37 NON-TYPING REPERFORATOR

ADJUSTMENTS

CONTENTS PAGE

Prepared for American Telephone and Telegraph Company by Teletype Corporation

CONTENTS PAGE

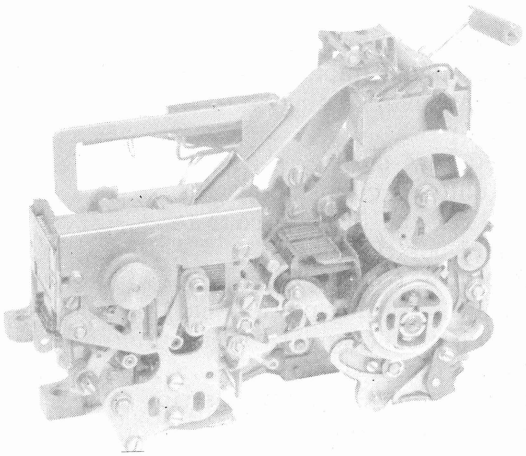


Figure 1 - 37 Non-Typing Reperforator

CONTENTS PAGE

1. GENERAL

1.01 This section provides adjustments for the 37 non-typing reperforator unit (Figure 1). It is reissued to change some testing requirements. Arrows in the margins indicate changes.

1.02 References to left or right, front or rear, and up or down refer to the reperforator in a normal operating position with the selector mechanism on the right and the function mechanism on the left.

1.03 Tools required to make the adjustments and test the spring tensions are listed in Section 570-005-800. 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.

1.04 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).

CAUTION: APPARATUS SHOULD NOT BE REMOVED FROM ITS PROTECTIVE HOUSING UNLESS POWER IS DISCONNECTED. WHERE OPERATION OF THE EQUIPMENT IS REQUIRED AFTER IT HAS BEEN REMOVED FROM ITS PROTECTIVE HOUSING, APPROPRIATE PRECAUTIONARY MEASURES SHOULD BE TAKEN TO PREVENT ACCIDENTS.

1.05 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 main shaft 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.

1.06 To manually operate the reperforator, proceed as follows:

(a) Attach the 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 main shaft in a counterclockwise direction until all the clutches are brought to their disengaged position.

(c) Fully disengage the clutches in accordance with 1.05, 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 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 main shaft until all operations initiated by the selector action clear through the unit.

1.07 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 pile-ups can be replaced when the part is remounted. When parts removed are replaced, related adjustments which may have been affected should be checked.

1.08 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.

1.09 The spring tensions specified are indications and not exact values. Therefore, to obtain reliable readings it is important that spring tensions be measured by spring scales placed in the positions shown in the drawings.

Note: Use only spring scales found in Maintenance Tools, Section 570-005-800.

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 per cent 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 Gold-plated contacts are used in this equipment. The recommended cleaning interval for gold-plated contacts in special low-level applications (less than 250 microwatts and having an average weekly used of 60 hours) should not exceed 90 days. This interval may be reduced dependent on the signal circuit configuration, usage, and environment.

1.12 Use twill jean cloth (KS2423) to clean gold-plated contacts. Do not use burnishers, files, etc which will remove the gold plating.

CAUTION: DO NOT USE GOLD-PLATED CONTACTS ALTERNATELY IN HIGH- AND LOW-LEVEL CIRCUITS BECAUSE HIGH-LEVEL OPERATION MAY DAMAGE THE GOLD PLATING AND IMPAIR THE CONTACTS USED IN LOW-LEVEL CIRCUITS.

1.13 The reperforator is normally used as a component of an automatic send-receive teletypewriter set and is mounted onto a base inside a cabinet. When assembling the reperforator onto its base in a cabinet, gear mesh and possibly other installation type adjustments are required. Refer to Section 574-329-700 for installation type adjustments.

1.14 The adjustments are arranged in a sequence which should be followed if a complete readjustment of the reperforator is undertaken. In some cases, the sequence that should be followed is indicated by the letters (A), (B), (C), etc. No single adjustment should be undertaken without first completely understanding the procedure and knowing the requirement. Therefore, read a procedure all the way through before as a first step. If one adjustment is changed, related adjustments should be checked.

CAUTION: REMOVE POWER BEFORE MAKING ANY ADJUSTMENTS.

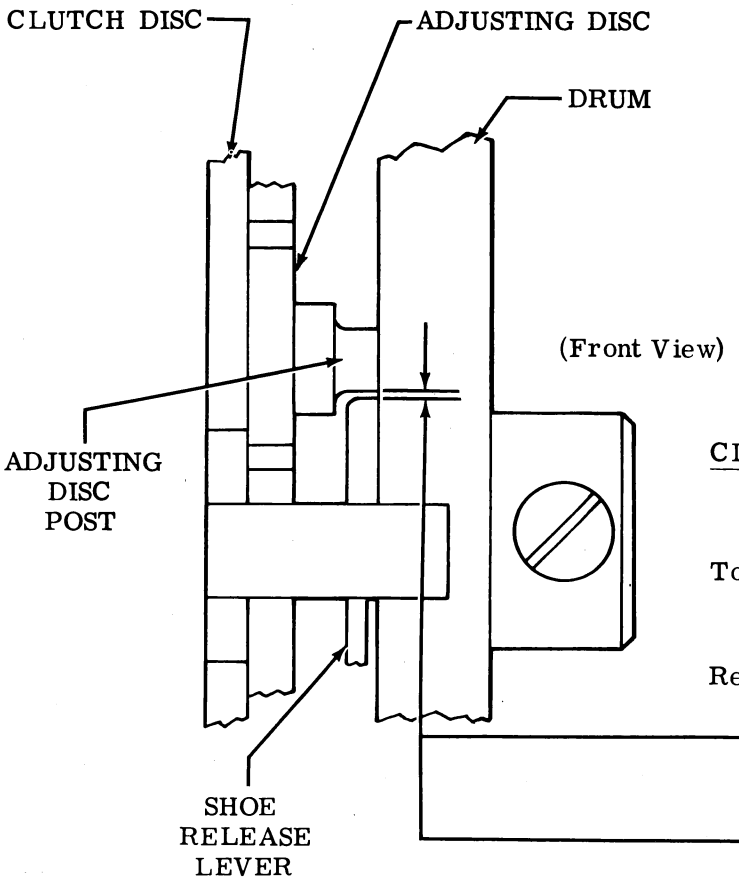
1.15 In the adjustment procedures, the location of clearances and the position of parts are illustrated by line drawings. Requirements and procedures are presented in the several texts accompanying the drawings.

1.16 When a procedure calls for using pry points or slots to make an adjustment, place a screwdriver between the points or in the slots and pry parts in the proper direction.

1.17 Unless specifically stated otherwise, make screws or nuts friction tight to make an adjustment and tighten them securely once the adjustment is made.

2. BASIC UNIT

2.001 Selector Mechanism and Function Mechanism



Note 1: BIDREC means bidirectional regenerative clutch.

CLUTCH "BIDREC" GAP

Note 2: The following requirement applies to all reperforator clutches.

To Check

Engage clutch. Check gap between adjusting disc post and shoe lever.

Requirement

Less than 100 reperforator operational hours
Min 0.002 inch---Max 0.015 inch between adjusting disc post and shoe lever.

More than 100 reperforator operational hours
Min 0.002 inch---Max 0.020 inch between adjusting disc post and shoe lever.

To Adjust

Replace clutch shoes and/or drum.

2.01 Selector Mechanism and Function Mechanism (continued)

(A) CLUTCH SHOE LEVER

Note: This adjustment should be made for both selecting and function clutches.

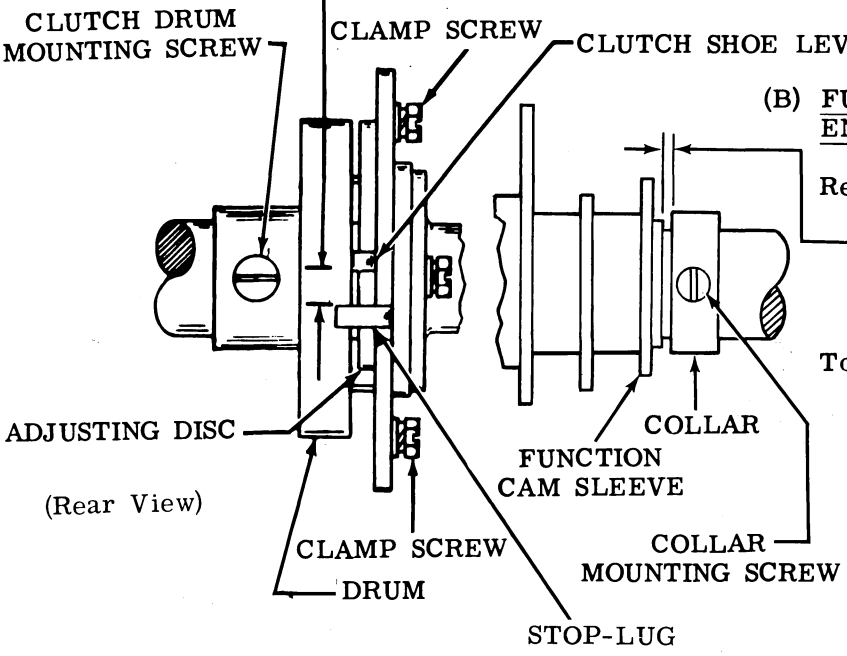
(1) To Check
Disengage clutch. Measure clearance.

(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
Loosen clamp screws. Engage wrench or screwdriver with lug on adjusting disc. Rotate disc. Tighten screws.

Note: On multiple-stop clutches, measure the clearance on the side where the adjusting disc post is located. See CLUTCH "BIDREC" GAP (2.001) adjustment.



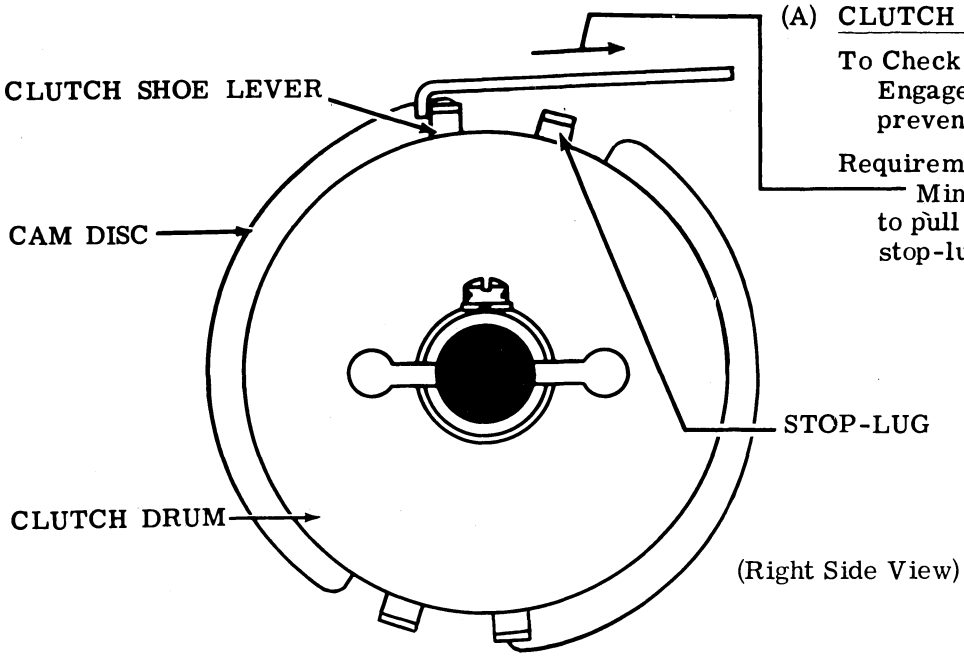
(B) FUNCTION CLUTCH DRUM ENDPLAY

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

2.02 Selector Mechanism and Function Mechanism (continued)

Note: These spring tensions apply to both clutches.

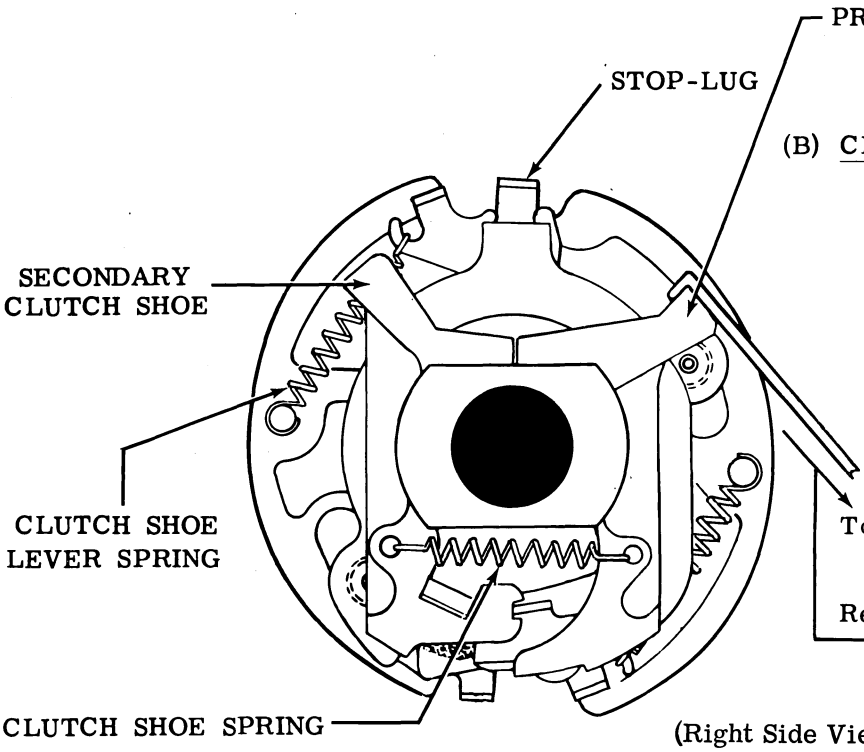


(Right Side View)

(A) CLUTCH SHOE LEVER SPRING

To Check
Engage clutch. Hold cam disc to prevent its turning.

Requirement
Min 16 oz---Max 22 oz to pull shoe lever in contact with stop-lug.



(Right Side View)

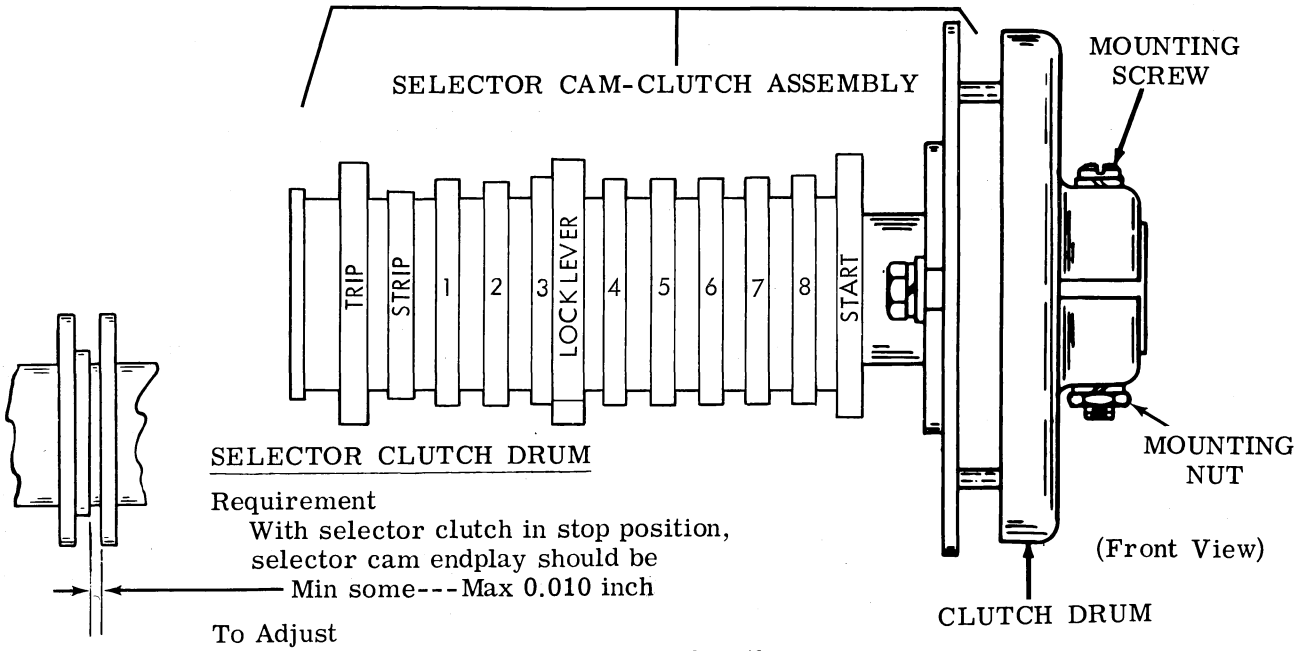
(B) CLUTCH SHOE SPRING

Note: In order to check this spring tension, it is necessary to remove the clutch from the mainshaft. Therefore, it should not be checked unless there is reason to believe it will not meet its requirement.

To Check
Remove clutch from drum.

Requirement
Min 3 oz---Max 5 oz to start primary shoe moving.

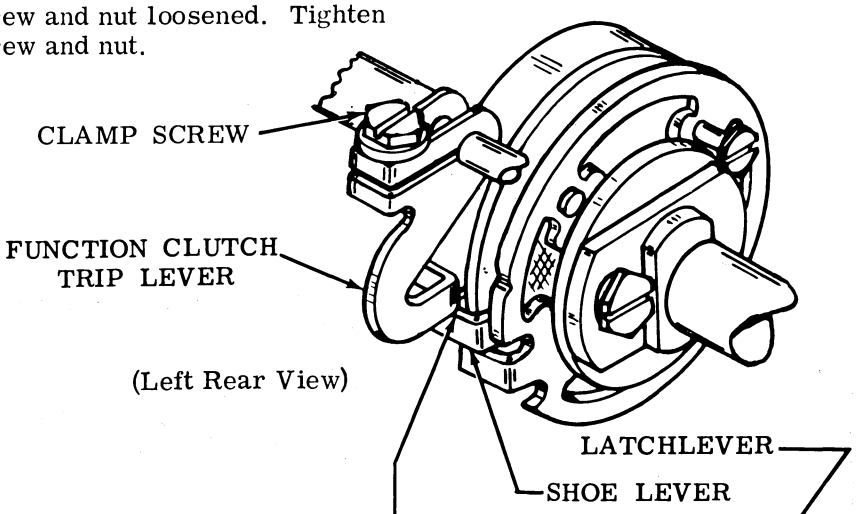
2.03 Selector Mechanism and Function Mechanism (continued)



SELECTOR CLUTCH DRUM

Requirement
With selector clutch in stop position, selector cam endplay should be Min some---Max 0.010 inch

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

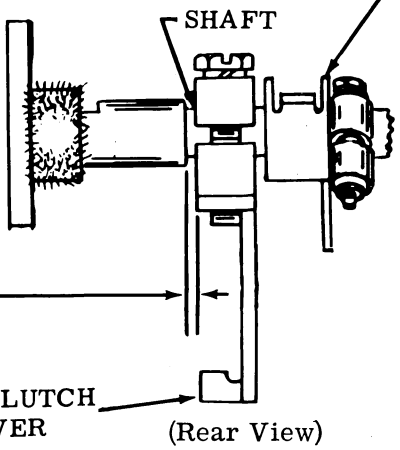


FUNCTION CLUTCH TRIP LEVER

(1) Requirement
With release resting on main trip lever (see 2.13), 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.



