	Nut, 10-32 Hex	
151455	7-109	Spring, Helical Clip	
151620	7-107,-108,-109	Strap, Motor Mounting	
151621	7-107,-108,-109	Screw, 6-32 x 3/4 Rd	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
151622	7-107,-108,-109	Nut, 6-32 Sq	
151630	7-107,-109,-113	Screw, 6-40 x 1/4 Hex	
151637	7-108,-111	Screw, 4-40 x 1/4 Fil	
151642	7-105,-110	Screw, 6-40 x 3/4 Fil	
151657	7-110	Screw, 6-40 x 1/4 Fil	
151658	7-110	Screw, 6-40 x 5/16 Fil	
151659	7-111,-112	Screw, 6-40 x 1/2 Fil	
151661	7-110,-111	Screw, 6-40 x 1" Fil	
151686	7-108,-112	Screw, 4-40 x 3/8 Fil	
151687	7-113	Screw, 4-40 x 7/16 FiL	
151692	7-112	Screw, 6-40 x 3/16 Fil	
151693	7-112	Screw, 6-40 x 9/16 Fil	
151795	7-103,-105	Motor Assembly, std, Ccw, AC Synchronous, 1/20 Hp, 115V, 50/60 Hz, 3000/3600 RPM	
151922	7-103,-108	Clamp	
151923	7-103,-107	Relay, Motor Starting	
151925	7-103,-108	Clamp	
151926	7-108	Nut, 4-40 Spl	
151927	7-103,-107	Cable Assembly w/Terminals	
152035	7-113	Plug	
152042	7-113	Cover	
152044	7-113	Cover	
152046	7-104,-113	Bracket w/Cradle, Motor	
152059	7-104	Cable Assembly w/Terminals	
152067	7-104,-113	Nipple	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
152297	7-105	Washer, Bearing	
152495	7-111,-112	Bushing	
153030	7-105,-106,-109	Mount, Vibration	
153031	7-109	Bushing, Lead	
153049	7-105	Washer, Insulating	
153101	7-109	Grommet, Rubber	
153102	7-109	Setscrew, 8-32	
153103	7-109	Screw, 4-40 Self-Tapping	
153114	7-109	Jumper, 8-1/2" Black	
153342	7-112	Screw, 6-40 x 15/16 Hex	
153535	7-112	Screw, 6-40 Shoulder	
153536	7-112	Gear Assembly	
153885	7-112	Spring Assembly	
153962	7-112	Disc	
153963	7-112	Disc	
153964	7-112	Counterweight	
153965	7-112	Bracket	
153966	7-112	Gear Assembly	
153967	7-112	Gear, 28T	
153968	7-112	Gear Assembly	
153976	7-112	Gear, 32T	
153977	7-112	Gear, Worm	
153979	7-112	Gear, Post	
154375	7-111,-112	Backstop	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
154628	7-112	Governor Assembly	
154674	7-112	Gear, 20T	
154676	7-112	Disc Assembly	
154680	7-112	Bearing, Roller	
154684	7-112	Insulator	
154685	7-112	Fan Assembly	
154693	7-112	Bracket	
155585	7-112	Bearing, Ball	
155593	7-112	Bearing, Ball	
155594	7-112	Screw, 4-40 Shoulder	
155600	7-112	Bracket	
155601	7-112	Plate, Gear Train	
155602	7-112	Gear, 28T	
155603	7-112	Gear, 28T	
155605	7-112	Bearing, Ball	
155611	7-112	Ring, Bearing	
155613	7-112	Gear, 28T	
155752	7-107	Sleeve, 5/64" ID x 1/2" Lg Insulating	
156875	7-107	Screw, 6-40 x 5/32 Fil	
157987	7-112	Washer, Insulating	
160302	7-108	Plate, Nut	
161578	7-104,-113	Suppressor, Noise	
161579	7-104,-113	Capacitor, 0.5 Mfd	
162072	7-103,-108	Capacitor, 88 to 108 Mfd	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
162196	7-103,-108	Insulator	
162464	7-106	Stator, Motor	
162466	7-106	Shield, Rear End	
162467	7-106	Shield, Front End	
162469	7-106	Washer, Spring	
162482	7-106	Bolt, 6-32 x 3-1/2 Fil	
162910	7-108	Insulator	
164890	7-106	Bearing, Ball	
164891	7-106	Shim, 0.032" Thk	
164892	7-106	Shim, 0.018" Thk	
164893	7-106	Collar, Thrust	
164894	7-106	Shim, 0.018" Thk	
172902	7-106	Nut, 6-32 Hex	
173004	7-113	Resistor, 100 Ohm	
173425	7-103,-108	Relay, Motor Starting	
174471	7-103,-108	Switch, Thermostatic	
176137	7-103	Jumper, 9-1/4" Black	
176417	7-106	Ring, Retaining	
179010	7-108	Bracket, Relay	
179103	7-104,-113	Resistor, 250 Ohm	
179420	7-104,-113	Container	
179421	7-113	Capacitor, 1 Mfd	
179422	7-113	Suppressor, Noise	
179423	7-113	Plate w/Bracket	
179424	7-104,-113	Lid w/Insulator	

Table 7-4. Motor Unit - Continued

Part Number	Figure Number(s)	Description	Notes
198691	7-113	Plate w/Resistor Assembly	
198692	7-113	Container Assembly	
199721	7-105	Bolt, 8-32 x 5/13/16 Fil	
305658	7-103,-107	Spring	
305659	7-103,-107	Insulator	
305660	7-103,-107	Plate, Mounting	
305661	7-103,-107	Bracket w/Cradle, Motor	
310295	7-103,-106	Motor Assembly, Miniature, AC Synchronous, 25 Mhp, 115V/60 Hz/3600 RPM	
312530	7-113	Washer, Textolite	
312531	7-113	Washer, Fiber	
320410	7-109	Terminal, Spade Type	
320418	7-107	Terminal, Ring Type	
320420	7-109	Terminal, Ring Type	
320422	7-109	Terminal, Ring Type	
324116	7-111	Governor Assembly	
330565	7-106	Rotor	
330579	7-113	Screen w/Brackets	
332865	7-105	Fan, Motor	
334877	7-103,-107	Switch, 50 Hz	

Table 7-5. Electrical Service Assembly (ESA)

Part Number	Figure Number(s)	Description	Notes
2191	7-116 thru -119	Lockwasher	
3598	7-117,-118	Nut, 6-40 Hex	
3599	7-121	Nut, 4-40 Hex	
3650	7-120	Washer, Flat	
7001	7-117,-118	Washer, Flat	
7002	7-116 thru -119	Washer, Flat	
7096	7-120	Bushing, Insulating	
55219	7-116	Screw, 8-32 x 3/8 Fil	
83885	7-117	Nut, 6-32 Hex	
92260	7-117	Lockwasher	
92527	7-116,-118	Lockwasher	
104807	7-120	Washer, Flat	
107116	7-116,-118,-119	Lockwasher	
110743	7-117,-118,-120, -121	Lockwasher	
111017	7-116,-117,-118	Screw, 6-40 x 5/16 Fil	
116783	7-116,-118	Holder, Fuse	
118146	7-120,-122,-123	Resistor, 4700 Ohm	
118147	7-122	Resistor, 6800 Ohm	
118154	7-123	Resistor, 47000 Ohm	
118177	7-123	Resistor, 22000 Ohm	
118178	7-122	Resistor, 220K Ohm	
118659	7-116,-118	Switch, Toggle	
118720	7-120,-122,-123	Resistor, 100K Ohm	
120175	7-116,-118	Plate, ON-OFF	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
120424	7-123	Resistor, 4300 Ohm	
121243	7-119	Clamp, 3/16" ID Cable	
124611	7-118	Screw, 8-32 x 3/8 Hex	
125011	7-118,-121	Washer, Flat	
126255	7-114,-115	Bumper, Rubber	
129850	7-120,-123	Resistor, 680 Ohm	
129854	7-120,-122,-123	Resistor, 10000 Ohm	
131807	7-121	Fuse, 0.5 Amp	
135563	7-117	Jumper, 2-3/4" Green	
137438	7-122	Resistor, 100 Ohm	
137442	7-120-123	Resistor, 1500 Ohm	
137604	7-120,-123	Resistor, 620 Ohm	
139143	7-120	Resistor, 43000 Ohm	
143631	7-124	Fuse, 1/5 Amp	
144495	7-120,-122,-123	Pad, Transistor Mounting	
144835	7-120	Bushing, Spring	
145781	7-114,-115,-116, -118	Grommet	
145822	7-114,-115,-116, -118	Stud, Oval Head	
150040	7-117,-118	Screw, 6-40 x 5/8 Fil	
150089	7-121	Screw, 4-40 x 1/2 Fil	
151335	7-116,-117,-118	Stud	
151416	7-116,-117,-118	Nut, 6-40 Hex	
151629	7-117,-118	Nut, 6-40 Lug	
151630	7-116,-117,-118, -119	Screw, 6-40 x 1/4 Hex	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
151631	7-116,-117	Screw, 6-40 x 5/16 Hex	
151632	7-119	Screw, 6-40 x 3/8 Hex	
151637	7-117,-118,-121	Screw, 4-40 x 1/4 Fil	
151659	7-117,-118	Screw, 6-40 x 1/2 Fil	
151685	7-120	Screw, 4-40 x 5/16 Fil	
151687	7-117	Screw, 4-40 x 7/16 Fil	
151693	7-120	Screw, 6-40 x 9/16 Fil	
151722	7-116,-119	Screw, 6-40 x 3/16 Hex	
151723	7-116,-118	Screw, 10-32 x 3/8 Hex	
151880	7-120	Nut, 4-40 Hex	
152035	7-116,-119	Plug	
152888	7-120	Screw, 4-40 x 6/16 Hex	
155753	7-116,-117,-118	Sleeve, 1/8" ID x 1/2" Lg Insulating	
158250	7-116,-117,-118	Block, Terminal	
158252	7-116,-117,-118	Insulator, Terminal Block	
162360	7-116,-118	Fuse, SL-BL, 0.8 Amp	
171533	7-121,-124	Resistor, 4 Ohm	
171585	7-121,-124	Capacitor, 0.22 Mfd	
171587	7-120	Capacitor, 0.25 Mfd	
171829	7-120,-123	Capacitor, 0.15 Mfd	
171831	7-121	Capacitor, 10 Mfd	
172726	7-117,-118	Resistor, 250 Ohm	
177113	7-120,-121	Insulator	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
178844	7-120,-121,-123 -124	Varistor, 100 Amp	
178860	7-120,-121,-123 -124	Capacitor, 0.022 Mfd	
178864	7-123	Resistor, 3900 Ohm	
181266	7-121	Bushing, Insulating	
181618	7-122	Capacitor, 0.01 Mfd	
181619	7-122	Diode, 1N914	
181667	7-120,-123	Diode, 1N750A	
181675	7-120	Transistor, Power	
181999	7-117,-118	Insulator	
182180	7-121,-124	Resistor, 200 Ohm	
182284	7-117,-118	Insulator, 0.015" Thk	
182520	7-121	Rectifier, 1N4383	
182523	7-117,-118	Clamp, 1-3/8" ID Mounting	
182751	7-120	Resistor, 3600 Ohm	
185688	7-116,-118	Plate, Identification	
193053	7-124	Capacitor, 2.0 Mfd	
195180	7-117	Bumper, Rubber	
195245	7-116,-118	Sleeve, 1/2" ID x 1-1/2" Lg Insulating	
198937	7-121,-124	Resistor, 2700 Ohm	
300116	7-123	Cover, Insulating	
303142	7-122	Circuit Card Assembly, LLK	
305298	7-121,-124	Resistor, 3300 Ohm	
309868	7-123	Resistor, 1300 Ohm	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
311664	7-121	Resistor, 2500 Ohm	
312284	7-121	Capacitor, 1.5 Mfd	
312385	7-121	Capacitor, 0.1 Mfd	
315930	7-122	Transistor, 2N3568	
315931	7-122	Transistor, 2N3638	
318835	7-121	Transistor	
320038	7-121,-124	Jack, Red Test	
320039	7-121,-124	Jack, Black Test	
320040	7-121,-124	Jack, Orange Test	
320041	7-121	Jack, Green Test	
320042	7-121	Jack, Slate Test	
320045	7-120	Circuit Card Assembly	
320047	7-122	Capacitor, 2 Mfd	
320048	7-122	Capacitor, 0.5 Mfd	
320049	7-122	Capacitor, 0.15 Mfd	
320051	7-122	Circuit Card	
320056	7-116,-118	Bracket	
320057	7-117	Cover, Top	
320058	7-117	Cover, Bottom	
320410	7-117,-119	Terminal, Spade Type	
320418	7-116 thru -118	Terminal, Ring Type	
321128	7-116,-118	Transformer, Power	
321129	7-117,-118	Capacitor, 750 Mfd	
321130	7-121	Circuit Card Assembly	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
321132	7-124	Circuit Card Assembly, PS, 1-1/2 Amp	
321133	7-116,-119	Inductor	
321136	7-124	Diode, 1N4722	
321140	7-121	Circuit Card	
321145	7-121,-124	Transistor, 2N2270	
321148	7-120	Sink, Heat	
321149	7-120	Diode	
321151	7-120	Resistor, 110 Ohm	
321153	7-120	Spacer	
321154	7-120,-123	Diode, 1N757A	
321155	7-120	Resistor, 2000 Ohm	
321156	7-120,-123	Diode, 1N482A	
321157	7-120,-122,-123	Capacitor, 500 Pf	
321158	7-120	Capacitor, 0.1 Mfd	
321159	7-120,-121	Choke	
321160	7-120	Potentiometer	
321161	7-120,-123	Diode, 1N748A	
321164	7-120	Potentiometer	
321165	7-120,-123	Transistor, 2N3638A	
321166	7-120,-123	Transistor, 2N1893	
321167	7-120	Jumper, 2-7/8" Yellow	
321168	7-120	Jumper, 2-7/8" Blue	
321169	7-120	Jumper, 2-7/8" Orange	
321170	7-120	Jumper, 2-7/8" Red	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
321171	7-120	Jumper, 3-3/4" Black	
321204	7-122	Resistor, 13000 Ohm	
321205	7-116,-119	Filter Assembly	
321207	7-116,-119	Strip, Terminal	
321208	7-116,-119	Plate	
321230	7-118,-119	Electrical Service Assembly	
321231	7-116,-117	Electrical Service Assembly	
321246	7-117	Cable Assembly	
321248	7-117	Cable Assembly	
321258	7-120	Resistor, 20000 Ohm	
321259	7-120	Resistor, 15 Ohm	
321260	7-123	Capacitor, 1 Mfd	
321261	7-120,-123	Transistor, 2N4036	
321263	7-120	Resistor, 13 Ohm	
321264	7-120	Capacitor, 2.7 Mfd	
321285	7-116,-118	Bracket, Mounting	
321286	7-121,-124	Diode Zener, 1N4749A	
321288	7-121	Sink, Heat	
321290	7-121	Circuit Card Assembly, PS, 0.5 Amp	
321291	7-124	Circuit Card	
321292	7-120	Resistor, 1300 Ohm	
321299	7-120	Circuit Card	
321975	7-123	Resistor, 33 Ohm	
321986	7-114	Cover w/Bumpers	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
321987	7-114	Cover w/Studs	
321991	7-120	Circuit Card Assembly, CMD	
321995	7-116 thru -119	Container, Outer	
321996	7-116,-118	Cover	
321997	7-116 thru -118	Bracket	
321998	7-117	Container	
321999	7-117	Bracket, Connector Mounting	
323501	7-118	Bracket, Connector Mounting	
323505	7-115	Cover w/Bumpers	
323506	7-115	Cover w/Studs	
323810	7-123	Circuit Card Assembly, SMD	
323813	7-116,-117	Electrical Service Assembly	
323835	7-123	Circuit Card	
323841	7-123	Resistor, 300 Ohm	
323842	7-123	Resistor, 21 Ohm	
323843	7-123	Resistor, 590 Ohm	
323844	7-123	Transistor, 2N3053	
323845	7-123	Transistor	
323846	7-123	Pad, Transistor Mounting	
323847	7-123	Sink, Heat	
323964	7-123	Potentiometer, 500K ohm	
323970	7-119	Cable Assembly	
323971	7-119	Cable Assembly	
324137	7-117	Cable	
324138	7-117	Cable	

Table 7-5. Electrical Service Assembly (ESA) - Continued

Part Number	Figure Number(s)	Description	Notes
324139	7-117	Cable	
324144	7-120,-122,-123	Transistor, 2N4121	
324147	7-120,-122,-123	Pad, Transistor Mounting	
324154	7-116	Cable	
324698	7-116,-118	Nut, No. 10 Speed	
326270	7-117,-118	Connector, 15-Pt Circuit Card	
326351	7-116,-118	Transformer Assembly	
326352	7-116,-118	Cable Assembly	
326353	7-116,-118	Cable Assembly	
326374	7-117	Label	
326376	7-117	Label	
326382	7-116	Label	
326390	7-117	Jumper, 9" Red	
326776	7-123	Capacitor, 0.47 Mfd	
327382	7-117	Spacer	
327386	7-119	Decalcomania	
327444	7-116,-119	Capacitor, 2 Mfd	
327782	7-119	Decalcomania	
327783	7-116	Decalcomania	
327786	7-116	Decalcomania	

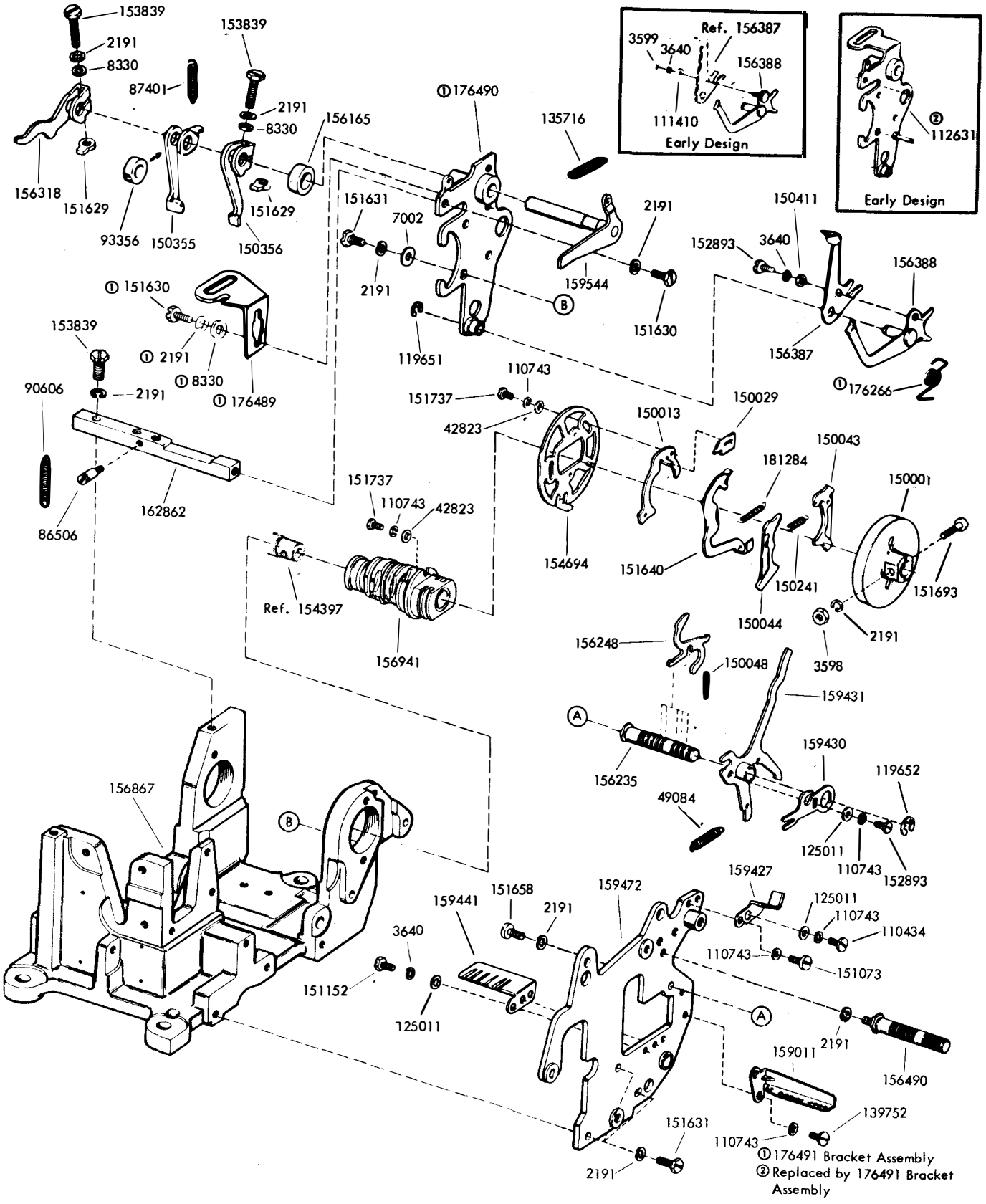


Figure 7-1. One-Shaft Frame Mechanism

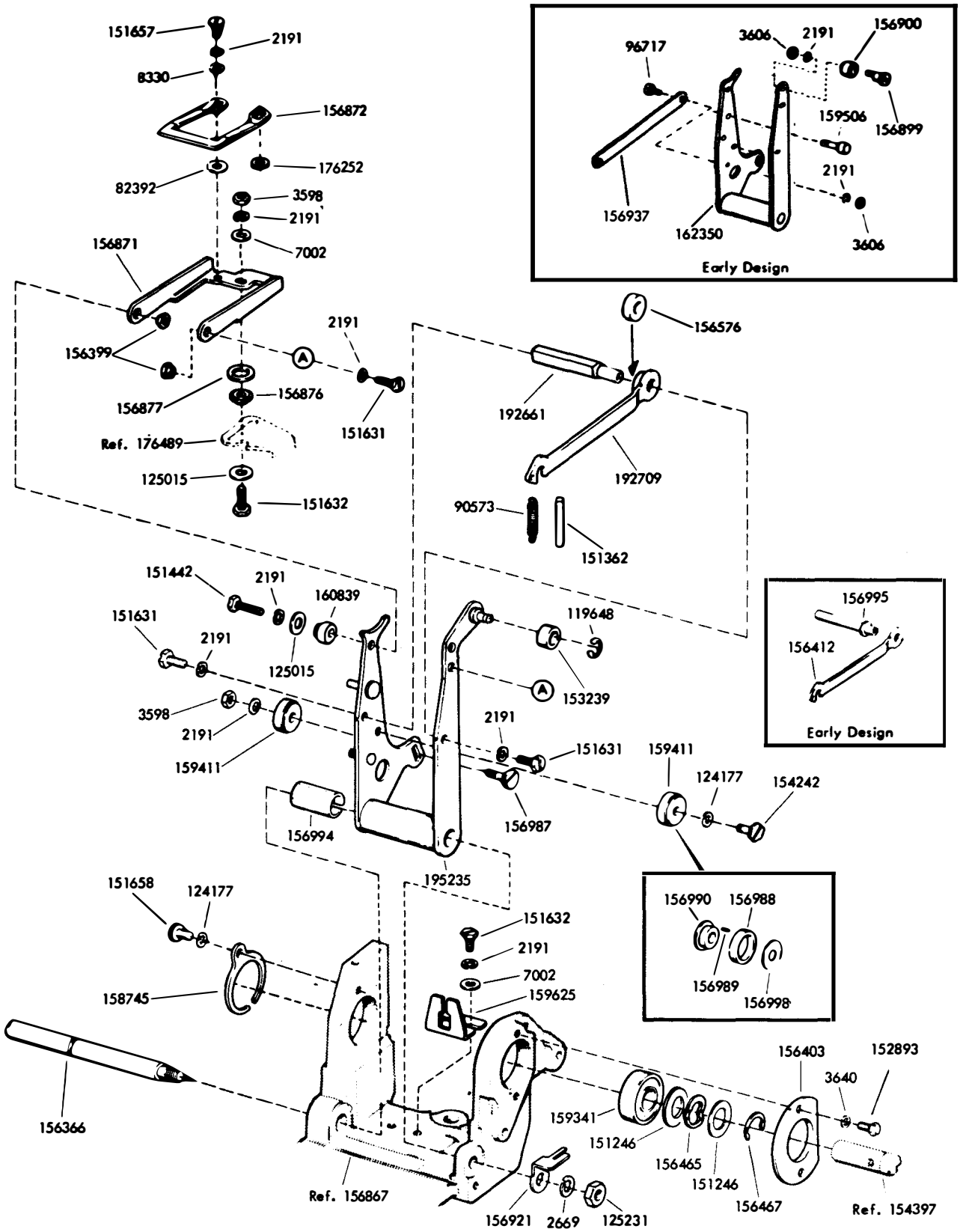
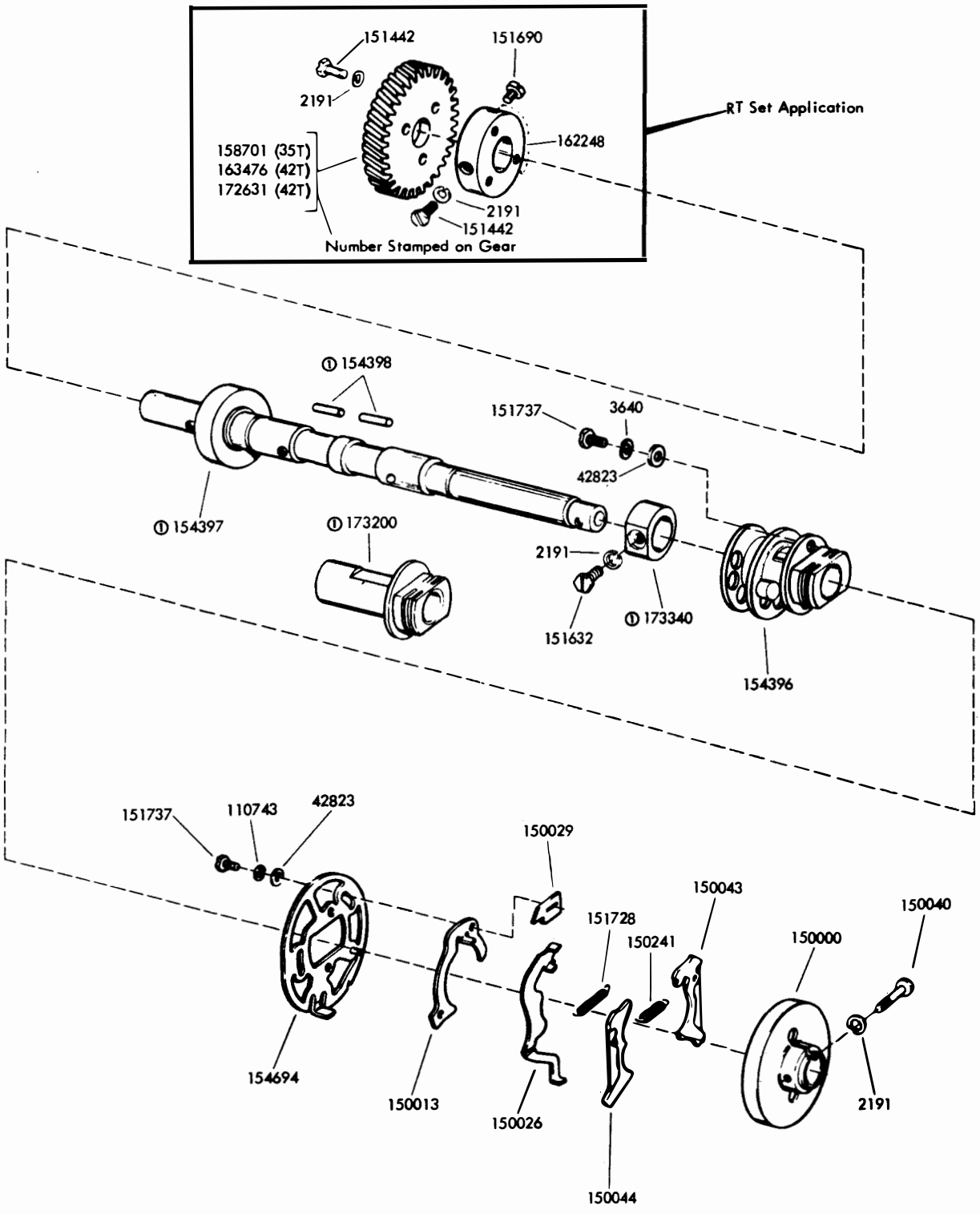


Figure 7-2. Frame Mechanism



① 173336 Modification Kit to Provide New Style Shaft and Bearing Specification 5979S

Figure 7-3. Main Shaft Mechanism

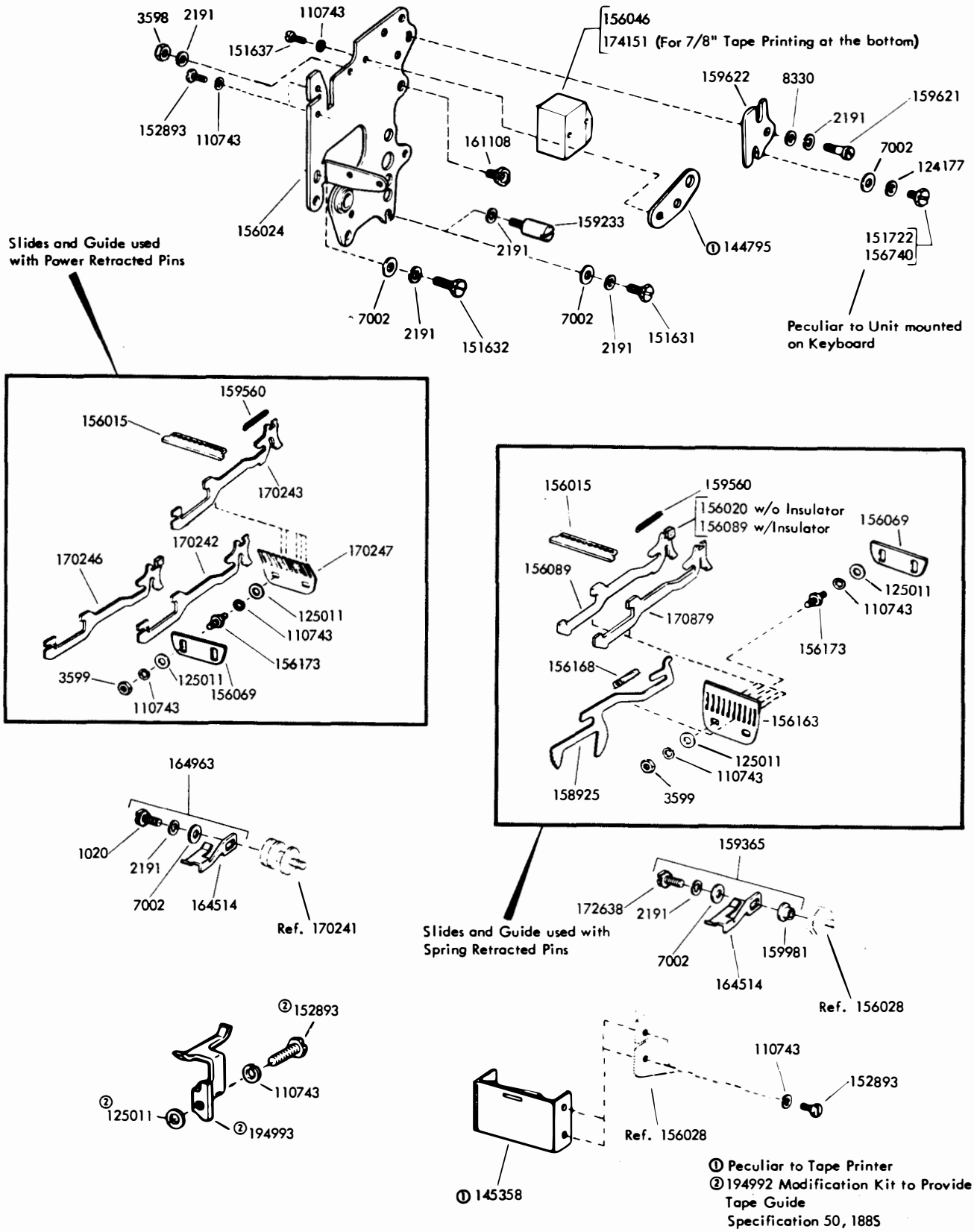
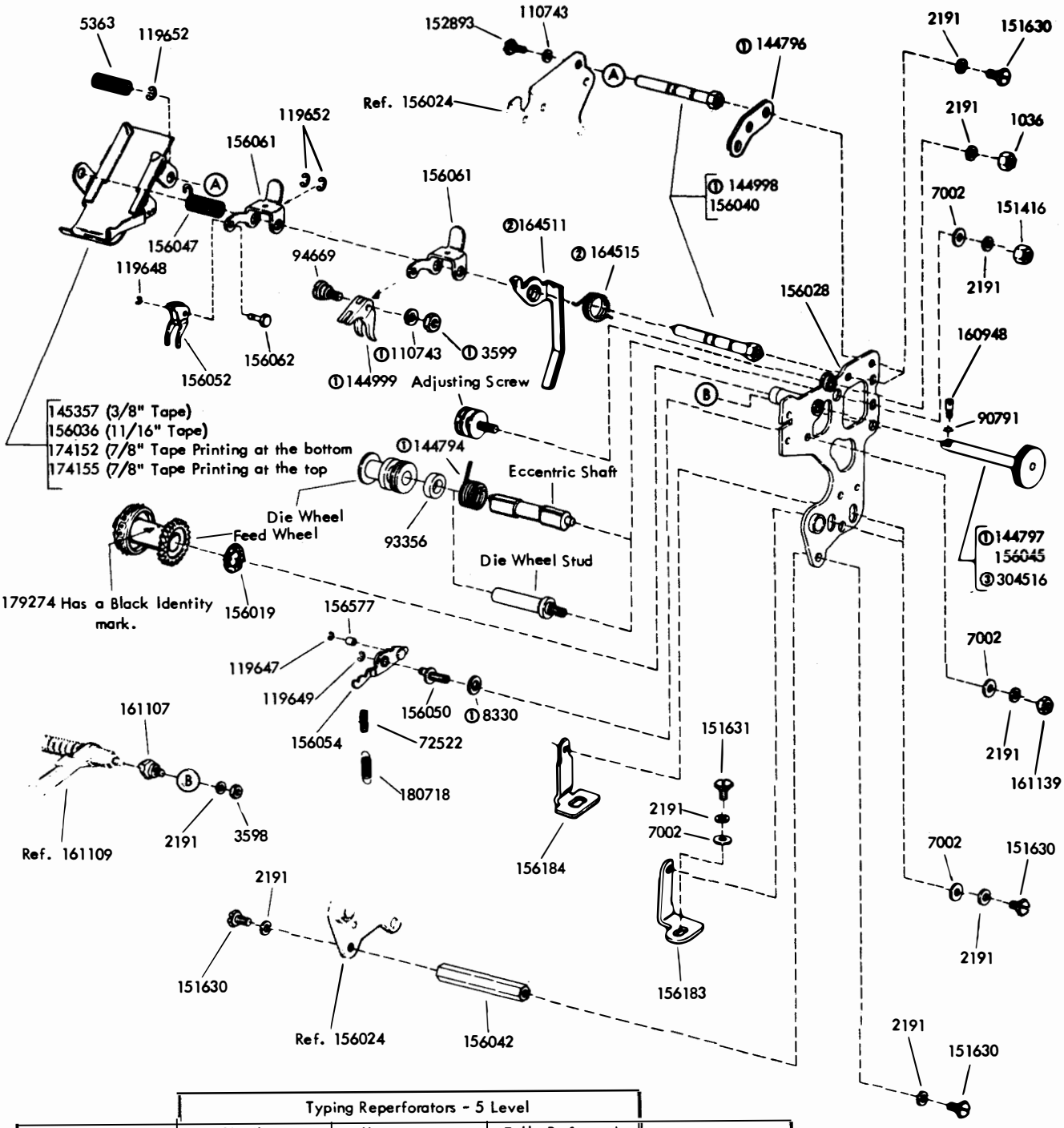


Figure 7-4. Punch Rear Plate Mechanism



Type of Punch	Typing Reperforators - 5 Level			Tape Printer
	Chadless w/Spring Ret. Pins	Fully Perforated w/Spring Ret. Pins	Fully Perforated w/Power Ret. Pins	
Die Wheel	156055	170788	170788	145353
Feed Wheel	See Fig. 7-19 for Punch Block and feed Wheel Combinations			145356
Die Wheel Stud	156044	170219	170219	
Adjusting Screw	156090	170241	170241	170241
Eccentric Shaft				144793

① Peculiar to Tape Printer
② Chadless Tape Only
③ 304515 Modification Kit to Eliminate Tape Loading Safety Hazard. Specification 50273S

Figure 7-5. Punch Front Plate Mechanism

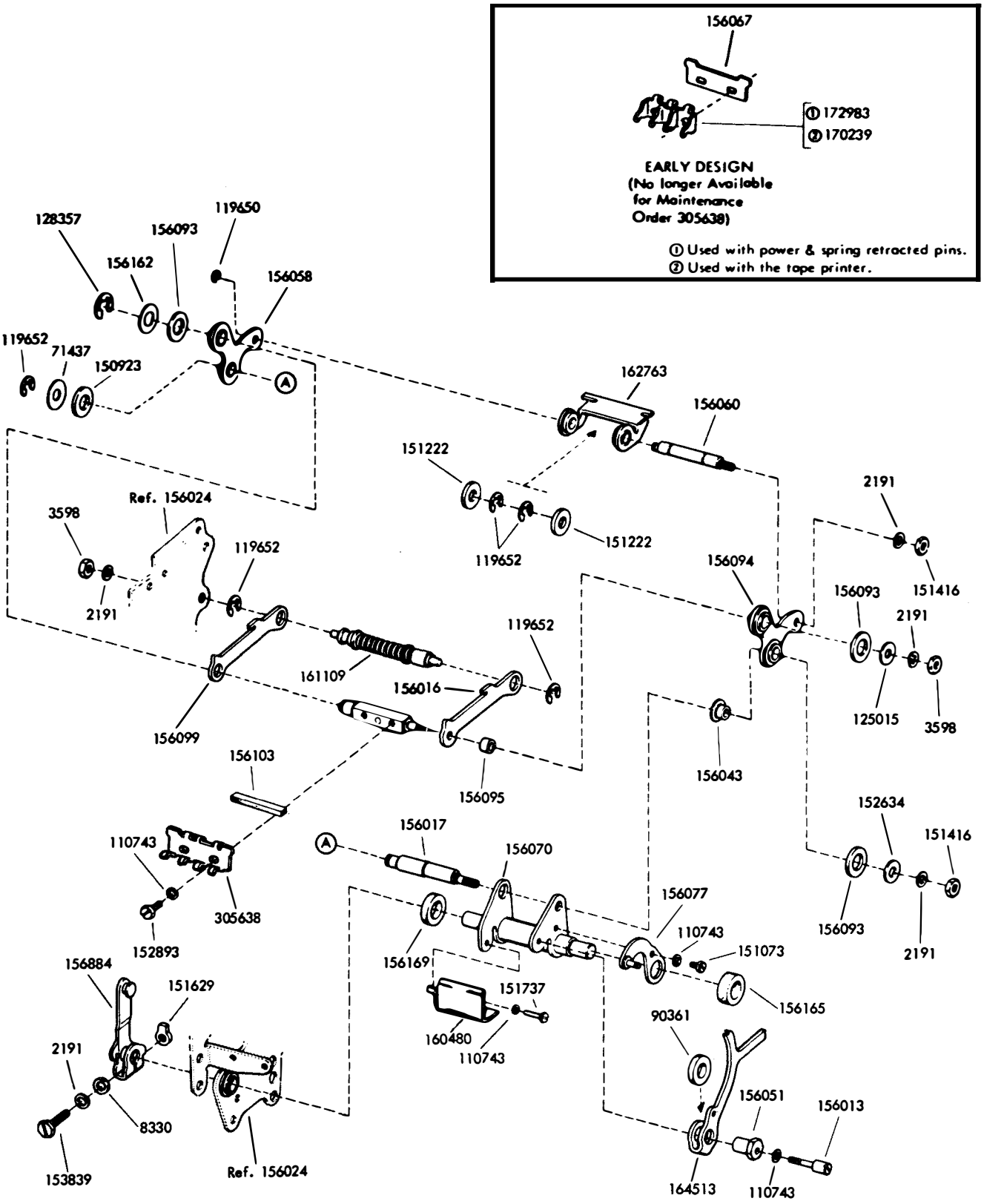


Figure 7-6. Punch Bail Mechanism

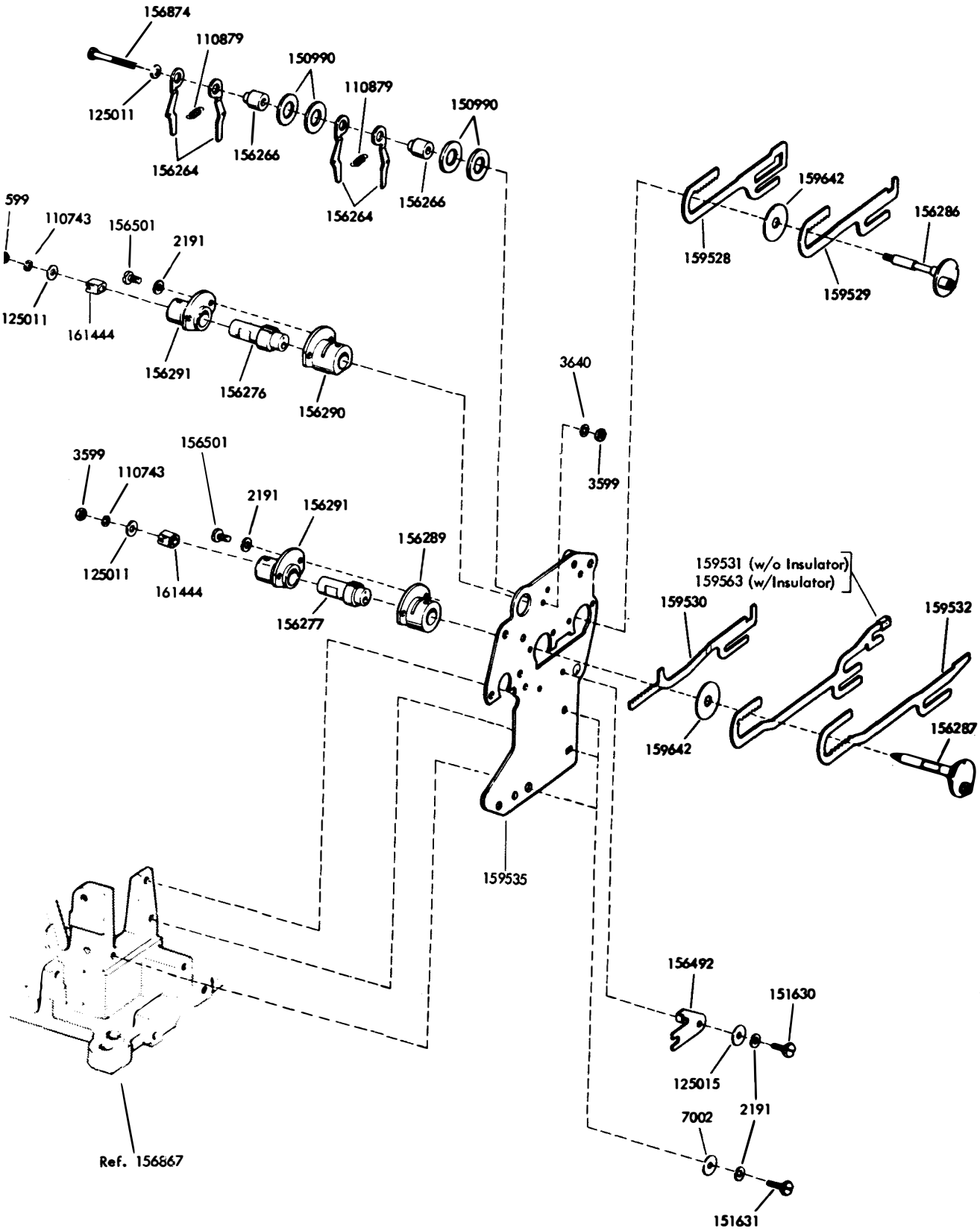
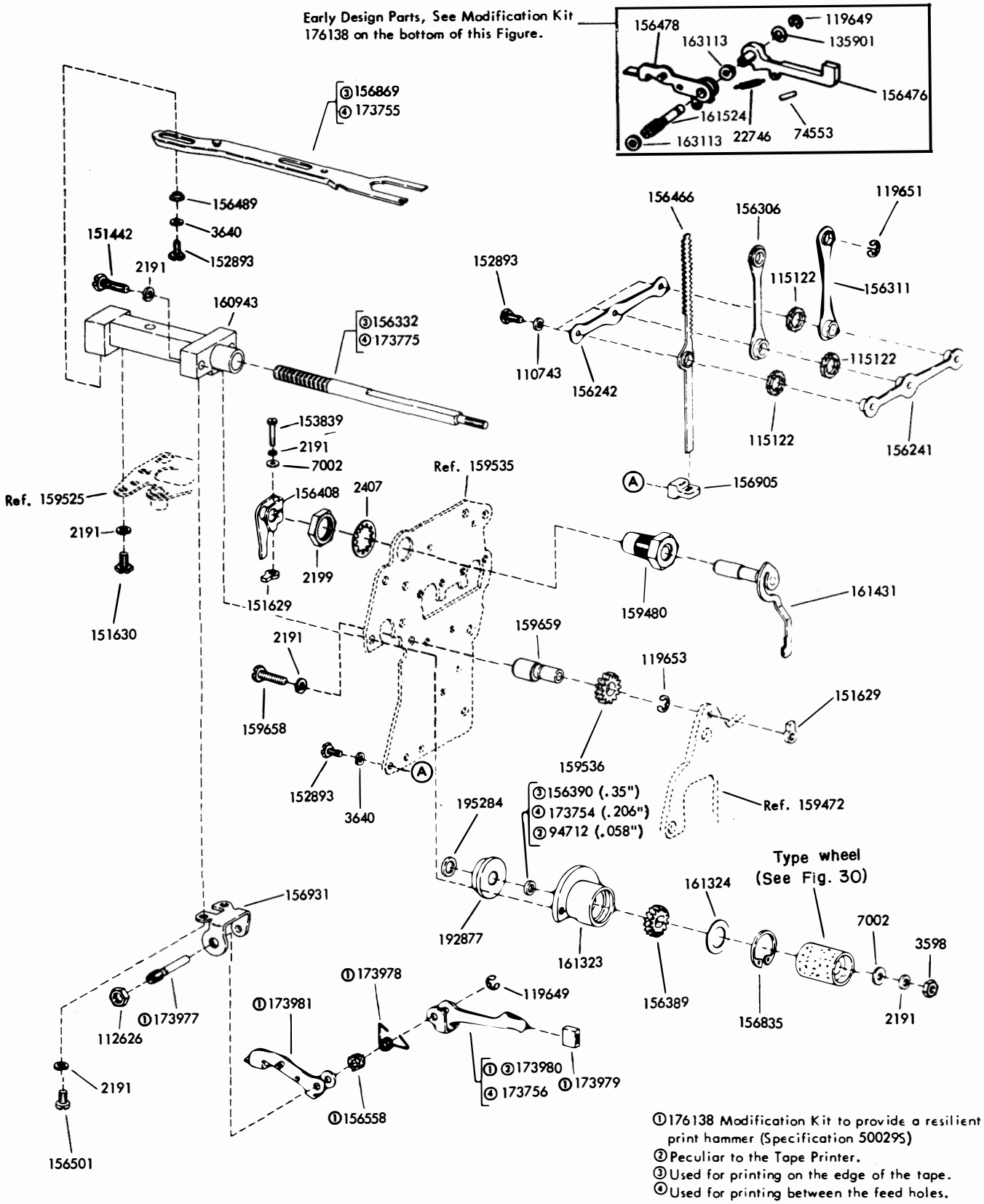


Figure 7-7. Rotary Positioning Mechanism (Sheet 1 of 2)



①176138 Modification Kit to provide a resilient print hammer (Specification 50029S)
②Peculiar to the Tape Printer.
③Used for printing on the edge of the tape.
④Used for printing between the feed holes.

Figure 7-8. Rotary Positioning Mechanism (Sheet 2 of 2)

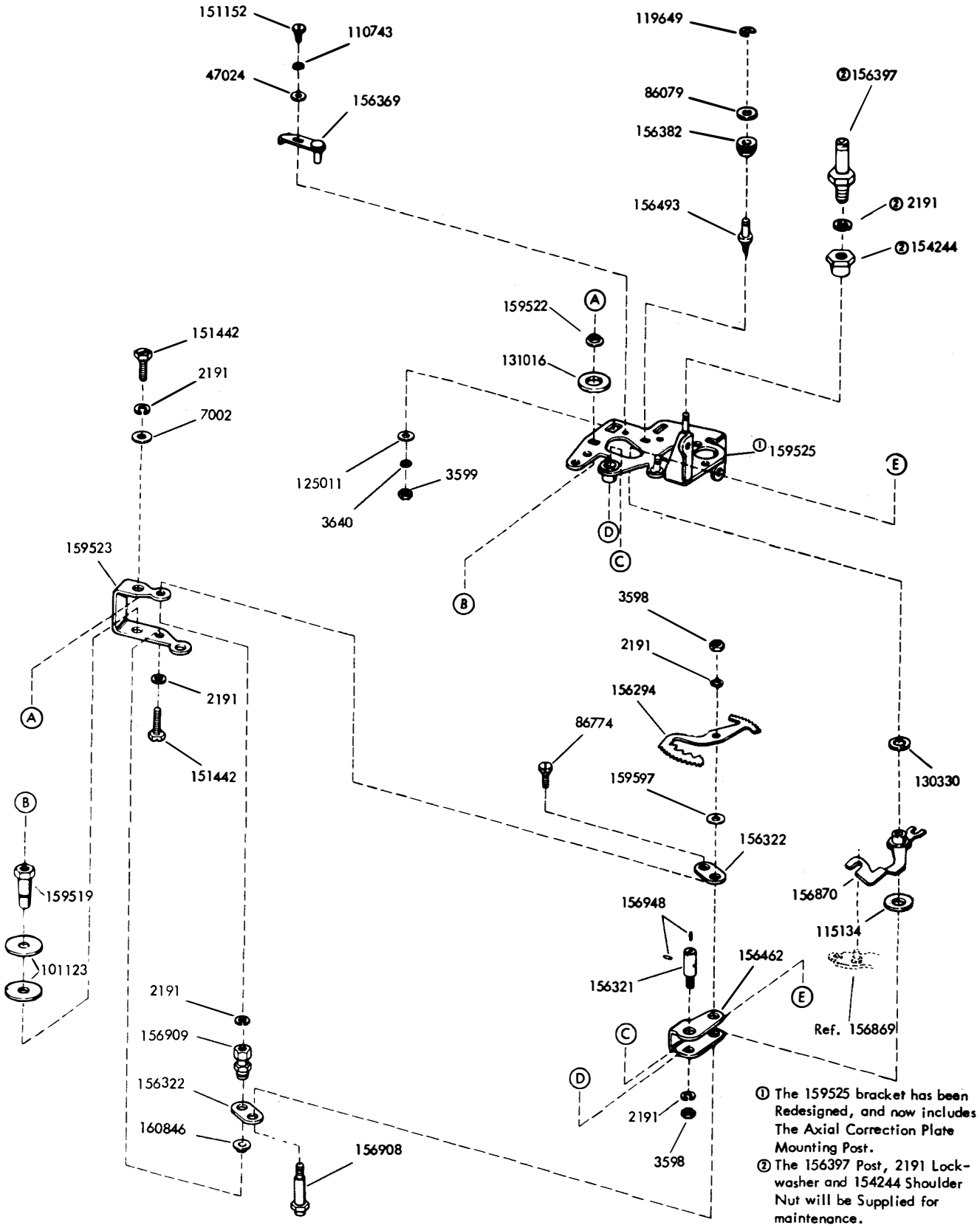


Figure 7-9. Axial Positioning Mechanism (Sheet 1 of 2)

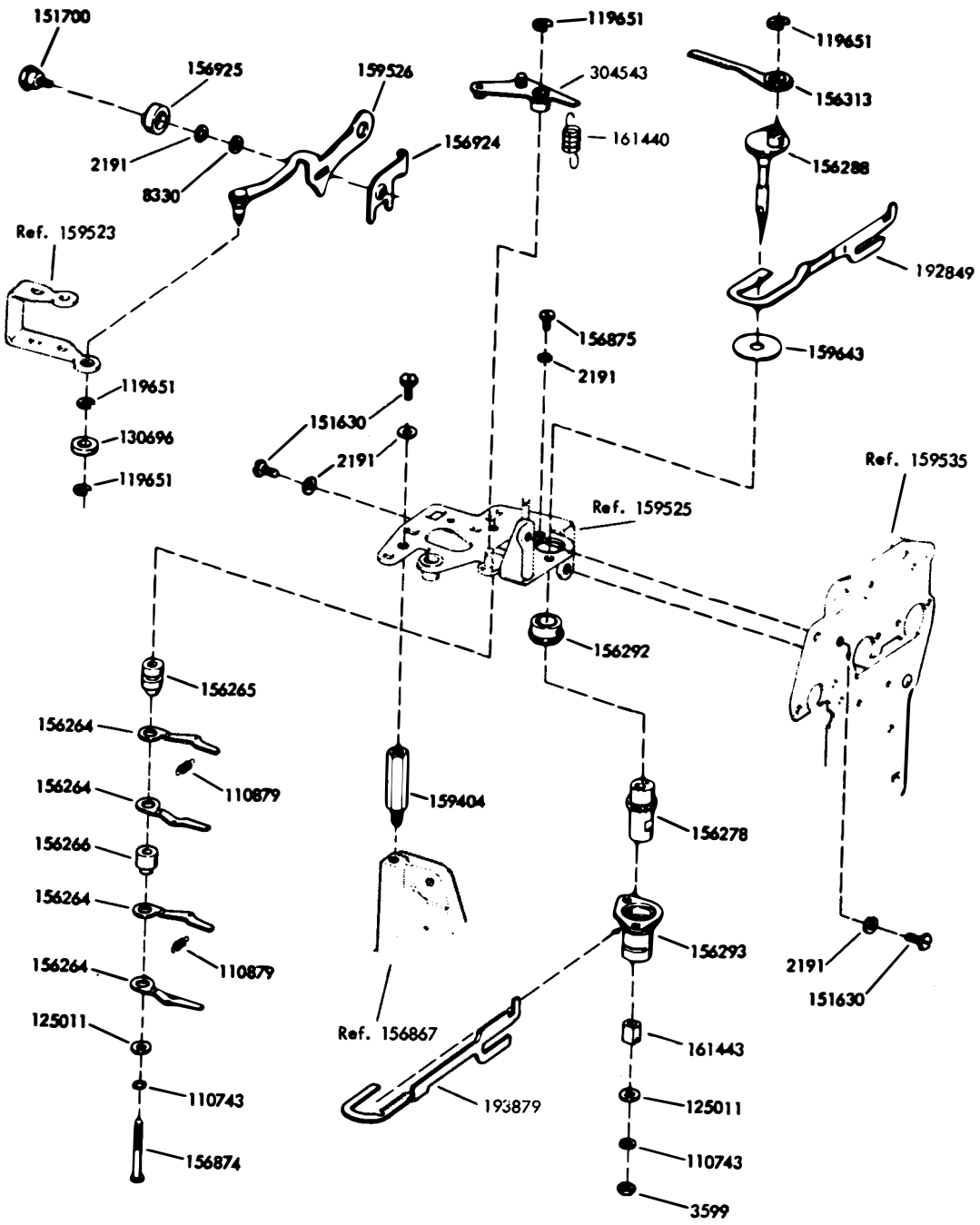


Figure 7-10. Axial Positioning Mechanism (Sheet 2 of 2)

