

**BULLETIN 287B  
VOL. 2**

**TECHNICAL MANUAL  
MODEL 35  
AUTOMATIC SEND-RECEIVE  
TELETYPEWRITER SET  
(DATA COMMUNICATIONS)**



**TELETYPE<sup>®</sup>  
CORPORATION**  
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287B  
VOLUME 2

INTRODUCTION

Bulletin 287B is a technical manual that provides general and specific technical information about the Model 35 Automatic Send-Receive Teletypewriter Set (Data Communications) and its component units.

The Bulletin is made up of two volumes. Volume 1 contains descriptions and principles of operation, installation, service and maintenance, lubrication, and disassembly and reassembly. Volume 2 contains adjustments.

Each volume is made up of a group of appropriate independent sections. The sections are complete within themselves; they are separately identified by title and section number and the pages of each section are numbered consecutively, independent of other sections.

The identifying number of a section, a 9-digit number, appears at the top of each page of the section, in the left corner of left-hand pages and the right corner of right-hand pages. The sections are placed in the manual in ascending numerical order.

To locate specific information refer to the table of contents on the following page. Find the name of the involved component in column one and the title of the section in column two. The correct 9-digit section number will then be found in column three. Turn to page one of the section indicated, where the contents of that section will be found (except where a section is small and does not require a listing of contents).

The sections comprising this bulletin are now stocked separately and may be individually ordered if the entire bulletin is not needed.

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FILING INSTRUCTIONS

1. The following filing instructions apply to changes sent to the field.
2. Asterisks (\*) in the table of contents indicate changes.
3. When the issue of a section changes, replace the old issue with the attached new one.
4. In the case of addendums, turn to the affected section and follow the instructions on the first page of the attached addendum.
5. Replace the old table of contents with this new one.

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Keyboard (LAK)	Adjustments	574-222-700TC	6*
Base, Dual Reader (LCXB)	Adjustments and Lubrication	574-223-700TC	3
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35 TYPING UNIT (LP)

ADJUSTMENTS

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## 1. GENERAL

1.01 This section contains the specific requirements and adjustments for the 35 typing unit.

1.02 This section is reissued to include paper jam alarm, to add recent engineering changes and to delete the adjustment for typebox position (sprocket feed). Arrows in the margins indicate changes and additions.

**CAUTION: REMOVE POWER FROM SET OR UNIT BEFORE MAKING ADJUSTMENTS.**

1.03 The adjustments in this section are arranged in a sequence that should be followed if a complete readjustment of the unit is undertaken. A complete adjusting procedure should be read before attempting to make the adjustment. After an adjustment is completed, be sure to tighten any nuts or screws that may have been loosened, unless otherwise instructed.

1.04 The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions, and the angle at which scales should be applied. The tools required to make adjustments and check spring tensions are not supplied with the equipment, but are listed in Section 570-005-800TC. Springs which do not meet the requirements, and for which there are no adjusting procedures, should be discarded and replaced by new springs.

1.05 References made to left, right, up, down, front, rear, etc, apply to the unit in its normal operating position as viewed from the front.

1.06 When a requirement calls for a clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latch-lever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum.

Note: When the main shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve drag and permit the main shaft to rotate freely, apply pressure on the lug of the clutch disc with a screwdriver to cause it to engage its latch lever and fully disengage the clutch.

1.07 To manually operate the typing unit proceed as follows.

(a) Attach the TP312709 armature clip to the selector magnet armature by carefully placing the spring loop over the magnet terminal insulator. Press down to engage the hook of the clip on the underside of the armature and release. The spring tension of the armature clip will hold the selector armature in the marking (attracted) position.

(b) While holding the selector magnet armature operated by means of the armature clip, use the handwheel, included with the special tools for servicing 28 teletypewriter apparatus, to manually rotate the main shaft in a counterclockwise direction until all the

clutches are brought to their disengaged position.

(c) Fully disengage all clutches in accordance with 1.06, Note.

(d) Release the selector magnet armature momentarily to permit the selector clutch to engage.

(e) Rotate the main shaft slowly until all the pushlevers have fallen to the left of their selecting levers.

(f) Strip the pushlevers from their selector levers, which are spacing in the code combination of the character function that is being selected, and allow the pushlevers to move to the right.

(g) The pushlevers and the selector levers move in succession starting with the no. 1 to the no. 7; the no. 8 is always marking and is not equipped with a selector lever.

(h) Continue to rotate the main shaft until all operations initiated by the selector action clear through the unit.

1.08 Where adjustment instructions call for removal of components, assemblies, subassemblies or parts, all adjustments which the removal of these parts might facilitate should be made before the parts are replaced or as the equipment is reassembled. When a part mounted on shims is removed, the number of shims and their location should be noted so that the identical pile-up can be made when the part is replaced.

1.09 All electrical contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25 percent of the contact diameter. Check contacts for pitting and corrosion and clean or bur-nish them before making specified adjustment or tolerance measurement. Avoid sharp kinks or bends in the contact springs.

**CAUTION: KEEP ALL ELECTRICAL CONTACTS FREE OF OIL AND GREASE.**

1.10 When making a complete adjustment of the unit, the following conditioning operations should be performed to prevent damage.

(a) Loosen the shift lever drive arm clamp screw (2.13).

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- (b) Move the right and left vertical positioning lever eccentric studs (2.32 and 2.33) in rocker shaft brackets to their lowest position.
- (c) Loosen the two bearing stud mounting screws and the two connecting strip clamp screws in the horizontal positioning drive linkage (2.38).
- (d) Loosen the clamp screws and move the reversing slide brackets to their uppermost position (2.37).
- (e) Loosen the function reset bail blade mounting screws (2.36).
- (f) Loosen the carriage return lever clamp screw (2.49).
- (g) Loosen the clamp screws in the oscillating rail slide (2.44).
- (h) Loosen the reversing slide adjusting stud (2.37).
- (i) Loosen clamp and pivot screws on shift arm bearing bracket and move to extreme downward position (2.39).
- (j) Loosen the clamp screw on the shift drive pawl operating bail (2.41).
- (k) Check the following adjustments during each lubricating period.
  - (1) Printing carriage position (2.51).
  - (2) Printing hammer bearing stud (2.51).
  - (3) Printing hammer stop bracket. Also see Note in 2.54.
  - (4) Lower draw wire rope (2.45).
  - (5) Dashpot vent screw adjustment and check transfer slide for binds (2.50).

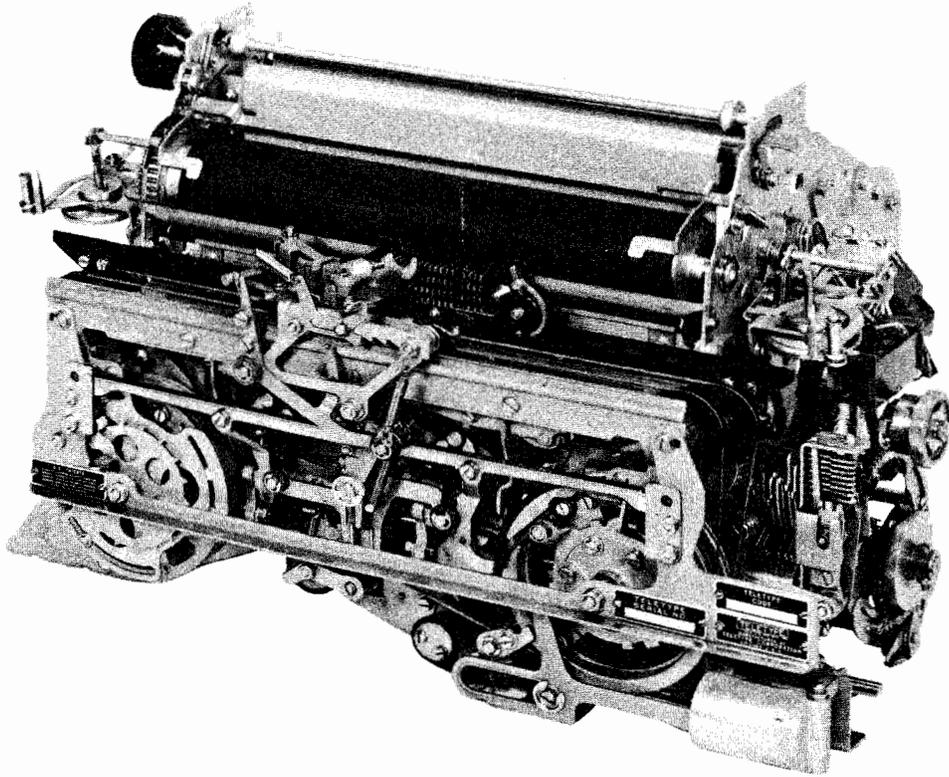


Figure 1 - 35 Typing Unit (Friction Feed)

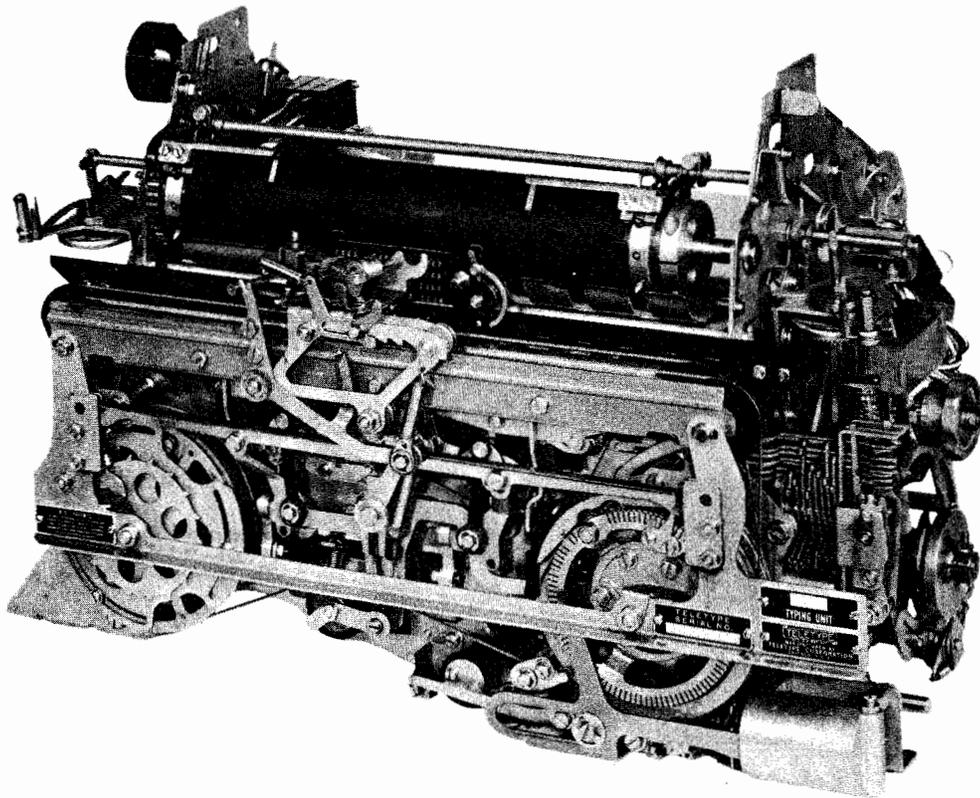


Figure 2 - 35 Typing Unit (Sprocket Feed)

2. BASIC UNITS

2.01 Selector Mechanism

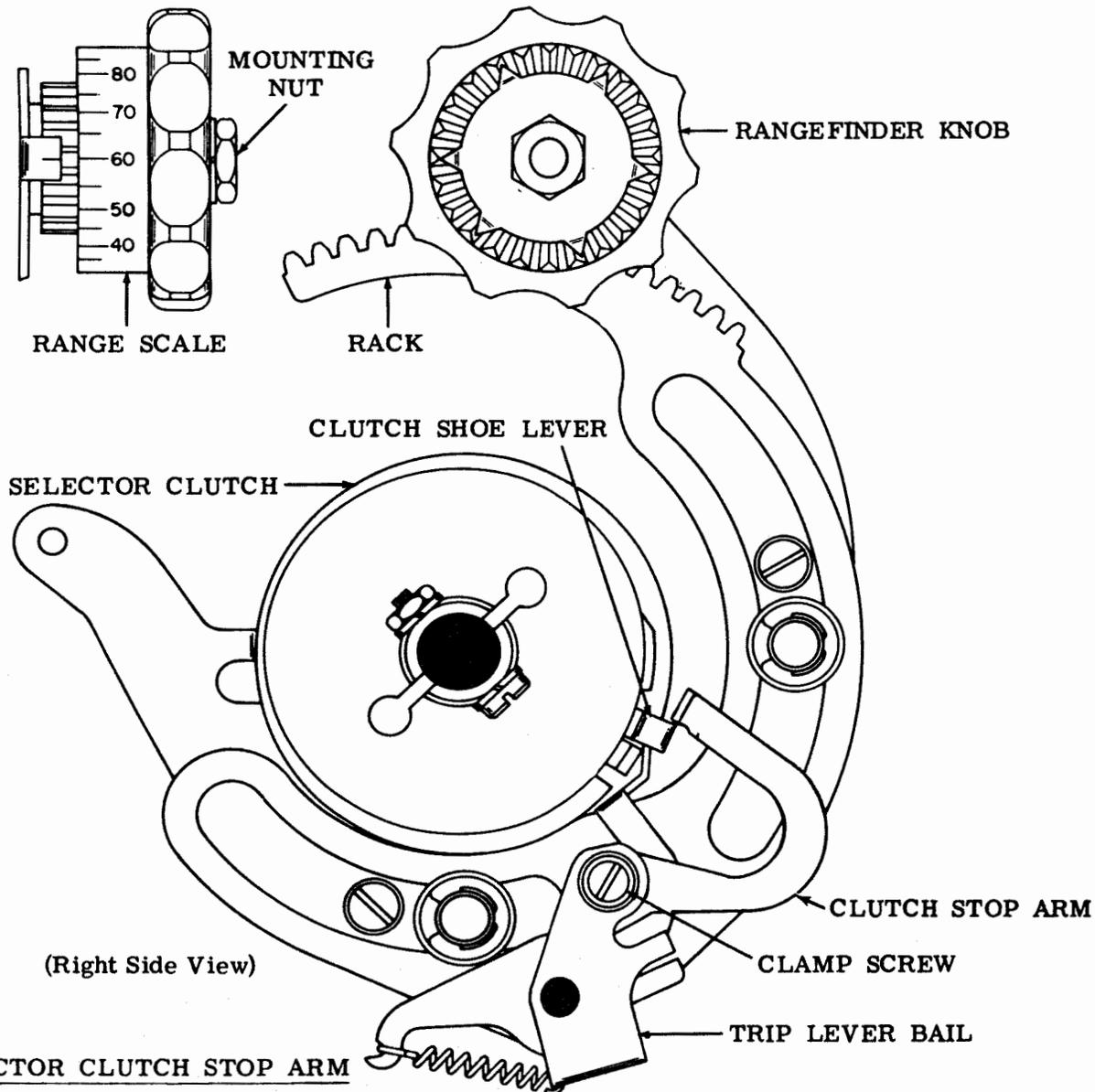
(A) RANGEFINDER KNOB

Requirement

With rangefinder knob turned to either end of rack, and inner teeth of knob and teeth of sector assembly engaged,  $\phi$  mark on scale should be within  $\pm 3$  divisions of scribed line on rangefinder plate.

To Adjust

Loosen knob mounting nut and engage teeth of sector in position that most closely aligns the mark on the plate with the  $\phi$  mark on the knob.



(B) SELECTOR CLUTCH STOP ARM

Requirement

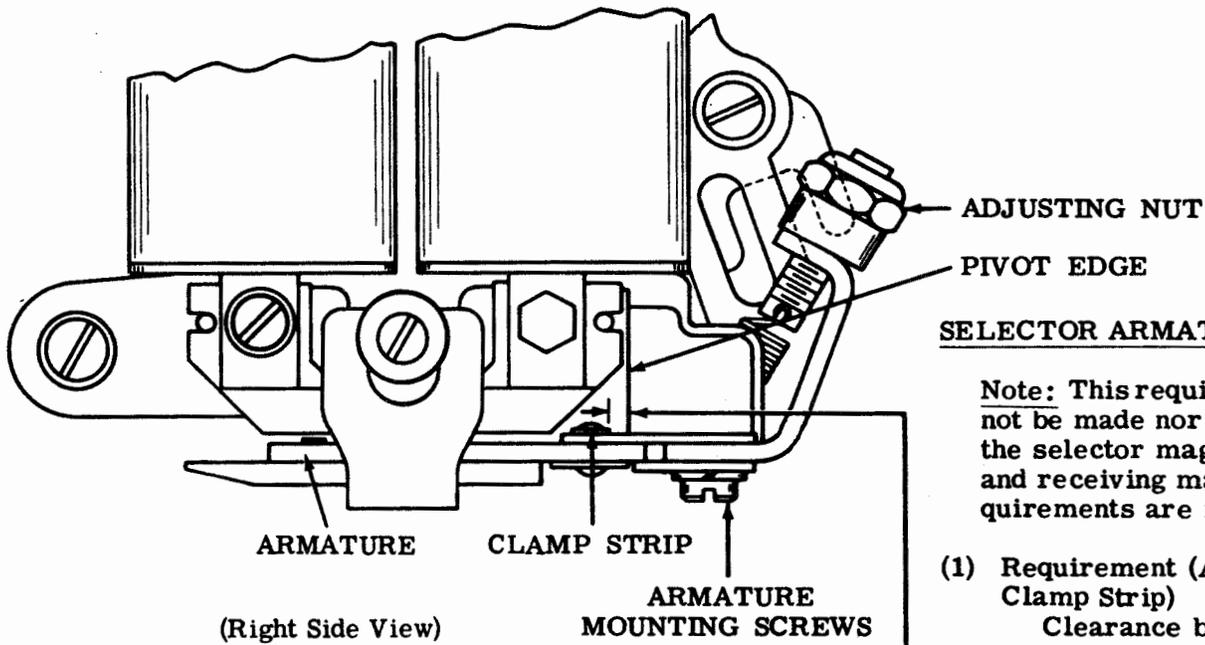
Range scale set at 60. Selector clutch disengaged. Armature in marking position. Clutch stop arm should engage clutch shoe lever by approximately full thickness of clutch stop arm.

To Adjust

Position stop arm on trip lever bail with clamp screw loosened.

2.02 Selector Mechanism (continued)

Note: To facilitate making the following adjustments, remove the rangefinder and selector magnet assemblies. To insure better operation, pull a piece of bond paper between the armature and the pole pieces to remove any oil or foreign matter that may be present. Make certain that no lint or pieces of paper remain between the pole pieces and armature.



SELECTOR ARMATURE

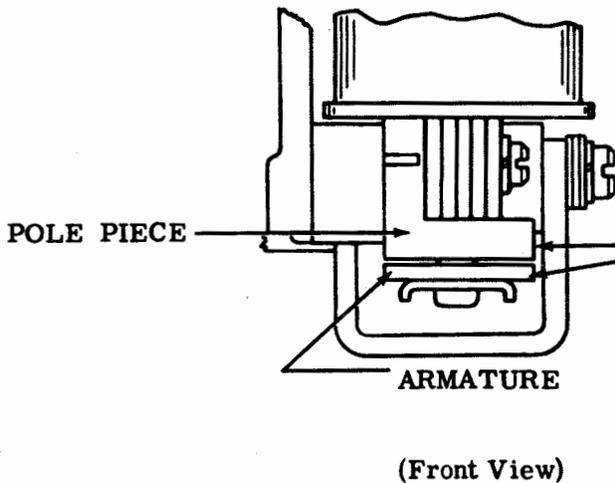
Note: This requirement need not be made nor checked if the selector magnet bracket and receiving margin requirements are met.

- (1) Requirement (Armature Clamp Strip)  
Clearance between armature clamp strip and casting  
— Min 0.010 inch

To Adjust  
Position armature spring adjusting nut to hold armature firmly against pivot edge of casting.

- (2) Requirement (Armature Alignment)  
Outer edge of armature should be flush within  
— Max 0.015 inch  
with outer edge of pole pieces.

To Adjust  
Position armature and backstop with mounting screws loosened.



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**2.03 Selector Mechanism (continued)**

**Note:** Replace rangefinder and selector magnet assembly.

**SELECTOR ARMATURE DOWNSTOP (PRELIMINARY)**

**Requirement**

Magnet de-energized. Locklevers on high part of cam. With armature resting against downstop

— Min 0.030 inch---Max 0.035 inch clearance between end of armature and left edge of left pole piece.

(Right Side View)

DOWNSTOP BRACKET MOUNTING SCREW

POLE PIECE

GAUGE

ARMATURE

**To Adjust**

Position downstop with downstop bracket mounting screw friction tight.

ARMATURE DOWNSTOP BRACKET

DOWNSTOP BUTTON

(Front View)

## 2.04 Selector Mechanism (continued)

**SELECTOR ARMATURE SPRING**

(For Units Employing Selector Armature With Single Antifreeze Button Only)

**Requirement (Preliminary)**

With locklevers and start lever on high part of their cams, scale applied as nearly vertical as possible under end of armature extension. It should require the following tensions to move armature to marking position:

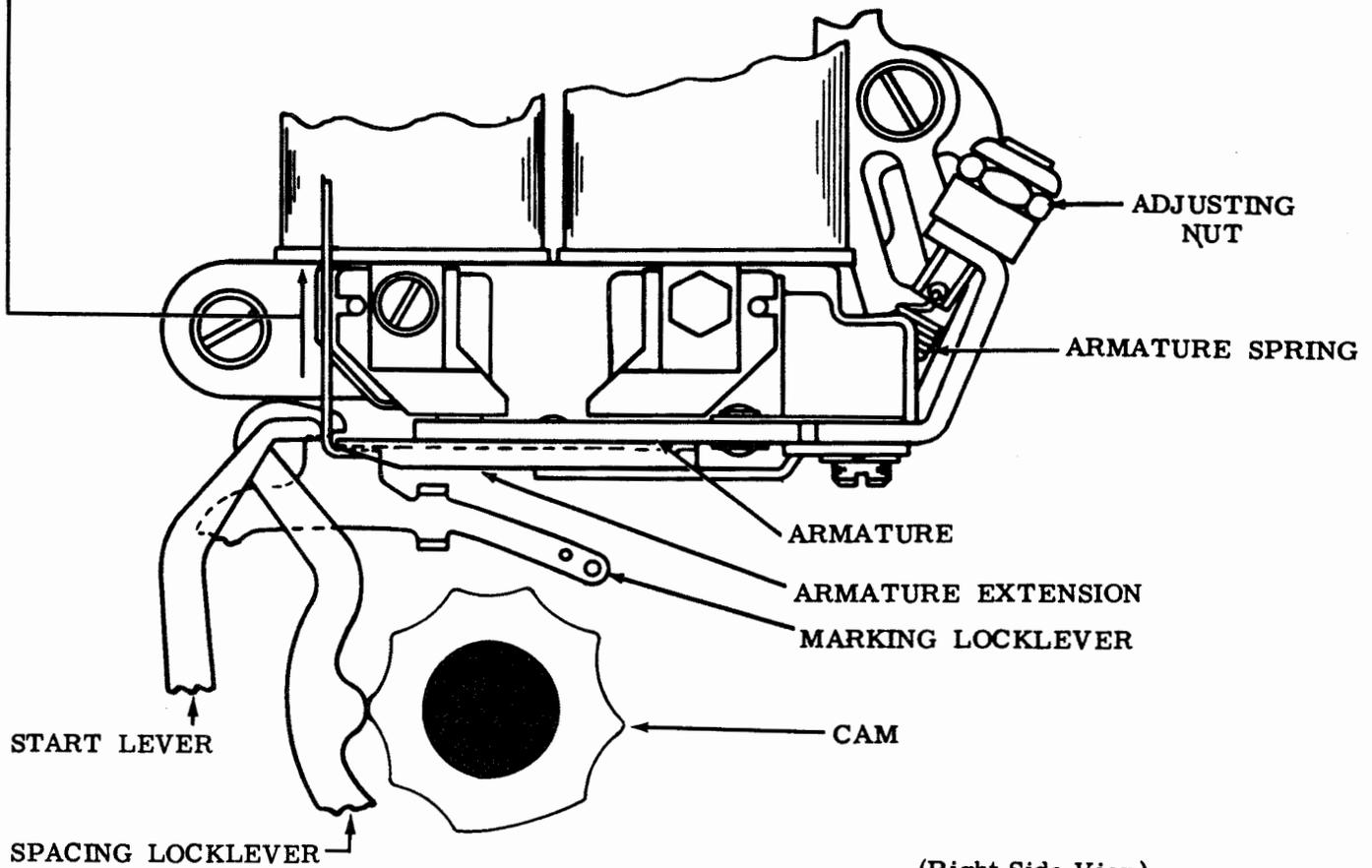
- 0.060 ampere - Min 2-1/2 oz---Max 3 oz
- 0.030 ampere - Min 1-1/2 oz---Max 2 oz
- 0.500 ampere - Min 4-1/2 oz---Max 5-1/2 oz

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

To Adjust  
Position adjusting nut.

**Requirement (Final)**

See SELECTOR RECEIVING MARGIN adjustment (2.10).



2.05 Selector Mechanism (continued)

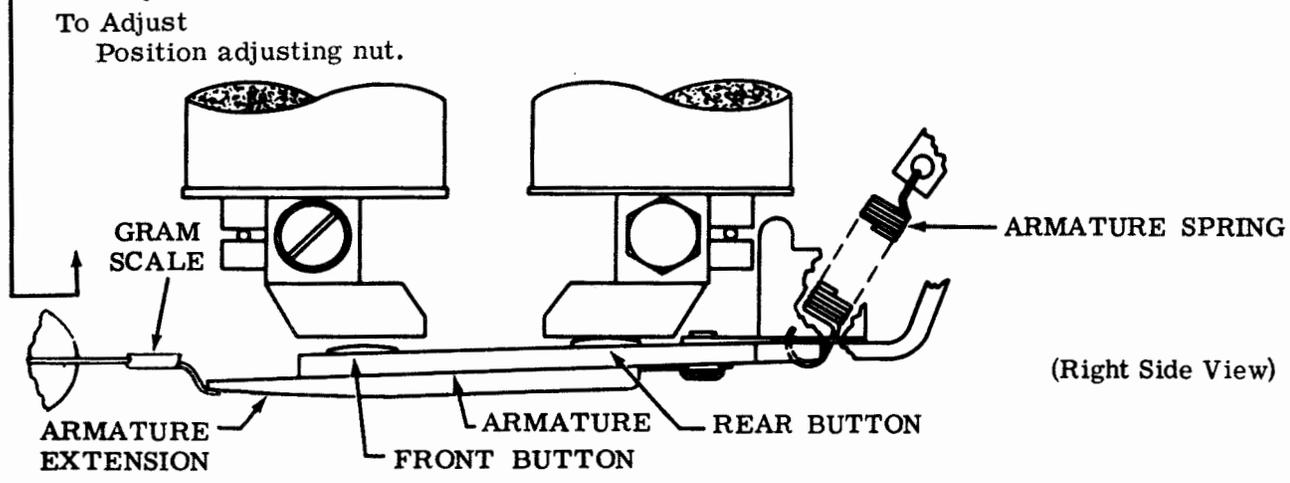
**SELECTOR ARMATURE SPRING (PRELIMINARY)**

(For Units Employing Selector Armature With Two Antifreeze Buttons Only)

**Requirement**

With locklevers and start lever on high part of their cams, gram scale applied under end of armature extension, it should require approximately the following tensions to move the rear antifreeze button against the magnet core:

- 0.020 ampere -- 14 grams
- 0.030 ampere -- 18 grams
- 0.060 ampere -- 21 grams
- 0.500 ampere -- 28 grams

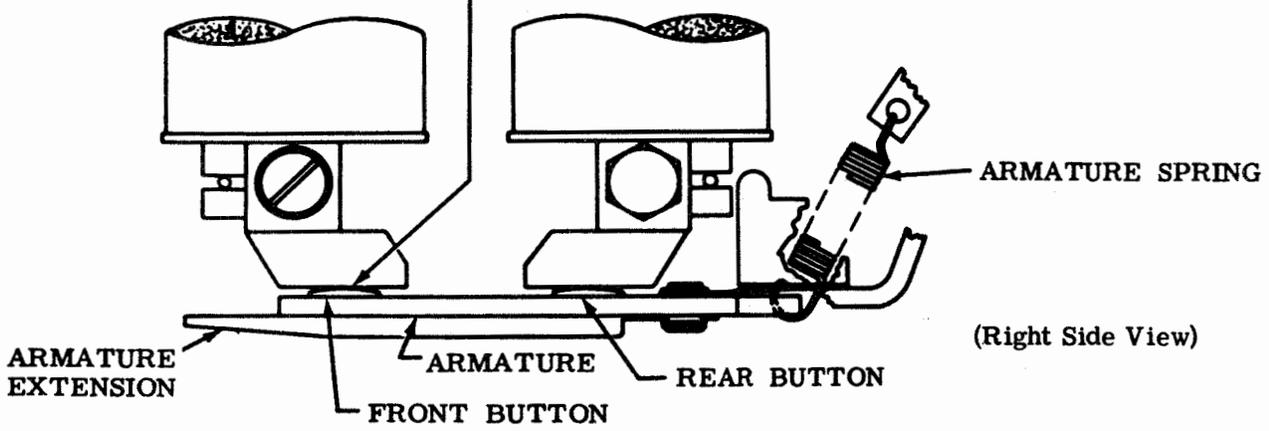


**SELECTOR ARMATURE SPRING (FINAL)**

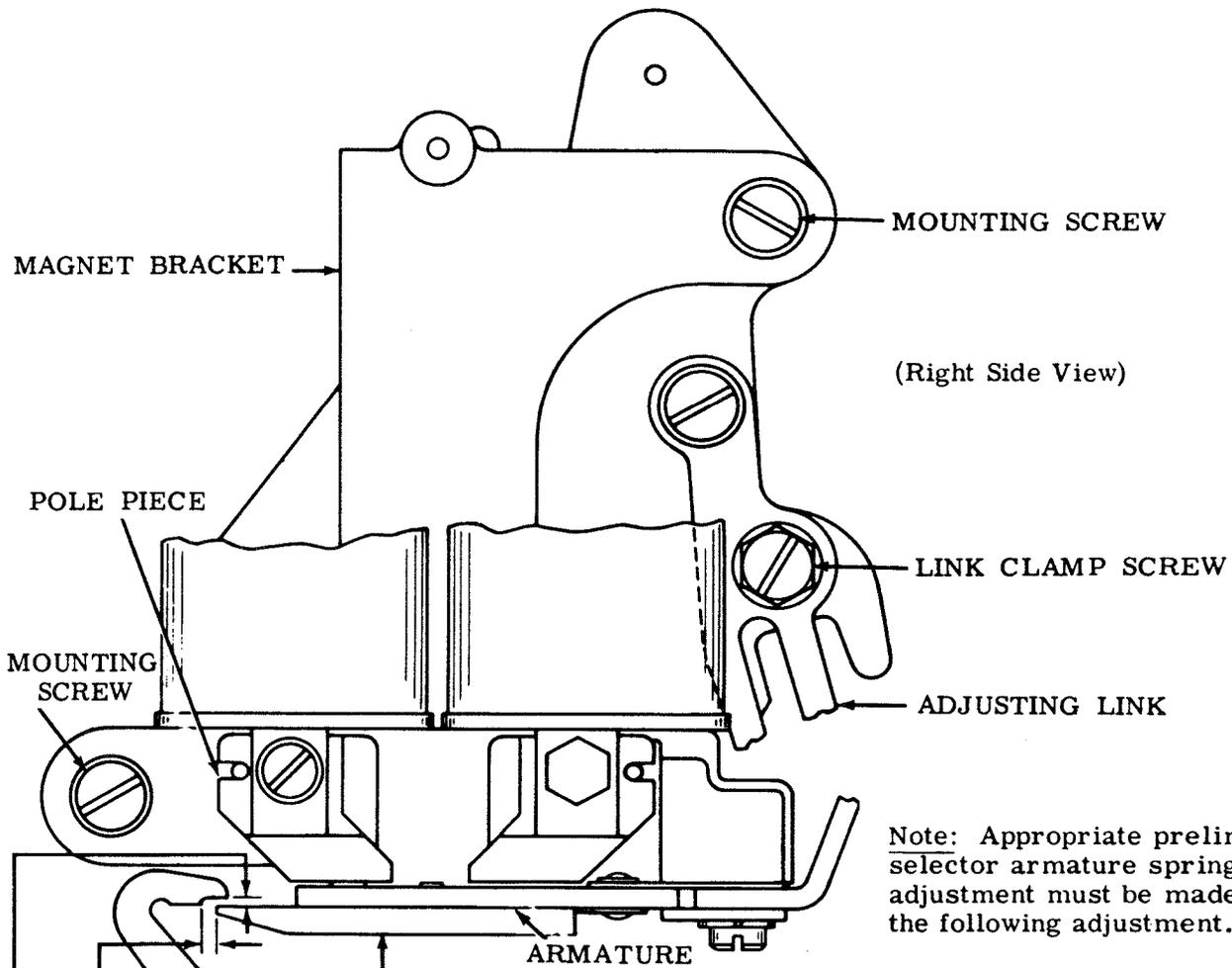
**Requirement**

When a Distortion Test Set is available, the selector armature spring tension should be refined, if necessary, to obtain satisfactory receiving margins. The front antifreeze button must contact the magnet core when the magnet coils are energized.

(See SELECTOR RECEIVING MARGIN adjustment, 2.10.)



2.06 Selector Mechanism (continued)

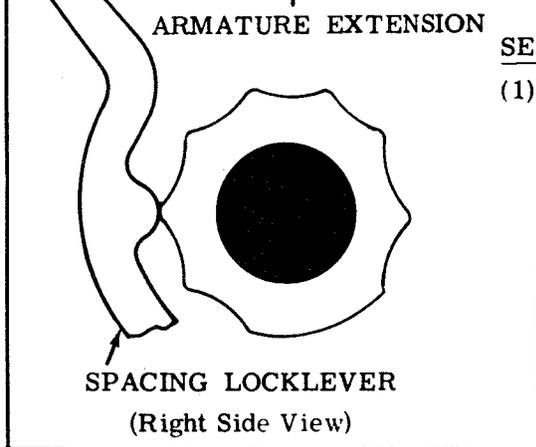


Note: Appropriate preliminary selector armature spring tension adjustment must be made before the following adjustment.

**SELECTOR MAGNET BRACKET**

- (1) Requirement (For Units Employing Either One or Two Antifreeze Buttons)  
 Spacing locklever on each peak of cam. Armature in contact with front pole piece (magnet energized). Clearance between end of armature extension and shoulder on spacing locklever.  
 Min 0.020 inch---Max 0.035 inch

To Adjust  
 Loosen two magnet bracket mounting screws and adjusting link clamp screw. Position magnet bracket by means of adjusting link and tighten link clamp screw only.



- (2) Requirement  
 Armature in contact with front pole piece (magnet energized). Clearance between upper surface of armature extension and lower surface of spacing locklever when locklever is held downward.  
 Min some---Max 0.003 inch

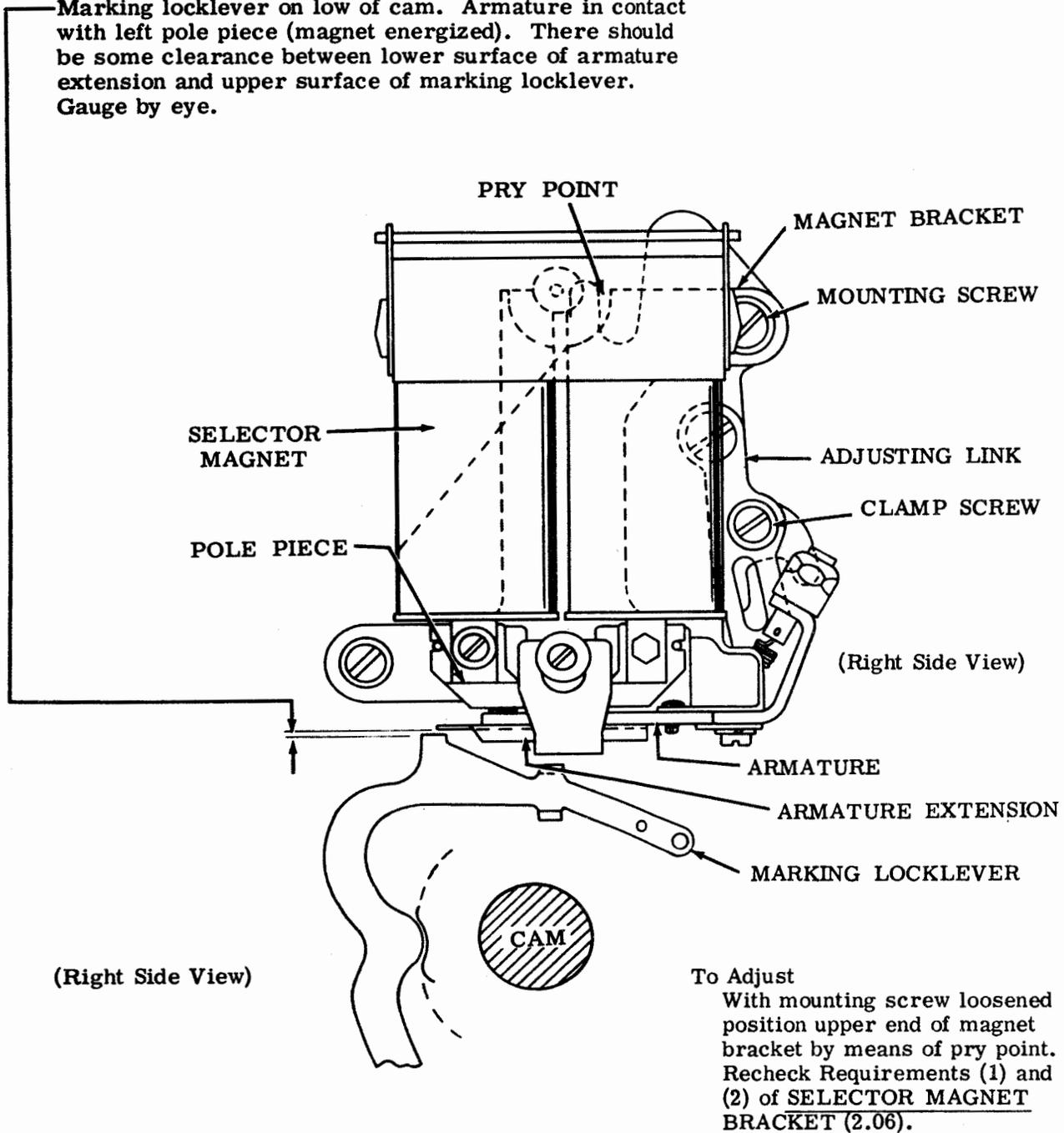
To Adjust  
 Position upper end of magnet bracket. Tighten two magnet bracket mounting screws. Recheck Requirement (1).

2.07 Selector Mechanism (continued)

SELECTOR MAGNET BRACKET (VERTICAL ADJUSTMENT)

Requirement (For Units Employing Either One or Two Antifreeze Buttons)

Marking locklever on low of cam. Armature in contact with left pole piece (magnet energized). There should be some clearance between lower surface of armature extension and upper surface of marking locklever. Gauge by eye.



2.08 Selector Mechanism (continued)

**SELECTOR ARMATURE DOWNSTOP**  
**(FINAL)**

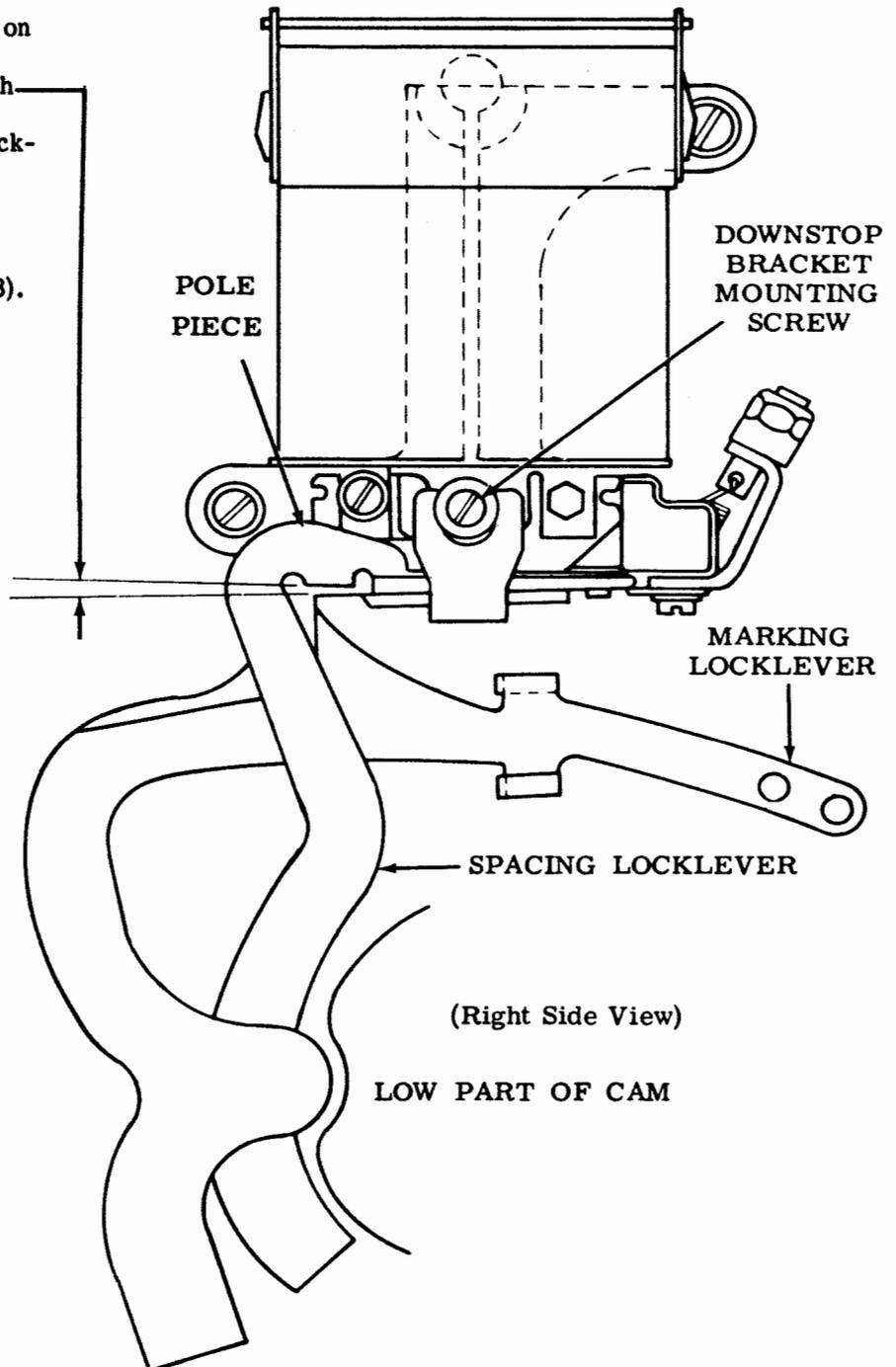
**Requirement**

Magnet de-energized. Locklevers on low part of their cams

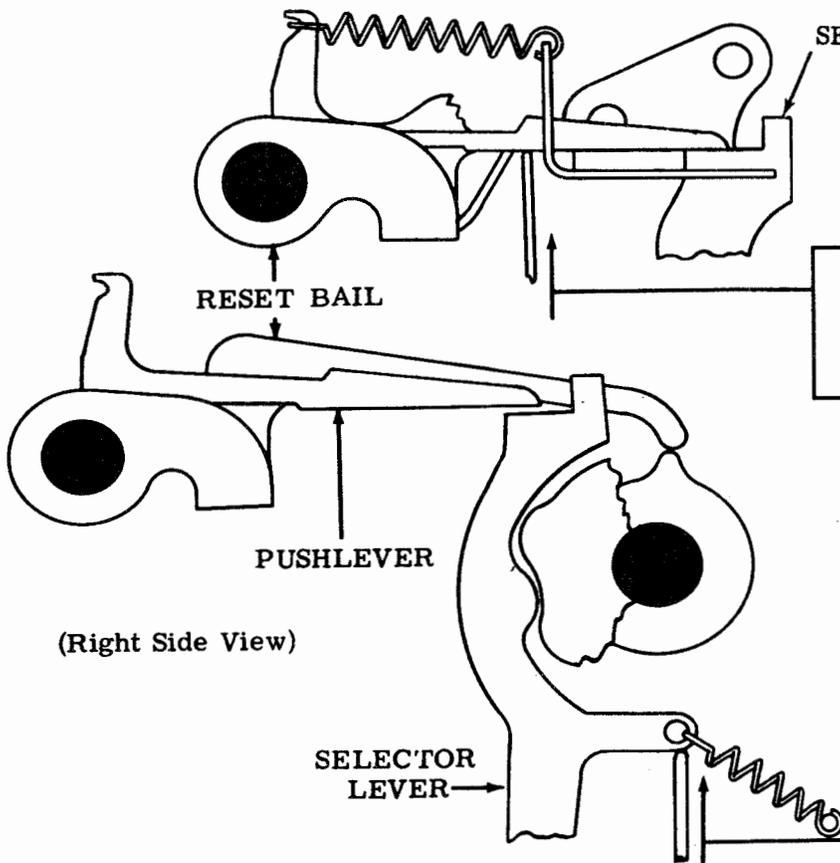
Min 0.005 inch---Max 0.015 inch clearance between top of armature extension and bottom of spacing lock-lever.

**To Adjust**

Refine **SELECTOR ARMATURE DOWNSTOP (PRELIMINARY)** (2.03).



2.09 Selector Mechanism (continued)



SELECTOR PUSHLEVER SPRING

Requirement

Pushlever in spacing position  
 Min 3/4 oz---Max 1-1/2 oz  
 to move pushlevers from selector  
 levers on all except first pushlever  
 in sequence of selection. It should  
 require  
 Min 2 oz---Max 3 oz  
 to move this pushlever from its  
 selector lever. This spring is  
 copper color.

SELECTOR LEVER SPRING

Requirement

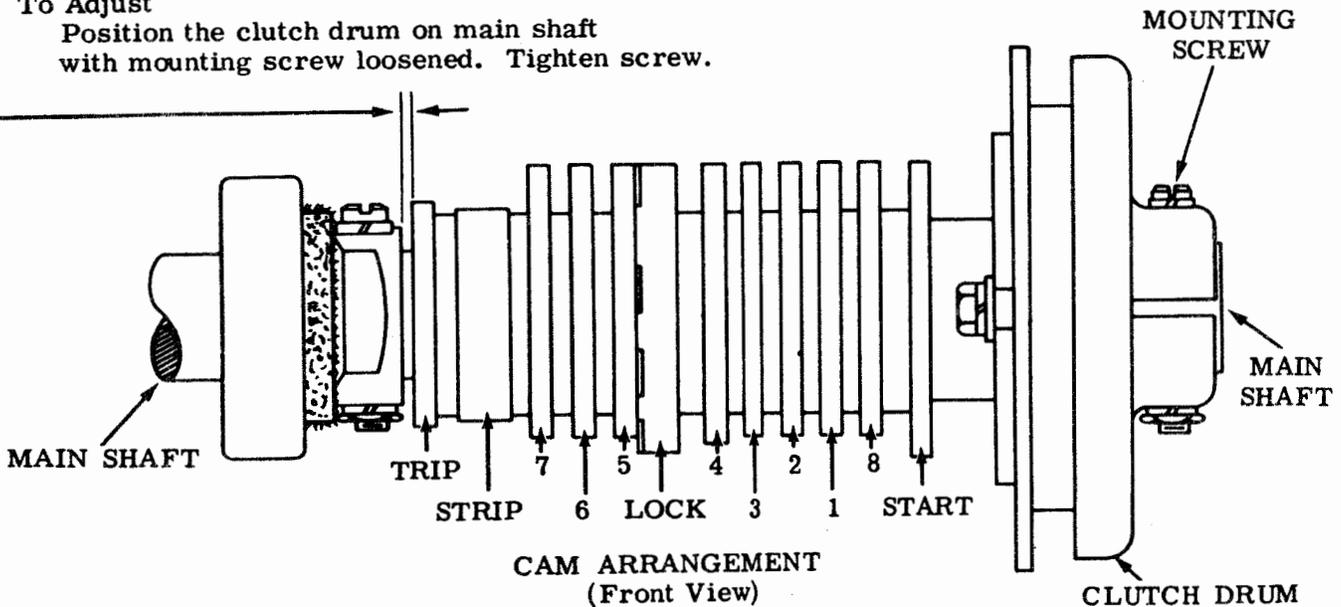
Typing unit upside down.  
 Reset bail on peak of its cam.  
 Min 1-1/2 oz---Max 3 oz  
 to start each lever moving.  
 If necessary, unhook start lever  
 spring to check selector lever  
 springs near the start lever spring.

SELECTOR CLUTCH DRUM

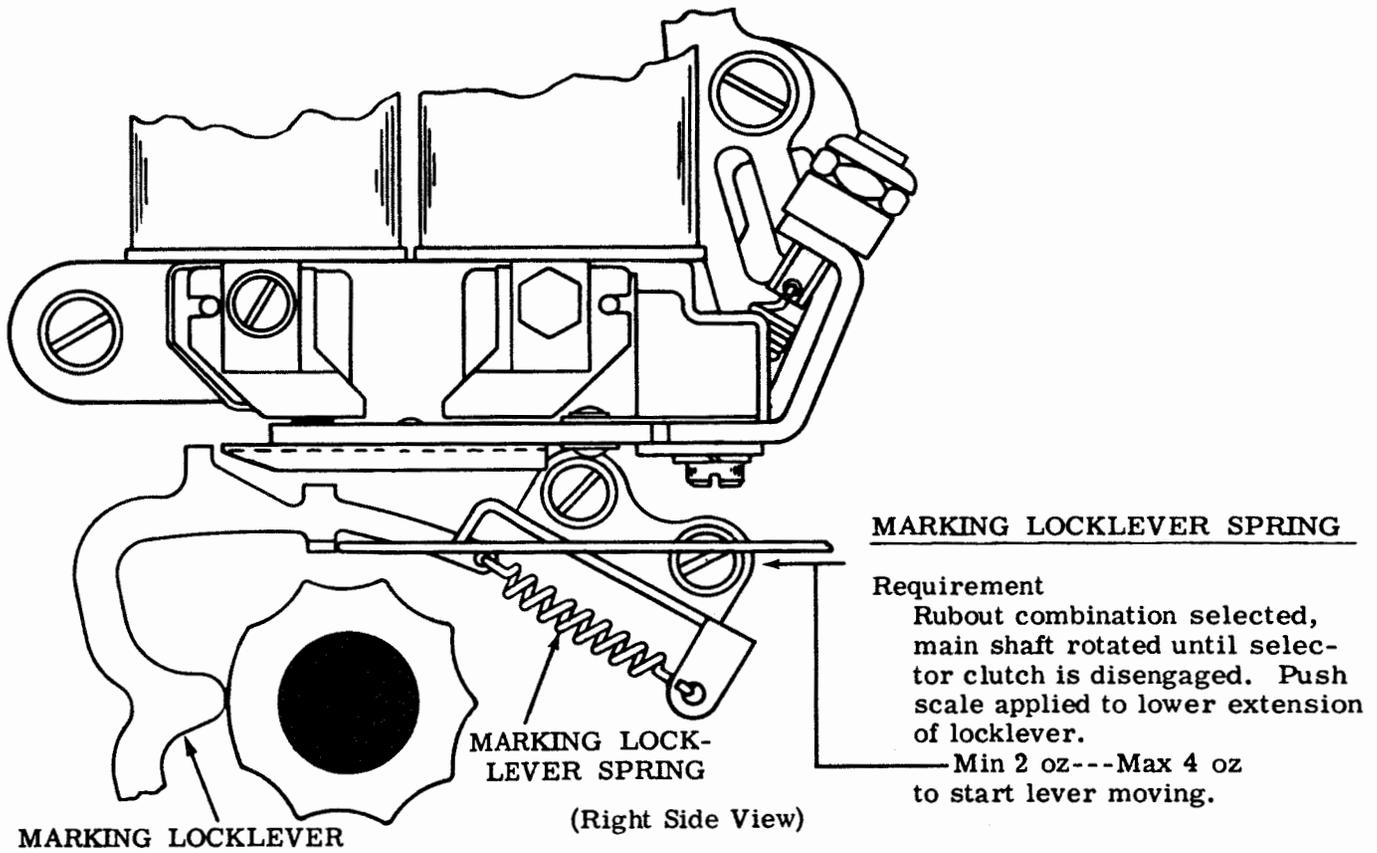
Requirement

Clutch latched in stop position. Cam-  
 clutch assembly should have some endplay  
 Max 0.010 inch

To Adjust  
 Position the clutch drum on main shaft  
 with mounting screw loosened. Tighten screw.



2.10 Selector Mechanism (continued)



SELECTOR RECEIVING MARGIN

- (1) Requirement (For Units Employing Armature With One Antifreeze Button)  
When a signal Distortion Test Set is used for determining the receiving margins of the selector, and where the condition of the components is equivalent to that of new equipment, the range and distortion tolerances below should be met.
- (2) Requirement (For Units Employing Armature With Two Antifreeze Buttons)  
When a Distortion Test Set is available, the selector armature spring tension should be refined, if necessary, to obtain satisfactory receiving margins. The front anti-freeze button must contact the magnet core when the magnet coils are energized.

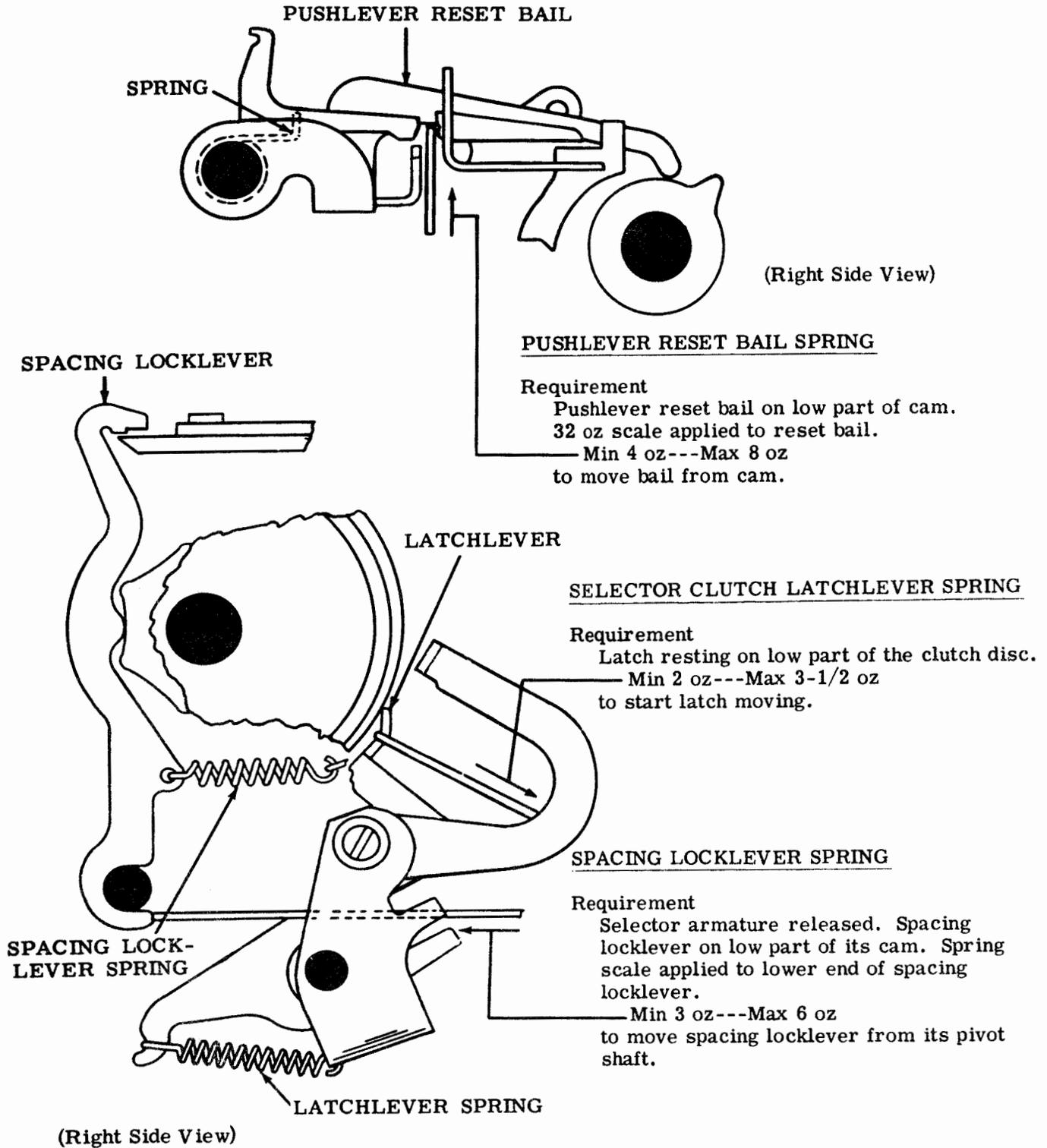
To Adjust

Refine the SELECTOR ARMATURE SPRING adjustments (2.04, 2.05).

Selector Receiving Margin Minimum Requirements

<u>Current</u>	<u>Speed in WPM</u>	<u>Points Range With Zero Distortion</u>	<u>Percentage of Marking and Spacing Bias</u>	<u>End Distortion Tolerated With Scale at Bias Optimum Setting</u>
0.500 Amp (Windings Parallel)	100	72	38	35
0.060 Amp (Windings Parallel) (For LP821 Only)	100	72	35	33

2.11 Selector Mechanism (continued)



2.12 Selector Mechanism (continued)

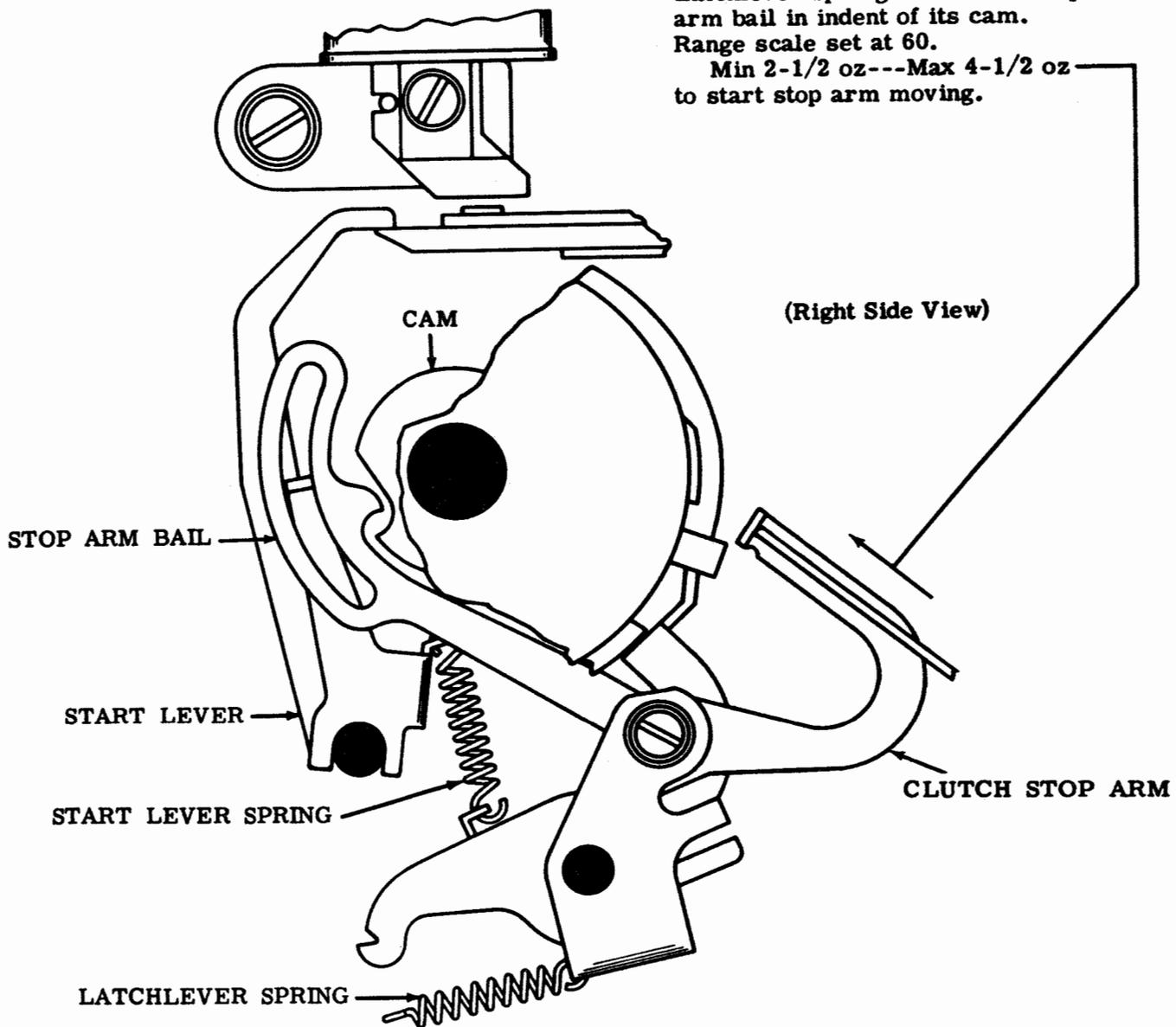
START LEVER SPRING

**Requirement**

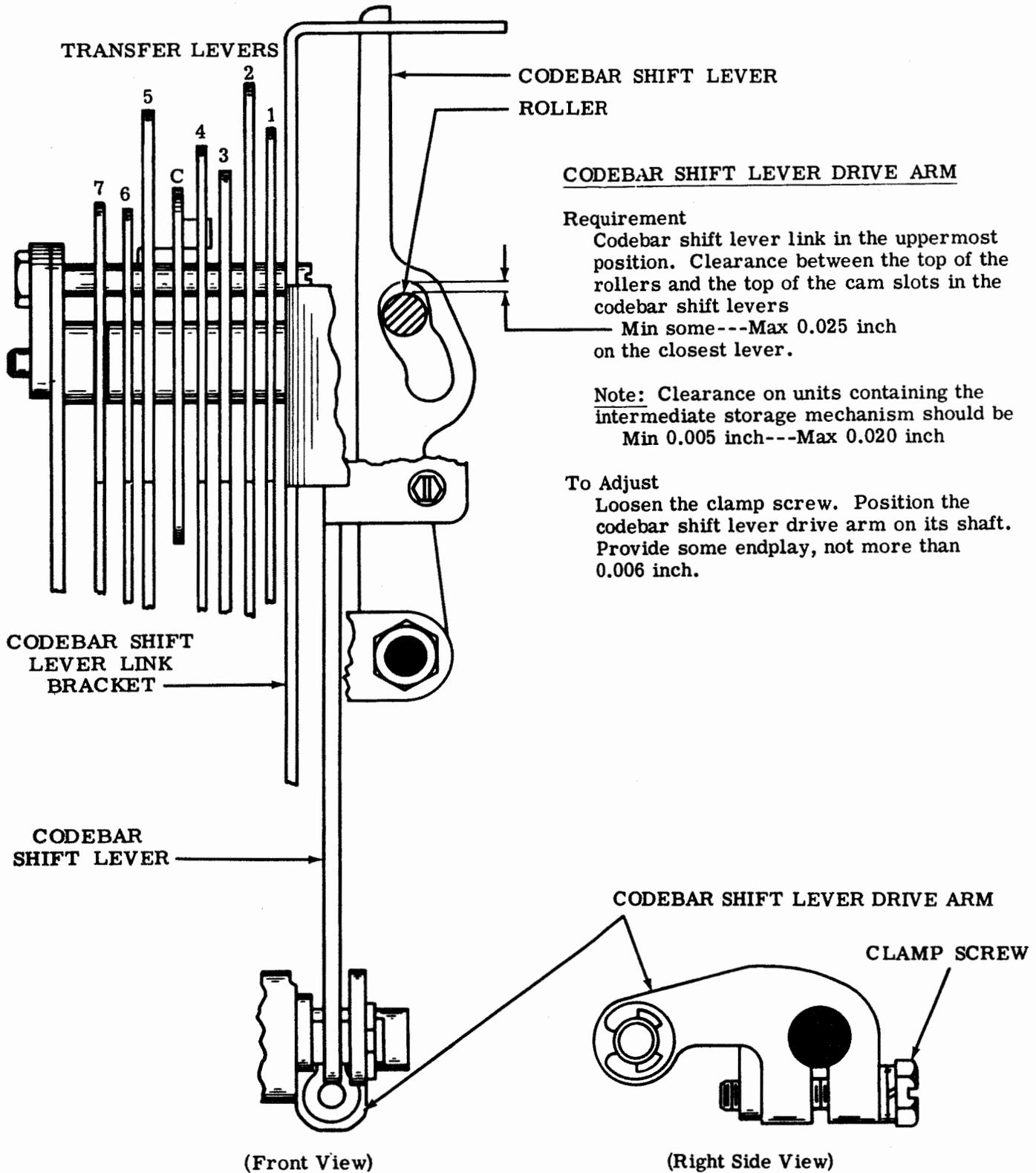
Latchlever spring unhooked. Stop arm bail in indent of its cam.

Range scale set at 60.

Min 2-1/2 oz---Max 4-1/2 oz to start stop arm moving.



2.13 Codebar Mechanism

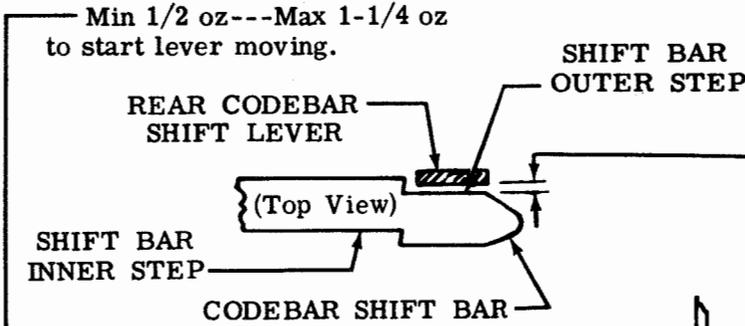


2.14 Codebar Mechanism (continued)

COMMON TRANSFER LEVER SPRING

**Requirement**

Transfer lever in spacing position. Scale applied near upper end of common transfer lever.



TRANSFER LEVER ECCENTRIC

**Requirement**

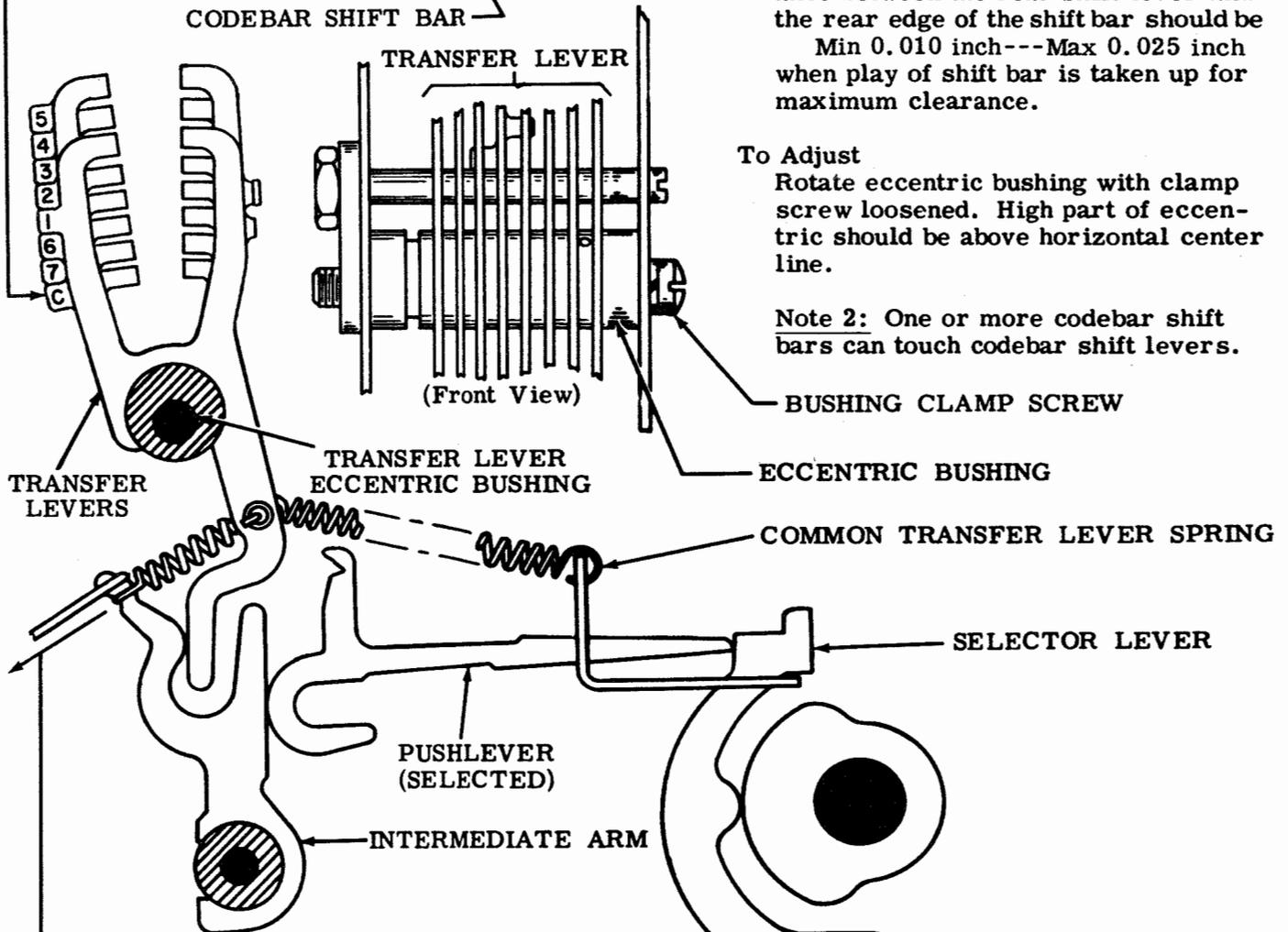
Pushlevers positioned for rubout. Selector clutch disengaged. Codebar shift lever link in uppermost position, clearance between rear codebar shift lever and rear edge of shift bar farthest from rear codebar shift lever  
Min 0.010 inch---Max 0.025 inch

**Note 1:** On units having the intermediate storage mechanism, the clearance between the rear shift lever and the rear edge of the shift bar should be  
Min 0.010 inch---Max 0.025 inch when play of shift bar is taken up for maximum clearance.

**To Adjust**

Rotate eccentric bushing with clamp screw loosened. High part of eccentric should be above horizontal center line.

**Note 2:** One or more codebar shift bars can touch codebar shift levers.



TRANSFER LEVER SPRING

**Requirement**

Transfer lever held in spacing position  
Min 1-1/2 oz---Max 2-1/2 oz to start intermediate arm moving.

(Right Side View)

2.15 Codebar and Selector Mechanisms (continued)

(A) INTERMEDIATE ARM BACKSTOP BRACKET

Requirement

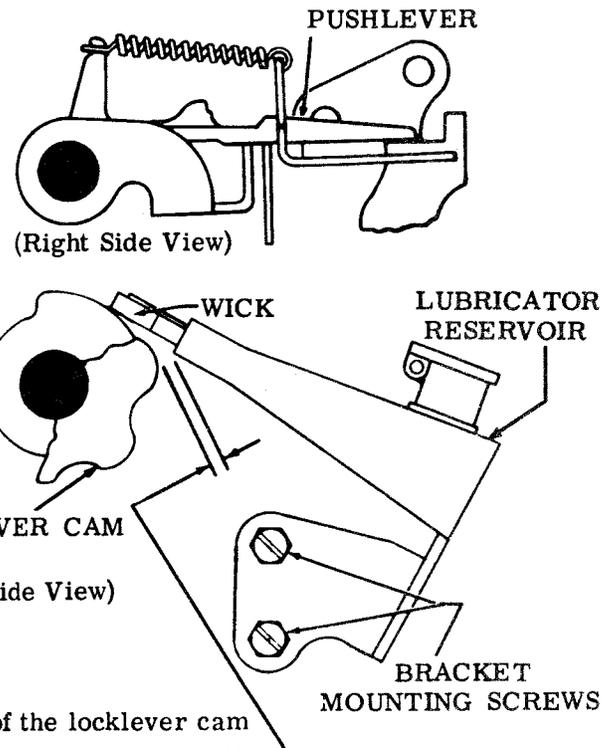
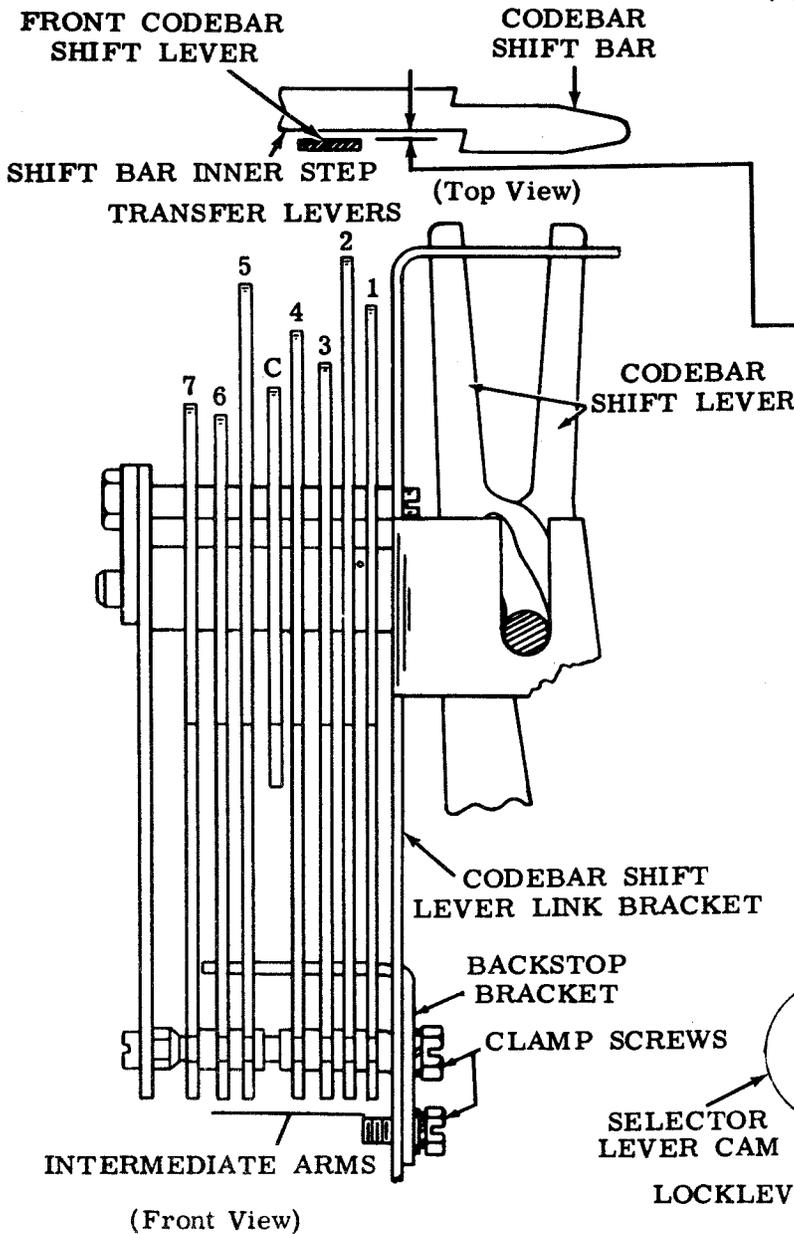
Pushlevers not selected. All codebar shift bars to the right. Selector clutch disengaged. Codebar shift lever link in lowermost position. Clearance between front codebar shift lever and the front edge of the inner step of the codebar shift bar farthest from front codebar shift lever

Min 0.010 inch---Max 0.025 inch when play in parts is taken up for maximum clearance.

To Adjust

Position backstop bracket with its two clamp screws loosened.

Note: Number 7 codebar shift bar does not have to meet the maximum requirement until the SHIFT SELECTOR ARM BELLCRANK (2.43) adjustment has been made.



(B) SELECTOR CAM LUBRICATOR

Requirement

The lubricator tube should clear the high part of the locklever cam  
Min 0.020 inch

The high part of the selector lever cams should touch the lubricator wick, but should not raise it more than 1/32 inch.

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

To Adjust

Position the lubricator bracket with its mounting screws loosened.

2.16 Codebar Mechanism (continued)

**CODEBAR SHIFT LEVER**

**Requirement**

Motion of front and rear codebar shift levers should be equalized with respect to codebar travel.

**(1) To Check (Front)**

Select blank combination and rotate main shaft until codebar shift lever link reaches highest travel. Take up play for maximum clearance. Clearance between front codebar shift lever and shoulder on nearest codebar shift bar

Min 0.002 inch---Max 0.025 inch

**(2) To Check (Rear)**

Select rubout combination. Check clearance between rear codebar shift lever and shoulder on nearest codebar shift bar in same way.

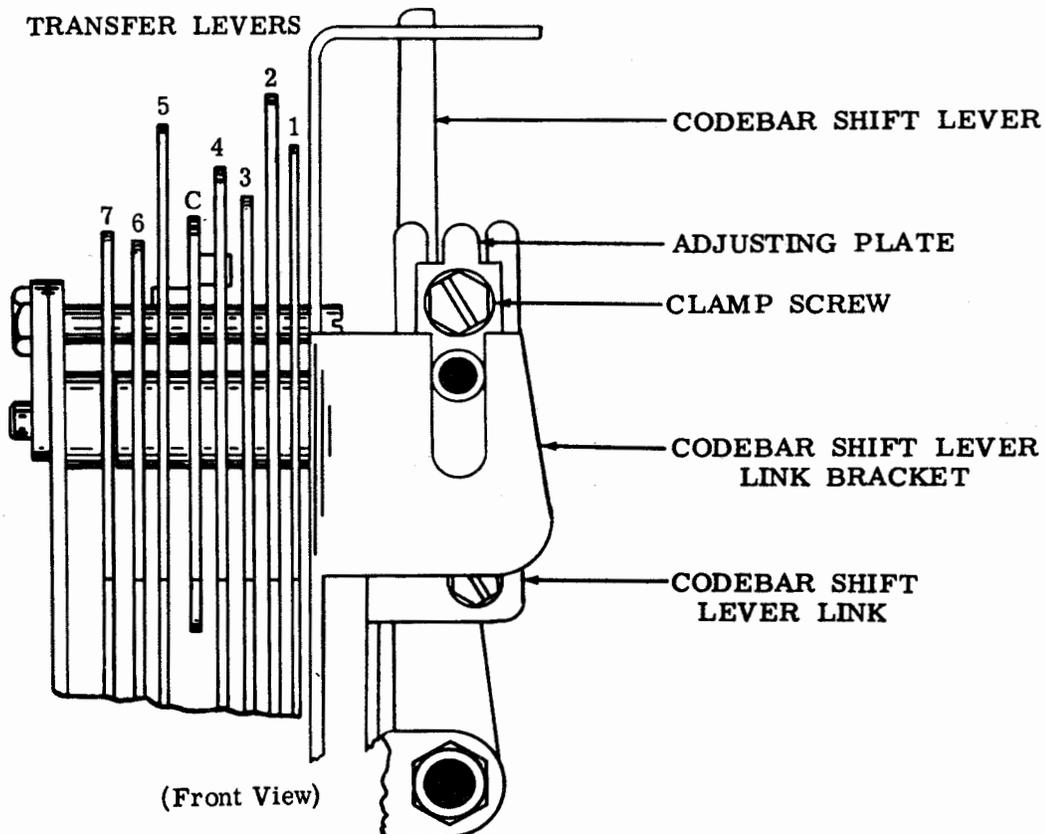
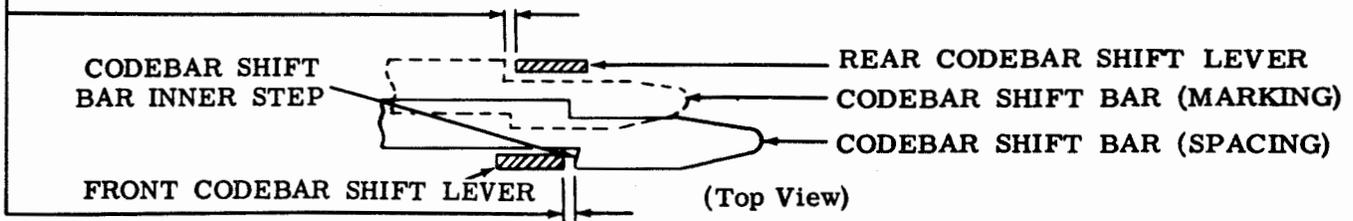
Min 0.002 inch---Max 0.025 inch

**Note:** The clearance on units containing the intermediate storage mechanism should be

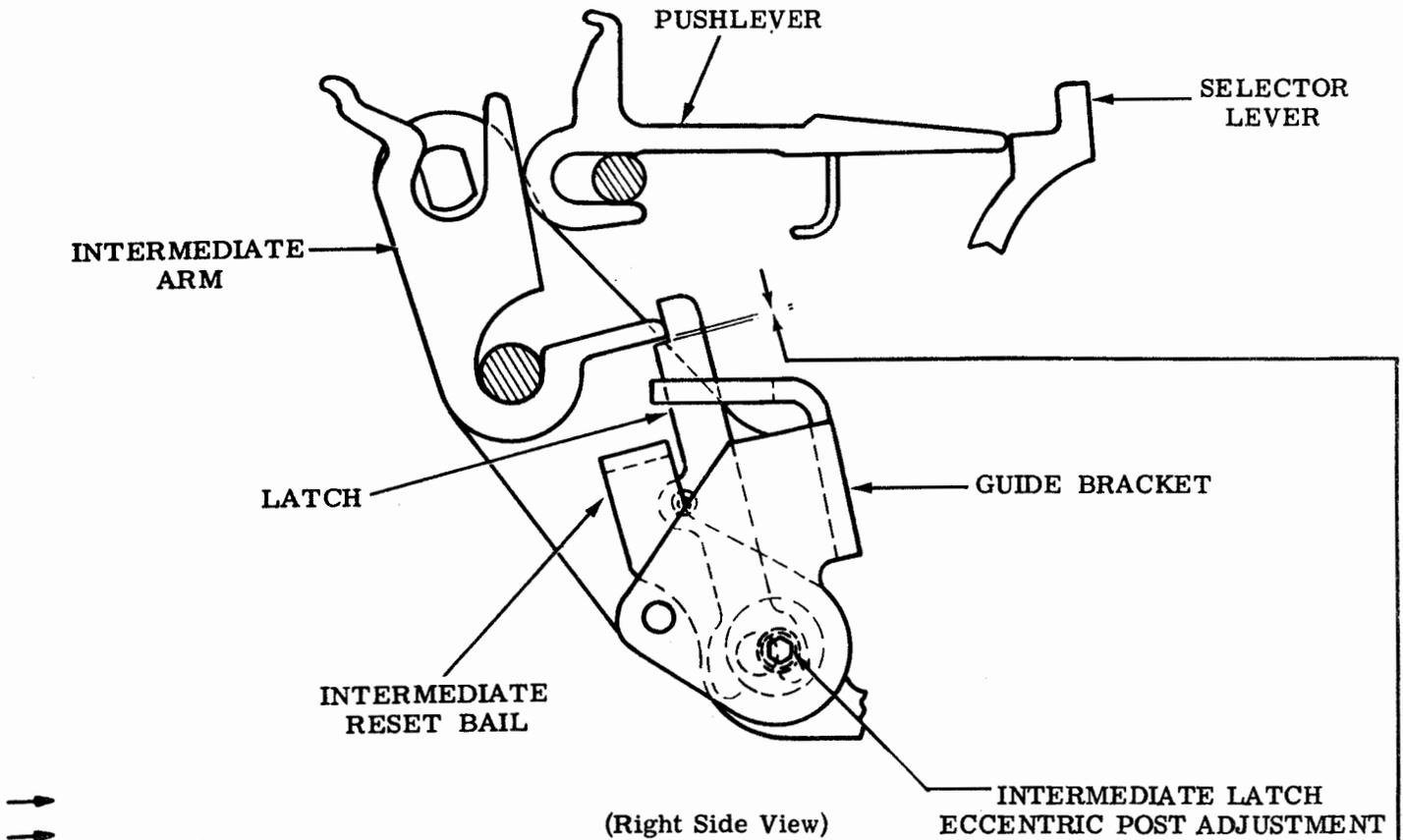
Min 0.002 inch---Max 0.012 inch

**To Adjust**

Position adjusting plates (front and rear) with clamp screws loosened.



2.17 Codebar Mechanism (continued)



INTERMEDIATE LATCH ECCENTRIC

**Note:** This adjustment applies to units containing the intermediate storage mechanism.

**Requirement**

Pushlevers positioned for rubout. Selector clutch disengaged. Clearance between the top of latch surface on the latch and the bottom of the intermediate arm having the least clearance.

Min 0.002 inch---Max 0.006 inch

Check all latches.

**To Adjust**

Rotate the latch eccentric post to meet the requirement keeping the high part of the eccentric to the front.

## 2.18 Codebar Mechanism (continued)

**(A) INTERMEDIATE RESET LEVER SPRING**

**Note:** This adjustment applies to units containing the intermediate storage mechanism.

**Requirement**

With the intermediate reset lever in its unoperated position and the spring removed from the lever

Min 1 oz---Max 2 oz \_\_\_\_\_  
to stretch the spring to its installed length. Replace the spring.

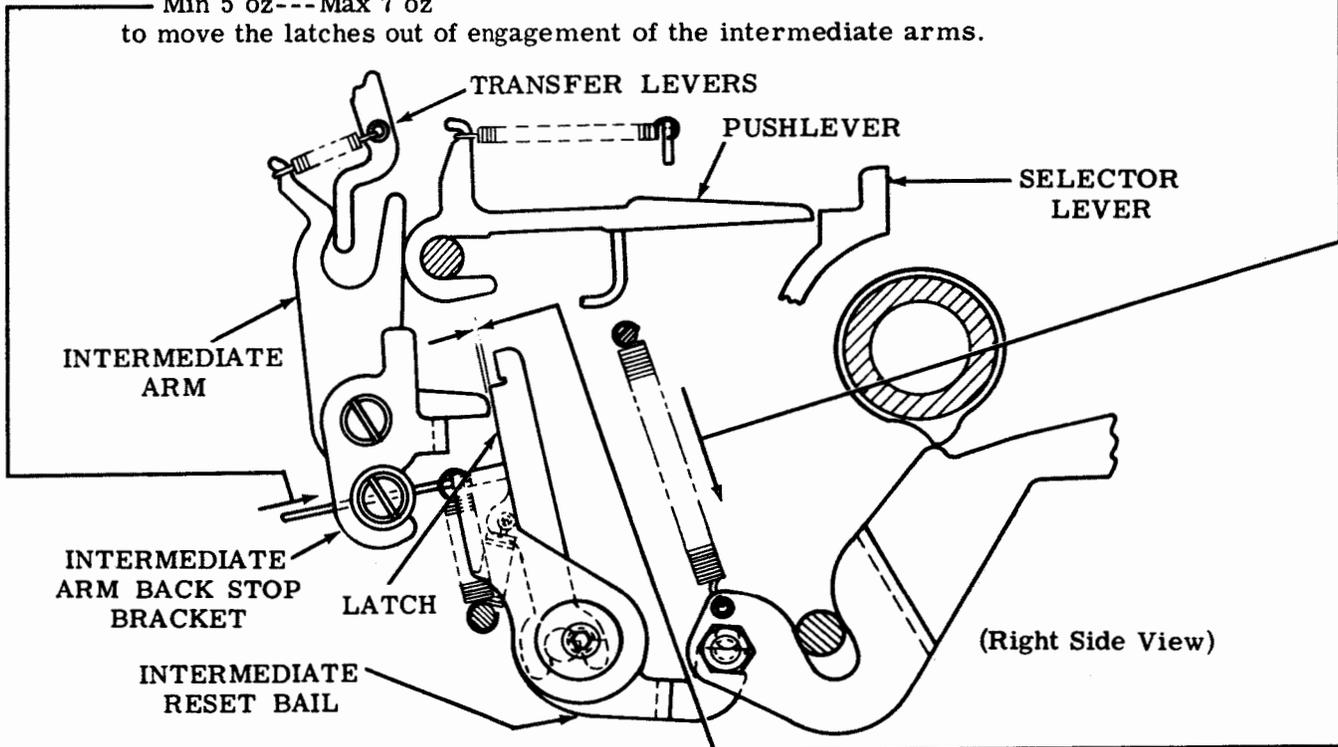
**(B) INTERMEDIATE RESET BAIL SPRING**

**Note:** This adjustment applies to units containing the intermediate storage mechanism.

**Requirement**

With all pushlevers in the marking condition and the latches in a latched position, push against the reset bail at the spring hole

Min 5 oz---Max 7 oz \_\_\_\_\_  
to move the latches out of engagement of the intermediate arms.

**(C) INTERMEDIATE RESET BAIL ECCENTRIC**

**Note 1:** This adjustment applies to units containing the intermediate storage mechanism (for applicable unit).

**Requirement**

With the intermediate reset lever on the high part of its cam. Clearance between the latch and the intermediate arm should be

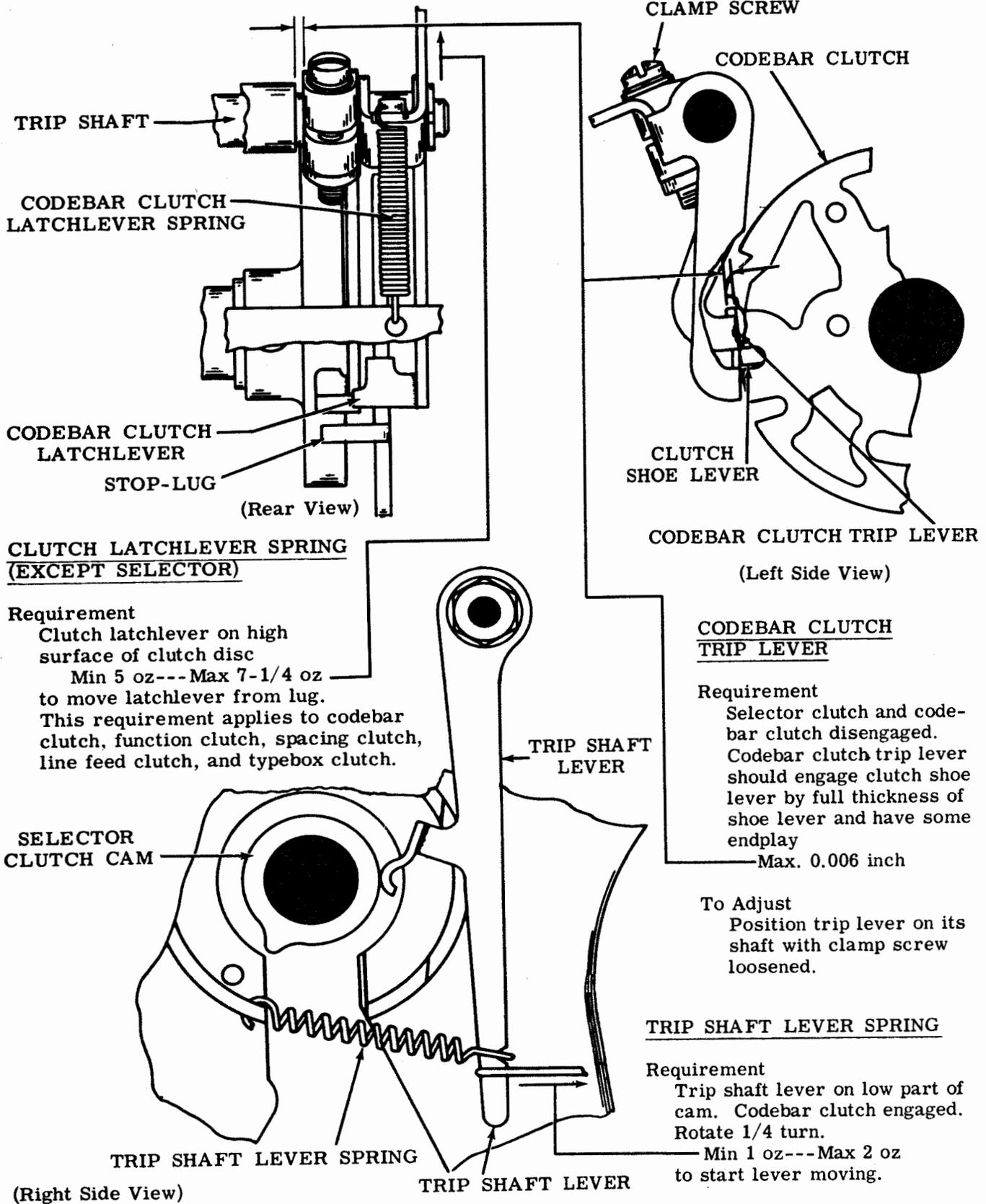
Min 0.010 inch \_\_\_\_\_  
with the high part of the eccentric to the rear.

**To Adjust**

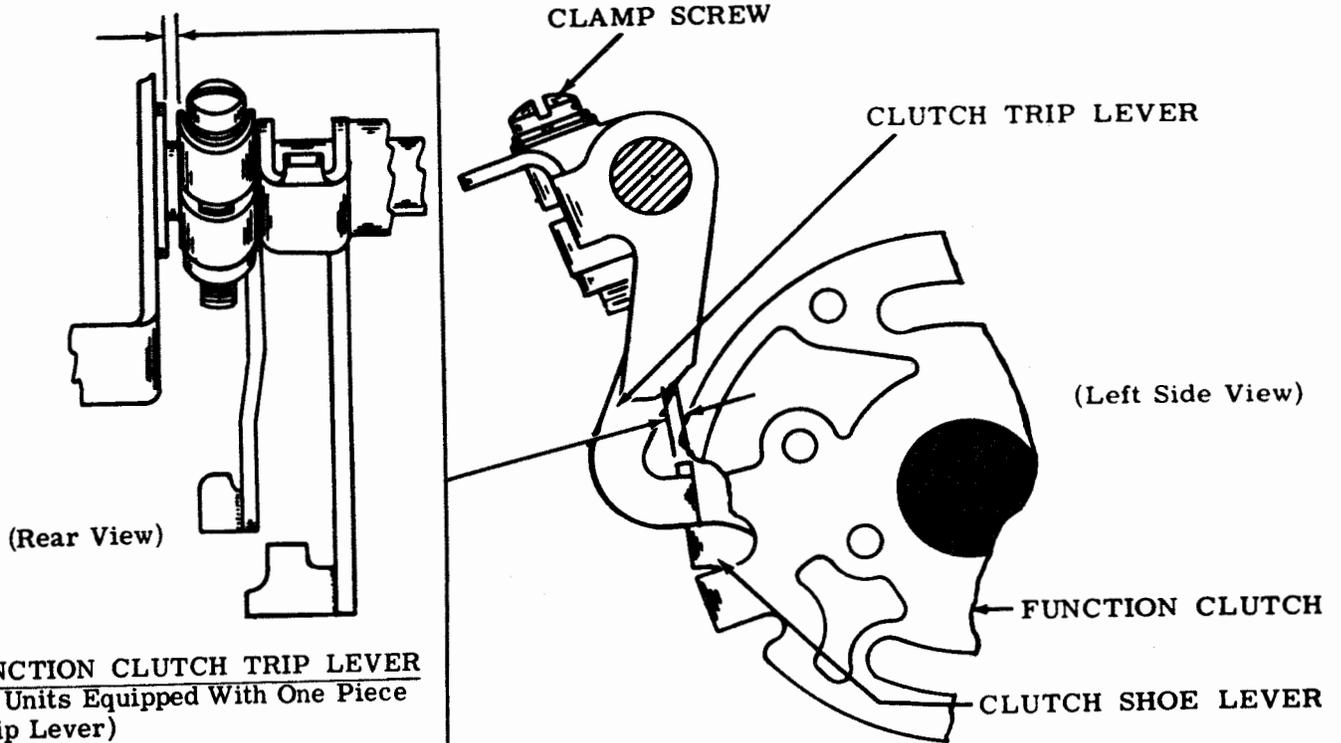
Rotate eccentric to meet requirement.

**Note 2:** The codebar positioning mechanism is assembled at the factory and at this time the guide bracket is biased to the rear by means of the play in the body holes. If this assembly is removed from the printer, it will be necessary to bias the guide bracket to the rear during reassembly.

2.19 Main Shaft and Trip Shaft Mechanisms



2.20 Main Shaft and Trip Shaft Mechanisms (continued)



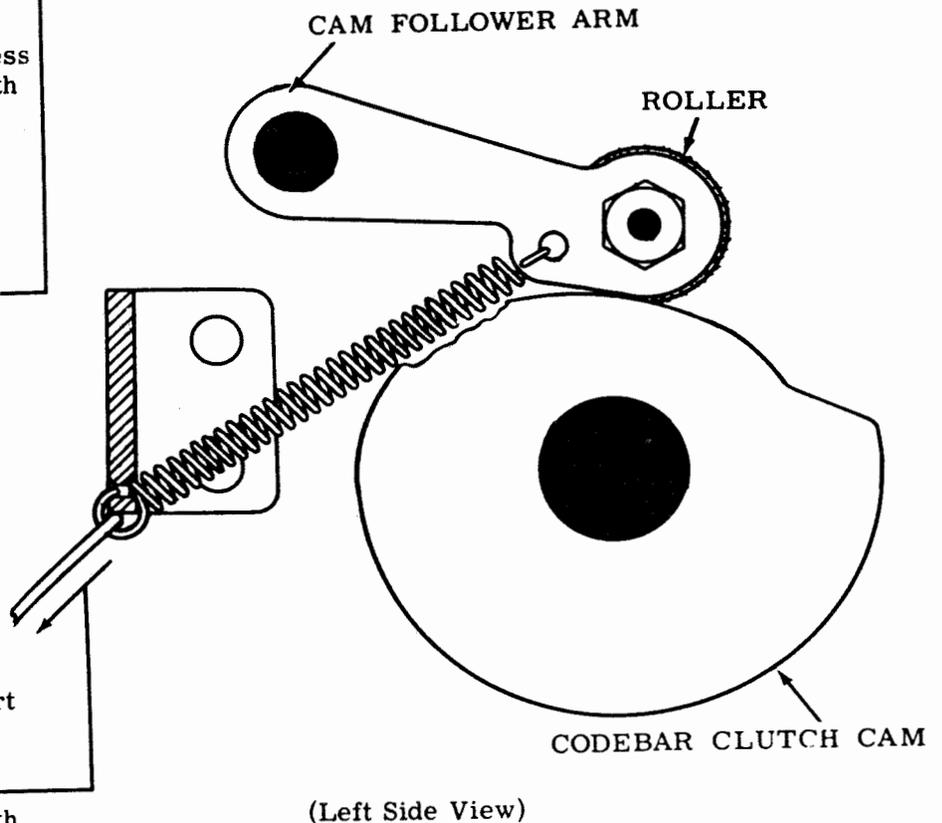
**FUNCTION CLUTCH TRIP LEVER**  
(On Units Equipped With One Piece Trip Lever)

**Requirement**

Codebar clutch and function clutch disengaged. Function clutch trip lever should engage clutch shoe lever by full thickness of shoe lever. (Check at lug with least bite on two stop clutches.)

**To Adjust**

Position trip lever on its shaft with clamp screw loosened, letting shaft have endplay  
Min some---Max 0.006 inch



**CODEBAR CLUTCH CAM FOLLOWER SPRING**

**Requirement**

Cam follower roller on low part of cam. The spring unhooked from spring bracket.

Min 20 oz---Max 24 oz  
to pull spring to installed length.

2.21 Main Shaft and Trip Shaft Mechanisms (continued)

(A) FUNCTION CLUTCH TRIP LEVER TRIP ARM  
(On Units Equipped With Adjustable Backstop)

**Requirement**

Codebar clutch and function clutch disengaged. Clearance between edge of bail of function clutch trip lever and projection on trip lever trip arm.

Min 0.040 inch---Max 0.050 inch

When making this adjustment, position the trip lever trip arm so that the trip shaft has some endplay

Min some---Max 0.006 inch

**To Adjust**

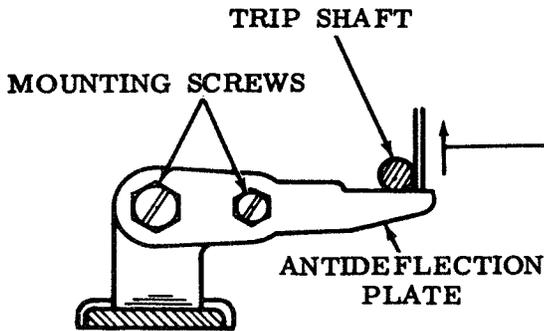
Position trip arm on trip shaft with its clamp screw loosened.

TRIP ARM ADJUSTMENT SCREW

BACK STOP  
ADJUSTMENT  
SCREW

(Left Side View)

ENGAGEMENT TO BE THE  
FULL THICKNESS OF THE  
SHOE LEVER



(Left Side View, Upside Down)

(B) ANTIDEFLECTION PLATE

**Requirement**

With typing unit upside down and function, spacing, line feed, and type-box clutches disengaged and latched

Min 1 lb---Max 5 lb  
to pull trip shaft away from anti-deflection plate.

**To Adjust**

Position plate with mounting screws loosened.

2.22 Main Shaft and Trip Shaft Mechanisms (continued)

(A) CLUTCH TRIP SHAFT SET COLLARS

(1) Requirement  
Spacing cutout lever should have side play  
Min some---Max 0.008 inch

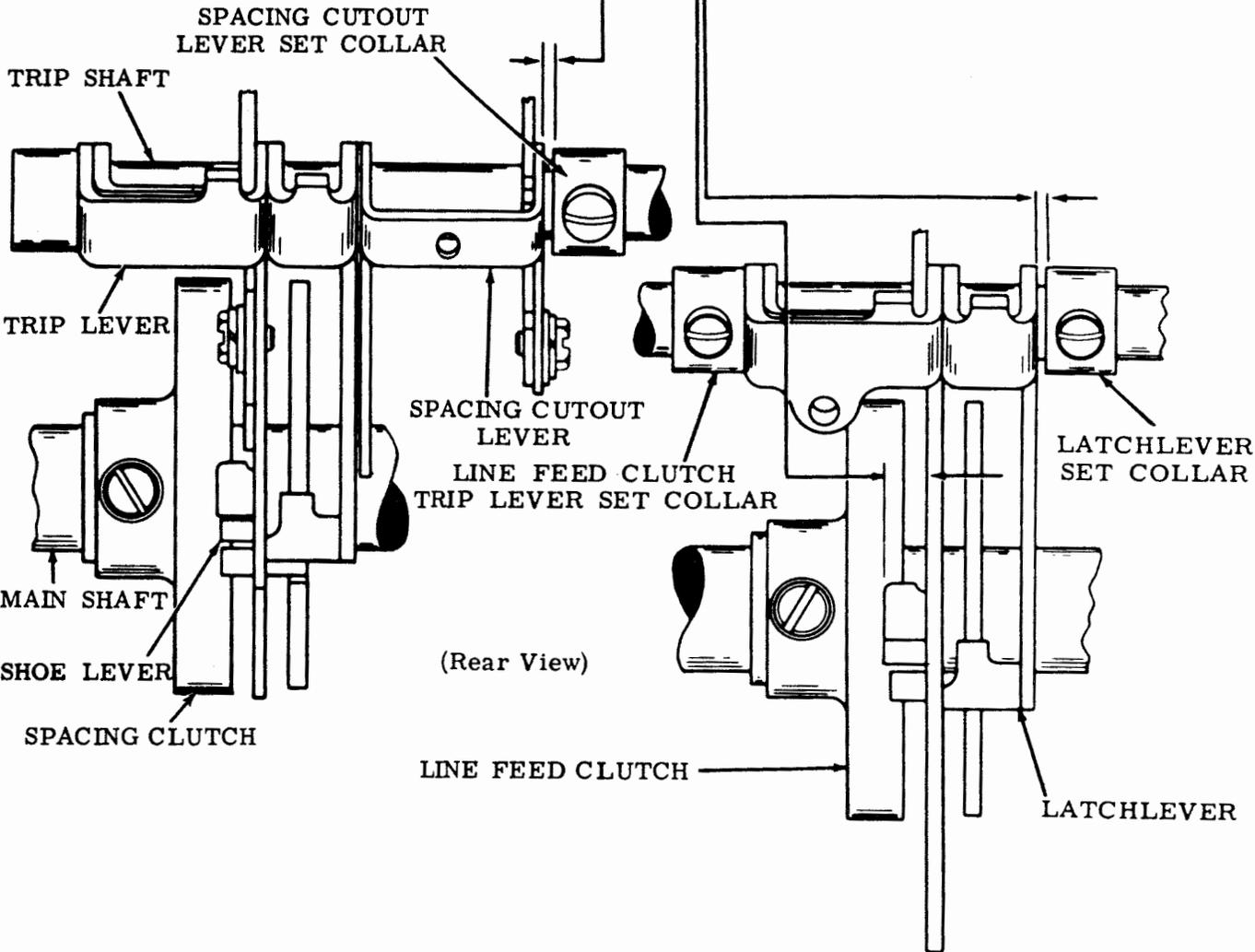
To Adjust  
Position spacing cutout lever set collar.

(2) Requirement  
Approximate alignment of right end of stop extensions on trip lever and shoe lever.

To Adjust  
Position line feed clutch trip lever set collar.

(3) Requirement  
Line feed clutch latchlever should have side play  
Min some---Max 0.008 inch

To Adjust  
Position line feed clutch latchlever set collar.



2.23 Main Shaft and Trip Shaft Mechanisms (continued)

SPACING CLUTCH TRIP LEVER

**Requirement**

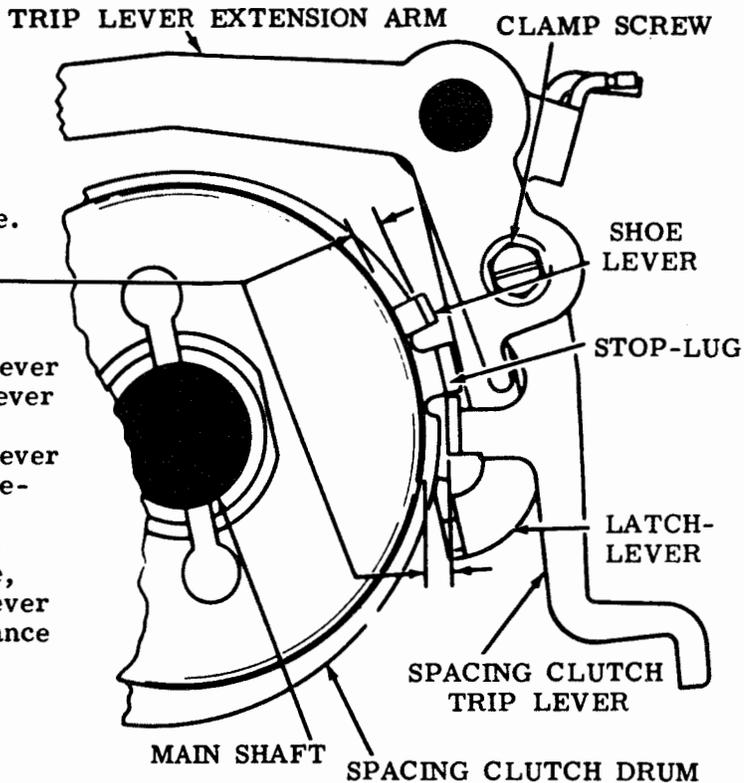
Clearance between trip lever and clutch drum should be 0.018 to 0.035 inch less than clearance between shoe lever and drum at stop showing greatest clearance. There should be some overbite on all stop-lugs. Gauge by eye.

**To Check**

Disengage the clutch. Trip clutch trip lever and slowly rotate main shaft until trip lever is over the shoe lever. Take up play of shoe lever inward by snapping the trip lever over the shoe lever. Check clearance between shoe lever and drum at each stop position. With the trip lever at the stop position which yields greatest clearance, rotate main shaft slowly until the trip lever just falls off the stop-lug. Check clearance between trip lever and drum.

**To Adjust**

Position the trip lever by means of its clamp screw.



(Right Side View)

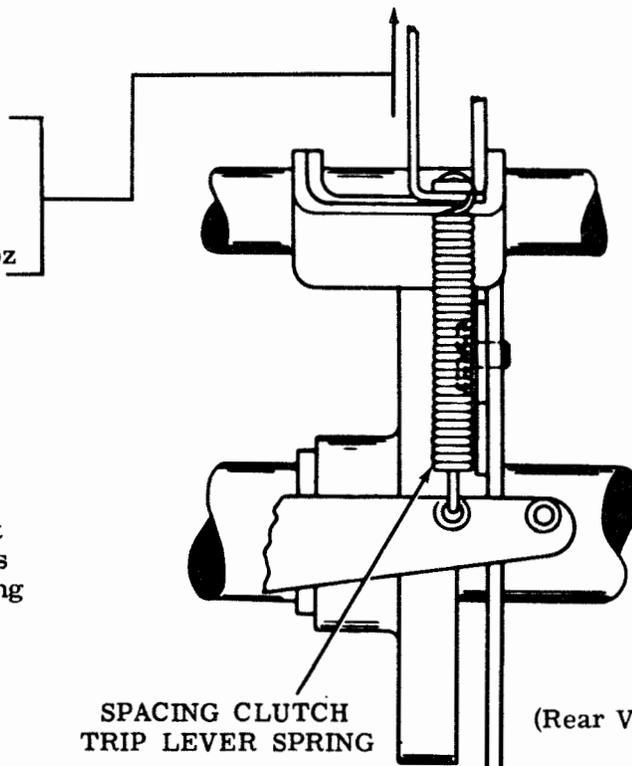
CLUTCH TRIP LEVER SPRING

**Requirement**

Clutch engaged and rotated until trip lever rests on stop-lug

Clutch Function	Min	Max
Spacing	1-1/2 oz	4 oz
Line Feed	11 oz	16 oz
Typebox	10 oz	13 oz
	5 oz	7-1/4 oz

to move lever away from stop-lug.



(Rear View)

INTERMEDIATE LEVER SPRING (On Units Equipped With Three Piece Spacing Clutch Trip Lever Bail)

**Requirement**

Trip spacing clutch and turn the main shaft so that the spacing clutch stop lever arm is in its unoperated position. Unhook the spring from the intermediate lever bail and pull spring to installed length.

Min 1-1/2 oz---Max 3-1/2 oz

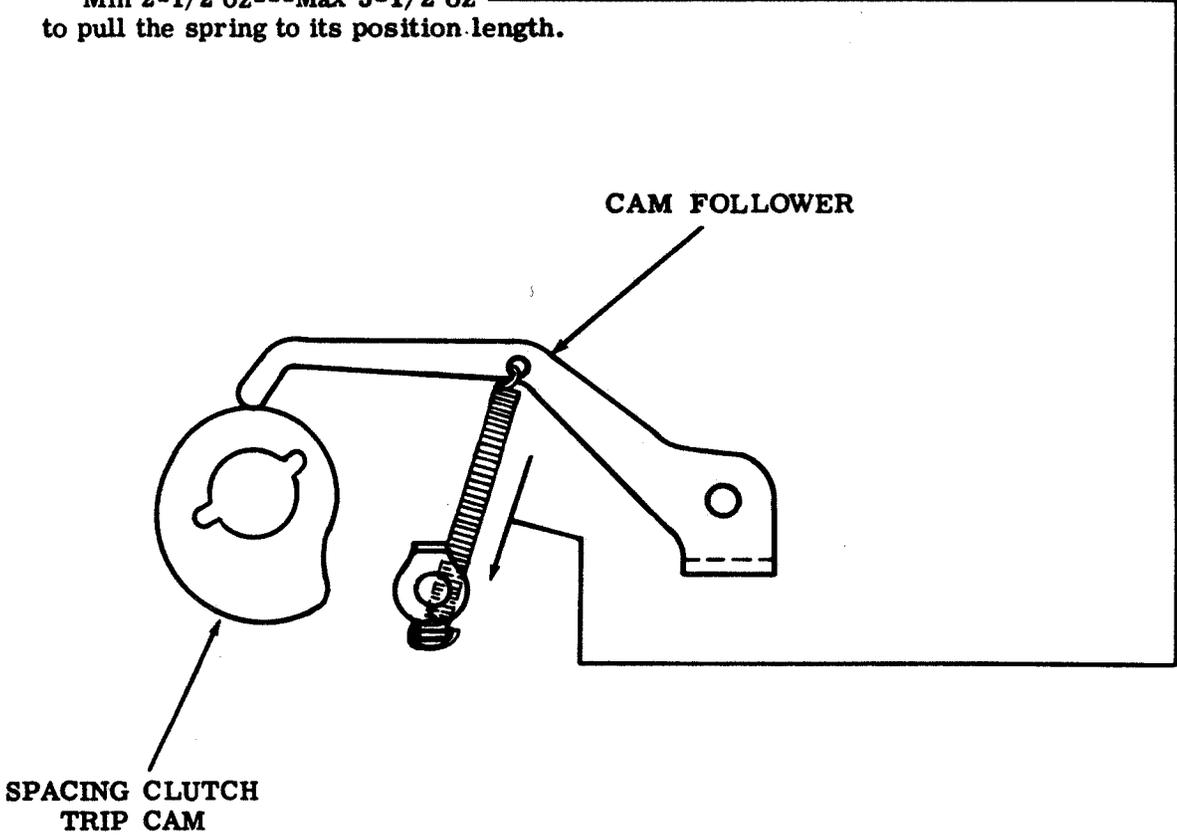
2.24 Main Shaft and Trip Shaft Mechanisms (continued)

SPACING CLUTCH TRIP CAM FOLLOWER SPRING (If Used)

**Requirement**

With the function clutch in the stop position, unhook the spring from the spring ear. Hook a scale to the spring loop.

Min 2-1/2 oz---Max 3-1/2 oz \_\_\_\_\_  
to pull the spring to its position length.



(Right Side View)

2.25 Main Shaft and Trip Shaft Mechanisms (continued)

LINE FEED CLUTCH TRIP LEVER ECCENTRIC POST

Requirement

Clearance between trip lever and clutch drum should be:

For 3-stop clutch — 0.018 inch to 0.035 inch

For 6-stop clutch — 0.012 inch to 0.025 inch

less than clearance between shoe lever and drum at stop which shows least clearance.

To Check

Disengage clutch. Trip clutch trip lever and slowly rotate main shaft until trip lever is over shoe lever. Take up play of shoe lever inward by snapping trip lever over shoe lever. Check clearance between shoe lever and drum at each stop position. With trip lever at stop position which yields least clearance, rotate main shaft slowly until trip lever just falls off stop-lug. Check clearance between trip lever and drum.

To Adjust

Back off trip lever adjusting screw and position trip lever eccentric stop post.

LINE FEED CLUTCH TRIP LEVER  
ADJUSTING SCREW

(1) Requirement

Clearance between end of trip lever adjusting screw and trip arm

Min some---Max 0.006 inch

To Check

Line feed function slide arm in rear position. Clutch trip lever against its eccentric post. Trip arm held against its function slide arm.

To Adjust

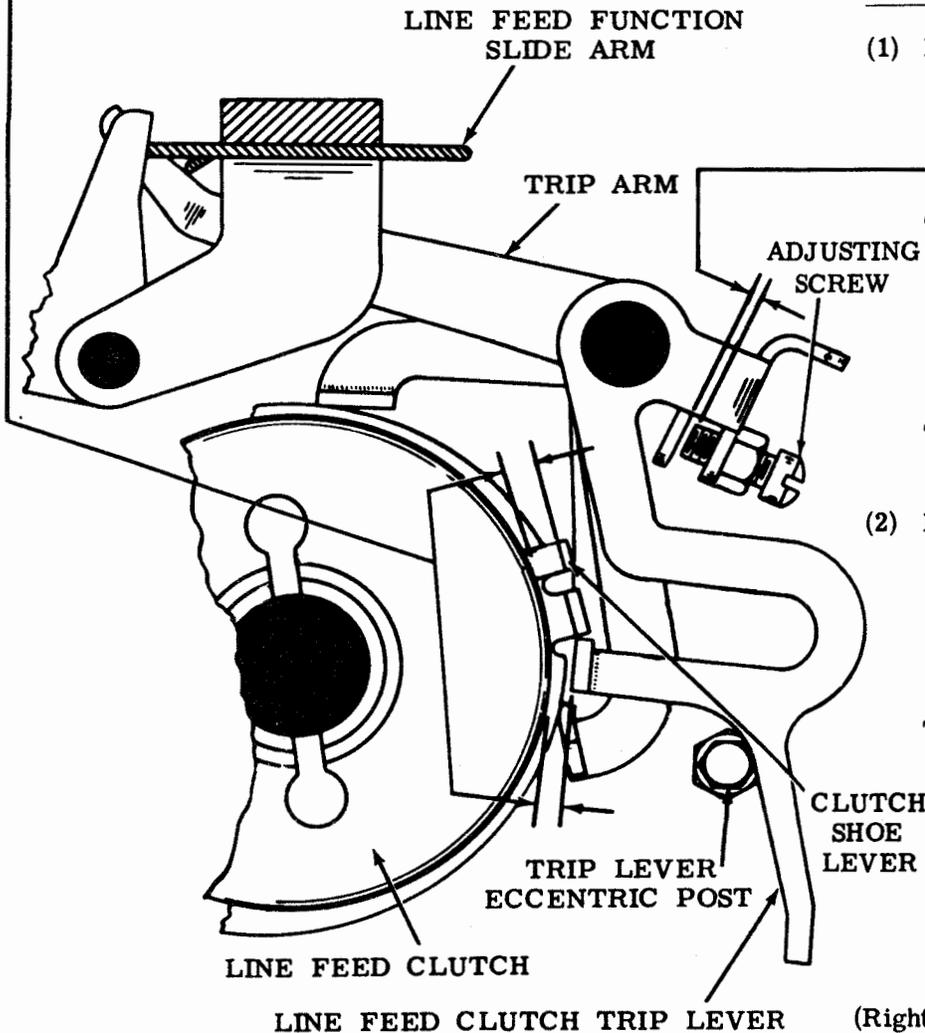
Position adjusting screw.

(2) Requirement

Clearance between line feed trip lever and all line feed clutch shoe levers should be Min 0.004 inch when form-out and vertical tab is selected.

To Adjust

Check and refine if necessary: Requirement (1), FUNCTION RESET BAIL BLADE (2.36), LINE FEED CLUTCH TRIP LEVER ECCENTRIC POST (2.25), MOUNTING BRACKET (3.01).



(Right Side View)

2.26 Main Shaft and Trip Shaft Mechanisms (continued)

TYPEBOX CLUTCH TRIP LEVER ECCENTRIC POST

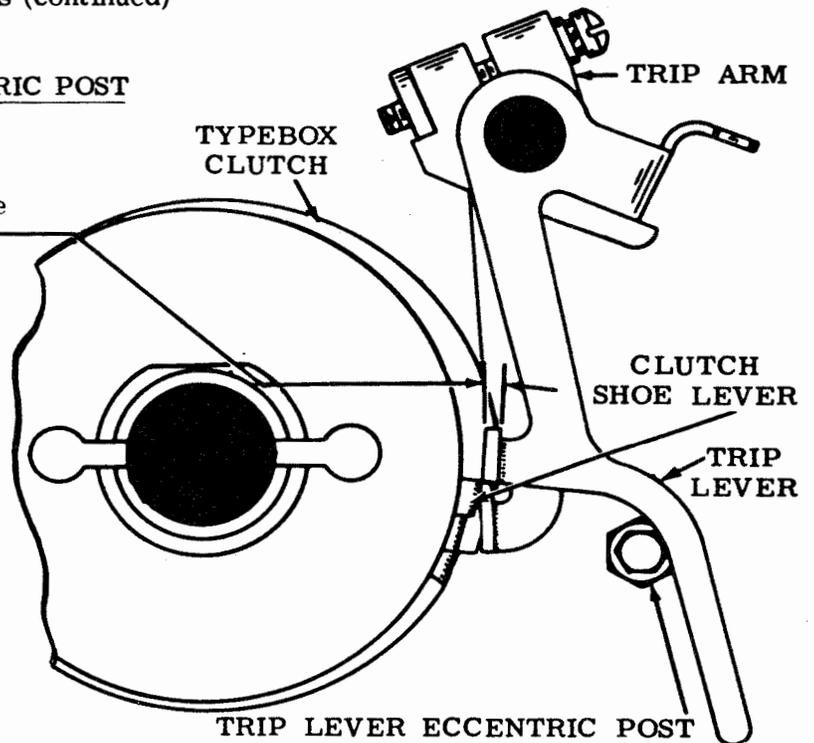
**Requirement**

Typebox clutch disengaged. Trip lever should engage the clutch shoe lever by the full thickness of the shoe lever.

**To Adjust**

Position the trip lever eccentric post.

(Right Side View)



TYPEBOX CLUTCH TRIP LEVER TRIP ARM

(1) **Requirement**

Clutch trip shaft cam follower roller (see 2.20) on lowest surface of cam (located on codebar clutch). Clearance between inner face of typebox clutch trip lever and the clutch disc stop-lug.  
Min 0.025 inch---Max 0.045 inch

**To Adjust**

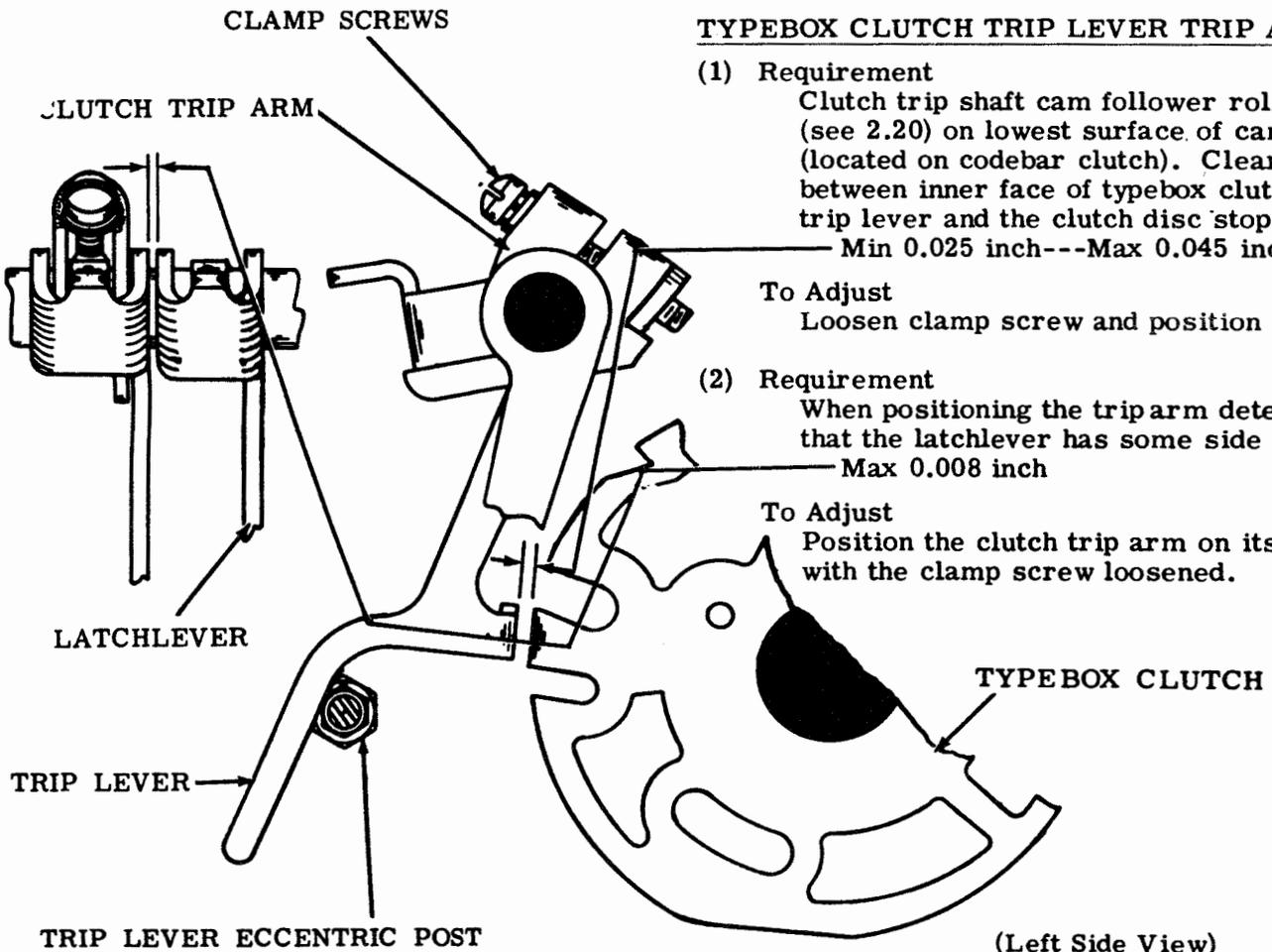
Loosen clamp screw and position stop.

(2) **Requirement**

When positioning the trip arm determine that the latchlever has some side play  
Max 0.008 inch

**To Adjust**

Position the clutch trip arm on its shaft with the clamp screw loosened.



2.27 Main Shaft and Trip Shaft Mechanisms (continued)

CLUTCH SHOE LEVER

**Requirement**

Gap between clutch shoe lever and its stop-lug should be 0.055 inch to 0.085 inch greater when clutch is engaged than when the clutch is disengaged.

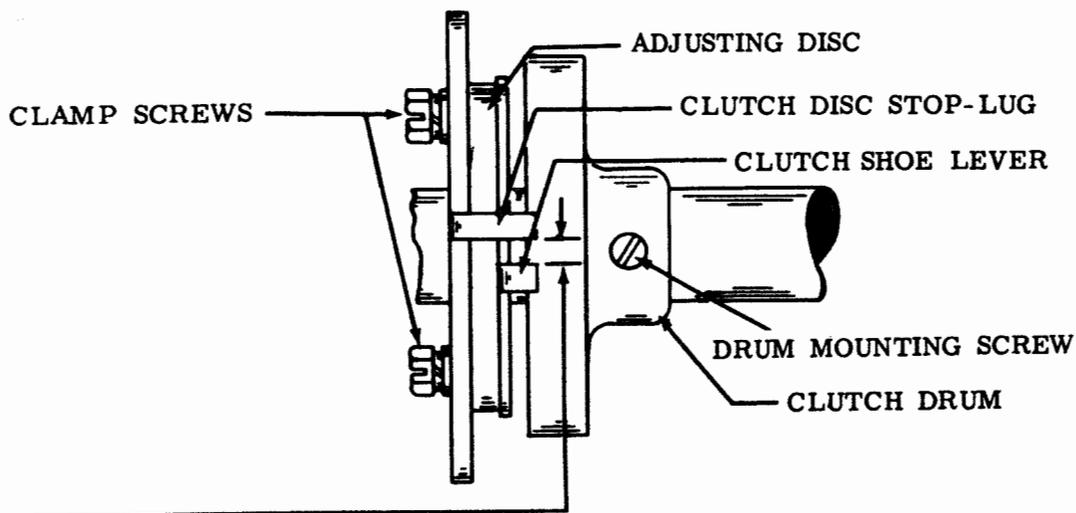
**To Check**

Disengage the clutch and measure the gap. Trip the clutch and rotate it until the clutch shoe lever is toward the bottom of the unit. Again measure the gap with the clutch thus engaged.

**Note:** On multiple stop clutches check the clearance at the stop-lug that is adjacent to the form in the clutch adjusting disc.

**To Adjust**

Loosen the two clamp screws on the clutch disc. Engage a wrench or screwdriver on the lug of the adjusting disc and rotate the disc.



(Bottom View)

2.28 Main Shaft and Trip Shaft Mechanisms (continued)

CLUTCH SHOE LEVER SPRING

Requirement

Clutch engaged. Hold cam disc to prevent turning. Spring scale pulled at tangent to clutch.

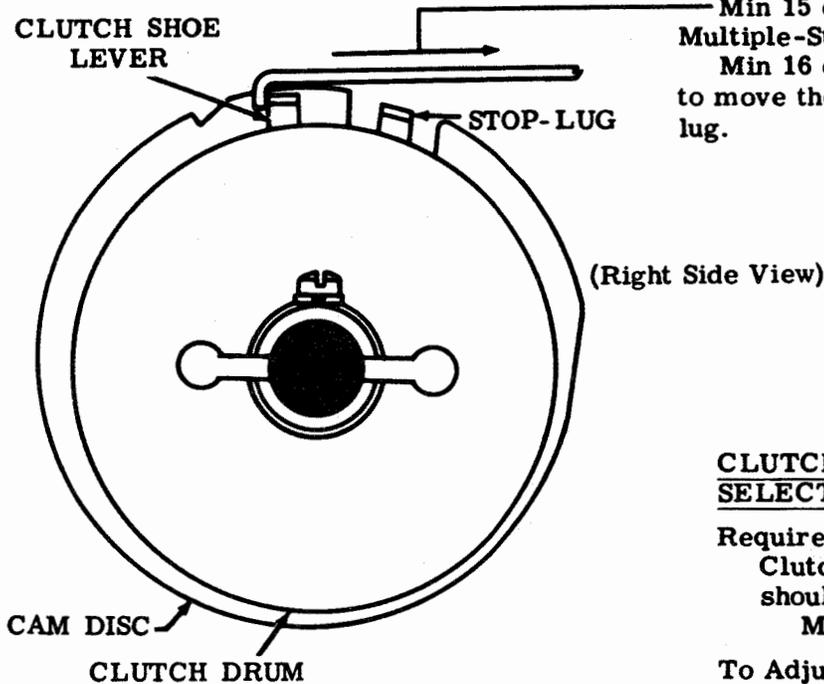
One-Stop Clutches:

Min 15 oz---Max 20 oz

Multiple-Stop Clutches:

Min 16 oz---Max 22 oz

to move the shoe lever in contact with the stop-lug.



CLUTCH DRUM POSITION (EXCEPT SELECTOR)

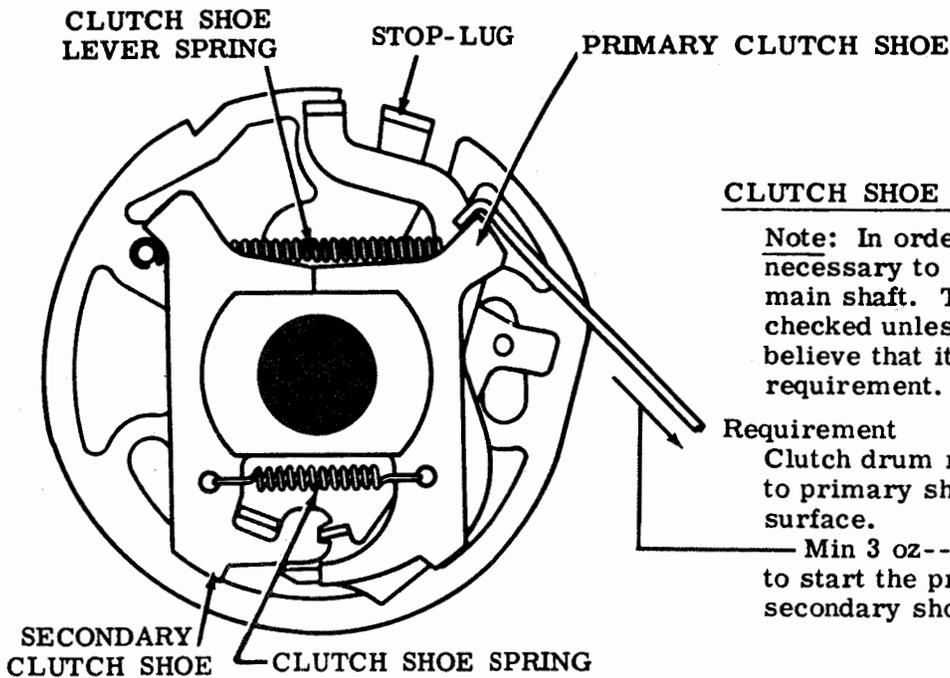
Requirement

Clutch shoe lever held disengaged. Clutch should have some endplay

Max 0.015 inch

To Adjust

Position each drum and spacing clutch set collar with mounting screws loosened.



CLUTCH SHOE SPRING

Note: In order to check this spring, it is necessary to remove the clutch from the main shaft. Therefore, it should not be checked unless there is good reason to believe that it does not meet its requirement.

Requirement

Clutch drum removed. Spring scale applied to primary shoe at a tangent to the friction surface.

Min 3 oz---Max 5 oz

to start the primary shoe moving away from secondary shoe at point of contact.

2.29 Spacing Mechanism

**(B) SPACING GEAR PHASING**

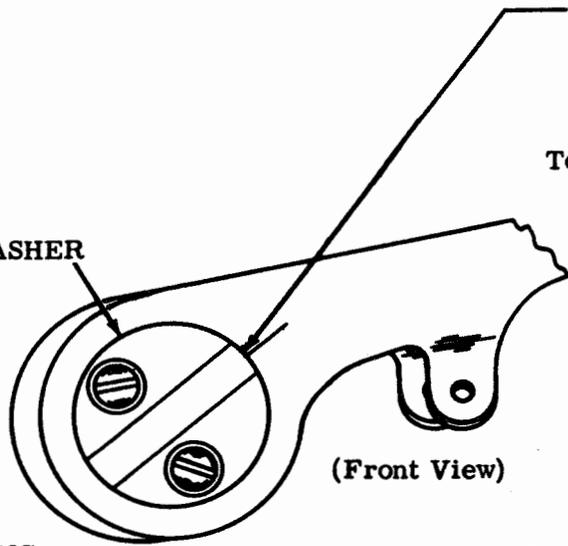
**Requirement**

Spacing clutch disengaged. Index line on the spacing pawl should be as near as possible to the center of the two lines on the pawl retaining washer.

**To Adjust**

Remove the mounting screw from the spacing shaft gear. Hold the pawls in alignment and engage the spacing shaft gear with the clutch gear at a point where the spacing shaft gear mounting screw hole is in line with the tapped hole in the spacing shaft and insert the mounting screw.

RETAINING WASHER



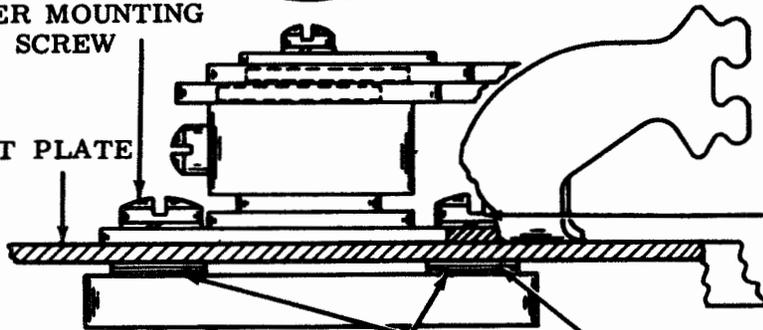
(Front View)

UPPER MOUNTING SCREW

FRONT PLATE

LOWER MOUNTING SCREW

SHIMS



SPACING SHAFT BEARING

SPACING SHAFT

MOUNTING SCREW



(Bottom View)

SPACING SHAFT GEAR

**(A) SPACING GEAR CLEARANCE**

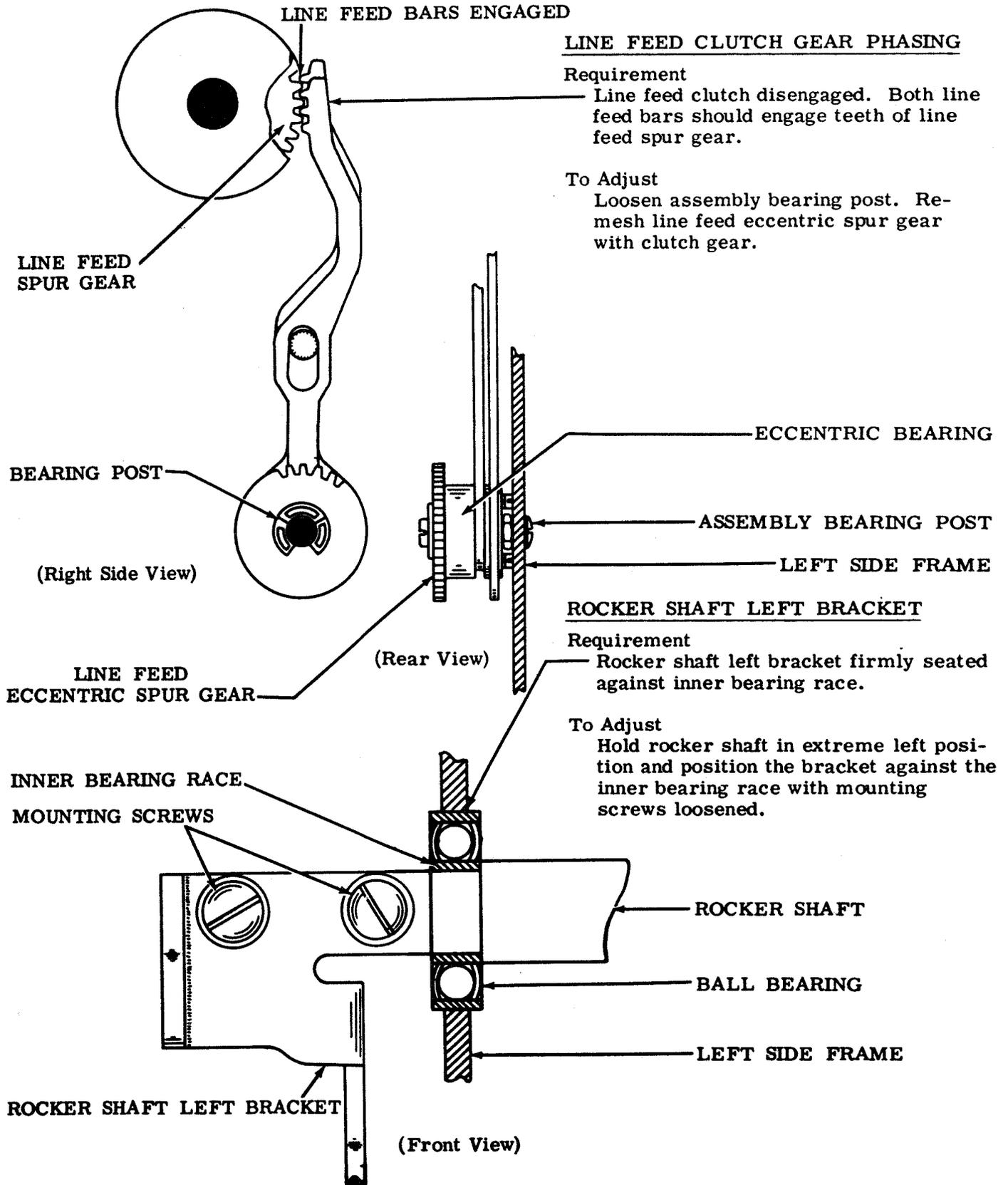
**Requirement**

Carriage fully returned. Minimum backlash of spacing gears without bind.

**To Adjust**

Insert shims between the spacing shaft bearing and front plate at upper mounting screw to increase clearance and at lower mounting mounting screw to decrease clearance.

2.30 Line Feed, Platen Mechanism, and Positioning Mechanism



2.31 Positioning Mechanism

ROCKER SHAFT BRACKET ECCENTRIC STUD

(1) Requirement

Typebox clutch disengaged. Play in locking arm taken up towards front. Gap between lower side of locklever roller and top edge of shoulder on horizontal positioning locklever  
 Min 0.055 inch---Max 0.090 inch

To Adjust

Position eccentric stud in lower end of rocker shaft left bracket. Keep high part of eccentric (marked with dot) below center line of drive link.