2.04 Selector Mechanism

SELECTOR ARMATURE

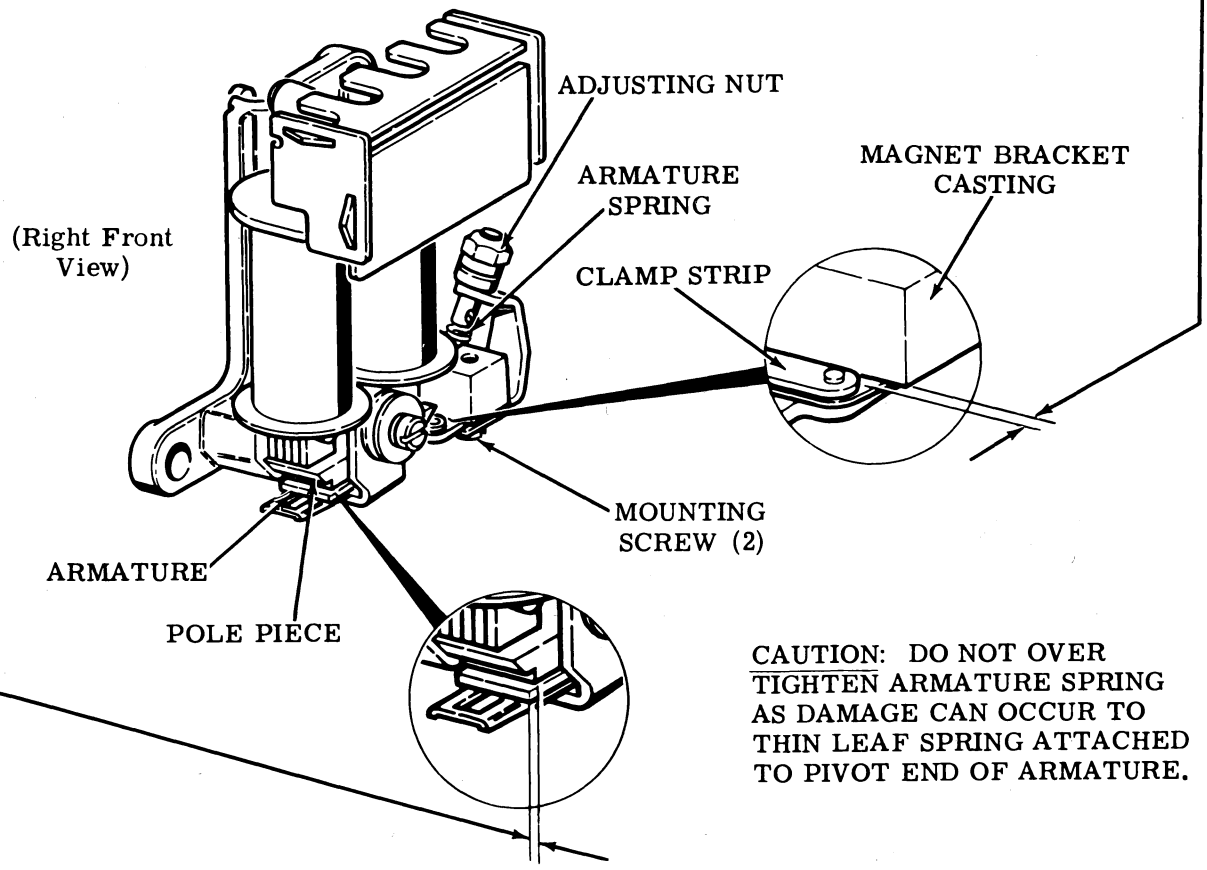
Note 1: This requirement need not be made (nor checked) if SELECTOR MAGNET BRACKET (2.08) and SELECTOR RECEIVING MARGIN (2.12) adjustments are met.

Note 2: To facilitate adjustment, remove rangefinder assembly and selector magnet assembly.

(1) Requirement
Clearance between clamp strip and magnet bracket casting should be
Min 0.025 inch---Max 0.045 inch

(2) Requirement
Alignment of outer edge of armature with outer edge of pole pieces should be
Min flush---Max 0.015 inch

To Adjust
Position adjusting nut to hold armature firmly against pivot edge of casting. (See CAUTION.) Loosen mounting screws and position armature. Replace selector magnet assembly and rangefinder assembly. Tighten mounting screws.



CAUTION: DO NOT OVER TIGHTEN ARMATURE SPRING AS DAMAGE CAN OCCUR TO THIN LEAF SPRING ATTACHED TO PIVOT END OF ARMATURE.

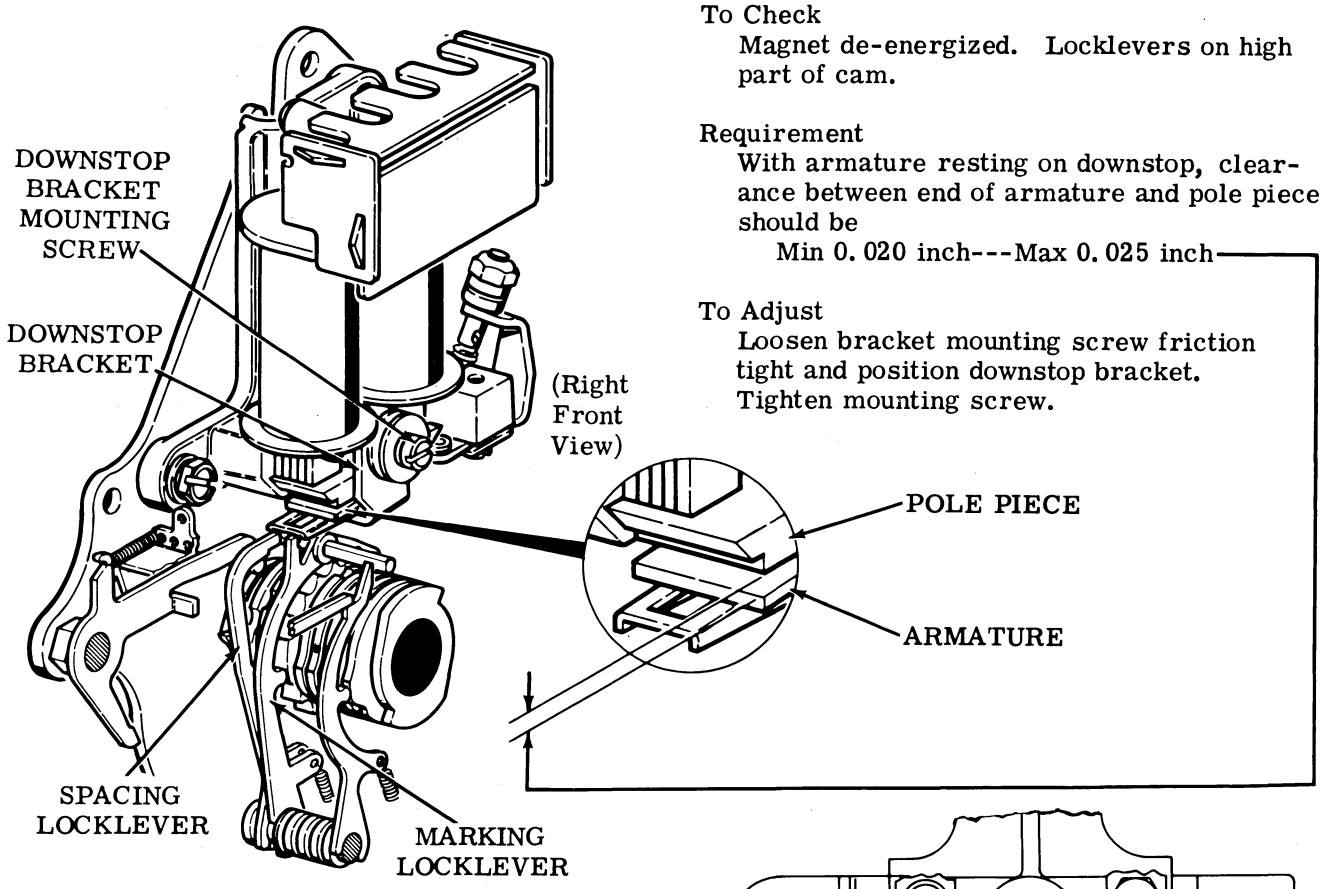
2.05 Selector Mechanism (continued)

SELECTOR ARMATURE DOWNSTOP

To Check
Magnet de-energized. Locklevers on high part of cam.

Requirement
With armature resting on downstop, clearance between end of armature and pole piece should be
Min 0.020 inch---Max 0.025 inch

To Adjust
Loosen bracket mounting screw friction tight and position downstop bracket. Tighten mounting screw.

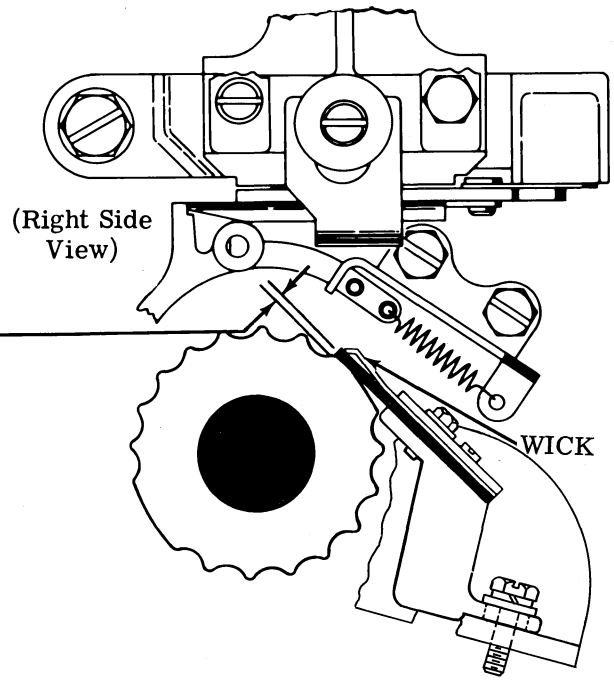


SELECTOR CAM LUBRICATOR

(1) Requirement
Wick should be in contact with high part of selector lever cams but should not be deflected more than
Max 1/32 inch
as gauged by eye.

(2) Requirement
Lubricator tube should clear high part of locklever cam by
Min 0.020 inch

To Adjust
Loosen lubricator mounting screws friction tight. Rotate lubricator about lower screw and tighten mounting screws.



2.06 Selector Mechanism (continued)

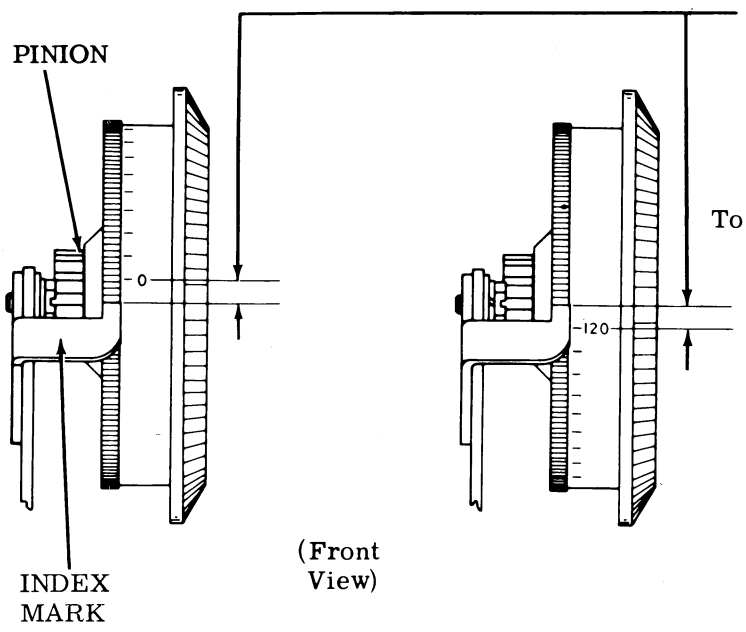
RANGEFINDER KNOB PHASING

Requirement

With rangefinder knob turned to maximum clockwise or counterclockwise position, zero or 120 mark should be approximately opposite of index. Overtravel and undertravel of knob should be approximately equal at each end position.

To Adjust

Rotate rangefinder knob clockwise until rack is stopped by the rack stop. Loosen mounting nut and pull rangefinder knob and pinion from engagement with rack. Position rangefinder knob so that 0 mark is closely aligned with index mark. Re-engage pinion with rack and tighten mounting nut.



SELECTOR CLUTCH STOP ARM

To Check

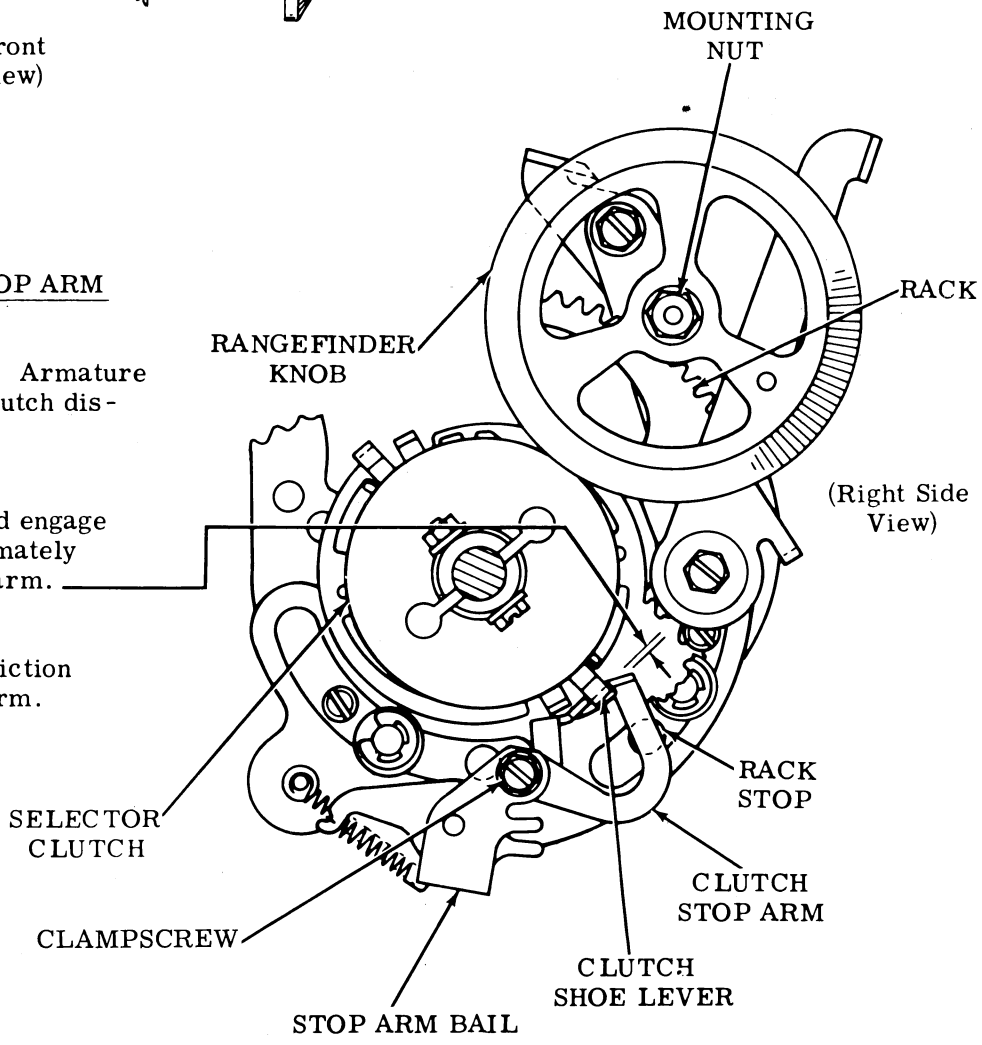
Range scale set at 60. Armature attracted. Selector clutch disengaged.

Requirement

Clutch stop arm should engage shoe lever by approximately full thickness of stop arm.

To Adjust

Loosen clampscrew friction tight. Position stop arm. Tighten clampscrew.