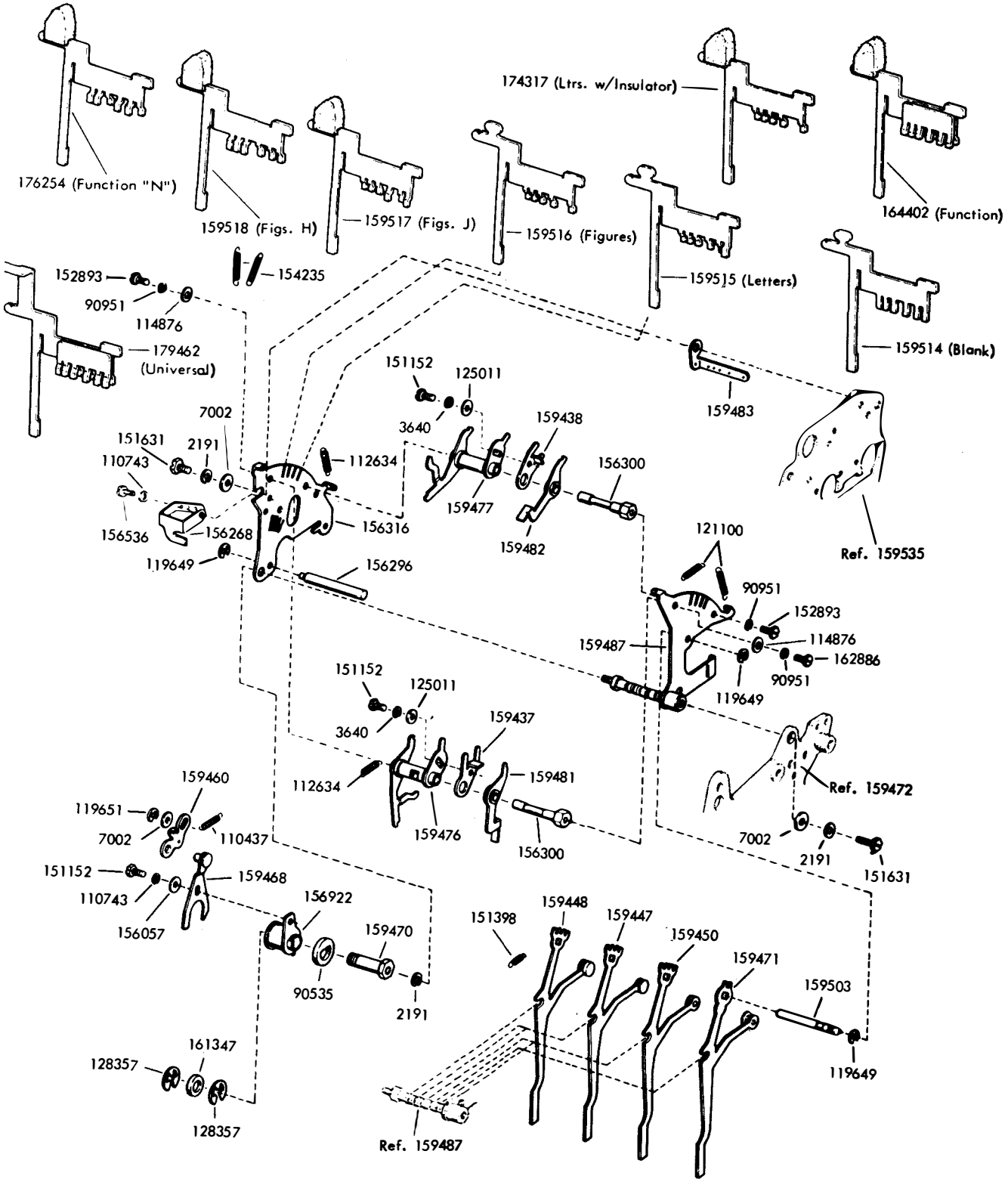


Figure 7-11. Function Box Mechanism

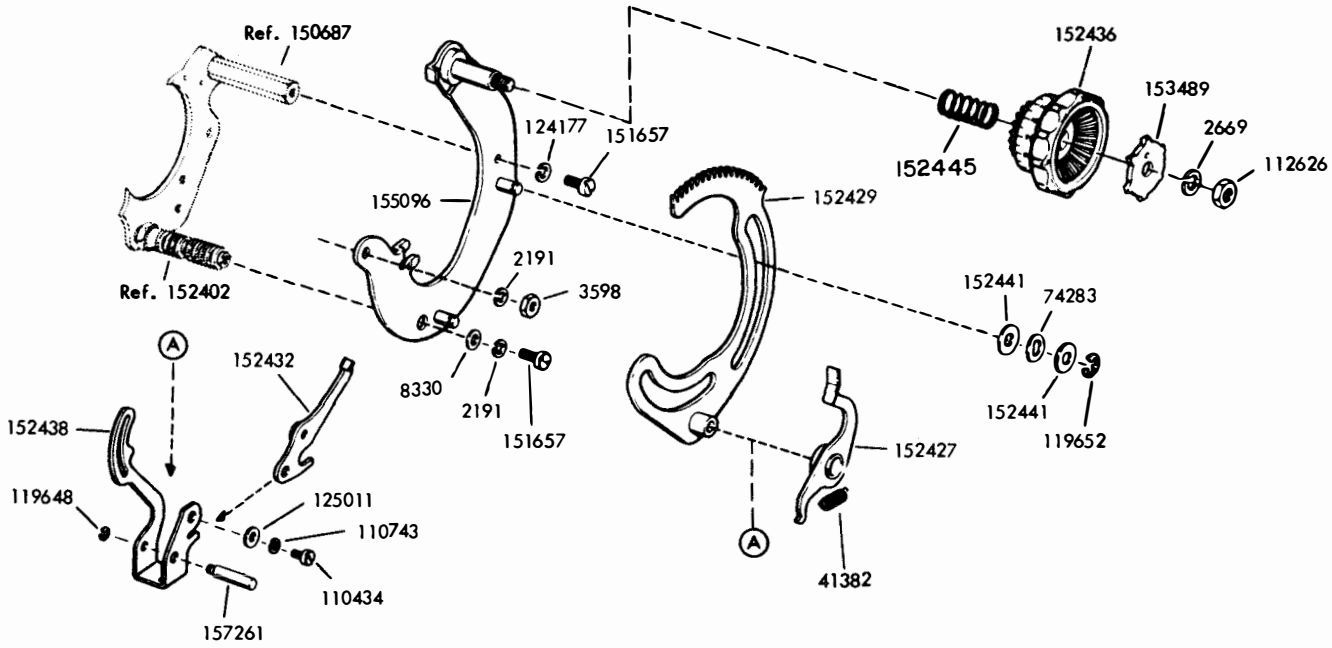


Figure 7-12. Range Finder Mechanism

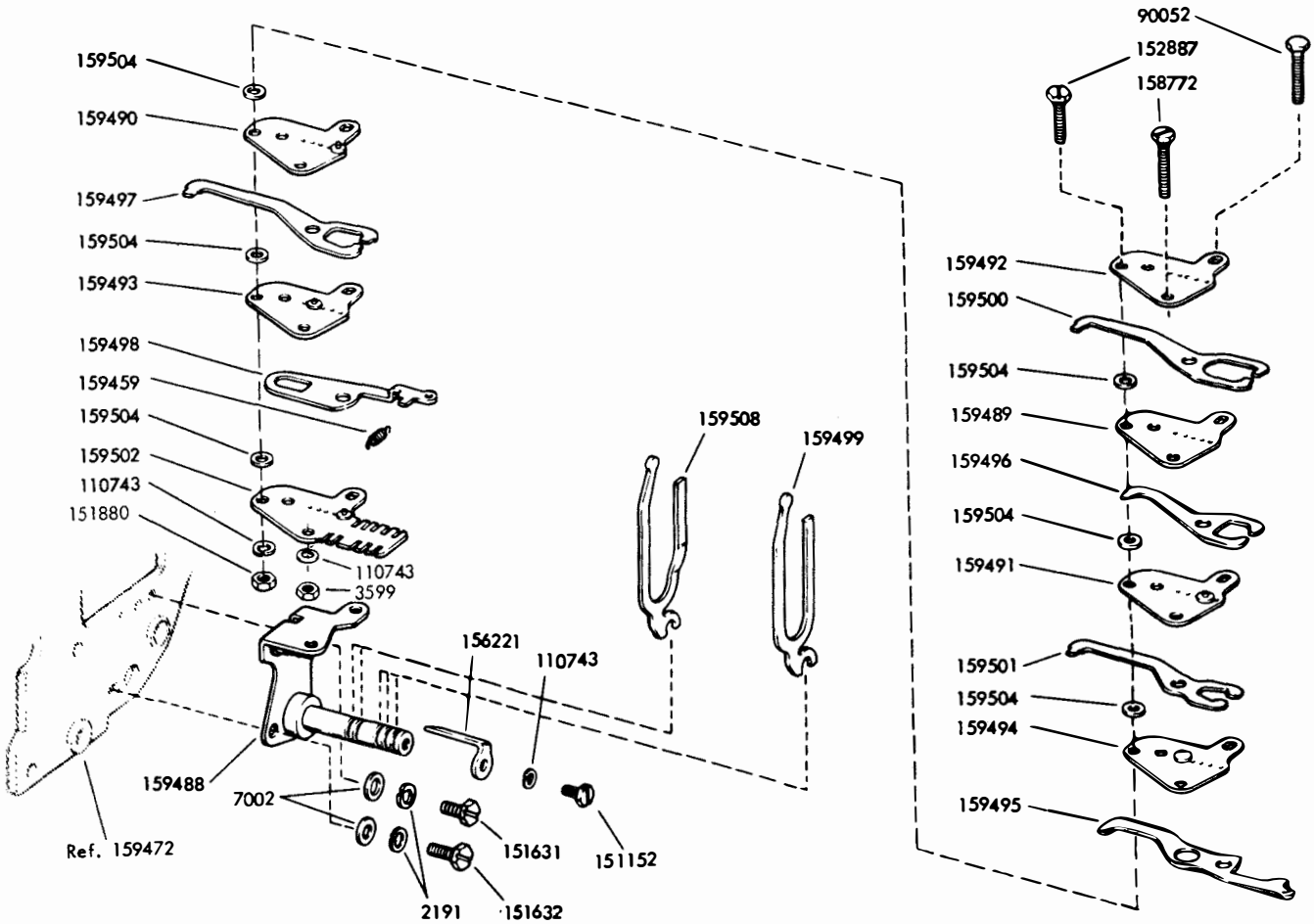


Figure 7-13. Transfer Mechanism

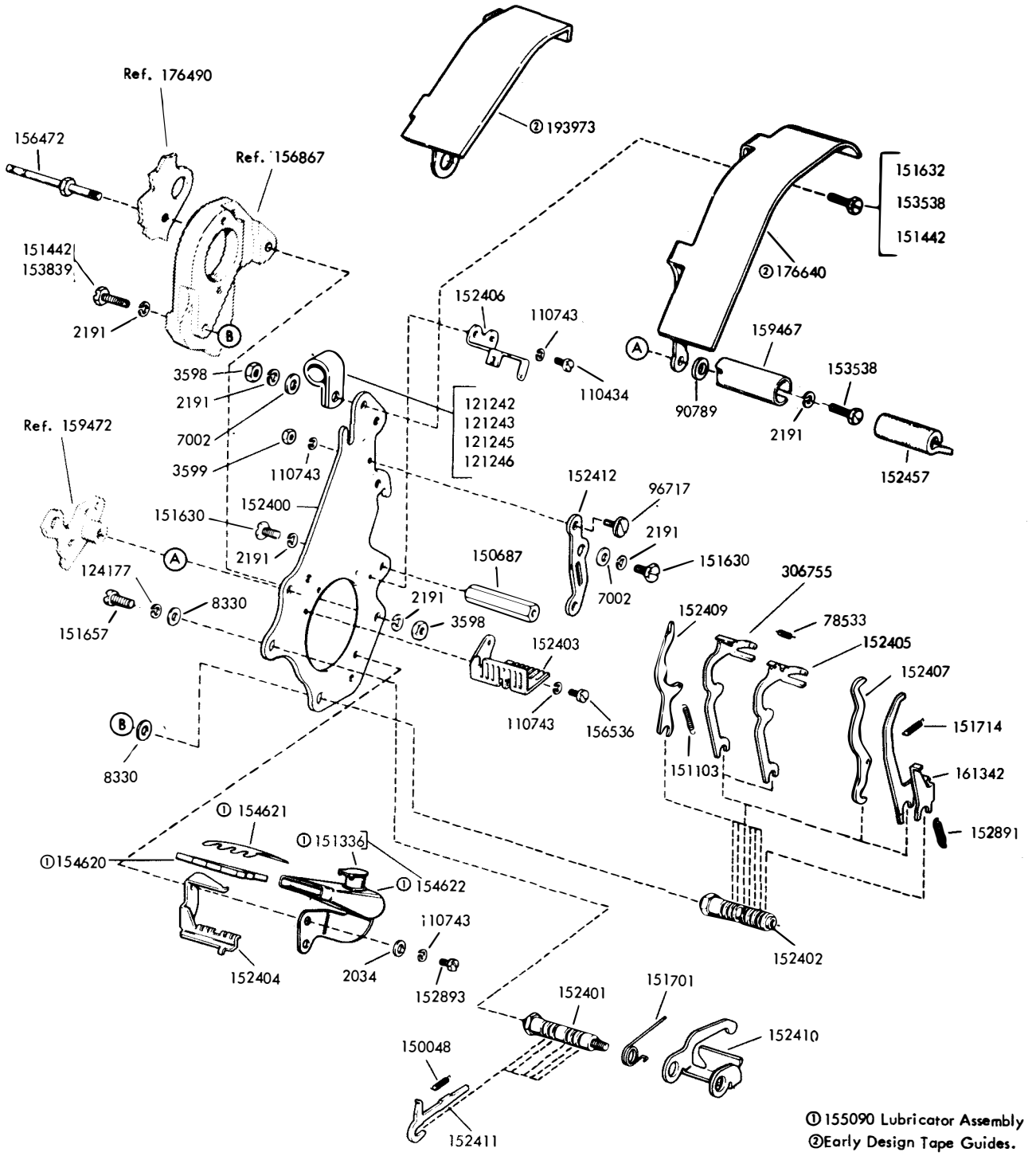
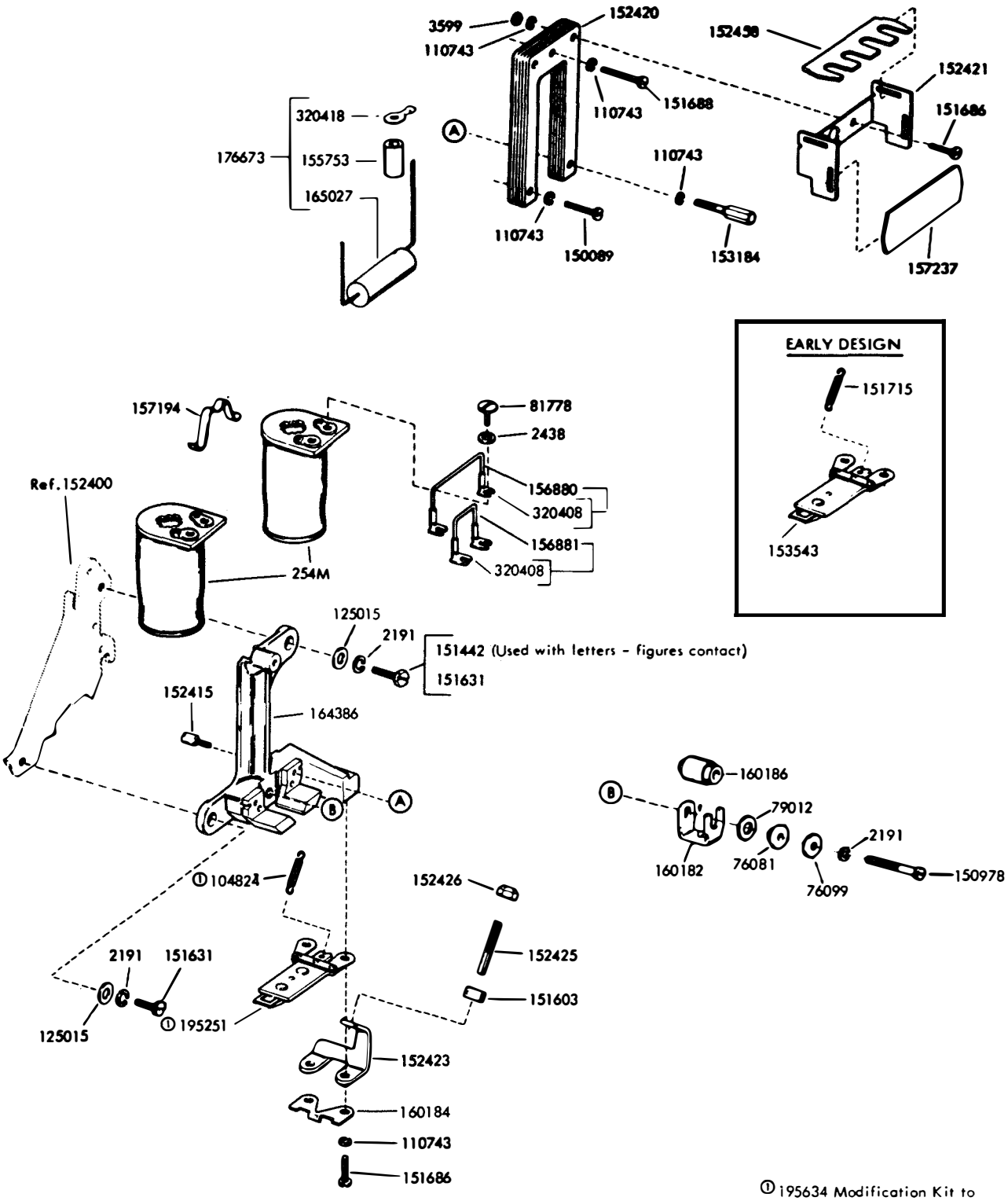
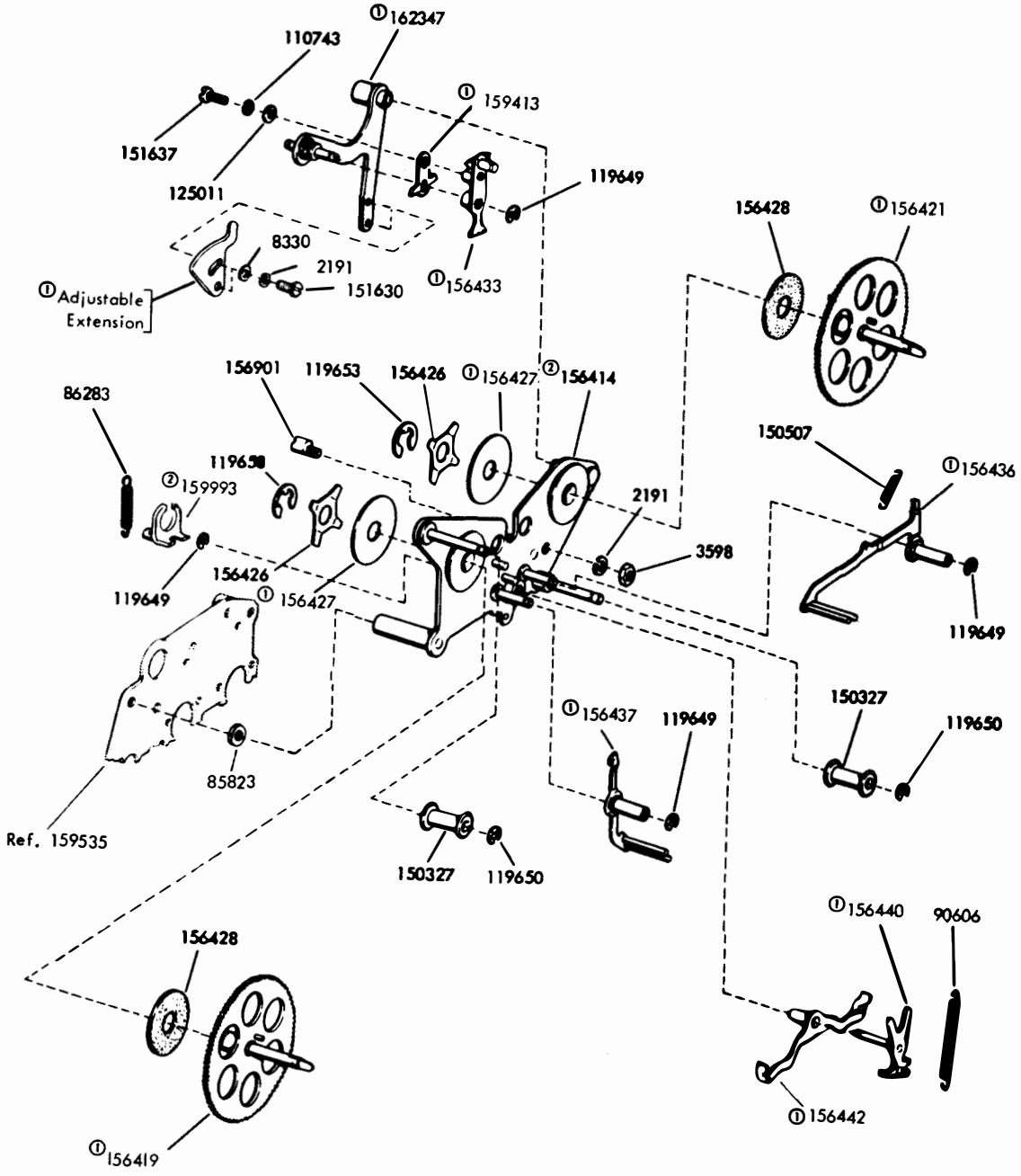


Figure 7-14. Selecting Mechanism - Used on High-Level Sets



① 195634 Modification Kit to provide quick release of the armature. (New and Early design parts are interchangeable only in pairs). Specification 50165S

Figure 7-15. Selecting Magnet Mechanism - Used on High-Level Sets



For Latest Design Ribbon Feed Mechanism, See Fig. 7-20.

① No Longer available, or the 164520 ordered ribbon feed assembly on Fig. 7-20.
② The 159993 bracket is still available to be used with early design 156414 which did not include the drive arm spring post.

Figure 7-16. Ribbon Feed Parts (Early Design)

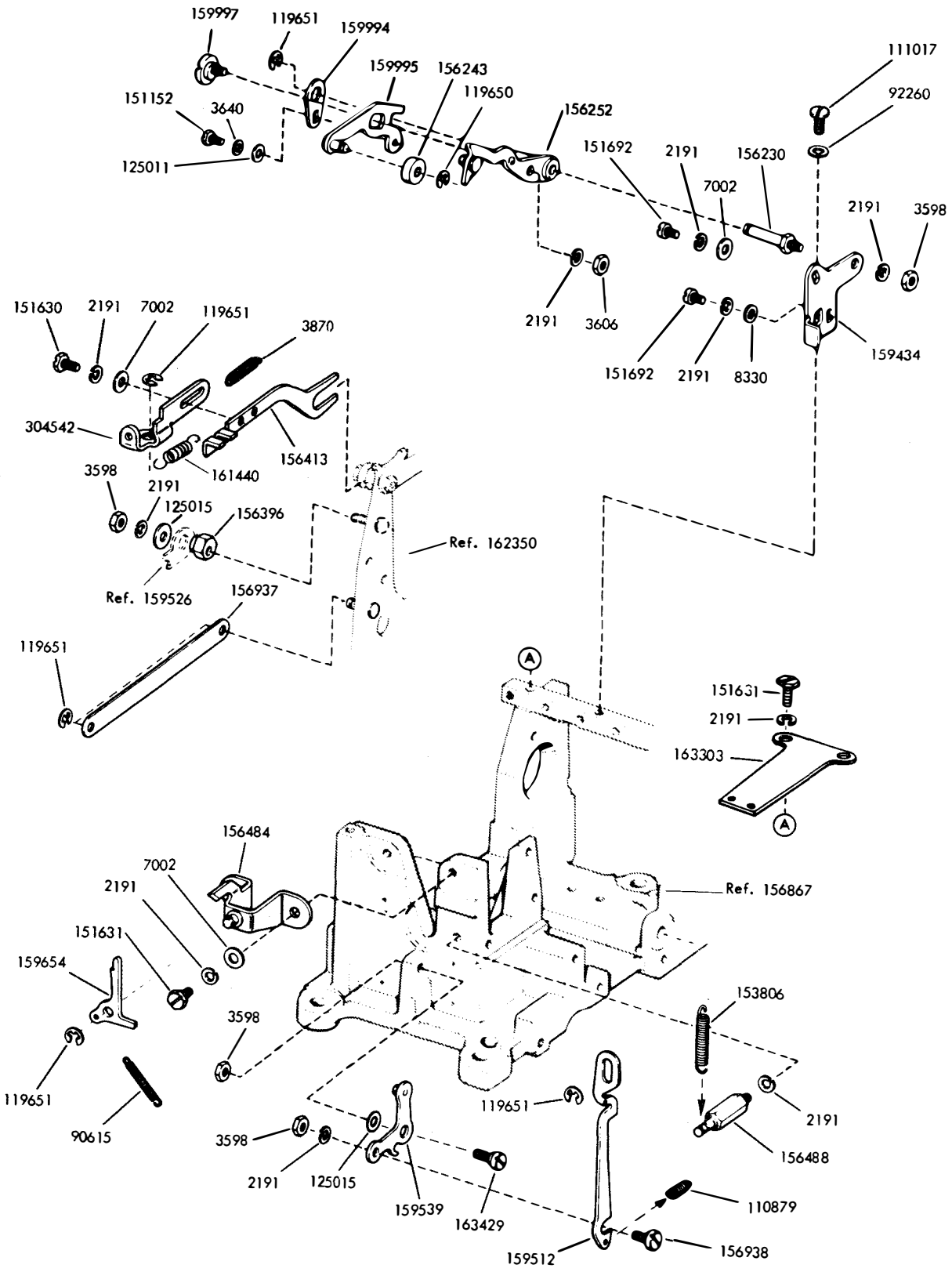


Figure 7-17. Typing Mechanism

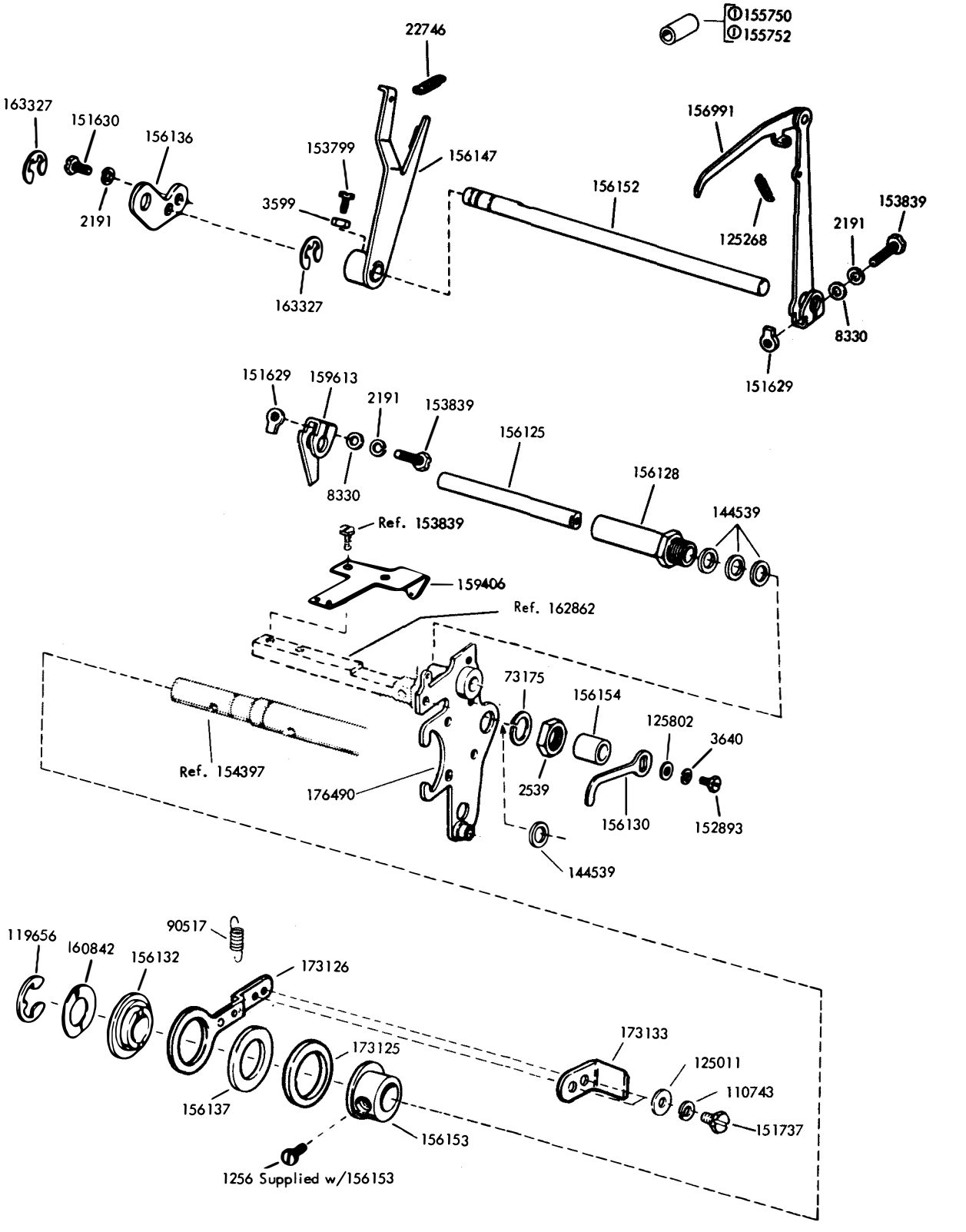
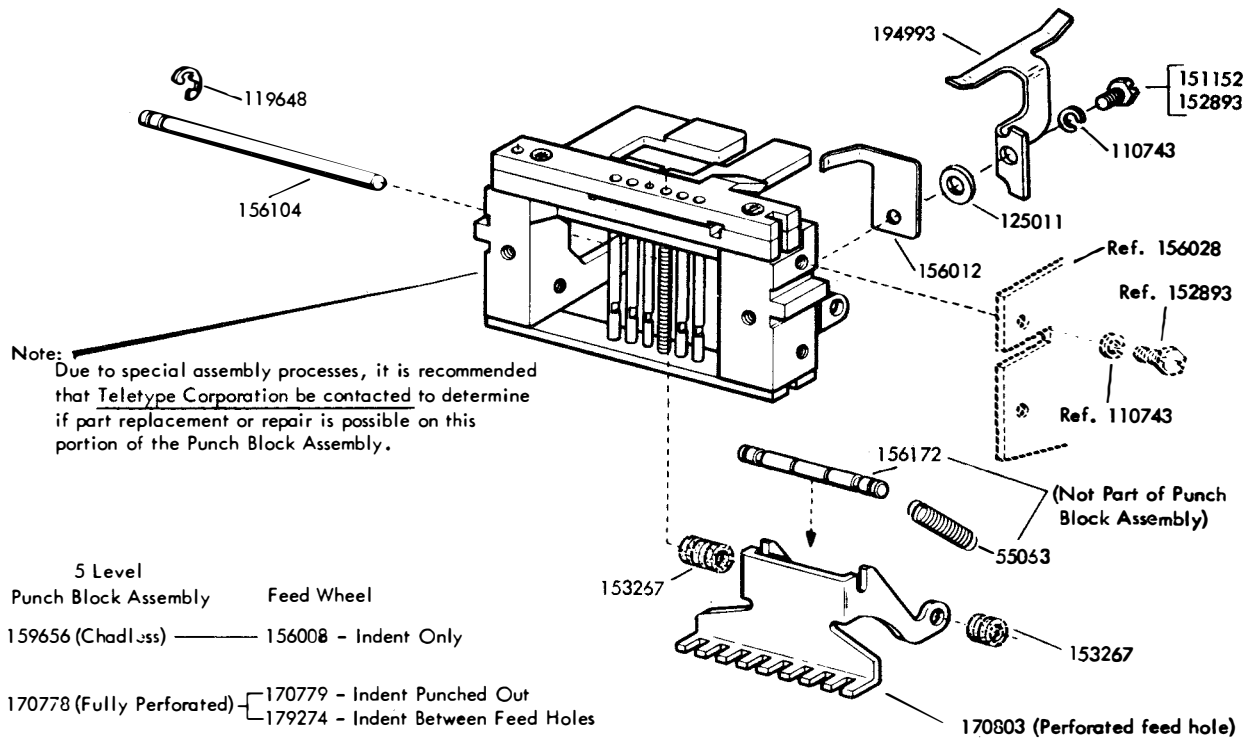


Figure 7-18. Noninterfering Tape Feed-Out Mechanism



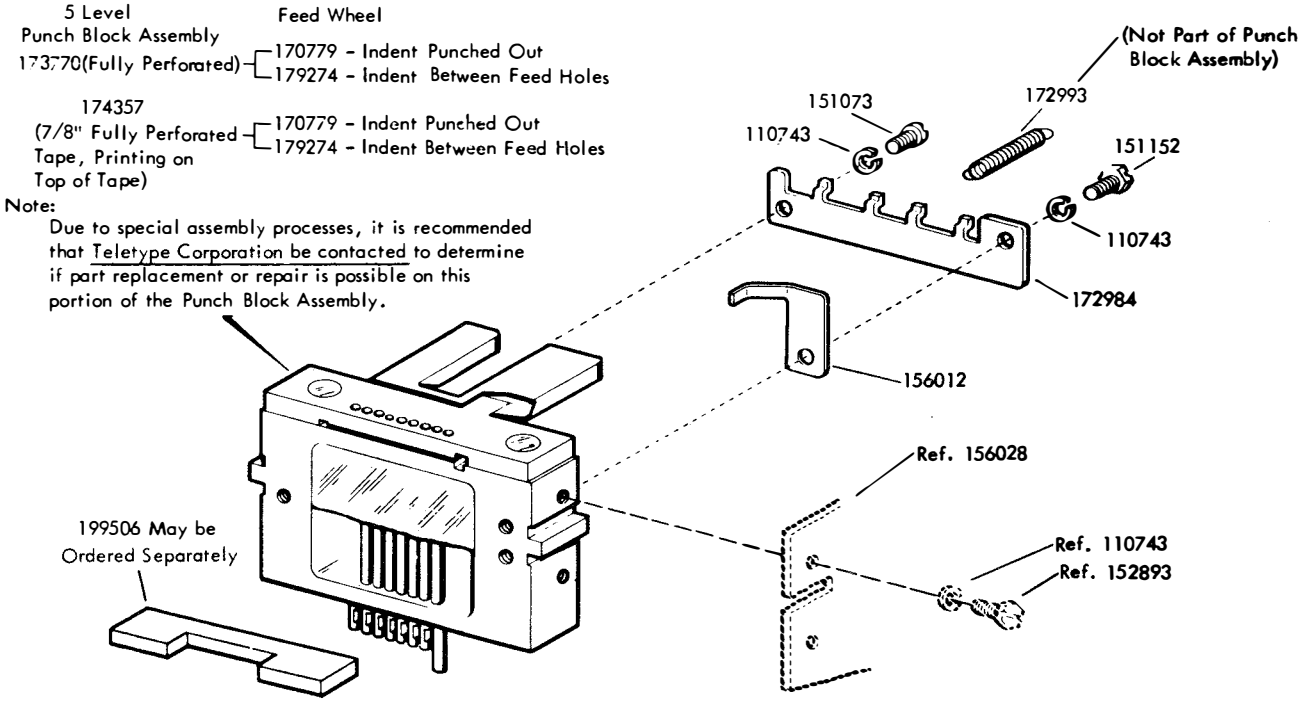
Note:
Due to special assembly processes, it is recommended that Teletype Corporation be contacted to determine if part replacement or repair is possible on this portion of the Punch Block Assembly.

5 Level Punch Block Assembly	Feed Wheel
159656 (Chadless)	156008 - Indent Only
170778 (Fully Perforated)	170779 - Indent Punched Out 179274 - Indent Between Feed Holes
174150 (7/8" Fully Perforated Tape, Printing on Bottom of Tape)	170779 - Indent Punched Out 179274 - Indent Between Feed Holes

Punch Blocks with Spring Retracted Punch Pins

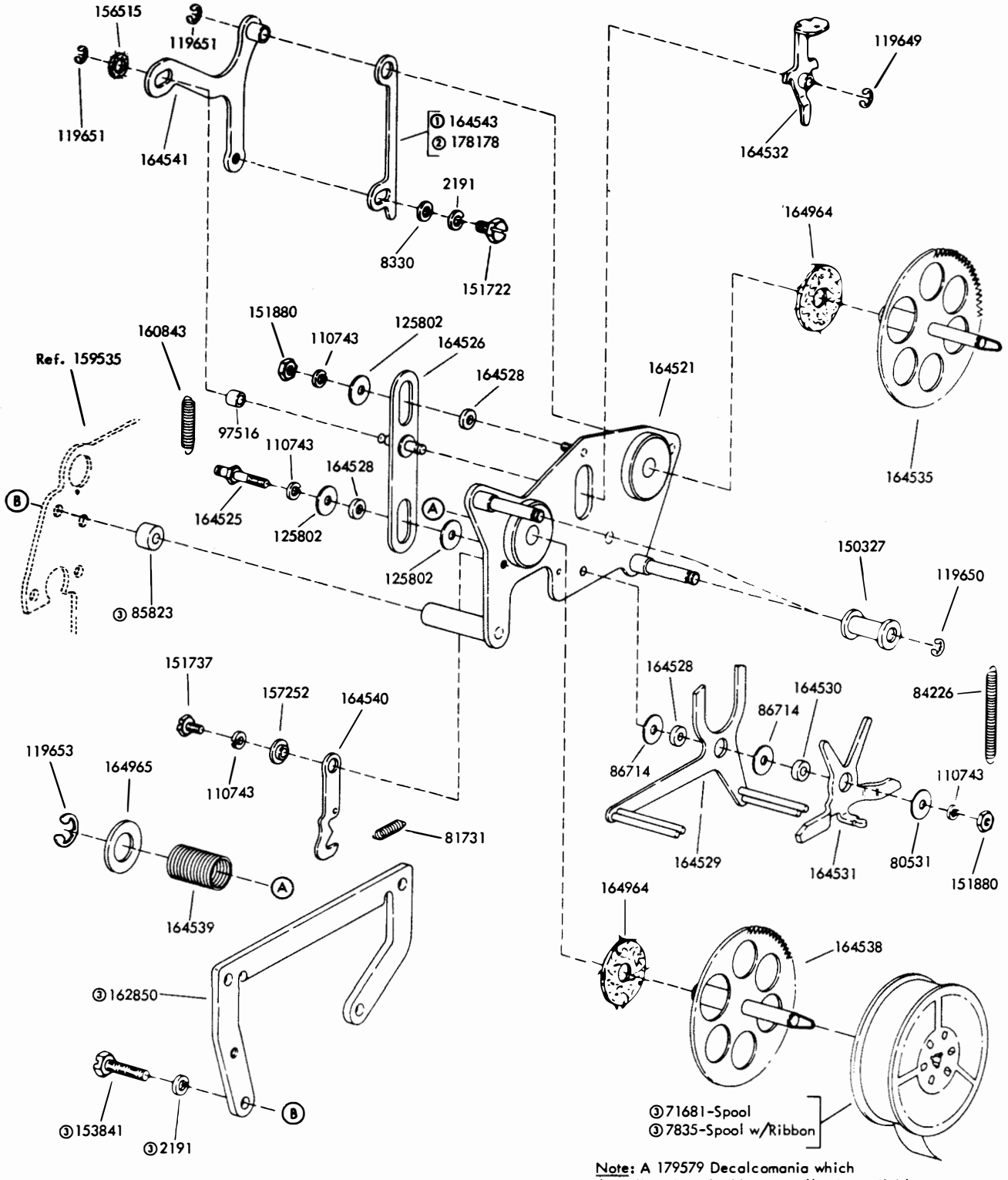
5 Level Punch Block Assembly	Feed Wheel
173770 (Fully Perforated)	170779 - Indent Punched Out 179274 - Indent Between Feed Holes
174357 (7/8" Fully Perforated Tape, Printing on Top of Tape)	170779 - Indent Punched Out 179274 - Indent Between Feed Holes

Note:
Due to special assembly processes, it is recommended that Teletype Corporation be contacted to determine if part replacement or repair is possible on this portion of the Punch Block Assembly.



Punch Blocks with Power Retracted Punch Pins

Figure 7-19. Punch Block Assemblies



Note: A 179579 Decalcomania which show direction of Ribbon to Roller is available.

① Peculiar to Units Equipped with Spring Retracted Punch Pins
② Peculiar to Units Equipped with Power Retracted Punch Pins
③ Not part of 164520
For Early Design Ribbon Feed Mechanism See Fig. 7-16.

Figure 7-20. Ribbon Feed Assembly 164520

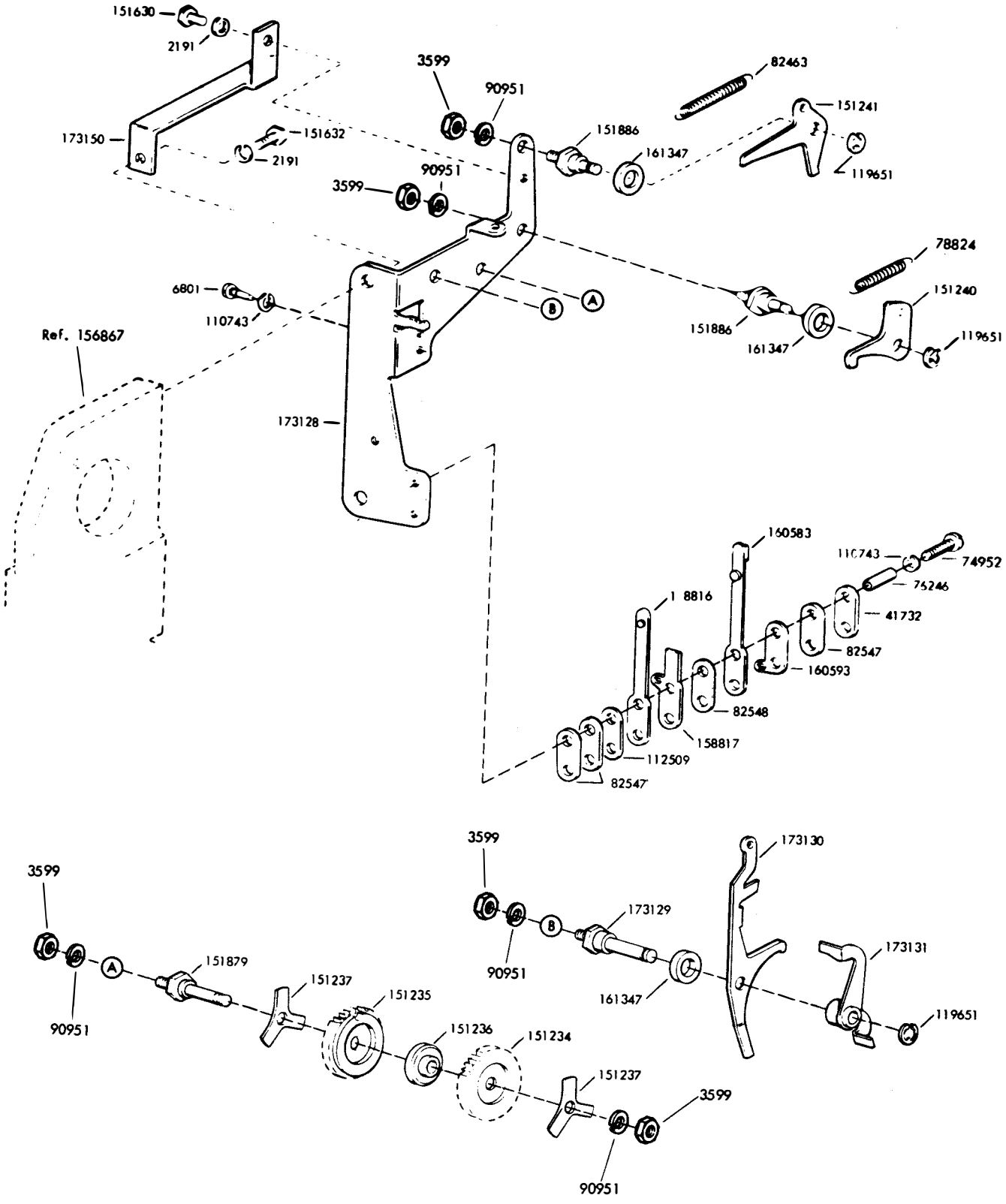
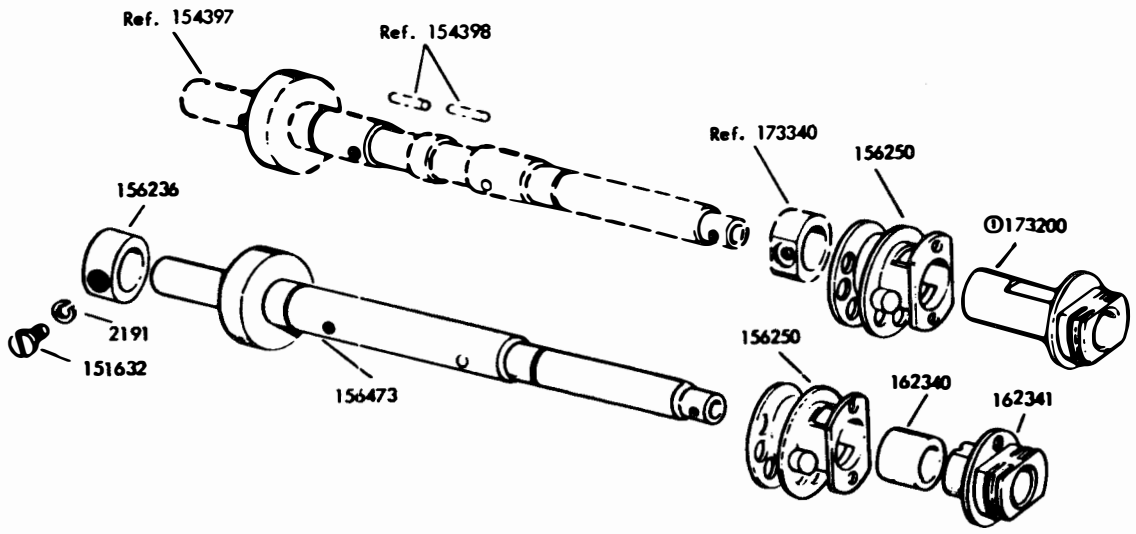
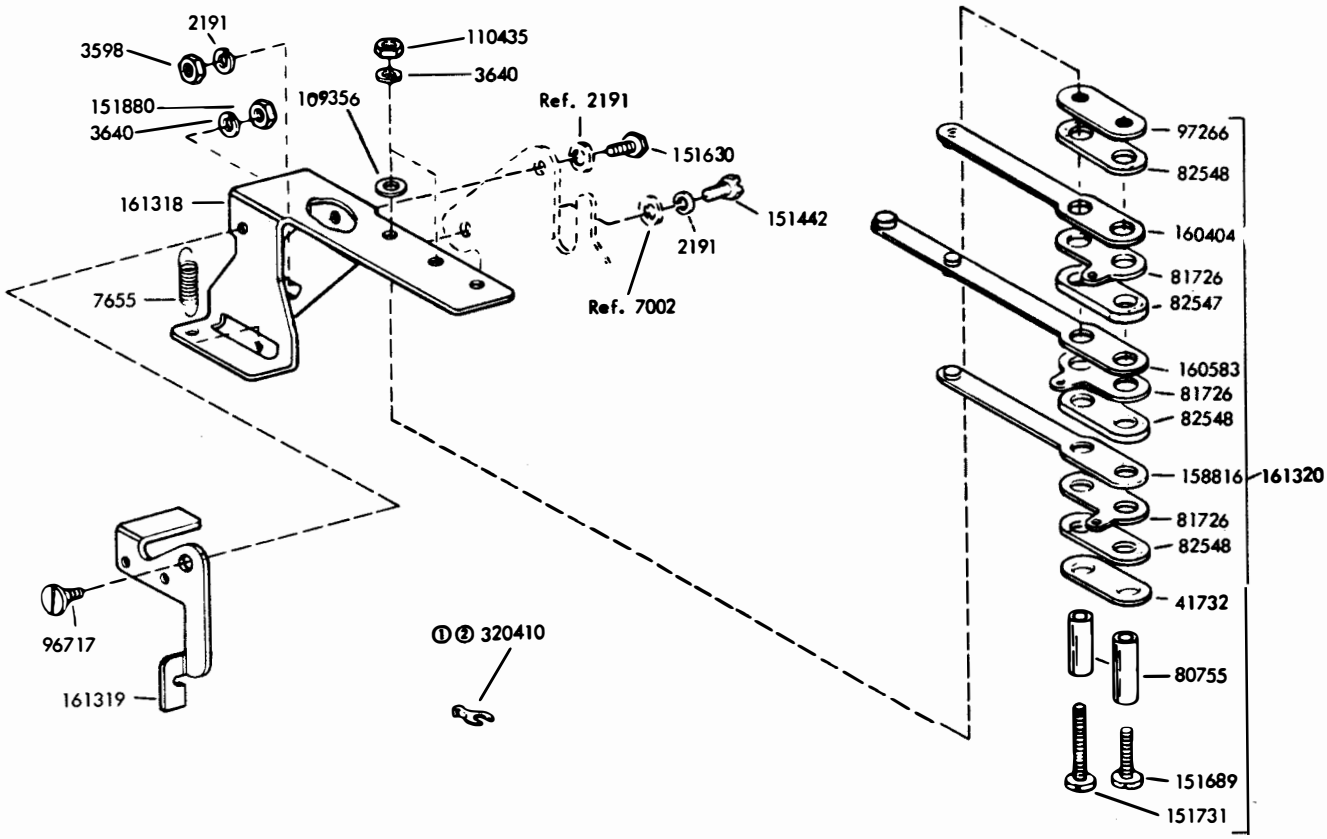


Figure 7-21. Motor Control Mechanism



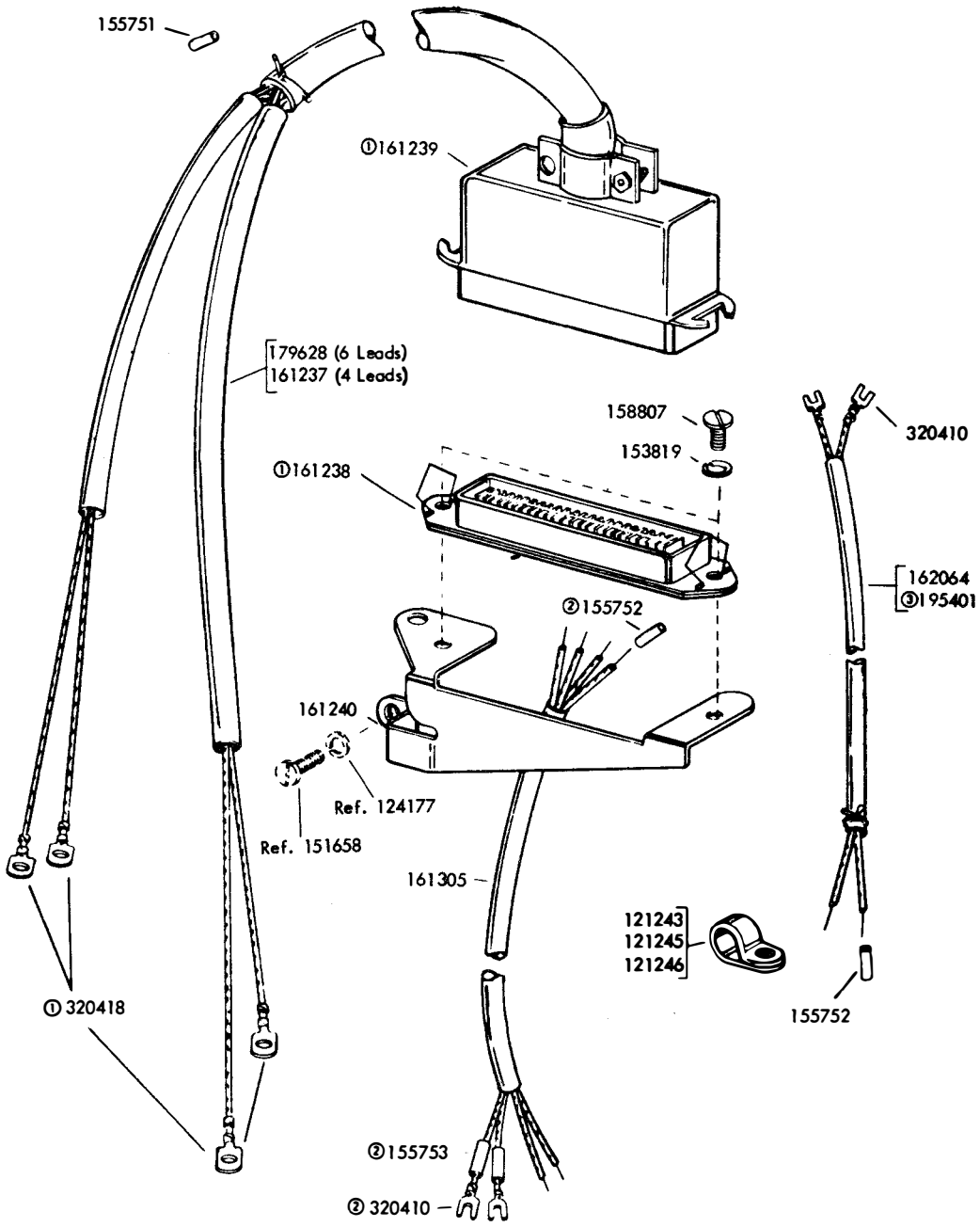
① Part of 173336 Modification Kit to Provide New Style Shaft and Bearing. Specification 59795 (See Figure 7-3 for additional parts)

Figure 7-22. Main Shaft Mechanism (Early Design)



①161355 Cable w/Terminal
②Peculiar to 161321

Figure 7-23. Letters-Figures Contact Assembly 161321 and 162247



①161237 and 179628 Cable Assemblies
②161305 Cable Assembly
③Peculiar to Tape Printer

Figure 7-24. Cables (Typing Reperforator) (Sheet 1 of 2)

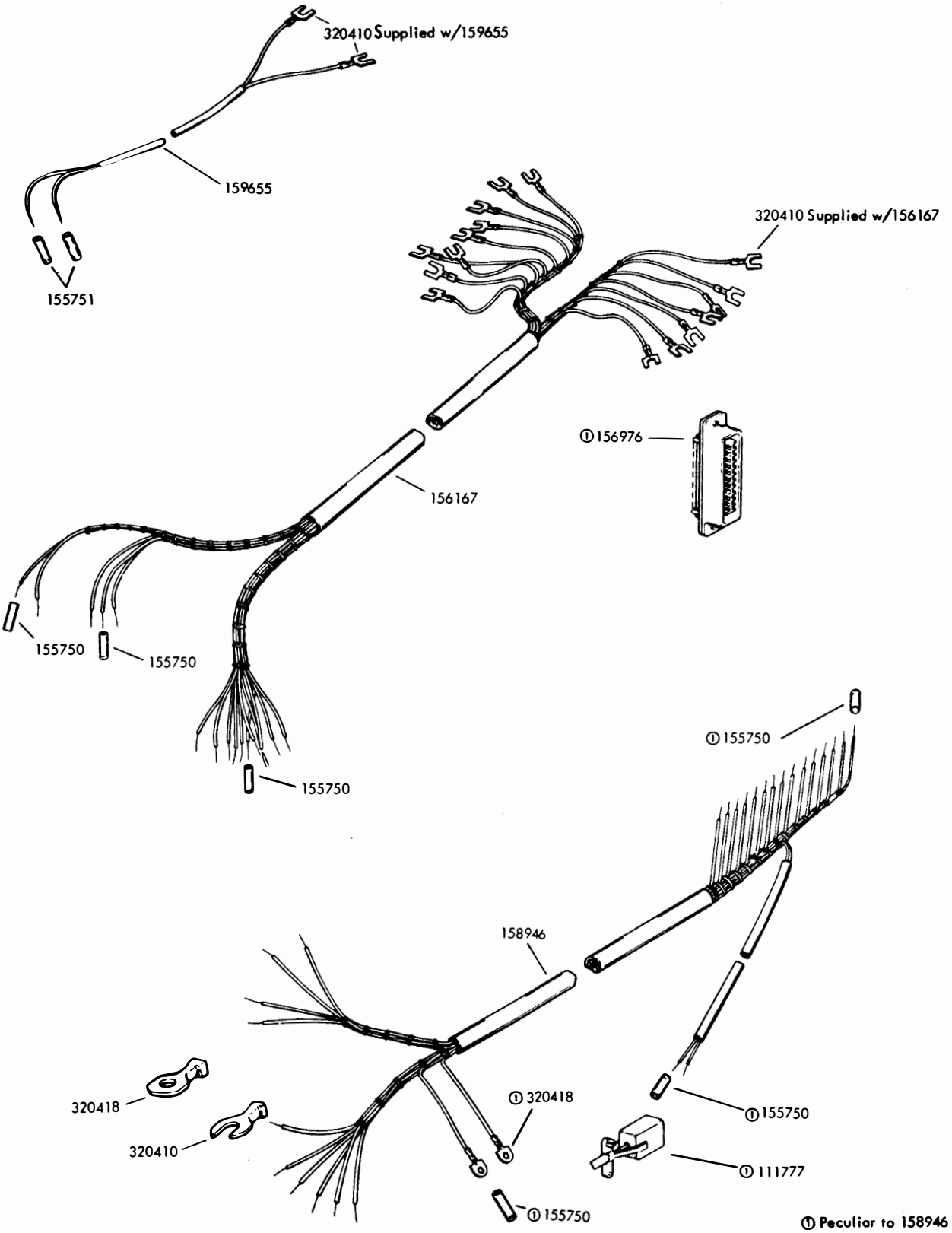


Figure 7-25. Cables (Typing Reperforator) (Sheet 2 of 2)

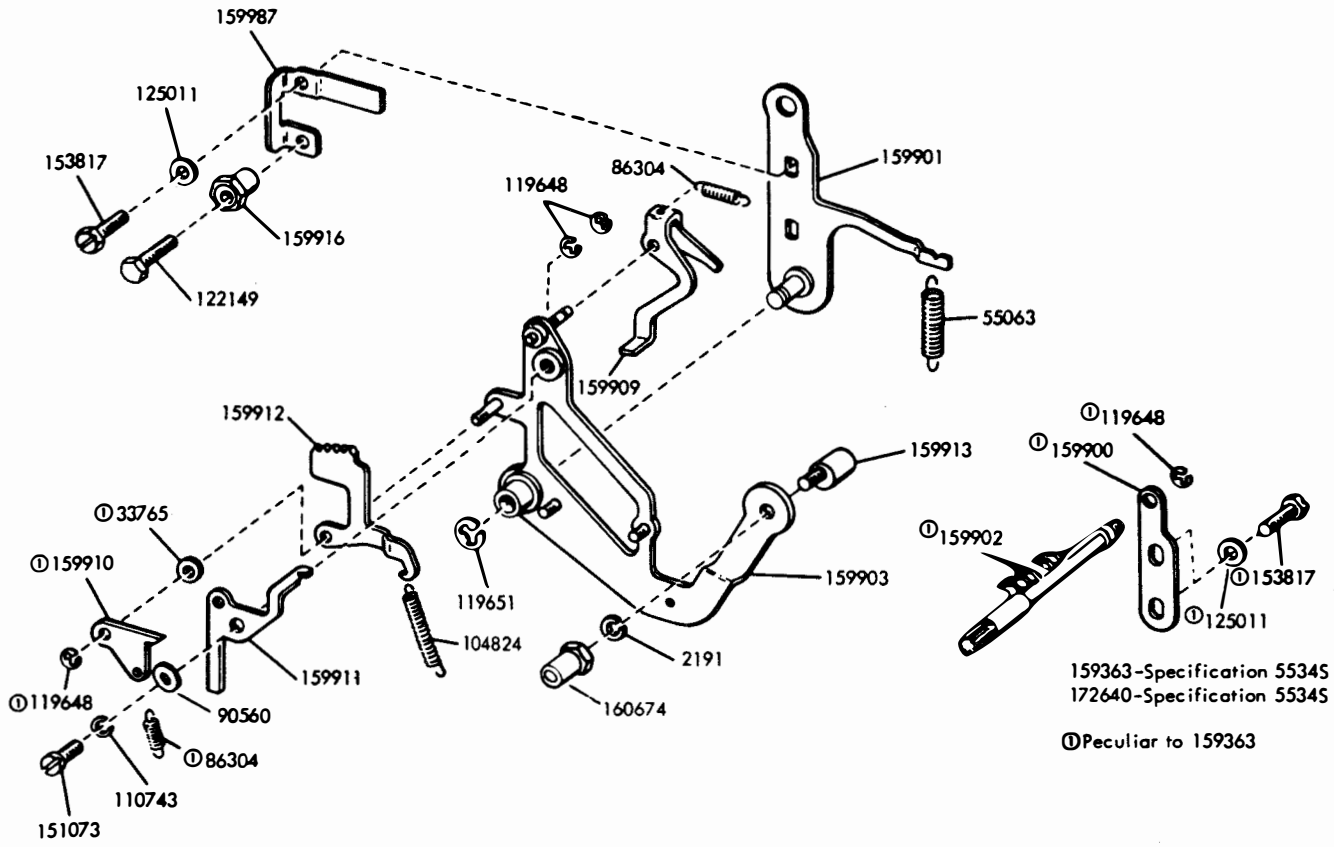


Figure 7-26. Modification Kits 159363 (Chadless Tape) and 172640 (Fully Perforated Tape) to Add Manual Backspace (Printing on Edge of Tape)

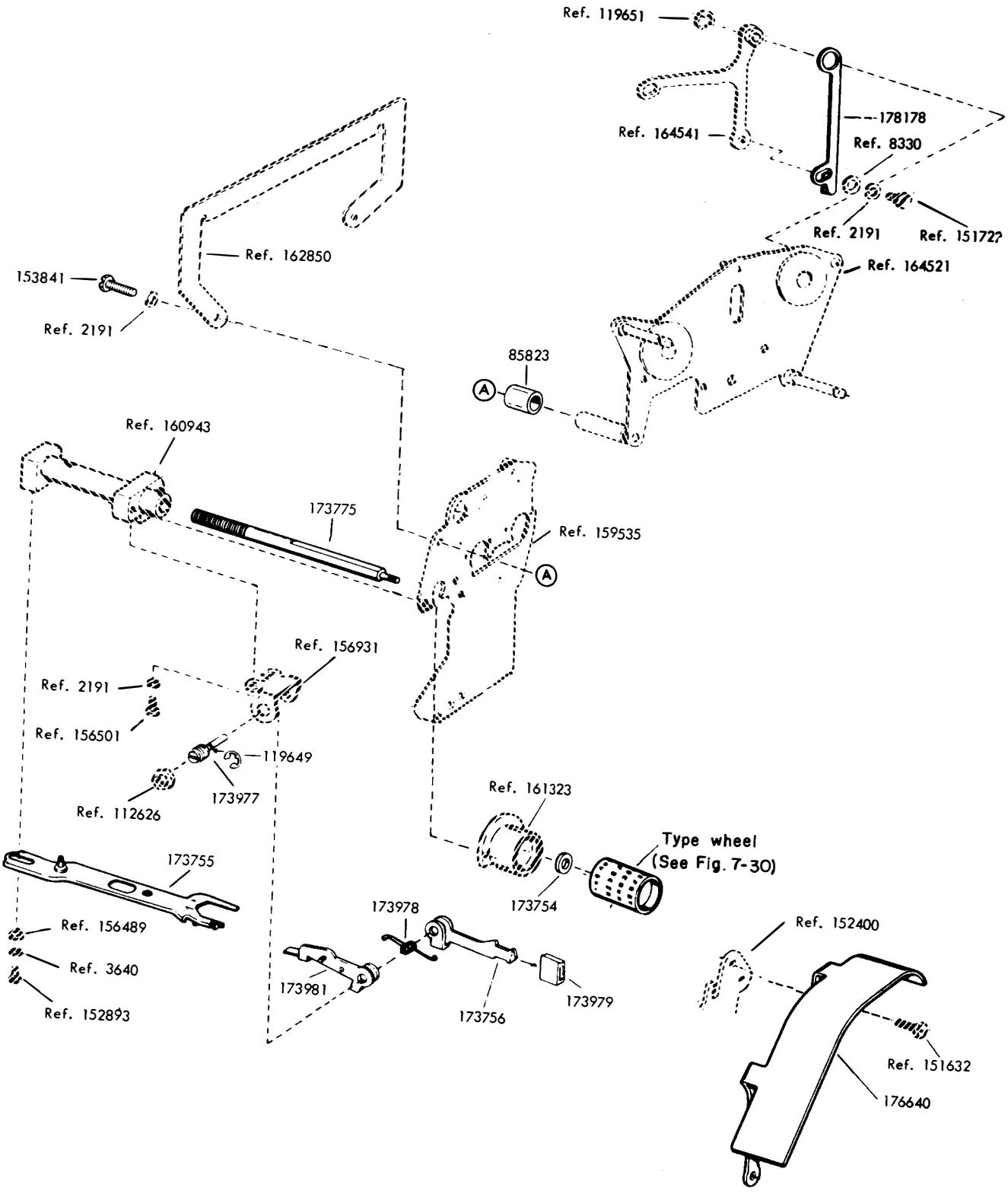


Figure 7-27. Modification Kit 178834 to Convert Ribbon Feed Mechanism to Fully Perforated Tape (Sheet 1 of 2)

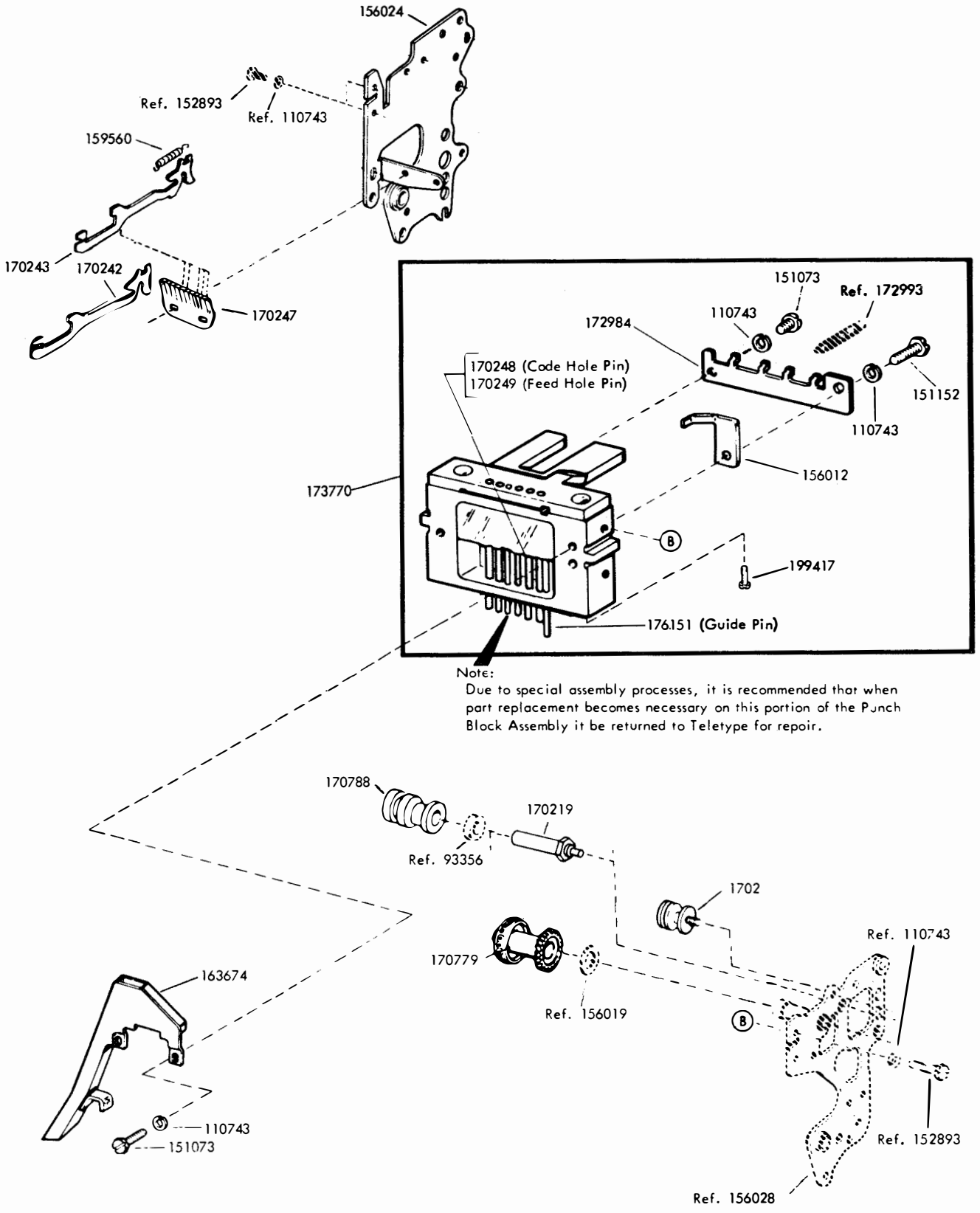
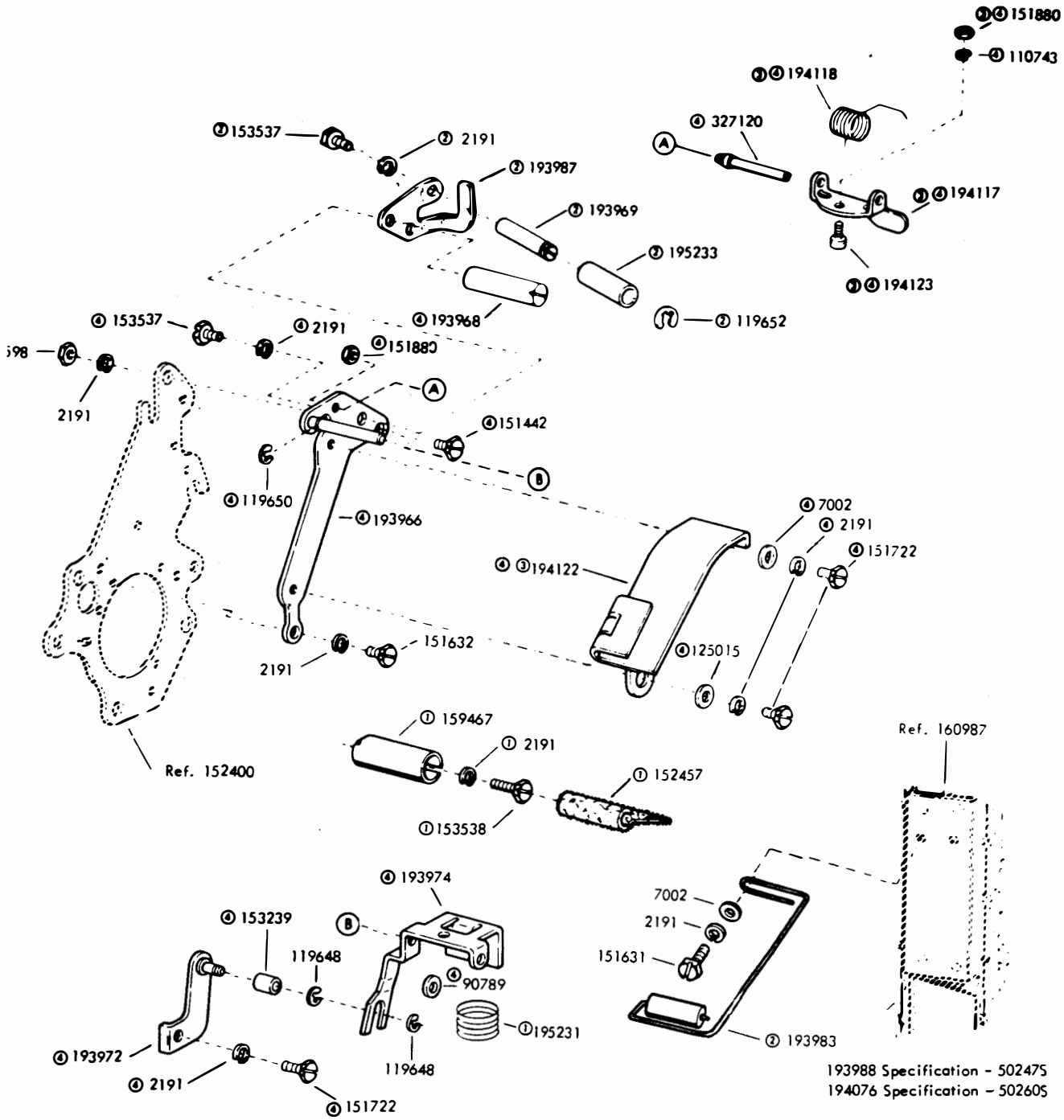
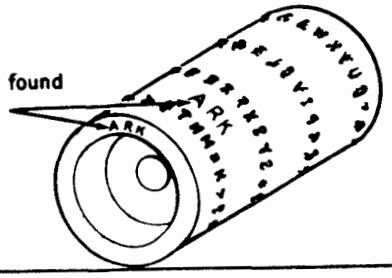


Figure 7-28. Modification Kit 178834 to Convert Ribbon Feed Mechanism to Fully Perforated Tape (Sheet 2 of 2)



① Early Design Part
② 194076 Modification Kit to Reroute Tape
③ Replaces Early Design 195231
④ 193988 Modification Kit to maintain Slack Tape