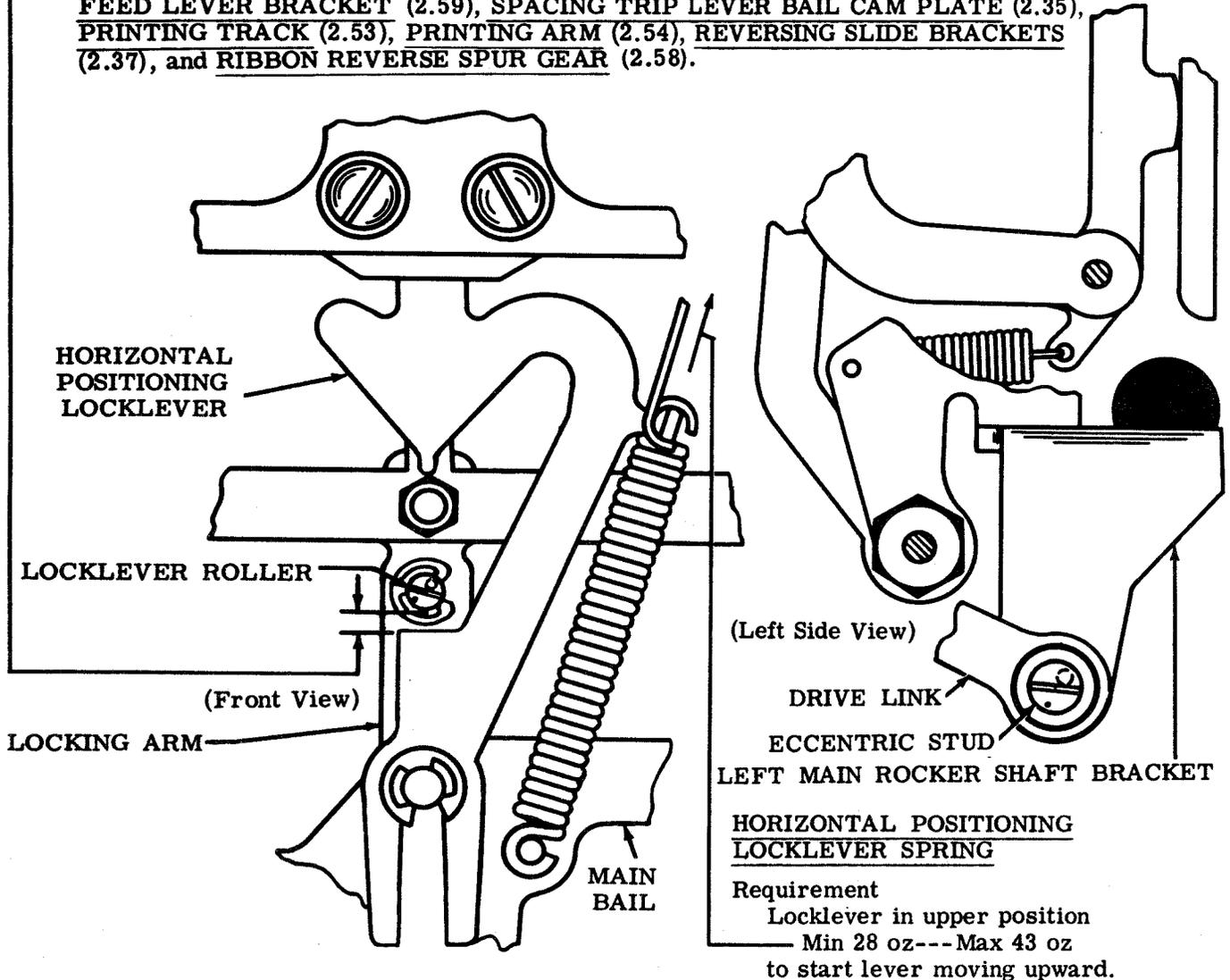
(2) Requirement

Rocker shaft drive link bearing stud should be free to move, parallel to the main shaft, in its typebox clutch bearing when the clutch is in stop position and 180 degree position.

To Adjust

Refine the above to adjust.

**Note:** Any change in this adjustment after making related adjustments will require a rechecking of the following adjustments: HORIZONTAL POSITIONING DRIVE LINKAGE (2.38), RIGHT VERTICAL POSITIONING LEVER ECCENTRIC STUD (2.32), LEFT VERTICAL POSITIONING LEVER ECCENTRIC STUD (2.33), VERTICAL POSITIONING LOCKLEVER (2.34), RIBBON FEED LEVER BRACKET (2.59), SPACING TRIP LEVER BAIL CAM PLATE (2.35), PRINTING TRACK (2.53), PRINTING ARM (2.54), REVERSING SLIDE BRACKETS (2.37), and RIBBON REVERSE SPUR GEAR (2.58).



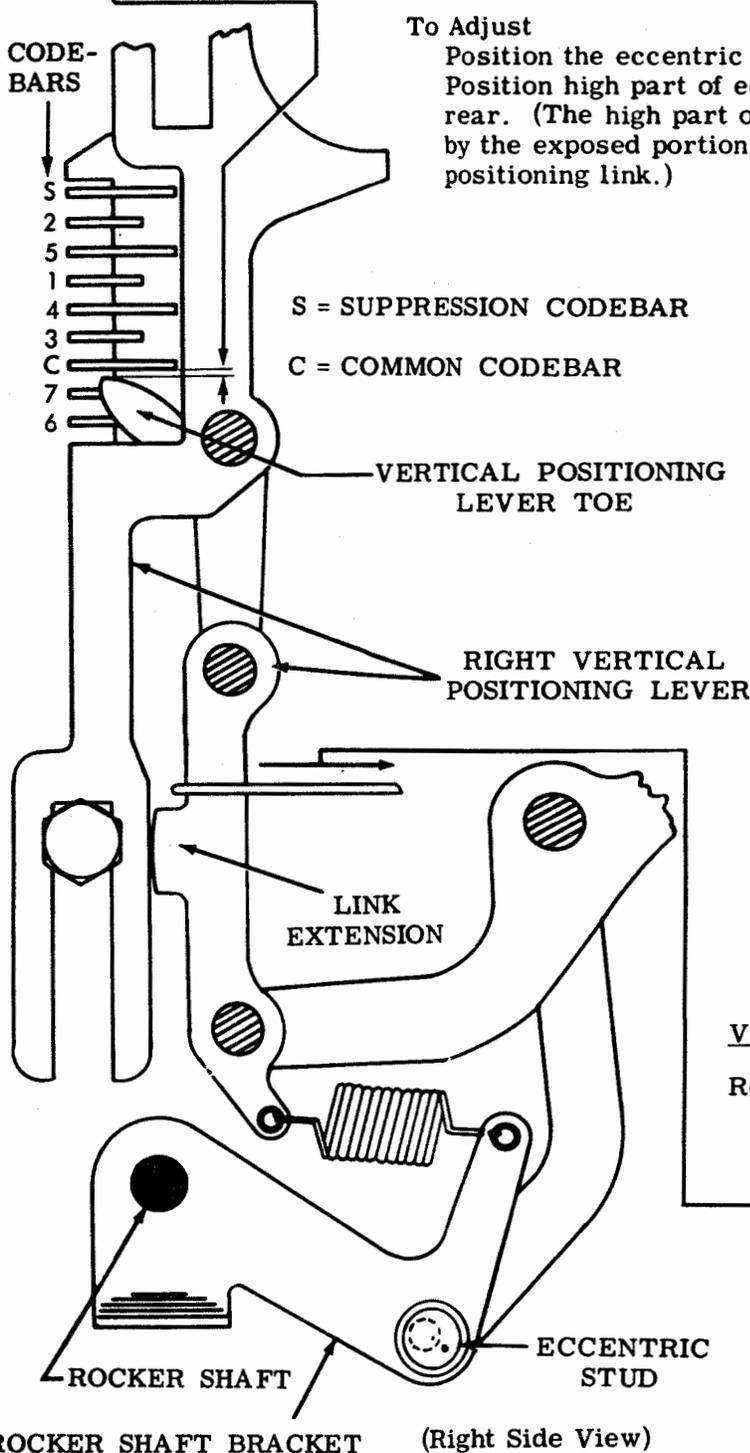
2.32 Positioning Mechanism (continued)

RIGHT VERTICAL POSITIONING LEVER ECCENTRIC STUD

**Requirement**

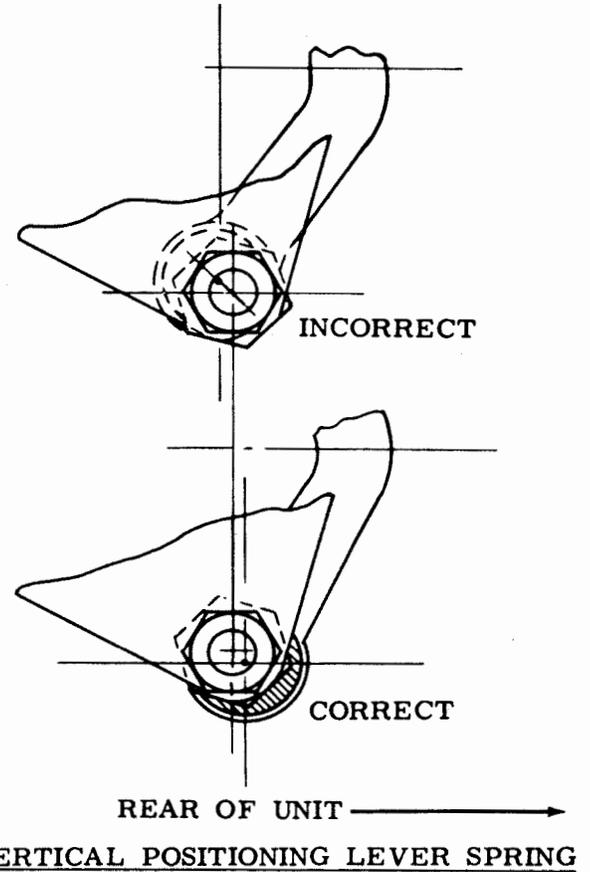
Typebox clutch disengaged, common codebar in spacing position. Play taken up by pressing downward on common codebar at guide block.

Min 0.030 inch---Max 0.050 inch clearance between the toe of vertical positioning lever and the bottom of the common codebar when play is taken up to make clearance a minimum.



**To Adjust**

Position the eccentric stud in the right rocker shaft bracket. Position high part of eccentric (marked with dot) toward the rear. (The high part of the eccentric can also be identified by the exposed portion of the flat surface of the vertical positioning link.)

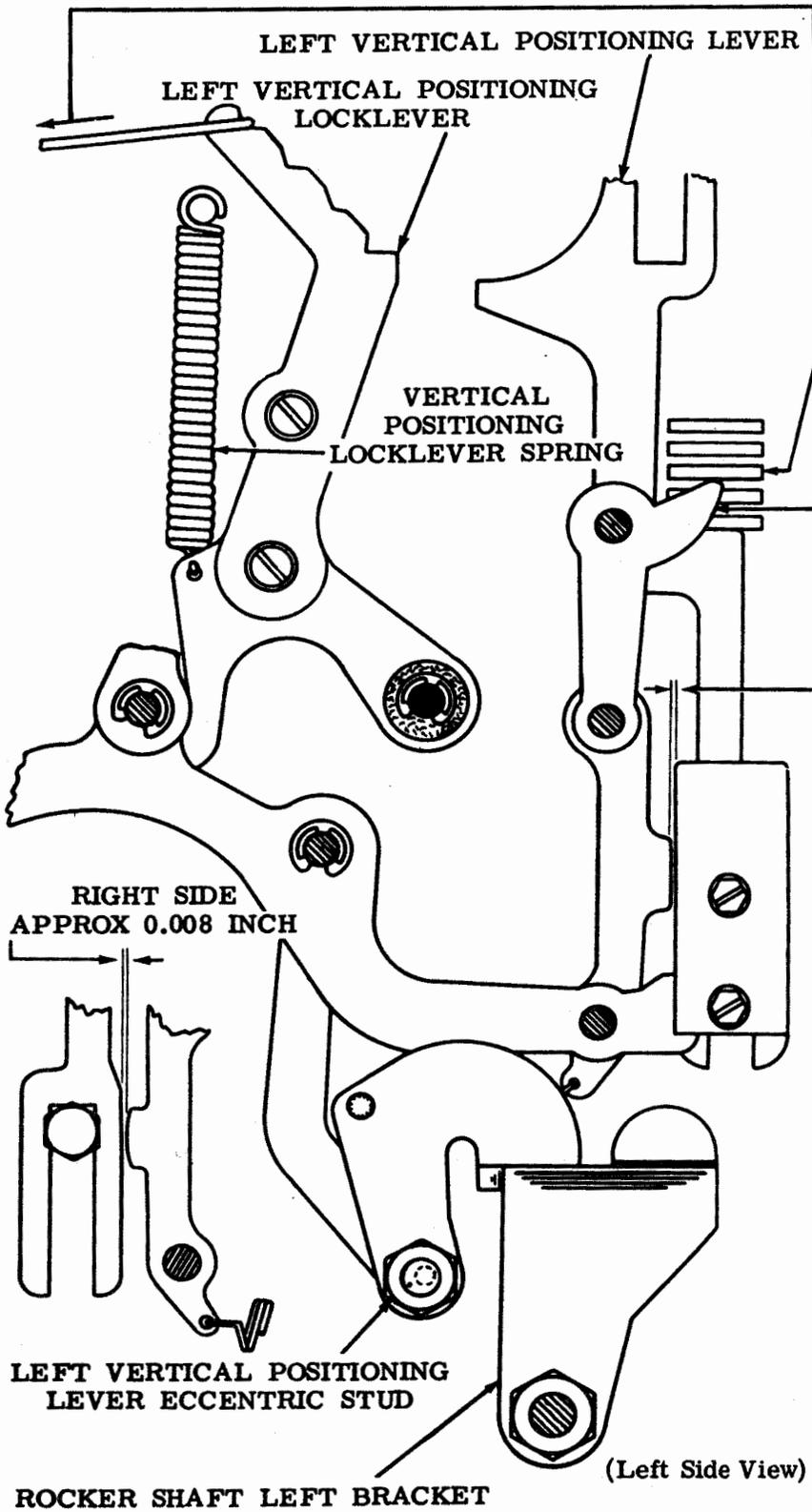


**Requirement**

Vertical positioning lever toes (right and left) in contact with the suppression codebar, levers not buckled.

Min 4 oz---Max 12 oz to move the link extension away from the vertical positioning lever. Check both right and left springs.

2.33 Positioning Mechanism (continued)



**VERTICAL POSITIONING LOCK-LEVER SPRING**

**Requirement**  
 Typebox clutch disengaged  
 Min 5 oz---Max 8 oz  
 to start locklever moving.  
 Check right and left springs.

**COMMON CODEBAR**  
**VERTICAL POSITIONING LEVER TOE**  
**LEFT VERTICAL POSITIONING LEVER ECCENTRIC STUD**

**Requirement**  
 Right and left vertical position-  
 ing levers should buckle equally  
 within 0.006 inch.

**To Check**  
 Common codebar in spacing  
 position. Trip typebox clutch.  
 Rotate main shaft until right  
 vertical positioning lever toe  
 touches common codebar, buck-  
 ling its lower link approxi-  
 mately 0.008 inch. Left vertical  
 positioning lever toe should  
 touch common codebar, buckling  
 its lower link equally within  
 0.006 inch.

**To Adjust**  
 Position eccentric stud on  
 rocker shaft left bracket inner  
 arm. Position high part of cam  
 (marked with dot) toward rear.

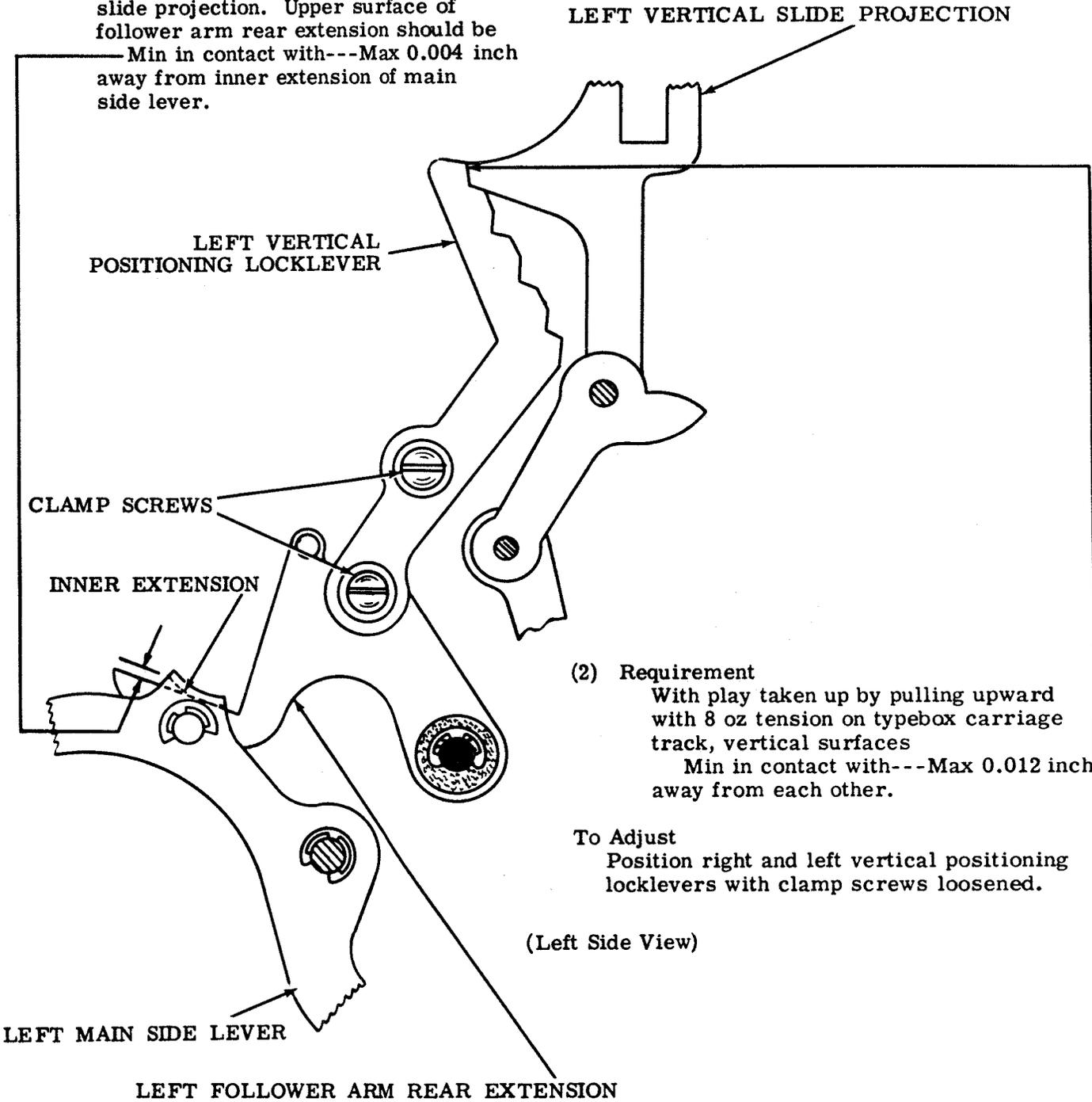
**Note:** On units containing inter-  
 mediate storage mechanism,  
 position the eccentric stud in the  
 right rocker shaft bracket. (The  
 high part of the eccentric can  
 also be identified by the exposed  
 portion of the flat surface of the  
 vertical positioning link.)

2.34 Positioning Mechanism (continued)

VERTICAL POSITIONING LOCKLEVER

(1) Requirement

Rubout combination set up on codebars. Main side operating levers at upper end of travel. Upper notch of vertical positioning locklever fully engaged (manually if necessary) with vertical slide projection. Upper surface of follower arm rear extension should be Min in contact with---Max 0.004 inch away from inner extension of main side lever.



LEFT VERTICAL SLIDE PROJECTION

LEFT VERTICAL POSITIONING LOCKLEVER

CLAMP SCREWS

INNER EXTENSION

LEFT MAIN SIDE LEVER

LEFT FOLLOWER ARM REAR EXTENSION

(2) Requirement

With play taken up by pulling upward with 8 oz tension on typebox carriage track, vertical surfaces

Min in contact with---Max 0.012 inch away from each other.

To Adjust

Position right and left vertical positioning locklevers with clamp screws loosened.

(Left Side View)

2.35 Spacing Mechanism (continued)

(A) SPACING TRIP LEVER BAIL CAM PLATE

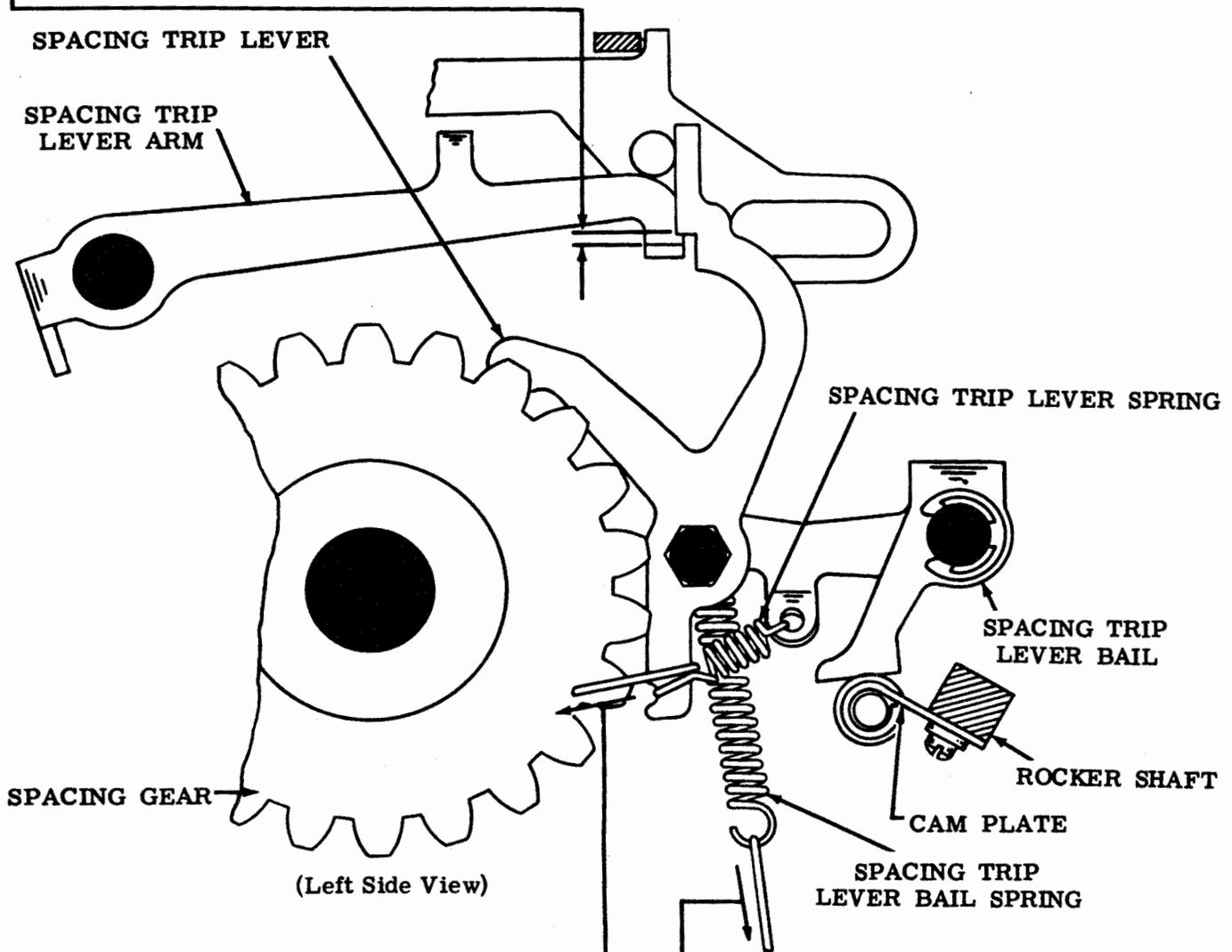
**Requirement**

Spacing trip lever arm in upward position. Typebox clutch rotated through approximately one-half of its cycle. All function pawls disengaged from function bars. Clearance between top surface of trip lever arm extension and spacing trip lever shoulder

Min 0.010 inch---Max 0.040 inch

**To Adjust**

Position cam plate on rocker shaft with mounting screws loosened. Position forward edge of cam plate parallel to shaft.



(B) SPACING TRIP LEVER SPRING

**Requirement**

Typebox clutch disengaged.  
Min 2-1/2 oz---Max 5 oz  
to start lever moving.

(C) SPACING TRIP LEVER BAIL SPRING

**Requirement**

Spacing trip lever bail against stop.  
Spacing trip lever bail spring unhooked.

Min 8 oz---Max 12 oz  
to pull spring to installed length.

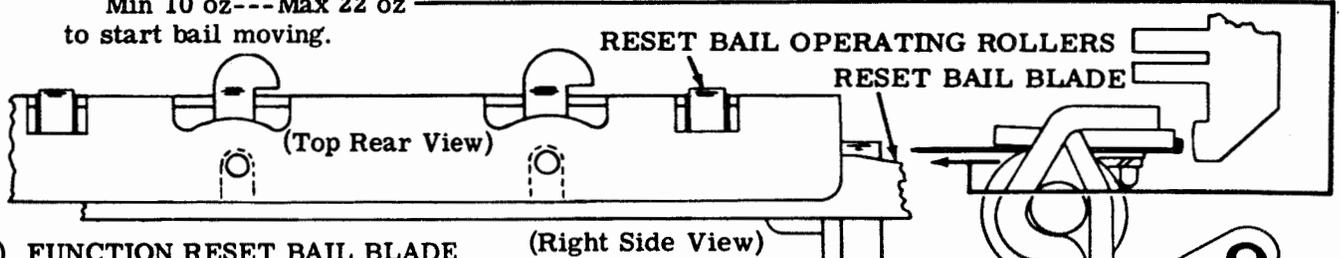
2.36 Function Mechanism

(B) FUNCTION RESET BAIL SPRING

**Requirement**

With typing unit upside down, hold no. 1 codebar in its marking position so that no function bar is selected. Rotate the main shaft until the function reset bail springs are in their minimum length position. Place pull rod of 32 ounce scale between clutch trip shaft and space suppression bail, hook scale on front edge of reset bail (at middle of bail) and pull toward rear.

Min 10 oz---Max 22 oz  
to start bail moving.



(A) FUNCTION RESET BAIL BLADE

(1) **Requirement**

Function and typebox clutches disengaged. Function pawls unlatched. Function bar held in maximum rearward position. Clearance between function bar and reset bail blade

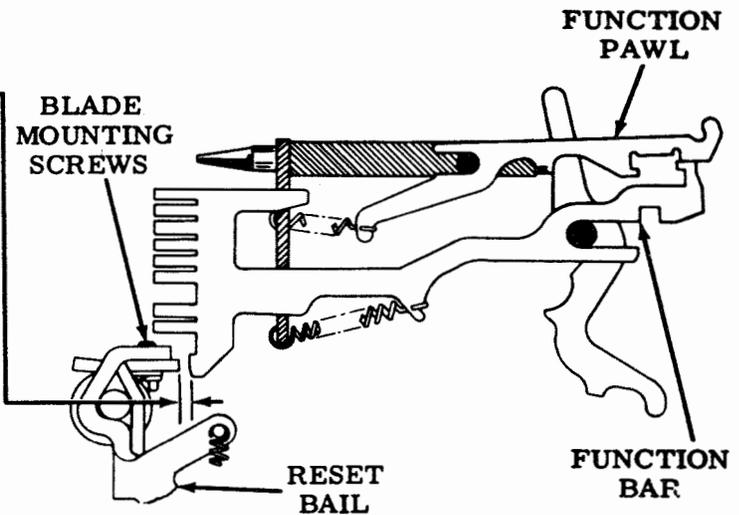
Min 0.018 inch---Max 0.035 inch

**To Check**

Measure clearance at bars located in stunt box slots 1, 4, 11, 18, 23, 33, 38, and 41. If there is no bar in a designated slot, use nearest bar. If there is a bar on each side of a designated vacant slot, use bar in highest numbered slot. (Note: Facing rear of unit, slots are numbered from left to right.)

**To Adjust**

Position blade on reset bail with its mounting screws friction tight.



(2) **Requirement**

Function pawl should overtravel function bar by  
Min 0.002 inch

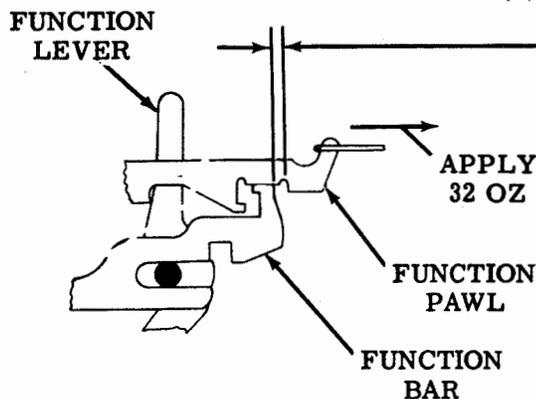
**To Check**

If carriage return lever adjustment has not been made, its clamp screw should be loosened. Position function clutch so that lug on clutch disc is toward bottom of unit. Strip off any selected function pawls. Hold function lever in maximum rearward position (do not put over 2 lb of tension on lever) and hold function pawl to rear with a tension of 32 oz. (As load on reset bail affects overtravel, do not latch more than one pawl at a time.) Measure clearance. Repeat for each function pawl on stunt box.

**To Adjust**

If necessary, refine Requirement (1) within the following limits

Min 0.018 inch---Max 0.035 inch



(Right Side View)

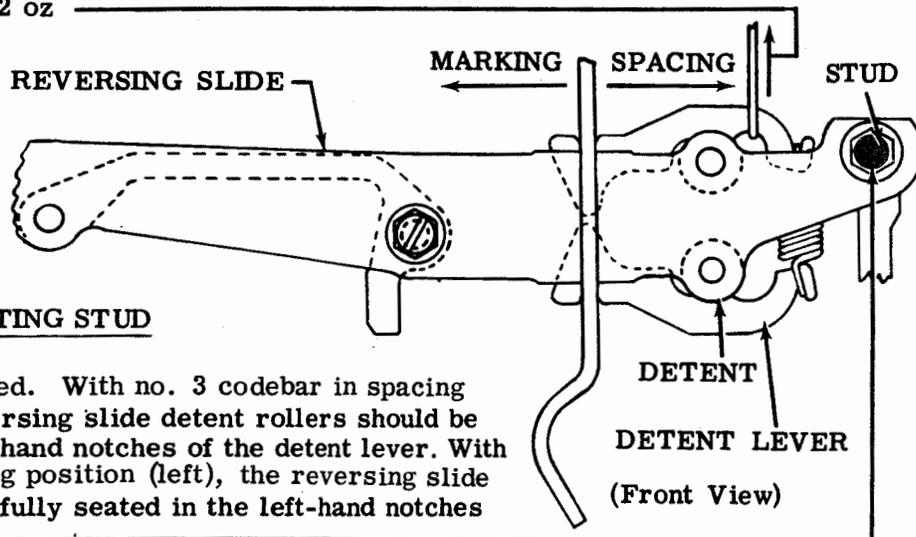
2.37 Positioning Mechanism (continued)

(A) REVERSING SLIDE DETENT SPRING

**Requirement**

Slide in left hand position. Scale hooked in upper right hand detent notch.

Min 2 oz---Max 4-1/2 oz  
to start detent moving.



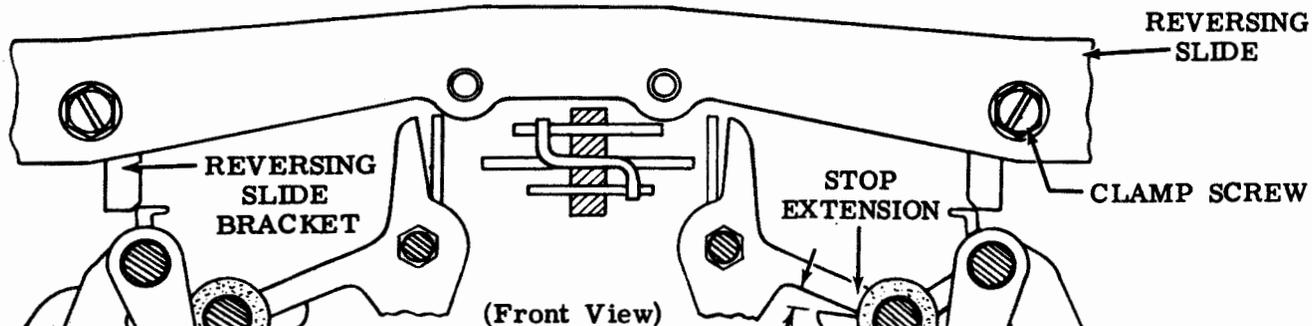
(B) REVERSING SLIDE ADJUSTING STUD

**Requirement**

Typebox clutch disengaged. With no. 3 codebar in spacing position (right), the reversing slide detent rollers should be fully seated in the right-hand notches of the detent lever. With no. 3 codebar in marking position (left), the reversing slide detent rollers should be fully seated in the left-hand notches of the detent lever.

**To Adjust**

Position the reversing slide stud in its elongated hole with its mounting nut loosened.



(C) REVERSING SLIDE BRACKETS

**Requirement**

Typebox clutch, codebar clutch, and function clutch disengaged. Reversing slide moved to right and left through its full travel. Right motion should buckle left horizontal positioning drive linkage and left motion should buckle right horizontal positioning drive linkage. The amount of buckling in each case should be  
Min 0.035 inch---Max 0.050 inch  
measured at point of maximum clearance.

**To Adjust**

Position each reversing slide bracket with its clamp screw loosened.

2.38 Positioning Mechanism (continued)

HORIZONTAL POSITIONING DRIVE LINKAGE

(1) Requirement

Typebox clutch disengaged. Codebars in spacing position. Clearance between longest horizontal stop and positioning linkage slides

Min 0.090 inch--Max 0.110 inch

clearance at two sides should be equal within 0.008 inch, with positioning linkage in straight position. Move reversing slide to right and left to check both sides.

To Adjust

Loosen two screws in drive linkage bearing posts and two screws in bearing posts tie bar. With reversing slide in right hand position, locate right hand bearing post so clearance between longest horizontal stop and right hand positioning lever slide

Min 0.095 inch--Max 0.105 inch

Tighten two screws in bearing posts tie bar. Do not tighten bearing posts mounting screws. Move reversing slide to left hand position, check clearance between longest horizontal stop and left hand positioning lever slide. Equalize clearance at right and left positioning slides within 0.008 inch by moving two bearing posts as a unit.

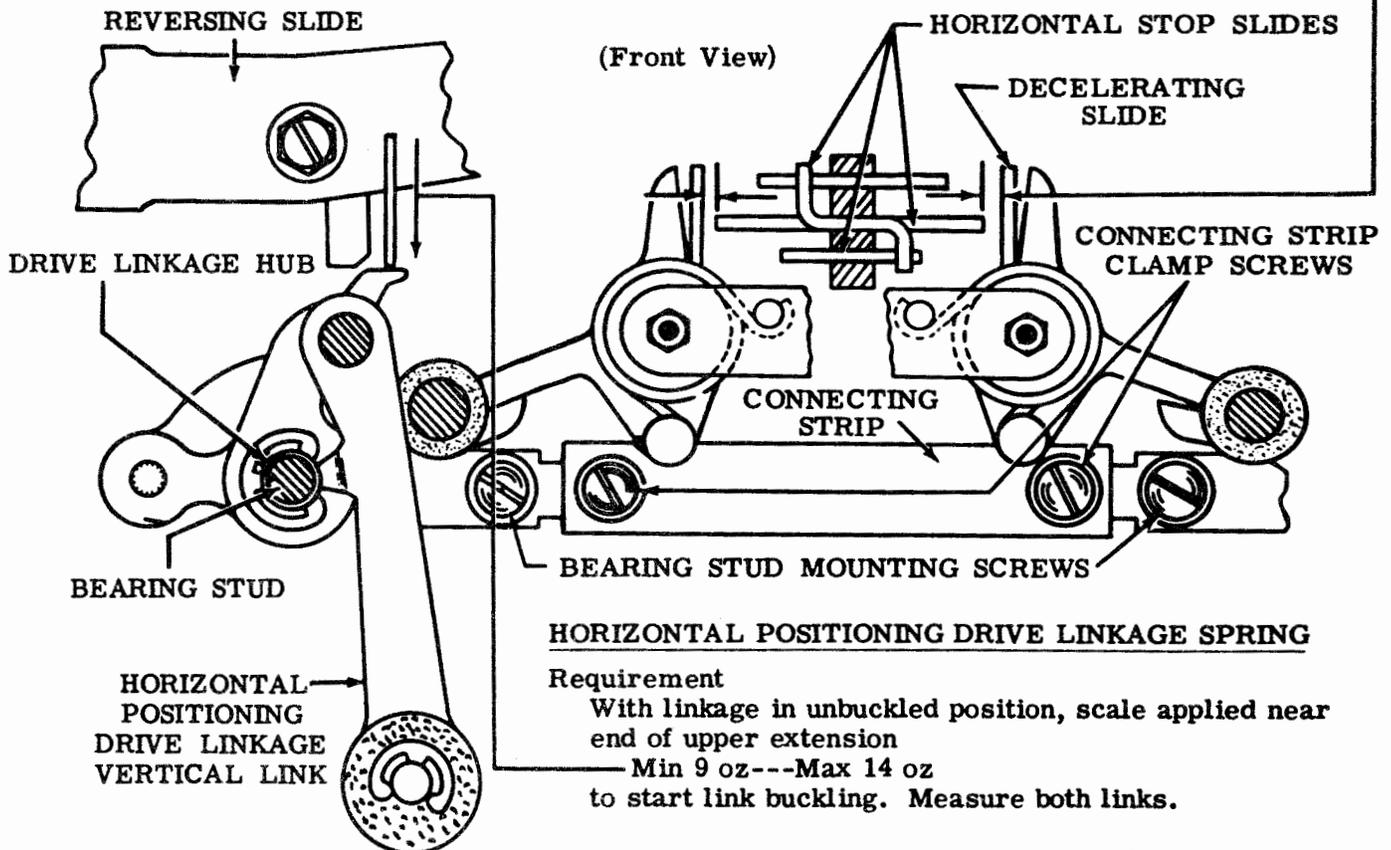
(2) Requirement

Horizontal positioning mechanism should be free of jams or binds.

To Check

Typebox clutch disc should have some movement in the normal direction of rotation in the stop position.

Note: Each positioning linkage should return freely to its straight position after buckling. Recheck REVERSING SLIDE BRACKETS (2.37).



2.39 Positioning Mechanism (continued)

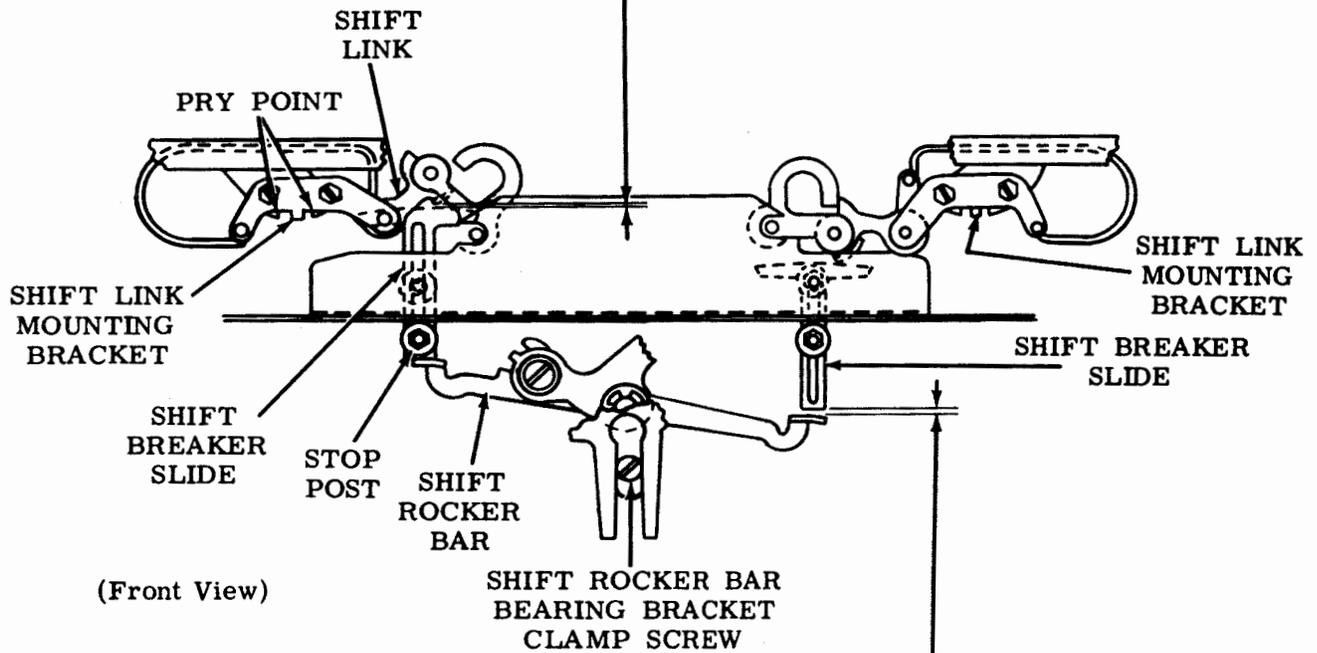
SHIFT LINKAGE (PRELIMINARY)

Requirement

With codebar and typebox clutches disengaged  
 Min 0.030 inch---Max 0.050 inch  
 between shift breaker slide and pad on shift  
 link, with link buckled and shift breaker slide  
 pushed upwards against stop. Clearance at  
 two sides equal within 0.010 inch.

To Adjust

Position shift link mounting brackets up or  
 down by means of play in mounting holes.



SHIFT ROCKER BAR BEARING BRACKET

Requirement

Note: Verify SHIFT ROCKER LEVER (2.41)  
 before proceeding with this adjustment.

Codebar and typebox clutches disengaged.  
 Clearance between shift rocker bar and lower  
 end of right shift breaker slide

Min 0.050 inch---Max 0.070 inch

Check left side in similar manner.

To Check

Raise left end of shift rocker bar to uppermost  
 position, holding left shift breaker slide against  
 stop. Make sure right shift link is straight, and  
 hold right shift breaker slide against shift link pad.

To Adjust

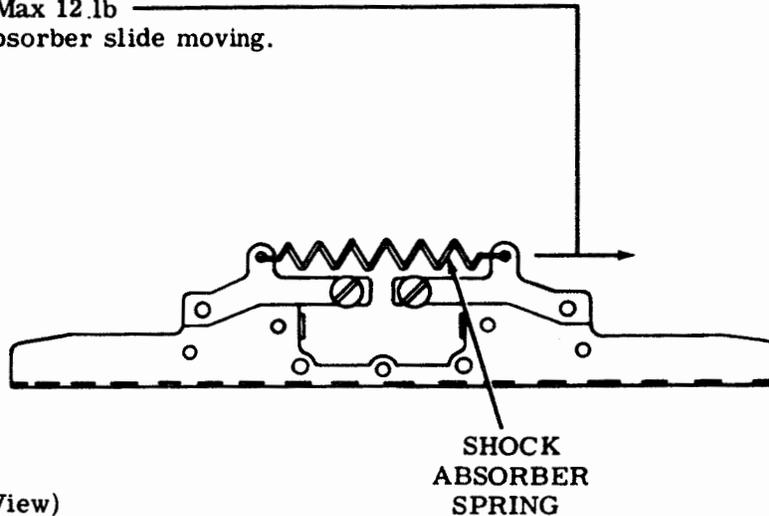
Position shift rocker bar bearing bracket with  
 clamp screw friction tight.

## 2.40 Positioning Mechanism (continued)

HORIZONTAL SHIFT LINK SHOCK ABSORBER SPRING**Requirement**

Typebox carriage at left side of typing unit. Right hand shift link in straight or unbuckled position.

Min 10 lb---Max 12 lb  
to start shock absorber slide moving.

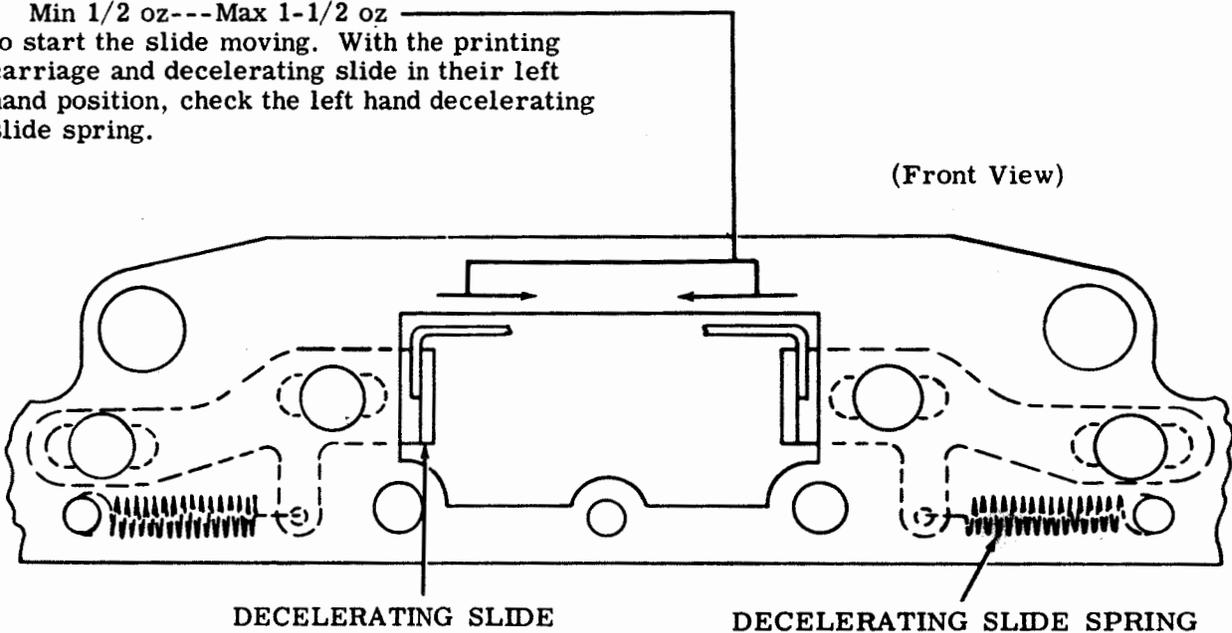


(Front View)

DECELERATING SLIDE SPRING**Requirement**

Printing bail in downward position. Printing carriage and decelerating slide assembly in right hand position.

Min 1/2 oz---Max 1-1/2 oz  
to start the slide moving. With the printing carriage and decelerating slide in their left hand position, check the left hand decelerating slide spring.



(Front View)

DECELERATING SLIDE

DECELERATING SLIDE SPRING

2.41 Positioning Mechanism (continued)

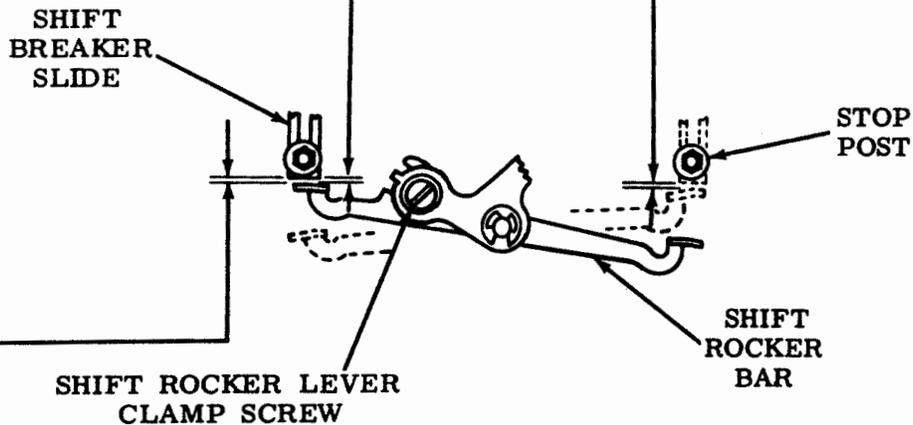
SHIFT ROCKER LEVER

Requirement

With the codebar bail arm assembly roller on the high part of the cam, make a left and right shift selection. On each shift selection measure the clearance between the raised end of the shift rocker bar and the lower end of the associated shift breaker slide. On the shift selection which yields the smaller clearance, take up the play in an upward direction at the lower end of the shift rocker lever with a force of 2 ounces. The resulting clearance should be equal within 0.010 inch to the clearance between the raised end of the shift rocker bar and the lower end of the associated shift breaker slide when the opposite shift selection is made.

To Adjust

Loosen shift rocker lever clamp screw friction tight and position shift rocker lever. Tighten clamp screw.



(Front View)

SHIFT DRIVE PAWL OPERATING BAIL

Requirement

With shift drive pawl operating bail cam follower on high dwell of cam, clearance between shift rocker bar and lower end of raised shift breaker slide

Min 0.005 inch---Max 0.025 inch  
when slide is held against stop. To be held within

Min 0.005 inch---Max 0.035 inch  
when the 0.010 inch parallel requirement is held in the SHIFT ROCKER LEVER adjustment.

To Adjust

Position operating bail cam follower arm by means of its clamp screw. Recheck SHIFT ROCKER LEVER adjustment.

SHIFT ROCKER BAIL SPRING (For Applicable Units)

Requirement

Position the shift rocker bail alternately in the letters or figures position.

While spring is extended it should require

Min 2 oz---Max 6 oz  
to pull spring to its installed length.

2.42 Positioning Mechanism (continued)

SHIFT DRIVE PAWL GUIDE BRACKET

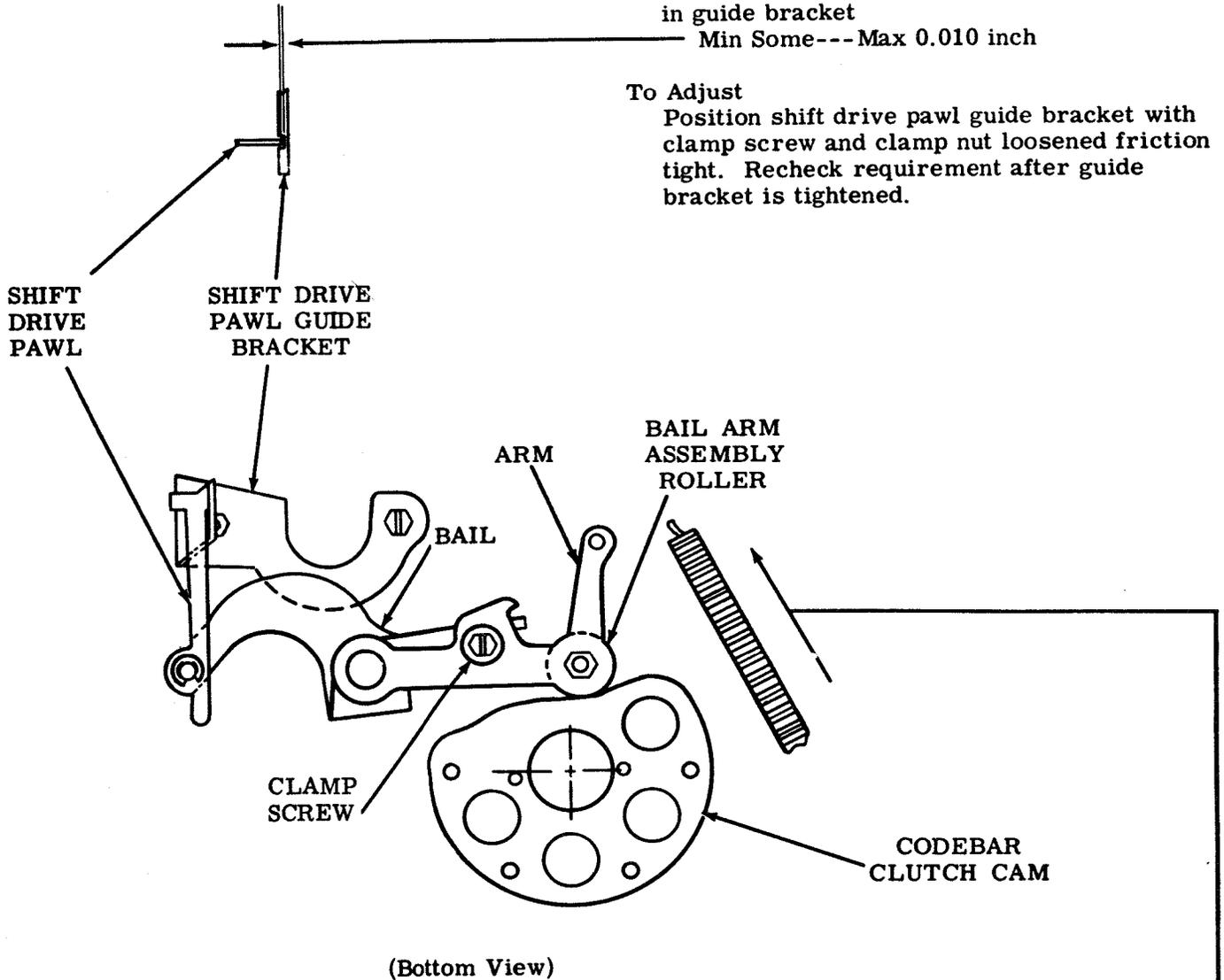
**Requirement**

Codebar clutch disengaged. Bail arm assembly spring removed. Movement of its bail arm assembly should cause shift drive pawl to move freely in its guide bracket throughout its entire travel. Clearance between shift drive pawl and bottom of slot in guide bracket

Min Some---Max 0.010 inch

**To Adjust**

Position shift drive pawl guide bracket with clamp screw and clamp nut loosened friction tight. Recheck requirement after guide bracket is tightened.



(Bottom View)

BAIL ARM ASSEMBLY SPRING

**Requirement**

Drive pawl bail arm assembly on low part of cam. Unhook spring.

Min 6 oz---Max 12 oz

to pull spring to installed length.

2.43 Positioning Mechanism (continued)

SHIFT SELECTOR ARM BELLCRANK

**Requirement**

Shift pushlever in marking position (toward front), selector clutch and codebar clutch disengaged. Shift pawl should clear end of shift drive pawl bearing post.

Min some---Max 0.025 inch

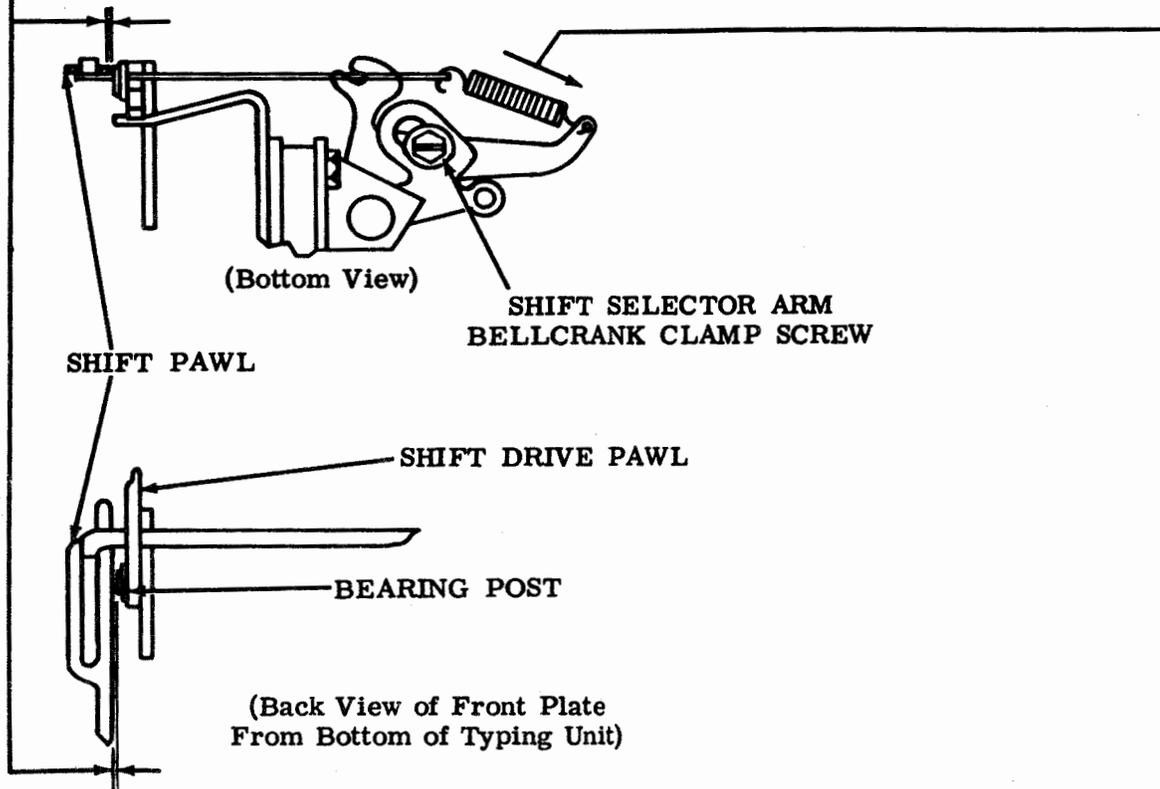
**Note:** On units containing storage mechanism, shift pushlever in spacing position (toward rear), shift intermediate storage lever marking, selector clutch and codebar clutch disengaged. Shift pawl should clear end of shift drive pawl bearing post.

Min some---Max 0.025 inch

Recheck INTERMEDIATE ARM BACKSTOP BRACKET (2.15). Refine requirement above.

**To Adjust**

Loosen shift selector arm bellcrank clamp screw friction tight. Position to meet requirement.



SHIFT PAWL SELECTOR LINK YIELD SPRING

**Requirement**

Shift pushlever in marking position, selector clutch and codebar clutch disengaged

Min 5 oz---Max 7 oz  
to pull spring to installed length.

2.44 Spacing Mechanism (continued)

Note: Check related adjustments, (See 2.48, 2.55, and 2.56) if the following adjustments are remade.

OSCILLATING RAIL SLIDE POSITION

Requirement

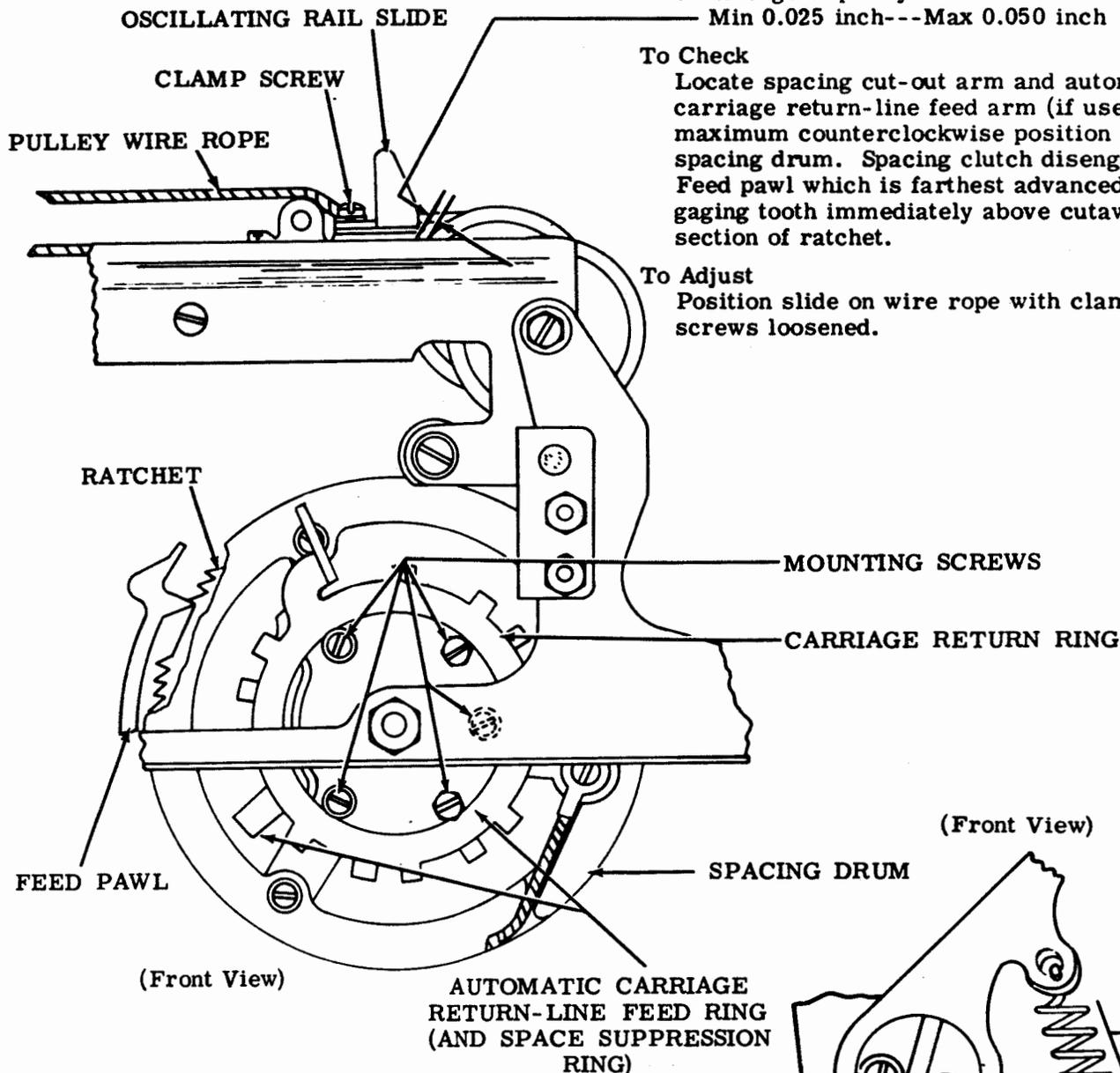
Right end of oscillating rail slide should clear edge of pulley  
Min 0.025 inch---Max 0.050 inch

To Check

Locate spacing cut-out arm and automatic carriage return-line feed arm (if used) in maximum counterclockwise position on spacing drum. Spacing clutch disengaged. Feed pawl which is farthest advanced engaging tooth immediately above cutaway section of ratchet.

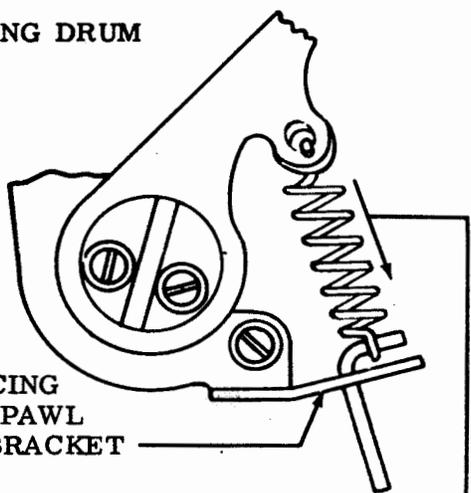
To Adjust

Position slide on wire rope with clamp screws loosened.



(Front View)

(Front View)



(Front View)

SPACING FEED PAWL SPRING

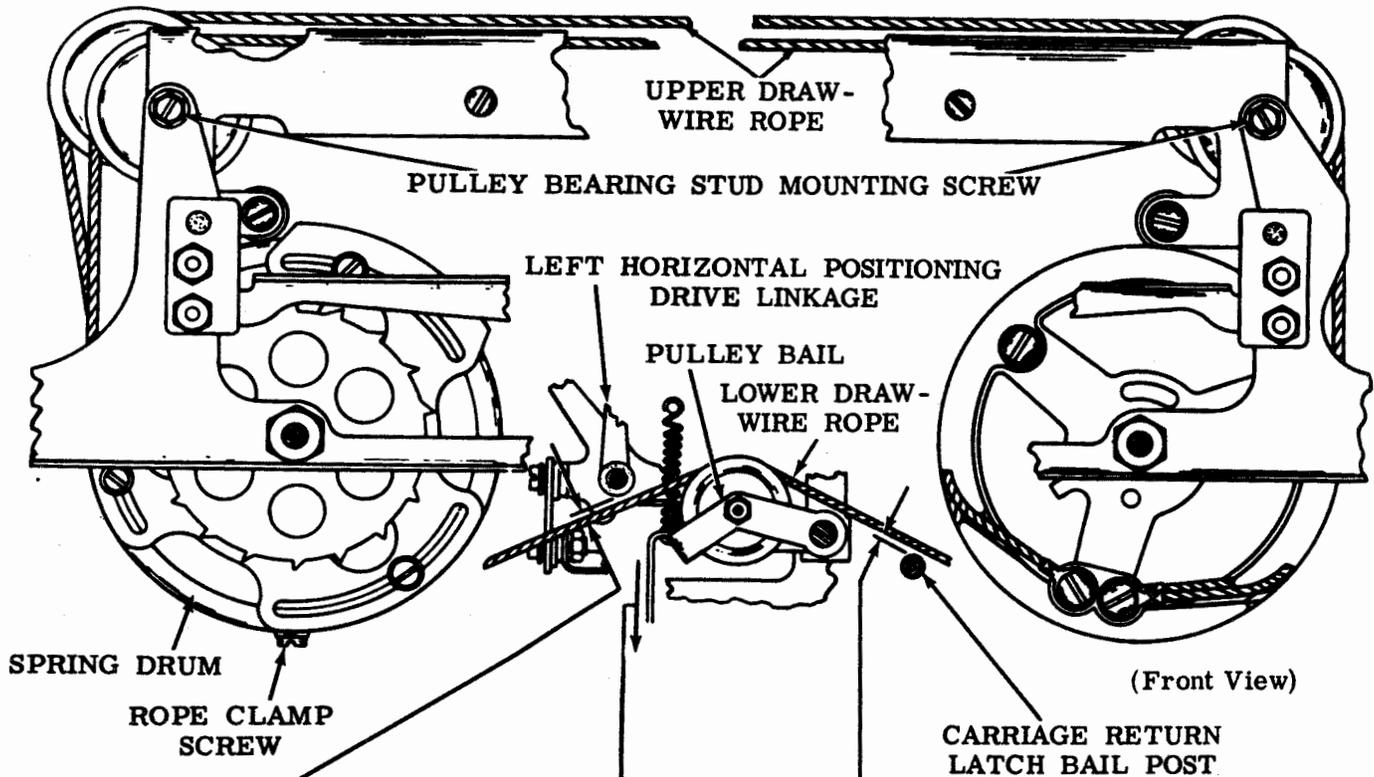
Requirement

Each spacing pawl in least advanced position resting against ratchet wheel. Each spring unhooked from bracket

Min 2-1/2 oz---Max 6 oz  
to pull springs to installed length.

Note: On units equipped for 5 or 6 spaces per inch the tension to pull each spring to installed length should be Min 7-1/2 oz---Max 11 oz.

2.45 Spacing Mechanism (continued)



**LOWER DRAW-WIRE ROPE PULLEY BAIL SPRING**

**Requirement**

Spring unhooked from pulley bail, bail extension resting on opening in front plate.

Min 26 oz ---Max 30 oz  
to pull spring to position length.

**CARRIAGE DRAW-WIRE ROPE**

**Requirement**

Clearance between lower draw-wire rope and carriage return latch bail post should be

Min 0.006 inch

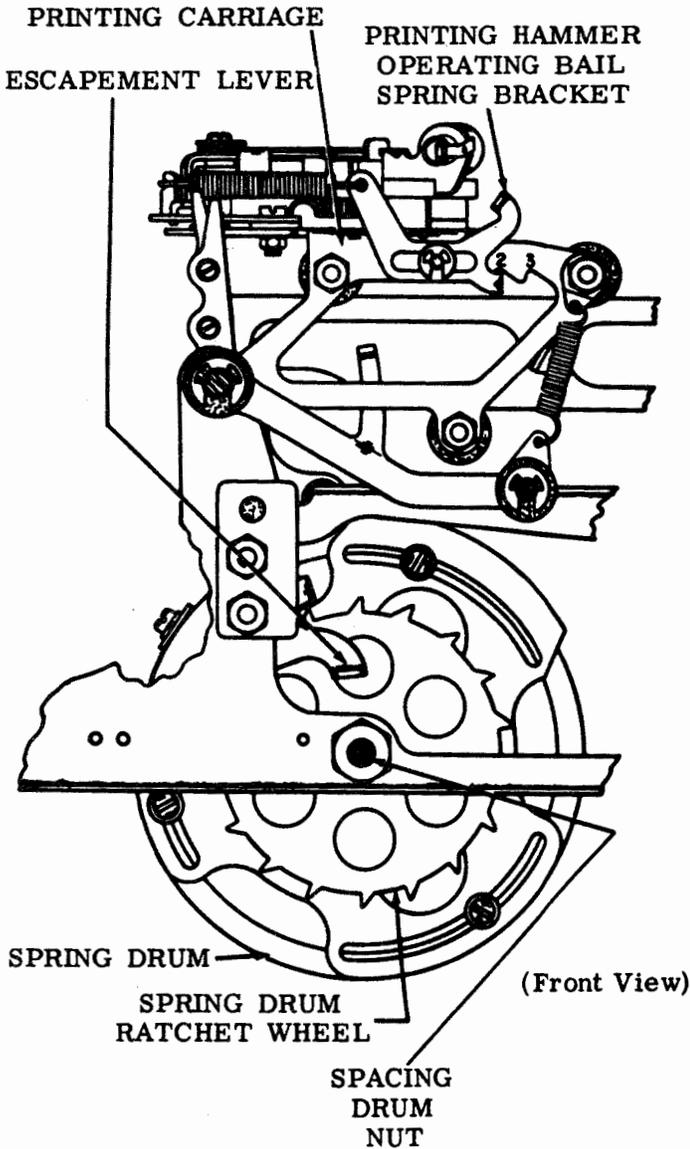
With the horizontal positioning mechanism in its lowest position, clearance between the lower draw-wire rope and the left horizontal positioning drive linkage should be

Min 0.030 inch

**To Adjust**

Advance printing carriage to extreme left hand position. Rotate typebox clutch 1/2 revolution. Loosen rope clamp screw one turn only. Position pulley bearing studs, with their mounting screws loosened, to meet requirement. Check that cable has moved around its equalizing clamp so that cables have equal tension (gauge by feel). Tighten clamp screw.

2.46 Spacing Mechanism (continued)



CARRIAGE RETURN SPRING

Requirement

Pull required to start drum moving  
 Min 3-1/2 lb---Max 4-1/4 lb

To Check

Spacing drum in returned position.  
 Printing track in lowest position.  
 Remove lower cable roller and print hammer carriage stabilizer springs. Hold spacing pawls, buffer slide, and carriage return latch to prevent interference with spacing drum.

To Adjust

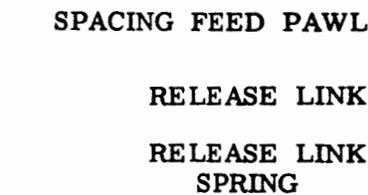
Spring drum nut loosened. Rotate spring drum ratchet wheel to increase tension. Operate escapement lever to decrease tension.

Note: Keep spring tension at minimum for operation at altitudes higher than 2000 feet above sea level.

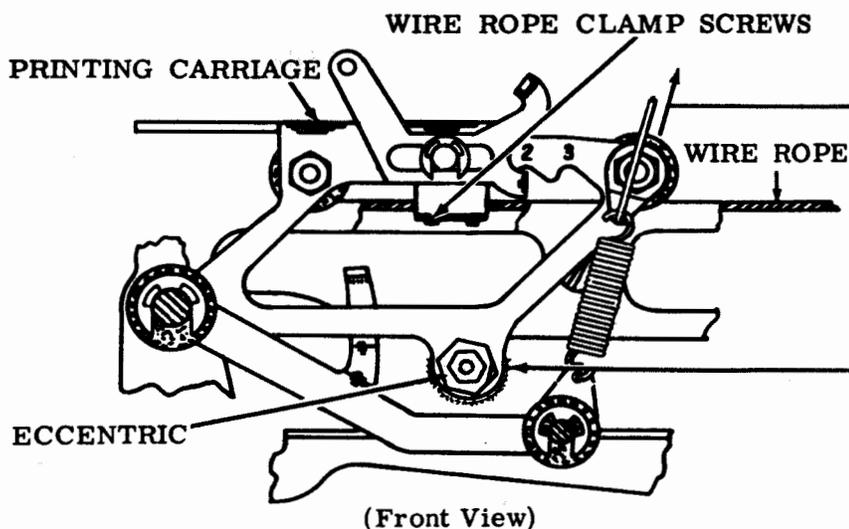
SPACING FEED PAWL RELEASE LINK SPRING

Requirement

Min 1/2 oz---Max 2-1/2 oz  
 to start link moving.



2.47 Printing Mechanism



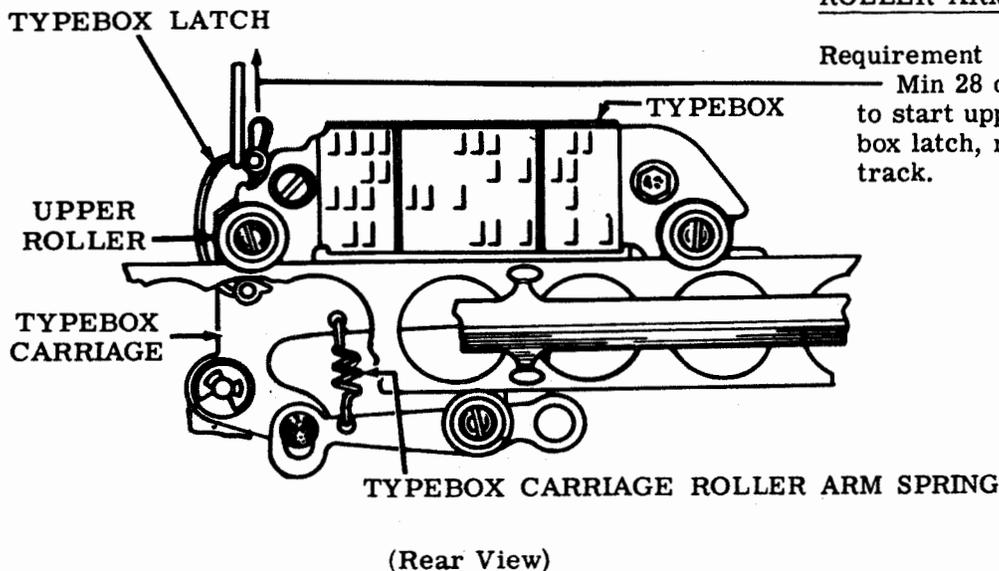
STABILIZING SPRING

Requirement  
Typebox clutch disengaged  
Min 5 oz --- Max 8 oz  
to pull spring to installed  
length.

PRINTING CARRIAGE  
LOWER ROLLER

Requirement  
Carriage vertical play on track  
minimum without binding.

To Adjust  
Position eccentric of lower roller  
with screw nut loosened. Keep  
high part of eccentric (chamfered  
corner) toward right.



TYPEBOX CARRIAGE  
ROLLER ARM SPRING

Requirement  
Min 28 oz --- Max 36 oz  
to start upper roller, nearest type-  
box latch, moving away from carriage  
track.

2.48 Spacing Mechanism (continued)

CARRIAGE RETURN LATCH BAIL

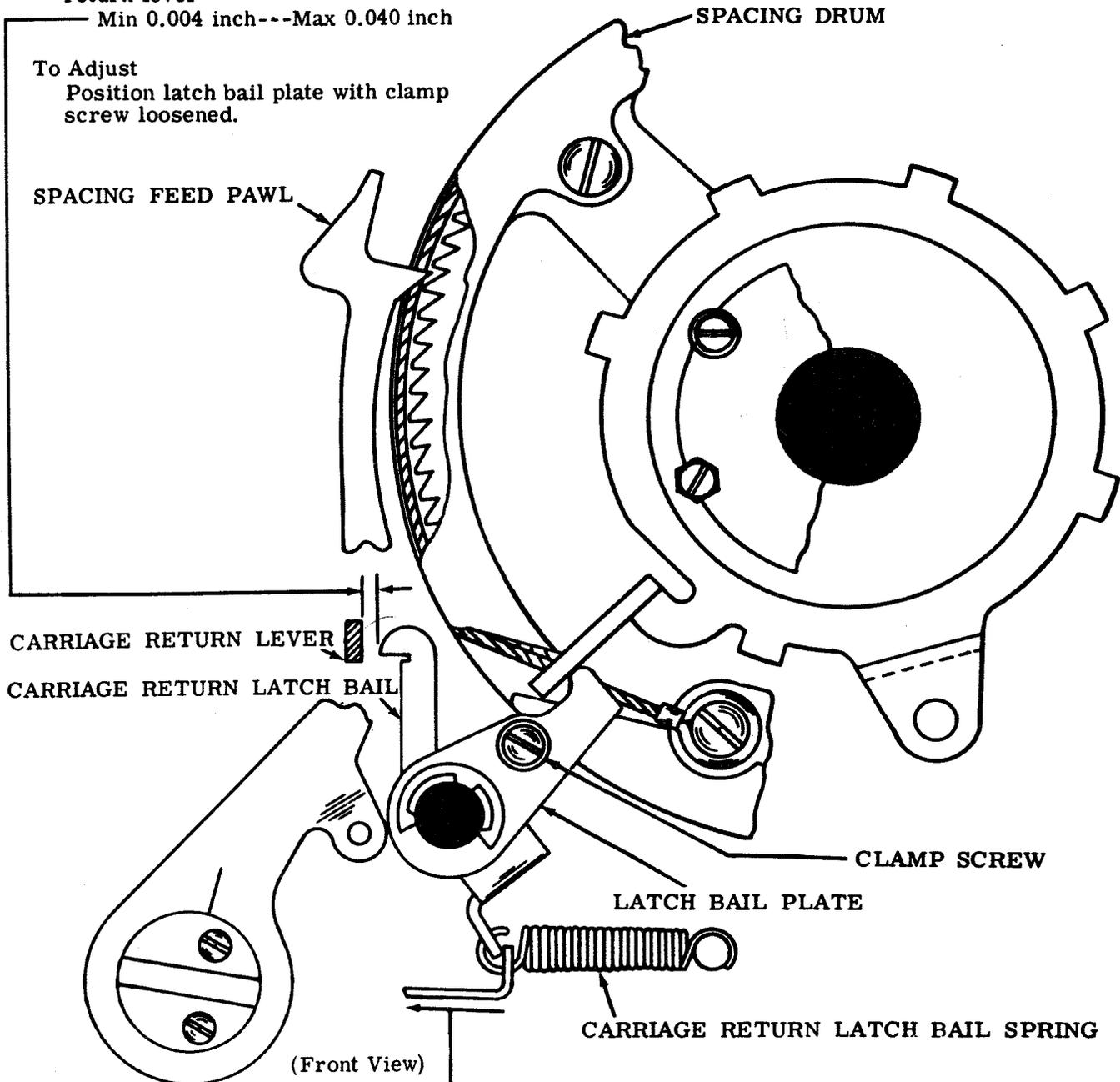
Requirement

Carriage fully returned. Play in carriage return bail taken up to right by holding right side of bail against its retainer. Clearance between carriage return latch bail and carriage return lever

Min 0.004 inch---Max 0.040 inch

To Adjust

Position latch bail plate with clamp screw loosened.

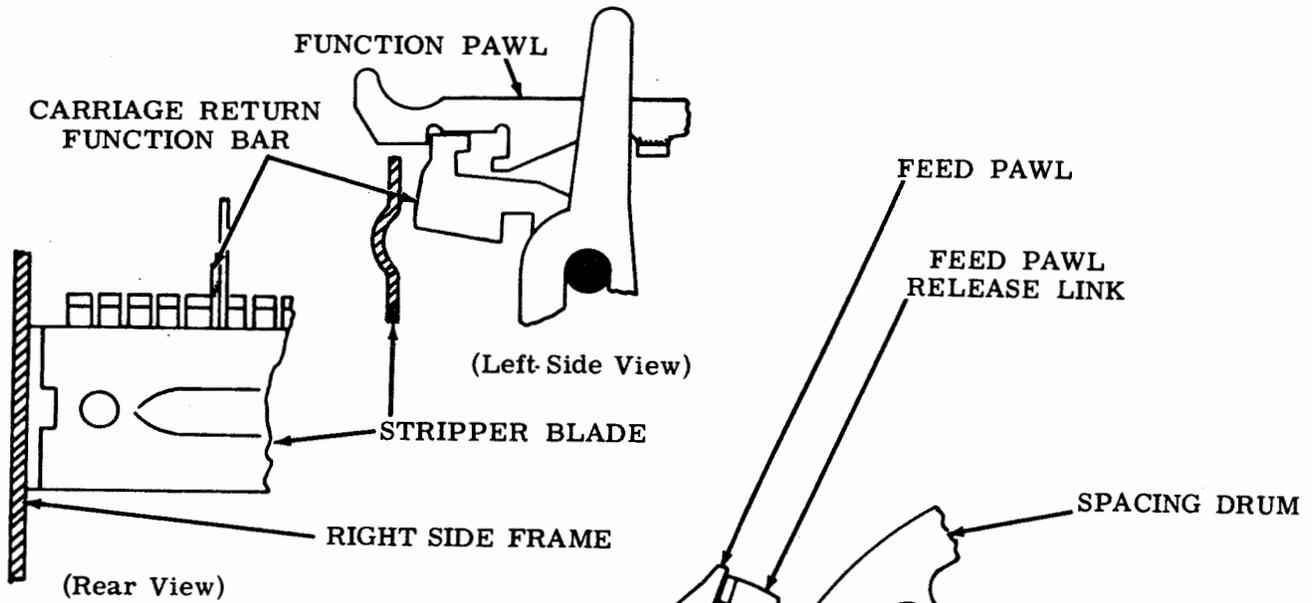


CARRIAGE RETURN LATCH BAIL SPRING

Requirement

Spacing drum fully returned  
Min 3 oz---Max 4-1/2 oz  
to start latch bail moving.

2.49 Spacing Mechanism (continued)



CARRIAGE RETURN LEVER

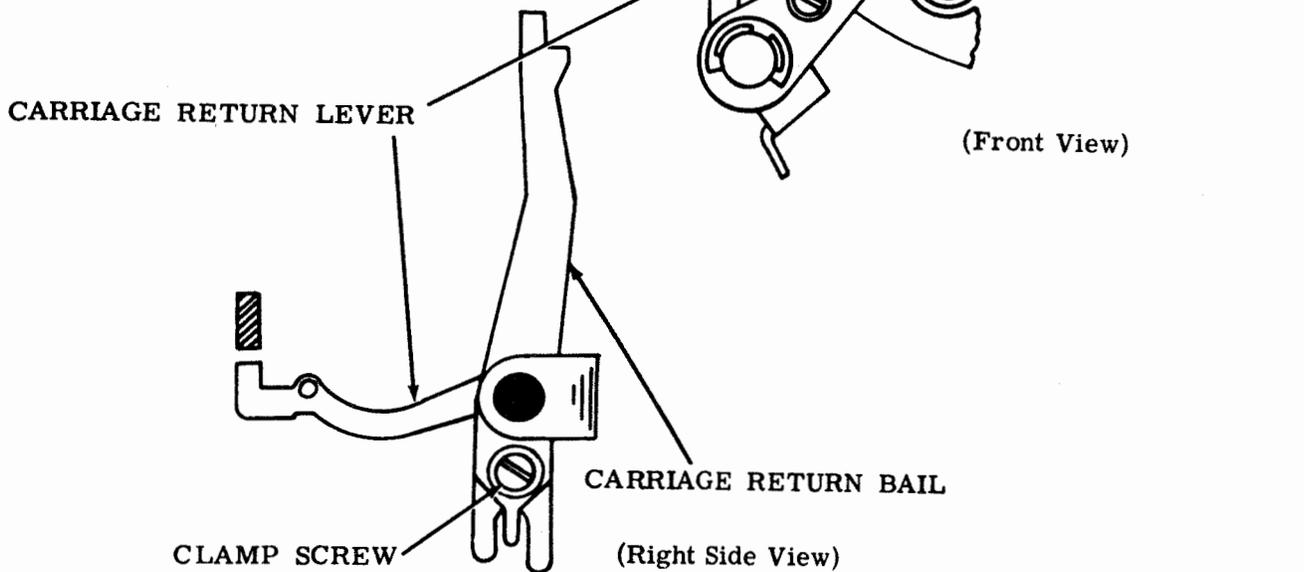
Requirement (Units Equipped with One-Stop Function Clutch)

Carriage return function set up on selector. Main shaft rotated until function clutch stop-lug is toward bottom of unit. Carriage return function pawl hooked over its function bar. Spacing drum held so that carriage return latch bail is latched. Clearance between latch bail and carriage return lever

Min 0.006 inch---Max 0.035 inch

To Adjust

Position carriage return lever on carriage return bail with clamp screw loosened.



2.50 Spacing Mechanism (continued)

DASHPOT VENT SCREW

Requirement

Typebox carriage should return from any length of line without bouncing.

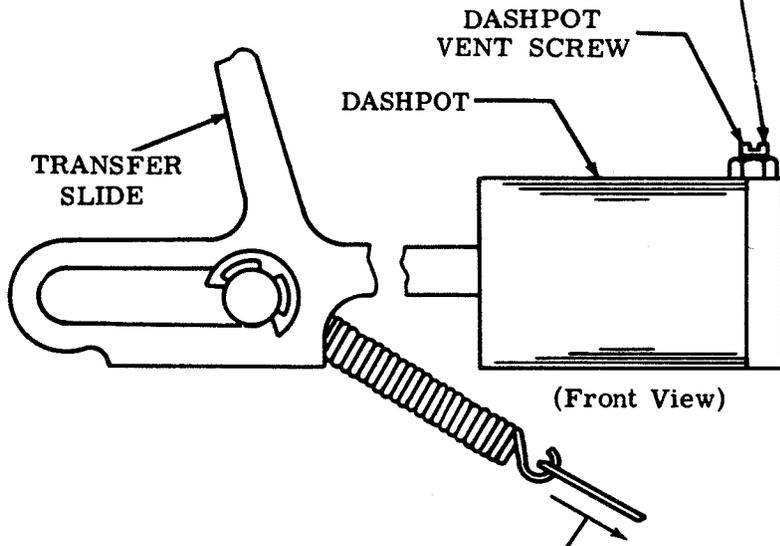
To Check

Printer operated at any speed from automatic transmission with one CR and one LF signal between lines. First character of each line should be printed in same location as if unit was manually operated slowly.

To Adjust

Turn down vent screw until slight pneumatic bounce is perceptible. Back off screw until effect disappears, then back screw off 1/4 turn. Tighten nut.

Note: It may also be necessary to reduce tension shown in CARRIAGE RETURN SPRING (2.46) adjustment to minimum for operation at altitudes higher than 2000 feet above sea level.



(Front View)

TRANSFER SLIDE SPRING

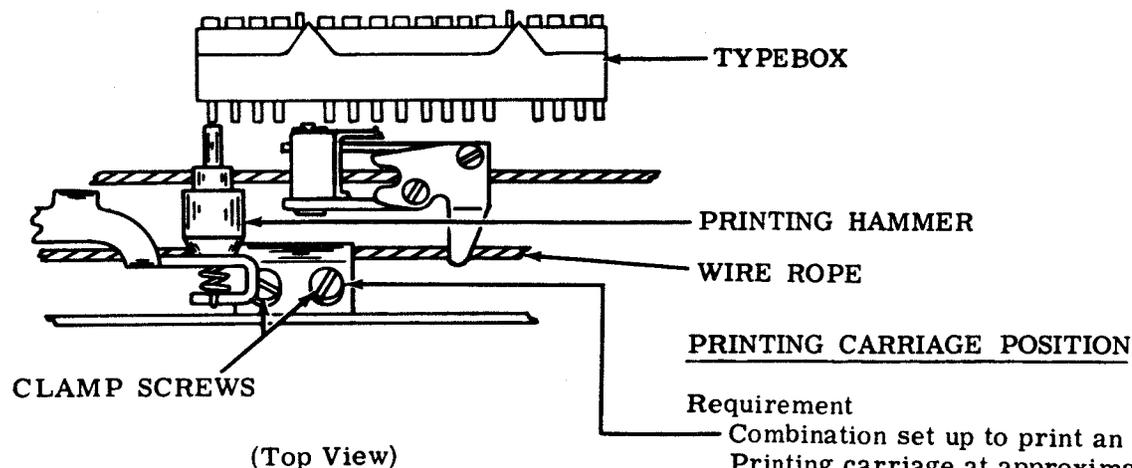
Requirement

Transfer slide in extreme left position. Spring unhooked.

Min 3-1/2 oz---Max 4-1/2 oz  
to pull spring to installed length.

2.51 Printing Mechanism (continued)

Note: Check related adjustments (2.44, 2.46, and 2.56), if the following adjustments are remade.



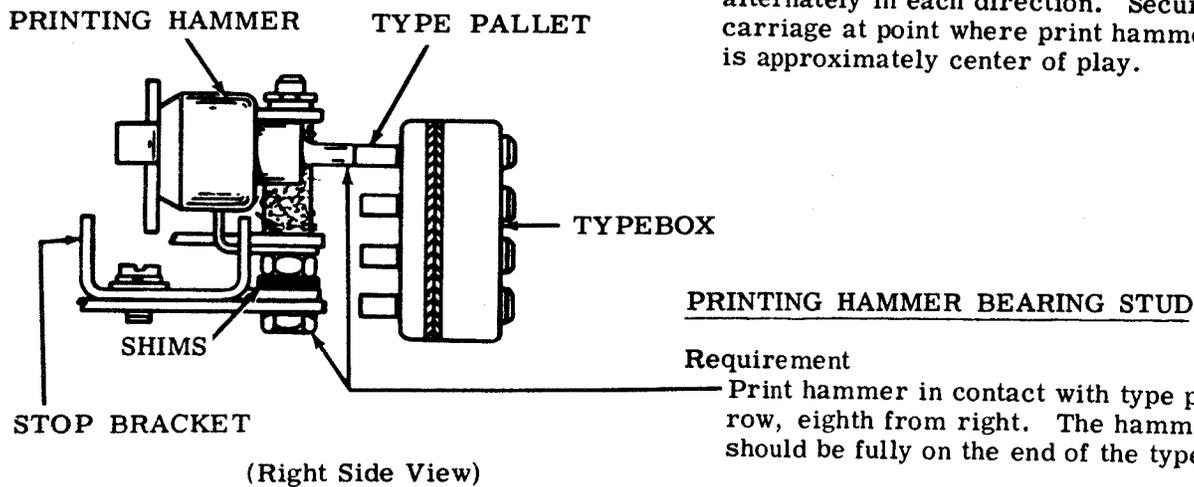
Requirement

Combination set up to print an apostrophe. Printing carriage at approximate midpoint of track. Rotate printer shaft so typebox is in printing position. Proper type pallet should be approximately in center of printing hammer.

To Adjust

Position printing carriage on wire rope with clamp screw loosened.

Note: Take up play in typebox carriage alternately in each direction. Secure carriage at point where print hammer is approximately center of play.



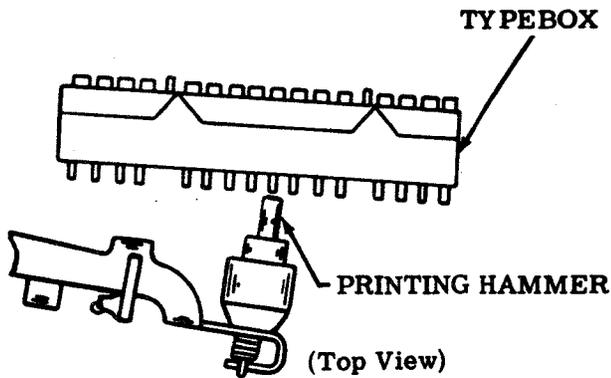
Requirement

Print hammer in contact with type pallet in top row, eighth from right. The hammer face should be fully on the end of the type pallet.

To Adjust

Add or remove shims between shoulder on bearing post and stop bracket. When checking, take up play in hammer operating bail downward on post.

2.52 Positioning Mechanism (continued)



(A) SHIFT LINKAGE (FINAL)

Requirement

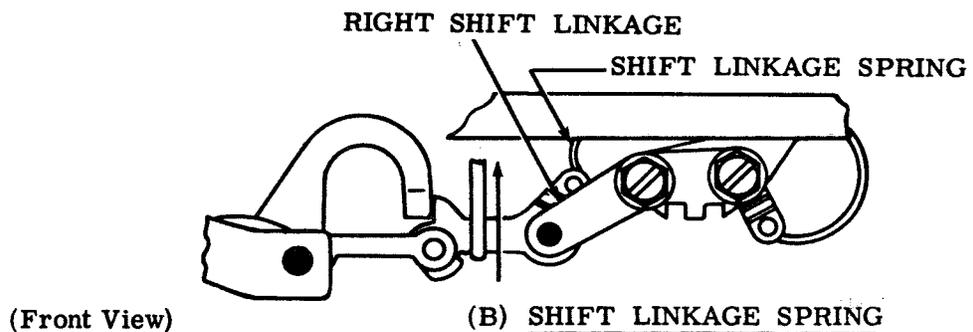
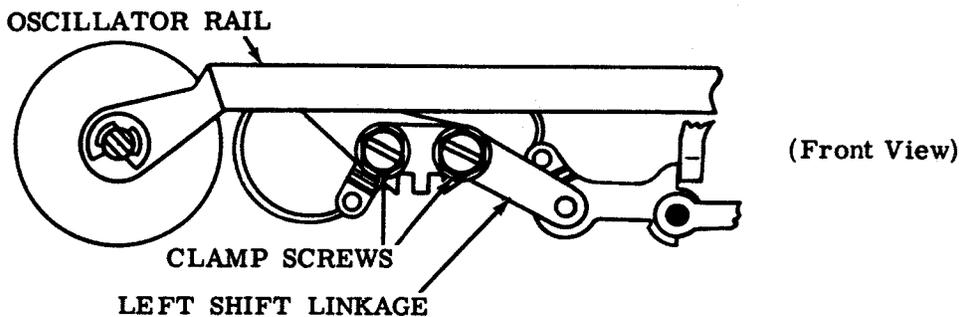
Typebox in position to print eighth character from right in the top row at midpoint of platen. Proper type pallet should align with print hammer.

To Adjust

Position oscillator left hand shift link bracket with two clamp screws loosened. With printer operating alternate characters (& and C), refine adjustment for correct alignment if necessary.

Note: Take up typebox carriage play in both directions and set print hammer to approximate center of play, as gauged by eye.

Do not disturb preliminary adjustment (2.39).



Requirement

Link in straight position  
Min 6 oz---Max 14 oz  
to start each link moving.  
Measure both right and  
left links.

2.53 Printing Mechanism (continued)

(A) PRINTING TRACK

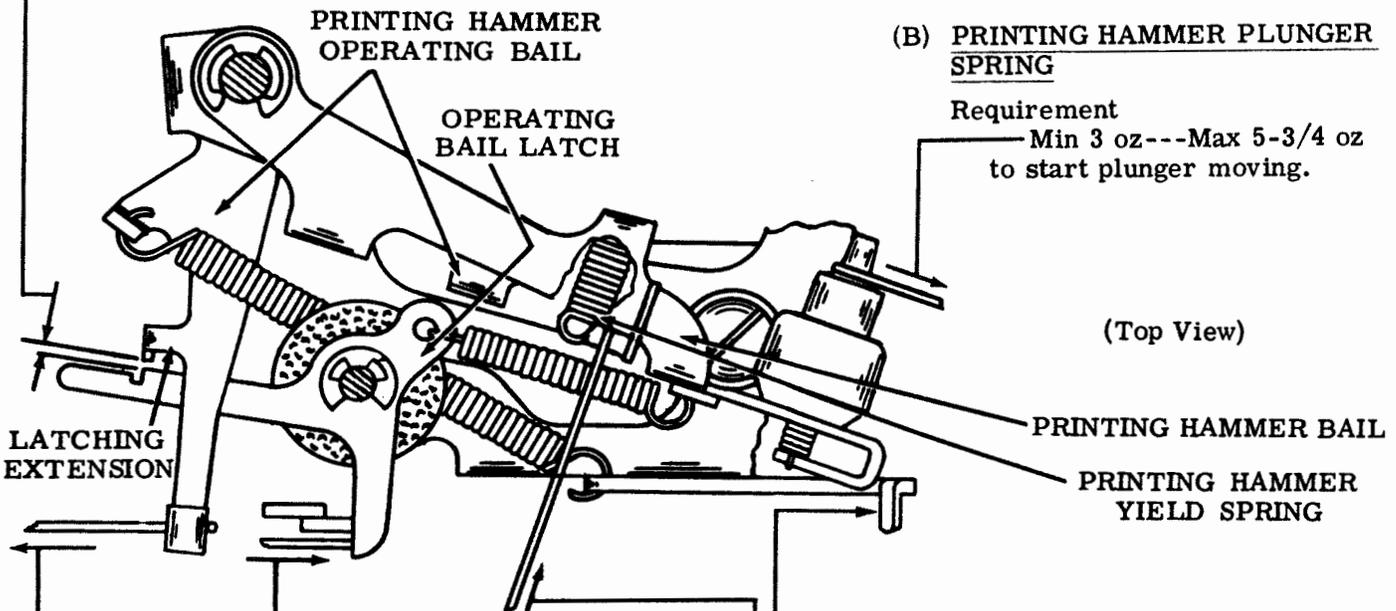
Requirement

Printing track in its extreme downward position. Extreme right hand character selected. Printing hammer operating bail latching extension held with left face in line with the latch shoulder. Printing arm slide positioned alternately over each track mounting screw. Printing bail reset each time. Clearance between latching extension and operating bail latch should be

Min 0.015 inch---Max 0.040 inch

To Adjust

Position the printing track up or down with its mounting screws loosened. Hold clearance to maximum.



(B) PRINTING HAMMER PLUNGER SPRING

Requirement

Min 3 oz---Max 5-3/4 oz to start plunger moving.

(Top View)

(E) PRINTING HAMMER OPERATING BAIL LATCH SPRING (Not as Illustrated)

Requirement

Printing track in its extreme upward position

Min 3 oz---Max 4-1/2 oz to start latch moving.

(C) PRINTING HAMMER OPERATING BAIL SPRING

Requirement

Use notch no. 1 for printing one to three copies, no. 2 for four or five copies, and no. 3 for six or more copies.

To Adjust

Position spring adjusting bracket in required notch.

(F) PRINTING HAMMER OPERATING BAIL SPRING (Not as Illustrated)

Requirement

Operating bail latched. Spring adjusting bracket in left hand (no. 1) notch. Hammer yield spring unhooked

Min 10 oz---Max 13 oz to start bail moving.

(D) PRINTING HAMMER YIELD SPRING

Requirement

Printing hammer operating bail against its stop

Min 1 oz---Max 2-1/2 oz to start hammer bail moving (horizontal position).

2.54 Printing Mechanism (continued)

PRINTING HAMMER STOP BRACKET

**Requirement**

With print hammer in upper left typebox position and printing bail in its maximum downward position, there should be  
 Min 0.005 inch---Max 0.050 inch  
 clearance between print hammer and type pallet at any point along length of platen.

Note: Refine this adjustment to 0.005 to 0.015 inch on sprocket feed printer, if necessary to improve copy legibility on multiple forms.

**To Adjust**

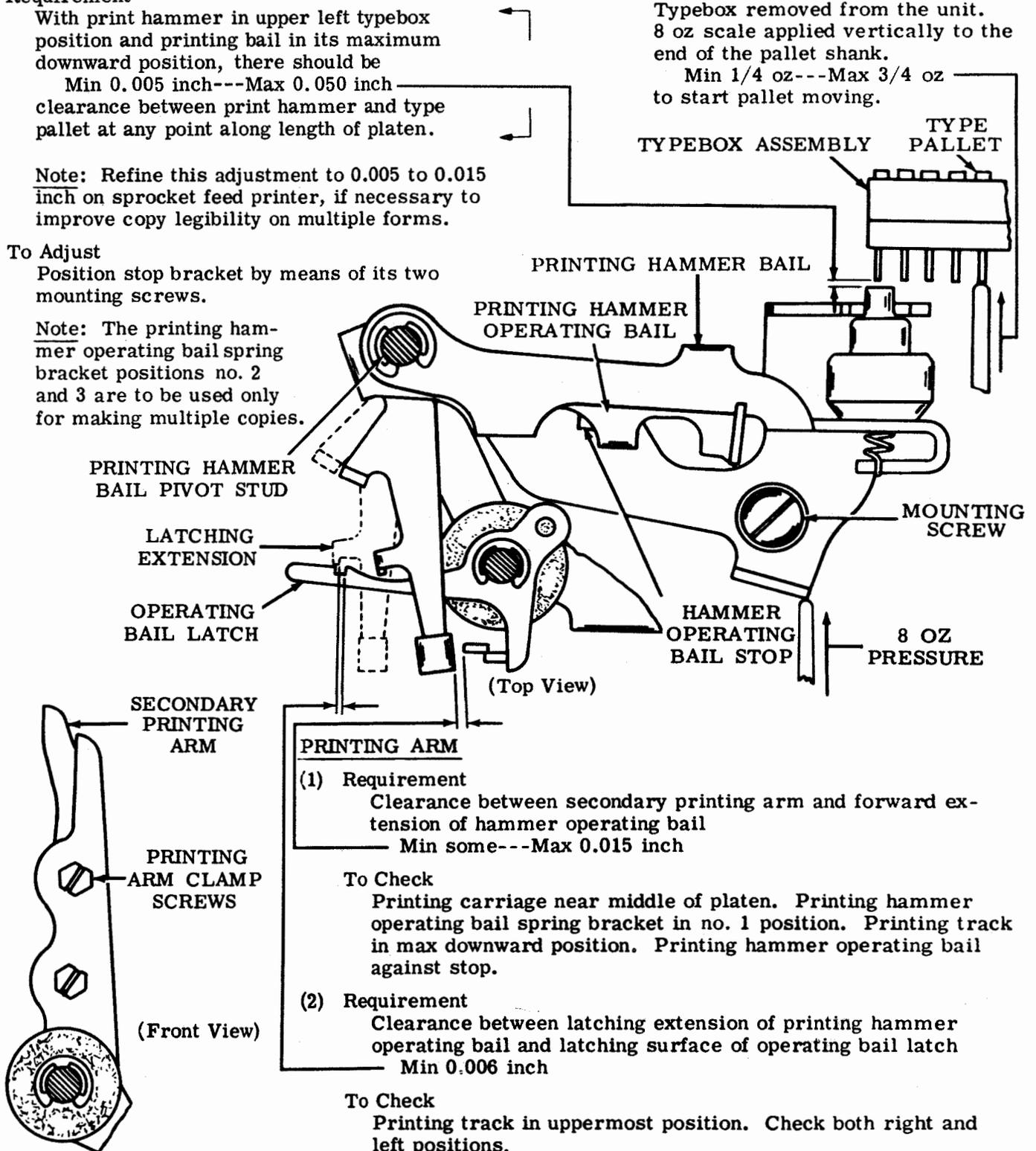
Position stop bracket by means of its two mounting screws.

Note: The printing hammer operating bail spring bracket positions no. 2 and 3 are to be used only for making multiple copies.

TYPE PALLET SPRING

**Requirement**

Typebox removed from the unit.  
 8 oz scale applied vertically to the end of the pallet shank.  
 Min 1/4 oz---Max 3/4 oz  
 to start pallet moving.



PRINTING ARM

(1) **Requirement**

Clearance between secondary printing arm and forward extension of hammer operating bail  
 Min some---Max 0.015 inch

**To Check**

Printing carriage near middle of platen. Printing hammer operating bail spring bracket in no. 1 position. Printing track in max downward position. Printing hammer operating bail against stop.

(2) **Requirement**

Clearance between latching extension of printing hammer operating bail and latching surface of operating bail latch  
 Min 0.006 inch

**To Check**

Printing track in uppermost position. Check both right and left positions.

**To Adjust**

Position secondary printing arm with clamp screws loosened.

2.55 Spacing Mechanism (continued)

**Note 1:** Check related adjustments (2.44, 2.48, and 2.56), if the following adjustments are remade.

**Note 2:** For sprocket feed units see 2.76 thru 2.82.

**LEFT MARGIN**

(1) Requirement (72 Character Line)

Typebox clutch disengaged. Spacing drum in returned position. Clearance between left edge of platen and print indicator located in front of printing hammer stop bracket

Min 15/16 inch---Max 1-1/16 inch

(In Bell System Switched-Network Services

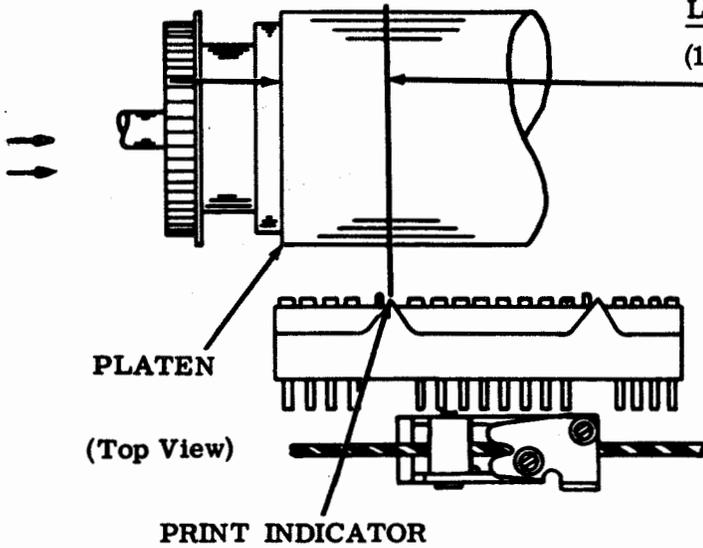
Min 9/16 inch---Max 11/16 inch)

**AUTOMATIC CR-LF BELLCRANK SPRING**  
(For Units So Equipped)

Requirement

Function clutch disengaged.

Min 2-1/2 oz---Max 7 oz  
to move the bellcrank.



PLATEN

(Top View)

PRINT INDICATOR

(2) Requirement

Spacing clutch disengaged. Front spacing feed pawl farthest advanced. Spacing drum fully returned. Play in spacing shaft gear (2.29) taken up clockwise. Clearance between pawl and shoulder of ratchet wheel tooth immediately ahead

Min some---Max 0.008 inch

(3) Requirement

Rear pawl, when farthest advanced, should rest at bottom of indentation between ratchet wheel teeth.

To Adjust

Return print carriage to its left position. Loosen four indicated carriage return ring mounting screws. Hold carriage return ring in its counterclockwise position. Locate typebox so that print indicator which is in front of printing hammer stop bracket is in required position. Tighten four mounting screws.

FEED PAWLS

AUTOMATIC  
CR-LF BELLCRANK

MOUNTING  
SCREWS

CARRIAGE  
RETURN RING

SPACING DRUM  
RATCHET WHEEL

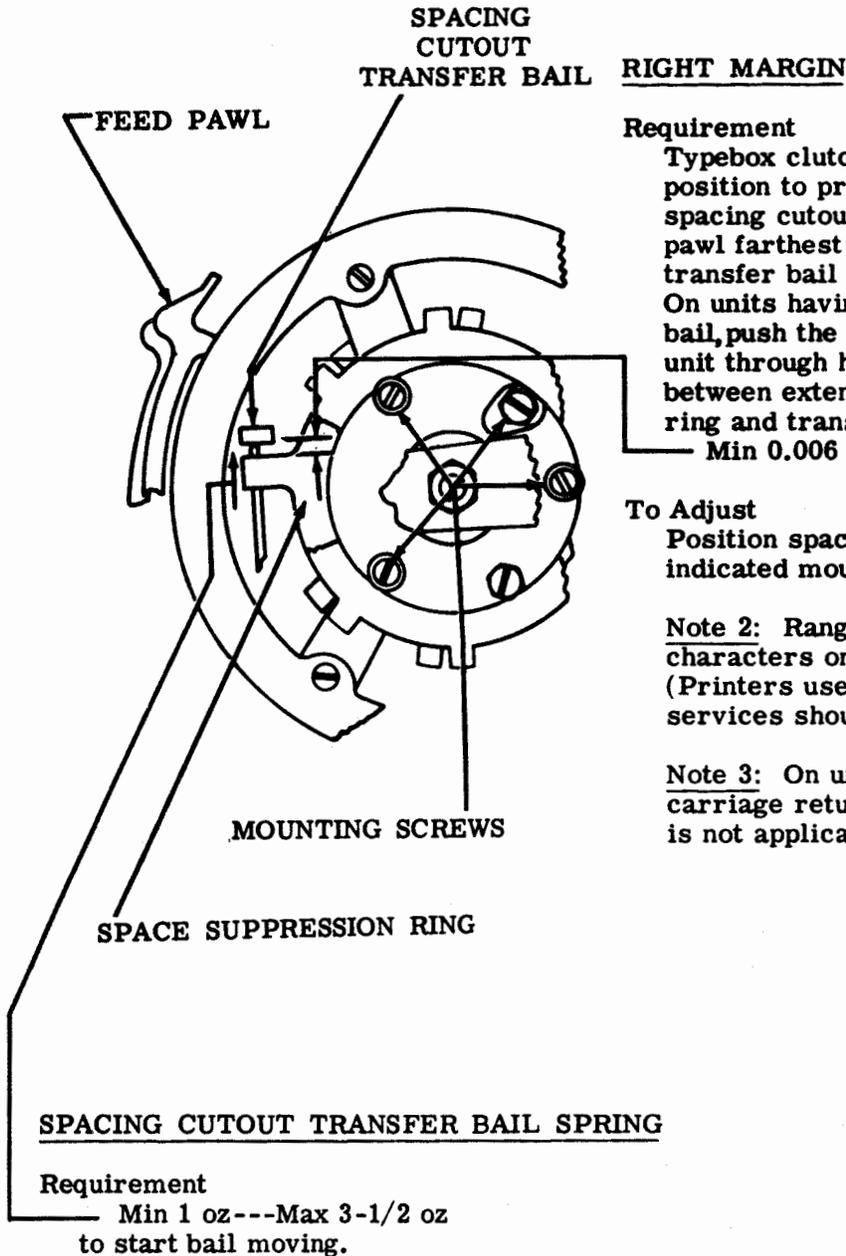
(This view shows  
the spacing drum  
fully returned.)

(Front View)

**Note 3:** The left margin may be varied as required. Maximum range of adjustment for mechanisms with standard 10 characters per inch spacing is: friction feed platen 85 characters and sprocket feed platen 74 characters.

## 2.56 Spacing Mechanism (continued)

**Note 1:** Check related adjustments (2.36, 2.55, and 2.48), if the following adjustments are remade.

**Requirement**

Typebox clutch disengaged. Carriage in position to print character on which spacing cutout is to occur. Front feed pawl farthest advanced. Spacing cutout transfer bail held in its uppermost position. On units having two piece spacing cutout bail, push the cutout bail towards rear of unit through hole in front plate. Clearance between extension on space suppression ring and transfer bail

Min 0.006 inch---Max 0.025 inch

**To Adjust**

Position space suppression ring with four indicated mounting screws loosened.

**Note 2:** Range of adjustment is from 0 to 85 characters on units with ring-type cutout arm. (Printers used in Bell System switched network services should be adjusted to 72 characters.)

**Note 3:** On units equipped with automatic carriage return-line feed ring, this adjustment is not applicable.

**SPACING CUTOUT TRANSFER BAIL SPRING****Requirement**

Min 1 oz---Max 3-1/2 oz  
to start bail moving.

**SPACE SUPPRESSION BYPASS SPRING** (On Unit Equipped With Separate Cutout Lever and Spring)**Requirement**

With typing unit upside down, hook a scale on the spacing cutout lever extension pawl next to the spring and pull towards the rear of the unit.

Min 20 oz---Max 26 oz  
to start the pawl moving.

2.57 Printing Mechanism (continued)

TYPEBOX ALIGNMENT

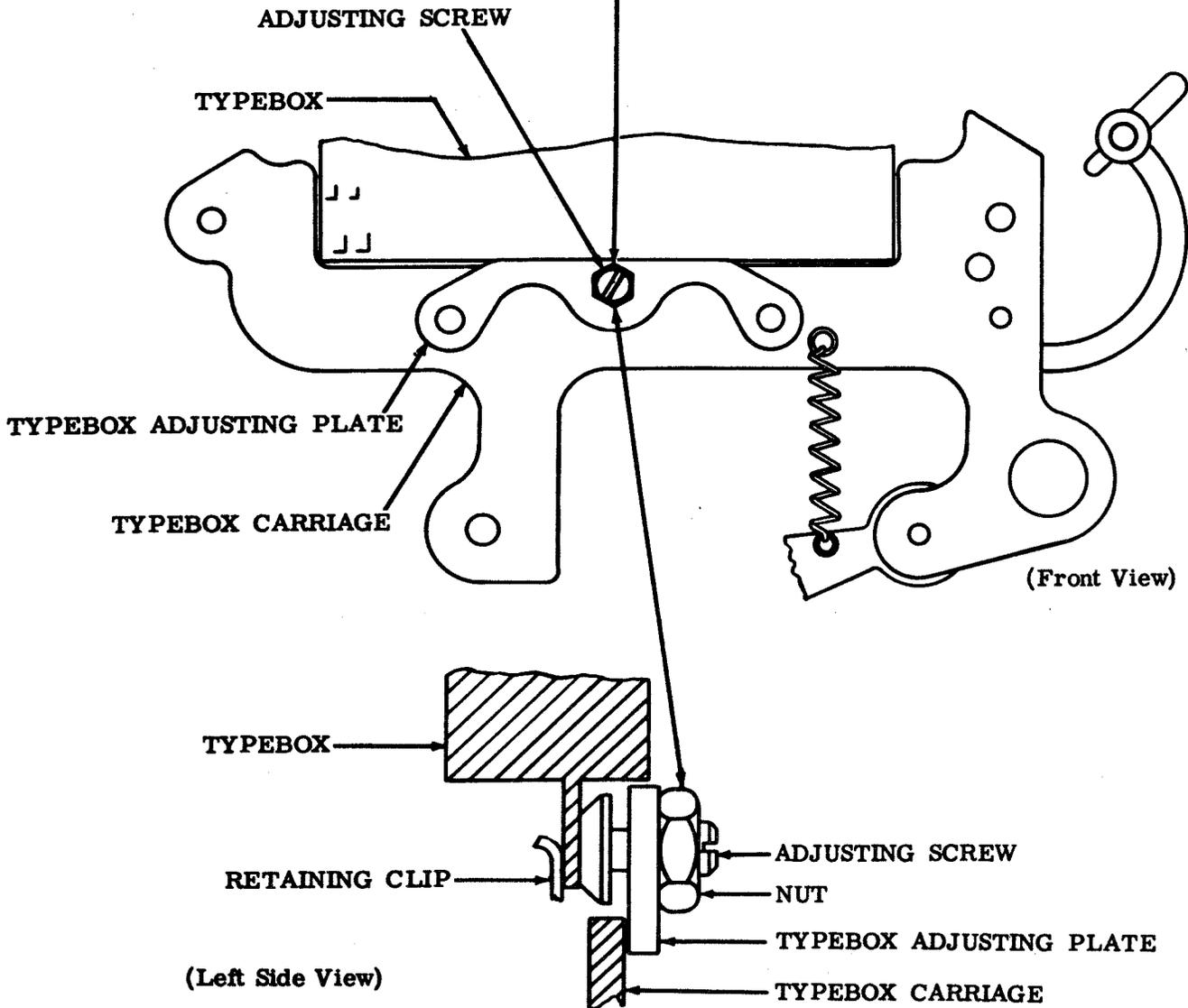
Requirement

Printed impression of characters at top and at bottom should be equal (gauge visually).

To Adjust

Loosen nut. Operate printer under power. Repeat characters E and Z. Turn adjusting screw in or out (in steps of 1/4 turn) to meet requirement. Tighten nut.

Note: Check and refine PRINTING HAMMER STOP BRACKET (2.54) if necessary.



2.58 Printing Mechanism (continued)

**(A) RIBBON REVERSE SPUR GEAR**

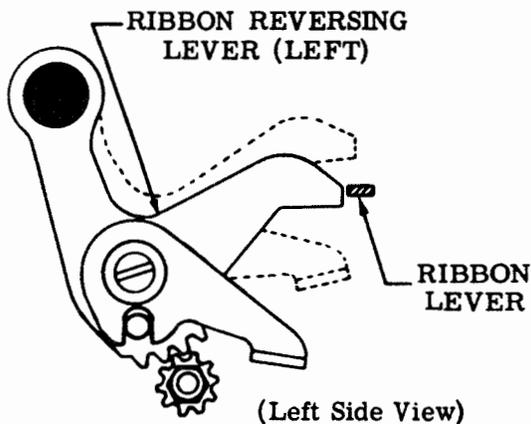
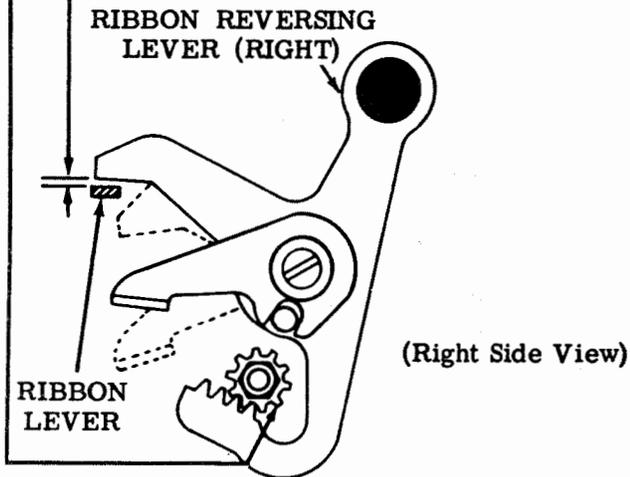
**Requirement**

When right reversing lever is in max downward position, the left reversing lever should be in its max upward position.

**To Adjust**

Loosen the setscrews in the detent cam. Loosen the left spur gear nut. Securely tighten the right spur gear nut. Move the right reversing lever to its max upward position and hold the left reversing lever in its max downward position. Then tighten the left spur gear nut.

**Note:** Rotate typebox clutch 1/2 turn. Right reversing lever upward. Move right ribbon lever under right ribbon reversing lever. There should be some clearance between levers. Check left side same way. Refine adjustment if necessary.



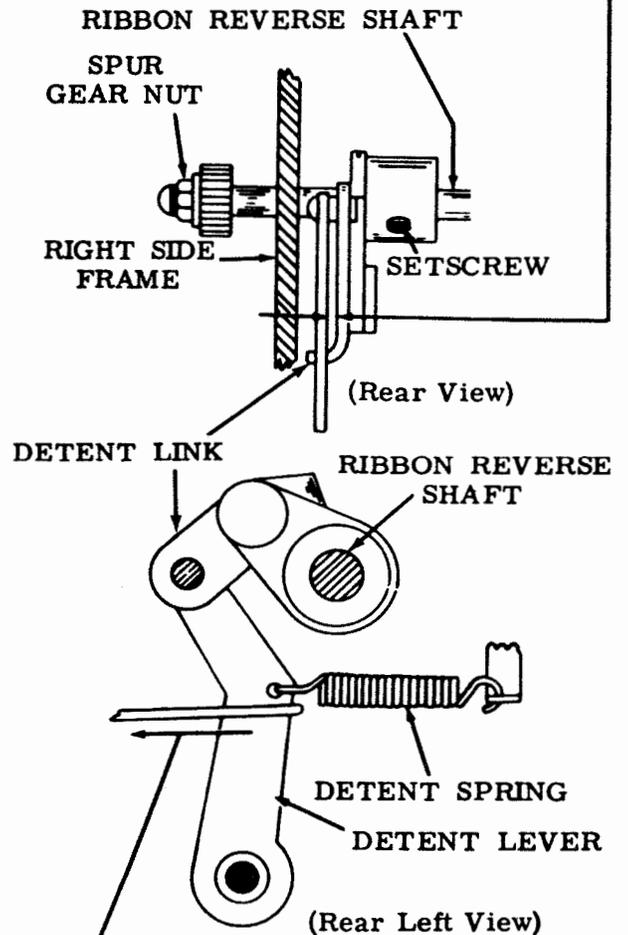
**(B) RIBBON REVERSE DETENT**

**Requirement**

Ribbon reverse detent link buckled in its downward position, clearance between detent link and detent lever  
Min some---Max 0.055 inch  
when play in the lever is taken up lightly toward the right side of the printer.

**To Adjust**

Hold left ribbon reversing lever in its downward position, position detent link, and tighten the upper setscrew in the hub of the detent link. Buckle the detent link upward and tighten lower setscrew.



**(C) RIBBON REVERSE DETENT LEVER SPRING**

**Requirement**

Detent link buckled in upward position  
Min 10 oz---Max 18 oz  
to start detent lever moving toward rear.

2.59 Printing Mechanism (continued)

RIBBON FEED LEVER BRACKET

(1) Requirement (Left-Hand Mechanism)

Left reversing lever in upward position. Ribbon mechanism in upper position. Ratchet wheel held against the detent lever. Clearance between the front face of the feed lever and the shoulder of a tooth on the ratchet wheel

Min 0.015 inch---Max 0.035 inch

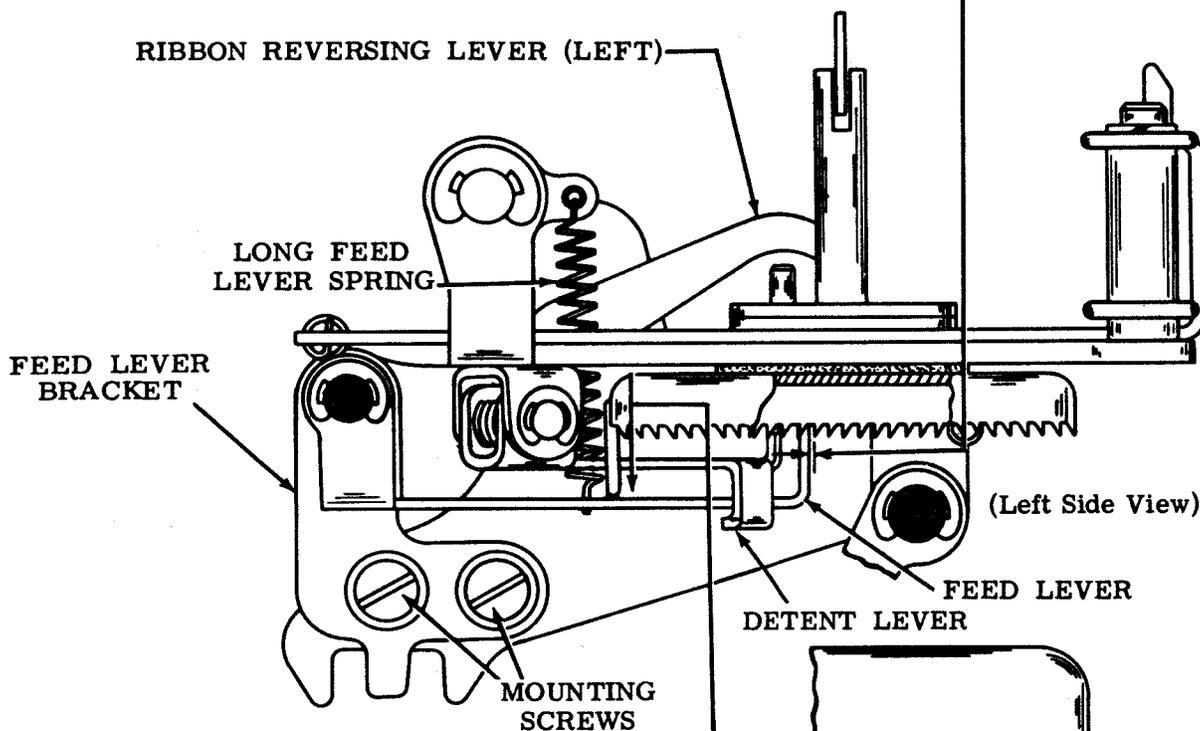
(2) Requirement (Right-Hand Mechanism)

Right reversing lever and ribbon mechanism in upward position. Adjust feed lever bracket in the same manner.

Note 1: Rotate the main shaft. The ratchet wheel should step one tooth only with each operation.

To Adjust

Position the feed lever bracket with its mounting screws loosened.



RIBBON FEED LEVER SPRING

Requirement

Ribbon feed levers in uppermost position. For Long Lever: Push downward near its spring.

For Short Lever: Push downward at point near long lever spring.

Min 3/4 oz---Max 2 oz to start feed levers moving. Measure all four levers.

Note 2: If minimum requirement of short lever is not met, pull lower end of torsion spring to rear.

RIBBON RATCHET WHEEL FRICTION SPRING

Requirement

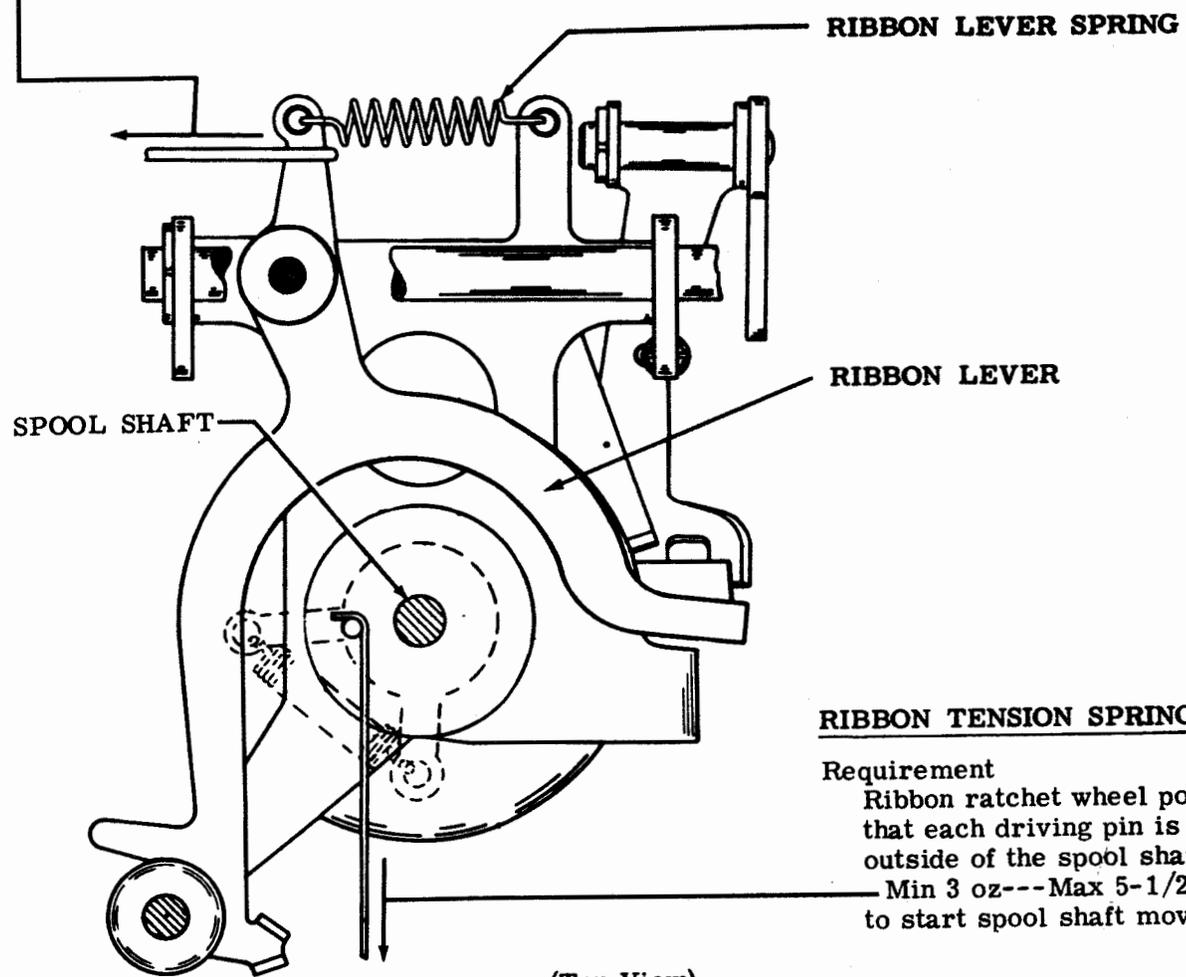
Feed levers disengaged. Min 3 oz---Max 8-1/2 oz to start the ratchet wheel moving.

2.60 Printing Mechanism (continued)

RIBBON LEVER SPRING

Requirement

Min 1-1/2 oz---Max 3 oz  
to start the lever moving. Check both  
right and left springs.



RIBBON TENSION SPRING

Requirement

Ribbon ratchet wheel positioned so  
that each driving pin is toward the  
outside of the spool shaft.

Min 3 oz---Max 5-1/2 oz  
to start spool shaft moving.

(Top View)

2.61 Line Feed and Platen Mechanism (continued)

(B) PLATEN DETENT BAIL SPRING

Requirement

Detent seated between two teeth on line feed spur gear.

Min 16 oz---Max 32 oz to start detent bail moving.

(C) LINE FEED BAR RELEASE LEVER SPRING

Requirement

Min 3 oz---Max 8 oz to start lever moving.

HANDWHEEL

LINE FEED BAR RELEASE LEVER

(A) LINE FEED SPUR GEAR DETENT ECCENTRIC

Requirement

Line feed clutch disengaged. Platen rotated until detent stud is seated between two teeth on line feed spur gear. When hand wheel is released, manually set the teeth on the line feed bars into engagement with the teeth on the line feed spur gear. The detent stud should contact one gear tooth and be not more than 0.010 inch from other tooth.

To Adjust

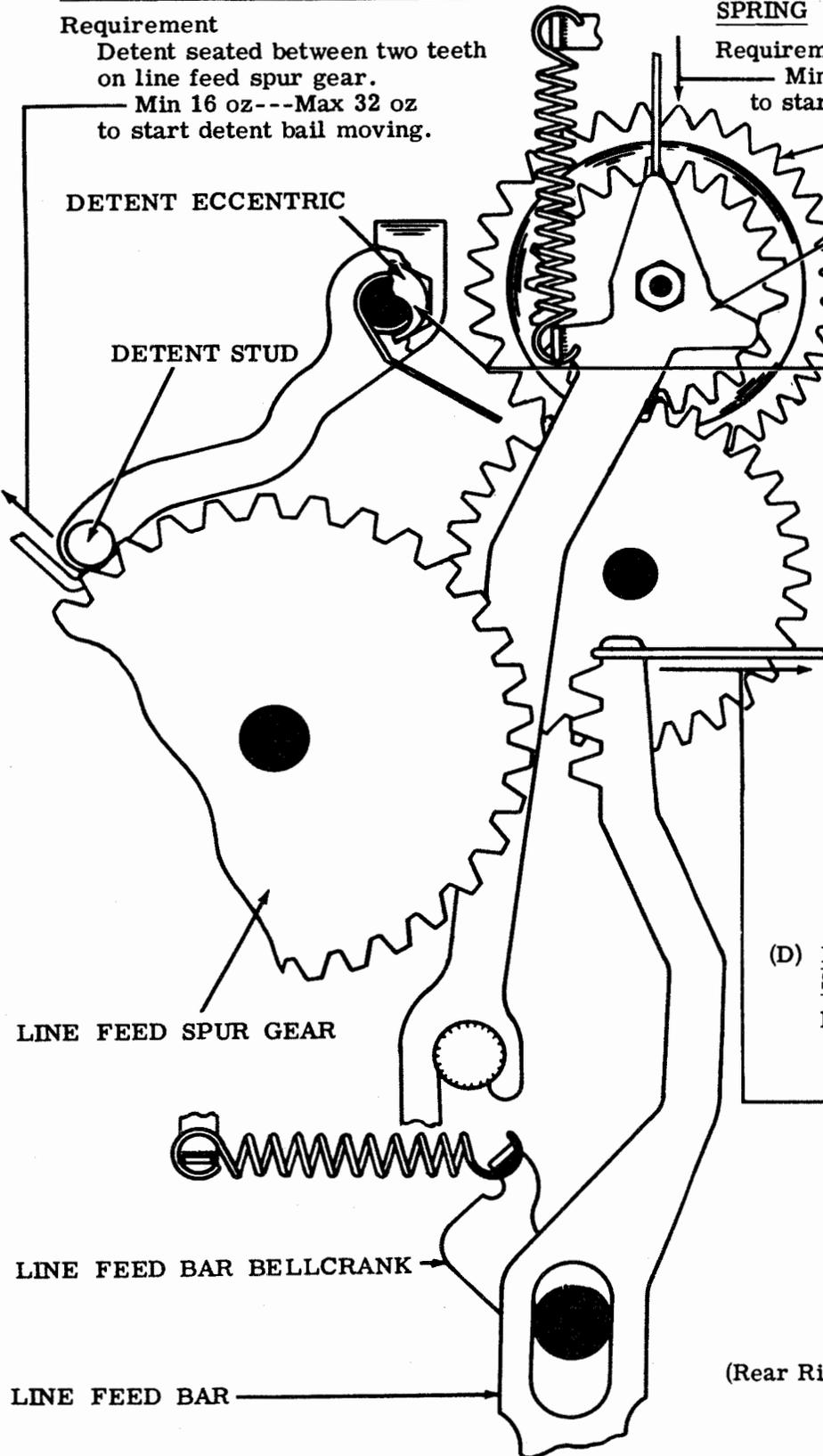
Rotate the detent eccentric with its mounting screw loosened. Keep high part of eccentric upward.

(D) LINE FEED BAR BELLCRANK SPRING (FRICTION FEED)

Requirement

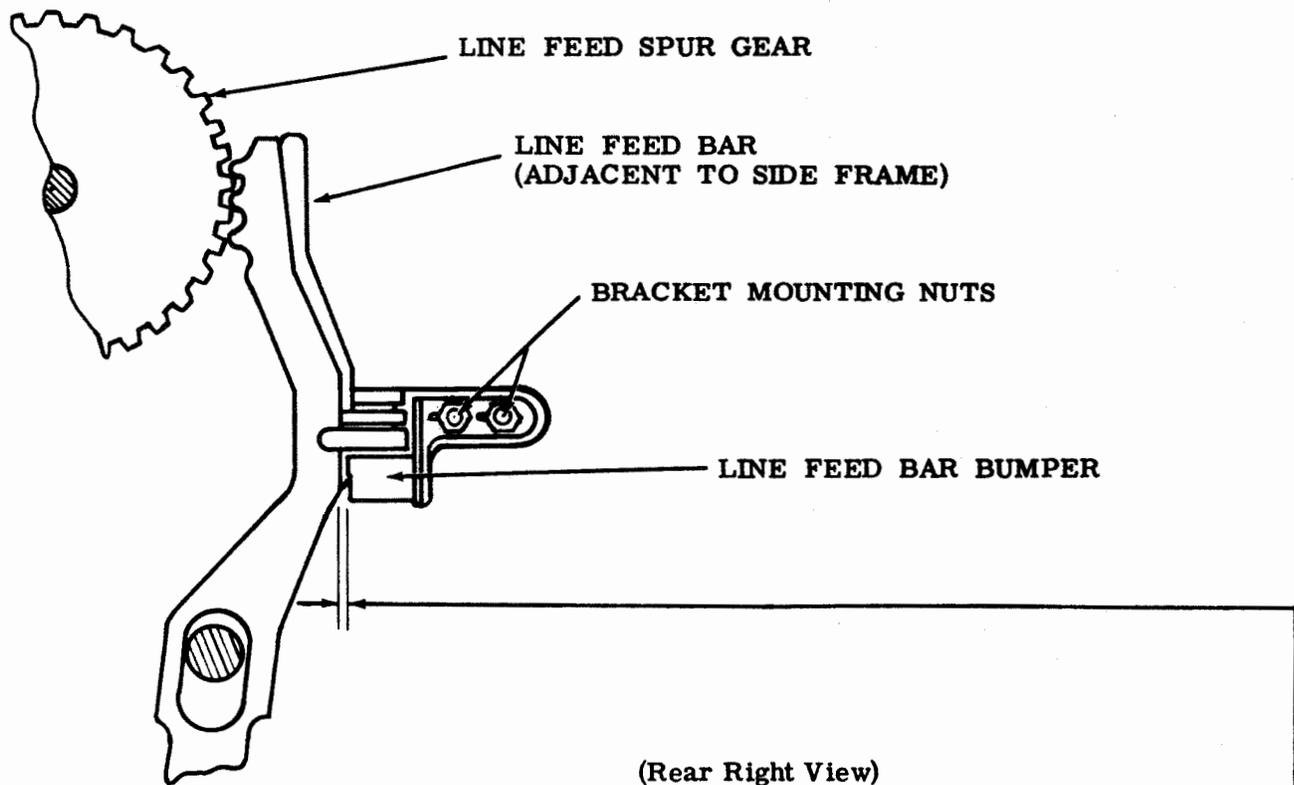
Left-hand line feed bar in rear position

Min 19 oz---Max 24 oz to start bar moving.



(Rear Right View)

## 2.62 Line Feed and Platen Mechanism (continued)

LINE FEED BAR BUMPER (SIX STOP CLUTCH ONLY)**Requirement**

With the line feed clutch tripped manually, rotate the main shaft until the line feed bar adjacent to side frame is at its maximum travel away from the line feed spur.

Min 0.065 inch---Max 0.080 inch \_\_\_\_\_  
clearance between the other line feed bar and the line feed bar bumper.

**To Adjust**

Loosen the two bracket mounting nuts and position the bracket thru its elongated slots until proper clearance is obtained. Then tighten the two mounting nuts.

Note: Recheck vertical tab or form-out adjustment (variable features).

2.63 Function Mechanism (continued)

STRIPPER BLADE DRIVE CAM POSITION

**Requirement**

Stripper blade drive cam should move each stripper blade cam arm on equal distance above and below center line of its pivot (gauge by eye).

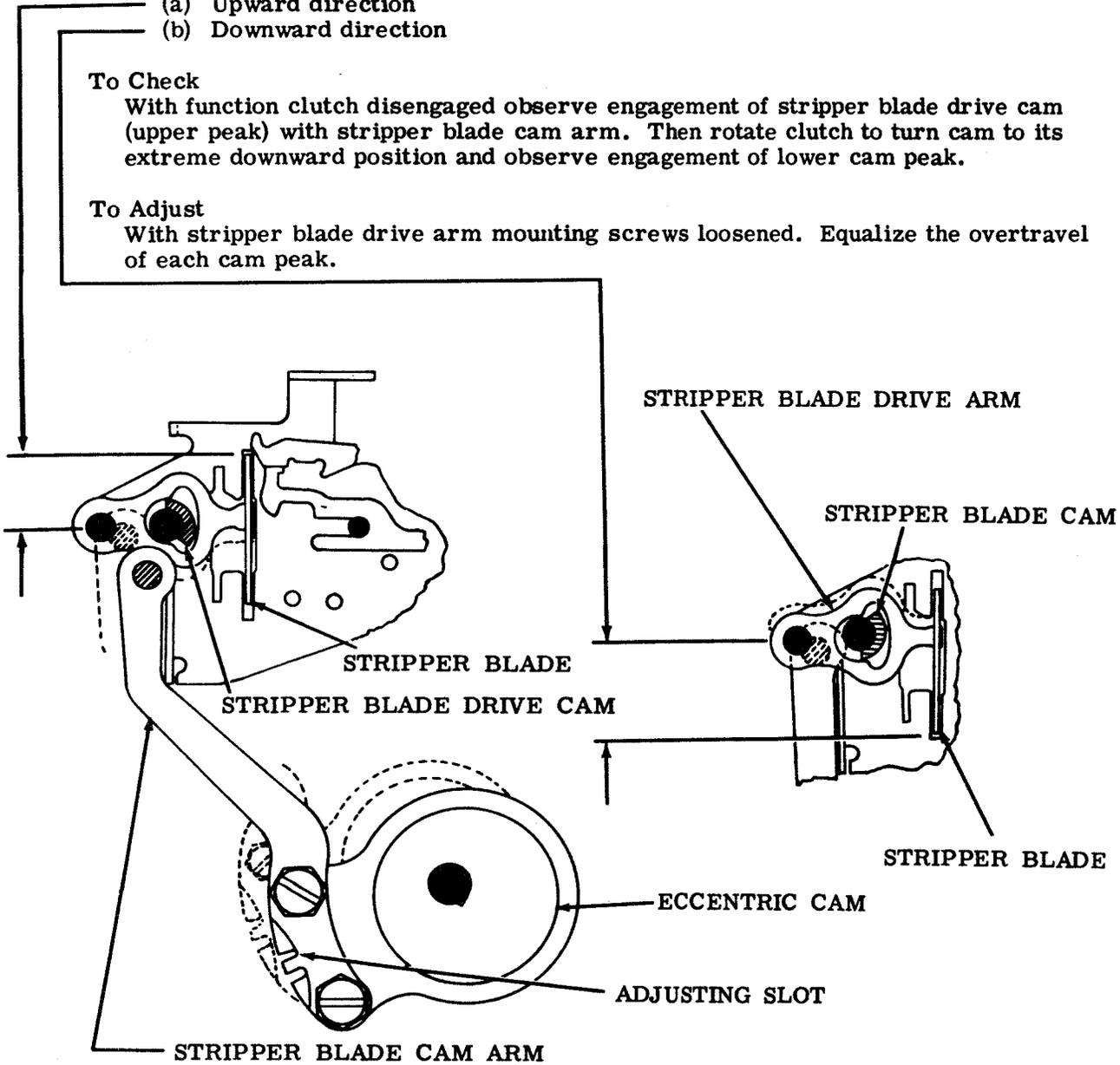
- (a) Upward direction
- (b) Downward direction

**To Check**

With function clutch disengaged observe engagement of stripper blade drive cam (upper peak) with stripper blade cam arm. Then rotate clutch to turn cam to its extreme downward position and observe engagement of lower cam peak.