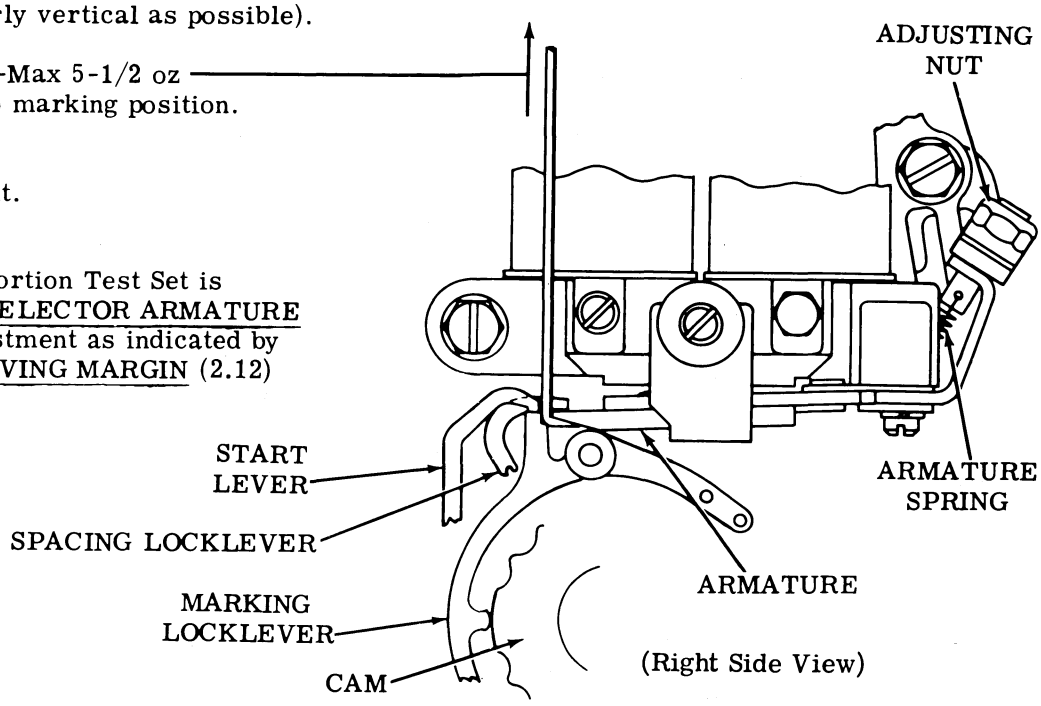
2.07 Selector Mechanism (continued)

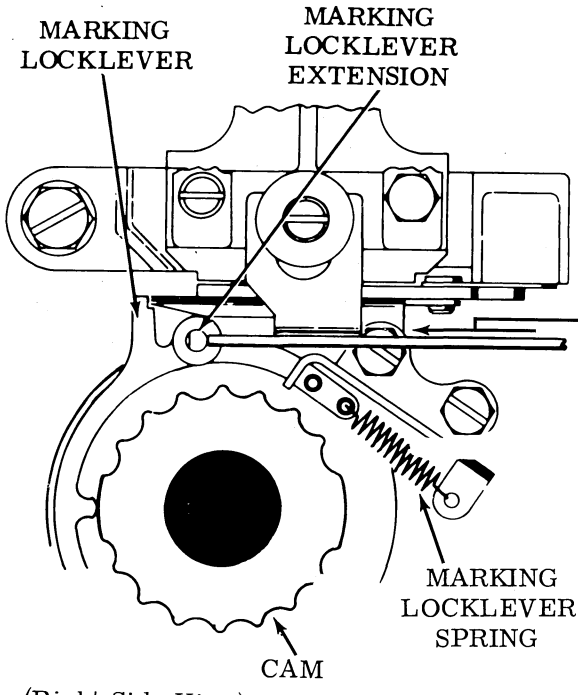
SELECTOR ARMATURE SPRING

Requirement (Preliminary)
With marking locklever, spacing locklever, and start lever on high part of their cams, hook scale under end of armature extension (hold scale as nearly vertical as possible). It should require
Min 4-1/2 oz---Max 5-1/2 oz
to pull armature to marking position.

To Adjust
Rotate adjusting nut.

Requirement (Final)
When a Signal Distortion Test Set is available, refine SELECTOR ARMATURE SPRING (2.07) adjustment as indicated by SELECTOR RECEIVING MARGIN (2.12) adjustment.



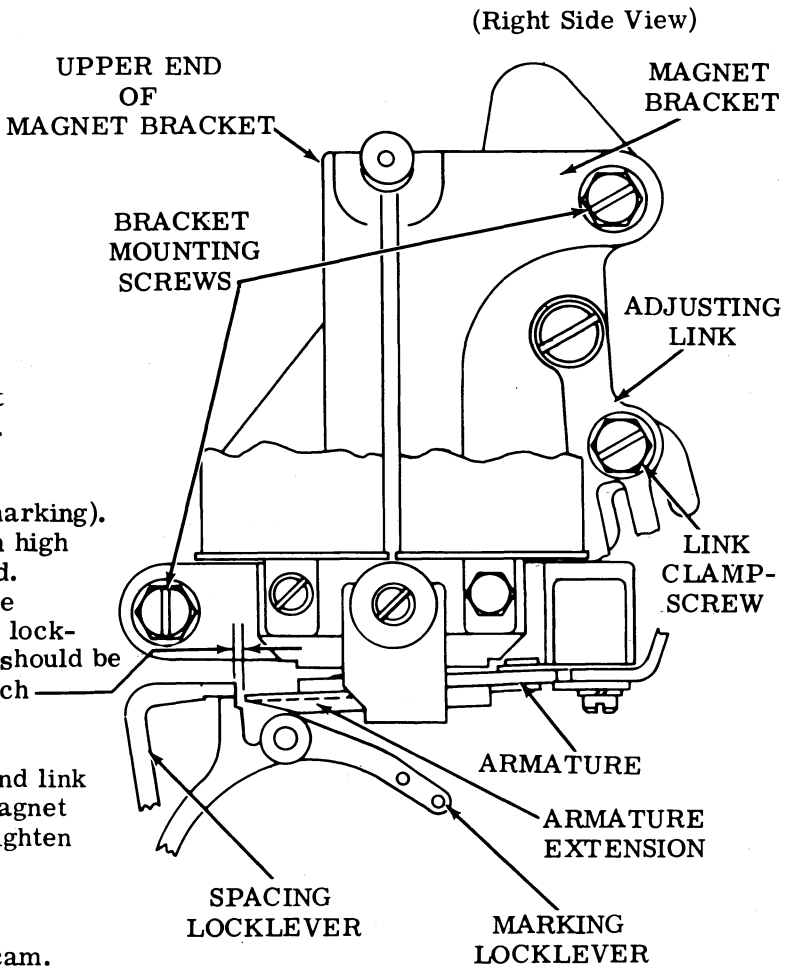


MARKING LOCKLEVER SPRING

To Check
Magnet energized. All pushlevers latched behind selector levers. Selector clutch disengaged.

Requirement
Min 4 oz---Max 9oz
to start lever moving.

2.08 Selector Mechanism (continued)



SELECTOR MAGNET BRACKET

Note: The preliminary SELECTOR ARMATURE SPRING (2.07) adjustment must be made prior to this adjustment.

(1) Requirement

Delete combination selected (all marking). Marking and spacing locklevers on high part of cam. Magnet de-energized. Clearance between end of armature extension and shoulder of marking locklever and tip of spacing locklever should be

Min 0.009 inch---Max 0.016 inch

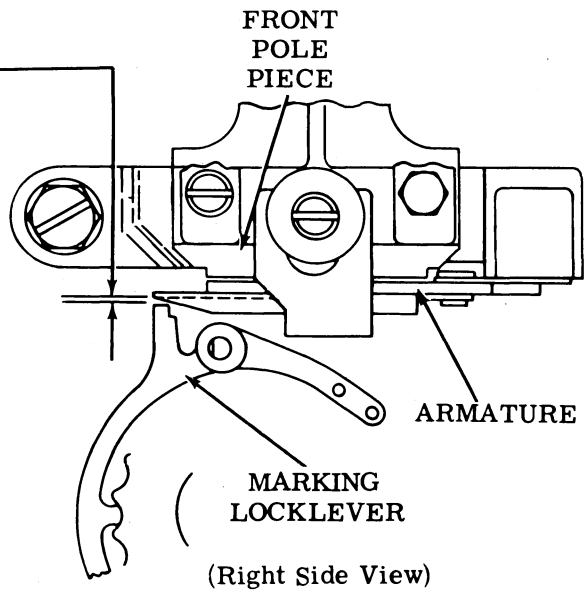
To Adjust

Loosen two bracket mounting screws and link clampscrew friction tight. Position magnet bracket by means of adjusting link. Tighten link clampscrew only.

(2) Requirement

Marking locklever on low part of cam. Magnet energized. Armature in contact with front pole piece. Clearance between lower surface of armature and upper surface of marking locklever should be

Min some---Max 0.003 inch



To Adjust

With bracket mounting screws friction tight, position upper end of magnet bracket. Tighten mounting screws. Recheck requirement (1).

(3) Requirement

With selector clutch engaged, rotate shaft and check for smooth operation of start lever on armature.

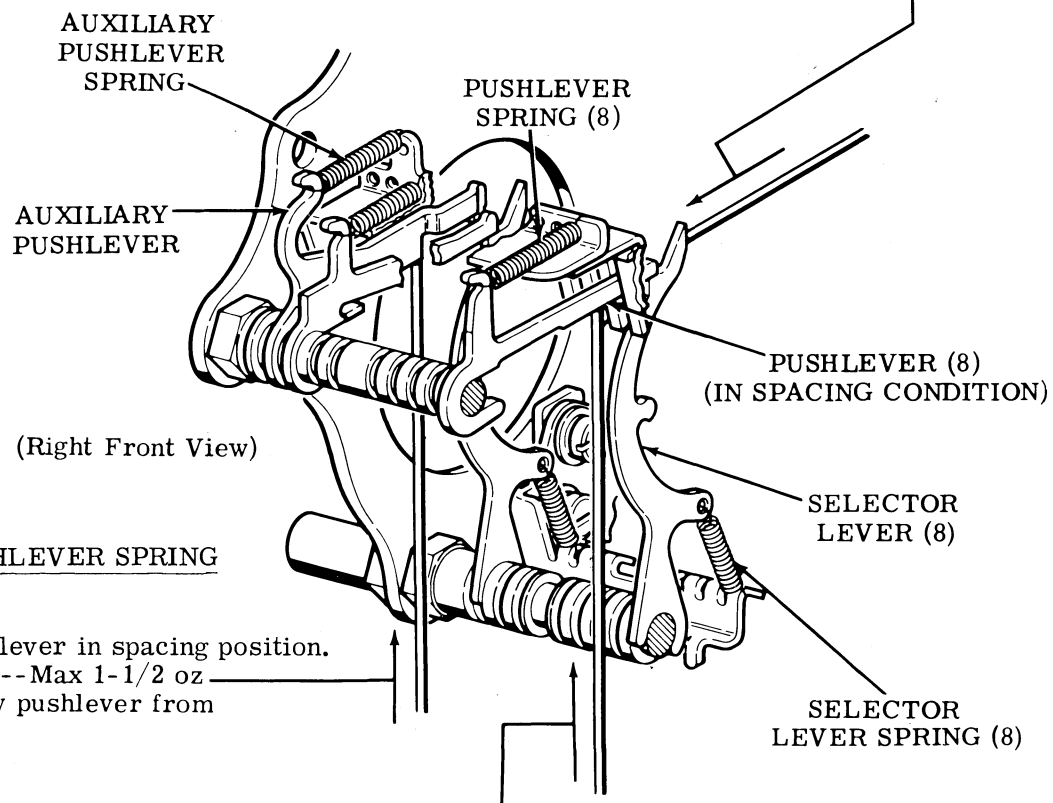
To Adjust

Refine adjustments for requirements (1) and (2).

2.09 Selector Mechanism (continued)

SELECTOR LEVER SPRING

Requirement
Selector levers on high part of their cams.
Pushlever reset bail latched on lever guide.
Min 1-1/2 oz---Max 2-1/2 oz
to start each selector lever moving. Check eight springs.



(Right Front View)

AUXILIARY PUSHLEVER SPRING

Requirement
Auxiliary pushlever in spacing position.
Min 1/2 oz---Max 1-1/2 oz
to lift auxiliary pushlever from selector lever.

SELECTOR PUSHLEVER SPRING

Requirement
Pushlever in spacing position.
Min 1-1/2 oz---Max 2-1/2 oz
to lift pushlever from selector lever.
Check eight springs.

2.10 Selector Mechanism (continued)

Note 1: Spring tension measured with range scale at 60, stop arm bail in cam indent, and latchlever spring unhooked. Replace latchlever spring after checking tensions.

LIFT LEVER SPRING

Note 1: Applicable

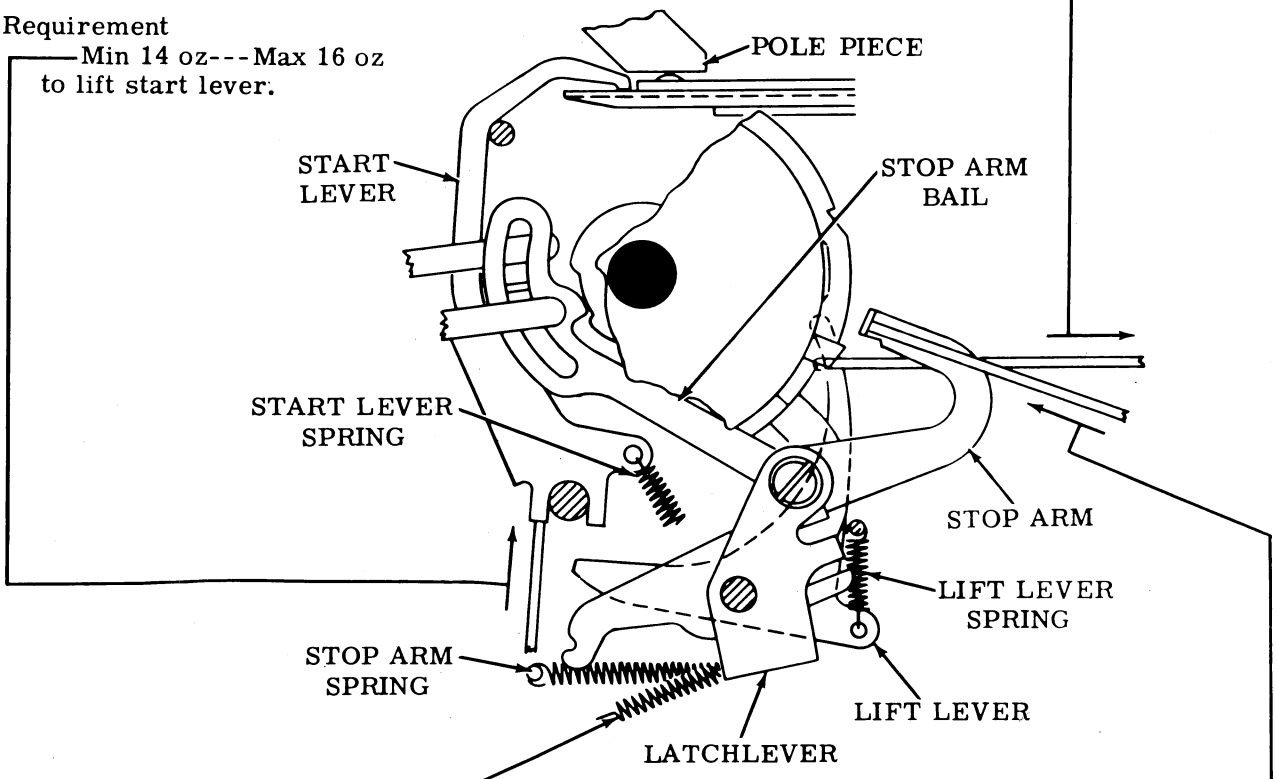
Requirement
With start lever held upward and out of engagement with lift lever
Min 3 oz---Max 5 oz
to start lift lever moving.

START LEVER SPRING

Note 1: Applicable

Requirement
Min 14 oz---Max 16 oz
to lift start lever.

(Right Side View)



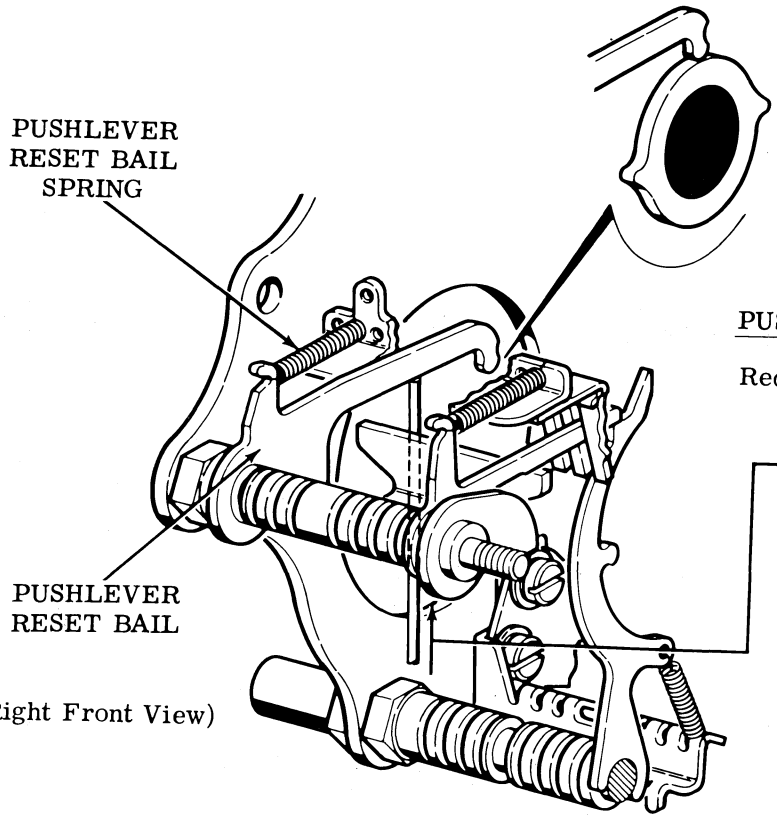
STOP ARM SPRING

Note 1: Applicable

Note 2: START LEVER SPRING must be checked and meet its requirement before checking this spring.

Requirement
Min 9-1/2 oz---Max 13 oz
to start the stop arm moving.

2.11 Selector Mechanism (continued)



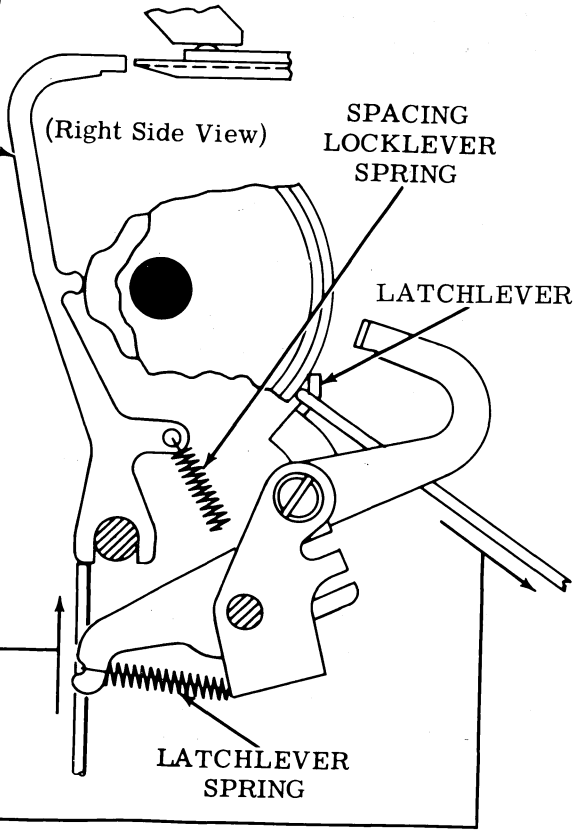
(Right Front View)

PUSHLEVER RESET BAIL SPRING

Requirement

Pushlevers in spacing position. Pushlever reset bail on low part of cam.