Figure 7-29. Slack Tape and Reroute Tape Mechanisms



TYPE WHEEL ARRANGEMENT

COMMUNICATION		COMMUNICATION		COMMUNICATION		FRACTION		FRACTION		FRACTION		WEATHER	
CODE	PART NUMBER	CODE	PART NUMBER	CODE	PART NUMBER	CODE	PART NUMBER	CODE	PART NUMBER	CODE	PART NUMBER	CODE	PART NUMBER
AWA	173967	AFU	175690	AWJ	175573	ABA	175586	AGM	307306	AXY	175520	ARE	173970
ABD	175588	AFV	175691	AWM	175576	ABC	175587	AGP	307308	AXZ	175521	ABZ	175607
ABE	175589	AFW	175692	AWU	175582	ABG	175591	AGT	307311	AYB	175523	ADH	175636
ABF	175590	AFX	175693	AXE	175504	ABM	175596	AGU	307312	AYE	175526	ADR	175643
ABH	175592	AFY	175694	AXG	175506	ABN	175597	AGW	307314	AYG	175528	AGS	307310
ABJ	175593	AGA	175696	AXH	175507	ABR	175599	AGX	307315	AYL	175532	AHT	307333
ABL	175595	AGE	307300	AXP	175513	ABU	175602	AGY	307316	AYP	175535	AJG	307346
ABP	175598	AGK	307304	AXR	175514	ABV	175603	AGZ	307317	AYS	175537	AJK	307348
ABS	175600	AGN	307307	AXU	175517	ABX	175605	AHB	307319	AYT	175538	AJM	307350
ABT	175601	AGR	307309	AYC	175524	ABY	175606	AHE	307322	AYV	175544	AJR	307353
ABW	175604	AHA	307318	AYF	175527	ACB	175609	AHK	307326	AZE	175552	AKD	307364
ACA	175608	AHC	307320	AYH	175529	ACE	175611	AHL	307327	AZG	175554	ARM	163677
ACD	175610	AHD	307321	AYK	175531	ACG	175613	AHM	307328	AZM	175559	ARW	163683
ACF	175612	AHF	307323	AYM	175533	ACH	175614	AHR	307331	AZN	175561	AWB	163685
ACL	175617	AHN	307329	AYR	175536	ACJ	175615	AHV	307335	AZV	175567	AWE	163688
ACM	175618	AHP	307330	AYU	175543	ACK	175616	AJB	307341	BRB	175701	AWP	175578
ACN	175619	AHS	307332	AZC	175550	ACR	175621	AJD	307343	BRG	175706	AWY	175584
ACP	175620	AHU	307334	AZH	175555	ACS	175622	AJE	307344	BRJ	175708	AWZ	175585
ACT	175623	AHW	307336	AZJ	175556	ACZ	175629	AJH	307347	BRW	175719	AXA	175500
ACU	175624	AHX	307337	AZK	175557	ADA	175630	AJL	307349	BRX	175720	AXC	175502
ACV	175625	AHY	307338	AZP	175560	ADC	175632	AJP	307351	BWD	175723	AXD	175503
ACW	175626	AJA	307340	AZG	175562	ADE	175633	AJT	307355	BWM	175731	AXF	175505
ACX	175627	AJC	307342	AZT	175565	ADF	175634	AJW	307357	BWY	175740	AXS	175515
ACY	175628	AJF	307345	AZU	175566	ADK	175638	AJX	307358	BXB	175743	AYA	175522
ADB	175631	AJS	307354	AZW	175568	ADM	175640	AKA	307361	BXD	175745	AYD	175525
ADJ	175637	AJU	307356	AZX	175569	ADP	175642	AKB	307362	BXK	175751	AYJ	175539
ADL	175639	AJZ	307360	AZY	175570	ADS	175644	AKC	307363			AYN	175534
ADT	175645	AKF	307366	BRL	175710	ADV	175647	AKE	307365			AYX	175546
ADU	175646	AKG	307367	BRN	175712	ADX	175649	AKH	307368			AYZ	175547
ADW	175648	AKJ	307369	BRP	175713	ADY	175650	AKS	307375			AZF	175553
AED	175655	AKL	307370	BRQ	175714	ADZ	175651	AKT	307376			AZL	175558
AEF	175656	AKM	307371	BRT	175716	AEA	175652	AKV	307378			AZR	175563
AEG	175657	AKN	307372	BWC	175700	AEB	175653	AKX	307380			AZS	175564
AEH	175658	AKP	307373	BWH	175727	ABJ	175659	ALB	307384			BRF	175705
AEK	175660	AKR	307374	BWJ	175728	AEP	175664	ARC	173971			BRH	175707
AEL	175661	AKU	307377	BWK	175729	AER	175665	ARJ	173968			BRK	175709
AEM	175662	AKW	307379	BWL	175730	AET	175667	ARP	163678			BRS	175715
AEN	175663	AKY	307381	BWN	175732	AFA	175674	ART	163680			BRV	175718
AES	175666	AKZ	307382	BWP	175733	AFD	175677	ARU	163689			BRY	175721
AEV	175669	ALA	307383	BWR	175734	AFE	175678	AWD	163687			BRZ	175722
AEW	175670	ARA	173965	BWS	175735	AFH	175680	AWK	175574			BWE	175724
AEX	175671	ARK	163675	BWT	175736	AFK	175682	AWN	175577				
AEY	175672	ARL	163676	BWX	175739	AFL	175683	AWR	175579				
AFB	175675	ARS	173969	BWZ	175741	AFN	175685	AWT	175581				
AFC	175676	ARV	163684	BXA	175742	AFZ	175695	AWX	175583				
AFG	175679	ARX	163682	BXC	175744	AGB	175697	AXB	175501				
AFJ	175681	ARY	163681	BXE	175746	AGC	175698	AXL	175510				
AFM	175684	ARZ	163679	BXF	175747	AGD	175699	AXM	175511				
AFP	175686	AWC	163686	BXG	175748	AGF	307301	AXN	175512				
AFR	175687	AWF	163690	BXH	175749	AGH	307302	AXT	175516				
AFS	175688	AWG	175571	BXJ	175750	AGJ	307303	AXV	175518				
AFT	175689	AWH	175572	BXL	175752	AGL	307305	AXW	175519				

Note:
Type wheels not appearing on this page may be ordered by Code Letters

Figure 7-30. Type Wheels

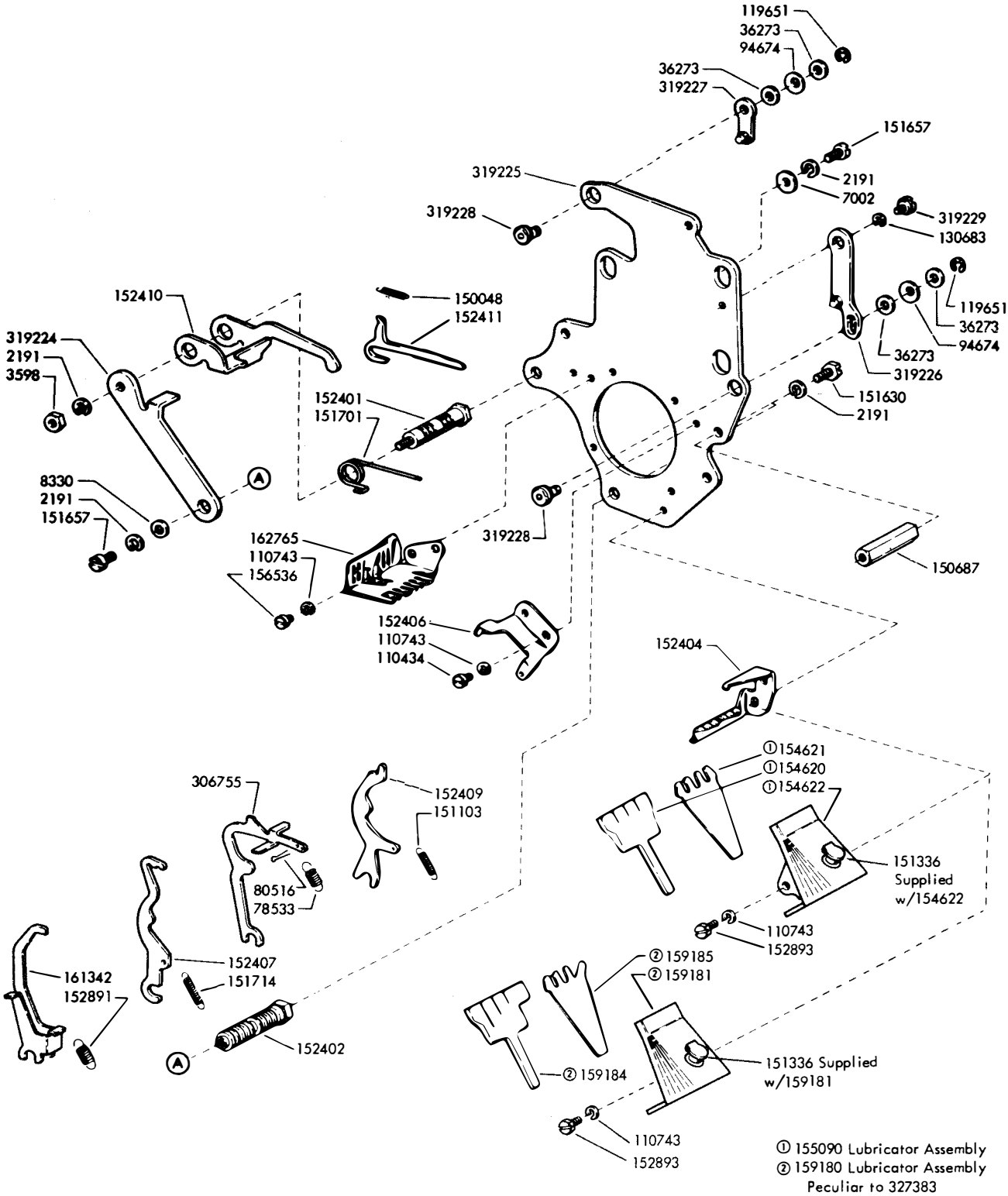


Figure 7-31. Selector Assemblies 319204 and 327383 - Used on Low-Level Sets (Sheet 1 of 2)

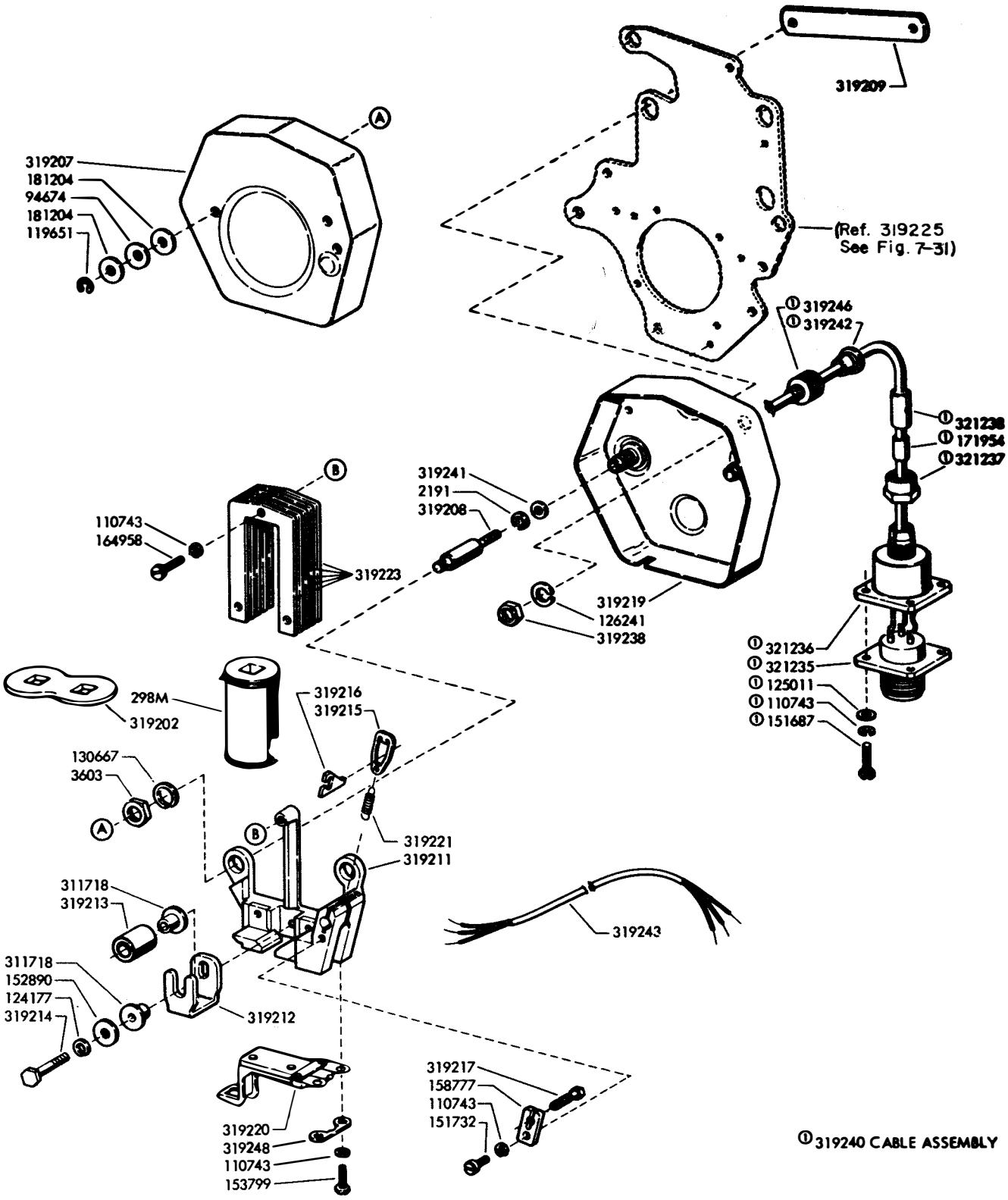


Figure 7-32. Selector Assemblies 319204 and 327383 - Used on Low-Level Sets (Sheet 2 of 2)

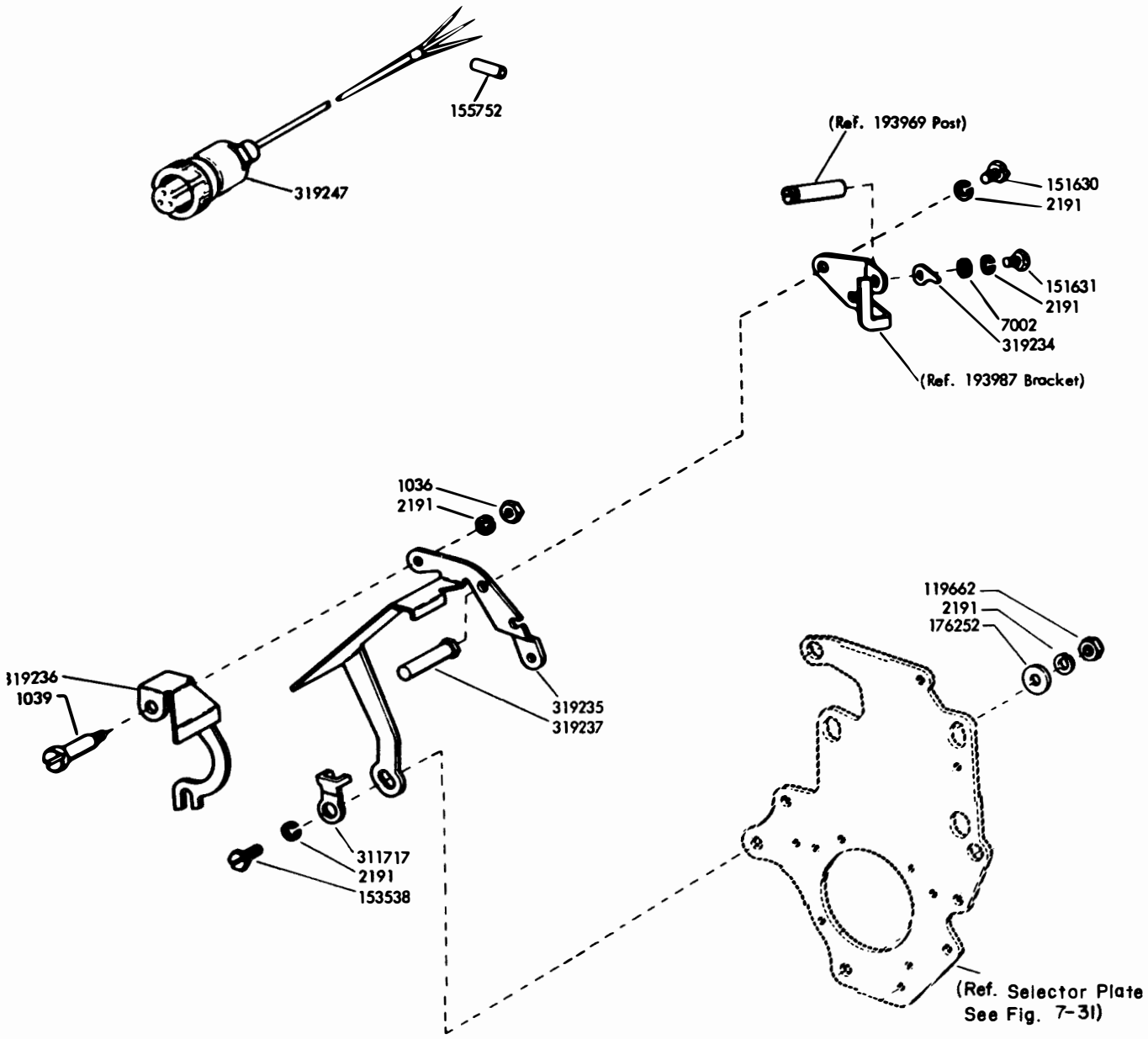


Figure 7-33. Selector Mounting Components for Typing Reperforator - Used on Low-Level Sets

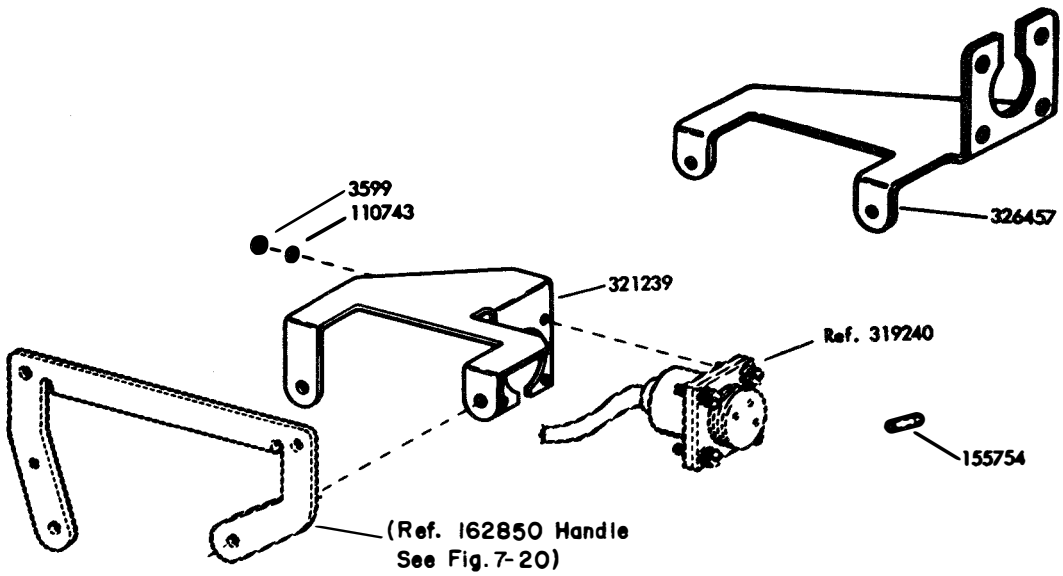


Figure 7-34. Cable Mounting Components for Typing Reperforator - Used on Low-Level Sets

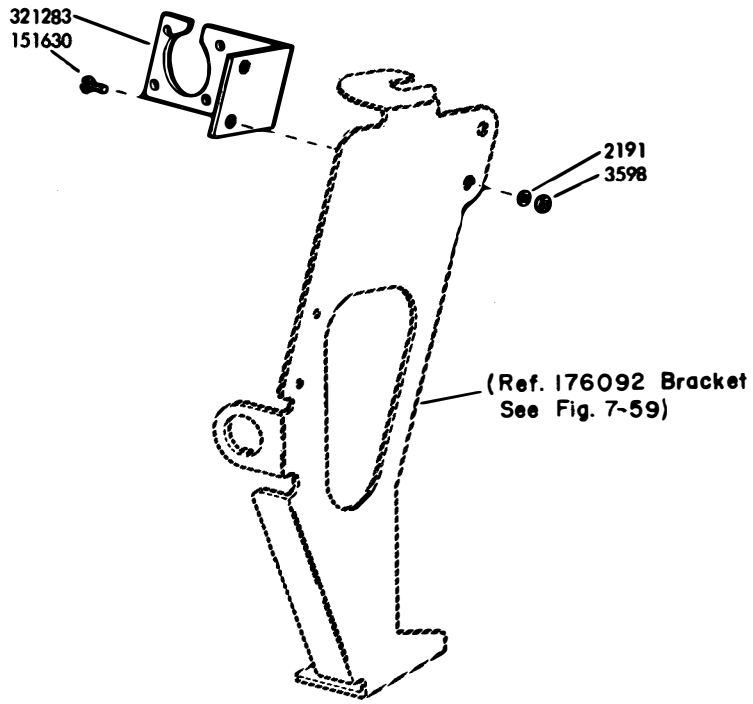


Figure 7-35. Cable Mounting Components for Compact Typing Reperforator - Used on Low-Level Sets

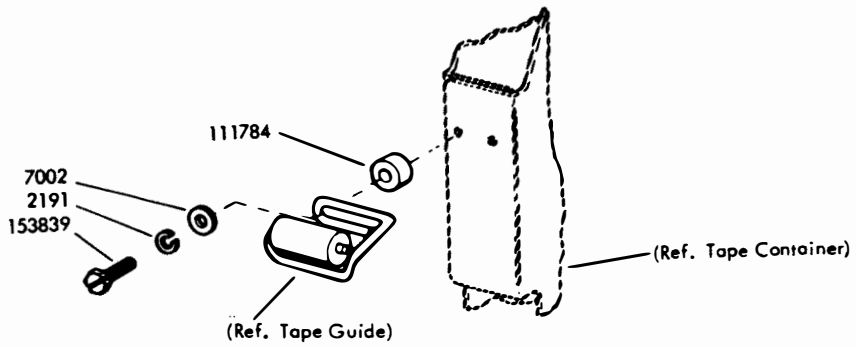


Figure 7-36. Tape Guide Mounting Components - Used on Low-Level Sets

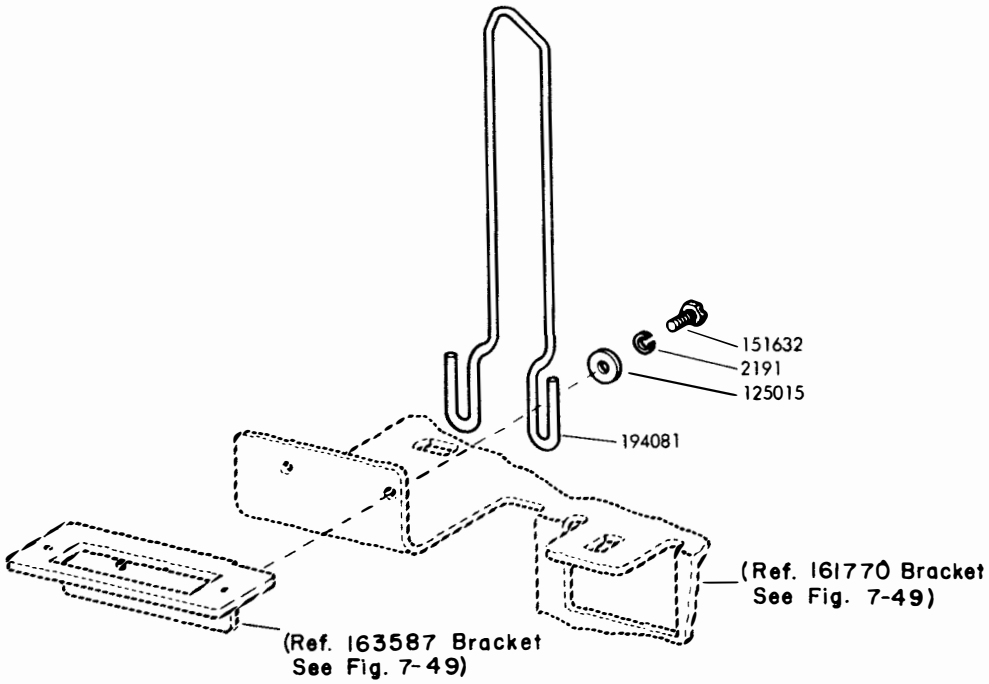


Figure 7-37. Tape Guide Mounting Components for Auxiliary Base - Used on Low-Level Sets

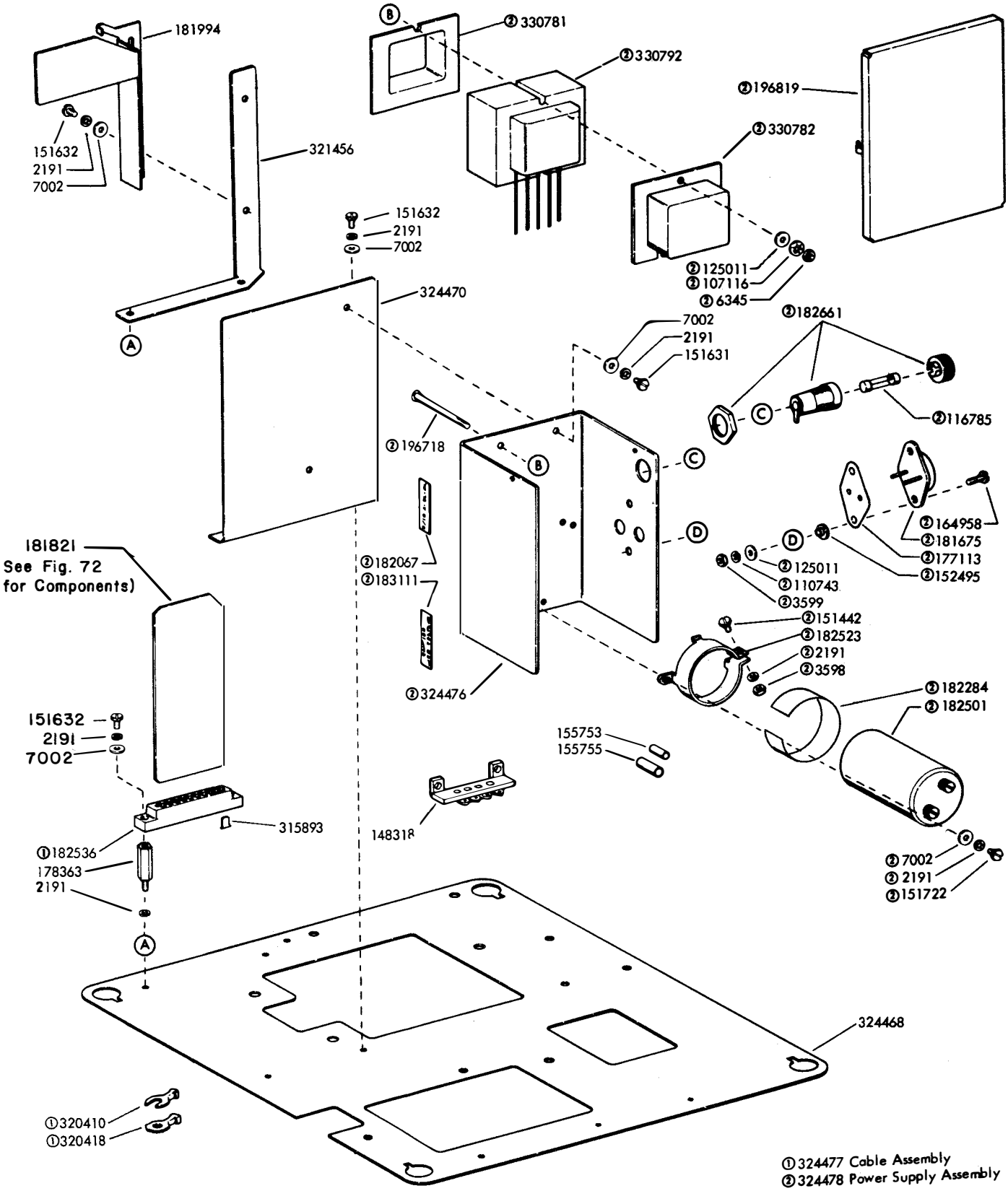


Figure 7-38. Base With Selector Magnet Driver and Power Supply

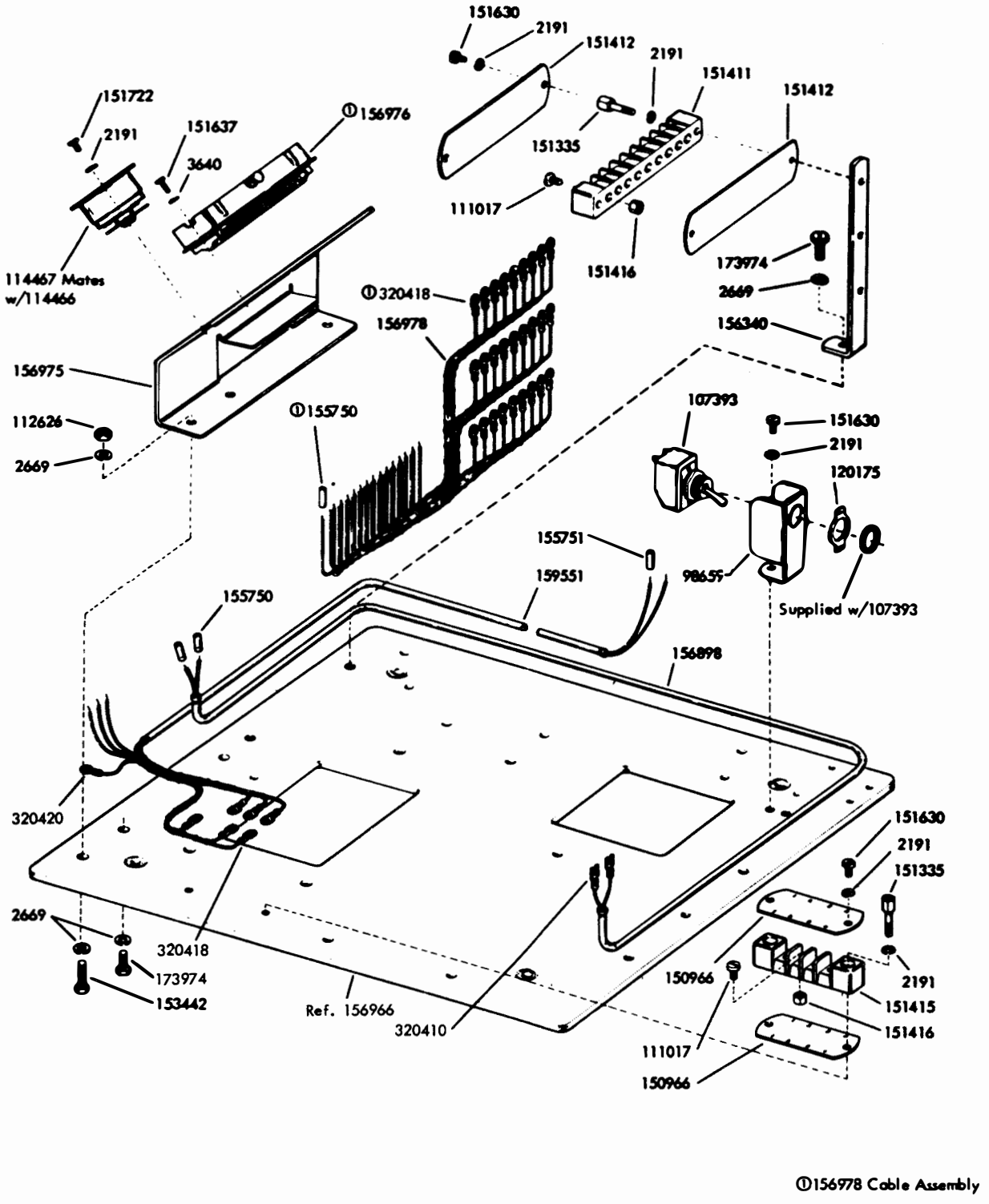


Figure 7-39. Reperforator Base - Single-Plate (Sheet 1 of 2)

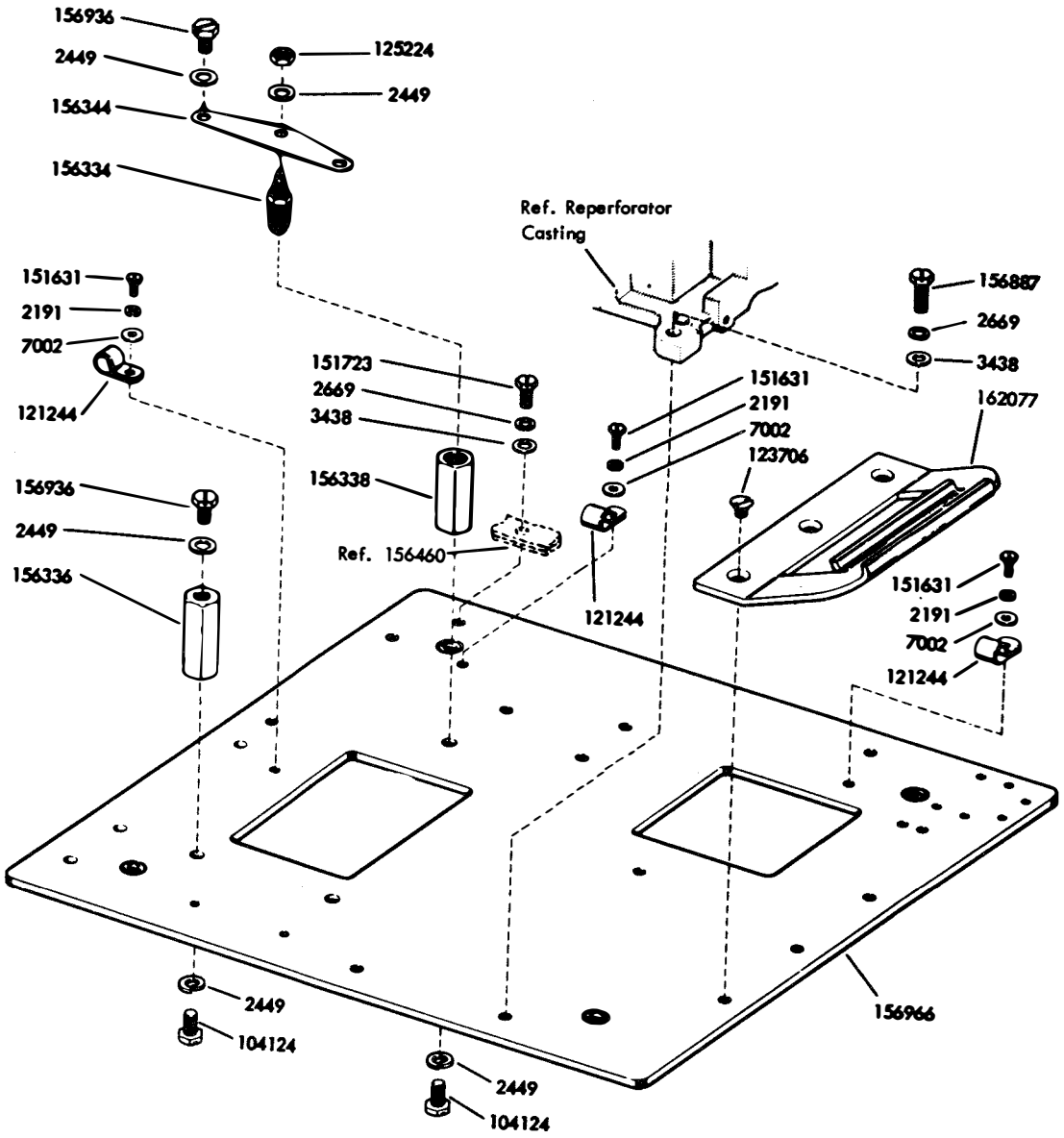
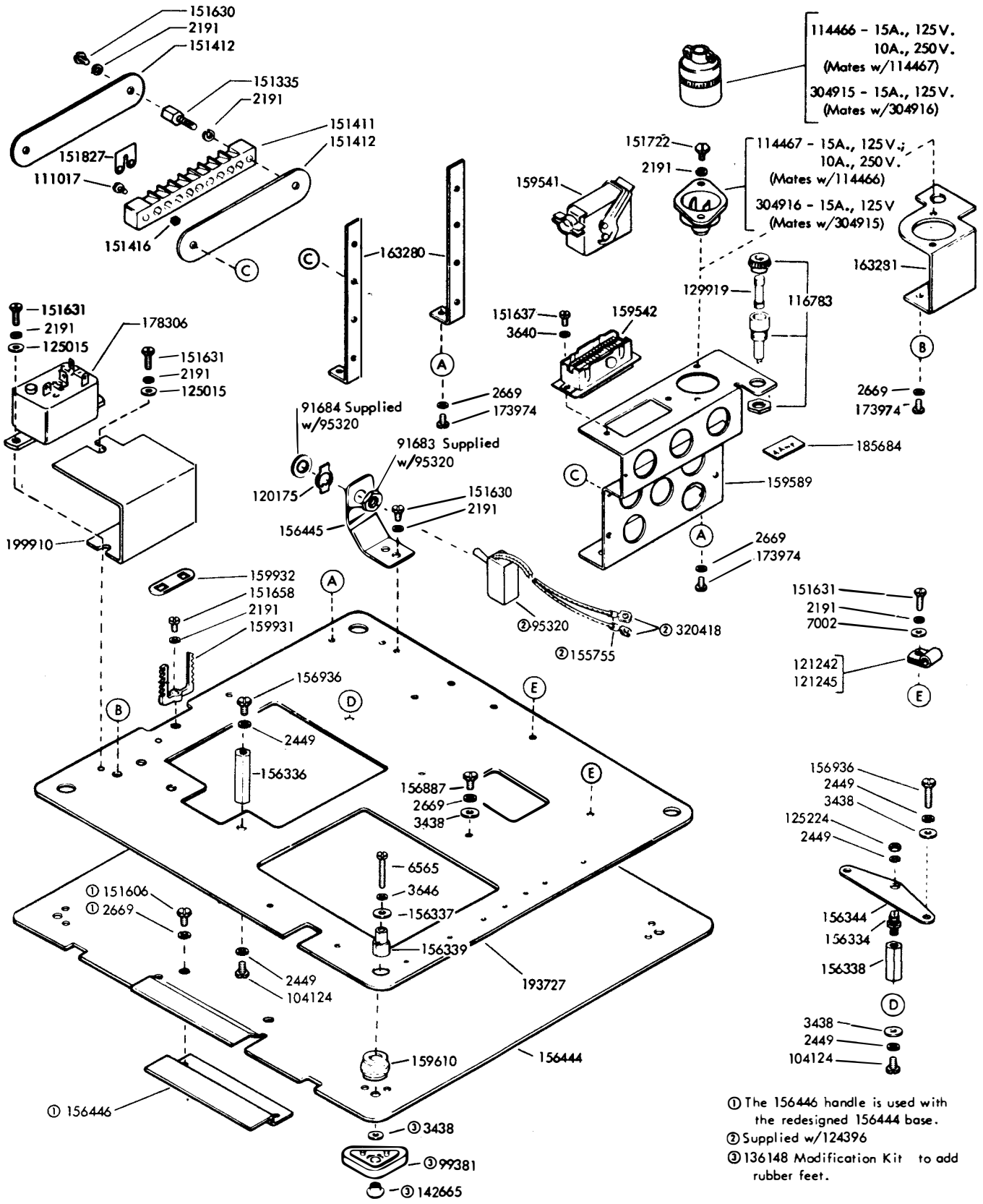


Figure 7-40. Reperforator Base - Single-Plate (Sheet 2 of 2)



① The 156446 handle is used with the redesigned 156444 base.
② Supplied w/124396
③ 136148 Modification Kit to add rubber feet.

Figure 7-41. Reperforator Base - Double-Plate (Sheet 1 of 2)

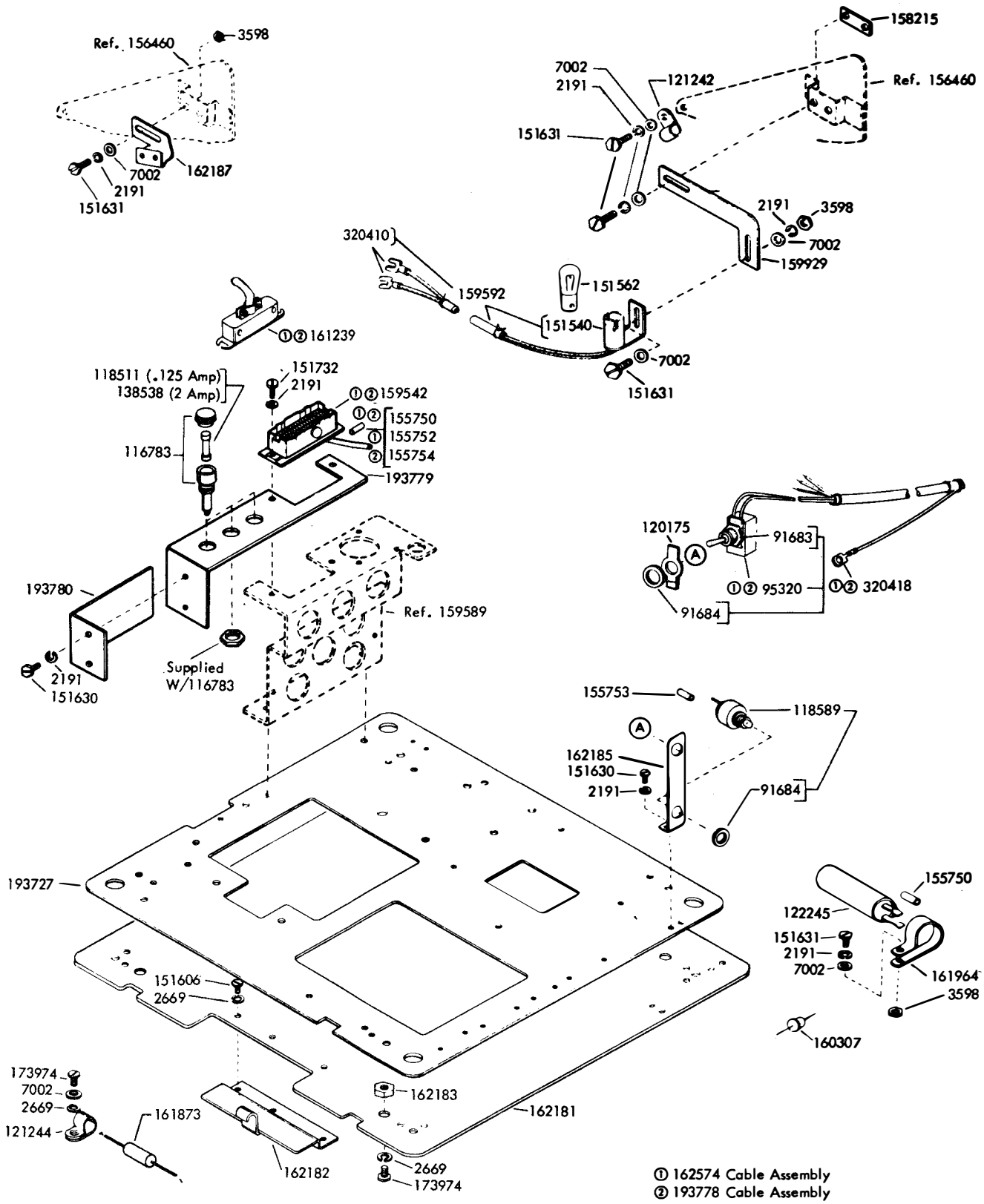


Figure 7-42. Reperforator Base - Double-Plate (Sheet 2 of 2)

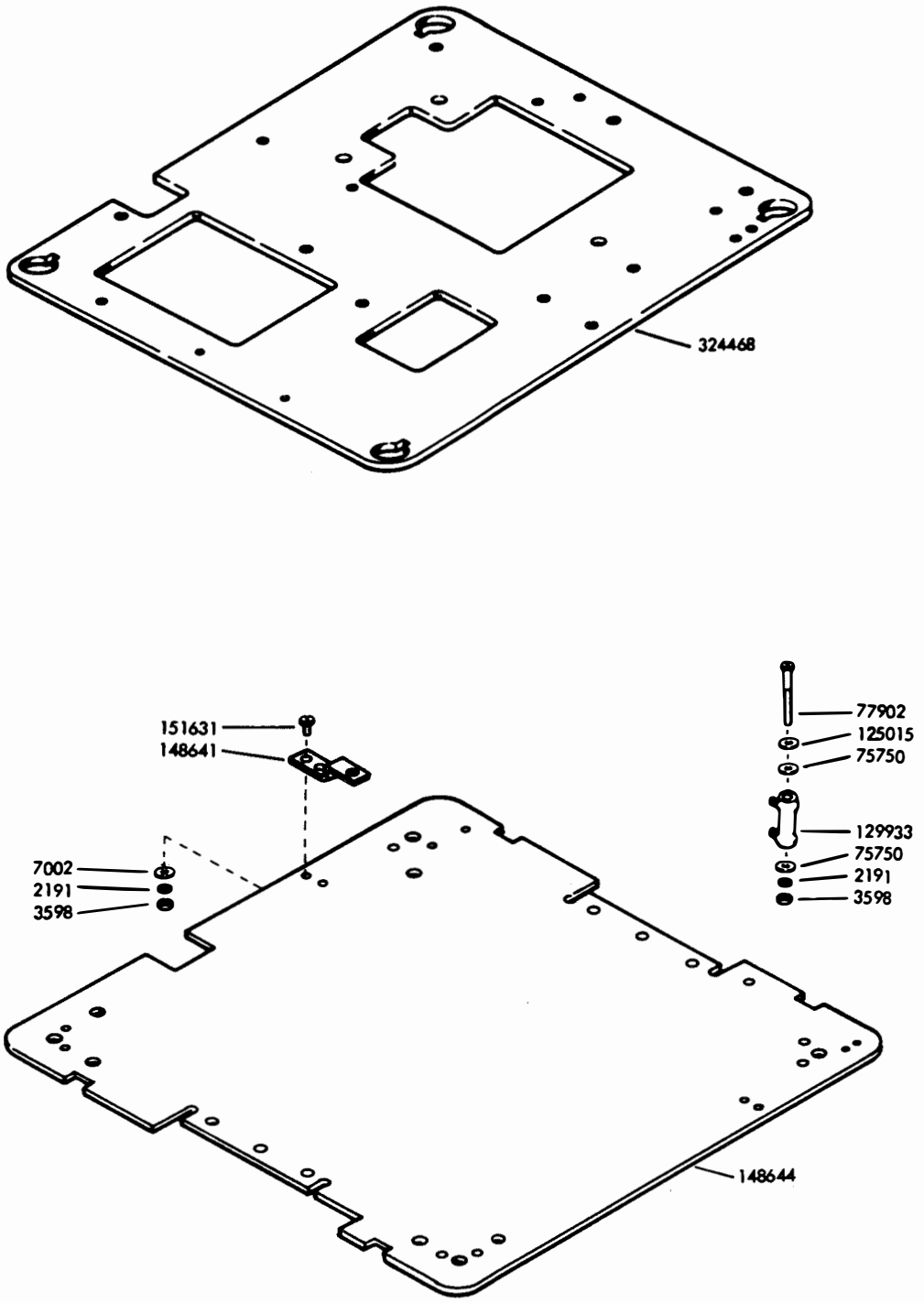
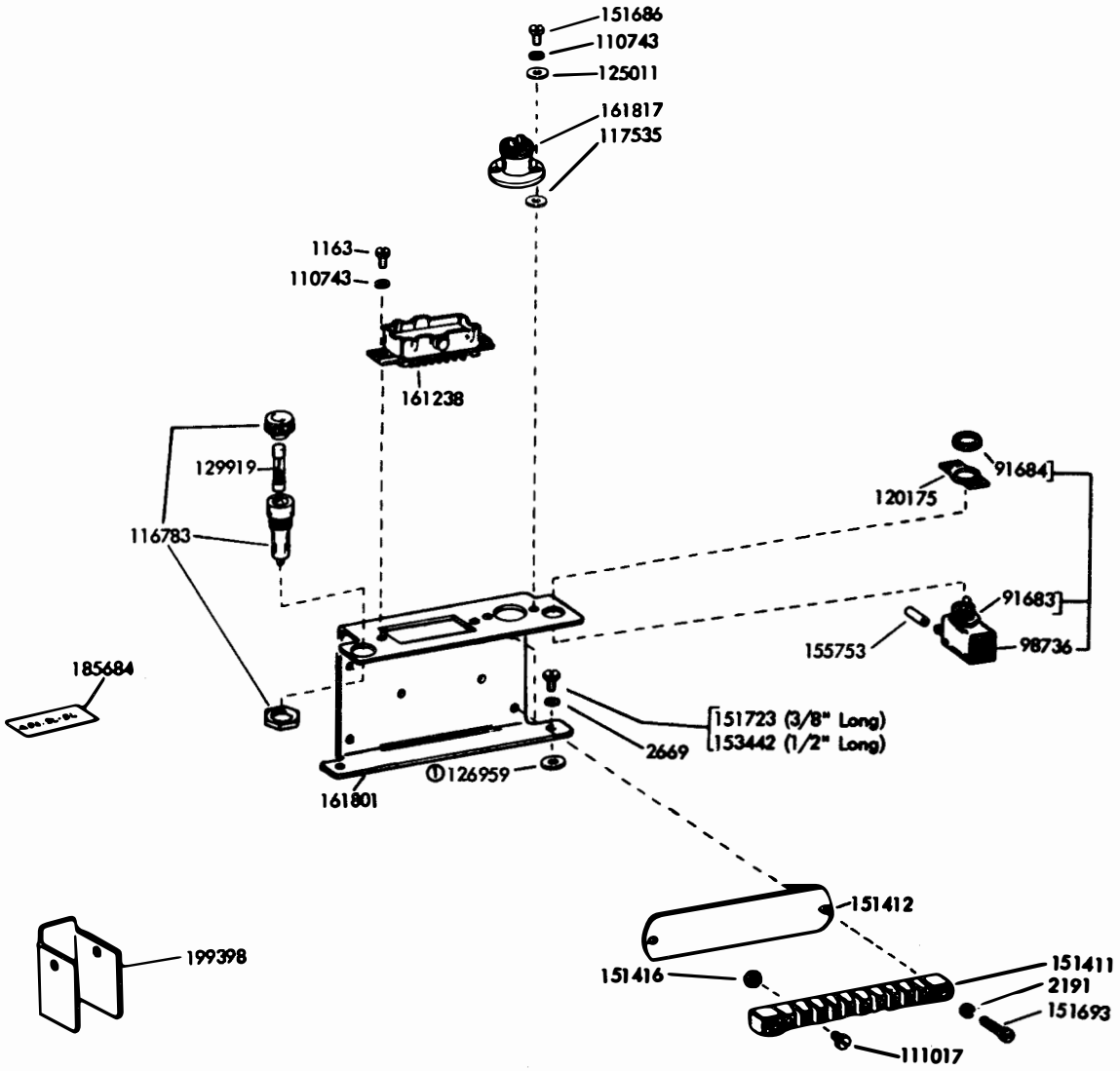


Figure 7-43. Reperforator Base Plates



① Used with the 153442 Screw

Figure 7-44. Base Electrical Components

Tape Container Assembly	Tape Container	Guide w/ Roller	Spacer	Tape Reel w/Core Dia.	Cable Assembly	Tape Width
156974	156460	195658	207223WU	158289 (2")	156972	11/16"
162079	156460	156470	207223WU	162075 (1")	162373	11/16"
192867	192865	193837	192868	192864 (2")	194221	1"
321461	192865	193837	192868	192864(2")	194221	1"

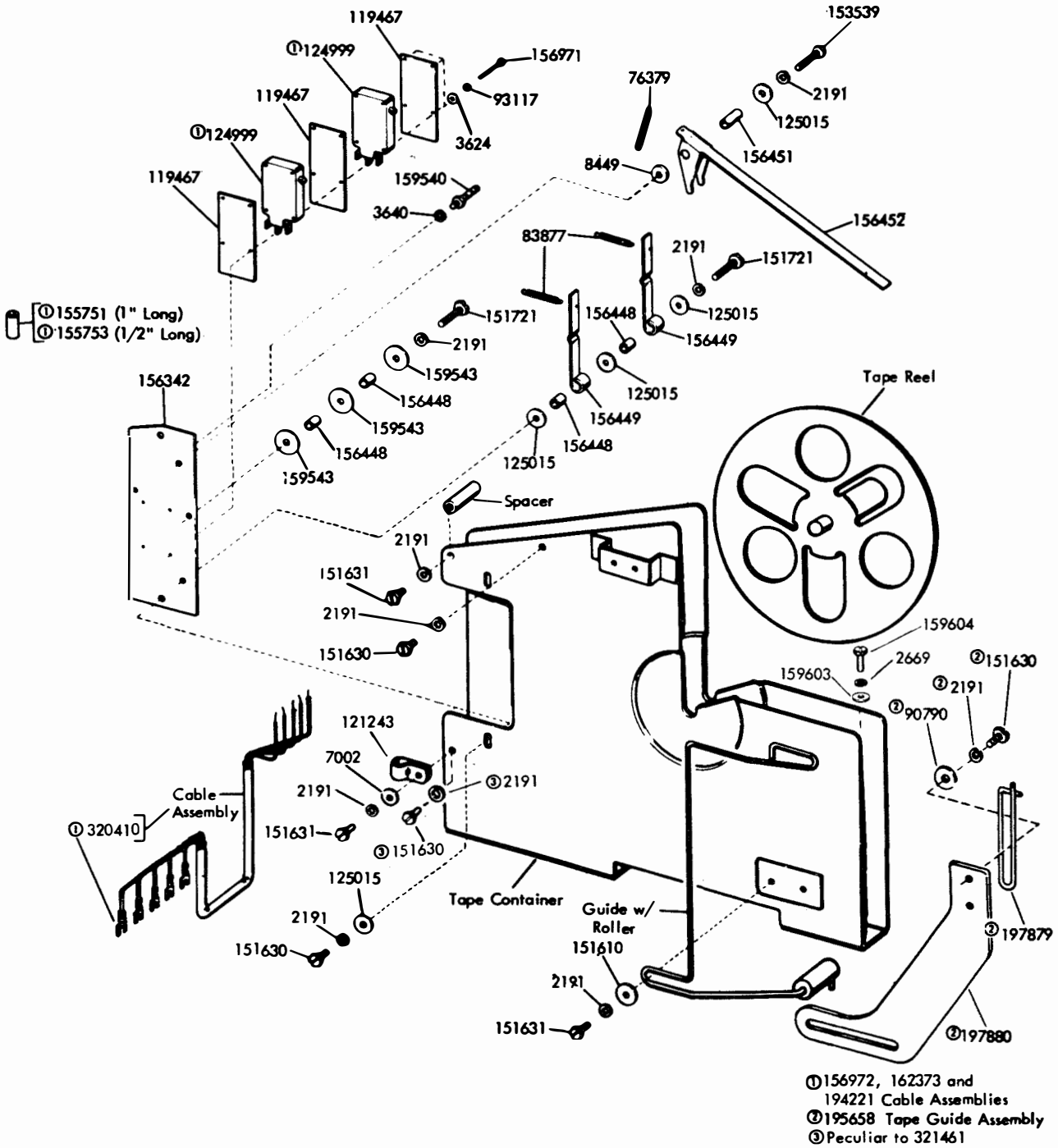
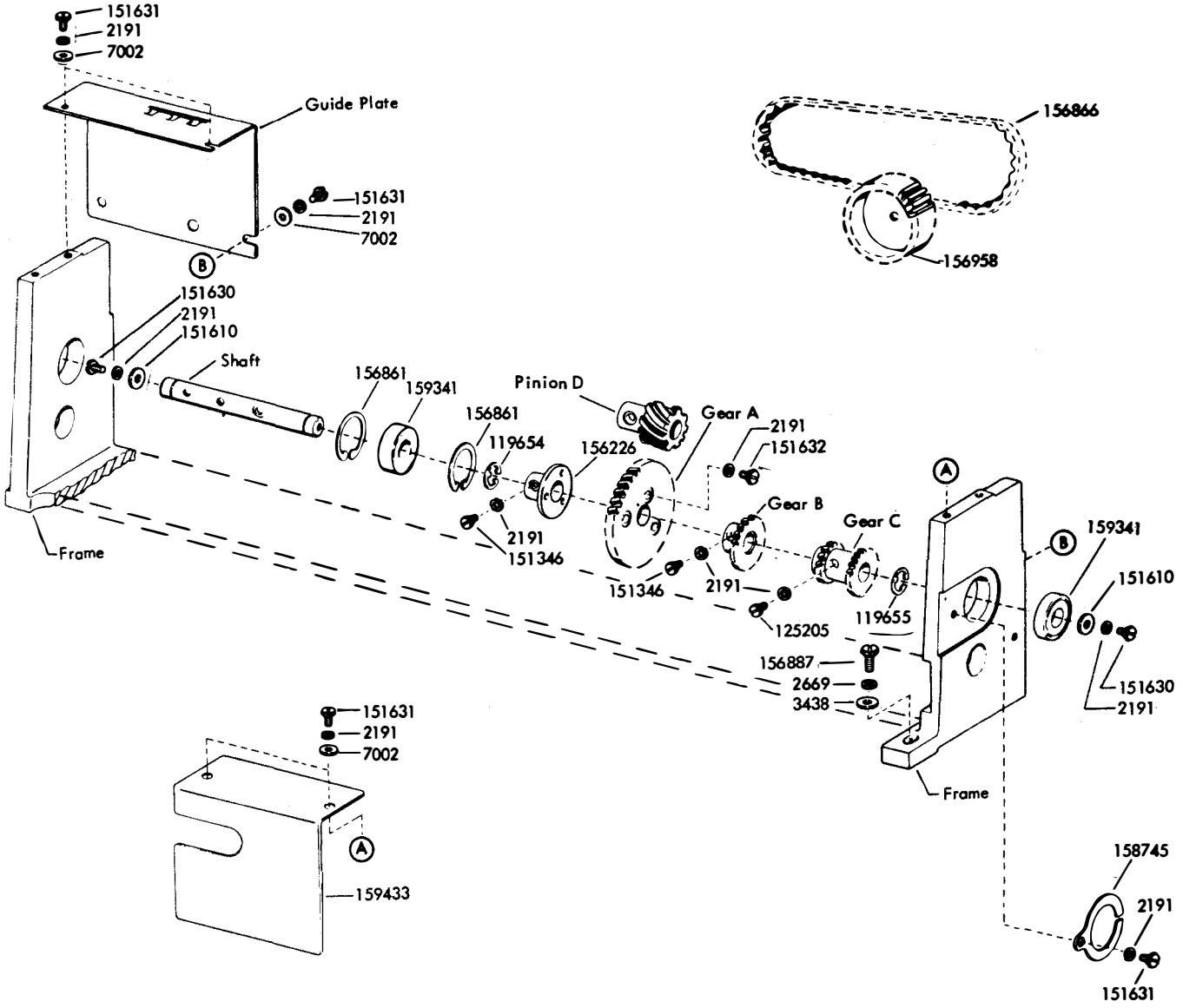


Figure 7-45. Tape Container Assemblies

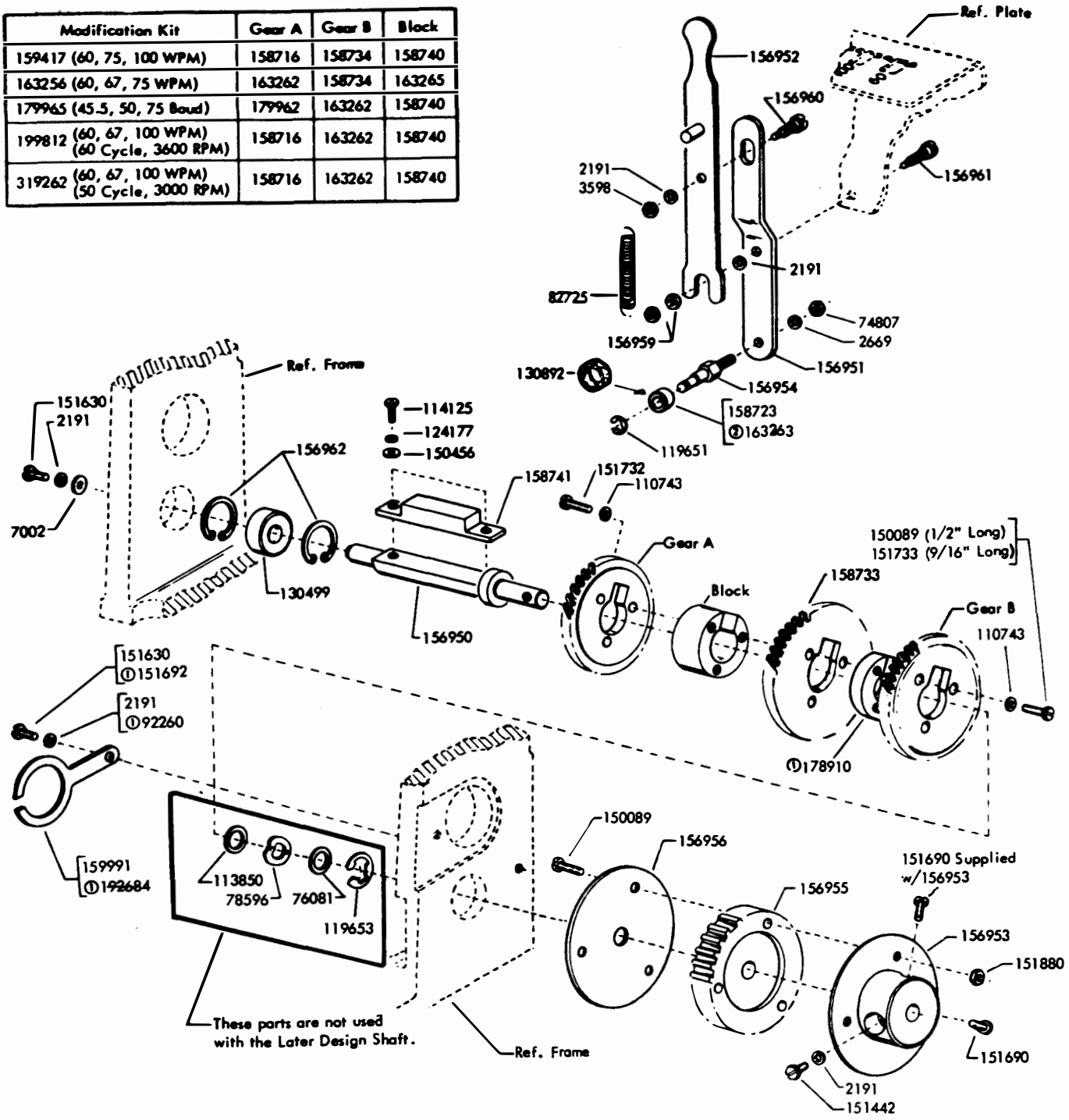
Modification Kit	Frame	Shaft	Gear A	Gear B	Gear C	Pinion D	Guide Plate	Unit Code
159417 (60, 75, 100 WPM)	156965	156967	156949	158712	158732	156964	156968	7.42
163256 (60, 67, 75 WPM)	156965	163264	163260	163261	158732	156964	163328	7.42
179965 (45.5, 50, 75 Baud)	192685	156967	163260	179963	178870	156964	179969	7.00
319262 (60, 67, 100 WPM) (50 Hz, 3000 WPM)	156965	156967	319260	158712	178870	319259	199814	7.42
199812 (60, 67, 100 WPM) (60 Hz, 3600 WPM)	156965	156967	156949	158712	178870	156964	199814	7.42



Note:
All parts are common to all Modification Kits unless otherwise indicated. Also include parts shown on figure 7-47.

Figure 7-46. Modification Kits to Provide Variable Speed Drive (Sheet 1 of 2)

Modification Kit	Gear A	Gear B	Block
159417 (60, 75, 100 WPM)	158716	158734	158740
163256 (60, 67, 75 WPM)	163262	158734	163265
179965 (45.5, 50, 75 Baud)	179962	163262	158740
199812 (60, 67, 100 WPM) (60 Cycle, 3600 RPM)	158716	163262	158740
319262 (60, 67, 100 WPM) (50 Cycle, 3000 RPM)	158716	163262	158740



Note:
All parts are common to all Modification Kits unless otherwise indicated. Also include parts shown on figure 7-46.