**To Adjust**

With stripper blade drive arm mounting screws loosened. Equalize the overtravel of each cam peak.



(Rear View)

2.64 Function Mechanism (continued)

(A) FUNCTION LEVER SPRING

**Note:** If a function lever operates a contact or a slide, hold off the contact or slide when checking the spring.

**Requirement**

Function lever in unoperated position. Suppression bail held forward.

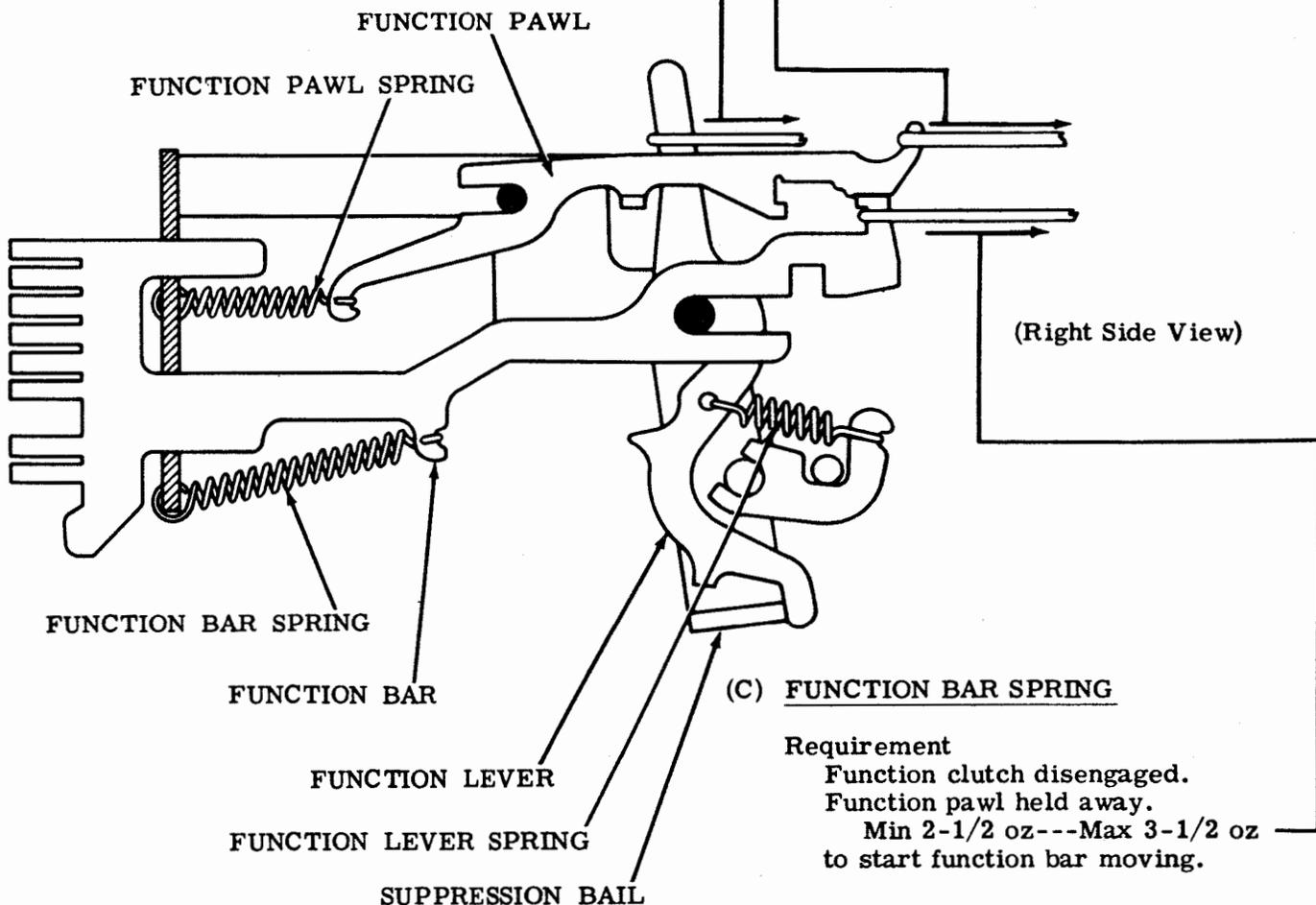
Min 1-1/2 oz---Max 2-3/4 oz  
to start function lever moving. Check each spring.

(B) FUNCTION PAWL SPRING

**Requirement**

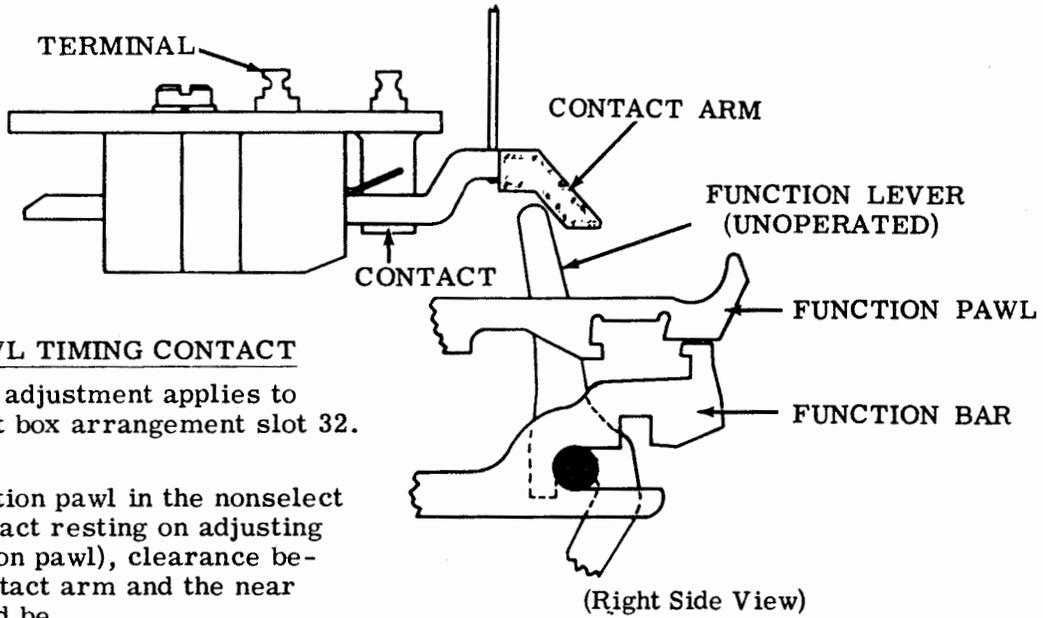
Rear end of function pawl resting on function bar

Min 3 oz---Max 5 oz  
to start pawl moving. Check each spring.



**CAUTION:** SEVERE WEAR TO THE POINT OF OPERATION FAILURE WILL RESULT IF THE TELETYPEWRITER IS OPERATED WITHOUT EACH FUNCTION PAWL HAVING EITHER A RELATED FUNCTION BAR OR, WHERE A FUNCTION BAR IS MISSING, A RELATED FUNCTION PAWL CLIP TO HOLD THE FUNCTION PAWL AWAY FROM THE STRIPPER BLADE.

2.65 Function Mechanism (continued)



**FUNCTION PAWL TIMING CONTACT**

Note 1: This adjustment applies to the ATX stunt box arrangement slot 32.

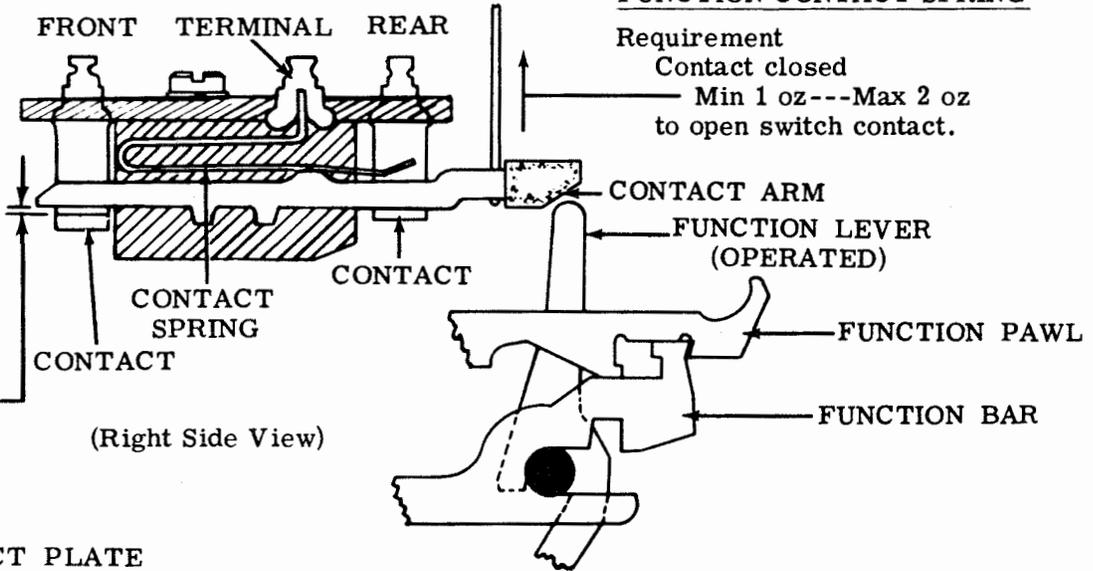
**Requirement**

With the function pawl in the nonselect position (contact resting on adjusting stud of function pawl), clearance between the contact arm and the near contact should be

Min 0.005 inch---Max 0.015 inch

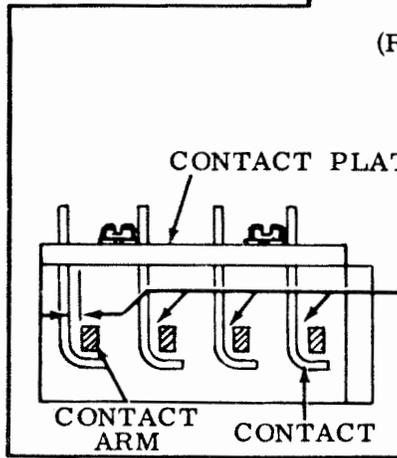
**To Adjust**

Position adjusting stud by means of its mounting screw.



**FUNCTION CONTACT SPRING**

Requirement  
Contact closed  
Min 1 oz---Max 2 oz  
to open switch contact.



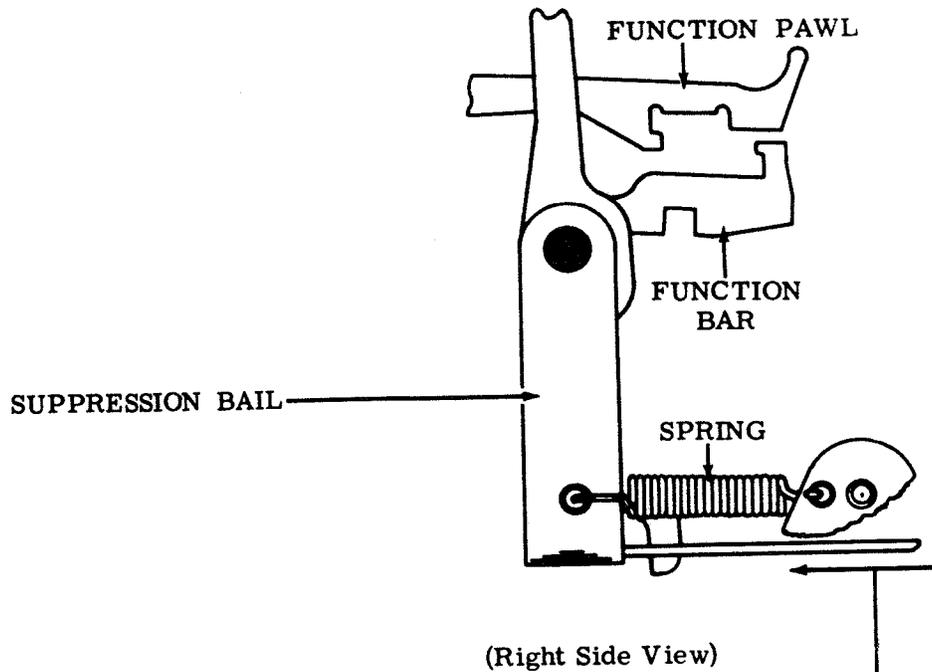
(Rear View)

Note 2: If the switches are removed from the stunt box, the following requirements apply.

Provide at least 0.006 inch clearance between the contact arm and the vertical portion of the contact clip. If the switch has contacts front and rear, this clearance applies to both front and rear. To obtain this clearance, position the contact plate before tightening the contact plate screws.

On switches with contacts front and rear, check to see that there is a gap of not less than 0.008 inch between the formed-over end of the front contact clip and the bottom of the contact arm when the rear contact is closed.

2.66 Spacing Mechanism (continued)



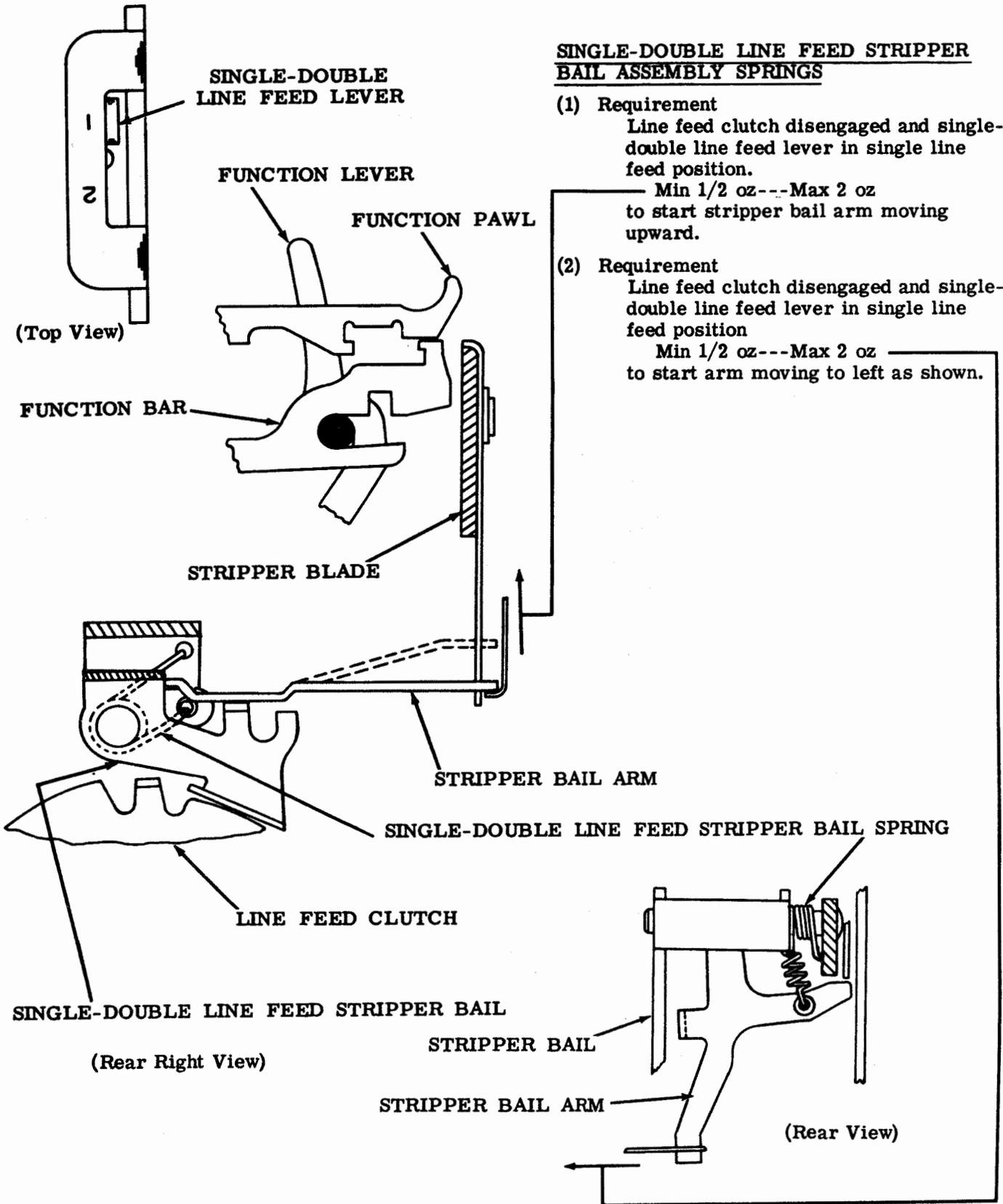
SPACING SUPPRESSION BAIL SPRING

**Requirement**

Spacing suppression bail in rear position. Scale applied near center of horizontal portion of bail.

Min 1/2 oz---Max 1-1/2 oz  
to start bail moving.

2.67 Line Feed and Platen Mechanism (continued)



2.68 Line Feed and Platen Mechanism (continued)

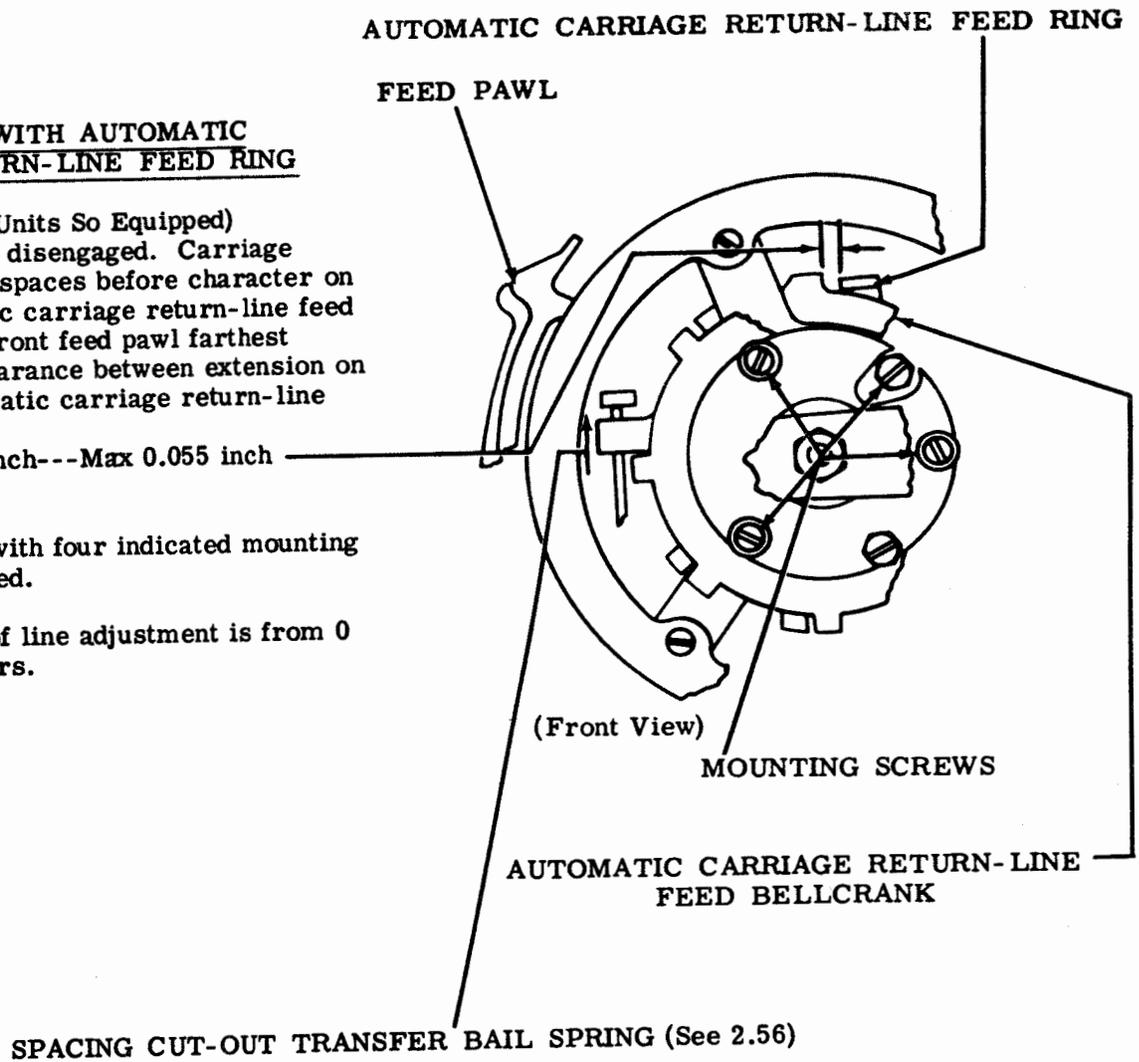
RIGHT MARGIN WITH AUTOMATIC CARRIAGE RETURN-LINE FEED RING

Requirement (On Units So Equipped)  
 Typebox clutch disengaged. Carriage positioned two spaces before character on which automatic carriage return-line feed is to occur. Front feed pawl farthest advanced. Clearance between extension on ring and automatic carriage return-line feed bellcrank

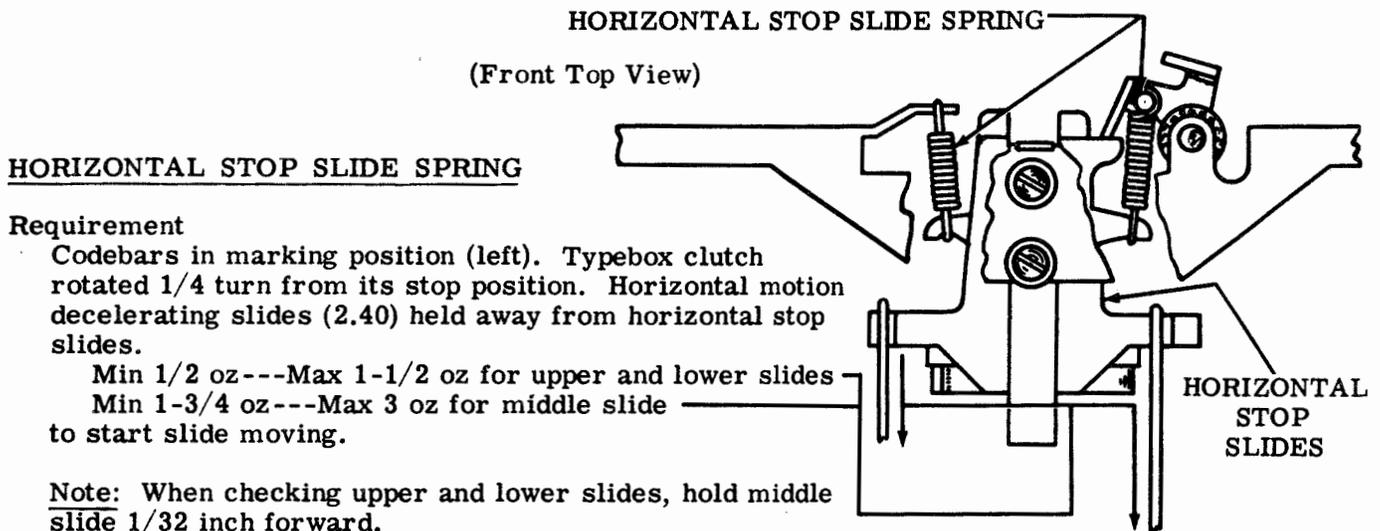
Min 0.040 inch---Max 0.055 inch

To Adjust  
 Position ring with four indicated mounting screws loosened.

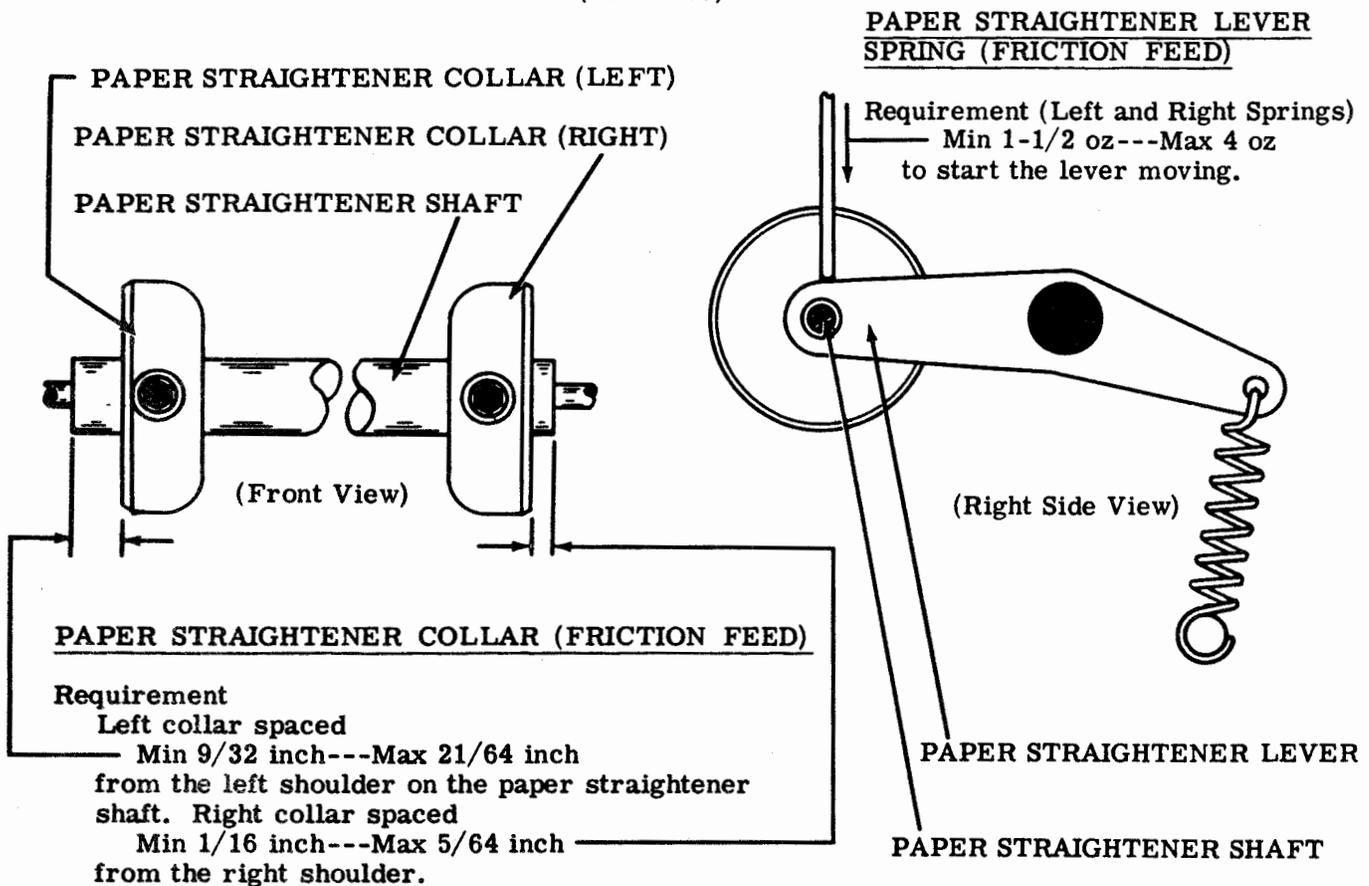
Note: Range of line adjustment is from 0 to 85 characters.



2.69 Positioning Mechanism (continued)



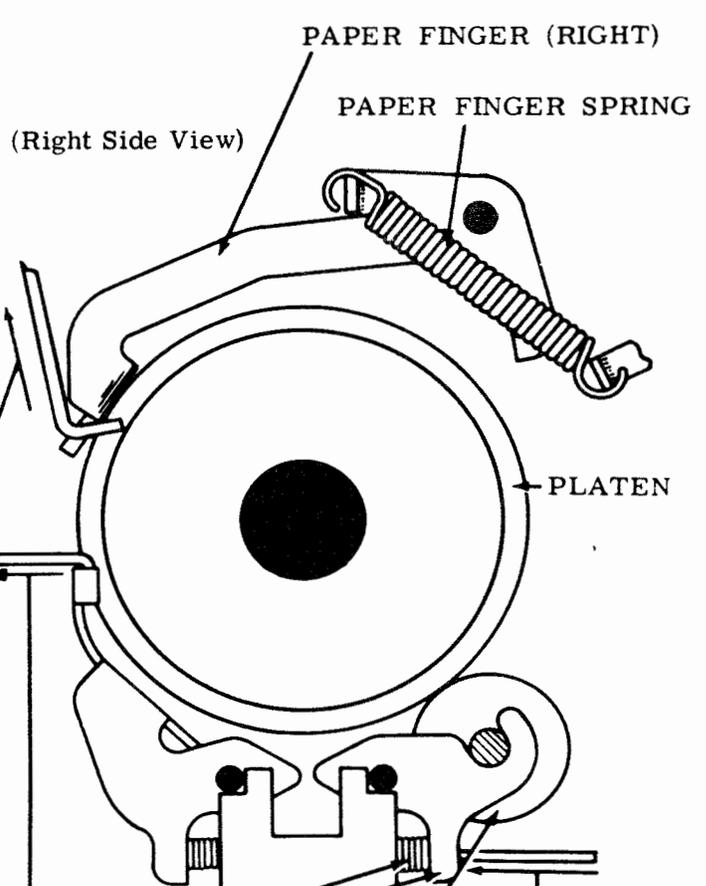
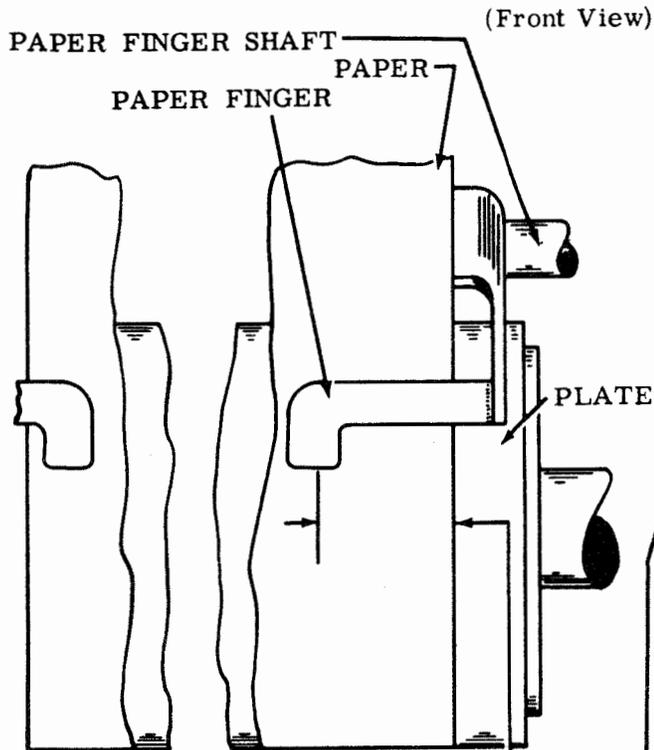
2.70 Line Feed and Platen Mechanism (continued)



**To Adjust**  
Position collars on shaft with setscrews loosened.

**Note:** For sprocket feed mechanism, see 2.76.

2.71 Line Feed and Platen Mechanism (continued)



PAPER FINGER (FRICTION FEED)

**Requirement**

The pressure end of the paper fingers should overlap the paper from 3/8 inch to 1/2 inch.

**To Adjust**

Position the paper fingers by sliding them on their shaft.

PAPER FINGER SPRING (FRICTION FEED)

**Requirement**

Pull upward on right paper finger to start left paper finger moving from platen.

Min 3 oz---Max 6 oz

PRESSURE ROLLER LEVER SPRING (FRICTION FEED)

**Requirement**

Min 28 oz---Max 36 oz to start each center lever moving alternately.

PAPER PRESSURE BAIL SPRING (FRICTION FEED)

**Requirement**

Scale hooked over pressure bail at each end of platen.

Min 7 oz---Max 20 oz to move pressure bail from platen.

**Note:** For sprocket feed mechanism, see 2.80.

2.72 Codebar Mechanism (continued)

CODEBAR DETENT

**Requirement**

Front plate removed. All clutches disengaged. Suppression and shift codebars should detent equally (gauged by eye).

**To Adjust**

Equalize the detenting of the codebars by adding or removing shims between the casting and the codebar bracket.

CODEBAR DETENT SPRING

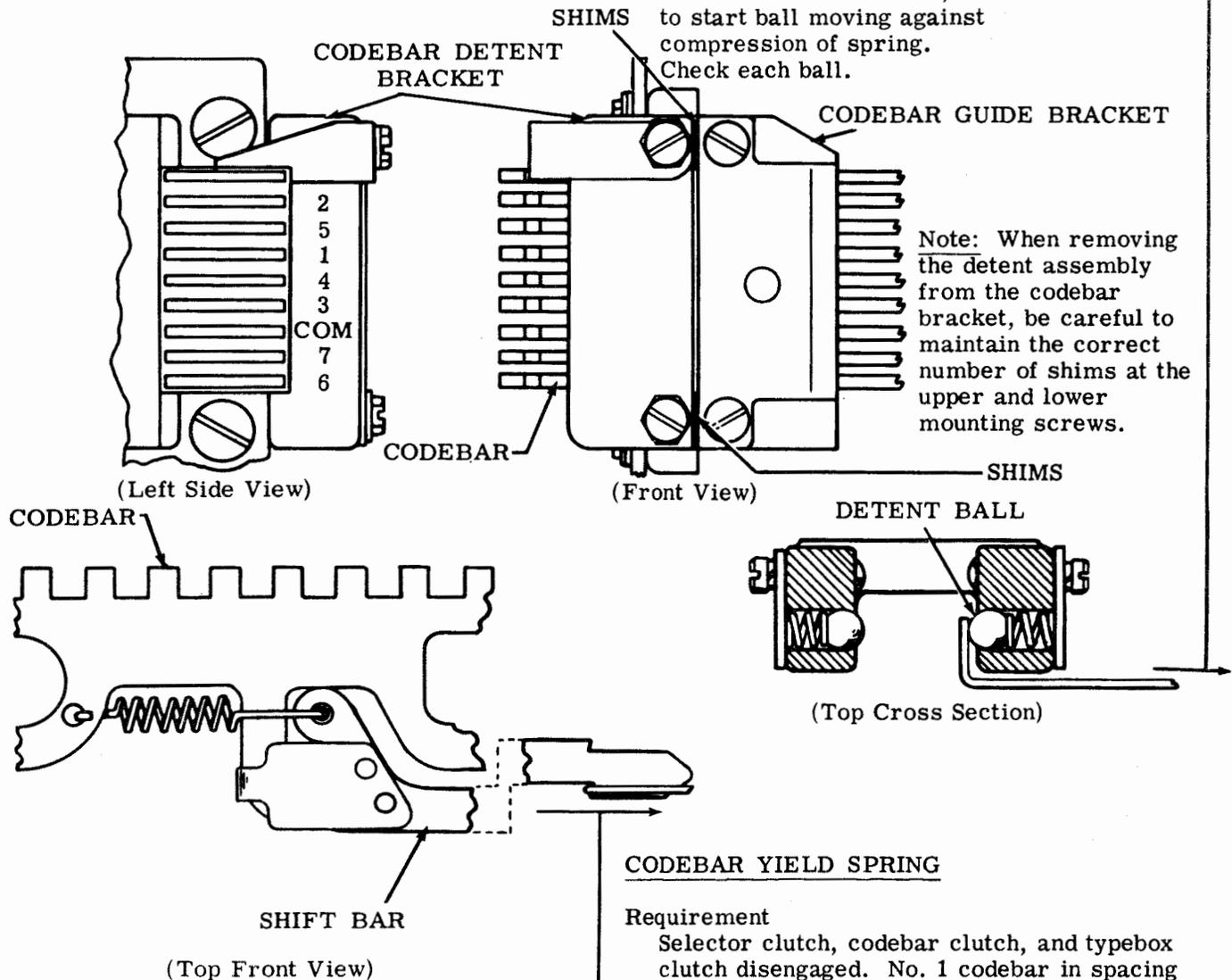
**Note:** Unless there is reason to believe that these springs are causing operating failure, do not check this requirement.

**Requirement**

Codebar detent bracket carefully removed and codebars removed from detent bracket. Scale applied to detent ball and pulled in direction of ball travel

Min 1-1/2 oz---Max 3-1/2 oz  
(no. 6 codebar for non-Bell, no. 6 and no. 7 codebars for Bell  
Min 4 oz---Max 6 oz)

to start ball moving against compression of spring.  
Check each ball.



**Note:** When removing the detent assembly from the codebar bracket, be careful to maintain the correct number of shims at the upper and lower mounting screws.

CODEBAR YIELD SPRING

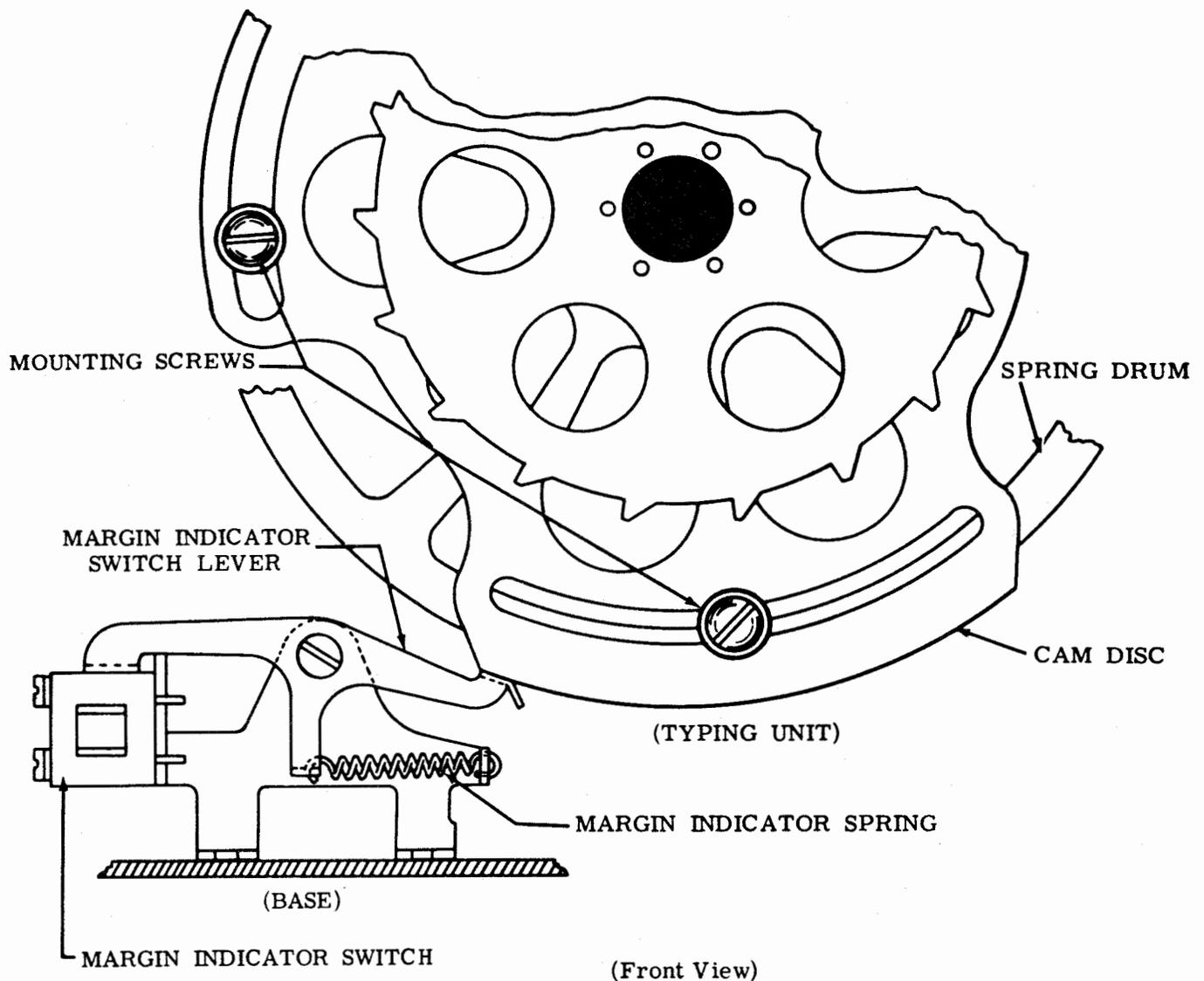
**Requirement**

Selector clutch, codebar clutch, and typebox clutch disengaged. No. 1 codebar in spacing position

Min 14 oz---Max 23 oz

to start codebar shift bar pivot moving away from codebar. Check no. 2 and common codebar shift bar in the same manner.

## 2.73 Spacing Mechanism (continued)

MARGIN INDICATOR LAMPRequirement

Operating under power, the lamp should light on the desired character.

To Adjust

Set the typebox carriage to print the desired character and position the cam disc counterclockwise on the spring drum with its three mounting screws loosened so that the switch just opens. If a line shorter than 72 characters is required, it may be necessary to remove the cam disc screws and insert them in adjacent slots in the disc, if the range of rotation in one slot is not enough. Range is from the 5th through the 85th character.

(Min 65 characters---Max 69 characters  
in Bell System switched network service)

2.74 Printing Mechanism (continued)

(B) PRINT SUPPRESSION BLOCKING LEVERS

To Check

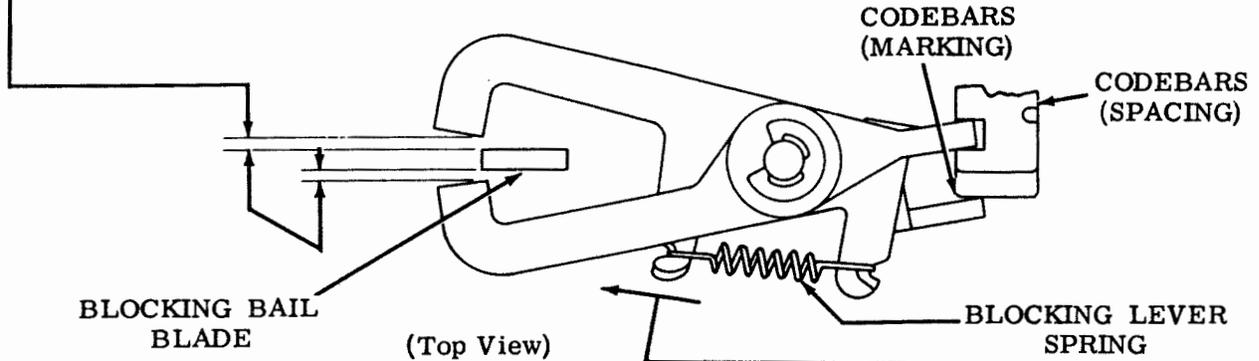
Manually move blocking bail blade opposite blocking lever.

Requirement

No. 6 codebar marking. No. 7 and suppression codebars spacing. Clearance between blocking levers and blocking bail blade should be equal within 0.020 inch.

To Adjust

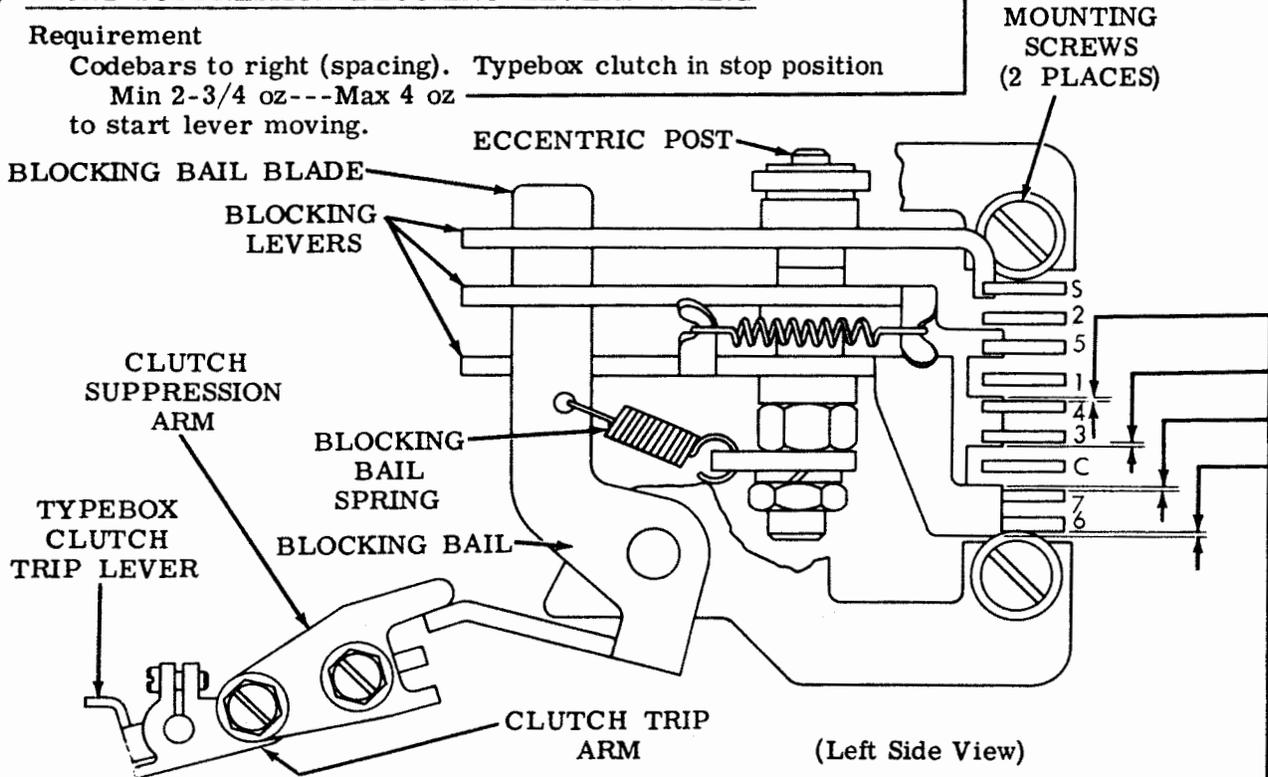
Position eccentric post, keeping high part of eccentric toward front of unit.



(C) PRINT SUPPRESSION BLOCKING LEVERS SPRING

Requirement

Codebars to right (spacing). Typebox clutch in stop position  
Min 2-3/4 oz --- Max 4 oz  
to start lever moving.



(A) PRINT SUPPRESSION MECHANISM

Requirement

Blocking lever extensions fully engaged by associated codebars.

To Adjust

Position print suppression assembly, with mounting screws friction tight, so lower lever extension is equally engaged by no. 6 and no. 7 codebars as gauged by eye.

2.75 Printing Mechanism (continued)

TYPEBOX CLUTCH SUPPRESSION ARM

**Requirement**

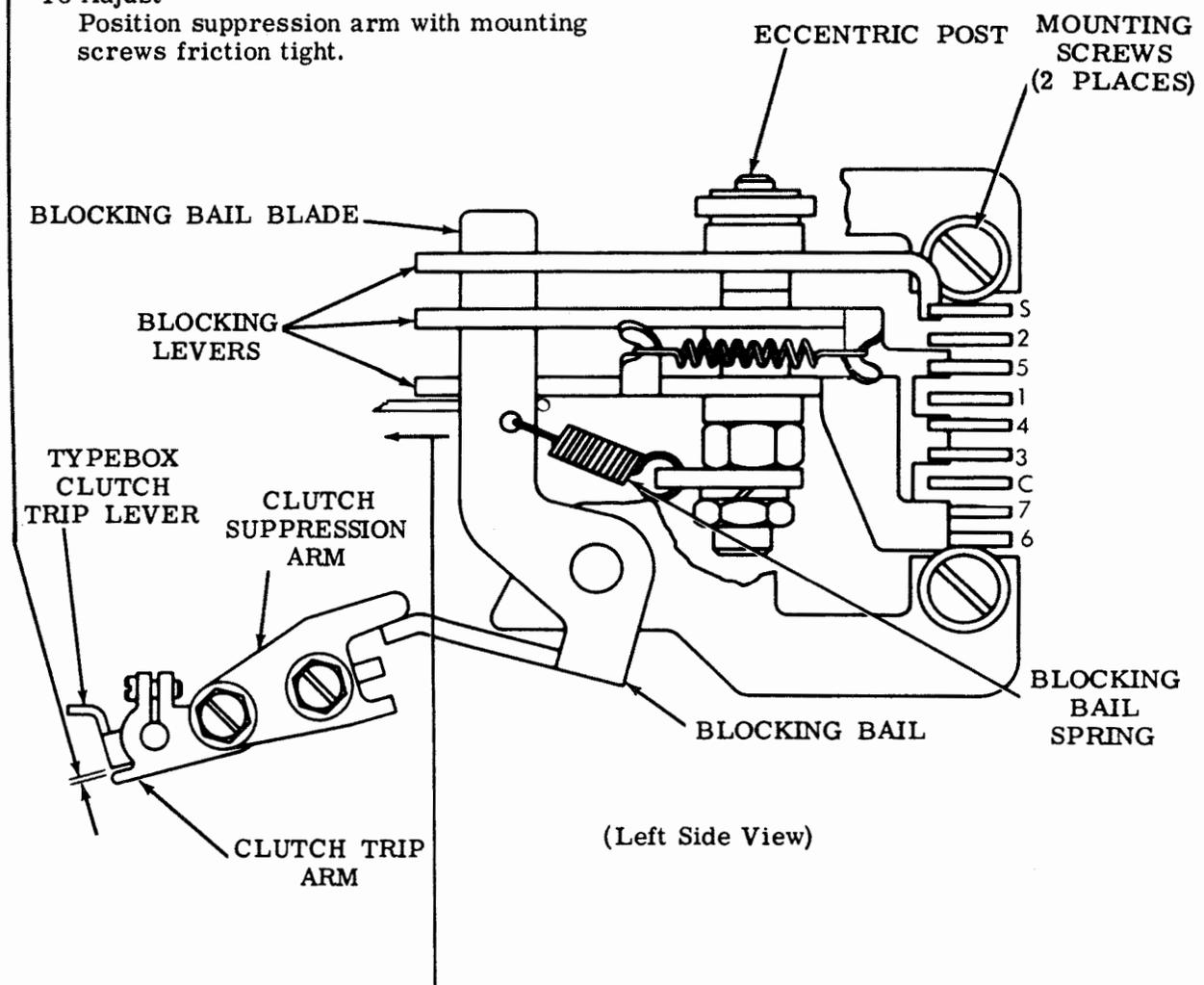
Blocking bail blocked. Rotate main shaft until function clutch shoe lever is opposite function clutch trip lever.

— Min 0.003 inch clearance between typebox clutch trip arm extension and clutch trip lever.

— Min 0.006 inch clearance between function clutch shoe lever and function clutch trip lever.

**To Adjust**

Position suppression arm with mounting screws friction tight.



(Left Side View)

PRINT SUPPRESSION BLOCKING BAIL SPRING

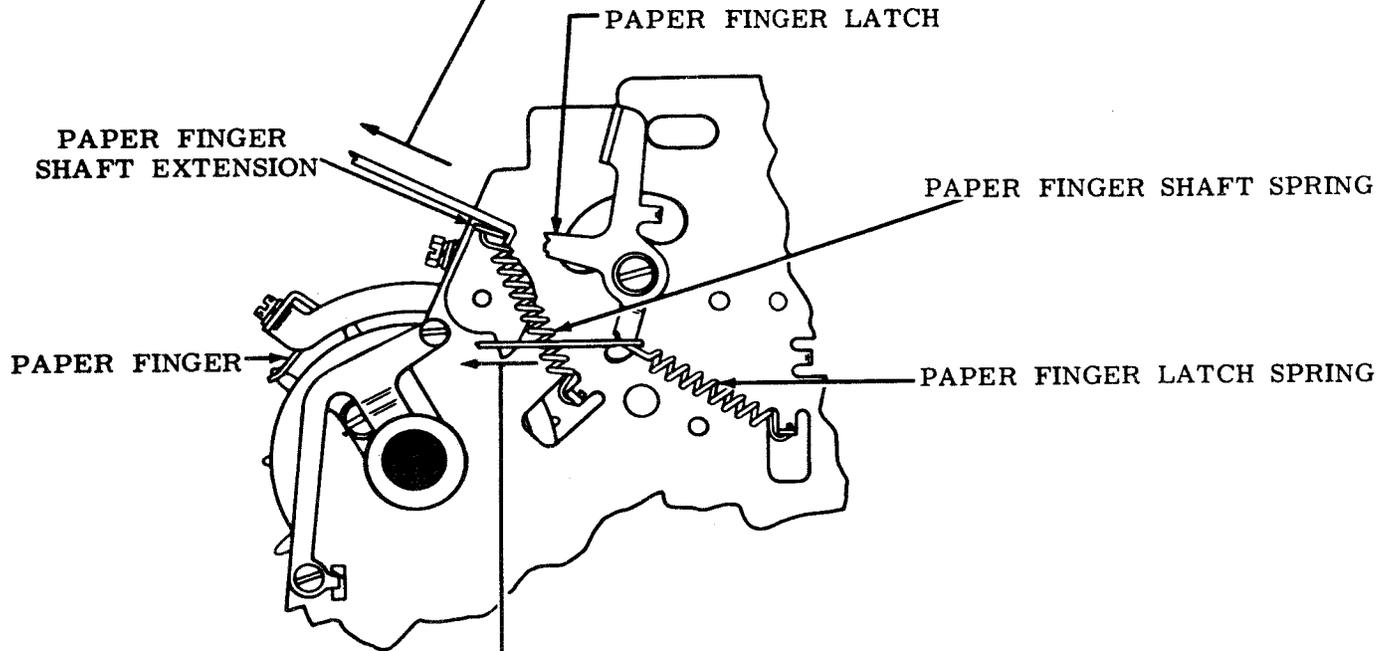
**Requirement**

All codebars right (spacing). Typebox clutch in stop position  
 — Min 1/2 oz---Max 1-1/2 oz to start bail moving.

2.76 Line Feed and Platen Mechanism (continued)

(A) PAPER FINGER SHAFT SPRING (SPROCKET FEED)

Requirement  
Hold latch away from shaft extension  
Min 6 oz---Max 10 oz  
to move paper finger against the platen.



(Right Side View)

(B) PAPER FINGER LATCH SPRING (SPROCKET FEED)

Requirement  
Hold paper finger against platen.  
Min 8 oz---Max 12 oz  
to start latch moving.

PLATEN DETENT BAIL SPRING

Use 2.61.

2.77 Line Feed and Platen Mechanism (continued)

(A) LEFT MARGIN (SPROCKET FEED)

(1) Requirement

Typebox clutch disengaged. Spacing drum fully returned. Clearance between centerline of sprocket pins in left hub and print indicator located in front of printing hammer stop bracket.  
Min 5/16 inch---Max 7/16 inch

(2) Requirement

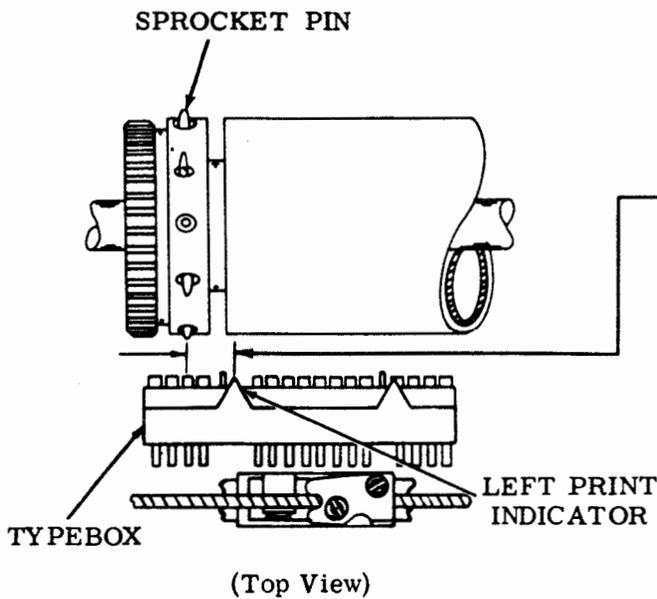
Spacing clutch disengaged. Front spacing feed pawl farthest advanced. Spacing drum fully returned. Play in spacing shaft gear (2.29) taken up clockwise. Clearance between pawl and shoulder of ratchet wheel tooth immediately ahead  
Min some---Max 0.008 inch

(3) Requirement

Rear pawl, when farthest advanced, should rest at bottom of indentation between ratchet wheel teeth.

To Adjust

Position carriage return ring with mounting screws loosened.

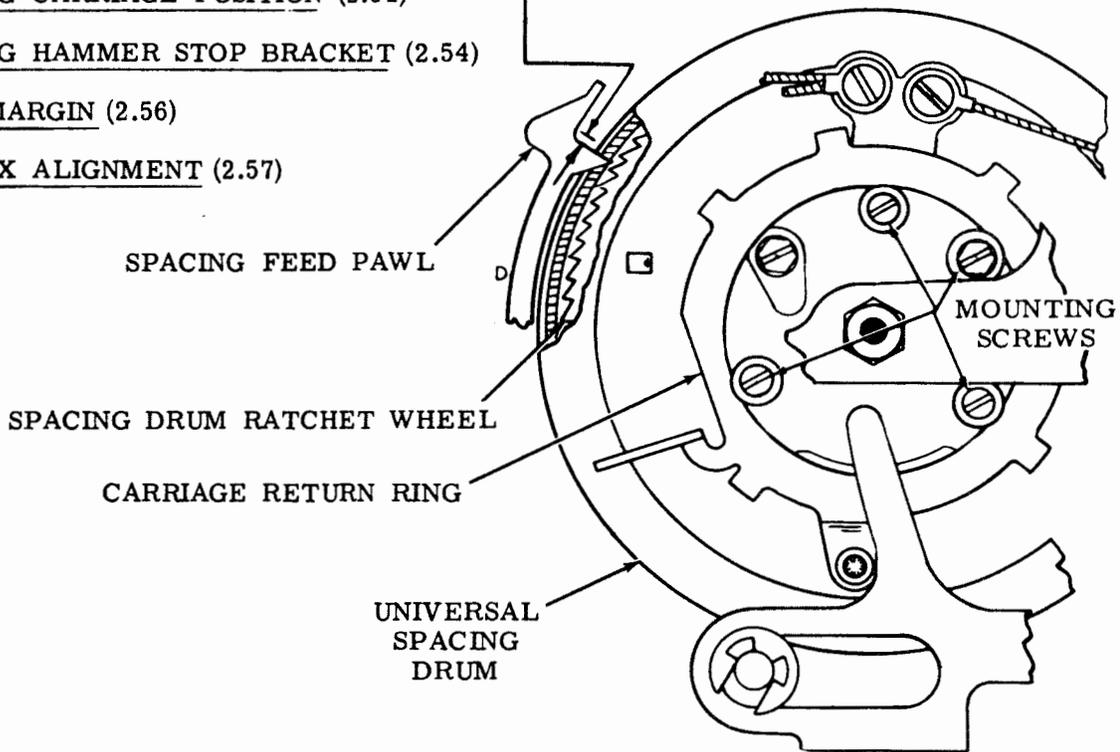


(B) PRINTING CARRIAGE POSITION (2.51)

(C) PRINTING HAMMER STOP BRACKET (2.54)

(D) RIGHT MARGIN (2.56)

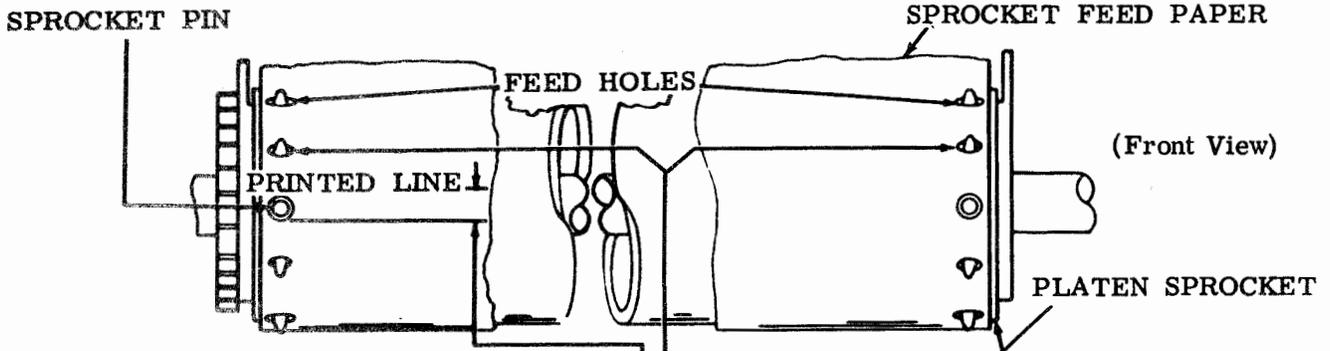
(E) TYPEBOX ALIGNMENT (2.57)



Note: Following this adjustment, all screws should be tightened.

2.78 Line Feed and Platen Mechanism (continued)

(A) LINE FEED SPUR GEAR DETENT ECCENTRIC Use 2.61.



(B) PRINTED LINE (SPROCKET FEED)

**Requirement**

The bottom of the printed line should be  $1/32$  inch  $\pm$   $1/64$  inch (plus a multiple of  $1/6$  inch if required) above a horizontal line drawn even with the bottom edge of any sprocket hole.

**To Adjust**

Loosen screws and position left sprocket.

**Note:** This adjustment is dependent on the type of form, and the location of the first printed line. The tolerances are field limits therefore the adjustment is not made in the factory.

(D) SPROCKET PIN SEPARATION (SPROCKET FEED)

(1) **Requirement**

With single sheet of sprocket feed paper placed on the platen the sprocket pins should be centrally located in the feed holes of the paper.

(2) **Requirement**

Printed line should be parallel to a line drawn perpendicular to edge of paper within plus or minus  $1/32$  inch.

**To Adjust**

Position right sprocket with clamp screw loosened.

(C) PLATEN ENDPLAY (SPROCKET FEED)

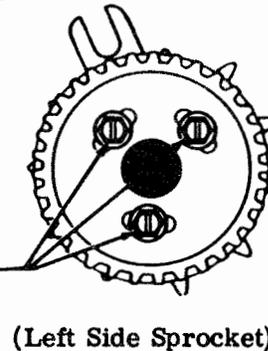
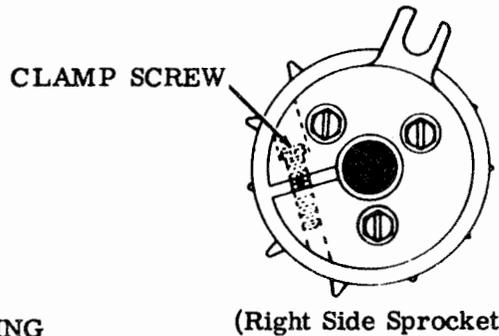
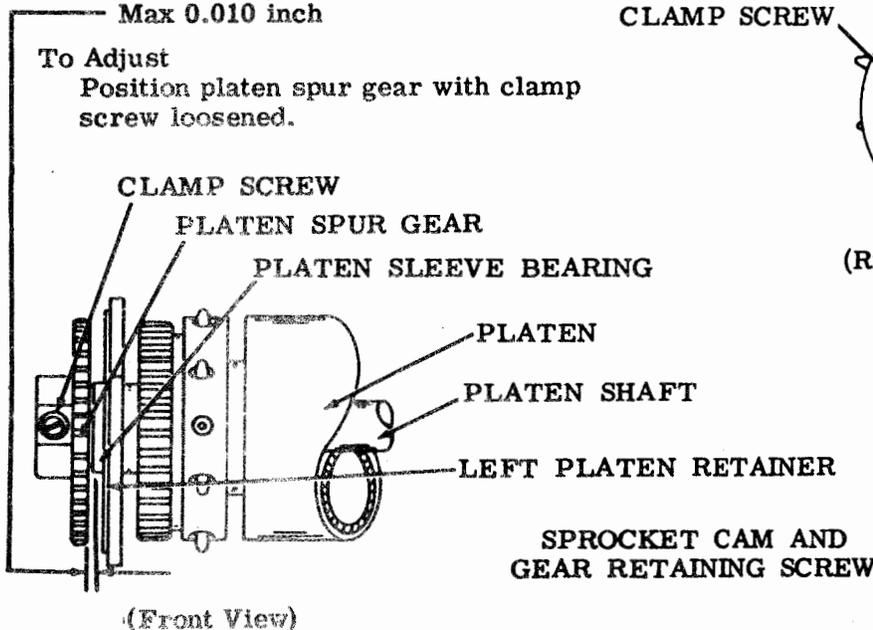
**Requirement**

Line feed pawls disengaged. Platen shaft should have some endplay

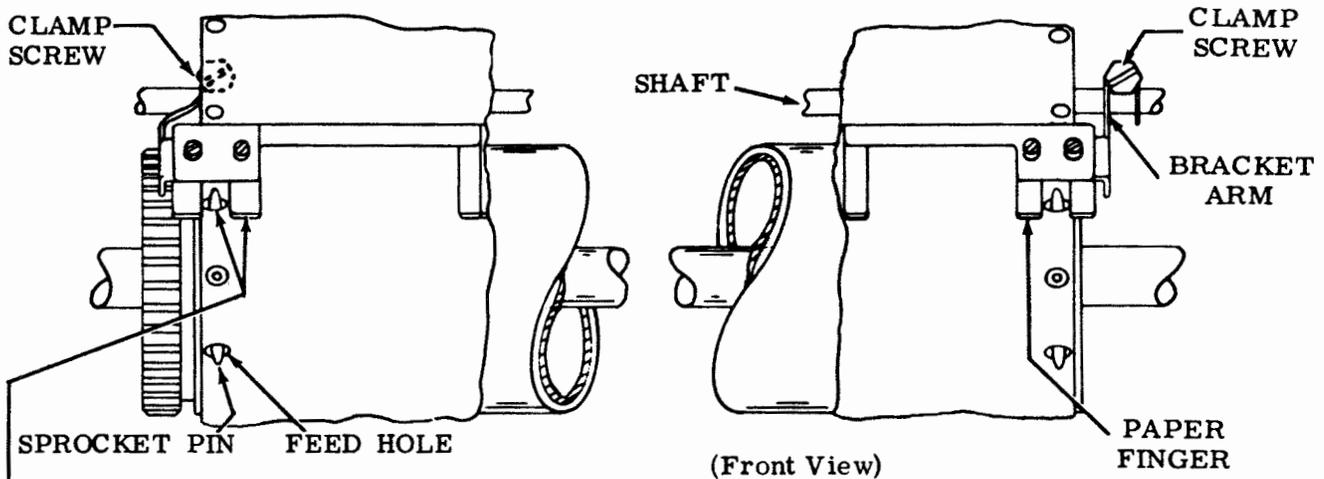
Max 0.010 inch

**To Adjust**

Position platen spur gear with clamp screw loosened.



2.79 Line Feed and Platen Mechanism (continued)



PAPER FINGER (SPROCKET FEED)

(1) Requirement

Sprocket pin should be centrally located in the paper finger slot.

(2) Requirement

The gap between the platen and the paper finger should be

Min 0.050 inch---Max 0.150 inch  
(for stapled copies)

Min 0.020 inch---Max 0.060 inch  
(unstapled or single copy).

Note: It is desirable to have the clearance at the minimum which will pass the stationery freely. This minimum is dependent upon the type of paper, number of copies, stapling, etc.

To Adjust

With paper finger assembly in latched position, loosen both clamp screws, position assembly horizontally to meet Requirement (1). Rotate assembly to meet Requirement (2).

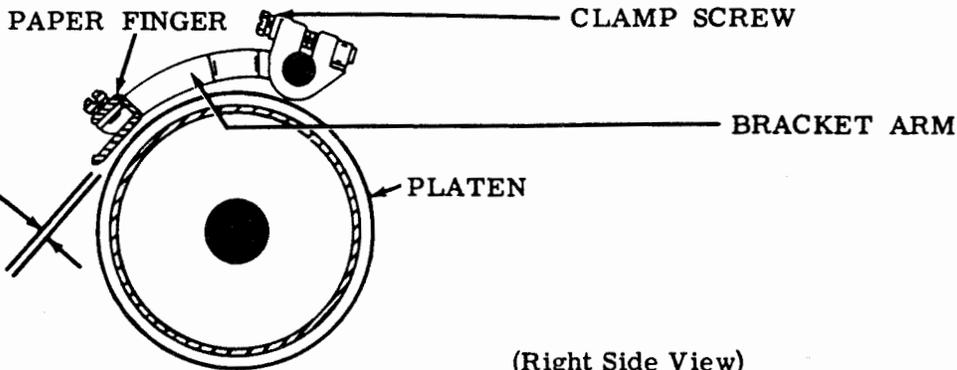
(3) Requirement (Not Illustrated)

Min 0.035 inch

between leading edge of paper finger and ribbon guide. Both right and left paper fingers must be parallel to the same printed line as gauged by eye.

To Adjust

Select rubout combination and rotate typebox clutch 1/2 revolution. Position paper fingers by means of elongated mounting holes. After tightening the screws recheck Requirements (1), (2), and (3).



(Right Side View)

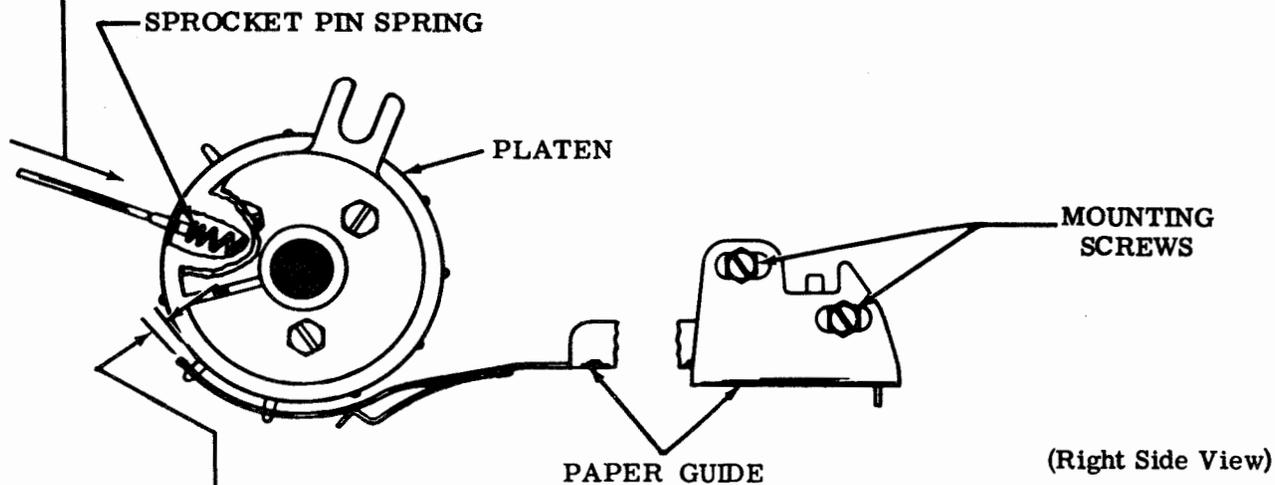
2.80 Line Feed and Platen Mechanism (continued)

**(B) SPROCKET PIN SPRING (SPROCKET FEED)**

**Requirement (Early Design)**

Pins to be tested aligned with slots in guide bracket.

Min 6 oz---Max 8 oz  
to start depressing the pin.



**(A) PAPER GUIDE (SPROCKET FEED)**

**Requirement**

The clearance between the platen and the front edge of the paper guide should be

Min 0.050 inch---Max 0.150 inch  
(stapled copies)

Min 0.020 inch---Max 0.060 inch  
(unstapled or single copy).

**To Adjust**

Position the guide with its rear mounting screws loosened.

**(C) RIBBON REVERSE SPUR GEAR**

Use 2.58.

**(D) RIBBON REVERSE DETENT**

Use 2.58.

**(E) LINE FEED BAR BELLCRANK SPRING (SPROCKET FEED)**

Use 2.61 except

Min 28 oz---Max 38 oz  
to start bar moving.

**Note:** It is desirable to have the clearance at the minimum which will pass the stationery freely. This minimum is dependent upon the type of paper, number of copies, stapling, etc.

2.81 Function Mechanism (continued)

STRIPPER SLIDE BAIL ARM

(1) Requirement

Clearance between top edge of stripper slide bail and lower surface of the closest line feed function pawl should be

Min 0.030 inch---Max 0.045 inch

To Check

Single-double line feed lever in double line feed position and all clutches in latched stop position. Select line feed function. Rotate main shaft until codebar clutch stop lever just touches codebar clutch shoe lever. Take up play of stripper bail cam shaft drive arm to make clearance a maximum between the stripper bail and line feed function pawl. Take up play of stripper slide bail and function pawl in downward direction.

To Adjust

Position stripper slide bail arm with its clamping screw loosened. Position arm laterally to clear stripper slide when screw is tightened.

(2) Requirement

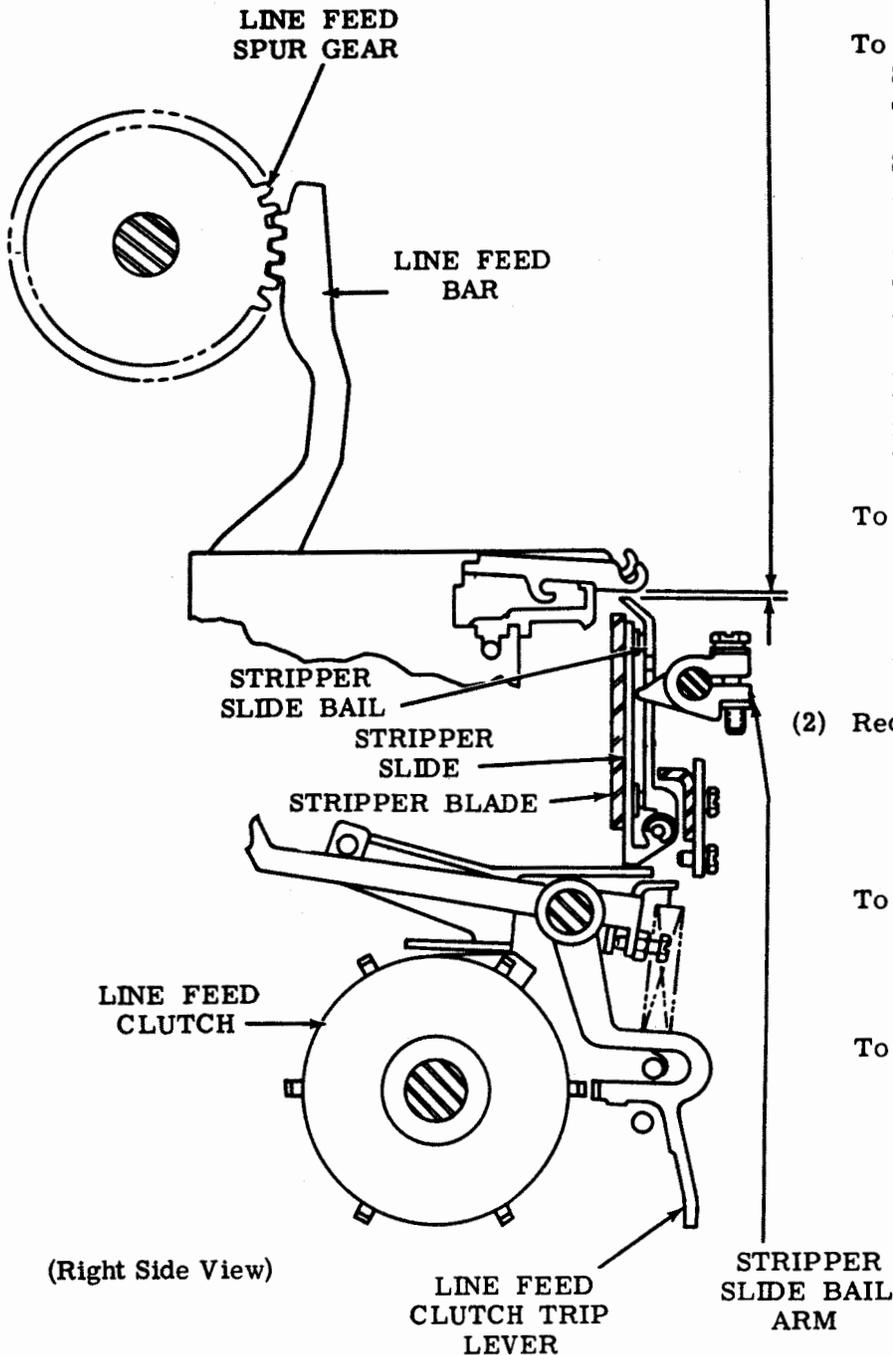
The line feed trip lever should reset at a point over, or just past, the second stop-lug by not more than 1/3 the distance between lugs.

To Check

Single-double line feed lever in double position. Select line feed function and rotate main shaft.

To Adjust

Refine LINE FEED CLUTCH TRIP LEVER ADJUSTING SCREW (2.25), if necessary. Recheck Requirement (1) of this adjustment.



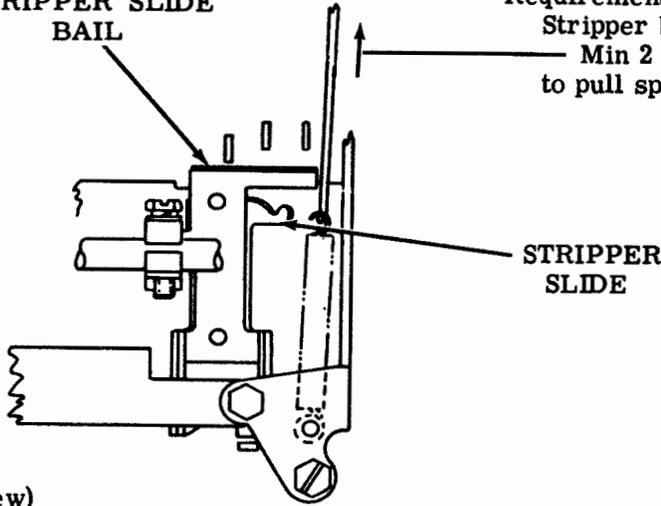
(Right Side View)

2.82 Function Mechanism (continued)

STRIPPER SLIDE SPRING

STRIPPER SLIDE  
BAIL

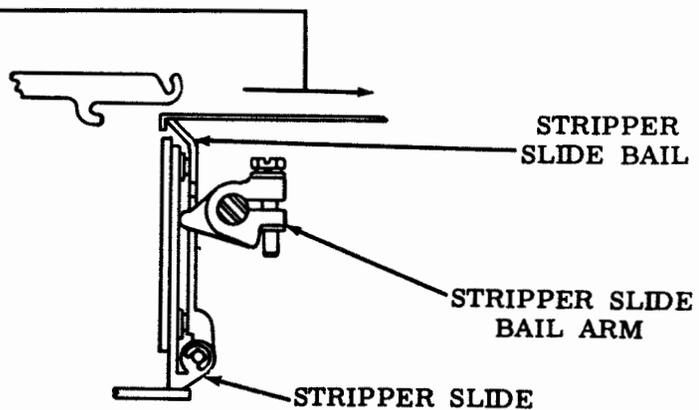
Requirement  
Stripper blade in its lowermost position.  
Min 2 oz---Max 3 oz  
to pull spring to installed length.



(Rear View)

STRIPPER SLIDE BAIL TORSION SPRING

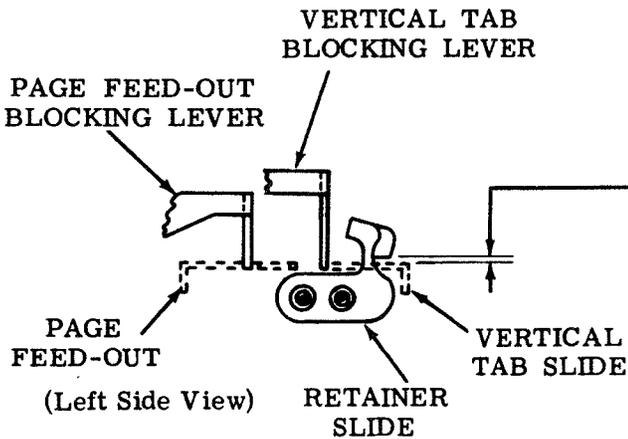
Requirement  
Single-double feed lever in single position.  
Select line feed function and rotate main  
shaft until stripper slide bail just strips  
line feed function pawl.  
Min 1 oz---Max 1-1/2 oz  
to just start bail moving.



(Left Side View)

3. VARIABLE FEATURES

3.01 Vertical Tabulator Mechanism (For Bell System Switched Network Service)



(A) VERTICAL TABULATOR SLIDE RETAINER

Requirement

Clearance between vertical tab slide and retaining edge of retainer  
Min some---Max 0.012 inch

To Adjust

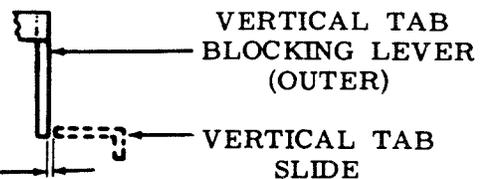
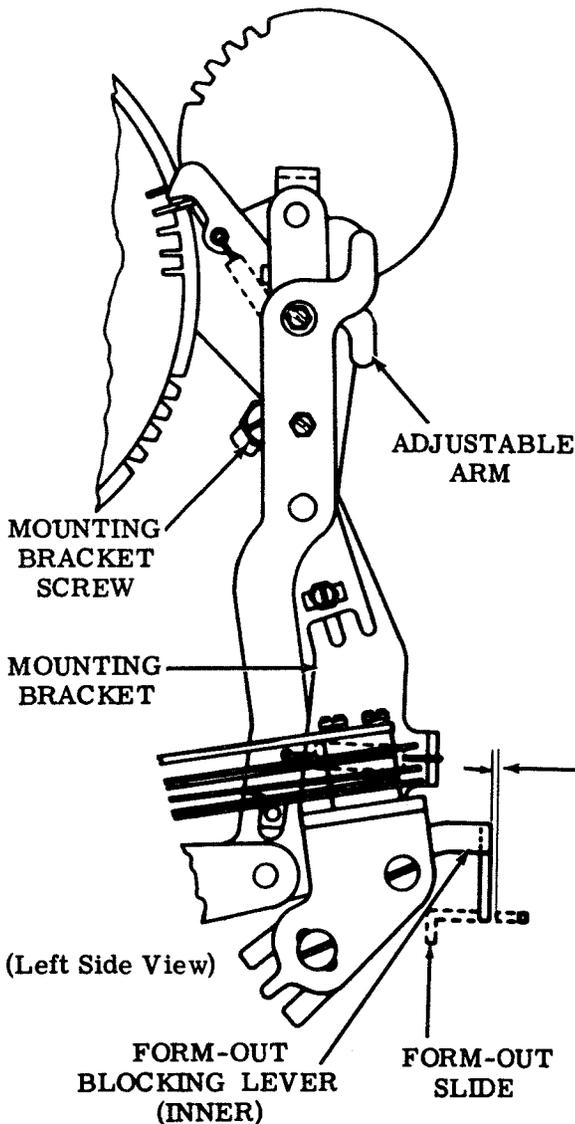
Move retainer to extreme forward position and locate up or down to meet requirement.

(B) MOUNTING BRACKET

(1) Requirement

Select form-out code combination and rotate main shaft until form-out slide is in forwardmost position. Clearance between form-out (inside) blocking lever and form-out slide.

Min some---Max 0.020 inch when play in blocking lever is taken up to make clearance minimum.



(2) Requirement

Select vertical tab code combination and rotate main shaft until vertical tab slide is in forwardmost position. Clearance between vertical tab slide and vertical tab blocking (outer) lever

Min 0.002 inch when play in blocking lever is taken up to make clearance minimum.

To Adjust

With mounting bracket screw friction tight, position lower portion of mounting bracket to meet Requirements (1) and (2).

3.02 Vertical Tabulator Mechanism (continued)  
(For Bell System Switched Network Service)

(B) INDEXING DISC

Requirement

Line feed clutch disengaged. Form-out stop plate adjacent to form-out follower. Clearance between stop plate and follower

Min 0.015 inch---Max 0.040 inch with slack taken up in idler and form start gears to make gap minimum.

To Adjust

Pull gear out of engagement with idler. Turn handwheel clockwise until a stop plate just operates follower and then engage first tooth on idler. Position disc with three mounting screws.

(C) POINTER ADJUSTMENT

Requirement

Line feed clutch disengaged. Form-out stop plate adjacent to follower. Pointer on printer side frame should line up with notch in index disc.

To Adjust

Pointer mounting screw, on printer side frame, friction tight. Position pointer so it lines up with notch on index disc, and clears any stop plate by approximately 1/16 inch.

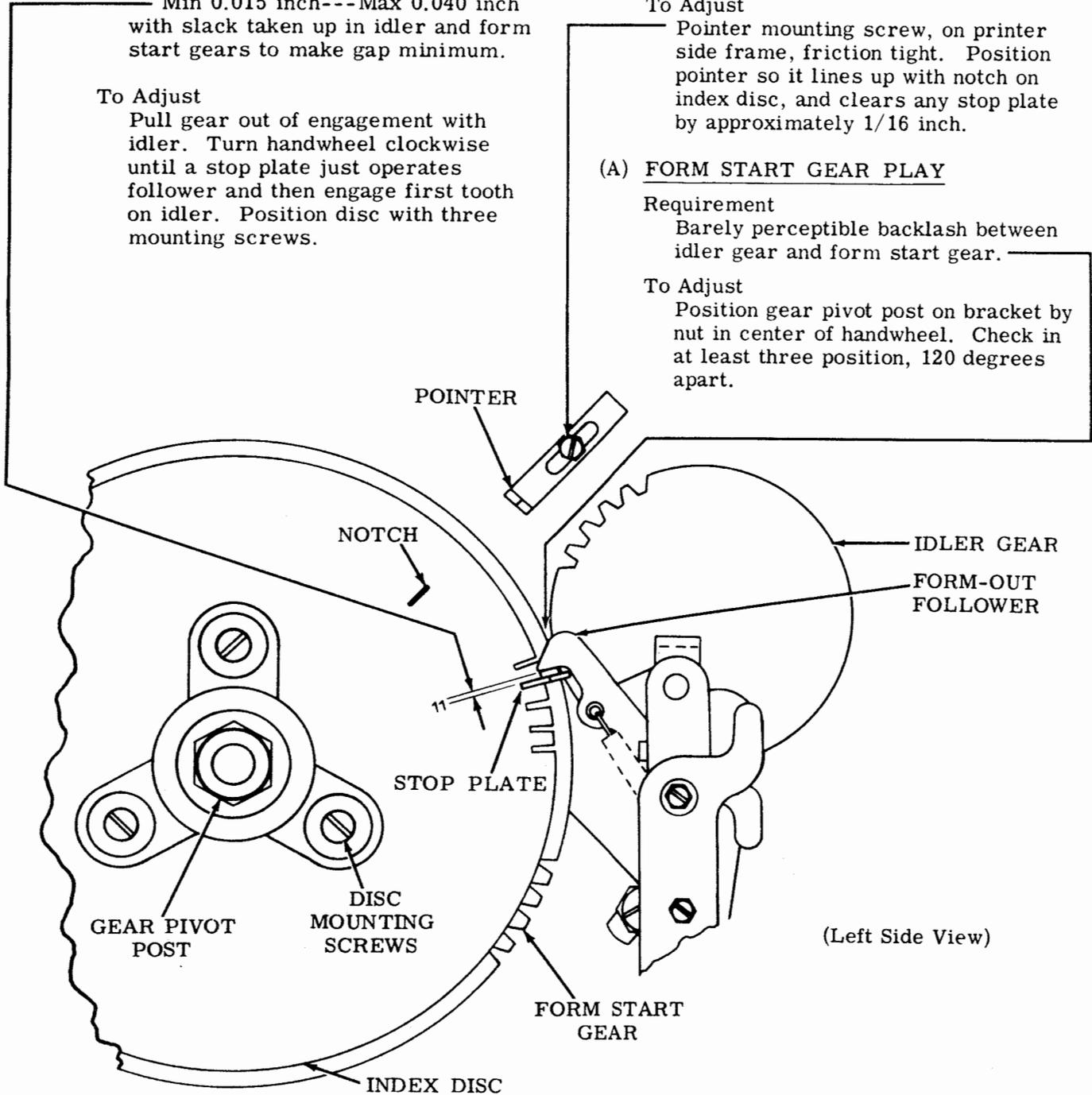
(A) FORM START GEAR PLAY

Requirement

Barely perceptible backlash between idler gear and form start gear.

To Adjust

Position gear pivot post on bracket by nut in center of handwheel. Check in at least three position, 120 degrees apart.



3.03 Vertical Tabulator Mechanism (continued)  
 (For Bell System Switched Network Service) (Transmitter Control Switch Adjustments)

(D) NORMALLY OPEN CONTACT GAP

Requirement  
 Blocking levers unoperated. Gap between normally open contacts  
 Min 0.008 inch---Max 0.012 inch

To Adjust  
 Bend stiffener.

(A) TRANSFER CONTACT SPRING

Requirement  
 Blocking levers unoperated.  
 Min 2 oz---Max 3 oz  
 to just open contacts. Bend long contact spring to meet requirement.

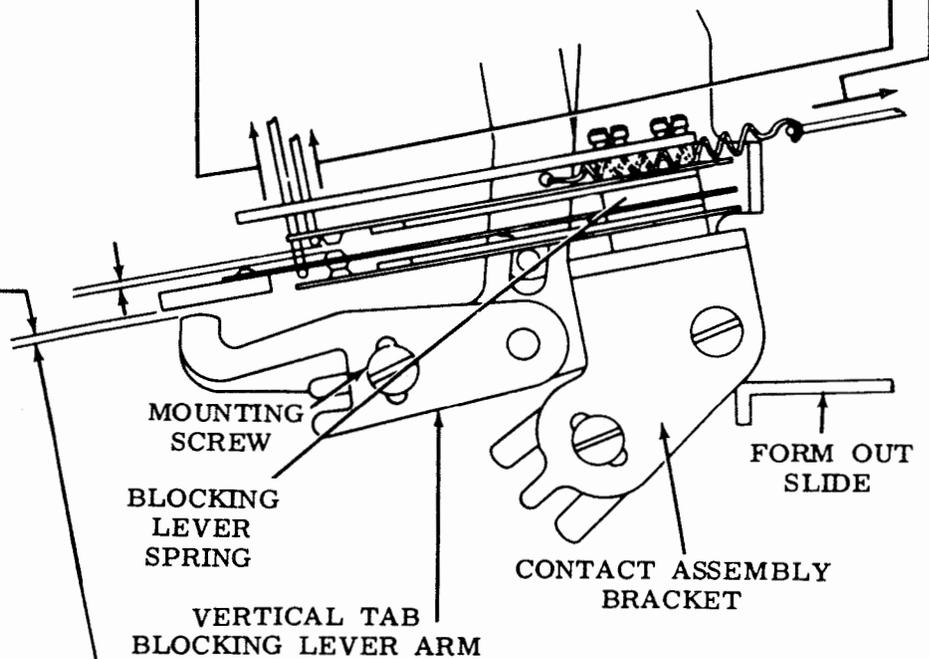
(H) VERTICAL TAB BLOCKING LEVER SPRING

Requirement  
 Blocking lever arms resting on top of their slides. Unhook blocking lever spring from mounting bracket.  
 Min 9 oz---Max 11 oz  
 to pull spring to operating length. Check both blocking lever springs.

(B) NORMALLY OPEN CONTACT SPRING

Requirement  
 Blocking levers unoperated  
 Min 1 oz---Max 2 oz  
 to just move short contact spring away from stiffener. Bend short contact spring to meet requirement.

(Left Side View)



(F) VERTICAL TAB BLOCKING LEVER ARM

Requirement  
 Vertical tab blocking lever resting on top of slide, clearance between blocking lever arm and insulator pad  
 Min some

To Adjust  
 Position blocking lever arm with mounting screws friction tight.

(E) CONTACT BRACKET

Requirement  
 Form-out blocking lever resting on top of form-out slide. Clearance between blocking lever and insulator tip of swinger  
 Min some

To Adjust  
 Position contact assembly bracket with mounting screws friction tight.

3.04 Vertical Tabulator Mechanism (continued)  
 (For Bell System Switched Network Service) (Transmitter Control Switch Adjustments)

(G) NORMALLY CLOSED CONTACT GAP

(1) Requirement

Select form-out code combination. Rotate main shaft until form-out slide is in forwardmost position and form-out blocking lever drops behind slide. Clearance between normally closed contact points

Min 0.008 inch

To Adjust

Refine NORMALLY OPEN CONTACT GAP and CONTACT BRACKET (3.03, (D) and (E)).

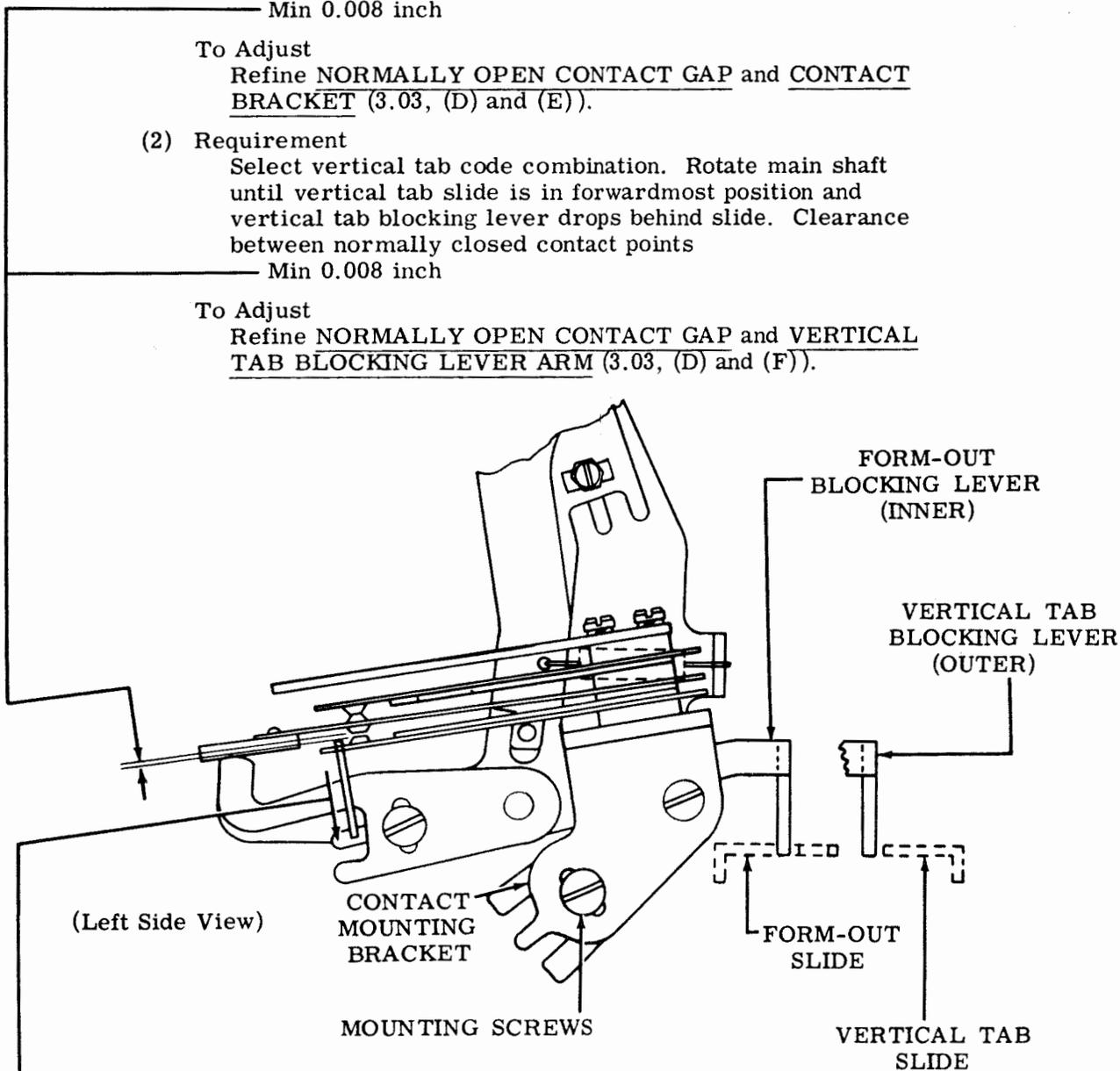
(2) Requirement

Select vertical tab code combination. Rotate main shaft until vertical tab slide is in forwardmost position and vertical tab blocking lever drops behind slide. Clearance between normally closed contact points

Min 0.008 inch

To Adjust

Refine NORMALLY OPEN CONTACT GAP and VERTICAL TAB BLOCKING LEVER ARM (3.03, (D) and (F)).

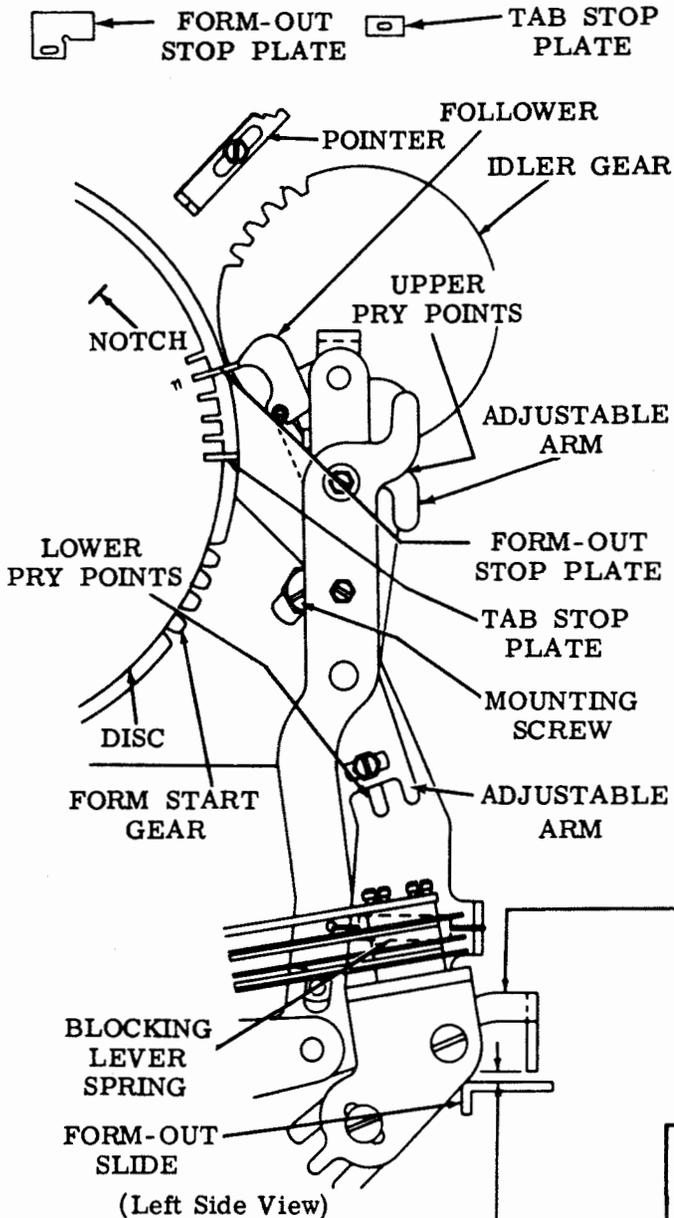


(C) NORMALLY CLOSED CONTACT SPRING

Requirement

Blocking levers operated  
 Min 2 oz---Max 3 oz  
 to just move short contact spring away from stiffener.  
 Bend short contact spring to meet requirement.

3.05 Vertical Tabulator Mechanism (continued)  
 (For Bell System Switched Network Service) (Form-Out and Tabulator Stops)



**Note 1: Form-Out Stop Adjustment** — Form-out index plates should be placed in numbered slots corresponding to length of form to be used. Form-out device may now be synchronized with form by first positioning form so that typing unit prints in first typing line of form. (When typing unit is in stop position, top of ribbon guide lines up with bottom of printing line.) With form in this position, pull form start gear out of engagement with idler and turn it until pointer on printer side is lined up with notch in index disc. (Form start gear is held in engagement with idler by spring tension, and may be disengaged by pulling the handwheel assembly out to left.)

**Note 2: Tabulation Stop Adjustment** — Tabulation stops within a form may be synchronized by first positioning form so typing unit will print on first typing line of form. (Procedure is outlined in Note 1.) Next, line feed platen to desired first printing line in form. Place tab stop plate in disc slot which lines up with vertical tab follower (inner). In same manner, place tab stop plates at succeeding desired printing lines within form. Tab stop plates may be placed on their sides in disc to nullify undesired printing positions on form.

**BLOCKING ARM (FORM-OUT)**

**Requirement**

Clearance between bottom of form-out blocking lever and top of form-out slide  
 Min 0.005 inch---Max 0.045 inch

**To Check**

Trip line feed clutch. Rotate main shaft until form-out follower is on peak of form-out stop plate.

**To Adjust**

Position adjustable arm at lower pry points with clamp screw loosened.

**BLOCKING ARM (VERTICAL TAB)**

**Requirement**

Clearance between bottom of vertical tab blocking lever and top of vertical tab slide  
 Min 0.005 inch---Max 0.045 inch

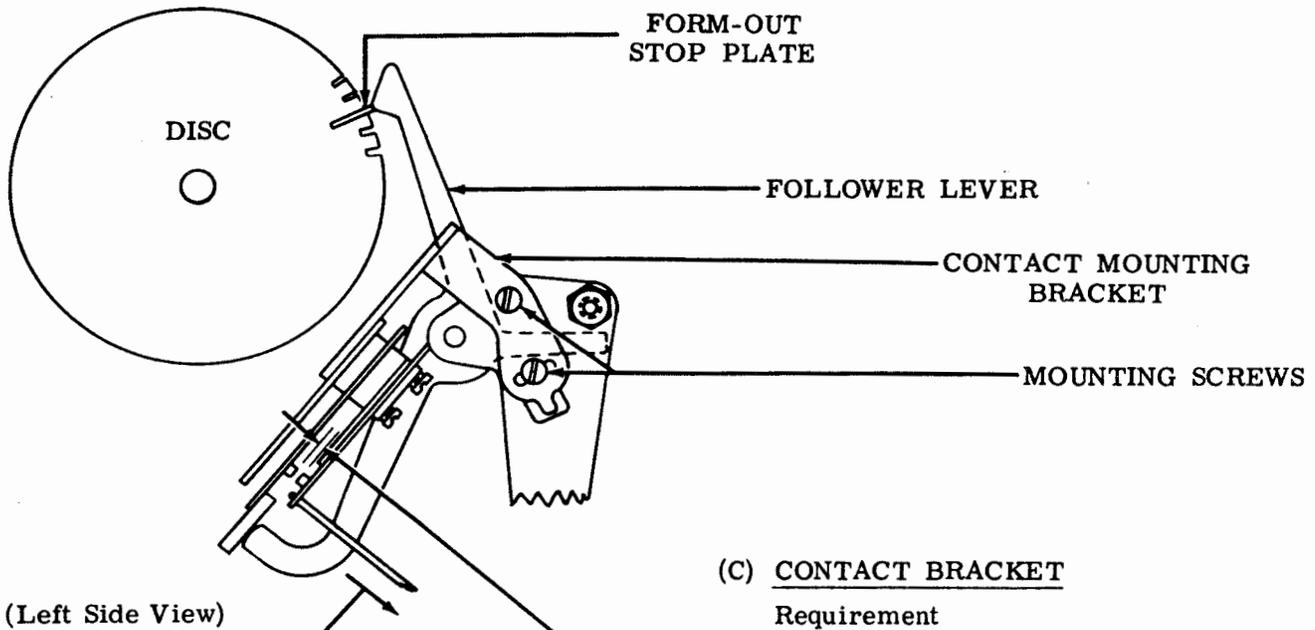
**To Check**

Trip line feed clutch. Rotate main shaft until vertical tab follower is on peak of tab stop plate.

**To Adjust**

Position adjustable arm at upper pry points with clamp screw loosened.

3.06 Vertical Tabulator Mechanism (continued)  
 (For Bell System Switched Network Service) (Off Normal Contact Adjustments)



(C) CONTACT BRACKET

Requirement

Follower lever on peak of a form-out stop plate. Clearance between contact points

Min 0.010 inch---Max 0.020 inch

To Adjust

Position contact assembly bracket with mounting screws friction tight.

(A) SHORT CONTACT SPRING

Requirement

Follower lever operated.  
 Min 2 oz---Max 3 oz  
 to just move short contact spring away from stiffener. Bend short contact spring to meet requirement.

(B) LONG CONTACT SPRING

Requirement

Follower lever unoperated.  
 Min 2 oz---Max 3 oz  
 to just open contacts. Bend long contact spring to meet requirement.

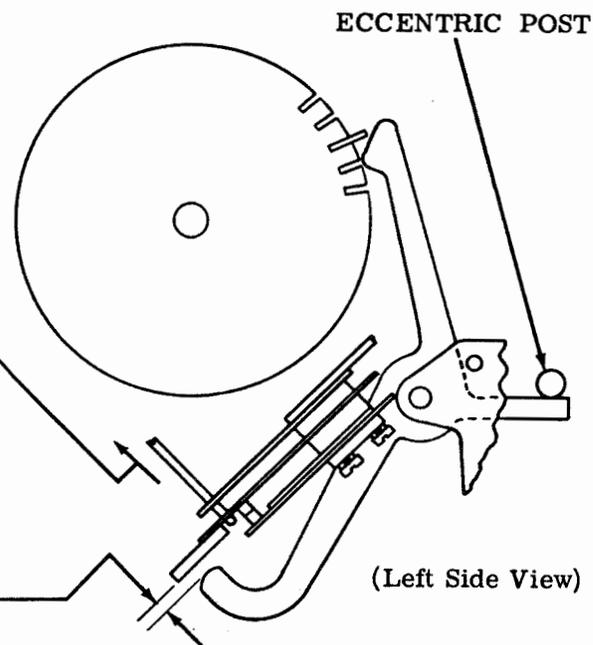
(D) FOLLOWER LEVER

Requirement

Index disc rotated to bring form-out stop plate one slot away from operating position. Clearance between follower lever and insulator tip  
 Min 0.010 inch---Max 0.020 inch

To Adjust

Rotate eccentric post until requirement is met.



(Left Side View)

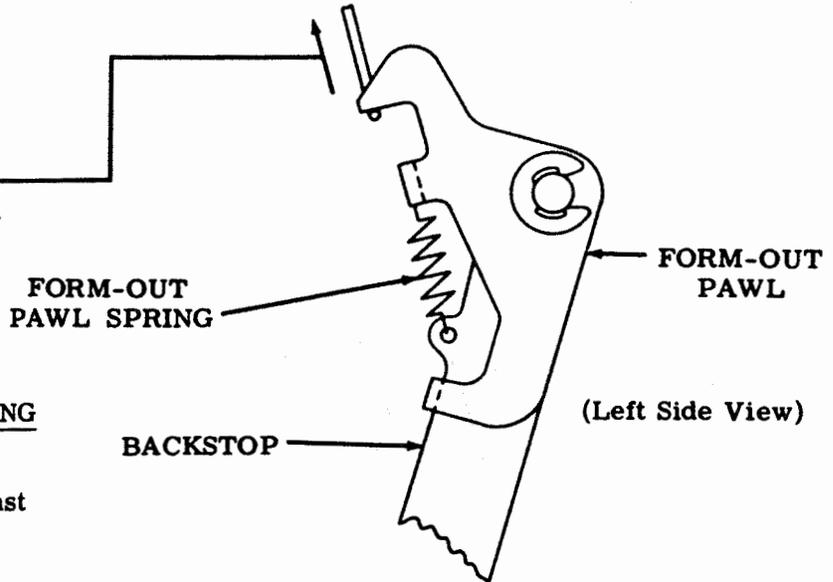
3.07 Vertical Tabulator Mechanism (continued)  
(Common to 3.01 and 3.24)

FORM-OUT PAWL SPRING

Requirement

Form-out pawl extension resting against backstop.

Min 3 oz---Max 8 oz  
to move pawl away from backstop.

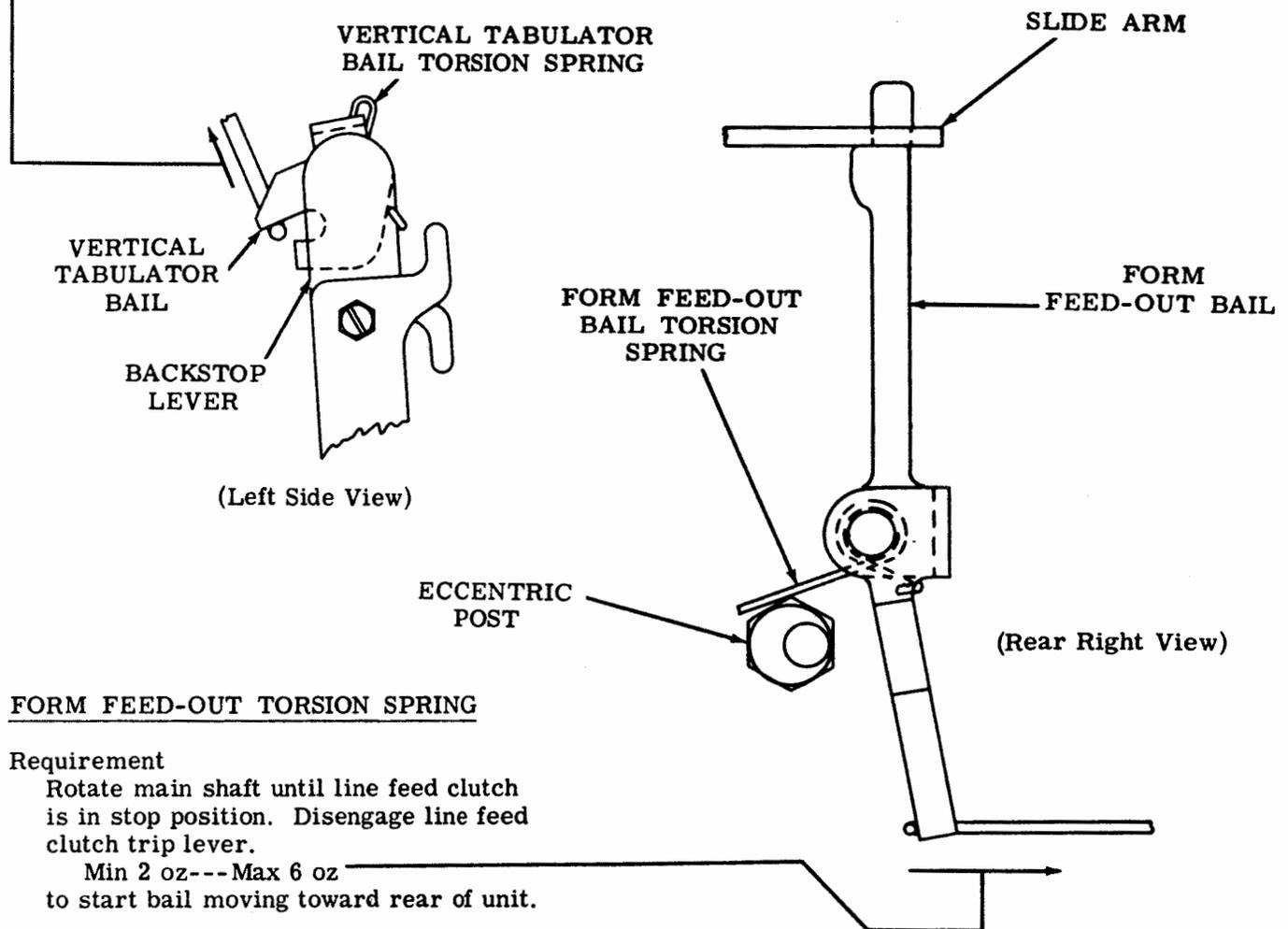


VERTICAL TABULATOR BAIL SPRING

Requirement

Extension of tab bail resting against backstop.

Min 3 oz---Max 8 oz  
to move bail away from backstop.



FORM FEED-OUT TORSION SPRING

Requirement

Rotate main shaft until line feed clutch is in stop position. Disengage line feed clutch trip lever.

Min 2 oz---Max 6 oz  
to start bail moving toward rear of unit.

3.08 Form-Out Mechanism

(A) FORM-OUT LEVER BACKSTOP

Requirement

Line feed clutch trip lever against eccentric post. Form-out lever against formed extension of mounting plate. Clearance between trip lever and form-out lever

Min some---Max 0.010 inch

To Adjust

Loosen adjusting screw. Hold lower end of form-out lever against extension of mounting plate. Position upper end of form-out lever. Tighten screw.

(B) SOLENOID LEVER (See also 3.09.)

Requirement

When solenoid plunger is seated, form-out slide, through combined motions of nonrepeat slide, form-out lever and form-out bail, should have moved forward to permit form-out blocking lever to fall in behind it. Clearance between slide and blocking lever

Min 0.020 inch---Max 0.030 inch

To Adjust

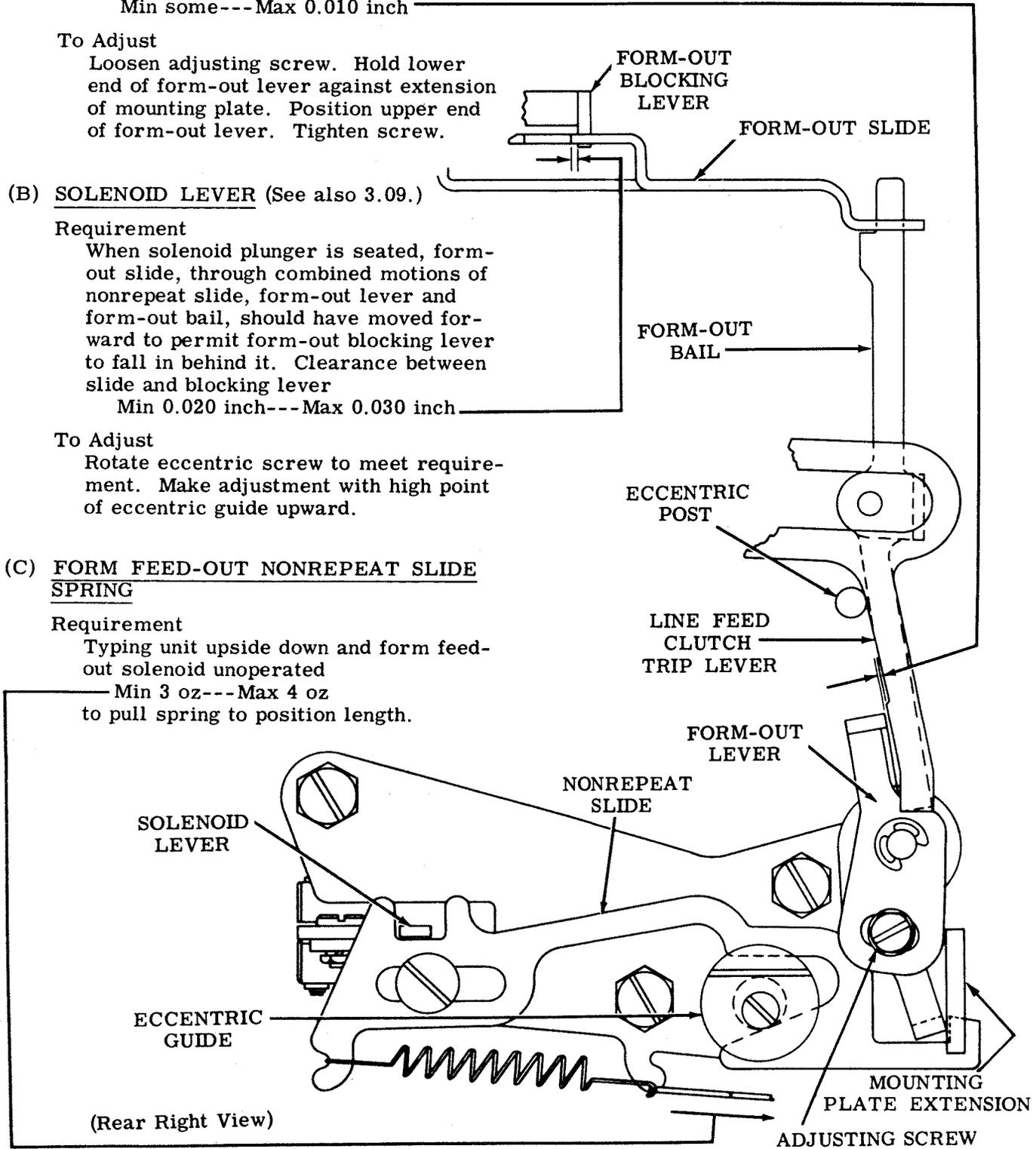
Rotate eccentric screw to meet requirement. Make adjustment with high point of eccentric guide upward.

(C) FORM FEED-OUT NONREPEAT SLIDE SPRING

Requirement

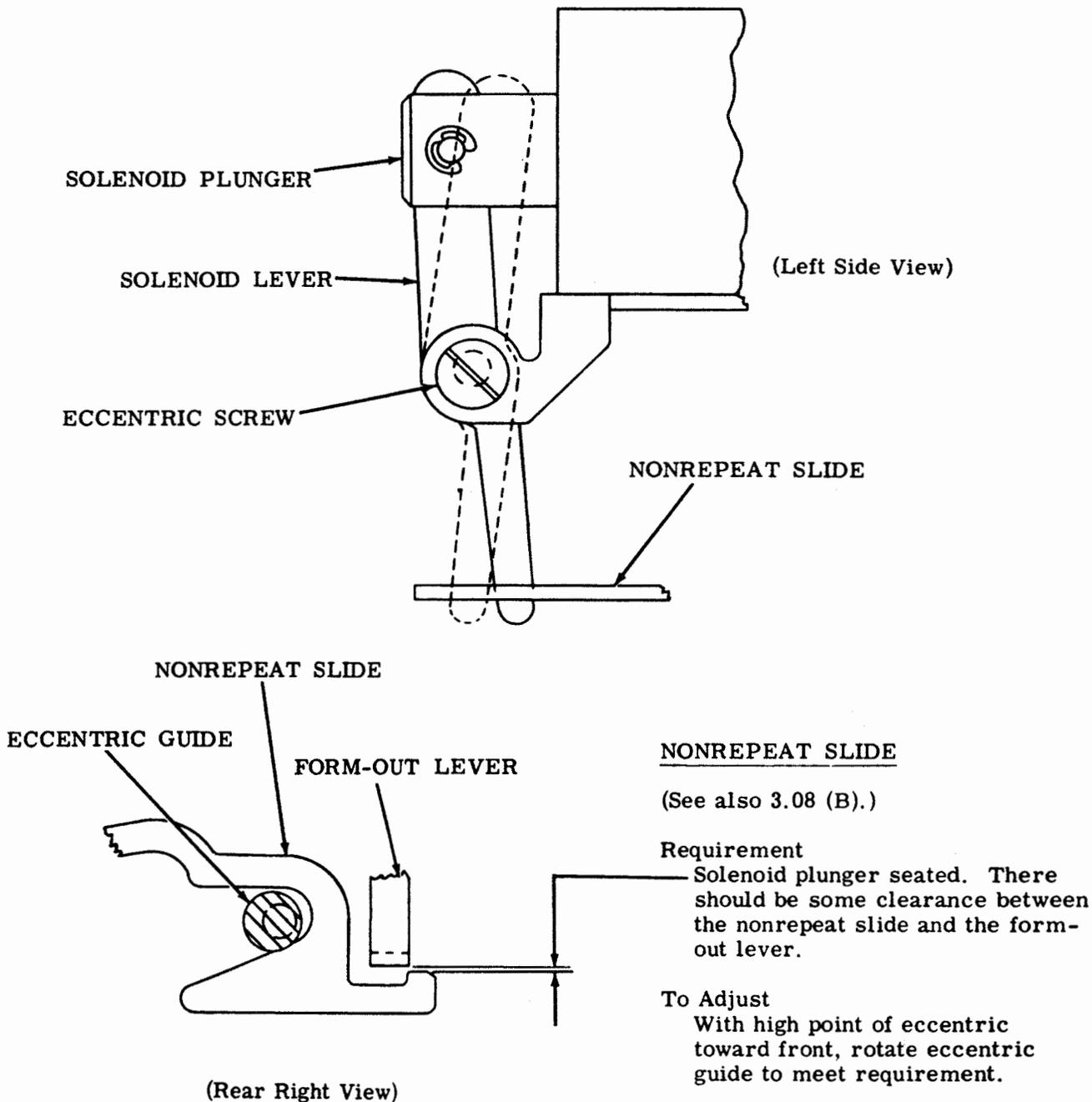
Typing unit upside down and form feed-out solenoid unoperated

Min 3 oz---Max 4 oz  
to pull spring to position length.



3.09 Form-Out Mechanism (continued)

**Note:** This adjustment insures that nonrepeat slide is stripped out of engagement with form-out lever before solenoid plunger is fully seated. It will also reduce the Min 0.020 inch---Max 0.030 inch clearance between form-out blocking lever and form-out slide, 3.08 (B), at point of stripping. Check for at least some clearance at this point. Solenoid plunger must not bind against solenoid. Loosen mounting screws and move solenoid up or down.



3.10 Low Paper and Paper Out Alarm Mechanisms

LOW PAPER AND PAPER OUT ALARM  
(SPROCKET FEED)

(1) Requirement

Without paper in unit, rear ends of switch operating levers should be in lowermost position. Switch plungers should be depressed. Normally open contacts should be closed. Ends of switch levers should be within outline of typing unit frame.

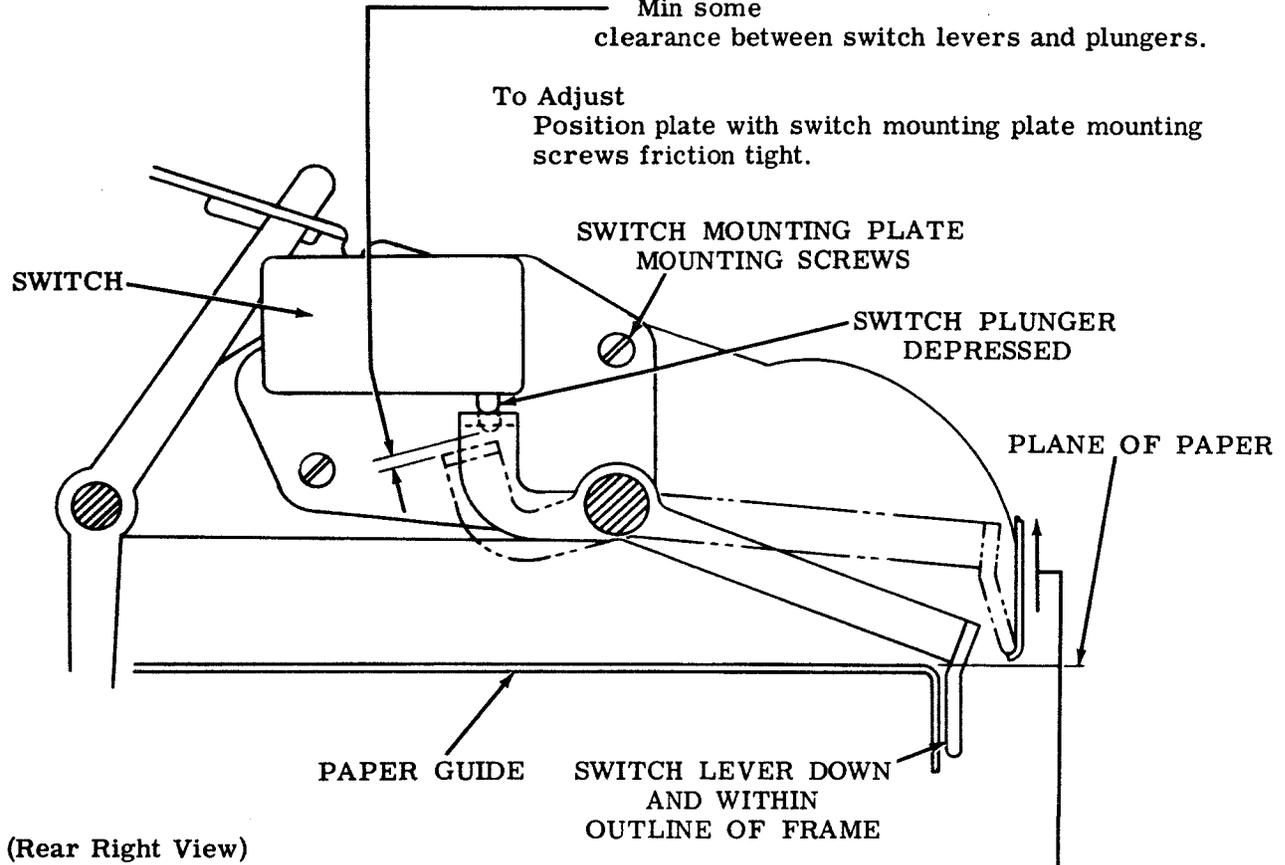
(2) Requirement

Rear ends of switch operating levers lifted to height of plane of upper surface of paper guide, switch plungers should be extended.

Min some clearance between switch levers and plungers.

To Adjust

Position plate with switch mounting plate mounting screws friction tight.



(Rear Right View)

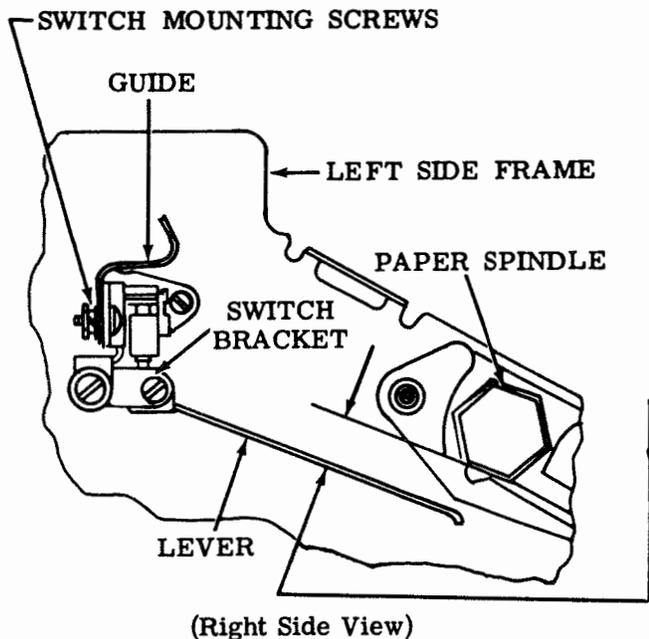
PAPER OUT ALARM SENSING LEVER SPRING  
(SPROCKET FEED)

Requirement

Min 1/2 oz---Max 1 oz \_\_\_\_\_  
to lift end of lever, which rides paper, to same plane as upper surface of paper guide. Measure both sensing lever springs in same manner.

3.11 Paper Out Alarm Mechanism (continued)  
(Friction Type) (Later Design)

Note: Adjustment requirements for the new-style paper-out alarm.



SWITCH

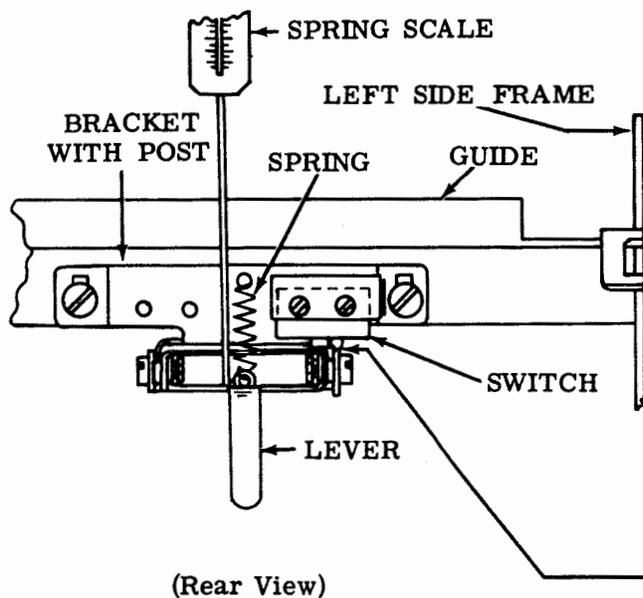
**Requirement**  
Switch in uppermost position parallel to switch bracket.

**To Adjust**  
Position switch with switch mounting screws loose.

LEVER

**Requirement**  
Flat side of empty paper spindle parallel with upper surface of lever extension.  
Lever 1/4 inch below paper spindle.

**To Adjust**  
Position bracket with post vertically up or down with mounting screws loose. If necessary, form the lever by hand.



LEVER SPRING

**Requirement**  
Spring scale applied in downward direction to lever near spring eye  
— Min 11 oz---Max 18 oz  
to move switch lever clear of switch button.

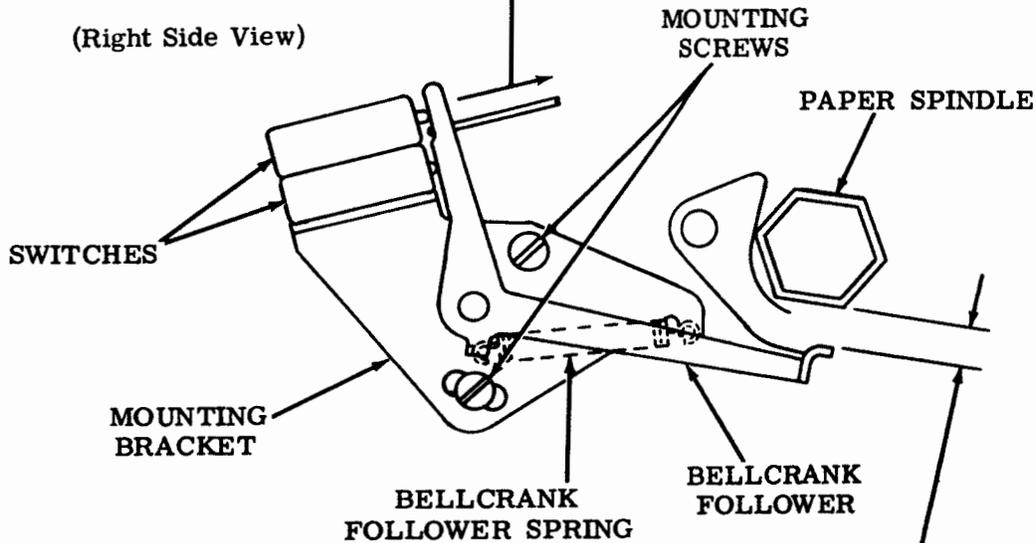
3.12 Low Paper and Paper Out Alarm Mechanism (continued)

PAPER OUT ALARM BELLCRANK FOLLOWER  
SPRING (FRICTION FEED) (Early Design)

**Requirement**

Roll of paper removed from unit.

Min 3-1/2 oz---Max 4-1/2 oz  
to move lever far enough to just clear  
lower switch.



PAPER OUT ALARM ASSEMBLY (FRICTION FEED)

(1) Requirement (Early Design)

The upper switch should operate when paper supply is reduced to approximately

Min 10 feet---Max 15 feet  
on the roll.

(2) Requirement

Paper follower bellcrank should operate upper switch at approximately 1/4 inch from flat side of empty paper spool.

**To Adjust**

Position bracket with two bracket mounting screws friction tight.

## 3.13 Horizontal Tabulator Mechanism

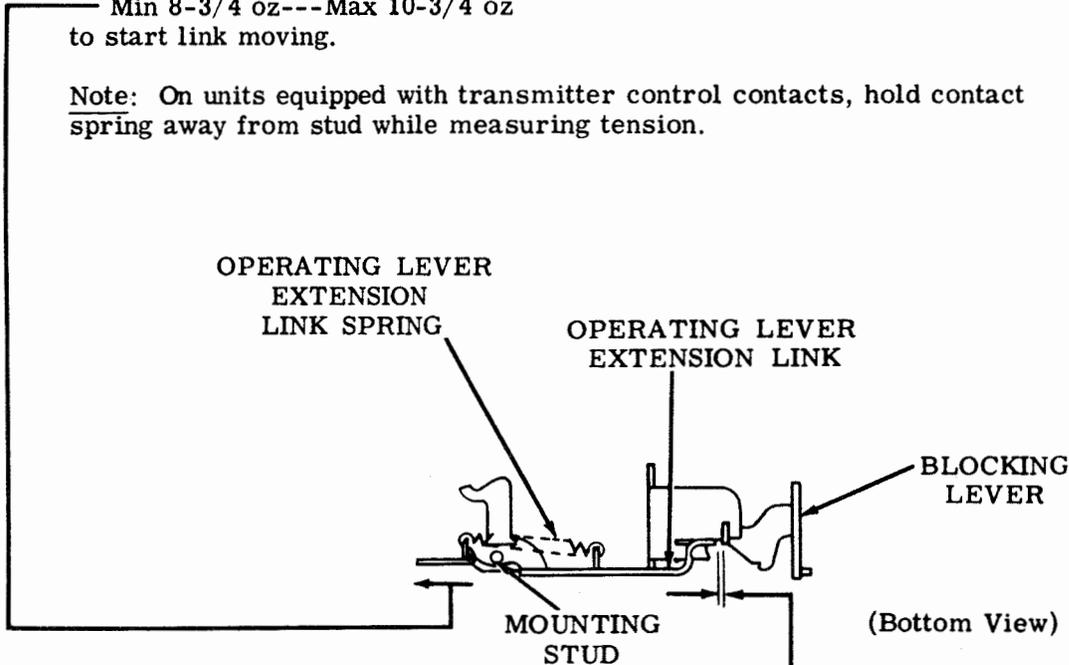
HORIZONTAL TAB OPERATING LEVER EXTENSION LINK SPRING

## Requirement

Unhook trip arm latchlever spring. Operating lever in operated position  
Slide arm against blocking lever.

Min 8-3/4 oz---Max 10-3/4 oz  
to start link moving.

Note: On units equipped with transmitter control contacts, hold contact  
spring away from stud while measuring tension.

HORIZONTAL TAB OPERATING LEVER LINK

## Requirement

Rotate function clutch until function pawl stripper blade is in lower position, and function reset bail roller on high part of cam. Pull horizontal tab function pawl to rear until latched on function bar. Clearance between operating lever extension link and blocking lever

Min 0.005 inch---Max 0.025 inch  
with play taken up to minimize clearance.

## To Adjust

Position extension link on operating lever with mounting stud friction tight.

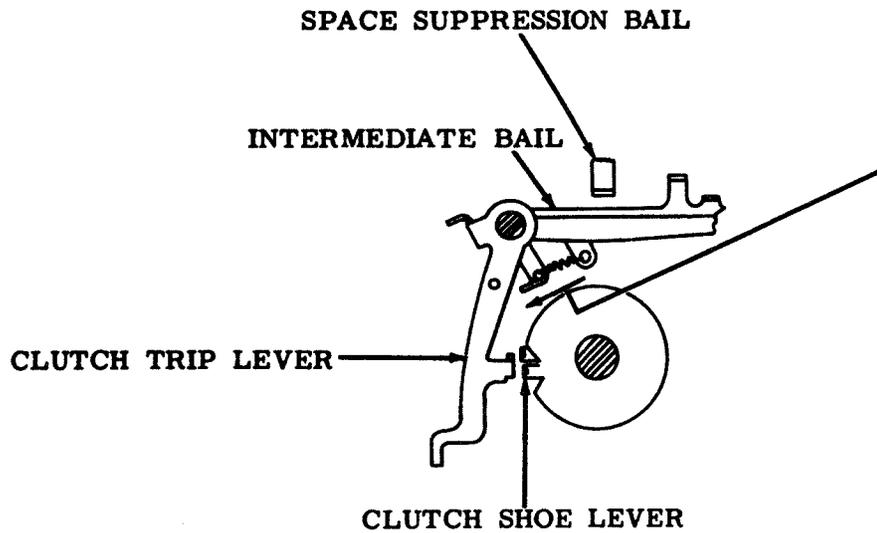
Note: When pulling function pawl to rear, if operating lever cam plate should be stripped off the tab slide arm before function pawl is latched on function bar, temporarily disable cam plate stripper bail arm by loosening its adjusting screw.

3.14 Horizontal Tabulator Mechanism (continued)

HORIZONTAL TAB INTERMEDIATE BAIL SPRING

Requirement

Trip lever arm and intermediate bail unoperated  
Min 1-1/2 oz---Max 3-1/2 oz  
to pull spring to installed length.



(Left Side View)

3.15 Horizontal Tabulator Mechanism (continued)

(B) HORIZONTAL TAB SPACING TRIP LEVER

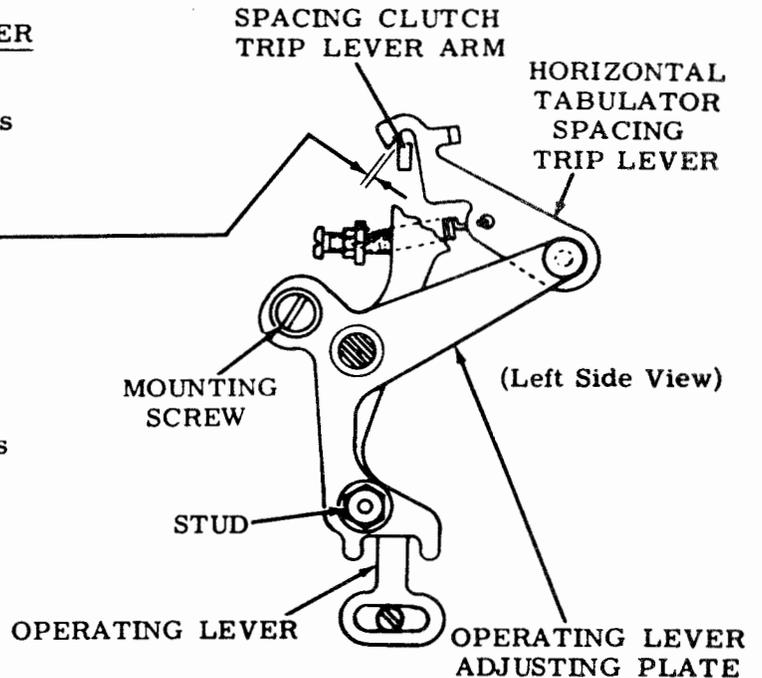
Requirement

Spacing clutch trip lever arm against its stop. Operating lever against adjusting screw. Clearance between spacing trip lever and trip lever arm

Min some---Max 0.010 inch

To Adjust

Loosen mounting screw and mounting stud friction tight. With spacing trip lever riding on clutch trip lever arm, slowly rotate operating lever adjusting plate by means of screwdriver pry slots until spacing trip lever just falls off trip lever arm.



HORIZONTAL TABULATOR SLIDE ARM

ADJUSTING SCREW

OPERATING LEVER CAM PLATE

OPERATING LEVER

(Left Side View)

(A) HORIZONTAL TAB OPERATING LEVER CAM PLATE

(1) Requirement

Horizontal tab slide arm unoperated. Operating lever against adjusting screw. Clearance between slide arm and cam plate

Min some

(2) Requirement

With the operating lever extension link in the unoperated position, it should engage at least 2/3 of the surface of the step in the blocking lever, as gauged by eye.