Min 1 oz---Max 2oz
to move bail from cam.



SELECTOR CLUTCH LATCHLEVER SPRING

Requirement

Latchlever resting on low part of cam disc.

Min 2 oz---Max 4 oz
to start latchlever moving.

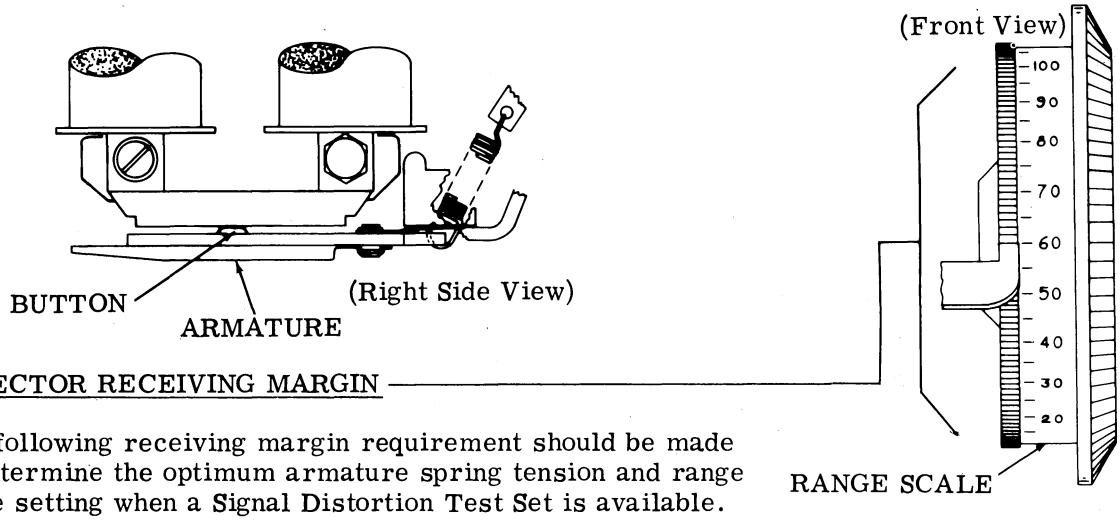
SPACING LOCKLEVER SPRING

Requirement

Magnet energized. Selector clutch disengaged and latched.

Min 18 oz---Max 26 oz
to start lever moving.

2.12 Selector Mechanism (continued)



SELECTOR RECEIVING MARGIN

The following receiving margin requirement should be made to determine the optimum armature spring tension and range scale setting when a Signal Distortion Test Set is available.

Requirement

The test set should be equipped with or connected through a solid state driver similar to TP303170 selector magnet driver card (SMD) in a test circuit capable of providing 500 milliamperes to the selector magnets without signal regeneration. Selector armature spring tension should be refined, if necessary, to obtain the following selector receiving margin minimum requirements.

Selector Receiving Margin Minimum Requirements

SPEED (WPM)	MINIMUM PERCENT MARKING AND SPACING BIAS TOLERATED — SET RANGE SCALE AT BIAS OPTIMUM*	MINIMUM PERCENT MARKING AND SPACING END DISTORTION TOLERATED WITH RANGE SCALE SET AT BIAS OPTIMUM
150	27	27
100	37	37

*Minimum of four points difference between the upper and lower bias limits.

To Adjust

Refine the SELECTOR ARMATURE SPRING adjustment (2.07). Adjust spring tension for maximum of 5 percent internal bias.

Note: The above requirement should be met on a simple open and closed circuit free of simulators or other wave shaping devices.

2.13 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 lever and main trip lever

Min 0.010 inch---Max 0.030 inch

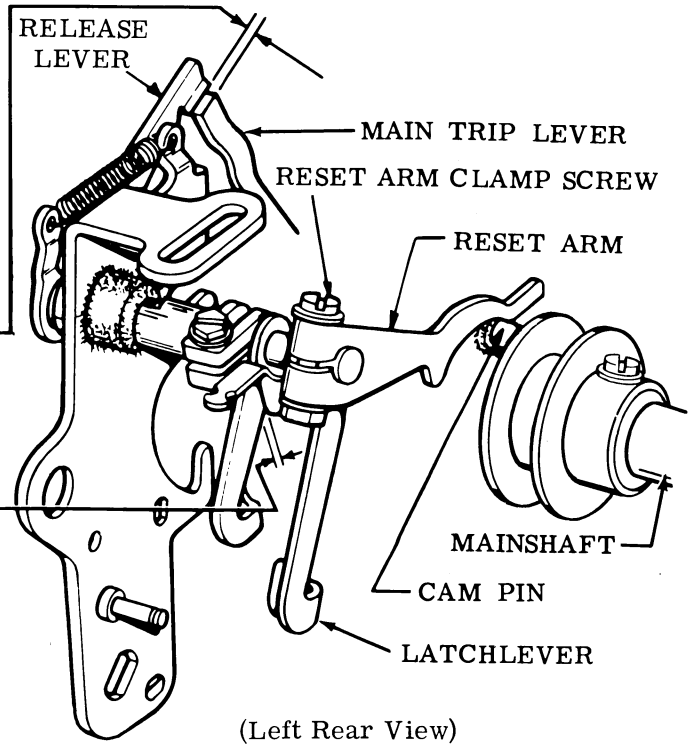
(2) Requirement

Latchlever endplay

Min some---Max 0.010 inch

To Adjust

Position reset arm with clamp screw loosened. Tighten screw.



(Left Rear View)

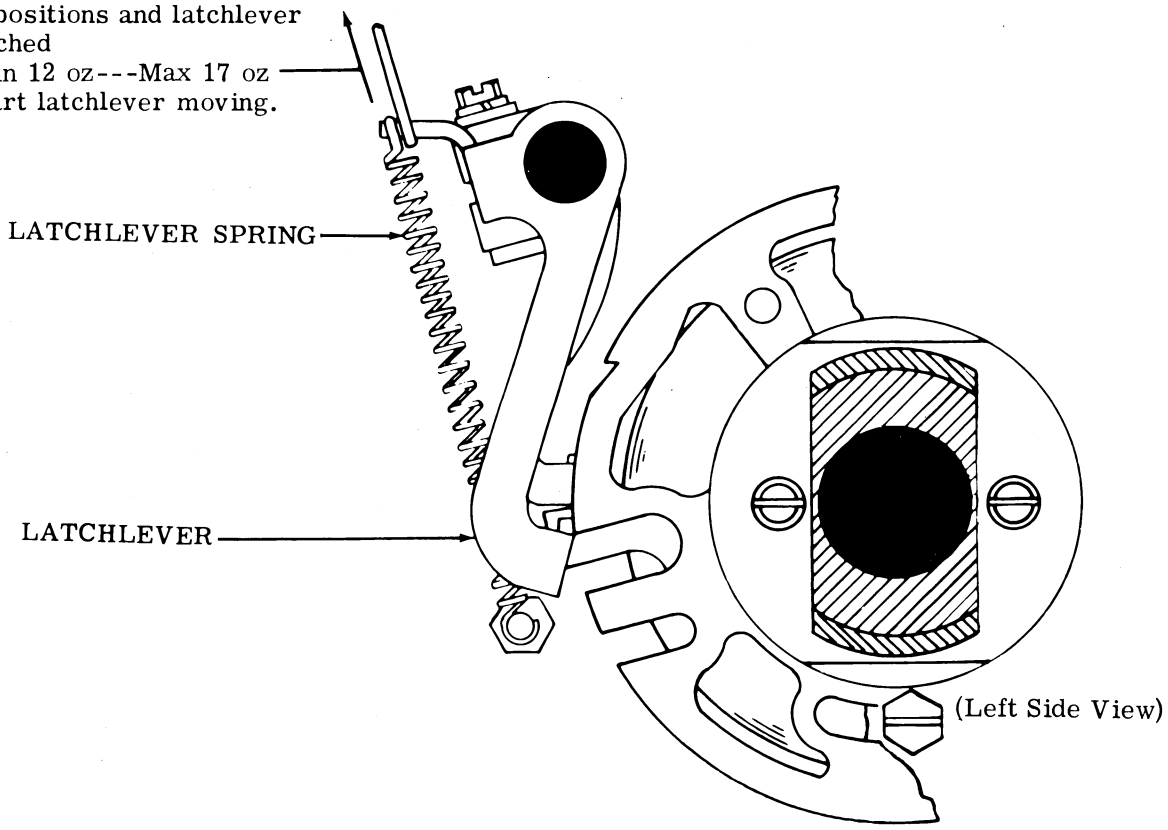
(B) FUNCTION CLUTCH LATCHLEVER SPRING

Requirement

With function clutch turned to stop positions and latchlever unlatched

Min 12 oz---Max 17 oz

to start latchlever moving.



(Left Side View)

2.14 Function Mechanism (continued)

TRIP CAM FOLLOWER LEVER

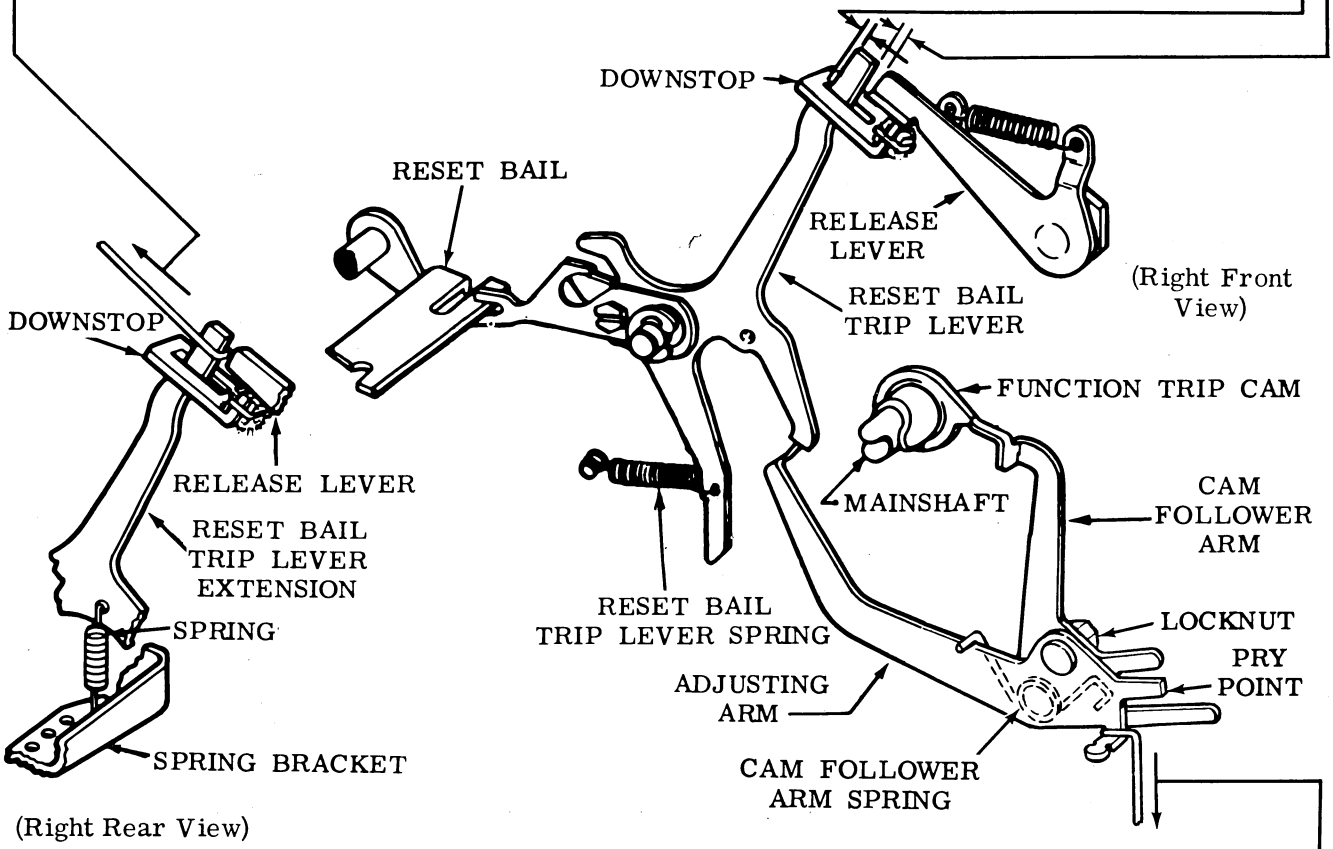
(1) Requirement
With follower lever on high part of cam clearance between release and main trip lever
Min 0.010 inch---Max 0.030 inch

(2) Requirement
Some clearance between main trip lever and downstop bracket.

To Adjust
By means of pry point, position adjusting arm on follower lever with locknut loosened. Tighten nut.

RESET BAIL TRIP LEVER SPRING

Requirement
Trip reset bail trip lever extension. Pulling at top of lever
Min 1 oz---Max 4 oz
to start lever moving.



(Right Rear View)

CAM FOLLOWER ARM SPRING

Requirement
With follower lever on high part of trip cam and reset bail trip lever held away from adjusting arm
Min 2-1/2 oz---Max 4 oz
to start adjusting lever moving.

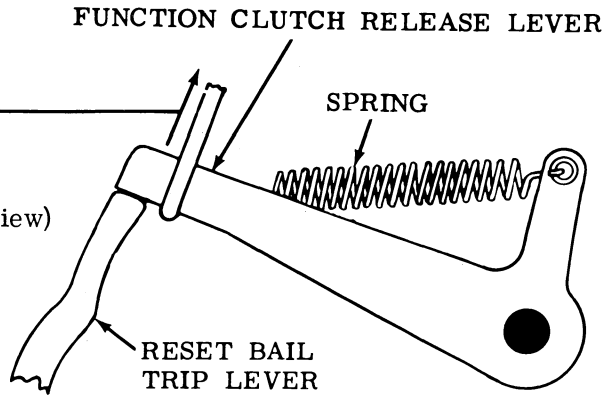
2.15 Function Mechanism (continued)

FUNCTION CLUTCH RELEASE LEVER SPRING

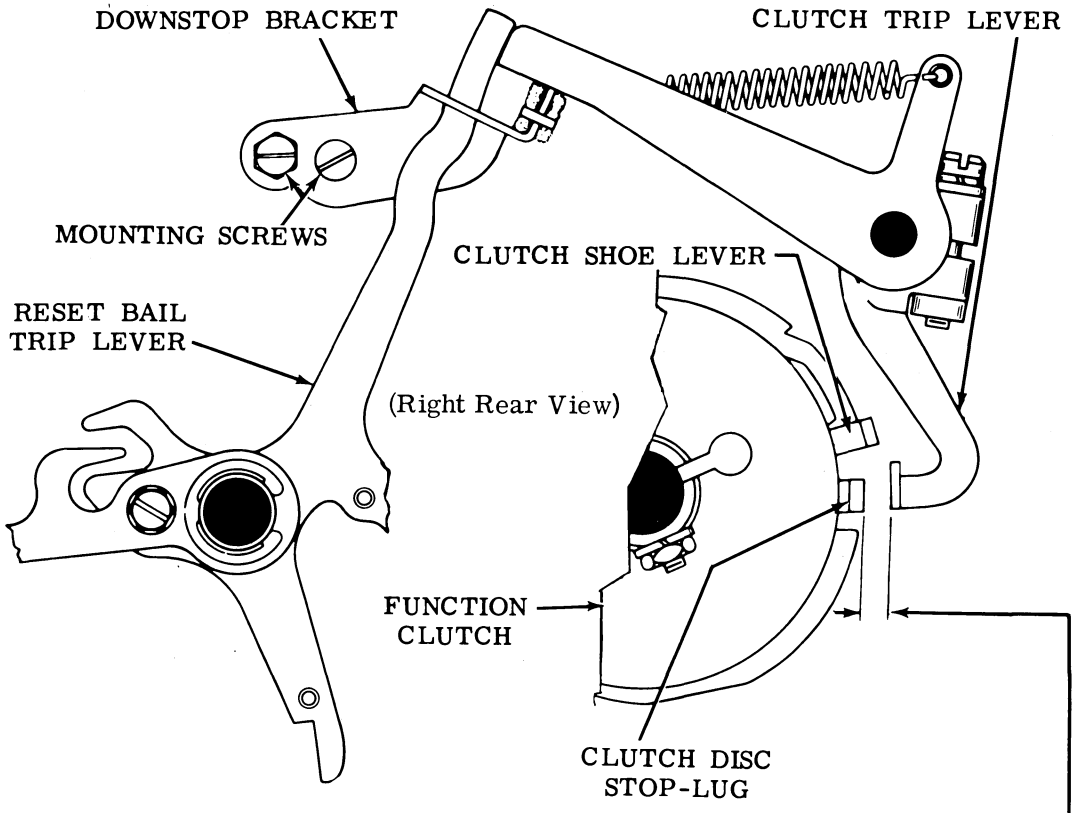
Requirement

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.



(Right Rear View)



(Right Rear View)

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 0.020 inch---Max 0.050 inch

To Adjust

Remove tape guide. With downstop bracket mounting screws friction tight position bracket. Tighten screws.

2.16 Function Mechanism (continued)

CAM FOLLOWER ROLLER

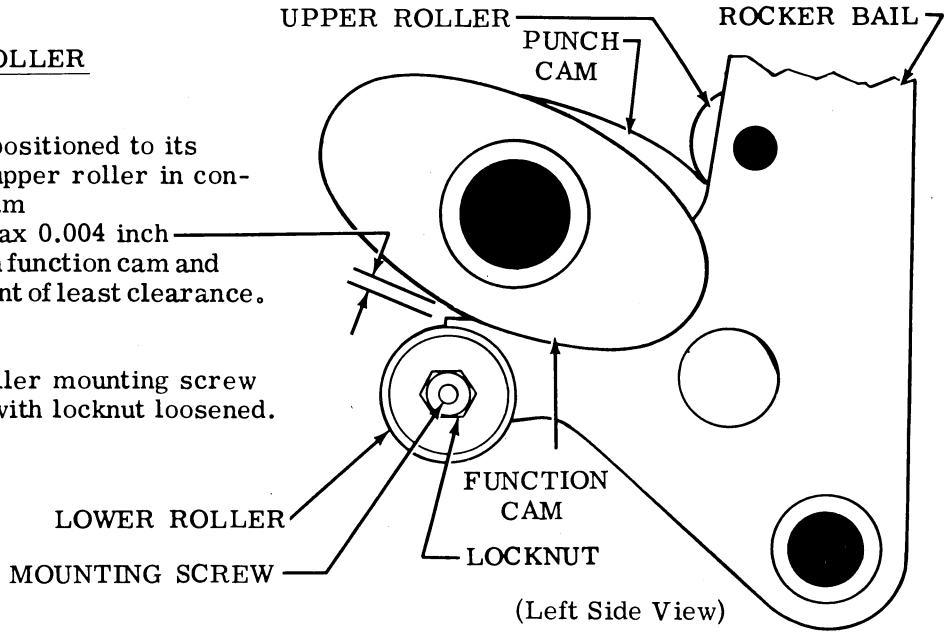
Requirement

With rocker bail positioned to its extreme left and upper roller in contact with punch cam

Min some---Max 0.004 inch clearance between function cam and lower roller at point of least clearance.