① Peculiar to 179965, 199812 and 319262

② Peculiar to 163256

Figure 7-47. Modification Kits to Provide Variable Speed Drive (Sheet 2 of 2)

Speed Change Gears for Self-Contained Sprocket Driven Units (Order Separately)						
Set Number	Pinion	Driven Gear	Approx. O.P.M. (Receiving)	Approx. W.P.M.	Unit Code	Baud
161519	161104 (11T)	161103 (49T)	461.7	67	7.42	50
161654	156982 (9T)	156981(44T)	420	60	7.42	45.45
161655	156984(12T)	156983(47T)	525.7	75	7.42	56.88
161656	156986(14T)	156985(42T)	685	100	7.42	74.2
①176295	176296(15T)	176297(43T)	692	107	7.00	75
②311283	311272 (14T)	311273 (52T)	461.7	67	7.42	50
321547	321548 (37T)	321549 (49T)	685	100	7.42	74.2
324480	324471 (9T)	324479 (36T)	900	150	7.42	113

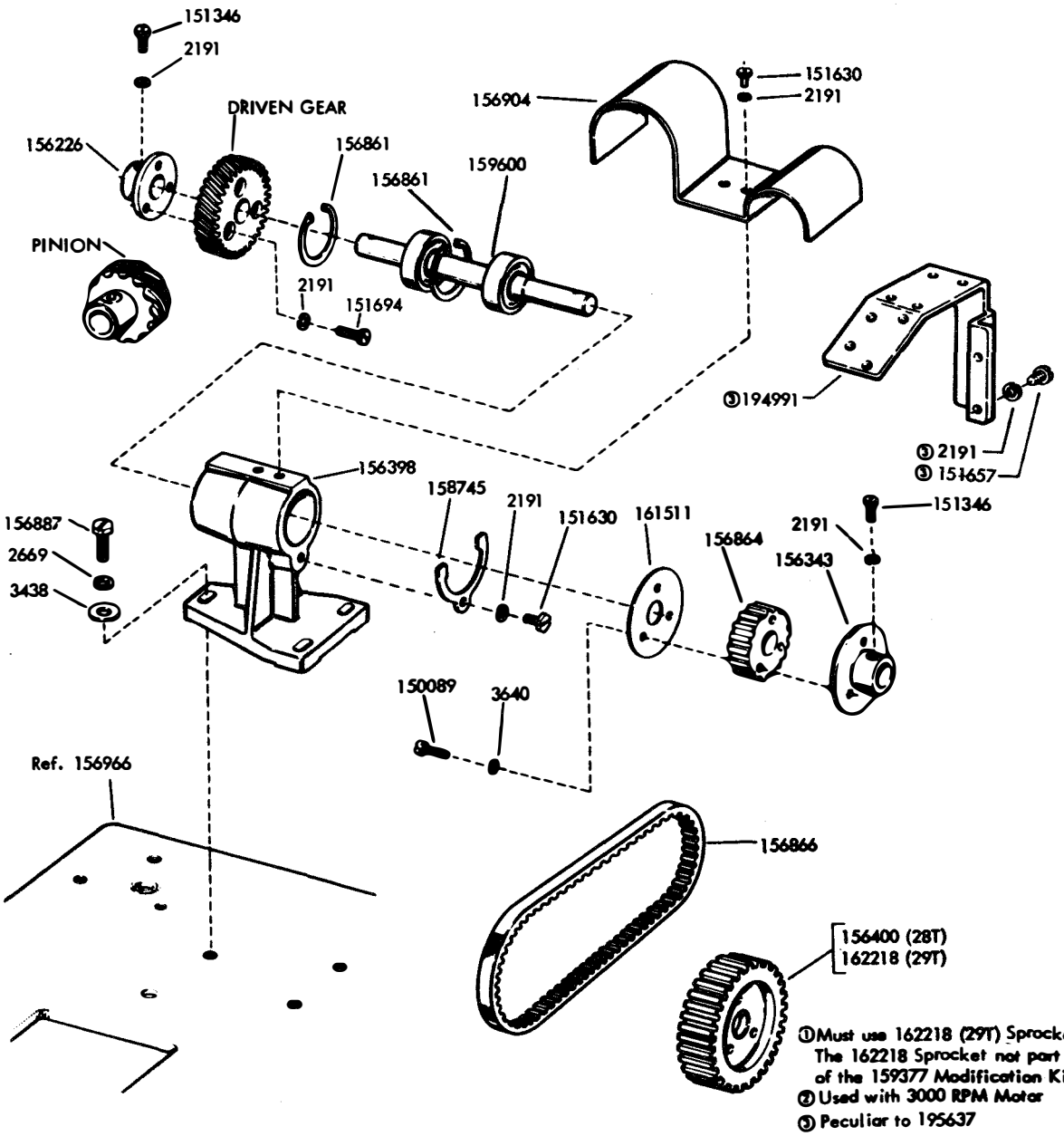


Figure 7-48. Modification Kits 159377 and 195637 to Provide Single Speed Drive

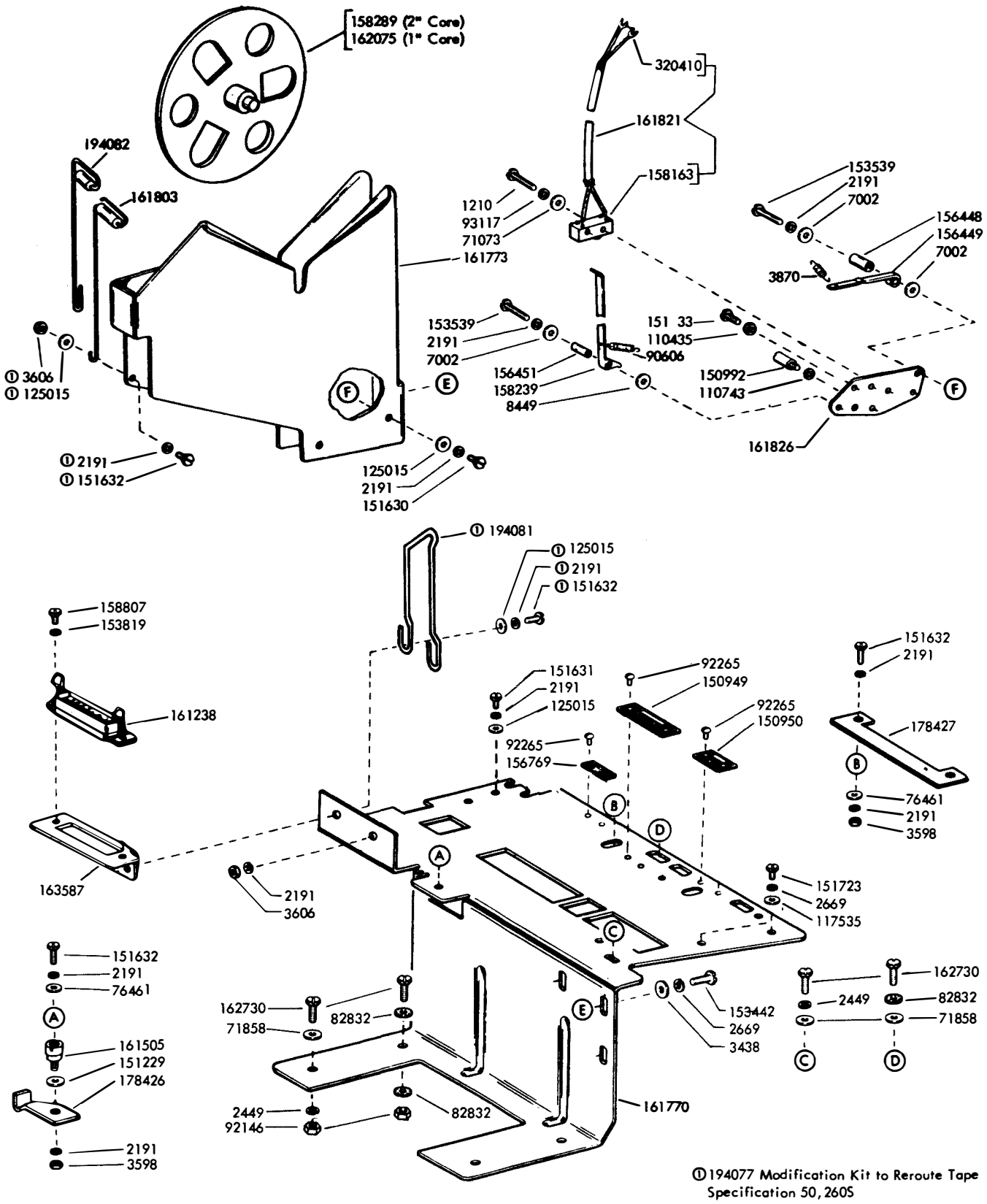


Figure 7-49. Auxiliary Reperforator Base

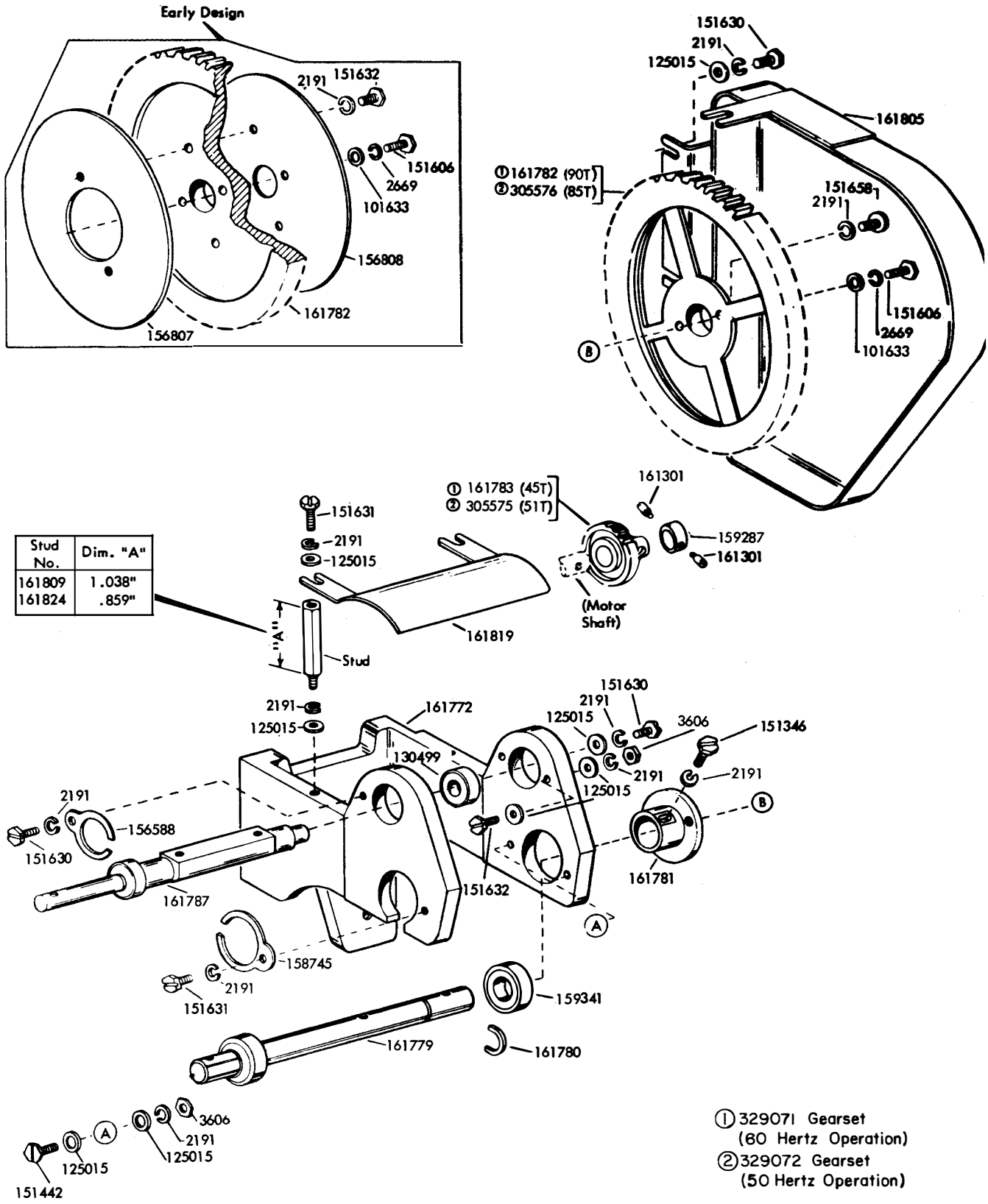
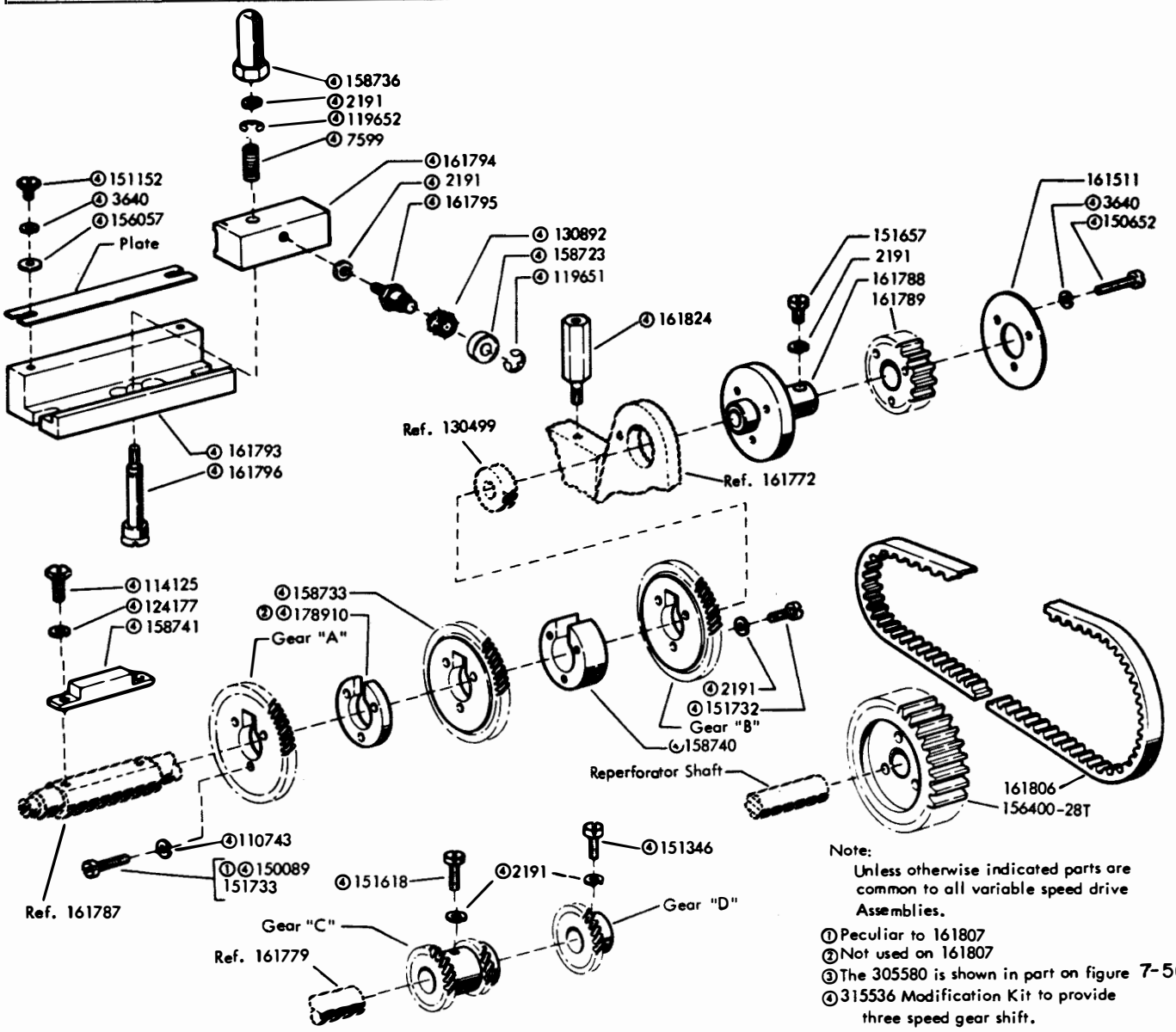


Figure 7-50. Gear Bracket Mechanism for Auxiliary Mounted Reperforator

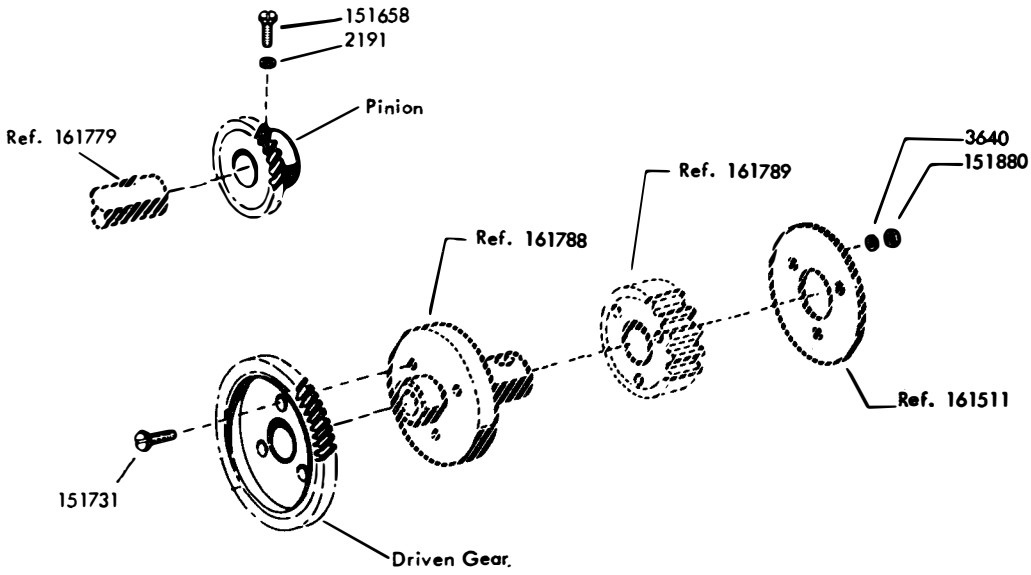
Gear Set Number	W.P.M. or Baud	Motor Operation	Gear "A"	Gear "B"	Gear "C"	Gear "D"	Plate
161807	(WPM) 60-75-100	60 Hertz	158734	158716	158732	158712	161797
178869	(WPM) 60-67-100	60 Hertz	163262	158716	178870	158712	178885
192678	(BAUD) 45.5-50-75	60 Hertz	163262	179962	178870	179963	192680
③ 305580	(BAUD) 45.5-50-74.2	50 Hertz	163262	158716	178870	158712	178885
315536	(BAUD) 45.5-50-75	50 Hertz	④163262	④176071	④178870	④176072	④192680



Note:
Unless otherwise indicated parts are common to all variable speed drive Assemblies.

①Peculiar to 161807
②Not used on 161807
③The 305580 is shown in part on figure 7-50.
④315536 Modification Kit to provide three speed gear shift.

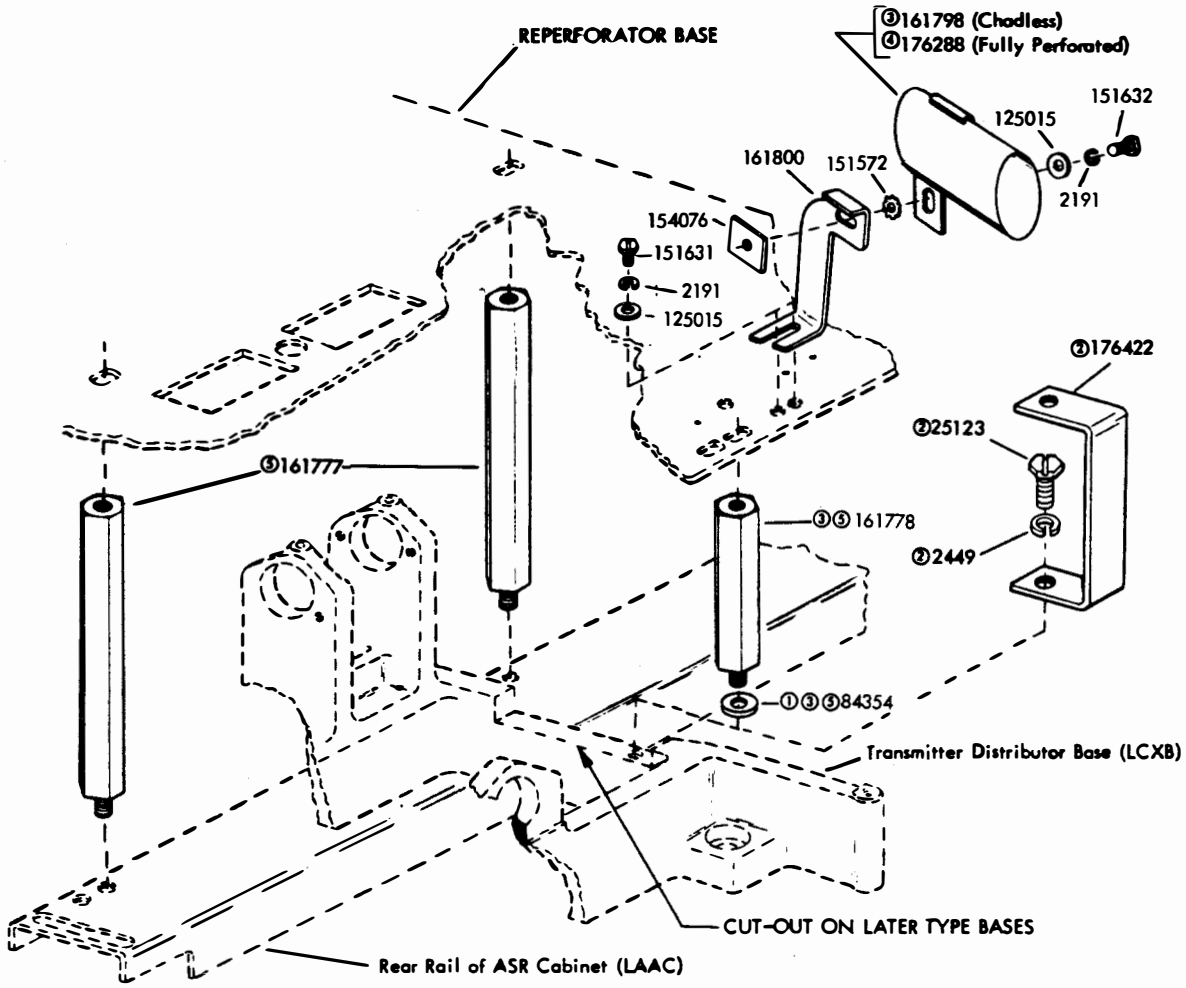
Figure 7-51. Variable Speed Drive Gearsets for Auxiliary Mounted Reperforator



Single Speed Drive Gear Sets for Auxiliary Mounted LPR Sets					
Gear Set	Driven Gear	Pinion	Unit Code	W.P.M. (Nominal)	Baud
② 161811	161790-44T	161784-18T	7.42	60	45.45
② 161812	161791-47T	161785-24T	7.42	75	56.88
② 161813	161792-39T	161786-26T	7.42	100	74.2
② 173820	173822-49T	173821-20T	7.00	65	45.45
② 163448	163447-49T	163446-22T	7.00	71	50
② 163451	163450-40T	163449-27T	7.00	107	75
① 319920	319919-51T	319918-25T	7.00	65	45.5
① 319923	319922-52T	319921-28T	7.00	71	50
① 319926	319925-26T	319924-21T	7.00	107	75

① Used with 3000 RPM Motors
② Used on 3600 RPM Motors

Figure 7-52. Single Speed Drive Gearsets for Auxiliary Mounted Reperforator



①Not required when unit is equipped with base isolation parts.
②Used on bases with cut-out
③Peculiar to 161815
④Peculiar to 176287
⑤Part of the 179492 Specification 59295

Figure 7-53. Modification Kits 161815, 176287, and 179492 to Mount an Auxiliary Typing Reperforator Base

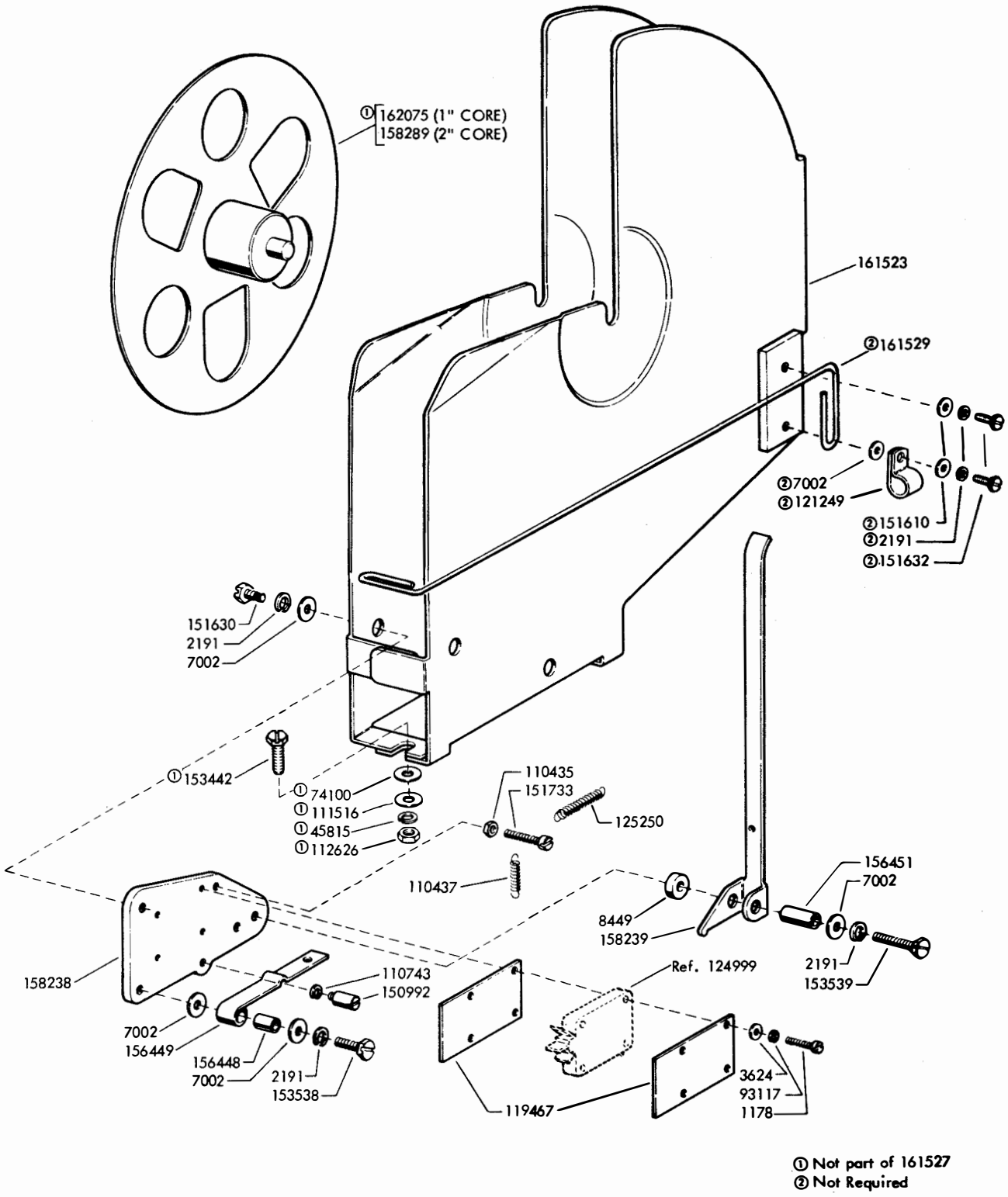
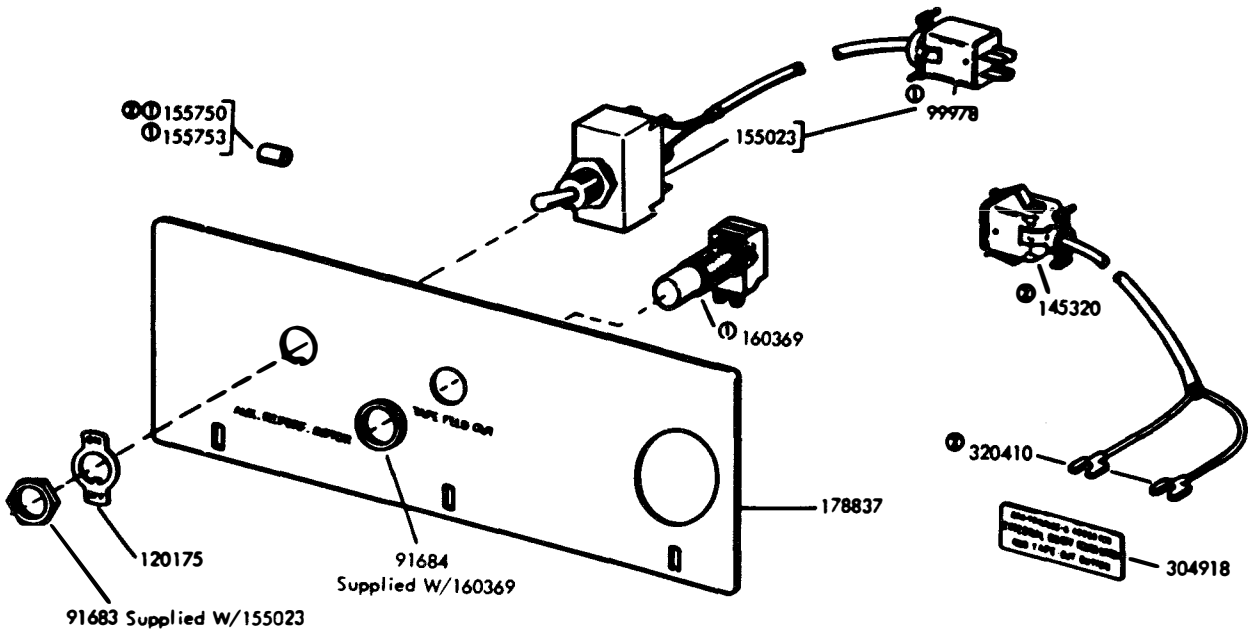
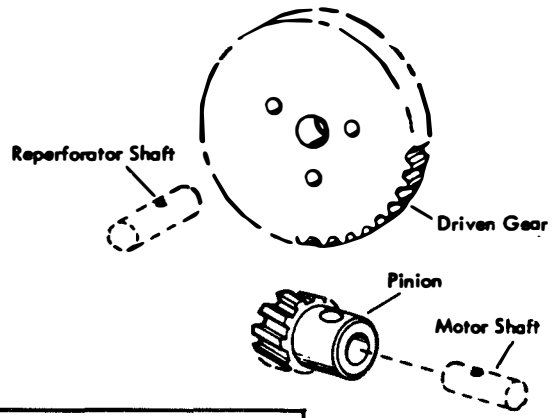


Figure 7-54. Tape Container Assembly 161527



① 312475 Cable Assembly
② 312476 Cable Assembly

Figure 7-55. Modification Kit 178838 to Relocate Power Switch from Auxiliary Base to Outside of Cabinet



Speed Change Gear Sets for Non-typing Reperforator					
Set Number	Pinion	Driven Gear	(Nominal) WPM	Unit Code	Baud
①164784	164782-6T	164783-52T	120	8.5	102.9
②193620	192791-5T	192790-49T	53	8.61	46.15
②193621	192789-6T	192788-47T	66	8.61	57.69
②193643	193641-6T	193642-40T	77.7	8.00	67.8
②193678	193677-8T	193676-42T	100	11.0	110
②193681	193680-5T	193679-39T	67	11.0	73.7
①③199896	199894-13T	199895-68T	100	8.5	85
②③308197	308195-10T	308196-41T	60	8.5	50
②③308206	308204-15T	308205-67T	67	8.5	56.86

① Reperforator clutch must be 2 cycle design
② Reperforator clutch must be 1 cycle design
③ Used with 50 Hertz-3000 RPM Motor

Figure 7-56. Gear Chart for Self-Contained Nontyping Reperforator

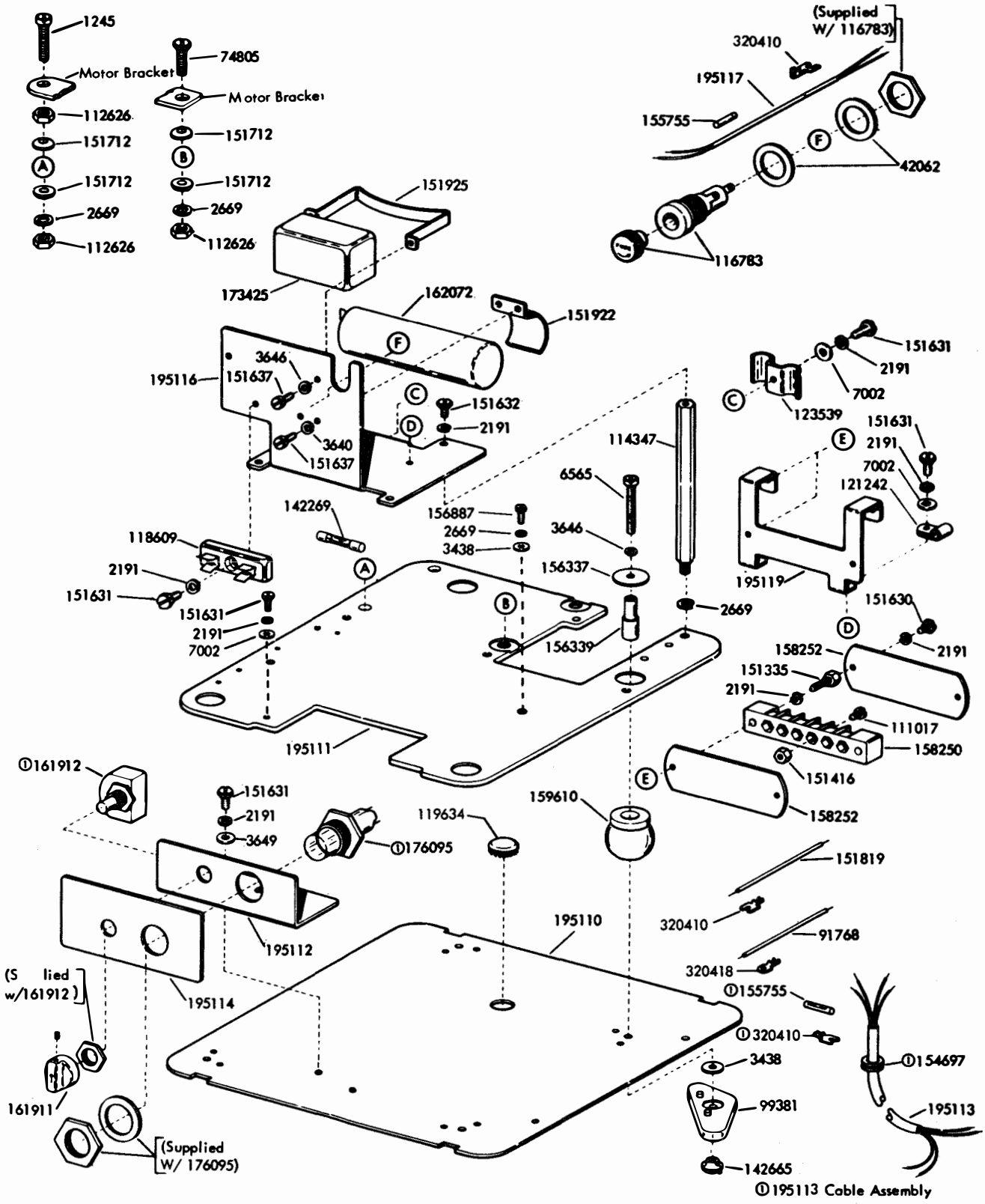


Figure 7-57. Compact Tape Printer Base (Sheet 1 of 2)

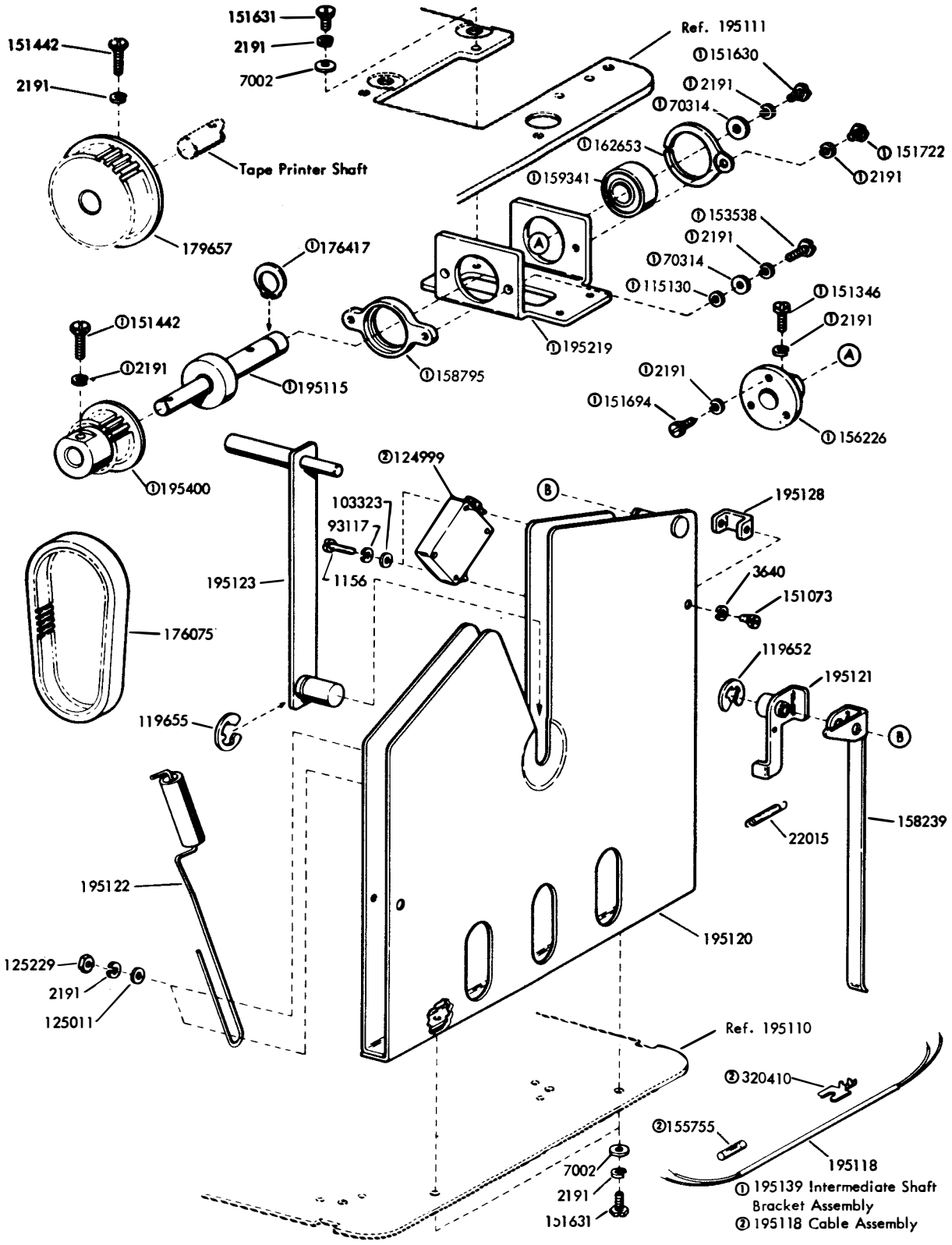
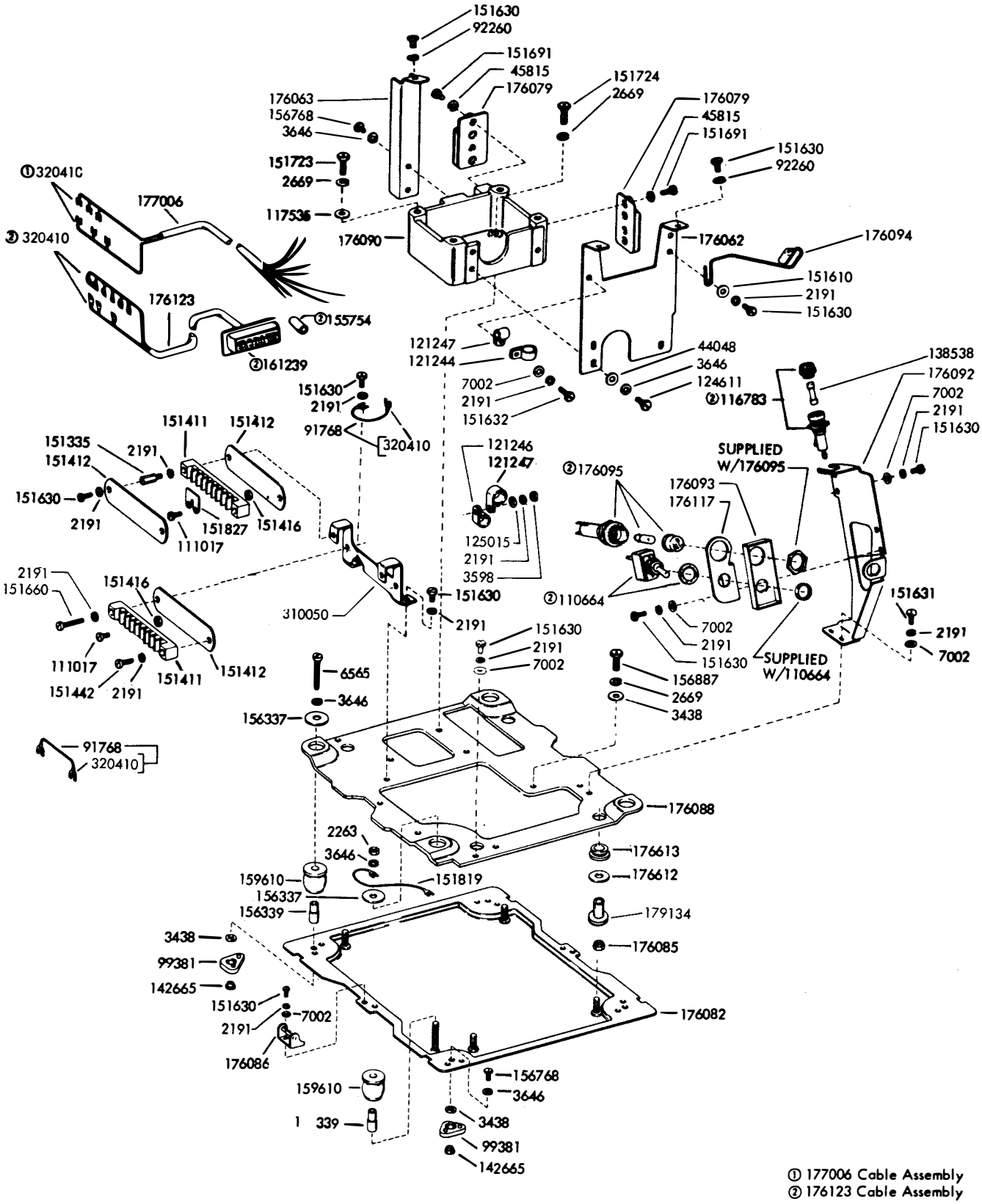


Figure 7-58. Compact Tape Printer Base (Sheet 2 of 2)



① 177006 Cable Assembly
② 176123 Cable Assembly

Figure 7-59. Compact Receiving-Only Reperforator Base

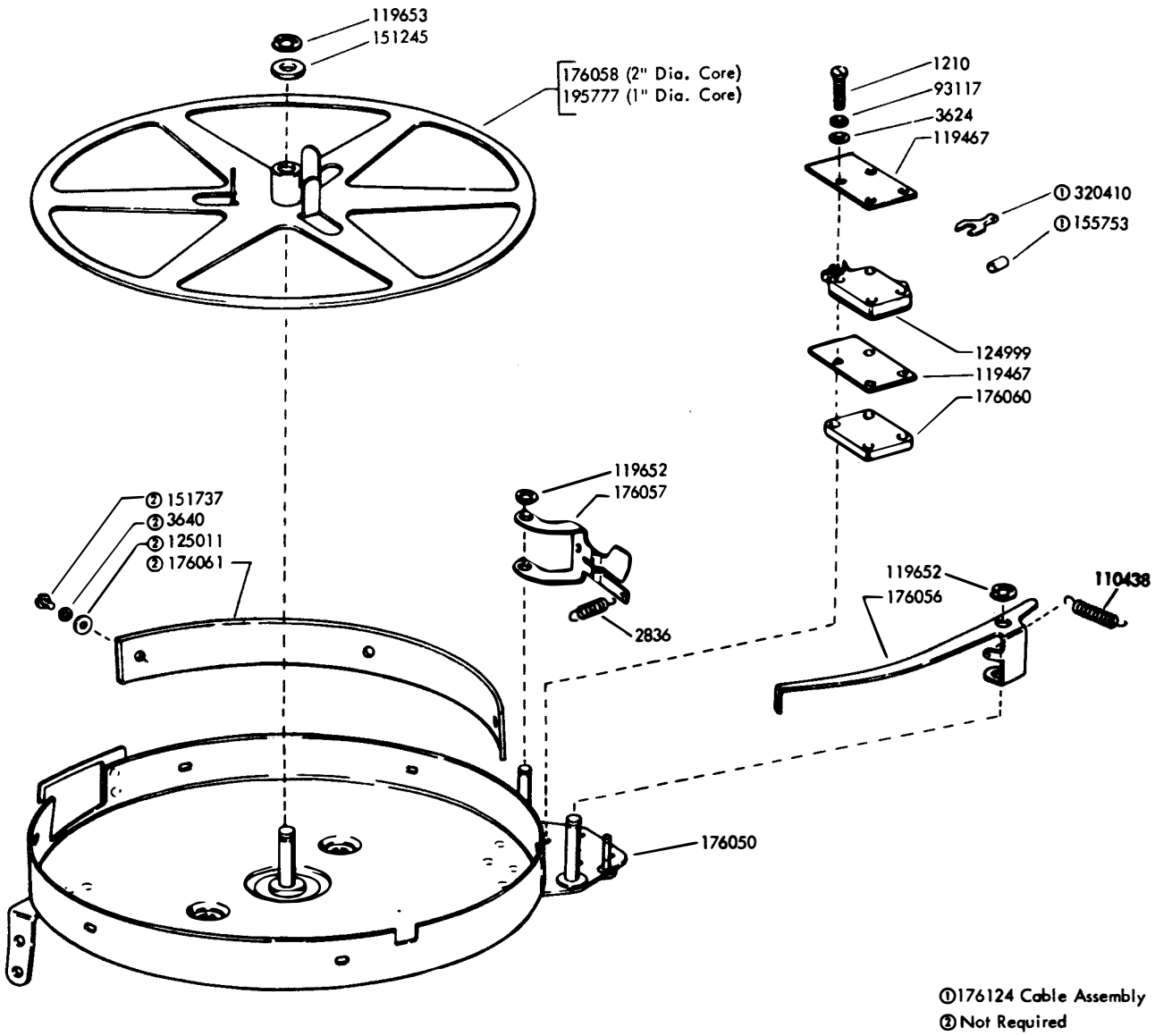


Figure 7-60. Tape Container Assembly 174492 (Compact Receiving-Only Reperforator)

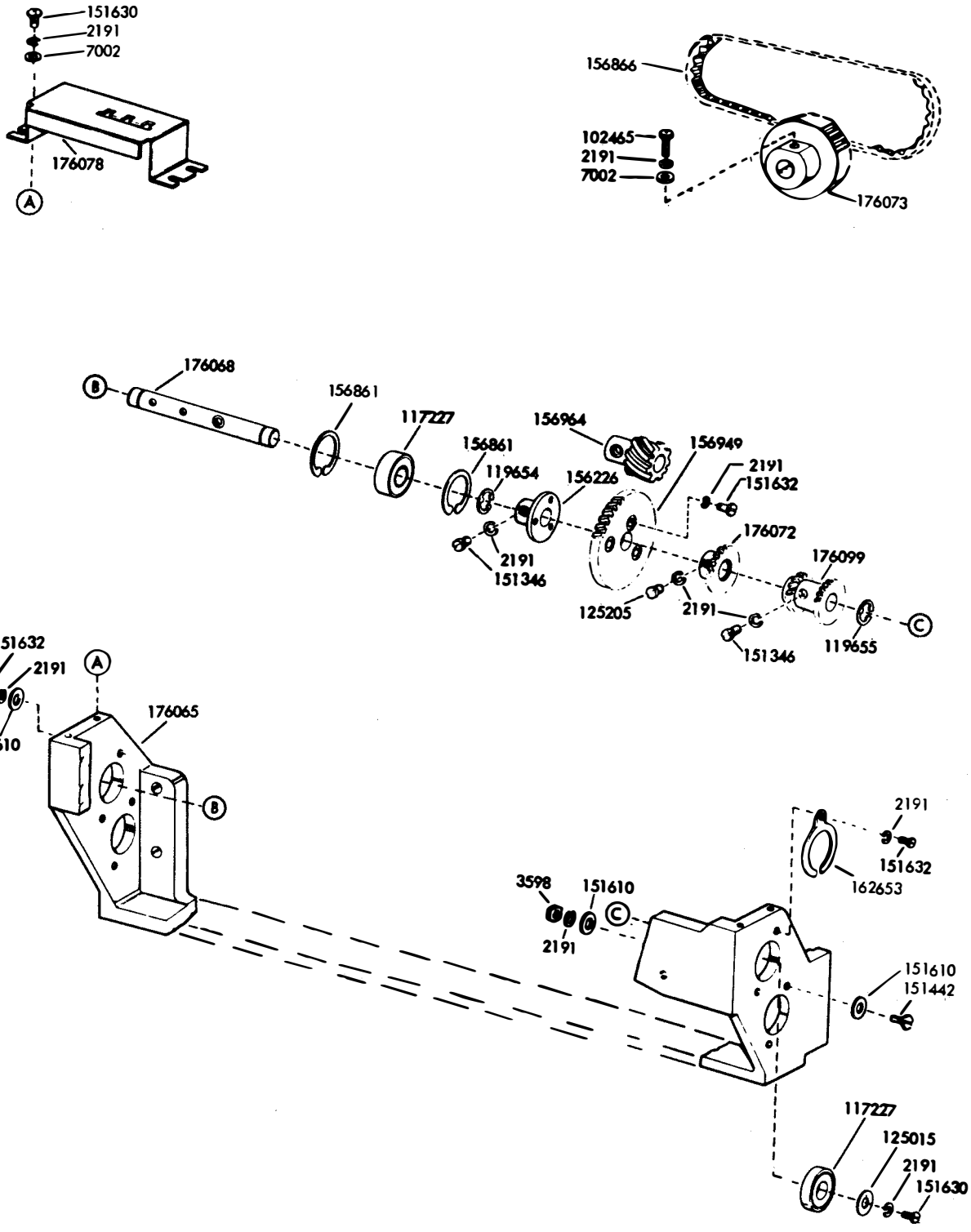


Figure 7-61. Variable Speed Mechanism Assembly 176100 (Compact Receiving-Only Reperforator) (Sheet 1 of 2)

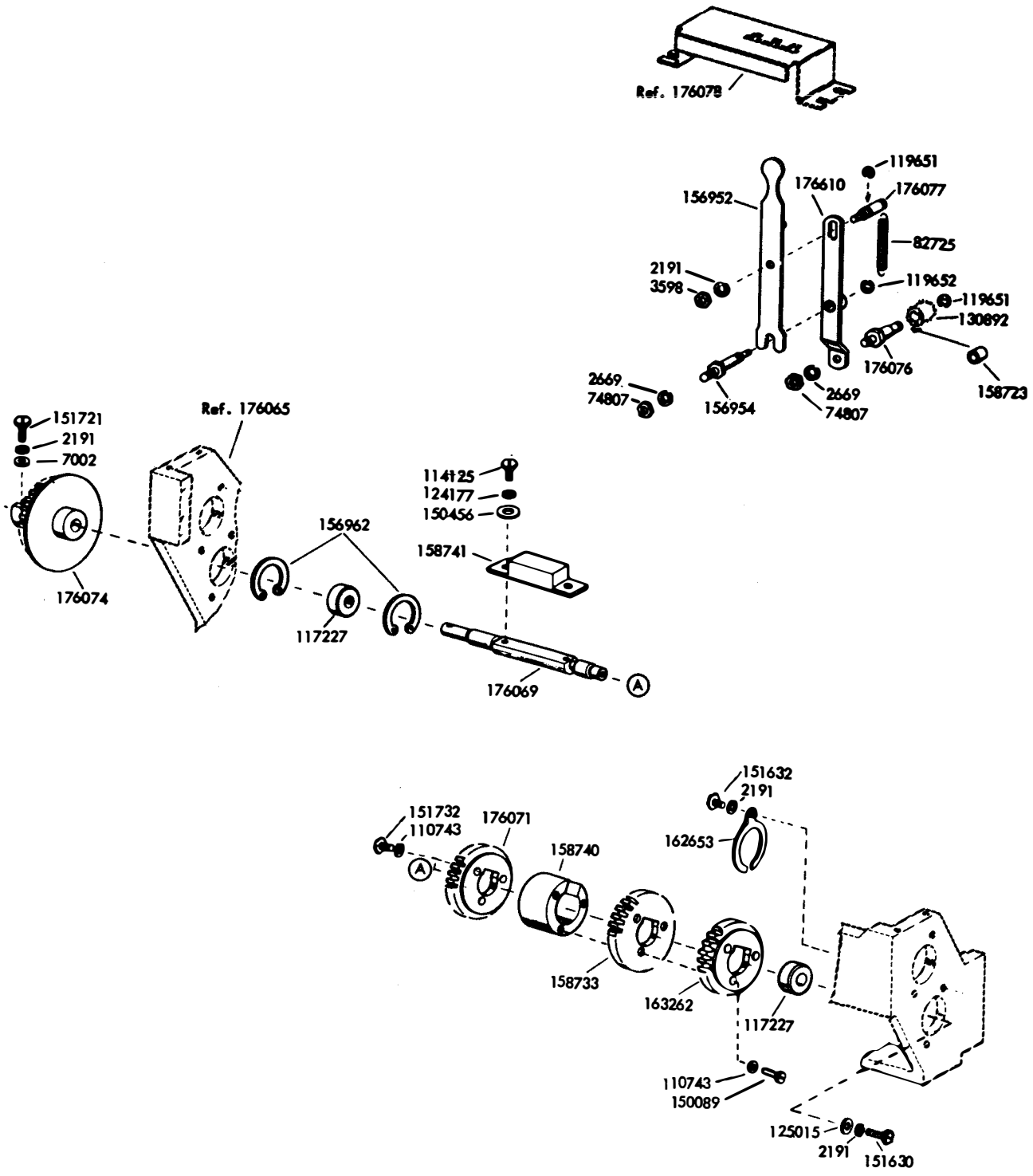


Figure 7-62. Variable Speed Mechanism Assembly 176100 (Compact Receiving-Only Reperforator) (Sheet 2 of 2)

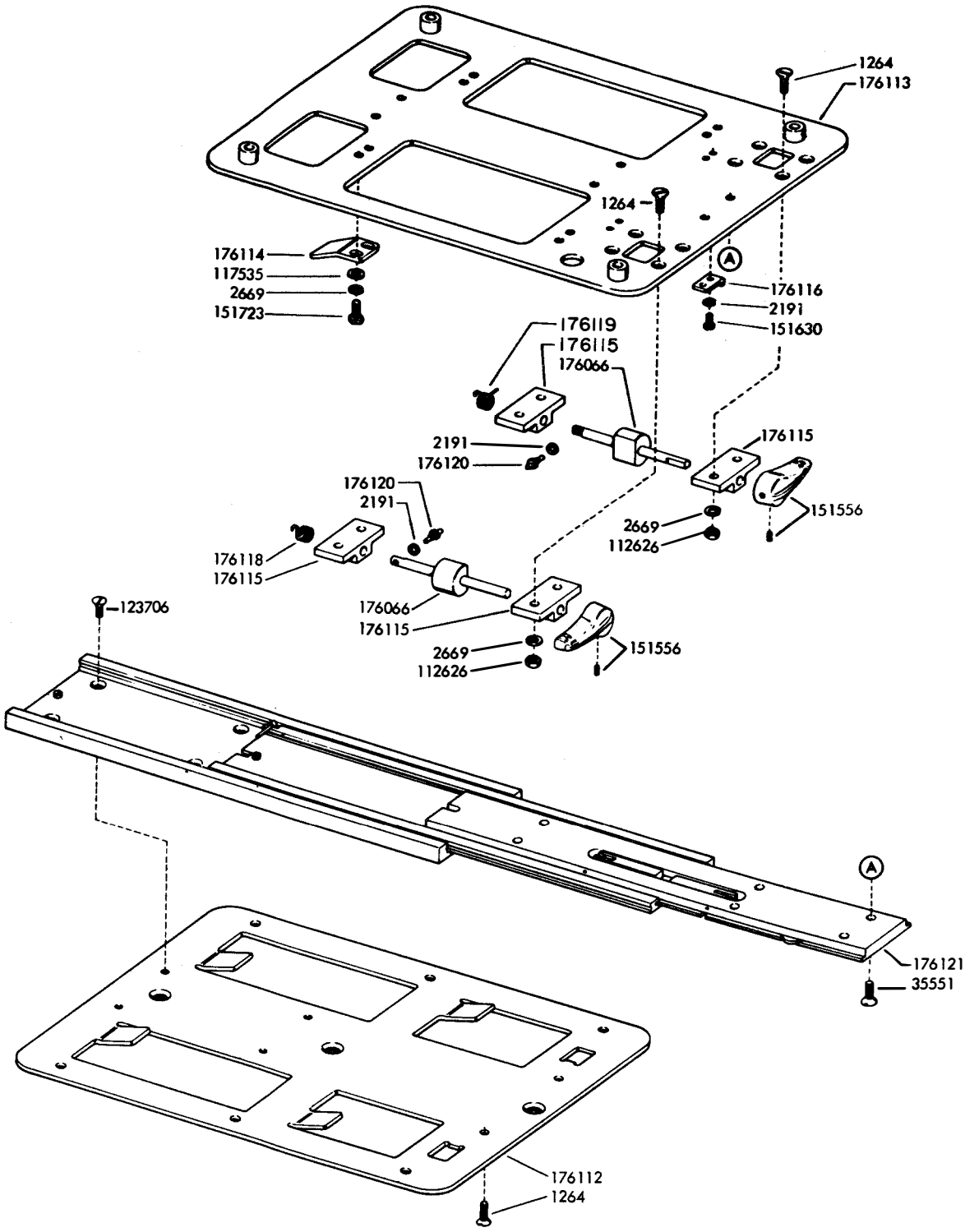


Figure 7-63. Modification Kit 174459 to Provide a Sliding Base

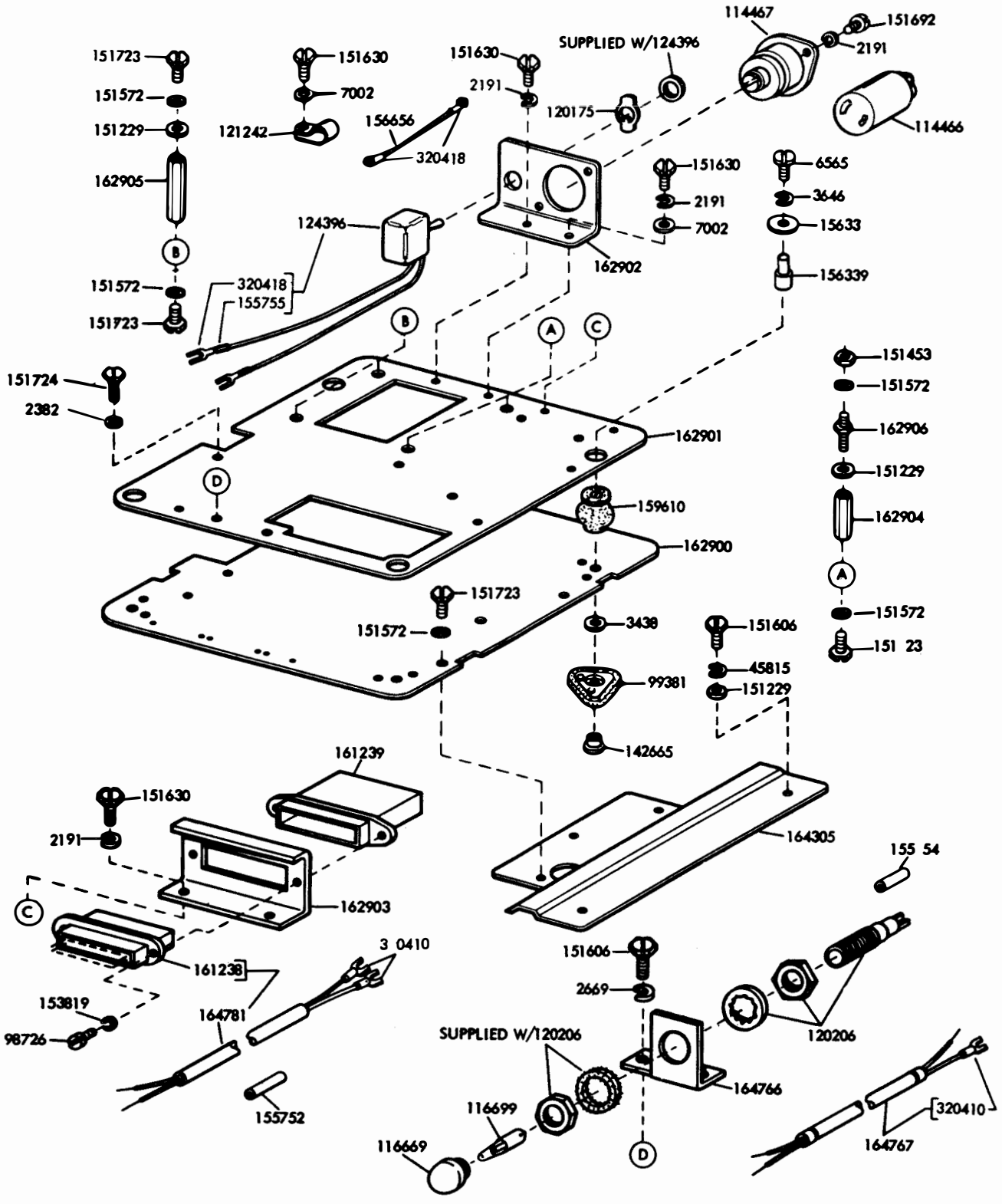


Figure 7-64. Miniaturized Base for Nontyping Reperforator (Sheet 1 of 2)

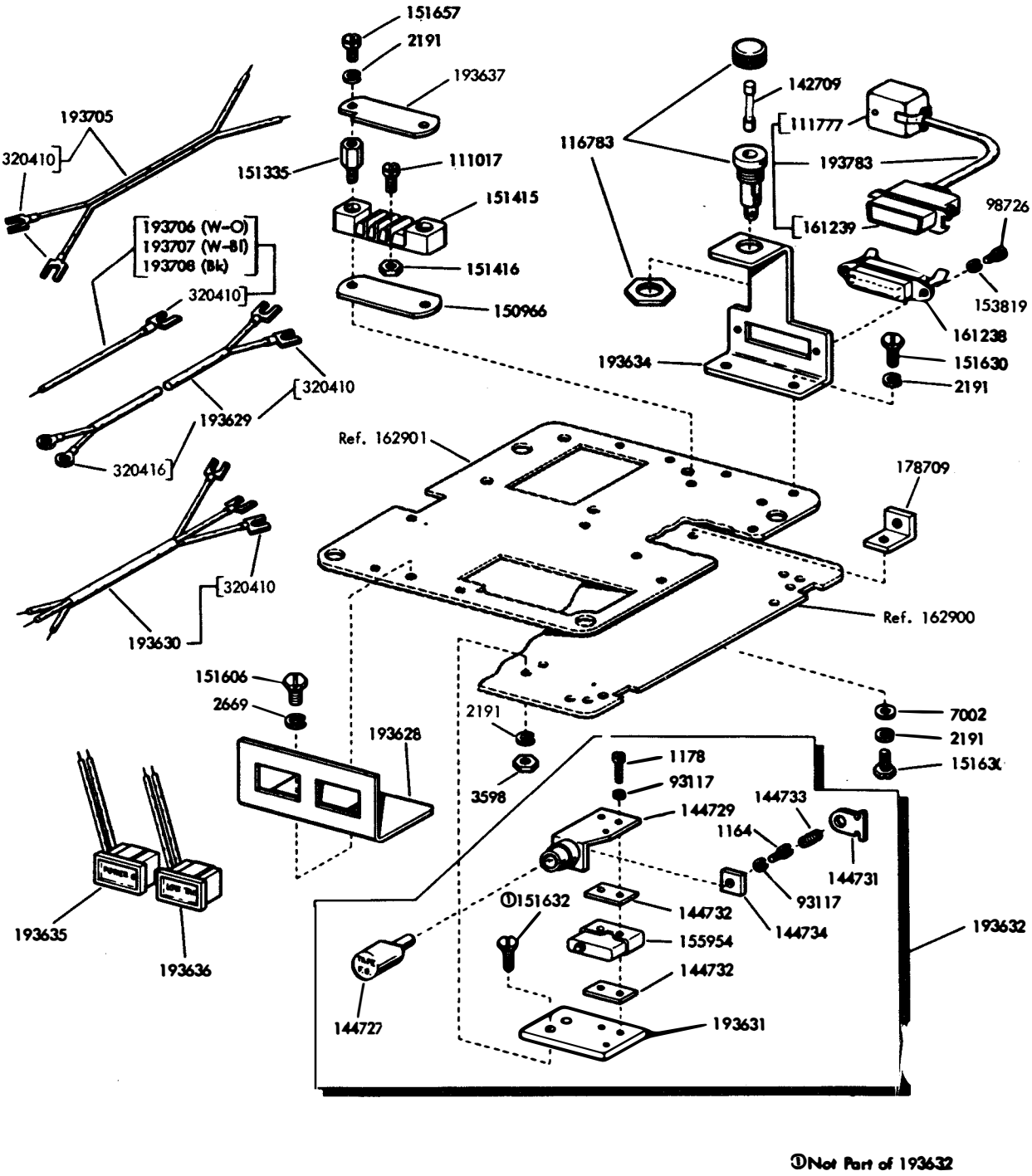


Figure 7-65. Miniaturized Base for Nontyping Reperforator (Sheet 2 of 2)