To Adjust

Position adjusting screw.

3.16 Horizontal Tabulator Mechanism (continued)

HORIZONTAL TAB OPERATING LEVER  
CAM PLATE SPRING

**Requirement**

Operating lever unoperated.  
Horizontal tab function pawl  
unlatched.

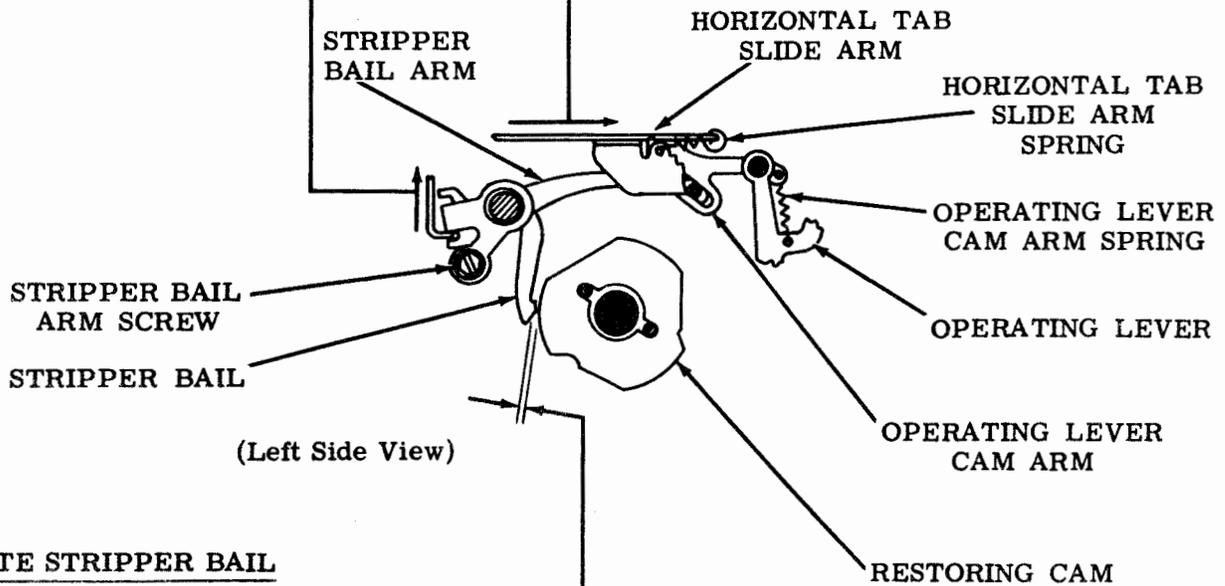
Min 4 oz---Max 9 oz  
to start stripper bail moving.

HORIZONTAL TAB SLIDE ARM SPRING

**Requirement**

Operating lever operated. Slide arm  
unoperated.

Min 1-1/2 oz---Max 4 oz  
to start slide moving.



CAM PLATE STRIPPER BAIL

**Requirement**

Operating lever and horizontal tab  
slide arm unoperated. Rotate spacing  
clutch until high of restoring cam is  
opposite stripper bail. Clearance  
between stripper bail and high of re-  
storing cam

Min 0.010 inch---Max 0.025 inch

**To Adjust**

Position stripper bail on stripper  
bail arm with stripper bail arm  
screw friction tight.

3.17 Horizontal Tabulator Mechanism (continued)

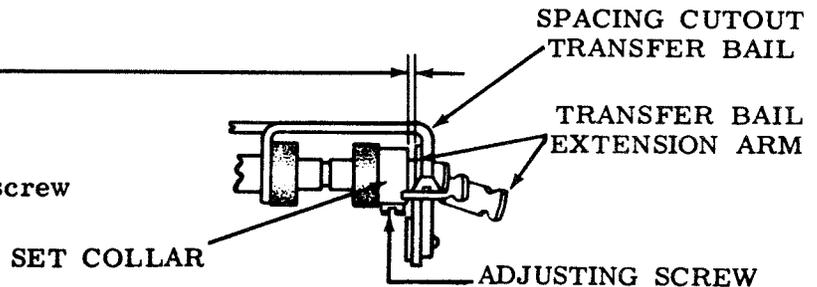
(A) SPACING CUTOUT TRANSFER BAIL SET COLLAR

Requirement

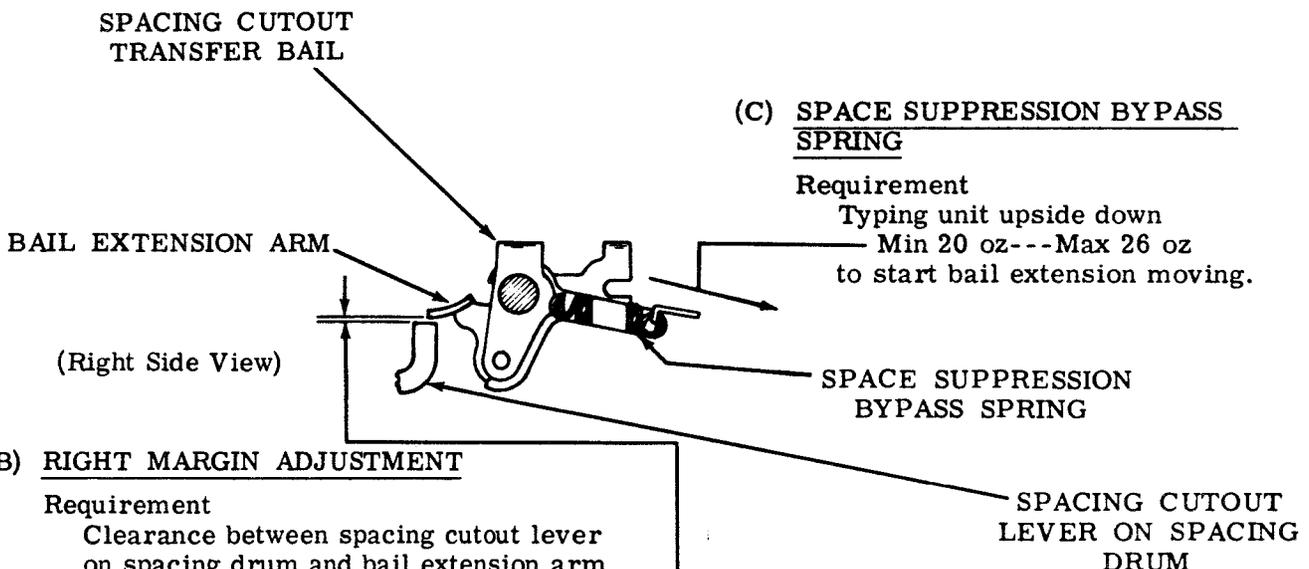
Transfer bail should have  
Min some---Max 0.008 inch  
endplay.

To Adjust

Position set collar with adjusting screw  
loosened.



(Bottom View)



(Right Side View)

(C) SPACE SUPPRESSION BYPASS SPRING

Requirement

Typing unit upside down  
Min 20 oz---Max 26 oz  
to start bail extension moving.

(B) RIGHT MARGIN ADJUSTMENT

Requirement

Clearance between spacing cutout lever  
on spacing drum and bail extension arm  
Min 0.006 inch---Max 0.025 inch

To Check

Place typebox in position to print character on which spacing cutout is desired. Pull forward on part of transfer bail extending below mounting shaft until bail is in fully operated position. Gauge clearance.

To Adjust

Position cutout lever with clamp screws loosened.

Note: Four screws must be loosened to adjust cutout lever (see figure in 2.56). Do not loosen hex head screw that clamps front ring.

## 3.18 Horizontal Tabulator Mechanism (continued)

TABULATOR PAWL (PRELIMINARY)

Note: Prior to adjustment, check LEFT MARGIN (2.55) and SPACING GEAR PHASING (2.29) adjustments.

## (1) Requirement

Beginning with 15th slot (counterclockwise from roller on slotted ring), position tab stops approximately an equal number of slots apart over remaining length of printing line.

## To Adjust

To move stops, hook small spring hook in hole of stop. Pull tab stop straight out from spacing drum and slide it on garter spring while continuing to pull it straight out. Spacing drum may have to be rotated manually to facilitate locating stops in some slots.

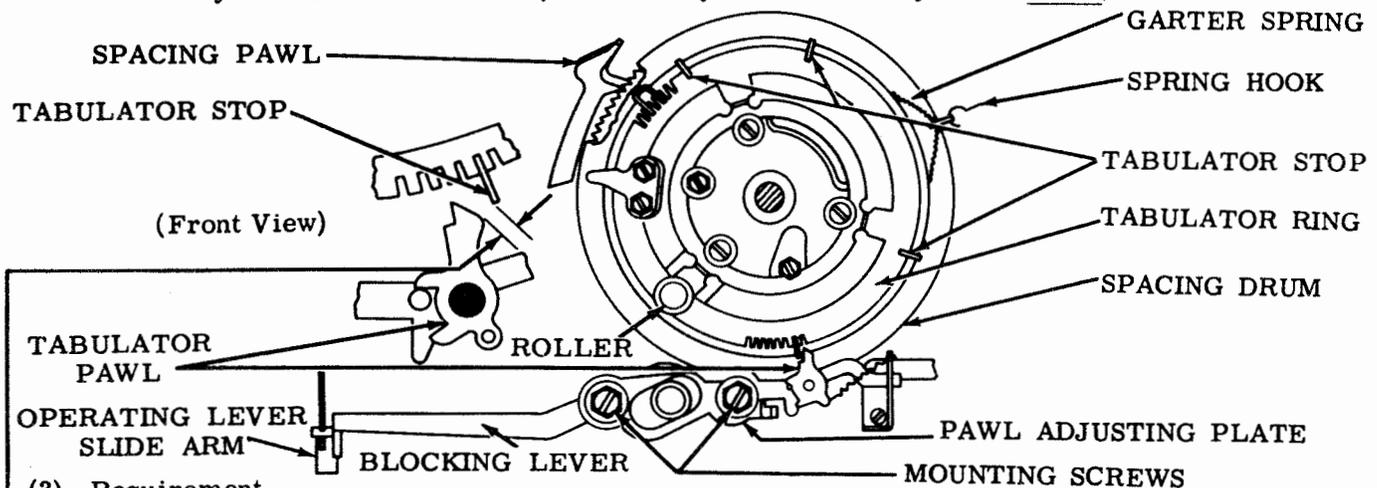
**CAUTION: CHECK THAT ALL STOPS ARE FULLY SEATED IN SLOTS, AND NOT TURNED SIDEWAYS.**

## (2) Requirement

All clutches disengaged. Front spacing feed pawl in lower position, pawl adjusting plate should be positioned at center of vertical and horizontal adjustments.

## To Adjust

Vertically position with both right and left screws loosened. Horizontally position with only left screw loosened. (Vertical adjustment is always made first.)



## (3) Requirement

Disengage spacing feed pawls. Let spacing drum return to maximum counterclockwise position. Keep spacing clutch disengaged manually. Advance spacing drum until first stop is immediately left of pawl.

## To Adjust

Adjust horizontal position of pawl adjusting plate so tabulator stop is in line with left edge of shoulder on pawl.

## (4) Requirement

With blocking lever and operating lever extension link unblocked, disengage spacing feed pawls and let spacing drum move back exactly 2 full spaces. Both spacing feed pawls should be fully engaged.

## To Adjust

With extension link blocked by blocking lever, gauge clearance between slope on pawl and tab stop. Note clearance. Advance drum until next stop is just left of tab pawl. Let spacing drum move back two full spaces. With extension link blocked by blocking lever, gauge and note clearance as before. Repeat procedure for remaining three stops. Note stop that gives maximum clearance. Use this stop as reference stop for final vertical and horizontal adjustments.

3.19 Horizontal Tabulator Mechanism (continued)

TABULATOR PAWL VERTICAL ADJUSTMENT (FINAL)

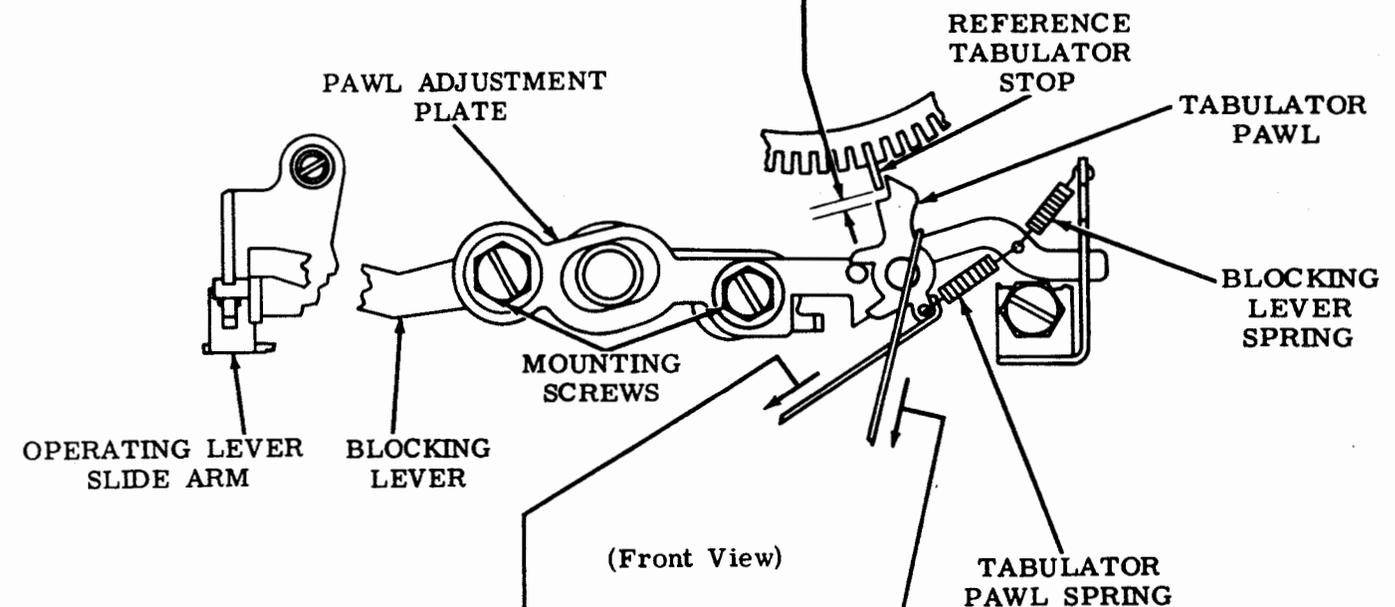
**Requirement**

Using stop with maximum clearance (determined by preliminary adjustment), position spacing drum until tab stop is opposite shoulder on tab pawl. With operating lever extension link blocked by blocking lever

Min 0.055 inch---Max 0.075 inch  
clearance between tab stop and tab pawl.

**To Adjust**

Position pawl adjusting plate with both screws loosened. Tighten right screw only, using wrench to hold bushing from turning.



HORIZONTAL TAB PAWL SPRING

**Requirement**

Tab pawl unoperated  
Min 3 oz---Max 5 oz  
to start pawl moving.

HORIZONTAL TAB BLOCKING LEVER RETURN SPRING

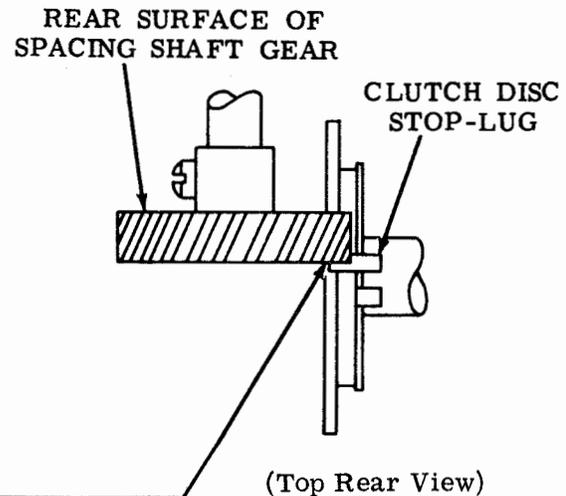
**Requirement**

Operating lever slide arm held to rear  
Min 2-1/2 oz---Max 4-1/2 oz  
to start lever moving.

## 3.20 Horizontal Tabulator Mechanism (continued)

TABULATOR PAWL HORIZONTAL ADJUSTMENT**Requirement**

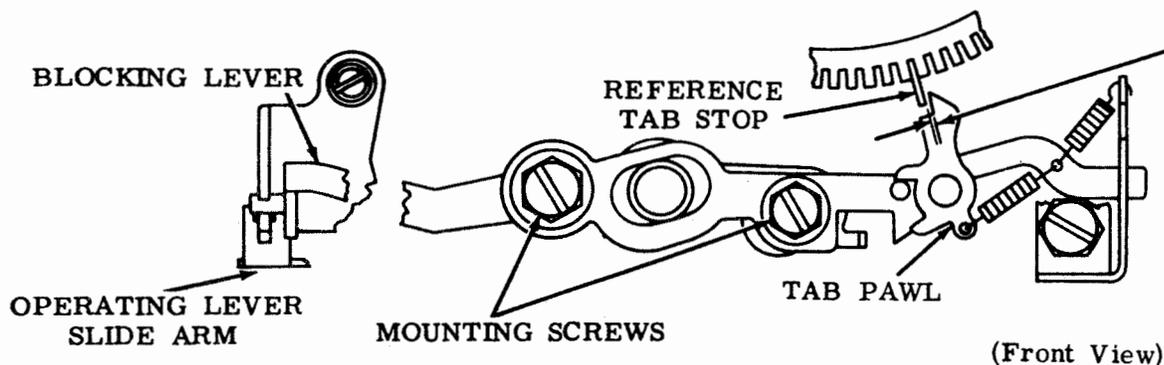
All clutches disengaged. Front spacing feed pawl in lower position. Position spacing drum so tab stop with maximum clearance (as determined by preliminary adjustment) is immediately left of pawl. Operating lever extension link forward in unblocked position. Disengage feed pawls, let spacing drum move back one full space. Both feed pawls should be fully engaged. Pull back extension link to blocked position on blocking lever. Trip spacing clutch stop lever and slowly rotate main shaft and spacing clutch until blocking lever is just tripped, allowing extension link to move forward. At this point, some portion of clutch disc stop-lug should be aligned with rear surface of spacing shaft gear. Take up play in spacing shaft towards rear of unit.

**To Adjust**

Trip spacing clutch and rotate clutch until middle of stop-lug is in line with rear surface of spacing shaft gear. If blocking lever trips too soon, first adjust the pawl adjusting plate to left until blocking lever can be placed in blocked position on extension link. Slowly move adjusting plate to right, with left screw loosened, until blocking lever just trips. When adjusting for trip-off point, take care that blocking lever is cammed down by tab stop and not pulled or pushed out of blocked position when prying adjusting plate. Recheck trip-off point against position of clutch stop-lug as before.

**Note:** After obtaining trip-off point of blocking lever, continue rotating spacing clutch to full stop position. Tab pawl should be right of tab stop. When extension link is moved to rear, blocking lever should move to blocked position. If tip of pawl should remain on end of tab stop, readjust pawl to right until there is

Min 0.003 inch---Max 0.008 inch  
clearance between right surface on tab stop and left edge on pawl tip.



## 3.21 Horizontal Tabulator Mechanism (continued)

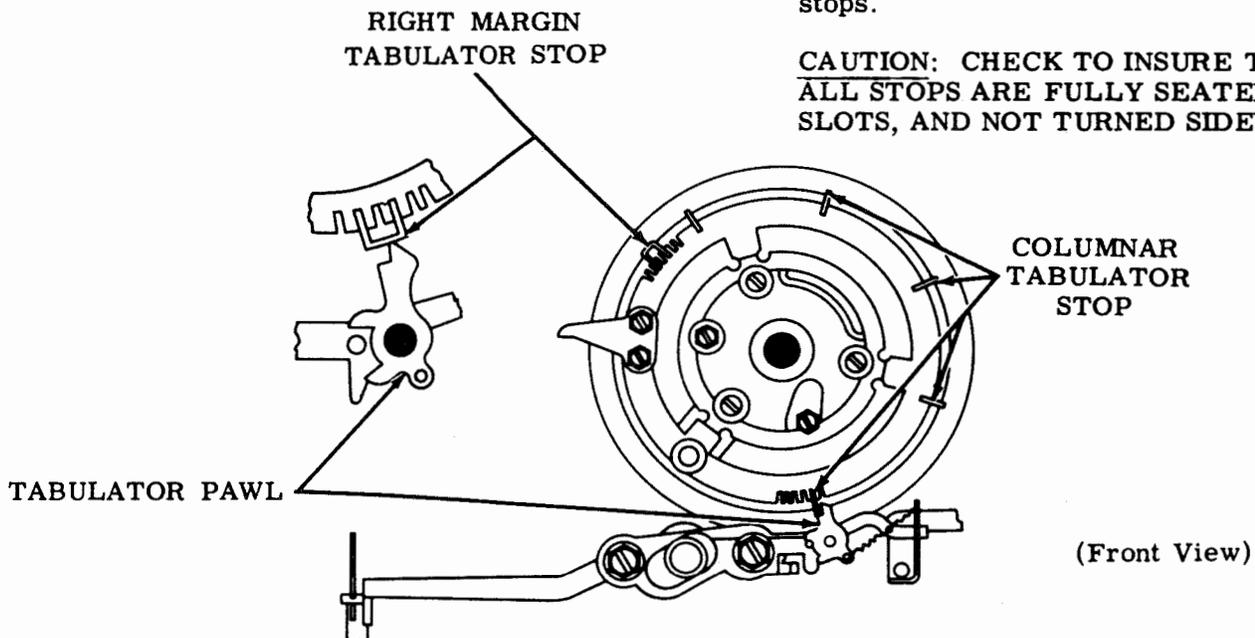
**(C) RIGHT MARGIN TABULATOR STOP**  
**(WITH WIDE SHELF)****Requirement**

Check right margin and tabulator pawl adjustments. Position printing carriage at right margin (spacing cutout operated). Insert stop with wide shelf in slot immediately to left of pawl. Shelf should extend to right so pawl rests on it.

**(A) TABULATOR STOPS SETTING****Requirement**

To move stops, hook small spring hook in hole in stop and pull straight out from drum. Slide stop on spring while continuing to pull out from drum. Position drum to facilitate moving stops.

**CAUTION: CHECK TO INSURE THAT ALL STOPS ARE FULLY SEATED IN SLOTS, AND NOT TURNED SIDEWAYS.**

**COLUMNAR TABULATOR STOPS****Requirement**

Place carriage in position to print first character in column. Insert stop in slot immediately to left of tab pawl. To facilitate installation, mark desired slot position, rotate drum to a more accessible position. For slots near left margin, count number of space operations from left margin and place stop in corresponding slot number, beginning with slot no. 1 just to right of roller.

**Note:** When printing forms, check stop settings with relation to columns. Corresponding stops on all machines connected in a circuit must be same number of spacing operations from left margin.

3.22 Transmitter Distributor Transfer Control Contacts

(D) CONTACT ASSEMBLY BRACKET (PRELIMINARY)

Requirement (Not Illustrated)  
 Operating lever unoperated. Clearance between stud on operating lever and long contact spring  
 Min 0.020 inch---Max 0.025 inch

To Adjust  
 Position contact assembly bracket with mounting screws loosened. The bracket pivots about a pin at upper end of bracket.

(E) TRANSMITTER CONTROL CONTACT GAP

Requirement (Not Illustrated)  
 Operating lever in operated position.  
 Min 0.010 inch---Max 0.015 inch between normally closed contacts.

To Adjust  
 Bend stiffener..

(B) NORMALLY OPEN CONTACT SPRING

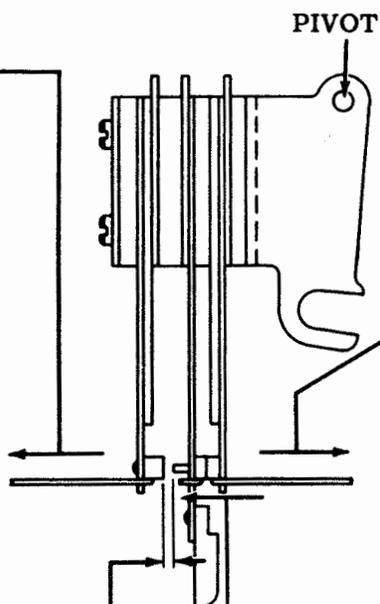
Requirement  
 Operating lever unoperated  
 Min 1 oz---Max 2 oz to just move short contact spring away from stiffener.

To Adjust  
 Bend short contact spring.

(C) NORMALLY CLOSED CONTACT SPRING

Requirement  
 Operating lever operated.  
 Min 2 oz---Max 3 oz to just move short contact spring away from stiffener.

To Adjust  
 Bend short contact spring.



(F) NORMALLY OPEN CONTACT GAP

Requirement  
 Operating lever unoperated.  
 Min 0.010 inch---Max 0.015 inch between normally open contacts.

To Adjust  
 Bend stiffener.

(A) TRANSFER CONTACT SPRING

Requirement  
 Operating lever unoperated.  
 Min 2-1/2 oz---Max 3-1/2 oz to just open contacts.

To Adjust  
 Bend long contact spring.

(G) CONTACT ASSEMBLY BRACKET (FINAL)

Requirement  
 Operating lever unoperated. There should be some clearance between stud on operating lever and long contact spring.

To Adjust  
 Remake adjustments (D), (E) and (F).

3.23 Transmitter Distributor Transfer Control Contacts (Later Design)

(A) TRANSFER CONTACT SPRING

Requirement

With the operating lever in the unoperated position, hook scale over the transfer contact swinger and pull at right angle to it.

Min 2 oz---Max 3 oz  
to just open the contacts.

To Adjust

Bend the contact swinger spring.

(B) NORMALLY OPEN CONTACT SPRING

Requirement

With the operating lever in the unoperated position, hook scale over the short contact spring just above the contact point and pull at right angles to it.

Min 1 oz---Max 2 oz  
to just move the short contact spring away from the stiffener.

To Adjust

Bend the short contact spring.

(C) CONTACT SPRING

Requirement

With the transfer contact swinger held away from the extension of the long contact spring, hook scale over the extension and pull at right angles to it.

Min 2 oz---Max 3 oz  
to separate the contact points.

To Adjust

Bend the long contact spring.

(D) CONTACT ASSEMBLY BRACKET  
(PRELIMINARY)

Requirement

With the operating lever in the unoperated position, there should be  
Min 0.020 inch---Max 0.025 inch  
between the stud on the operating lever and the long contact spring.

To Adjust

Position the contact assembly bracket with the mounting screw loosened. The bracket pivots about a pin at the upper end of the bracket.

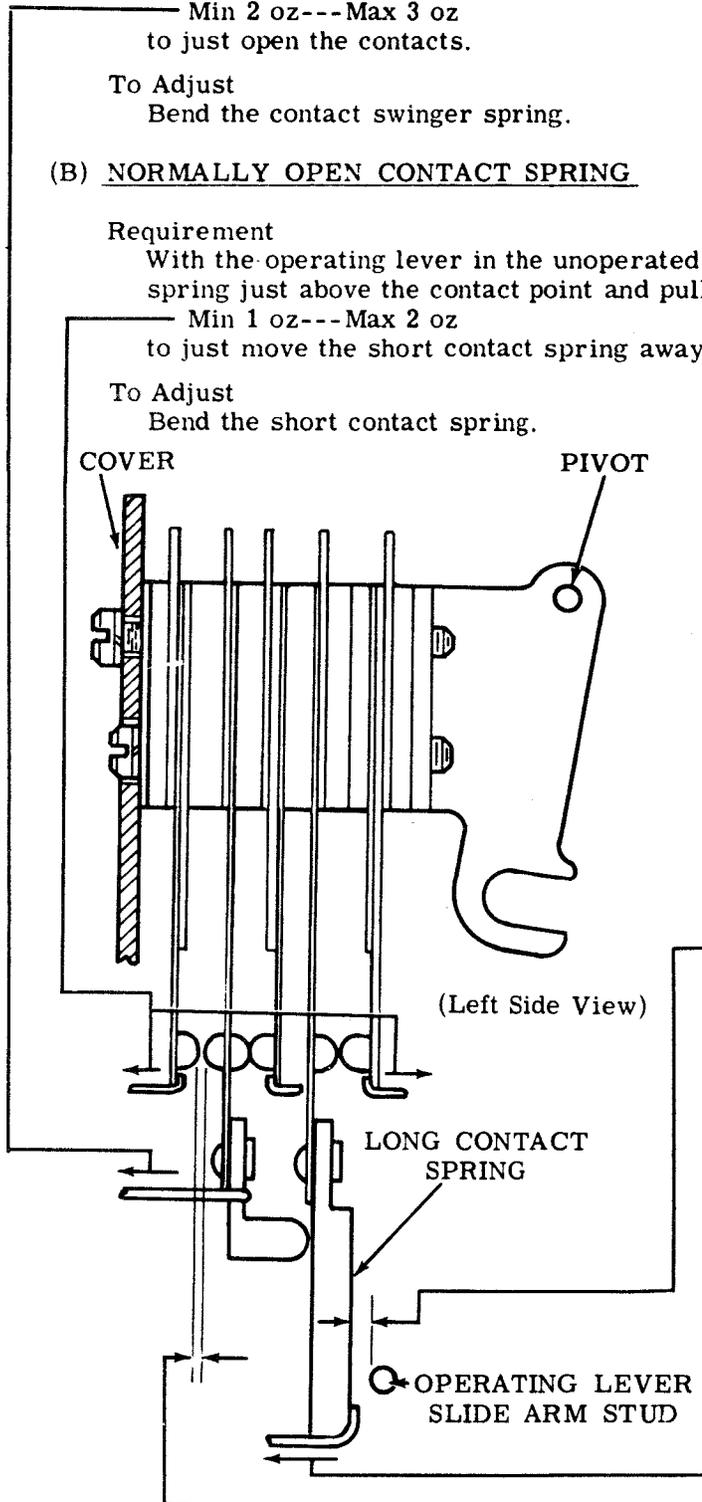
(E) NORMALLY OPEN CONTACT GAP

Requirement

With the operating lever in the unoperated position, there should be  
Min. 0.012 inch---Max 0.020 inch  
between the normally open contacts.

To Adjust

Bend the stiffener.



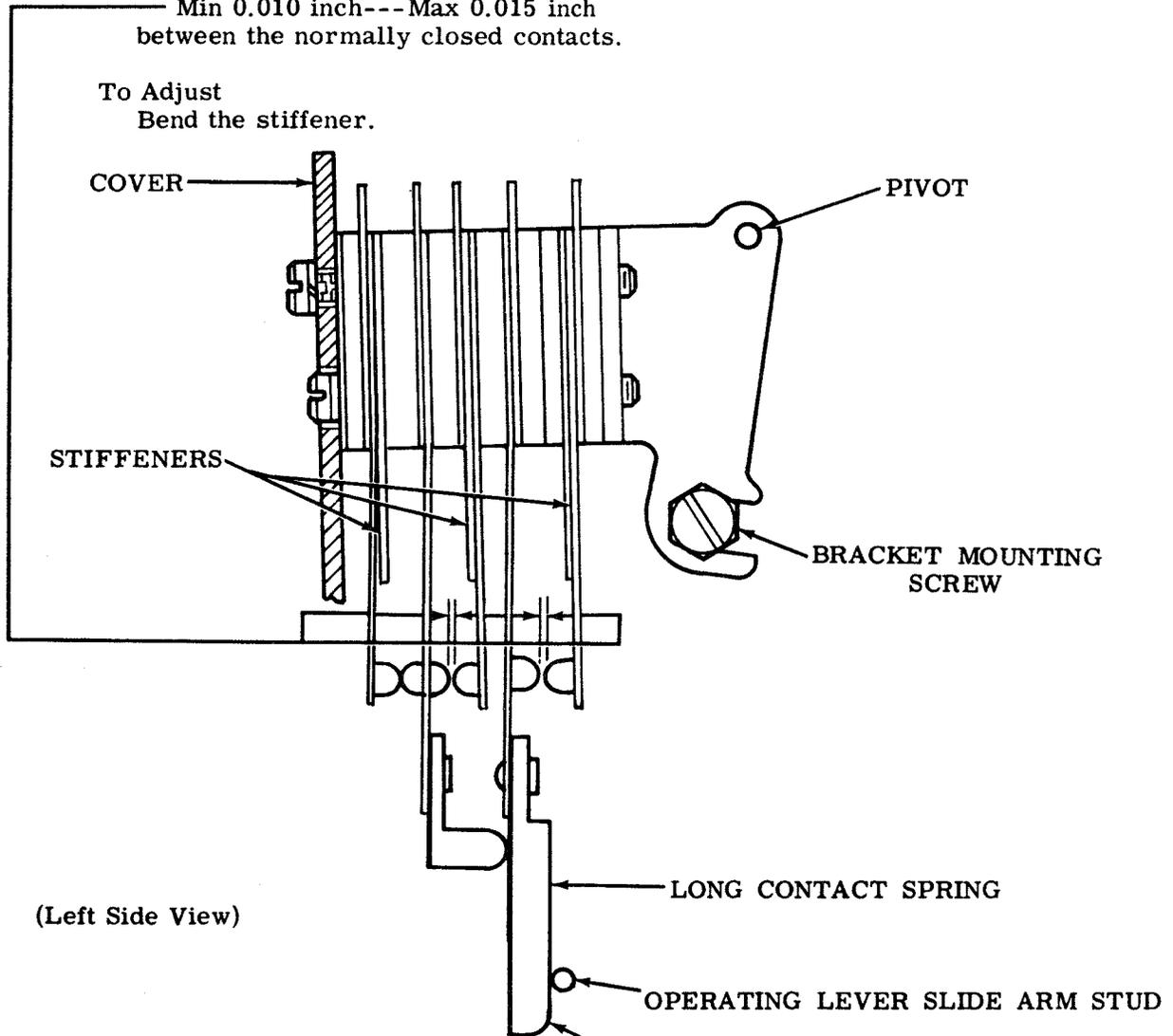
3.24 Transmitter Distributor Transfer Control Contacts (continued)

(A) TRANSMITTER CONTROL CONTACT GAP

Requirement

With the operating lever in the operated position, there should be  
Min 0.010 inch---Max 0.015 inch  
between the normally closed contacts.

To Adjust  
Bend the stiffener.



(B) CONTACT ASSEMBLY BRACKET (FINAL)

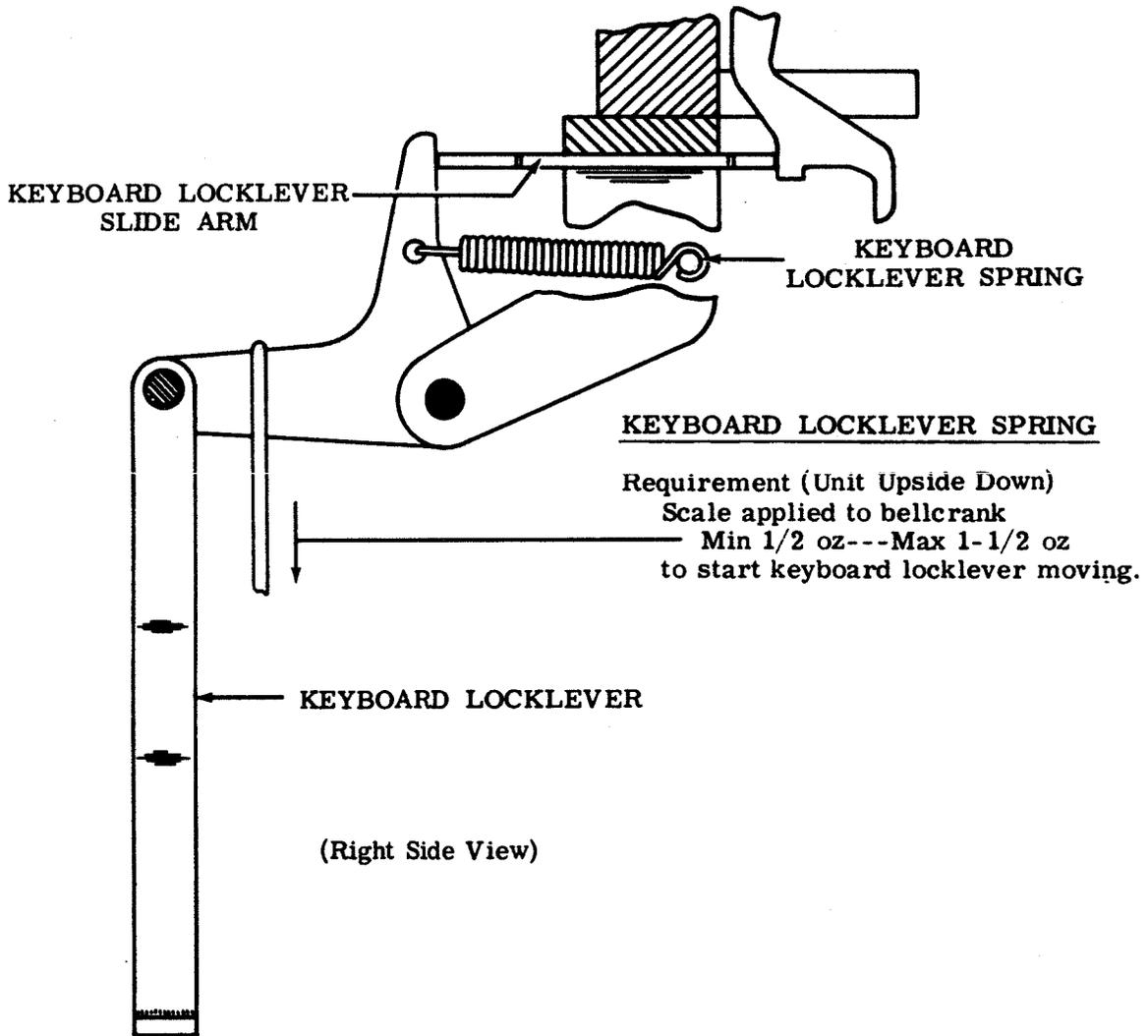
Requirement

With the operating lever in the unoperated position, there should be some clearance between the stud on the operating lever and the long contact spring.

To Adjust

Remake TRANSFER CONTACT SPRING (3.23) and  
TRANSMITTER CONTROL CONTACT GAP adjustments.

3.25 Keyboard Lock Mechanism



3.26 Local Backspace Mechanism

CAMMING BAIL STOP ARM

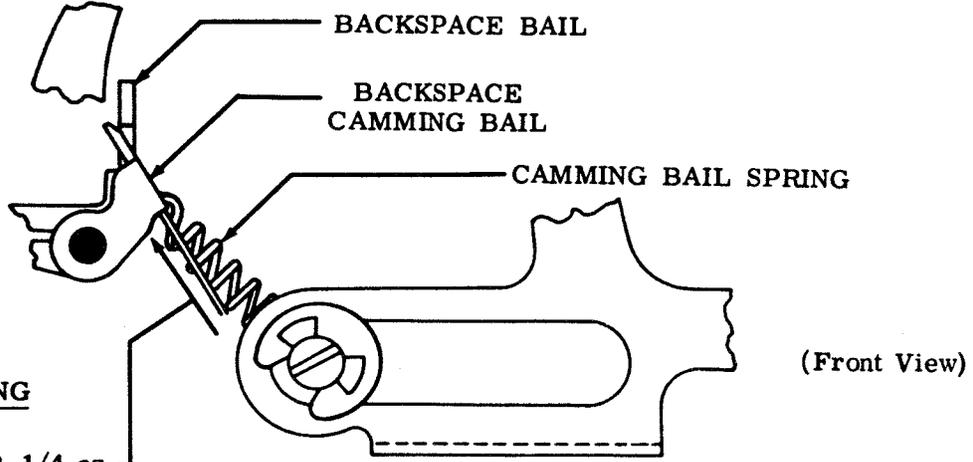
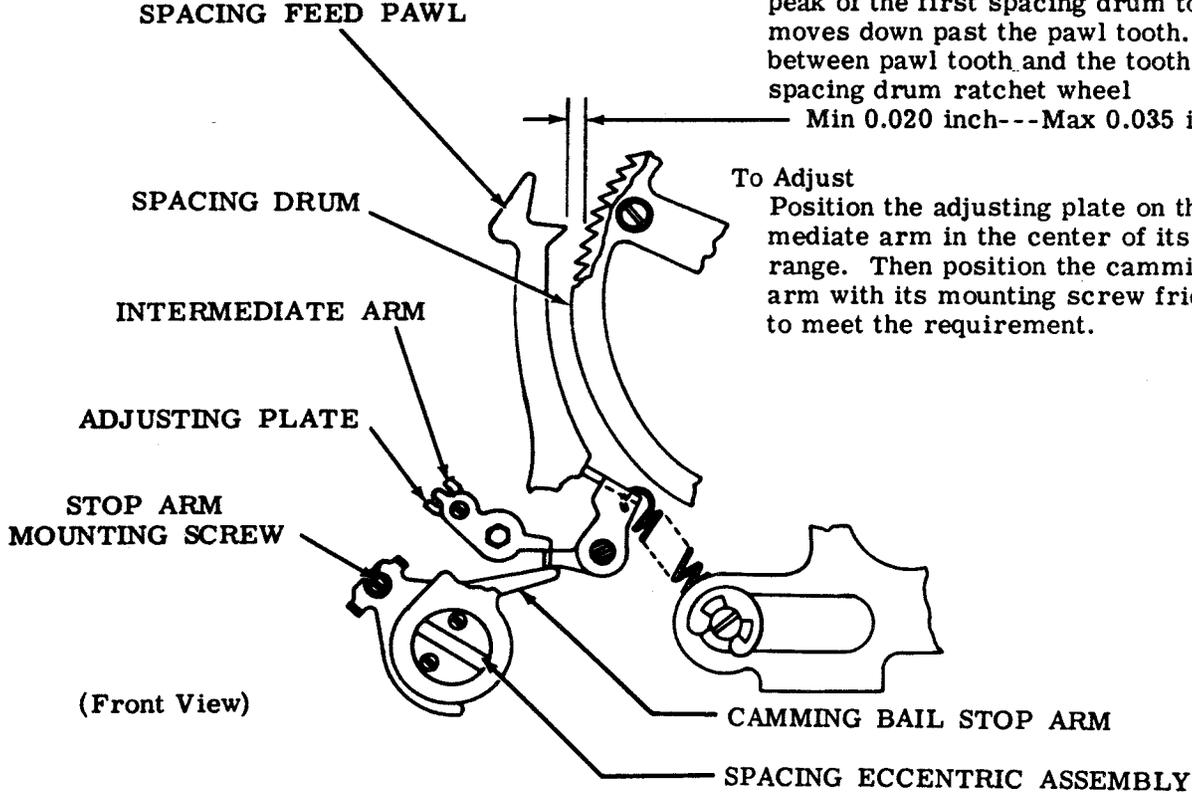
Requirement

Spacing clutch disengaged, front feed pawl in lower position, backspace bail held operated, clutch tripped and main shaft rotated until the front feed pawl tooth is opposite the peak of the first spacing drum tooth that moves down past the pawl tooth. Clearance between pawl tooth and the tooth on the spacing drum ratchet wheel

Min 0.020 inch---Max 0.035 inch

To Adjust

Position the adjusting plate on the intermediate arm in the center of its adjusting range. Then position the camming bail stop arm with its mounting screw friction tight to meet the requirement.



CAMMING BAIL SPRING

Requirement

Min 1 oz---Max 2-1/4 oz to start bail moving.

Note: See appropriate section for related keyboard adjustments.

3.27 Vertical Tabulator Mechanism

(C) FORM START GEAR PLAY

Requirement

Barely perceptible backlash between idler gear and form start gear.

To Adjust

Position gear pivot post with nut loosened.

Note: Gears should mesh accurately when checked at 3 equal distances around circumference of gear.

(E) INDEXING DISC

Requirement

Clearance between form-out stop plate and follower should be

Min 0.020 inch---Max 0.040 inch

To Check

Line feed clutch disengaged. Stop plate adjacent to follower. Slack in gears taken up to make gap a maximum.

To Adjust

Pull gear out of engagement with idler gear. Turn hand wheel clockwise until stop plate just operates the follower, then engage first tooth on idler. Position indexing disc with three mounting screws loosened.

(D) BLOCKING LEVER

See 3.28.

(A) VERTICAL TABULATOR SLIDE RETAINER

Requirement

Clearance between vertical tab slide and retaining edge of retainer should be

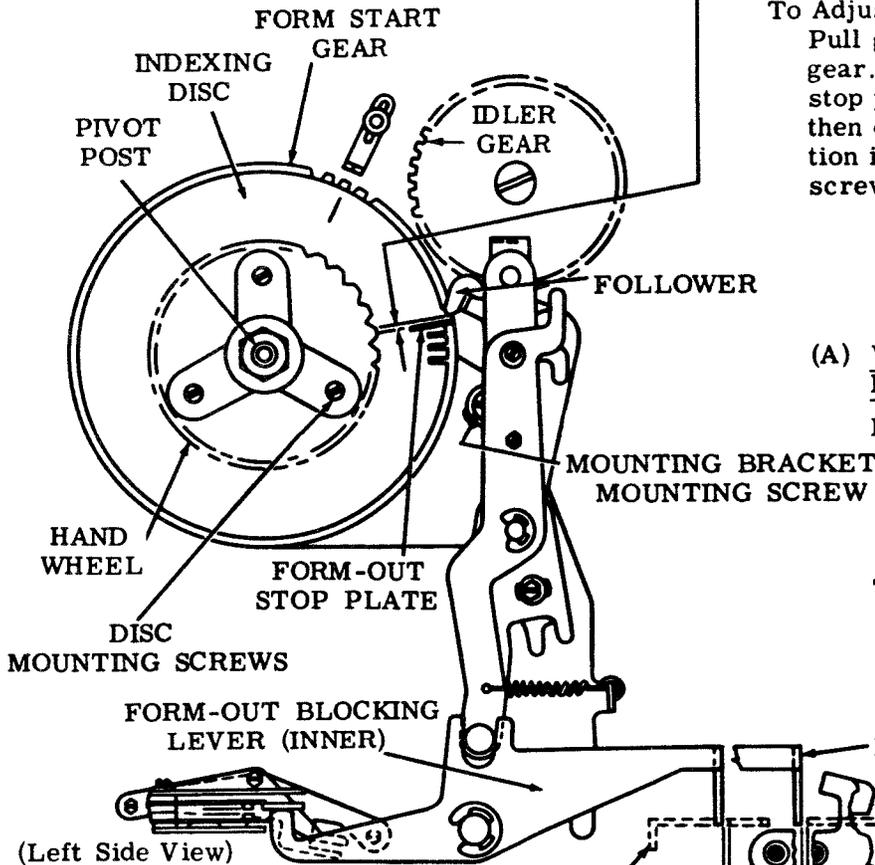
Min some---Max 0.012 inch

To Adjust

Position retainer forward and locate it up or down with mounting screws loosened.

VERTICAL TAB BLOCKING BLOCKING LEVER (OUTER)

VERTICAL TAB SLIDE RETAINER



(B) MOUNTING BRACKET

(1) Requirement

Clearance between form-out blocking lever (inner lever) and form-out slide  
Min some---Max 0.020 inch

To Check

Select FORM-OUT (CONTROL L) code combination, hold stripper slide bail to the rear of unit and rotate main shaft until form-out slide is in most forward position. Take up play in form-out blocking lever to make clearance minimum.

(2) Requirement

Clearance between vertical tab slide and vertical tab blocking lever (outer lever)  
Min 0.002 inch

To Check

Select VERTICAL TAB (CONTROL K) code combination, hold stripper bail to rear of unit and rotate main shaft until vertical tab slide is in most forward position. Take up play in vertical tab blocking lever to make clearance minimum.

To Adjust

Position lower portion of mounting bracket with mounting screws loosened.

3.28 Vertical Tabulator Mechanism (continued)

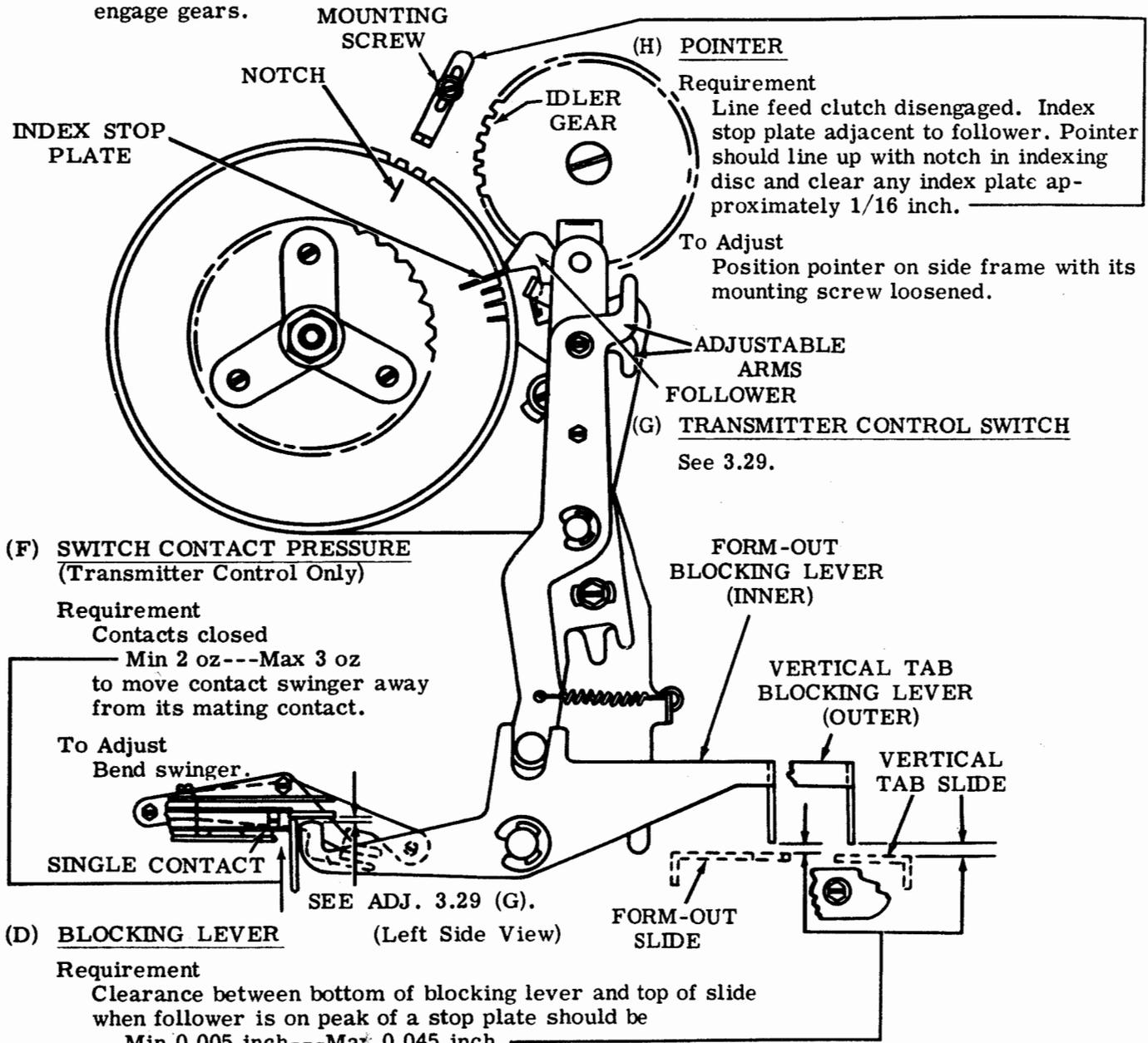
(I) FORM-OUT STOP PLATE POSITION

Requirement

Place a form-out stop plate in the numbered slots on disc corresponding to length of page form to be used. Synchronize form-out device with a form by positioning form so that typing unit will print in first typing line of the form. When typing unit is in stop position, top of ribbon guide should align with bottom of printing line.

To Position

With page form in desired position, disengage form-stop gear from its idler gear. Rotate form-start gear until notch in indexing disc aligns with pointer on side of printer. Re-engage gears.



(H) POINTER

Requirement

Line feed clutch disengaged. Index stop plate adjacent to follower. Pointer should line up with notch in indexing disc and clear any index plate approximately 1/16 inch.

To Adjust

Position pointer on side frame with its mounting screw loosened.

ADJUSTABLE ARMS FOLLOWER

(G) TRANSMITTER CONTROL SWITCH

See 3.29.

(F) SWITCH CONTACT PRESSURE  
(Transmitter Control Only)

Requirement

Contacts closed  
Min 2 oz---Max 3 oz  
to move contact swinger away from its mating contact.

To Adjust  
Bend swinger.

SINGLE CONTACT

SEE ADJ. 3.29 (G).

(D) BLOCKING LEVER

(Left Side View)

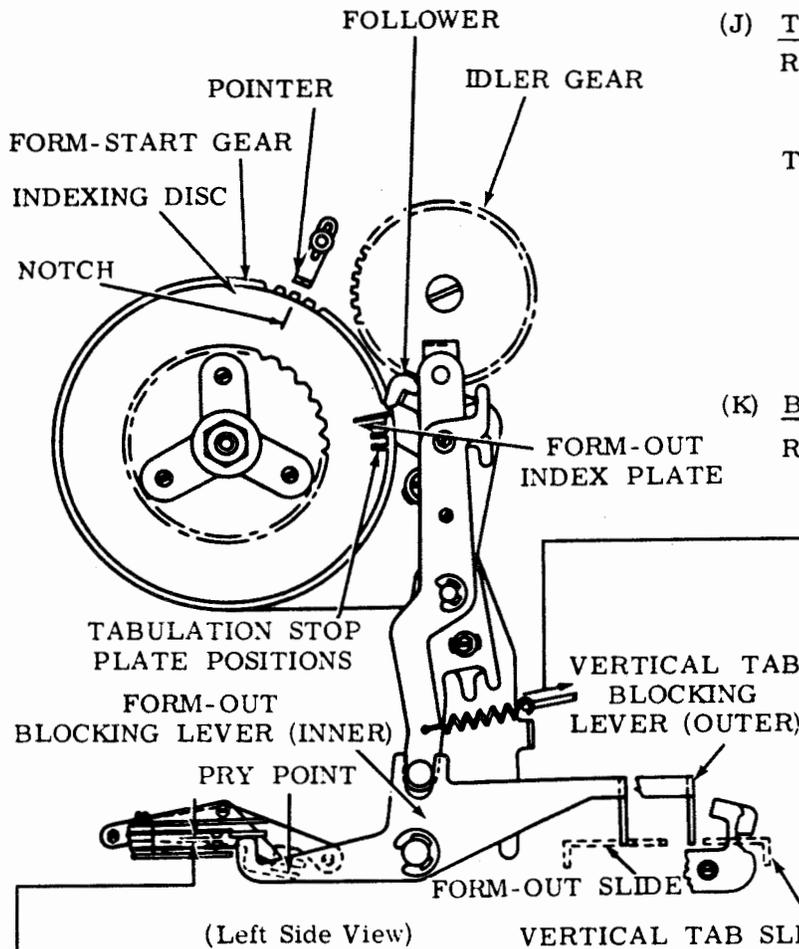
Requirement

Clearance between bottom of blocking lever and top of slide when follower is on peak of a stop plate should be  
Min 0.005 inch---Max 0.045 inch

To Adjust

Trip line feed clutch. Rotate main shaft until follower is on peak of stop plate. Position adjustable arm with mounting screws loosened. Make adjustment for each blocking lever.

3.29 Vertical Tabulator Mechanism (continued)



(J) TABULATION STOP PLATE POSITION

Requirement

With adjustment (I) met, line feed platen to desired first line of printing in that form.

To Position

Place tabulation stop plate in index disc slot to align with follower. Install additional tab stop plates at succeeding desired printing lines within the form. When tabulation at a given point is not needed, rotate tab stop plates on their sides.

(K) BLOCKING LEVER SPRING

Requirement

With spring unhooked and blocking lever on top of slide.

Min 9 oz---Max 11 oz to pull respective spring to position length.

LINE FEED CLUTCH TRIP LEVER SPRING

See 2.23.

VERTICAL TAB BAIL SPRING

See 3.07.

FORM-OUT PAWL SPRING

See 3.07.

FUNCTION CONTACT SPRING

See 2.65.

(G) TRANSMITTER CONTROL SWITCH (SINGLE CONTACT TYPE)

(1) Requirement

With control contacts open clearance between contacts should be Min 0.010 inch---Max 0.020 inch

To Check

Select form-out code. Rotate main shaft until form-out slide is in most forward position and form-out blocking lever drops behind its slide.

(2) Requirement

Same as Requirement (1)

To Check

Select vertical tab code. Rotate main shaft until vertical tab slide is in most forward position and vertical tab blocking lever drops behind its slide.

(3) Requirement

With transmitter control contacts closed, there should be some clearance between insulator tip of swinger and lobes of both form-out and vertical tab blocking levers. (See figure in 3.28.)

To Check

Rotate main shaft until both form-out and vertical tab blocking levers are resting on top of slides.

To Adjust

Position switch assembly at pry point with center mounting screw loosened.

3.30 Transmitter Control Contacts (Later Design)

(A) SWITCH CONTACT PRESSURE

Requirement

With the break (lower) contacts closed and the make contacts open, it should require

Min 20 grams---Max 25 grams

to move the contact swinger away from its mating break contact.

To Adjust

Bend the swinger until the requirement is met.

(B) NORMALLY OPEN CONTACT GAP

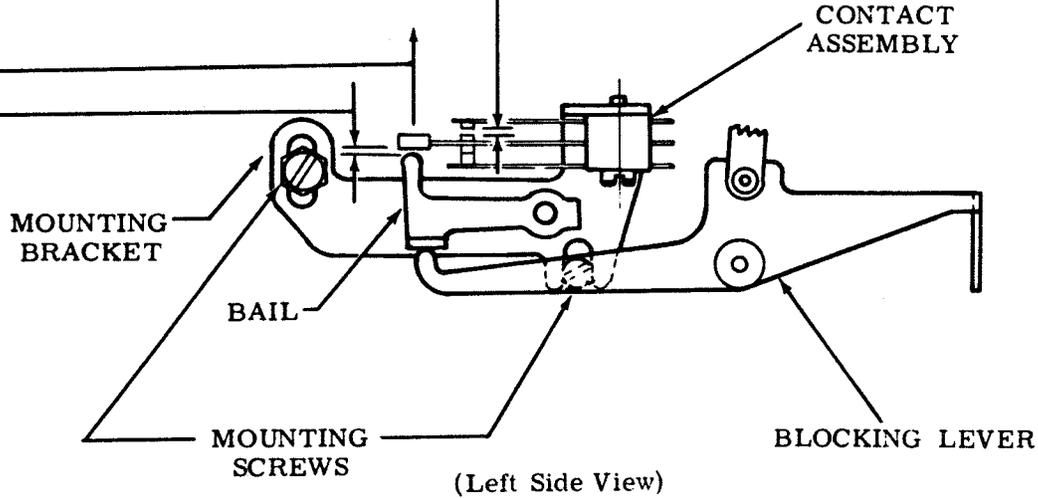
Requirement

The contact gap between the swinger and the make (upper) contact should be

Min 0.008 inch---Max 0.020 inch

To Adjust

Bend the make contact spring until the requirement is met.



(C) CONTACT BRACKET

Requirement

Rotate the main shaft until both the form-out and vertical tab blocking levers are unoperated (resting on top of the slides). The transmitter control contacts (lower set) should be closed and there should be

Min 0.005 inch---Max 0.015 inch

between the insulator pad of the swinger and the lobe of the bail.

To Adjust

With mounting screws friction tight, position mounting bracket. Tighten screws.

3.31 Upper Solenoid (For Applicable Units)

UPPER SOLENOID

Requirement

With the solenoid held in the energized condition, position the solenoid so that there is

Min 0.060 inch---Max 0.080 inch between the solenoid bail stop and the codebar detent housing.

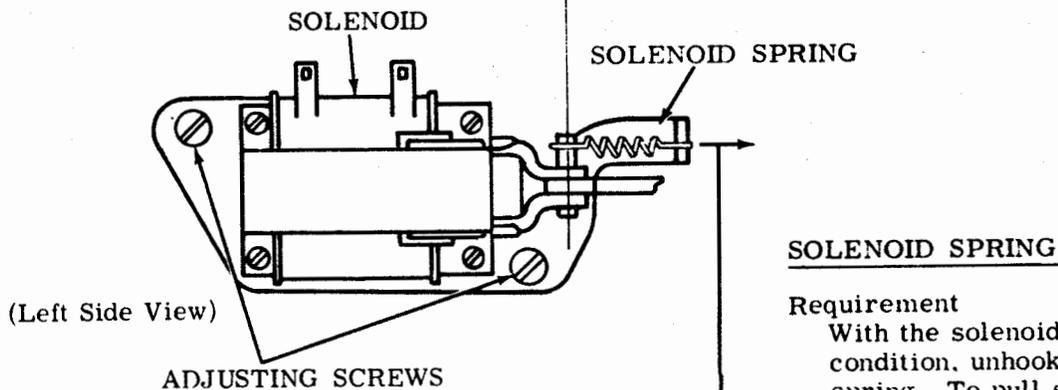
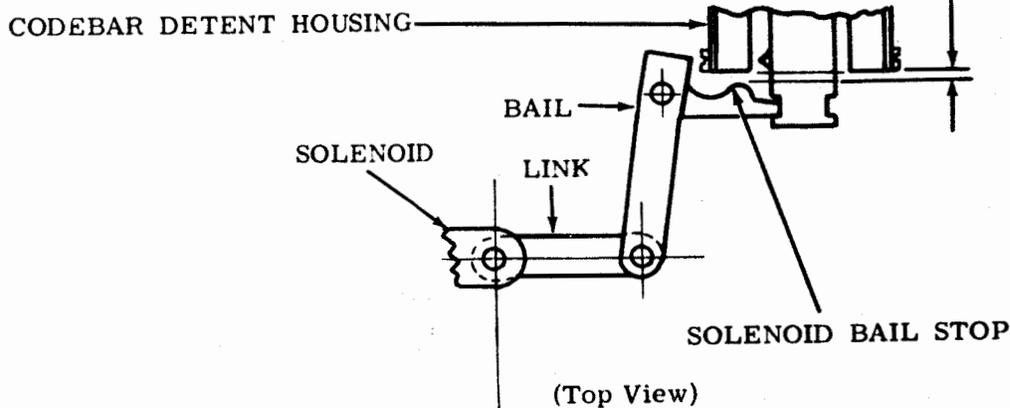
Note: Take up play in bail to the left to make this clearance a maximum.

To Adjust

Loosen the two solenoid adjusting screws and position the solenoid to meet the requirement.

To Check

Apply 110 volts ac to the solenoid. If the solenoid buzzes, the suppression bar is stopped before the solenoid is in its proper energized condition. Refine above.



Requirement

With the solenoid in the de-energized condition, unhook the front end of the spring. To pull spring to installed length

Min 2 oz---Max 3 oz

3.32 Lower Solenoid (For Applicable Units)

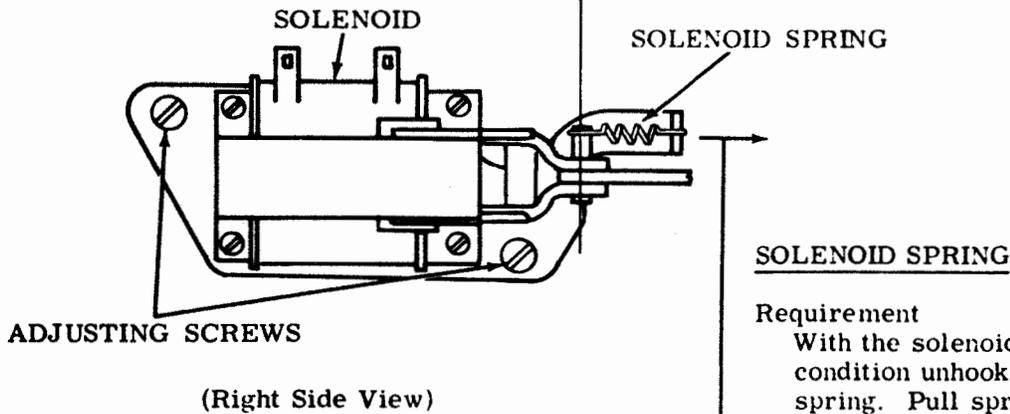
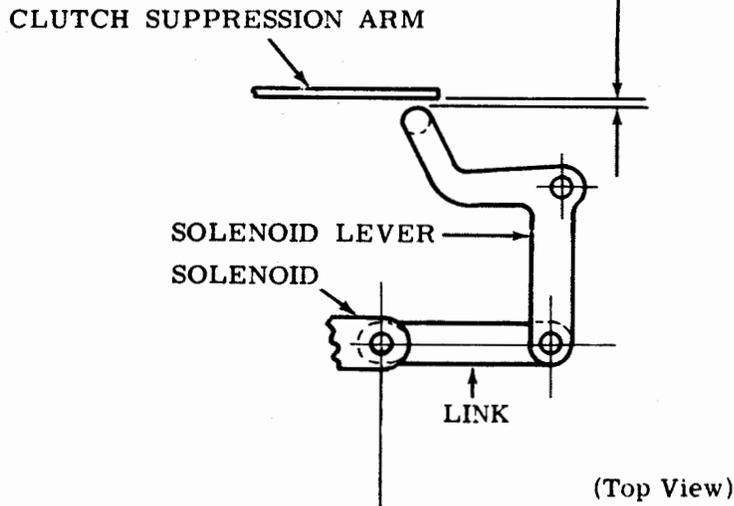
LOWER SOLENOID

**Requirement**

With the solenoid in the de-energized condition there should be  
Min 0.030 inch---Max 0.070 inch  
between the clutch suppression arm and the end of the solenoid  
lever.

**To Adjust**

Loosen the two solenoid adjusting screws and position the  
solenoid to the requirement.



**Requirement**

With the solenoid in the de-energized  
condition unhook the front end of the  
spring. Pull spring to installed  
length.

Min 2 oz---Max 3 oz

**To Adjust**

Replace the spring.

3.33 Print-Nonprint Solenoid Mechanism

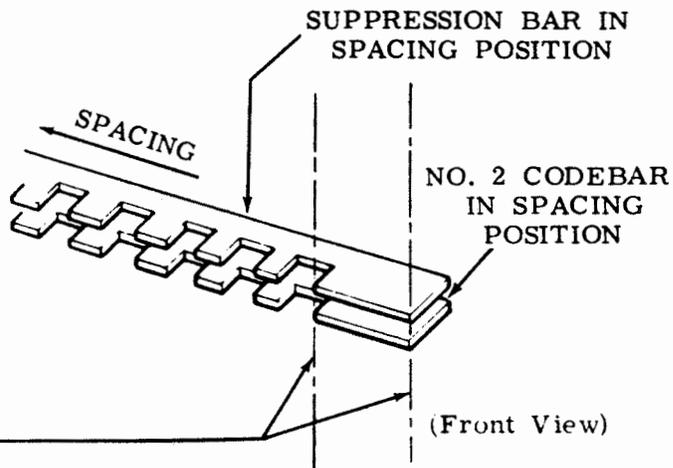
(A) SOLENOID PLUNGER

(1) Requirement

With the solenoid plunger held against the stop inside of the solenoid, the outer edge of the end of the suppression codebar should line up with the outer edge of the end of spacing no. 2 codebar. Also, when the suppression codebar is spacing, the tines of the suppression bar should line up with the tines of the no. 2 codebar. Vertically align either point by eye in both marking and spacing positions.

To Adjust

Loosen the solenoid mounting screws and move the solenoid forward or backward to meet both of these requirements. Check outer edges of the bars and the tine line-up by eye. Check tines by sighting over and through stunt box at rear of unit. Recheck requirement. Tighten screws.



(2) Requirement

With 48 v dc applied to the solenoid, recheck Requirement (1); the suppression codebar should not overtravel when the solenoid is energized.

To Adjust

Same as above.

(B) SOLENOID CONTACT

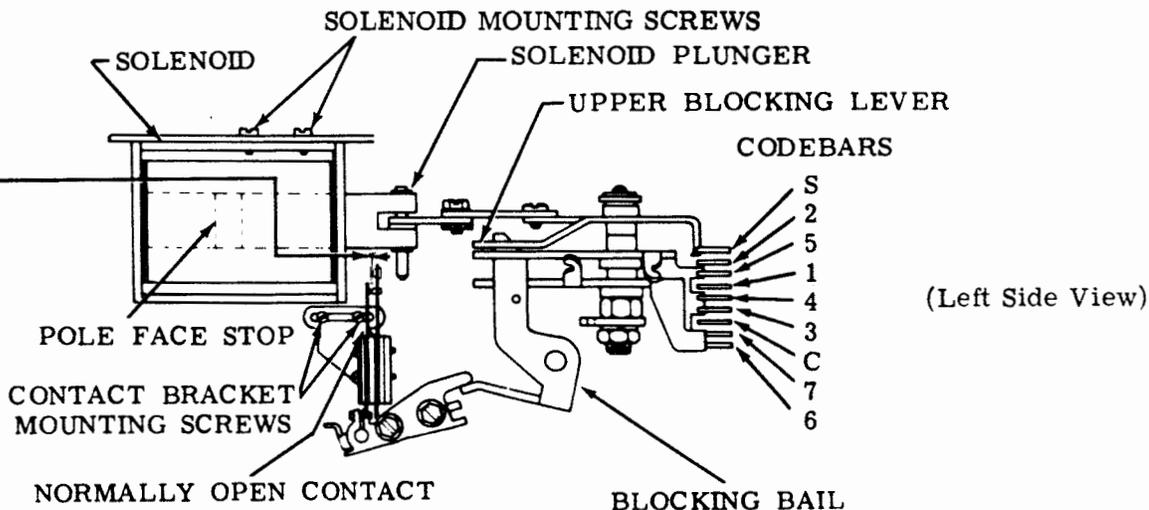
Requirement

With the solenoid de-energized and the plunger in the unoperated position there should be Min 0.010 inch---Max 0.020 inch gap between the contacts.

Note: Open up the contact cover to measure gap and to facilitate the following adjustments. Close contact cover after the requirements are met.

To Adjust

Bend the contact springs to gain the requirement.



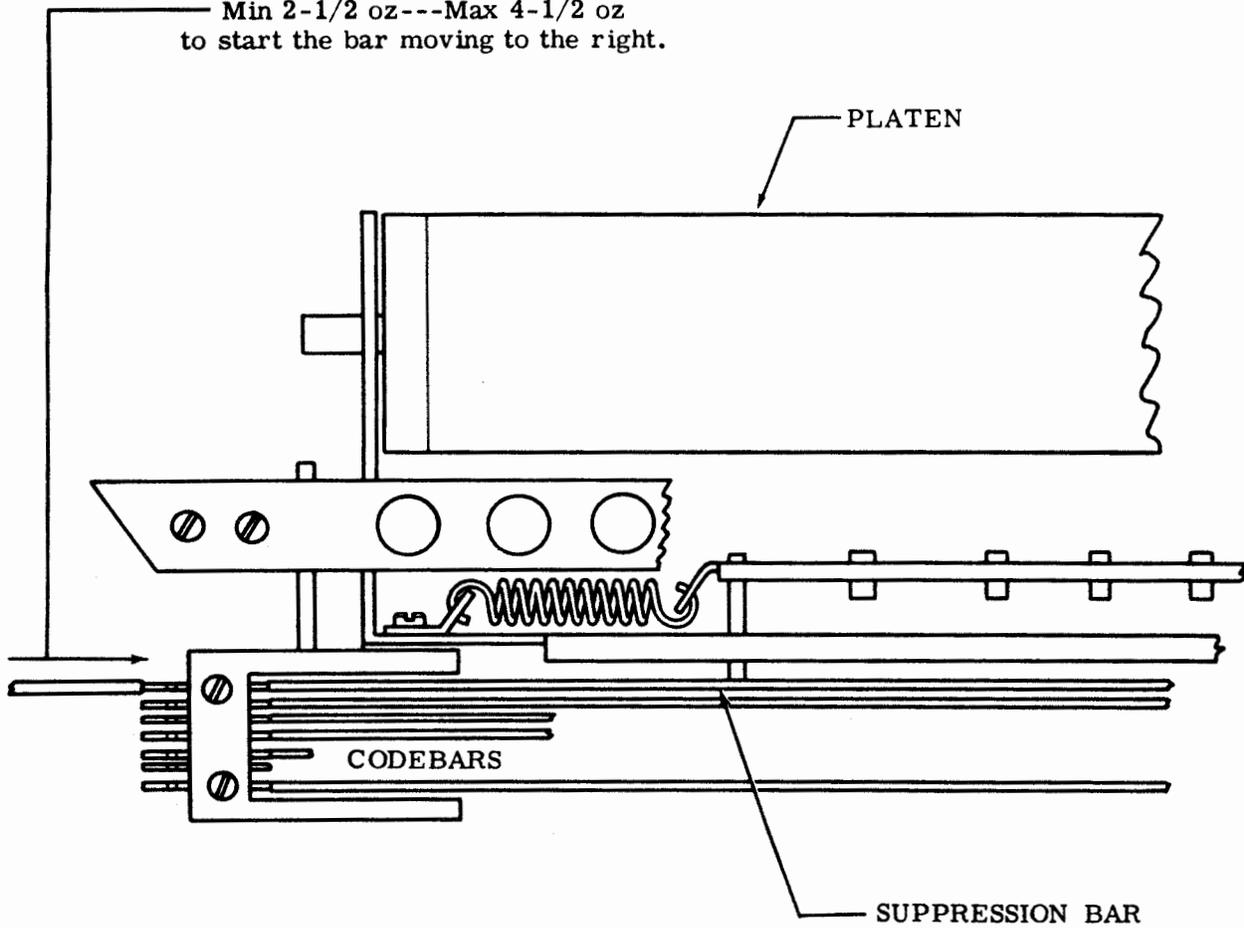
3.34 Print-Nonprint Solenoid Mechanism (continued)

SUPPRESSION BAR RETURN SPRING (FOR UNITS EMPLOYING  
THE PRINT SUPPRESS SOLENOID MECHANISM)

**Requirement**

With the solenoid de-energized and suppression bar moved to the left, push against the left end of the bar and parallel to the bar. All bearing points in solenoid linkage must be free of binds.

Min 2-1/2 oz---Max 4-1/2 oz  
to start the bar moving to the right.



(Front View of Printer)

## 3.35 Print-Nonprint Solenoid Mechanism (continued)

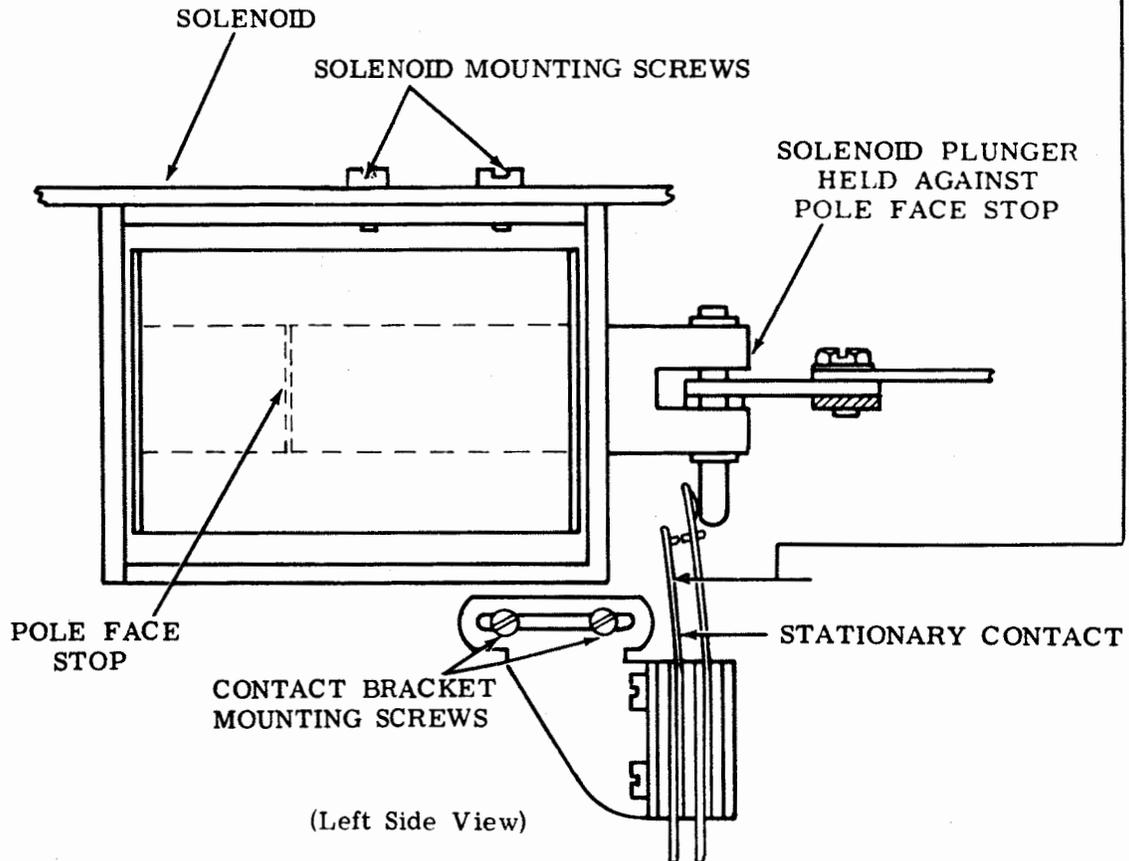
SOLENOID ENERGIZED**Requirement**

With the solenoid plunger held against the solenoid pole face stop, the solenoid pin should operate the contact swinger and close the contacts. It should require a force of at least

Min 2 oz \_\_\_\_\_  
to separate the contacts.

**To Adjust**

Loosen the contact bracket mounting screws and position the bracket so that the solenoid pin strikes the contact button just before the end of the plunger travel. Tighten screws. Bend the stationary contact to meet the requirement. Recheck requirement and then close contact cover.



3.36 Print-Nonprint Solenoid Mechanism (continued)

SOLENOID DE-ENERGIZED

Requirement

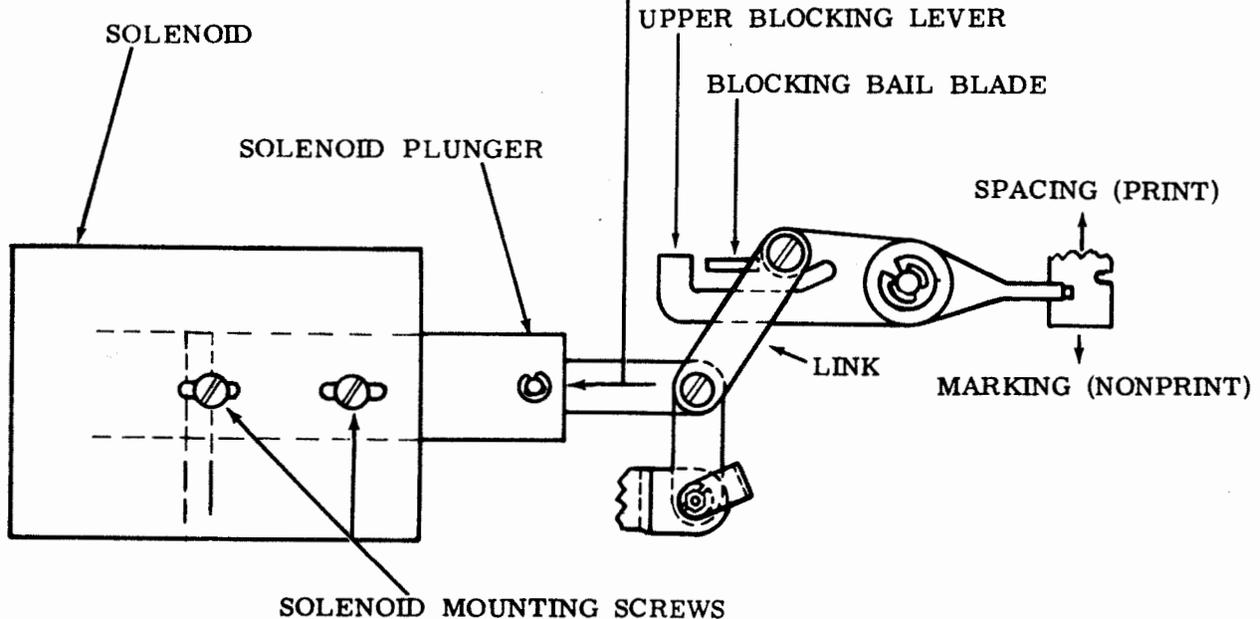
All pivot points on the solenoid linkage must be free of binds. With the solenoid plunger in its unoperated position, a force of no more than

Max 1-1/4 oz

applied to end of the plunger should move the plunger when the suppression bar return spring is removed.

To Adjust

Inspect all pivot points for binds.



(Top View)

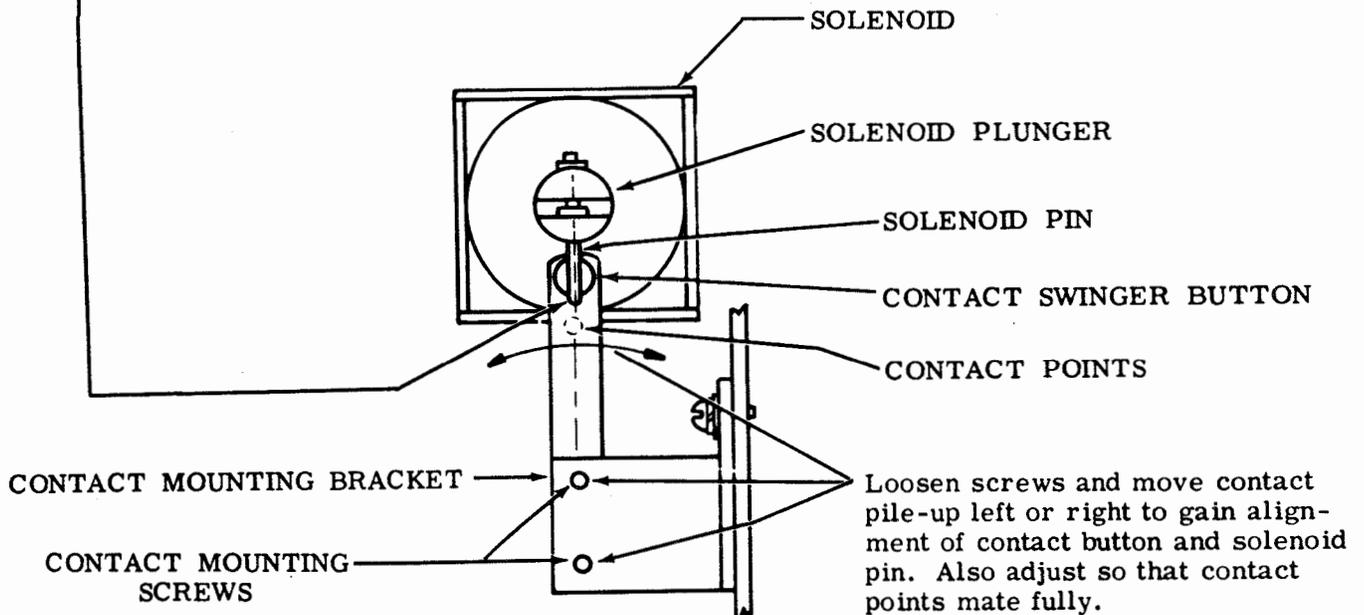
## 3.37 Print-Nonprint Solenoid Mechanism (continued)

CONTACT BUTTON AND SOLENOID PIN ALIGNMENT**Requirement**

The swinger contact button and the solenoid plunger pin should be aligned by eye such that the pin strikes the flat surface of the button.

**To Adjust**

Loosen the contact pile-up mounting screws and move the contacts left or right to gain the alignment of button and pin. Check to see that the contact points mate fully.



(Front View)

**3.38 Timing Contact Mechanism (Operated by Selector)**

**Note 1:** In this text, the letters S, B, and M are used to denote respectively the "swinger", "break" (normally closed with lever riding cam depression) and "make" (normally open; closed only with lever riding cam peak) contact springs.

**Note 2:** When making adjustments (F) through (H) make certain the "S" spring insulator is clear of the operating lever.

**Note 3:** Parts should be well aligned and free of sharp bends. Contact points misalignment should not exceed 1/4 the diameter of points.

**(A) "M" CONTACT SPRINGS**

**Requirement**

Min 4 oz  
to move contact spring away from its stiffener.

**To Adjust**

Bend contact spring.

**(B) "B" CONTACT SPRINGS**

**Requirement**

Min 4 oz  
to move contact spring away from its stiffener.

**To Adjust**

Bend contact spring.

**(C) "S" - "B" CONTACT SPRINGS**

**Requirement**

Min 3-1/2 oz---Max 4-1/4 oz  
to move swinger contact away from normally break contact.

**To Adjust**

Bend swinger contact spring.

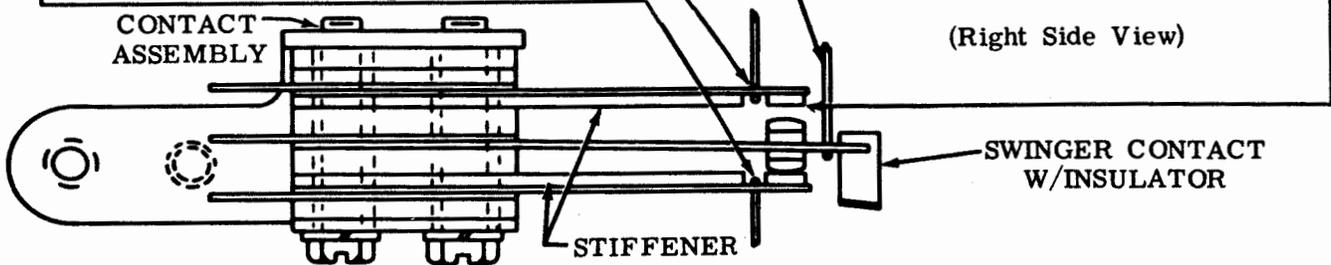
**(E) "S" - "M" CONTACT GAP**

**Requirement**

Min 0.012 inch---Max 0.020 inch

**To Adjust**

Bend stiffener.



(Right Side View)

**(D) TWIN "B" CONTACT SPRINGS**

**(1) Requirement**

Both contacts should open at the same time.

**(2) Requirement**

The insertion of an 0.008 inch gauge between one pair of points should not cause the other pair to separate.

**To Adjust**

Bend springs or slightly twist stiffener. Recheck contact pressure.

**SWINGER CONTACT W/INSULATOR**

**(F) TWIN SPRINGS ("M" CONTACTS)**

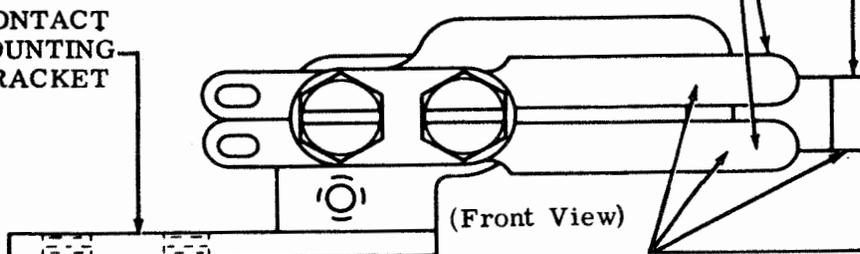
**Requirement**

Both make and swinger contacts should make approximately the same time (within 0.006 inch as gauged by eye).

**To Adjust**

Bend make contact springs or slightly twist stiffener.

**CONTACT MOUNTING BRACKET**



(Front View)

3.39 Timing Contact Mechanism (Operated by Selector) (continued)

(H) CONTACT ASSEMBLY POSITION

(1) Requirement

Set range scale at 50 (important).  
Rotate shaft so operating lever is on lowest part of cam.

To Adjust

With mounting screws loosened position contact assembly by means of its oversize mounting holes so lever can be moved

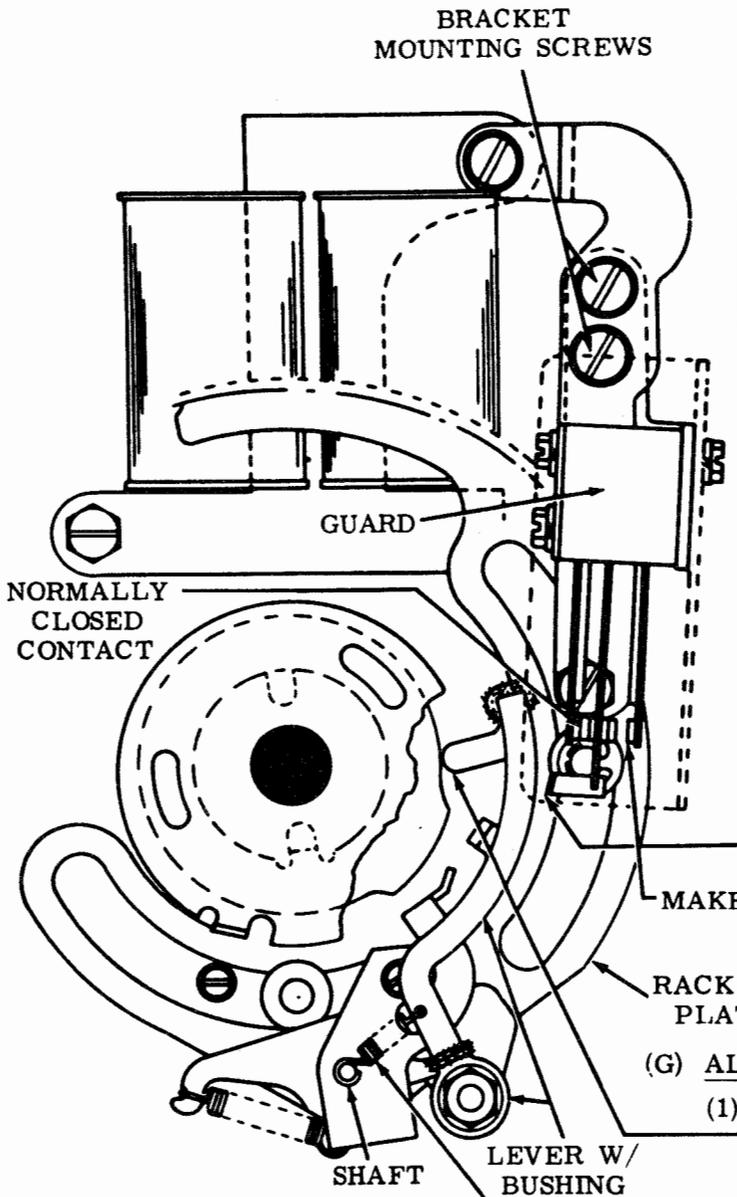
Min 0.002 inch---Max 0.006 inch before it touches the swinger spring, and so first touch is on lower half of spring stud wearing plate.

(2) Requirement

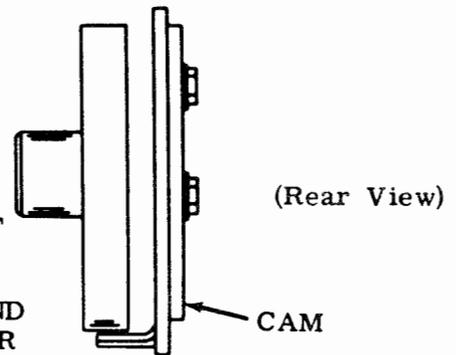
(At higher settings, movement will be larger: disregard.) Tighten screws and recheck. Rotate shaft and note the high part of cam causes both "M" contacts to move at least

Min 0.012 inch

If this contact movement is not met at setting 60 and 90, check for insecure parts and refine contact gap between swinger and make contact. If still not met, replace range scale sector rack.



(Right Side View)



(Rear View)

(G) ALIGNMENT OF OPERATING LEVER WITH CAM

(1) Requirement

Operating lever's full thickness should ride cam.

To Check

Take up all cam endplay toward selector to clutch drum, all operating lever endplay (at its bearing) in opposite direction. Observe lever and cam for full engagement.

(2) Requirement

Lever should not exert pressure against face of clutch disc.

To Adjust

Refine clutch drum endplay.

(I) OPERATING LEVER SPRING

Requirement

The spring should hold operating lever against cam with light pressure. With spring removed

Min 2 oz---Max 3 oz  
to stretch spring to 5/8 inch length.

3.40 Timing Contact Mechanism (Operated by Selector) (continued)

(A) TIMING VERIFICATION, 11.00 UNIT CODE

Note 1: DXD means distortion test set.

→ Note 2: Requirements (1), (2), or (4), may be omitted if the stroboscopic tests of Requirement (3) are to be made.

(1) Requirement

TP174451 Cam: With range scale at 45, manually rotate main shaft with selector armature spacing. The M contacts should close soon after, but not before, the locklever blocks the selector armature after the no. 8 selection. Continue rotation into the next cycle. With the selector armature marking, note that the M contacts again close and that they open and the B contacts close before the selector clutch slips (it may not latch because of the slow rotation).

(2) Requirement

TP174450 Cam: With range scale at 90 and the selector marking, rotate the shaft and latch the clutch. The M contacts should be closed. Trip the clutch and slowly rotate the shaft. The B contacts close after rotation starts. Repeat at range setting 45.

(3) Requirement

Stroboscopic Tests: Connect the B-S or S-M terminals (as required into a 120 v dc viewing circuit of 11.00 unit DXD or similar stroboscopic test set, 600 opm. Connect the DXD test message output or a comparable signal source in a line circuit to the selector magnets. Set distortion at zero. Synchronize the viewing scale with the transmitted signals. Observe DXD stroboscopic display of signals listed below. Ignore rhythmic shifting of a signal. This shifting occurs because of slight rotational displacement of the motor armature (and of the selector cam) as it encounters loads such as line feed, etc, from one printer cycle to the next. The shifting is exhibited as lighter colored display at the beginning or end of a signal. True readings are at the observed midpoints of shifting areas. If any shift area should be excessive, say over 18 DXD divisions total, it may be indication of binds, slippages, or wear in the machine. Signals should be clear of gaps (except see ++ below) (indicate dirt, chatter, or bounce) after the first ten DXD divisions of closure. Where only one range setting is specified, it indicates that tests at that setting are sufficient to verify performance at other settings.

## 3.41 Timing Contact Mechanism (Operated by Selector) (continued)

<u>Test Conditions</u>		<u>Signal Length in Viewed DXD Divisions</u>	
<u>Cam</u>	<u>Contact Pair</u>	<u>Message Stopped, Marking</u>	<u>Message Running</u>
TP174451	S-M	Dark at range 45	Min 104 at range 90. Begins after 11 of beginning of stop pulse, ends before 148 of stop pulse.
	B-S	1100 at range 45	++890-979
TP174450	S-M	1100 at range 45 & 90	++ Min 148 at range 90. Begins in stop pulse, ends before 48 of #1 pulse.
	B-2	Dark at range 45	++845-948
TP323070	B-S		

++ While viewing DXD, slowly move range scale from 90 to 45. If, at some setting there is within the signal a gap, it should not exceed 8 DXD divisions.

## (4) Requirement

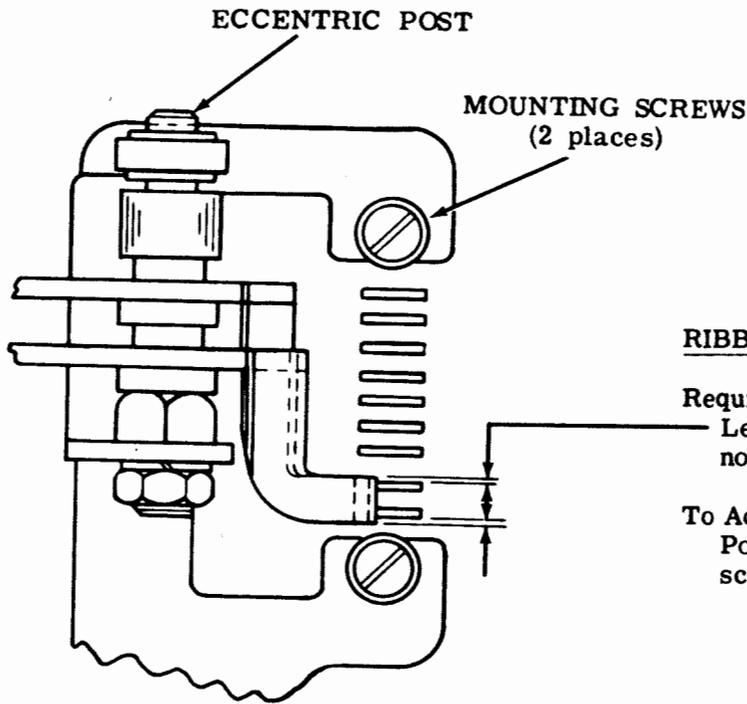
TP323070 Cam: With range scale set at 50 and the clutch latched, the normally closed contact should be closed. Trip the clutch and manually rotate the main shaft. The contact should open after the locklever is in place for the number one selection and close before the locklever is in place for the number five selection.

(B) CORRECTION OF TIMING

Check for the following:

- (1) Wrong cam
- (2) Range scale knob maladjusted
- (3) Contact, lever, and bracket adjustments. Refine if required.
- (4) Parts loose
- (5) Contacts dirty
- (6) Improper test connections
- (7) Improper synchronism of sending and stroboscopic portions of test set. Note that test message is to be sent direct to selector magnets. Introduction of a line relay, contact protection network, or any other condition affecting magnet release time will displace the viewed signals produced by the modification kits.

3.42 Two Color Ribbon Mechanism



(Left Side View)

RIBBON LEVERS

**Requirement**

Lever extensions fully engaged by codebars no. 6 and 7, as gauged by eye.

**To Adjust**

Position contact assembly with mounting screws friction tight.

CONTACT ACTIVATING LEVER

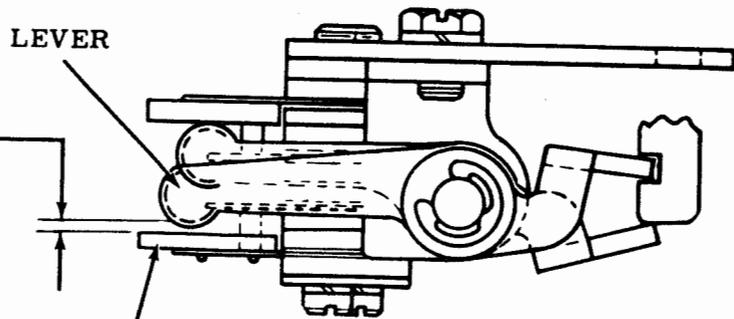
**Requirement**

With codebars no. 6 and 7 in same condition (marking or spacing), the clearance between the contact swinger pad and its respective lever should be

Min 0.010 inch

**To Adjust**

Position eccentric post; keep high part of eccentric toward left of unit.



(Top View)

3.43 Two Color Ribbon Mechanism (continued)

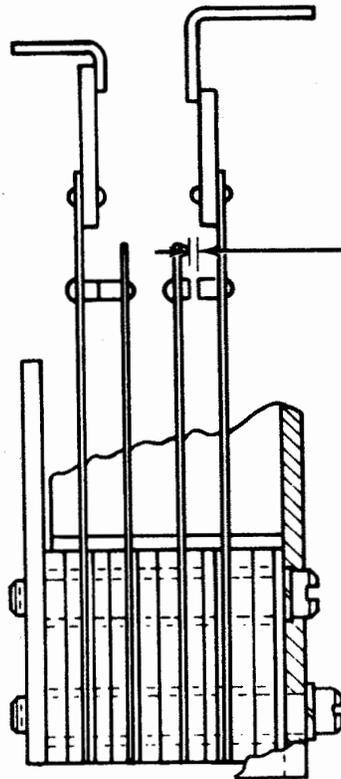
CONTACT SPRING

**Requirement**

To separate the normally closed contacts, it should require  
Min 1-1/2 oz---Max 2-1/2 oz

**To Adjust**

Bend stationary contact spring.



CONTACT GAP

**Requirement**

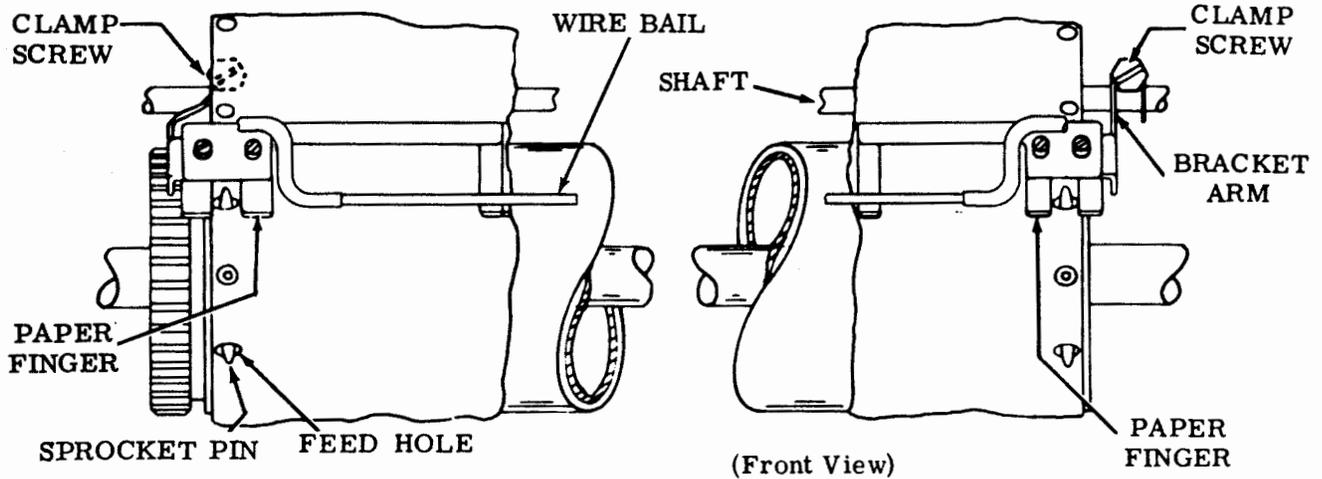
With no. 6 and 7 codebars in opposite conditions (one marking and one spacing), there should be a gap between the contact points  
Min 0.020 inch

**To Adjust**

Refine CONTACT ACTIVATING LEVER (3.42).

(Top View)

3.44 Paper Jam Alarm (Sprocket Feed)



**Note:** Before proceeding with WIRE BAIL adjustment, loosen switch plate mounting screws and rotate switch and latch to a position where they do not interfere with bail. Position the spring post by means of set collar so that spring has some initial tension. Spring post should be approximately 30° from vertical (see drawing, 3.46).

WIRE BAIL

**Requirement**

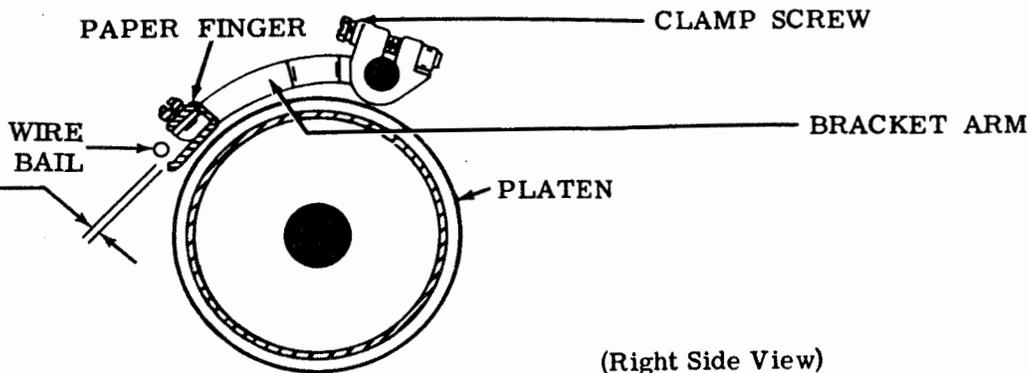
Wire bail should rest on paper fingers approximately in radius of fingers. Wire bail should touch at least one finger with not more than

—Max 0.015 inch clearance between other finger and wire bail.

**To Adjust**

Bend wire bail to meet requirement.

Note: Make sure there is no bind in the bail after making adjustment.



## 3.45 Paper Jam Alarm (Sprocket Feed) (continued)

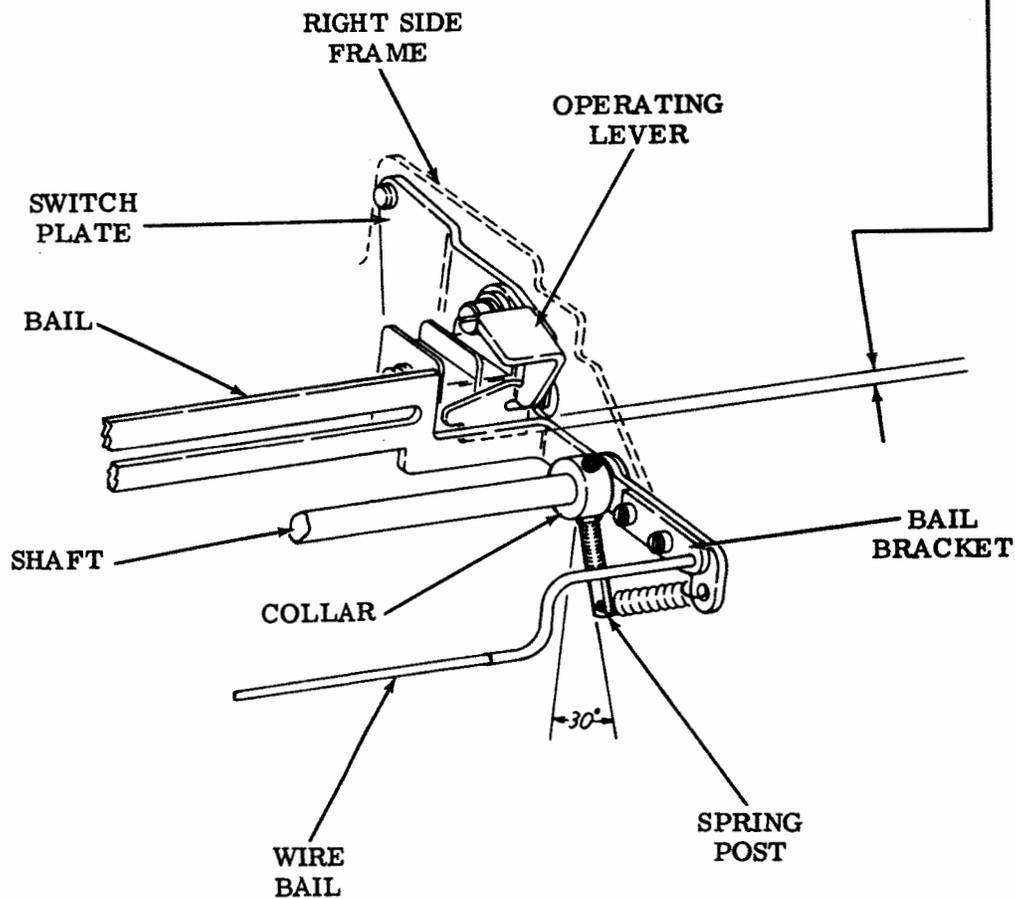
SWITCH POSITION**Requirement**

With wire bail held against paper fingers and operating lever latched behind operating bail, there should be

Min 0.035 inch---Max 0.065 inch \_\_\_\_\_  
between top of bail and bottom of step in lever. Lever should depress switch plungers sufficiently to operate switches.

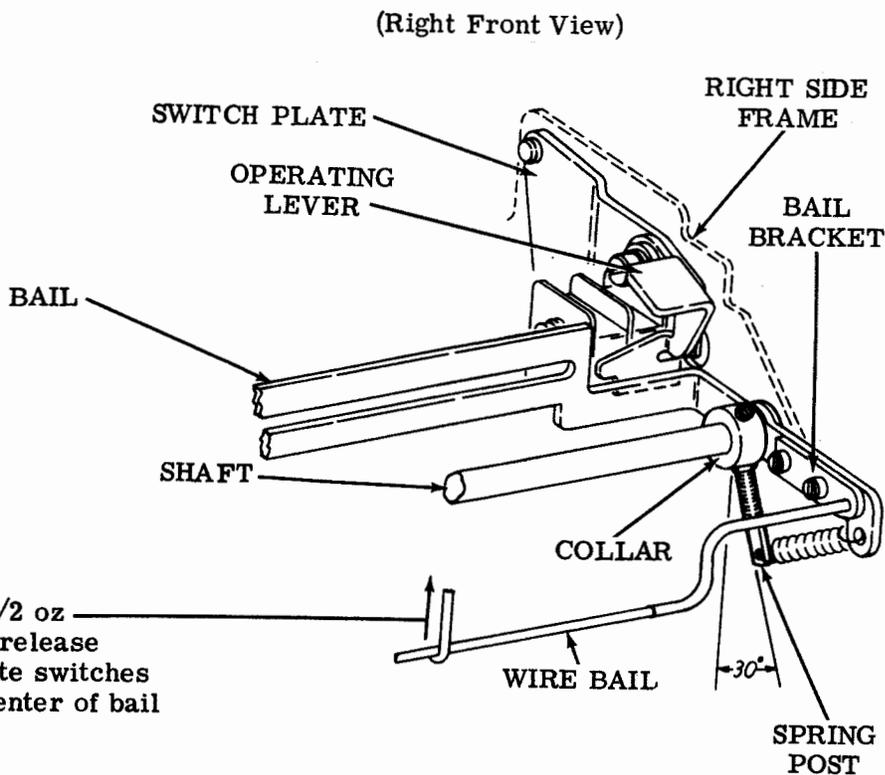
**To Adjust**

Loosen screws and position switch plate. Tighten screws.



(Right Front View)

3.46 Paper Jam Alarm (Sprocket Feed) (continued)



**BAIL SPRING**

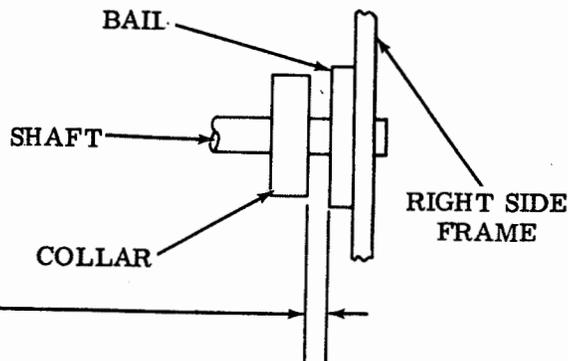
(1) Requirement

It should require

Min 1/2 oz---Max 1-1/2 oz  
to lift bail high enough to release  
operating lever and operate switches  
when scale is hooked to center of bail  
and pulled vertically.

(2) Requirement

Position collar laterally to provide  
Min some---Max 0.006  
endplay for bail.



To Adjust

Loosen setscrew. Position collar to meet  
requirements. Tighten setscrew.

(Right Front View)

Note 1: With play of bail taken to right, left side of bail should clear left paper finger arm.  
Refine left PAPER FINGER (SPROCKET FEED) (2.79) adjustment if necessary.

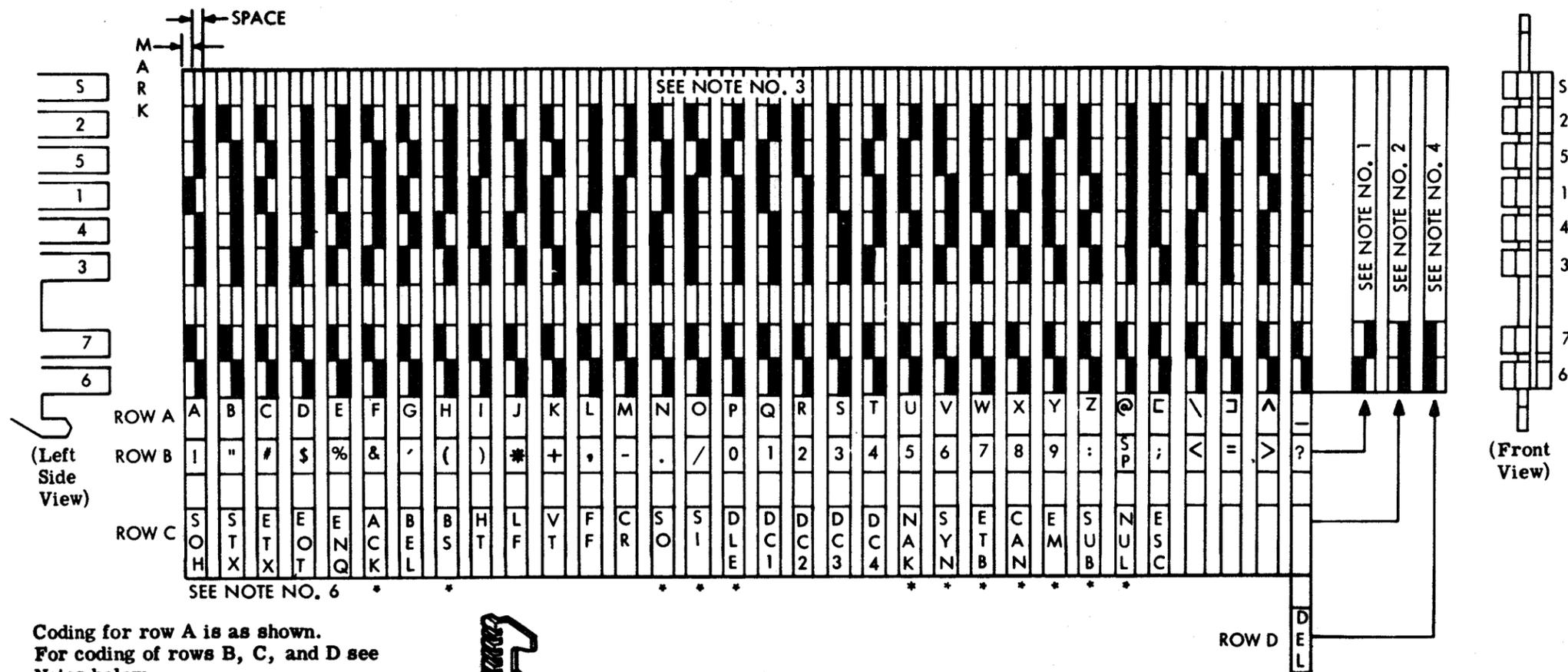
Note 2: With typing unit installed in its cabinet, lift bail to its maximum upward position, there should be some clearance between bail and operating lever.

Note 3: BAIL SPRING adjustments may be refined to make mechanism more or less sensitive to paper buckling.

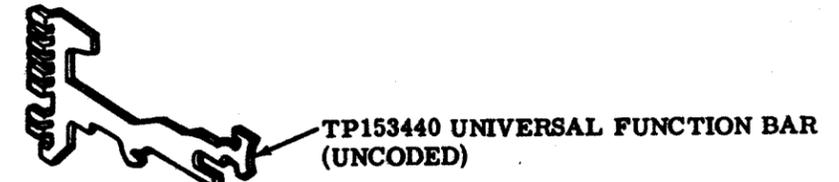
3.47 Universal Function Bar

CODING

CODING FOR 8-LEVEL FUNCTION BARS



Coding for row A is as shown.  
For coding of rows B, C, and D see  
Notes below.



■ INDICATES TINE  
□ INDICATES TINE REMOVED

Notes:

1. To operate function bars on symbols and numbers in row B, number 6 tine is left on the marking side and, number 7 tine is left on the spacing side.
2. To operate function bars on nonprinting functions in row C, number 6 and number 7 tines are left on the spacing side.
3. Suppression tine can be coded marking, spacing, or both to control the function bar. In selective calling systems and systems using the stunt shift solenoid, code as follows:
  - a. To sense suppression bar in mark (nonselect or nonprint), break off the spacing tine.
  - b. To sense suppression bar in space (solenoid operated, select or print), break off the marking tine.
  - c. To sense in either condition break off both tines.
  - d. In TWX and other systems not using a stunt shift solenoid, the suppression codebar is held by a clip in the spacing position. Break off marking tine.

4. To operate function bar on code in row D, number 6 and number 7 tines are left on the marking side.
5. The number 8 codebar is omitted from the printer since the number 8 code bit is not used for printing.
- \*6. These characters in row C have no associated keytop on Model 35 keyboards.
7. Bell system uses the 1966 ASCII code as shown on the above illustration except for the following:

ASCII CODE	BELL SYSTEM USAGE	ASCII CODE	BELL SYSTEM USAGE
ENQ	WRU	DC1	XON
BEL	BELL	DC2	TAPE
HT	TAB	DC3	XOFF
LF	LINE FEED	DC4	<del>TAPE</del>
CR	RETURN	DEL	RUB OUT

8. Refer to appropriate parts section for additional cross reference information pertaining to function bars and codes.

35 KEYBOARD FOR AUTOMATIC SEND-RECEIVE SETS

ADJUSTMENTS

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1. GENERAL

↗ 1.01 This section provides the adjustment procedures for the 35 Keyboard for Automatic Send-Receive Sets. It is reissued to include recent engineering changes and to add information covering the codebar arrangement for even parity (late design) and keyboard switch adjustments. Arrows in the margins indicate ↘ changes and additions.

1.02 The adjustments of each unit are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken. The tools and spring scales

required to perform these adjustments are listed in Section 570-005-800TC. After an adjustment is completed, be sure to tighten any nuts or screws that are loosened. The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions, and the angles at which scales should be applied when measuring spring tensions. 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 number is replaced when the part is remounted.

1.03 The spring tensions given in this section are indicated values and should be checked with proper spring scales in the positions indicated. Replace springs that do not meet requirements, unless otherwise indicated.

1.04 References made to left or right, up or down, front or rear, etc, apply to the unit in its normal operating position as viewed from the front.

1.05 When a requirement calls for a clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latch-lever so that the clutch shoes (Par. 2.04) release their tension on the clutch drum. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum.

1.06 All electrical contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25 percent of the contact diameter. Check contacts for pitting and corrosion and clean or bur-nish them before making specified adjustment or tolerance measurement. Avoid sharp kinks or bends in the contact springs.

Note: Keep all electrical contacts free of oil and grease.

#### GOLD-PLATED SIGNAL CONTACTS

1.07 All units now being manufactured have signal contacts made of gold-plated tungsten. Older units may have unplated tungsten contacts. If in doubt as to the type of contacts, remove signal generator cover and inspect contacts for gold plating.

(a) Servicing: For standard applications including those with data sets, observe standard maintenance intervals. For special low current applications, see below.

#### (b) Cleaning

- (1) Use twill jean cloth (KS2423) to clean gold-plated contacts.
- (2) Open contacts. Drop strip of twill jean between them.
- (3) Close contacts. Draw twill jean part way through. Open contacts and withdraw twill jean.
- (4) This procedure prevents small fibers at edges of twill jean strip from becoming lodged between contacts.
- (5) Clean unplated tungsten contacts in accordance with standard procedures.

#### (c) Special Low Voltage Applications

Note: Following does not apply to standard applications.

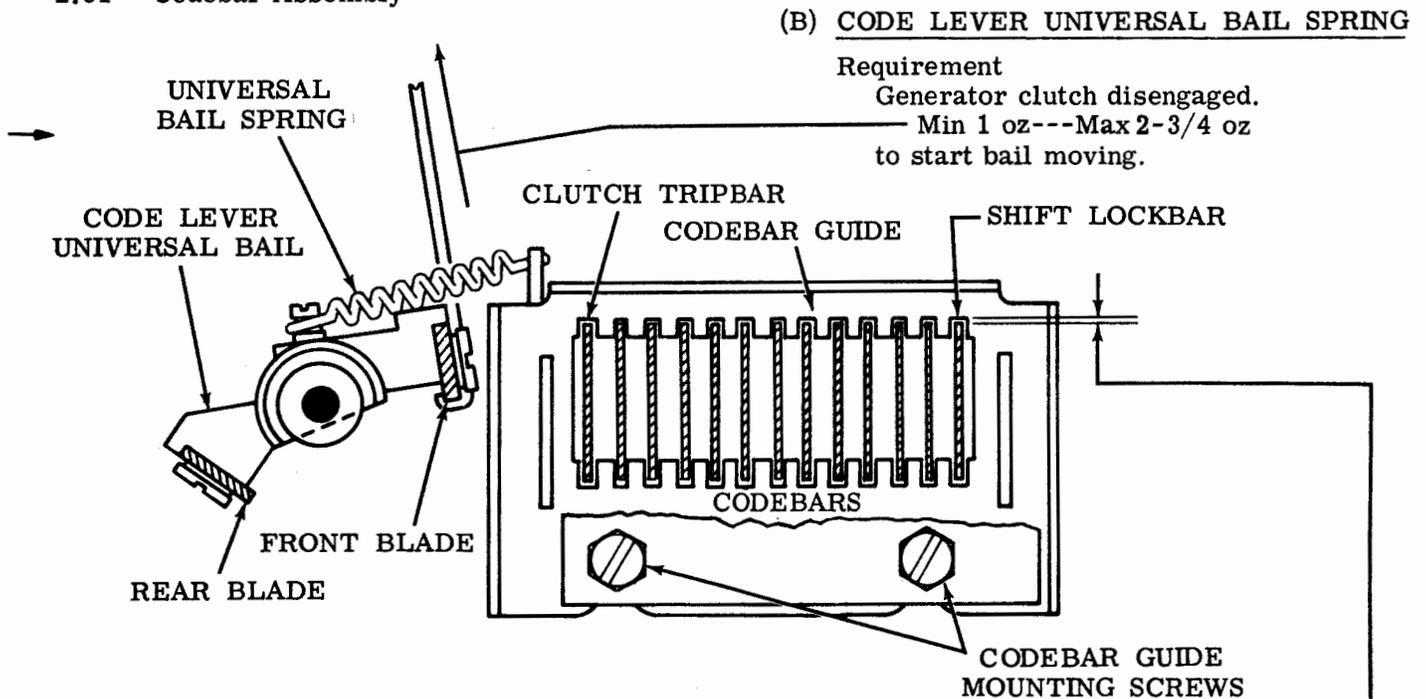
- (1) The recommended cleaning interval for gold-plated contacts in special low level applications (less than 250 micro-watts) having an average weekly use of 60 hours should not exceed 90 days. This interval may be reduced, dependent on the circuit configuration, usage, and environment. Contacts should be cleaned as described in 1.07 (b).

Note 1: Applying operating voltage of standard Distortion Test Set directly to contacts may damage gold plating and impair low voltage operation. When electrically adjusting or testing contacts (Par. 2.17), 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.

Note 2: Normally for low voltage applications, contacts should be used in circuits operating between 3 and 20 volts dc at a current level not to exceed 60 milliamperes. Between 20 and 70 volts dc, the current should be adjusted so that it does not exceed a 120 milliwatt power level. The contacts are not normally intended for use on voltages above 70 volts dc. Exceeding these levels for an appreciable length of time may result in damage to the gold plating and make them unfit for low voltage applications.

2. BASIC UNIT

2.01 Codebar Assembly



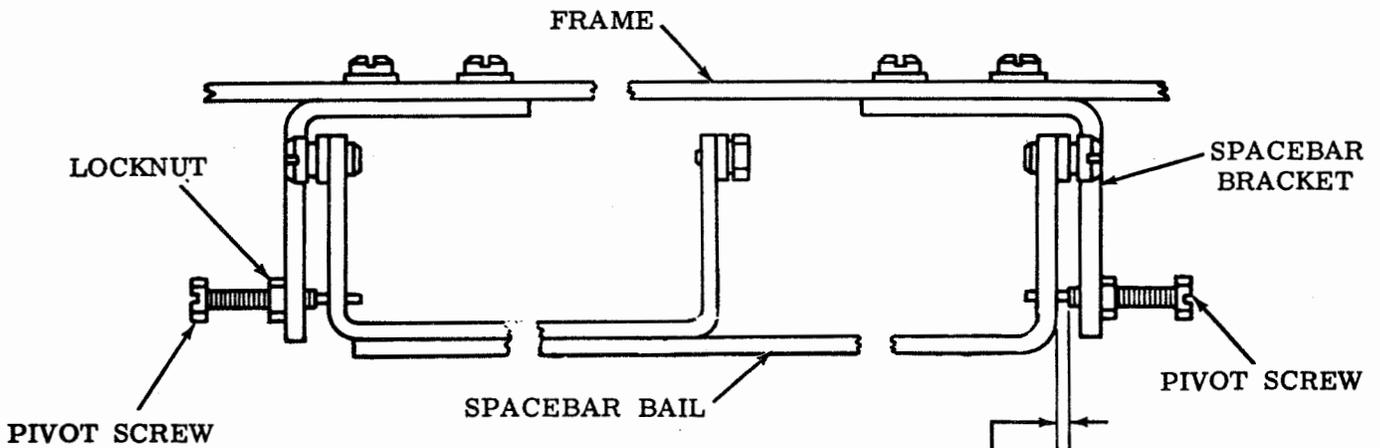
(A) CODEBAR GUIDE CLEARANCE

Requirement

Clearance between the top of no. 1 and no. 8 codebars should be  
 Min some---Max 0.006 inch  
 All codebars should move freely.

To Adjust

With mounting screws for either the left or right codebar guides friction tight, position guides. Tighten screws.



(C) SPACEBAR BAIL PIVOT

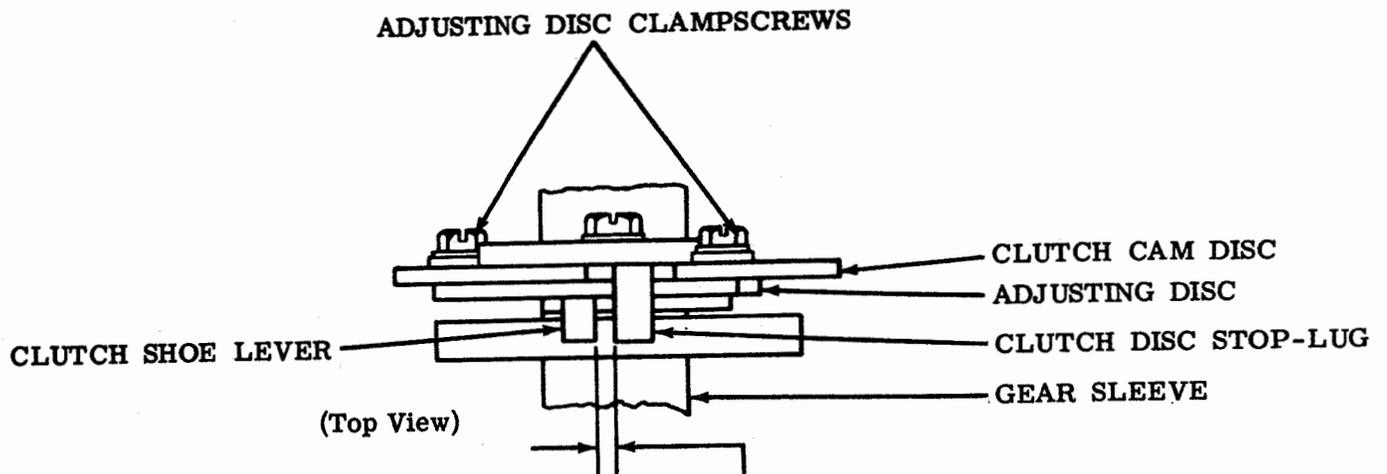
Requirement

Min some endplay---Max 0.010 inch  
 Spacebar free from bind.

To Adjust

Position spacebar with pivot screws.

## 2.02 Signal Generator Mechanism

CLUTCH SHOE LEVER**Requirement**

Clearance when clutch is disengaged should be  
 Min 0.055 inch---Max 0.085 inch  
 less than when clutch is engaged.

**To Check**

Latch clutch in disengaged position and measure clearance. Rotate gear until oil hole is upward. Engage clutch and measure clearance.

**To Adjust**

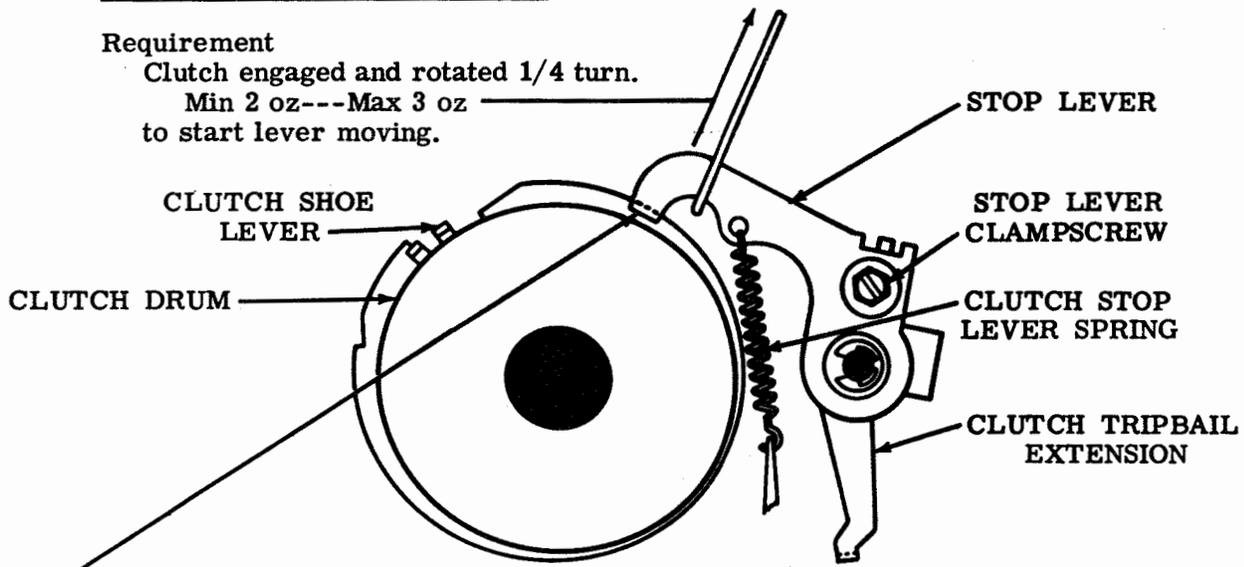
Loosen the two adjusting disc clampscrews to position disc.

2.03 Signal Generator Mechanism (continued)

(B) CLUTCH STOP LEVER SPRING

Requirement

Clutch engaged and rotated 1/4 turn.  
Min 2 oz---Max 3 oz  
to start lever moving.



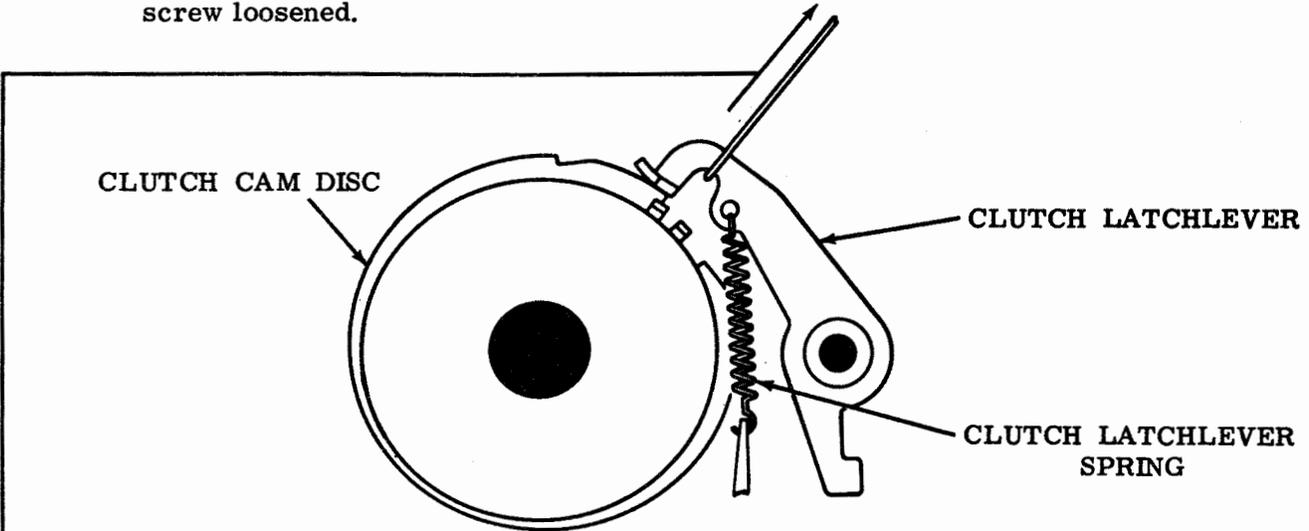
(A) CLUTCH STOP LEVER

Requirement

Should fully engage clutch shoe lever.  
During rotation, the lever should not  
touch the clutch drum at any point.

To Adjust

Position stop lever with its clamp-  
screw loosened.



(C) CLUTCH LATCHLEVER SPRING

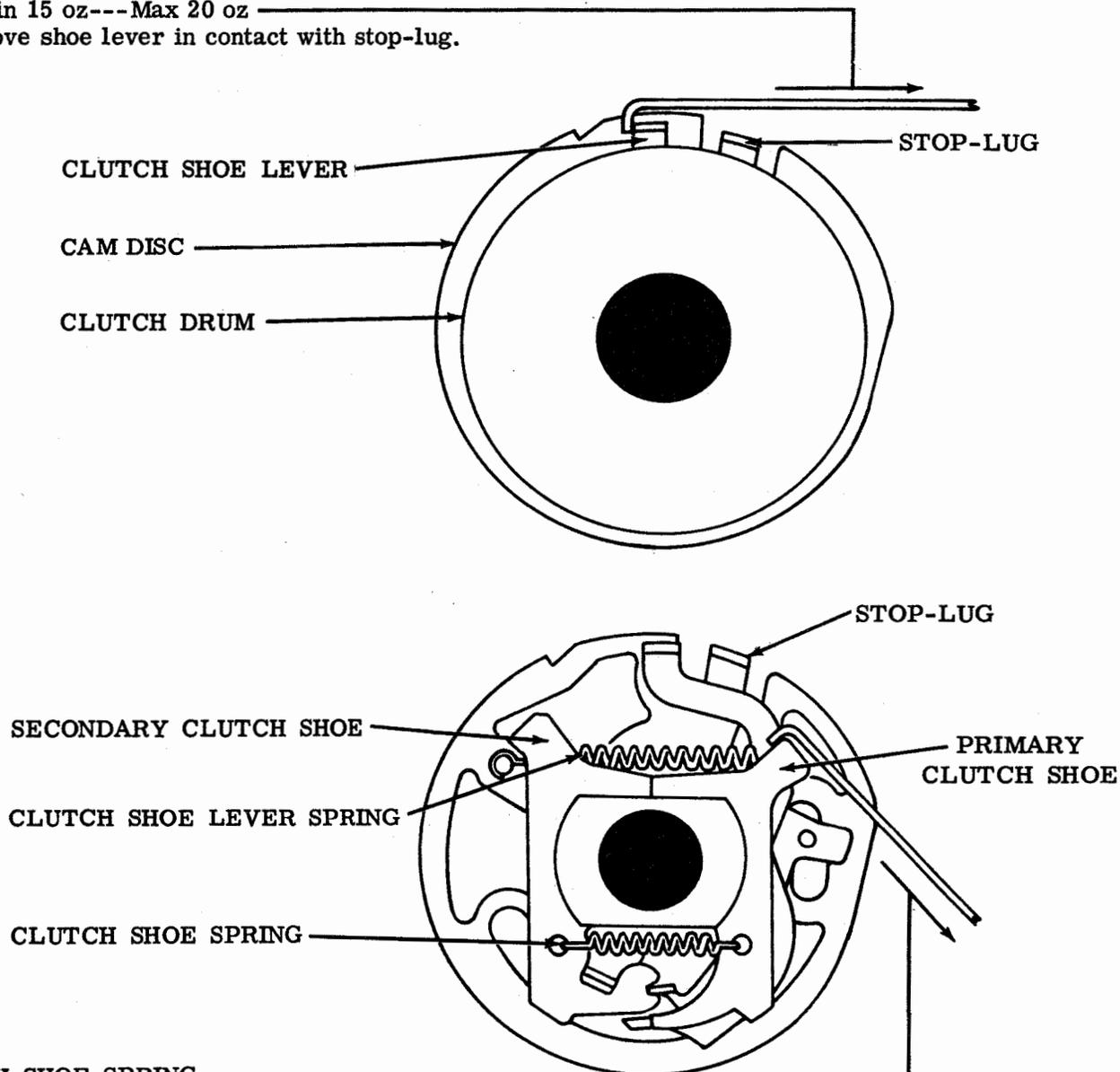
Requirement

Clutch latchlever resting on the  
highest point of clutch disc.  
Min 2 oz---Max 3 oz  
to start latchlever moving.

## 2.04 Signal Generator Mechanism (continued)

CLUTCH SHOE LEVER SPRING**Requirement**

Clutch engaged. Cam disc held to prevent turning.

Min 15 oz---Max 20 oz  
to move shoe lever in contact with stop-lug.CLUTCH SHOE SPRING

**Note:** In order to check this spring tension, it is necessary to remove the clutch from the main signal generator drive shaft. Therefore, it should not be checked unless there is good reason to believe that it does not meet its requirement.

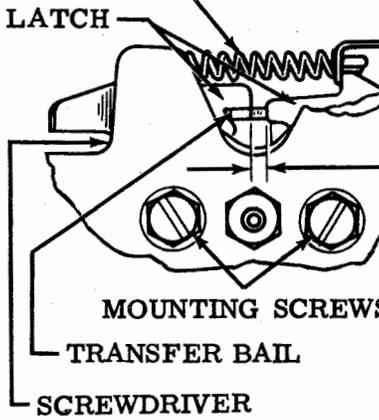
**Requirement**

Clutch drum removed.

Min 3 oz---Max 5 oz  
To start primary shoe moving away from secondary shoe at point of contact.

2.05 Signal Generator Mechanism (continued)

TRANSFER BAIL DETENT LATCH SPRING



(B) TRANSFER BAIL DETENT LATCH SPRING

Requirement

Min 2-3/4 oz---Max 4-1/4 oz to start latch moving. Hold transfer bail to left.

(A) TRANSFER BAIL DETENT PLATE

Requirement

Equal left hand and right hand clearance within 0.002 inch when transfer bail is at extreme left hand or right hand position as these occur in a character between start and no. 1 pulses only.

To Adjust

Rotate detent plate right or left by means of screwdriver with detent plate mounting screws loosened.

(C) SIGNAL CONTACT CLEARANCE

Requirement

Marking and spacing gaps should be equal within 0.001 inch.

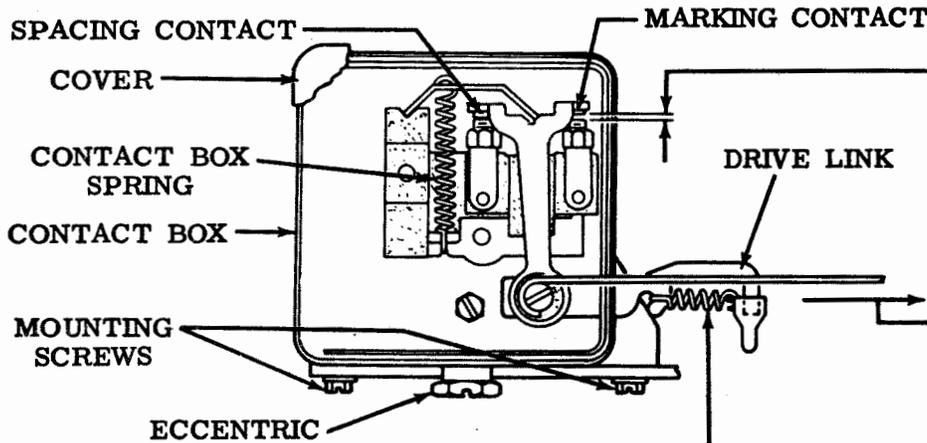
To Check

Depress Y keylever and rotate signal generator cam sleeve until each contact has fully opened.

To Adjust

Loosen mounting screws and move contact box by means of eccentric.

Note: Check by means of signal checking device where possible, and carefully refine the adjustment to eliminate all bias from the signals by equalizing the current-on and current-off intervals (Par. 2.17).



Note: For servicing instructions on gold-plated contacts, see 1.07 on page 3.