To Adjust

Position lower roller mounting screw in elongated slot with locknut loosened. Tighten nut.



(Left Side View)

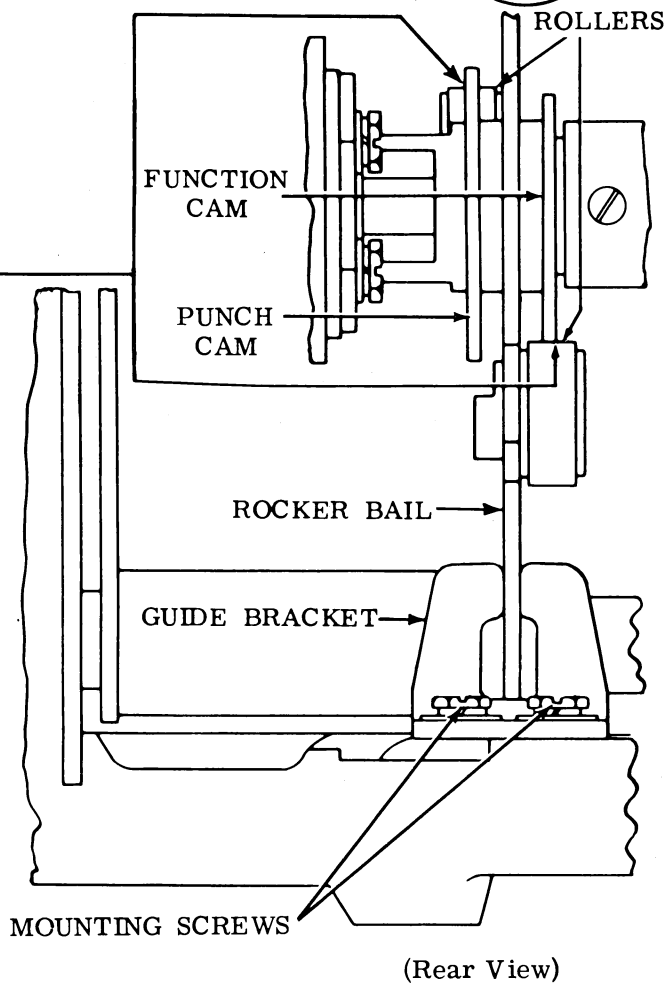
CAM FOLLOWER ROLLER ALIGNMENT

Requirement

Rocker bail rollers should engage full thickness of cams.

To Adjust

Position rocker bail and guide bracket with guide bracket mounting screws loosened. Tighten screws.



(Rear View)

2.17 Punch Mechanism

PUNCH MOUNTING PLATE (Preliminary)

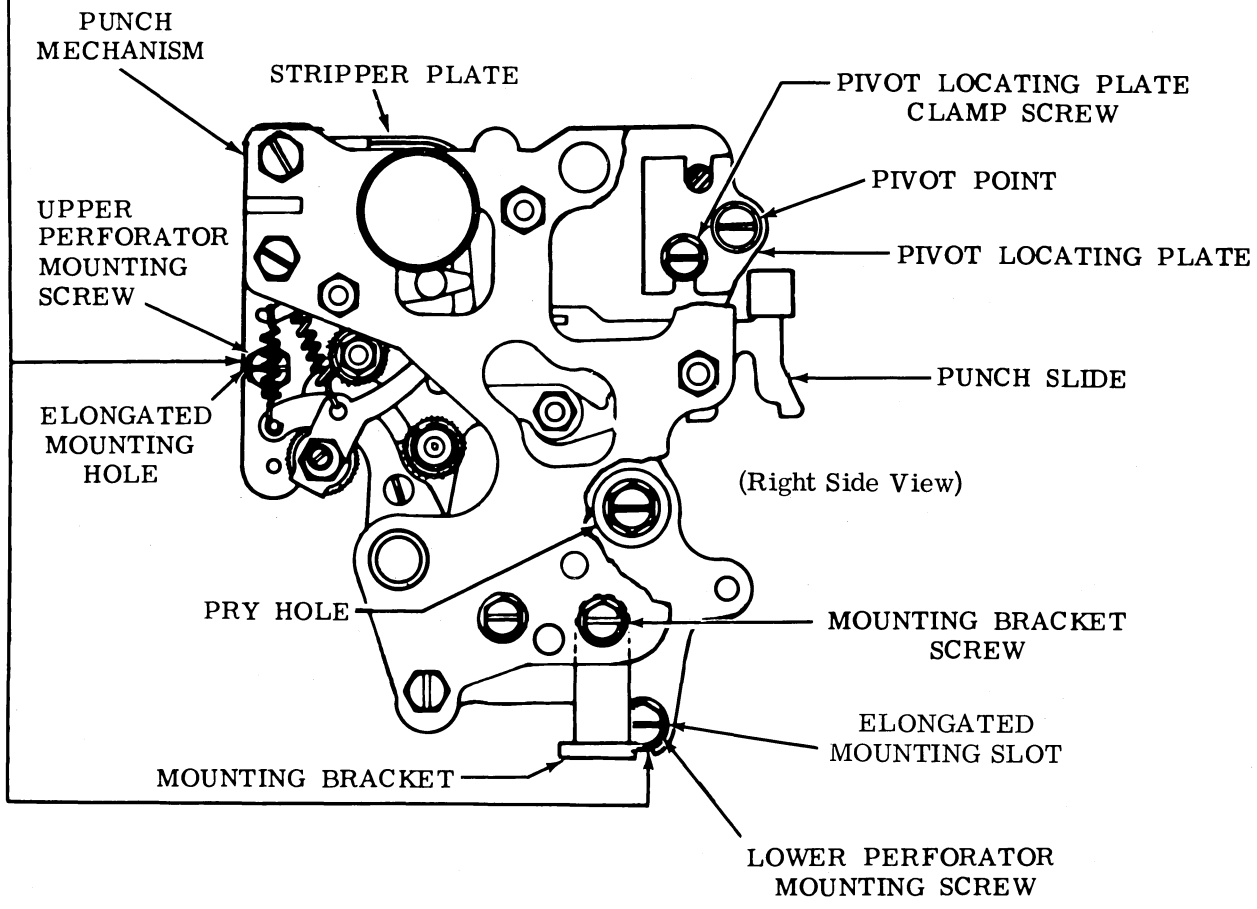
Requirement

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 mounting of the punch mechanism.

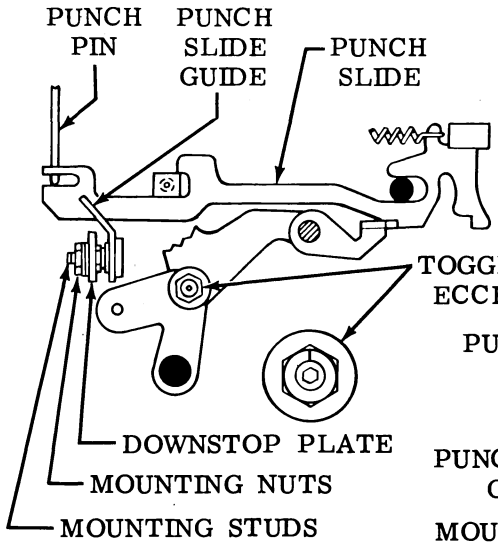
To Adjust

Remove mounting screw at the lower edge of punch mechanism backplate. With the three 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 three backplate mounting screws and recheck to see that requirement is met. Replace and tighten the lower backplate mounting screw. Tighten the bracket mounting screw.



2.18 Punch Mechanism (continued)

Note: Before proceeding with the punch mechanism adjustments, check the CAM FOLLOWER ROLLER (2.16) adjustment.

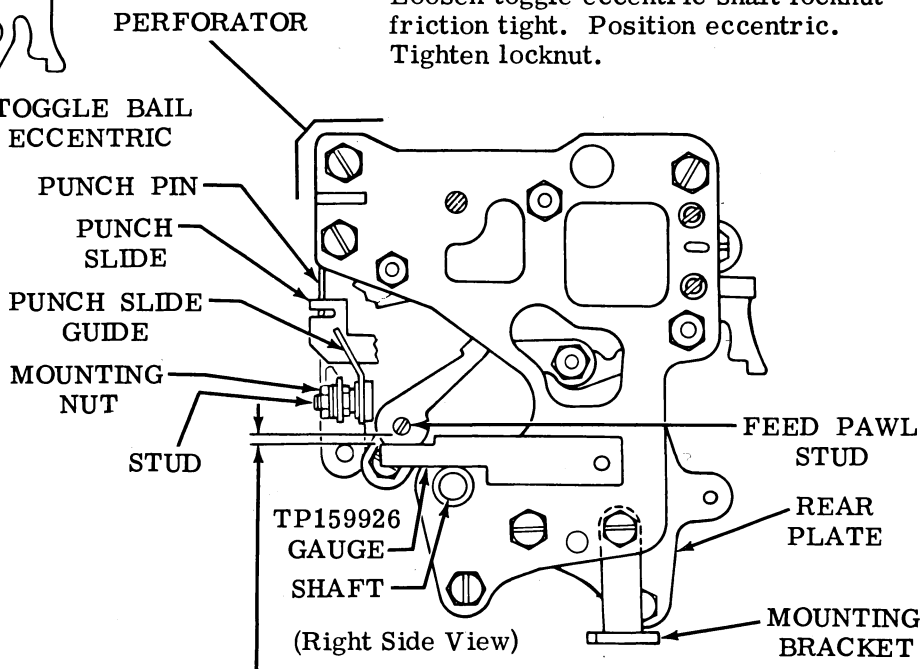


(Right Side View)

(A) TOGGLE BAIL ECCENTRIC

Requirement
The indent (high side of eccentric) should be in its uppermost position.

To Adjust
Loosen toggle eccentric shaft locknut friction tight. Position eccentric. Tighten locknut.



(Right Side View)

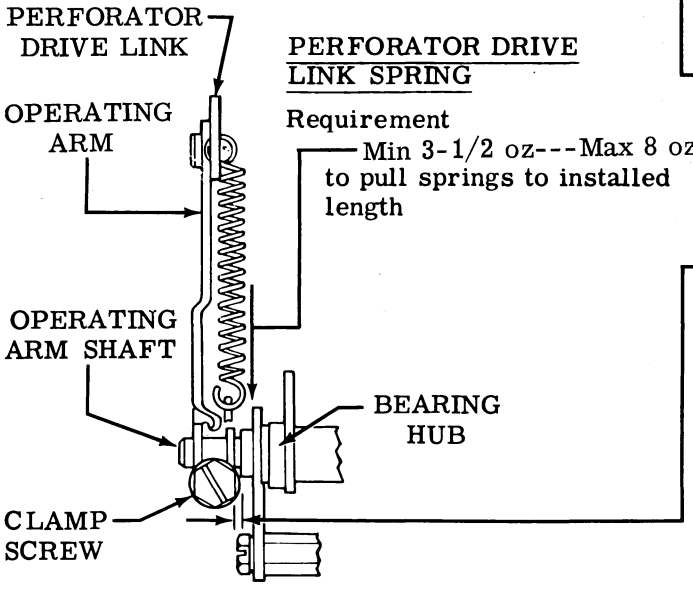
(B) TOGGLE OPERATING ARM

(1) Requirement
Trip function clutch and rotate main-shaft until the upper rocker bail roller is on high part of its cam.
Min 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 (2.22) adjustment has been made and PUNCH PIN PENETRATION (2.19) and FEED PAWL requirements are met, this requirement should be considered fulfilled.



(Front View)

PERFORATOR DRIVE LINK SPRING

Requirement
Min 3-1/2 oz---Max 8 oz to pull springs to installed length

2.19 Punch Mechanism (continued)

(B) PUNCH PIN PENETRATION

Requirement

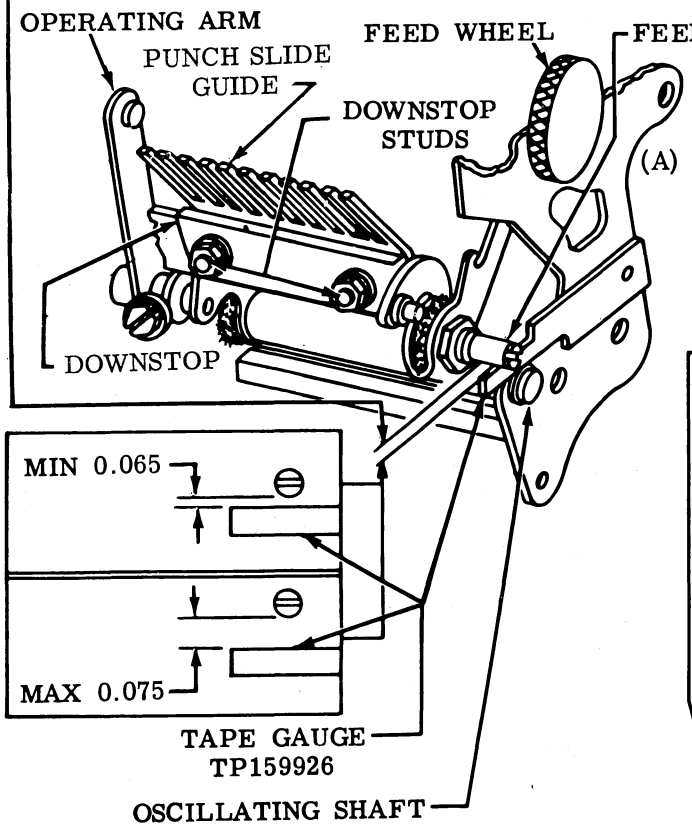
With DELETE combination selected, function clutch engaged, rotate mainshaft until all punch pins have cleared tape aperture in the punch block. With the TP159926 gauge in position

Min 0.065 inch---Max 0.075 inch

clearance between feed pawl stud and gauge.

To Adjust

Refine the TOGGLE BAIL ECCENTRIC (2.18) adjustment keeping the indent to the right of a vertical centerline through the shaft. Tighten nut.



(Right Front View)

(A) 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.

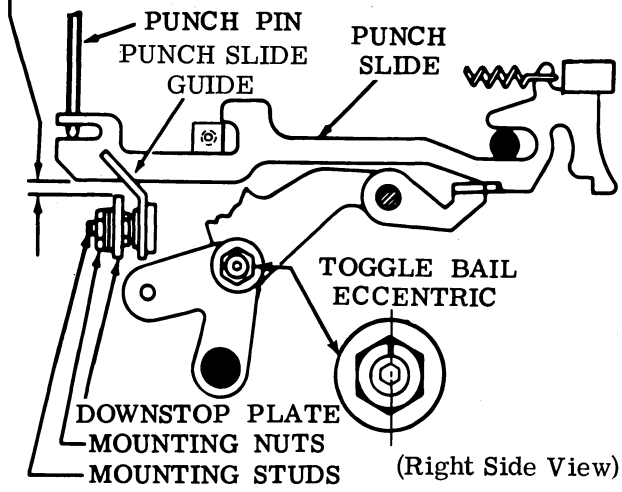
Min some---Max 0.008 inch

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.



(Right Side View)

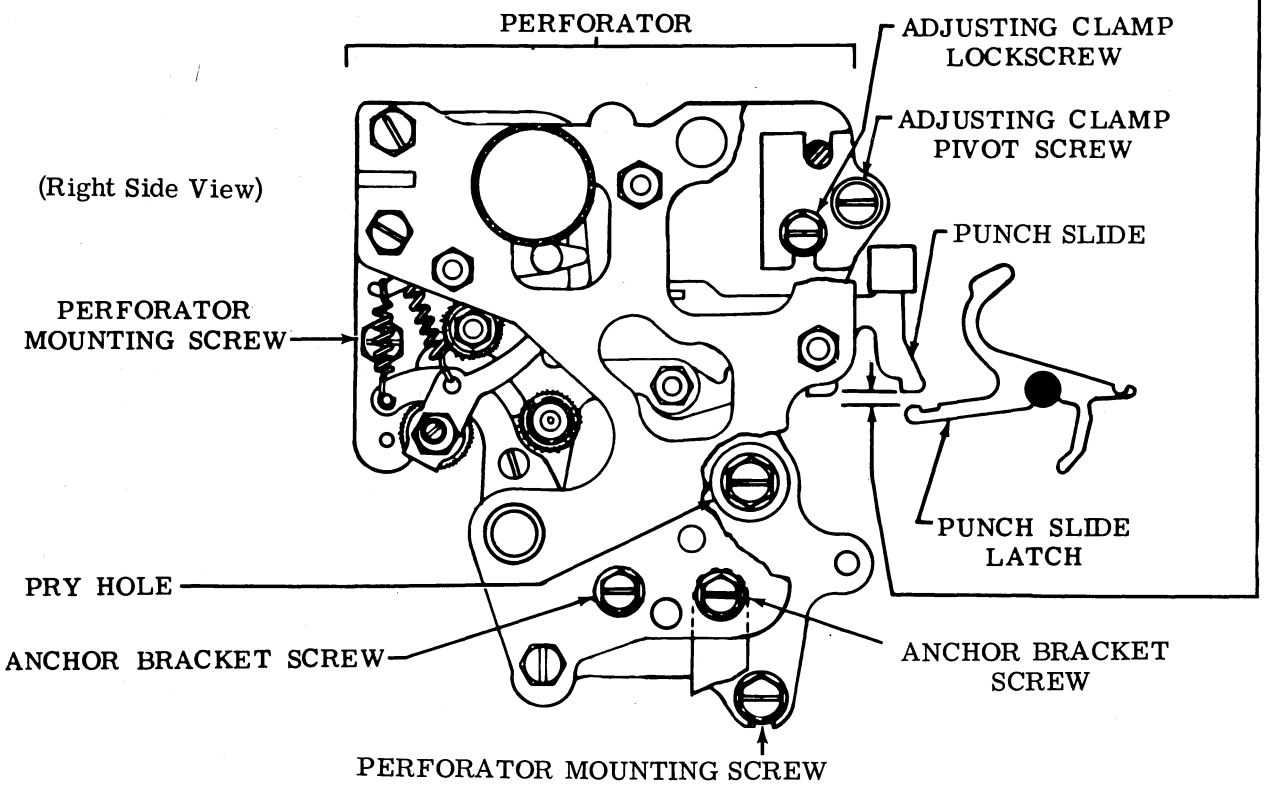
2.20 Punch Mechanism (continued)

PUNCH MOUNTING PLATE (Final)

To Check
Select DELETE 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 lockscrew, 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 screws.