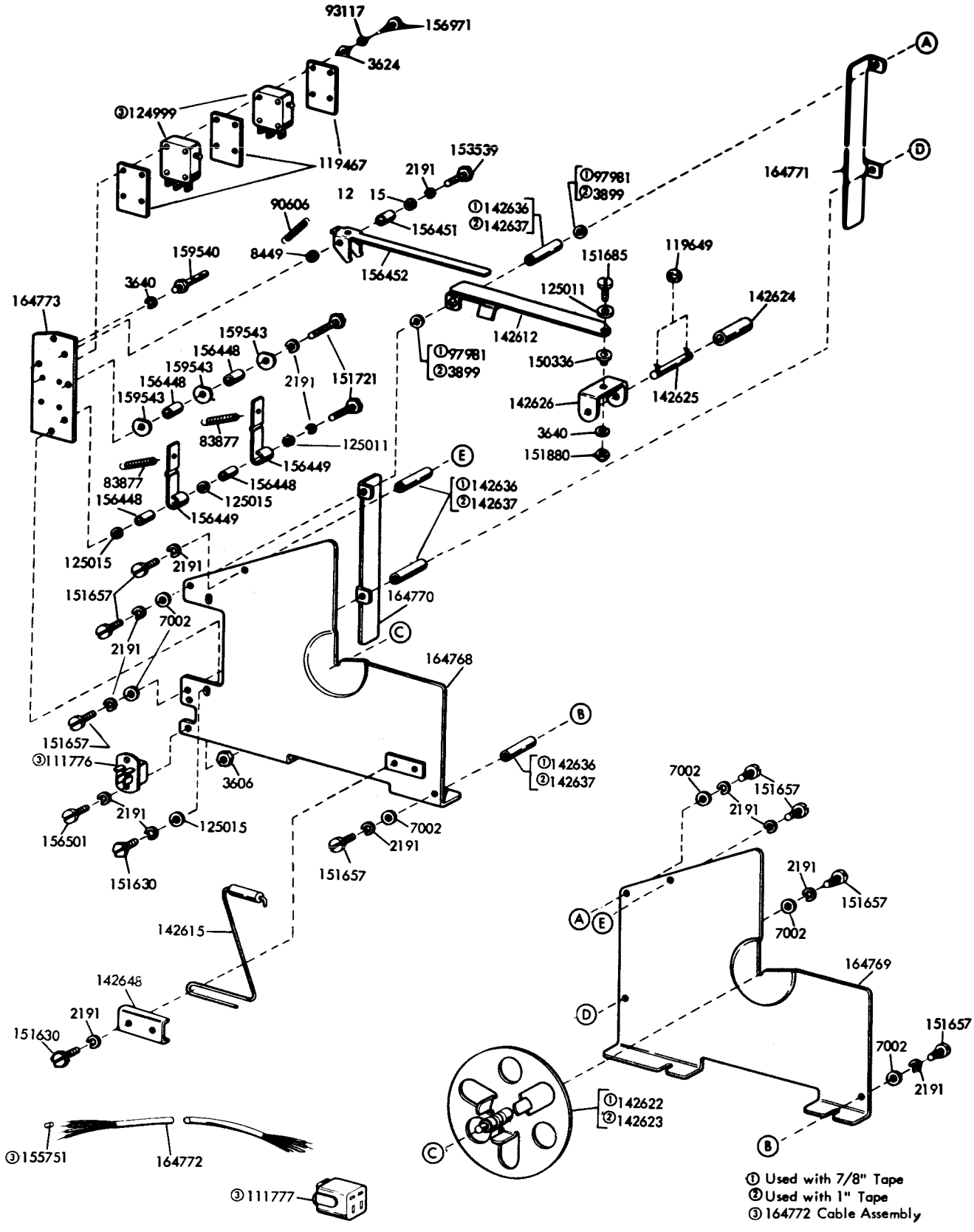


Figure 7-66. Tape Container Assemblies 164873 (7/8") and 193794 (1") with Tape-Out Switch

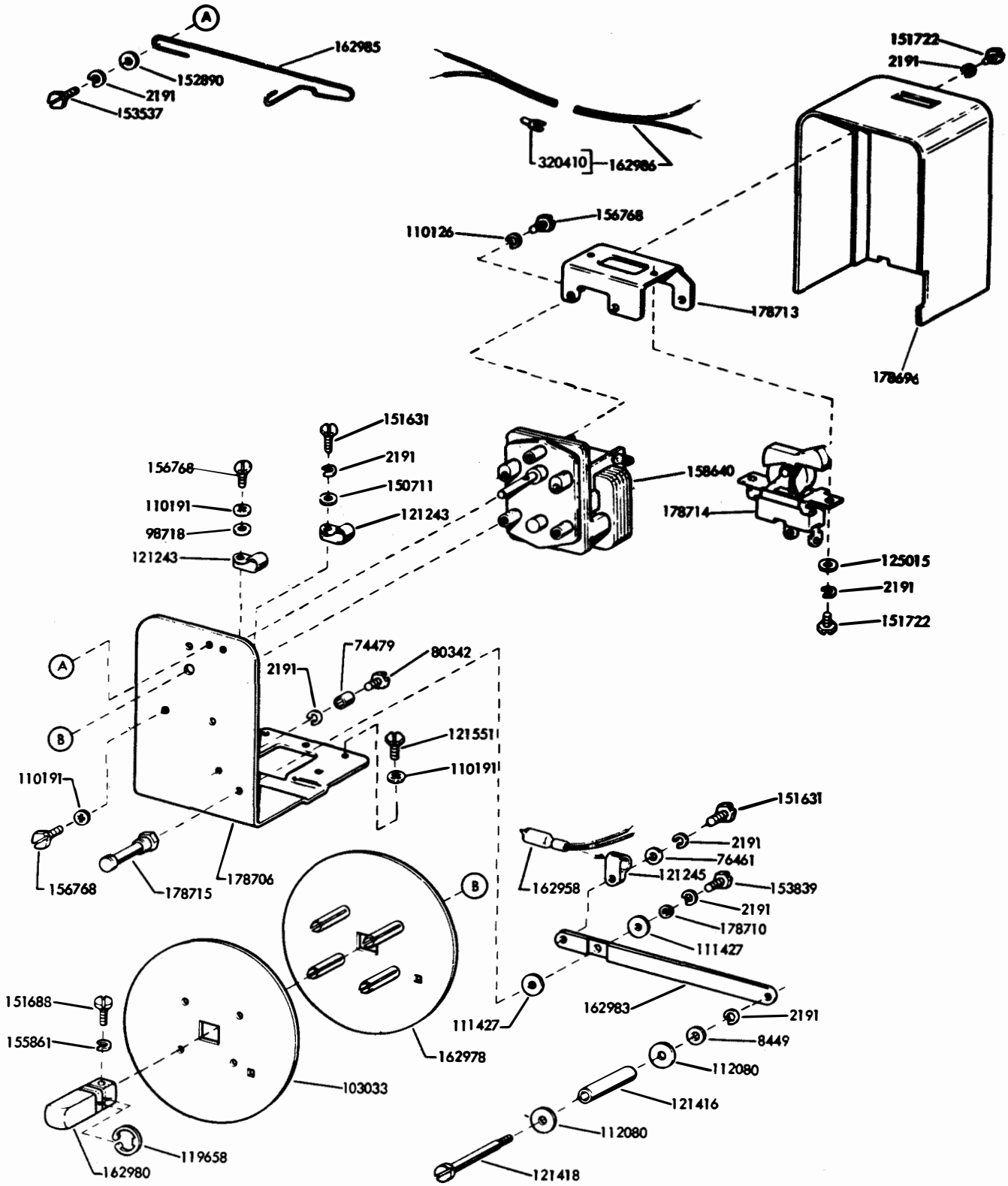


Figure 7-67. Tape Winder Assembly 162957

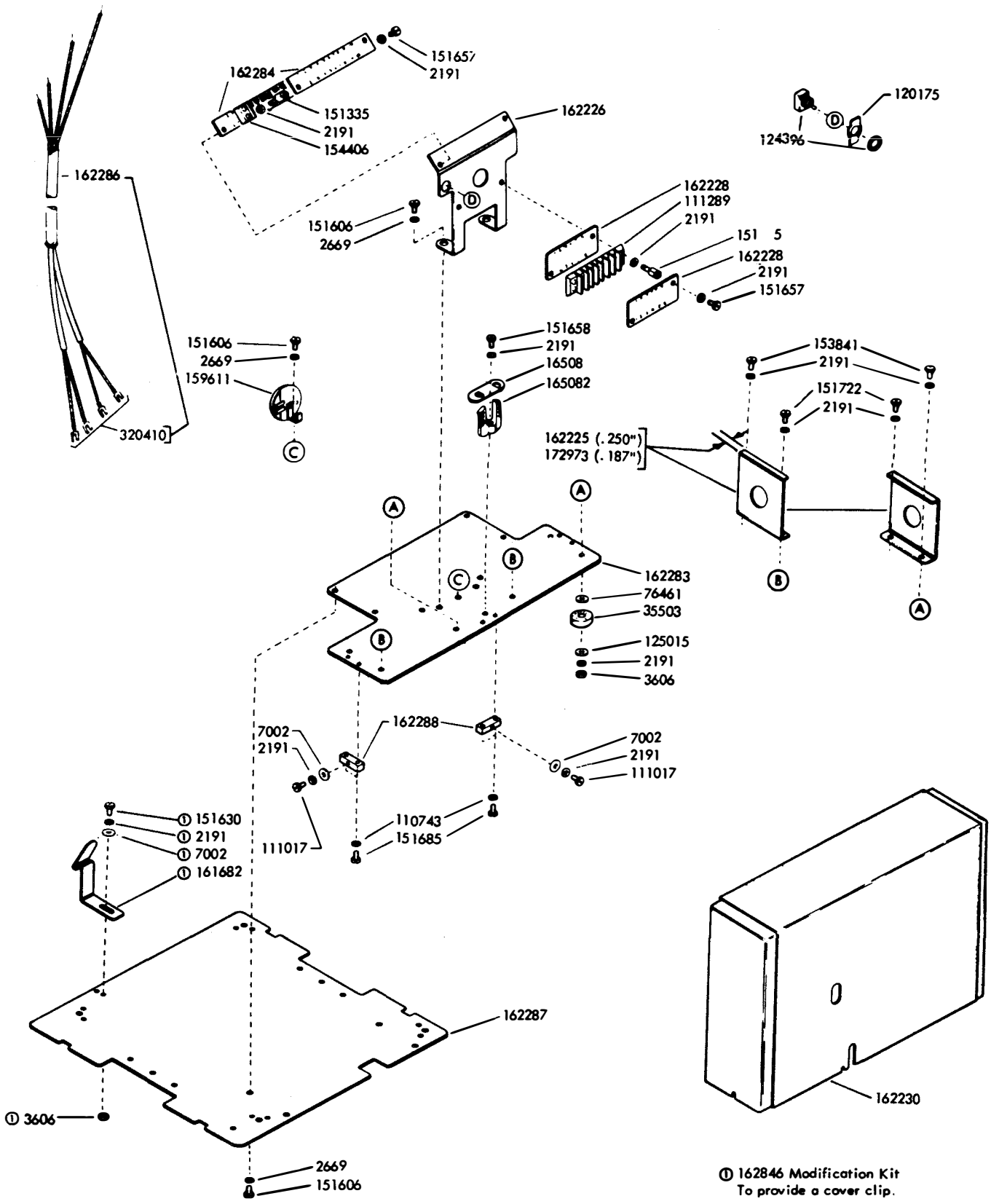
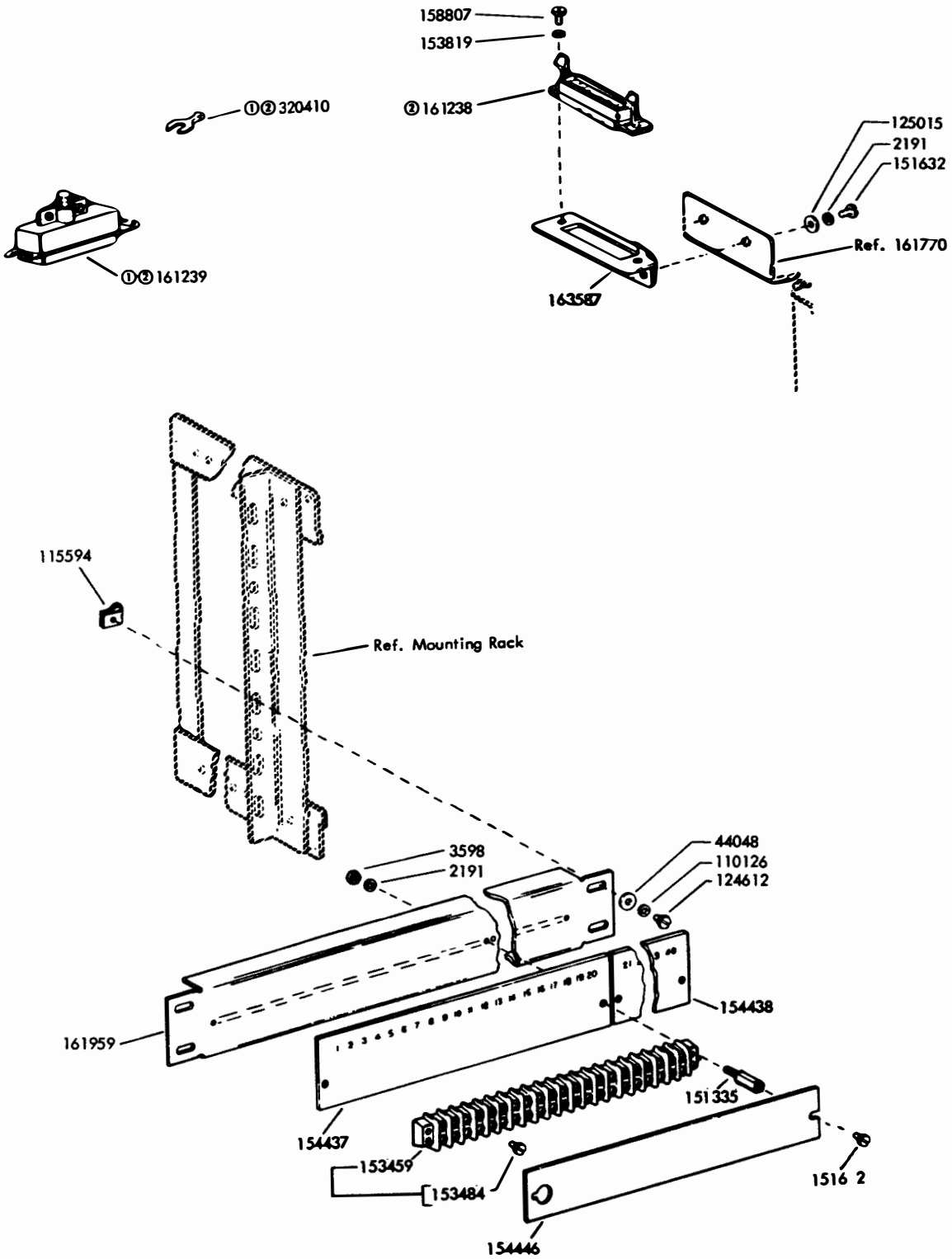
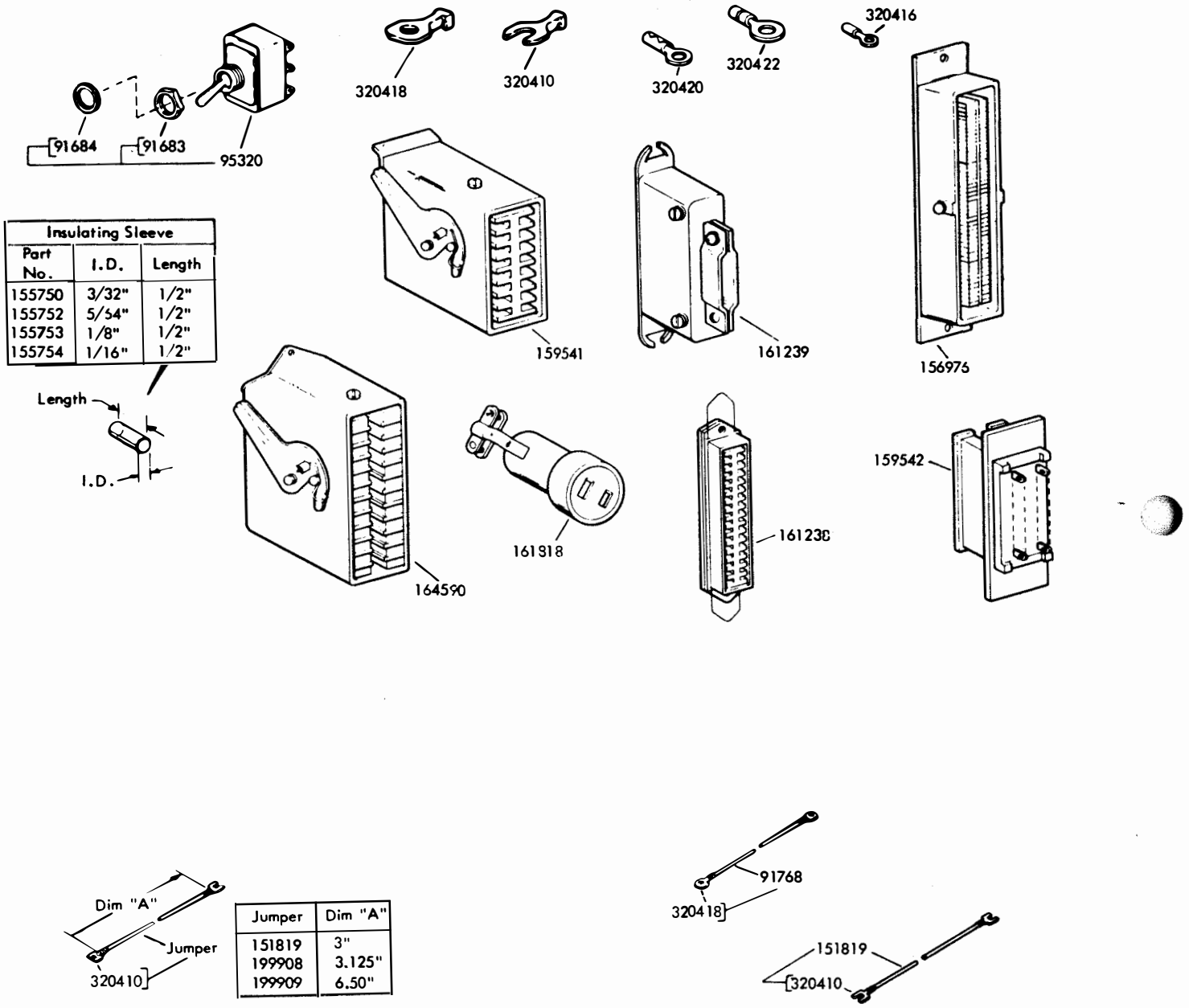


Figure 7-68. Reperforator Base with Extension



① 161914 Cable Assembly
② 161889 Cable Assembly
Specification 5932S

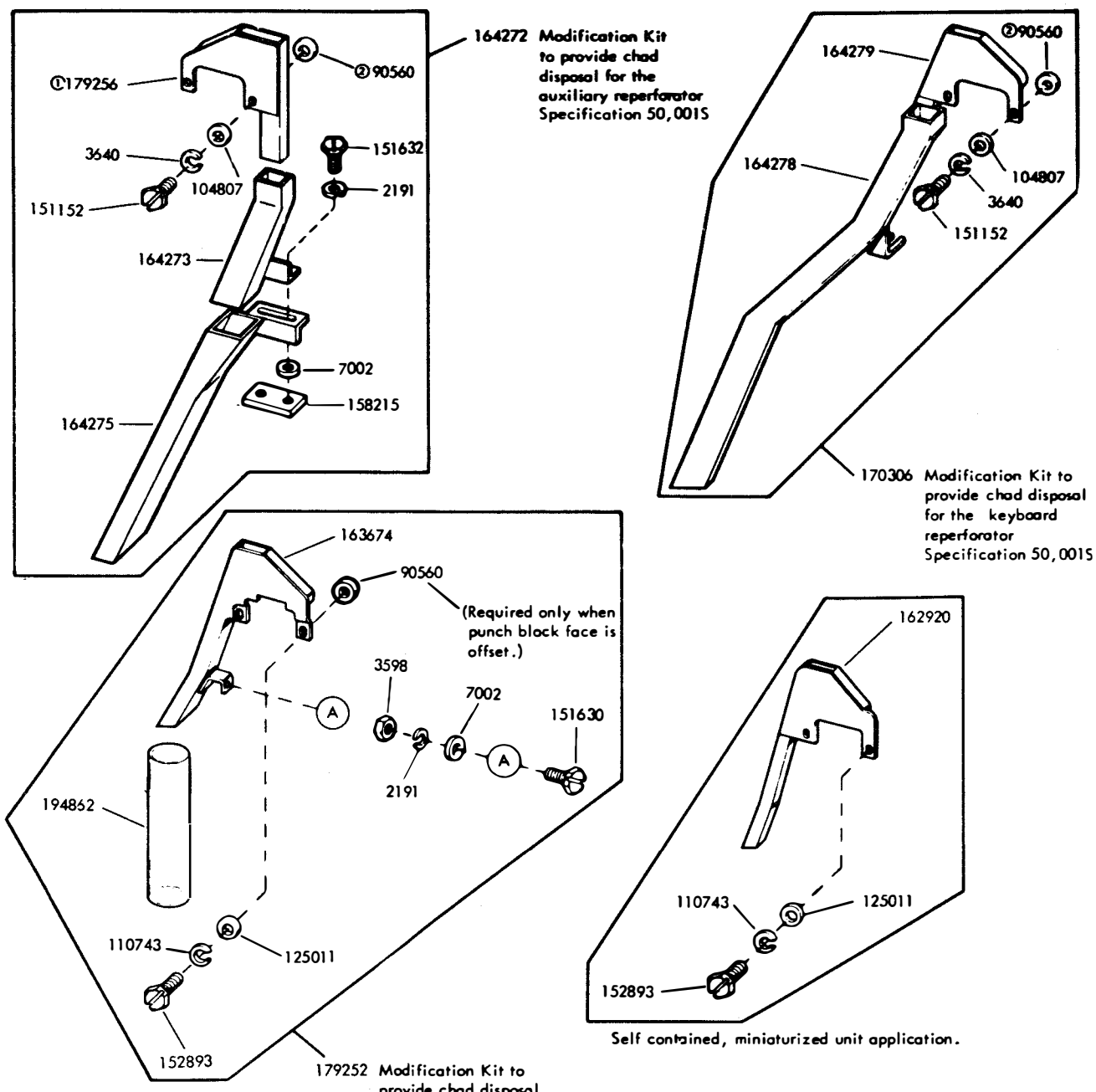
Figure 7-69. Modification Kit 161827 to Add Code Reading Contact Cabling



Insulating Sleeve		
Part No.	I.D.	Length
155750	3/32"	1/2"
155752	5/54"	1/2"
155753	1/8"	1/2"
155754	1/16"	1/2"

Jumper	Dim "A"
151819	3"
199908	3.125"
199909	6.50"

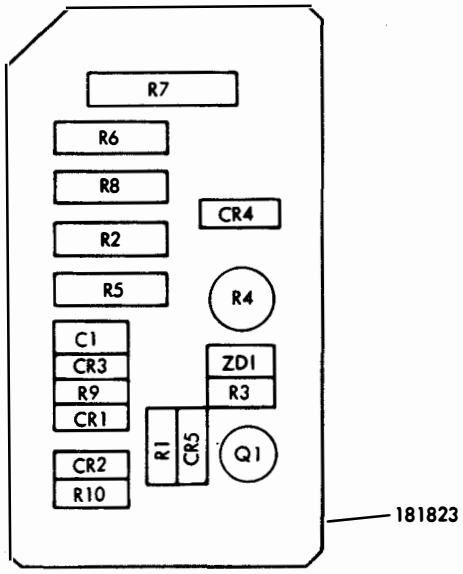
Figure 7-70. Cable Components (Receiving-Only Reperforator or Tape Printer Base)



①The 179256 chute is also used for the L/H RT set.

②The 90560 shim mounts between the chute and the punch block when the punch block face is offset. When the punch block face is flat the 90560 shim mounts between the chute and 104807 flat washer.

Figure 7-71. Modification Kits to Provide Chad Disposal



REFERENCE DESIGNATION	TELETYPE PART NO	DESCRIPTION
R1	182779	Resistor 420 Ohm
R10	182797	Resistor 135 Ohm
R2	181669	Resistor 330 Ohm
R3	182778	Resistor .82 Ohm
R4	182773	Potentiometer
R5	181717	Resistor 8 Ohm
R6	182770	Resistor 270 Ohm
R7	182772	Resistor 14 Ohm
R8	182627	Resistor 390 Ohm
R9	182776	Resistor 150 Ohm
CR1, CR2	182520	Rectifier
CR3, CR4	181619	Diode
CR5	178844	Varistor
ZD1	182774	Diode
C1	182628	Capacitor, 10 MFD
Q1	181671	Transistor

Note:
See Fig. 7-38 for Location.

Figure 7-72. Circuit Card 181821

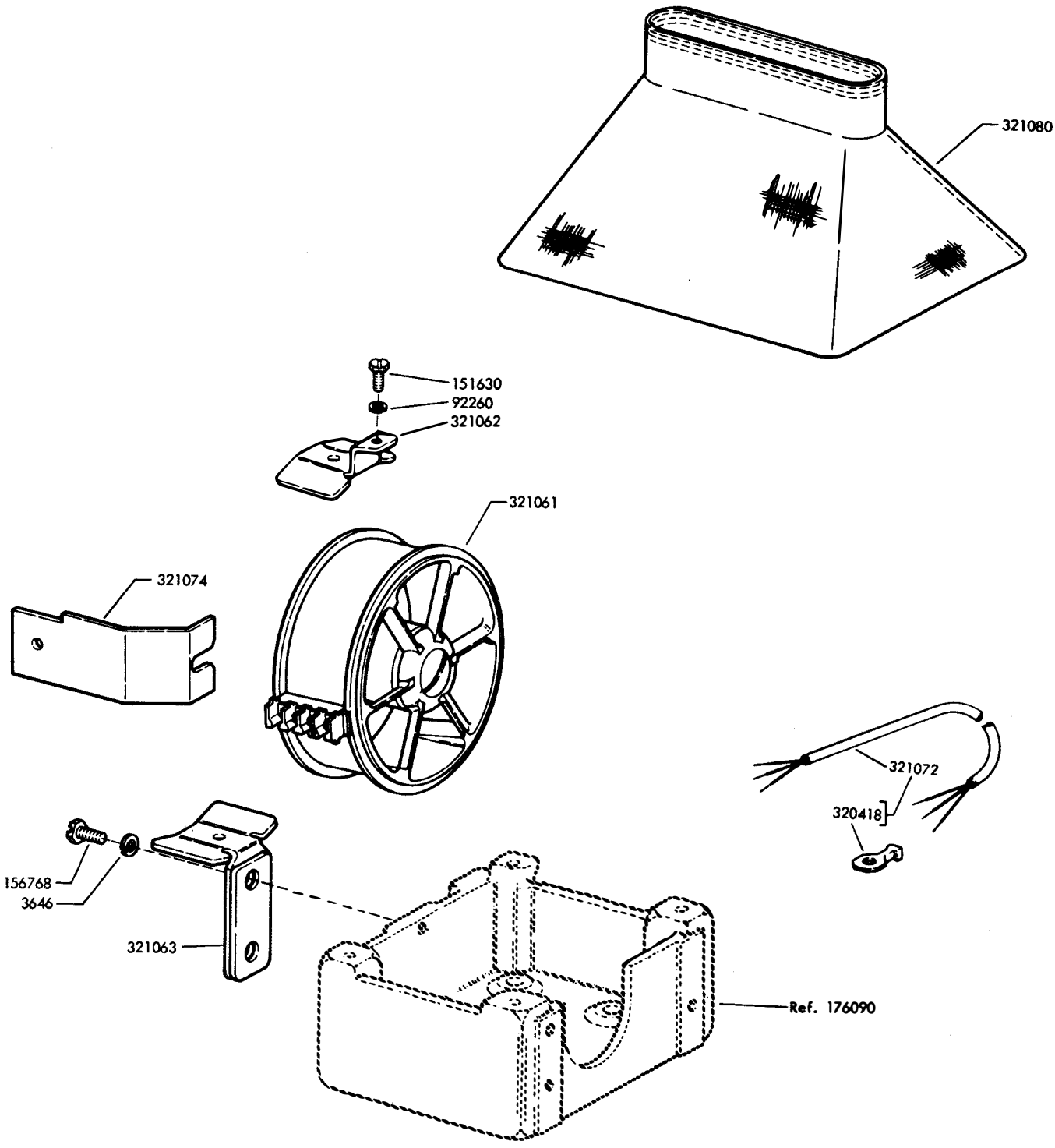
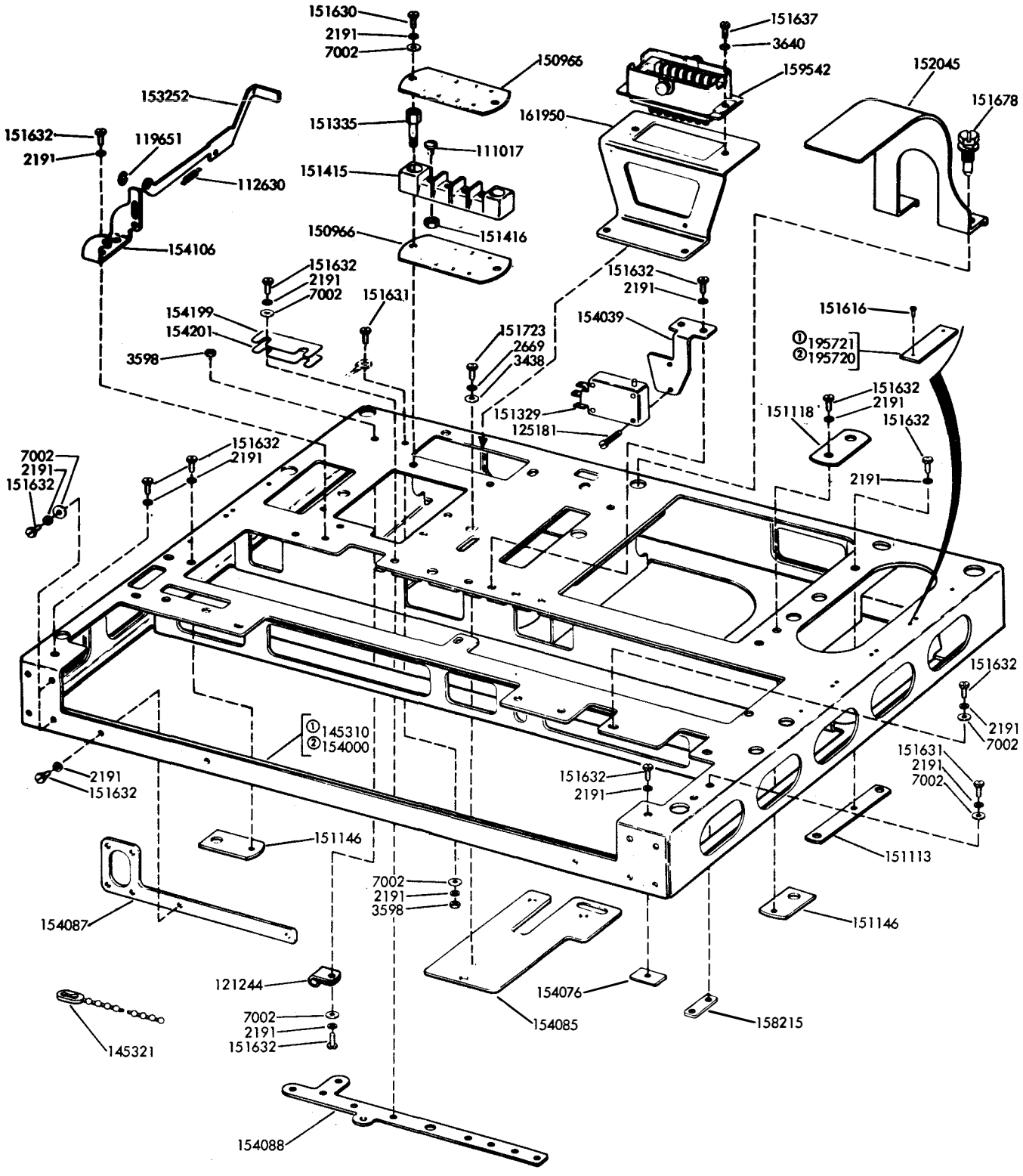


Figure 7-73. Fan and Mounting Brackets for Miniaturized Base



①Peculiar to Tape Printer Keyboard Base
②Peculiar to Typing Reperforator Keyboard Base

Figure 7-74. Keyboard Base

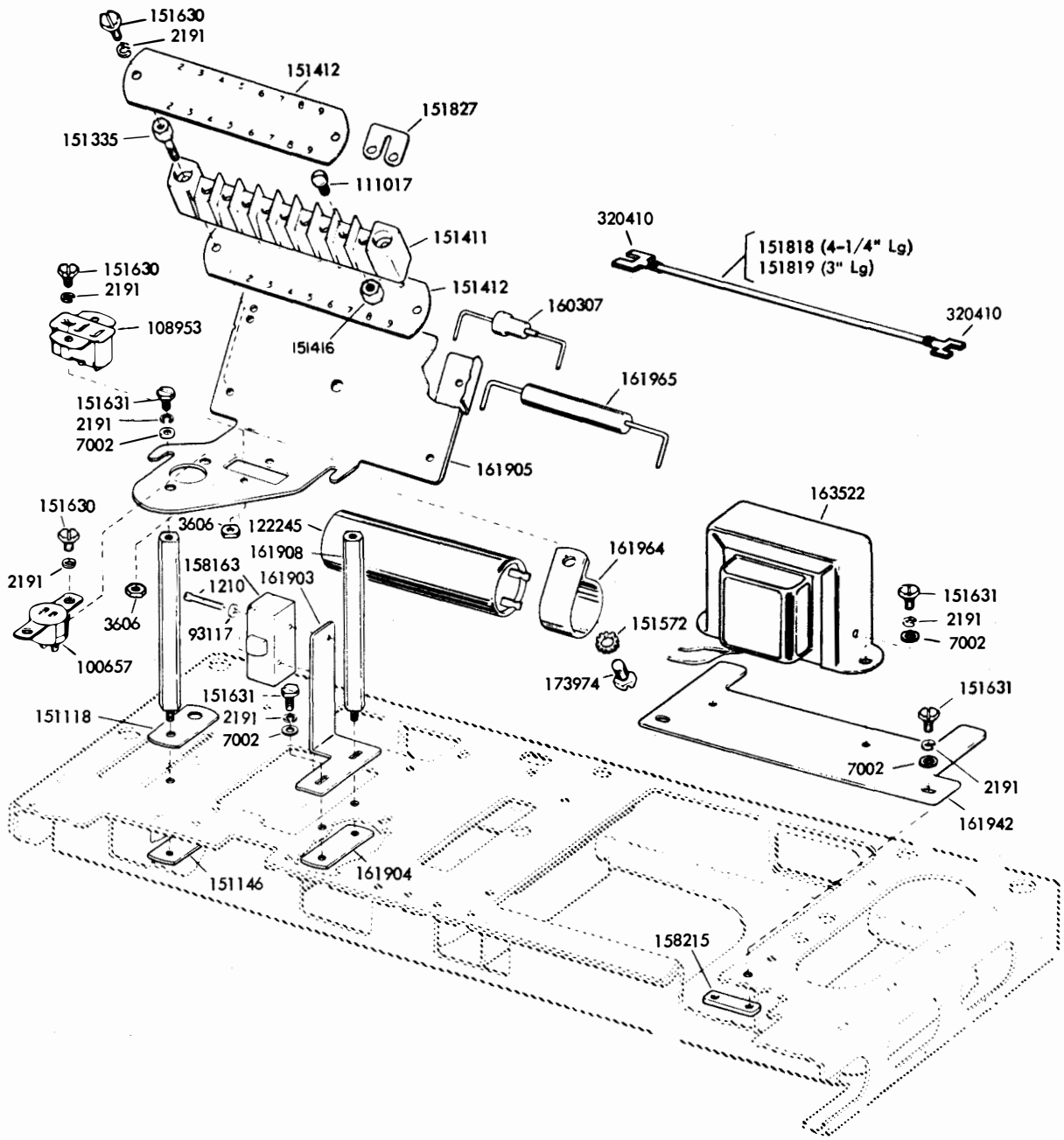


Figure 7-75. Electrical Components

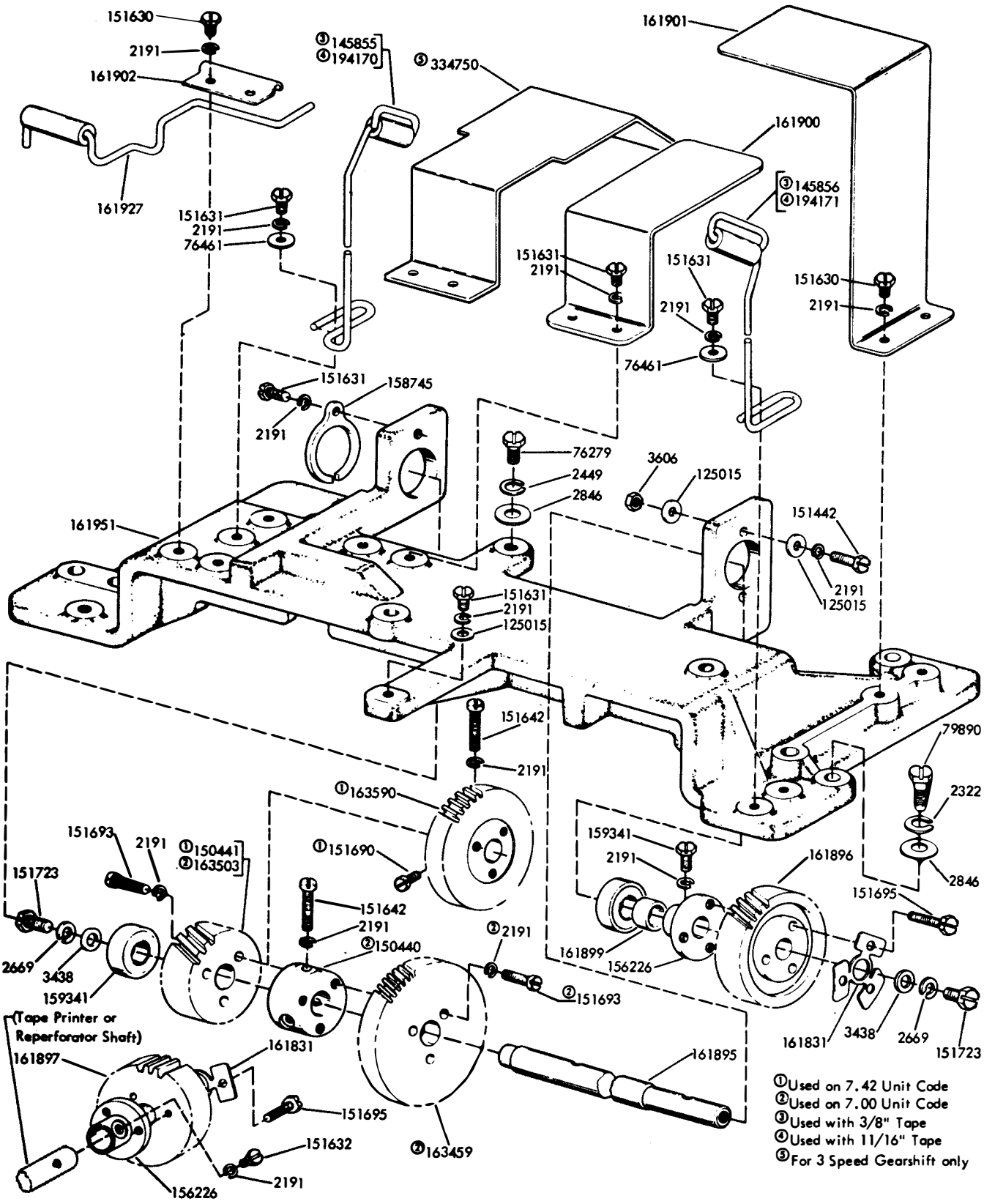


Figure 7-76. Casting

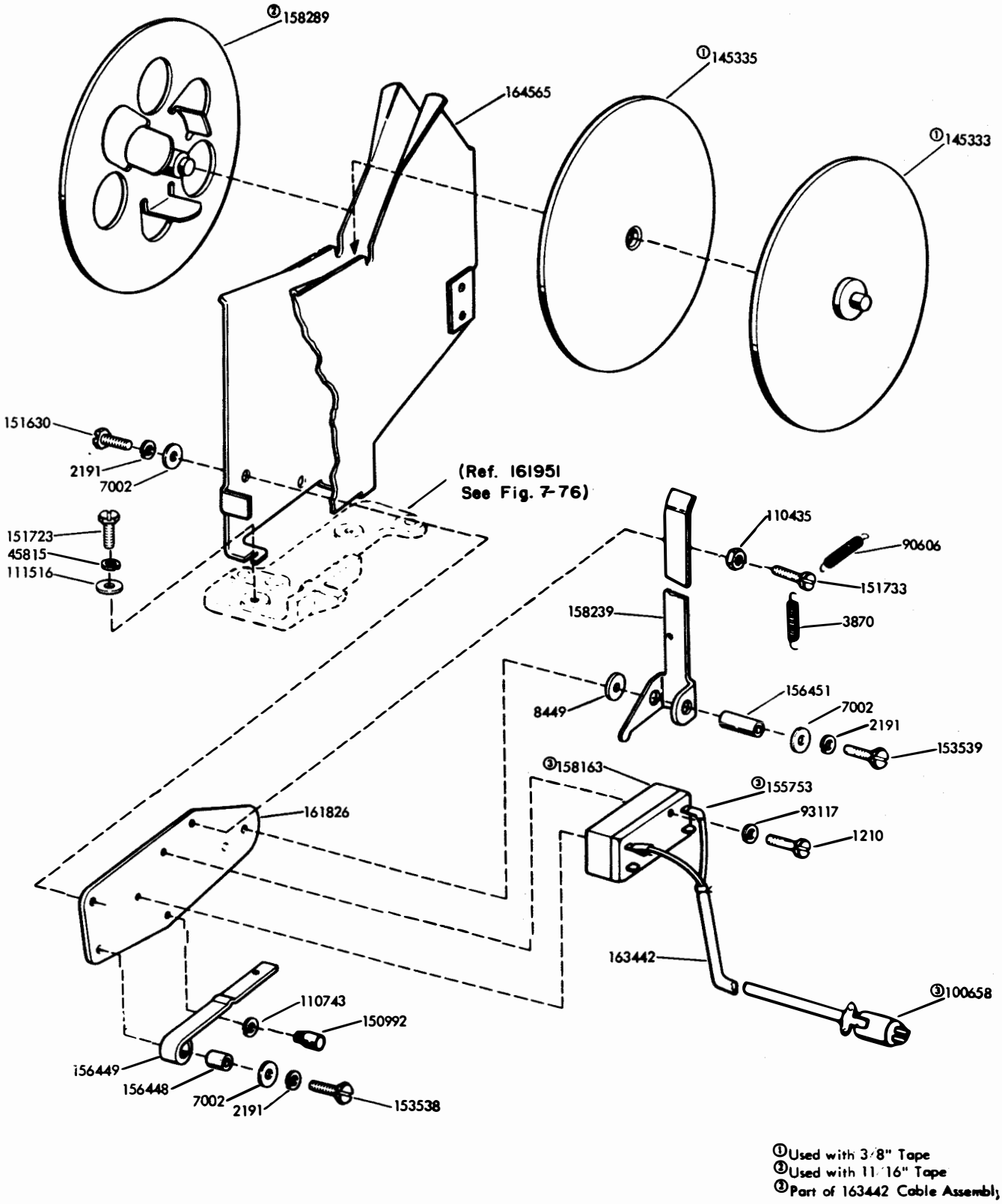


Figure 7-77. Tape Container

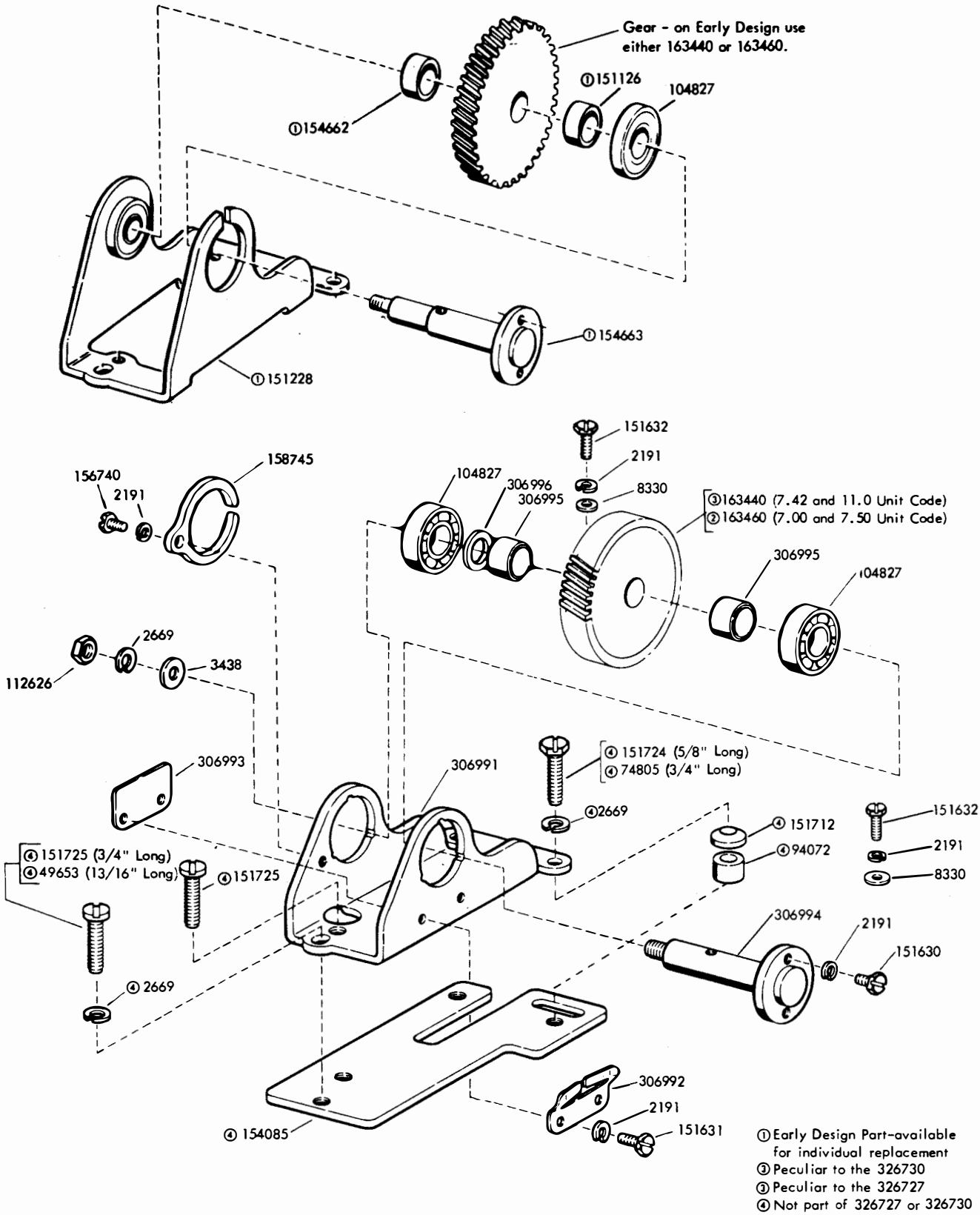


Figure 7-78. Intermediate Gear Assemblies 326727 and 326730

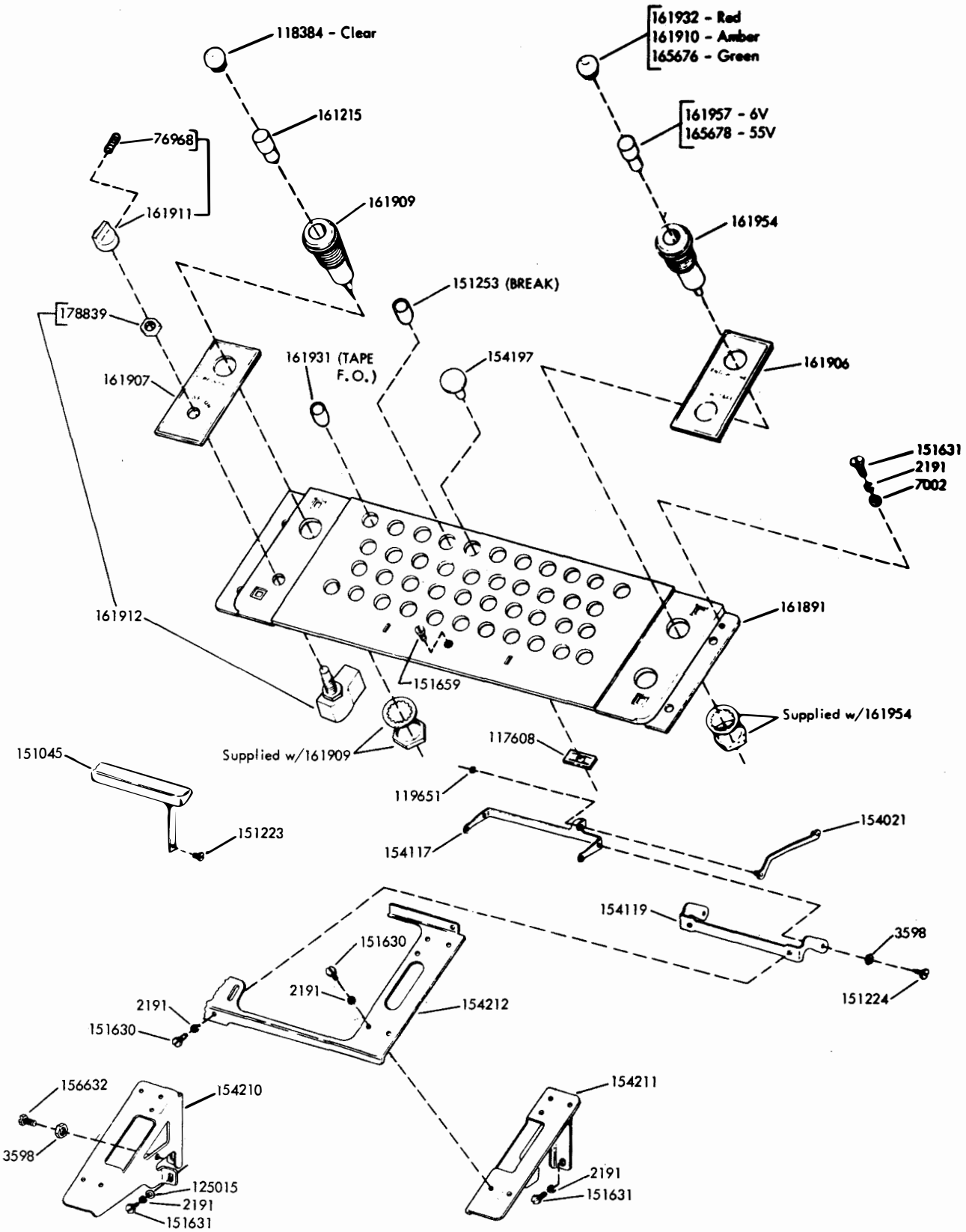
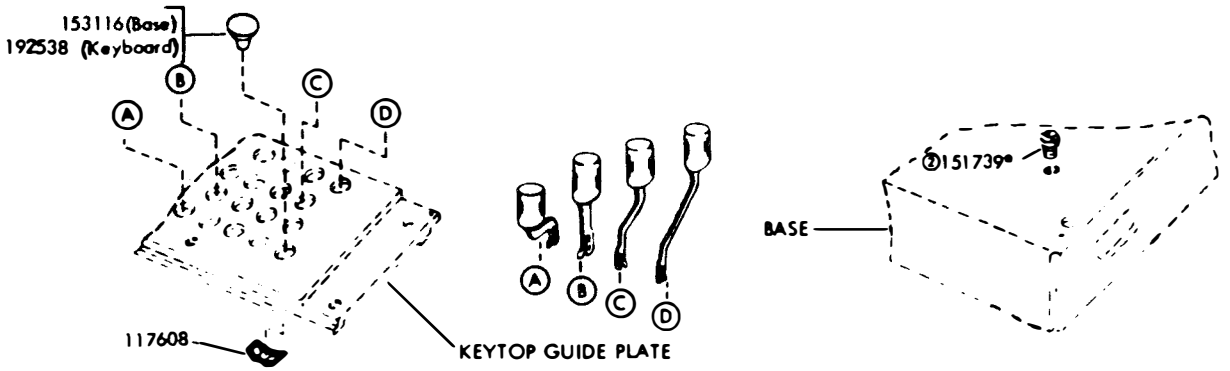


Figure 7-79. Keyboard



KEYTOP DESCRIPTION	PART NUMBER	KEYTOP DESCRIPTION	PART NUMBER	KEYTOP DESCRIPTION	PART NUMBER	KEYTOP DESCRIPTION	PART NUMBER	KEYTOP DESCRIPTION	PART NUMBER
E 3	151294	Q 1	151292	W 2	151293	LTRS	151320	①KBD LOCK	151289
I 8	151299	R 4	151295	X /	151314	LINE FEED	151321	①BREAK	151290
M .	151319	S BELL	151303	Y 6	151297	①LOC LF	151286	①REPT	151291
O 9	151300	T 5	151296	CAR RET	151311	①LOC CR	151287	①SEND	164434
P 0	151901	U 7	151298	FIGS	151312	①KBD UNLK	151288	①RECEIVE	164435

① Red Keytaps, all other Keytops are Gray-Green, all characters are White.

KEYLEVER ASSEMBLIES						KEYLEVER ASSEM. MOD. KITS			
KEYTOP DESCRIPTION	PART NUMBER	KEYTOP ARRANGEMENTS ARA	ARB	ARC	ARD	151934 ARAtoARC	152904 ARCtoARD	152905 ARCtoARB	152906 ARCtoARA
A -	151302	X	X	X					
A ↑	152001				X		X		
B ?	151317	X							X
B 5/8	151909		X	X		X			
B ⊕	152002				X		X		
C 1/8	151907		X	X		X			
C O	152003				X		X		
C :	151315	X							X
D $	151304	X	X	X					
D ↗	152004				X		X		
F 1	151305	X							X
F 1/4	151902		X	X		X			
F ←	152005				X		X		
G &	151306	X	X	X					
G ↘	152006				X		X		
H ↗	152009	X	X					X	X
H STOP	151903			X		X			
H ↓	152008				X		X		
J "	151308	X	X					X	X

KEYLEVER ASSEMBLIES						KEYLEVER ASSEM. MOD. KITS			
KEYTOP DESCRIPTION	PART NUMBER	KEYTOP ARRANGEMENTS ARA	ARB	ARC	ARD	151934 ARAtoARC	152904 ARCtoARD	152905 ARCtoARB	152906 ARCtoARA
J ↗	152010				X		X		
J ,	151904			X		X			
K (	151309	X							X
K 1/2	151905		X	X		X			
K ←	152011				X		X		
L)	151310	X							X
L 3/4	151906		X	X		X			
L ↖	152012				X		X		
N 7/8	151910		X	X		X			
N ⓓ	152013				X		X		
N ,	151318	X							X
V 3/8	151908		X	X		X			
V ⓘ	152014				X		X		
V ;	151316	X							X
Z "	151313	X	X	X					
Z +	152015				X		X		
No Symbol	151322								
–	152016				X		X		

② When ordering the 151739 Identification Screw, include the two or three letter code identifying the keytop arrangement.

Figure 7-80. Keylever Assemblies (Sheet 1 of 2)

KEYTOP DESCRIPTION		PART NUMBER
A	#	154530
A	+	157329
A		157365
A	?	158418
A	e	158438
B	RUSH	152133
B	OFF	152136
B		154525
B	%	155034
B	&	157342
B	*	157345
B	''	157354
B	EJT	157334
B	'	157944
B	DZ	157961
B	e	158414
B	#	158417
B	-	158419
B	¢	158434
B	TAB	158443
B	ON	158452
C	W-R-U	164457
C		154523
C	#	155035
C	1/4	157321
C	%	157339
C	ON	157343
C	c	157346
C	1/2	157945
C	¢	157957
C	&	157964
C	(	158410
C	+	158420
C	O	158441
C	?	154531
D		155038
D	•	157322
D	⊕	157326
D	OFF	157331
D	/	157355
D	&	157956
D	◊	157967
D	;	158421
D	BO	158448
D	TAB	158455
E	#	157940
F		154520
F	%	152020
F	#	152130
F	¢	155025
F	&	155036
F	3/4	155040
F	f	157347
F	CHI	157364
F	ñ	157963
F	TAB	158406
F	DATA	158408
F	▼▼	158409
F	*	158413
F	F	158433

KEYTOP DESCRIPTION		PART NUMBER
F	1/3	158435
G		157323
G	ON	154527
G	▼	154532
G	TAB	155037
G	◊	157348
G	TFO	157356
G	FO	157359
G	£	157955
G	:	158422
G	OFF	158444
G	•	158454
H		151307
H	£	152007
H	+	157358
H	OFF	154528
H	±	155026
H	?	157360
H	→	157968
H	FO	158431
H	&	158440
J		152134
J	J	157349
J	YIP	157362
J	◊	152017
J	¢	152018
J	BELL	152132
J	x	154533
J	ON	155031
J	1/2	157320
J	*	157340
J	%	157341
J	YD	157958
J	Yd	157962
J	#	157965
J	=	158423
J	TAB	158447
K		154521
K	&	157338
K	x	157350
K	NYC	157363
K	STOP	157941
K	▼	158424
K	+	158453
L		154522
L	&	157947
L	L	157966
L	.	158425
L	?	158436
L	ATL	158449
L	OFF	158451
M	STOP	152019
M	■	157335
M	%	157952
M		157366
M	#	157954
M	∞	157969
M	(	158426
M	M	158432
N		154526

KEYTOP DESCRIPTION		PART NUMBER
N	▼	152138
N	OFF	155029
N	n	157353
N	*	157357
N	START	157942
N	%	157946
N	&	157949
N	¢	157951
N	+	157959
N	•	157970
N	-	158412
N	)	158427
P	◊	151301
R	TAB	158450
S	▼	152131
S		157367
S	🔔	154535
S	ON	155030
S	/	157328
S	s	157351
S	#	158439
S	STOP	158445
U	7	157327
V		154524
V	%	152139
V	=	157325
V	*	155033
V	#	155039
V	¢	157336
V	&	157361
V	x	157943
V	''	157950
V	EA	157953
V	•	157960
V	■	157971
V	)	158411
V	-	158415
V	,	158428
V	±	158442
X	#	154523
X		157332
X	FO	158430
Z		152135
Z	TAB	155027
Z	ON	155028
Z	OFF	155032
Z	%	157337
Z	z	157352
Z	VERT	157344
Z	FO	157948
Z	!	158429
Z	*	158437
LOC	RLF	153283
LOC	B SP	153284
.	.	152137
—	\	154534
BELL	-	157330
ON	.	157333
.		158407
,	.	158416
HERE IS		163852

Figure 7-81. Keylever Assemblies (Sheet 2 of 2)

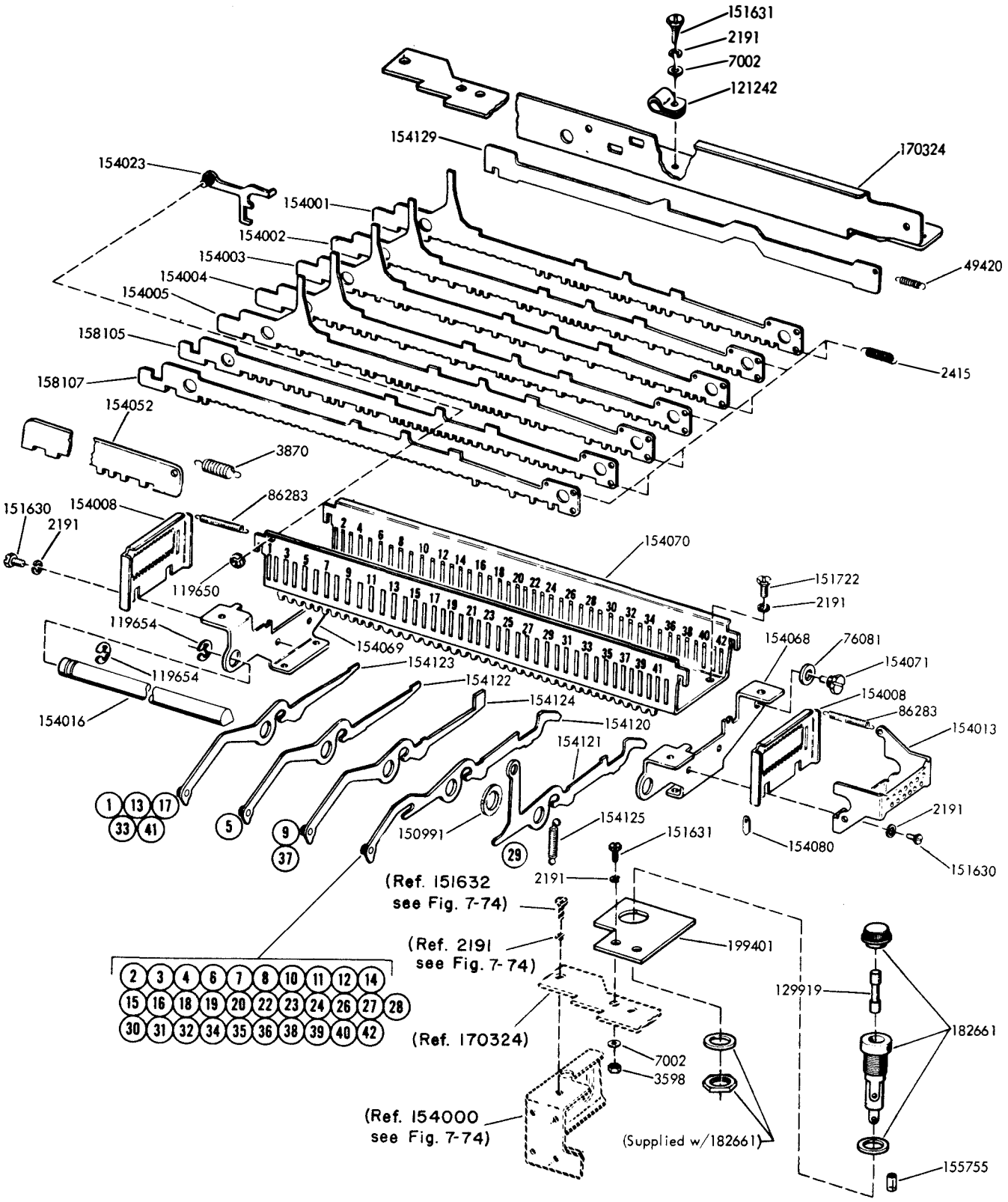


Figure 7-82. Code Bar Mechanism

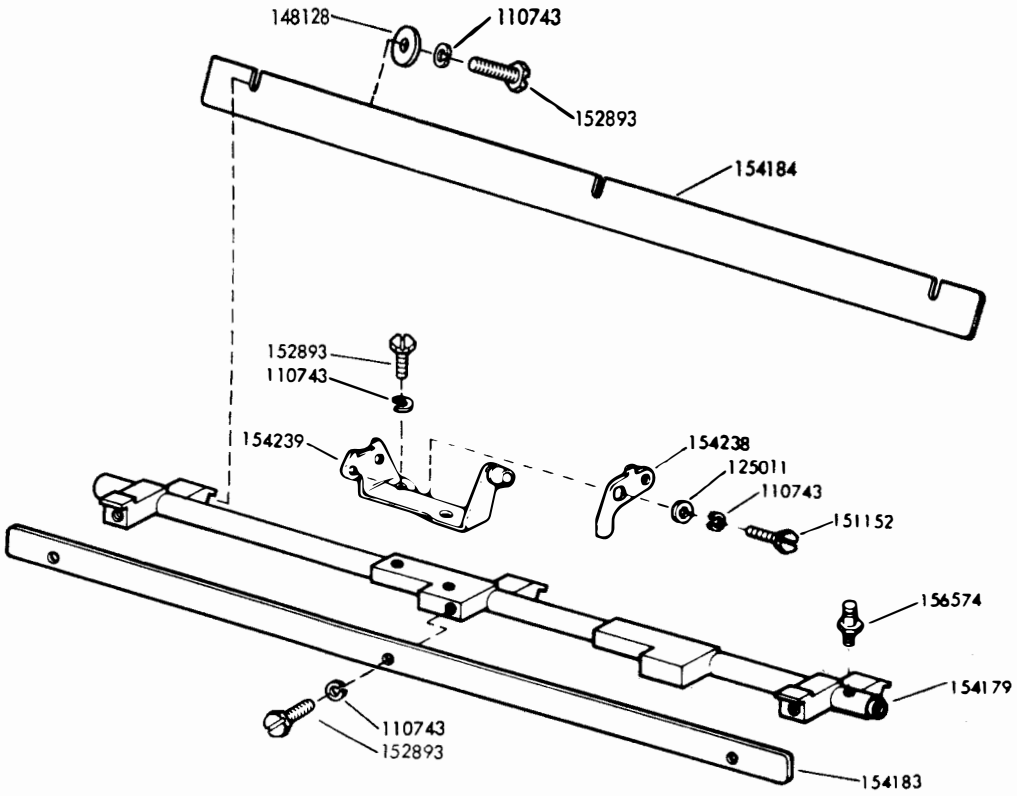


Figure 7-83. Universal Bail Mechanism

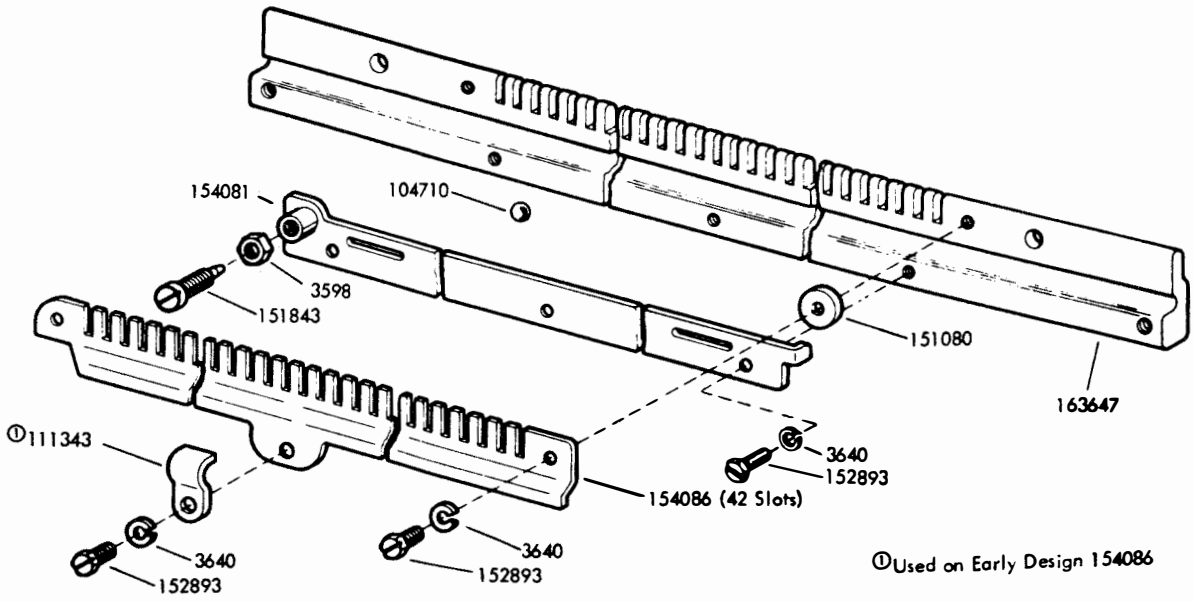
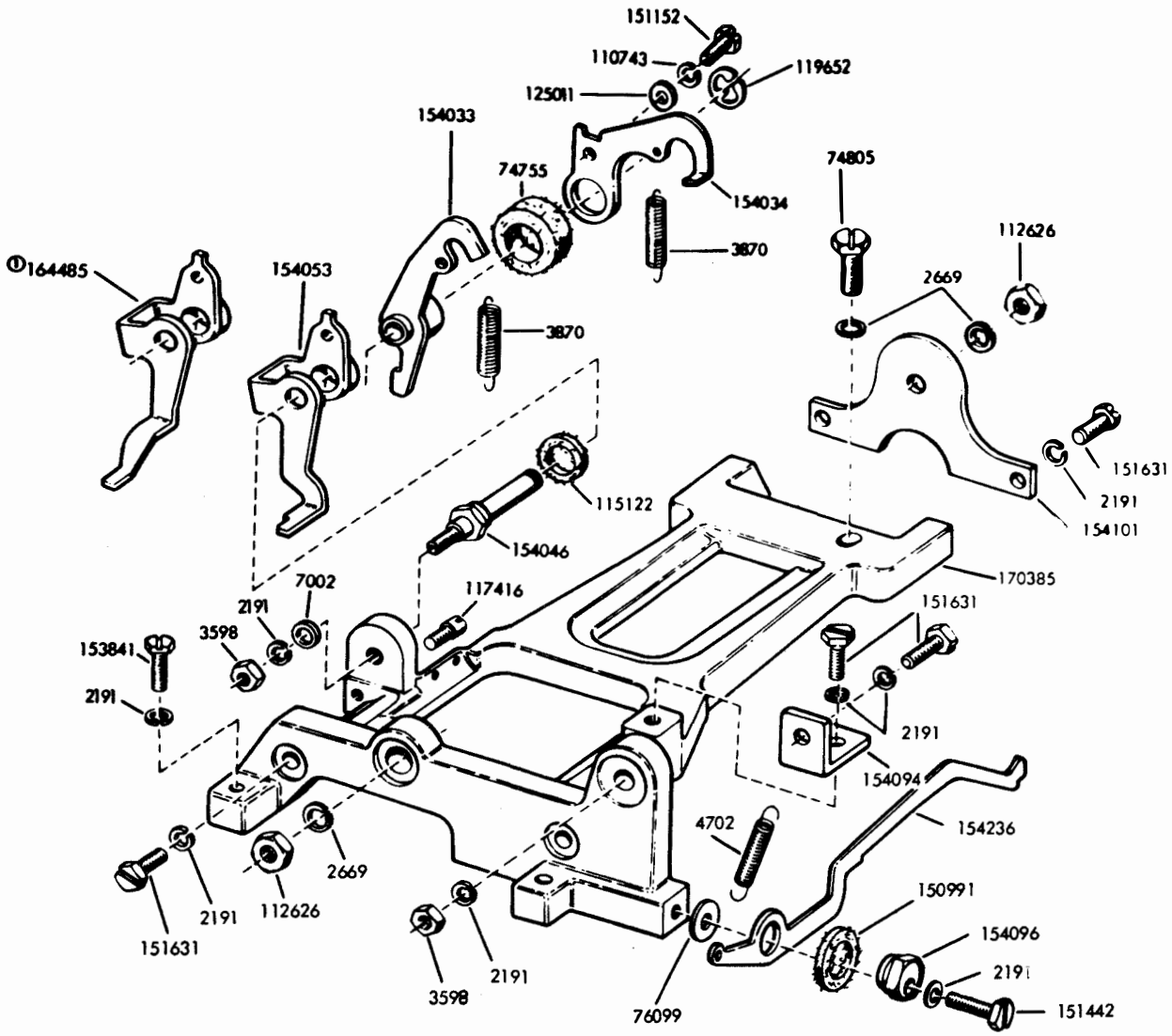