(D) SIGNAL CONTACT DRIVE LINK

Requirement

With main shaft in stop position and transfer bail detent latch spring unhooked, move latches away from transfer bail extension. Hold the toggle firmly against contacts.

Min 6 oz---Max 9 oz to start transfer bail extension moving.

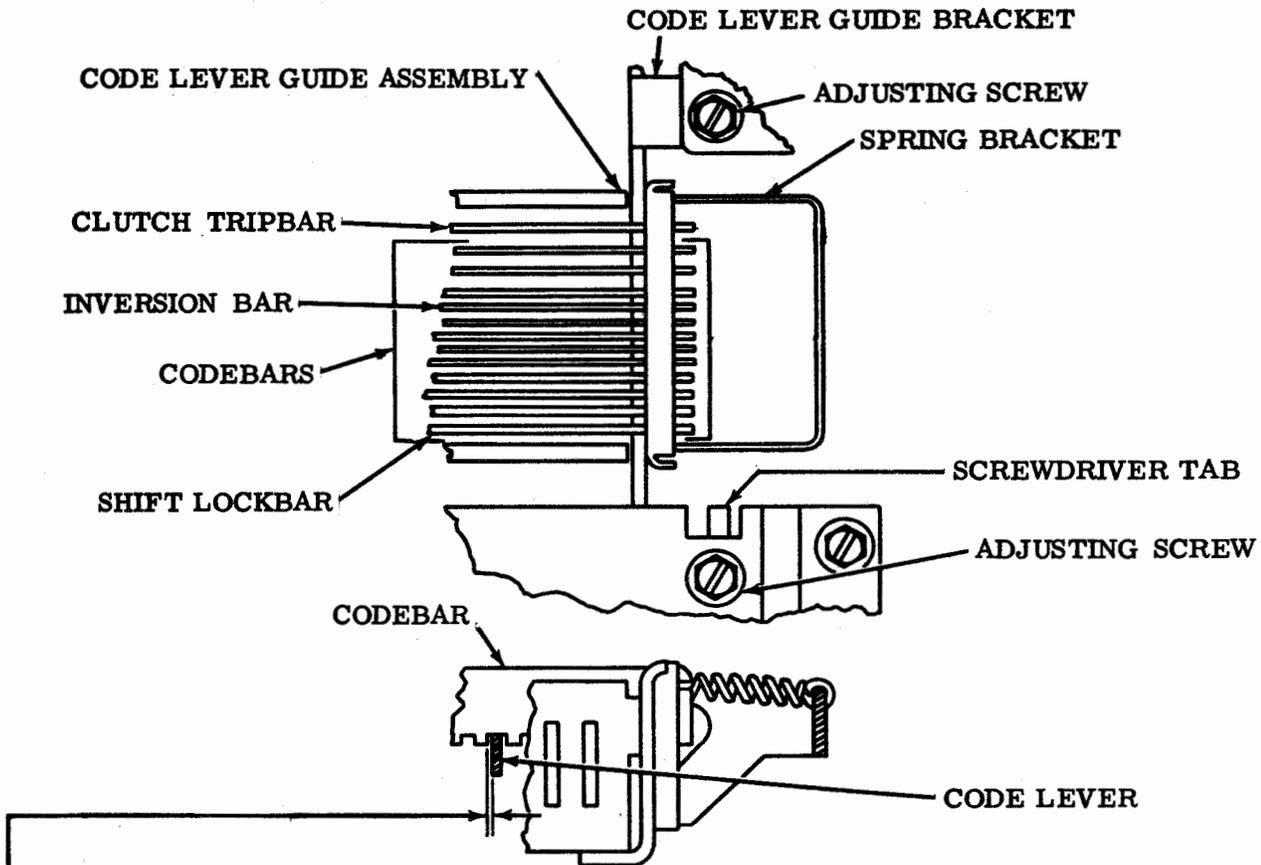
(E) SIGNAL CONTACT SPRING

Requirement

Remove drive link spring. Transfer bail held clear of drive link.

Min 2 oz---Max 3 oz to start link moving.

2.06 Codebar Assembly (continued)



CODEBAR AND CODE LEVER CLEARANCE

**Requirement**

Permutation must be such that highest level (no. 8 level in 8-level code) is spacing. The key code lever located furthest to right should meet requirement. While key is held down and cam cycled to stop position, gap between left-hand side of key code lever and codebar blocked

Min 0.006 inch---Max 0.017 inch

**To Adjust**

Position guide by adjusting slot with four mounting screws loosened. Tighten screws.

2.07 Codebar Assembly (continued)

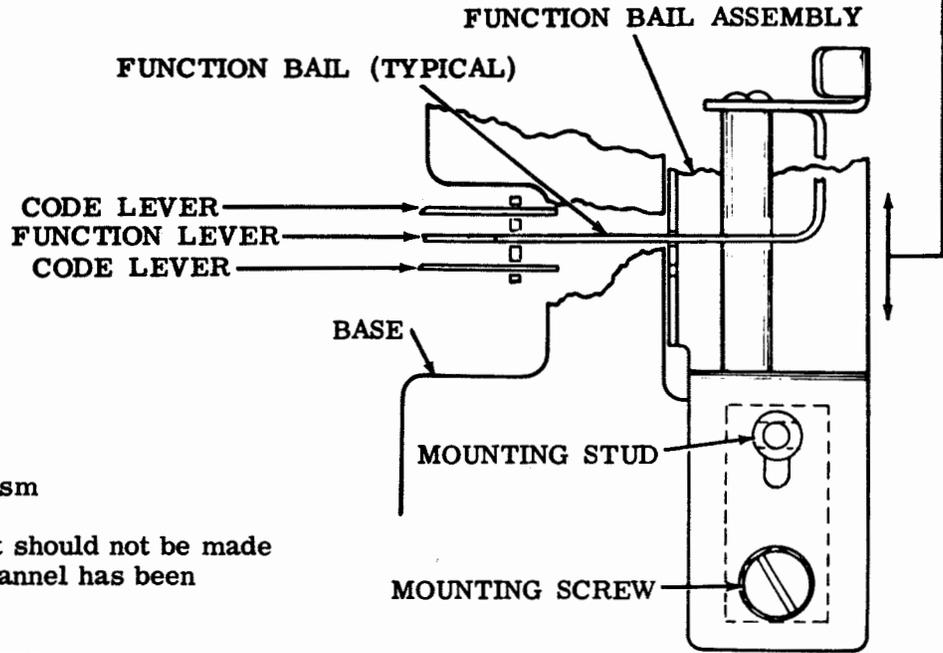
(A) FUNCTION BAIL LEVERS AND CODE LEVER CLEARANCE

**Requirement**

Function bails should operate within their guides without binding.

**To Adjust**

Position function bail assembly with two mounting studs loosened, one at each end.



2.08 Keyboard Mechanism

**Note:** This adjustment should not be made unless the lock ball channel has been disassembled.

(B) LOCK BALL CHANNEL

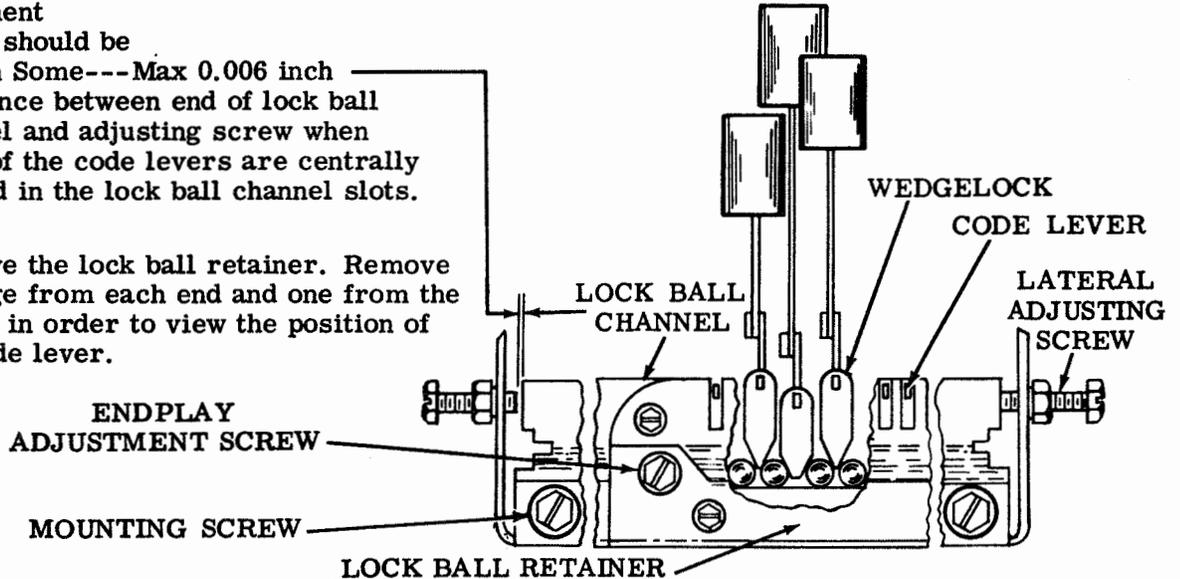
**Requirement**

There should be

Min Some---Max 0.006 inch clearance between end of lock ball channel and adjusting screw when most of the code levers are centrally located in the lock ball channel slots.

**To Check**

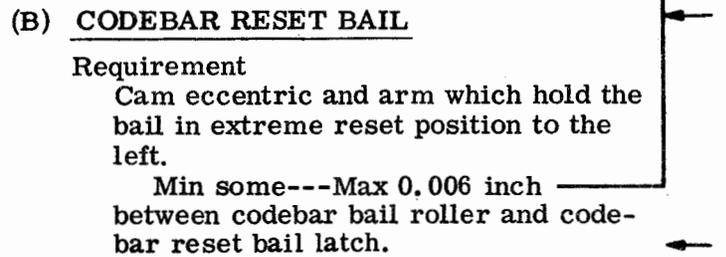
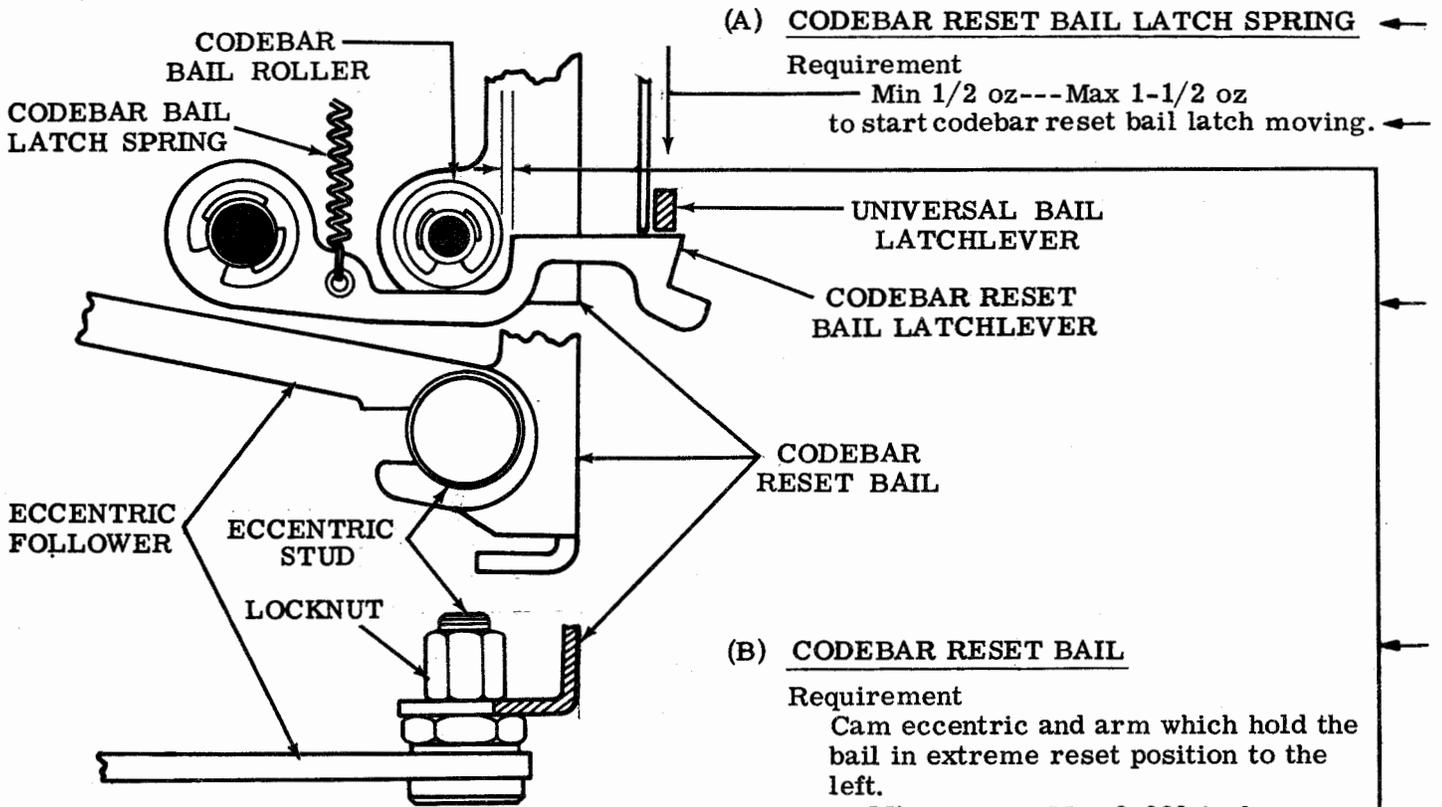
Remove the lock ball retainer. Remove a wedge from each end and one from the center in order to view the position of the code lever.



**To Adjust**

Loosen the lock ball channel mounting screws. Back off lateral adjusting screws and position channel. Turn one adjusting screw in against the end of the channel and lock it. Turn the other adjusting screw in to the center and back it off 1/4 turn. Lock the screw. Replace the wedges and check their position with respect to the balls. Pull channel assembly downward until all code levers strike their upstop without wedges jumping out of position. Replace lock ball retainer. Back off ball endplay adjusting screw.

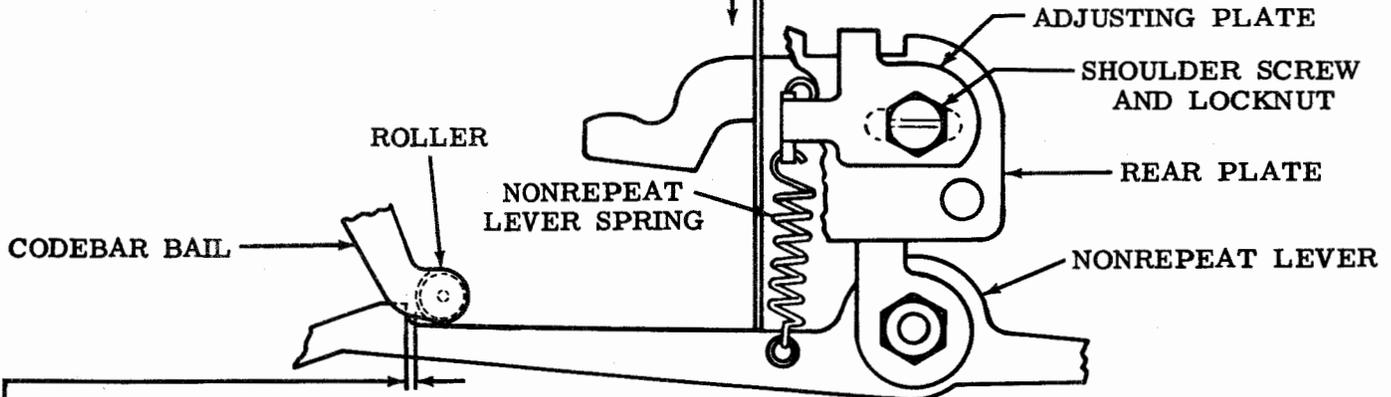
2.09 Codebar Assembly (continued)



(C) NONREPEAT LEVER SPRING

Requirement  
Clutch disengaged, any keylever depressed  
Min 2-1/4 oz---Max 3-1/4 oz  
to start nonrepeat lever moving downward.

To Adjust  
With locknut loosened, adjust eccentric stud so that high point is in upper half of arc.



(D) CODEBAR BAIL AND NONREPEAT LEVER CLEARANCE

Requirement  
Mechanism in initial trip off position, any key depressed, no power.  
Min some---Max 0.010 inch  
between roller of reset bail and nonrepeat lever pickup step.

To Adjust  
Loosen locknut and shoulder screw and move mechanism left or right.

Note: Do not permit clutch to rotate when tripping off.

2.10 Keyboard Mechanism (continued)

Note: Remove keyboard hood in order to make this adjustment. See disassembly and reassembly.

(A) BALL WEDGELOCK AND BALL TRACK CLEARANCE (PRELIMINARY)

To Check

Depress Q and P keylever alternately with 32 oz pressure and measure clearance in each instance. There should be no clearance between lower edge of code lever extensions and bottom of slots in wedges.

Requirement

Clearance between tip of wedge and the ball track  
 Min 0.005 inch---Max 0.015 inch  
 and equal within 0.005 inch.

To Adjust

Position ball track up or down with the two mounting screws loosened.

(B) LOCK BALL ENDPLAY (PRELIMINARY)

To Check (with ball endplay adjustment screw backed off)

Depress key at extreme right end of the A row with 32 oz pressure.

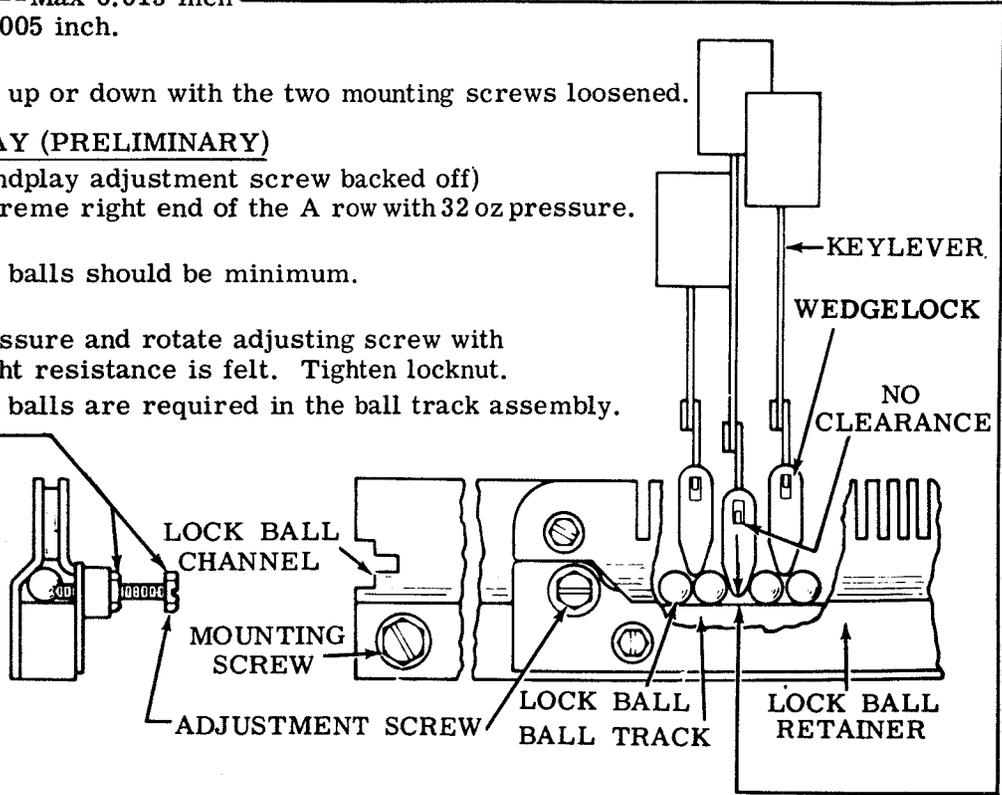
Requirement

Clearance between balls should be minimum.

To Adjust

Maintain 32 oz pressure and rotate adjusting screw with fingers until a slight resistance is felt. Tighten locknut.

Note: A total of 53 balls are required in the ball track assembly.



(C) BALL WEDGELOCK, BALL ENDPLAY, AND UNIVERSAL BAIL LATCH (FINAL)

Note: Perform this adjustment following UNIVERSAL BAIL EXTENSION (2.11).

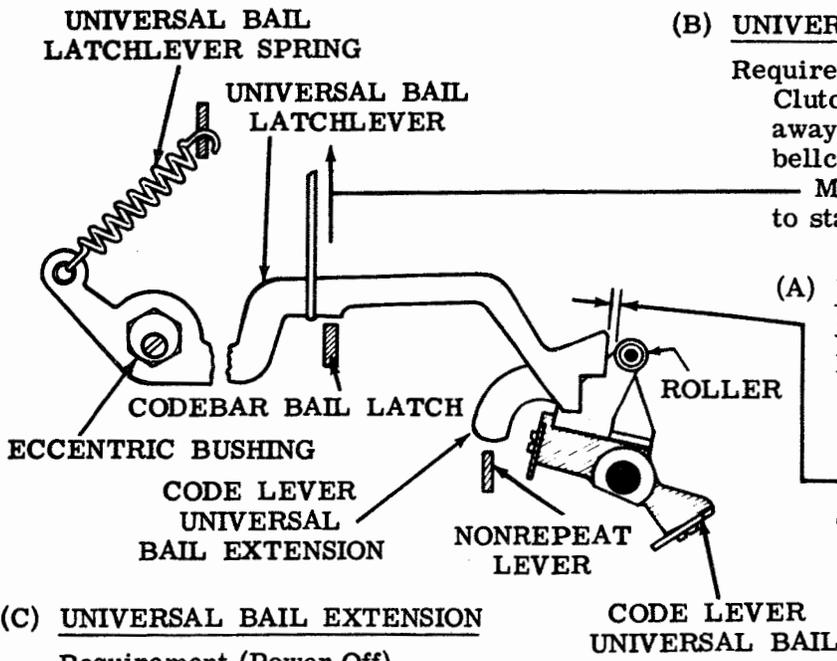
Requirement (under power)

- (1) Trip-off pressure of any key in row A should be  
 Min 2 oz---Max 6 oz
- (2) Apply 6-1/2 oz pressure perpendicular to A key, depress each key in that row.  
 The A key should trip each time a key is released.
- (3) Repeat (2) with the 6-1/2 oz pressure on extreme right key in that row.
- (4) The clutch should not trip when two keys are depressed simultaneously.
- (5) With 5-1/4 ± 1/4 oz applied to the spacebar, depress carriage return key.  
 The spacebar should trip each time the carriage return key is released  
 (by moving the finger off the key in a horizontal direction).

To Adjust

If necessary, refine BALL WEDGELOCK AND BALL TRACK CLEARANCE (PRELIMINARY) (2.10), LOCK BALL ENDPLAY (PRELIMINARY) (2.10), UNIVERSAL BAIL LATCHLEVER (PRELIMINARY) (2.11), and UNIVERSAL BAIL EXTENSION (2.11).

2.11 Codebar Assembly (continued)



(B) UNIVERSAL BAIL LATCHLEVER SPRING

Requirement

Clutch disengaged, universal bail held away from latchlever. Nonrepeat lever bellcrank held down against its stop post.  
 Min 7-1/2 oz---Max 11 oz  
 to start latchlever moving.

(A) UNIVERSAL BAIL LATCHLEVER (PRELIMINARY)

Requirement

Clearance between universal bail latchlever and roller on universal bail extension should be  
 Min 0.015 inch---Max 0.025 inch

To Check

Depress G key slowly with 32 oz pressure. Manually rotate universal bail backwards and release quickly.

To Adjust

Rotate eccentric. Keep high part of eccentric up.

Note: It will be necessary to remake UNIVERSAL BAIL - REAR BLADE Par. 2.11 adjustment.

(C) UNIVERSAL BAIL EXTENSION

Requirement (Power Off)

Universal bail extension roller resting against end of universal bail latchlever  
 Min 0.050 inch---Max 0.080 inch  
 between extension and nonrepeat lever.

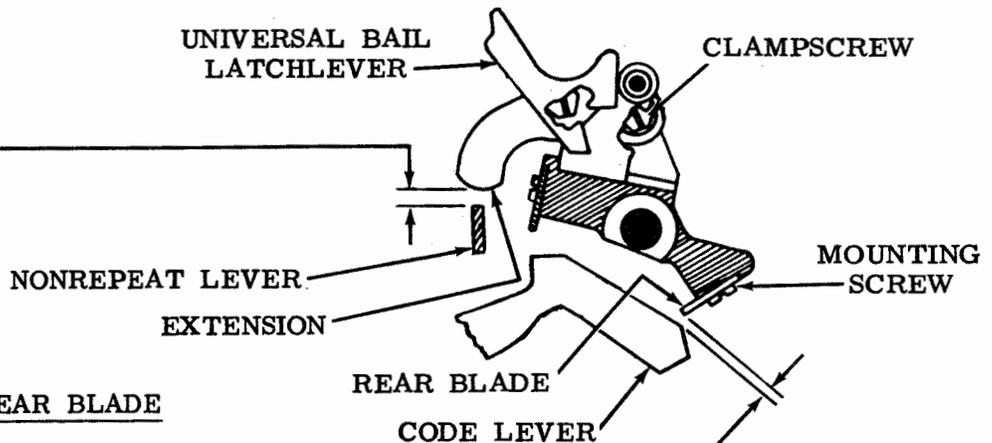
To Check

Depress rubout keylever and release it. Check clearance.

To Adjust

Position the extension with its clamp-screw loosened.

(E) BALL WEDGELOCK, BALL ENDPLAY, AND UNIVERSAL BAIL LATCH (FINAL)  
 see Par. 2.10



(D) UNIVERSAL BAIL - REAR BLADE

Requirement

Unit in initial trip off condition, no key depressed, no power, extension post of universal bail resting against the end of latch  
 Min Some---Max 0.015 inch  
 between universal bail rear blade and any code lever.

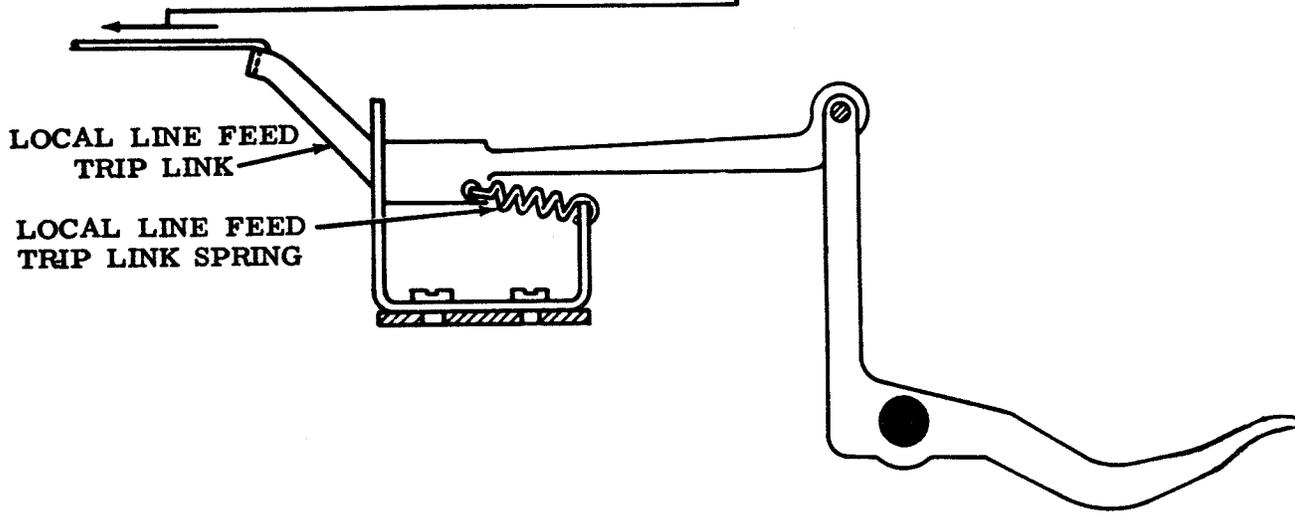
To Adjust

Position rear blade with mounting screws loosened.

2.12 Keyboard Mechanism (continued)

LOCAL LINE FEED TRIP LINK SPRING

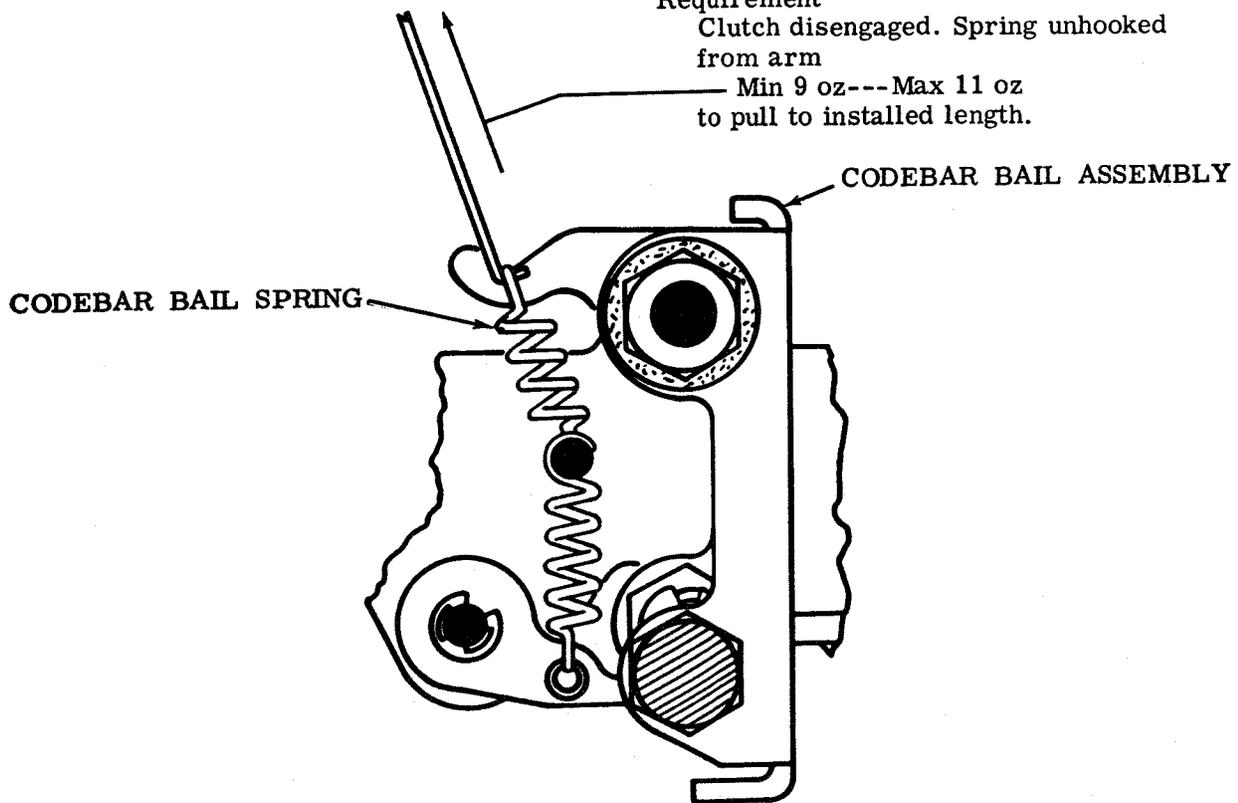
Requirement  
Min 5 oz---Max 10 oz  
to start link moving.



2.13 Codebar Assembly (continued)

CODEBAR BAIL SPRING

Requirement  
Clutch disengaged. Spring unhooked  
from arm  
Min 9 oz---Max 11 oz  
to pull to installed length.



2.14 Keyboard Mechanism (continued)

KEYTOP GUIDE SPACING

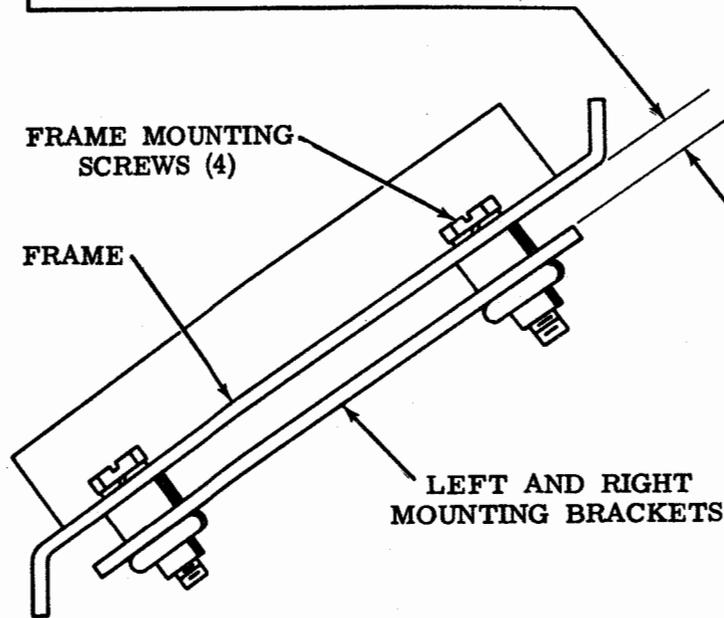
Requirement

Gap between frame and left and right mounting bracket should be

Min 0.141 inch---Max 0.171 inch

To Adjust

Tighten or loosen as required the four frame mounting screws.



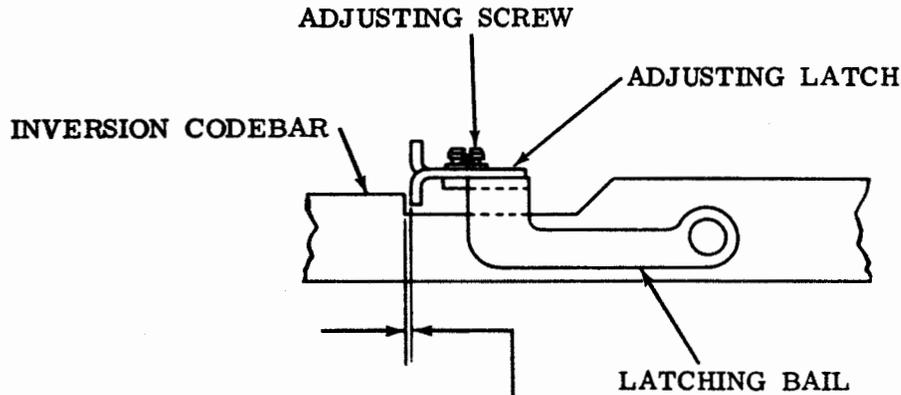
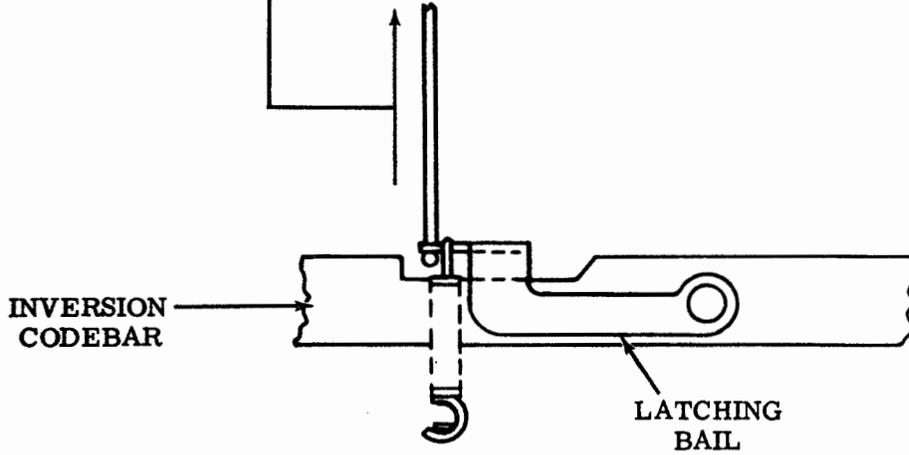
2.15 Codebar Assembly (continued)

(A) INVERSION LATCH SPRING TENSION (EARLY DESIGN)

Requirement

Min 3-1/2 oz---Max 4-1/2 oz  
to move bail on parity keyboards.

Min 3/4 oz---Max 1-1/2 oz  
to move bail on nonparity keyboards.



(B) INVERSION CODEBAR LATCH (EARLY DESIGN)

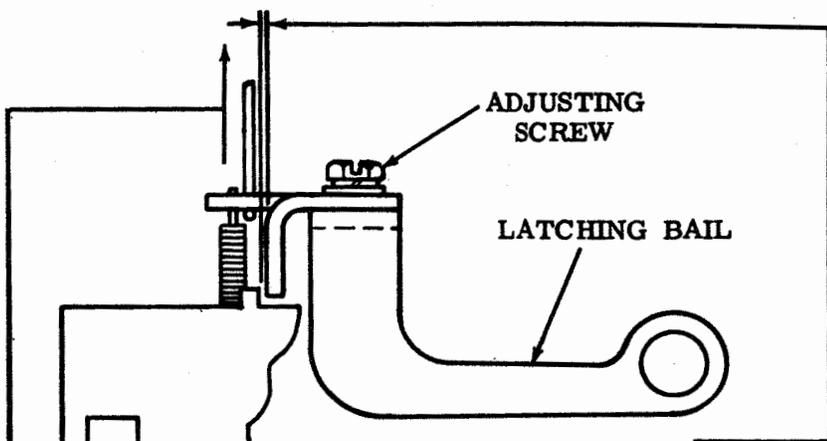
Requirement

Signal generator disengaged  
Min 0.002 inch---Max 0.012 inch  
gap between inversion codebar and its latch.  
Latch should align with inversion codebar.

To Adjust

With screw on inversion bail friction tight,  
move adjustable extension to obtain clearance.

2.16 Codebar Assembly (continued)



CODEBAR

ADJUSTING SCREW

LATCHING BAIL

INVERSION BAR LATCHING BAIL SPRING (LATER DESIGN)

(1) Requirement

Min 2-1/2 oz---Max 3-1/2 oz to move no. 5 inversion bail.

(2) Requirement

Min 1-1/2 oz---Max 2-1/2 oz to move no. 8 inversion bail.

INVERSION CODEBAR LATCH (LATER DESIGN)

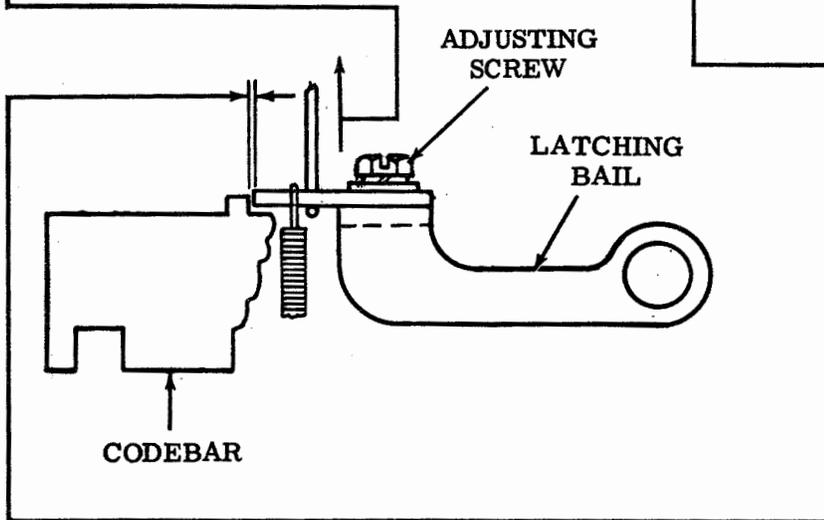
Requirement

Signal generator clutch disengaged.

Min 0.002 inch---Max 0.012 inch gap between number 5 and 8 inversion codebars and their respective latches. Check clearance at both the number 5 and 8 inversion codebars and adjust to whichever is closest.

To Adjust

With respective screws on inversion bail latch friction tight, move adjustable extension to obtain clearance. Tighten screws and recheck clearance.



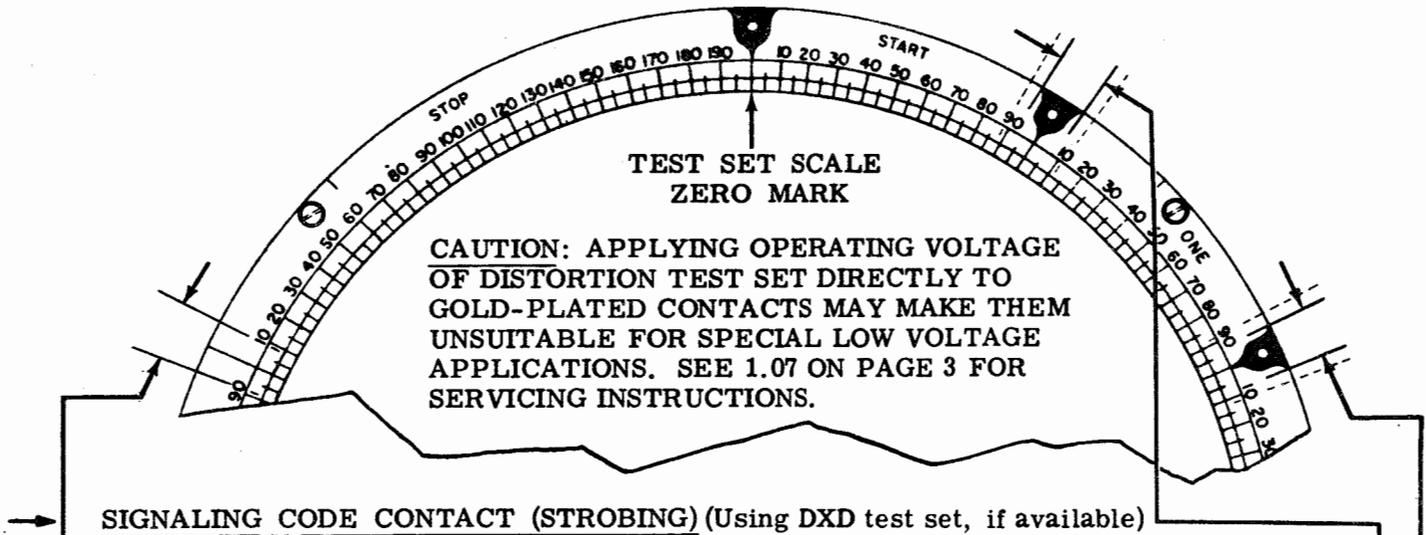
CODEBAR

ADJUSTING SCREW

LATCHING BAIL

## 2.17 Signal Generator Mechanism (continued)

**Note:** On units equipped with signal regenerators, remove regenerator circuit card before applying test set probes to contact access terminals.

**Procedure**

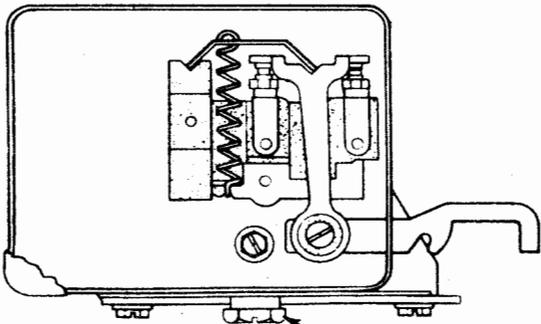
- (1) Disconnect arc suppressor or RF filter. Reconnect signal generator contacts so current to stroboscope lamp of DXD test set is interrupted. Synchronize signal generator with DXD so end of stop pulse image is in line with "0" mark or start pulse on DXD scale when transmission is continuous and both units are operating at 100 wpm (600 rpm).

**Note:** If end of stop pulse varies, adjust the scale so the variation extends equally to either side of "0" mark of start pulse on scale. Numbers in parenthesis ( ) are for units using timing contacts.

- (2) Nominal length of intelligence pulses is 100 divisions. If adjustment to feeler gauges does not permit pulse lengths within tolerance, refine SIGNAL CONTACT CLEARANCE Par. 2.05 adjustment. Favor intelligence pulses by using up to  $\pm 8$  divisions tolerance on beginning of stop pulse, so each is near as possible to 100 divisions in length.

**Requirement**

- (1) Each marking code pulse to begin not later than 8 (12) mark and no earlier than 92 (88) mark of previous pulse.
- (2) Each marking code pulse to end not earlier than 92 (88) mark or later than 8 (12) mark in pulse following one being observed.
- (3) Marking code pulses may have break not more than 3 divisions wide and occurs only at end of code pulse image between the 92 (88) mark and end of image.
- (4) Stop image should not change in length or position more than 1 division while changing from R to Y selection (or equivalent permutations for other codes).

**ECCENTRIC**

**Note:** If necessary, reposition stabilizer mechanism so end of stop image coincides with "0" mark of start pulse on scale. (Do not remove scale.)

- (5) DXD strobing should yield allowable spacing signal distortion of  $\pm 12\%$ .

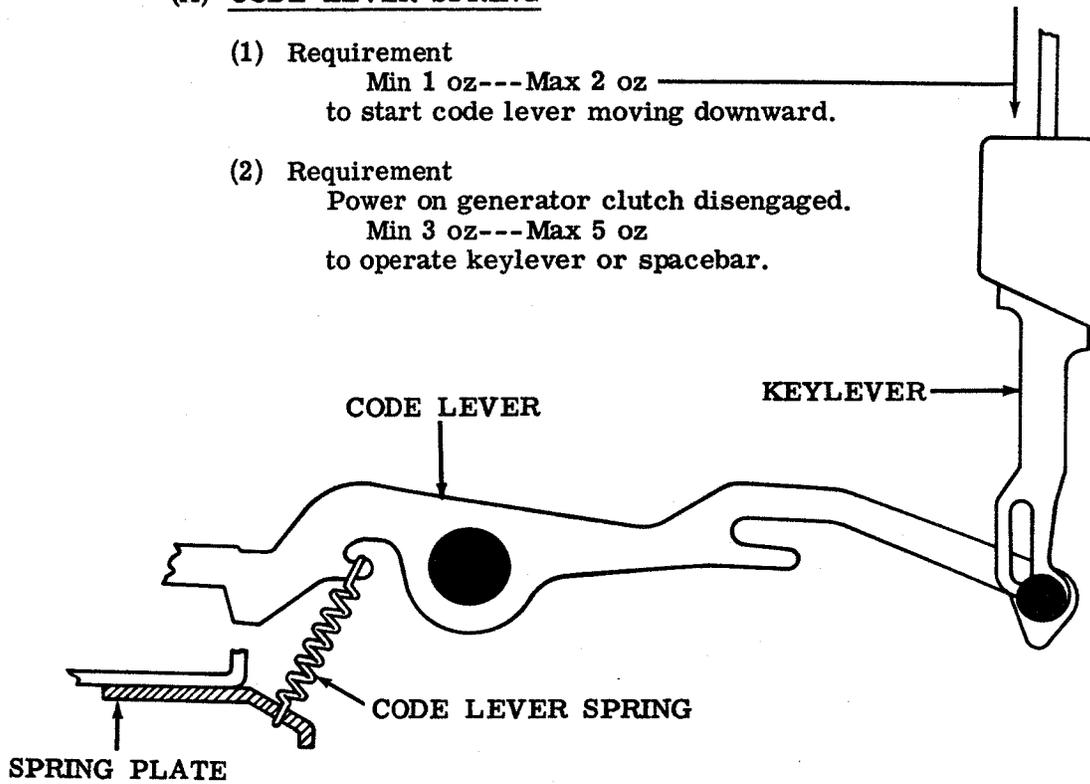
**To Adjust**

Loosen mounting screws and move contact box by means of eccentric.

2.18 Keyboard Mechanism (continued)

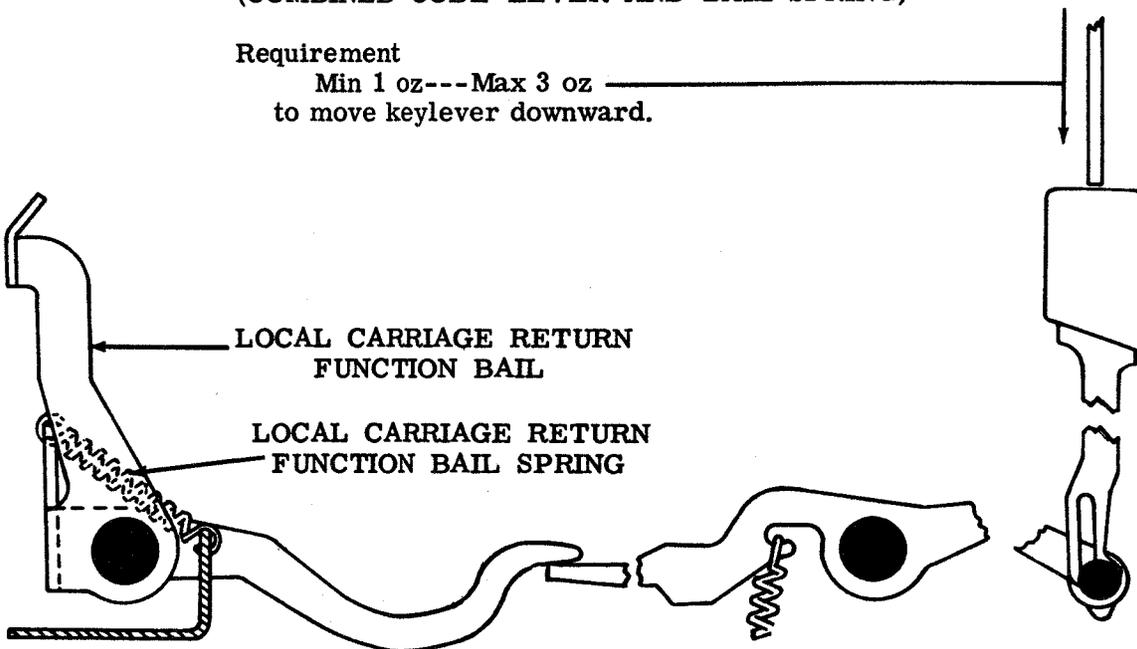
(A) CODE LEVER SPRING

- (1) Requirement  
Min 1 oz---Max 2 oz  
to start code lever moving downward.
- (2) Requirement  
Power on generator clutch disengaged.  
Min 3 oz---Max 5 oz  
to operate keylever or spacebar.



(B) LOCAL CARRIAGE RETURN FUNCTION BAIL SPRING  
(COMBINED CODE LEVER AND BAIL SPRING)

- Requirement  
Min 1 oz---Max 3 oz  
to move keylever downward.

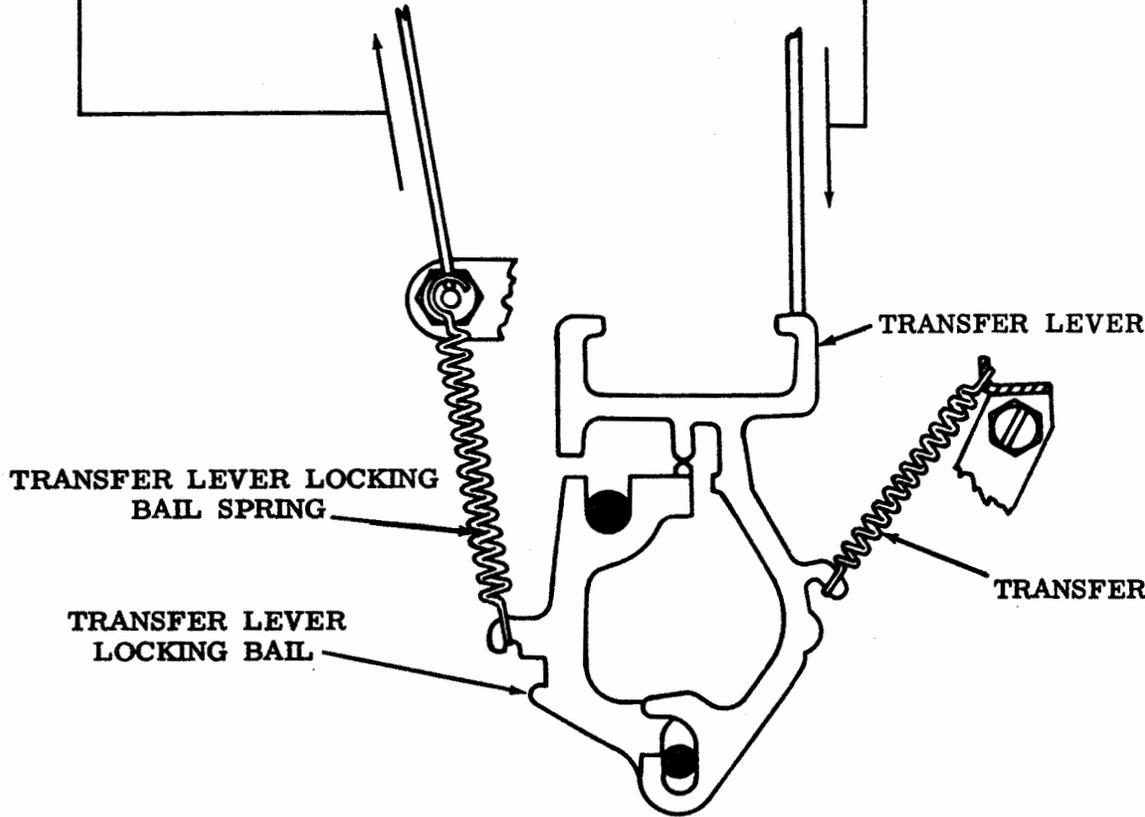


2.19 Codebar Assembly (continued)

(B) TRANSFER LEVER LOCKING BAIL SPRING

Requirement

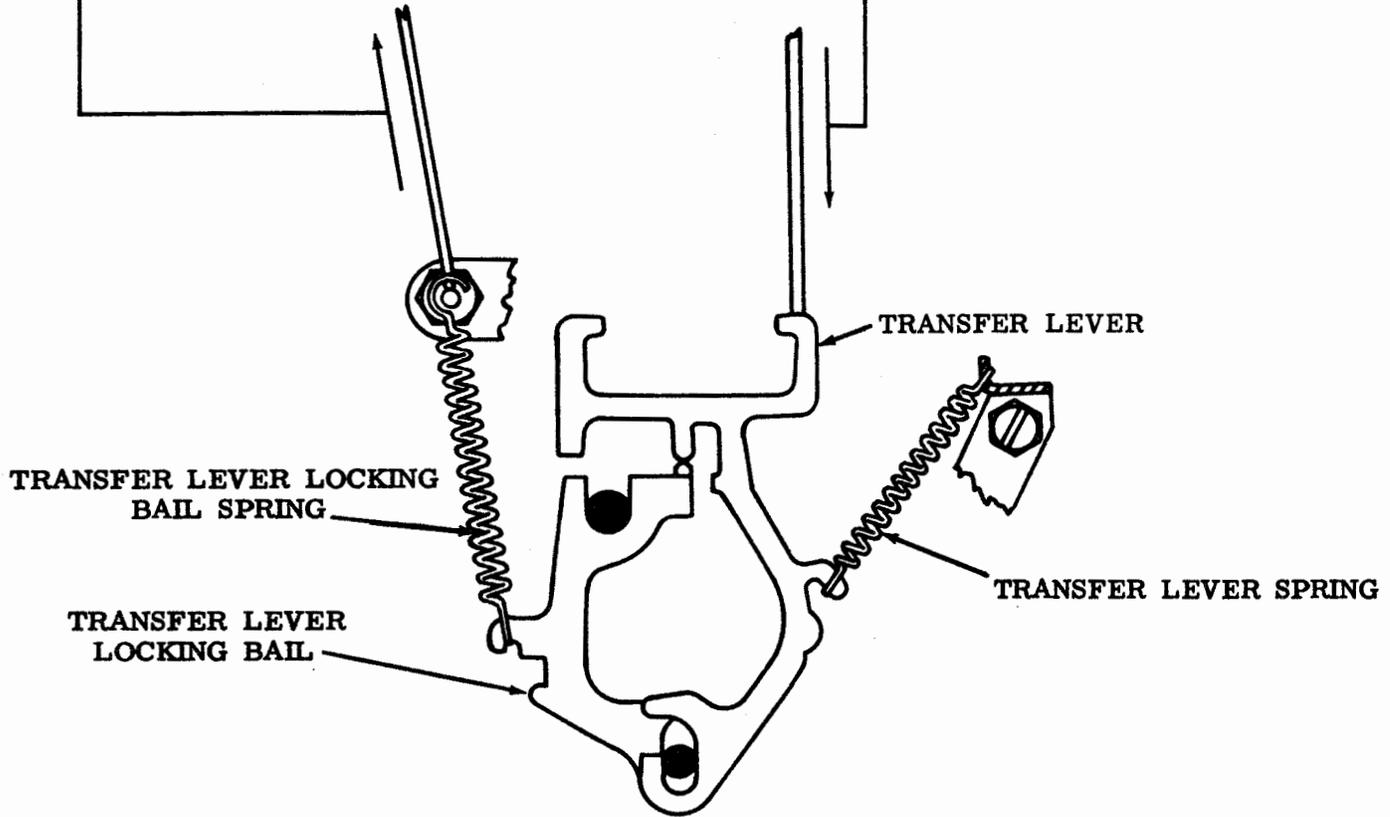
Spring unhooked from post  
Min 5 oz---Max 7 oz  
to pull to installed length.



(A) TRANSFER LEVER SPRING

Requirement

Clutch disengaged  
Min 1-1/2 oz---Max 2-1/2 oz  
to start each of 10 levers moving.

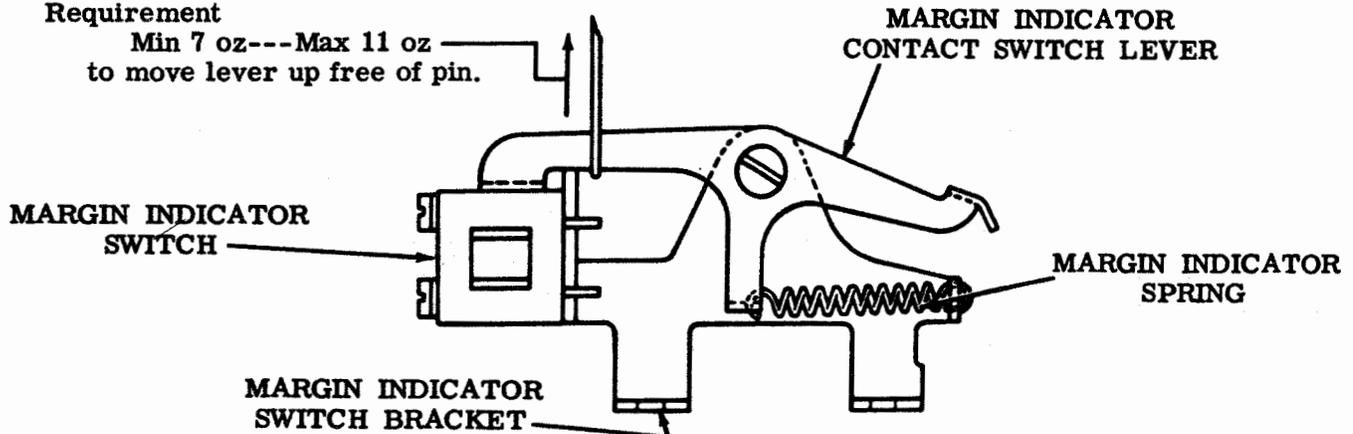


2.20 Interrelated Features

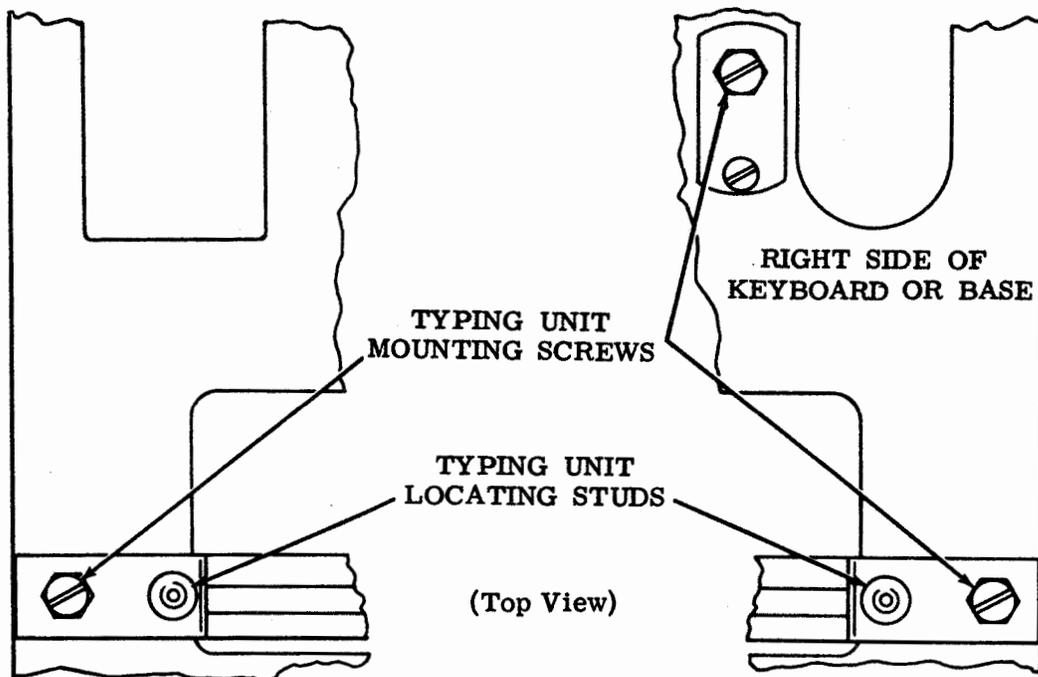
MARGIN INDICATOR SPRING

Requirement

Min 7 oz---Max 11 oz  
to move lever up free of pin.



2.21 Interrelated Features (continued)



MOUNTING TYPING UNIT ON KEYBOARD

**Requirement**

When placing the typing unit on the base, hold it tilted slightly to the right. Lower the right end into engagement with the right locating stud. While easing the left end downward, rotate the motor by hand to properly mesh the gears. Secure by four mounting screws. Rotate the motor by hand to insure proper meshing of gears.

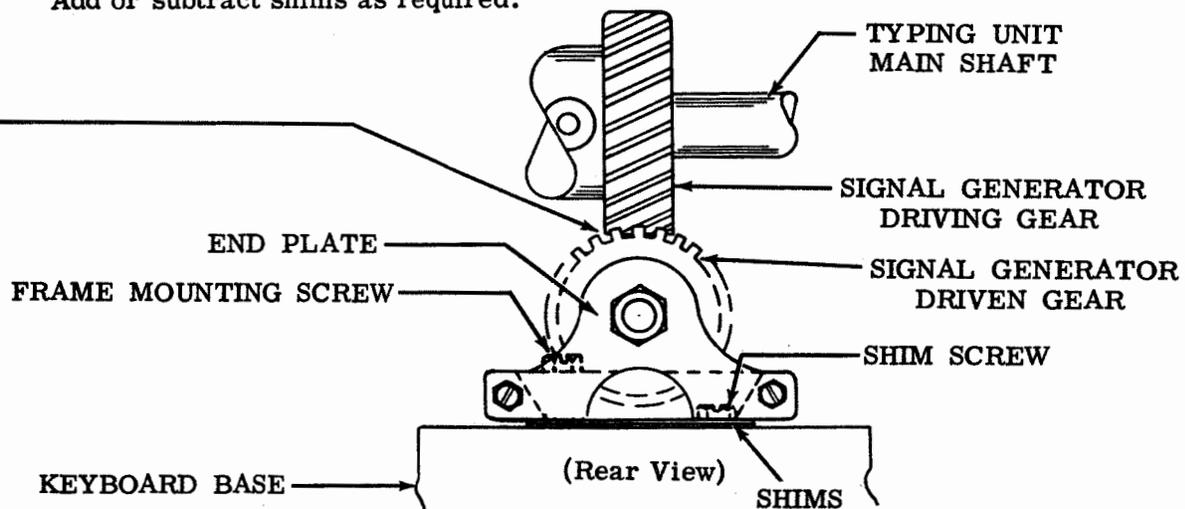
SIGNAL GENERATOR FRAME

**Requirement**

With typing unit mounted in position, there should be a perceptible amount of backlash between the signal generator driven gear and the signal generator driving gear at the point where backlash is the least.

**To Adjust**

Remove the signal generator frame rear mounting screw and loosen the shim screw. Add or subtract shims as required.



2.22 Interrelated Features (continued)

INTERMEDIATE GEAR ASSEMBLY

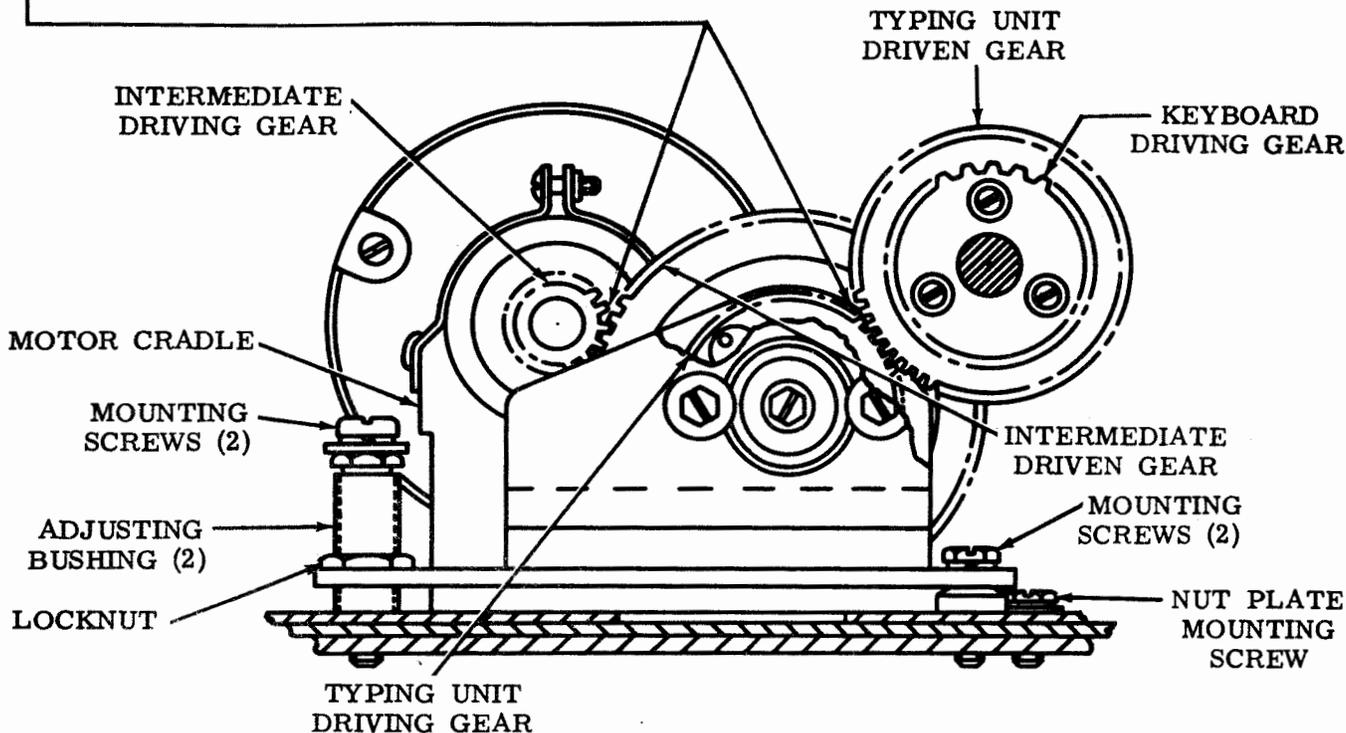
→ **Note:** This adjustment should be checked  
 → with typing unit mounting screws tight.

**Requirement**

Backlash between motor pinion and its driven gear, and between typing unit main shaft gear and its driving gear  
 Min 0.004 inch---Max 0.008 inch  
 as gauged by feel.

**To Adjust**

Loosen intermediate gear assembly mounting screws (4). Loosen two locknuts which lock adjusting bushings at rear of assembly. Loosen nut plate mounting screw just in front of gear bracket. Move assembly backward or forward and adjust height at rear by means of adjusting bushing nearest motor (back out other bushing for clearance after correct adjustment is obtained). Lock adjusting bushing nut, turn other bushing with fingers until it touches base, and tighten locknut.



MOUNTING REPERFORATOR UNIT ON KEYBOARD (NOT ILLUSTRATED)

**Requirement**

The reperforator should be mounted so that the jack shaft is in alignment with rear bearing bracket shaft end and is perpendicular to rear motor shaft.

**To Adjust**

Loosen setscrews in flexible coupling and slide coupling out of engagement with rear bearing bracket shaft. Loosen two screws on alignment bracket. Loosen four reperforator mounting screws. Align reperforator jack shaft with rear bearing bracket shaft and tighten reperforator mounting screws. Snub alignment bracket against reperforator casting and tighten two screws. If the shafts are not in alignment at this point, adjust rear bearing bracket to left or right until shafts are in alignment. Position and fasten flexible coupling.

## 3. VARIABLE FEATURES

## 3.01 Timing Contact Mechanism (Early Design)

TIMING CONTACT

## (1) Requirement

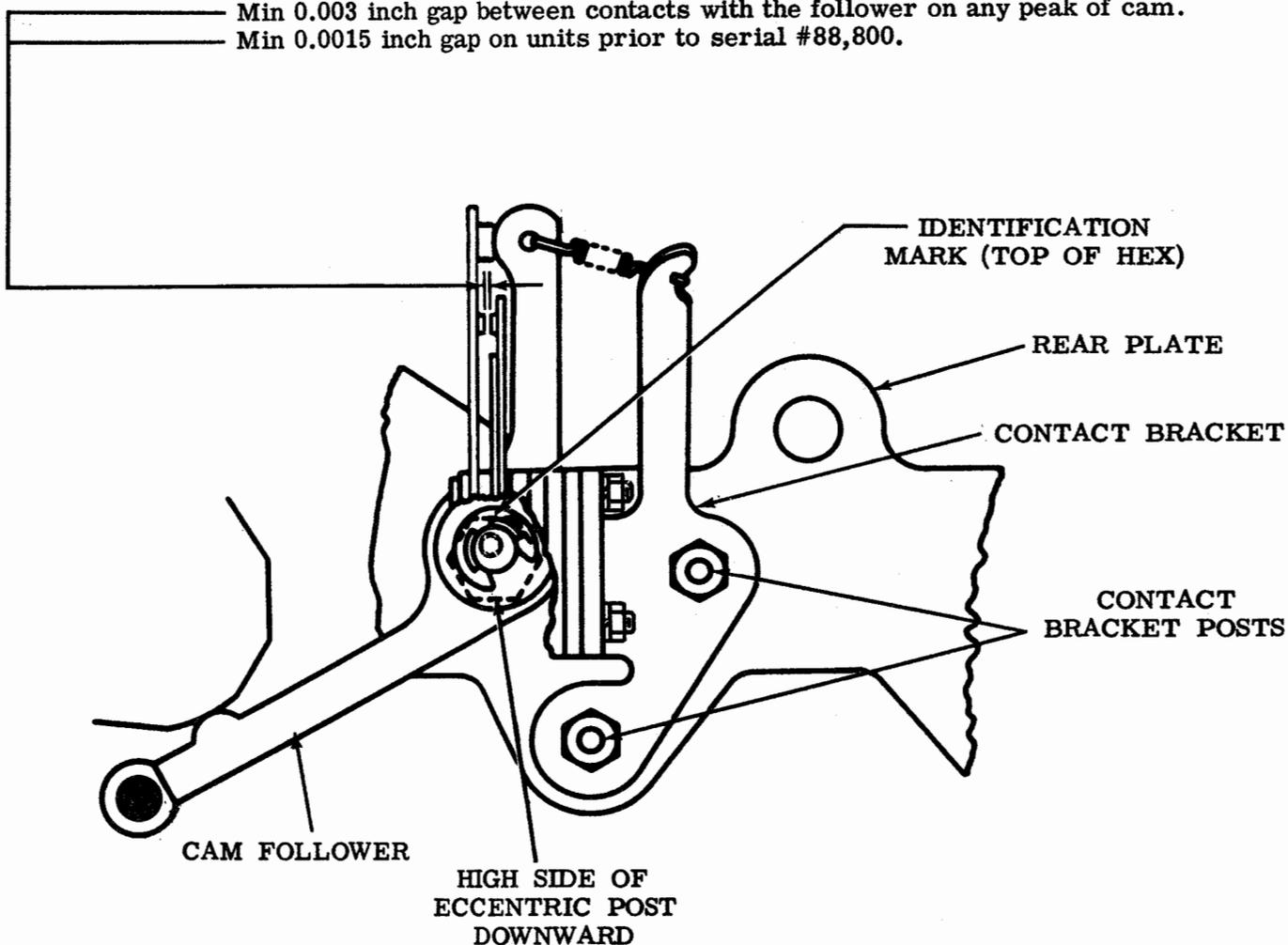
Contacts should be closed when nylon pad is raised 0.007 inch.  
 Contacts should be open when nylon pad is raised 0.015 inch.

## To Check

Identification mark viewed on top side of hex and  
 follower on low part of cam.

## (2) Requirement

Min 0.003 inch gap between contacts with the follower on any peak of cam.  
 Min 0.0015 inch gap on units prior to serial #88,800.



## To Adjust

Loosen two timing contact bracket posts. With screwdriver between bracket upright and rear plate, adjust gap  
 Min some---Max 0.010 inch  
 adjust eccentric screw to meet requirements.

Note: Use signal checking device to refine this adjustment.

3.02 Timing Contact Mechanism (Early Design) (continued)

(A) CONTACT SWINGER

Requirement

Contacts closed

Min 2 oz---Max 3-1/2 oz  
to just open contacts.

To Adjust

Use TP110455 spring bender.

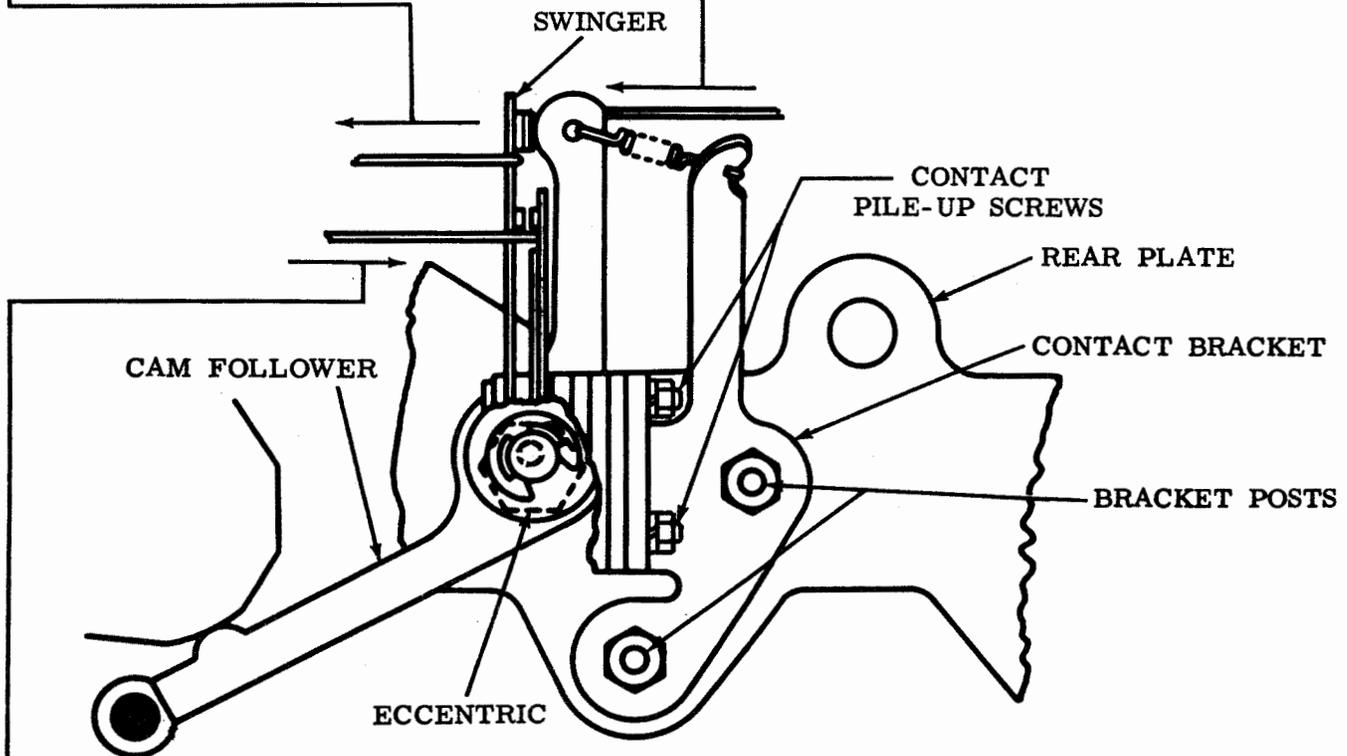
(B) CAM FOLLOWER SPRING

Requirement

Signal generator latched. Contact  
spring held back

Min 6 oz

to start cam follower moving.



(C) CONTACT STIFFENER

Requirement

Contact open

Min 5 oz---Max 8 oz  
to move contact.

To Adjust

Remove transparent contact guard. Remove contact assembly from unit by removing two posts securing it to rear plate. Loosen two screws holding contact pile-up to contact bracket. Bend contact using TP110445 spring bender.

**Note:** Check CONTACT SWINGER Par. 3.02 and refine if necessary. Remake Par. 3.01 if necessary.

3.03 Timing Contact Mechanism (Later Design)

TIMING CONTACT

(1) Requirement

With unit in the stop position, there should be a gap between contact points

Min 0.008 inch---Max 0.011 inch

(2) Requirement

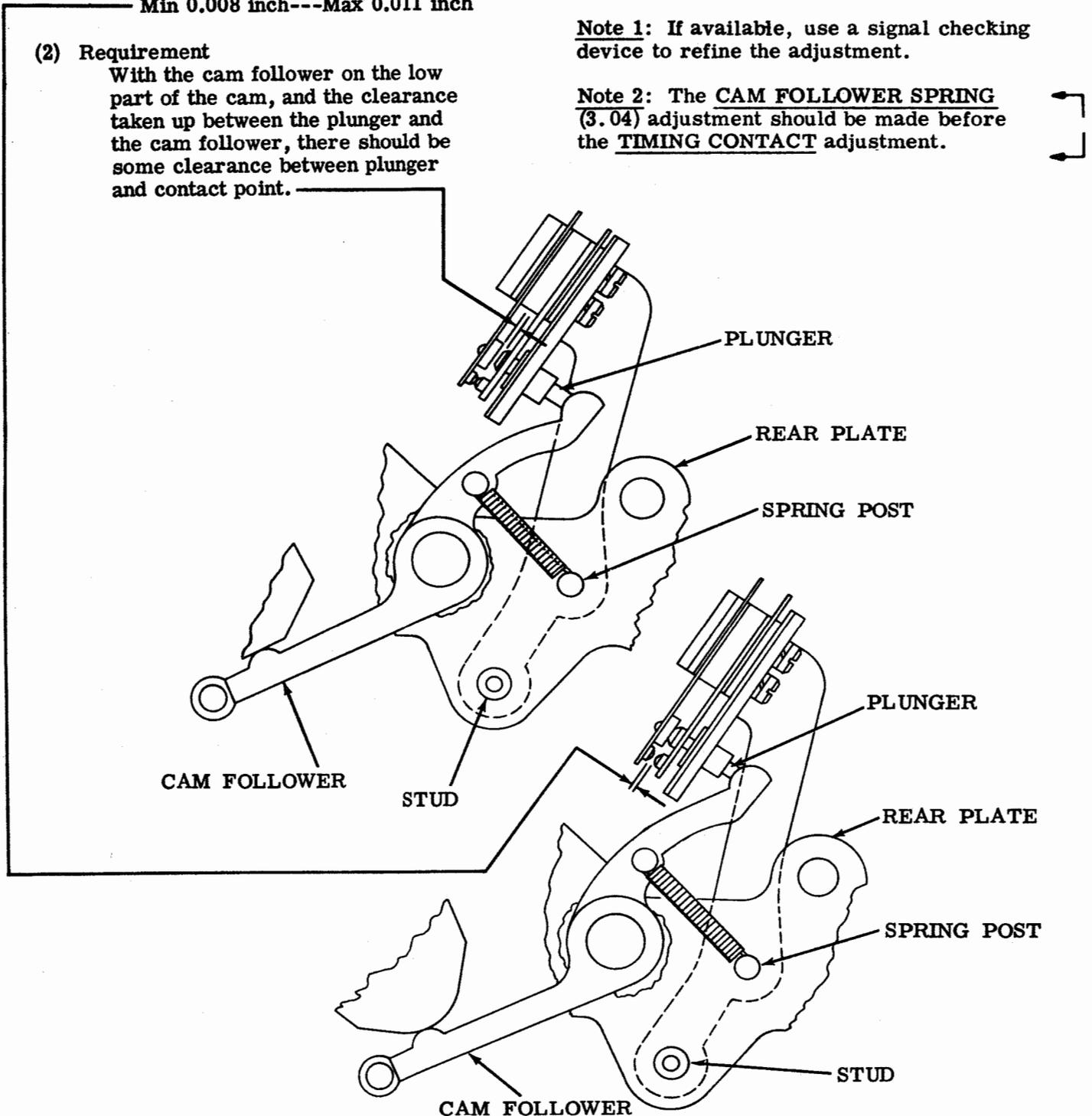
With the cam follower on the low part of the cam, and the clearance taken up between the plunger and the cam follower, there should be some clearance between plunger and contact point.

To Adjust

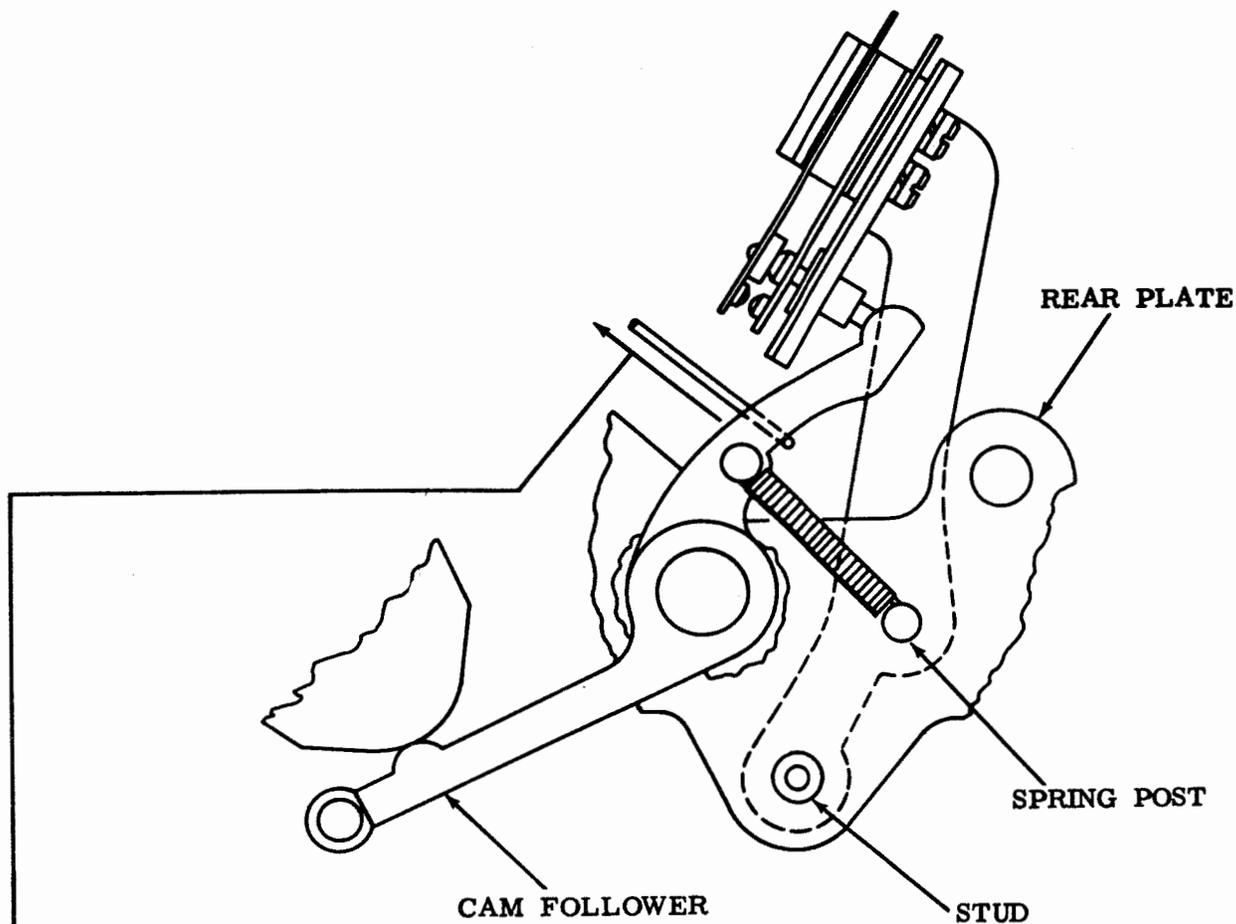
Loosen the two posts holding the timing contact bracket to friction tightness. Position the bracket in order to meet (1) and (2) Requirements. Tighten the posts and recheck the adjustment.

Note 1: If available, use a signal checking device to refine the adjustment.

Note 2: The CAM FOLLOWER SPRING (3.04) adjustment should be made before the TIMING CONTACT adjustment.



3.04 Timing Contact Mechanism (Later Design) (continued)



CAM FOLLOWER SPRING

**To Check**

Timing contact assembly must be moved out of contact with the cam follower, and spring post must be tightened to check this requirement and TIMING CONTACT SWINGER SPRING (3.05) adjustment.

**Requirement**

With the signal generator in the latched position, apply the pull end of the scale to the cam follower.

Min 6 oz---Max 9 oz  
to start cam follower moving.

3.05 Timing Contact Mechanism (Later Design) (continued)

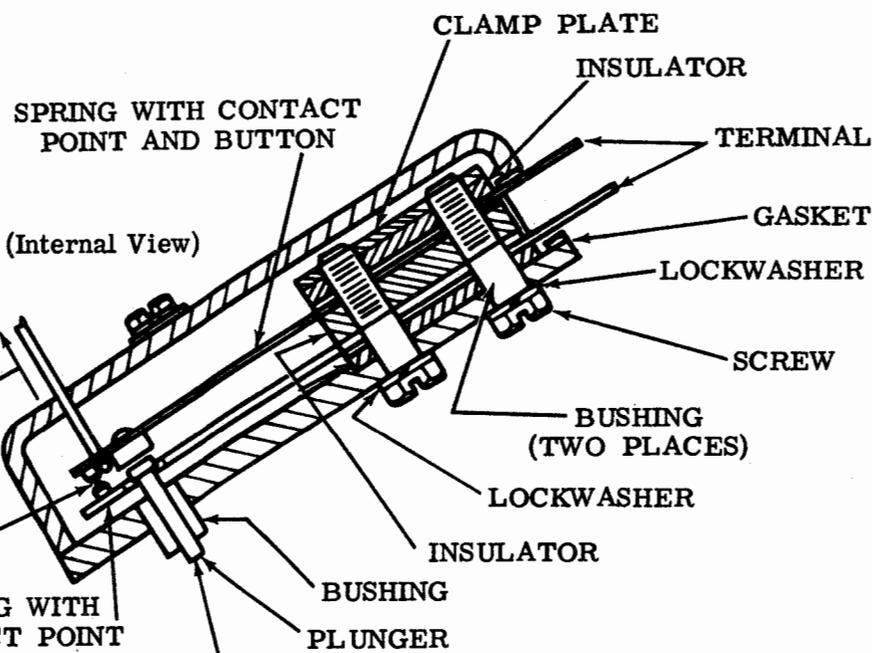
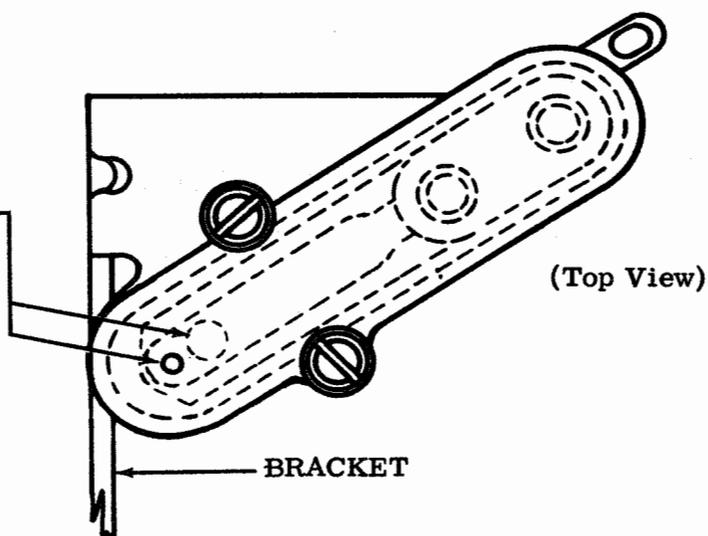
TIMING CONTACT SWINGER SPRING

(1) Requirement

Contact points should be in line and the head of the plunger should be centered in its hole in the spring as gauged by eye.

To Adjust

Position contact springs with screws friction tight. Tighten screws.



(2) Requirement

With plunger depressed flush with its bushing, contact cap should be  
Min 0.045 inch---Max 0.065 inch

To Adjust

Bend spring.

(3) Requirement

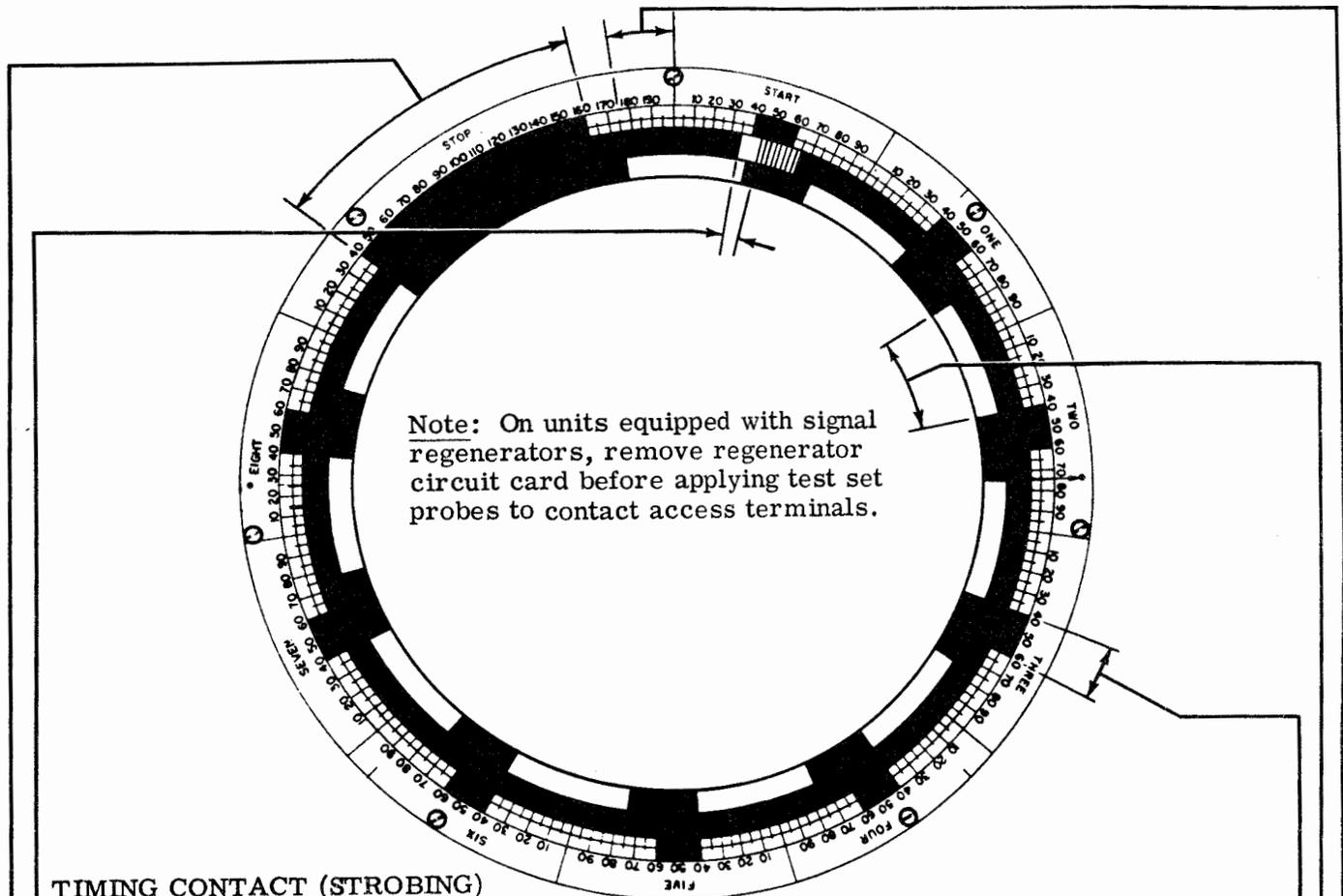
With contacts closed  
Min 3-1/2 oz---Max 4-1/2 oz  
to just open contacts.

To Adjust

Bend spring. Recheck timing contact adjustment.

Note: Timing contact assembly must be moved out of contact with cam follower and spring post tightened to check requirement (3). Refer to CAM FOLLOWER SPRING (3.04) adjustment.

## 3.06 Timing Contact Mechanism (Early Design) (continued)



**TIMING CONTACT (STROBING)**  
 (Using DXD test set, if available)

- (1) Zero the test set as described in procedure (1) of Par. 2.17.
- (2) The light image of the timing contacts should meet the following requirements for speeds up to and including 100 words per minute.
  - (A) Open for a minimum of 20 divisions between the 25 division and 75 division points of each 100 division pulse.
  - (B) Open for a minimum of 120 divisions between the 25 division and 175 division points of the stop pulse.
  - (C) The close to open transitions should be in multiples of 100 divisions  $\pm 5$  divisions of the start pulse.
  - (D) There should be no contact break between the zero division point and the close to open transition point, and no contact break between the 75 division point and the 100 division point of each pulse. There should be no contact break between the 175 division point and the 200 division point of the stop pulse.

**To Adjust**

Check and refine, if necessary, adjustment in Par. 3.01.

Note: The timing contacts should be open when the clutch is disengaged.

3.07 Local Backspace Mechanism

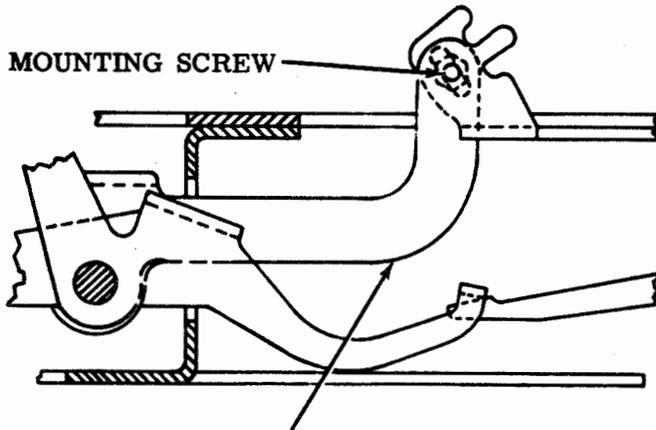
TRANSFER BAIL ADJUSTING LEVER

**Requirement**

Downward pressure on backspace key  
 Min 16 oz---Max 28 oz  
 to operate backspace lever.

**To Adjust**

Position transfer bail adjusting lever with its mounting screw loosened. If unit is forward spacing, the adjusting lever must be raised until proper backspacing is accomplished.



TRANSFER BAIL ADJUSTING LEVER

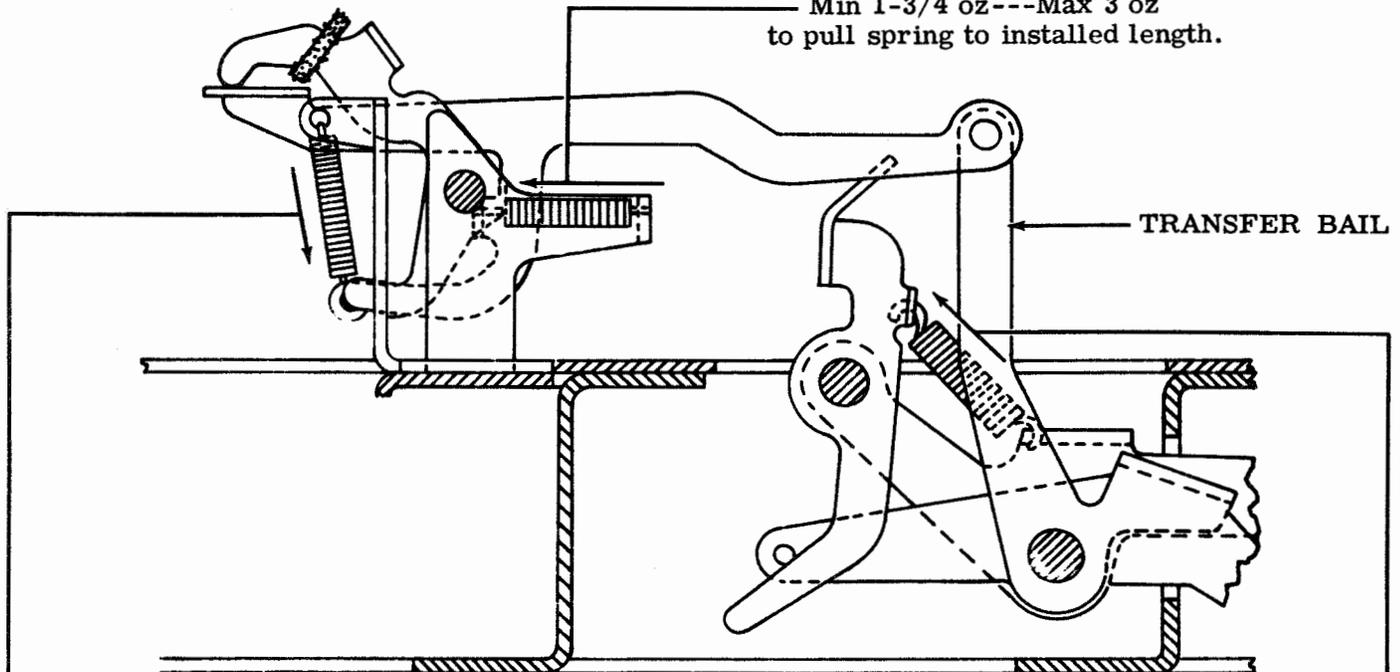
**Note 1:** This adjustment may require remaking when a different typing unit is used.

**Note 2:** The camming bail should return to its unoperated position when the key-lever is released. Refine adjustment if necessary.

TRIP LINK HORIZONTAL SPRING

**Requirement**

Unhook spring  
 Min 1-3/4 oz---Max 3 oz  
 to pull spring to installed length.



TRIP LINK VERTICAL SPRING

**Requirement**

Unhook spring  
 Min 1-1/2 oz---Max 3 oz  
 to pull spring to installed length.

TRANSFER BAIL SPRING

**Requirement**

Unhook spring  
 Min 1/2 oz---Max 1 oz  
 to pull spring to installed length.

**SECTION 574-222-700TC**

**3.08 Receive-Break Switch Mechanism**

**RECEIVE-BREAK SWITCH**

**Requirement**

The bail should operate the contact pile-up with some overtravel.

**To Check**

Keyboard lock plunger in downward position. Function bail latched.

**To Adjust**

Loosen lock nut on adjusting screw and position screw. Recheck for overtravel.

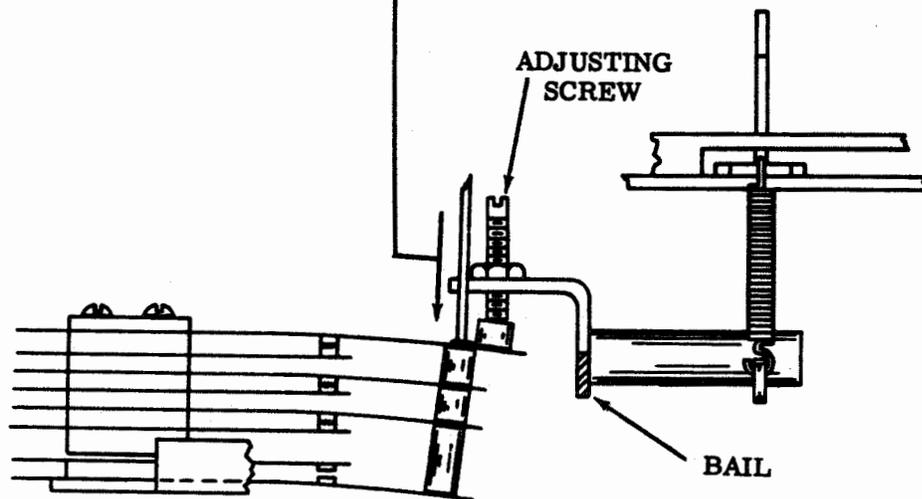
**RECEIVE-BREAK SWITCH TENSION**

**Requirement**

Normally open contacts should close and normally closed contacts should open  
Min 10 oz---Max 16 oz

**To Adjust**

Bend leaves carefully to meet requirements.



3.09 Codebar Arrangement for Even Parity (Early Design)

Note: For late design see 3.10.

CLUTCH TRIPBAR SPRING

Requirement

Clutch disengaged. Power off.

Min 8 oz---Max 12 oz  
to move bar.

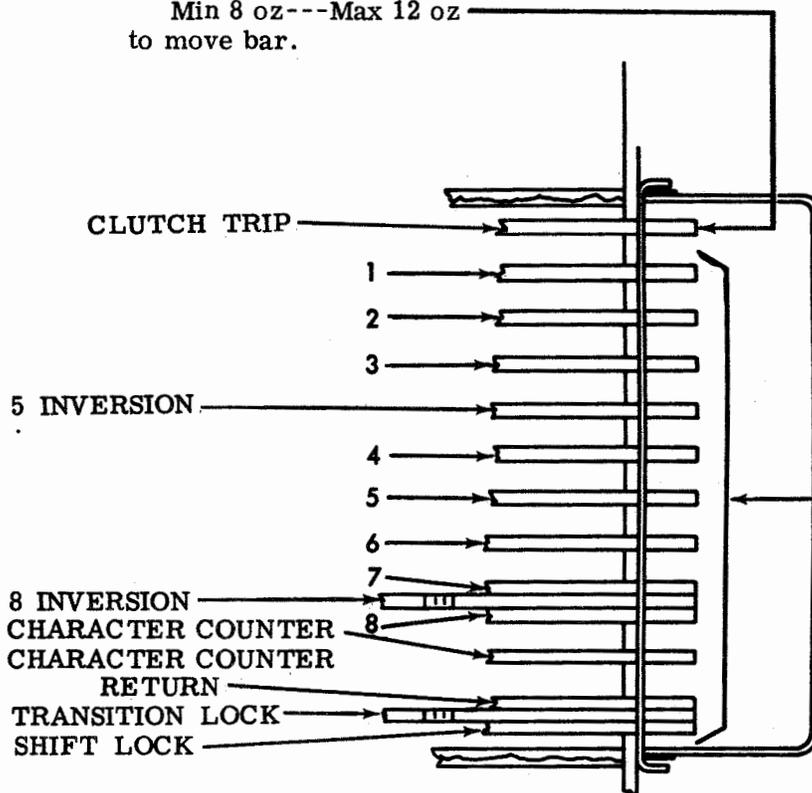
CODEBARS, SHIFT AND CONTROL LOCKBAR, COUNTER AND RETURN BAR SPRINGS

Requirement

Depress rubout or delete key.  
Power off. Transfer levers held right

Min 5 oz---Max 7-1/2 oz  
(no. 1, 2, 3, 4, 5, 6, 7, and 8 codebars)

Min 2 oz---Max 4 oz  
(all remaining bars)  
to start bar moving.



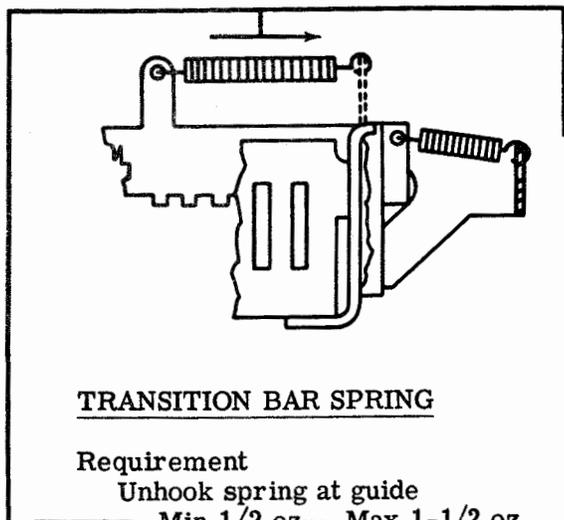
NO. 5 AND NO. 8 INVERSION BAR SPRINGS

Requirement

Codebar in latched position.

Unhook spring at guide

Min 6 oz---Max 8 oz  
to pull to installed length.



TRANSITION BAR SPRING

Requirement

Unhook spring at guide

Min 1/2 oz---Max 1-1/2 oz  
to pull to installed length.

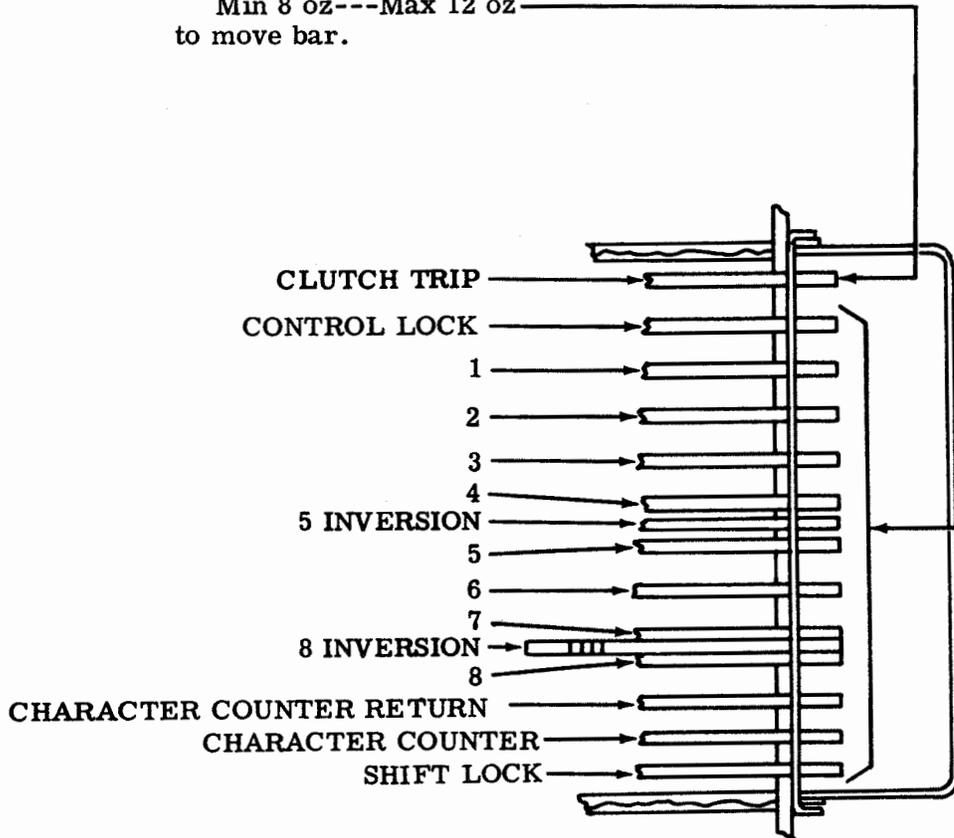
3.10 Codebar Arrangement for Even Parity (Late Design)

Note: For early design see 3.09.

CLUTCH TRIPBAR SPRING

Requirement

Clutch disengaged and power off  
 Min 8 oz---Max 12 oz  
 to move bar.



CODEBARS, SHIFT AND CONTROL LOCKBAR, COUNTER AND COUNTER RETURN BAR SPRINGS

Requirement

Depress rubout or delete key. Power off. Transfer levers held right.

Min 2 oz---Max 4 oz  
 for all remaining bars.

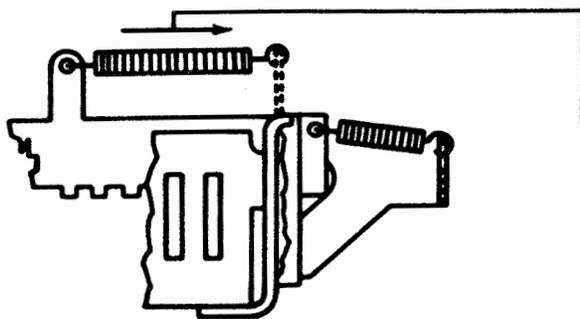
Min 5 oz---Max 7-1/2 oz  
 for 1 through 8 codebars to  
 start each bar moving.

NO. 5 AND NO. 8 INVERSION BAR SPRINGS

Requirement

With codebar in latched position unhook spring at guide

Min 2 oz---Max 4 oz  
 to pull to installed length.



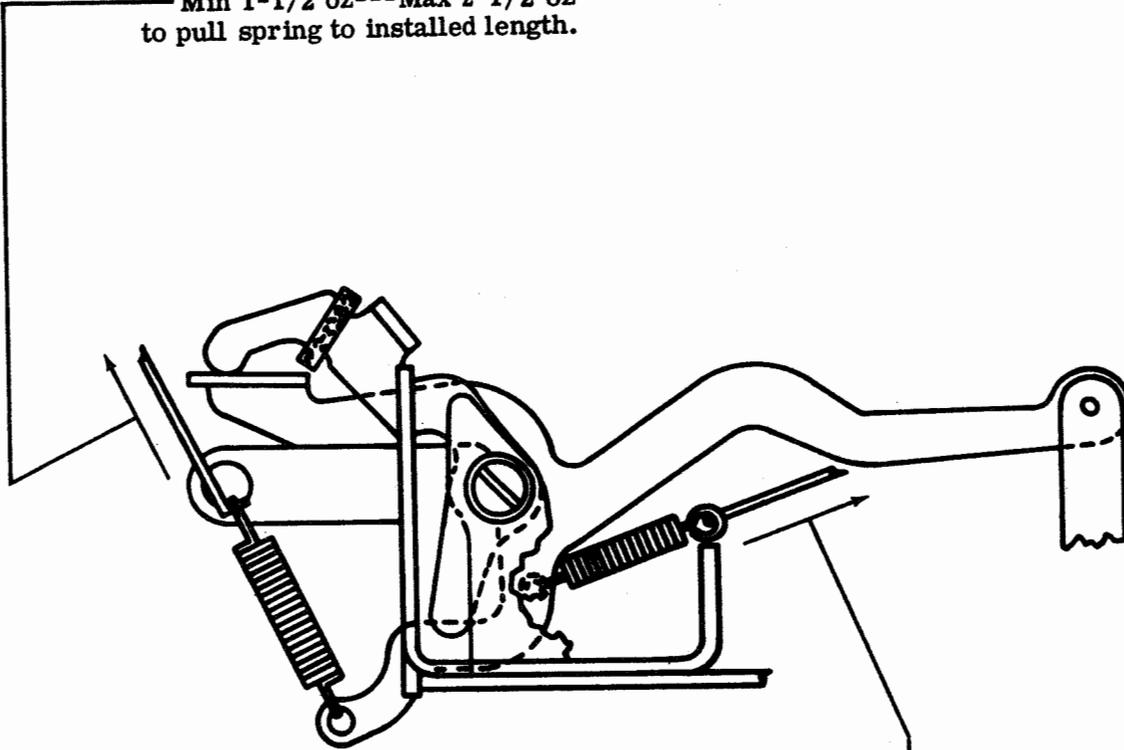
3.11 Local Single Line Feed Mechanism

TRIP LINK VERTICAL SPRING

Requirement

Unhook spring

Min 1-1/2 oz---Max 2-1/2 oz  
to pull spring to installed length.



(Left View)

TRIP LINK HORIZONTAL REAR SPRING

Requirement

Unhook spring

Min 1-1/2 oz---Max 3-1/2 oz  
to pull spring to installed length.

TRIP LINK FRONT SPRING

Requirement

Unhook spring

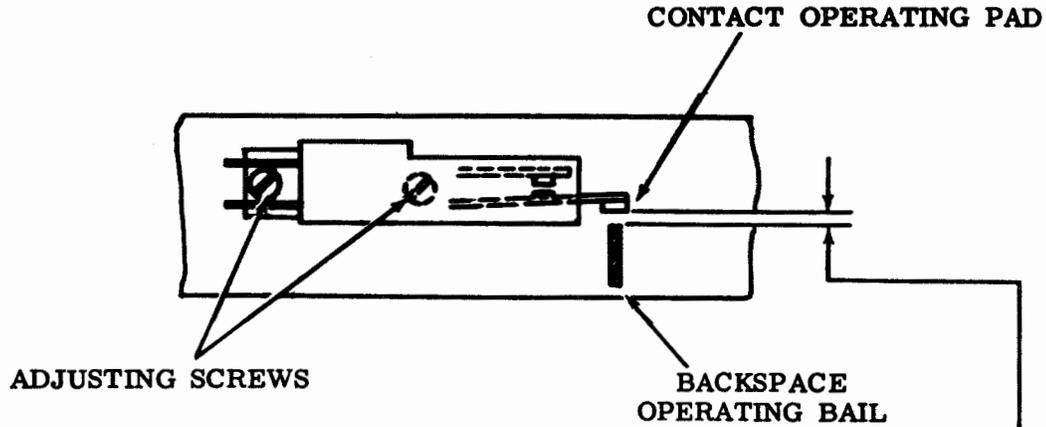
Min 1-1/2 oz---Max 2-1/2 oz  
to pull spring to installed length.

3.12 Reperforator Backspace Actuating Switch Mechanism

OPERATING PAD GAP

**Requirement**

Depressing LOC BSP key should close normally open reperforator backspace actuating switch.

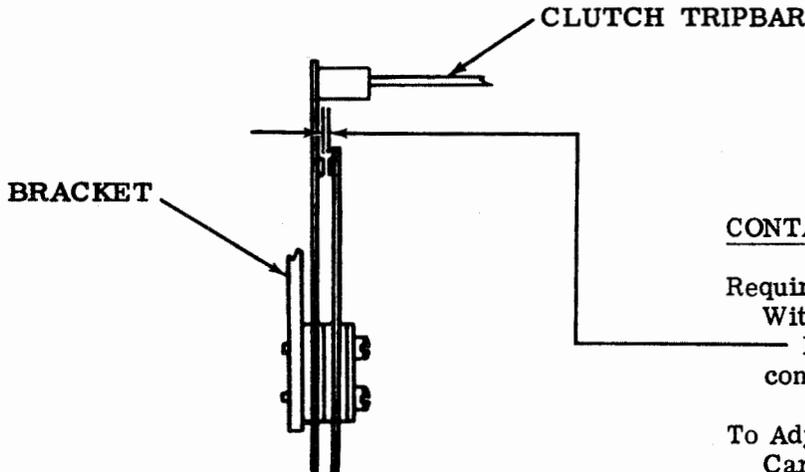


**To Adjust**

Check with ohmmeter, shift switch assembly on mounting holes.

Note: Ideal condition exists when printer and reperforator backspace simultaneously. To achieve, adjust by trial and error with printer and reperforator mounted. If reperforator backspaces before printer, increase gap between contact operating pad and backspace operating bail. If printer backspaces first, decrease gap.

→ 3.13 Universal Keyboard Contact Mechanism



CONTACT GAP

**Requirement**

With clutch latched  
Min 0.010 inch---Max 0.020 inch  
contact gap.

**To Adjust**

Carefully bend contact spring to meet requirement.

## 3.14 Universal Keyboard Switch Mechanism

Note: Suitable arc suppression should be provided when warranted.

KEYBOARD SWITCH (HORIZONTAL)

## (1) Requirement

Align contact assembly, guide, and code lever assembly. There should be

Min some---Max 0.020 inch clearance between the right edge of the contact swinger insulator and the extension of the code lever assembly in the unoperated position.

## To Adjust

Loosen screw holding the contact assembly to the retainer bars and adjust. Tighten screw.

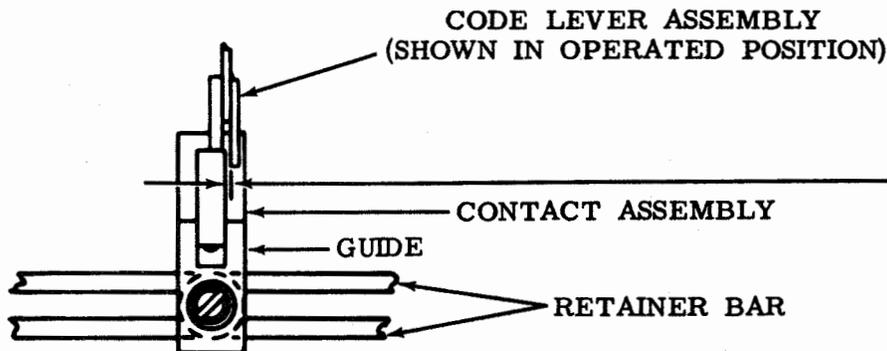
## (2) Requirement

Clearance between the contact assembly spring and the keyboard wedge retainer should be

Min 0.062 inch

## To Adjust

Bend the retainer bar if necessary.



3.15 Universal Keyboard Switch Mechanism (continued)

KEYBOARD SWITCH (VERTICAL)

(1) Requirement

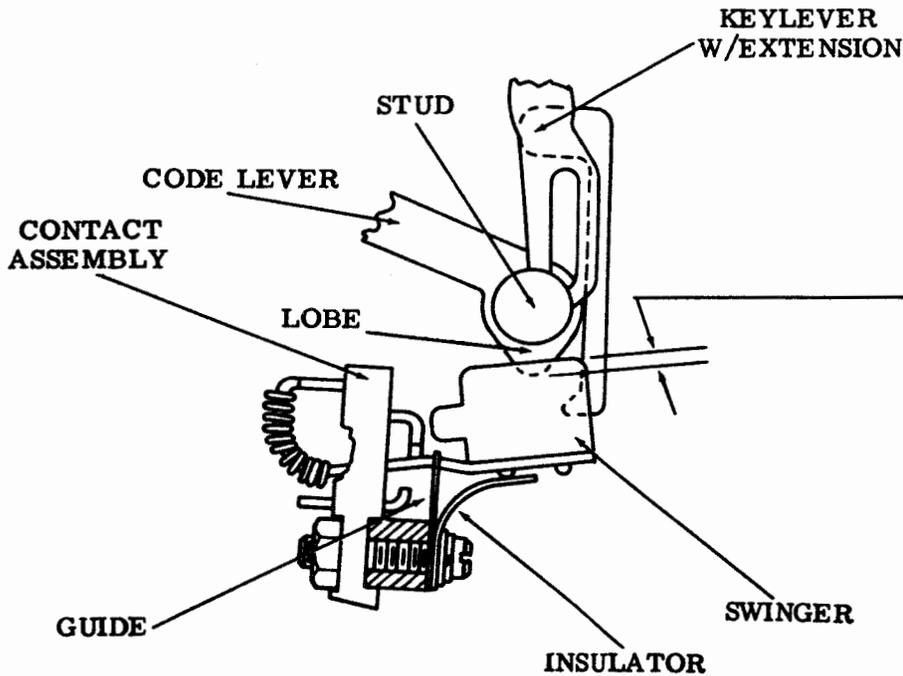
With unit in stop position and keylever depressed to a point where clutch engages, center and lower contact should just close or have a maximum gap of 0.008 inch.

(2) Requirement

For keylevers which do not cause clutch engagements, and with keylever unoperated, tip of code lever lobe should overlap contact swinger by  
Min some---Max 0.020 inch

To Adjust

Loosen two screws which fasten two brackets on the two studs and position complete mounting assembly.



**3.16 Tape Alarm****TAPE ALARM SWITCH****Requirement**

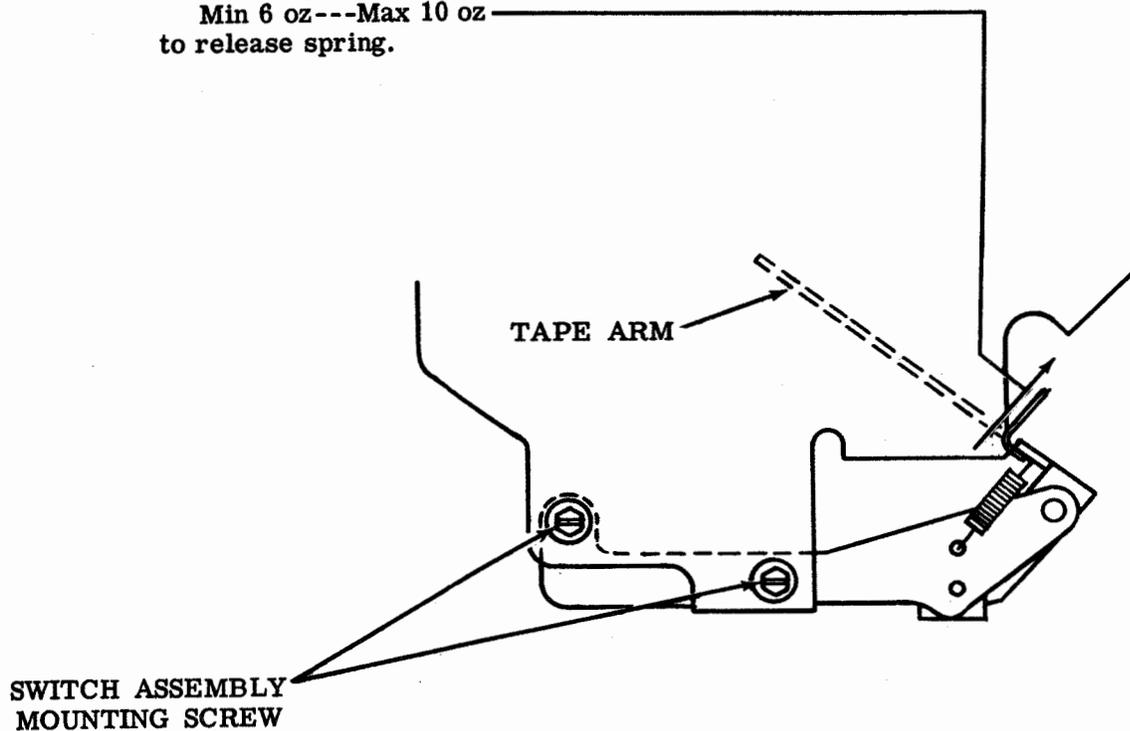
Switch should operate when roll of tape is reduced in diameter  
Min 2-3/8 inch---Max 2-3/4 inch

**To Adjust**

With switch assembly mounting screws loosened, position assembly in tape container to meet requirement. Bend tape arm if necessary.

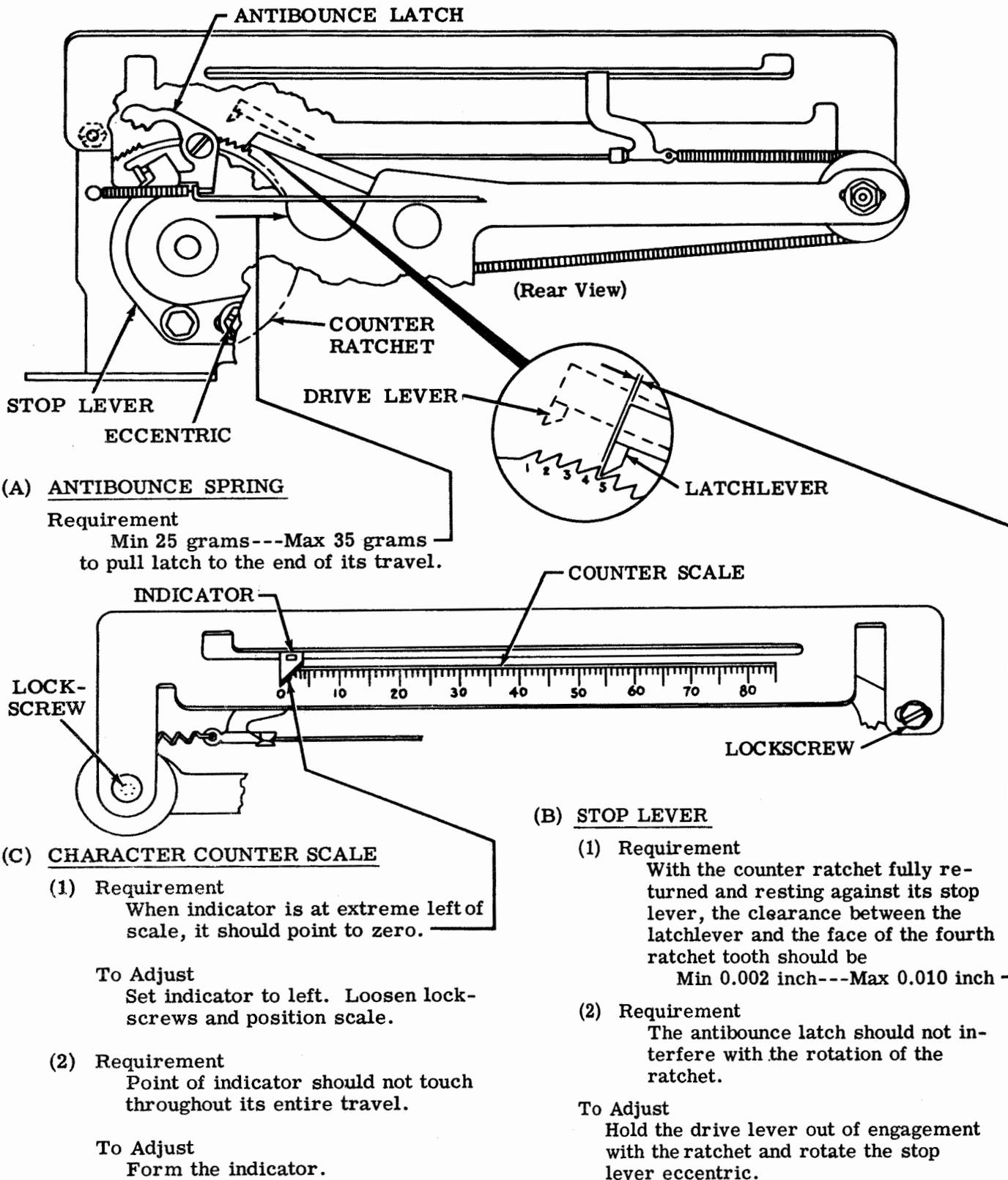
**TAPE ARM SPRING****Requirement**

Hook spring scale over tape lever and pull in line with spring  
Min 6 oz---Max 10 oz  
to release spring.



3.17 Character Counter Mechanism

Note: Character counter adjustments may be facilitated by removing the assembly from the keyboard except for Par. 3.16, character counter stroke.



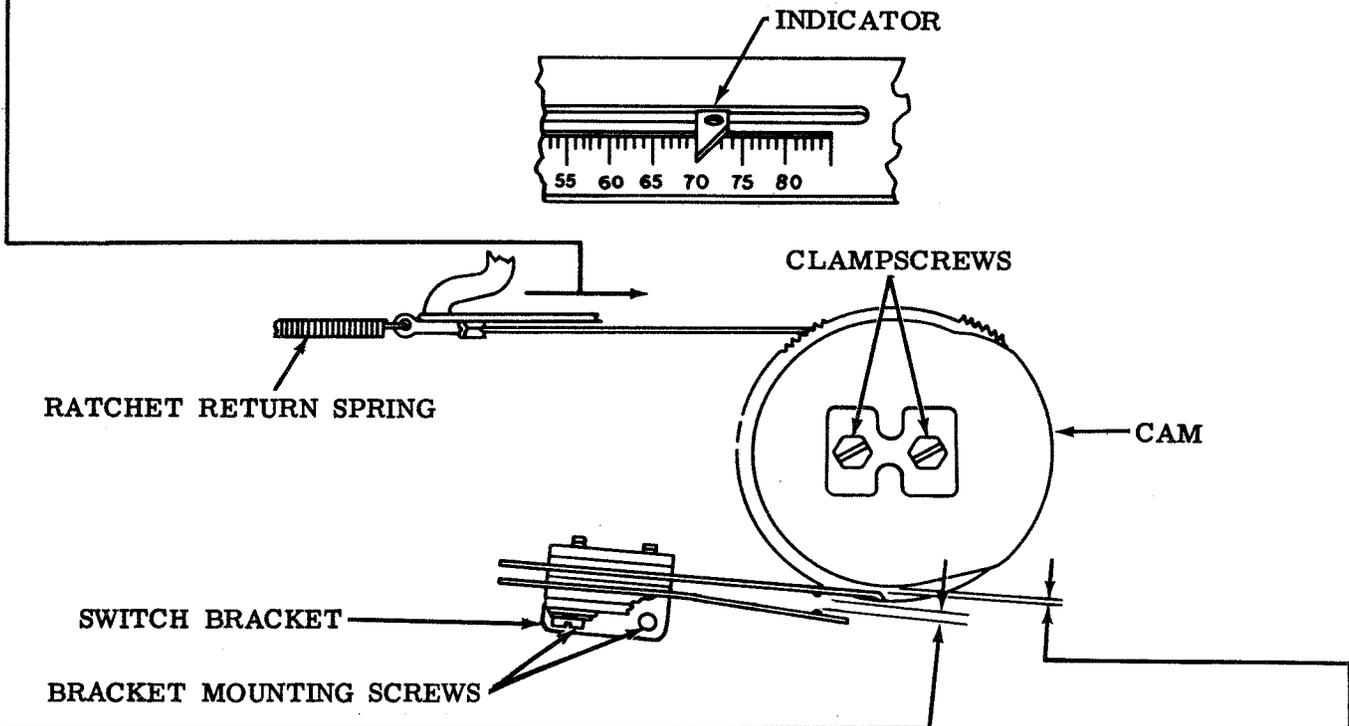
## 3.18 Character Counter Mechanism (continued)

(A) RATCHET DRUM ASSEMBLY RETURN SPRING

## Requirement

Min 1/2 oz---Max 1-1/2 oz  
when indicator points to 35 on the scale.

Min 1-1/2 oz---Max 2-1/2 oz  
when indicator points to 70 on the scale.

(B) END-OF-LINE SWITCH

## (1) Requirement

Switch leaves should be approximately parallel to switch mounting bracket as gauged by eye. Upper switch leaf should clear low part of cam

Min some---Max 0.025 inch  
at closest point.

## To Adjust

Loosen switch bracket mounting screws and position assembly.

## (2) Requirement

Clearance between contacts of switch leaves should be

Min 0.005 inch---Max 0.020 inch

## To Adjust

Bend lower leaf of switch.

## (3) Requirement

Switch should close at a preset number of characters with a small amount of overtravel by both contact leaves.

## To Adjust

Set indicator to count desired. Loosen clampscrews and adjust cam until switch just closes. Tighten screws. Check operation and refine 1, 2, and 3 if necessary.

3.19 Character Counter Mechanism (continued)

(A) CHARACTER COUNTER STROKE

(1) Requirement - Mount Assembly on Keyboard

When character and REPEAT keys are depressed, the counter should operate consistently in T or K-T position. When CARRIAGE RETURN key is depressed, the counter should reset without binding. The mechanism should count the first character on a restart after reset condition.

Min 0.006---Max 0.015 inch

between drive lever and ratchet tooth, when counter is set near midpoint of its range.

To Adjust

Loosen mounting screws. With keyboard in T position, start motor and strike CARRIAGE RETURN key, and then E key. Turn off motor. Depress E key. Position character counter frame for clearance. Turn control knob to K-T position and recheck. Refine if necessary.

(2) Requirement (not illustrated)

Min some clearance between drive lever and adjacent no. 8 codebar.

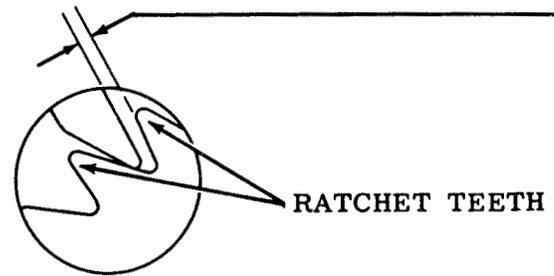
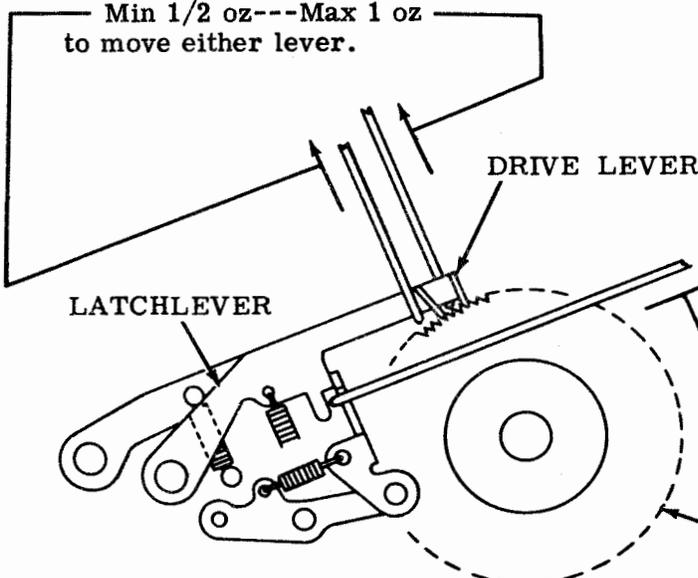
To Adjust

Loosen mounting screws and position character counter toward front of unit until requirement is met. Tighten screws.

(B) RESET LATCHLEVER AND DRIVE LEVER SPRING

Requirement

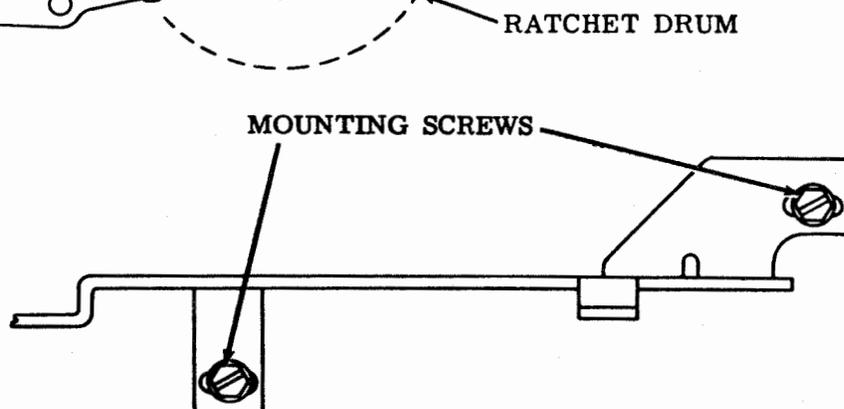
Min 1/2 oz---Max 1 oz to move either lever.



(C) RESET LEVER EXTENSION SPRING

Requirement

With the codebars latched  
Min 1/2 oz---Max 1-1/4 oz to start lever moving.



## 3.20 Auxiliary Contact Mechanism

CONTACT GAP

## Requirement

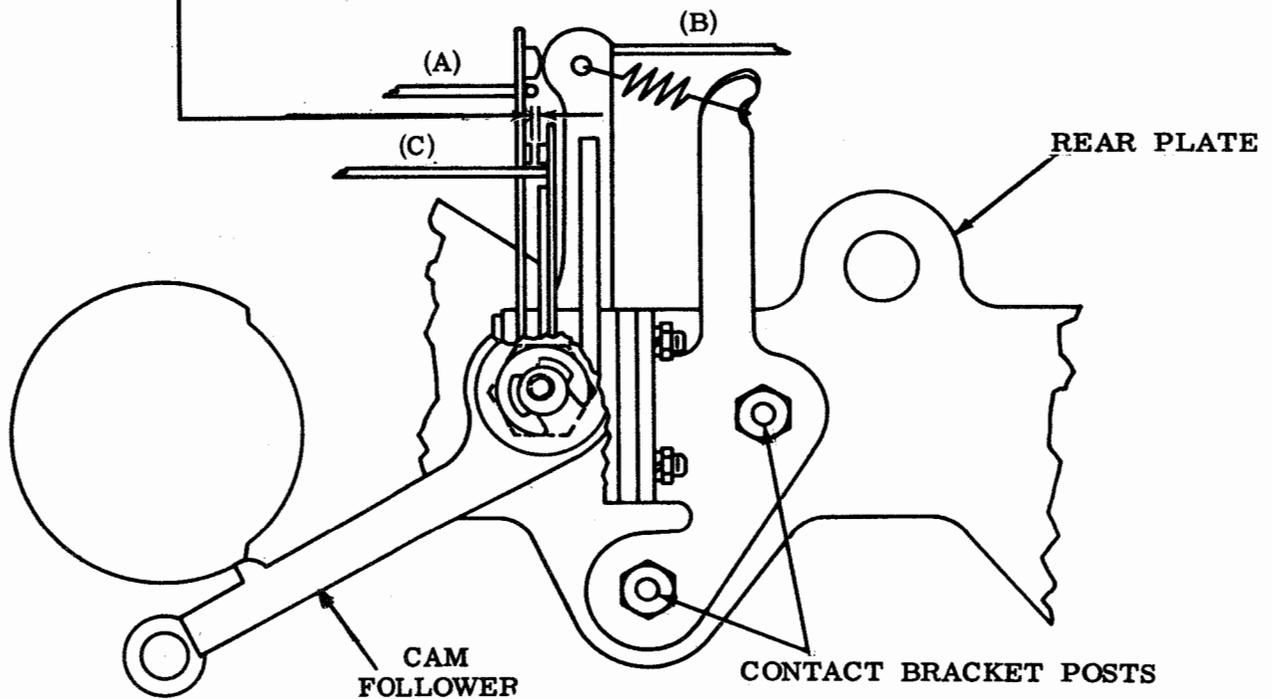
Clutch latched, cam follower on high part of cam.

Contact gap should be

Min 0.005 inch---Max 0.015 inch

## To Adjust

Loosen posts that hold contact bracket. Position bracket by use of screwdriver placed between bracket upright and rear plate.



See Par. 3.02 for requirements of:

- (A) CONTACT SWINGER
- (B) CAM FOLLOWER SPRING
- (C) CONTACT STIFFENER

See Par. 3.26 for AUXILIARY CONTACT REFINEMENT (STROBING).

3.21 Code Reading Contact Mechanism

Note 1: Adjustments on this page should be made with the contact assembly removed from the keyboard.

Note 2: Each adjustment should start with the contact pile-up farthest from the handle of the bending tool. See Par. 3.22.

(A) BACKSTOP - NORMALLY CLOSED CONTACT

Requirement

Normally closed contact leaf should be parallel to mounting plate and align with each other by 0.010 inch.

To Adjust  
Bend backstop.

(D) NORMALLY OPEN CONTACT GAP

Requirement

Min 0.018 inch---Max 0.030 inch normally open gap.

To Adjust  
Bend backstop.

(C) CONTACT SWINGER SPRING

Requirement

Min 30 grams---Max 40 grams to open the closed contact.