2.21 Punch Mechanism (continued)

RESET BAIL TRIP LEVER

(1) Requirement

Manually select the NULL code combination. Manually rotate reset bail trip lever. The punch slide reset bail should trip before the function clutch is tripped.

To Adjust

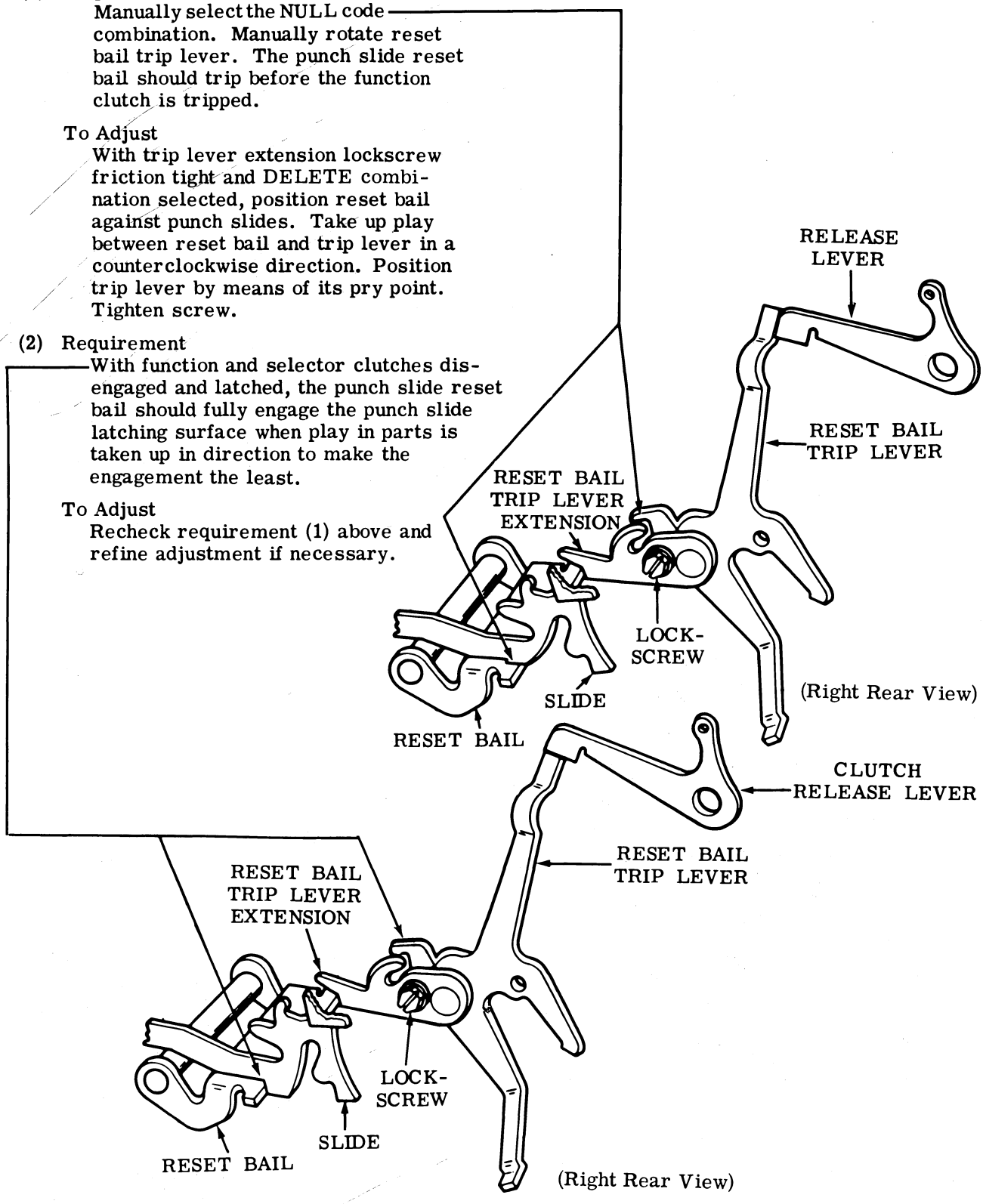
With trip lever extension lockscrew friction tight and DELETE combination selected, position reset bail against punch slides. Take up play between reset bail and trip lever in a counterclockwise direction. Position trip lever by means of its pry point. Tighten screw.

(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.



2.22 Punch Mechanism (continued)

(A) LATCHLEVER CLEARANCE

Requirement

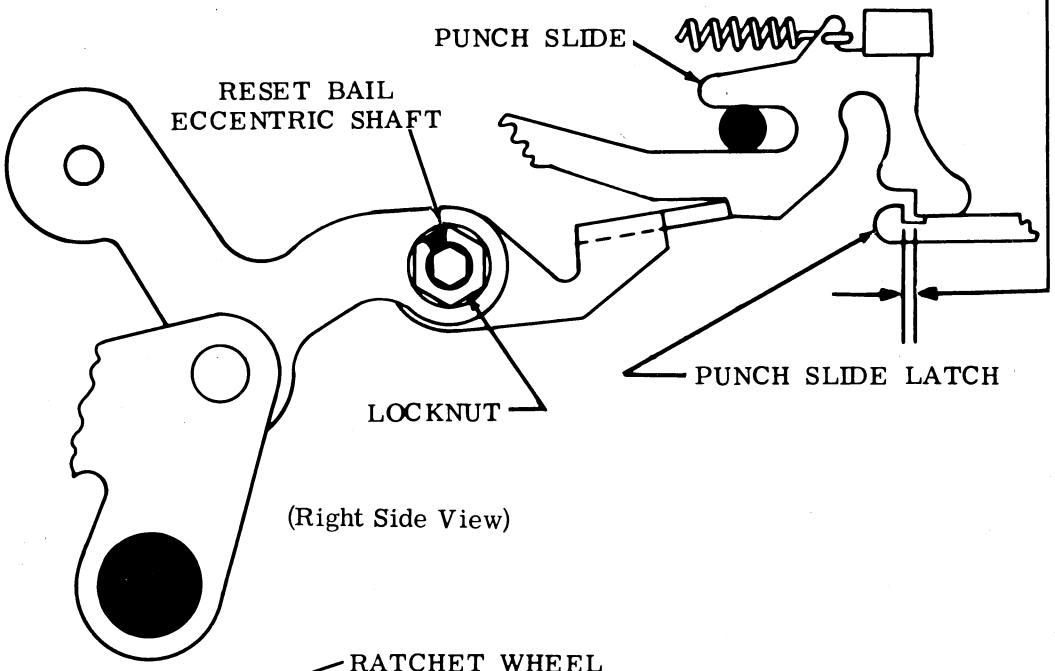
With NULL combination selected, the function clutch disengaged and latched, clearance between the punch slide and its associated latchlever should be

Min 0.005 inch---Max 0.015 inch

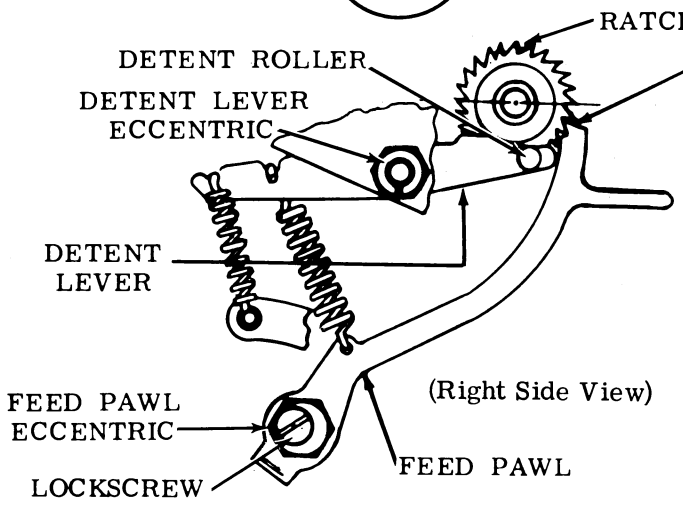
for the slide having the least clearance.

To Adjust

Rotate the reset bail eccentric shaft with its locknut loosened. Keep the indentation in the eccentric above center of shaft. Tighten locknut.



(Right Side View)



(Right Side View)

(B) FEED PAWL

To Check

Check with feed wheel oil hole in the up position.

Requirement

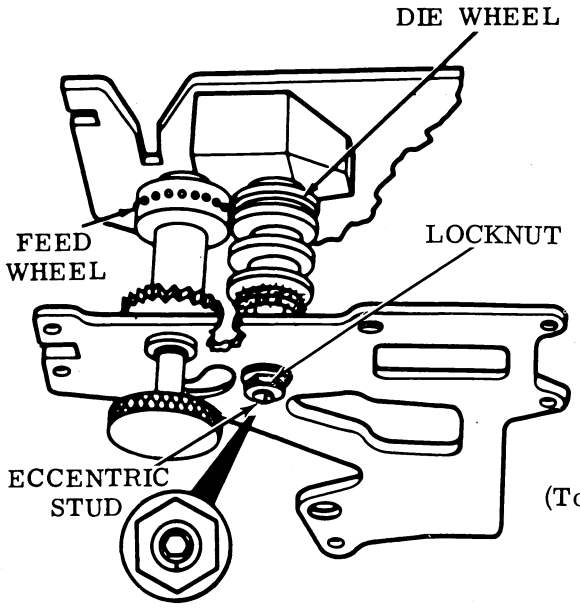
Function clutch disengaged, indentation in detent lever eccentric at right angle to lever, detent roller in contact with ratchet wheel, high part of feed pawl eccentric to the right of its lockscrew. The feed pawl should engage the first tooth below a horizontal centerline through the ratchet wheel with 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 (2.23), and two adjustments should be made at same time.

2.23 Punch Mechanism (continued)



(Top Right Side View)

TEN CHARACTERS PER INCH (Preliminary)

(1) Requirement

Indent of die wheel eccentric stud pointing downward.

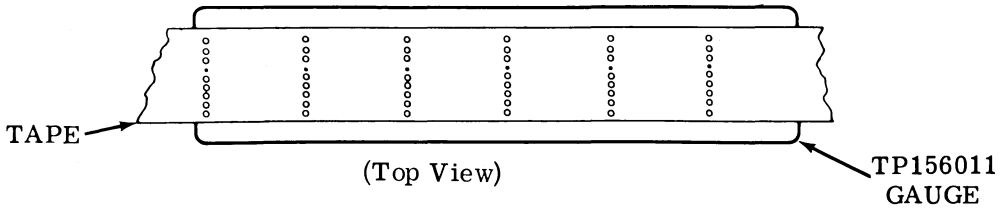
To Adjust

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 (2.25) 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.



(Top View)

TEN CHARACTERS PER INCH (Final)

(1) Requirement

With a piece of tape perforated with six series of 9 NULL code combinations followed by a DELETE combination placed over 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.

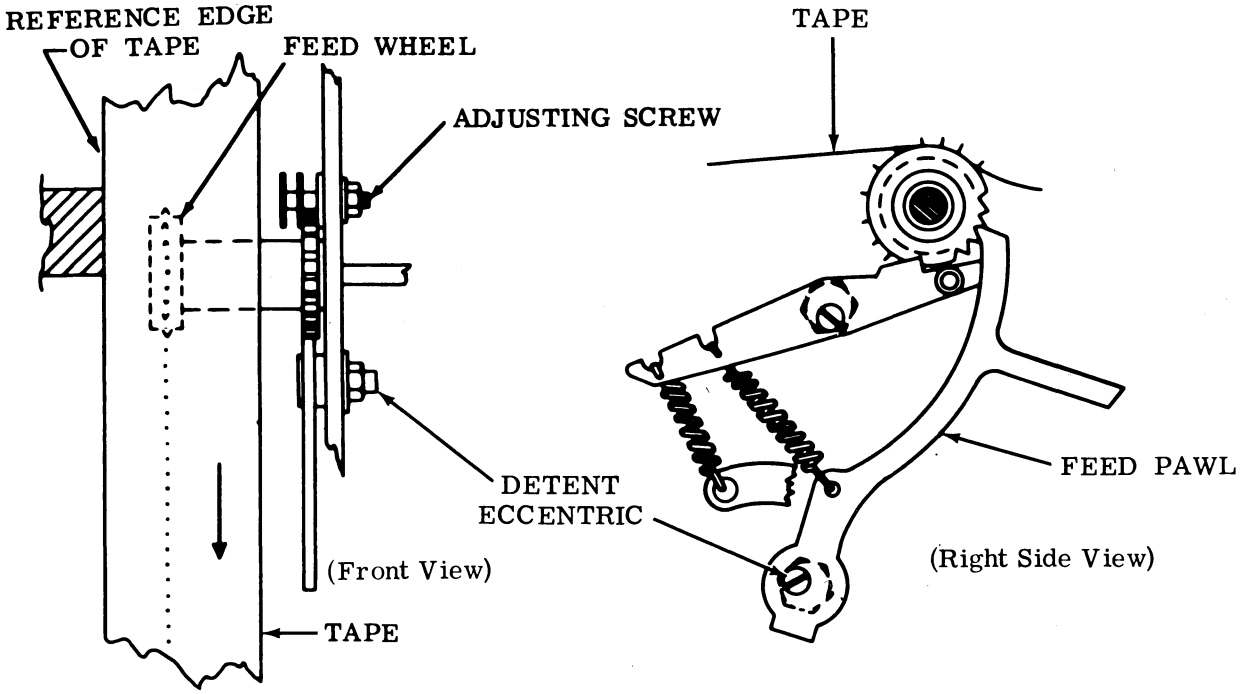
To Adjust

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.

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.

2.24 Punch Mechanism (continued)



LATERAL AND FRONT TO REAR FEED WHEEL POSITION DETENT

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

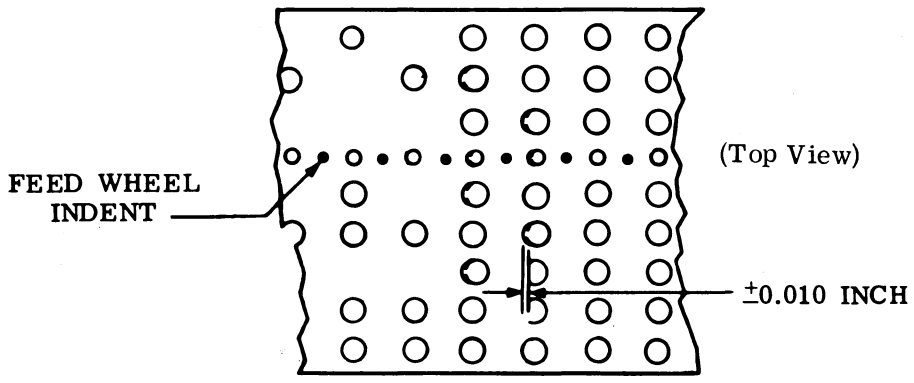
Perforate 6 inches of RY tape. Backspace 30 characters. Reperforate with DELETE characters. Code holes must coincide except for first two characters which may be elongated ±0.010 inch.

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 (2.22) adjustment if necessary.

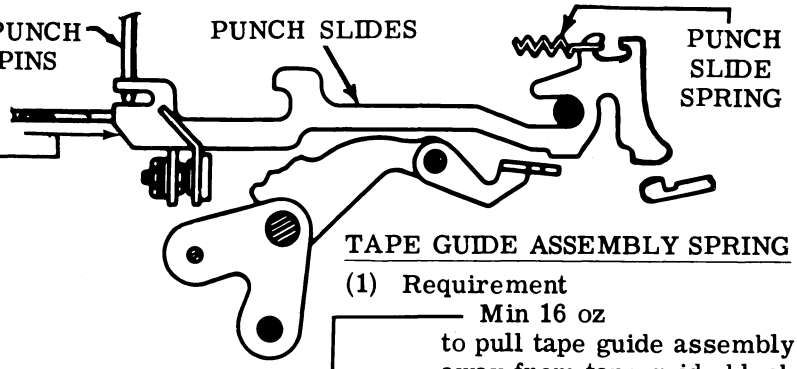
To Adjust (Front to Rear)

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.



2.25 Punch Mechanism (continued)

(Right Side View)



PUNCH SLIDE SPRING

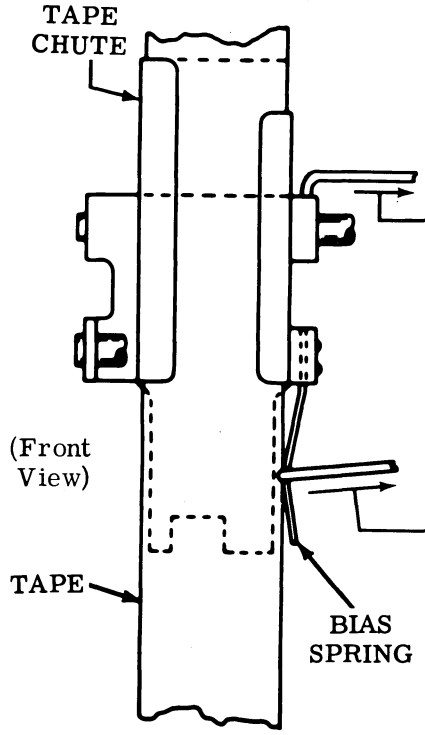
Requirement
DELETE combination set up, and punch slides in selected position
Min 2 oz---Max 4 oz
to start each slide moving.

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.



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.