Figure 7-84. Ball Lock Mechanism



① Peculiar to Units Equipped with Synchronous Pulsed Transmission

Figure 7-85. Signal Generator Frame Mechanism

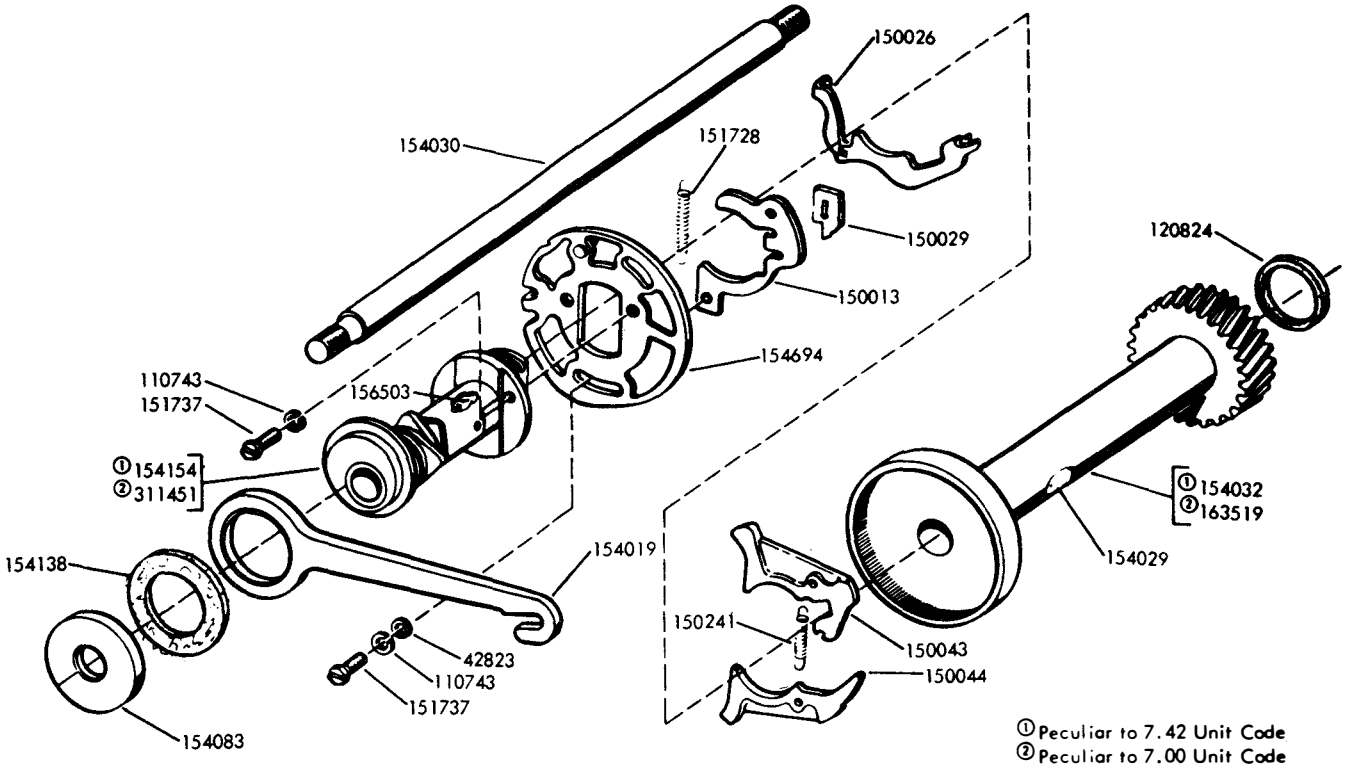
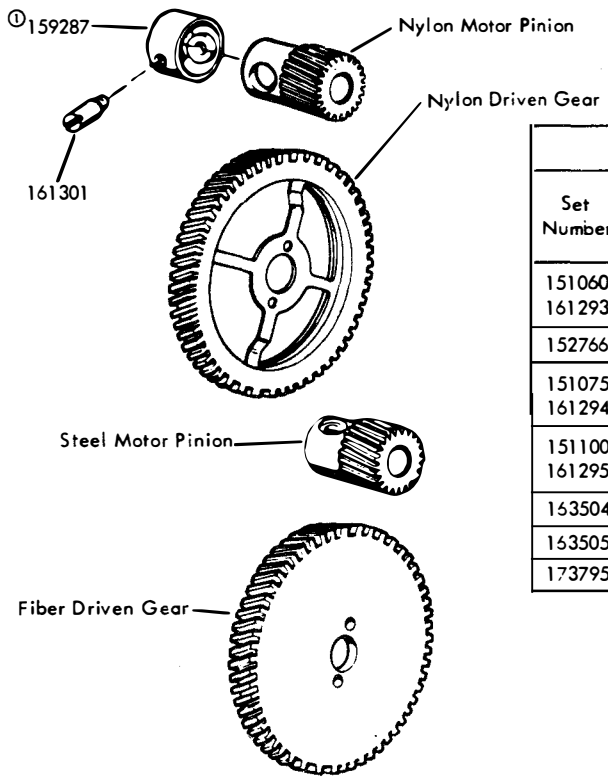


Figure 7-86. Signal Generator Shaft Mechanism



GEARSETS FOR SEND-RECEIVE KEYBOARD BASE								
Set Number	Pinion	Teeth	Driven Gear	Teeth	SPEED			
					7.00 Unit Code		7.42 Unit Code	
					WPM	Baud	WPM	Baud
151060 161293	151130 (S) 159278 (N)	14	151131 (F) 159279 (N)	96	——	——	60	45.5
152766	152765 (S)	13	152764 (F)	81	——	——	67	50
151075 161294	151132 (S) 159281 (N)	17	151133 (F) 159282 (N)	93	——	——	75	50
151100 161295	151134 (S) 159284 (N)	20	151135 (F) 159285 (N)	84	——	——	100	74.2
163504	163461 (N)	18	163462 (N)	117	71	50	——	——
163505	163463 (N)	24	163464 (N)	104	107	75	——	——
173795	173794 (N)	14	173793 (N)	100	65	45.5	——	——

① Supplied with Nylon Gearsets (except 173795)

Figure 7-87. Gearsets

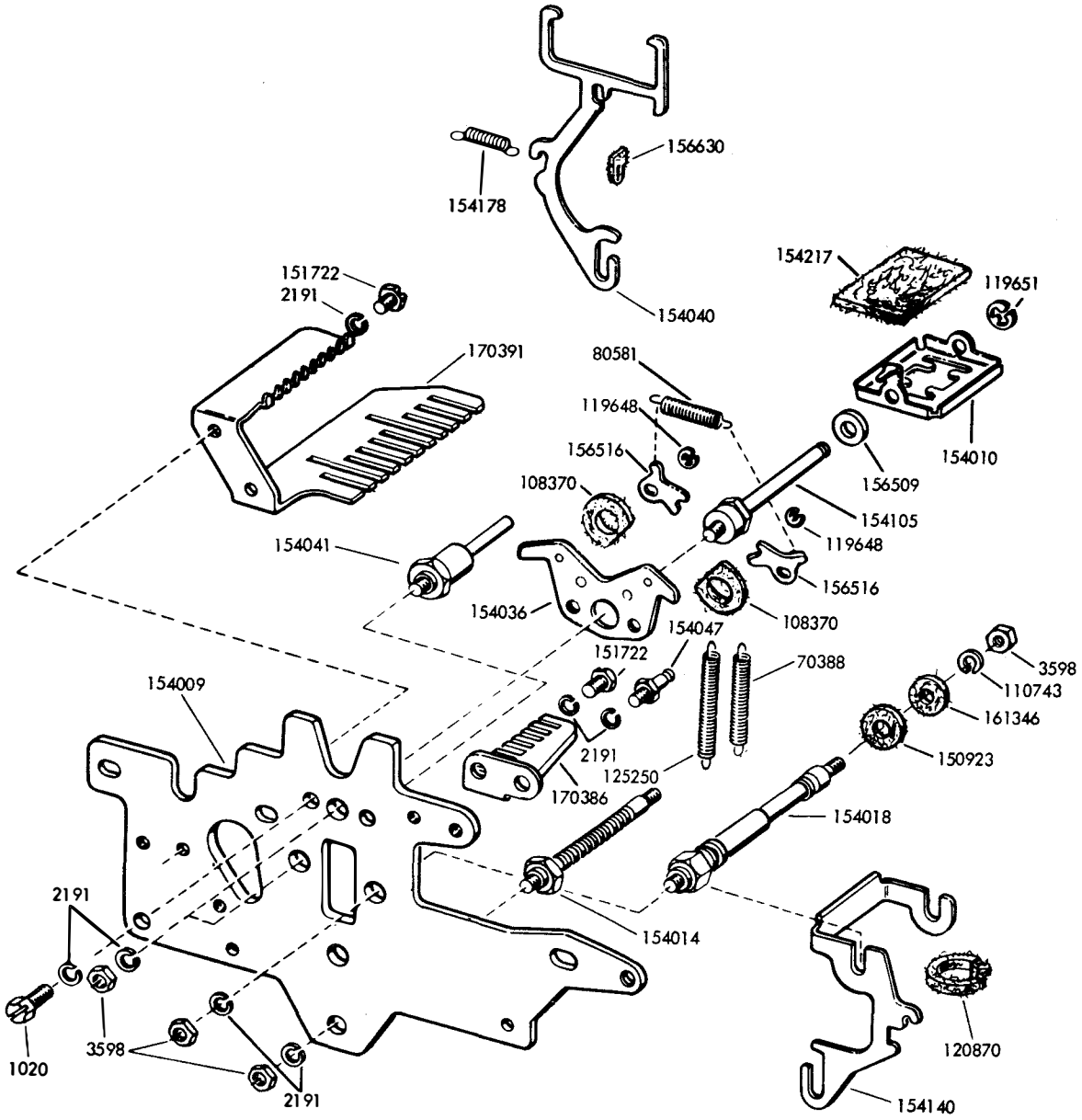
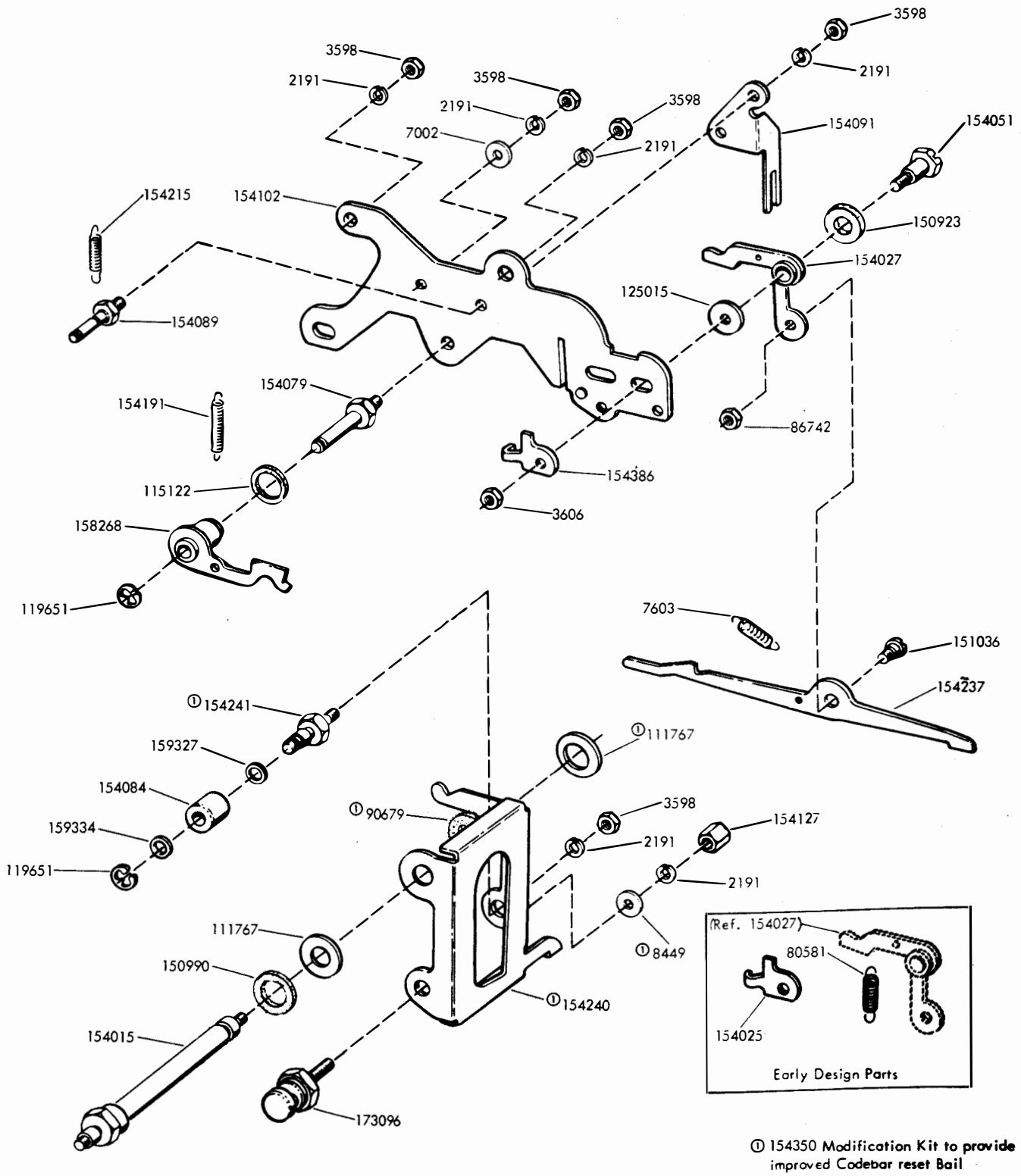
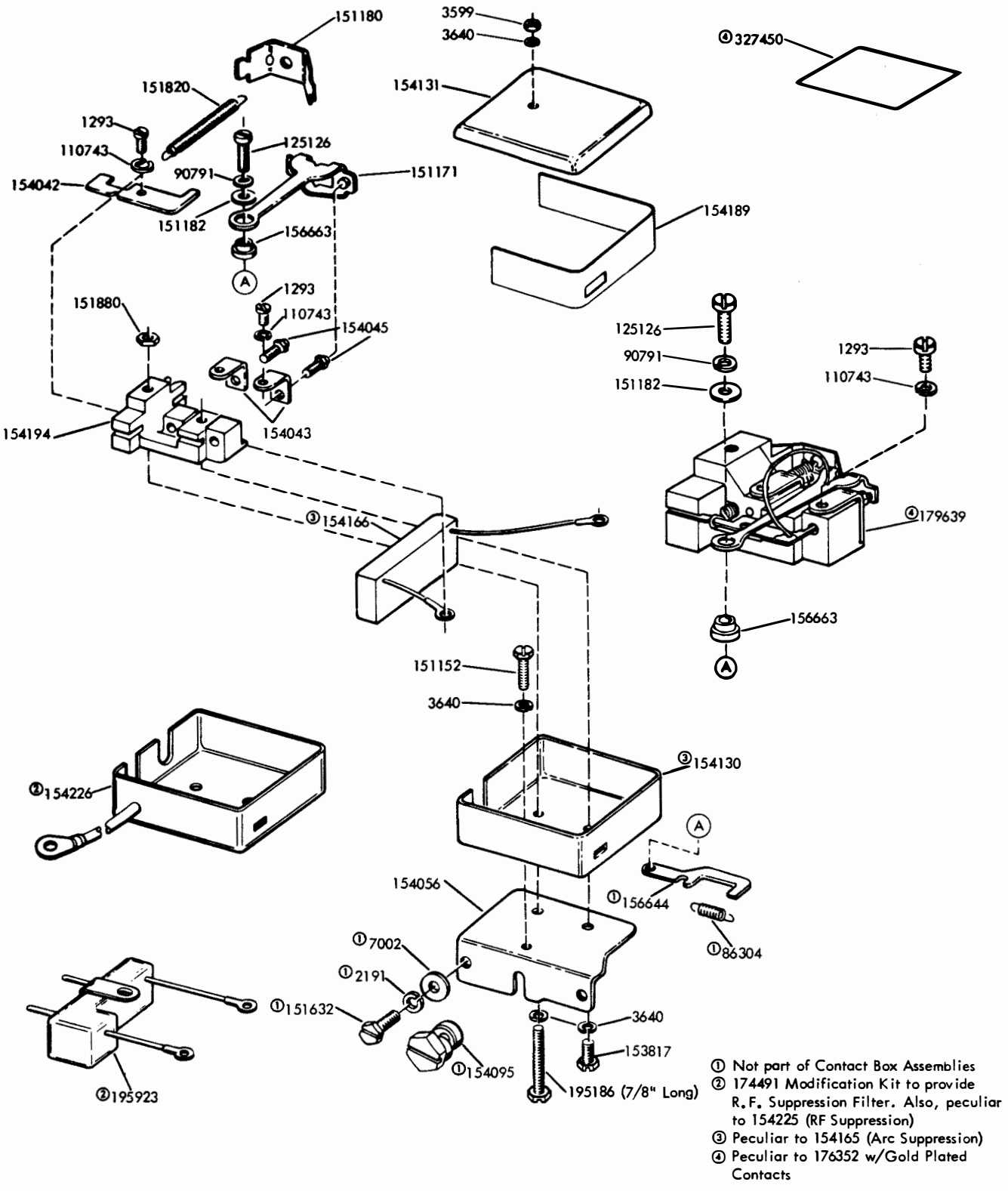


Figure 7-88. Signal Generator Front Plate Mechanism



① 154350 Modification Kit to provide improved Codebar reset Bail

Figure 7-89. Signal Generator Rear Plate Mechanism



① Not part of Contact Box Assemblies
② 174491 Modification Kit to provide R.F. Suppression Filter. Also, peculiar to 154225 (RF Suppression)
③ Peculiar to 154165 (Arc Suppression)
④ Peculiar to 176352 w/Gold Plated Contacts

Figure 7-90. Signal Generator Contact Box Assembles 154165, 154225, and 176352 - Used on High-Level Sets

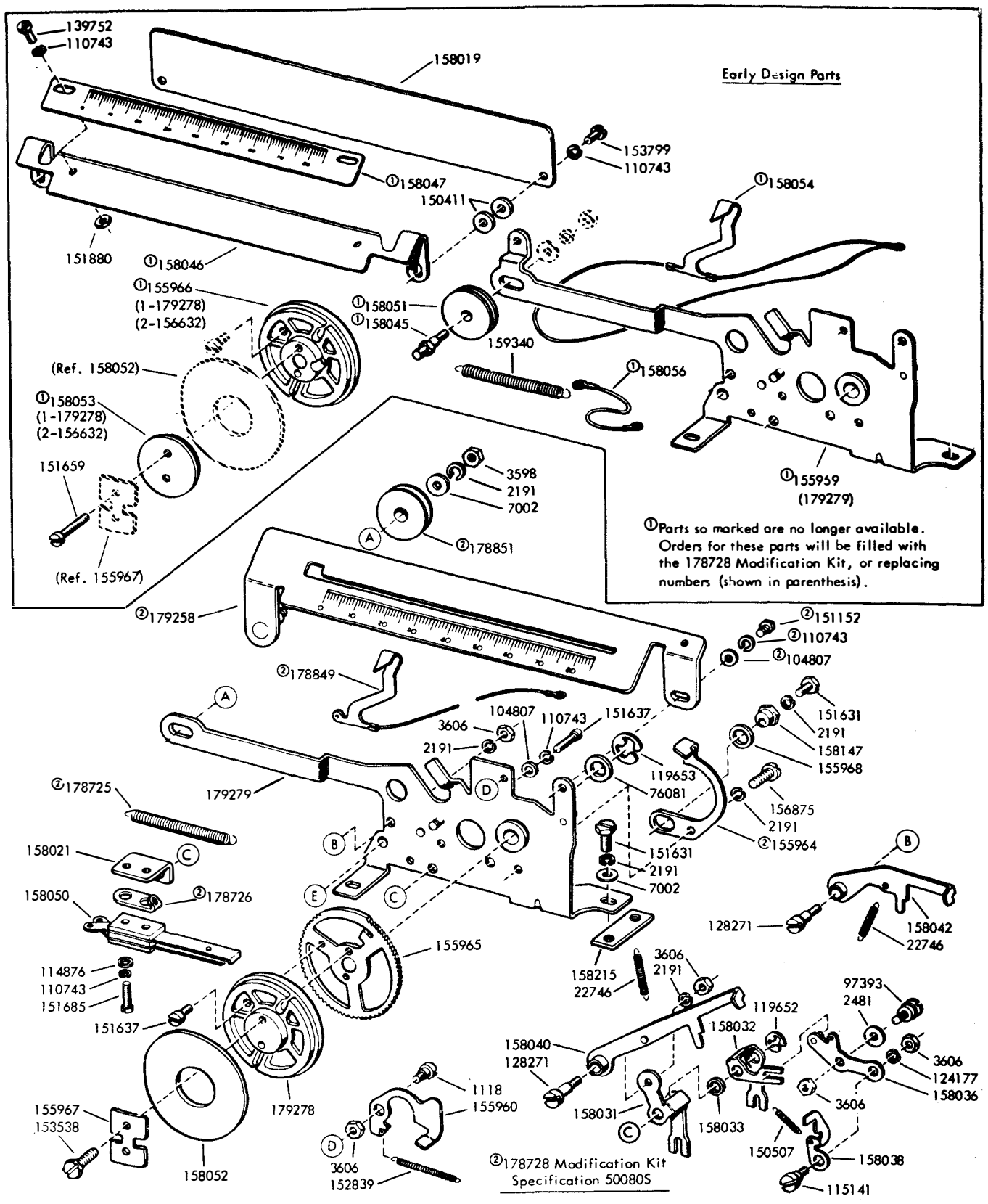


Figure 7-91. Character Counter Mechanism 155990

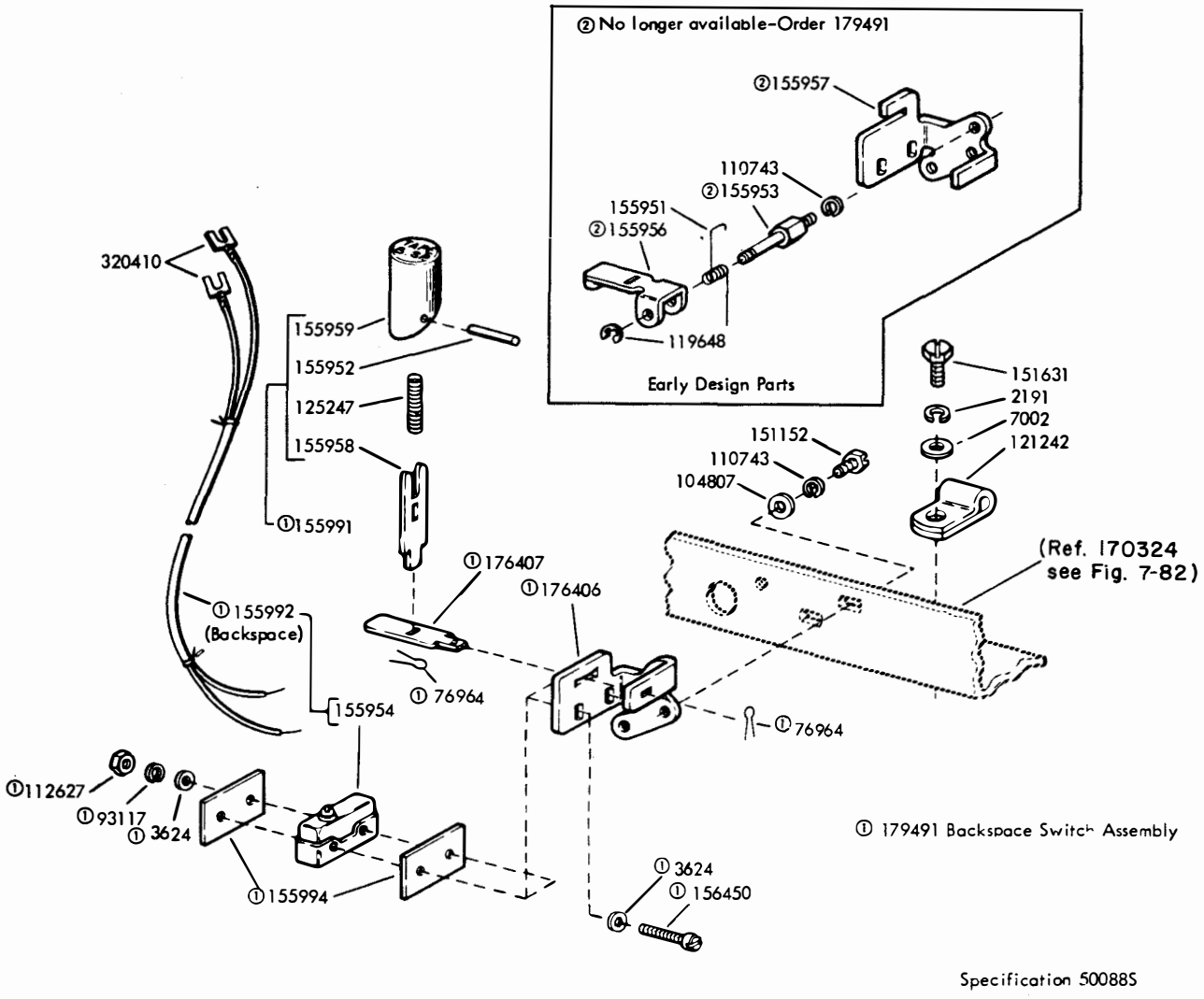


Figure 7-92. Modification Kit 176405 to Add Tape Backspace Button

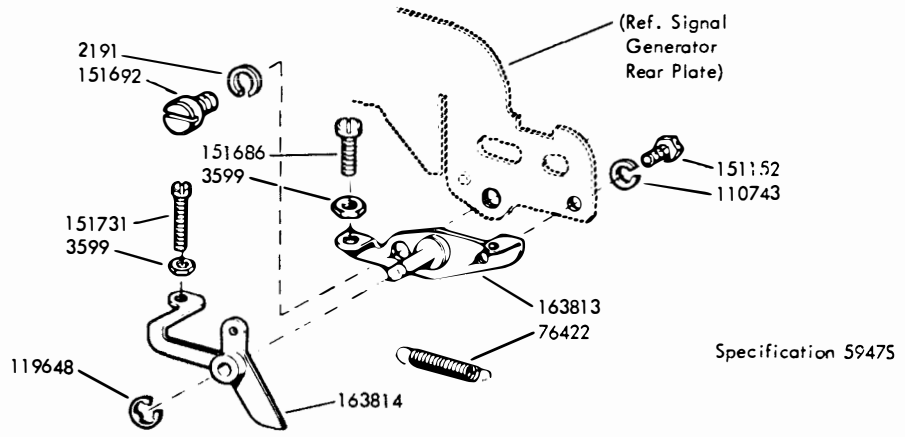


Figure 7-93. Modification Kit 163775 to Provide Repeat on Space Mechanism

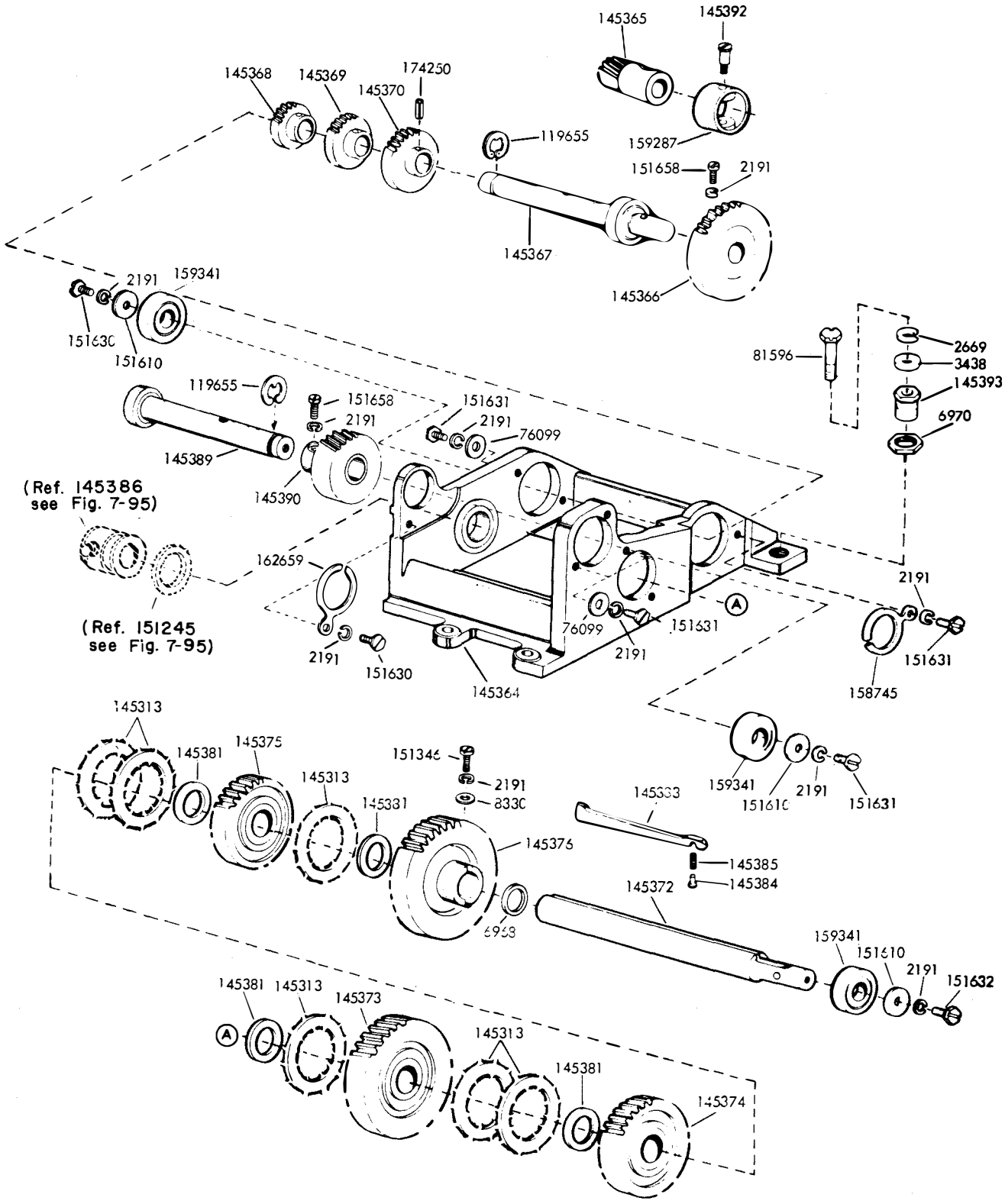


Figure 7-94. Gearshift Mechanism for Tape Printer Keyboard Base - Used on High-Level Sets (Sheet 1 of 2)

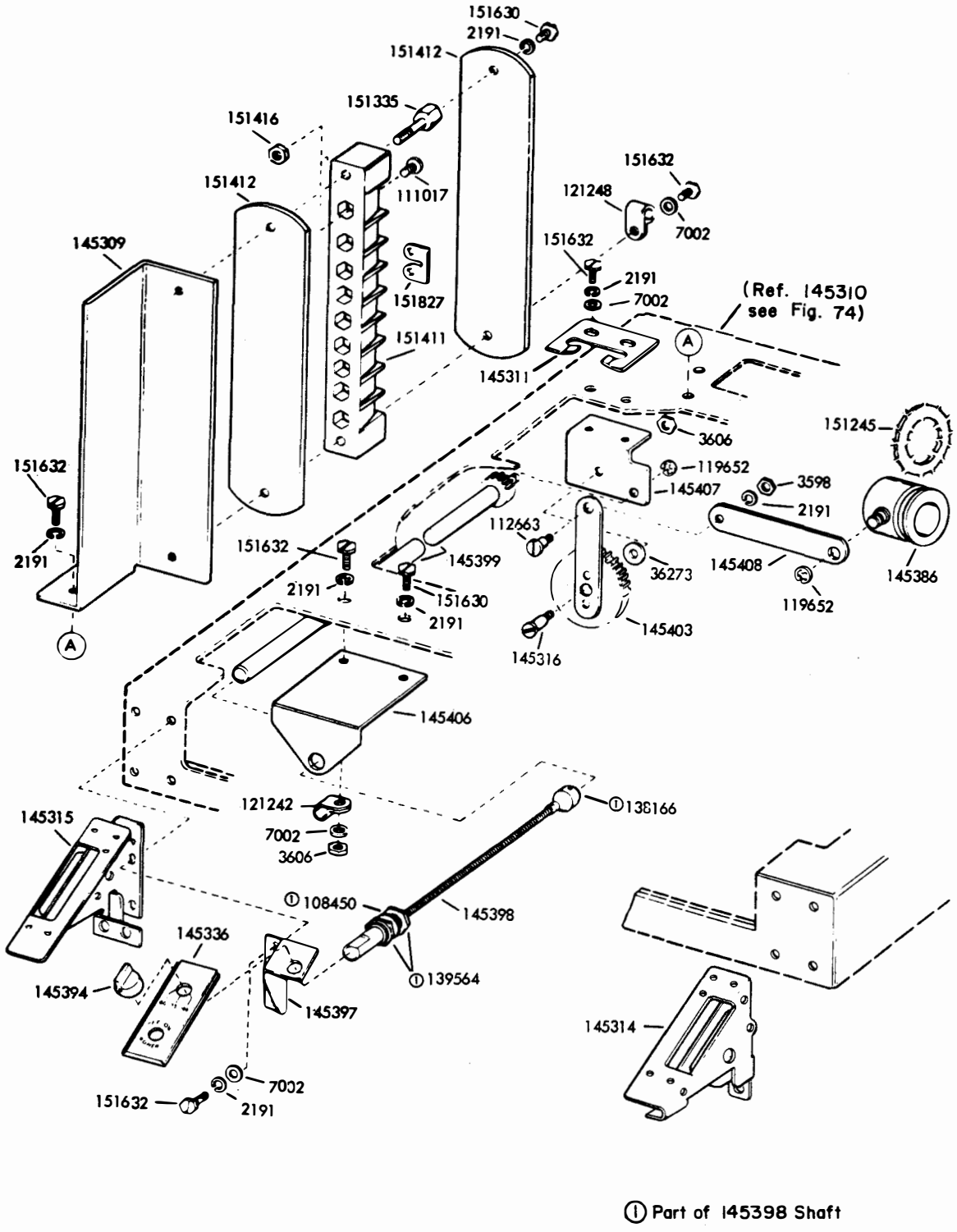


Figure 7-95. Gearshift Mechanism for Tape Printer Keyboard Base - Used on High-Level Sets (Sheet 2 of 2)

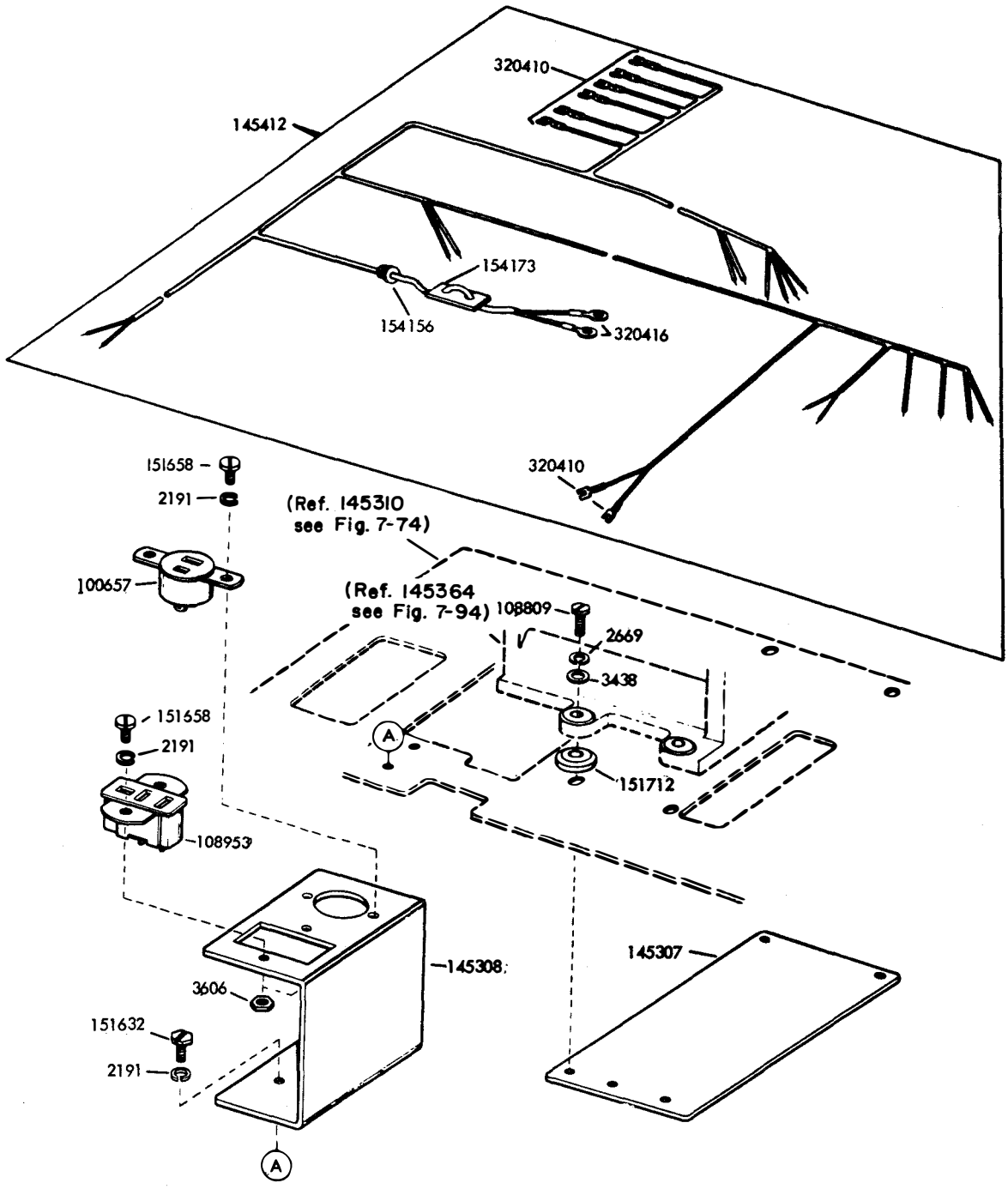


Figure 7-96. Connector and Cable

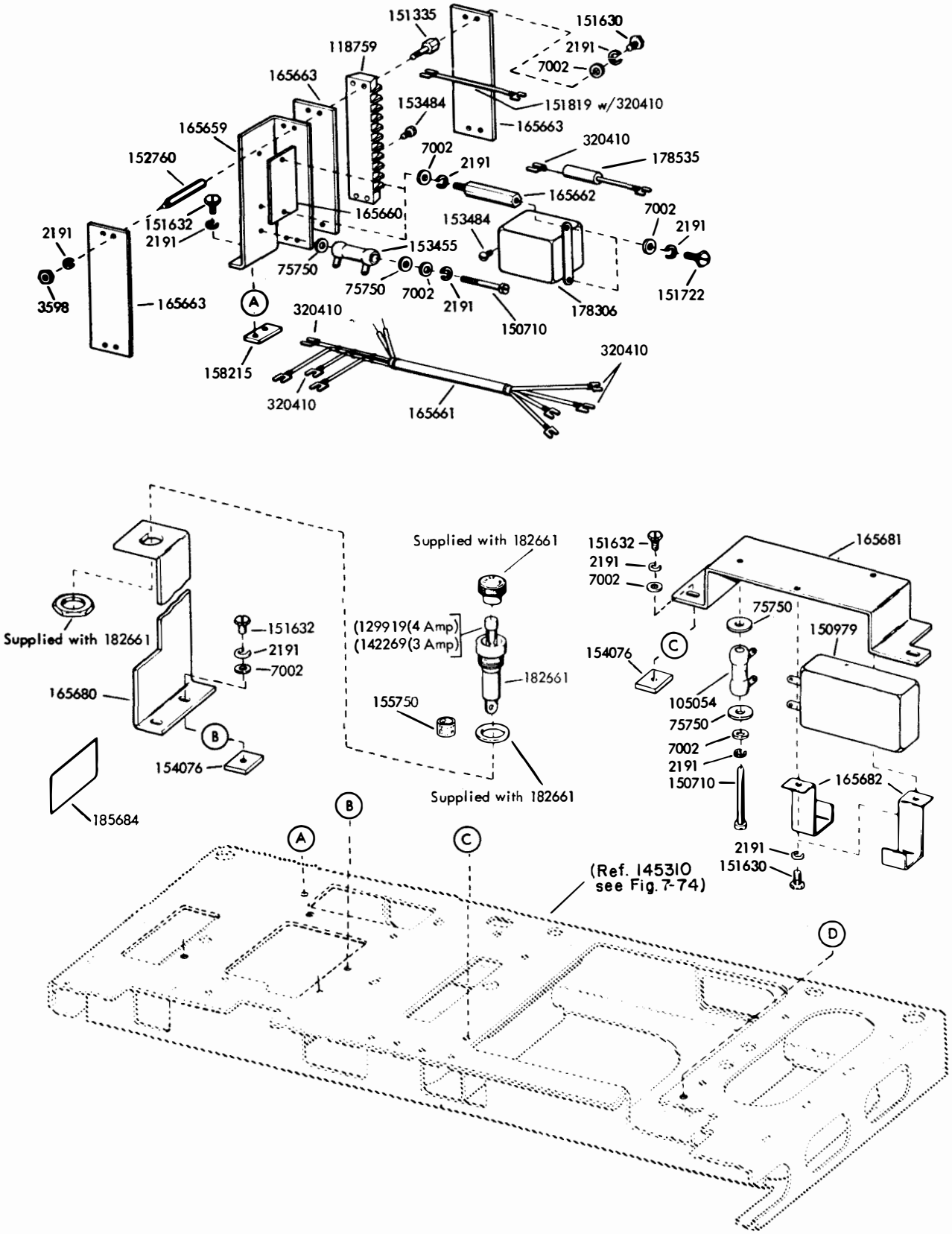


Figure 7-97. Electrical Components for Tape Printer Keyboard Base

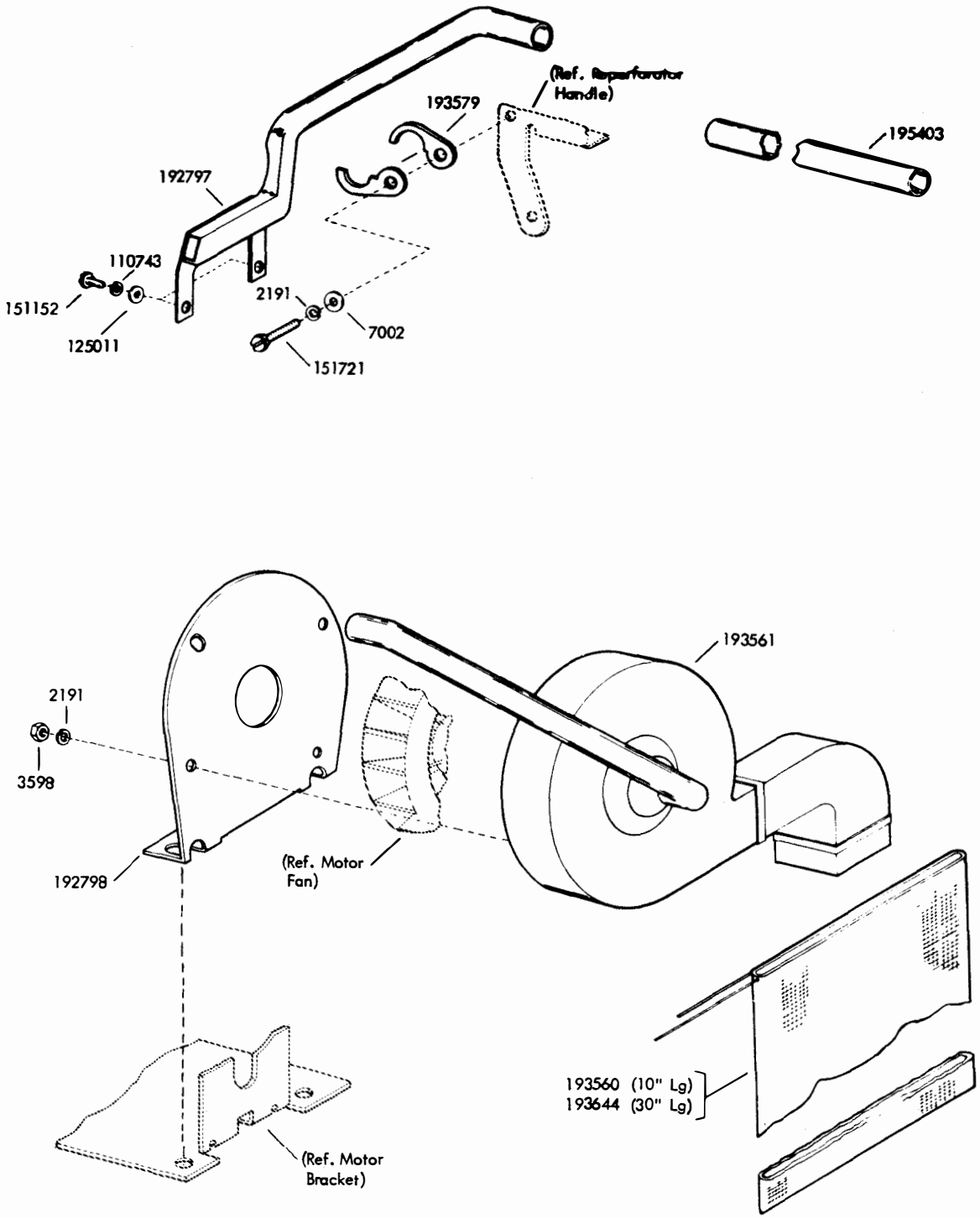


Figure 7-98. Modification Kit 192999 to Provide Vacuum Chad Removal for Send-Receive Typing Reperforator Set

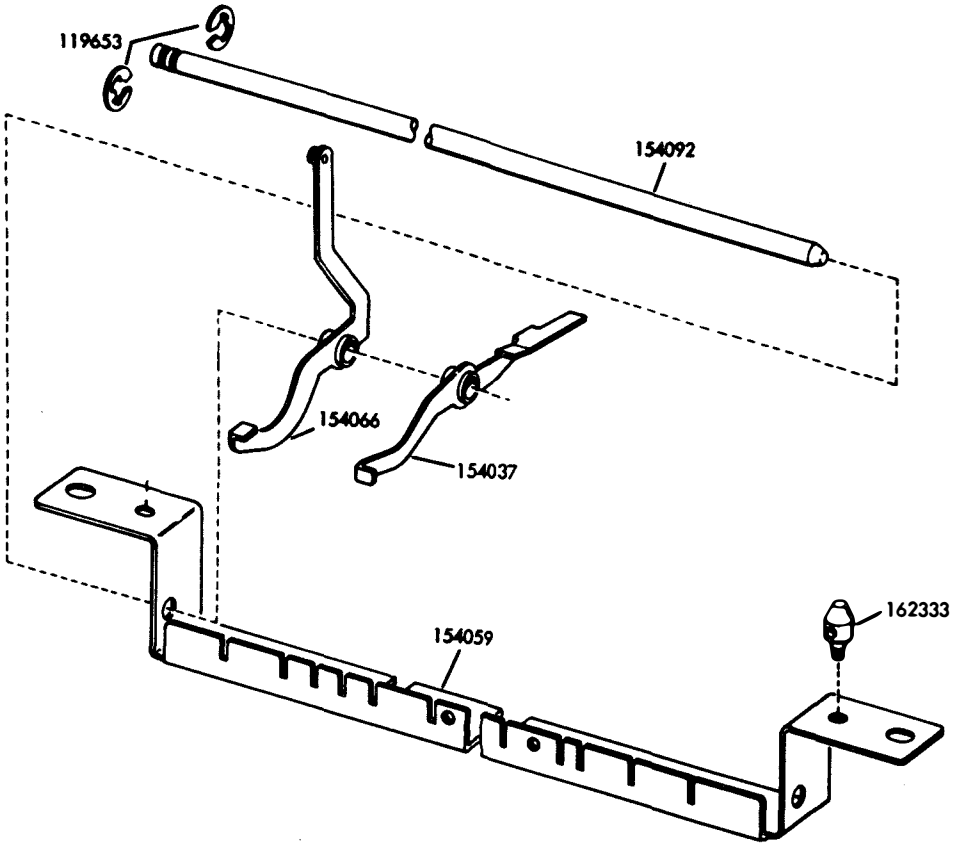
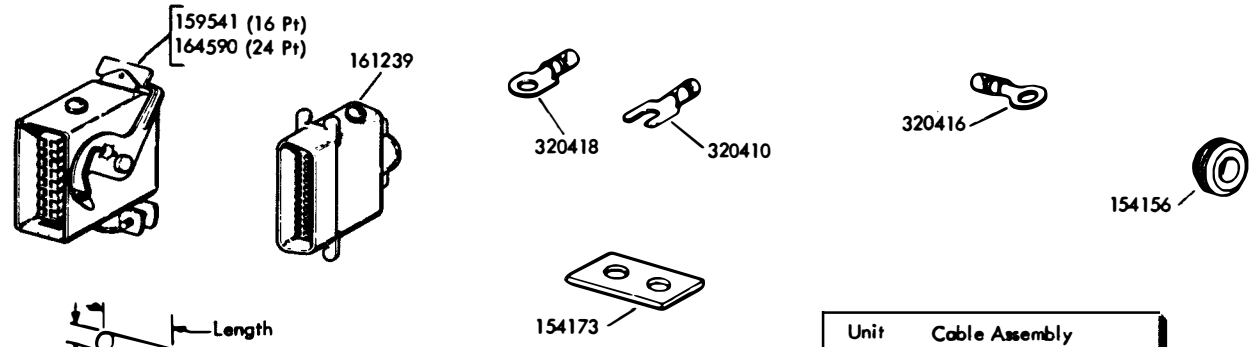


Figure 7-99. Function Bail Mechanism



INSULATING SLEEVE		
Number	I D	Length
155750	3/32"	1/2"
155751	1/8"	1"
155752	5/64"	1/2"
155753	1/8"	1/2"
155754	1/16"	1/2"
155755	11/64"	5/8"

Unit	Cable Assembly
LTPK1 -	145412, 165656
LTPK2 -	145412, 165679
LTPK3 -	165656
LTRK1 -	161878, 161892
LTRK5 -	161878, 161892
LTRK2 -	161892, 173396
LTRK3 -	172721, 173922
LTRK9 -	307720, 307722
LTRK6 - LTRK7	193720

Figure 7-100. Cables (Send-Receive Reperforator Base)

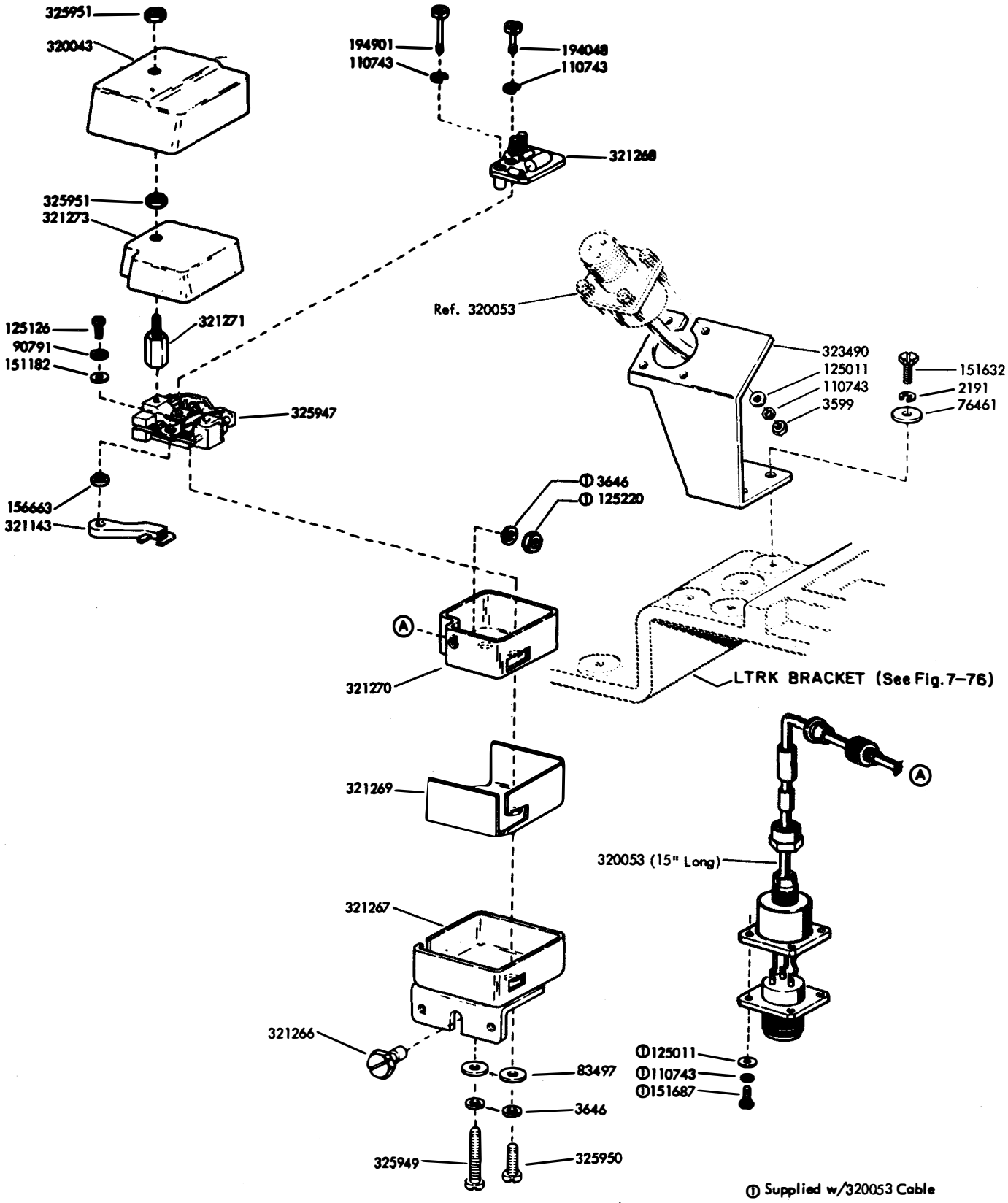


Figure 7-101. Contact Box Assembly 323645 (LTRK) - Used on Low-Level Sets

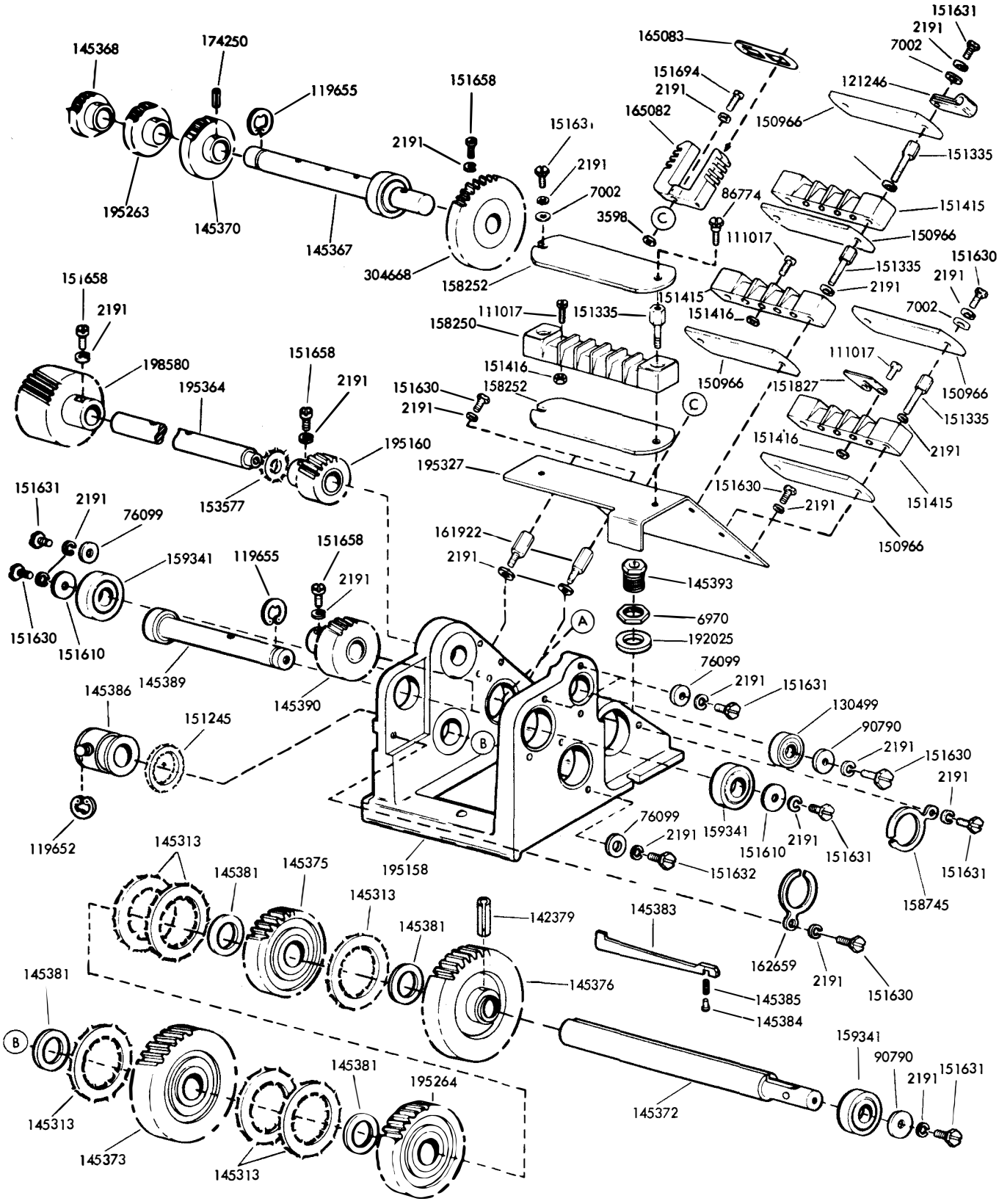


Figure 7-102. Gearshift Assembly 333145 - Used on Low-Level Sets

Teletype Code	Motor Assembly	Motor Bracket	Mounting Plate	Thermostatic Switch	Fixed Capacitor	Spring or Clamp	Relay	Relay Insulator	Spring or Clamp	Cable Assembly	Jumper
LMU3	151795	305661	305660	122249	122245	305658	151923	305659	305658	151927	96264R(5"lg. Red)
LMU24 and LMU56	310295	142589		174471 (Fused)	162072	151922	173425	162196	151925		176137 (9-1/4"lg. Black w/320410 Terminal) 96264R (5"lg. Red)
LMU38	151795	305661	305660	334877	122245	305658	151923	305659	305658	151927	96264R (5" lg. Red)

Figure 7-103. Synchronous Motor Cross-Reference Chart

Teletype Code	Motor Assembly	Motor Bracket	Container	Lid	Nipple	Capacitor	Resistor	Electrical Noise Suppressor	Cable Assembly	Jumper
LMU41	150701	152046	179420	179424	152067	161579	179103	161578	152059	91228(2-1/2"lg. w/320420 and 320422 Terminal

Figure 7-104. Series Motor Cross-Reference Chart

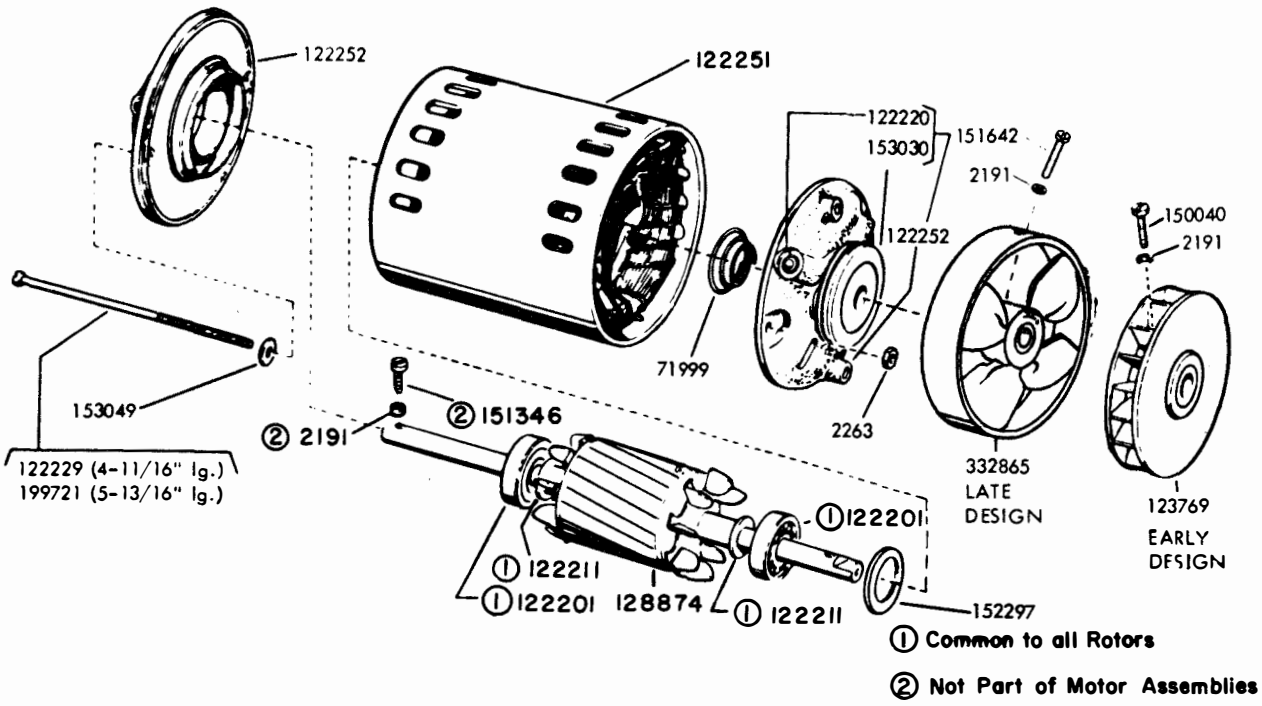


Figure 7-105. Synchronous Motor Assembly 151795 (Standard) - Used on LMU3 and LMU38