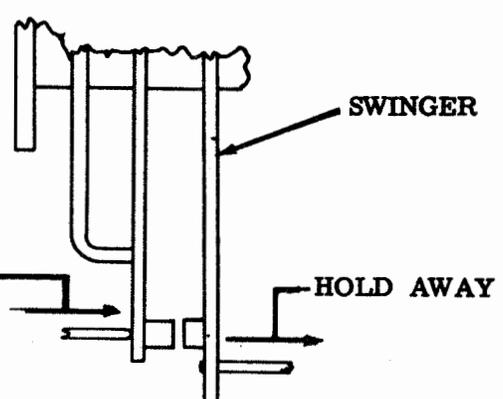
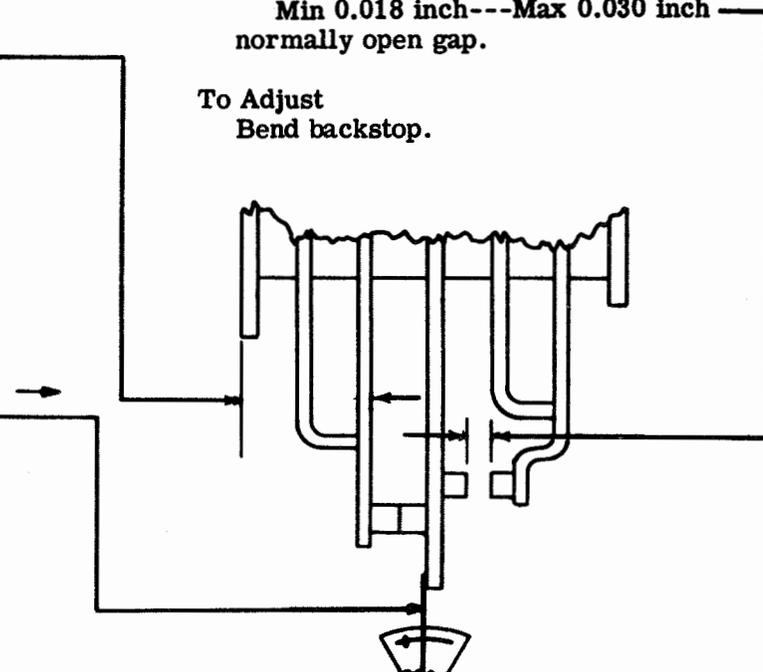
To Adjust  
Bend swinger.

(B) NORMALLY CLOSED CONTACT SPRING

Requirement

Min 2 oz---Max 6 oz to move contact spring away from backstop. Hold swinger away from closed contact.

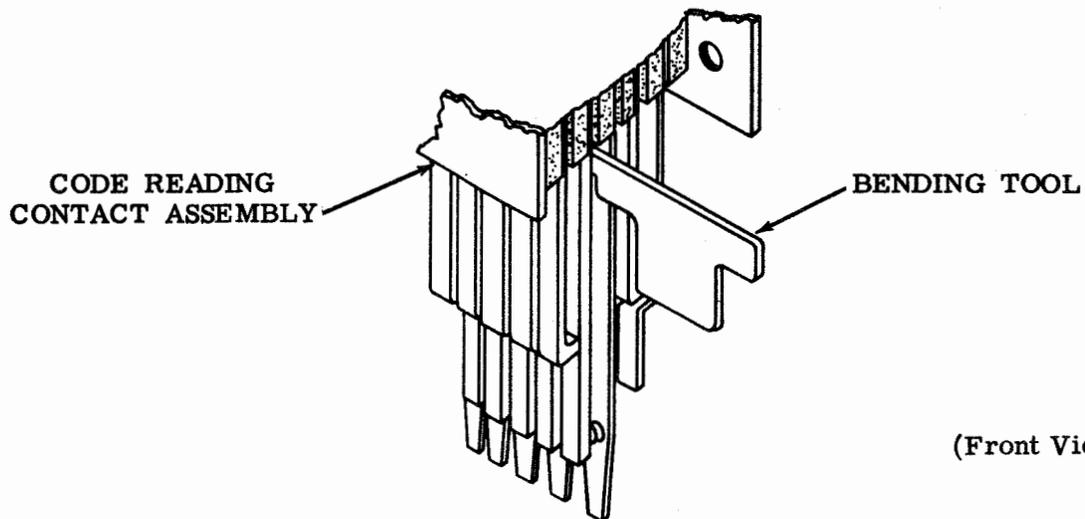
To Adjust  
Bend spring. To increase tension against backstop, bend backstop away from spring leaf and form leaf toward backstop, then reposition backstop per BACKSTOP - NORMALLY CLOSED CONTACT Par. 3.21.



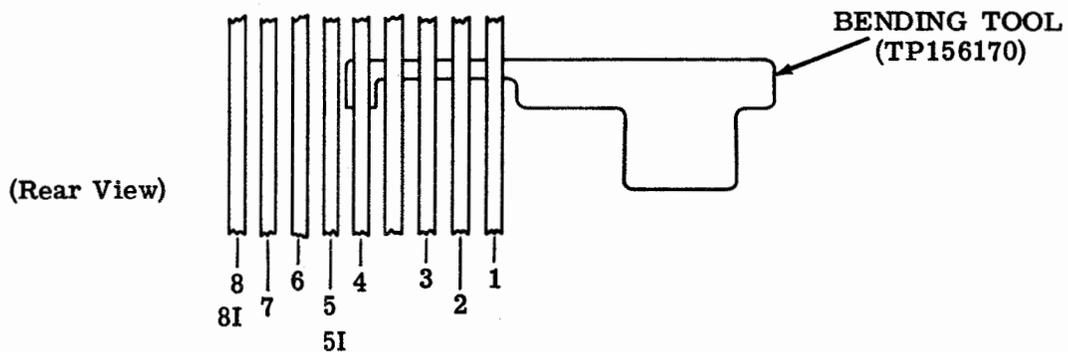
## 3.22 Code Reading Contact Mechanism (continued)

ADJUSTING CODE READING CONTACTS

- (1) The contact assembly should be removed from the keyboard to perform the adjustments of Par. 3.21. It is not necessary to remove the wires from the assembly.



- (2) Each adjustment should start with the contact pile-up farthest from the handle of the bending tool.



- (3) After adjusting contact pile-ups 4, 3, 2, and 1, insert the bending tool in the opposite side of the assembly and adjust contact pile-ups 5, 6, 7, and 8 in the order given.

3.23 Code Reading Contact Mechanism (continued)

**Note:** Perform LATCHLEVER SPRING. Then install contact assembly on the keyboard for the remaining code reading contact adjustments.

(B) MARKING CONTACT GAP

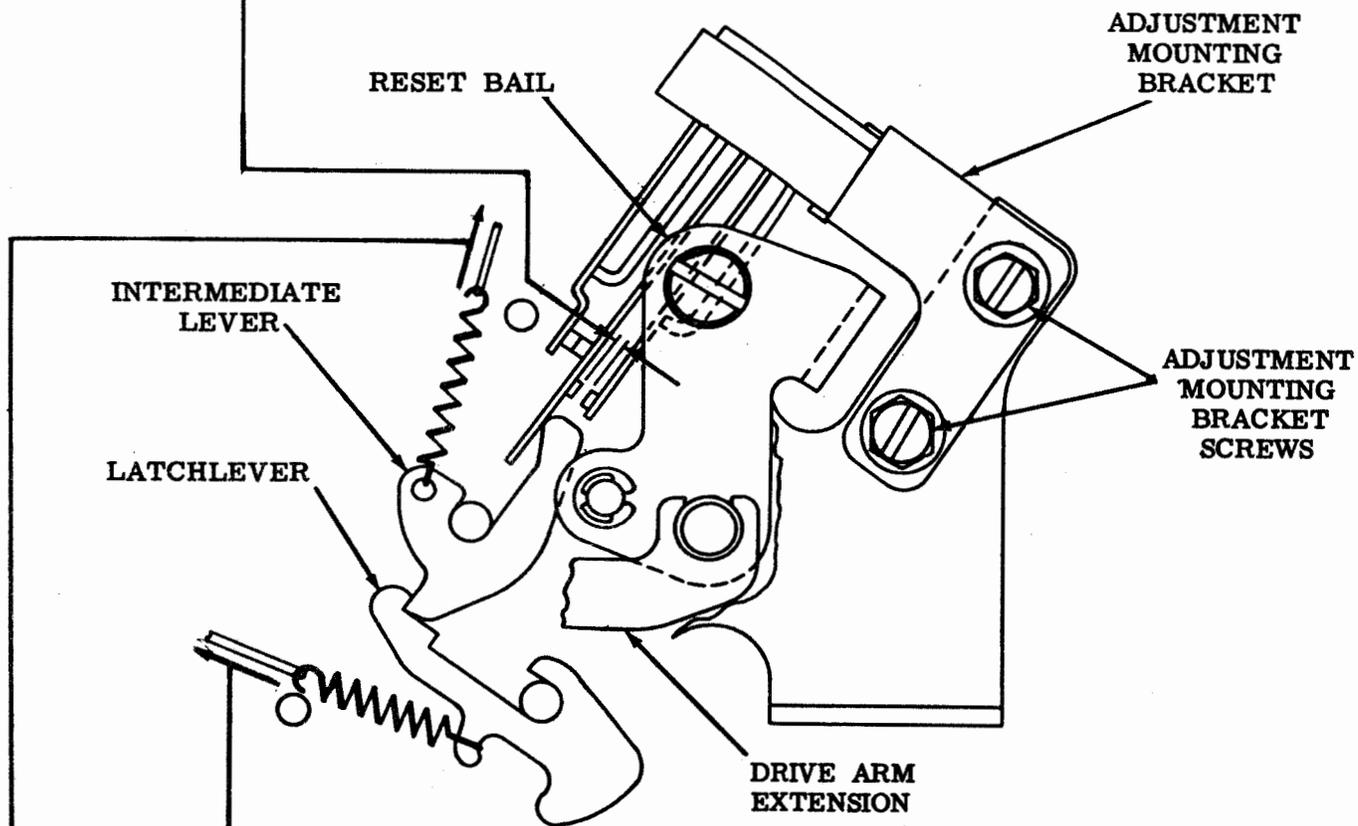
**Requirement**

With the clutch latched  
Min 0.005 inch---Max 0.015 inch  
contact gap. Check outside levels only.

**To Adjust**

Loosen four contact mounting bracket screws.  
Position contact adjustment mounting bracket.

**CAUTION:** DO NOT APPLY FORCE TO CONTACT PILE-UP.



(C) INTERMEDIATE LEVER SPRING

**Requirement**

With the clutch latched  
Min 1 oz---Max 2 oz  
to pull spring to installed length.

(A) LATCHLEVER SPRING

**Requirement**

With the clutch latched  
Min 2 oz---Max 4 oz  
to pull spring to installed length.

3.24 Code Reading Contact Mechanism (continued)

**RESET BAIL**

**Requirement**

Gap between any one latch and its intermediate lever should be

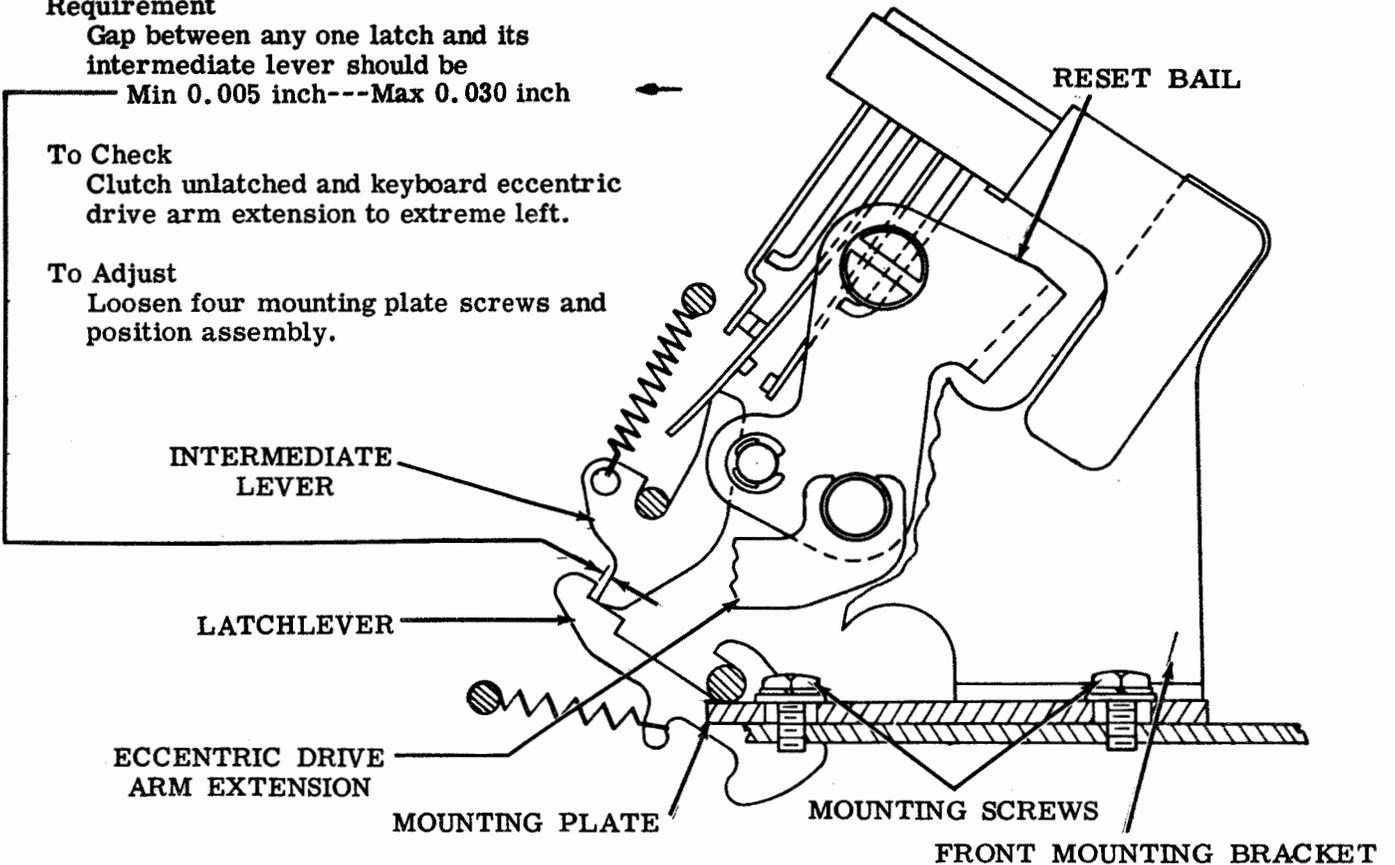
Min 0.005 inch---Max 0.030 inch

**To Check**

Clutch unlatched and keyboard eccentric drive arm extension to extreme left.

**To Adjust**

Loosen four mounting plate screws and position assembly.



**DRIVE ARM EXTENSION SPRING**

**Requirement**

Clutch latched

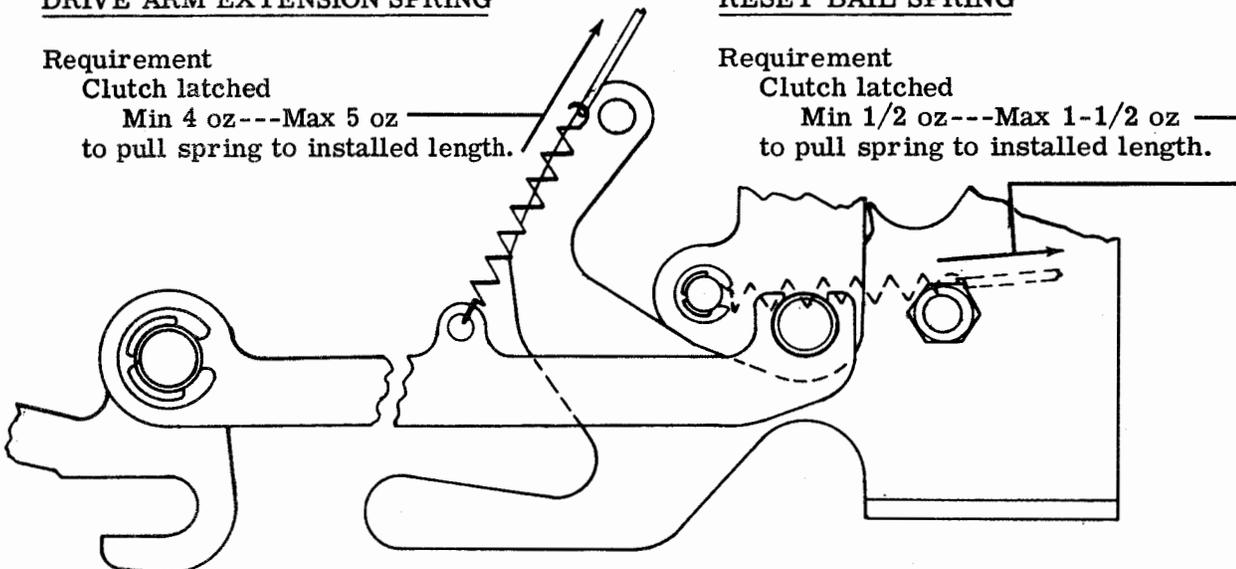
Min 4 oz---Max 5 oz  
to pull spring to installed length.

**RESET BAIL SPRING**

**Requirement**

Clutch latched

Min 1/2 oz---Max 1-1/2 oz  
to pull spring to installed length.



3.25 Code Reading Contact Mechanism (continued)

**Note 1:** The following tests should be performed using a DXD test set, if available, after the contact-assembly has been installed and all adjustments have been made.

**Note 2:** Minimum signal lengths apply to time between latest start and earliest end of all contact traces.

CODE READING CONTACT REFINEMENT (STROBING)

(1) Requirement

Zero the strobe unit (DXD) as follows:

- (A) Connect strobe neon trace to code reading contact no. 1. Send rubout combination from keyboard. Note latest point at which trace begins.
- (B) Repeat step (A) for all code reading contacts.
- (C) Choose trace that starts latest and set START-ZERO mark of strobe scale to this point.
- (D) Record earliest end of neon traces for future adjustment references.

(2) Requirement

Connect neon trace lamp to marking contact (contact that is normally open when keyboard is idle) of code reading contact assembly.

- (A) Send rubout combination from keyboard.
- (B) Combined code reading contact traces should have minimum signal length of 500 divisions (length between latest start and earliest end) and all bounce should end within 20 divisions of latest start of a contact trace. See Par. 3.26 for figure of strobe trace.
- (C) Repeat (A) and (B) for each code reading contact.

To Adjust

Refine Par. 3.21 (A).

Refine Par. 3.21 (B) and (C) if there is excessive bounce.

3.26 Auxiliary Contact Mechanism (continued)

AUXILIARY CONTACT REFINEMENT (STROBING)

Requirement (See Notes 1 and 2 in Par. 3.25)

Zero the strobe unit (DXD) as explained in (1) Requirement of Par. 3.25.

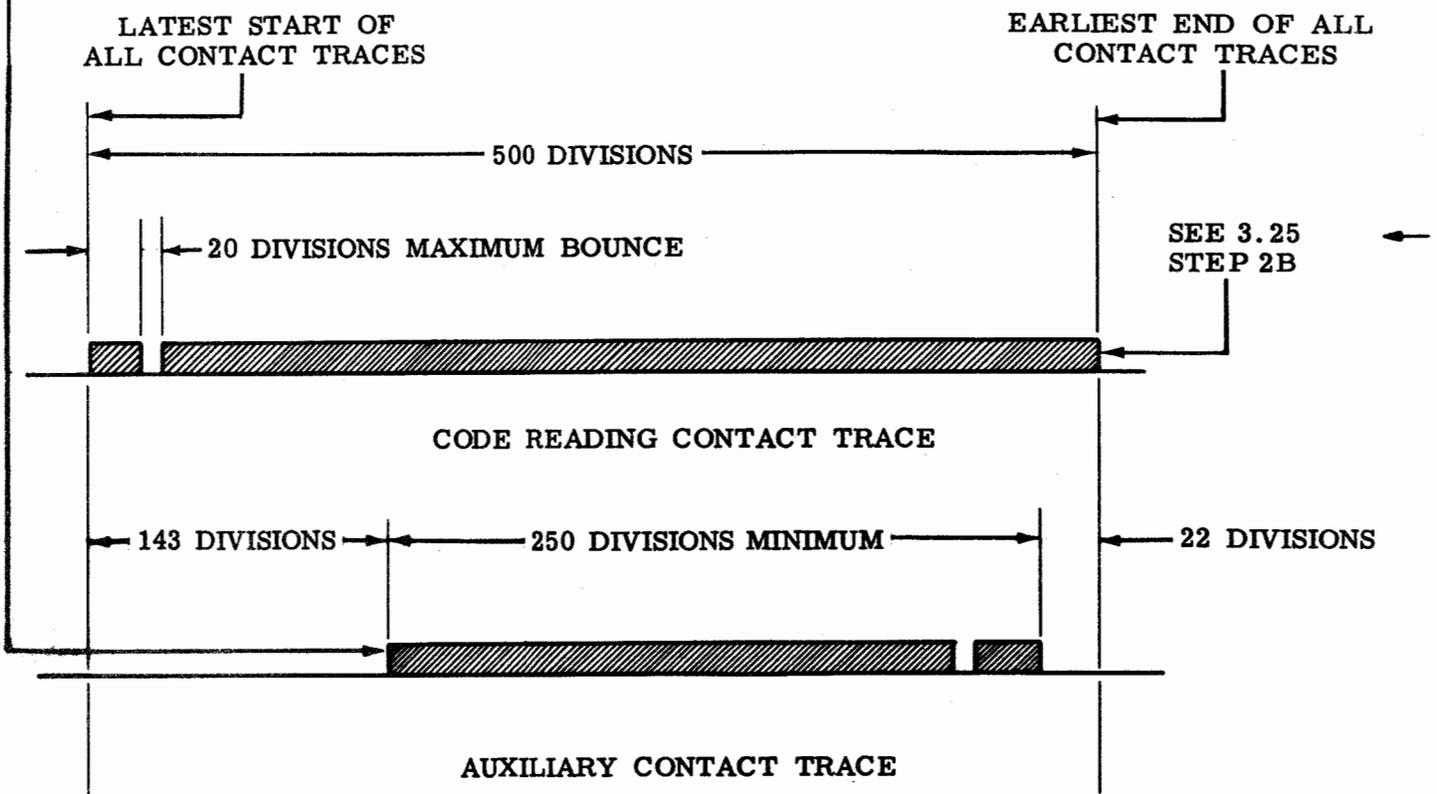
Connect strobe neon trace to auxiliary contacts.

(A) Send rubout combination from keyboard.

(B) End of neon trace should occur at a minimum of 22 divisions before earliest end of code read contact traces (including any bounce). Start of trace should begin at a minimum of 143 divisions after the strobe START-ZERO mark. The pulse must be at least 250 divisions long.

To Adjust

Refine adjustment in Par. 3.20.



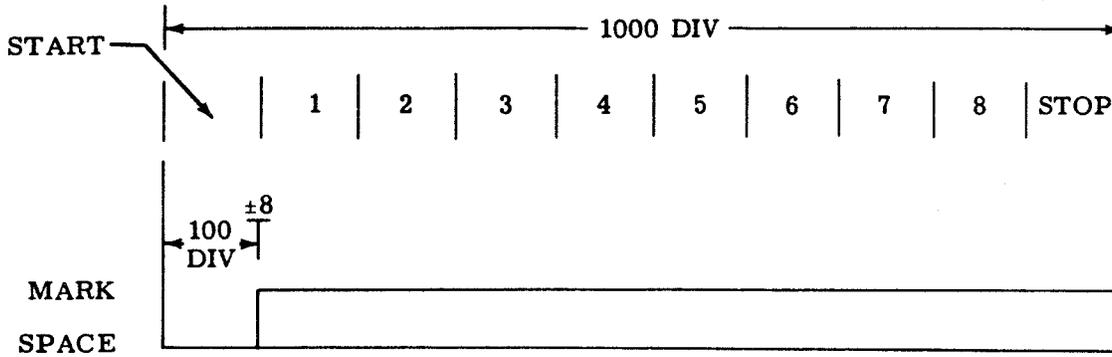
SECTION 574-222-700TC

3.27 Strobing Requirements

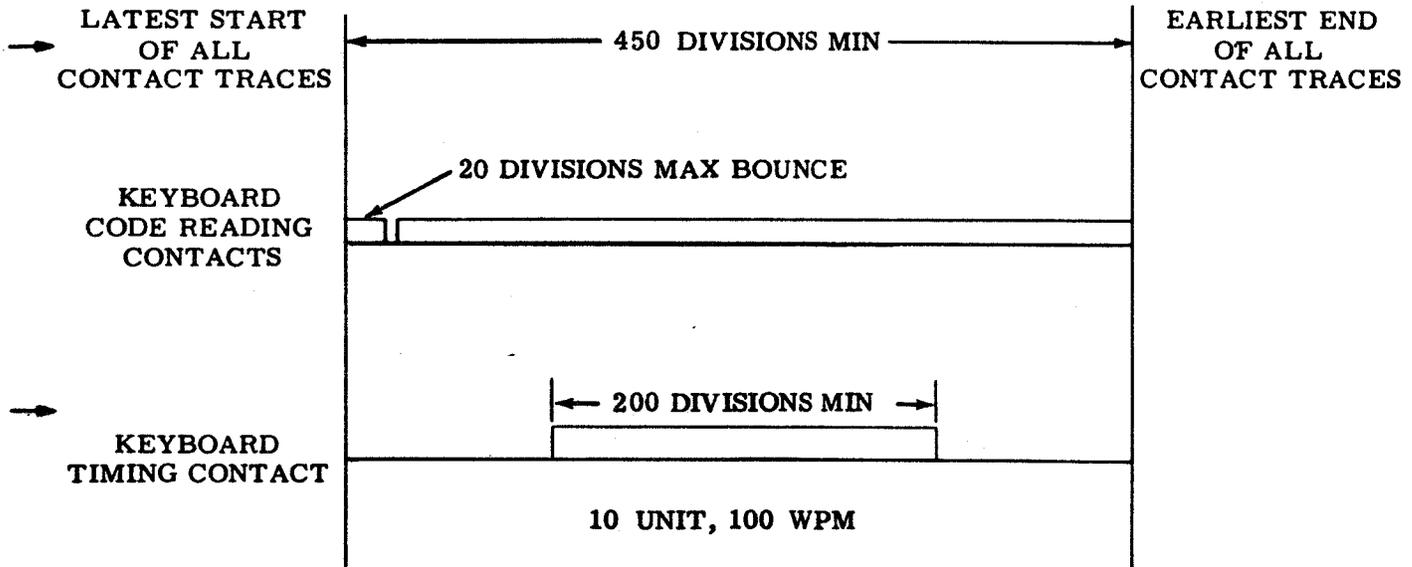
- Note 1: The following tests should be performed using a DXD test set, if available.

Note 2: For units equipped with signal regenerators, remove regenerator circuit card before applying test set probes to signal contacts.

SIGNAL GENERATOR CONTACTS



CODE READING AND TIMING CONTACTS



**CAUTION: APPLYING OPERATING VOLTAGE OF SIGNAL DISTORTION TEST SET DIRECTLY TO GOLD-PLATED SIGNAL CONTACTS MAY MAKE THEM UNSUITABLE FOR LOW-VOLTAGE APPLICATIONS. SEE PAR. 1.07 FOR SERVICING INSTRUCTIONS.**

35 TYPING REPERFORATOR (LPR)

ADJUSTMENTS

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1. GENERAL

1.01 This section provides adjustments and requirements for the 35 typing reperforator (Figure 1). It is reissued to include recent engineering changes and additions. Since this is a general revision, marginal arrows ordinarily used to indicate changes and additions have been omitted.

1.02 The basic equipment includes selector mechanism, transfer mechanism, eight-level fully perforating punch mechanism, and printing mechanism. The printing mechanism includes letters-figures contacts and magnet and may include print suppression, remote control noninterfering rubout tape feed-out, end of feed-out timing contacts, and power drive back-space mechanisms.

1.03 Reference to left or right, front or rear, and up or down refer to the apparatus in its normal operating position, as viewed from the front with the selector mechanism to the right and the punch mechanism to the left. It is assumed that the elements depicted in illustrations in this section are being viewed from a position in front of the equipment, unless the illustrations are specifically labeled otherwise. In the illustrations, pivot points are shown by circles or ellipses that are solid black to indicate fixed points and cross-hatched to indicate floating points.

1.04 Tools required to make the adjustments and test the spring tensions are listed in Section 570-005-800TC. Spring tensions given in this section are indications, not exact values, and should be checked with the correct scale applied in the positions shown in the drawings.

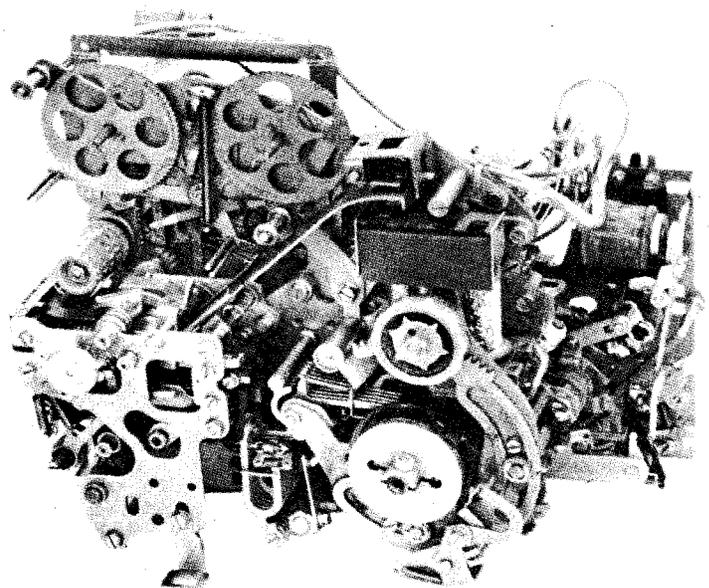


Figure 1 - Typical 35 Typing Reperforator (Front View)

SECTION 574-233-700TC

1.05 The unit is in its unoperated, or stop, condition when it is not under power. It is in its idling condition when it is under power and clutches are disengaged (steady marking condition of signal line). The unit is in the letters condition when the type wheel rack is in its upper position (the numerals appear on the top half of the type wheel). The unit is in the figures condition when the type wheel rack is in its lower position (the letters appear on the top half of the type wheel).

**CAUTION: APPARATUS SHOULD NOT BE SEPARATED FROM ITS PROTECTIVE HOUSING UNLESS POWER IS DISCONNECTED. WHERE OPERATION OF THE EQUIPMENT IS REQUIRED AFTER IT HAS BEEN SEPARATED FROM ITS PROTECTIVE HOUSING, APPROPRIATE PRECAUTIONARY MEASURES SHOULD BE TAKEN TO PREVENT ACCIDENTS.**

1.06 When a requirement calls for a clutch to be **DISENGAGED**, the clutch shoe lever must be fully latched between its trip lever (or stop arm) and latchlever. The mainshaft will then turn freely without the clutch shoes dragging. When the clutch is **ENGAGED**, the shoe lever and cam disc stop-lug are moved apart, and the clutch shoes are wedged against the drum so that the clutch turns with the shaft.

Note: If the shaft is turned by hand, the clutch will not fully disengage upon reaching its stop position. Where a procedure calls for disengagement, rotate the clutch to its stop position, apply a screwdriver to the cam disc stop-lug and turn the disc in the normal direction of shaft rotation until the latchlever seats in its notch in the disc.

1.07 To manually operate the 35 typing reperforator, proceed as follows.

(a) Attach the TP321071 armature clip to the selector magnet armature by carefully putting the flat formed end of the armature clip over the top of the armature between the pole pieces and then hooking the projection under the edge of the armature. The spring tension of the armature clip will hold the selector armature in the marking (attracted) position.

(b) While holding the selector magnet attracted by means of the armature clip, manually rotate the mainshaft in a counter-clockwise direction until all the clutches are brought to their disengaged position.

(c) Fully disengaged the clutches in accordance with 1.06, Note.

(d) Release the selector magnet armature momentarily to permit the selector clutch to engage.

(e) Rotate the mainshaft slowly until all the pushlevers have fallen to the left of their selecting levers.

(f) Strip the pushlevers from their selector levers if they are spacing in the code combination of the character or function that is being selected. Allow the pushlevers to move to the right. The pushlevers and selector levers move in succession, starting with the inner lever no. 1 to the outer lever no. 8.

(g) Continue to rotate the mainshaft until all operations initiated by the selector action clear through the unit.

1.08 Parts dismantled to facilitate checking or readjustment should be reassembled after the operation is completed. If a part mounted on shims is to be dismantled, the number of shims used at each mounting screw should be noted so that the same shim pileups can be replaced when the part is remounted. When parts removed are replaced, related adjustments which may have been affected should be checked.

1.09 Parts that are worn to the extent that they can no longer be made to meet the specified requirements by authorized adjustments, or which are worn to the extent that it seems probable that early further wear might cause a loss of adjustment, should be replaced by new parts. Springs which do not meet the requirements and for which there are no adjusting procedures should be discarded and replaced by new springs.

1.10 All contact points should meet squarely. Smaller points should fall wholly within the circumference of larger mating points. Points that are the same size should not be out of alignment more than 25 percent of the point diameter. Avoid sharp kinks or bends in the contact springs.

Note: Keep all electrical contacts free of oil and grease.

1.11 Where a 35 typing reperforator is used as a component of a receive-only or a send-receive set, it is mounted on a base or keyboard base. Refer to the base, keyboard and other applicable sections for gear mesh and additional adjustment requirements.

## 2. BASIC UNIT

2.01 The following figures show the adjusting tolerances, position of parts, and spring tensions. The illustrations are arranged so that the adjustments are in the sequence that would be followed if a complete readjustment of the apparatus were being made. In some cases, where an illustration shows interrelated parts, the sequence that should be followed in checking the requirements is indicated by the letters (A), (B), (C), etc.

2.02 Selector Mechanism

2.03 Function Mechanism

Note: For gear mesh adjustment, refer to applicable sections covering base or keyboard mounting facility.

### (A) CLUTCH SHOE LEVER

Note: This adjustment should be made for both selecting and function clutches.

- (1) To Check  
Disengage clutch. Measure clearance.
- (2) To Check  
Align head of clutch drum mounting screw with stop-lug. Engage clutch. Manually press shoe lever and stop-lug together and allow to snap apart. Measure clearance.

#### Requirement

Clearance between shoe lever and stop-lug

—Min 0.055 inch---Max 0.085 inch

greater when clutch engaged (2) than when disengaged (1).

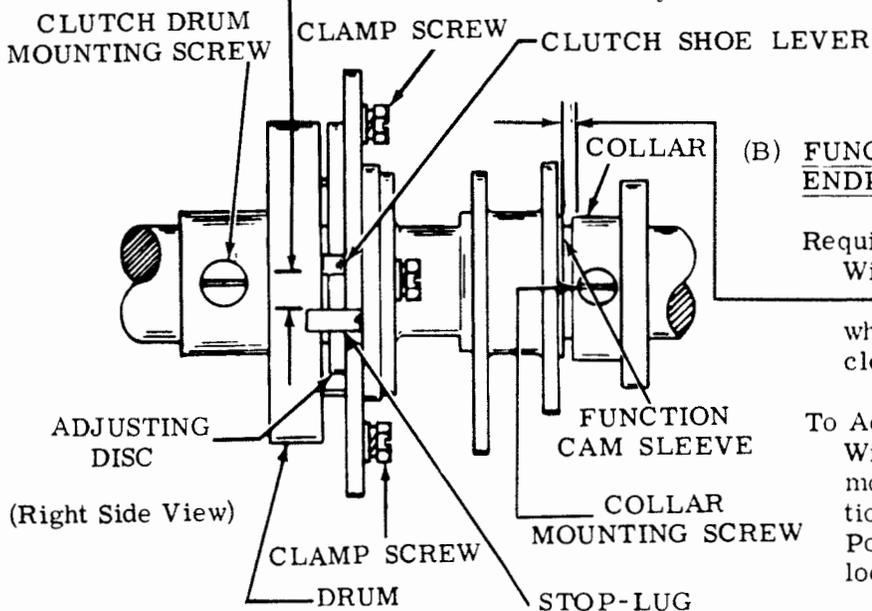
#### To Adjust

Engage wrench or screwdriver with lug on adjusting disc.

Rotate disc with clamp screws loosened. Tighten screws.

Note: After making adjustment, disengage clutch.

Remove drum mounting screw. Rotate drum in normal direction and check to see if it drags on shoe. If it does, refine adjustment.



### (B) FUNCTION CLUTCH DRUM ENDPLAY

#### Requirement

With function clutch disengaged

—Min some---Max 0.015 inch

when play is taken up to make

clearance maximum.

#### To Adjust

With its mounting screw loosened,

move drum to extreme front position. Tighten drum mounting screw.

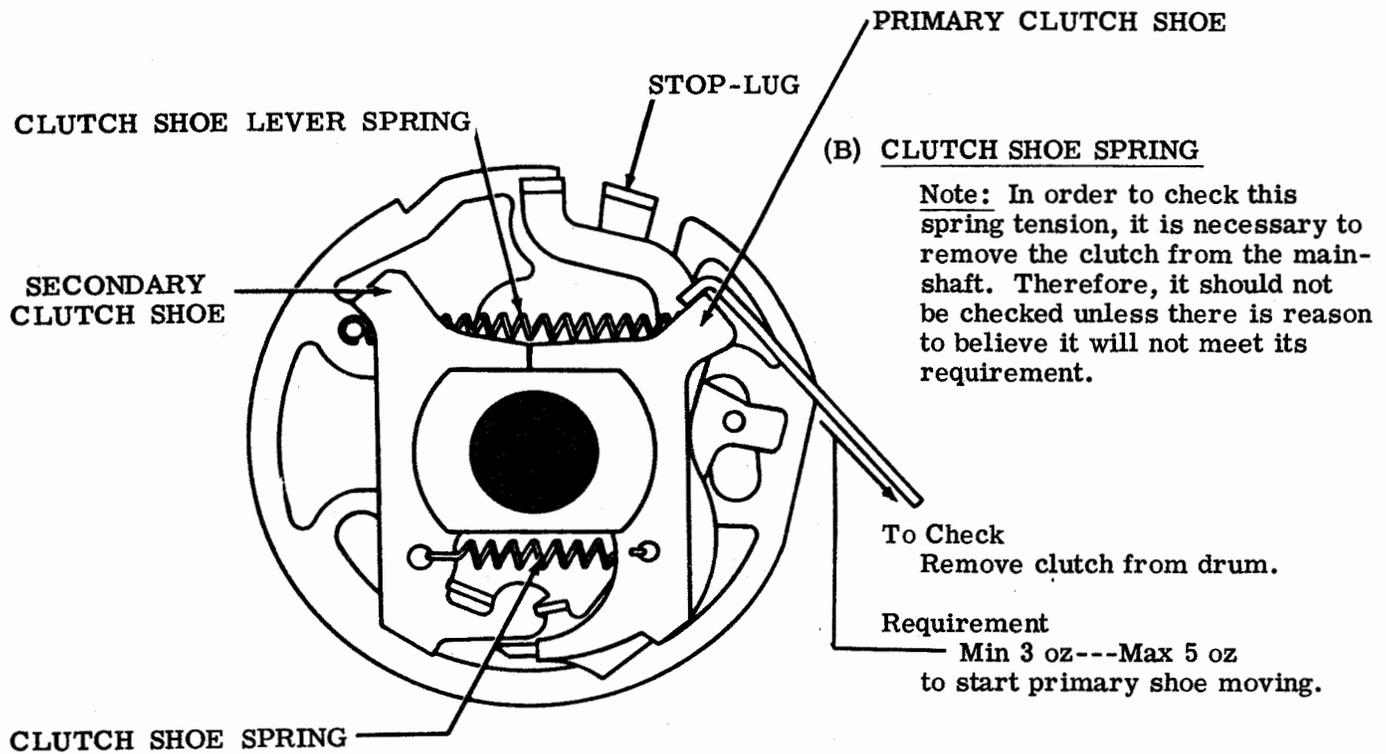
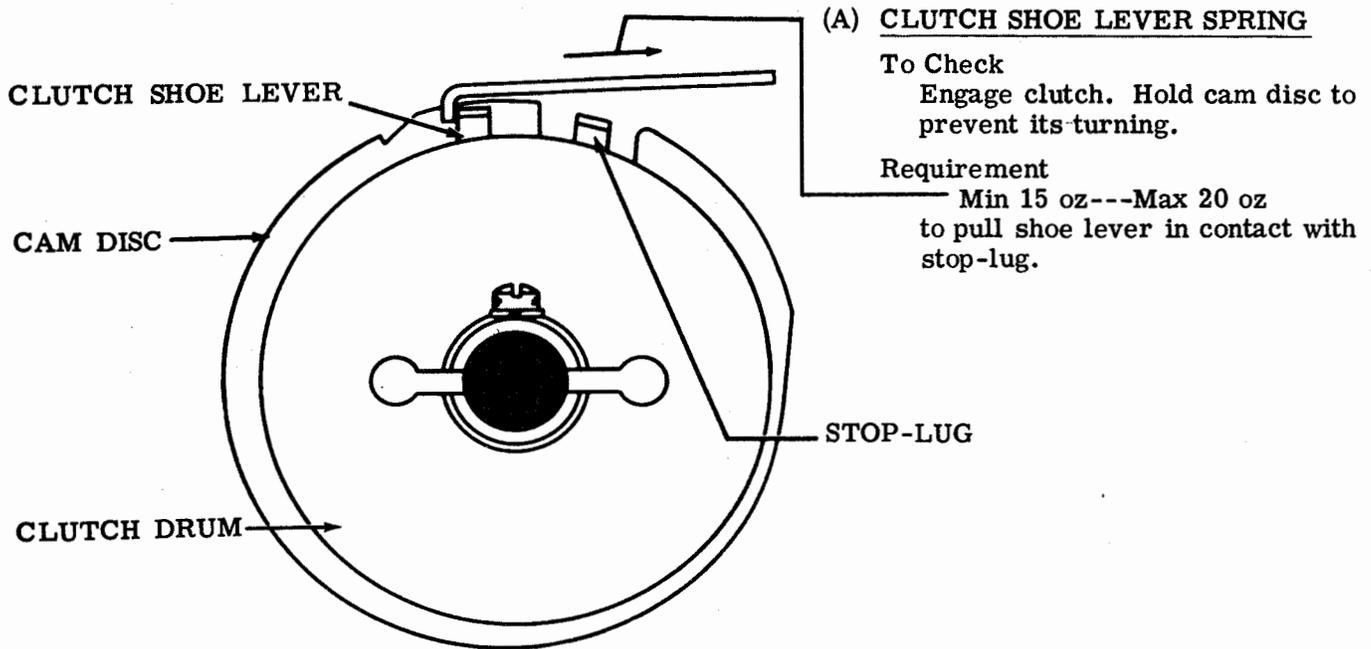
Position collar with mounting screw

loosened. Tighten screw.

2.04 Selector Mechanism (continued)

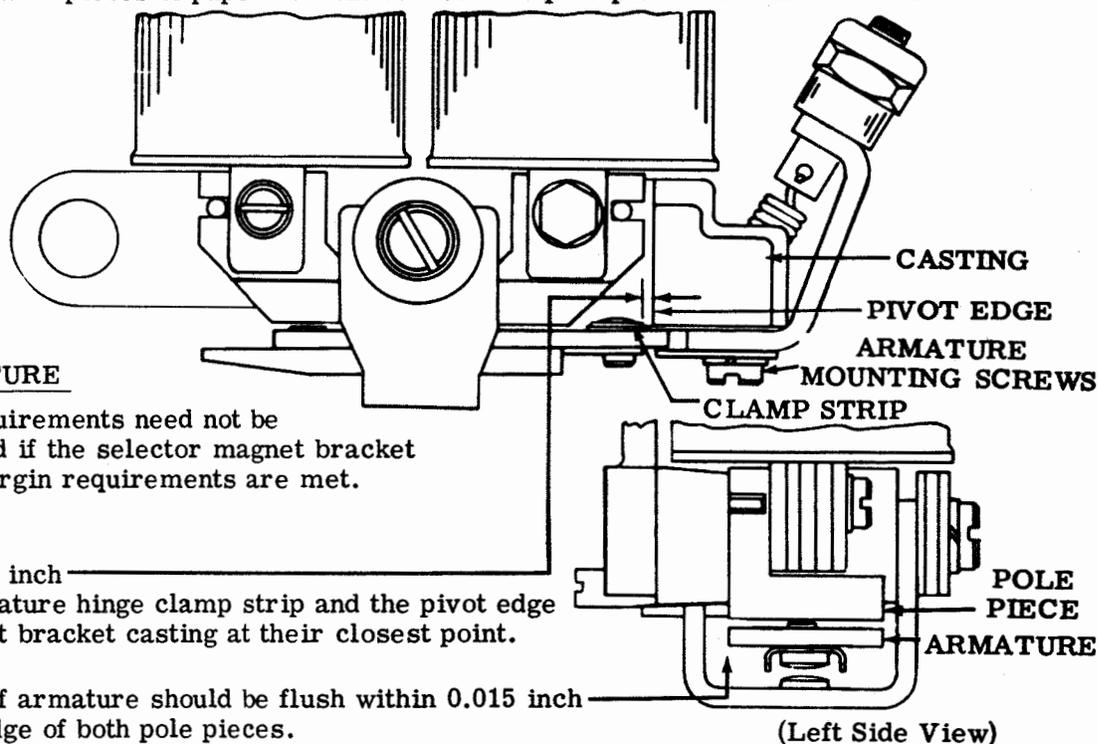
2.05 Function Mechanism (continued)

Note: These spring tensions apply to both clutches.



2.06 Selector Mechanism (continued)

Note: To facilitate making the following adjustments, remove the range finder assembly and selector magnet assembly. To insure better operation, pull a piece of bond paper between the armature and the pole pieces to remove any oil or foreign matter that may be present. Make certain that no lint or pieces of paper remain between the pole pieces and the armature.



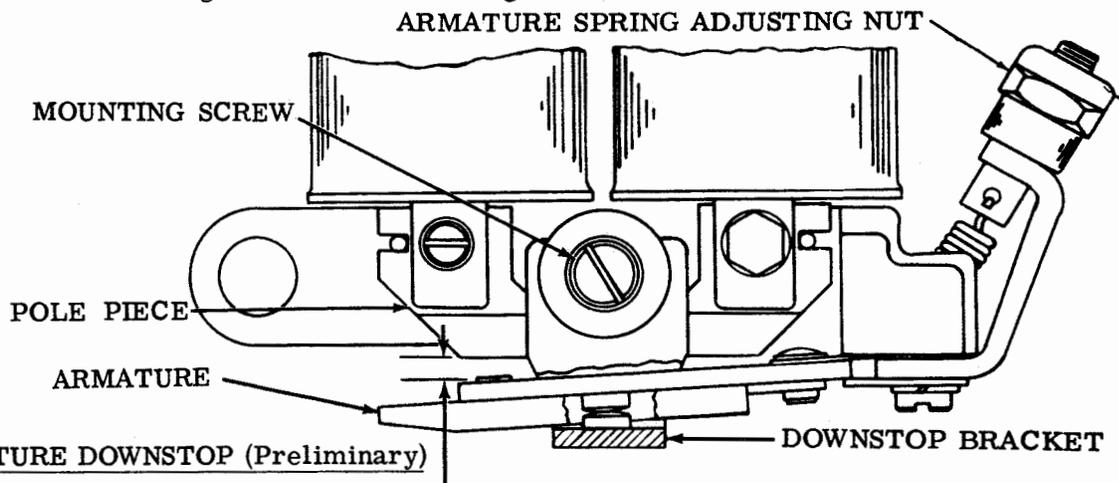
SELECTOR ARMATURE

Note: These requirements need not be made nor checked if the selector magnet bracket and receiving margin requirements are met.

- (1) Requirement  
Clearance  
Min 0.010 inch  
between armature hinge clamp strip and the pivot edge of the magnet bracket casting at their closest point.
- (2) Requirement  
Outer edge of armature should be flush within 0.015 inch with outer edge of both pole pieces.
- (3) Requirement  
Start lever should drop freely into armature extension slot.

To Adjust

Position armature spring adjusting nut to hold armature firmly against pivot edge of casting. Position armature with mounting screws loosened. Tighten screws.



SELECTOR ARMATURE DOWNSTOP (Preliminary)

Requirement

Remove oil shield. With magnet de-energized, locklevers on high part of their cam, and armature resting against its downstop, clearance between end of armature and left edge of left pole piece

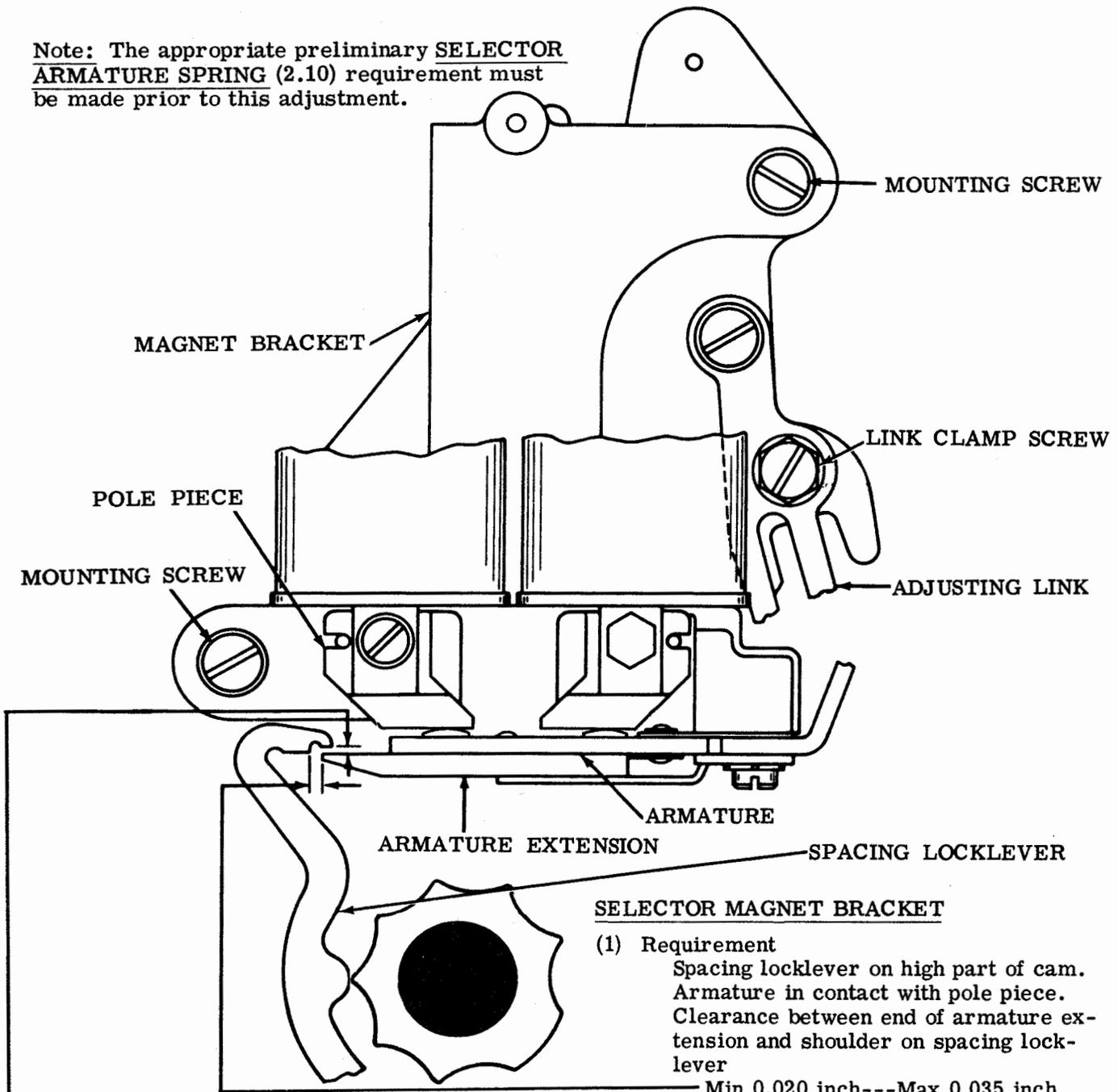
Min 0.030 inch---Max 0.035 inch

To Adjust

Position downstop bracket with mounting screw loosened. Replace oil shield and check OIL SHIELD (2.16) adjustment. Tighten screw.

2.07 Selector Mechanism (continued)

Note: The appropriate preliminary SELECTOR ARMATURE SPRING (2.10) requirement must be made prior to this adjustment.



SELECTOR MAGNET BRACKET

(1) Requirement

Spacing locklever on high part of cam.  
Armature in contact with pole piece.  
Clearance between end of armature extension and shoulder on spacing locklever

Min 0.020 inch---Max 0.035 inch

(2) Requirement

Spacing locklever on high part of cam.  
Armature in contact with pole piece.  
Min some---Max 0.003 inch  
clearance between upper surface of the upper step of the spacing locklever when locklever is held downward.

To Adjust

Position upper end of magnet bracket.  
Tighten two magnet bracket mounting screws.  
Recheck requirement (1).

To Adjust

Loosen two magnet bracket mounting screws and adjusting link clamp screw.  
Position magnet bracket by means of adjusting link and tighten link clamp screw only.

Note: See following page for requirement (3).

2.08 Selector Mechanism (continued)

Note: See preceding page for SELECTOR MAGNET BRACKET adjustment, requirements (1) and (2).

SELECTOR MAGNET BRACKET (continued)

(3) Requirement

Marking locklever on low part of cam. Magnet energized. Armature in contact with left pole piece. Some clearance between lower surface of armature extension and upper surface of marking locklever.

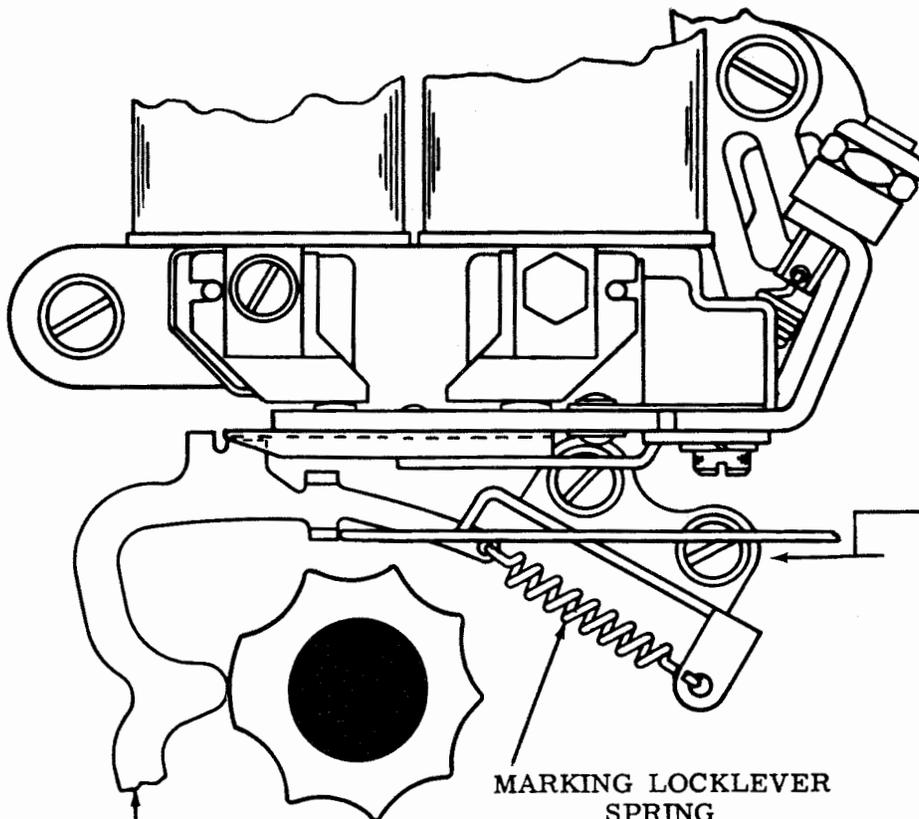
To Adjust

Position upper end of magnet bracket with mounting screws loosened. Tighten mounting screws and recheck requirements (1) and (2).

ARMATURE EXTENSION

MARKING LOCKLEVER

ARMATURE



MARKING LOCKLEVER SPRING

Requirement

Rubout combination (12345678) selected. Mainshaft rotated until selector clutch is disengaged. Push scale applied to lower extension of locklever  
 — Min 2 oz --- Max 4 oz  
 to start lever moving.

MARKING LOCKLEVER

MARKING LOCKLEVER  
 SPRING

2.09 Selector Mechanism (continued)

SELECTOR ARMATURE DOWNSTOP (Final)

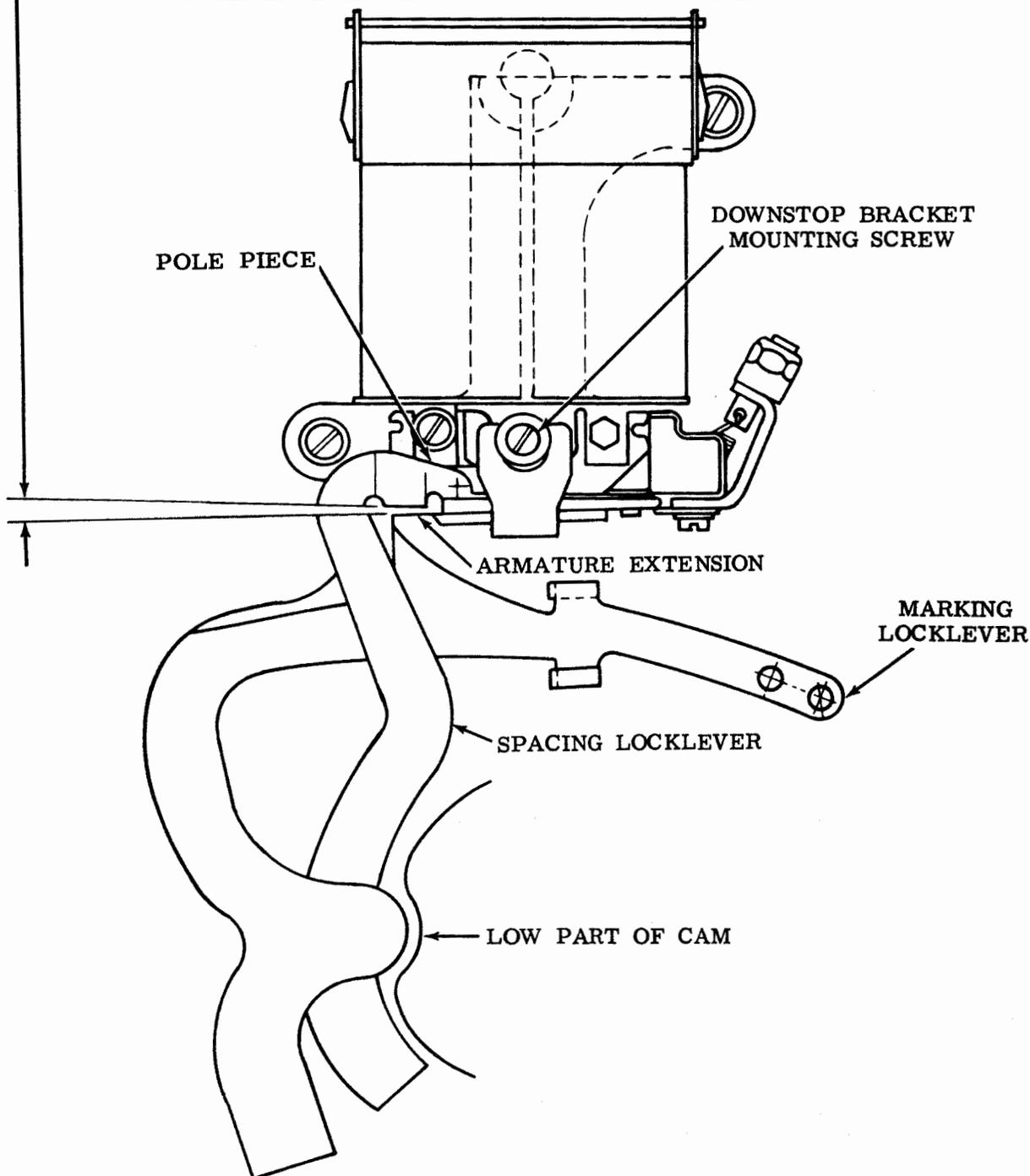
Requirement

With the selector magnet de-energized and the spacing locklever on the low part of its cam, there should be

Min 0.005 inch---Max 0.015 inch clearance between the top of the armature extension and the bottom of the lower step of the spacing locklever.

To Adjust

Refine the SELECTOR ARMATURE DOWNSTOP (Preliminary) (2.06) adjustment.



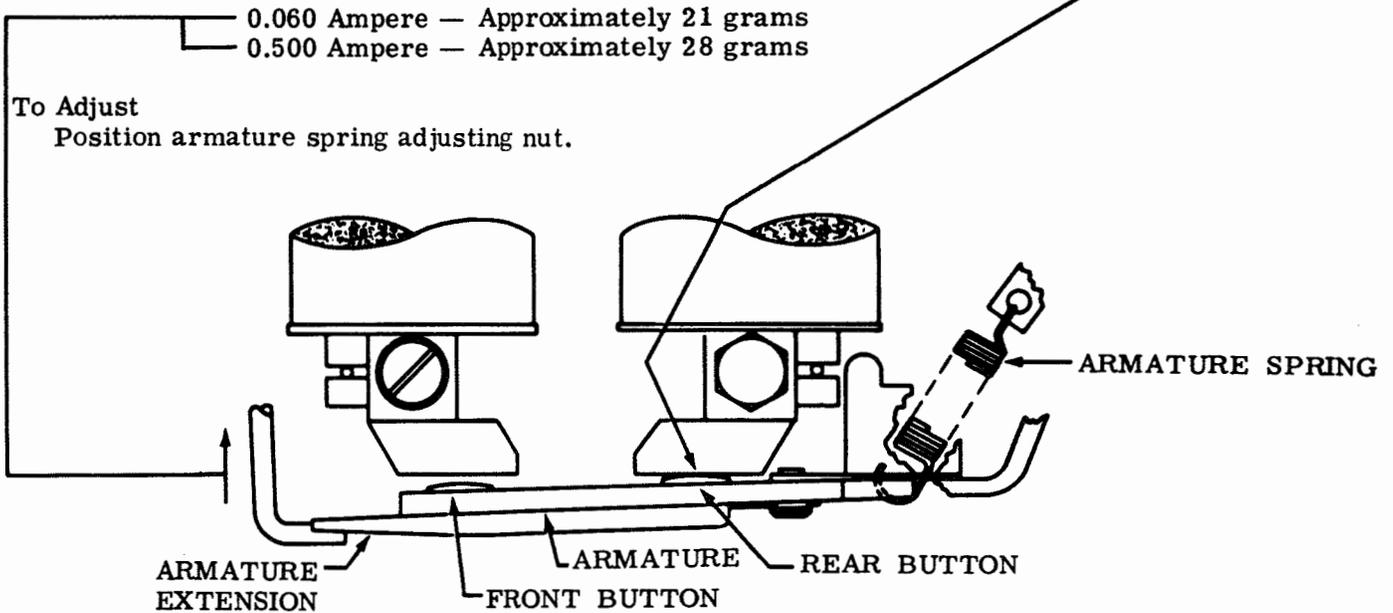
2.10 Selector Mechanism (continued)

**SELECTOR ARMATURE SPRING (Preliminary)**

(For Units Employing Selector Armature With Two Antifreeze Buttons Only)

**Requirement**

With locking levers and start lever on high part of their cams, scale applied as nearly vertical as possible under end of armature extension, it should require approximately the following tensions to move the rear antifreeze button against the magnet core.

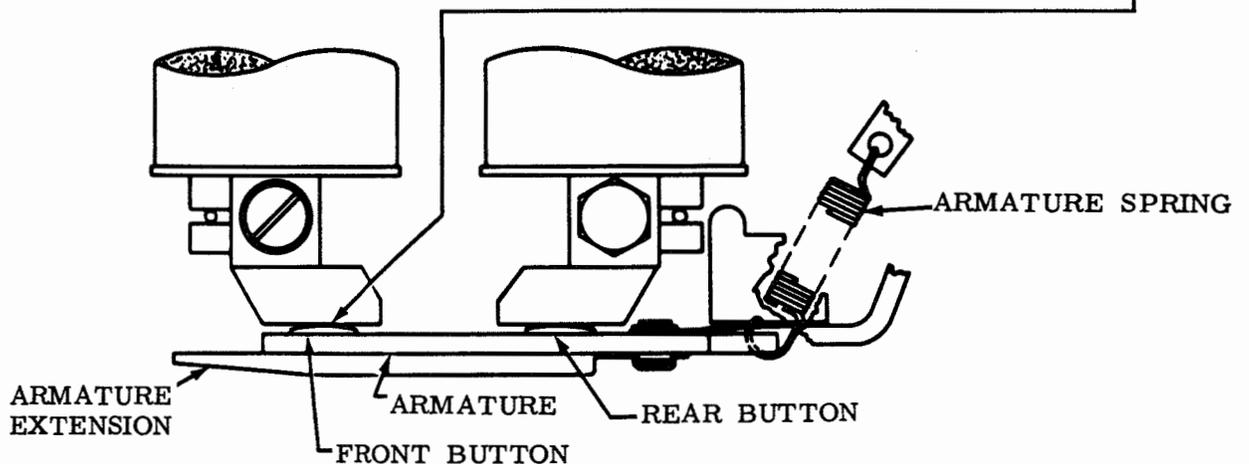


Note: See SELECTOR RECEIVING MARGIN (2.15) adjustment

**SELECTOR ARMATURE SPRING (Final)**

(1) Requirement

When a distortion test set is available, the selector armature spring tension should be refined (15 grams min), if necessary, to obtain satisfactory receiving margins. The front antifreeze button must contact the magnet core when the magnet coils are energized.



(2) Requirement

See SELECTOR RECEIVING MARGIN (2.15) adjustment.

## 2.11 Selector Mechanism (continued)

**SELECTOR ARMATURE SPRING (Preliminary) (continued)**

(For Units Employing Selector Armature With Single Antifreeze Button Only)

## (1) Requirement

With locking levers and start lever on high part of their cams, scale applied as nearly vertical as possible under end of armature extension, it should require the following tensions to move armature to marking position:

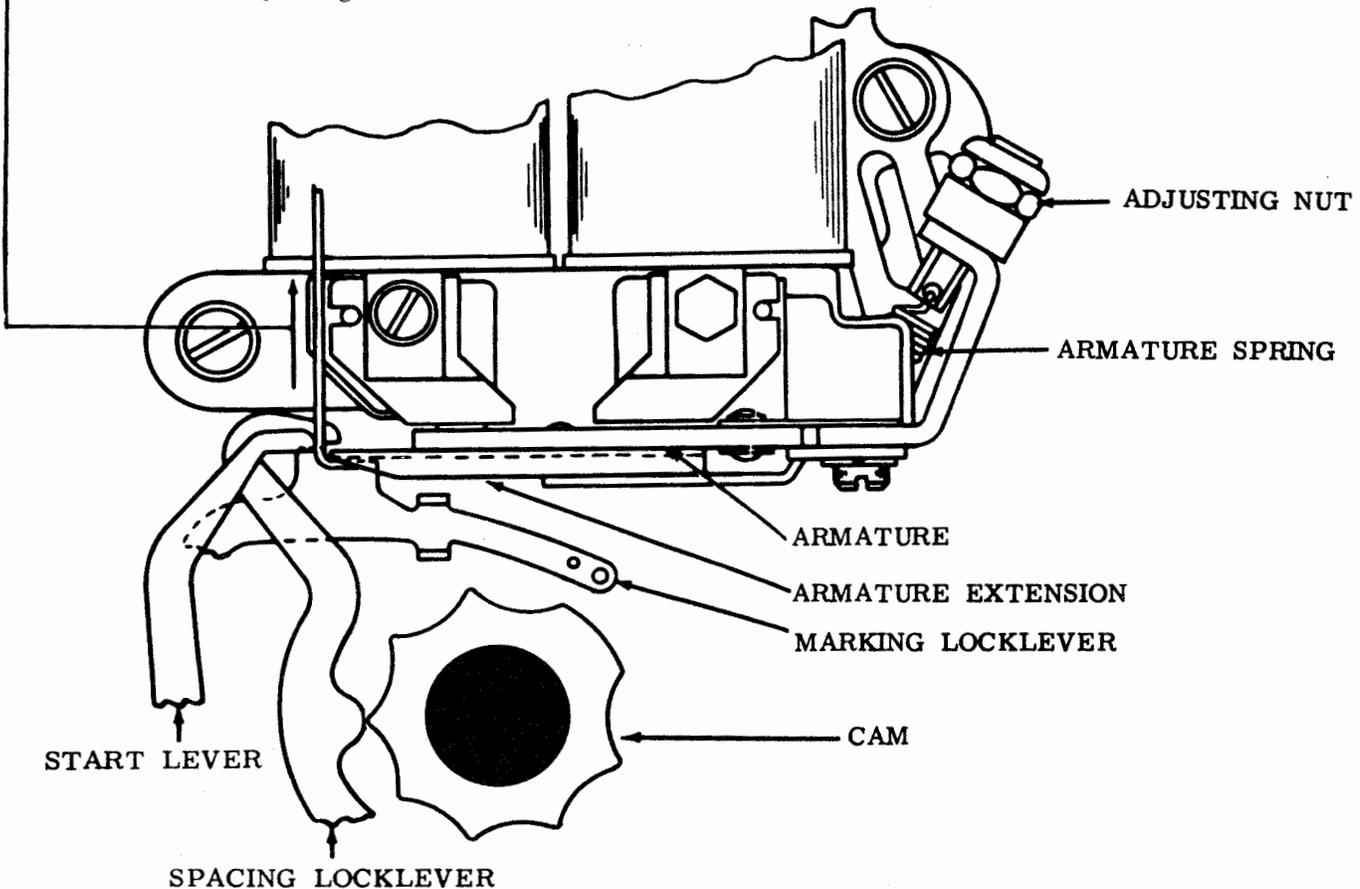
0.060 Ampere - Min 2-1/2 oz---Max 3 oz

0.500 Ampere - Min 4-1/2 oz---Max 5-1/2 oz

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.

To Adjust

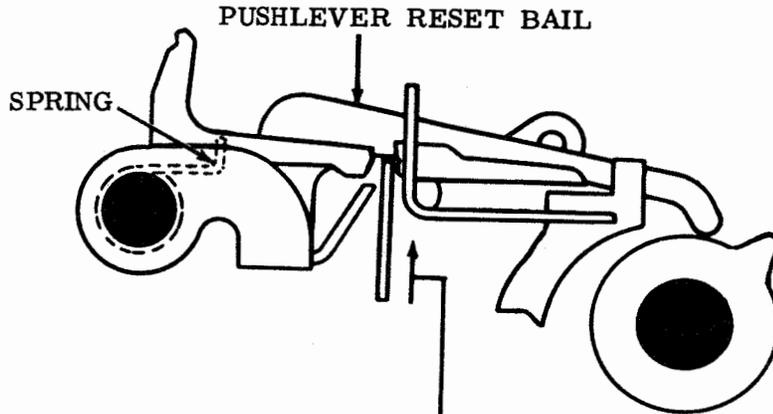
Position adjusting nut.



## (2) Requirement

See SELECTOR RECEIVING MARGIN (2.15) for final adjustment.

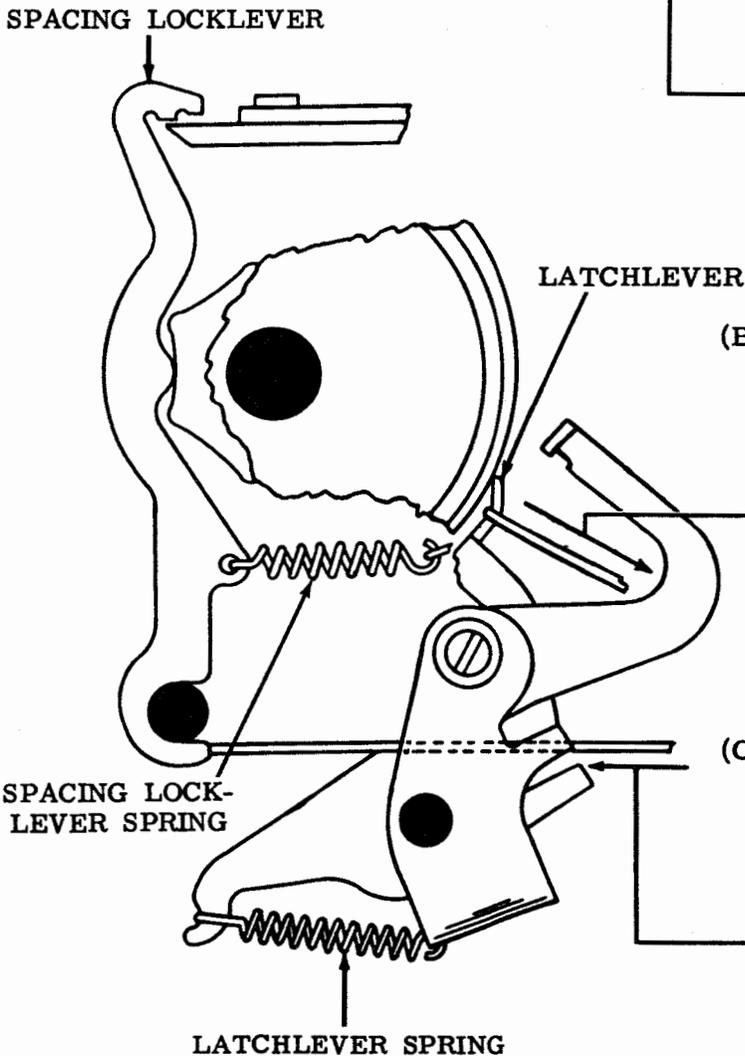
2.12 Selector Mechanism (continued)



(A) PUSHLEVER RESET BAIL SPRING

Requirement

Pushlever reset bail on low part of cam, 32 oz scale applied to reset bail.  
 Min 4 oz---Max 8 oz  
 to move bail from cam.



(B) SELECTOR CLUTCH LATCHLEVER SPRING

Requirement

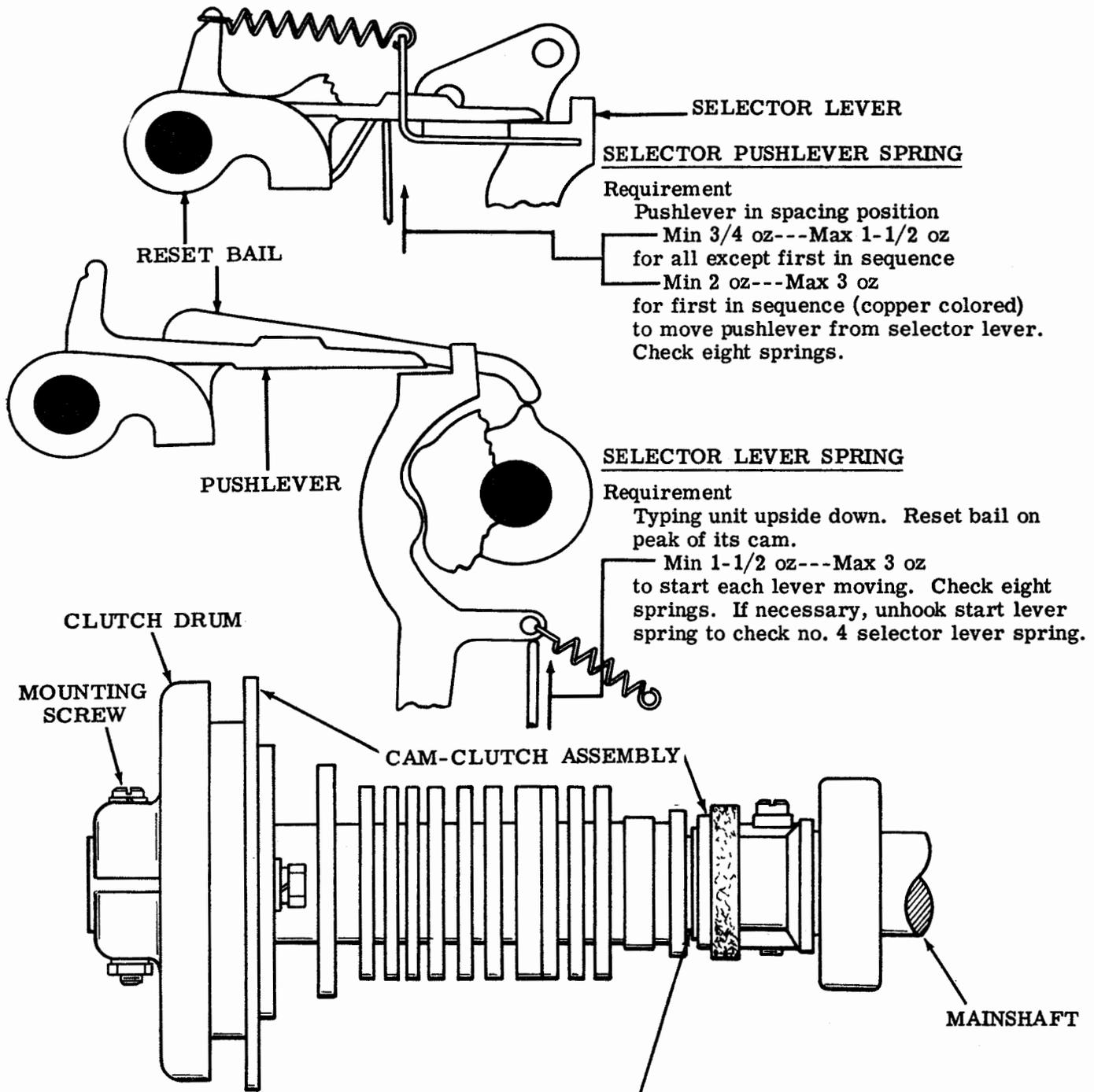
Latch resting on low part of its cam disc.  
 Min 2 oz---Max 3-1/2 oz  
 to start latch moving.

(C) SPACING LOCKLEVER SPRING

Requirement

Selector armature released. Spacing locklever on low part of its cam. Spring scale applied to lower end of spacing locklever.  
 Min 3 oz---Max 6 oz  
 to move spacing locklever from its pivot shaft.

2.13 Selector Mechanism (continued)



SELECTOR CLUTCH DRUM ENDPLAY

**Requirement**  
 Clutch latched in stop position. Cam  
 assembly should have some endplay, not  
 more than 0.010 inch.

(Right Side View)

**To Adjust**  
 Position clutch drum on mainshaft with  
 mounting screw loosened.

2.14 Selector Mechanism (continued)

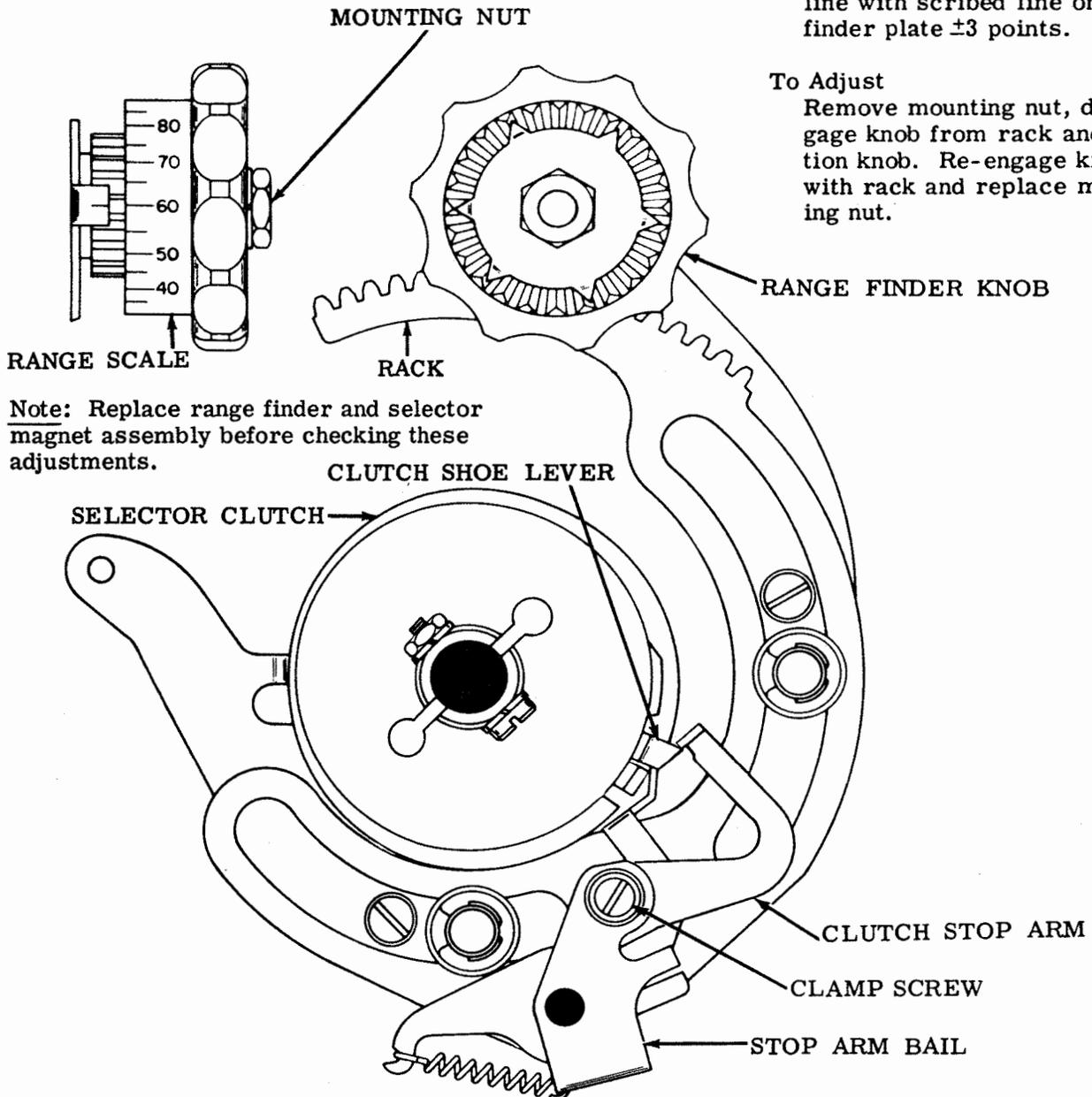
(A) RANGE FINDER KNOB PHASING

Requirement

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  $\pm 3$  points.

To Adjust

Remove mounting nut, disengage knob from rack and position knob. Re-engage knob with rack and replace mounting nut.



Note: Replace range finder and selector magnet assembly before checking these adjustments.

(B) SELECTOR CLUTCH STOP ARM

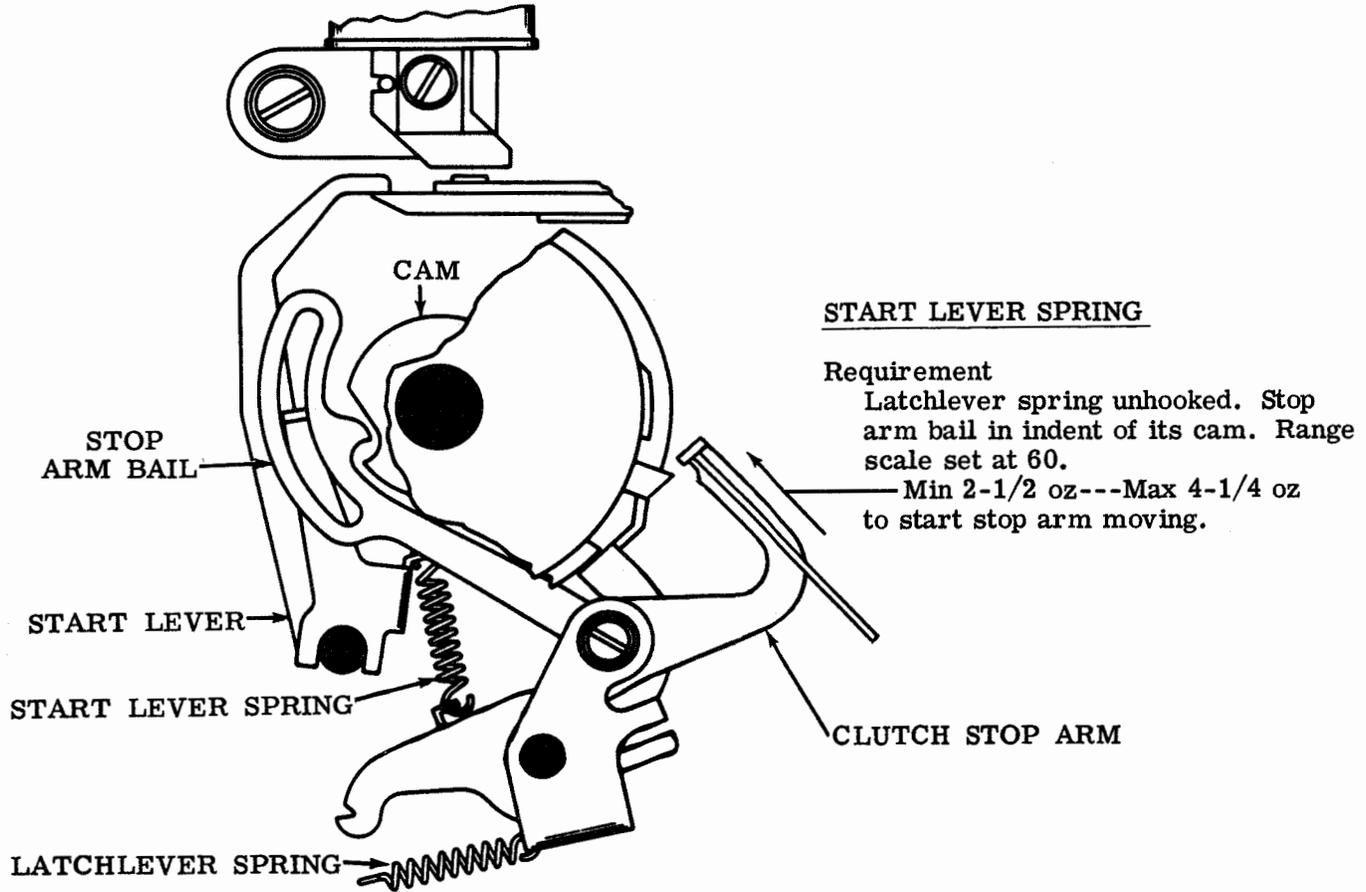
Requirement

Range scale set at 60. Selector clutch disengaged. Armature in marking position. Clutch stop arm should engage clutch shoe lever by approximately full thickness of stop arm.

To Adjust

Position stop arm on stop arm bail with clamp screw loosened. Tighten screw.

2.15 Selector Mechanism (continued)



SELECTOR RECEIVING MARGIN

- (1) Requirement (For Units Employing Armature With One Antifreeze Button)  
 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 distortion tolerances below should be met.
- (2) Requirement (For Units Employing Armature With Two Antifreeze Buttons)  
 When a distortion test set is available, the selector armature spring tension should be refined, if necessary, to obtain satisfactory receiving margins. The front antifreeze button must contact the magnet core when the magnet coils are energized.

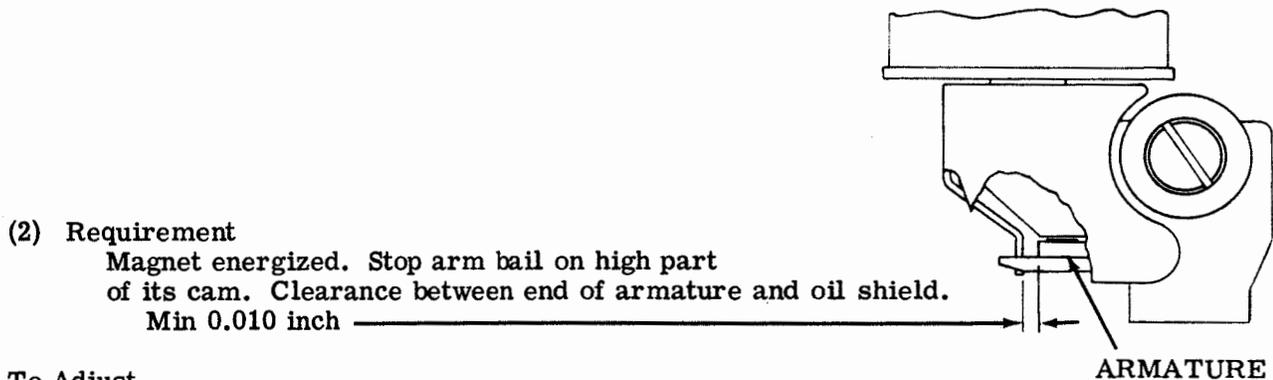
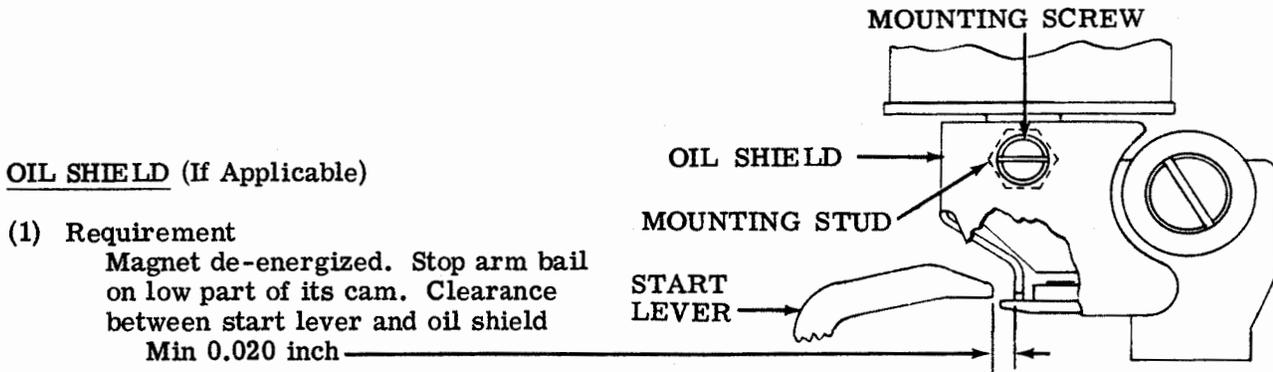
**To Adjust**

Refine the SELECTOR ARMATURE SPRING (2.10) adjustment.

**SELECTOR RECEIVING MARGIN MINIMUM REQUIREMENTS**

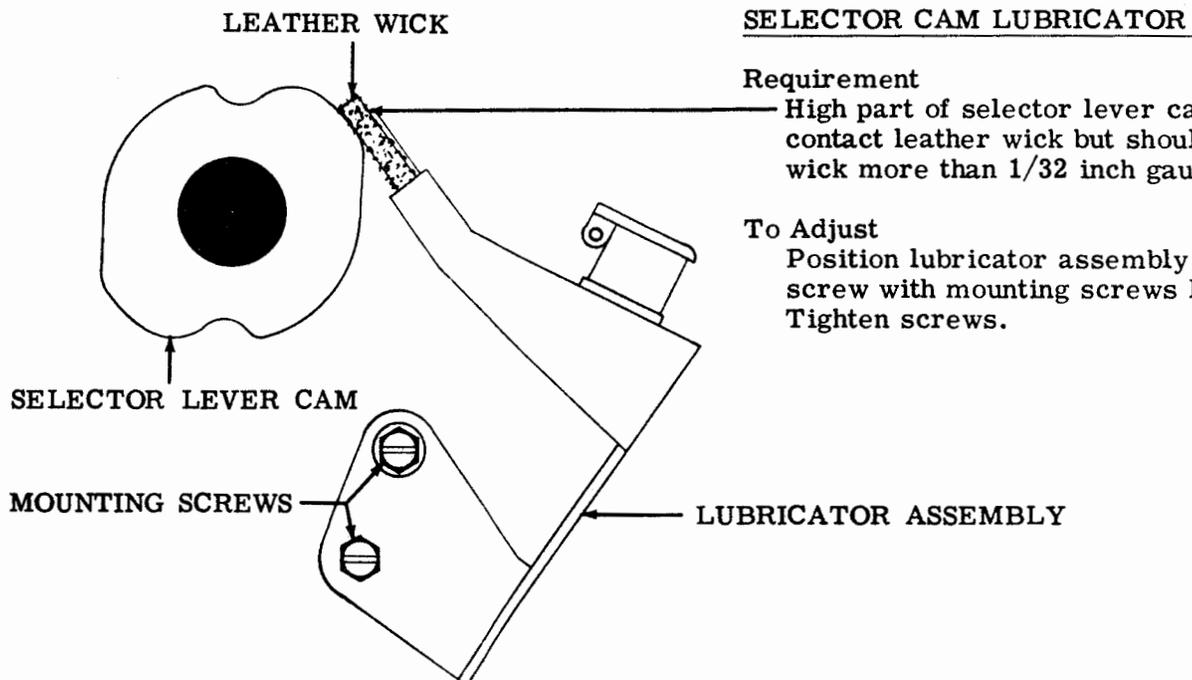
Current	Speed in WPM	Points Range with Zero Distortion	Percentage of Marking and Spacing Bias	End Distortion Tolerated with Scale at Bias Optimum Setting
0.500 Amp (Windings Series)	100	72	38	35

2.16 Selector Mechanism (continued)



To Adjust

Position shield with mounting screw loosened. Make sure oil shield mounting stud is secure before making adjustment. Check to be sure there is clearance between the oil shield and armature extension when the armature is energized. Tighten screw.



2.17 Function Mechanism (continued)

Note 1: For units equipped with automatic noninterfering rubout tape feed-out mechanism, substitute adjustment in variable features, Part 3.

(A) TRIP CAM FOLLOWER LEVER (Preliminary)

(1) Requirement

With trip cam follower lever on high part of cam, clearance between clutch release lever and reset bail trip lever should be

Min 0.010 inch---Max 0.030 inch

(2) Requirement

Some clearance between reset bail trip lever and left end of slot in downstop bracket.

To Adjust

By means of pry point, position adjusting arm on follower lever with locknut loosened. Tighten nut.

(C) RESET BAIL TRIP LEVER SPRING (Latest Design)

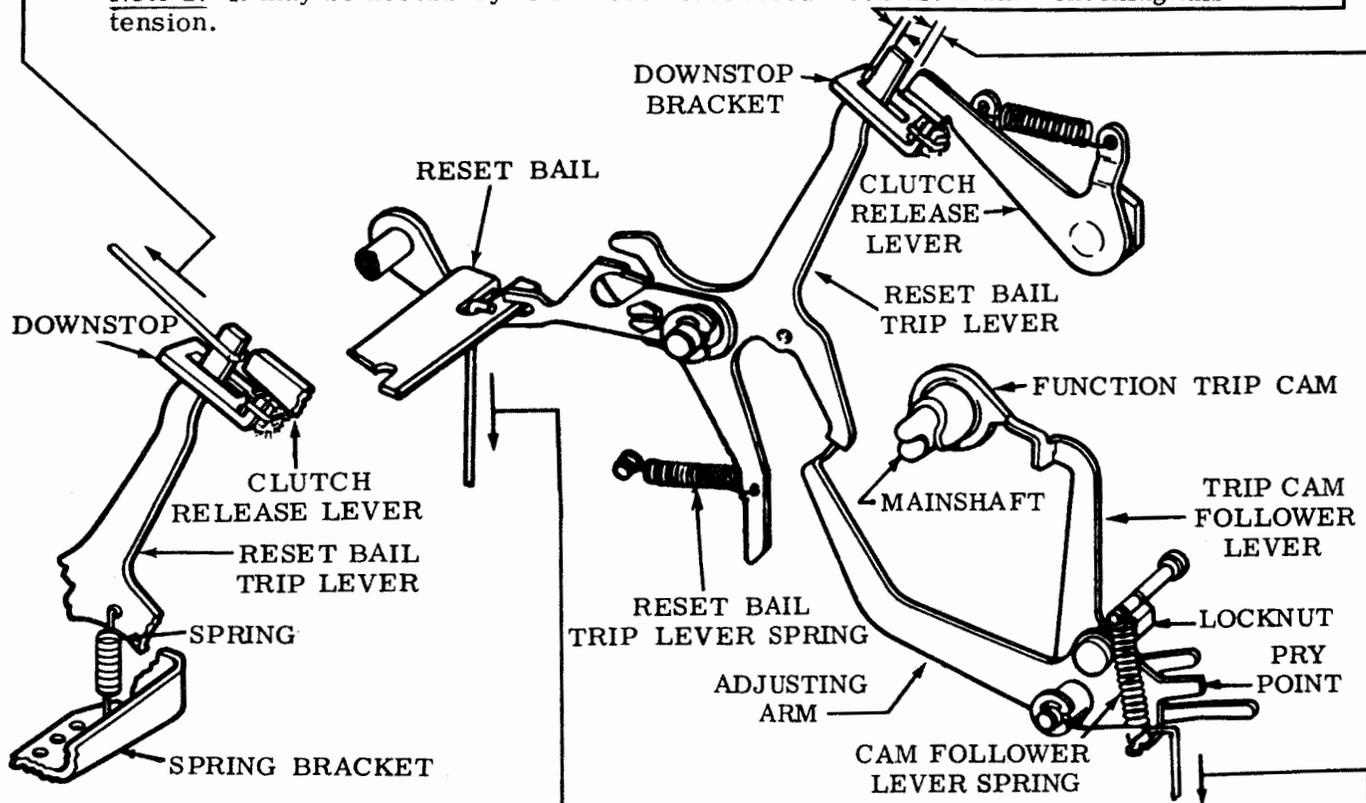
Requirement

Trip reset bail trip lever. With scale pulling at top of reset bail trip lever

Min 1 oz---Max 4 oz

to start lever moving.

Note 2: It may be necessary to remove ribbon feed mechanism when checking this tension.



RESET BAIL TRIP LEVER SPRING (Early Design)

Requirement

With follower lever on high part of trip cam

Min 2-1/2 oz---Max 4-1/2 oz

to start trip lever moving.

(B) CAM FOLLOWER LEVER SPRING (Early Design)

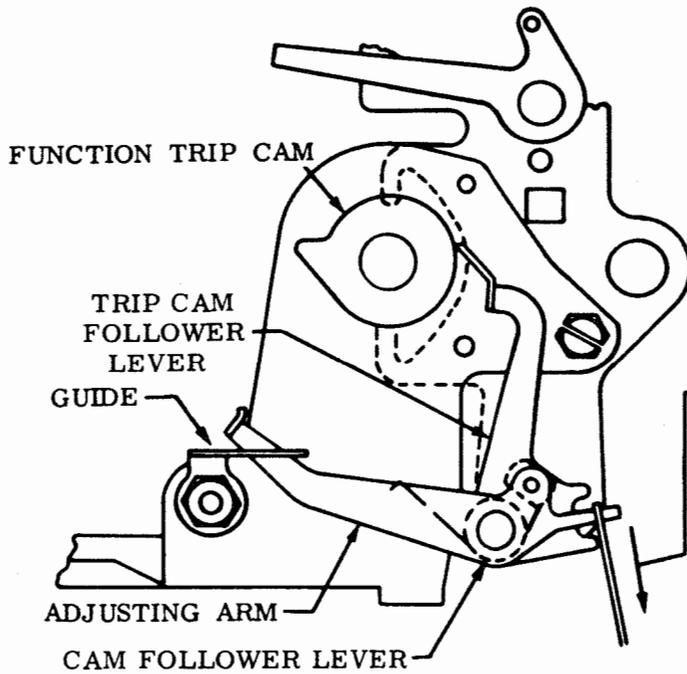
Requirement

With follower lever on high part of trip cam and main trip lever held away from adjusting arm

Min 2-1/2 oz---Max 4 oz

to start adjusting lever moving.

2.18 Function Mechanism (continued)

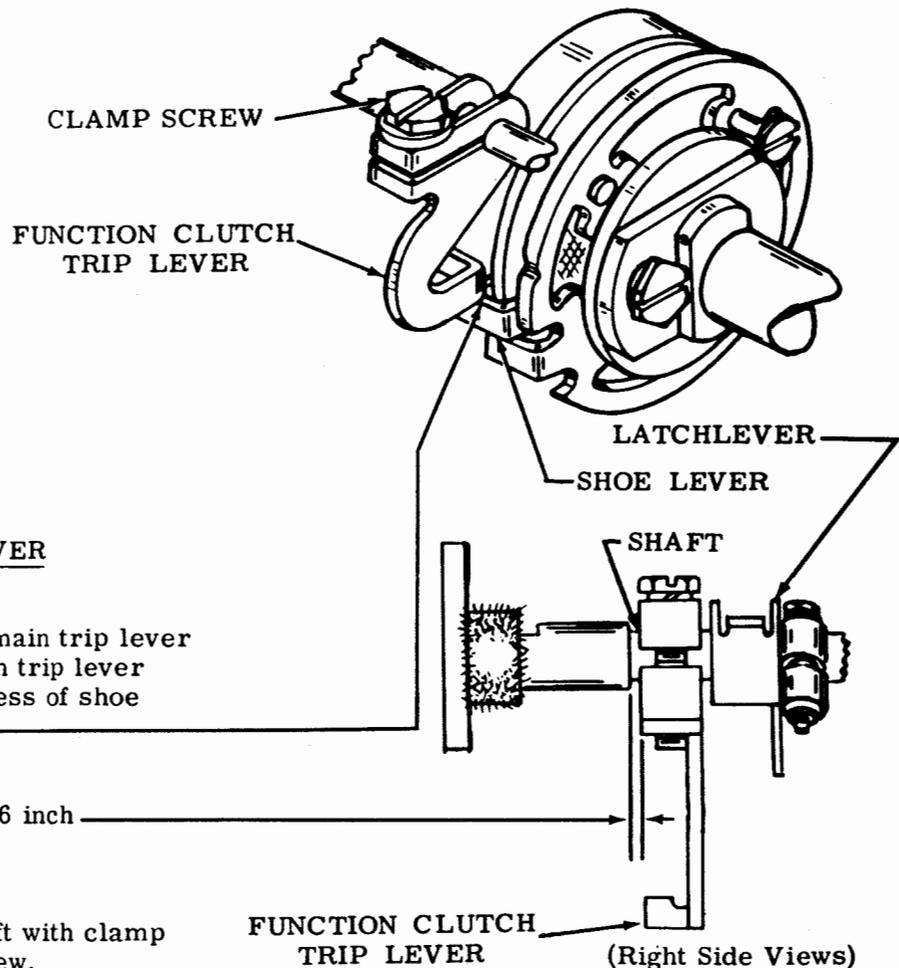


CAM FOLLOWER LEVER SPRING (Latest Design)

Requirement

With cam follower lever on low part of trip cam and reset bail trip lever held away from adjusting arm

Min 1 oz---Max 4 oz  
to start adjusting arm moving.



FUNCTION CLUTCH TRIP LEVER

- (1) Requirement  
With release resting on main trip lever (see 2.19), function clutch trip lever should engage full thickness of shoe lever.
- (2) Requirement  
Min some---Max 0.006 inch endplay in trip lever.

To Adjust  
Position trip lever on its shaft with clamp screw loosened. Tighten screw.

FUNCTION CLUTCH TRIP LEVER (Right Side Views)

2.19 Function Mechanism (continued)

(A) RESET ARM

To Check

Trip function clutch and position mainshaft so that reset arm is held in its highest position by cam pin.

(1) Requirement

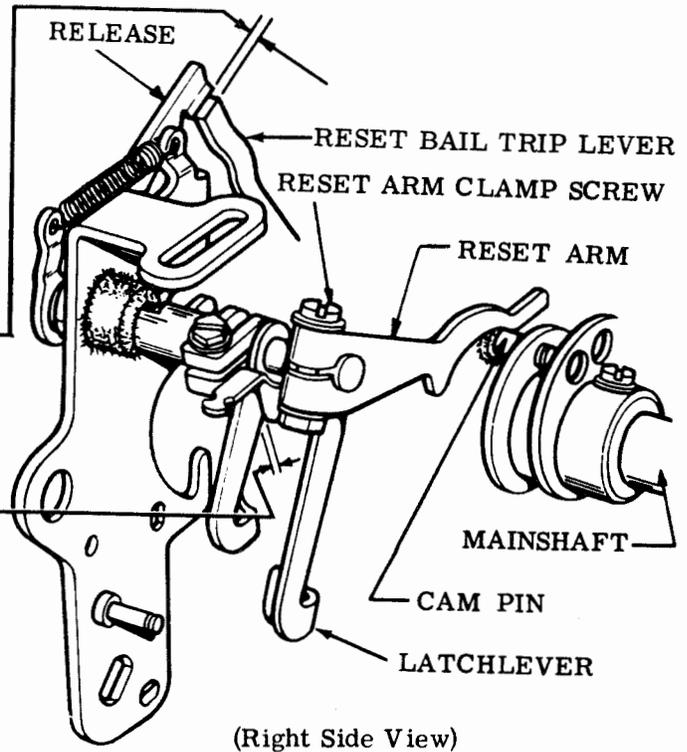
Clearance between release and reset bail trip lever  
Min 0.010 inch---Max 0.030 inch

(2) Requirement

Latchlever endplay  
Min some---Max 0.010 inch

To Adjust

Position reset arm with clamp screw loosened. Tighten screw.

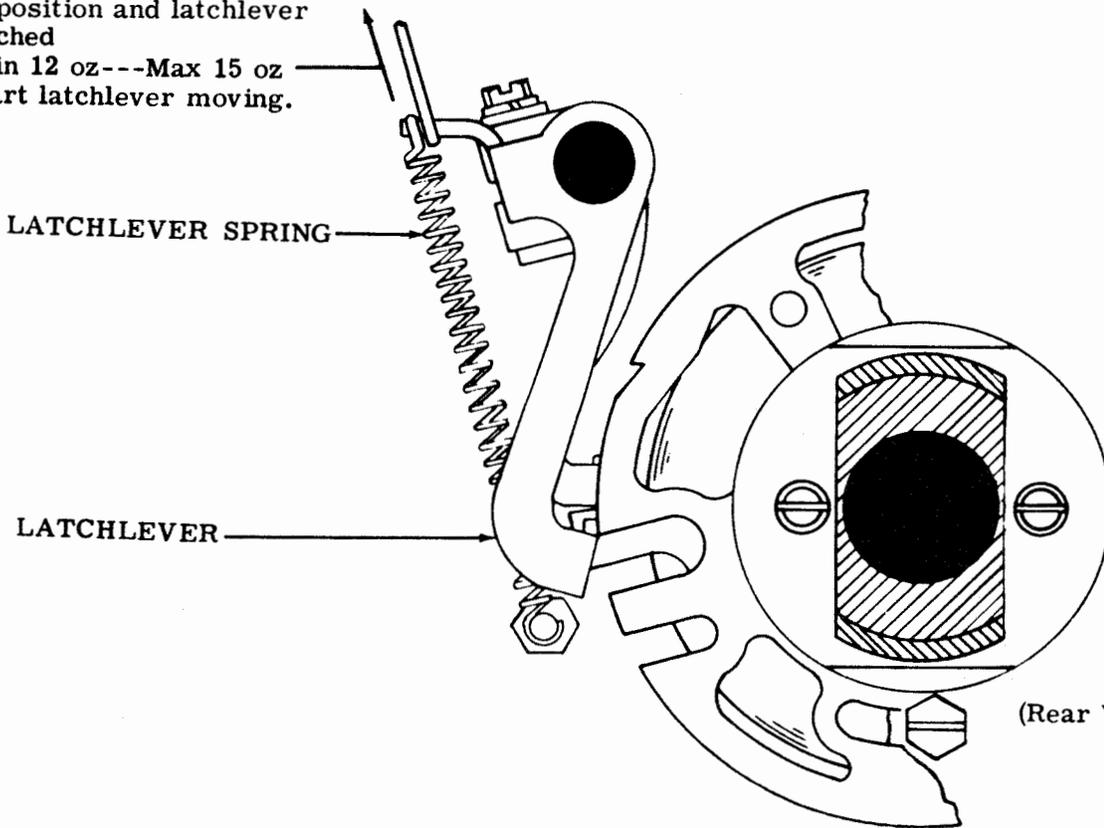


(Right Side View)

(B) FUNCTION CLUTCH LATCHLEVER SPRING

Requirement

With function clutch turned to stop position and latchlever unlatched  
Min 12 oz---Max 15 oz  
to start latchlever moving.



(Rear View)

2.20 Function Mechanism (continued)

(A) CAM FOLLOWER ROLLER

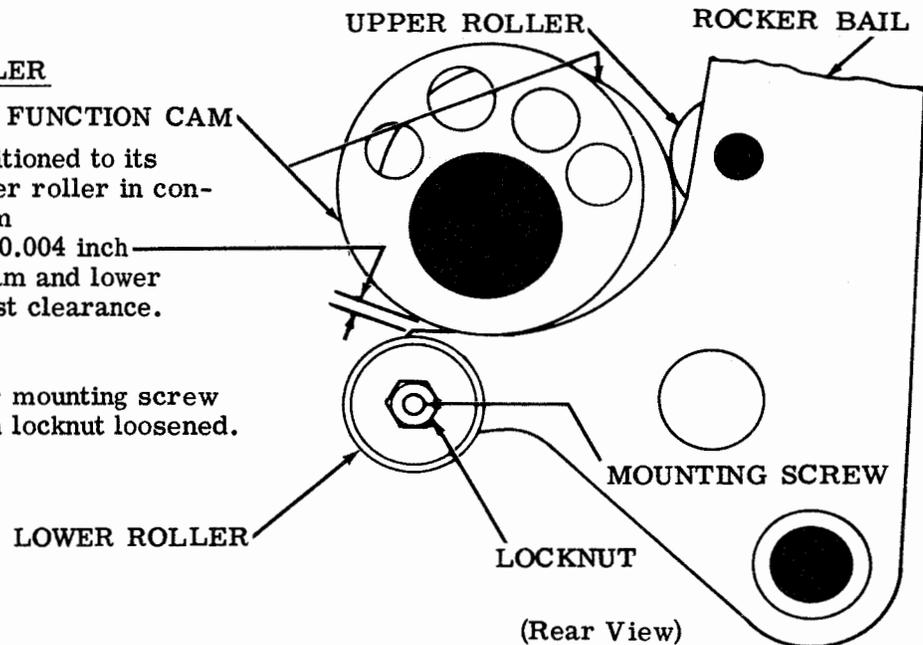
**Requirement**

With rocker bail positioned to its extreme left and upper roller in contact with function cam

Min some---Max 0.004 inch clearance between cam and lower roller at point of least clearance.

**To Adjust**

Position lower roller mounting screw in elongated slot with locknut loosened. Tighten nut.



(Rear View)

(B) CAM FOLLOWER ROLLER ALIGNMENT

(1) **Requirement**

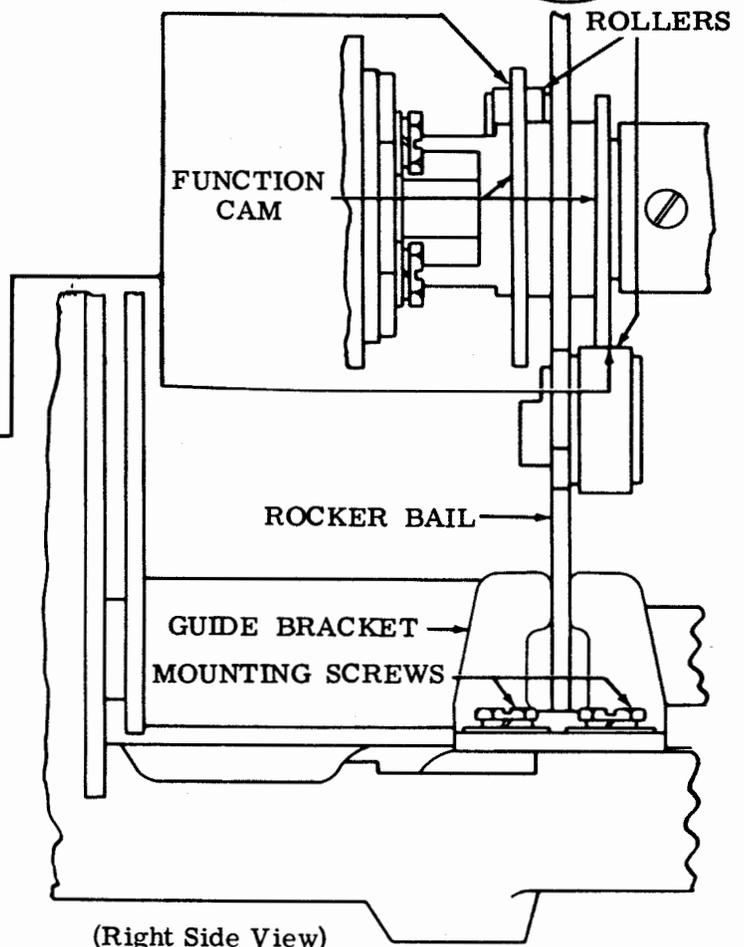
Rocker bail rollers should engage full thickness of function cam.

(2) **Requirement**

Lifter roller in full engagement with rocker bail camming surface.

**To Adjust**

Position rocker bail and guide bracket with guide bracket mounting screws loosened. Tighten screws.



(Right Side View)

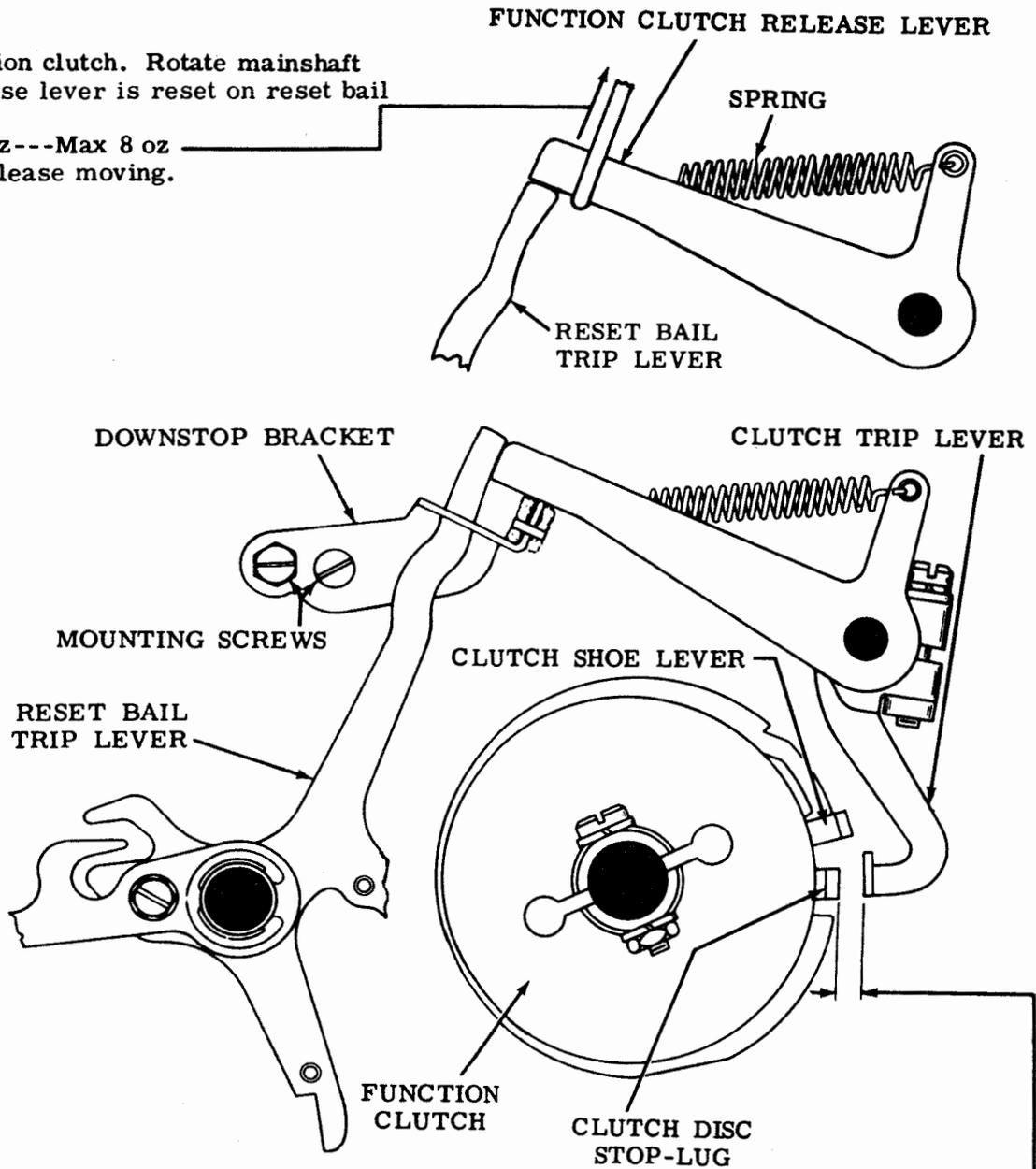
2.21 Function Mechanism (continued)

(A) FUNCTION CLUTCH RELEASE LEVER SPRING

**Requirement**

Trip function clutch. Rotate mainshaft until release lever is reset on reset bail trip lever.

Min 5 oz ---Max 8 oz  
to start release moving.



(B) RELEASE DOWNSTOP BRACKET

**Requirement**

With function clutch tripped, rotate shaft until clearance between function clutch disc stop-lug and clutch stop lever is at a minimum. Release lever resting against downstop bracket. Clearance between function clutch disc stop-lug and stop lever

Min 0.002 inch ---Max 0.045 inch

**To Adjust**

Remove tape guide. With downstop bracket mounting screws friction tight position bracket. Tighten screws.

## 2.22 Punch Mechanism

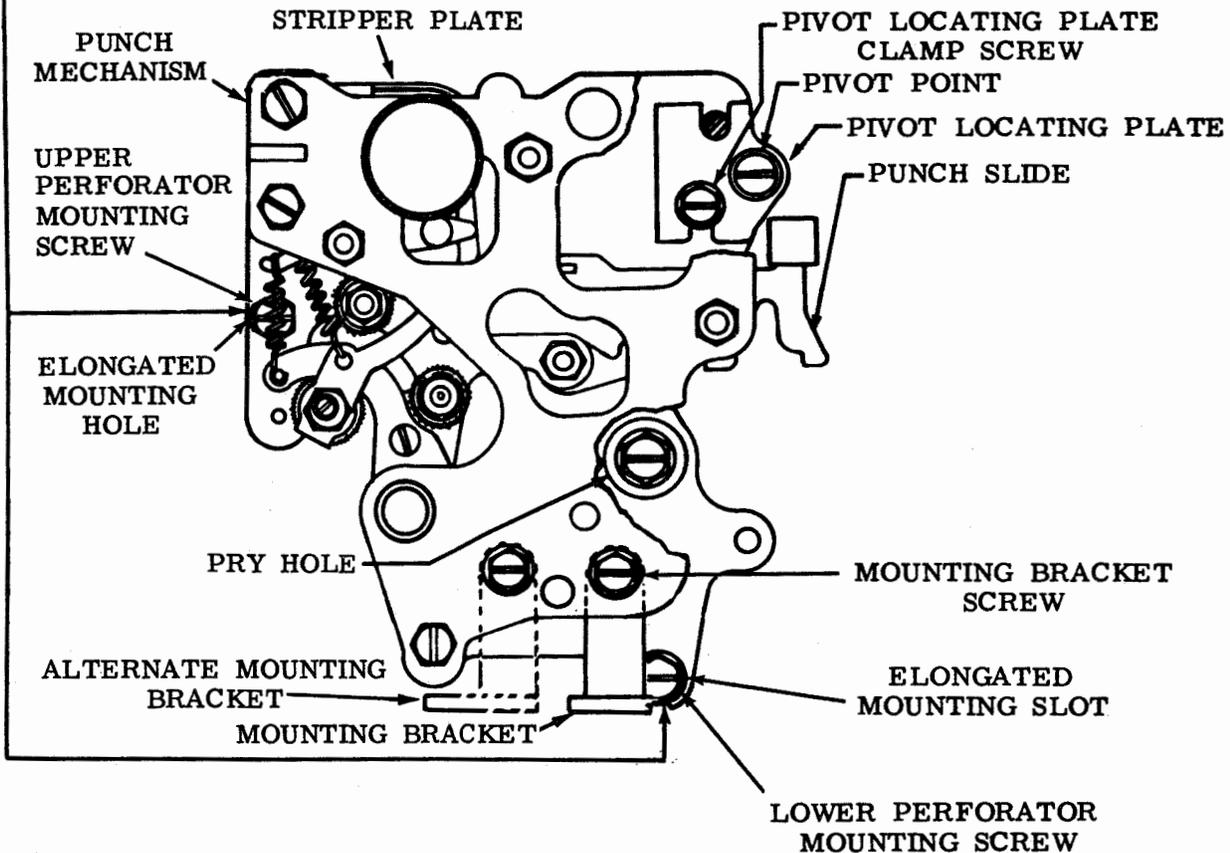
PUNCH MOUNTING PLATE (Preliminary)**Requirement**

The punch mechanism mounting screw, beneath punch block, and mounting screw at lower edge of punch mechanism backplate should be located centrally within their respective mounting holes.

**Note:** The mounting holes are oversize to facilitate use of punch mechanism on the typing reperforator.

**To Adjust**

Remove mounting screw at the lower edge of punch mechanism backplate. With the two remaining backplate mounting screws and mounting bracket screw friction tight, position punch mechanism so that the tapped hole of the frame is centrally located (as gauged by eye) within large body hole of punch mechanism backplate. Tighten the two backplate mounting screws and recheck to see that requirement is met. Replace and tighten the lower backplate mounting screw. Tighten the bracket mounting screw.



2.23 Punch Mechanism (continued)

Note: Before proceeding with the punch mechanism adjustments, check the CAM FOLLOWER ROLLER (2.20) adjustment and loosen the punch slide downstop mounting nut and guide mounting stud.

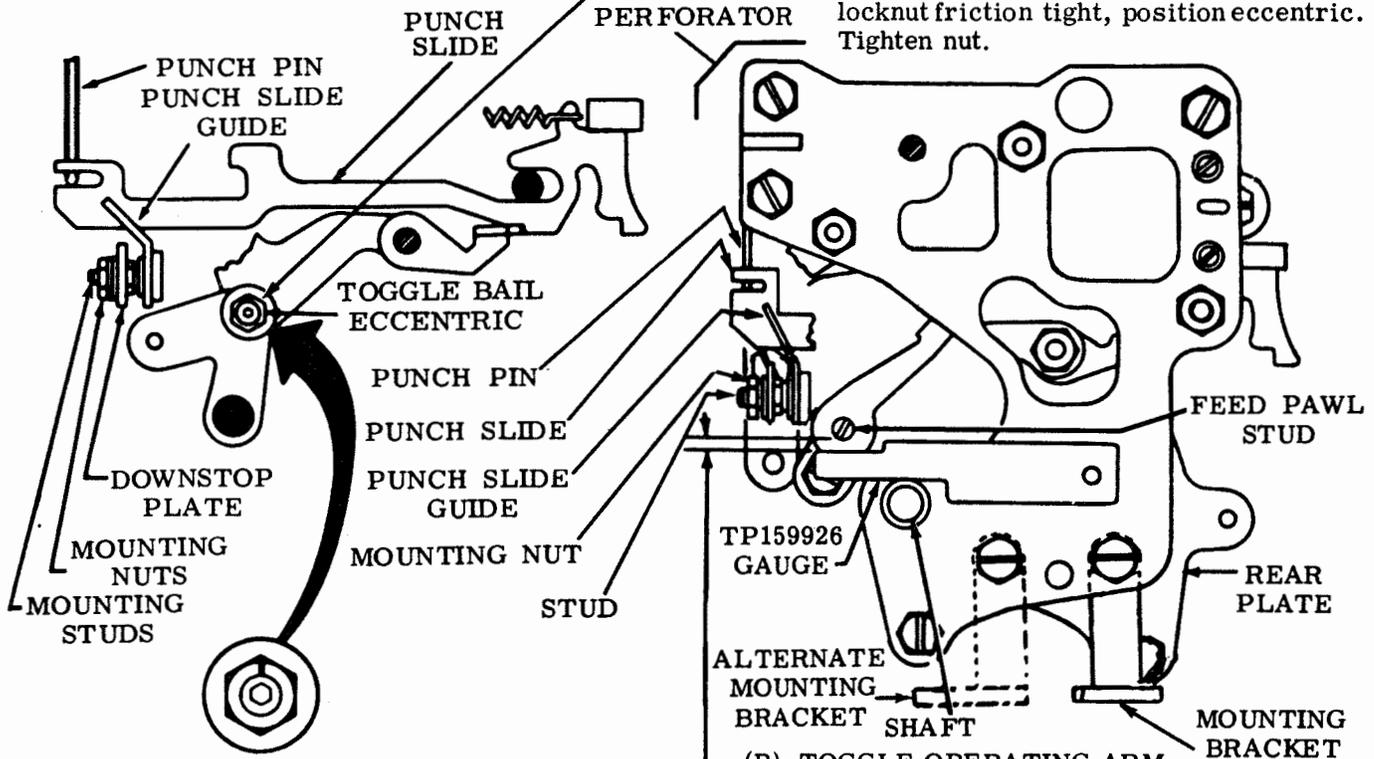
(A) TOGGLE BAIL ECCENTRIC (Preliminary)

Requirement

The indent (high side of eccentric) should be in its uppermost position.

To Adjust

With the toggle bail eccentric shaft locknut friction tight, position eccentric. Tighten nut.



(B) TOGGLE OPERATING ARM

(1) Requirement

Trip function clutch and rotate mainshaft until the upper rocker bail roller is on high part of its cam.  
 Min 0.002 inch---Max 0.005 inch clearance between feed pawl stud and the TP159926 gauge.

(2) Requirement

Clearance between arm and oscillating shaft bearing hub.  
 Min 0.002 inch---Max 0.015 inch with play taken up in direction to make clearance minimum.

To Adjust

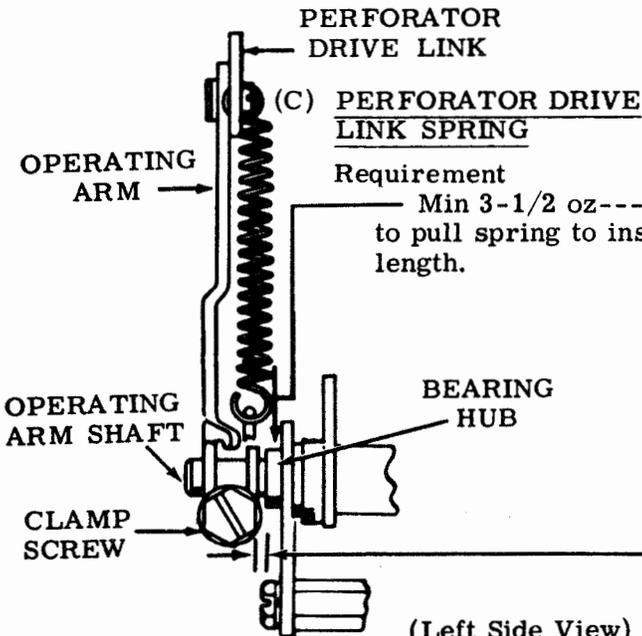
With clamp screw friction tight, position toggle bail and operating arm. Tighten screw.

Note: After FEED PAWL (2.27) adjustment has been made and PUNCH PIN PENETRATION (2.24) and FEED PAWL requirements are met, this requirement should be considered fulfilled.

(C) PERFORATOR DRIVE LINK SPRING

Requirement

Min 3-1/2 oz---Max 8 oz to pull spring to installed length.



2.24 Punch Mechanism (continued)

(A) PUNCH PIN PENETRATION

(1) Requirement

With the RUBOUT combination (12345678) selected, function clutch engaged, rotate mainshaft until all punch pins are into or above the tape aperture in punch block. With the TP159926 gauge in position

—Min 0.050 inch  
clearance between feed pawl stud and the gauge.

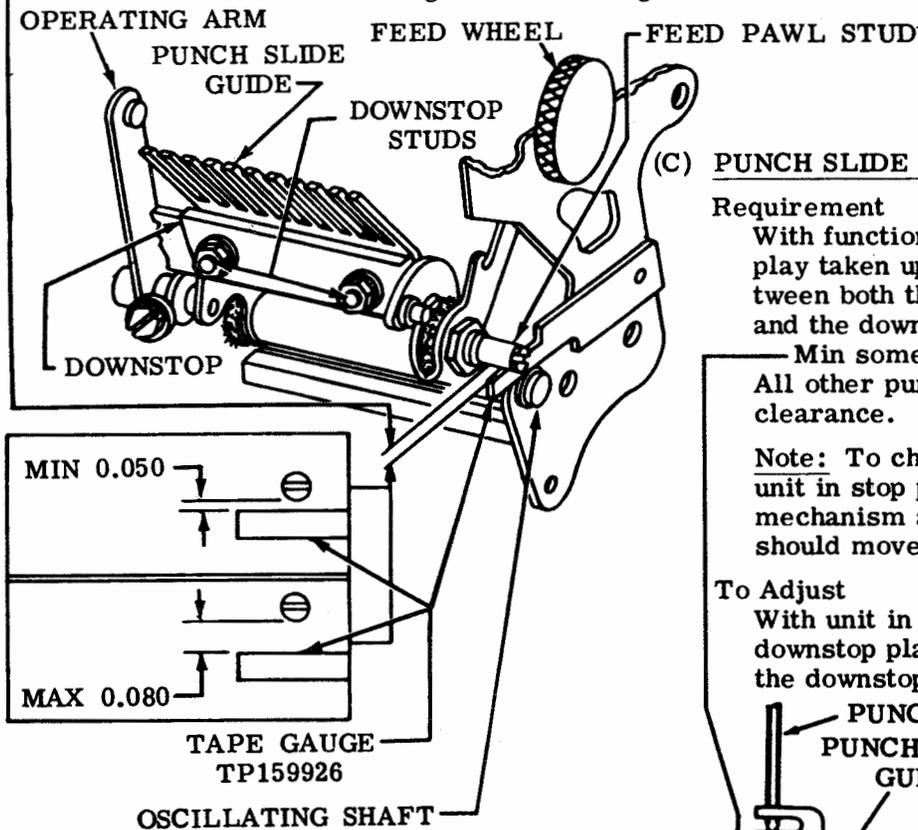
(2) Requirement

With RUBOUT combination selected, function clutch engaged, rotate mainshaft until all punch pins have cleared the punch block. With the TP159926 gauge in position

Min some---Max 0.080 inch  
clearance between feed pawl stud and gauge.

To Adjust

Refine the TOGGLE BAIL ECCENTRIC (2.23) adjustment keeping the indent to the right of a vertical centerline through the shaft. Tighten nut.



(C) PUNCH SLIDE DOWNSTOP POSITION

Requirement

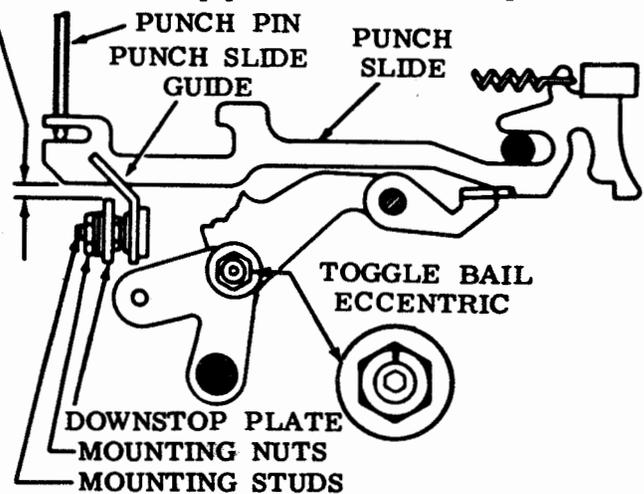
With function clutch disengaged and latched, play taken up toward the top, clearance between both the front and rear punch slides and the downstop plate

—Min some---Max 0.008 inch  
All other punch slides should have some clearance.

Note: To check for some clearance, place unit in stop position, trip function trip mechanism and latches. The punch slides should move fully to their operated position.

To Adjust

With unit in stop position, loosen the two downstop plate mounting locknuts and locate the downstop plate to meet the requirement.



B) PUNCH SLIDE GUIDE (Final)

Requirement

The punch slides should align with their corresponding punch pins and be free of binds after tightening the guide mounting studs. Each punch slide should return freely after being pushed in not more than 1/16 inch.

To Adjust

Position the guide with its mounting studs friction tight. Tighten studs.

2.25 Punch Mechanism (continued)

PUNCH MOUNTING PLATE (Final)

(1) To Check

Select RUBOUT code combination (12345678). Rotate until function clutch trips with punch levers in extreme left-hand position.

Requirement

Clearance between punch slide and punch slide latch

Min 0.015 inch---Max 0.045 inch  
at slide where clearance is least.

To Adjust

Loosen perforator mounting screws, adjusting clamp lock screw, adjusting clamp pivot screw, and anchor bracket screw until friction tight. Place tip of screwdriver between screw and rim of pry hole and pry perforator up or down. Tighten only adjusting clamp lock screw.

(2) To Check

Remove ribbon and tape. With unit in stop position and upper no. 7 pushbar to the right, check clearance between rear leg of stripper plate and type wheel. Select the R code combination (-2--5-78), trip the function clutch, and move rocker bail to its extreme left position. Check clearance between front leg of the stripper plate and type wheel.

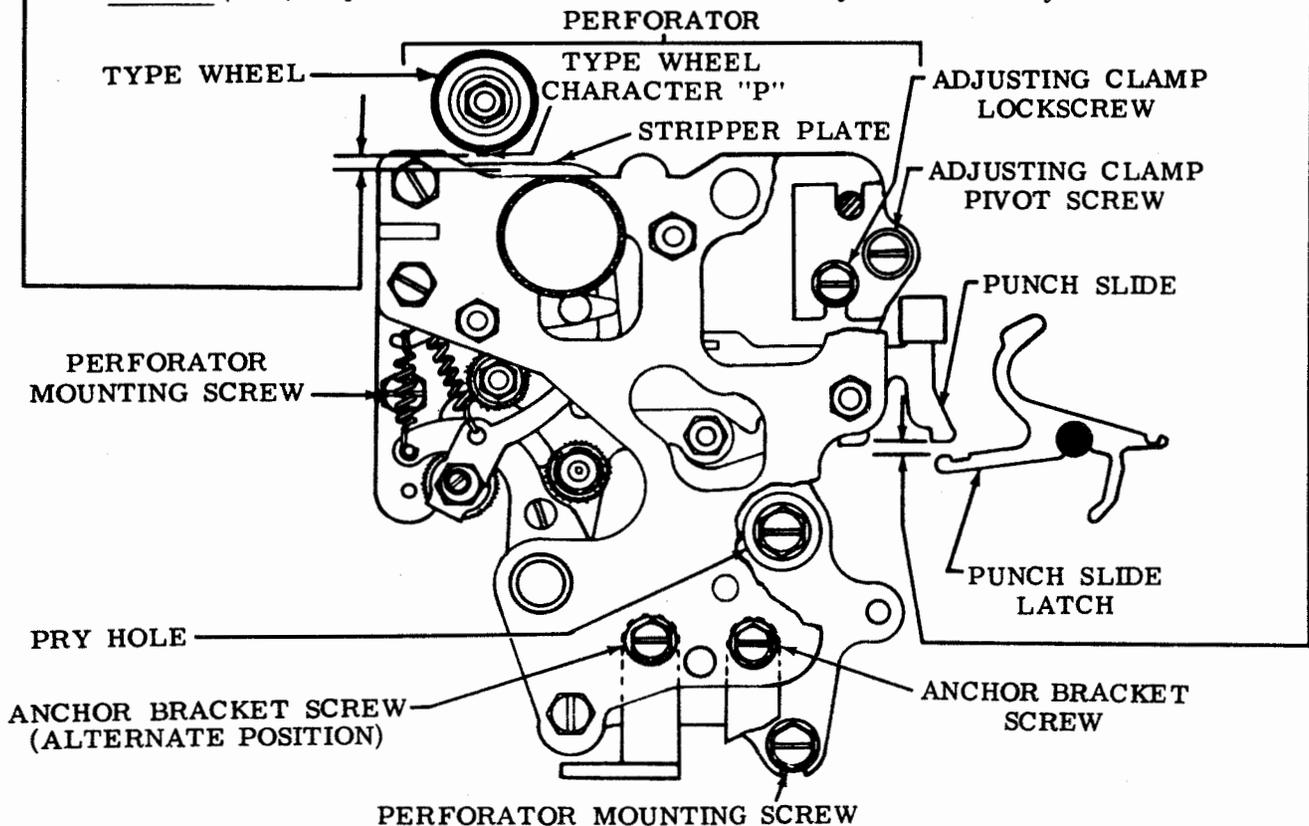
Requirement

Clearance between the character P and the front or rear leg of stripper plate (whichever has the least clearance) should be

Min 0.075 inch---Max 0.085 inch

To Adjust

Position perforator with two mounting screws, adjusting clamp pivot screw, and anchor bracket screw friction tight. Tighten screws. Check RESET BAIL TRIP LEVER (2.26) requirement for some clearance and adjust if necessary.



2.26 Punch Mechanism (continued)

RESET BAIL TRIP LEVER (Final)

(1) Requirement

Manually select the NULL code (BLANK) combination. Manually rotate reset bail trip lever. The punch slide reset bail should trip before the function clutch is tripped.

To Adjust

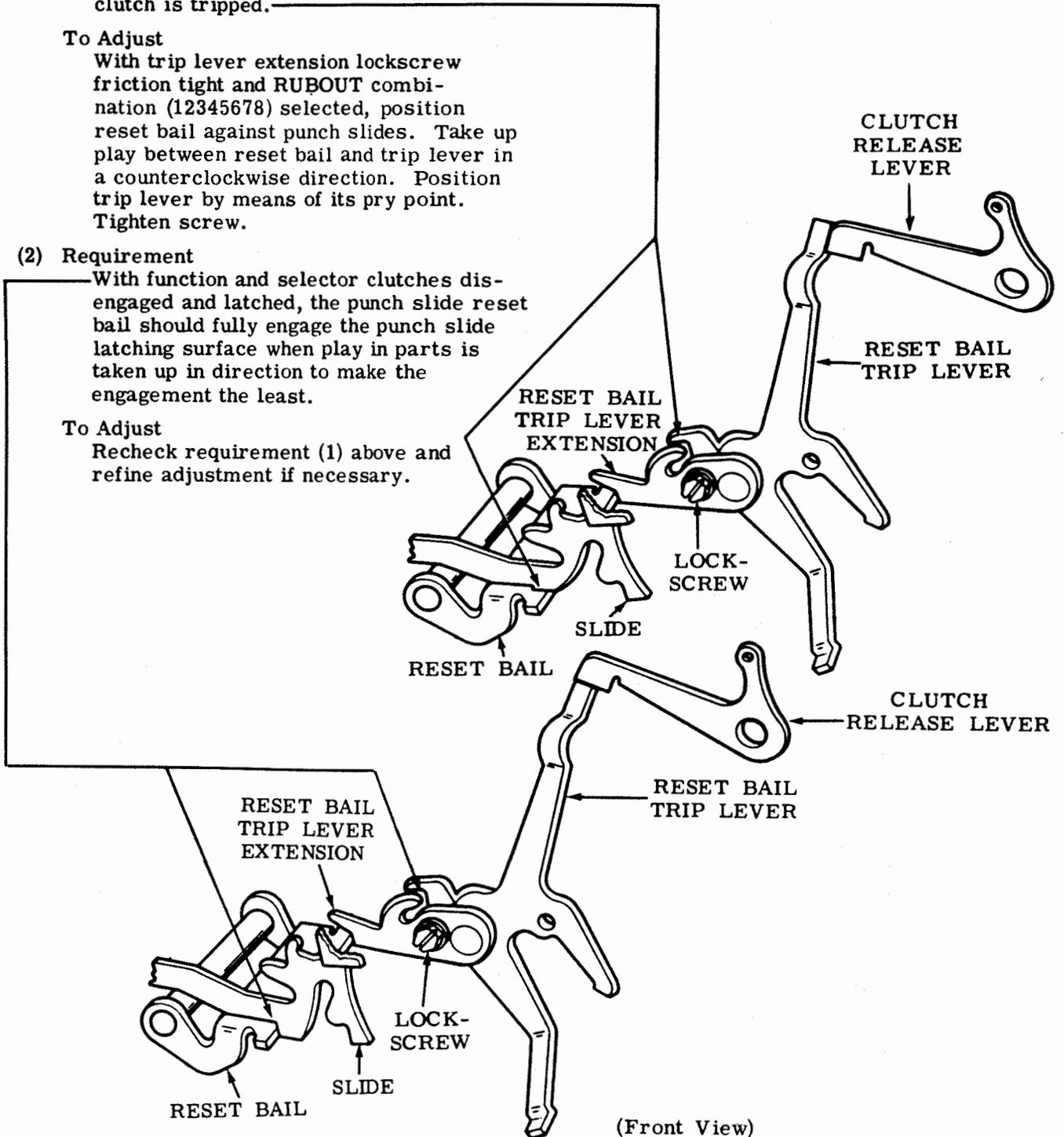
With trip lever extension lockscrew friction tight and RUBOUT combination (12345678) selected, position reset bail against punch slides. Take up play between reset bail and trip lever in a counterclockwise direction. Position trip lever by means of its pry point. Tighten screw.