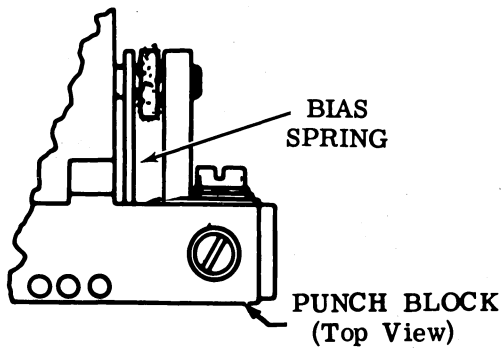
Note: It is necessary to remove several parts, on units equipped with backspace mechanism, in order to check this spring tension. It should not be checked unless there is good reason to believe that requirements are not met.

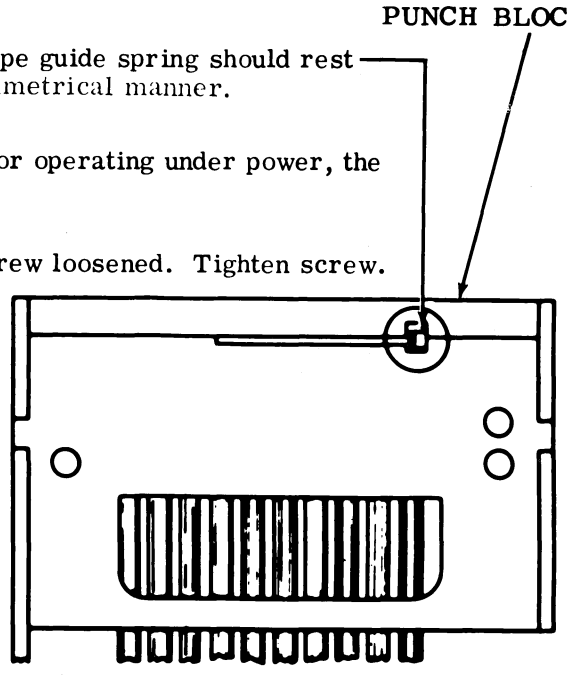
BIAS SPRING (PUNCH BLOCK)

(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.

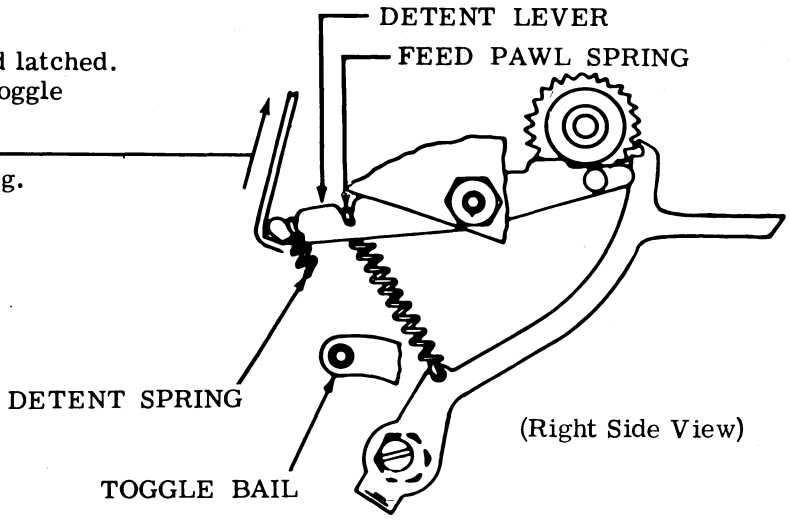




2.26 Punch Mechanism (continued)

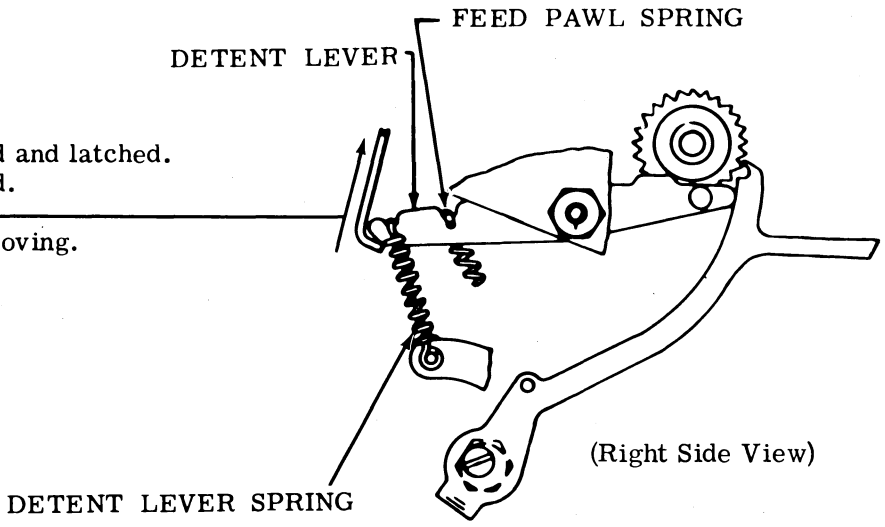
FEED PAWL SPRING

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.



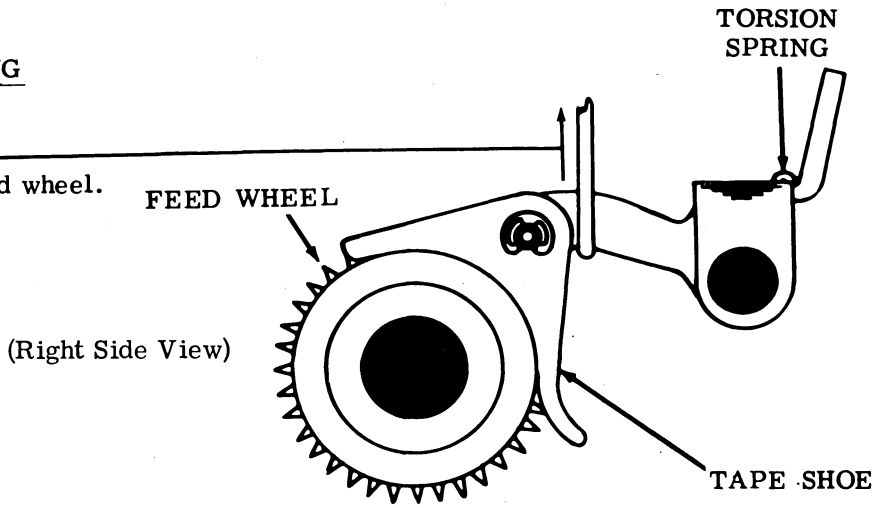
DETENT LEVER SPRING

Requirement
Function clutch disengaged and latched.
Feed pawl spring unhooked.
Min 7 oz---Max 10 oz
to start the detent lever moving.



TAPE SHOE TORSION SPRING

Requirement
Min 13 oz---Max 18 oz
to move tape shoe from feed wheel.



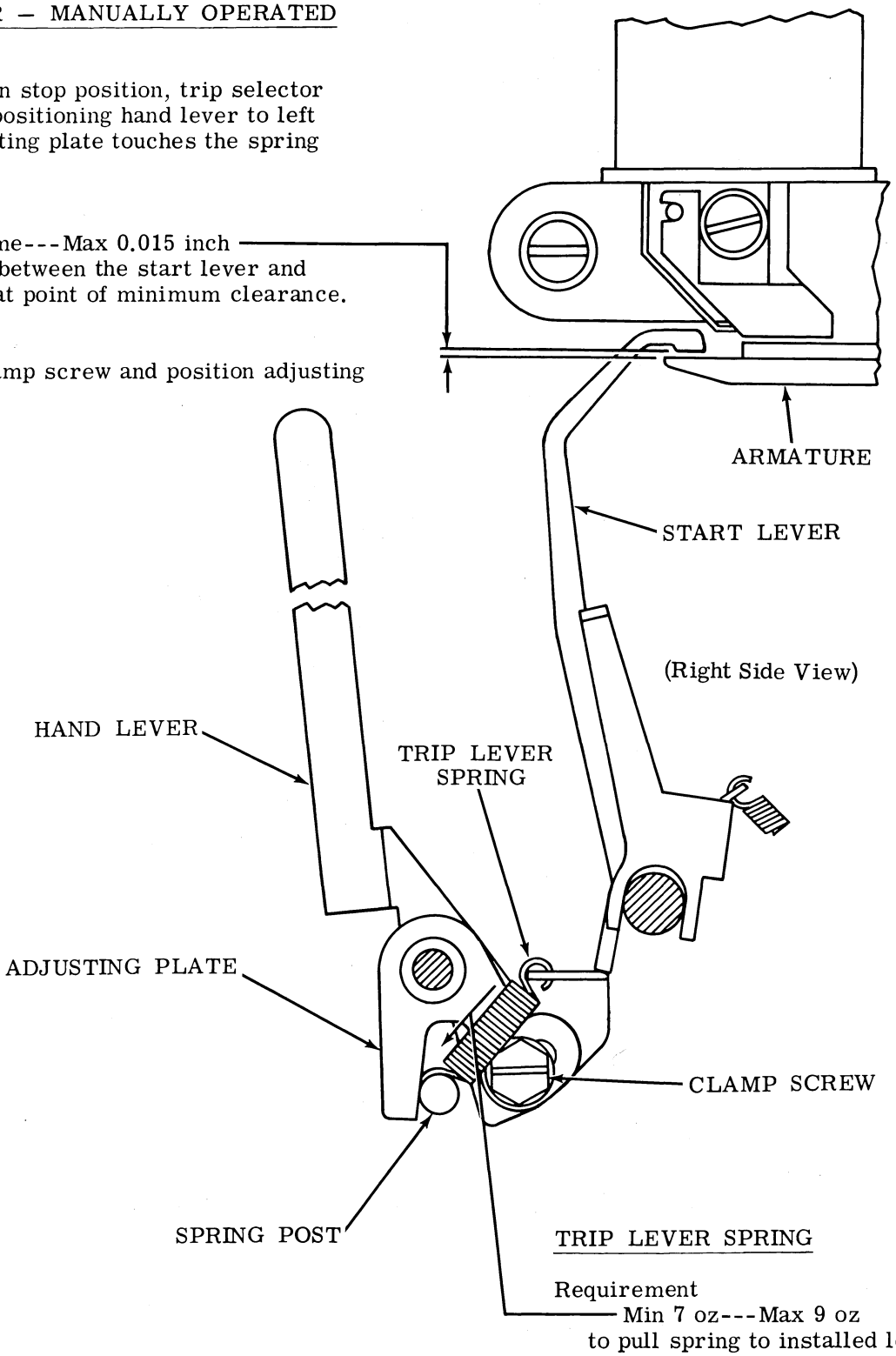
2.27 Manual Interfering Tape Feed-Out Mechanism

TRIP LEVER – MANUALLY OPERATED

To Check
With unit in stop position, trip selector clutch by positioning hand lever to left until adjusting plate touches the spring post.

Requirement
Min some---Max 0.015 inch clearance between the start lever and armature at point of minimum clearance.

To Adjust
Loosen clamp screw and position adjusting plate.



TRIP LEVER SPRING

Requirement
Min 7 oz---Max 9 oz to pull spring to installed length.

2.28 Tape Depressor Mechanism (continued)

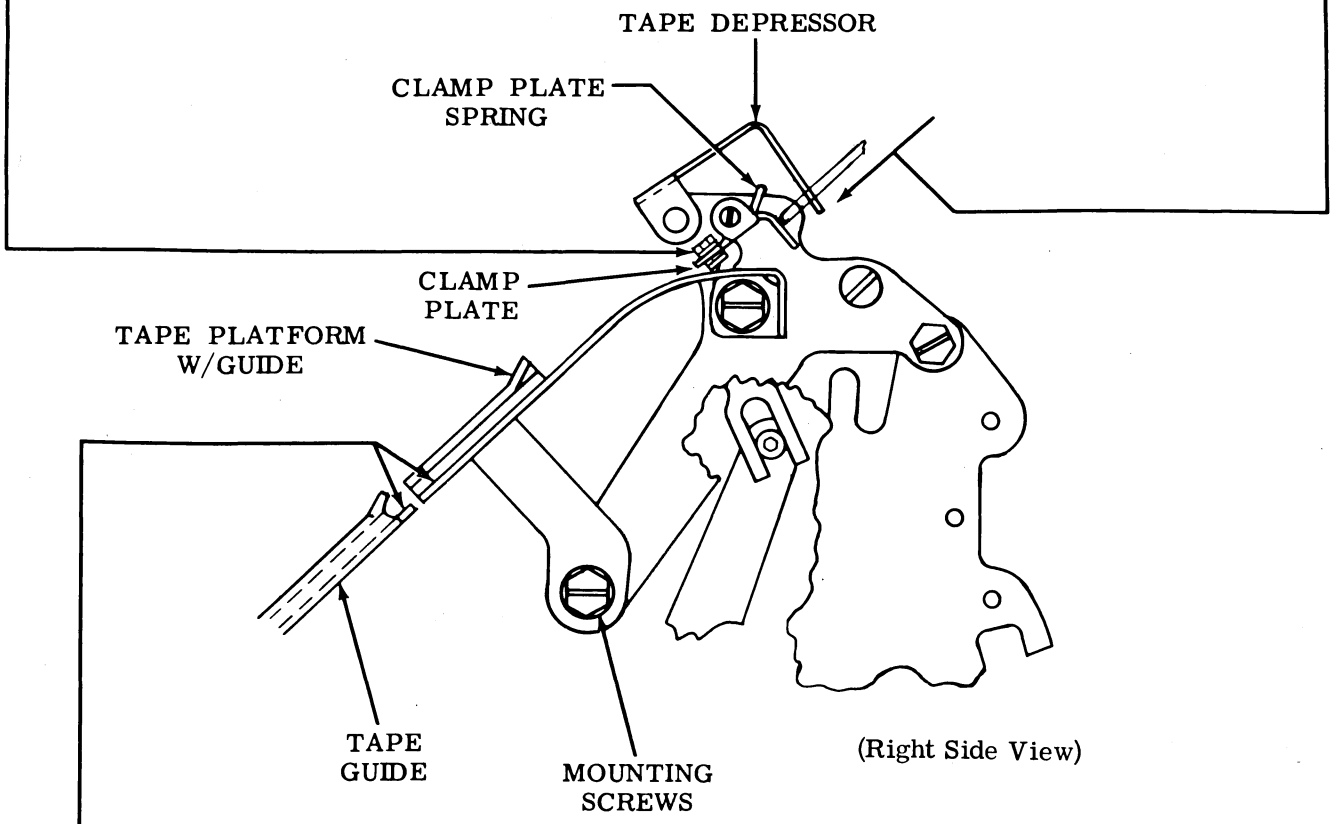
CLAMP PLATE SCREW WITH DISC

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

Requirement
Min 30 grams applied to tab of clamp plate to start it moving

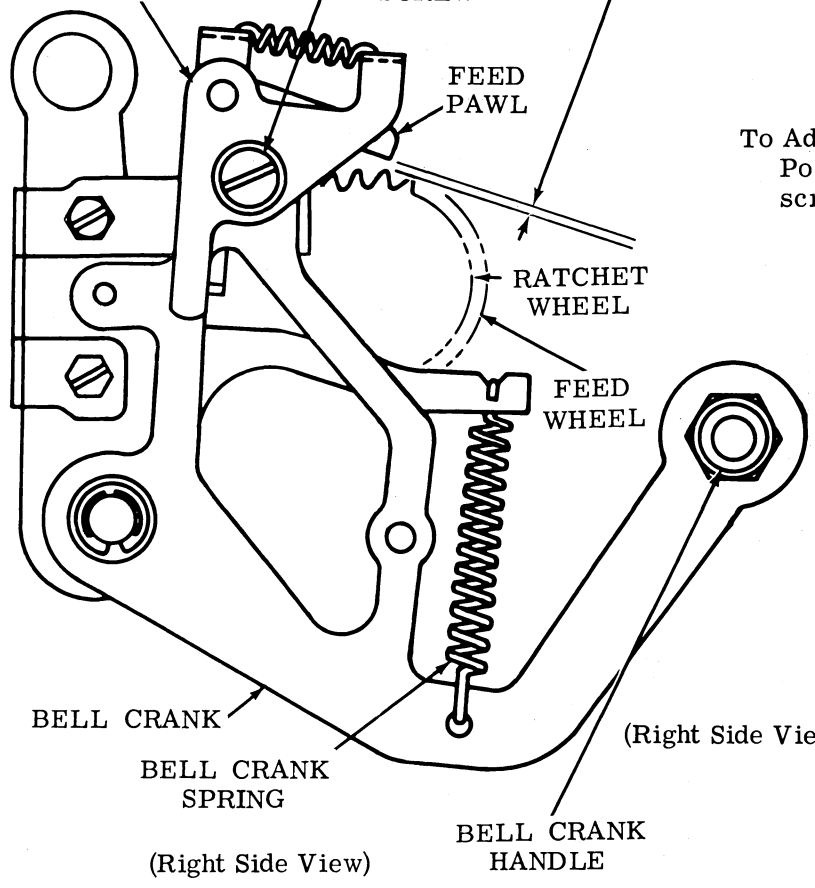


TAPE PLATFORM

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.

2.29 Power Drive Backspace Mechanism

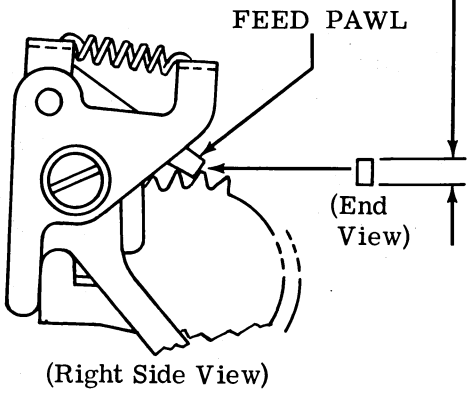


FEED PAWL CLEARANCE

(1) Requirement
With backspace bell crank rotated clockwise, backspace feed pawl should miss first tooth by a clearance of
Min 0.006 inch---Max 0.040 inch

(2) Requirement
Backspace feed pawl should miss first tooth and engage second tooth by at least 1/2 of right engaging surface of feed pawl (as gauged by eye) when the feed pawl first contacts ratchet tooth.

To Adjust
Position adjusting plate with mounting screw friction tight. Tighten screw.