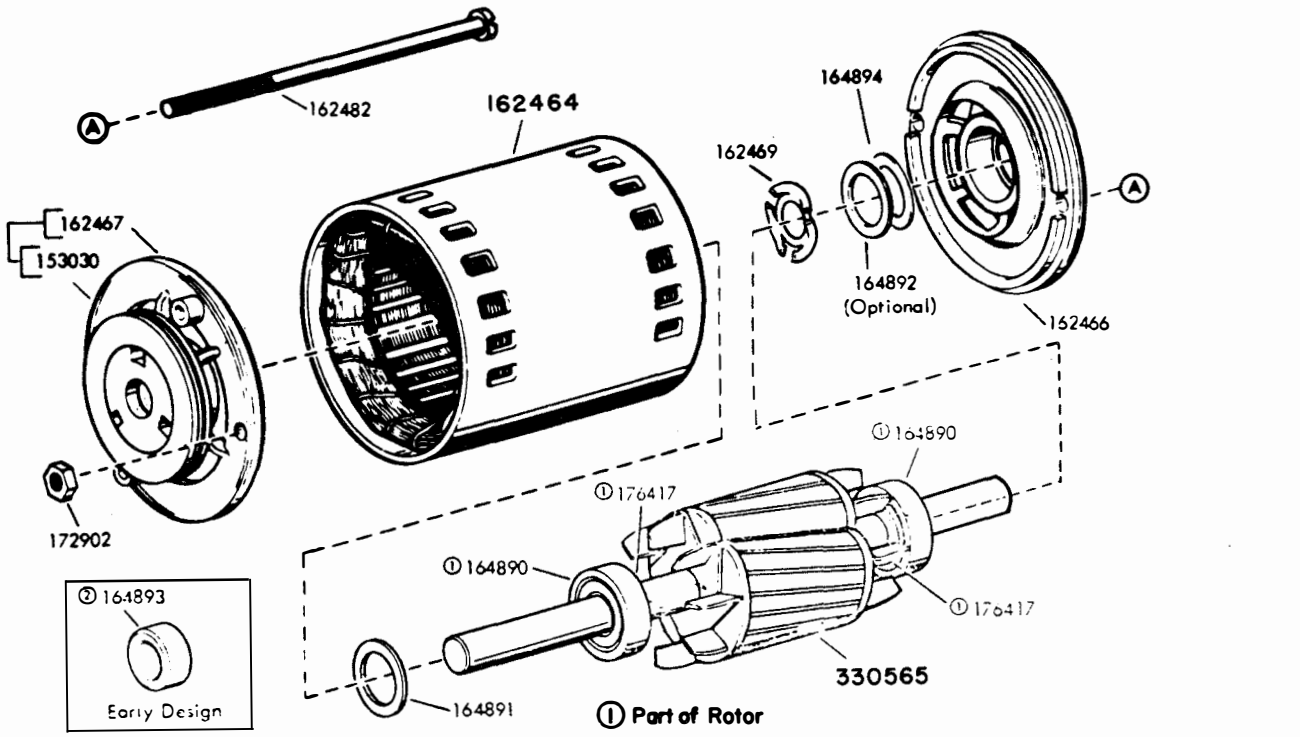


Figure 7-106. Synchronous Motor Assembly 310295 (Miniaturized) - Used on LMU24 and LMU56

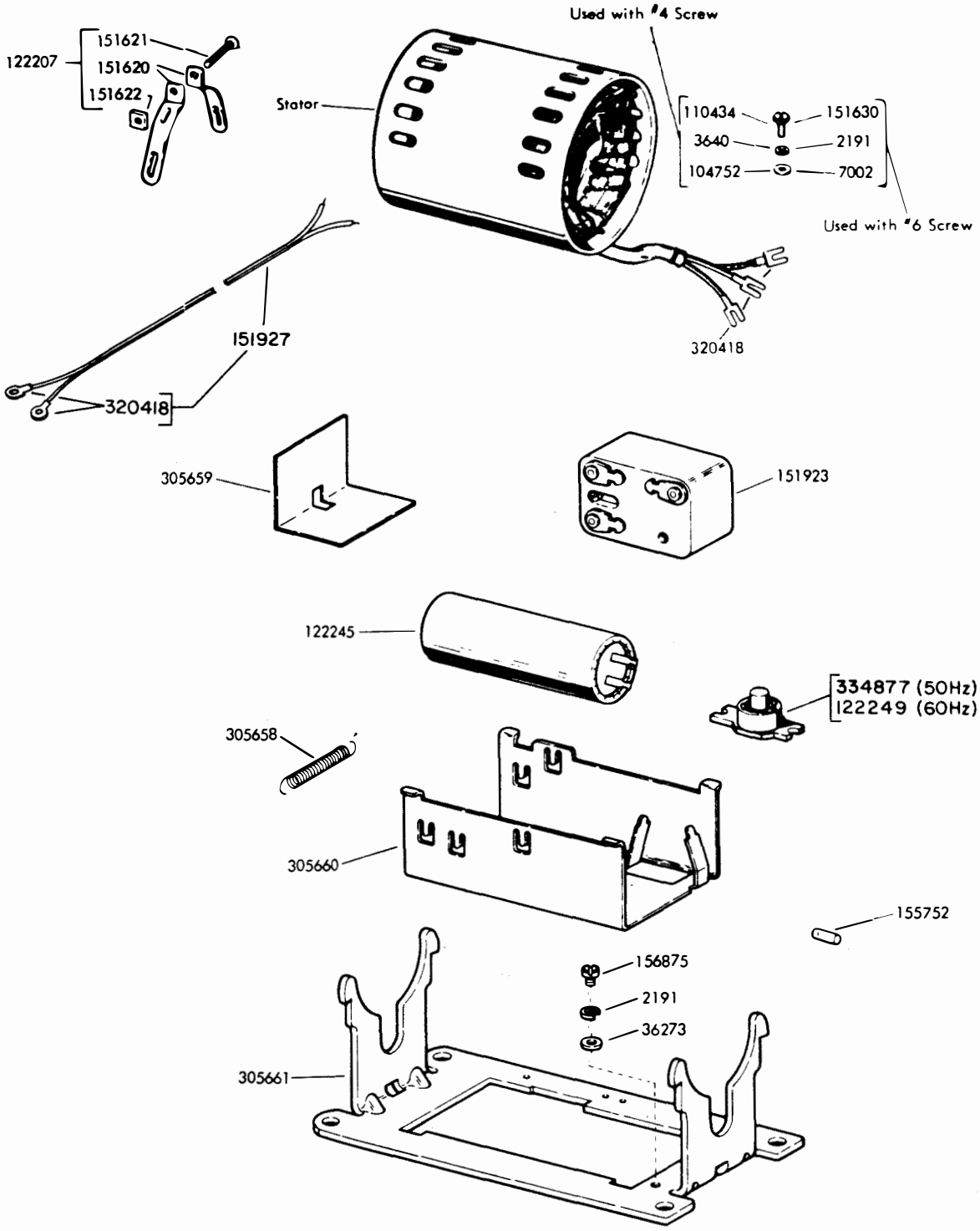


Figure 7-107. Relay and Capacitor Mounting (Synchronous) - Used on LMU3 and LMU38

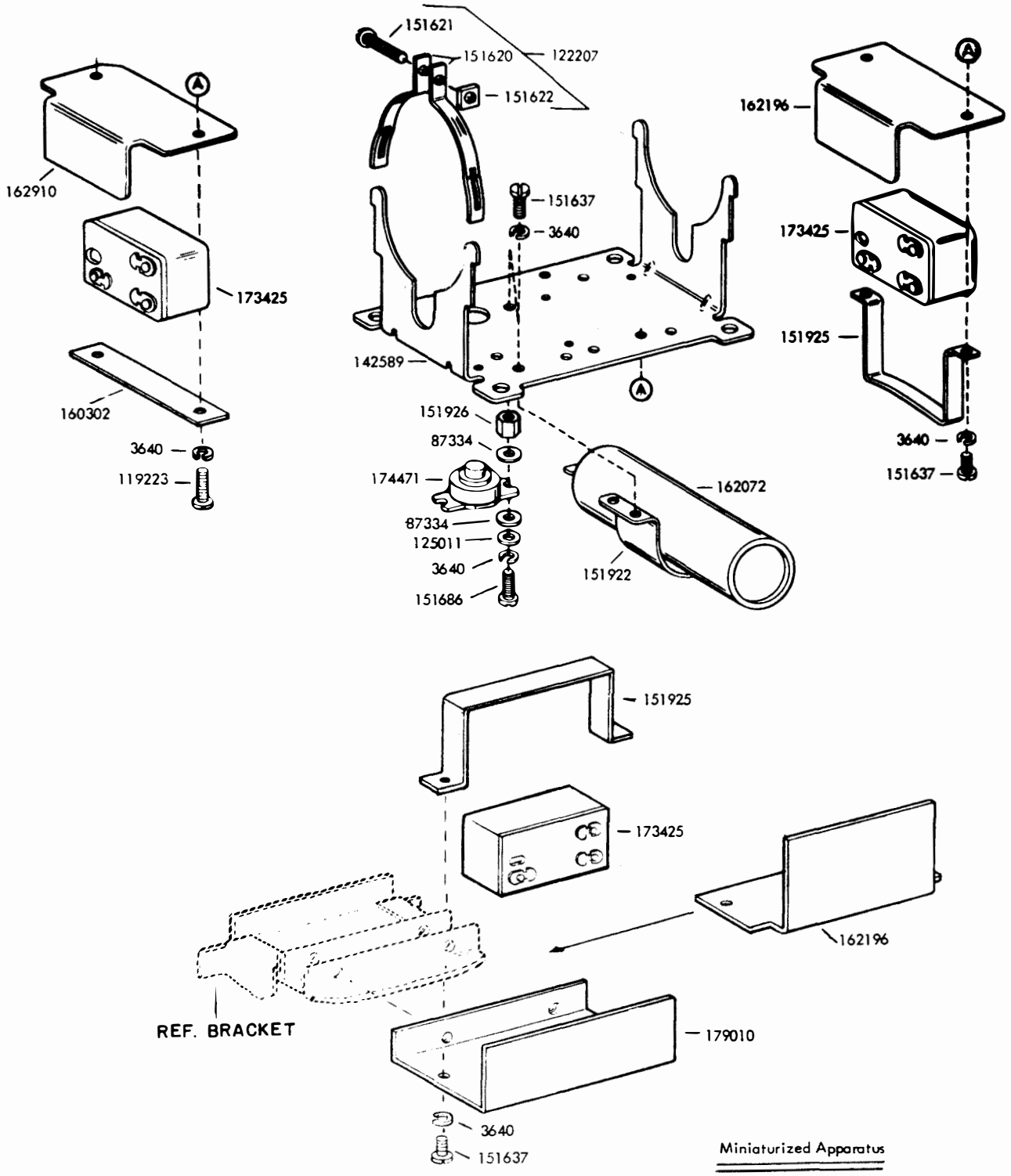


Figure 7-108. Relay and Capacitor Mounting (Synchronous) - Used on LMU24 and LMU56

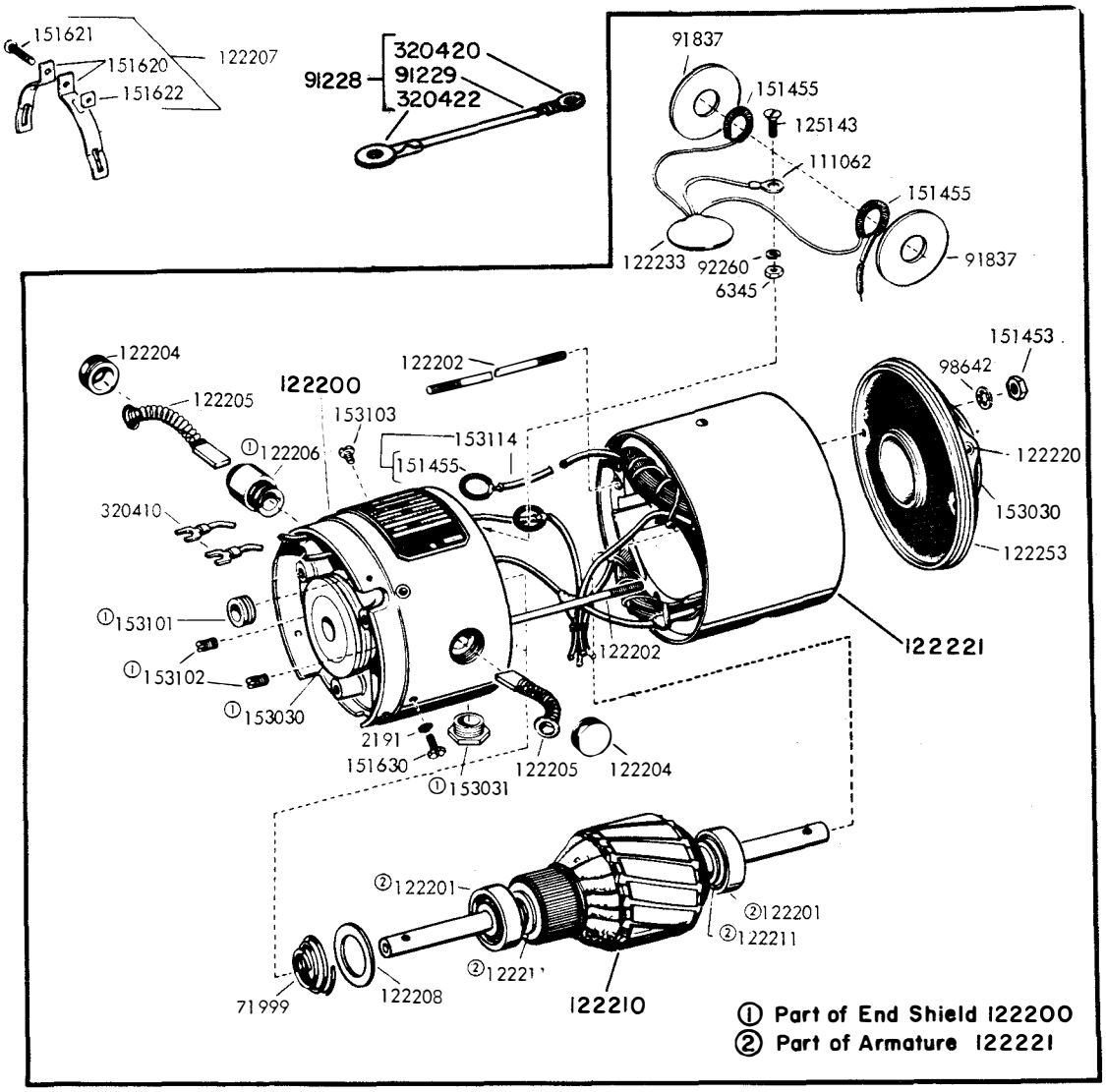
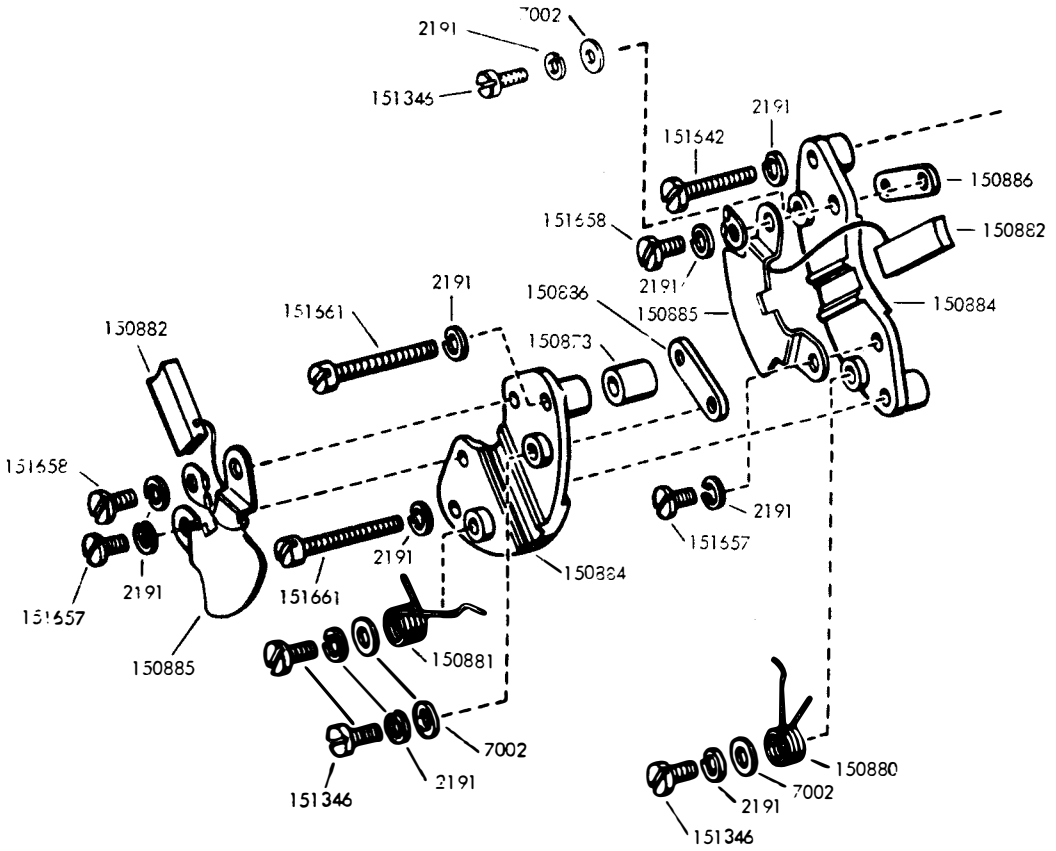


Figure 7-109. Series Motor Assembly 150701 (Standard) - Used on LMU41



150847 RIGHT BRUSH HOLDER ASSEMBLY

150846 LEFT BRUSH HOLDER ASSEMBLY

Figure 7-110. Brush Assemblies

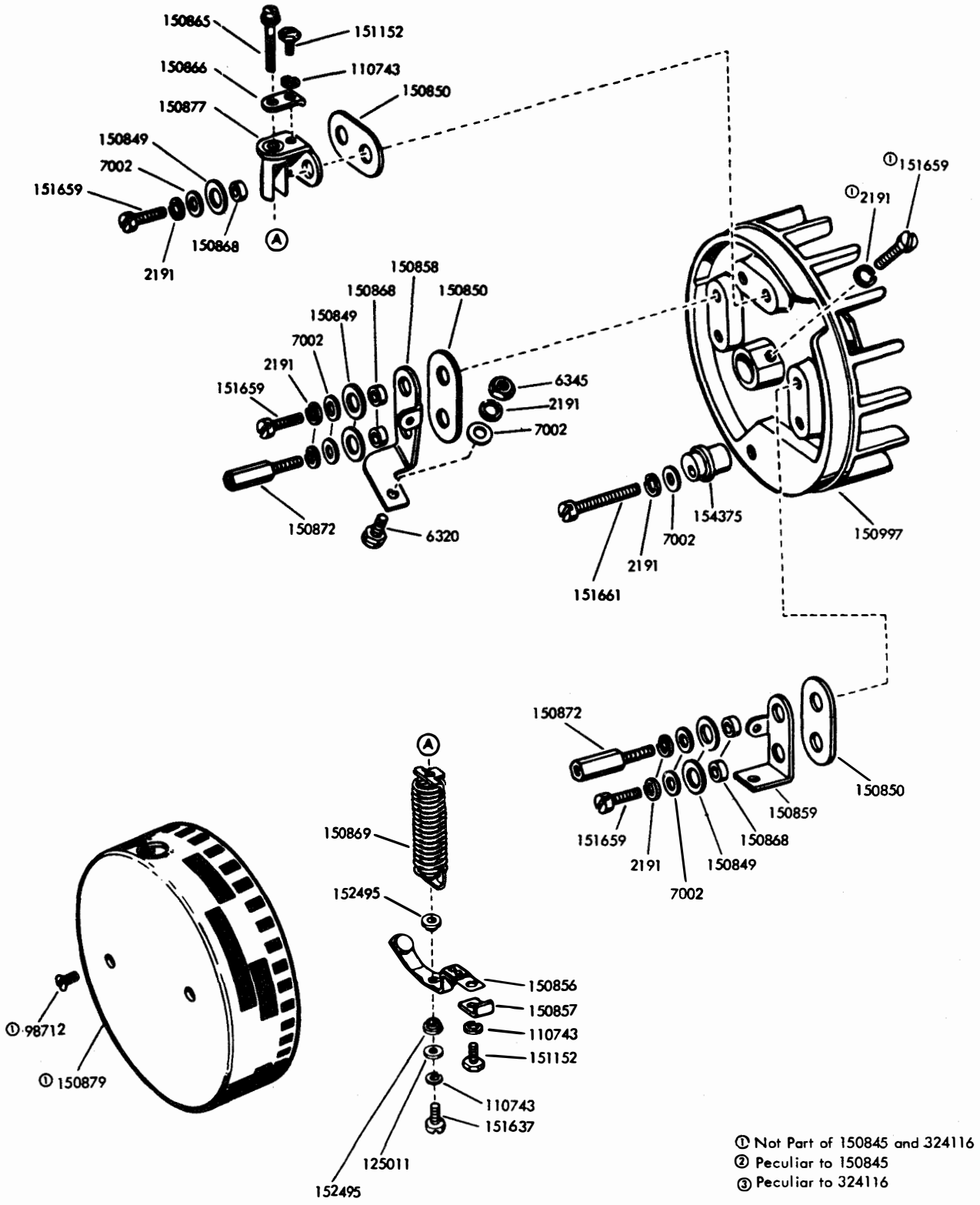


Figure 7-111. Governor Assemblies 150845 and 324116

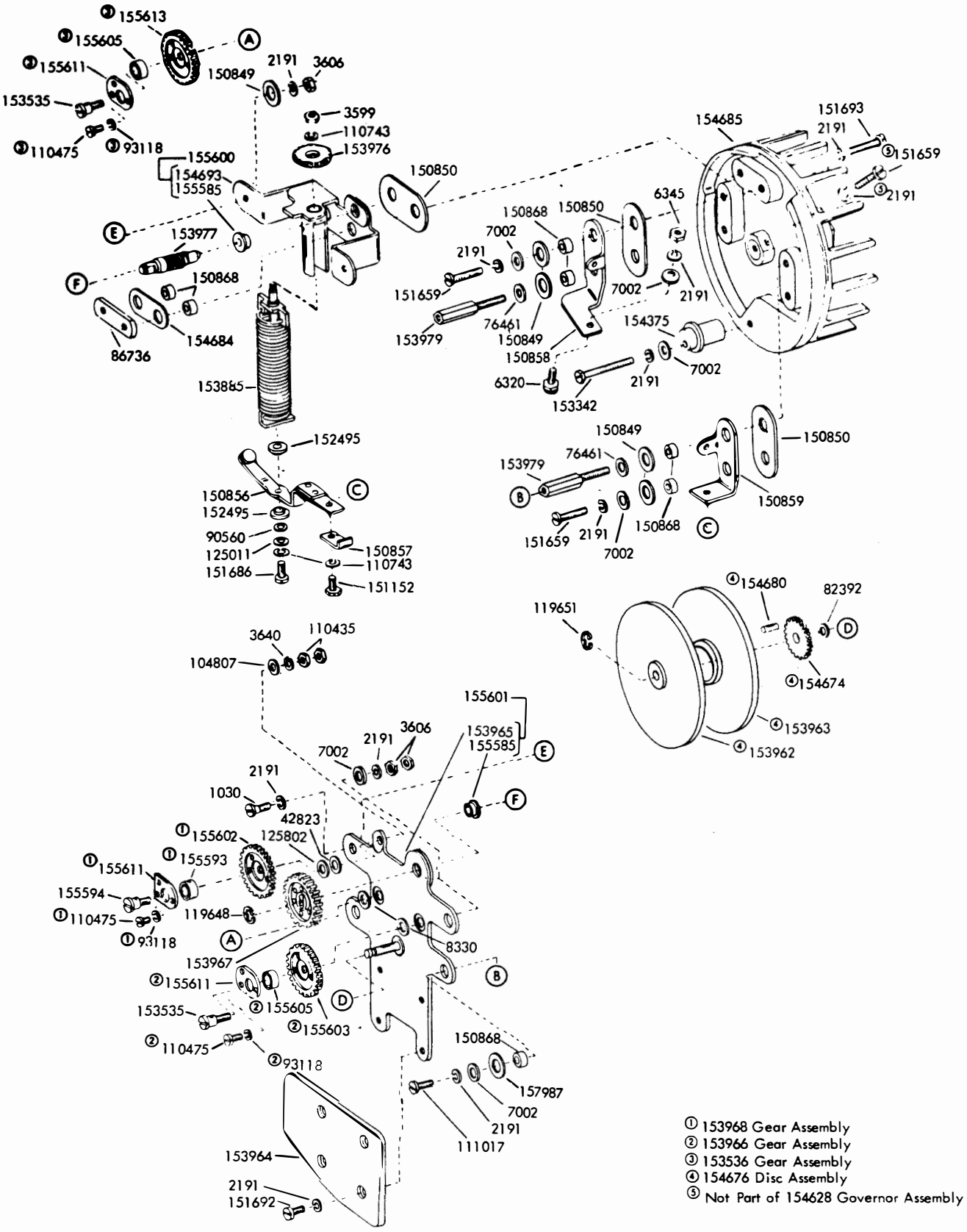
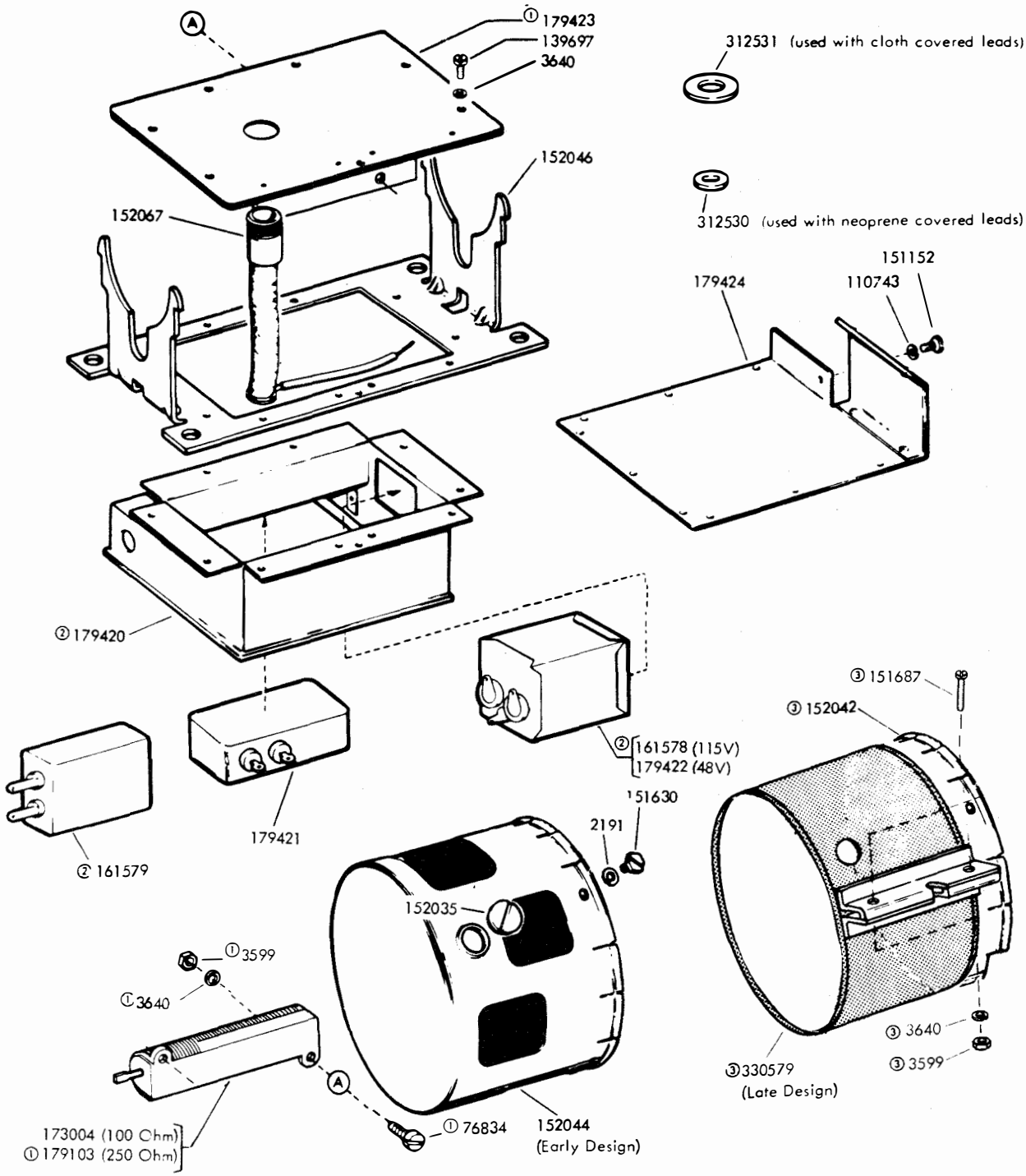


Figure 7-112. Governor Assembly 154628



① 198691 Plate w/Resistor Assembly
② 198692 Container Assembly
③ 152044 Cover Assembly

Figure 7-113. Series Motor Mounting Parts with RF Suppression - Used on LMU41

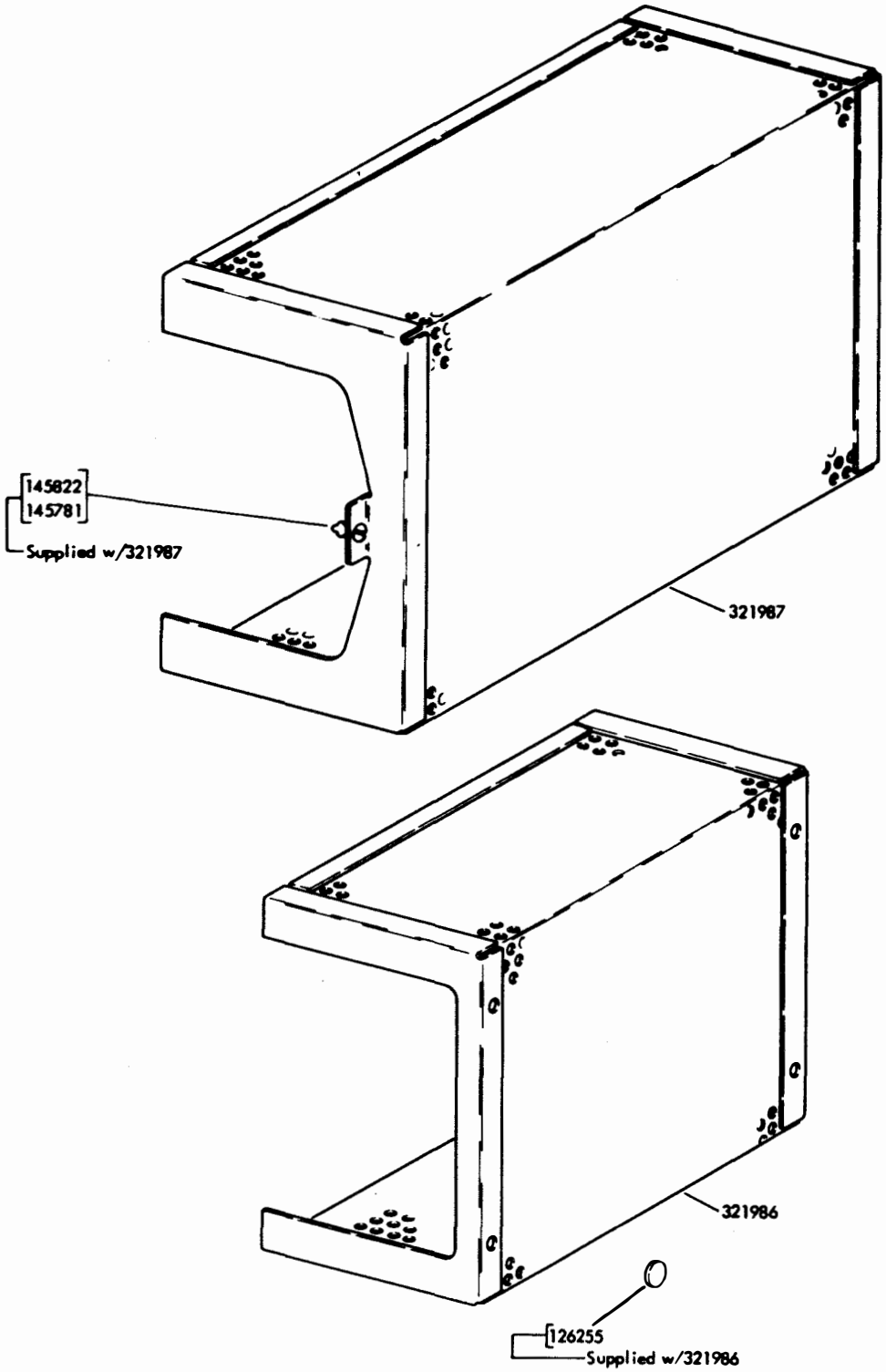


Figure 7-11a. Electrical Service Assembly Covers (Sheet 1 of 2)

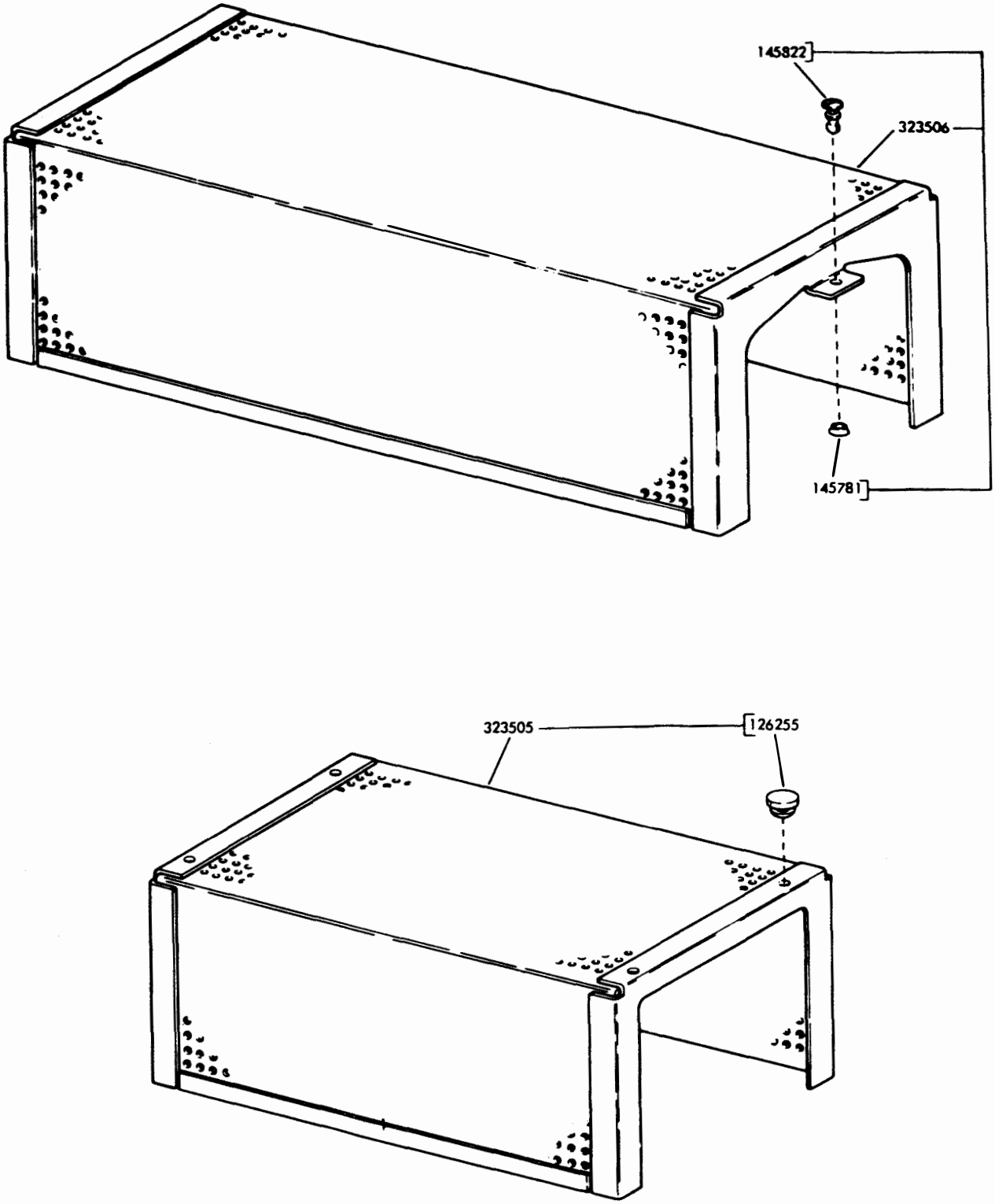


Figure 7-115. Electrical Service Assembly Covers (Sheet 2 of 2)

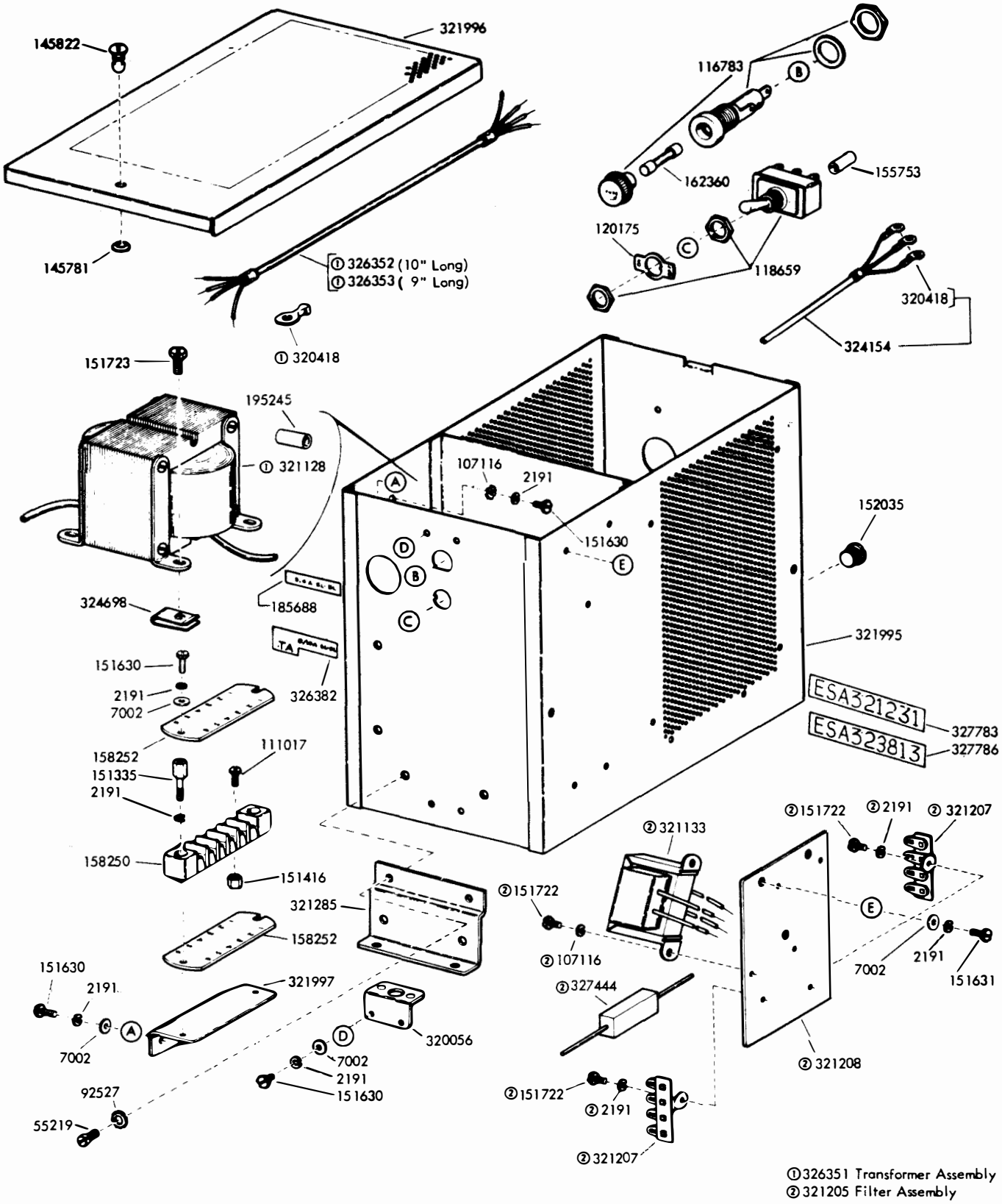


Figure 7-116. Electrical Service Assemblies 321231 and 323813 (Sheet 1 of 2)

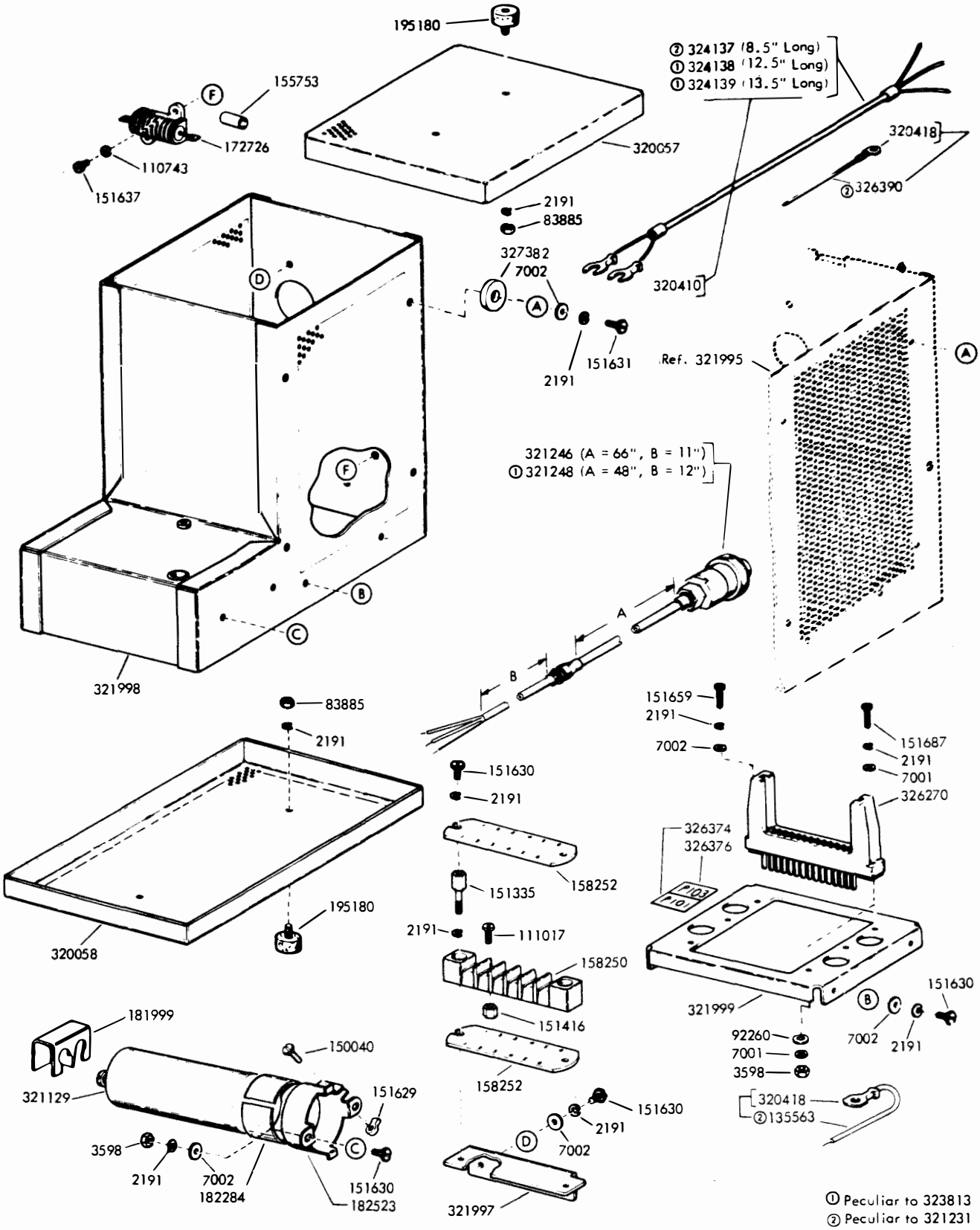


Figure 7-117. Electrical Service Assemblies 321231 and 323813 (Sheet 2 of 2)

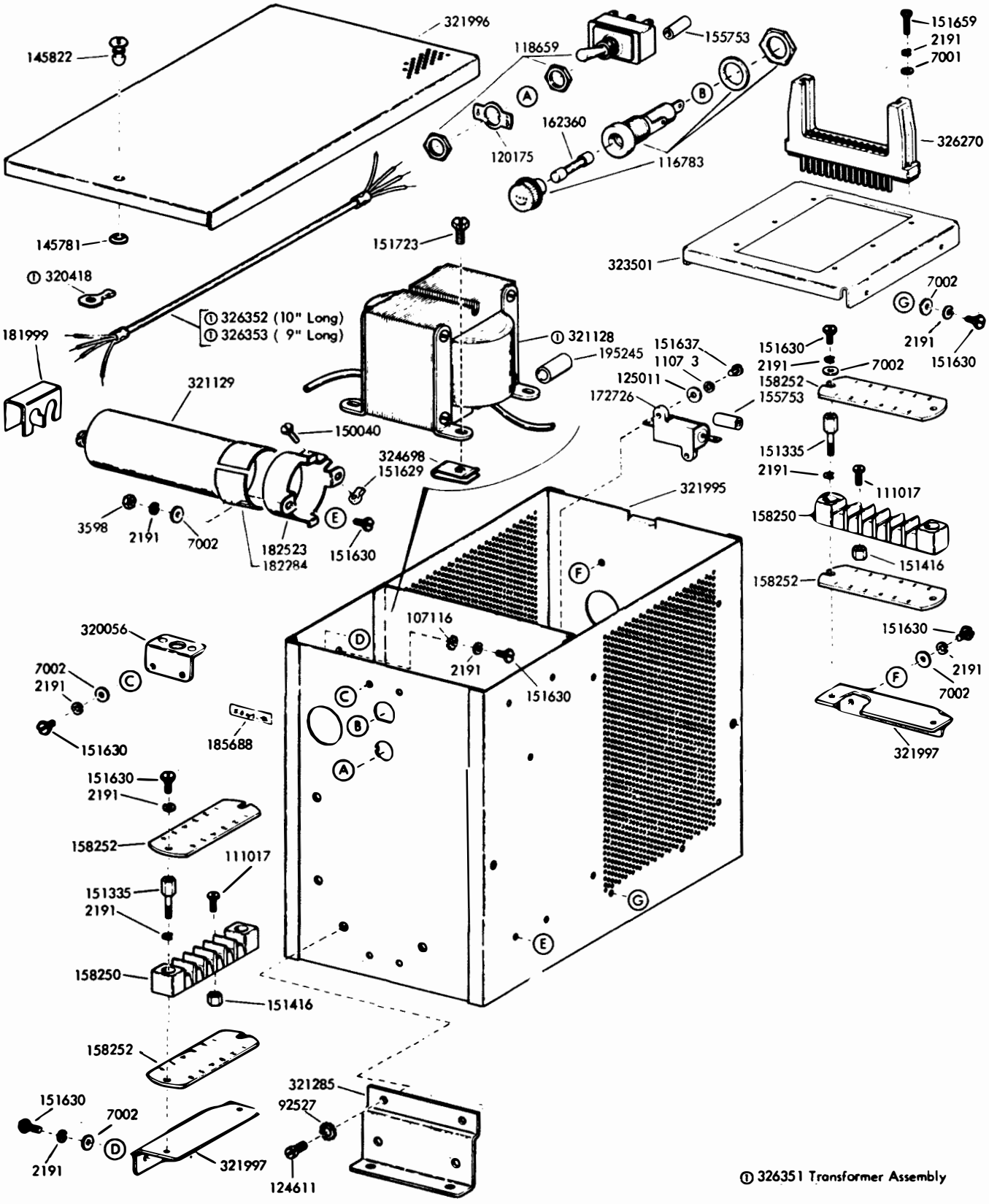
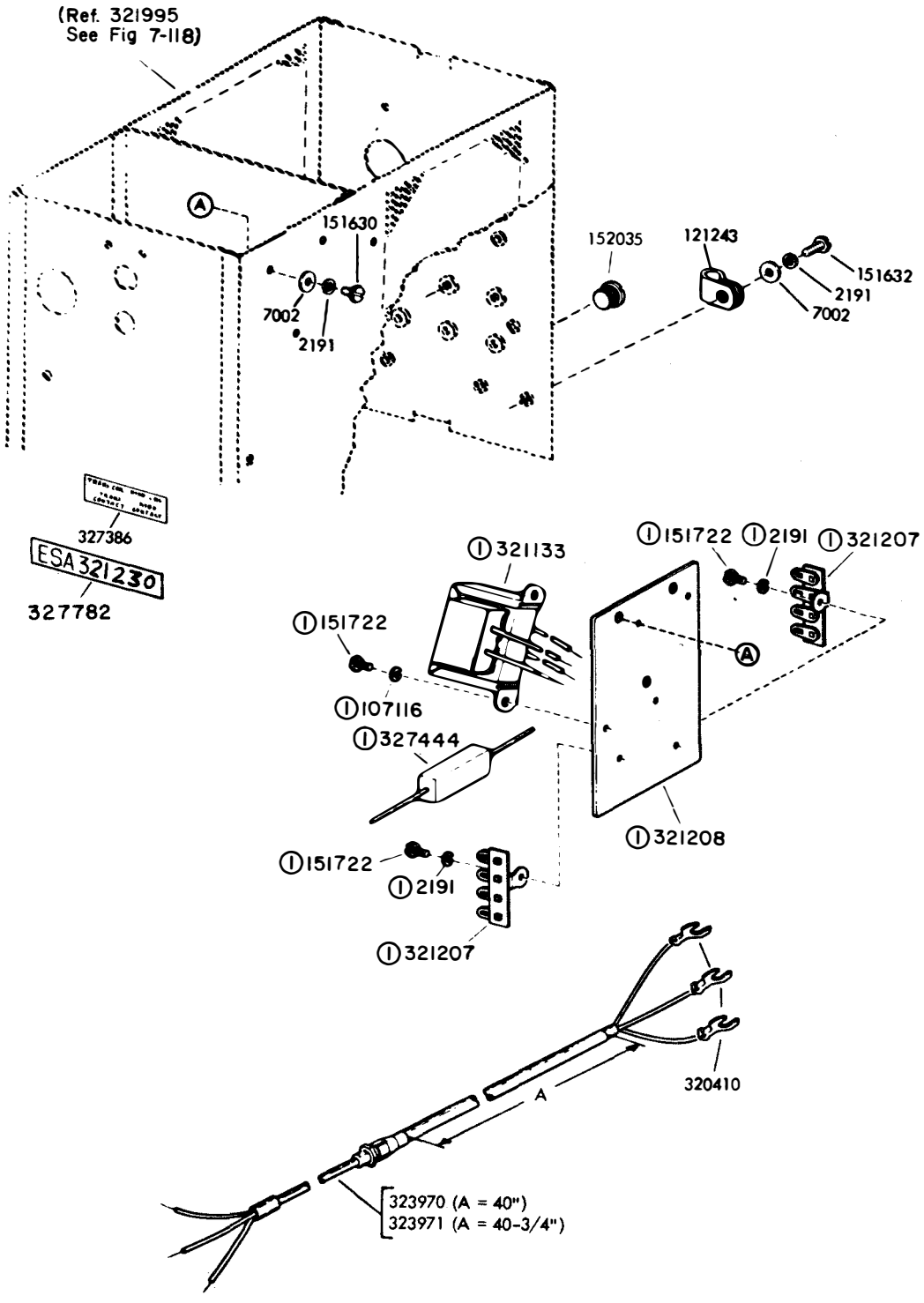
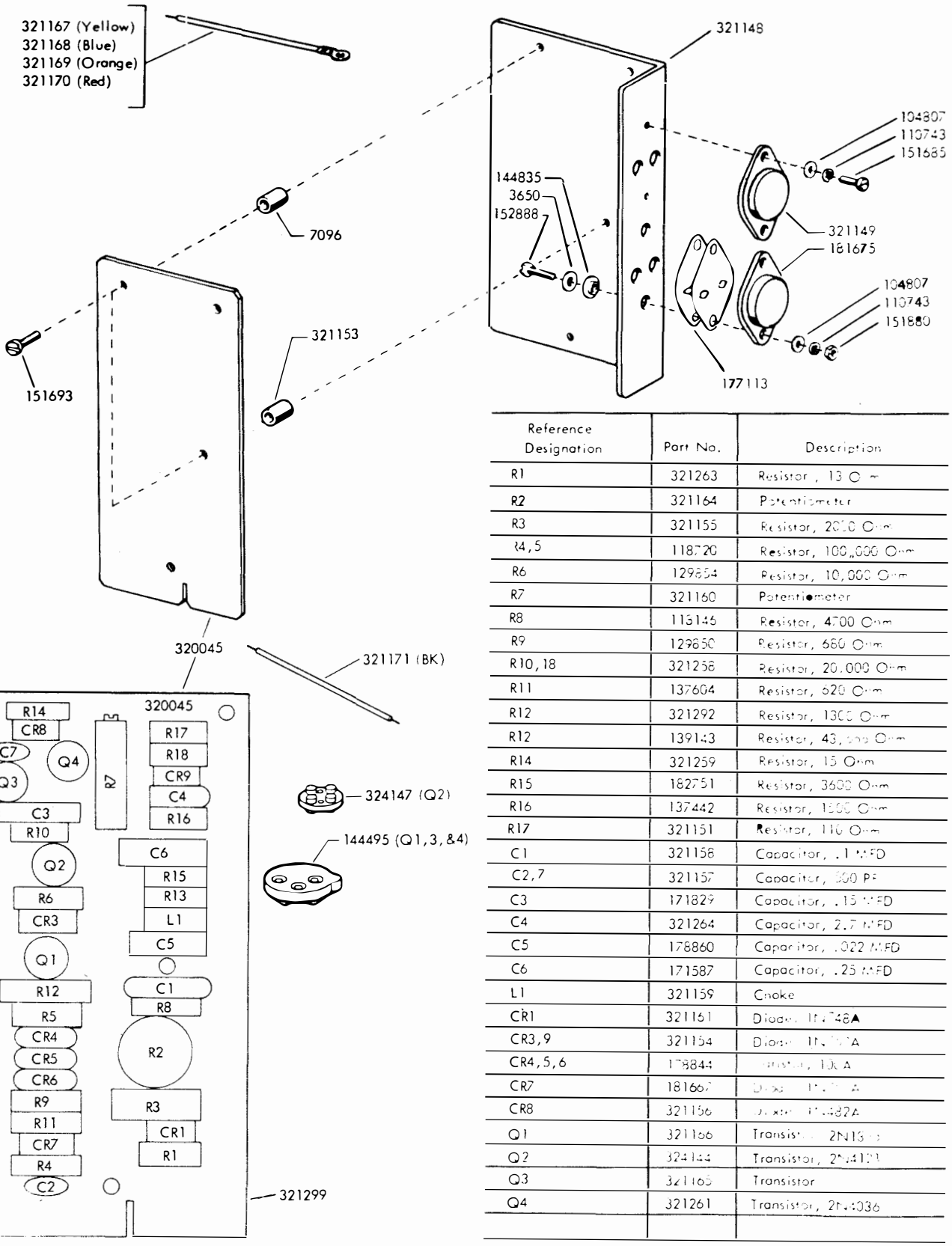


Figure 7-118. Electrical Service Assembly 321230 (Sheet 1 of 2)



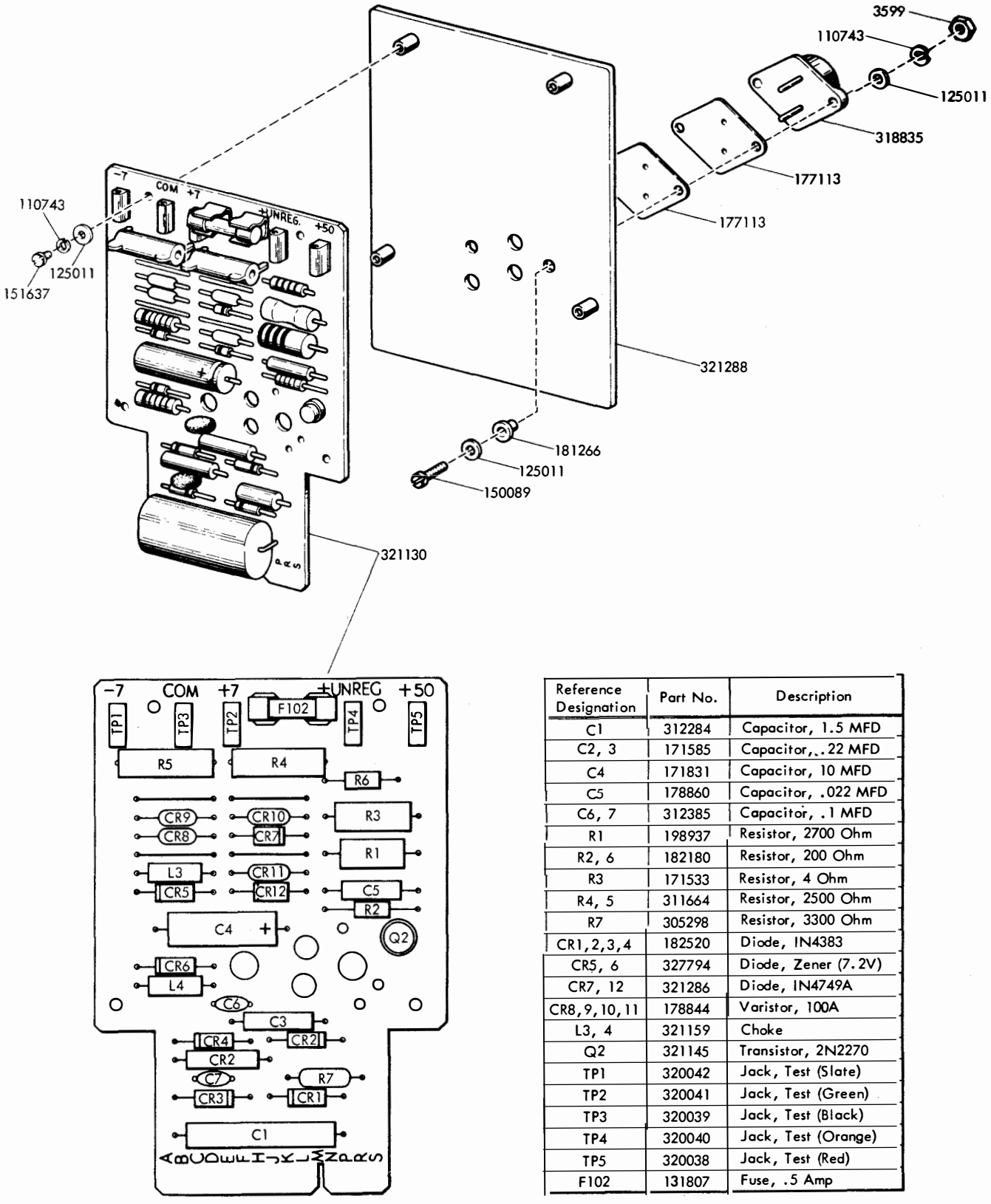
① 321205 Filter Assembly

Figure 7-119. Electrical Service Assembly 321230 (Sheet 2 of 2)



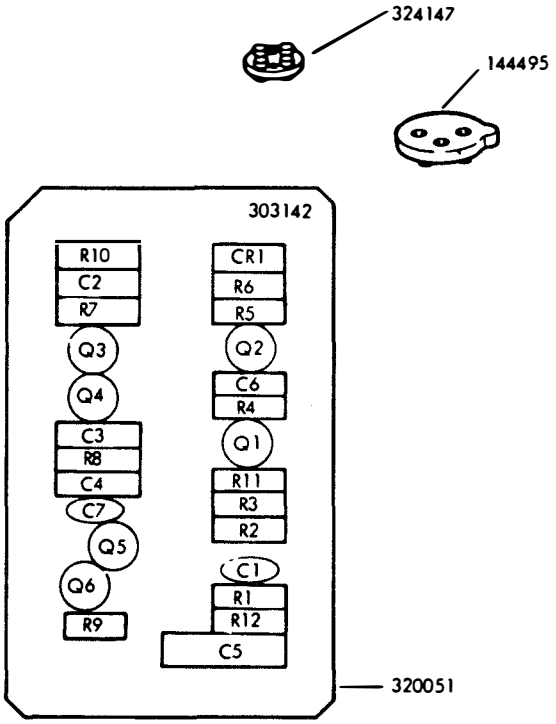
Reference Designation	Part No.	Description
R1	321263	Resistor, 13 Ohm
R2	321164	Potentiometer
R3	321155	Resistor, 2000 Ohm
R4,5	118720	Resistor, 100,000 Ohm
R6	129854	Resistor, 10,000 Ohm
R7	321160	Potentiometer
R8	115145	Resistor, 4700 Ohm
R9	129850	Resistor, 660 Ohm
R10,18	321258	Resistor, 20,000 Ohm
R11	137604	Resistor, 620 Ohm
R12	321292	Resistor, 1300 Ohm
R12	139143	Resistor, 43,000 Ohm
R14	321259	Resistor, 15 Ohm
R15	182751	Resistor, 3600 Ohm
R16	137442	Resistor, 1200 Ohm
R17	321151	Resistor, 110 Ohm
C1	321158	Capacitor, .1 MFD
C2,7	321157	Capacitor, 500 PF
C3	171829	Capacitor, .15 MFD
C4	321264	Capacitor, 2.7 MFD
C5	178860	Capacitor, .022 MFD
C6	171587	Capacitor, .25 MFD
L1	321159	Choke
CR1	321161	Diode, IN748A
CR3,9	321154	Diode, IN[illegible]A
CR4,5,6	178844	[illegible], 10A
CR7	181667	Diode, IN[illegible]A
CR8	321156	Diode, IN4482A
Q1	321166	Transistor, 2N1613
Q2	324144	Transistor, 2N4121
Q3	321165	Transistor
Q4	321261	Transistor, 2N4036

Figure 7-120. Clutch Magnet Driver Circuit Card 321991



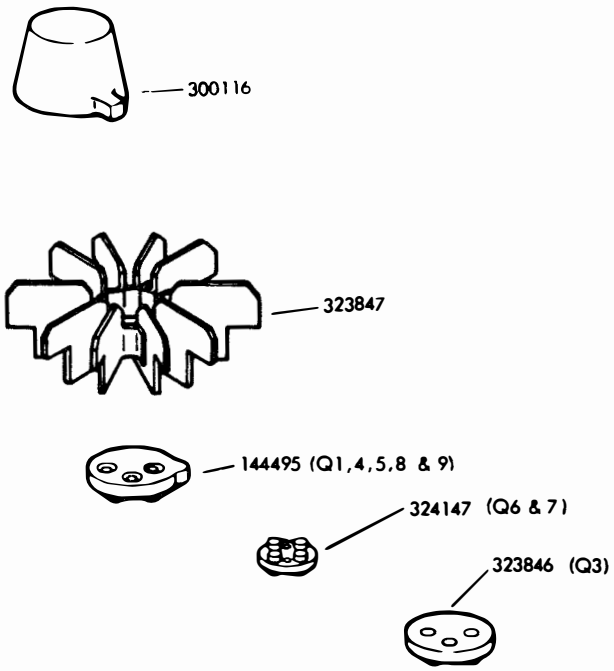
Reference Designation	Part No.	Description
C1	312284	Capacitor, 1.5 MFD
C2, 3	171585	Capacitor,..22 MFD
C4	171831	Capacitor, 10 MFD
C5	178860	Capacitor, .022 MFD
C6, 7	312385	Capacitor, .1 MFD
R1	198937	Resistor, 2700 Ohm
R2, 6	182180	Resistor, 200 Ohm
R3	171533	Resistor, 4 Ohm
R4, 5	311664	Resistor, 2500 Ohm
R7	305298	Resistor, 3300 Ohm
CR1,2,3,4	182520	Diode, IN4383
CR5, 6	327794	Diode, Zener (7.2V)
CR7, 12	321286	Diode, IN4749A
CR8,9,10,11	178844	Varistor, 100A
L3, 4	321159	Choke
Q2	321145	Transistor, 2N2270
TP1	320042	Jack, Test (Slate)
TP2	320041	Jack, Test (Green)
TP3	320039	Jack, Test (Black)
TP4	320040	Jack, Test (Orange)
TP5	320038	Jack, Test (Red)
F102	131807	Fuse, .5 Amp