(2) Requirement

With function and selector clutches disengaged and latched, the punch slide reset bail should fully engage the punch slide latching surface when play in parts is taken up in direction to make the engagement the least.

To Adjust

Recheck requirement (1) above and refine adjustment if necessary.



(Front View)

2.27 Punch Mechanism (continued)

(A) LATCHLEVER CLEARANCE

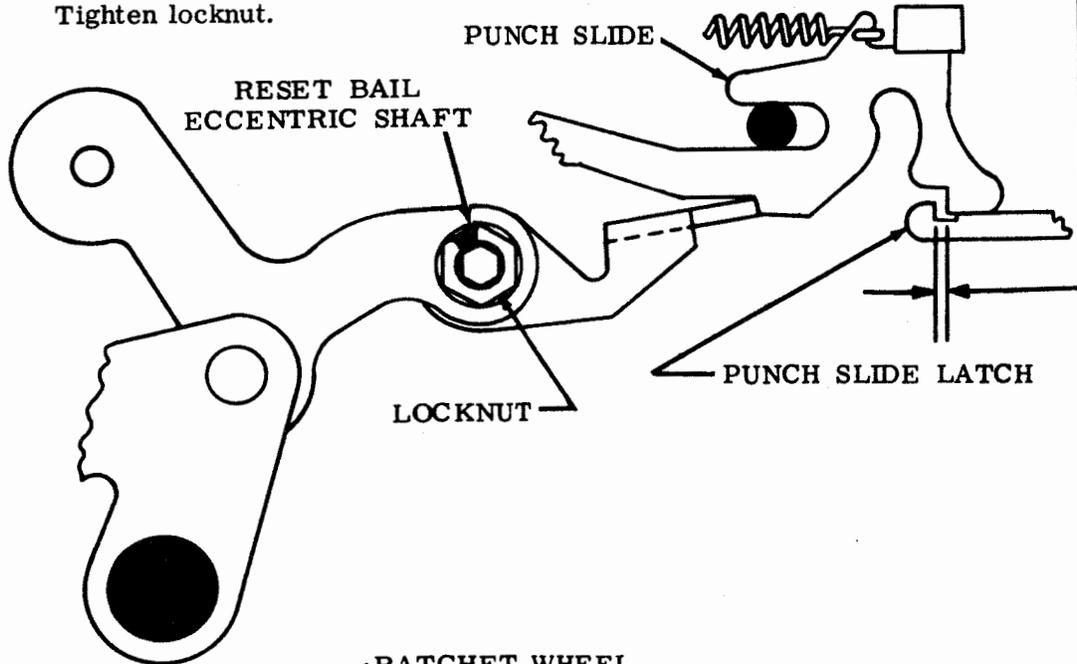
Requirement

With NULL code (BLANK) combination selected, the function clutch disengaged and latched, clearance between the punch slide and its associated latchlever should be

Min 0.008 inch---Max 0.020 inch  
for the slide having the least clearance.

To Adjust

Rotate the reset bail eccentric shaft with its locknut loosened. Keep the indentation in the eccentric above center of shaft. Tighten locknut.



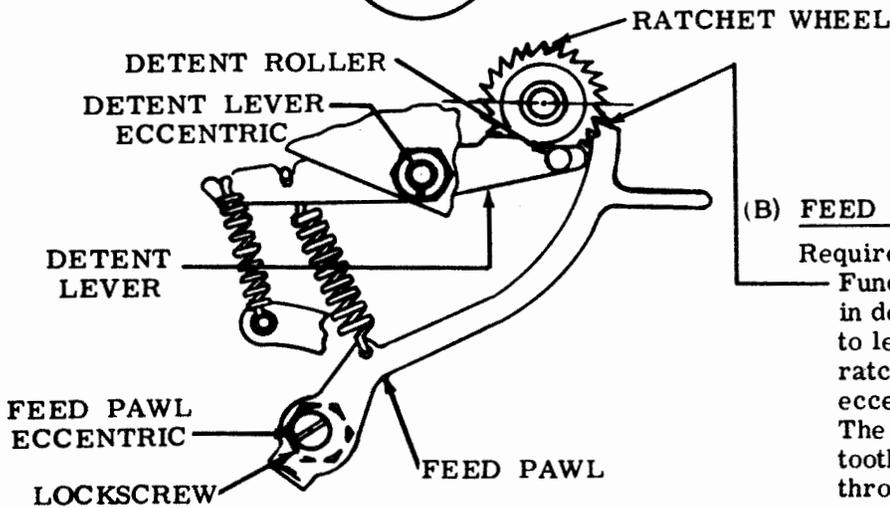
(B) FEED PAWL

Requirement

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 the right of its lockscrew. The feed pawl should engage the first tooth below a horizontal centerline through the ratchet wheel with no perceptible clearance.

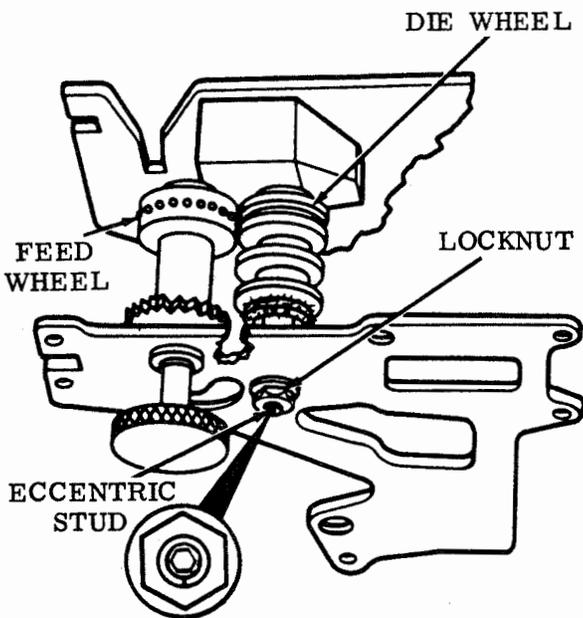
To Adjust

Rotate the feed pawl eccentric with lockscrew loosened. Tighten screw.



Note: This adjustment is related to TEN CHARACTERS PER INCH (2.28), and the two adjustments should be made at the same time.

## 2.28 Punch Mechanism (continued)

TEN CHARACTERS PER INCH (Preliminary)

## (1) Requirement

Indent of die wheel eccentric stud pointing downward.

## To Adjust

Position die wheel eccentric stud with locknut loosened. Tighten nut.

## (2) Requirement

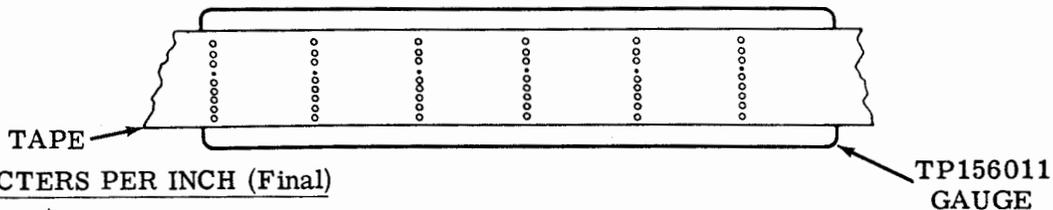
With tape shoe blocked away from feed wheel, feed pawl and detent disengaged, and tape removed, feed wheel should rotate freely. Check through 3 or 4 revolutions of feed wheel. Refine requirement (1) above if necessary to meet this requirement.

**Note:** Before proceeding with the following adjustment check both BIAS SPRING (2.31) tensions, 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.

REPERFORATOR MOUNTING

## Requirement

Mount the reperforator to the base and adjust in accordance with the associated base section.

TEN CHARACTERS PER INCH (Final)

## (1) Requirement

With a piece of tape perforated with six series of 9 NULL code (BLANK) combinations followed by a rubout combination placed over the TP95960 gauge or the smooth side of the TP156011 tape gauge so that the circular portion of the first number 2 code hole in the tape is concentric with the first hole of the tape gauge, the next four holes in the tape gauge should be visible through the number 2 code holes in the tape and the circular portion of the last (sixth) number 2 code hole in the tape should be entirely within the 0.086 diameter hole of the tape gauge.

## (2) Requirement

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

## To Adjust

With tape removed from punch mechanism, loosen eccentric locknut and rotate die wheel eccentric shaft until it binds against feed wheel. Back off eccentric until die wheel is just free. Check through 3 or 4 rotations. Keep the indent of eccentric below the horizontal centerline of the stud. Refine adjustment for requirement (1), if necessary, by moving the die wheel toward the feed wheel to decrease the character spacing and away from the feed wheel to increase the character spacing. Tighten nut. Refine FEED PAWL (2.27) adjustment, if necessary.

**CAUTION:** WITH TAPE REMOVED. MAKE SURE FEED WHEEL AND DIE WHEEL DO NOT BIND. RECHECK REQUIREMENT (1). IF NECESSARY, REFINE.

**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  $\pm 0.007$  inch variation in 5 inches.

## 2.29 Punch Mechanism (continued)

(For Latest Design see 2.30)

LATERAL AND FRONT TO REAR FEED WHEEL POSITION DETENT (Early Design)**Requirement**

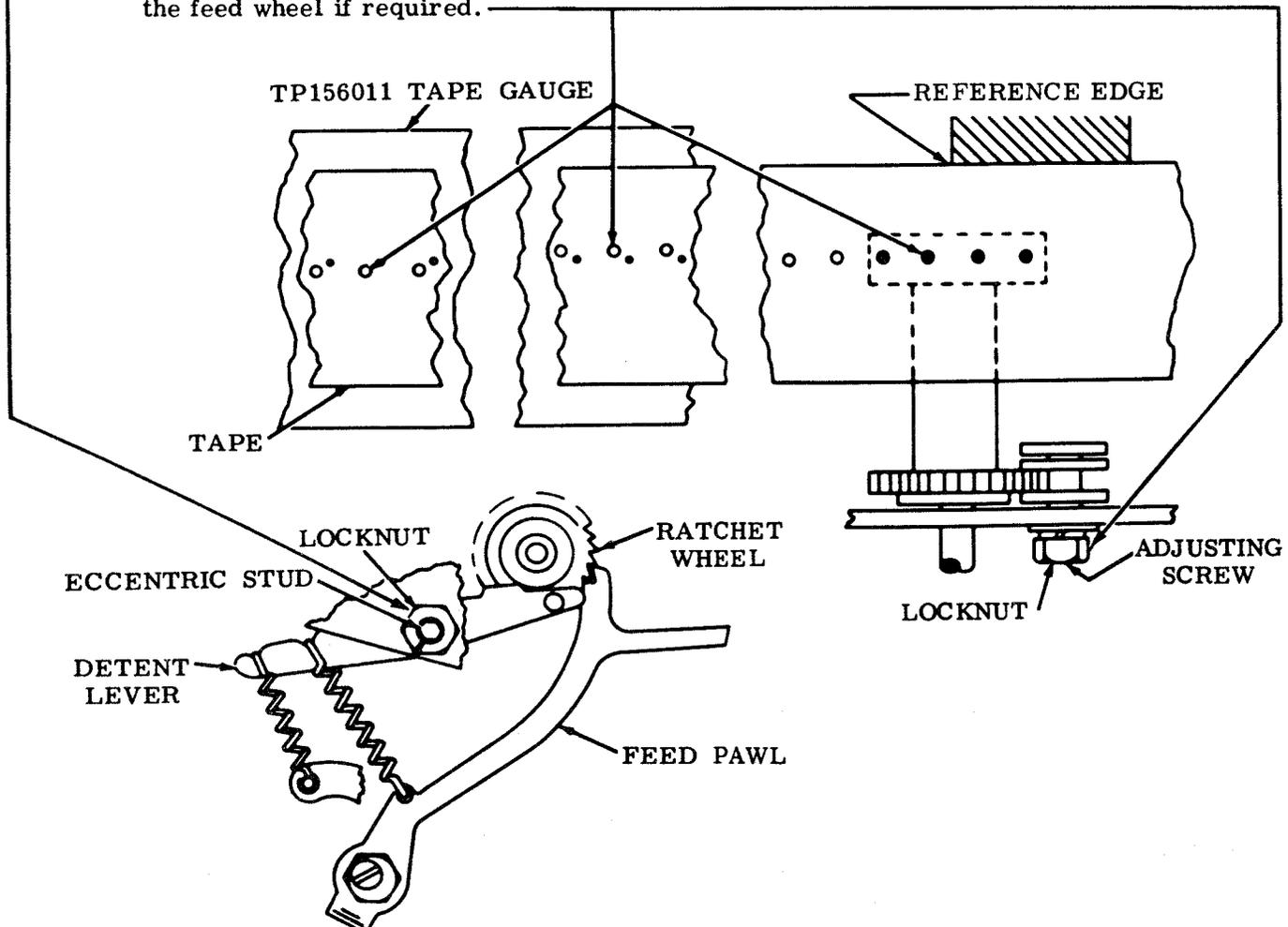
With the reperforator operating under power, obtain a tape sample consisting of a series of NULL (BLANK) perforations, by a visual inspection of the perforated feed holes, laterally and front to rear, the indentations of the feed wheel should be fully punched out.

**(1) To Adjust (Laterally)**

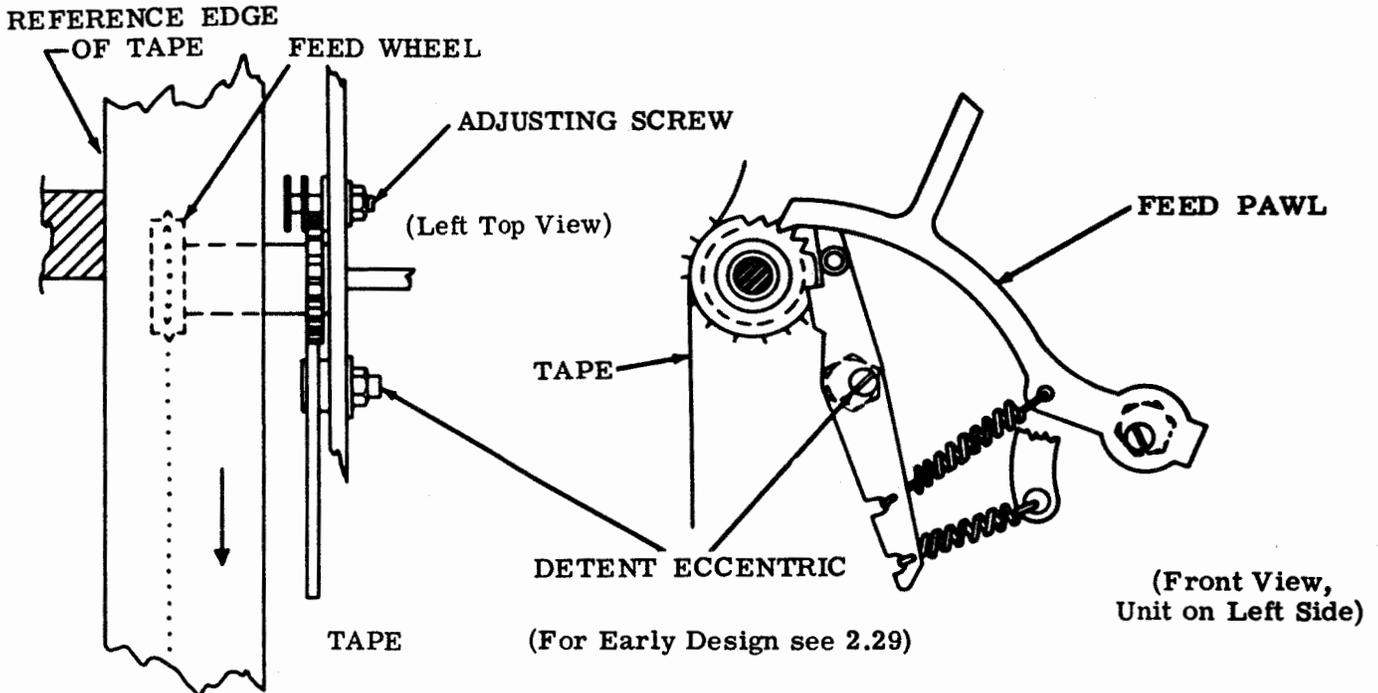
To meet the lateral requirement, loosen the detent eccentric stud locknut and rotate the detent eccentric clockwise to move the feed wheel perforations towards the leading edge of the feed hole. Rotate the detent eccentric counterclockwise to move the feed wheel perforation towards the trailing edge of the feed hole. Tighten nut. Refine the FEED PAWL (2.27) adjustment.

**(2) To Adjust (Front to Rear)**

To meet the front to rear requirement with respect to the reference edge of the tape, loosen the adjusting screw locknut and position the adjusting screw. To move the indentations in the tape away from the reference edge of the tape, move the feed wheel towards the front plate of the punch mechanism by rotating the adjusting screw counterclockwise. To move the indentations in the tape towards the reference edge of the tape, move the feed wheel towards the backplate of the punch mechanism by rotating the adjusting screw clockwise. Tighten nut. Refine the adjustment above to align the lateral indentations of the feed wheel if required.



2.30 Punch Mechanism (continued)



LATERAL AND FRONT TO REAR FEED WHEEL POSITION DETENT (Latest Design)

**Requirement**

The indentations punched by the feed wheel should be centrally located between the punched feed holes (gauged by eye) and on same horizontal centerline. The unit must backspace the tape at least 30 characters without losing its point of registration.

**To Check**

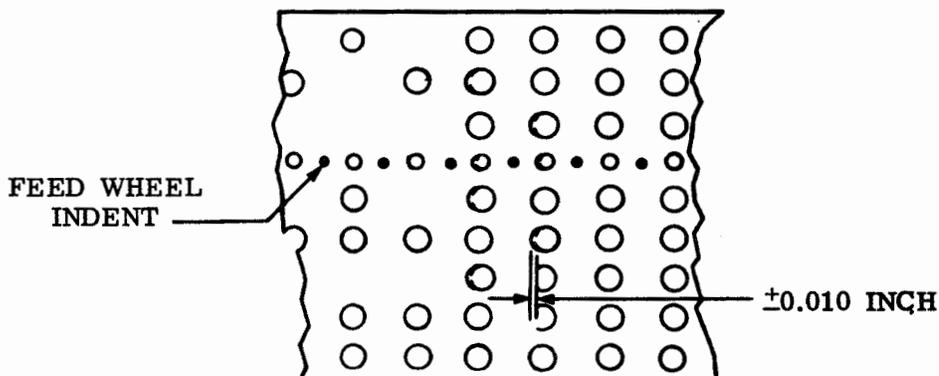
Perforate 6 inches of RY tape. Backspace 30 characters. Reperforate with RUBOUT characters. Code holes must coincide except for first two characters which may be elongated  $\pm 0.010$  inch.

**To Adjust (Laterally)**

Rotate detent eccentric clockwise to move the feed wheel perforation toward the leading edge of the feed hole and rotate eccentric counterclockwise to move the perforation toward the trailing edge of the feed hole. Tighten locknut. Refine FEED PAWL (2.27) adjustment if necessary.

**To Adjust (Front to Rear)**

Loosen locknut on adjusting screw and rotate the screw counterclockwise to move the indentations in the tape away from the reference edge (rear) of the tape. To move indentations in the tape toward the reference edge of the tape, rotate adjusting screw clockwise. Tighten nut. Refine the lateral adjustment above if necessary.



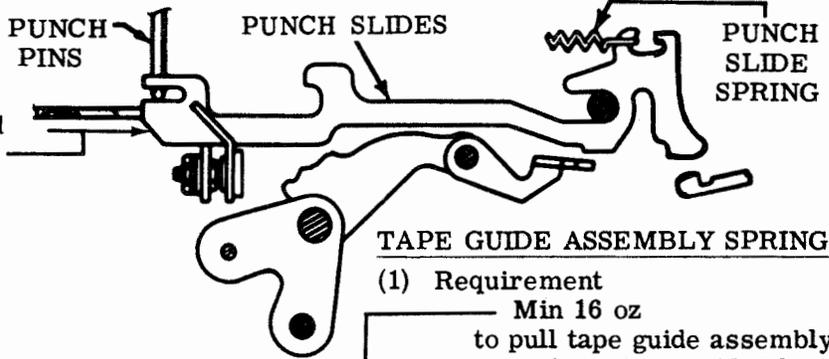
2.31 Punch Mechanism (continued)

PUNCH SLIDE SPRING

Requirement

RUBOUT combination (12345678) set up, and punch slides in selected position

Min 2-1/4 oz---Max 3-1/4 oz to start each slide moving.



TAPE GUIDE ASSEMBLY SPRING

(1) Requirement

Min 16 oz to pull tape guide assembly away from tape guide block.

(2) Requirement

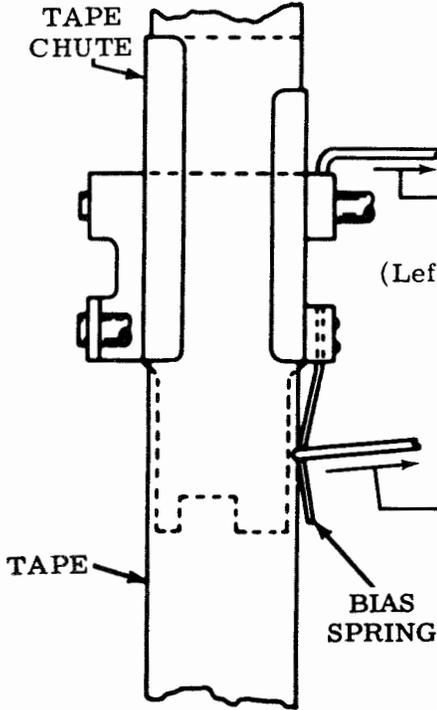
Tape guide assembly should move freely on shaft.

To Adjust

With mounting screws loosened, position mounting post. Tighten screws.

TAPE CHUTE

(Left Top View)



BIAS SPRING (TAPE CHUTE)

Requirement

With selector and function clutches disengaged and latched, tape threaded through punch mechanism, it should require

Min 1-1/4 oz---Max 2-1/4 oz

to just move the spring away from the tape.

To Adjust

Bend the spring.

Note: It is necessary to remove several parts, on units equipped with backspace mechanism, in order to check this spring tension. It should not be checked unless there is good reason to believe that requirements are not met.

BIAS SPRING (PUNCH BLOCK)

(1) Requirement

With tape removed from the punch block, the tape guide spring should rest against the clearance slot in the block in a symmetrical manner.

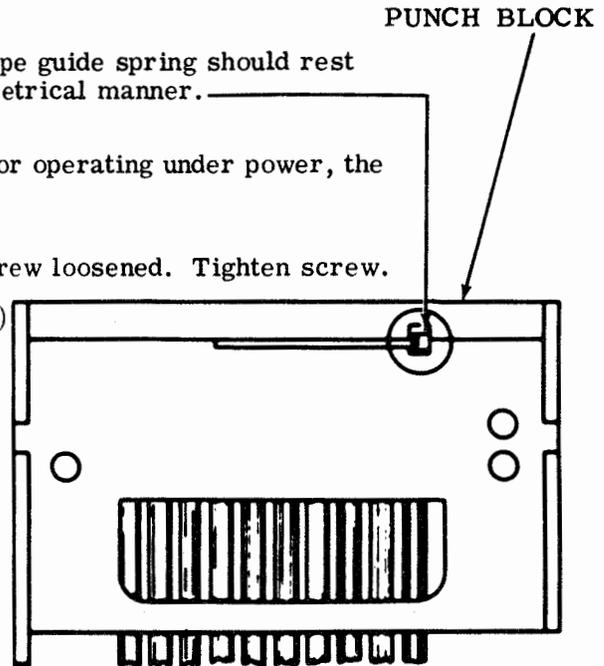
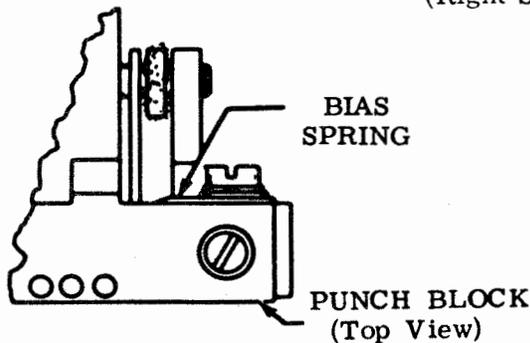
(2) Requirement

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

To Adjust

Bend the spring and position it with its mounting screw loosened. Tighten screw.

(Right Side View)



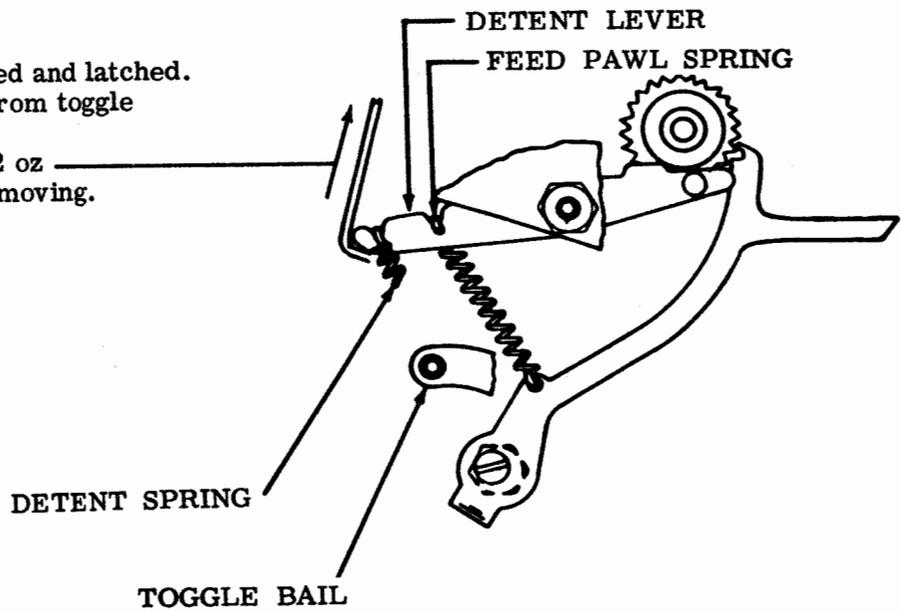
2.32 Punch Mechanism (continued)

FEED PAWL SPRING

**Requirement**

Function clutch disengaged and latched.  
 Detent spring unhooked from toggle bail

Min 3 oz---Max 4-1/2 oz  
 to start the detent lever moving.

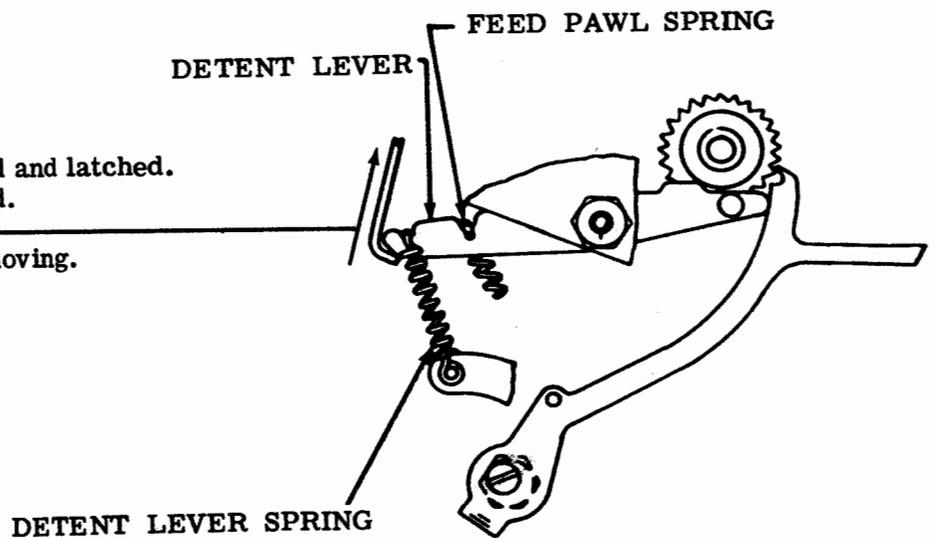


DETENT LEVER SPRING

**Requirement**

Function clutch disengaged and latched.  
 Feed pawl spring unhooked.

Min 7 oz---Max 10 oz  
 to start the detent lever moving.

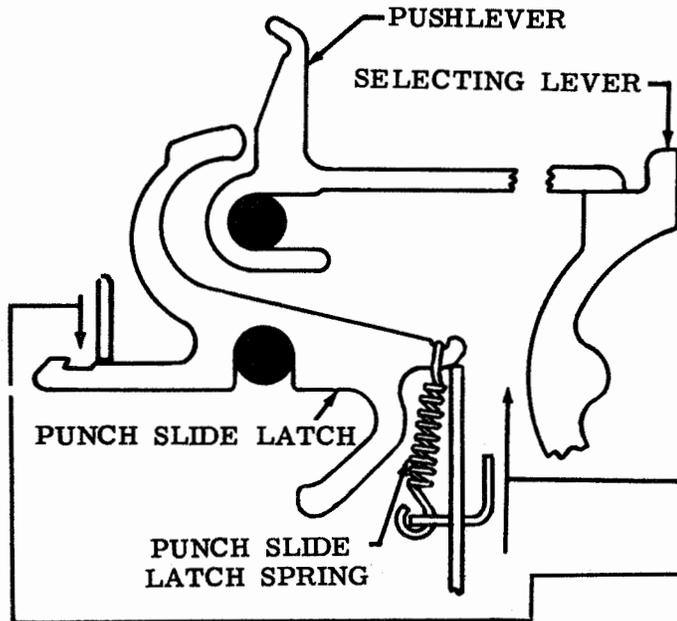
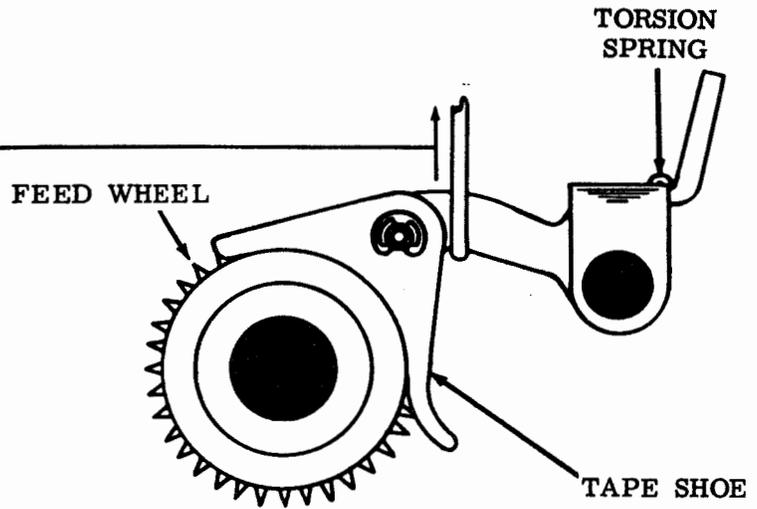


2.33 Punch Mechanism (continued)

TAPE SHOE TORSION SPRING

Requirement

Min 13 oz---Max 18 oz  
to move tape shoe from feed wheel.



PUNCH SLIDE LATCH SPRING

To Check

Select RUBOUT code combination (12345678). Position rocker bail to extreme left. Strip pushlevers from selecting levers.

Requirement

For one-shaft unit  
— Min 1 oz---Max 3 oz  
to start latch moving.  
For two-shaft unit  
— Min 3/4 oz---Max 2 oz  
to start latch moving.

2.34 Typing Mechanism

(A) PUSHBAR OPERATING BLADE (Preliminary)

To Check

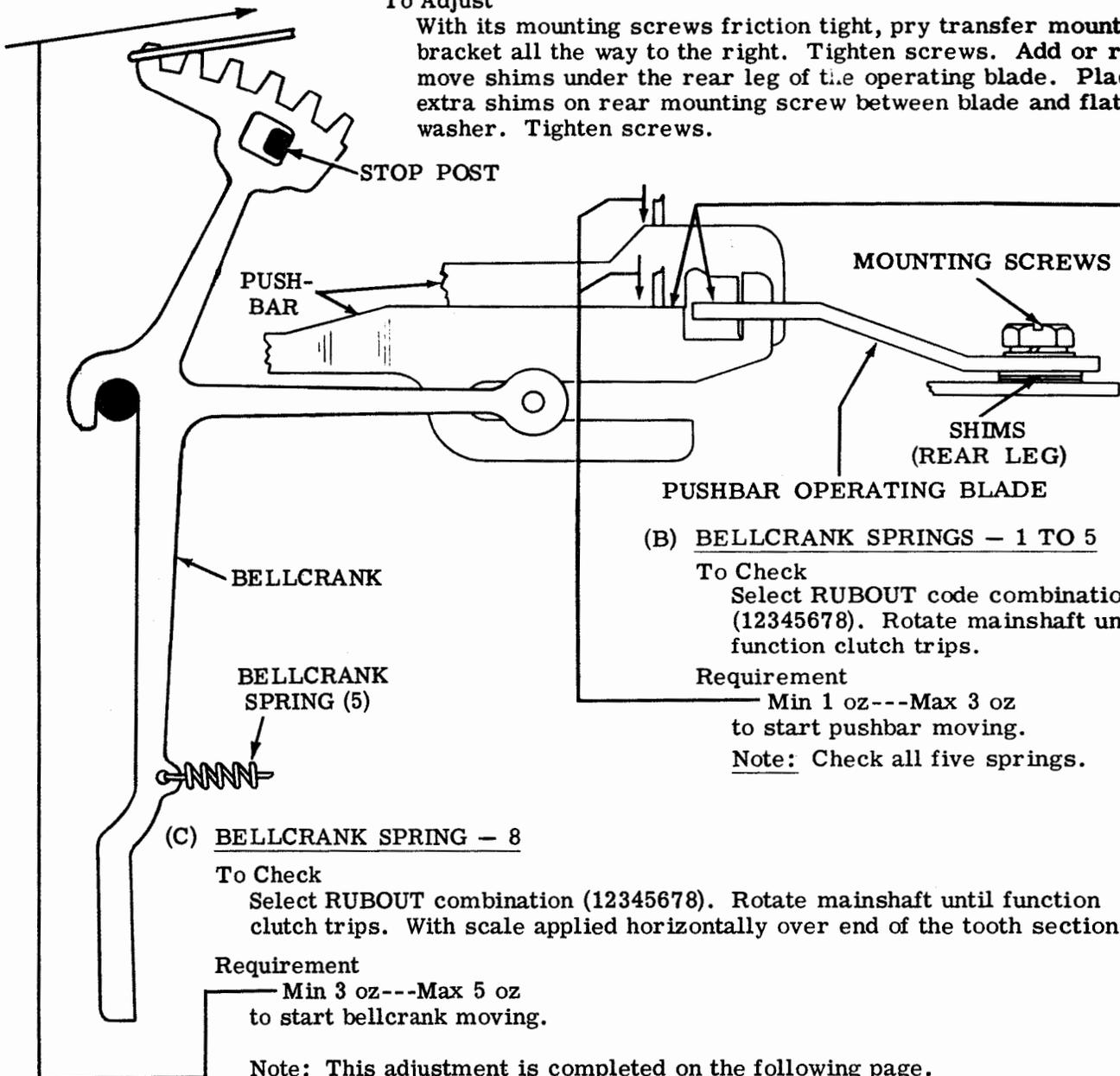
Manually select RUBOUT code combination (12345678). Rotate mainshaft until function clutch trips. Hold no. 2 and 3 bellcranks against stop post.

Requirement

Operating blade parallel to (not necessarily flush with) no. 2 and 3 pushbars.

To Adjust

With its mounting screws friction tight, pry transfer mounting bracket all the way to the right. Tighten screws. Add or remove shims under the rear leg of the operating blade. Place extra shims on rear mounting screw between blade and flat washer. Tighten screws.



(B) BELLCRANK SPRINGS - 1 TO 5

To Check

Select RUBOUT code combination (12345678). Rotate mainshaft until function clutch trips.

Requirement

Min 1 oz---Max 3 oz to start pushbar moving.

Note: Check all five springs.

(C) BELLCRANK SPRING - 8

To Check

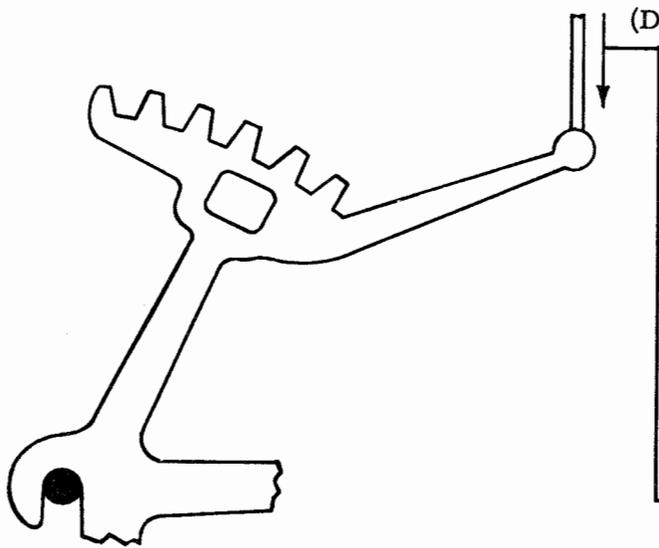
Select RUBOUT combination (12345678). Rotate mainshaft until function clutch trips. With scale applied horizontally over end of the tooth section.

Requirement

Min 3 oz---Max 5 oz to start bellcrank moving.

Note: This adjustment is completed on the following page.

2.35 Typing Mechanism (continued)



(D) BELLCRANK SPRINGS - 6 AND 7

To Check  
 Select RUBOUT combination (12345678).  
 Rotate mainshaft until function clutch trips.

(1) Requirement (Bellcrank Spring 6)  
 With scale applied vertically to ball end of bellcrank contact operating arm  
 — Min 2 oz---Max 4 oz  
 to start bellcrank moving.

(2) Requirement (Bellcrank Spring 7)  
 With no. 7 pulse lever spring removed and scale applied vertically to ball end of bellcrank operating arm  
 — Min 3 oz---Max 6 oz  
 to start bellcrank moving.

SHOULDER CLEARANCE

To Check

Manually select RUBOUT code combination (12345678). Rotate mainshaft until function clutch trips. Manually seat pushbars in detented position. In bar which is nearest left edge of blade, take up play to left and rear, and then release.

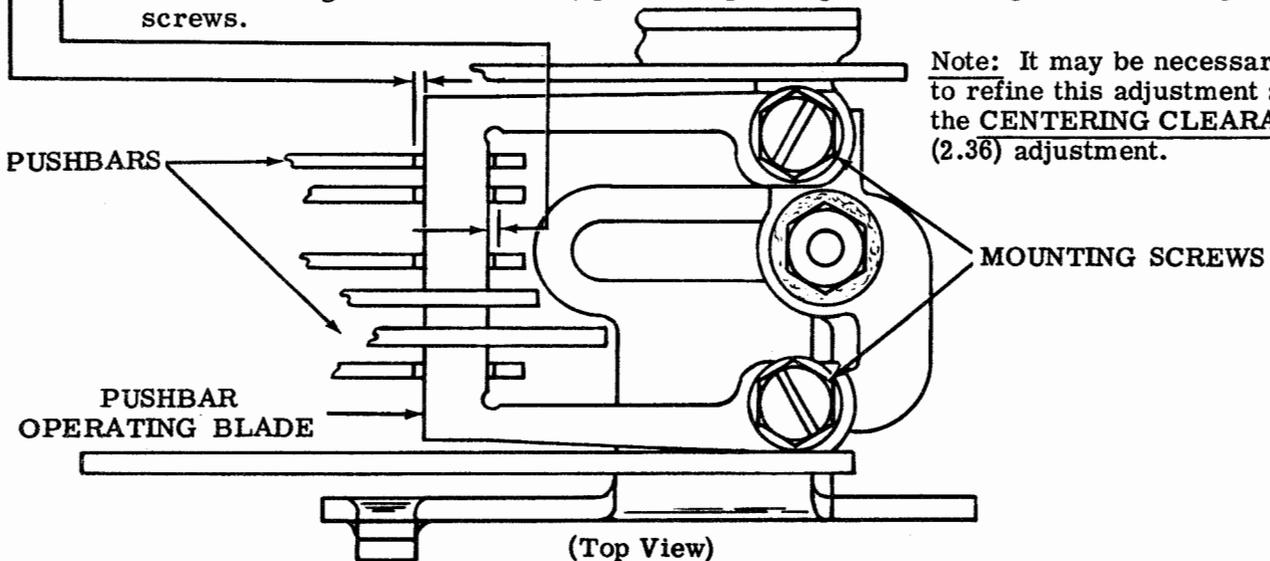
(1) Requirement  
 Clearance between bar and left edge of blade  
 — Min 0.015 inch---Max 0.030 inch

(2) Requirement  
 Some clearance between right edge of blade and pushbars when play in bars has been taken up to right and released.

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

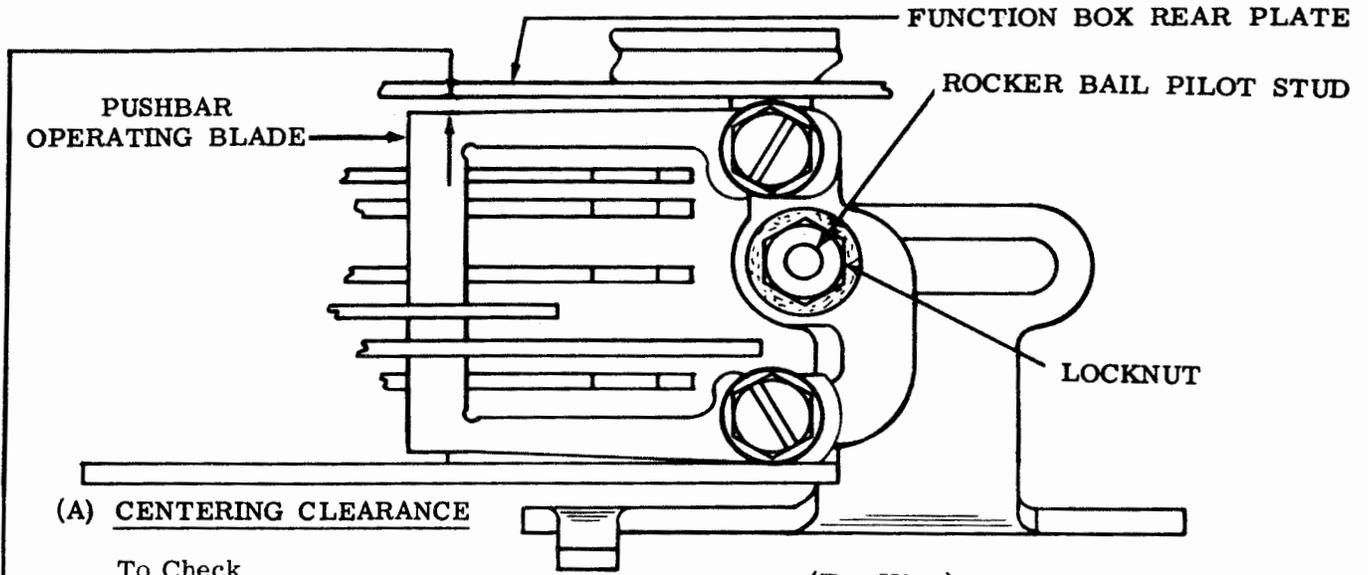
To Adjust

With mounting screws loosened, position operating blade in elongated holes. Tighten screws.



Note: It may be necessary to refine this adjustment after the CENTERING CLEARANCE (2.36) adjustment.

2.36 Typing Mechanism (continued)



To Check

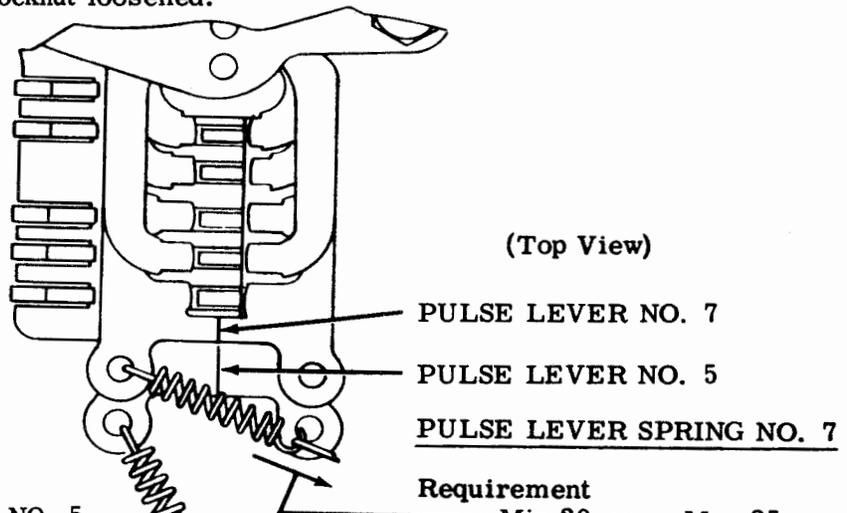
Select NULL code (BLANK) combination.  
Position rocker bail through a complete cycle to insure the clearance is a minimum.

Requirement

Clearance between function box rear plate and pushbar operating blade  
— Min 0.005 inch---Max 0.020 inch  
at a point in the cycle where play is taken up to make clearance minimum.

To Adjust

Position rocker bail pilot stud in elongated hole with locknut loosened.  
Tighten nut.



PULSE LEVER SPRING NO. 5

Requirement

Min 10 oz---Max 15 oz  
to pull spring to length of 7/16 inch.

Requirement

Min 20 oz---Max 25 oz  
to pull spring to length of 7/16 inch.

2.37 Typing Mechanism (continued)

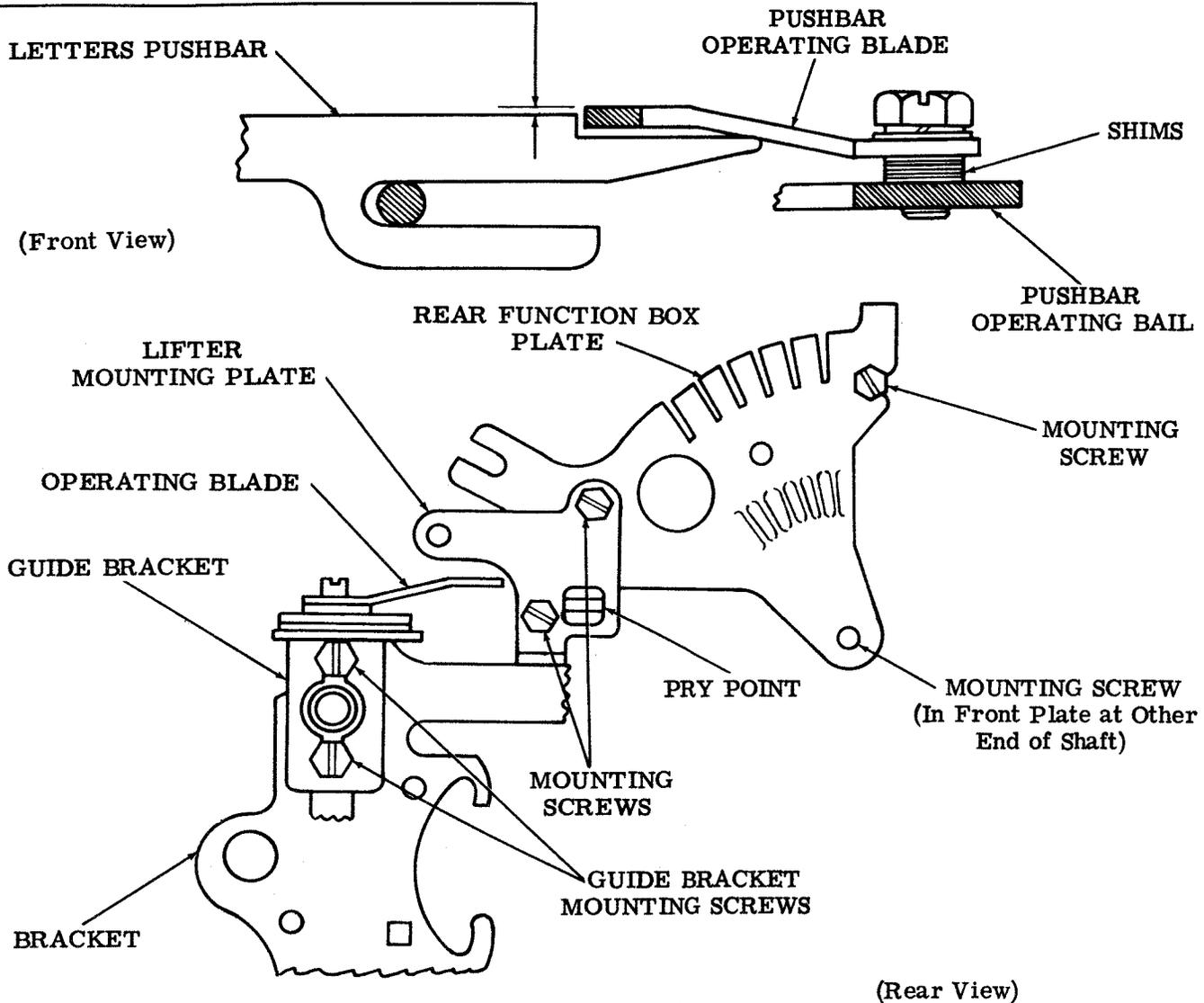
FUNCTION BOX

Requirement

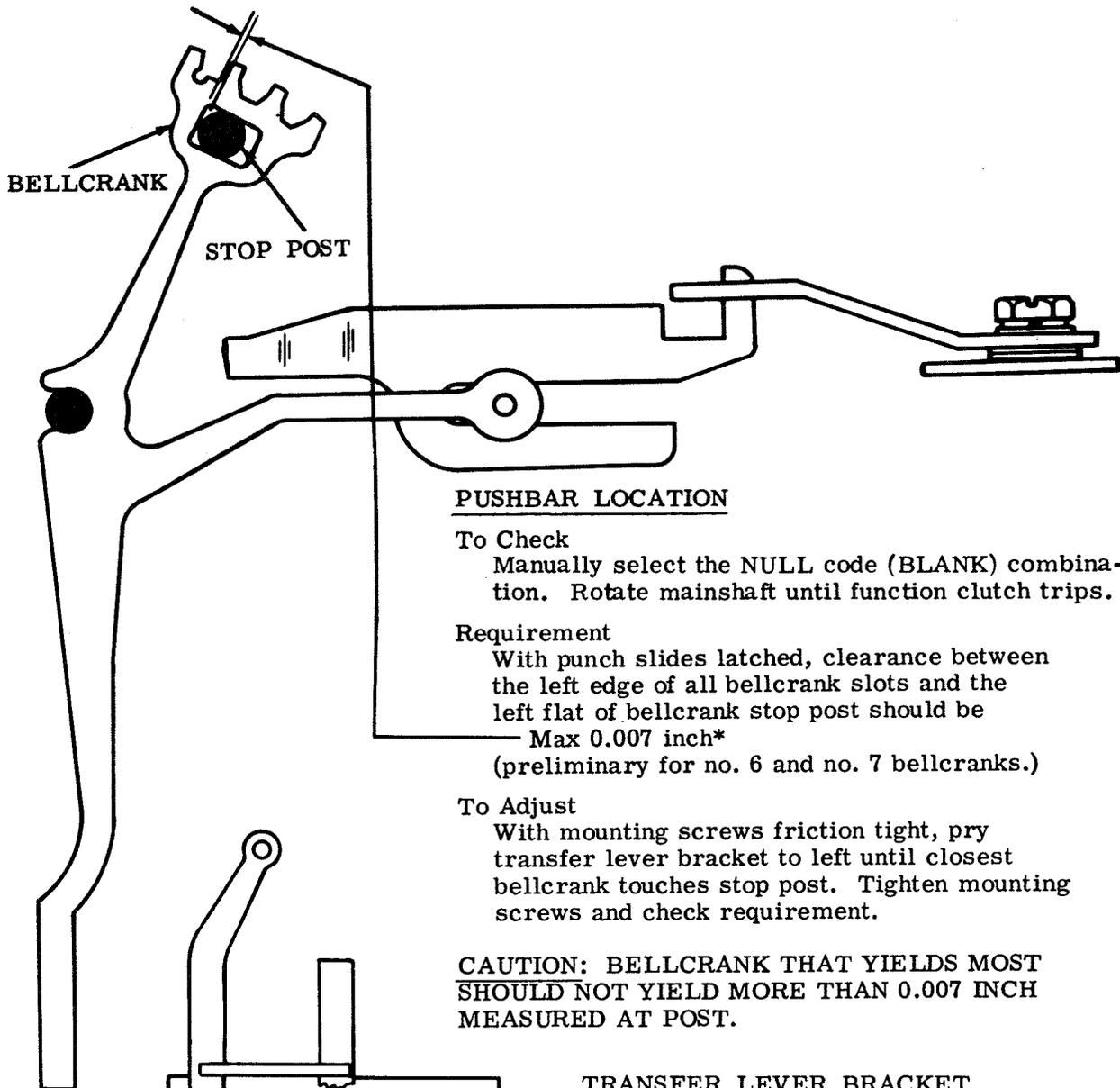
With letters pushbar to extreme right and fully detented, RUBOUT code (12345678) selected, punch slides disengaged and function clutched tripped, eliminate play in downward direction, then release. Keep operating blade parallel with no. 2 and no. 3 pushbars and take up function box play in a clockwise direction. The top of the operating blade should be

Min flush---Max 0.020 inch  
above top rubout pushbars.

- (1) To Adjust  
Loosen the two screws mounting function box to spacer posts on front plate and set pry point in center of the cutout.
- (2) To Adjust  
Loosen the two screws which mount guide to the bracket and position guide to meet above requirement. Tighten screws.



2.38 Typing Mechanism (continued)



PUSHBAR LOCATION

To Check

Manually select the NULL code (BLANK) combination. Rotate mainshaft until function clutch trips.

Requirement

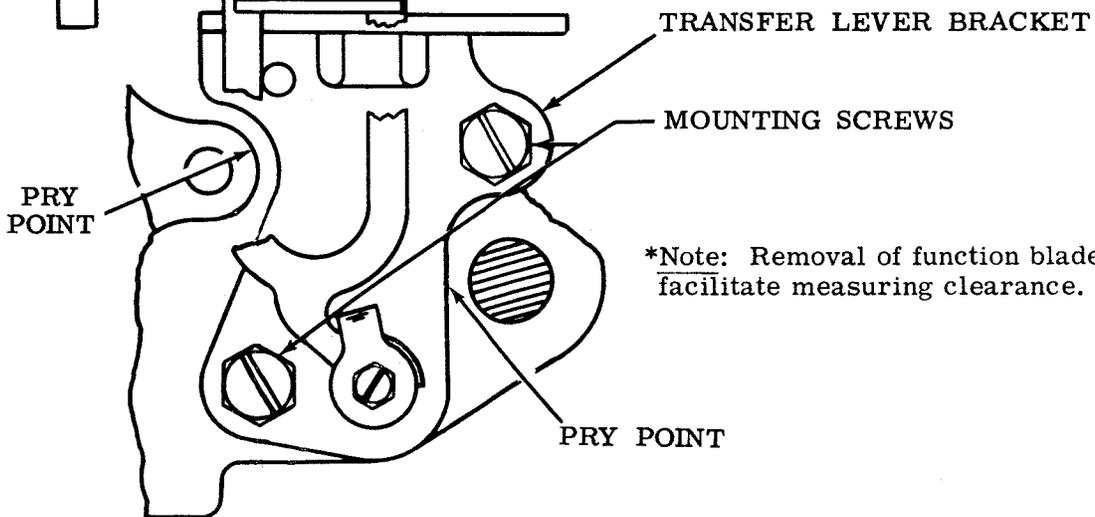
With punch slides latched, clearance between the left edge of all bellcrank slots and the left flat of bellcrank stop post should be  
 Max 0.007 inch\*

(preliminary for no. 6 and no. 7 bellcranks.)

To Adjust

With mounting screws friction tight, pry transfer lever bracket to left until closest bellcrank touches stop post. Tighten mounting screws and check requirement.

**CAUTION: BELLCRANK THAT YIELDS MOST SHOULD NOT YIELD MORE THAN 0.007 INCH MEASURED AT POST.**

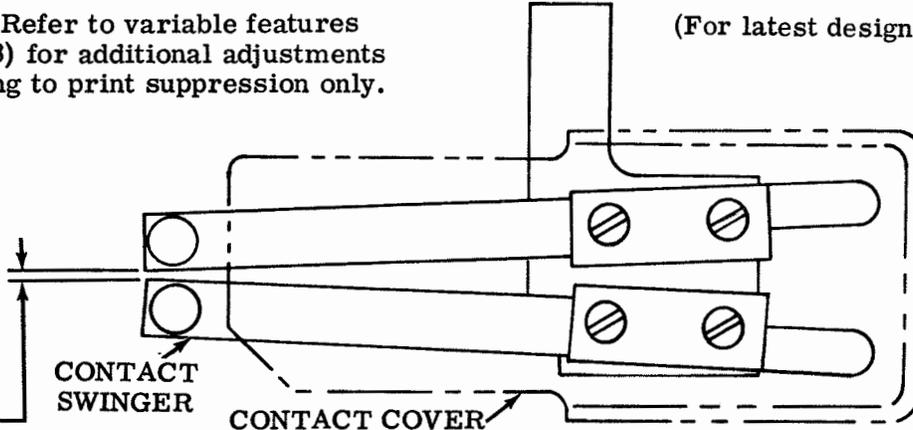


\*Note: Removal of function blades will facilitate measuring clearance.

2.39 Ribbon Shift and Print Suppression Mechanism (Early Design)

Note: Refer to variable features (Part 3) for additional adjustments applying to print suppression only.

(For latest design see 2.41)



RIBBON SHIFT AND PRINT SUPPRESSION CONTACTS

(Top View)

Note: The contact assembly can be identified by gold-plated contact points with a common transfer contact point on the contact swinger spring.

(1) Requirement

With the two contact swingers positioned toward each other, the clearance between the swingers should be

Min 0.035 inch---Max 0.060 inch

To Adjust

Disconnect all power from unit. Remove the contact assembly from the function box by removing the two mounting bracket screws. With the four contact cover mounting screws friction tight, position the contact swingers. Check the alignment of the associated contacts with each swinger and tighten the four contact cover mounting screws.

(2) Requirement - Preliminary

With the contact assembly still removed from the function box, there should be  
Min 0.015 inch---Max 0.020 inch

clearance between the two swinger contact points and their associated normally open contact points. The top surface of the plastic insulators on both swingers should be parallel to each other and in the same plane (as gauged by eye).

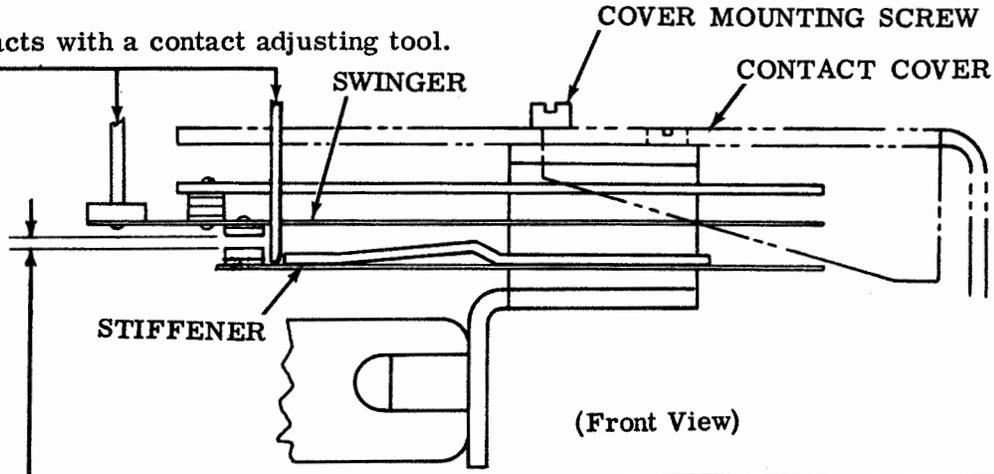
(3) Requirement

In addition to the clearance requirement, it should take  
Min 2 oz---Max 3 oz

to start each swinger moving and to start normally open contacts moving away from their associated stiffeners.

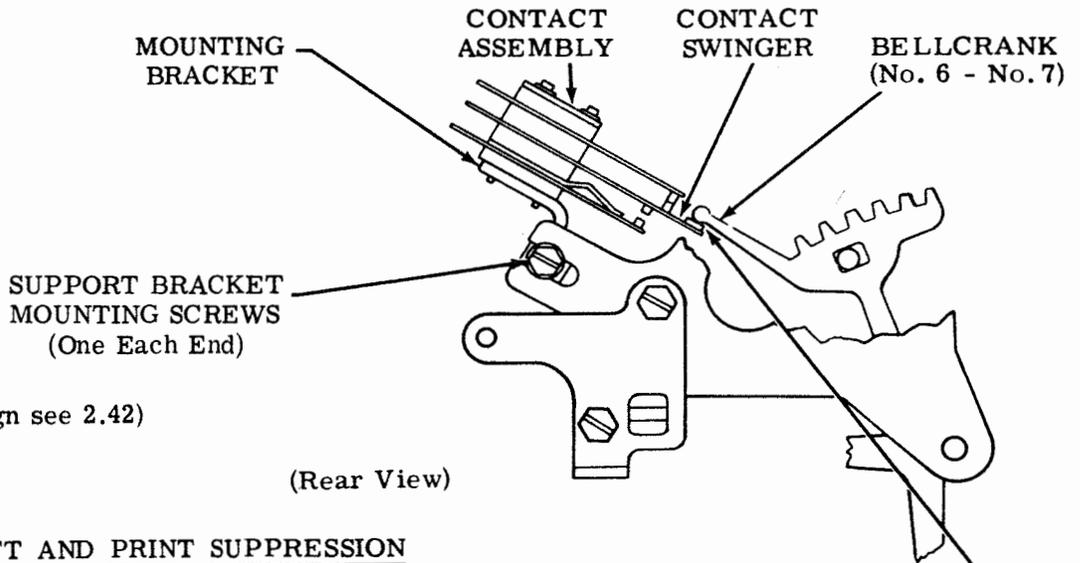
To Adjust

Adjust the contacts with a contact adjusting tool.



(Front View)

2.40 Ribbon Shift and Print Suppression Mechanism (Early Design) (continued)



(For Latest Design see 2.42)

(Rear View)

RIBBON SHIFT AND PRINT SUPPRESSION  
CONTACT POSITION

Note: The following adjustments are to be made with the contact assembly mounted on the unit.

(1) Requirement

Manually select the NULL code (BLANK) combination. With the function clutch tripped, the follower portion of the no. 6 and no. 7 bellcranks should be centrally positioned with respect to the insulator followers on the contact swingers as viewed from the front of the unit.

To Adjust

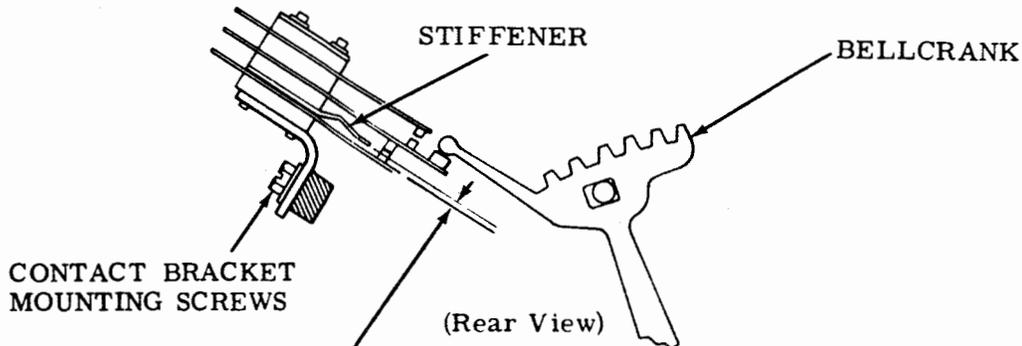
With the support bracket mounting screws friction tight, position the contact assembly. Tighten screws.

(2) Requirement

With the NULL code (BLANK) combination still selected and the function clutch tripped  
—Min some---Max 0.004 inch  
clearance between each of the two spacing contacts and their stiffeners. Take up the play in the function box in a clockwise direction (as viewed from the selector side of the unit).

To Adjust

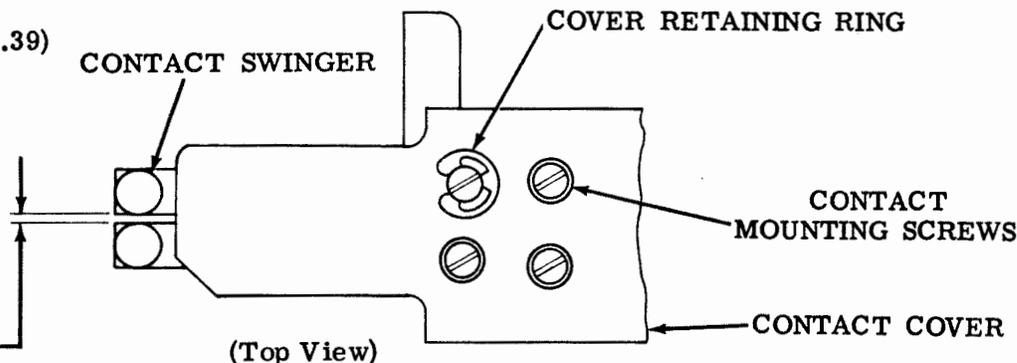
With the contact bracket mounting screws friction tight, position the bracket. Tighten screws.



## 2.41 Ribbon Shift and Print Suppression Mechanism (Latest Design)

**Note:** Refer to variable features (Part 3) for additional adjustments applying to print suppression only.

(For Early Design see 2.39)



### RIBBON SHIFT AND PRINT SUPPRESSION CONTACTS

**Note:** The contact assembly can be identified by silver contact points with a common transfer contact point on the contact swinger spring and one retaining ring for fastening the cover. The cover may be removed by taking off the cover retaining ring snapped in place over the special cover mounting screw.

(1) Requirement

With the two contact swingers positioned toward each other, the clearance between the swingers should be

Min 0.035 inch---Max 0.060 inch

To Adjust

Disconnect all power from unit. Remove the contact assembly from the function box by removing the two mounting bracket screws. With the four contact mounting screws friction tight, position the contact swingers. Check the alignment of the associated contacts with each swinger and tighten the four screws.

(2) Requirement - Preliminary

With the contact assembly still removed from the function box, there should be

Min 0.015 inch---Max 0.020 inch

clearance between the two swinger contact points and their associated normally open contact points. The top surface of the plastic insulators on both swingers should be parallel to each other and in the same plane (as gauged by eye).

(3) Requirement

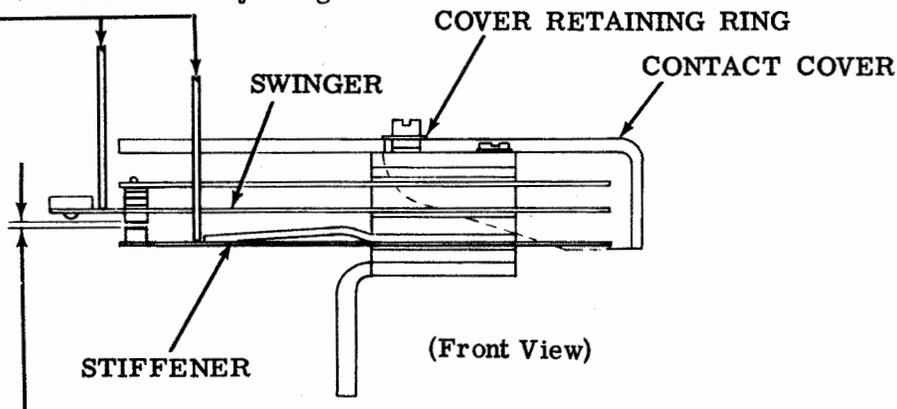
In addition to the clearance requirement, it should take

Min 45 grams---Max 60 grams

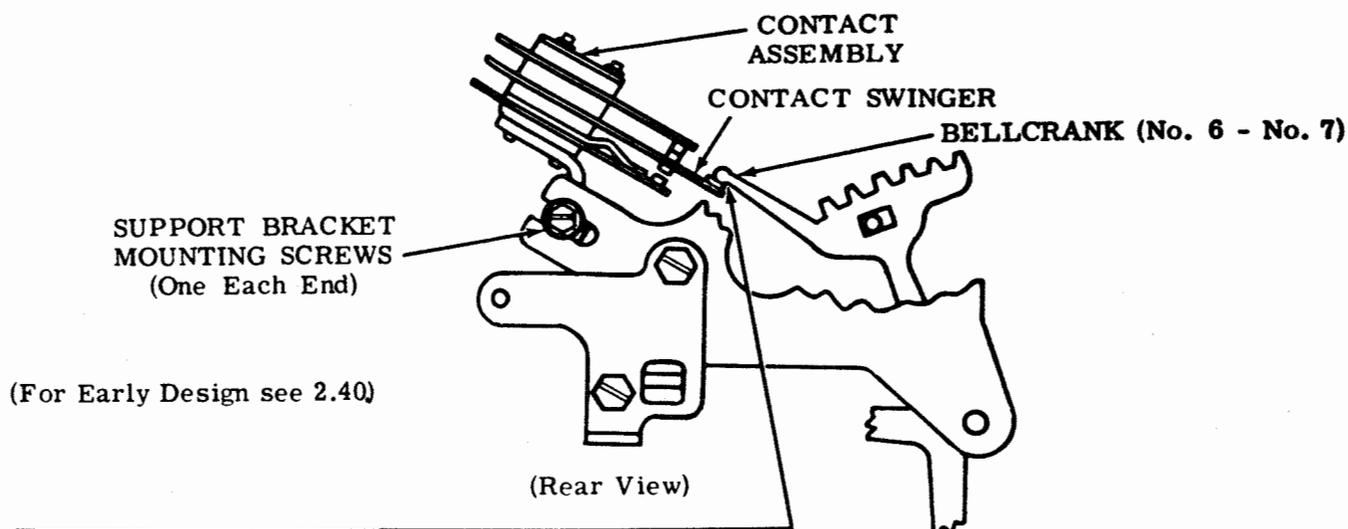
to start each swinger moving and to start normally open contacts moving away from their associated stiffeners.

To Adjust

Adjust the contacts with a contact adjusting tool.



## 2.42 Ribbon Shift and Print Suppression Mechanism (Latest Design) (continued)

**RIBBON SHIFT AND PRINT SUPPRESSION CONTACT POSITION (Latest Design)**

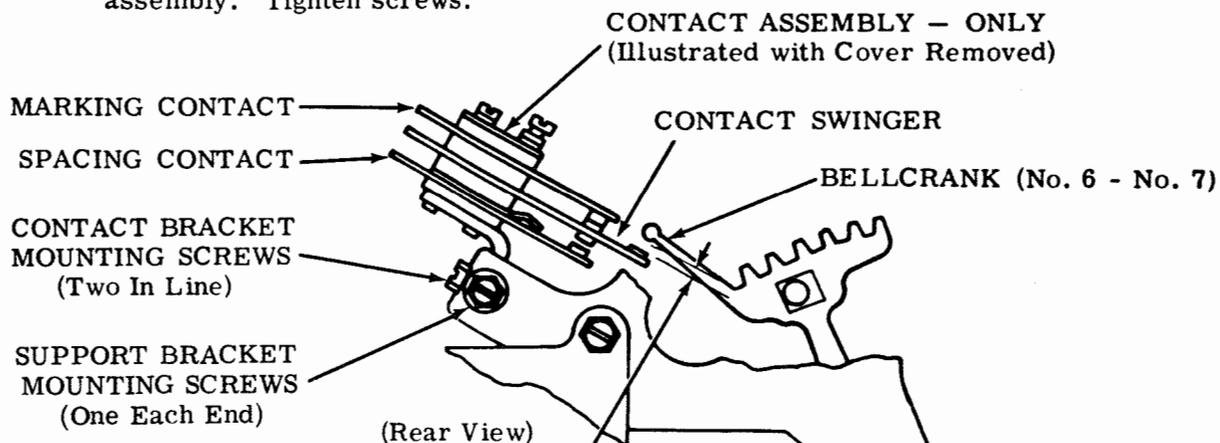
**Note:** The following adjustments are to be made with the contact assembly mounted on the unit.

**(1) Requirement**

Manually select the NULL code (BLANK) combination. With the function clutch tripped, the follower portion of the no. 6 and no. 7 bellcranks should be centrally positioned with respect to the insulator followers on the contact swingers as viewed from the front of the unit.

**To Adjust**

With the support bracket mounting screws friction tight, position the contact assembly. Tighten screws.

**(2) Requirement**

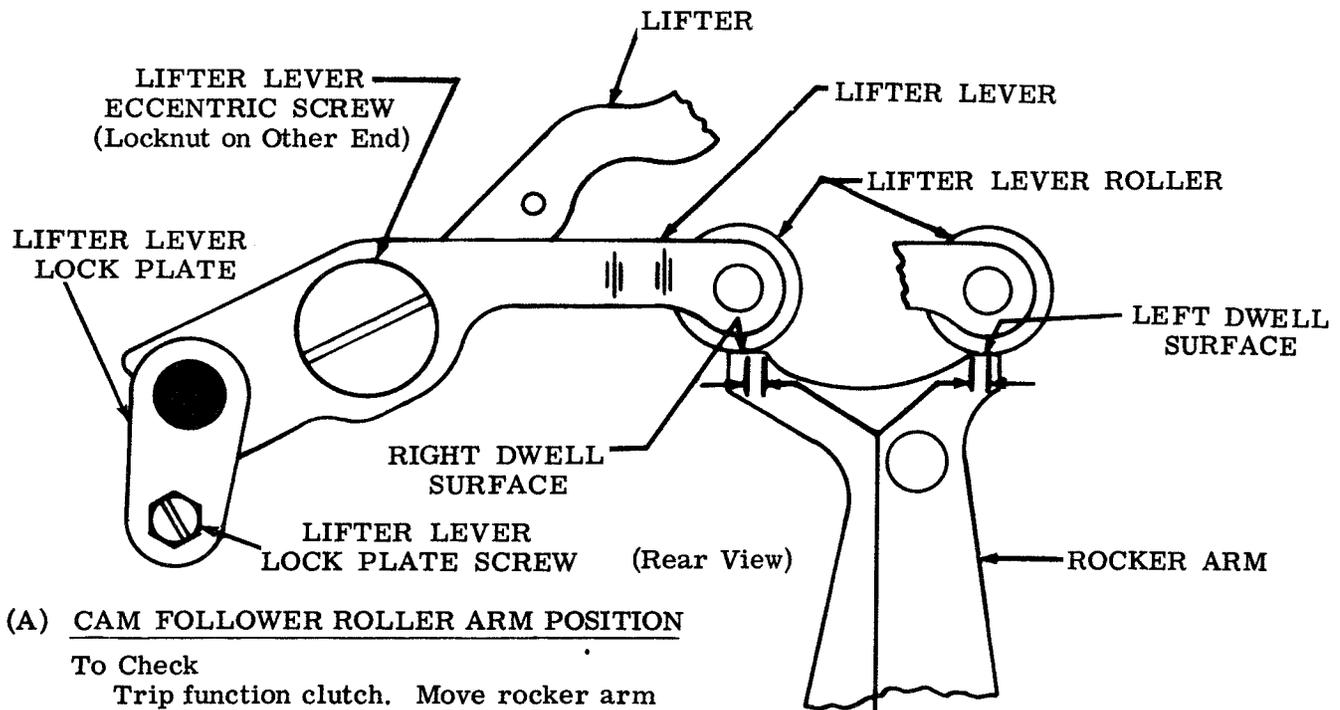
With the RUBOUT combination (12345678) selected and the function clutch tripped, there should be

Min 0.025 inch---Max 0.045 inch  
clearance between the bellcranks and the insulated portion of their respective swingers. Take up the play in the function box to make the clearance maximum.

**To Adjust**

With the contact bracket mounting screws friction tight, position the bracket. Tighten screws. Replace the cover and secure it with the cover retaining ring.

2.43 Typing Mechanism (continued)



(A) CAM FOLLOWER ROLLER ARM POSITION

To Check

Trip function clutch. 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.

Requirement

Approximately equal travel on each dwell surface.

To Adjust

Loosen lifter lever lock plate screw until friction tight. With eccentric screw locknut friction tight, position lifter lever. Tighten lifter lever lock plate screw. Do not tighten locknut.

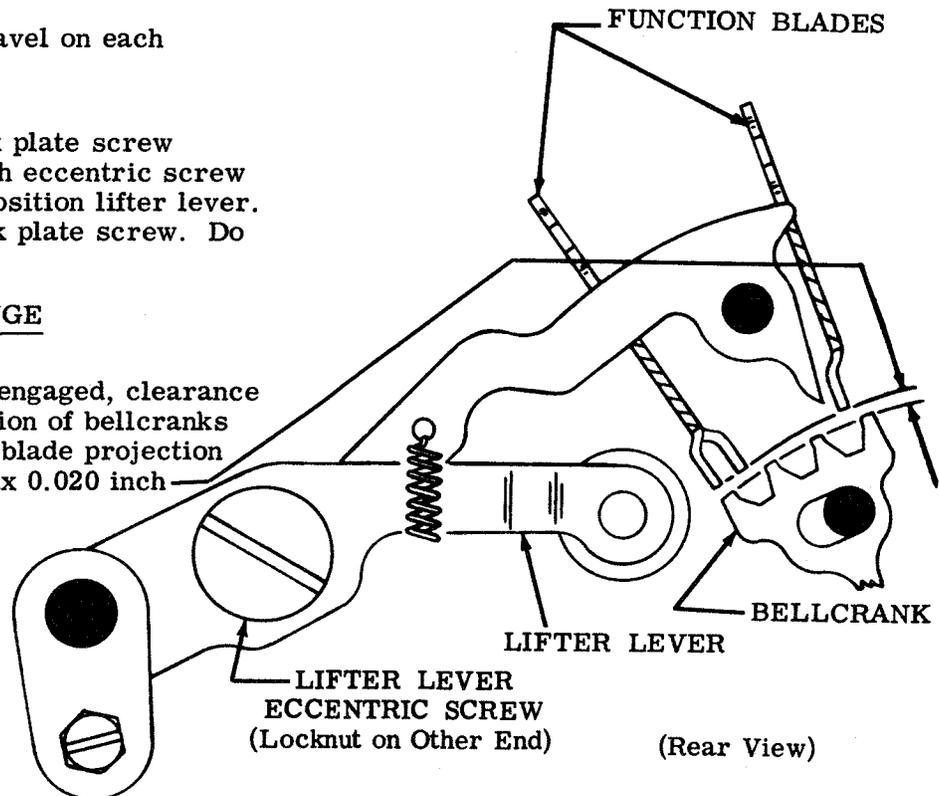
(B) LIFTER OPERATING RANGE

Requirement

With function clutch disengaged, clearance between closest projection of bellcranks and associated function blade projection  
Min 0.008 inch---Max 0.020 inch

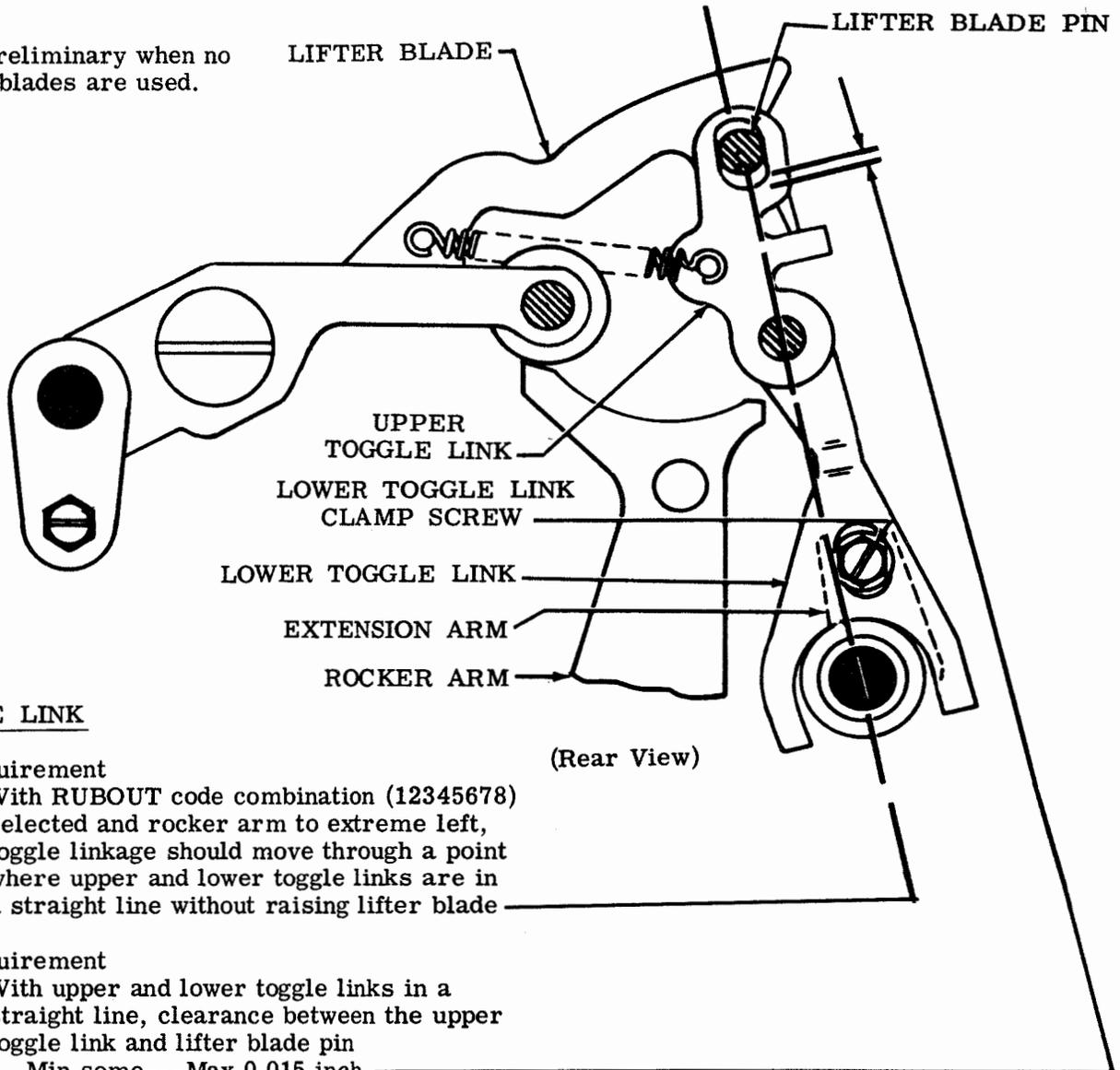
To Adjust

Position lifter lever eccentric screw with locknut loosened. Tighten locknut.



2.44 Typing Mechanism (continued)

Note: Preliminary when no function blades are used.



TOGGLE LINK

- (1) Requirement  
 With RUBOUT code combination (12345678) selected and rocker arm to extreme left, toggle linkage should move through a point where upper and lower toggle links are in a straight line without raising lifter blade
- (2) Requirement  
 With upper and lower toggle links in a straight line, clearance between the upper toggle link and lifter blade pin  
 Min some---Max 0.015 inch

**To Adjust**

Position lower toggle link by moving its extension arm up or down with clamp screw friction tight. Tighten clamp screw.

Note: To avoid interference with the lower toggle link clamp screw and the axial corrector link, it may be necessary to move the high part of the corrector bushing above its horizontal center line.

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2.45 Typing Mechanism (continued)

Note: Preliminary when no function blades are used.

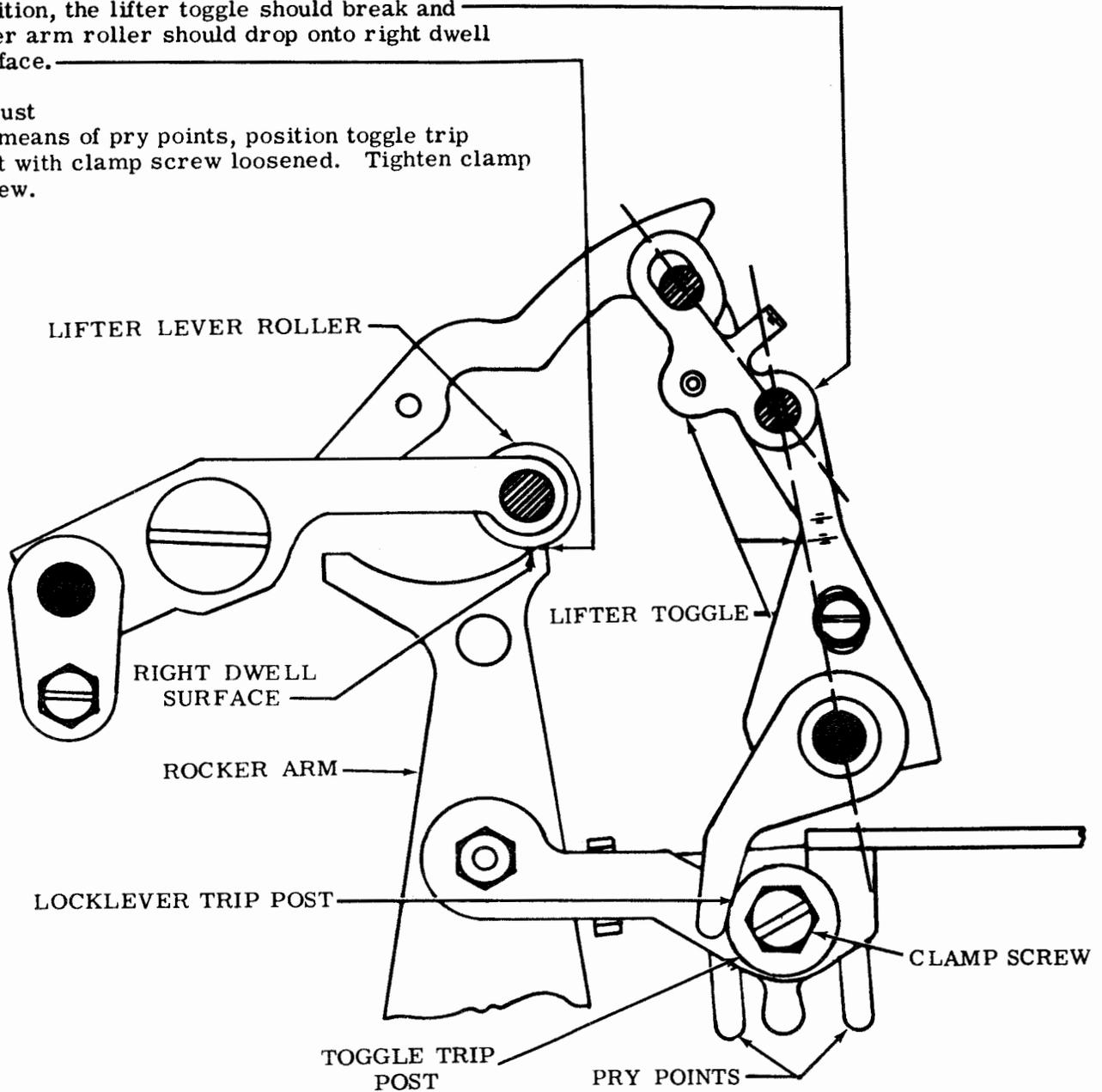
TOGGLE TRIP ARM

**Requirement**

As rocker arm approaches extreme right position, the lifter toggle should break and lifter arm roller should drop onto right dwell surface.

**To Adjust**

By means of pry points, position toggle trip post with clamp screw loosened. Tighten clamp screw.



(Rear View)

2.46 Typing Mechanism (continued)

(A) LIFTER TOGGLE LINK SPRING

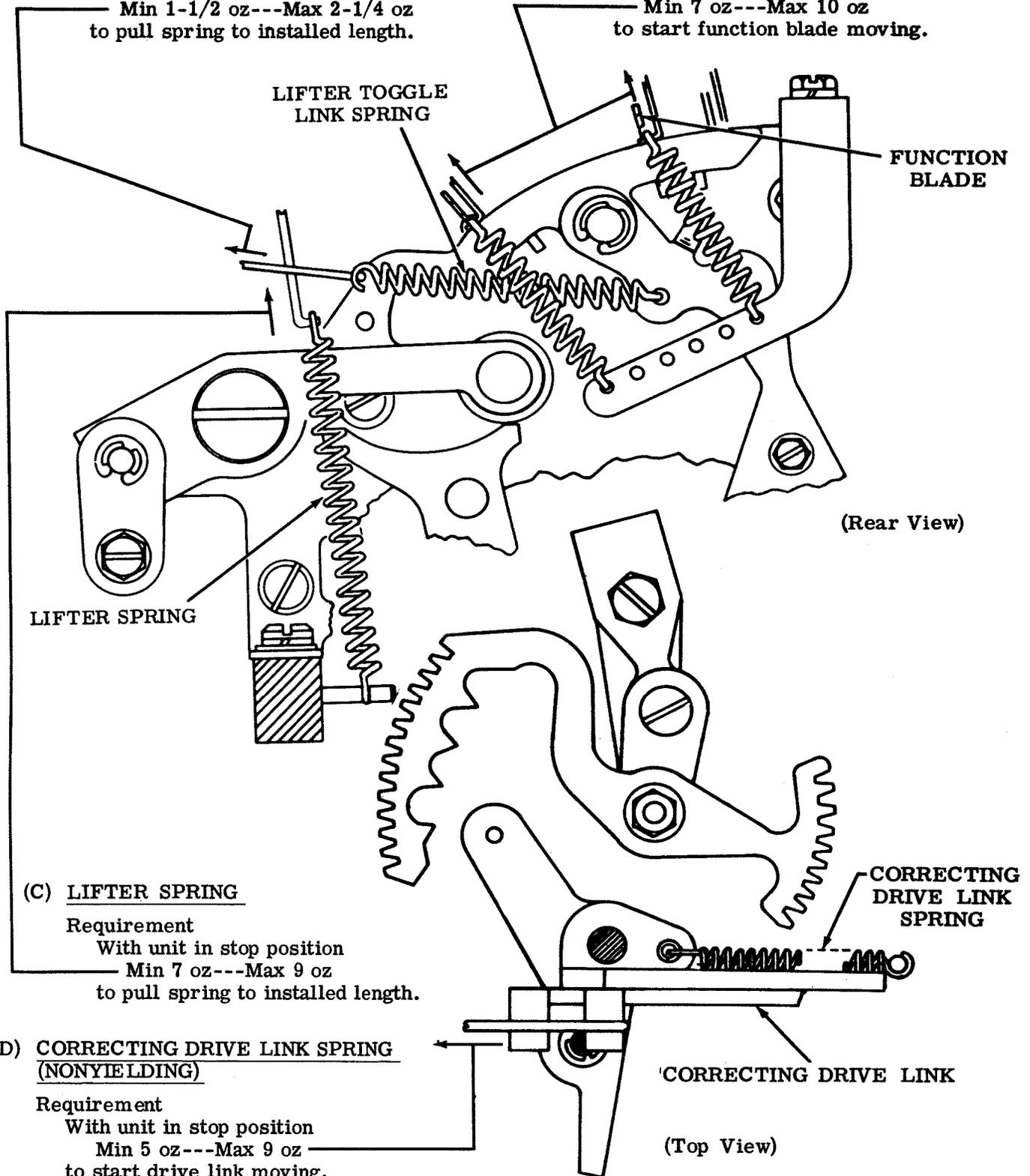
Requirement

With unit in stop position  
 Min 1-1/2 oz---Max 2-1/4 oz  
 to pull spring to installed length.

(B) FUNCTION BLADE SPRING (2 Or More)

Requirement (If so equipped)

With unit in stop position  
 Min 7 oz---Max 10 oz  
 to start function blade moving.



(C) LIFTER SPRING

Requirement

With unit in stop position  
 Min 7 oz---Max 9 oz  
 to pull spring to installed length.

(D) CORRECTING DRIVE LINK SPRING (NONYIELDING)

Requirement

With unit in stop position  
 Min 5 oz---Max 9 oz  
 to start drive link moving.

2.47 Typing Mechanism (continued)

(A) OSCILLATING BAIL DRIVE LINK

To Check

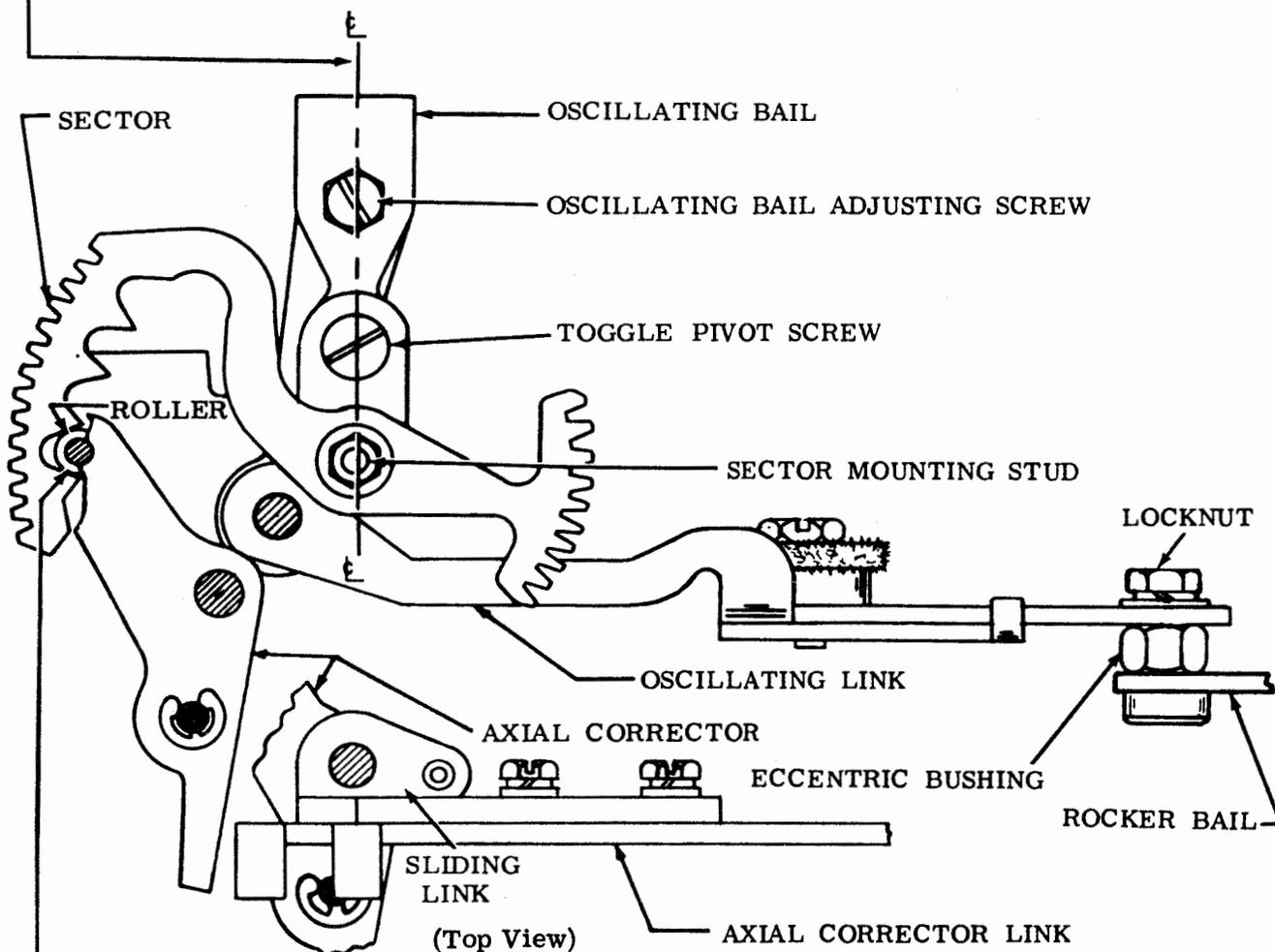
Position rocker bail to its extreme left.

Requirement

Sector mounting stud, toggle pivot screw and oscillating bail adjusting screw should approximately line up.

To Adjust

With locknut friction tight, position oscillating link by means of its eccentric bushing. Tighten locknut.



(B) OSCILLATING BAIL PIVOT

Requirement

With NULL (BLANK) combination selected, rotate mainshaft taking up the axial play in type wheel shaft toward the front of the unit. The axial corrector roller should enter first notch of the sector centrally.

To Adjust

With oscillating bail adjusting screw friction tight, select NULL combination. Position oscillating bail by means of its elongated mounting hole so corrector roller enters first notch of the sector when rocker bail moves to its extreme left position. Hold corrector roller firmly in first notch and take up the play in oscillating bail linkage by applying a force to the oscillating bail. Tighten oscillating bail adjusting screw.

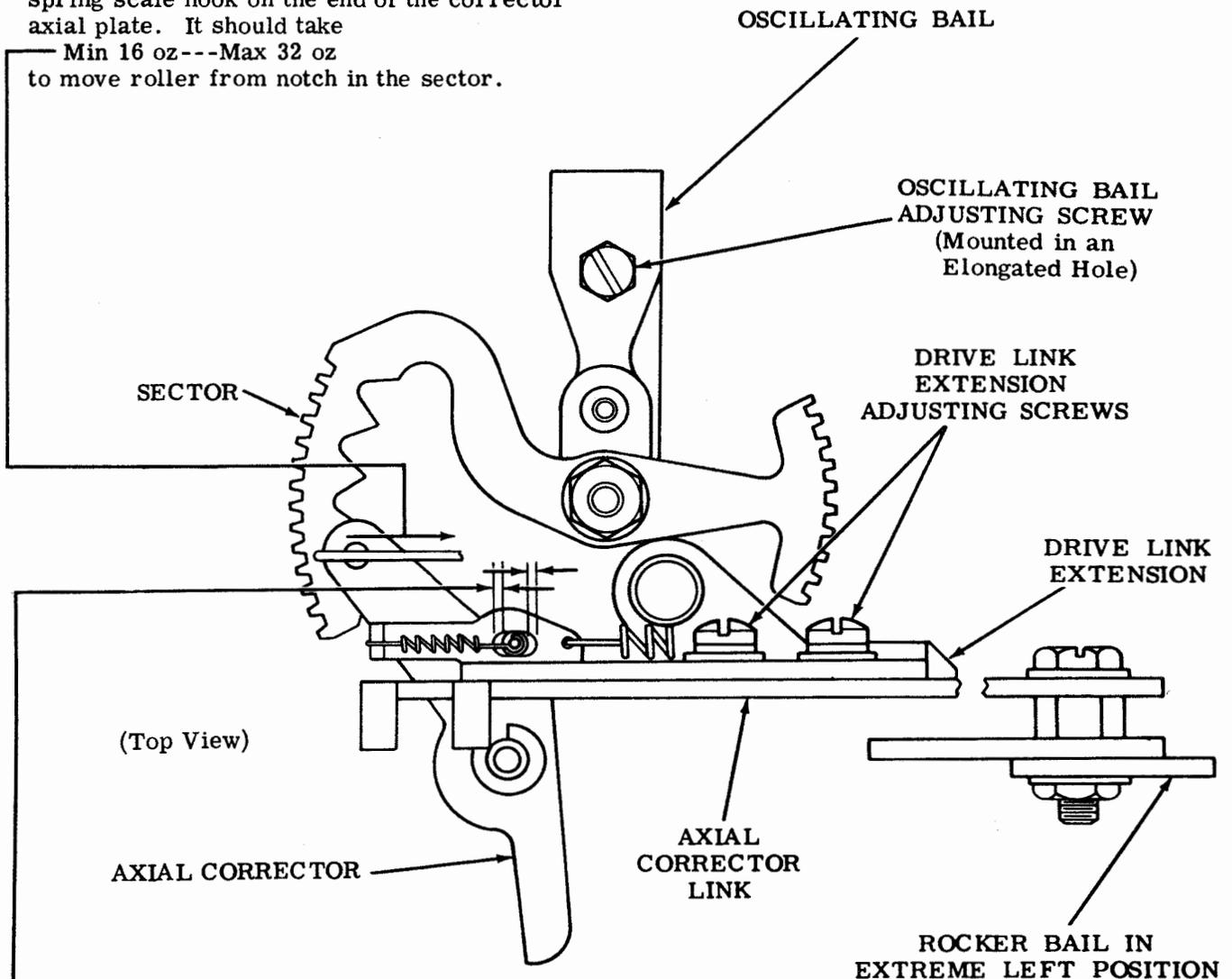
2.48 Typing Mechanism (continued)

CORRECTOR DRIVE LINK (YIELDING) EXTENSION SPRING

**Requirement**

With the NULL code (BLANK) combination selected, function clutch tripped, and rocker bail in its extreme left position, place a 32 oz spring scale hook on the end of the corrector axial plate. It should take

Min 16 oz---Max 32 oz to move roller from notch in the sector.



AXIAL CORRECTOR (YIELDING)

**Requirement**

With the NULL code (BLANK) combination selected, function clutch tripped and rocker bail in its extreme left position, the axial corrector roller should seat in the first sector notch and there should be

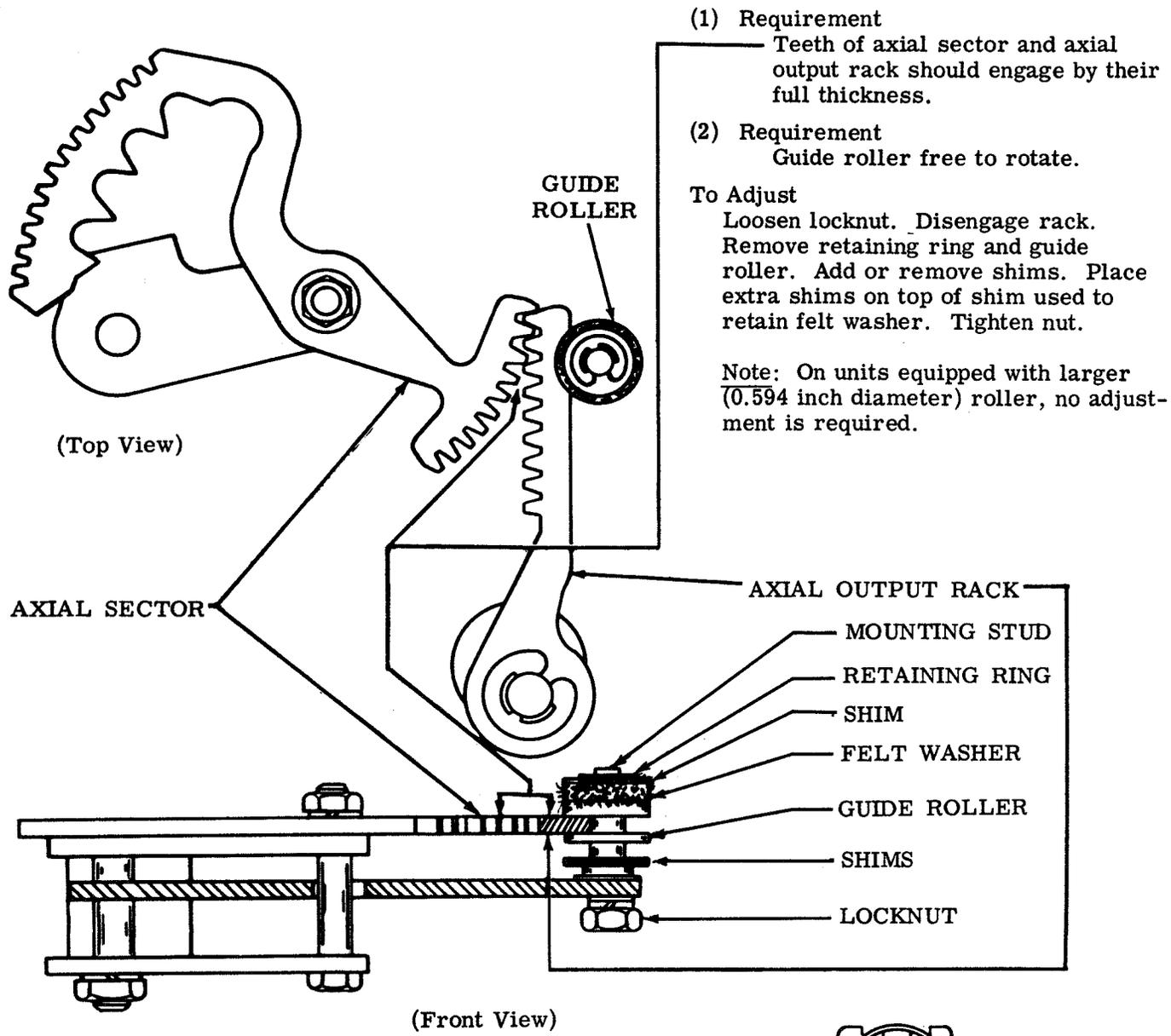
Min 0.005 inch between the ends of the slot and the spring post. Check both sides and check seating in fourth notch (letters selection). Turn the retaining ring that fastens drive link extension to corrector plate to check the minimum requirement.

**To Adjust**

Loosen two drive link adjusting screws. Position drive link to meet the requirement and retighten the screws.

2.49 Typing Mechanism (continued)

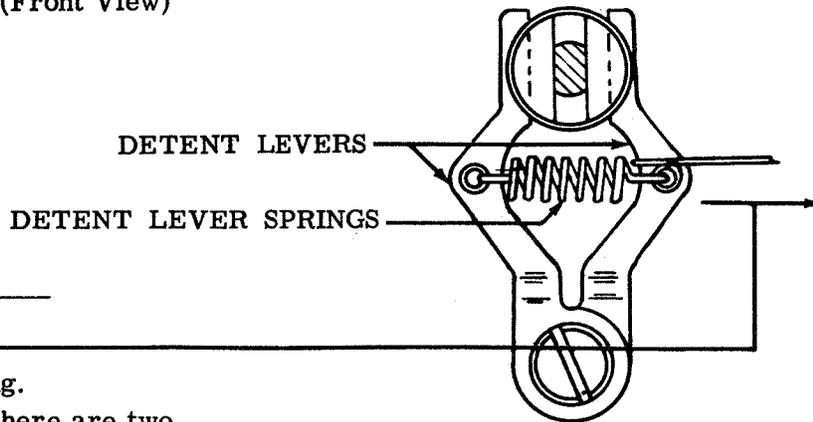
(A) AXIAL SECTOR ALIGNMENT



(B) ECCENTRIC SHAFT  
DETENT LEVER SPRING (6)

Requirement  
Min 7 oz---Max 10 oz  
to start detent lever moving.

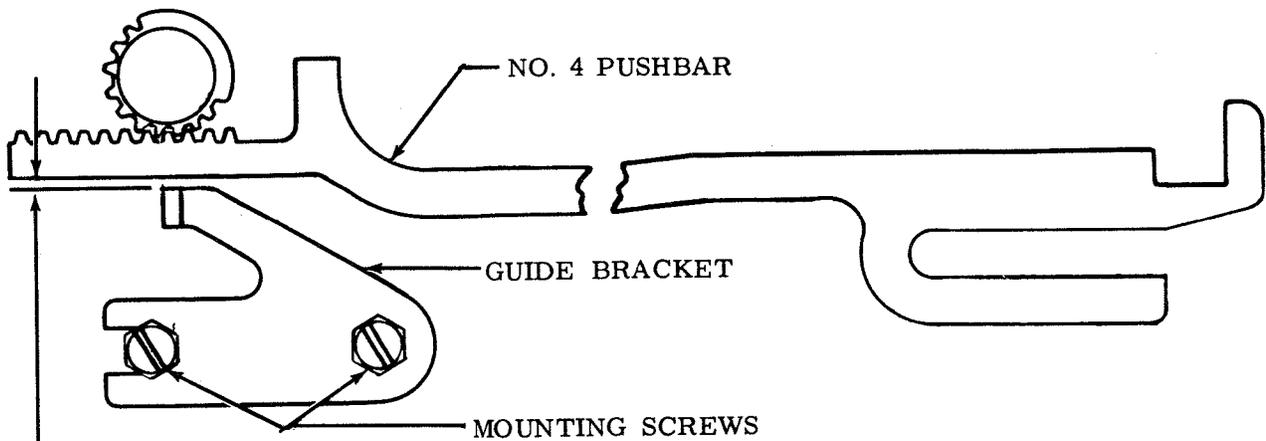
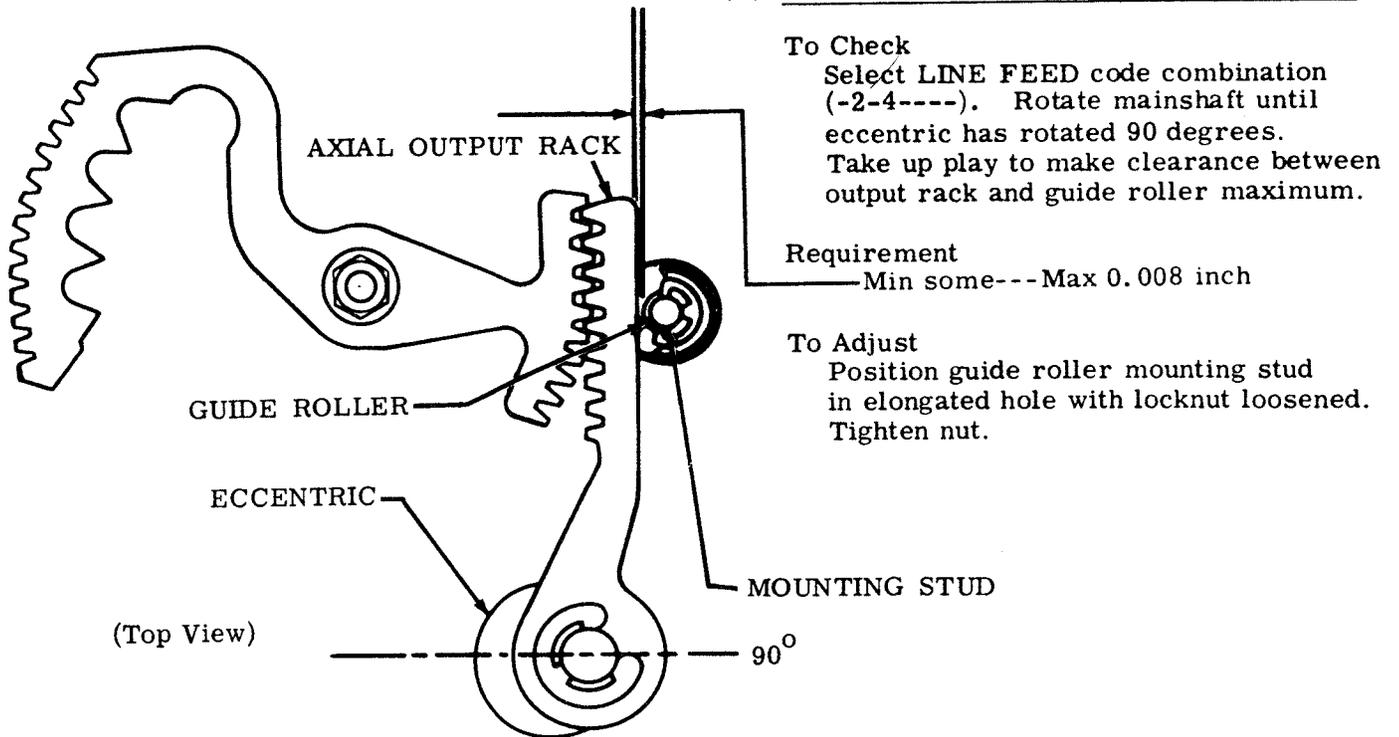
Note: Check all 6 springs. There are two on the axial positioning mechanism and four on the rotary positioning mechanism.



(Top View of Springs on Axial Positioning Mechanism)

2.50 Typing Mechanism (continued)

(A) AXIAL OUTPUT RACK GUIDE ROLLER



(B) PUSHBAR GUIDE BRACKET

To Check  
Manually select CARRIAGE RETURN code combination (1-34---8). Rotate mainshaft so that no. 4 pushbar moves through complete range of travel.

Requirement  
When play is taken up to make clearance maximum  
Min some---Max 0.008 inch  
between no. 4 pushbar and guide bracket throughout complete travel of bar.

To Adjust  
Position guide bracket with mounting screws loosened. Tighten screws.

2.51 Typing Mechanism (continued)

(A) CORRECTING DRIVE LINK (NONYIELDING)

(1) To Check

Select the NULL code (BLANK) combination. Trip function clutch and move rocker bail to extreme left.

Requirement

Roller on axial correcting plate firmly seated in first notch of axial sector.

(2) To Check

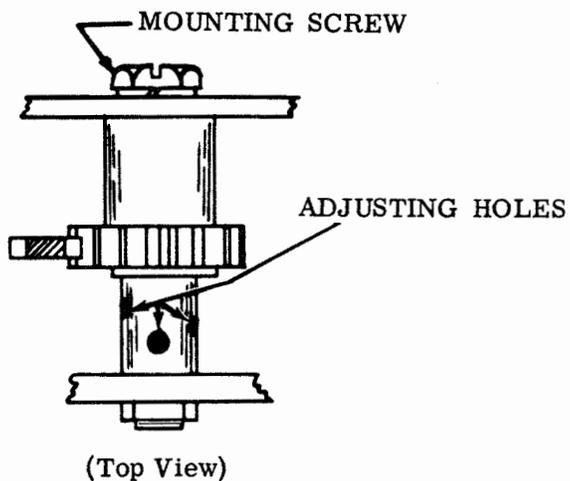
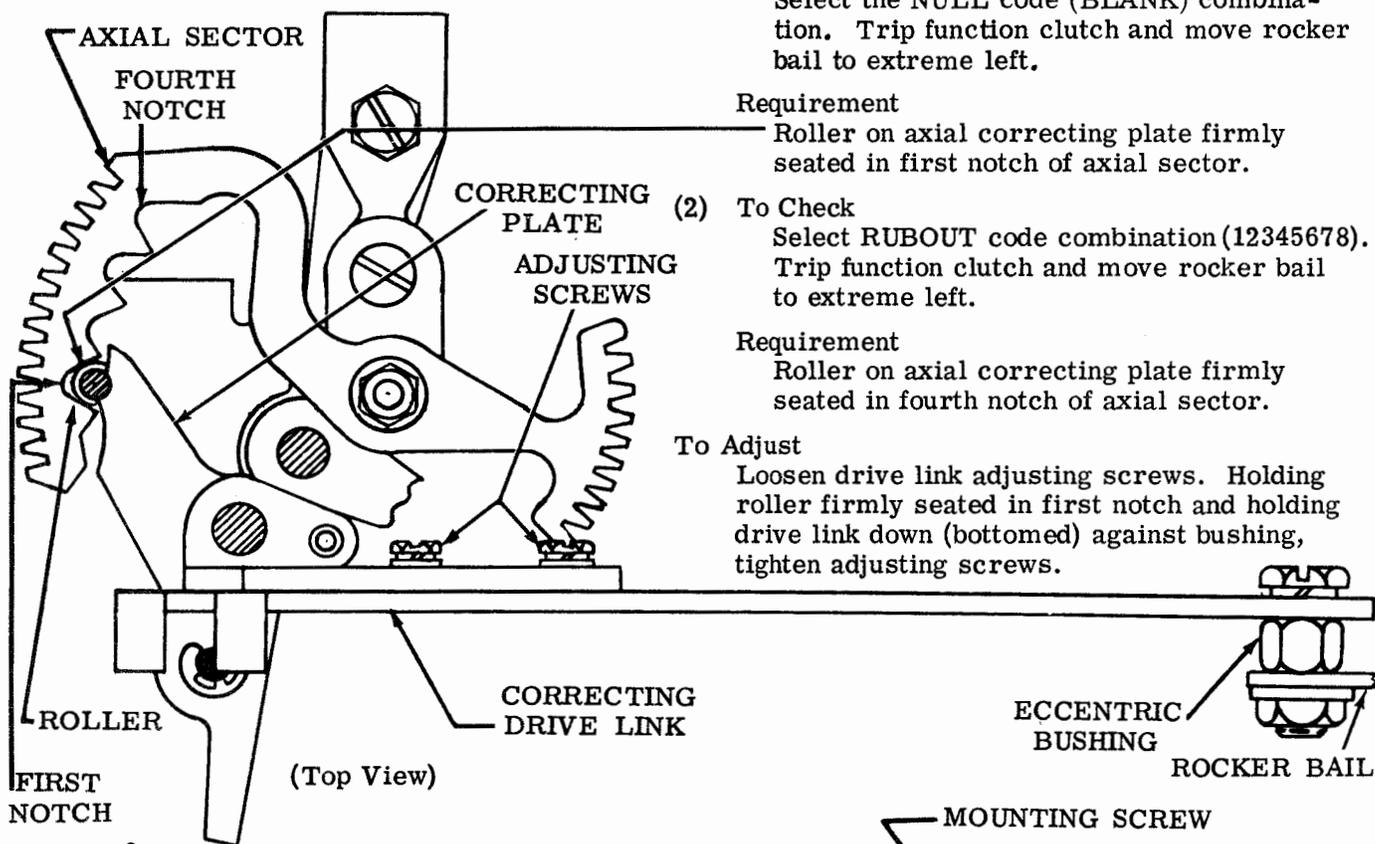
Select RUBOUT code combination (12345678). Trip function clutch and move rocker bail to extreme left.

Requirement

Roller on axial correcting plate firmly seated in fourth notch of axial sector.

To Adjust

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



(B) TYPE WHEEL RACK CLEARANCE

Requirement

With function clutch disengaged and upper no. 7 pushbar to the right  
 Min some---Max 0.015 inch  
 clearance between idler gear and rack at the closest point when all  
 play is taken up in a direction to make clearance a maximum.  
 There should be some clearance throughout travel of the rack.

To Adjust

With mounting screw friction tight, position idler gear eccentric  
 shaft by means of three adjusting holes in top of shaft. Tighten  
 screw.

## 2.52 Typing Mechanism (continued)

ROTARY CORRECTOR MESH

## (1) Requirement

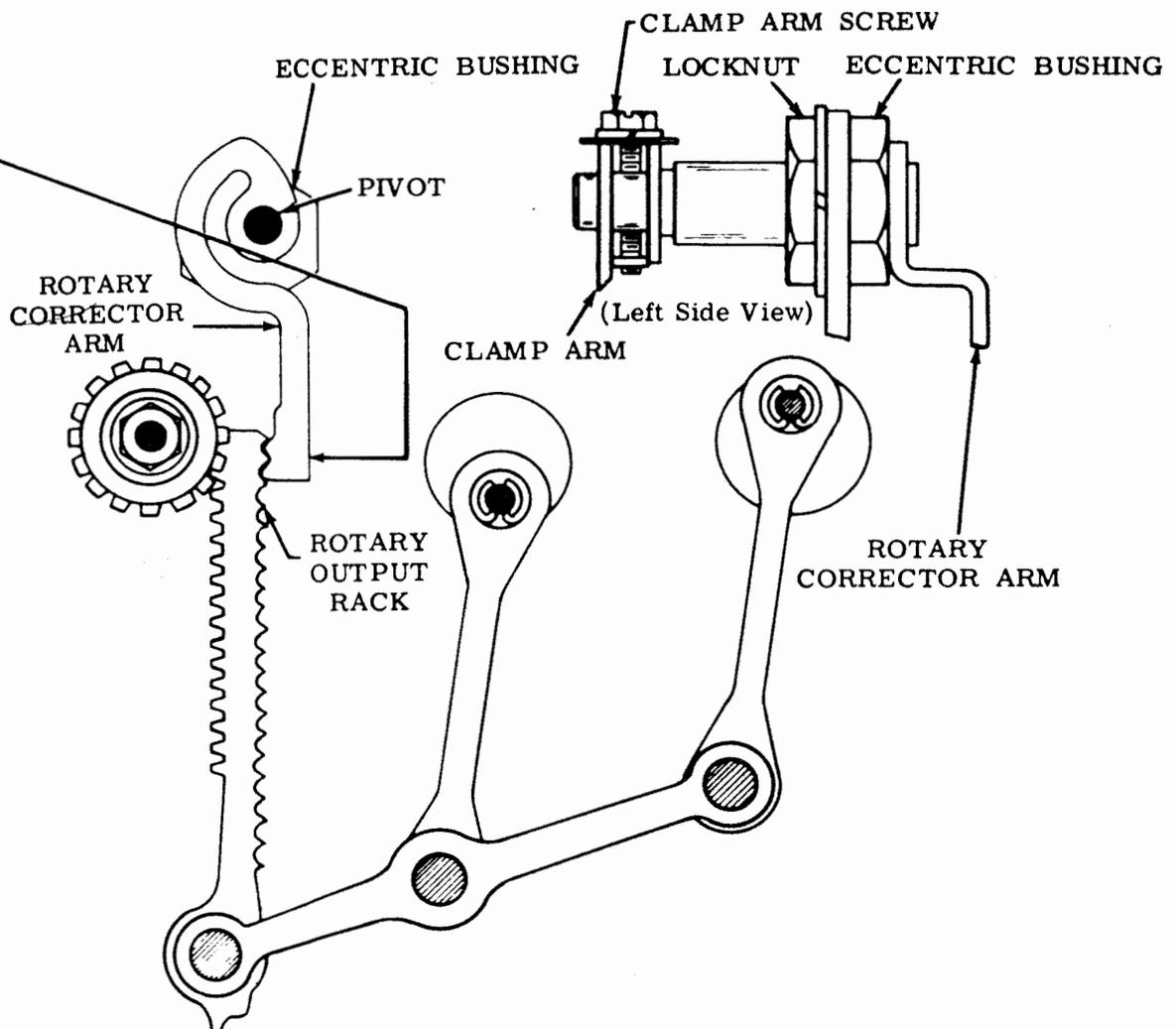
With X code combination (---45-78) selected and the pushbars manually detented, the second tooth from the top of the rotary output rack should seat between the lobes of the rotary corrector arm.

## To Adjust

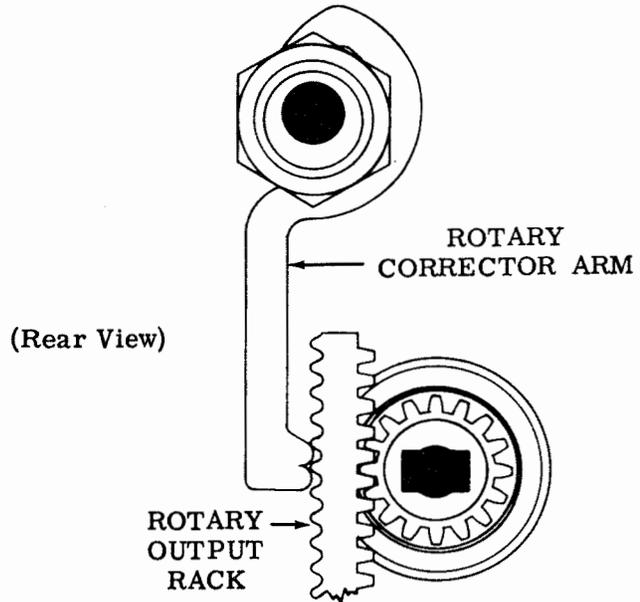
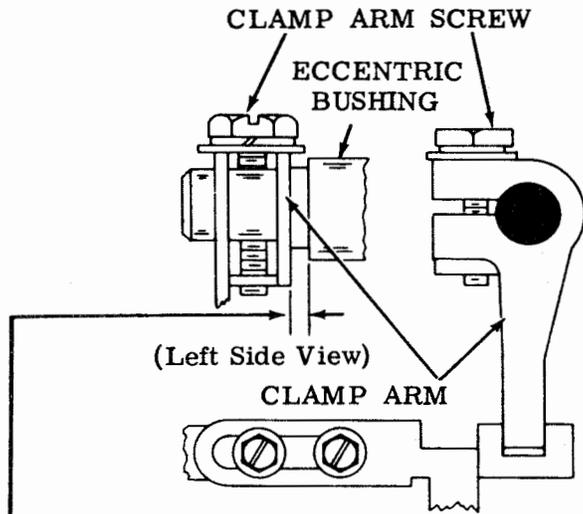
Loosen clamp arm screw and eccentric bushing locknut. With the pivot of the corrector arm to the right of the center of the bushing, position rotary corrector. Tighten bushing locknut. Do not tighten clamp arm screw at this point.

## (2) Requirement

In a manner similar to that described above, check engagement of fifth tooth (--34--78), ninth tooth (---4---8), and sixteenth tooth (--3-5---). Refine the adjustment if necessary.



2.53 Typing Mechanism (continued)



ROTARY CORRECTOR ARM

**To Check**

With unit in letters condition, select the RUBOUT code combination (12345678). Position rocker bail to extreme left. Manually seat corrector arm in rack.

**Requirement**

The rotary corrector arm should seat firmly in the rotary output rack.  
Min some---Max 0.006 inch endplay between clamp arm and bushing, with unit in the stop position.

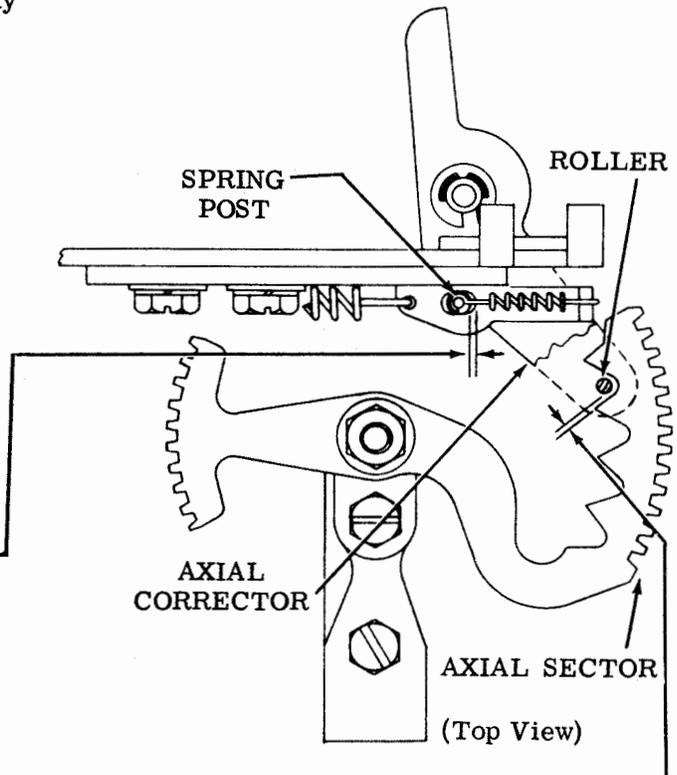
**To Adjust (Units equipped with a yielding axial corrector)**

As the rocker bail approaches the extreme left and the spring post of the axial corrector starts to leave the end of its slot, take up play of drive arm in its operating fork towards main bail and position the rotary corrector arm finger tight against rotary output rack and tighten clamp arm screw.

**To Adjust (Units equipped with nonyielding axial corrector)**

As the rocker bail approaches the extreme left, measure clearance between the axial corrector roller and the sector notch. When clearance is

Min some---Max 0.005 inch position rotary corrector arm finger tight against rotary output rack, and tighten corrector clamp arm screw.

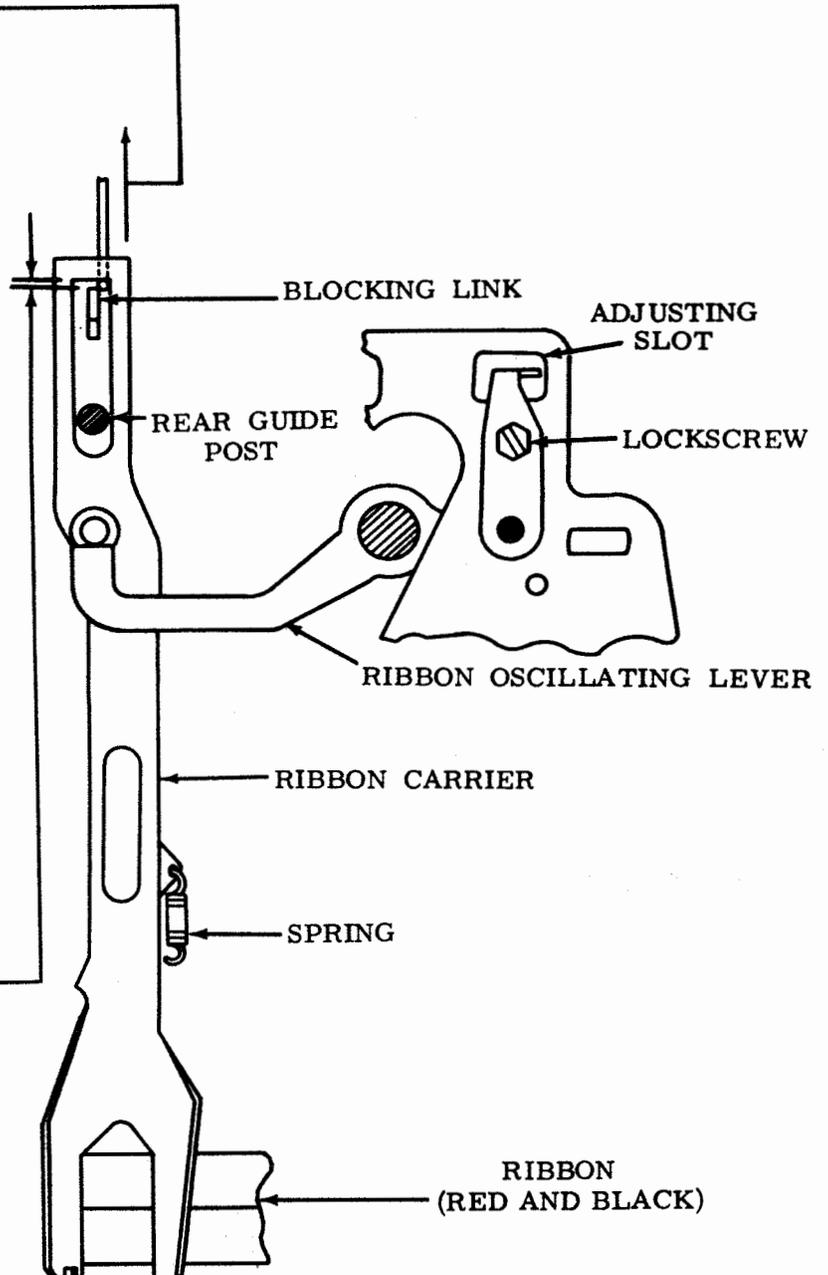


2.54 Ribbon Shift and Print Suppression Mechanism (Latest Design) (continued)

RIBBON CARRIER SPRING

Requirement

With unit in stop position  
Min 7 oz---Max 10 oz  
to start carrier moving.



RIBBON CARRIER

Requirement

With function clutch disengaged,  
manually lift blocking lever so  
that it is opposite ribbon carrier  
and against the type wheel shaft  
housing.

Min 0.040 inch---Max 0.060 inch  
clearance between blocking link  
and ribbon carrier.

To Adjust

Loosen lock screw. Position ribbon  
oscillating lever, using adjusting  
slot. Tighten screw.

(Front Top View)

2.55 Ribbon Shift and Print Suppression Mechanism (Early Design) (continued)

Note: The following adjustments apply to units with graphics either suppressed or in red (red of red-black ribbon towards rear of unit) when magnet is de-energized.

(B) ARMATURE AIR GAP

Requirement

With armature on downstop screw  
 Min 0.015 inch---Max 0.020 inch  
 clearance between magnet core  
 and armature at closest point and  
 Min some---Max 1/32 inch  
 clearance between rear of armature  
 slot and ribbon shift blocking link as  
 gauged by eye.

To Adjust

Position magnet bracket with screws  
 loosened. Tighten screws. Check for  
 binds.

(A) ARMATURE DOWNSTOP

Requirement

With rocker bail in extreme left position  
 and ribbon carrier biased downward,  
 hold the blocking link against the type  
 wheel shaft housing.

Min some---Max 0.005 inch  
 clearance between top surface of block-  
 ing link and lower surface of ribbon  
 carrier.

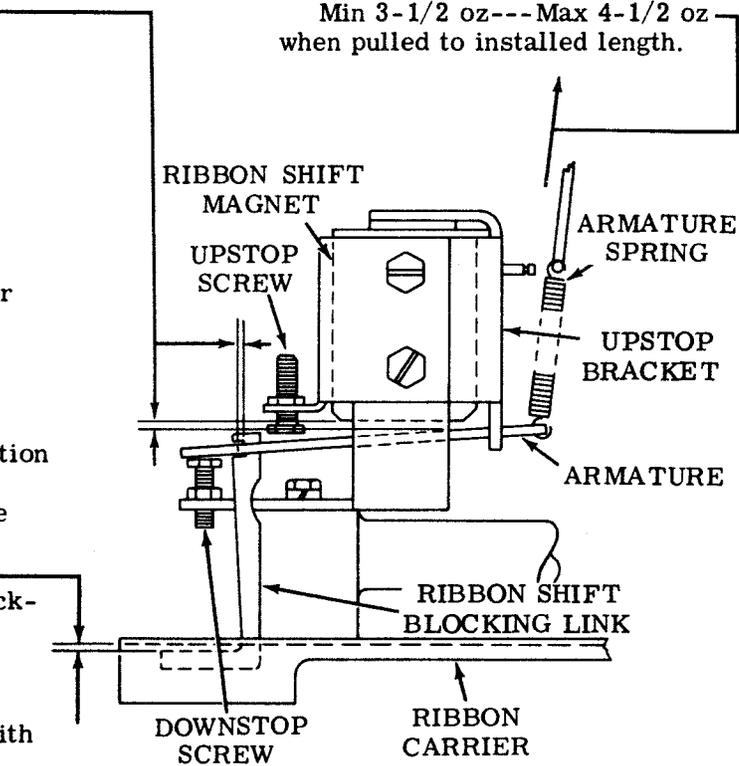
To Adjust

Position armature downstop screw with  
 locknut loosened. Tighten locknut.

(D) ARMATURE SPRING

Requirement

With spring disconnected  
 Min 3-1/2 oz---Max 4-1/2 oz  
 when pulled to installed length.



(C) ARMATURE UPSTOP

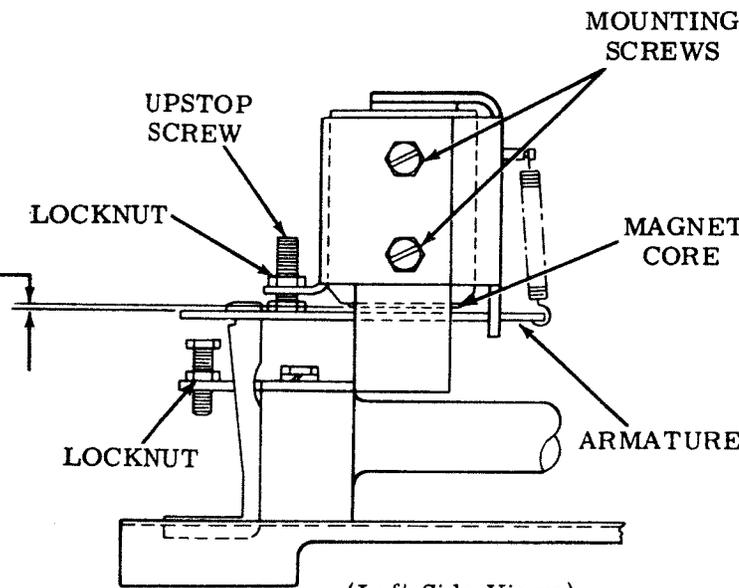
Requirement

With armature held against  
 upstop screw (magnet is not  
 to be energized)

Min 0.004 inch---Max 0.007 inch  
 clearance between magnet core  
 and armature at closest point.

To Adjust

Position upstop screw with lock-  
 nut loosened. Tighten locknut.



(Left Side Views)

Note: Refer to Part 3 for additional print suppression adjustments.

2.56 Ribbon Shift and Print Suppression Mechanism (Latest Design) (continued)

Note: The following adjustments apply to units with printing of graphics either suppressed or in red (red of red-black ribbon towards front of unit) when magnet is de-energized.

(A) ARMATURE AIR GAP AND DOWNSTOP

Requirement  
 With armature resting on downstop screw  
 Min 0.015 inch---Max 0.020 inch  
 clearance between magnet core and  
 armature at closest point.

To Adjust  
 Position downstop screw with locknut  
 loosened. Tighten locknut.

(D) ARMATURE SPRING

Requirement  
 With spring disconnected  
 Min 3-1/2 oz---Max 4-1/2 oz  
 when pulled to installed length.

(B) RIBBON SHIFT BLOCKING LINK

Requirement  
 With armature held against upstop screw  
 (magnet is not to be energized) and rib-  
 bon carrier biased upward

Min some---Max 0.008 inch  
 clearance between blocking link lower  
 surface and ribbon carrier top surface  
 at closest point and

Min some---Max 0.031 inch  
 clearance between rear of armature  
 slot and blocking link as gauged by eye.

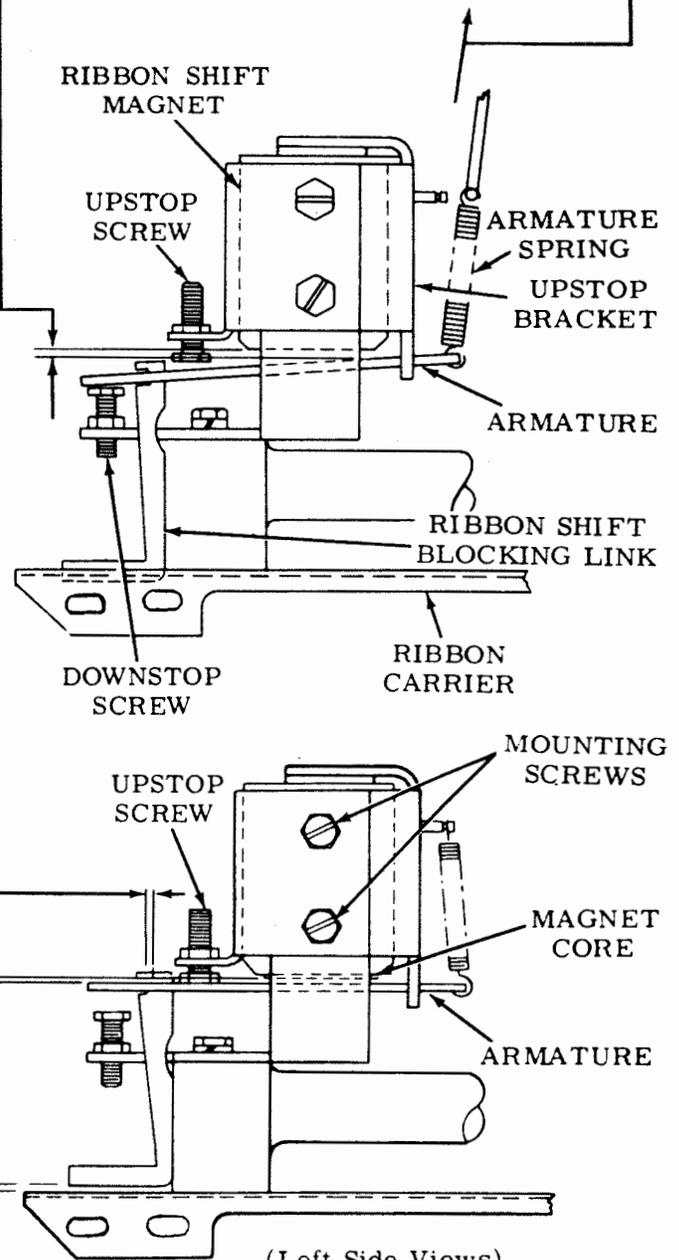
To Adjust  
 Position magnet bracket with mounting  
 screws loosened. Tighten screws.

(C) ARMATURE UPSTOP

Requirement  
 With armature held against upstop  
 screw (magnet is not to be energized)  
 ribbon carrier biased upward

Min 0.005 inch---Max 0.010 inch  
 clearance between magnet core and  
 armature at closest point.

To Adjust  
 Position upstop screw with locknut  
 loosened. Tighten lock nut.



(Left Side Views)

Note: Refer to Part 3 for additional print suppression adjustments.