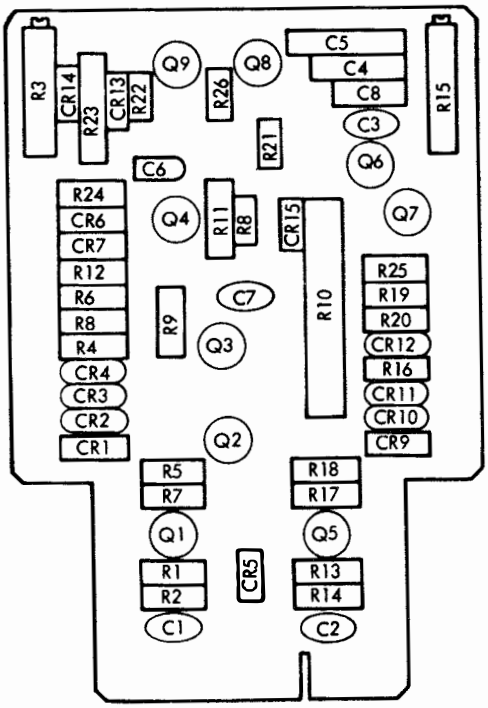
Figure 7-121. Power Supply Circuit Card 321290 (0.5 Ampere)



Reference Designation	Part No.	Description
R1&3	118720	Resistor, 100,000 Ohm
R2	118178	Resistor, 220,000 Ohm
R4&8	129854	Resistor, 10,000 Ohm
R5&6	321204	Resistor, 13,000 Ohm
R7&10	118147	Resistor, 6800 Ohm
R9	137438	Resistor, 100 Ohm
R11&12	118146	Resistor, 4700 Ohm
CR1	181619	Diode, 1N914
C1&7	321157	Capacitor, 500 PF
C2	320048	Capacitor, 0.5 MFD
C3&4	320049	Capacitor, 0.15 MFD
C5	320047	Capacitor, 2 MFD
C6	181618	Capacitor, 0.01 MFD
Q1,4&6	315930	Transistor, 2N3568
Q2	324144	Transistor, 2N4121
Q3&5	315931	Transistor, 2N3638

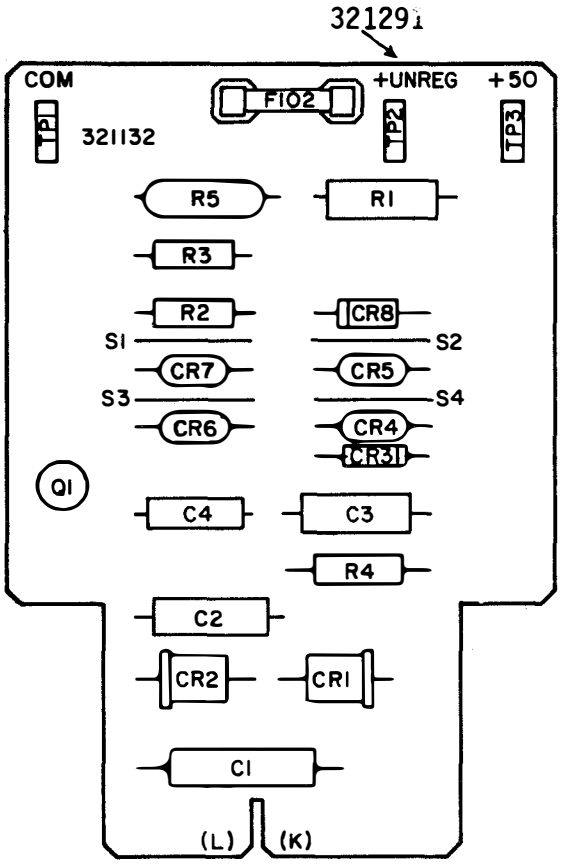
Figure 7-122. Low-Level Keyer Circuit Card 303142





Reference Designation	Part No.	Description
C1, C2, C3, C7	321157	Capacitor, 500 PF
C4	171829	Capacitor, .15 MFD
C5	326776	Capacitor, .47 MFD
C6	321260	Capacitor, 1 MFD
C8	178860	Capacitor, .022 MFD
R1, R2,R13, R14	118720	Resistor, 100,000 Ohm
R3, R15	323964	Potentiometer, 500,000 Ohm
R4, R16	129854	Resistor, 10,000 Ohm
R5, R17, R22	118177	Resistor, 22,000 Ohm
R6, R19	137604	Resistor, 620 Ohm
R7, R18	118146	Resistor, 4,700 Ohm
R8, R20	129850	Resistor, 680 Ohm
R9	309868	Resistor, 1,300 Ohm
R10	323841	Resistor, 300 Ohm
R11	323842	Resistor, 21 Ohm
R12	178864	Resistor, 3,900 Ohm
R21	321975	Resistor, 33 Ohm
R23	323843	Resistor, 590 Ohm
R24	137442	Resistor, 1,500 Ohm
R25	118154	Resistor, 47,000 Ohm
R26	120424	Resistor, 4,300 Ohm
CR1	321154	Diode, IN457A
CR2, CR3, CR4, CR10, CR11, CR12	178844	Varistor, 100A
CR5	181667	Diode, IN750A
CR6, CR7, CR13, CR15	321156	Diode, IN482A
CR8	321161	Diode, IN748A
CR9, CR14	321154	Diode, IN457A
Q1, Q5	321166	Transistor, 2N1893
Q2	323844	Transistor, 2N3053
Q3	321261	Transistor, 2N4036
Q4	323845	Transistor, 40319
Q6, Q7	324144	Transistor, 2N4121
Q8	321165	Transistor, 2N3638A
Q9	321261	Transistor, 2N4036
	324147	Pad, Transistor Mounting
	144495	Pad, Transistor Mounting
	323846	Pad, Transistor Mounting
	323847	Sink, Heat
	300116	Cover, Insulating
	323835	Card, Circuit

Figure 7-123. Selector Magnet Driver Circuit Card 323810



Reference Designation	Part No.	Description
C1	193053	Capacitor, 2.0 Mfd
C2	171585	Capacitor, 0.22 Mfd
C3	171585	Capacitor, 0.22 Mfd
C4	178860	Capacitor, 0.022 Mfd
CR1	321136	Diode, 1N4722
CR2	321136	Diode, 1N4722
CR3	321286	Diode, Zener, 1N4749A
CR4	178844	Varistor, 100A
CR5	178844	Varistor, 100A
CR6	178844	Varistor, 100A
CR7	178844	Varistor, 100A
CR8	321286	Diode, Zener, 1N4749A
R1	198937	Resistors, 2700 Ohm
R2	182180	Resistor, 200 Ohm
R3	182180	Resistor, 200 Ohm
R4	305298	Resistor, 3300 Ohm
R5	171533	Resistor, 4 Ohm
Q1	321145	Transistor, 2N2270
F102	143631	Fuse, 1.5 Amp
TP1	320039	Jack, Test (Black)
TP2	320040	Jack, Test (Orange)
TP3	320038	Jack, Test (Red)

Figure 7-124. Power Supply Circuit Card 321132 (1-1/2 Ampere)

Table 7-6. List of Abbreviations

#	Number	No.	Number
"	Inch	NO	Normally-Open
&	and		
x	by	OPM	Operations per Minute
A	Ampere (comb form)	Pf	Picofarad
AC	Alternating Current	PS	Power Supply
Amp	Ampere	Pt	Point
Bk	Black	Rcpt	Receptacle
Brd	Braided	Rd	Round
		Ref	Reference
Ccw	Counterclockwise	RFI	Radio Frequency Interference
CMD	Clutch Magnet Driver		
comb	Combination	RPM	Revolutions per Minute
DC	Direct Current	Shldr	Shoulder
Dia	Diameter	SL-BL	Slow-Blow
Dim	Dimension	SMD	Selector Magnet Driver
DP-DT	Double-pole Double-throw	SP-ST	Single-pole Single-throw
		Spl	Special
Fig.	Figure	Sq	Square
Fil	Fillister	Std	Standard
Hex	Hexagon	T	Teeth
Hp	Horsepower	Thk	Thick
Hvy	Heavy	Thru	Through
Hz	Hertz		
		UC	Unit Code
ID	Inside Diameter		
Ident	Identification	V	Voltage
K	Kilo	W-BL	White-blue
		w/	with (comb form)
Lg	Length, Long	W-O	White-orange
LLK	Low-Level Keyer	WPM	Words per Minute
Ma	Milliampere		
Mfd	Microfarad		
Mhp	Millihorsepower		
Mtg	Mounting		

CHAPTER 8
INSTALLATION

8-1. INTRODUCTION. This chapter provides instructions for installation and checkout of Keyboard Send-Receive (KTR) and Receive-Only Typing Reperforator (ROTR) Sets Model 28. Several configurations are currently in use, including Table Model Sets, Miniaturized Sets, and Multiple ROTR Sets.

a. Table Model Sets. These are cover-enclosed KTR or ROTR sets which may be placed on a table or other flat surface. Sufficient space is available for additional equipment.

b. Miniaturized Sets. These are similar to standard ROTR sets, but are equipped with a close-fitting cover.

c. Multiple ROTR Sets. These sets provide the facilities of three ROTR sets in a single mounting. Installation procedures will vary with the configuration, as well as the component complement of the set being installed. In general, a KTR (Keyboard Transmit-Receive) Set will consist of a typing perforator base, a motor unit, an electrical service unit (for low-level operation) and an enclosure. The RO base replaces the keyboard in Receive-Only Sets. The ROTR set incorporates a typing reperforator unit. This chapter provides instructions for installing each component, as well as requirements and adjustments to ensure that the components operate properly as a set.

8-2. UNPACKING. Reperforator and Tape Printer Sets are shipped as individual component assemblies. Carefully cut the sealed edge of the carton so as not to damage the component. When the component is fastened to a shipping pallet (for example a typing unit), or a motor unit, it is preferable to cut the sealed edges at the bottom of the carton, folding back the flaps so that the pallet rests directly on the bench or floor; then lift the carton off. The cloth bag containing small parts should remain tied to the unit until the parts are required for the installation. If a component is to be repacked for reshipment, follow, in reverse, the steps used in unpacking, including sufficient dunnage to prevent damage to the equipment in shipment.

8-3. TECHNICAL DATA. The following paragraphs include physical properties and operating criteria.

a. Size and Weight. The approximate size (in cubic feet and weight (including equipment spares) of the sets are as follows:

(1) Keyboard Send-Receive Set

Crated:	18.2 feet; 238 pounds
Uncrated:	10.0 feet; 119 pounds

(2) Receive-Only Set (Standard Size)

Crated:	8.5 feet; 115 pounds
Uncrated:	4.4 feet; 61 pounds

(3) Receive-Only Set (Miniaturized)

Crated:	8.5 feet; 110 pounds
Uncrated:	4.3 feet; 57 pounds

Refer to figure 8-1 for an outline and minimum mounting dimensions of the sets and to figure 8-2 for bulkhead or counter dimensions for shock mounts.

b. Power Supply Requirements. The following requirements apply to the motors used with the Transmitter Distributor Sets:

(1) AC Synchronous Motor (LMU3)

Input Voltage	115 VAC ±10%
Phase	Single
Frequency	60 Hertz ±0.5%
Input current,	
Starting	9 amperes
Running	1.85 amperes
Input Power	65 watts
Power Factor,	
No Load,	23.7%
Full Load	38.5%
Heat Dissipation	50 watts
Horsepower	0.050

(2) Miniaturized AC Synchronous Motor (LMU24)

Input Voltage	115 VAC ±10%
Phase	Single
Frequency	60 Hertz ±0.5%
Input current,	
Starting	5 amperes
Running, no load	1.05 amperes
Full load	1.25 amperes
Horsepower	0.025

(3) AC governed Motor (LMU4)

Input Voltage	115 VAC ±10%
Phase	Single
Frequency	50 to 60 Hertz
Input current,	
Starting	1.75 amperes
Running	1.00 amperes
Watts	95 watts
Power factor,	
No load,	71%
Full load	66.8%
Heat dissipation	75 watts
Horsepower	0.50

c. Ambient Operating Temperatures. Acceptable ambient operating temperature range is from -20 degrees Centigrade (-4 degrees Fahrenheit) to +50 degrees Centigrade (+122 degrees Fahrenheit). The temperature rise should not be in excess of +40 degrees Centigrade (+72 degrees Fahrenheit) above ambient temperature.

8-4. INSTALLATION OF UNITS - HIGH-LEVEL. Install high-level Reperforator and Tape Printer Sets Model 28 and components in accordance with the following paragraphs.

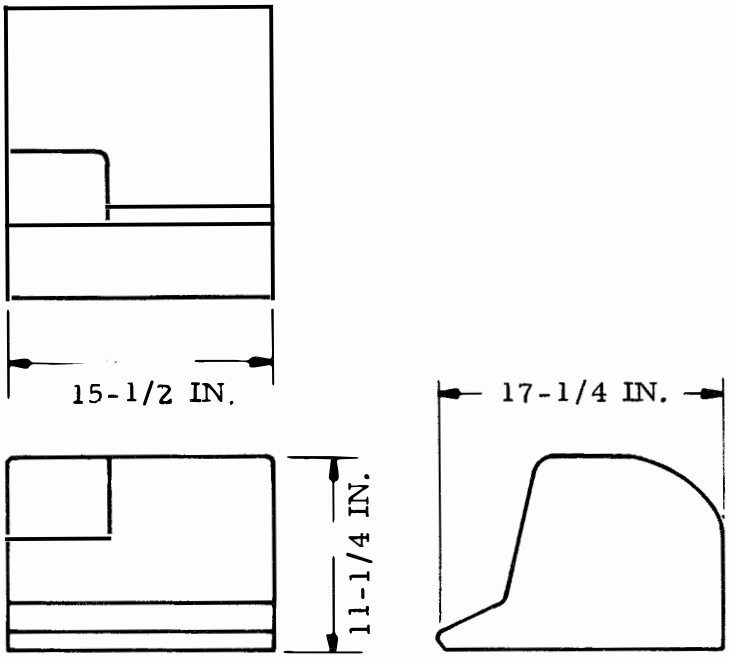
a. Keyboard Send-Receive Typing Reperforator (KTR) Set. Install as follows:

(1) Refer to figure 8-3.

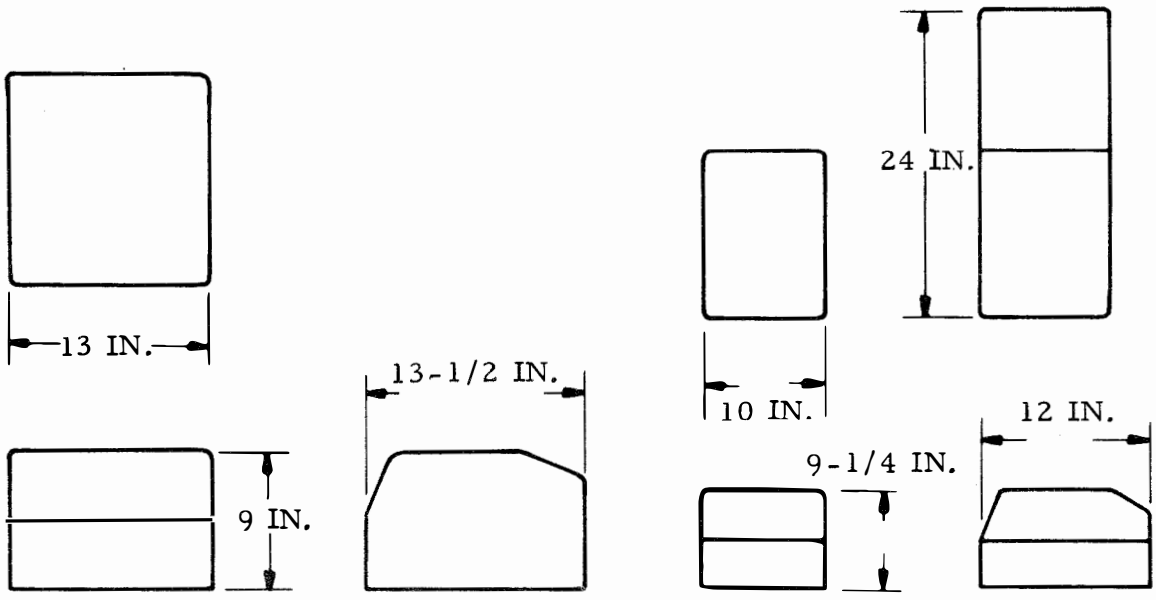
(2) Install drive pinion on motor shaft using rubber isolators and parts provided with gearset.

(3) Install driven gear on hub of intermediate gear assembly of the base using two screws provided on hub.

(4) Install motor unit. Place the TP152045 gear



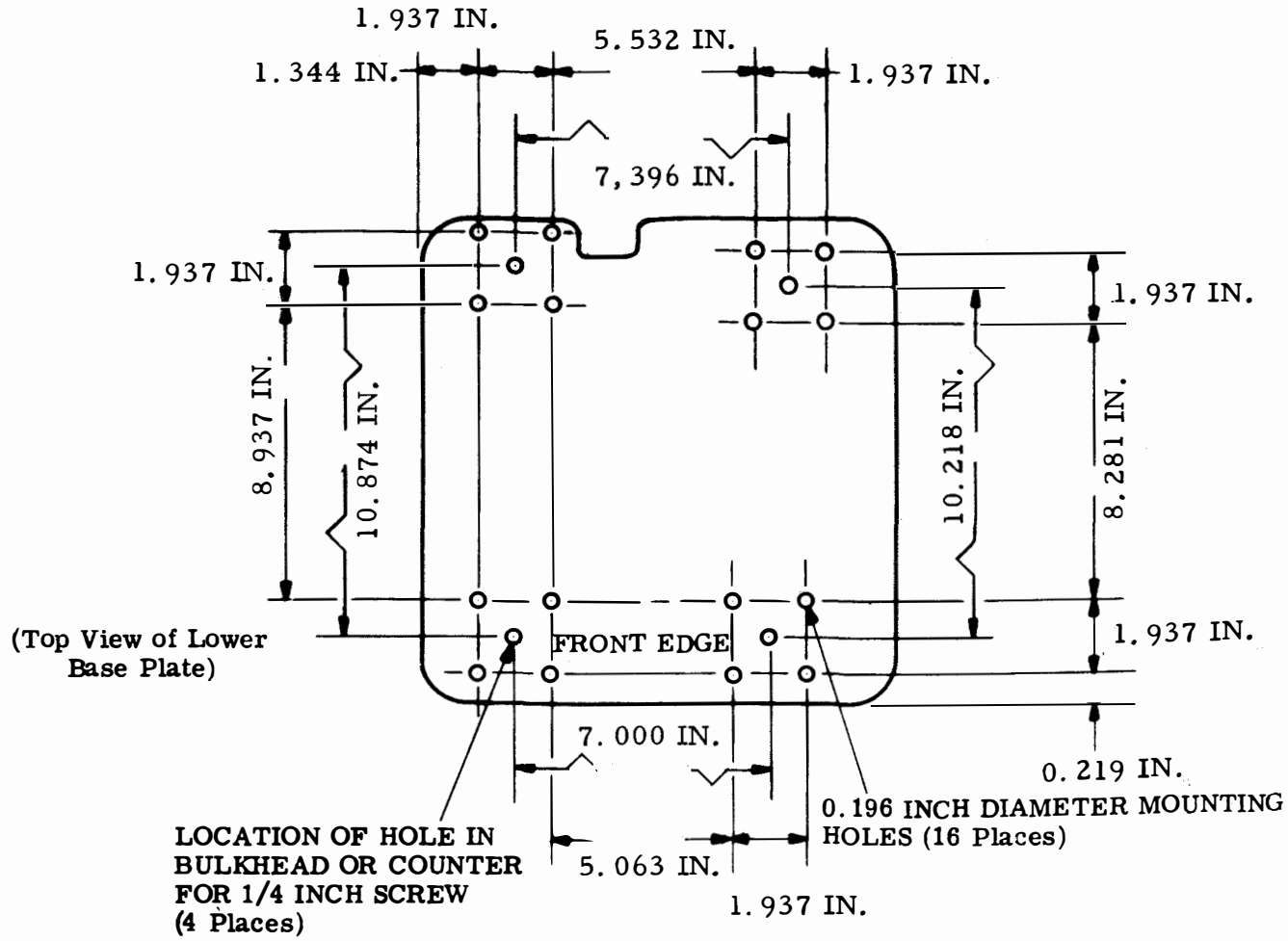
Keyboard Send-Receive Set



Receive-Only Set (Standard Size)

Receive-Only Set (Miniaturized)

Figure 8-1. Outline and Mounting Dimensions



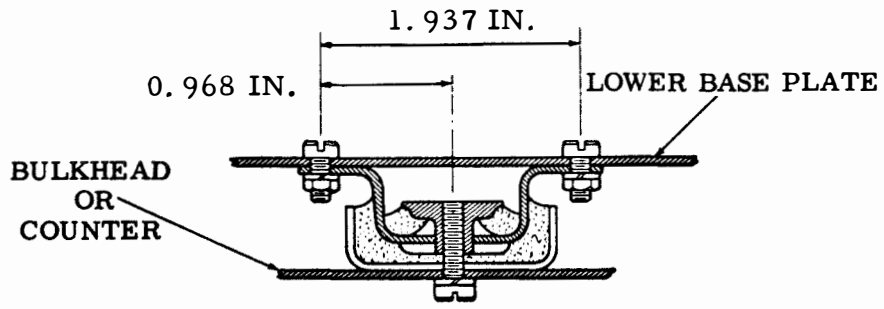


Figure 8-2. Bulkhead or Counter Installation Drilling Specifications for Shock Mounts

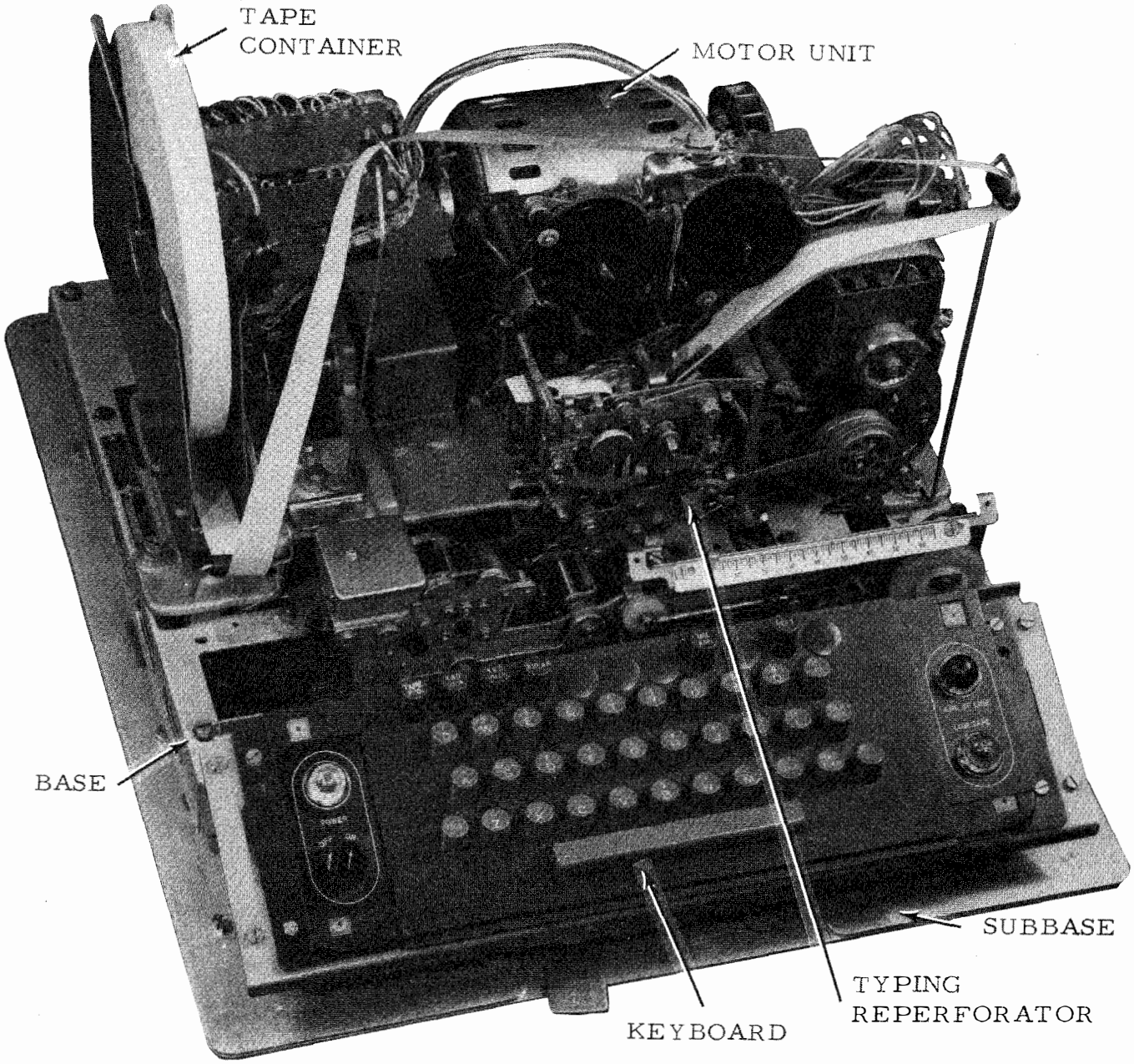


Figure 8-3. Typical Keyboard Send-Receive Typing Reperforator Set Model 28 (Cover Removed)

guard over left rear mounting hole and fasten motor with four TP151678 screws provided in cloth bag. Remove fiber insulator from 4-point terminal block on base and connect motor leads to terminals 1 and 2 per applicable wiring diagram. Replace insulator.

(5) To adjust the motor pinion to intermediate gear assembly, raise or lower front end of intermediate gear bracket by means of fillister head adjusting and clamping screws until there is a barely perceptible backlash between the motor pinion and intermediate gear throughout a complete rotation of the gear. Refine adjustment as necessary.

(6) Remove and discard the TP151442 mounting screw, retaining the TP2191 lockwasher from the main shaft of the typing reperforator. Mount the TP156226 hub on the shaft using a TP151632 screw and retained lockwasher. Mount the TP161897 gear on hub using the three TP151695 screws and the TP161831 spring washer.

(7) Install the typing reperforator using the three TP78301 screws, three TP3639 lockwashers, three TP3438 flat washers, one TP151631 screw, one TP2191 lockwasher, and one TP125015 flat washer. The typing reperforator driven gear should be positioned in line with its drive gear.

(8) There should be a barely perceptible amount of backlash between intermediate gear and reperforator gear throughout a complete rotation of the larger gear.

(9) Apply a thin film of KS7471 grease to all gears.

(10) A 16-point connector is provided for connecting the reperforator to the base. It is necessary to strap together terminals 1 and 9. Terminal 2 is the grounded side and terminal 11 is the ungrounded side of the power line. Terminals 8 and 11 are the signal circuit. See applicable wiring diagram.

(11) Mount keyboard typing reperforator on subbase of cover using the TP151549 screws which are found on subbase. Move latch handle to left and place cover on subbase. Make sure that cables exit through notched portion of cover at rear and that cover is resting directly on subbase. Open access door and plug in cover cable connector. Move latch to right to lock cover to subbase.

(12) When the associated typing reperforator unit is equipped with a backspace feature, the TP151540 character counter lampholder should be adjusted to the extreme upper position.

b. Receive-Only Typing Reperforator (ROTR) Set. Install as follows:

(1) Remove the two TP161630 screws and TP2191 lockwashers holding the TP156904 gear guard of intermediate shaft assembly casting. Set these parts aside.

(2) Remove the TP151346 screw and TP2191 lockwashers from the shaft and TP156226 hub. Remove hub from shaft.

(3) Select gear set for the desired speed. See table 8-1.

Table 8-1. Gearset Chart

Speed WPM	Speed OPM	Gearset	Gear	Motor Pinion
60	368	TP161654	TP156981	TP156982
67	404	TP161519	TP161103	TP161104
75	460	TP161655	TP156983	TP156984
100	600	TP161656	TP156985	TP156986

(4) Mount gear on hub using three each of TP151695 TP2191 screws and lockwashers. Mount gear with counterbored holes away from hub. do not tighten screws. To align gear, hub, and shaft, slip assembly onto intermediate shaft with hub side first, and tighten gear mounting screws. The assembly is removed and remounted with gear side first on the shaft. Secure hub to shaft using screw and lockwasher found in cloth bag attached to base. See step (2) above.

(5) Mount motor pinion on motor shaft using the TP151346 screw and TP2191 lockwasher.

(6) Remove the following parts from attached bag: one TP156334 stud, one TP156344 adjusting bracket, one TP125224 (1/4-32) nut, five TP2449 lockwashers, and four TP156936 (1/4-32 x 5/16) screws. Thread the TP156334 stud in motor mounting post to immediate left of driven gear. Do not tighten at this time. Using two TP156936 screws and two TP2449 lockwashers, mount adjusting bracket to gear end of motor with center hole extending beyond motor mounting plate. Place motor with bracket over three motor mounting posts with hole in adjusting bracket passing over stud in right post. Fasten fan end of motor with two TP156936 screws and two TP2449 lockwashers to the two posts, taking up all slack in mounting holes to extreme left position. Place remaining TP2449 lockwasher and TP125224 nut on stud holding adjusting plate. Tighten nut friction tight.

(7) Remove the TP156400 sprocket from bag attached to drive assembly. Mount sprocket to hub on reperforator using screws and lockwashers already fastened to hub. The screw heads and lockwashers should be on the side of the deeper inset of the sprocket.

(8) To mount reperforator onto base, remove the following from bag attached to base: three TP156887 (10-32 x 9/16) hex head screws, three TP3438 flat washers, one TP151631 (6-40 x 5/16) hex head screw, one TP2191 lockwasher, and one TP7002 flat washer. Place reperforator over its mounting holes in base. Loosen screw holding small TP156183 L-bracket to lower right front cover of punching mechanism. Start the TP151631 screw with

TP2191 lockwasher and TP7002 flat washer through the TP156183 L-bracket into the proper tapped hole in base plate. Do not tighten screw. Start the three TP156887 screws with TP2669 lockwashers and TP3438 flat washers through casting holes in base plate. Do not tighten screws. Press the TP156183 L-bracket against base plate and tighten screw holding bracket to punching mechanism. Tighten screw holding bracket to base. Tighten the three TP156887 mounting screws.

(9) Remove the TP156866 toothed belt from bag attached to base. Loosen intermediate shaft assembly mounting screws. Slip belt over sprockets on intermediate shaft assembly and reperforator drive shaft. Move intermediate shaft assembly away from motor until there is a deflection of 1/8 inch when a pressure of 8 ounces is applied to the belt midway between sprockets. Tighten screws.

(10) The motor pinion and intermediate gear should have a barely perceptible backlash. Adjust stud in right motor mounting post up or down as needed. Tighten nut on stud while holding stud. Loosen mounting screws on intermediate shaft casting if gears do not mesh at right angles. Correct angle and maintain tension on toothed belt as described in step (9). Tighten casting screws. Recheck backlash.

(11) Lubricate motor pinion and intermediate gear with KS7471 grease. Do not lubricate the sprockets over which the belt rides.

(12) Remount gear guard on intermediate drive shaft casting using its screws and lockwashers as described in step (1) above.

(13) Mount tape container along right edge of base with tape guide toward front. Remove two each TP151623 (10-32 x 3/8) hex head screws, TP2669 lockwashers, and TP3438 flat washers from the bag attached to the base and use to secure container to base.

(14) The right hand or low tape switch should operate before the left hand or tape-out switch. The low-tape switch should operate when the tape roll diameter is reduced to 2-7/16 inches. The tape-out switch should operate when the diameter is further reduced to 2-5/16 inches. To adjust, bend switch levers to meet requirements. To facilitate adjustment remove switch assembly from tape container.

8-5. INSTALLATION OF UNITS - LOW-LEVEL. Install low-level Reperforator and Tape Printer Sets Model 28 and components in accordance with the following paragraphs.

a. Introduction. A wiring diagram is packed with each RFI set and contains pertinent schematic and actual wiring diagrams. Reference should be made to the appropriate WDP for specific wiring information. References made to left or right, top or bottom, and front and rear apply to the set in its normal operating position as viewed from the front. The photographs included in conjunction with the following paragraphs are of typical RFI installations and should be used in support of their associated text. Check the cabinet ground connection before power is turned on to avoid electrical shock.

b. Table Model Keyboard Send-Receive Typing Reperforator (KTR) Set. Install as follows:

(1) Refer to figure 8-4.

(2) Mount the ESAs in space available anywhere near the set within the limit of the signal cables. Mounting brackets for the ESA are supplied, however, the customer must supply the hardware to fasten these brackets to a table, wall, or cabinet.

(3) Route the signal line conduit or cabling to the keyer selector magnet driver of the ESA. Route the signal line to the opposite side of the fuse and attach by means of a conduit fitting. The ESA container has two 7/8-inch diameter knockouts for 1/2-inch conduit fittings.

(4) Route the synchronous pulse control conduit or cable to the ESA opposite the side of the fuse and attach by means of conduit fittings.

(5) Route the power line conduit or cable to both ESA containers. Connect the power line to the side on which the fuse and power switch are located. Attach by means of a conduit fitting.

(6) Route the clutch magnet driver output cable and signal cables through the notch in the rear of the cover. Route the cables through the nylon clamp on the base and connect to the appropriate terminal block and connector.

c. Table Model Receive-Only Typing Reperforator (ROTR) Set. Install as follows:

(1) Refer to figure 8-5.

(2) A table-mounted ESA is used and can be mounted in space available anywhere near the set within the limit of the signal cable. Mounting brackets for the ESA are supplied, however, the customer must supply the hardware to fasten these brackets to a table or wall.

(3) Route the signal line conduit or cable to the ESA container (the side opposite the fuse) and attach by means of a conduit fitting. The container has two 7/8-inch diameter knockouts for 1/2-inch conduit fittings.

(4) Route the power line conduit or cable to the ESA container (the side with the fuse and power switch) and attach by means of a conduit fitting. The container has a 7/8-inch diameter knockout for 1/2-inch conduit fitting. A separate power cable should be brought into the base for the motor.

(5) Route the signal cable from the ESA to the apparatus through the notch in the rear of the cover, through the nylon cable clamp at the rear of the base, and along the left side of the set to the selector magnet assembly connector. Tie the cable to the motor mounting post at the base to keep it clear of the fan.

d. Slide Assemblies TP305104 and TP305105. Install as follows:

(1) Refer to figure 8-6.

(2) Position the rear mounting brackets on both

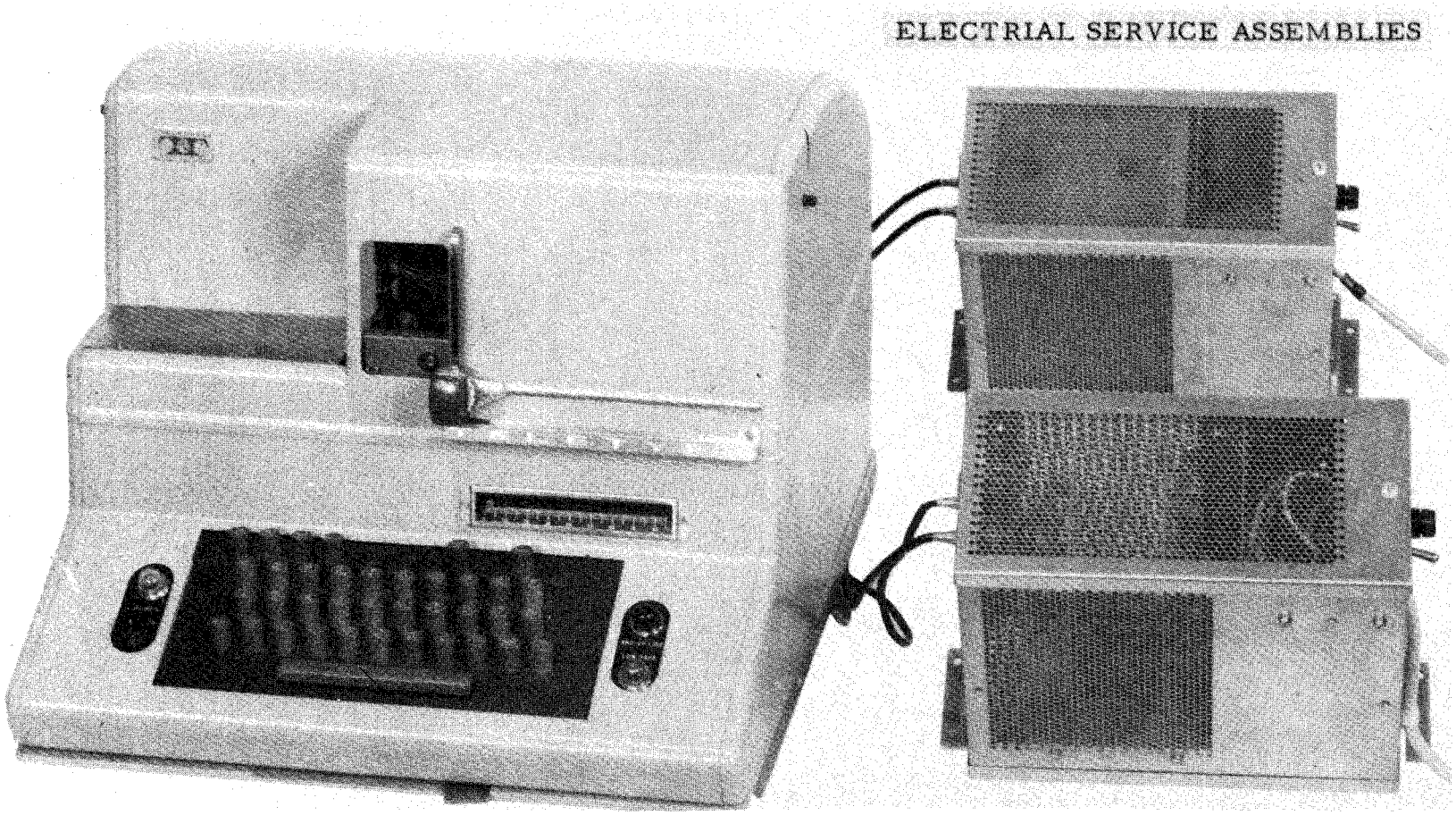


Figure 8-4. Table Model Keyboard Send-Receive Typing Reperforator (KTR) Set

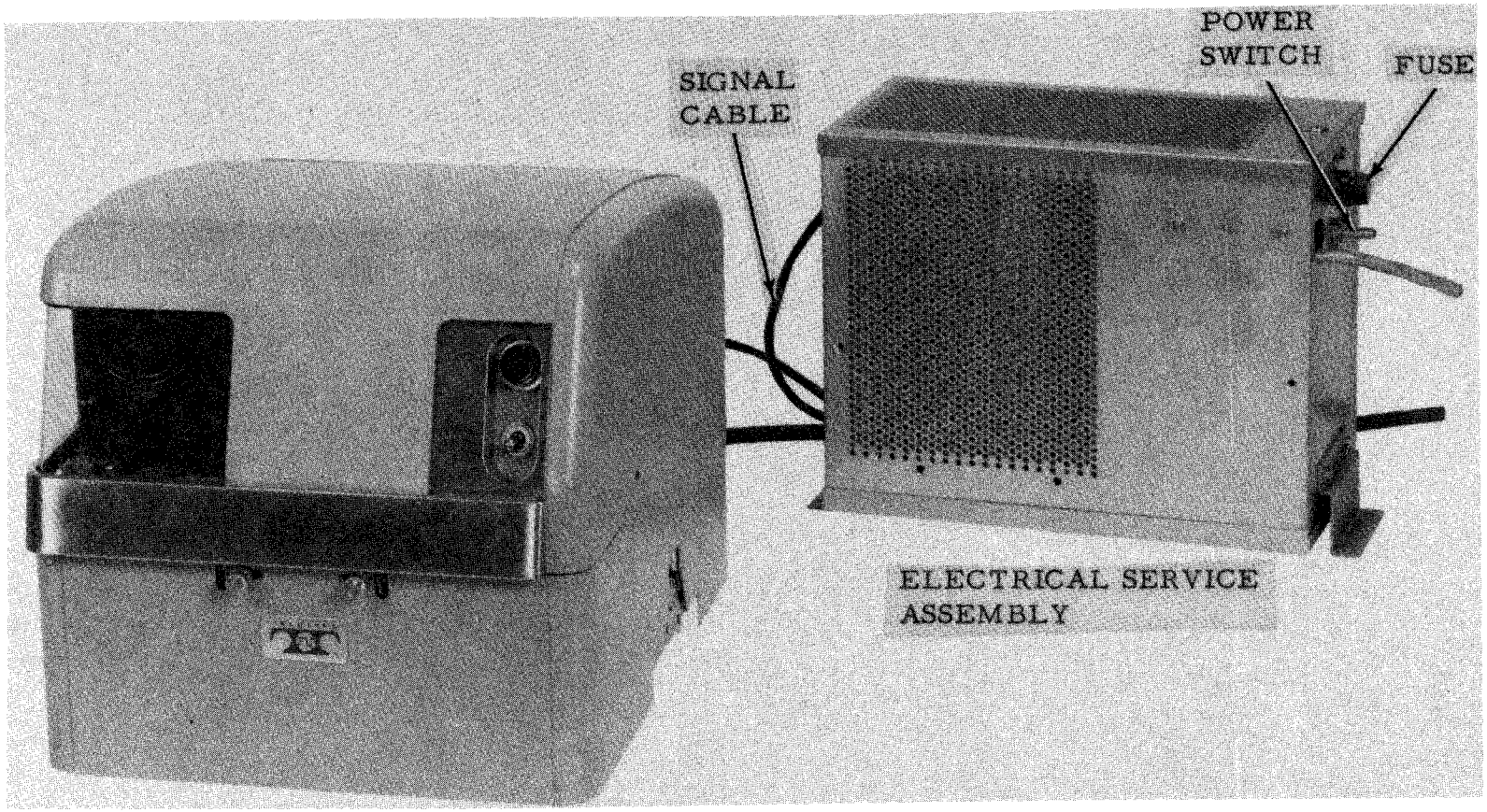


Figure 8-5. Table Model Receive-Only Reperforator (ROTR) Set

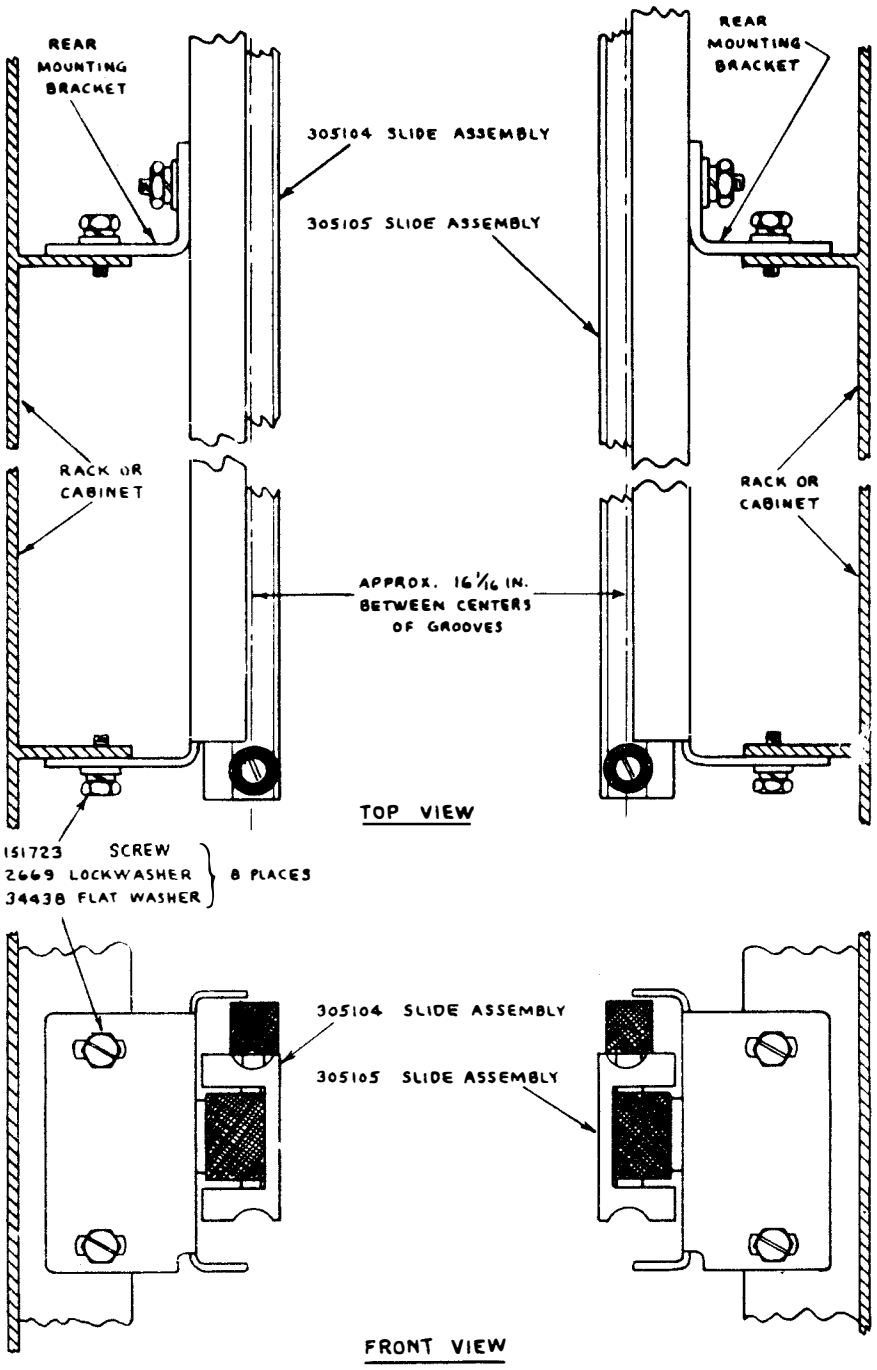


Figure 8-6. Installation of Slide Assemblies TP305104 and TP305105

slide assemblies, so that rear and front brackets span the cabinet mounting brackets. The nuts holding the rear mounting brackets to the slide assemblies should be finger tight.

(3) Loosely mount the slide assemblies to the cabinet mounting members.

(4) Position the slide assemblies so they are horizontally in the same plane and the distance between the centers of the top grooves is approximately 16-1/16 inches.

(5) Tighten the eight mounting screws then tighten the four nuts left loose as described in step (1).

(6) To mount the shelf assembly on the slides, remove two studs on bottom edges of the sides of the shelf. They are near the front of the shelf.

(7) Extend both slides to their full extension.

(8) Place the shelf on the slides so that the four guideposts, two on each side of the shelf, ride in the grooves of the slides. It will be necessary to hold the release rod, on the front of the shelf, in its inner position so that the shelf latch fingers are fully withdrawn.

(9) Check the shelf to see that the front two guideposts are behind the round rubber bumpers on the front of the slides.

(10) Replace the two studs removed in step (6) above.

(11) The shelf should not be able to move back and forth, when unlatched, and should be held captive to the slides by the two studs.

e. Circuit Card Hold-Downs. The circuit card hold-down installation provides the means to secure circuit cards into connectors of Model 28 low-level electrical service assemblies. This provides protection against shock, vibration, and loosening of circuit cards. The installation material consists of strips of Neoprene rubber foam.

f. Electrical Service Assemblies TP321230, TP321231 an TP323813. Install Neoprene foam rubber on these units as follows:

(1) Refer to figure 8-7.

(2) Turn the locking screw to remove and retain the TP321996 cover (with stud).

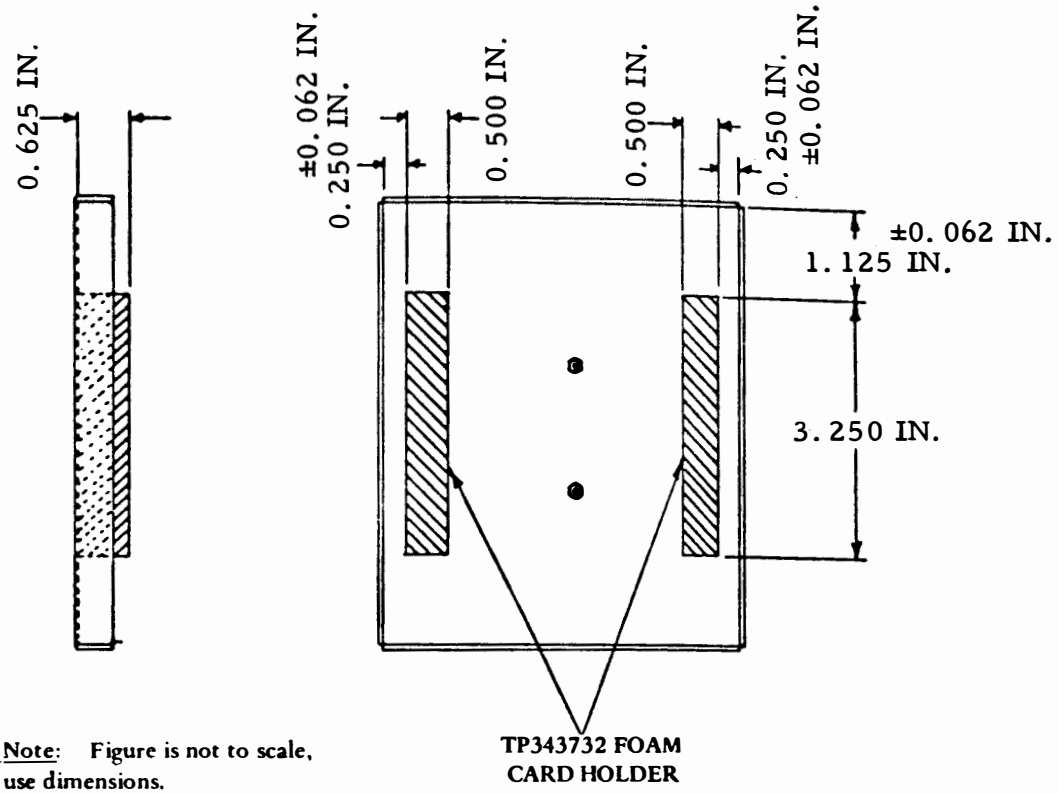
(3) Remove and retain the TP320057 inner cover.

(4) Measure and mark the central locations for the placement of the two TP343732 foam card holders, at the inside edge of the perforations, inside the TP320057 cover.

(5) Peel the paper backing from each TP343732 foam card holder and place adhesive sides to the inside of the TP320057 inner cover in area as shown on figure. Press foams to obtain maximum adhesion.

(6) Replace the modified TP320057 inner cover.

(7) Replace the TP321996 cover (with stud) and lock into position.



Note: Figure is not to scale, use dimensions.

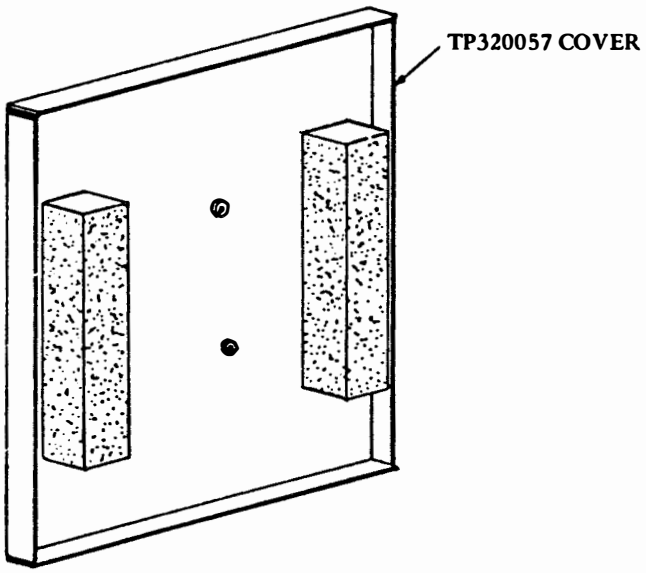


Figure 8-7. Installation of Neoprene Rubber Foam for Electrical Service Assemblies TP321230, TP321231 and TP323813

8-6. ELECTRICAL AND SIGNAL CIRCUITRY. Install electrical and signal circuitry as follows:

a. See appropriate wiring diagrams.

b. Cable connectors will be found on their associated base connectors.

8-7. CHECKOUT. Check mating of all connectors and receptacles. Check screw terminal connections and lamps for loosening or breakage. On some sets check fuse. The main power switch should be in the down (OFF) position before closing the main power line to the set.

8-8. TAPE AND RIBBON THREADING. Thread tape and ribbon in accordance with the following paragraphs:

a. Tape Threading. Thread tape as follows:

(1) Thread the tape according to figure 8-8.

(2) Threading is identical for all units within the typing reperforator mechanism, but the path from the tape container is adapted to the particular unit. The tape should feed smoothly over the approximate center of all rollers and feed without binding. Bend tape guides as necessary to meet this requirement.

(3) All typing reperforator sets print upon and perforate standard teletypewriter tape supplied in eight-inch rolls on a two-inch spool. Remove the tape container hub from the tape container and insert it through the spool. On most units the tape feeds from right to left. However, in some receive-only units the tape feeds from left to right. Insert hub and roll into tape container to feed from bottom of roll. Make certain the low tape switch lever is riding on the outer edge of the tape roll when the tape is installed in the container.

(4) Cut or tear the leading end of the tape square and feed it from the base tape guide rollers or loop into the tape chute. Push the tape downward around the die wheel to the point where it will be engaged by the feed wheel. Turn the manual feed thumbscrew counterclockwise to thread the tape between the feed wheel and the die wheel, under the tape shoe, and through the punch block.

(5) Extend the tape beyond the edge of the cabinet or cover tape aperture, closing the access door with the tape protruding.

b. Ribbon Threading. Install as follows:

(1) Refer to fiugre 8-9.

(2) Open the cabinet or cover access door.

(3) The ribbon mounts in a vertical position at the top of the reperforator, held in place on each of two ribbon spool shafts by a toggle lever. Engage the hook on the end of the ribbon in the hub of an empty spool (retain one spool if replacing a used ribbon). Wind a few turns of the ribbon onto the empty spool to make sure that the reversing eyelet has been wound upon the spool. The left spool winds clockwise, the right counterclockwise.

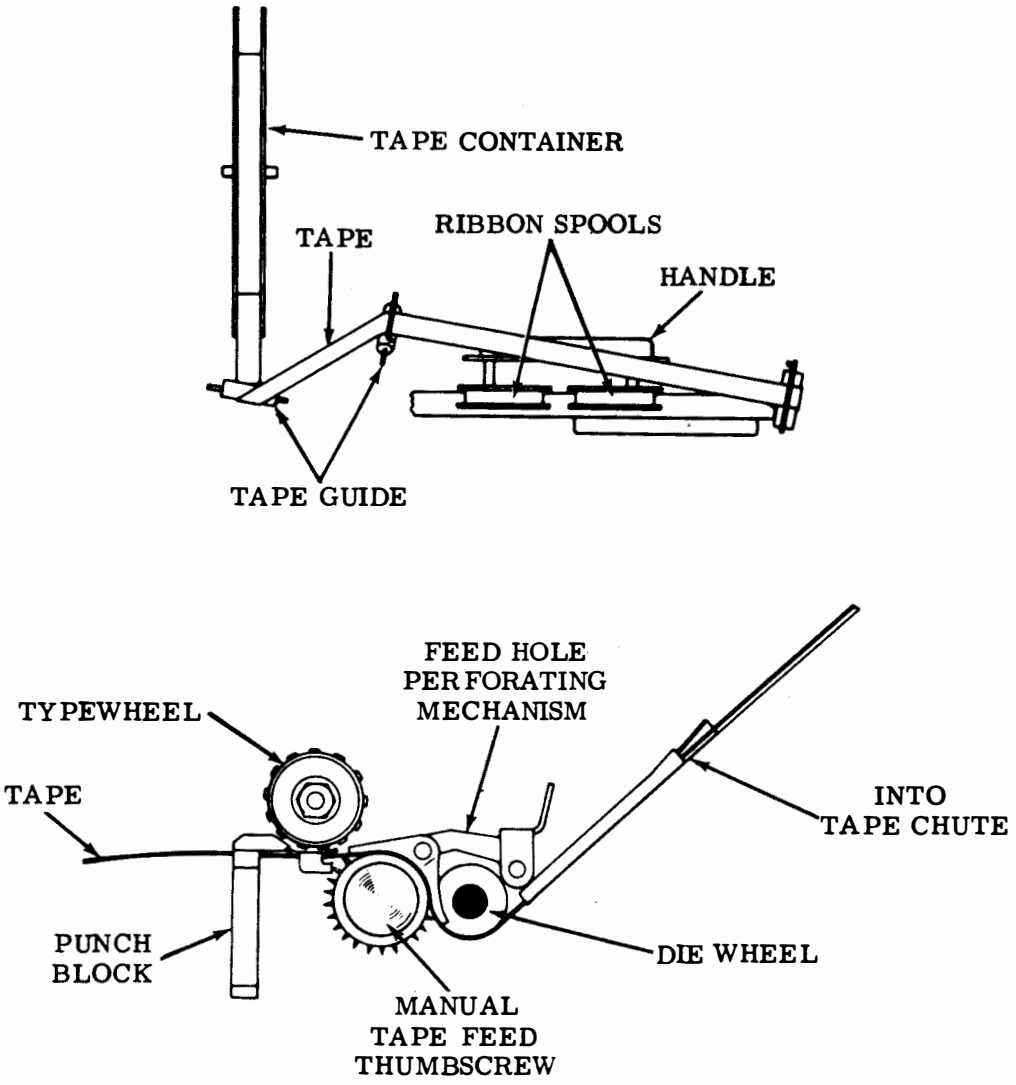


Figure 8-8. Path of Tape

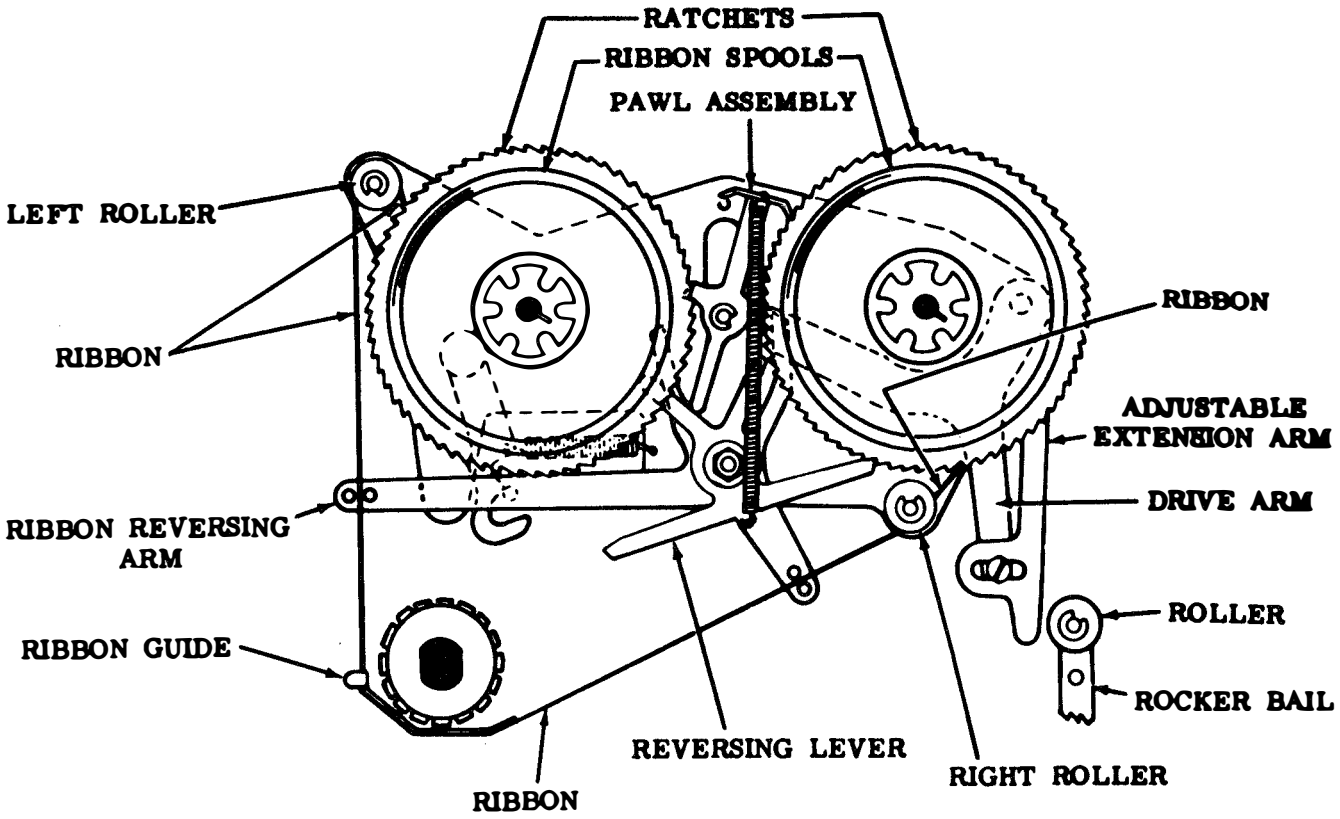


Figure 8-9. Path of Ribbon

(4) Install the empty spool over the open toggle of its spindle, and turn the spool slightly until the driving pins on the shaft engage the holes in the rear of the spool.

(5) Close the toggle, and thread the ribbon around the roller, through the reversing pins (making sure the eyelet is always above the pins) for both spools, over the left (or under the right) roller and to the opposite spindle.

(6) Place the spool on the spindle. Rotate the spool to take up the slack in the ribbon. Latch the second toggle. The properly installed ribbon should feed from the outside of each ribbon spool and should reverse whenever an eyelet engages a set of reversing pins.

c. Power Switch. Check out as follows:

CAUTION

Be sure the power switch is off before turning on the external power supply.

(1) Turn the power switch ON to prepare the equipment for automatic operation as receive-only sets responsive to incoming signal line impulses, or for combined send-receive operation.

(2) On receive-only sets the main power switch is a toggle-type switch located at the right side of the front of the cover and accessible through apertures in the cover.

(3) Send-receive sets are equipped with a rotary-type switch located at the left side of the keyboard. By rotating this switch counterclockwise the pilot light above the switch lights and the set is turned on.

d. Gear Operation. Check out as follows:

CAUTION

Operate the speed selector lever with the motor off.

(1) Refer to paragraph 8-4.b(3).

(2) Send-receive sets are equipped with gears of a given speed. Before operating the set make sure any other receiving equipment looped with it is equipped with the same gearset. Receive-only sets may be equipped with either a single speed set of gears or with a variable speed mechanism which allows the set to operate at typical speeds of 60, 75, or 100 words per minute.

(3) Before the equipment is operated, make certain that the set gears are compatible with the speed of the sending equipment. The variable-speed mechanism has a selecting lever at the rear of the set which may be moved to obtain the desired speed.

e. Keyboard Operation. Check out as follows:

(1) Visually check operation of the tape feed-out magnet armature when the TAPE FEED-OUT button (TAPE FEED-OUT key for send-receive sets) is depressed. The armature should be pulled down. Tape feed-out will not take place, however, since the set is running open

(no signal circuit) and tape feed is continuous.

(2) Close the external signal circuit. The typing reperforator should run closed (marking signal circuit) until an incoming signal initiates perforating and typing functions.

(3) Check an incoming message by inspecting the typed tape and comparing the coded equivalent (six characters in advance of the typed character) with the typed character. The punch mechanism and the typing mechanism are factory adjusted for satisfactory operation without installation adjustment. However, the quality of the input signal may require refinement of the orientation range setting.

(4) Check keyboard functions on send-receive sets by operating the keys under power and checking the tape prepared in the typing reperforator.

(5) With the motor switch ON, depress the KBD UNLK (keyboard unlock) key. Type any typical test message. Note that the indicator on the character counter advances one unit for each character. The character counter lamp at the right side of the keyboard should be illuminated between 66 and 68 characters. Depress the CAR RET (carriage return) key when the end-of-line indicator lamp is lit. The lamp should be extinguished, and the character counter indicator should return to zero position.

(6) Depress the TAPE B SP (tape backspace) key. Tape in the typing reperforator should be moved one character to the right of punch block.

(7) Depress the TAPE F O (tape feed-out) key. Tape should automatically feed out of the typing reperforator to a predetermined length. Depending on the type of feed-out mechanism in the set this feature must be checked accordingly. The set may be equipped with either an interfering or a noninterfering feed-out mechanism. Feed-out may be accomplished either automatically or manually.

(8) Depress the RPT (repeat) key simultaneously with any other character key. Transmission of the character should be continuous until the character key is released.

(9) Depress the BREAK key. The typing reperforator should run open, indicating an interruption in the signal circuit.

(10) Depress the KBD LOCK key. All keys on the keyboard should lock.

(11) There are three lamps on the send-receive set. They are the power pilot light, end-of-line indicator lamp, and the low-tape lamp. The Miniaturized Typing Peperforator Set has only the low-tape lamp. Make sure these lamps are operative.