2.57 Typing Mechanism (continued)

PRINTING LATCH

Note 1: For units with adjustable printing latch mounting bracket.

(1) Requirement

With rocker bail in its extreme left position, manually raise the print hammer accelerator. The clearance between the print hammer accelerator and the printing latch should be

Min some---Max 0.015 inch

(2) Requirement

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

To Adjust

(1) Position the rocker bail to the extreme right. With the high part of the eccentric to the left, rotate the eccentric so that the clearance between the print hammer accelerator and the ribbon carrier is

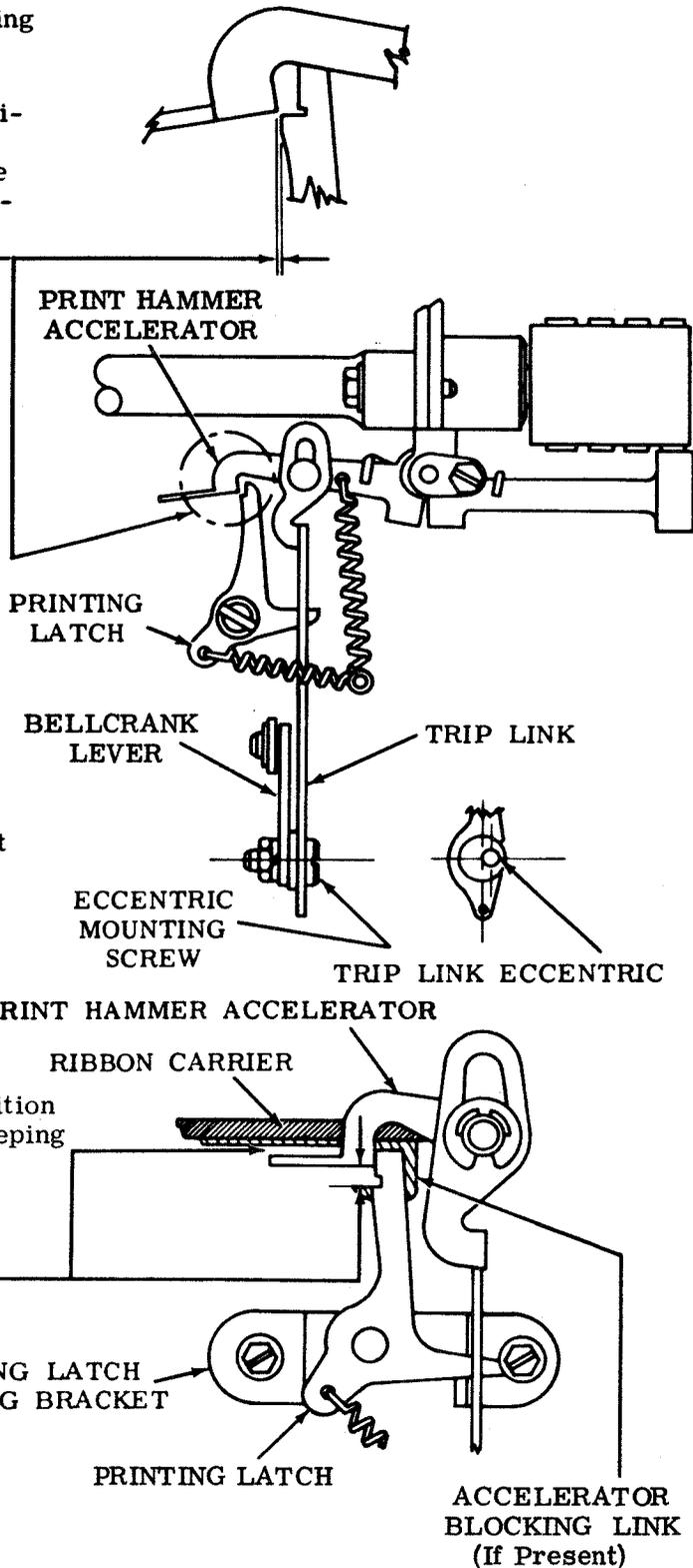
Approximately 0.065 inch

With mounting screws friction tight, position the printing latch mounting bracket to its extreme rear position.

(2) With the rocker bail to the extreme left, move the printing latch mounting bracket toward the front until the print hammer accelerator just trips. Tighten the mounting screws.

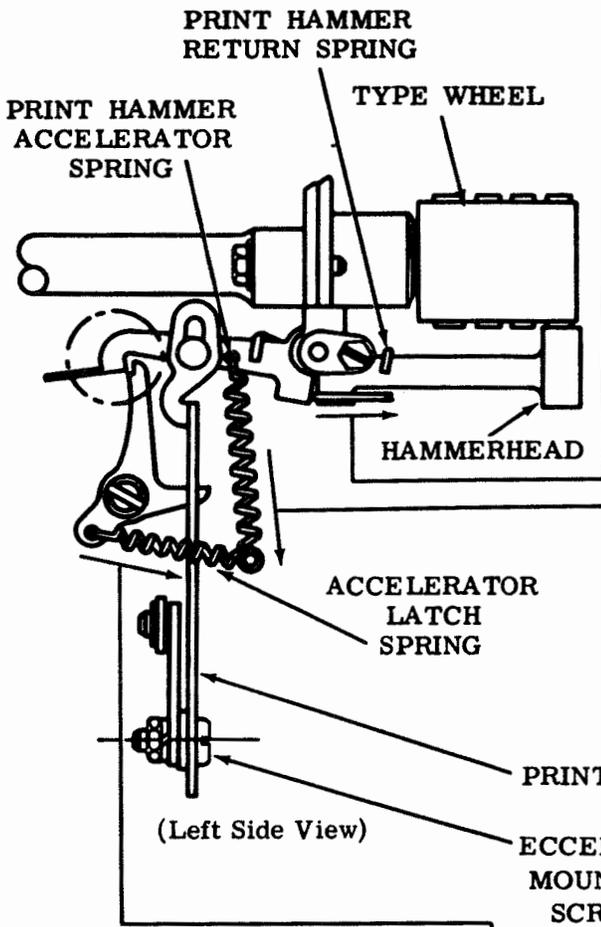
(3) With the rocker bail to the extreme left, position the trip link eccentric with locknut loose (keeping the high part to the left) until the clearance between the printing latch and the print hammer accelerator is as called for in requirement (1). Tighten eccentric locknut.

Note 2: For units with non-adjustable printing latch mounting bracket use above "(1) Requirement" and adjust according to "To Adjust (3)."



(Left Side Views)

2.58 Typing Mechanism (continued)



PRINT HAMMER RETURN SPRING

**Requirement**

With unit in the stop position, it should require  
 Min 1 oz---Max 3 oz  
 to pull the print hammer lever so that the top  
 of the hammerhead is level with the type wheel.

PRINT HAMMER ACCELERATOR SPRING

**Requirement**

With the unit in the stop position  
 Min 26 oz---Max 32 oz  
 to pull the spring to its installed length.

PRINT HAMMER ACCELERATOR LATCH SPRING

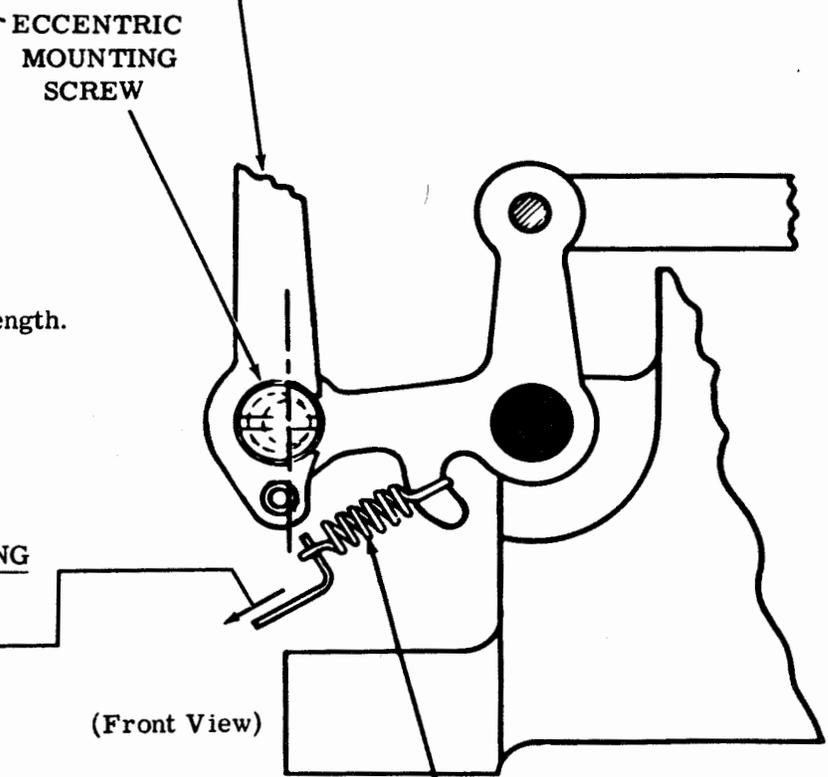
**Requirement**

With the unit in the stop position  
 Min 5 oz---Max 7 oz  
 to pull the spring to its installed length.

PRINT HAMMER TRIP LEVER SPRING

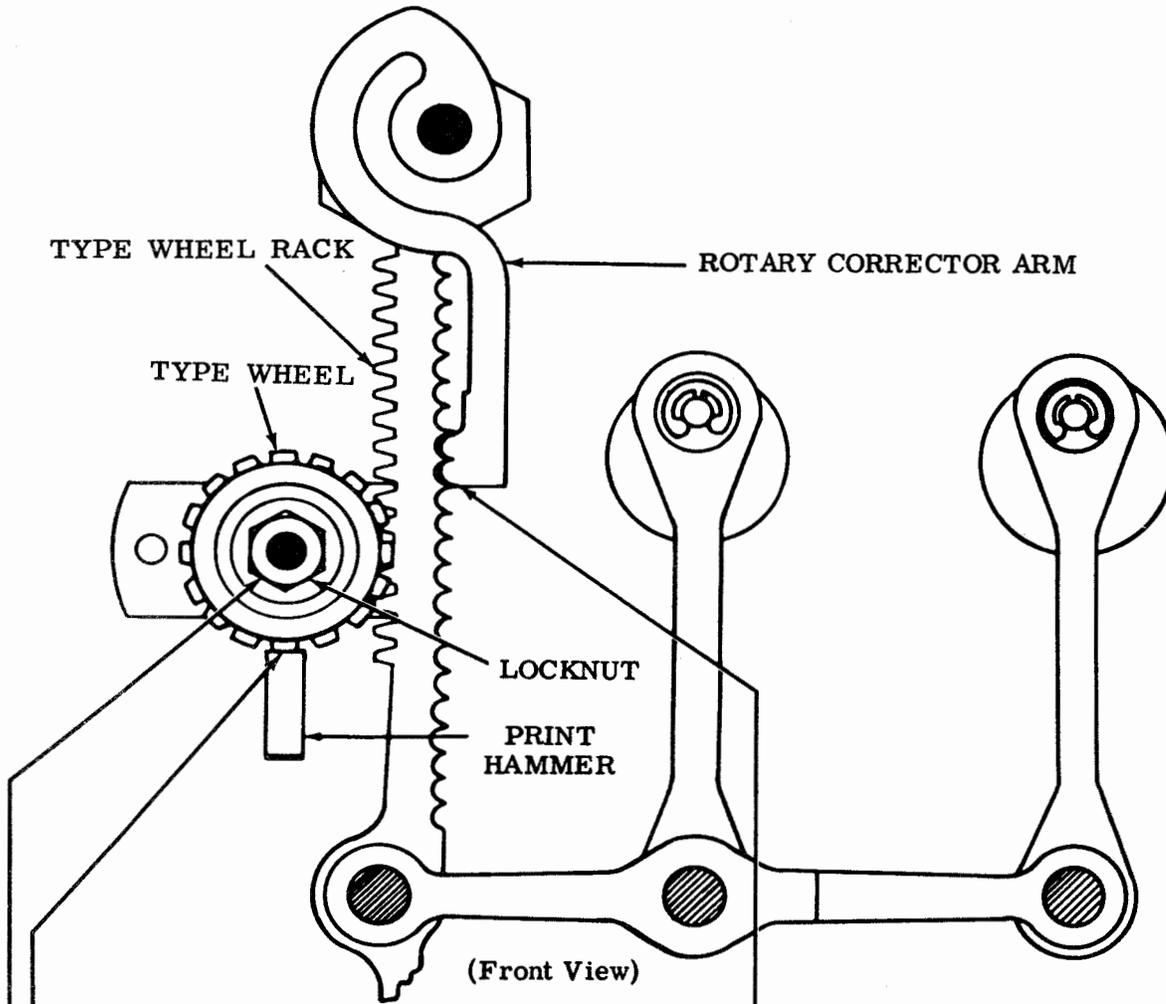
**Requirement**

Min 4 oz---Max 7 oz  
 to pull spring to installed length.



PRINTING TRIP LEVER SPRING

2.59 Typing Mechanism (continued)



TYPE WHEEL (Preliminary)

To Check

Select H code combination (---4--7-). Place rocker bail to extreme left. Corrector arm should be firmly seated in type wheel rack.

Requirement

Type wheel aligned so that full character is printed uniformly and six and one half code hole spaces behind its perforated code hole.

To Adjust

Position type wheel with locknut loosened. Check printing by manually lifting accelerator to latched position and releasing it.

Note: For best results, it may be necessary to make PRINT HAMMER (2.60) adjustment and then refine this adjustment.

TYPE WHEEL (Final)

To Check

With unit operating under power.

Requirement

All characters should be legible and six and one half code hole spaces behind the perforated code holes.

To Adjust

Refine type wheel position with locknut friction tight. Tighten locknut.

Note: For best results, it may be necessary to make PRINT HAMMER (2.60) adjustment and then refine this adjustment.

## 2.60 Typing Mechanism (continued)

PRINT HAMMER**To Check**

With unit operating under power.

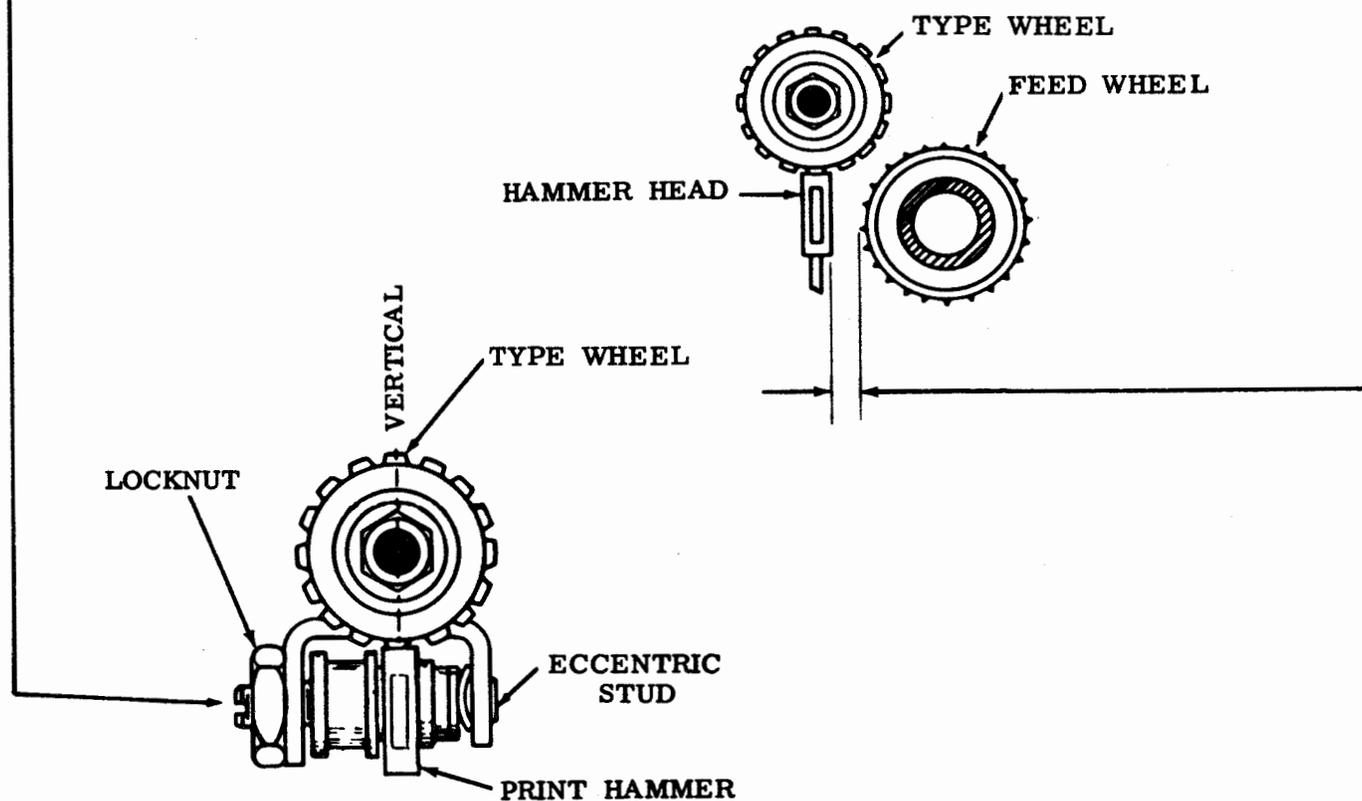
**Requirement**

Print hammer aligned with type wheel so as to obtain quality printing with some clearance between the pin points on the feed wheel and the side of the print hammer head.

**To Adjust**

Position print hammer shaft with its locknut friction tight. Tighten locknut.

**Note:** It may be necessary to make the TYPE WHEEL (Final) (2.59) adjustment and then refine this adjustment.



(Front View)

2.61 Typing Mechanism (continued)

FEED PAWL SPRING

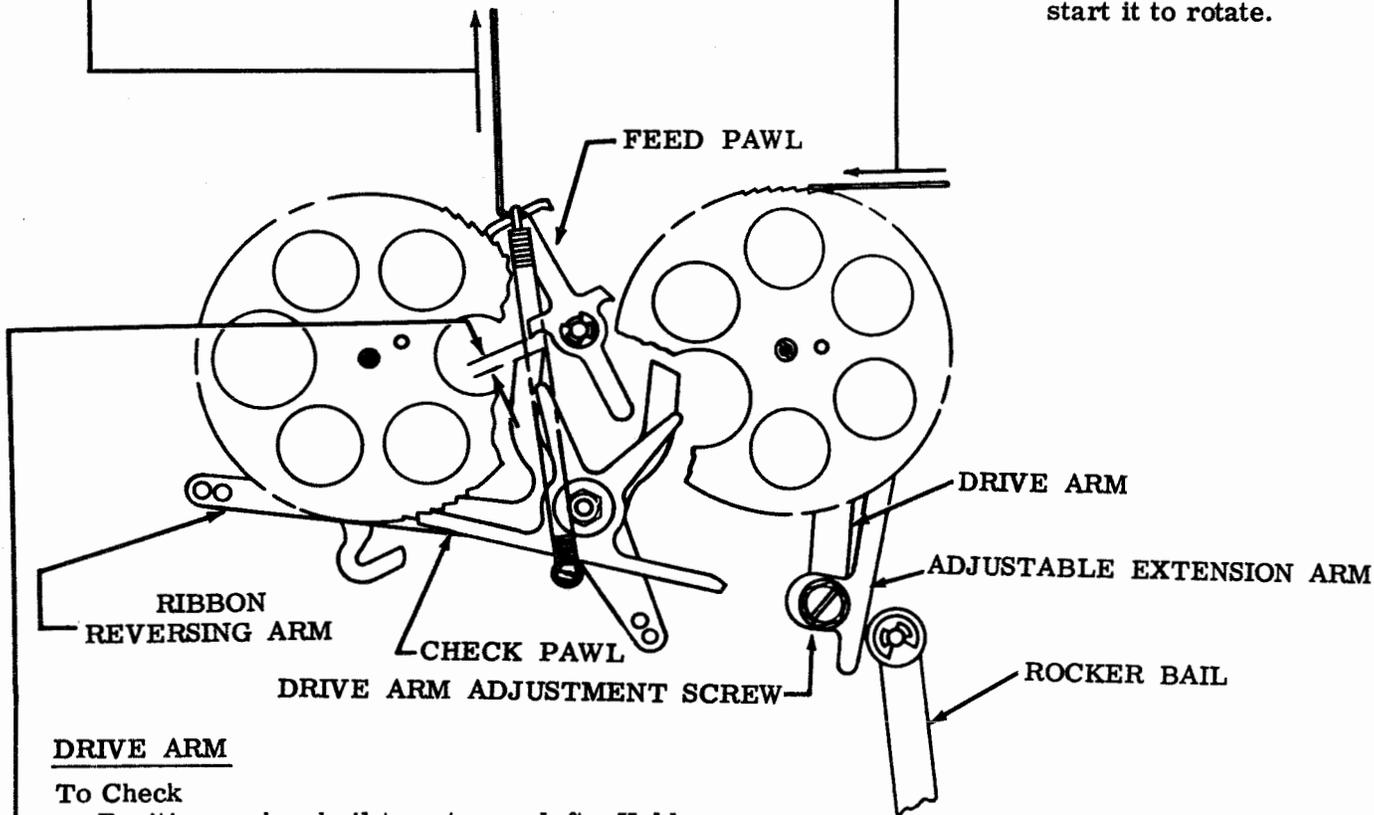
**Requirement**

With rocker bail to extreme right  
 Min 4 oz---Max 6 oz  
 to pull feed pawl spring to installed  
 length.

RATCHET WHEEL  
 TORQUE SPRING

**Requirement**

Min 1 oz---Max 3 oz  
 applied tangentially to  
 the ratchet wheel to  
 start it to rotate.



DRIVE ARM

**To Check**

Position rocker bail to extreme left. Hold the ribbon reversing arm under lower reversing extension of feed pawl.

- (1) **Requirement**  
 Clearance between blocking edge of ribbon reverse arm and reversing extension of feed pawl  
 Min some

- (2) **Requirement**  
 Clearance should not be so great as to allow feed pawl to feed more than two teeth at a time.

- (3) **Requirement**  
 Feed pawl detented in both its right and left position.

**To Adjust**

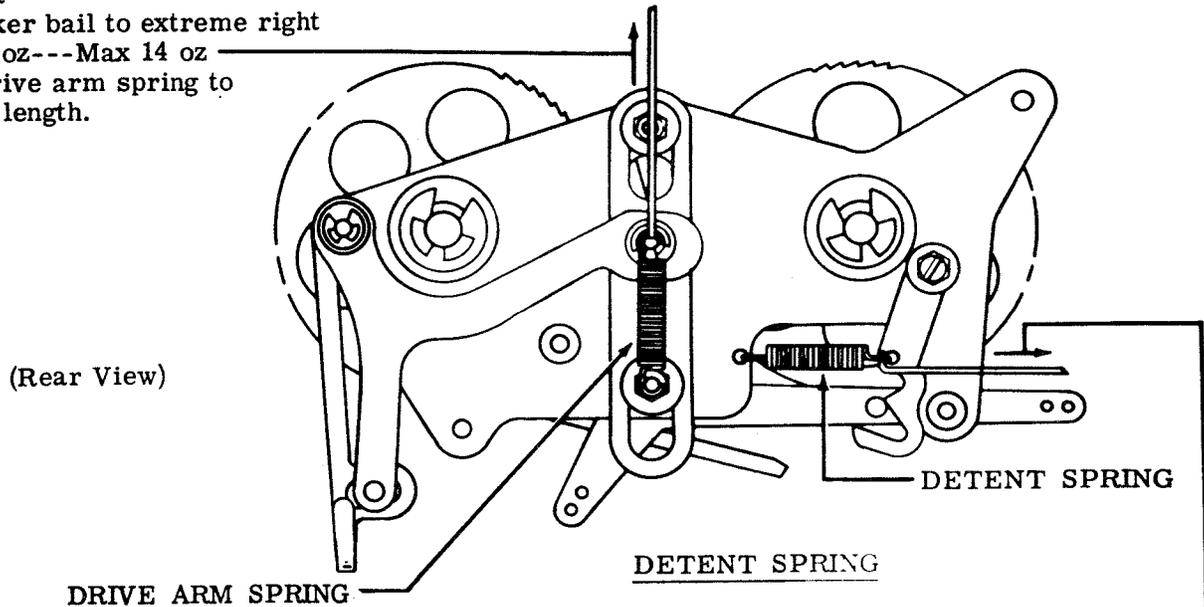
Position drive arm adjustable extension lever with its mounting screw loosened. Tighten screw.

2.62 Typing and Slack Tape Mechanisms

DRIVE ARM SPRING

Requirement

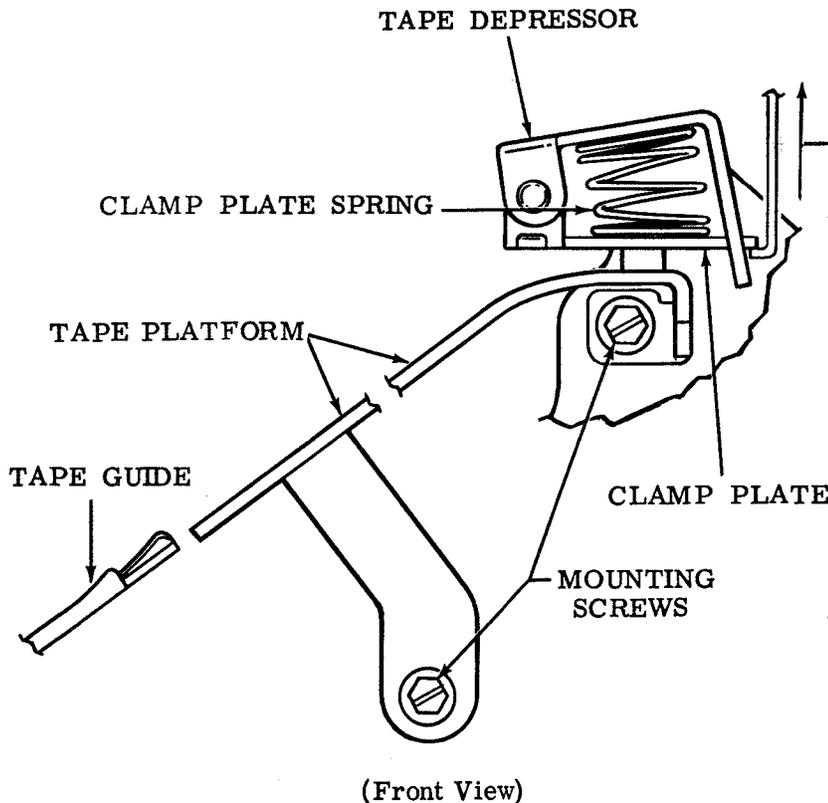
With rocker bail to extreme right  
 Min 9 oz---Max 14 oz  
 to pull drive arm spring to  
 installed length.



DETENT SPRING

Requirement

With reversing arm in its extreme  
 right or left position  
 Min 2 oz---Max 4 oz  
 to pull detent spring to its installed  
 length.



TAPE PLATFORM (Early Design)

Requirement

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

To Adjust

With tape platform mounting  
 screws loosened, position tape  
 platform. Tighten screws.

CLAMP PLATE SPRING  
 (Early Design)

Requirement

Function clutch disengaged and  
 latched. Clamp plate spring  
 bowed to the right.

Min 18 oz---Max 24 oz  
 to move clamp plate from bottom  
 of slot in tape depressor.

2.63 Slack Tape Mechanism (continued)

CLAMP PLATE SCREW WITH DISC (Latest Design)

Requirement

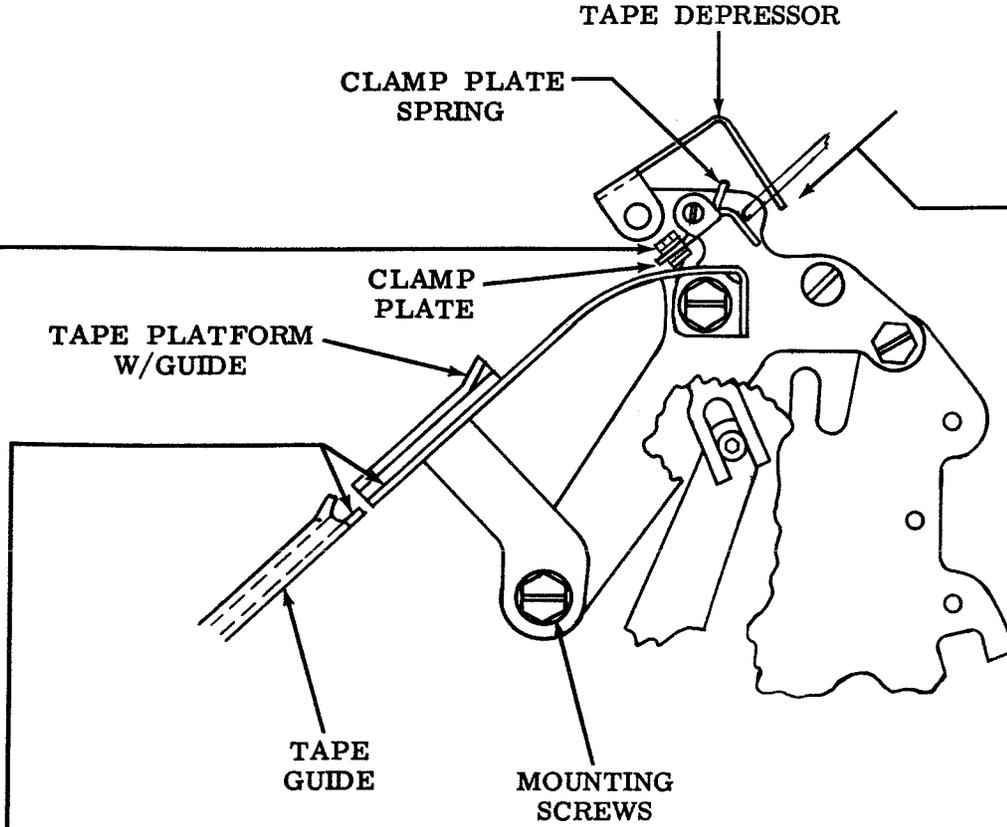
Loosen nut and turn screw with disc so that a new area of the disc contacts the tape. Tighten nut.

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

CLAMP PLATE SPRING (Latest Design)

Requirement

Min 30 grams applied to tab of clamp plate to start it moving



TAPE PLATFORM (Latest Design)

Requirement

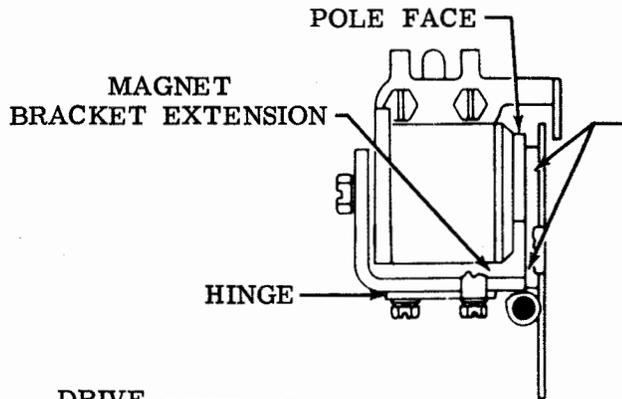
The top surface of tape platform and tape guide should be flush with the top surface of tape guide.

To Adjust

With tape platform mounting screws loosened, position tape platform. Tighten screws.

3. VARIABLE FEATURES

3.01 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism



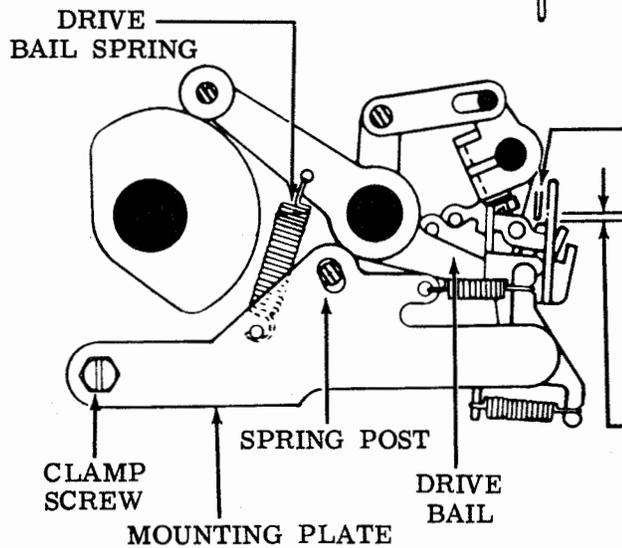
(A) ARMATURE HINGE

Requirement

With armature manually operated, it should be flush against pole face and magnet bracket extension.

To Adjust

Loosen armature hinge bracket mounting screws, position armature and tighten screws.



(B) DRIVE BAIL SPRING

Requirement

Rotate mainshaft until drive bail is on high part of its cam.

Min 23 oz---Max 32 oz to start the drive bail moving.

(C) MOUNTING PLATE

Requirement

With armature in unoperated position. Rotate mainshaft until drive bail is on high part of its cam. Clearance between the blocking bail and drive bail surface

Min 0.006 inch---Max 0.015 inch

To Adjust

Position blocking bail with mounting plate clamp screw and spring post friction tight. Tighten screw and nut.

(D) MAGNET ASSEMBLY

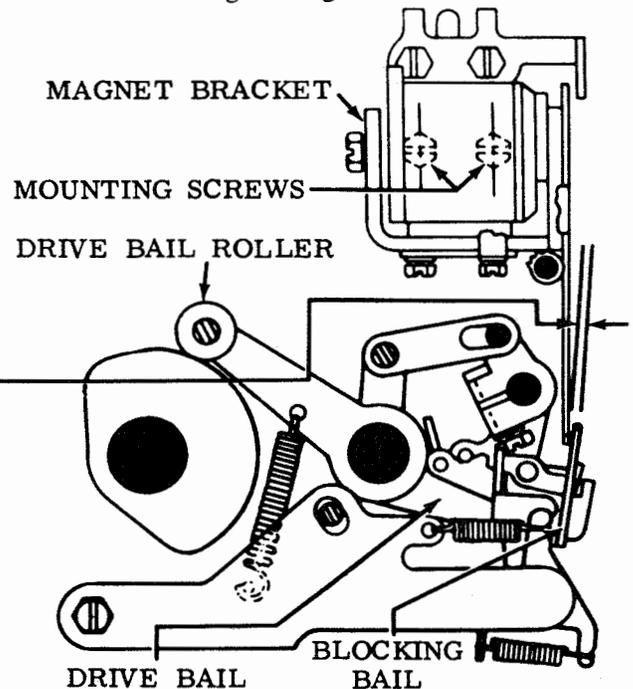
Requirement

With armature held in operated position, rotate mainshaft until drive bail roller is on high part of its cam. Clearance between blocking bail and right edge of drive bail at its closest point

Min 0.005 inch---Max 0.015 inch

To Adjust

Position magnet assembly, armature held against magnet pole piece with magnet bracket mounting screws friction tight. Tighten screws.



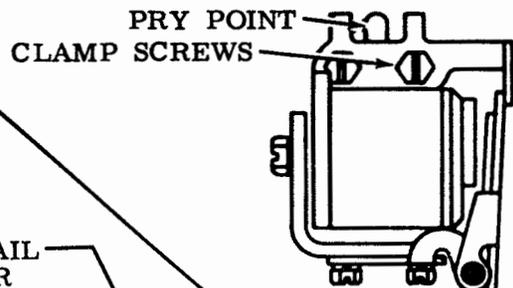
3.02 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

(A) BLOCKING LATCH TORSION SPRING

Requirement

With armature in unoperated position and drive bail roller on high part of its cam.

Min 15 grams---Max 40 grams to start blocking latch moving.



(B) ARMATURE BACKSTOP

(1) Requirement

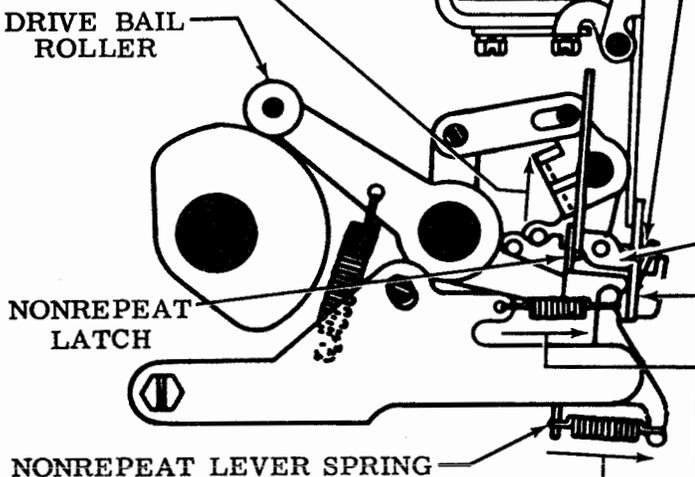
With armature in operated position, rotate mainshaft until drive bail roller is on high part of its cam. The drive bail should engage the blocking bail by at least 2/3 of its thickness.

(2) Requirement

Min some---Max 0.006 inch between blocking latch and non-repeat latch.

To Adjust

With the armature backstop mounting screws friction tight, position by means of pry point. Tighten screws.



(C) NONREPEAT LEVER SPRING

Requirement

With armature in unoperated position and drive bail roller on high part of its cam

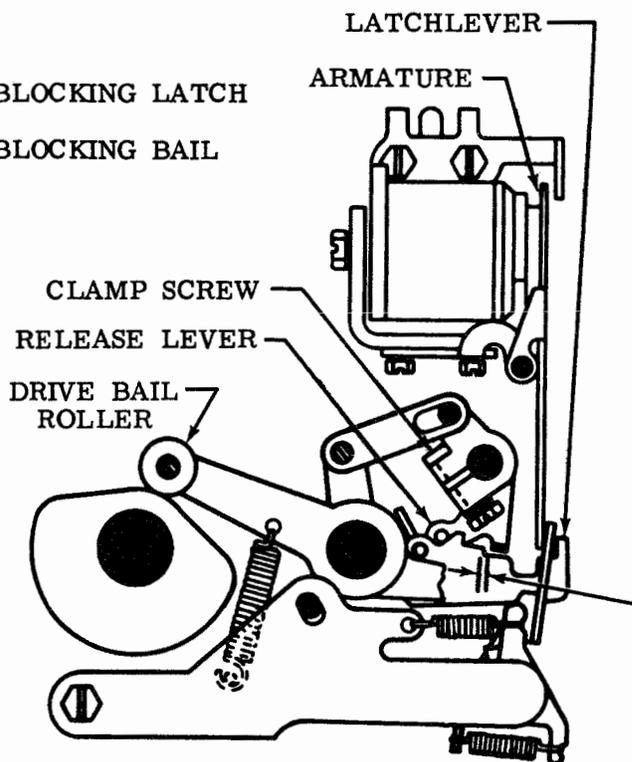
Min 6 oz---Max 9 oz to pull spring to installed length.

(D) BLOCKING BAIL SPRING

Requirement

With armature in unoperated position and drive bail roller on high part of its cam.

Min 3 oz---Max 5 oz to pull spring to installed length.



(E) RELEASE LEVER

Requirement

With armature in operated position, rotate mainshaft until drive bail roller is in indent of its cam. Clearance between release lever and latchlever.

Min 0.010 inch---Max 0.025 inch

To Adjust

With clamp screw friction tight, position release lever. Tighten screw.

3.03 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

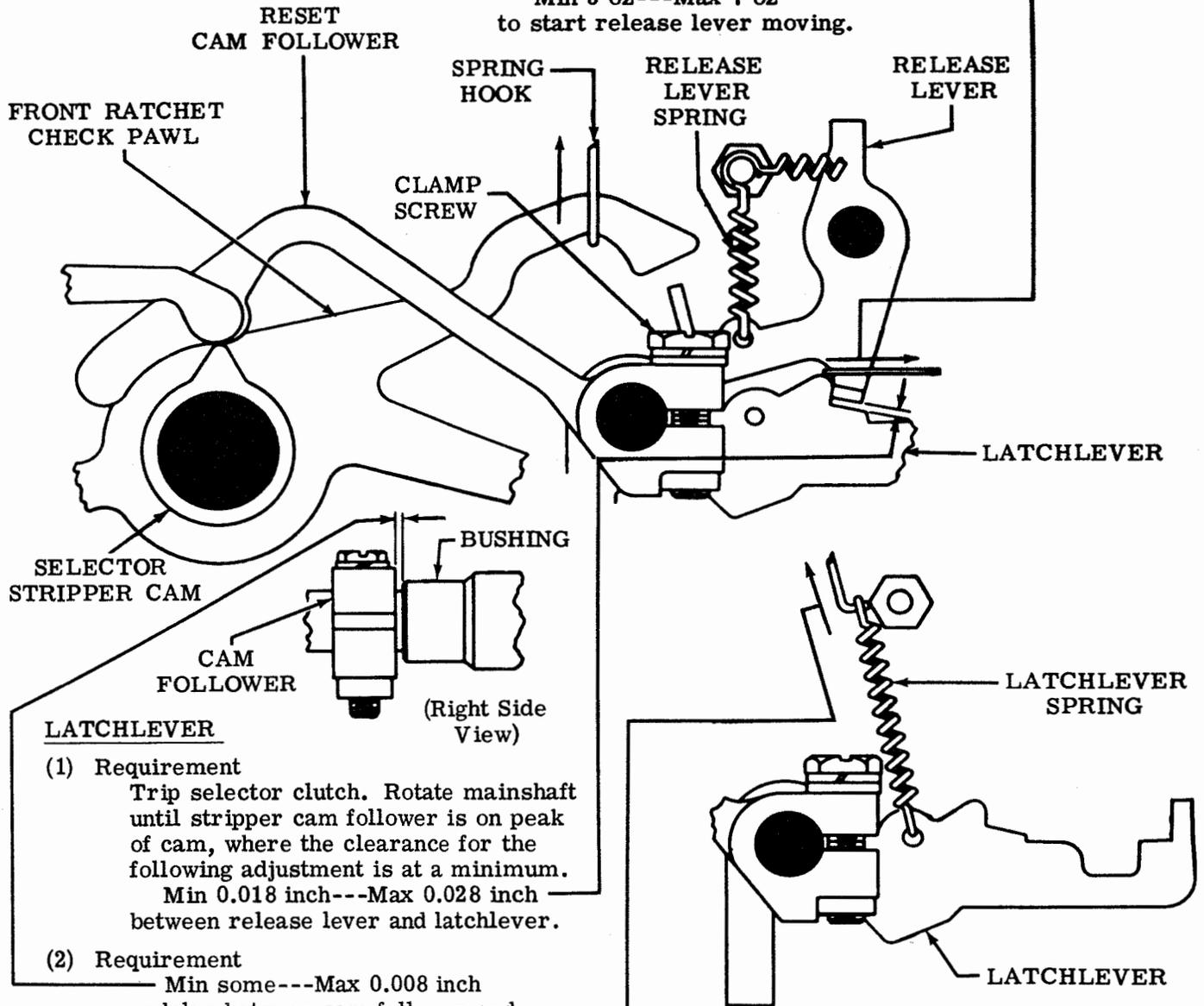
RELEASE LEVER SPRING

To Check

Trip selector clutch. Rotate mainshaft until reset cam follower is on peak of reset bail cam. With spring hook, hold front ratchet check pawl away from release lever.

Requirement

Min 5 oz---Max 7 oz  
to start release lever moving.



LATCHLEVER

(1) Requirement

Trip selector clutch. Rotate mainshaft until stripper cam follower is on peak of cam, where the clearance for the following adjustment is at a minimum.

Min 0.018 inch---Max 0.028 inch  
between release lever and latchlever.

(2) Requirement

Min some---Max 0.008 inch  
endplay between cam follower and  
bushing.

To Adjust

Position latchlever with clamp screw on  
stripper cam follower loosened.

LATCHLEVER SPRING

To Check

Trip selector clutch. Rotate mainshaft  
until reset cam follower is on peak of re-  
set bail cam.

Requirement

Min 2 oz---Max 4 oz  
to pull spring to installed length.

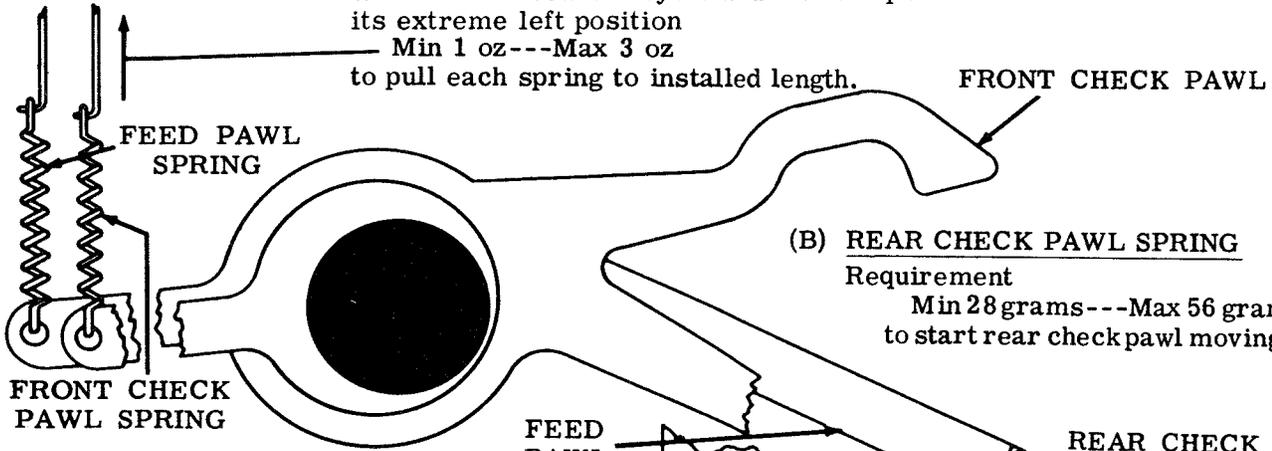
3.04 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

(C) FEED PAWL AND FRONT CHECK PAWL SPRINGS

Requirement

With unit in feed-out cycle and the feed pawl in its extreme left position

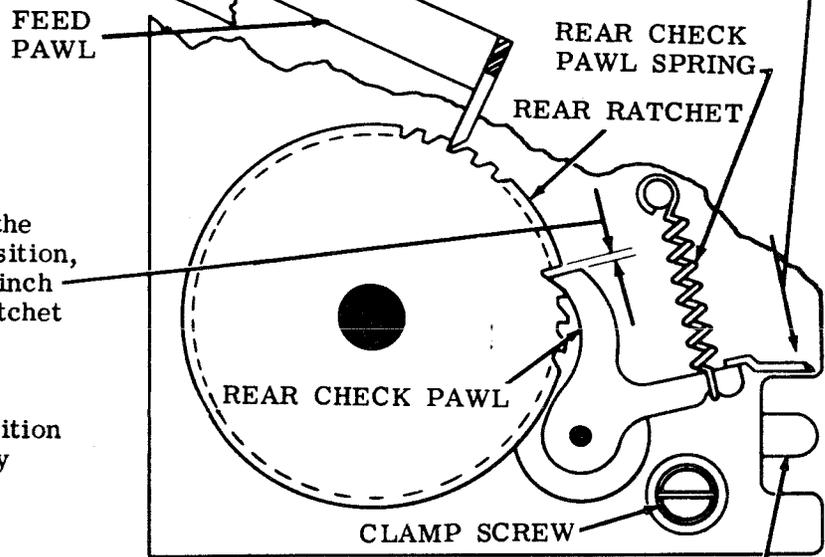
Min 1 oz---Max 3 oz  
to pull each spring to installed length.



(B) REAR CHECK PAWL SPRING

Requirement

Min 28 grams---Max 56 grams  
to start rear check pawl moving.



(A) REAR CHECK PAWL

Requirement

With unit in feed-out cycle and the feed pawl in its extreme left position,  
Min 0.008 inch---Max 0.020 inch  
between rear check pawl and ratchet tooth.

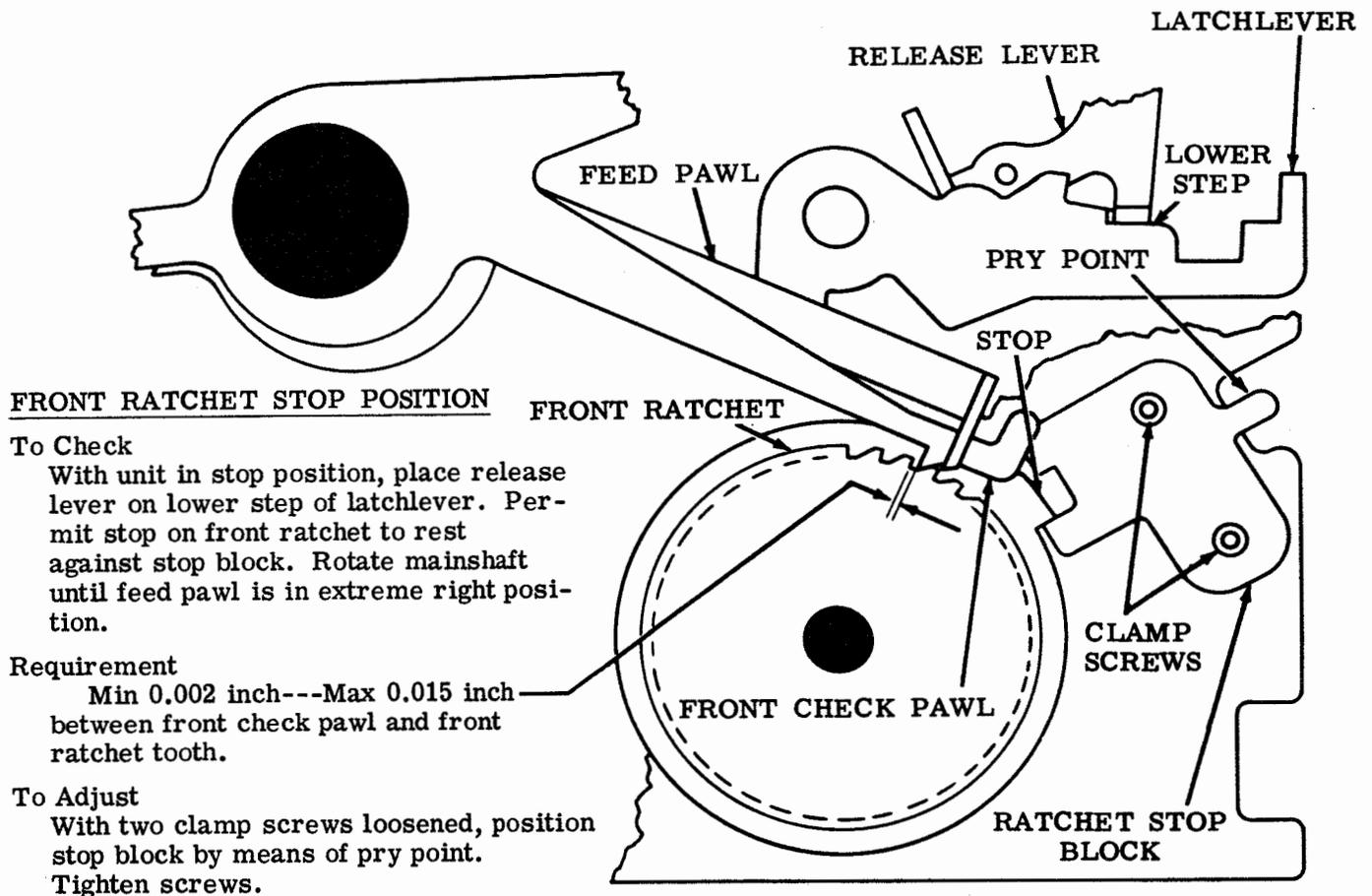
To Adjust

With clamp screw loosened, position rear check pawl by means of pry point. Tighten screw.

Note: Proceed to FRONT RATCHET STOP POSITION (3.05) adjustment.

## 3.05 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

Note: See REAR CHECK PAWL (3.04) adjustment before making this adjustment.



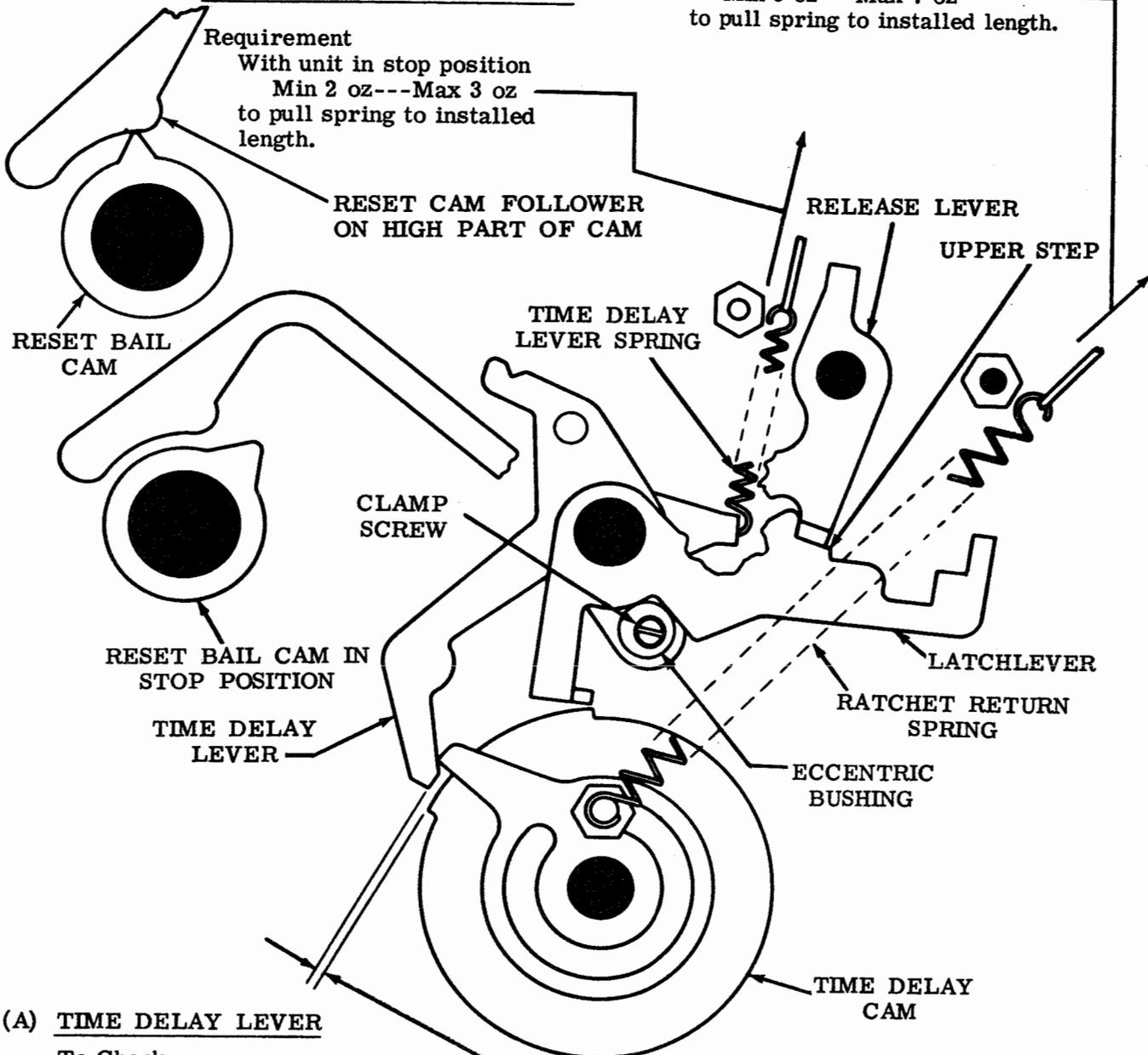
3.06 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

(C) RATCHET RETURN SPRING

Requirement  
 With unit in stop position  
 Min 5 oz---Max 7 oz  
 to pull spring to installed length.

(B) TIME DELAY LEVER SPRING

Requirement  
 With unit in stop position  
 Min 2 oz---Max 3 oz  
 to pull spring to installed length.



(A) TIME DELAY LEVER

To Check

Trip selector clutch and rotate mainshaft until reset cam follower is on high part of reset bail cam.

- (1) Requirement  
 Min 0.040 inch---Max 0.060 inch  
 clearance between time delay lever  
 and high part of time delay cam.

- (2) Requirement  
 With unit in stop position  
 Min some  
 clearance between time delay lever and  
 high part of time delay cam.

To Adjust  
 With clamp screw loosened, position  
 eccentric bushing. Tighten screw.

3.07 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

(A) RELEASE ARM

(1) Requirement

With unit in the feed-out cycle, ratchets advanced beyond the time delay, clearance between the drive arm and upper surface of release arm  
 Min 0.010 inch---Max 0.030 inch

Rotate cam so that the mating surfaces of the drive arm bail and release arm are approximately parallel.

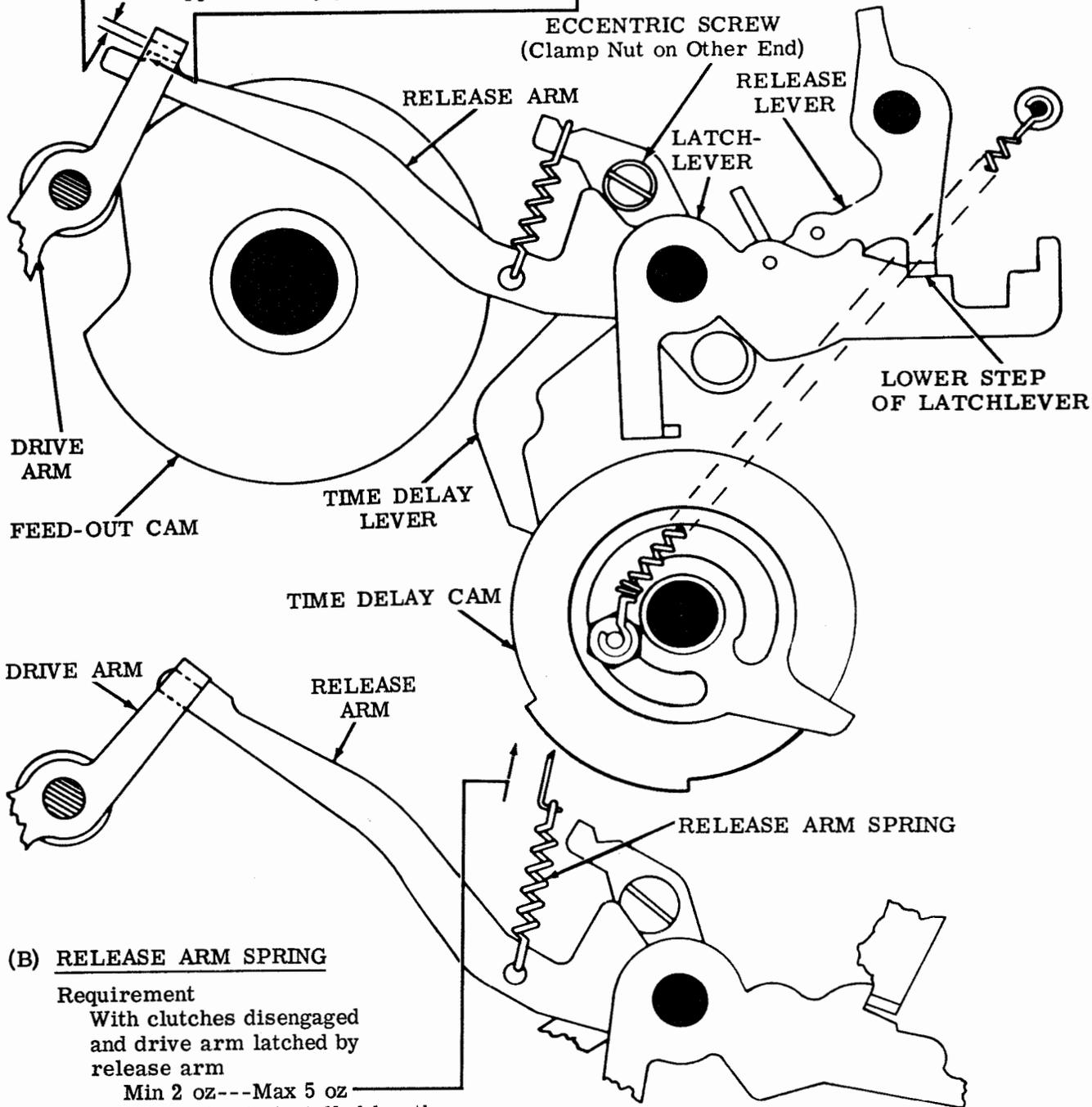
(2) Requirement

With unit in stop position, the surface of the drive arm bail that does not engage the release arm should not exceed

Max 0.015 inch

To Adjust

With clamp nut friction tight, position release arm by means of eccentric screw on time delay lever. Tighten nut.



(B) RELEASE ARM SPRING

Requirement

With clutches disengaged and drive arm latched by release arm

Min 2 oz---Max 5 oz  
 to pull spring to installed length.

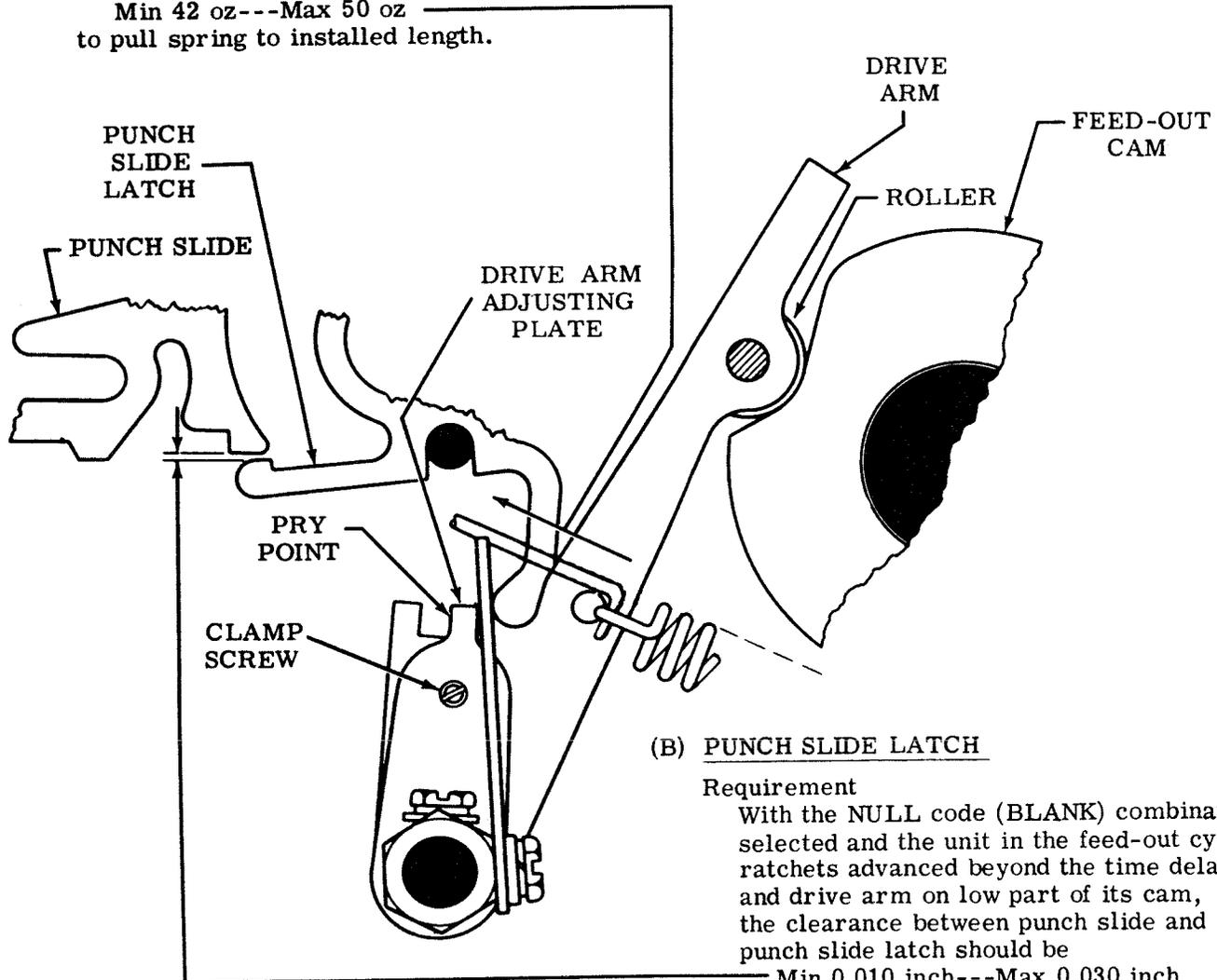
3.08 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

(A) DRIVE ARM SPRING

Requirement

With unit in feed-out cycle and drive arm roller held firmly against its cam indent

Min 42 oz---Max 50 oz  
to pull spring to installed length.



(B) PUNCH SLIDE LATCH

Requirement

With the NULL code (BLANK) combination selected and the unit in the feed-out cycle, the ratchets advanced beyond the time delay and drive arm on low part of its cam, the clearance between punch slide and punch slide latch should be

Min 0.010 inch---Max 0.030 inch  
at slide where clearance is a minimum.

Note: See that the reset bail is tripped.

To Adjust

With clamp screw loosened, position drive arm adjusting plate by means of its pry point. Tighten screw.

3.09 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

(B) ADJUSTING LEVER

To Check

Place unit in feed-out cycle by positioning release lever on lower step of latch-lever and advancing high part of time delay cam beyond time delay lever. Position mainshaft so that drive arm roller is on low part of cam.

(1) Requirement

Min 0.010 inch--Max 0.030 inch between release and main trip lever.

(2) Requirement

Some clearance between main trip lever and downstop bracket.

To Adjust

Loosen the clamp screw on the adjusting lever and position, making sure the adjusting lever rides fully on the slide trip lever. Tighten screw.

(A) TRIP CAM FOLLOWER

(1) Requirement

With follower lever on high part of trip cam

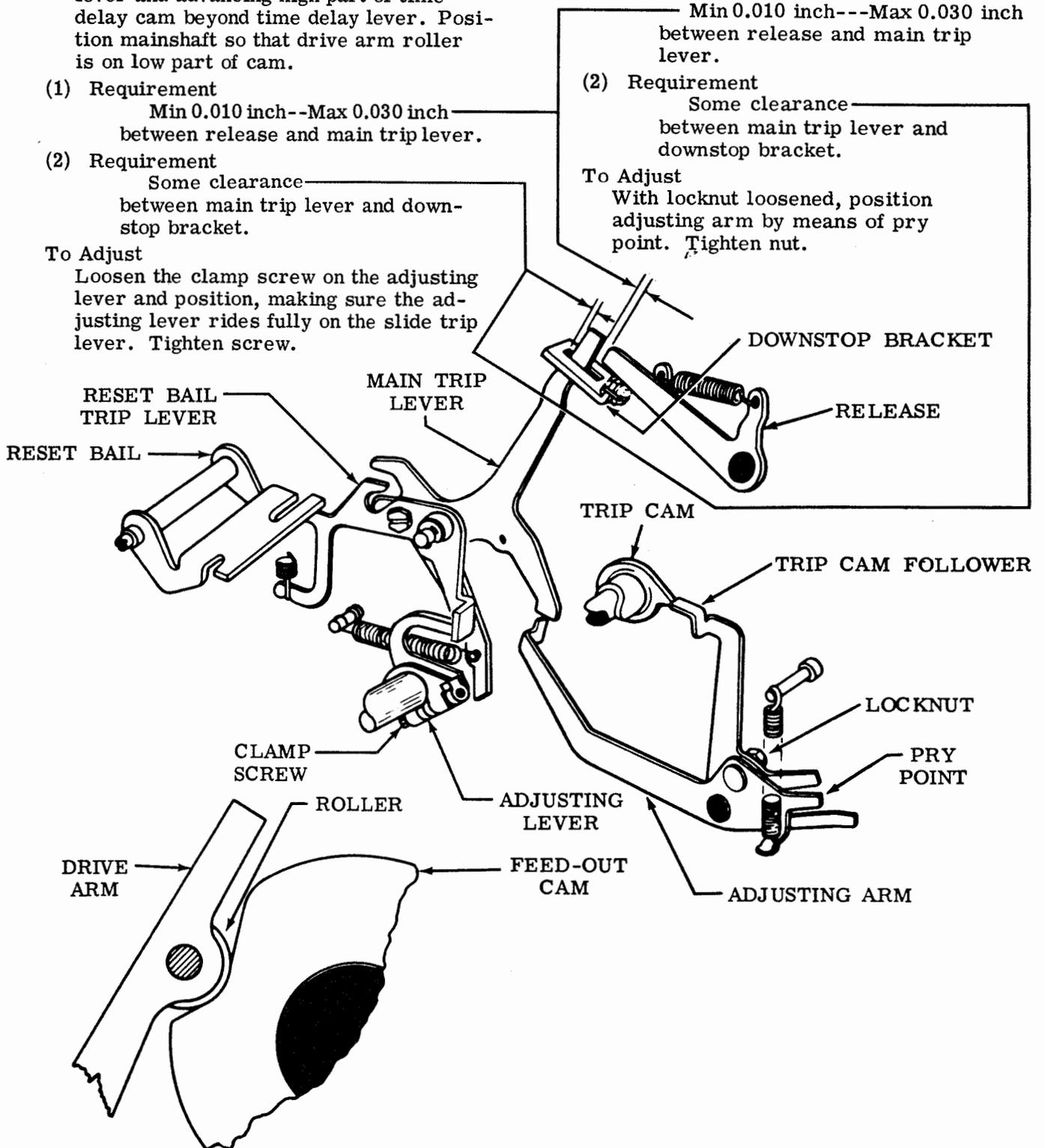
Min 0.010 inch---Max 0.030 inch between release and main trip lever.

(2) Requirement

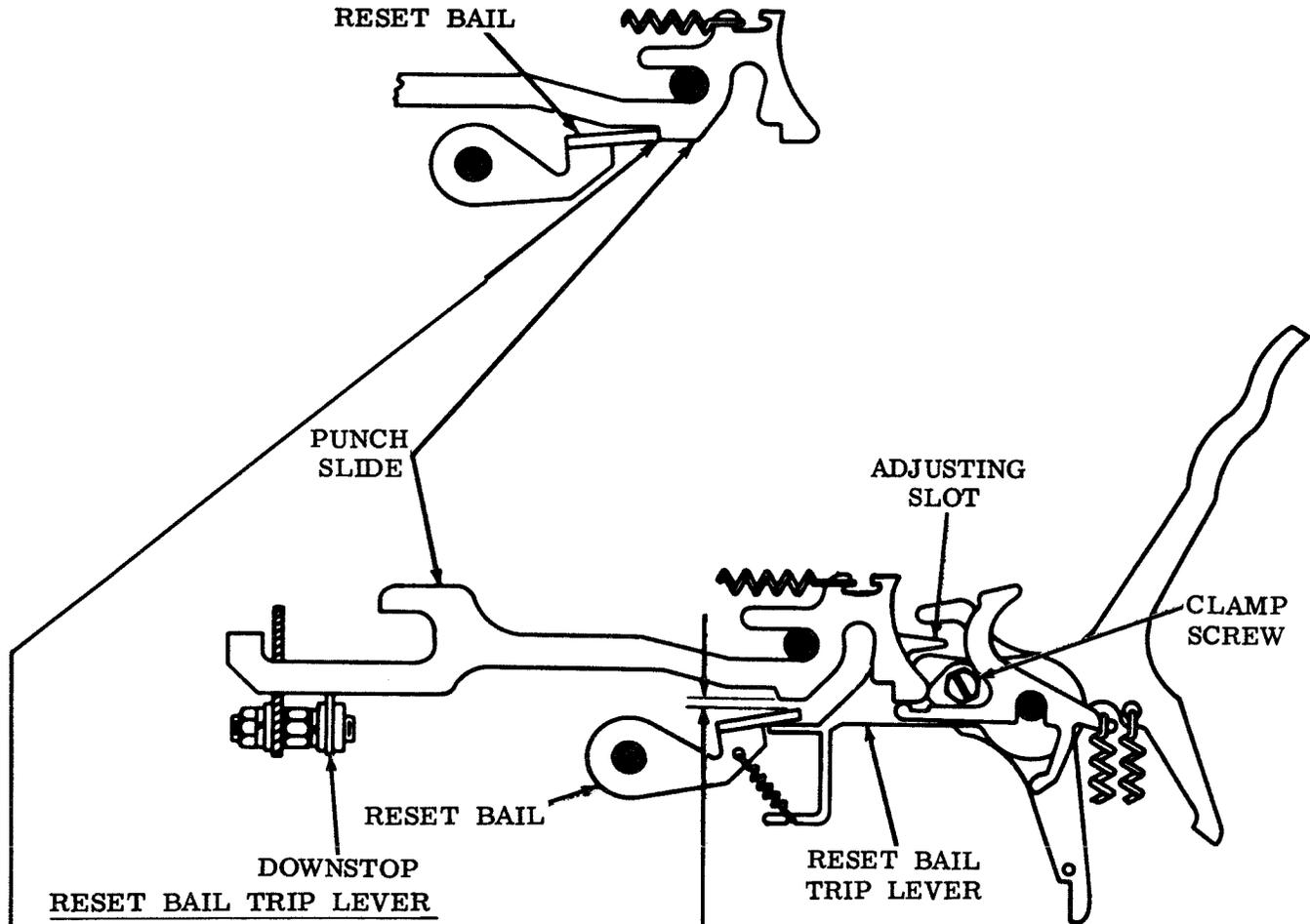
Some clearance between main trip lever and downstop bracket.

To Adjust

With locknut loosened, position adjusting arm by means of pry point. Tighten nut.



3.10 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)



DOWNSTOP  
RESET BAIL TRIP LEVER

To Check

Select RUBOUT code combination (12345678). Rotate mainshaft until function clutch trips. Position punch slides against downstop. Trip cam follower on high part of cam.

(1) Requirement

Min 0.008 inch---Max 0.020 inch  
between punch slide and reset bail.

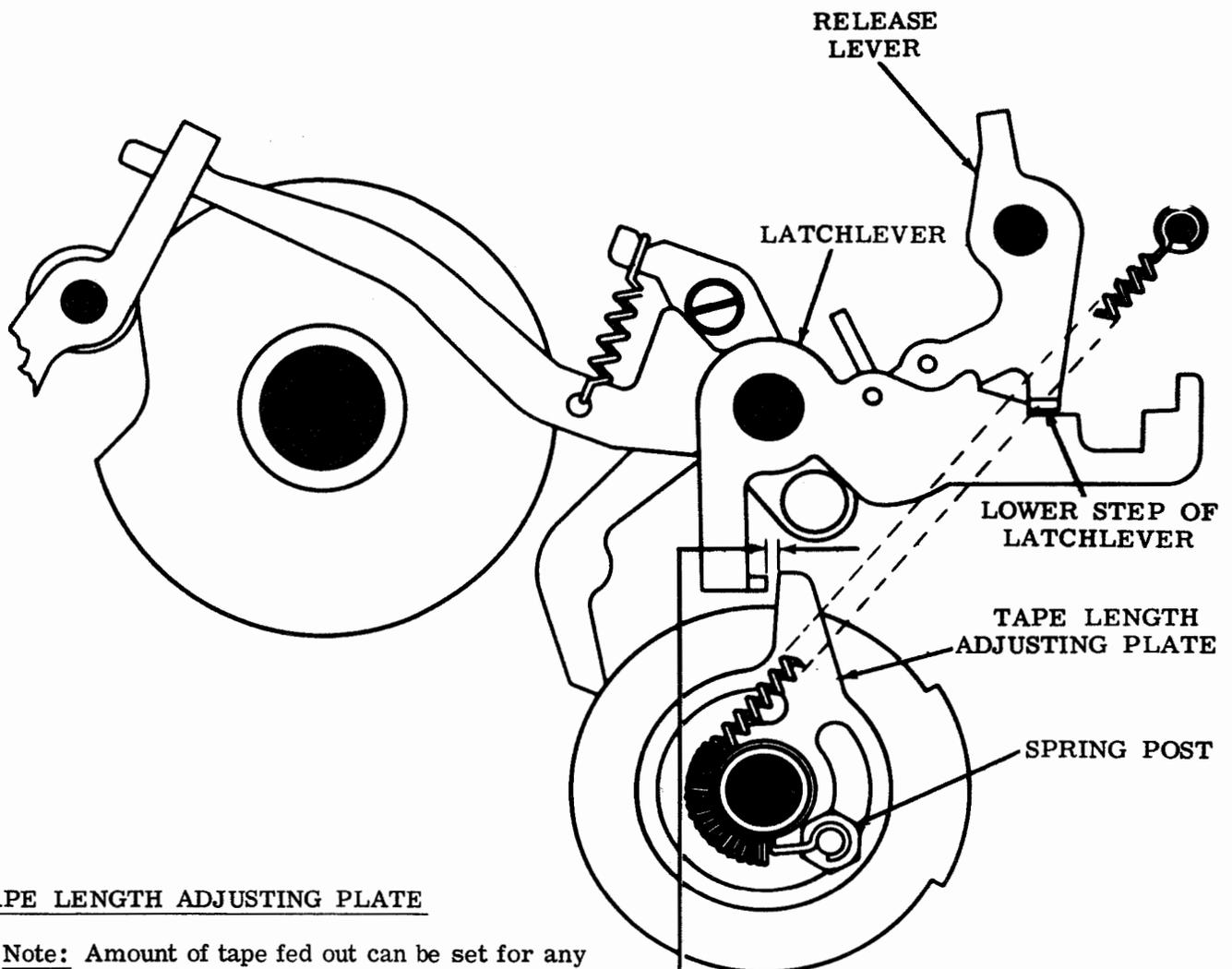
(2) Requirement

With clutches fully disengaged and latched, reset bail should fully engage notches in punch slides.

To Adjust

With clamp screw loosened, position reset bail trip lever by means of adjusting slot. Tighten clamp screw.

## 3.11 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

TAPE LENGTH ADJUSTING PLATE

Note: Amount of tape fed out can be set for any length up to 18 inches.

## (1) Requirement

Place unit in feed-out cycle by positioning release lever on lower step of latchlever. Manually advance ratchets so that front ratchet is in the tooth preceding trip off. Rotate mainshaft until feed pawl is in the extreme left position. Clearance between adjusting plate and latchlever projection  
Min 0.002 inch---Max 0.020 inch

## (2) Requirement

When operating under power, unit should feed out correct length of tape.

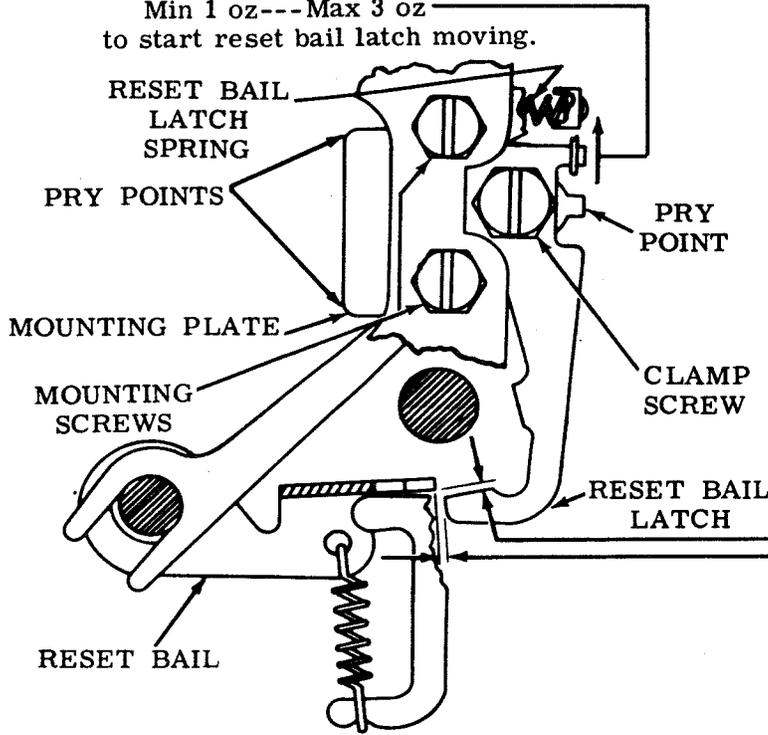
## To Adjust

With spring post friction tight. Position adjusting plate. Tighten spring post.

3.12 Remote Control Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

**(B) RESET BAIL LATCH SPRING**

Requirement  
 With unit in stop condition  
 Min 1 oz---Max 3 oz  
 to start reset bail latch moving.



**(A) RESET BAIL LATCH**

(1) To Check (Vertical Clearance)  
 Select RUBOUT code combination (12345678). Rotate mainshaft until function clutch trips and punch slides are to extreme left. Manually set up the NULL code (BLANK) combination in selector. Rotate mainshaft until punch slides are just latched.

(1) Requirement  
 Min 0.008 inch---Max 0.020 inch  
 between reset bail and reset bail latch.

To Adjust  
 With mounting screws loosened, position mounting plate by means of pry points. Tighten screws.

(2) Requirement (Horizontal Clearance)  
 With clutches disengaged,  
 Min 0.005 inch---Max 0.020 inch  
 between reset bail and reset bail latch.

To Adjust  
 With a clamp screw loosened, position bail latch by means of its pry points so its latching surface is approximately at midpoint in thickness of the reset bail. Tighten screw.

(2) To Check  
 Select RUBOUT code combination (12345678). Rotate mainshaft until function clutch trips. Manually set up the NULL code (BLANK) combination. Rotate mainshaft to stop position.

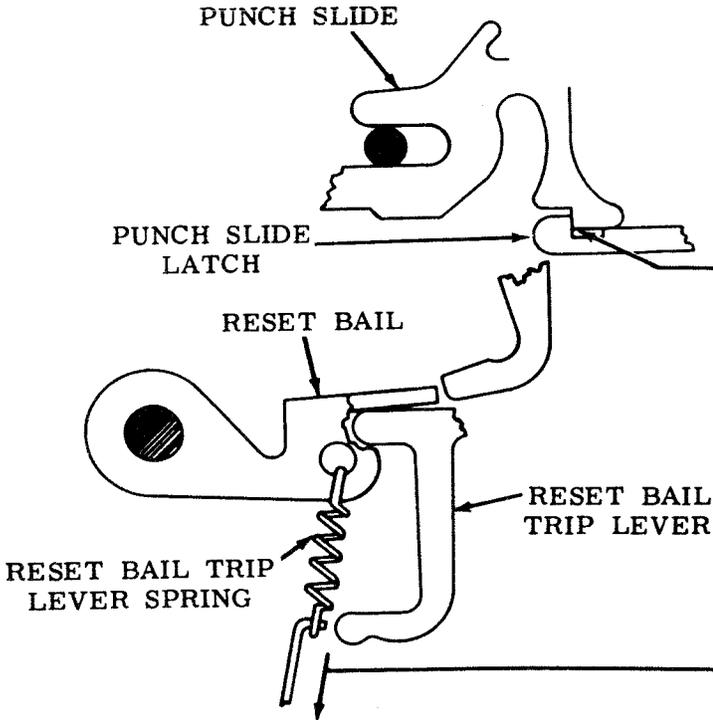
Requirement  
 Punch slides latched by punch slide latches.

To Adjust  
 Refine requirements (1) and (2) above.

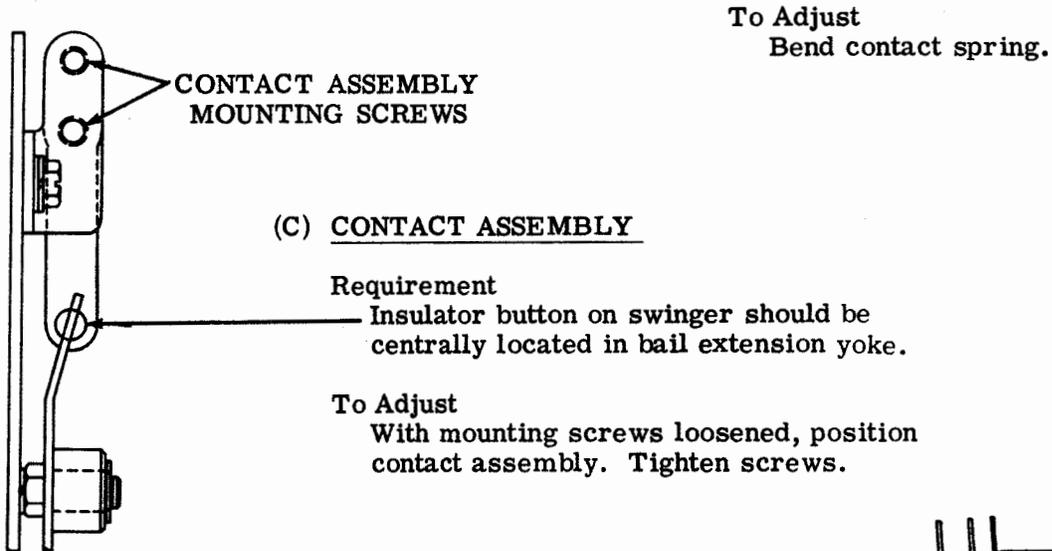
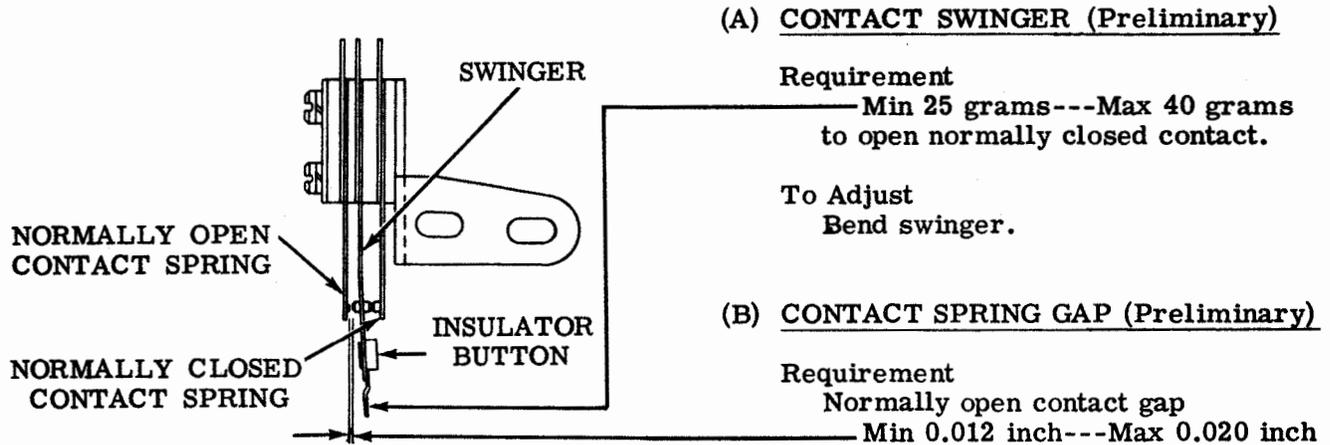
**(C) RESET BAIL TRIP LEVER SPRING**

To Check  
 Disengage both clutches. Trip function clutch by pivoting main trip lever counterclockwise. Hold reset bail trip lever up against reset bail.

Requirement  
 Min 18 oz---Max 24 oz  
 to pull spring to installed length.

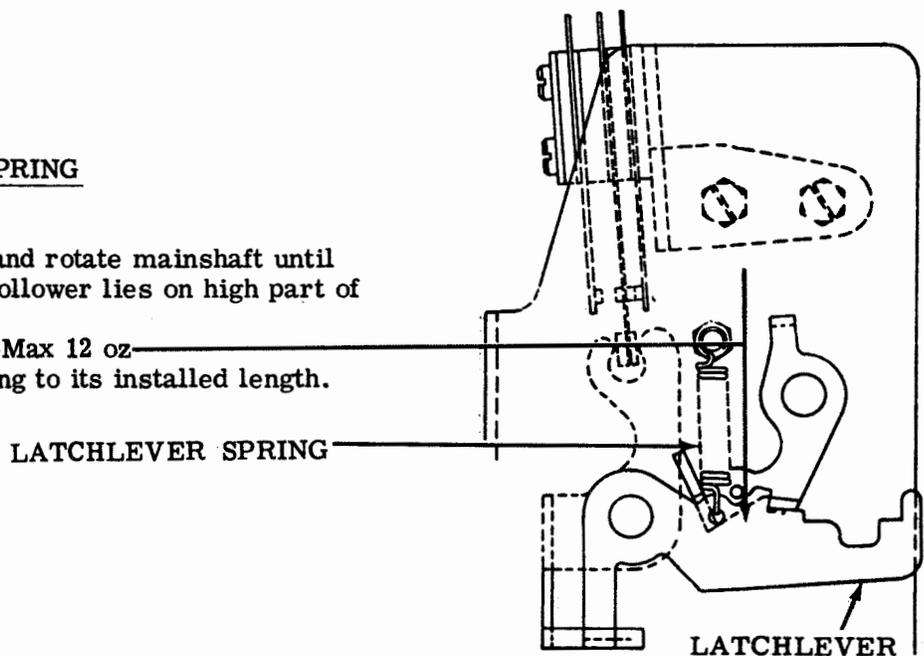


3.13 End of Feed-Out Contacts for Noninterfering RUBOUT Tape Feed-Out Mechanism



LATCHLEVER SPRING

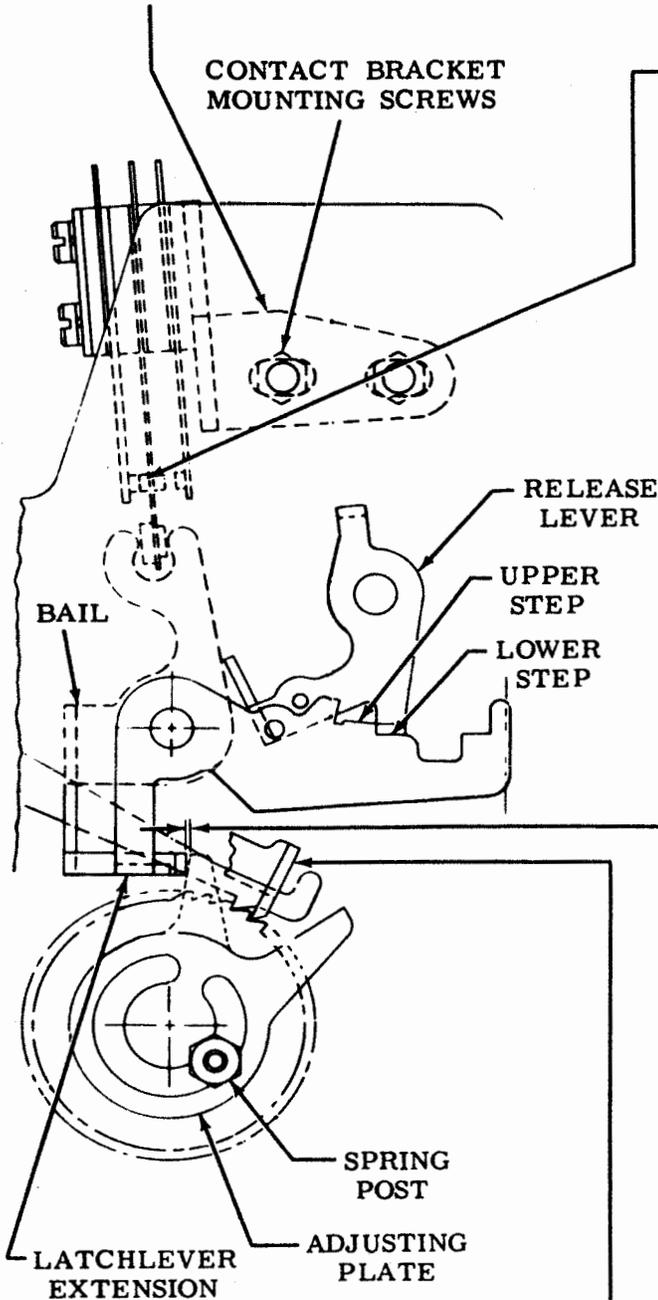
Requirement  
Trip selector and rotate mainshaft until  
stripper cam follower lies on high part of  
its cam  
Min 9 oz---Max 12 oz  
to stretch spring to its installed length.



3.14 End of Feed-Out Contacts for Noninterfering RUBOUT Tape Feed-Out Mechanism (continued)

Note: See preliminary contact adjustments, 3.13.

CONTACT ASSEMBLY MOUNTING BRACKET



(D) CONTACT ASSEMBLY MOUNTING BRACKET

- (1) Requirement (Unit in stop position)  
When normally open contacts are used and release lever is above lower step of latchlever  
Min 0.005 inch visible overtravel of swinger after it makes contact with normally open contact.
- (2) Requirement  
When normally closed contacts are used and release lever is on upper step of latchlever, the normally closed contacts should be closed and bail should not exert any force against swinger insulator button.

To Adjust  
Position contacts with bracket mounting screws loosened. Tighten screws.

(E) TAPE LENGTH ADJUSTING PLATE

- (1) Requirement  
With unit in stop position and release lever on lower step of latchlever, manually advance ratchets so that feed pawl is in the front tooth preceding trip off (not in deep tooth of rear ratchet). Hold bail lightly against latchlever extension  
Min 0.002 inch---Max 0.020 inch clearance between adjusting plate and bail.
- (2) Requirement  
When operating under power, unit should feed out correct length of tape.

To Adjust  
Position adjusting plate with spring post loosened. Tighten spring post.

Note: Feed pawl in extreme left position and adjusting plate in dotted position for adjustment (B), CONTACT SPRING GAP (Preliminary) only.

3.15 Manual and Power Drive Backspace Mechanism

(A) BACKSPACE RATCHET

Requirement

Teeth of backspace and feed wheel ratchets to line up (visual alignment). Feed wheel ratchet to be in detented position.

To Adjust

With adjusting clamp mounting screw friction tight, rotate backspace ratchet to meet the requirement. Tighten screw.

(B) BACKSPACE PAWL CLEARANCE

(1) Requirement (Preliminary)

With backspace bellcrank rotated clockwise, the backspace pawl should miss the first tooth by a clearance of  
Min 0.003 inch---Max 0.010 inch  
at point of least clearance.

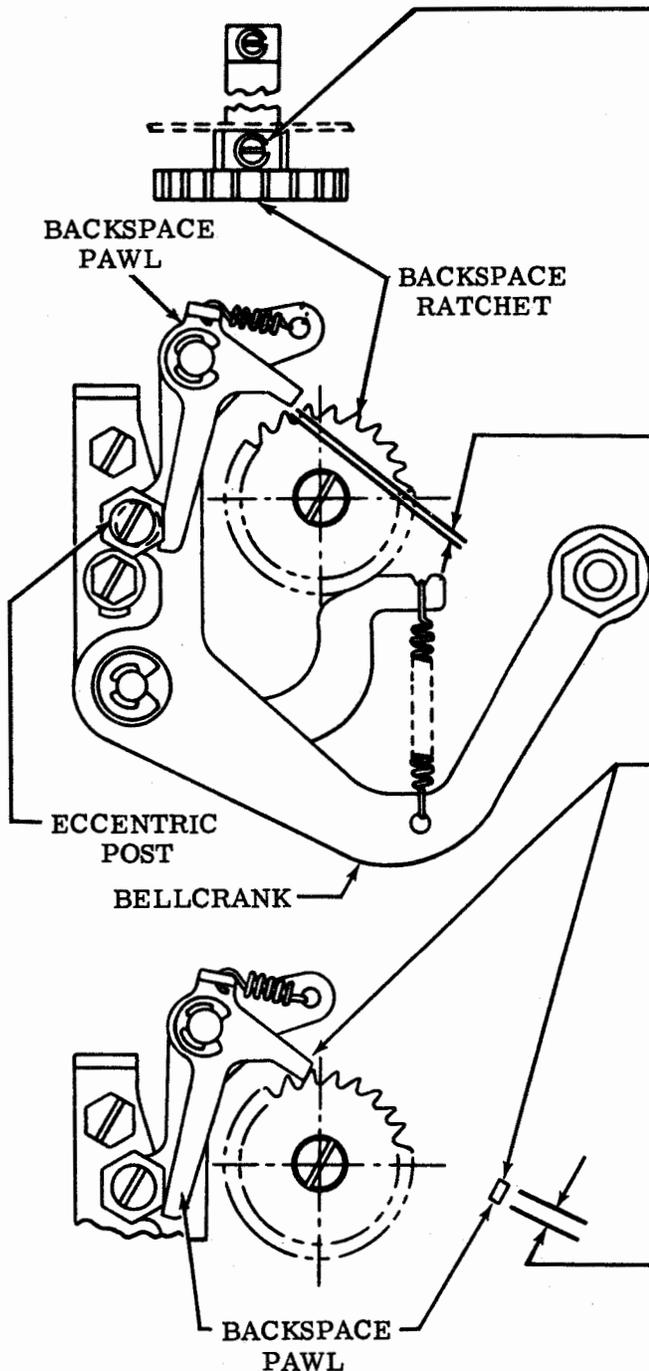
(2) Requirement (Final)

The backspace pawl should miss the first tooth and engage the second tooth by at least 1/2 of the right engaging surface of the backspace pawl (as gauged by eye) when backspace pawl first contacts the ratchet tooth.

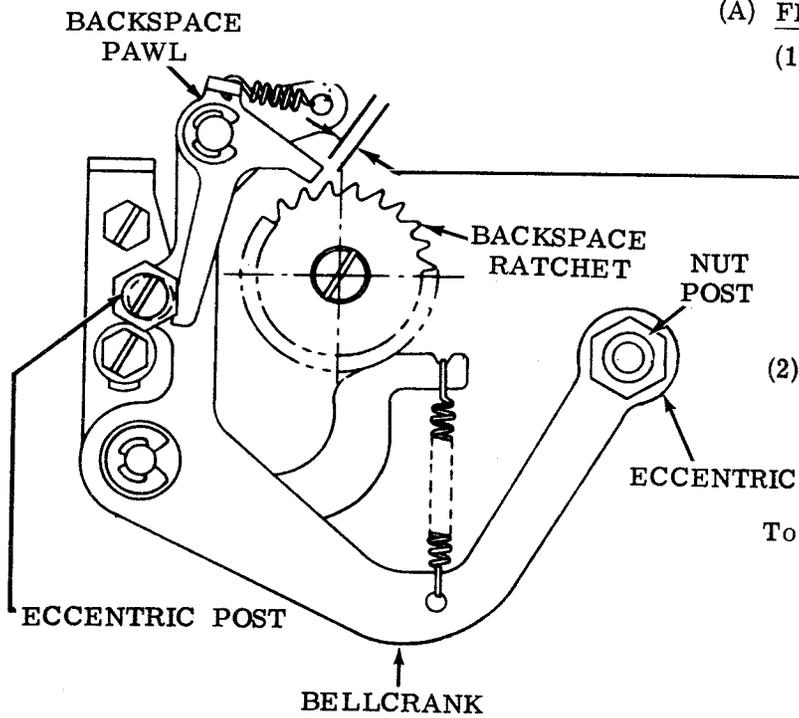
To Adjust

Take up all rotational play of backspace ratchet in relation to feed ratchet by rotating it clockwise at same time rotate bellcrank clockwise. With mounting screw friction tight, rotate eccentric post to meet the requirements. Tighten screw.

Final minimum engagement:  
1/2 of surface with second  
ratchet tooth at first point  
of contact.



3.16 Manual and Power Drive Backspace Mechanism (continued)



(A) FEED PAWL ECCENTRIC (Preliminary)

- (1) Requirement (Manual Backspace)  
With the backspace bellcrank assembly in its operated position and the feed wheel detented back one space. Min some---Max 0.003 inch clearance between the backspace ratchet tooth and the backspace feed pawl with all the rotational play of the backspace ratchet taken up in a direction to make the clearance maximum.
- (2) Requirement (Power Drive Backspace)  
With the backspace bellcrank assembly in its operated position, the high side of the eccentric should be in its uppermost position.

To Adjust

Loosen the nut post (friction tight) and rotate the eccentric with a hex wrench. Tighten the nut post.

(B) ARMATURE HINGE (Early Design)

Requirement

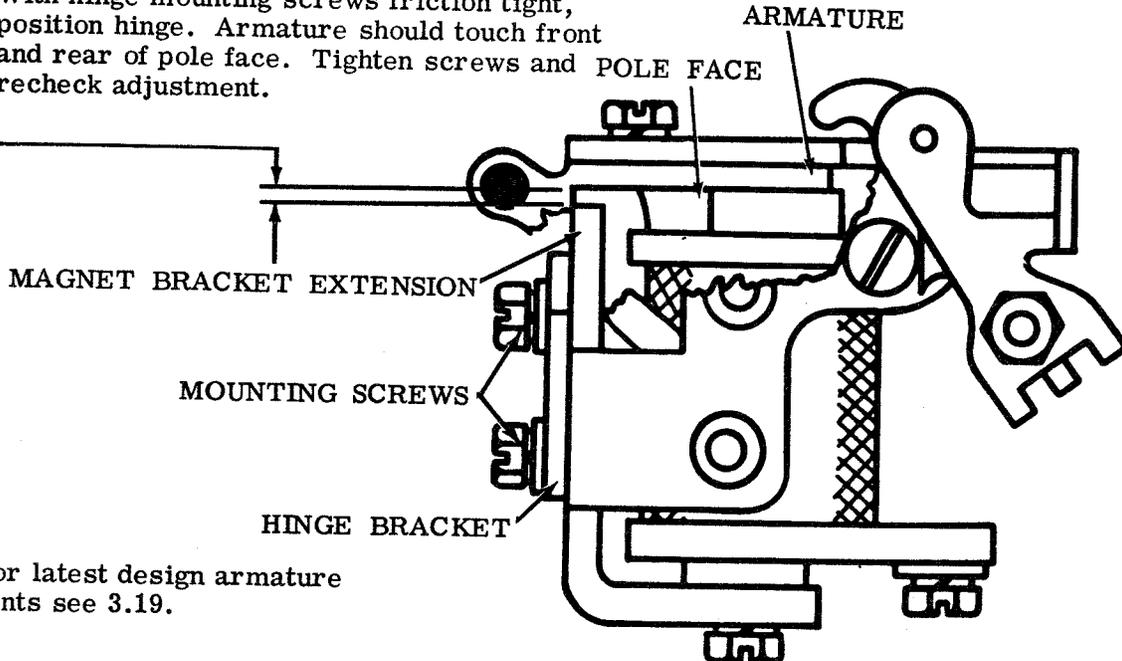
With armature bail spring removed, armature held against the pole face, take up play at hinge in a downward direction. Clearance between the armature and magnet bracket.

Min some---Max 0.004 inch

To Adjust

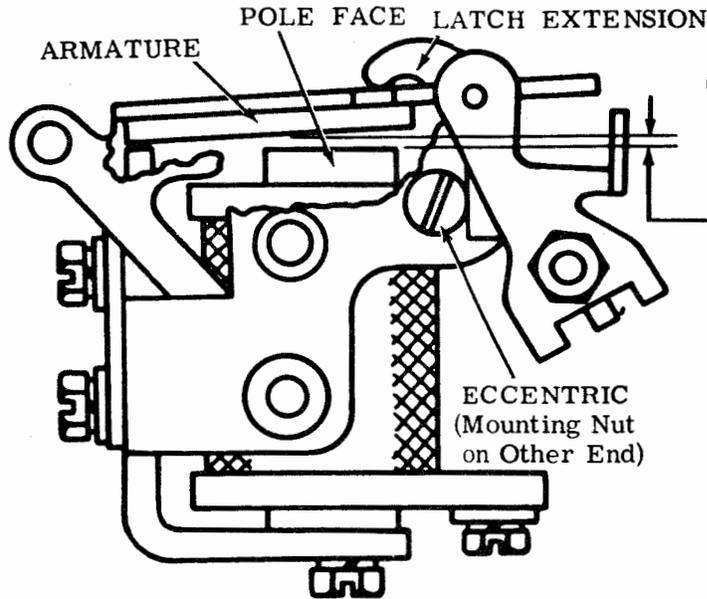
With hinge mounting screws friction tight, position hinge. Armature should touch front and rear of pole face. Tighten screws and recheck adjustment.

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.



Note: For latest design armature adjustments see 3.19.

3.17 Power Drive Backspace Mechanism (continued)



(A) ARMATURE UPSTOP (Early Design)

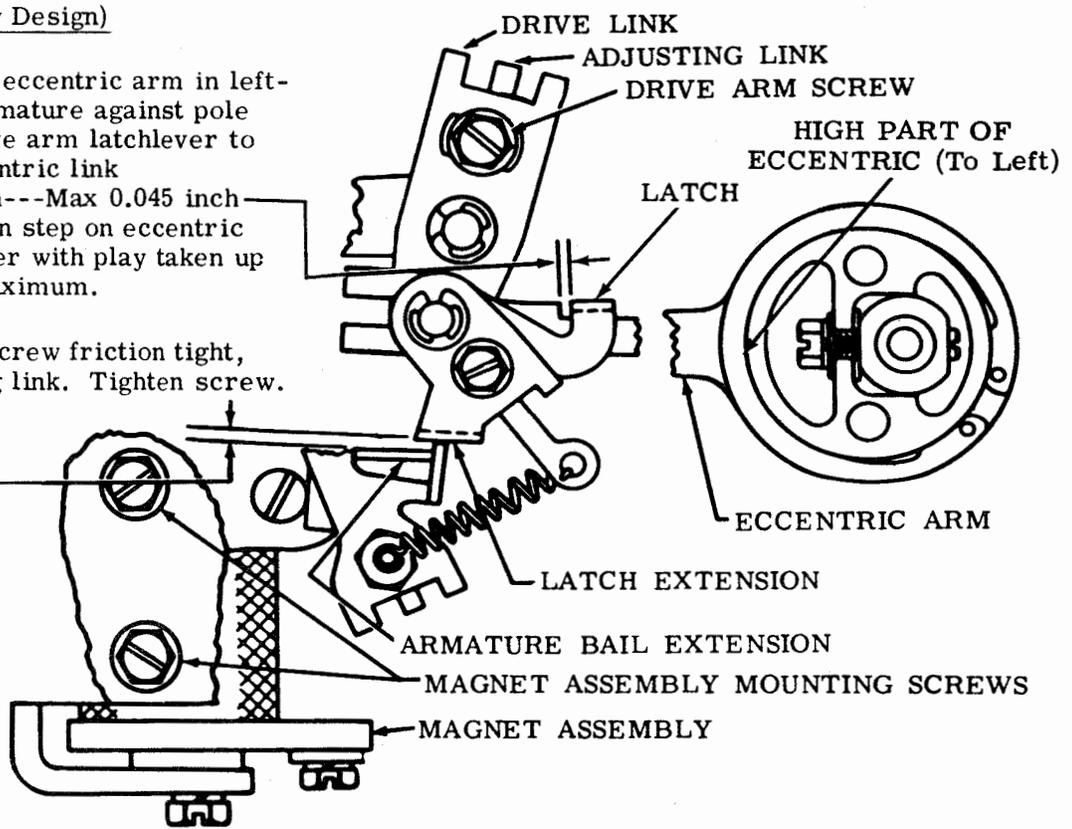
Requirement  
 Armature in unoperated position.  
 Gap between armature and pole face  
 Min 0.025 inch---Max 0.030 inch  
 at closest point.

To Adjust  
 Rotate eccentric with mounting nut  
 loosened. Keep high part of eccentric  
 to left. Tighten nut.

(B) DRIVE LINK (Early Design)

Requirement  
 With high part of eccentric arm in left-  
 hand position, armature against pole  
 face to allow drive arm latchlever to  
 rest against eccentric link  
 Min 0.040 inch---Max 0.045 inch  
 clearance between step on eccentric  
 arm and latchlever with play taken up  
 to make gap a maximum.

To Adjust  
 With drive arm screw friction tight,  
 position adjusting link. Tighten screw.

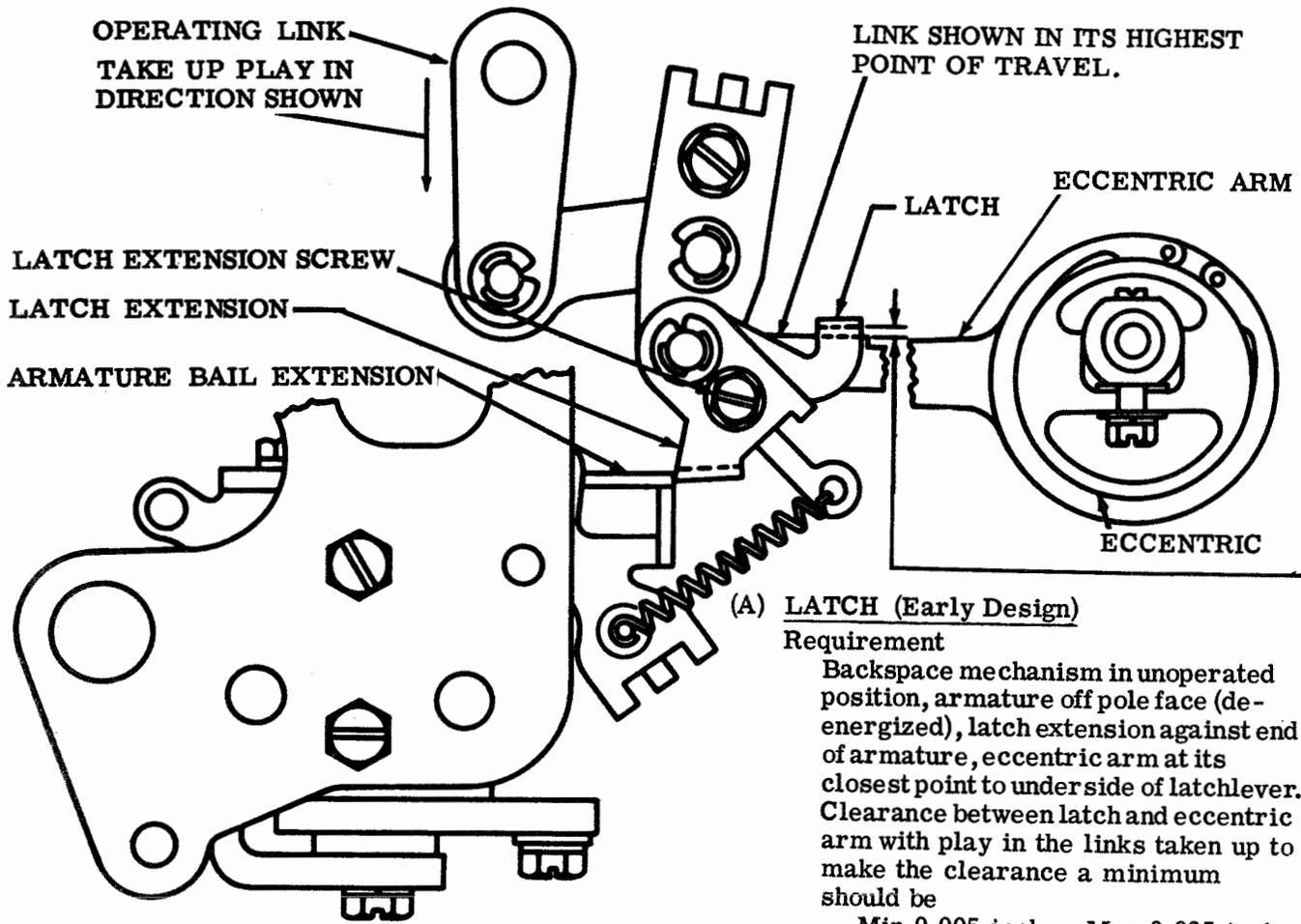


(C) LATCH EXTENSION (Early Design)

Requirement  
 With backspace mechanism in unoperated position, eccentric high part at the left, armature  
 against the pole face, latch resting on the eccentric arm notch, clearance between top of  
 armature bail extension and latch extension  
 Min 0.005 inch---Max 0.020 inch

To Adjust  
 With magnet assembly mounting screws friction tight, swing magnet left or right.  
 Tighten screws.

3.18 Power Drive Backspace Mechanism (continued)



(A) LATCH (Early Design)

Requirement

Backspace mechanism in unoperated position, armature off pole face (de-energized), latch extension against end of armature, eccentric arm at its closest point to under side of latchlever. Clearance between latch and eccentric arm with play in the links taken up to make the clearance a minimum should be

Min 0.005 inch---Max 0.025 inch---

To Adjust

With latch extension screw friction tight, position latch. Tighten screw.

(B) NONREPEAT ARM (Early Design)

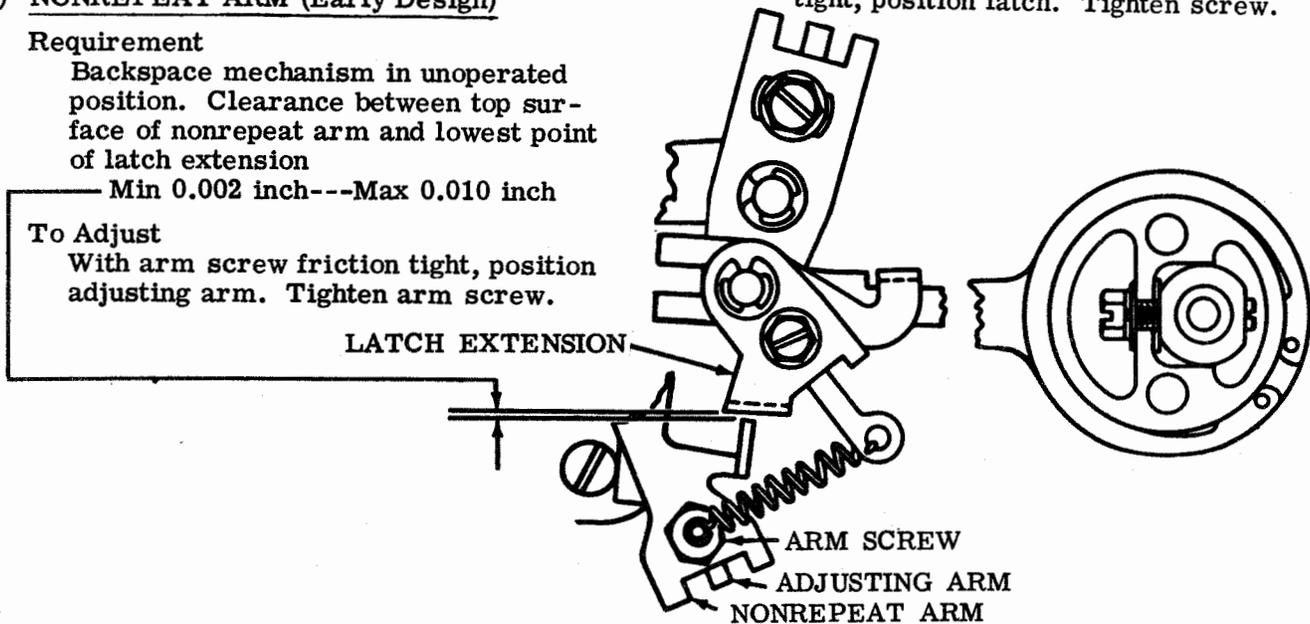
Requirement

Backspace mechanism in unoperated position. Clearance between top surface of nonrepeat arm and lowest point of latch extension

Min 0.002 inch---Max 0.010 inch

To Adjust

With arm screw friction tight, position adjusting arm. Tighten arm screw.



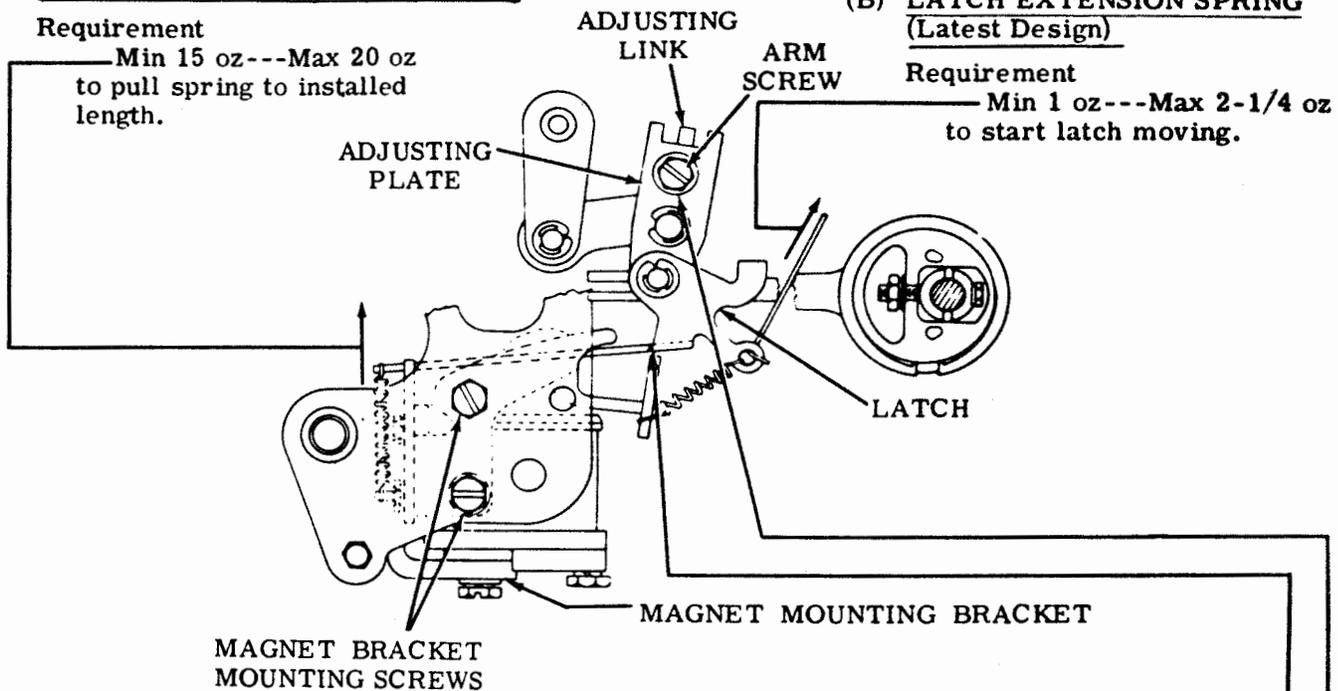
3.19 Power Drive Backspace Mechanism (continued)  
(Nonadjustable Backspace Magnet Assembly)

**Note 1:** For early design adjustable magnet assembly see 3.16.

(A) ARMATURE SPRING (Latest Design)

**Requirement**

Min 15 oz---Max 20 oz  
to pull spring to installed  
length.



(B) LATCH EXTENSION SPRING (Latest Design)

**Requirement**

Min 1 oz---Max 2-1/4 oz  
to start latch moving.

(C) MAGNET POSITION (Latest Design)

**Requirement**

The armature extension should engage the latch by approximately its full thickness when the magnet is de-energized.

**To Adjust**

Position the magnet assembly by means of its mounting screws. Tighten screws.

(D) FINAL MANUAL OR POWER ADJUSTMENT (Latest Design)

**Note 2:** This is the final adjustment for all backspace mechanisms, manual or power drive, regardless of the type of unit.

(1) **Requirement**

With tape in the unit, place the feed wheel shaft oil hole in its uppermost position; operate the backspace mechanism once. The ratchet wheel should be backed one space into a fully detented position.

**Note 3:** A fully detented position is defined as: With the detent roller in contact with the ratchet wheel the punch unit feed pawl should engage the first tooth below the horizontal centerline of the feed wheel ratchet with no perceptible clearance.

(2) **Requirement**

With the unit operating under power, perforate approximately two inches of tape with the RUBOUT combination selected. Backspace twelve characters in succession with the unit still under power. Again perforate approximately two inches of tape with the RUBOUT combination selected. Clipping of the code holes should be held to a minimum and should not exceed more than 0.005 inch, as gauged by eye.

**To Adjust**

On manual operated backspace mechanisms refine the FEED PAWL ECCENTRIC (Preliminary) (3.16) adjustment. On backspace mechanisms equipped with power drive, loosen the arm adjusting screw and position the adjusting plate. Tighten the arm adjusting screw.

3.20 Power Drive Backspace Mechanism (continued)

(A) FEED PAWL SPRING

Requirement

Backspace mechanism in unoperated position.  
Min 4 oz---Max 6 oz  
to start feed pawl moving.

(B) BELLCRANK SPRING

Requirement

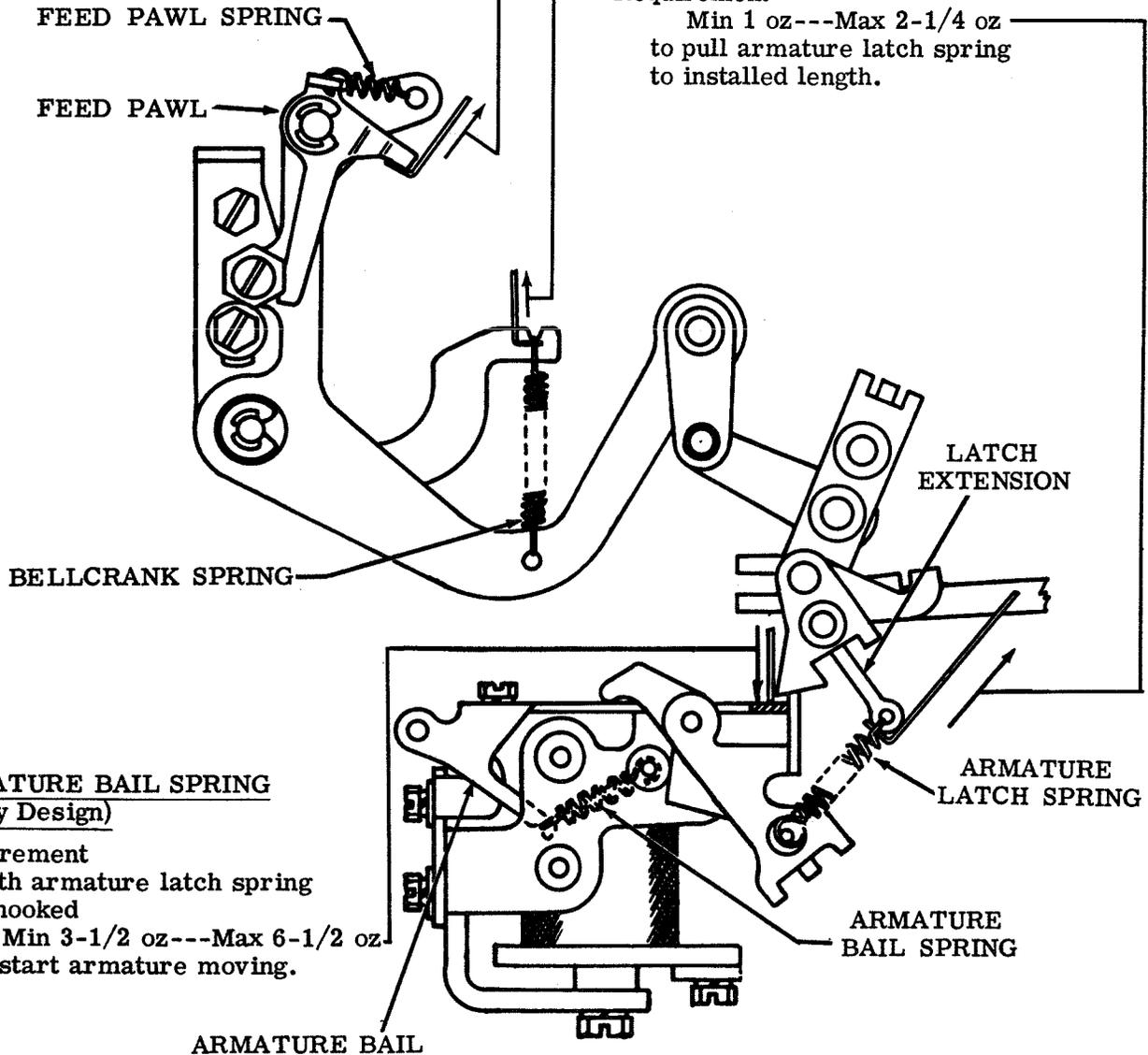
Min 9 oz---Max 12 oz  
to pull spring to installed length.

(C) ARMATURE LATCH SPRING  
(Early Design)

Requirement

Min 1 oz---Max 2-1/4 oz  
to pull armature latch spring  
to installed length.

Note: All spring tensions should be taken with the mechanism in unoperated position.



(D) ARMATURE BAIL SPRING  
(Early Design)

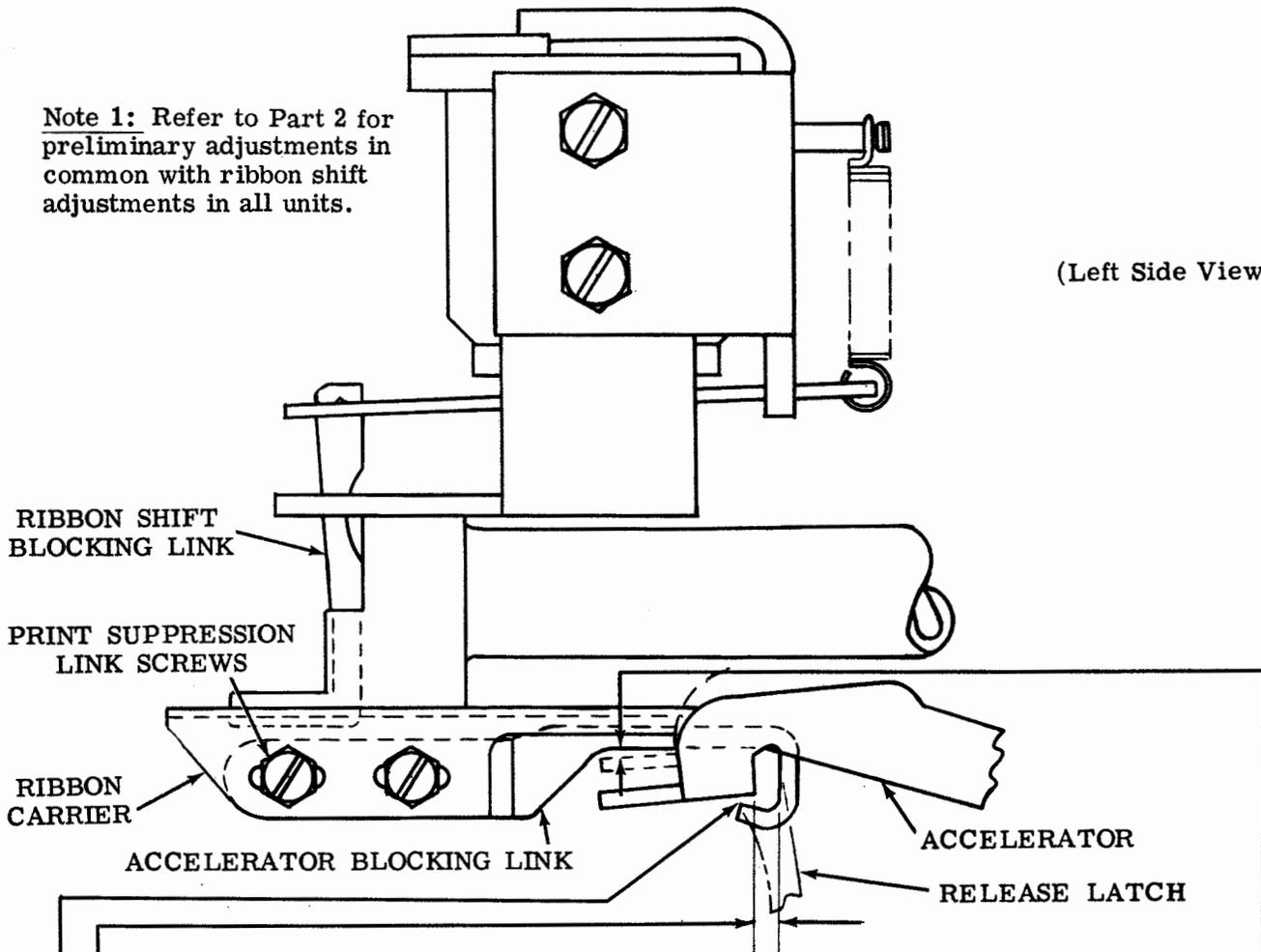
Requirement

With armature latch spring  
unhooked  
Min 3-1/2 oz---Max 6-1/2 oz  
to start armature moving.

## 3.21 Print Suppression Mechanism

Note 1: Refer to Part 2 for preliminary adjustments in common with ribbon shift adjustments in all units.

(Left Side View)



ACCELERATOR BLOCKING LINK (Latest Design)

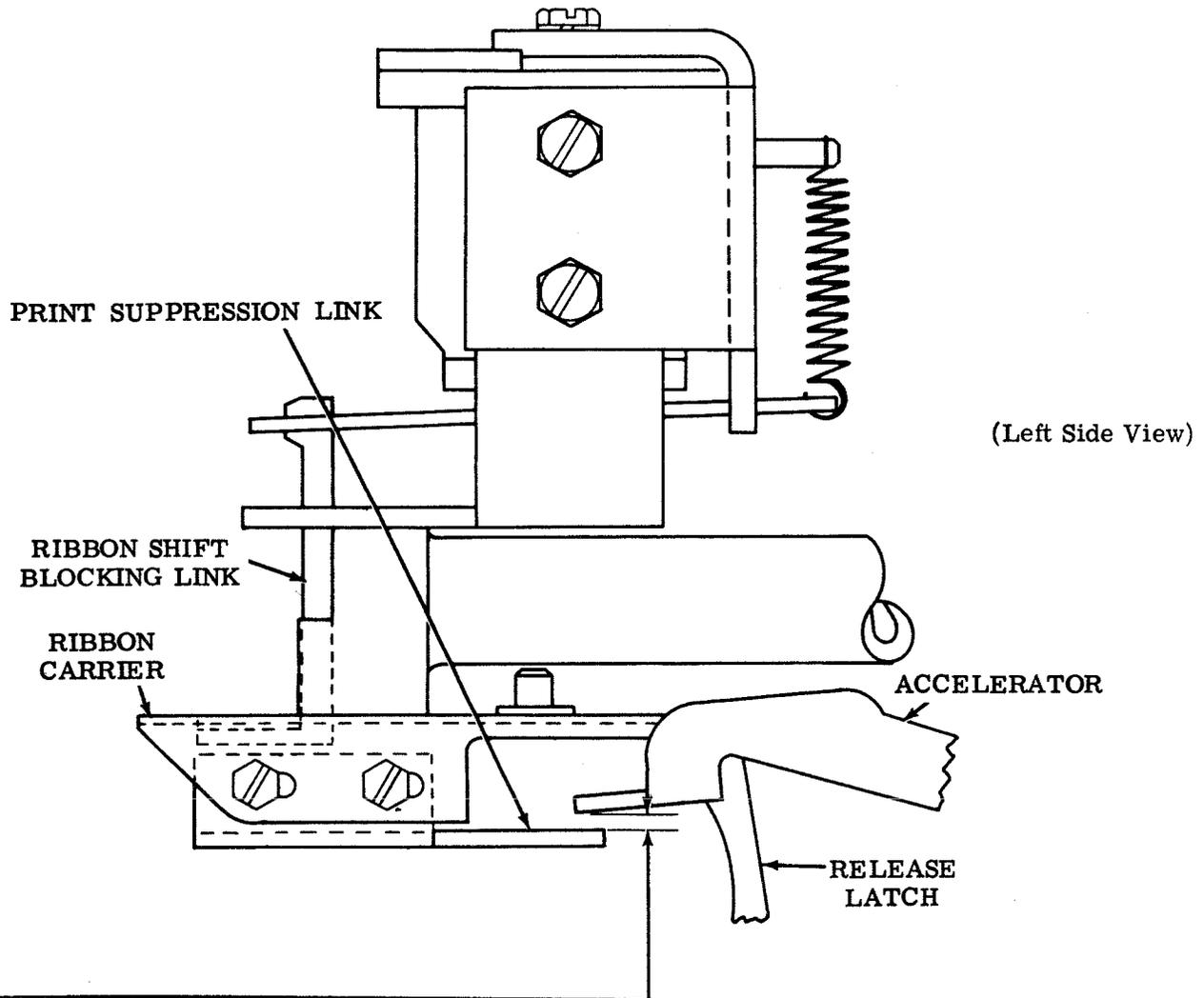
- (1) Requirement  
With the rocker bail in the extreme left position, there should be  
Min 0.075 inch---Max 0.095 inch  
clearance between the accelerator lever and the accelerator blocking link.
- (2) Requirement  
With the unit in the stop position, there should be  
Min some  
clearance between the top surface of the accelerator and the blocking link.
- (3) Requirement  
With the ribbon shift magnet armature resting against its upstop screw and  
when the mainshaft is rotated through a complete revolution, there should be  
Min some  
clearance between the accelerator and blocking link at its closest point.

**To Adjust**

Loosen the two screws which mount the accelerator blocking link and position the link both horizontally and vertically to meet the requirements. Tighten screws.

3.22 Print Suppression Mechanism (continued)

Note 1: Refer to Part 2 for preliminary adjustments in common with ribbon shift adjustments in all units.



Note 2: The following adjustment pertains to units that block the ribbon carrier when the shift magnet armature is held attracted.

ACCELERATOR BLOCKING LINK (Early Design)

**Requirement**

Function clutch tripped and mainshaft rotated until print hammer trip lever just touches print release latch. There should be

Min 0.020 inch---Max 0.030 inch clearance between the upper surface of the print suppression link and the lower surface of the print hammer accelerator.

**To Adjust**

Position the print suppression link all the way to the rear of the slots on the ribbon carrier. Position link in vertical direction with mounting screws loosened to meet requirement. Tighten screws.

## 3.23 Print Suppression Mechanism (continued)

CONTROL LEVER (Manual)

## (1) Requirement

There should be a clearance of  
Min 0.015 inch

between the print suppress lever and the print hammer when  
the lever extension is in the print position (down).

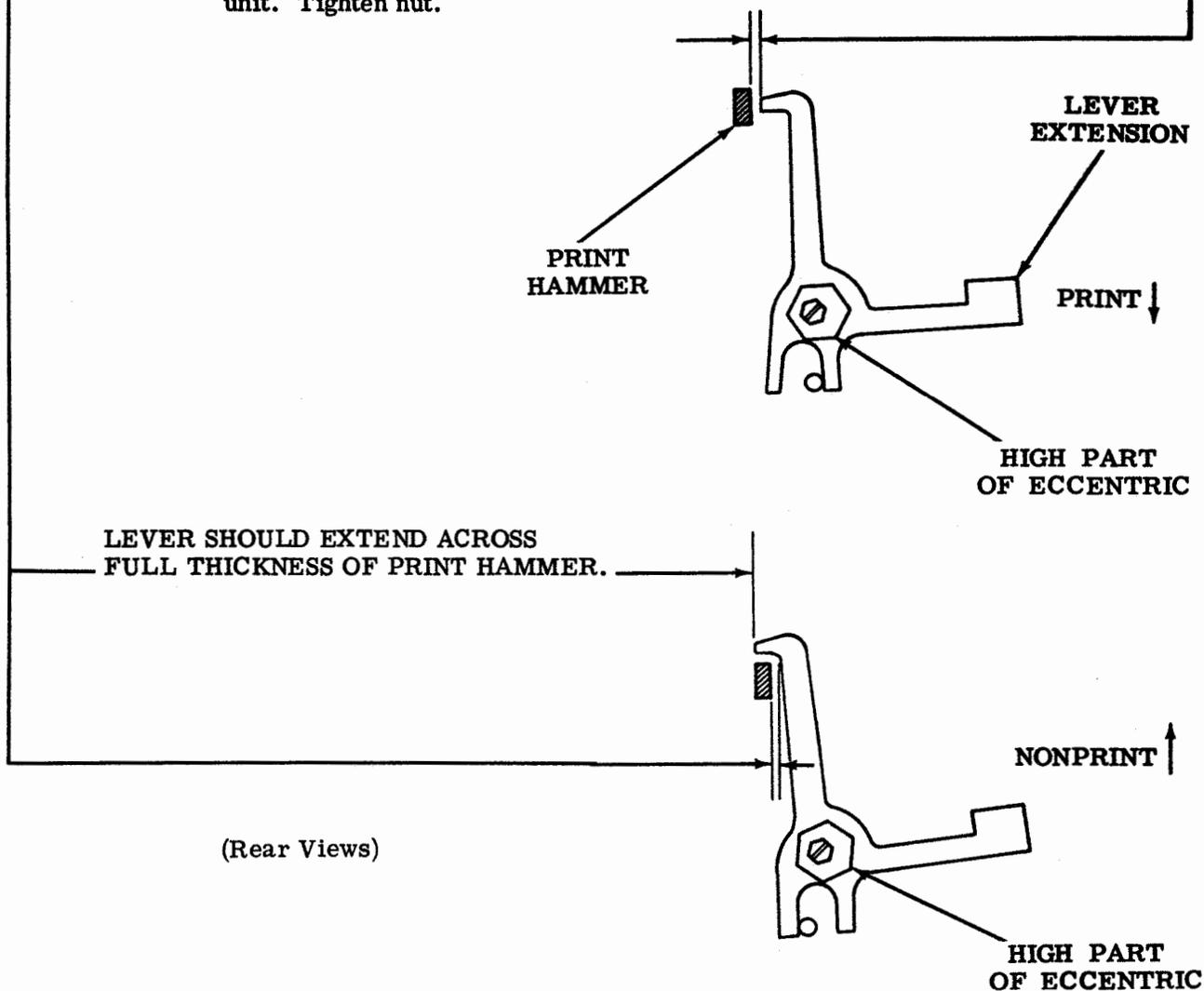
## (2) Requirement

When the lever extension is in the nonprint position (up), the  
blocking extension should extend across the full thickness  
of the print hammer with a clearance of

Min 0.015 inch  
at the side of the print hammer.

**To Adjust**

Loosen the eccentric bushing mounting nut and position the bushing  
until the requirements are met. The high part of the eccentric  
should be down and to the right as viewed from the rear of the  
unit. Tighten nut.



(Rear Views)

3.24 Signal Bell and EOT Contacts

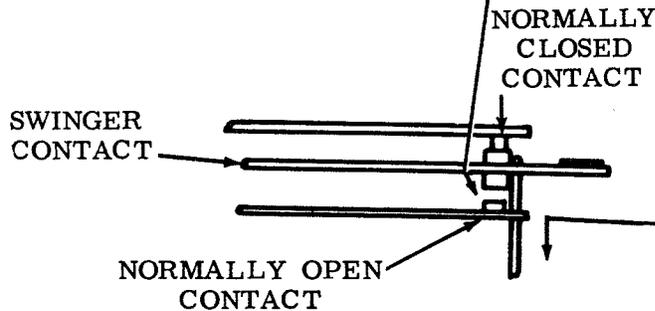
Note 1: The following adjustments should be made prior to installing the contact bracket assembly on unit.

(A) NORMALLY OPEN CONTACT GAP

Requirement  
 Min 0.008 inch---Max 0.015 inch  
 To Adjust  
 Bend normally open contact spring.

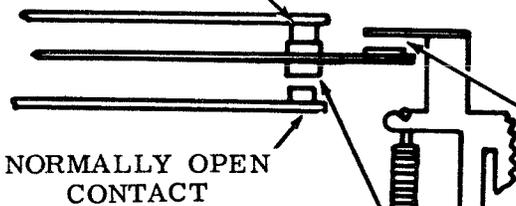
(B) NORMALLY CLOSED CONTACT

Requirement  
 Min 8 grams---Max 15 grams  
 to move the swinger contact away from the normally closed contact.  
 To Adjust  
 Bend normally closed contact spring.



Note 2: The following adjustments should be made after the contact bracket assembly is mounted to the unit.

NORMALLY CLOSED CONTACT



(C) NORMALLY OPEN CONTACT GAP

- (1) Requirement  
 With the function blade in its lowest position in the nonselected condition, clearance between the contact swinger insulator button and the function blade  
 Min some
- (2) Requirement  
 Contact gap  
 Min 0.008 inch---Max 0.015 inch

To Adjust  
 Bend normally closed contact spring.

- (3) Requirement  
 With the function blade in its lowest position in the selected condition, gap between the swinger contact and normally closed (now open) contact  
 Min 0.015 inch  
 and some overtravel of the normally open contact.

To Adjust  
 Bend normally closed contact spring. Refine previous adjustments to maintain requirements.