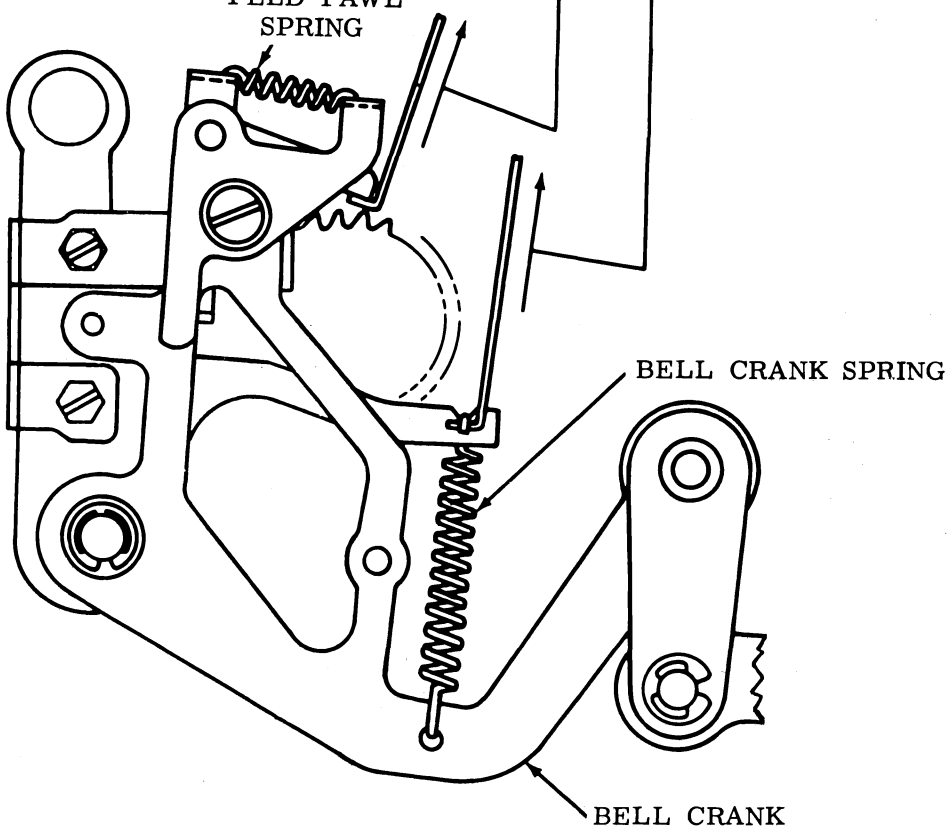
2.30 Power Drive Backspace Mechanism (continued)

FEED PAWL SPRING

Requirement
With backspace mechanism in unoperated position, it should require
Min 8 oz---Max 15 oz
to start feed pawl moving.

BELL CRANK SPRING

Requirement
Min 19 oz---Max 23 oz
to pull spring to installed length.



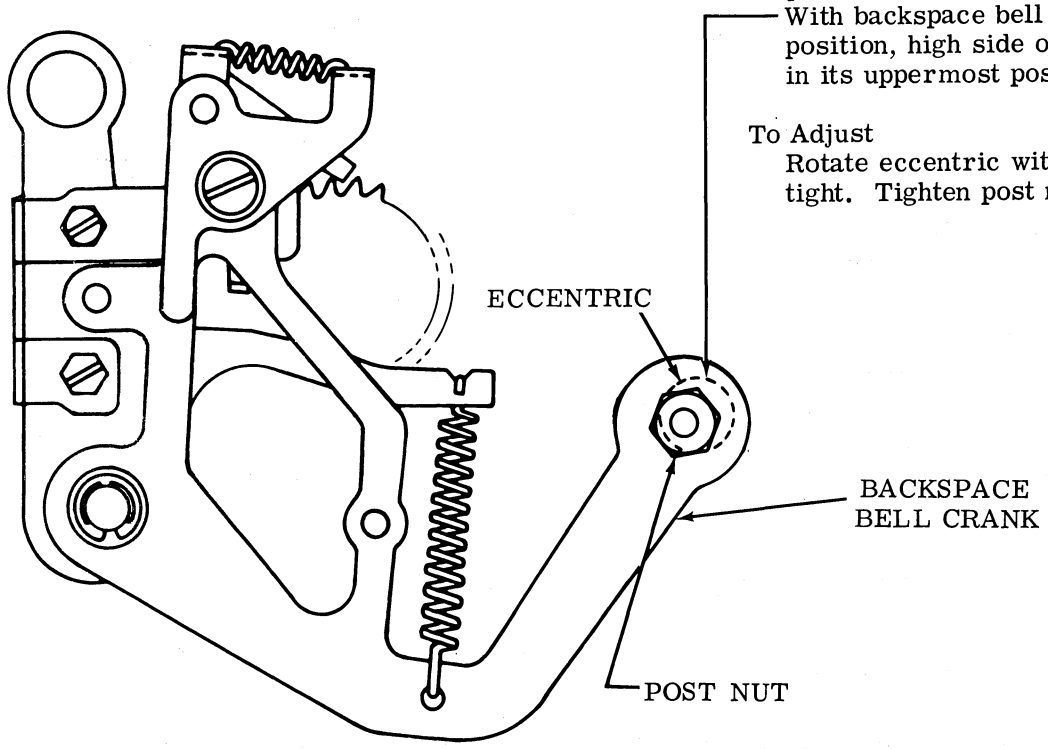
(Right Side View)

2.31 Power Drive Backspace Mechanism (continued)

FEED PAWL ECCENTRIC

Requirement
With backspace bell crank in its operated position, high side of eccentric should be in its uppermost position.

To Adjust
Rotate eccentric with post nut friction tight. Tighten post nut.

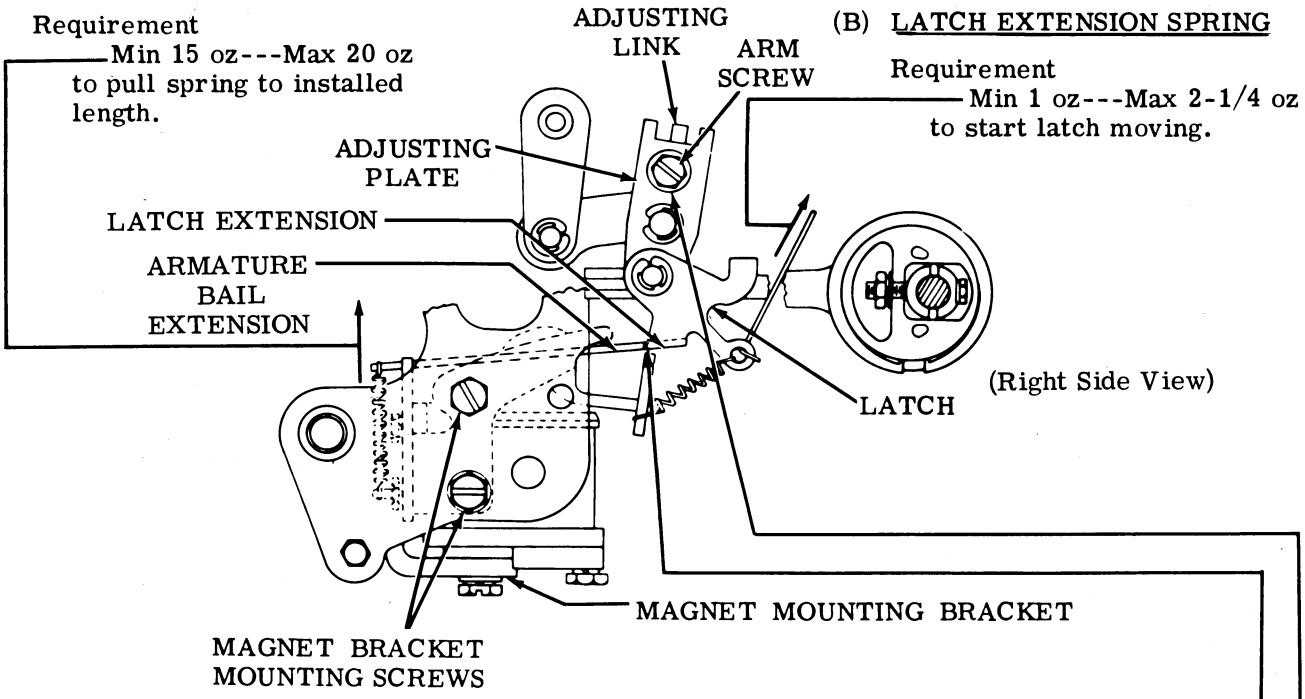


(Right Side View)

2.32 Power Drive Backspace Mechanism (continued)

(A) ARMATURE SPRING

Requirement
Min 15 oz---Max 20 oz to pull spring to installed length.



(C) MAGNET POSITION

Requirement
The armature bail extension should engage the latch extension 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

(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.

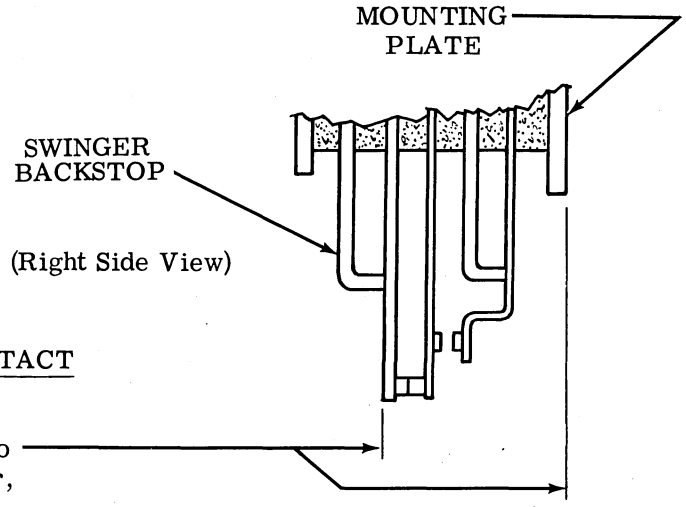
Note: A fully detented position is defined as: With the detent roller in contact with the ratchet wheel the punch unit feed pawl should engage the first tooth below the horizontal centerline of the feed wheel ratchet with no perceptible clearance.

(2) Requirement
With the unit operating under power, perforate approximately two inches of tape with the DELETE combination selected. Backspace twelve characters in succession with the unit still under power. Again perforate approximately two inches of tape with the DELETE 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
Loosen the arm adjusting screw and position the adjusting plate. Tighten the arm adjusting screw.

2.33 Code Reading Contacts

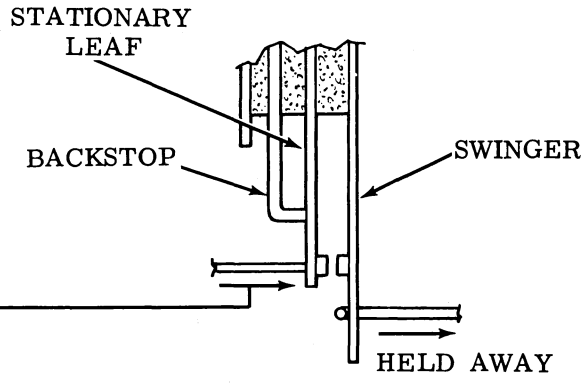
Note: Make the following adjustments with the code contacts removed from the reperforator unit. Refer to the appropriate disassembly section for this procedure. Start each adjustment with the contact pile-up farthest away from the bending tool so as not to disturb completed adjustments. Use bending tool TP156170 as required.



BACKSTOP — NORMALLY CLOSED CONTACT

Requirement
Eight swinger leaves should be parallel to mounting plate and in line with each other, as gauged by eye.

To Adjust
Bend swinger backstop as required.

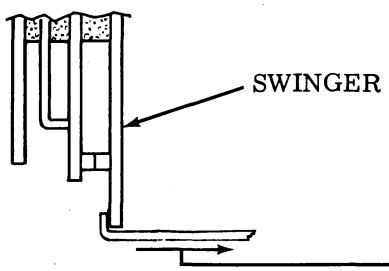


SPRING TENSION — NORMALLY CLOSED CONTACT AGAINST BACKSTOP (Preliminary)

Requirement
With swinger held away, it should require
Min 2 oz---Max 6 oz
to move stationary leaf away from its backstop.

To Adjust
Bend stationary leaf to meet requirement. To increase tension of the leaf against the backstop, it may be necessary to bend the backstop away from the contact leaf, form the leaf, and then reposition the backstop to meet requirement of BACKSTOP — NORMALLY CLOSED CONTACT (2.33).

2.34 Code Reading Contacts (continued)

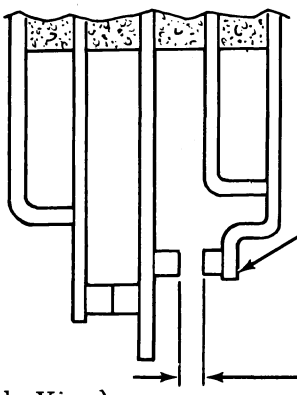


(Right Side View)

NORMALLY CLOSED CONTACT SPRING TENSION (Preliminary)

Requirement
Min 30 grams---Max 40 grams to open normally closed contact.

To Adjust
Bend swinger.

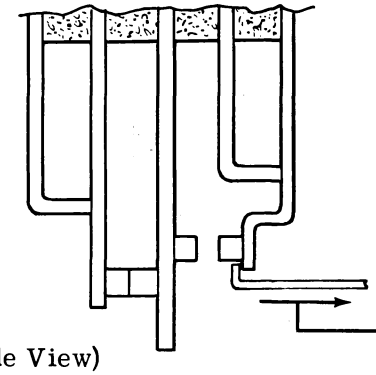


(Right Side View)

NORMALLY OPEN CONTACT GAP (Preliminary)

Requirement
Contact gap should be
Min 0.007 inch---Max 0.012 inch

To Adjust
Bend normally open contact backstop.



(Right Side View)

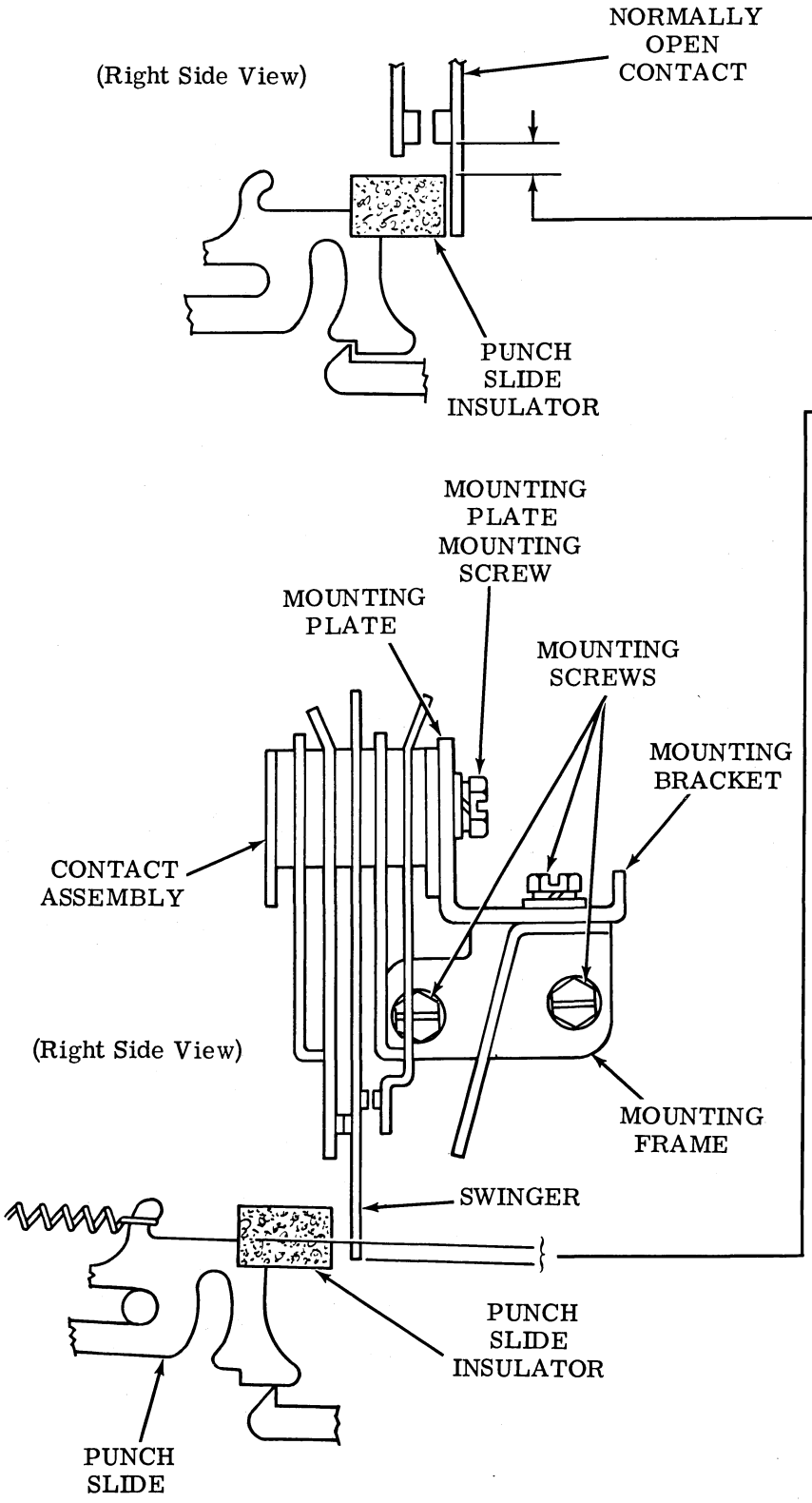
NORMALLY OPEN CONTACT SPRING TENSION (Preliminary)

Requirement
Min 35 grams---Max 50 grams to move normally open contact away from backstop.

To Adjust
Bend normally contact spring. To increase tension, it may be necessary to bend backstop away from the contact leaf, from the contact spring, and then reposition the backstop to meet requirement of NORMALLY OPEN CONTACT GAP (2.34).

2.35 Code Reading Contacts (continued)

Note: Make the following adjustments with the code contacts installed on the reperforator. Refer to the appropriate disassembly section for this procedure.



MOUNTING FRAME

(1) Requirement
With function clutch disengaged and latched, there should be
Min 0.100 inch clearance between closest normally open contact spring and punch slide insulator.

(2) Requirement
With DELETE combination selected and punch pins in their uppermost position, swinger should be parallel to right end of punch slide insulator and extend below its center, as gauged by eye.

To Adjust
Remove contact assembly, loosen mounting frame mounting screws, and position mounting frame to meet requirements. Tighten screws. Reinstall contact assembly.

MOUNTING PLATE POSITION

Requirement
Swinger of each pile-up should be aligned with its associated punch slide, as gauged by eye.

To Adjust
With mounting plate mounting screw loosened, position contact assembly. Tighten screw.

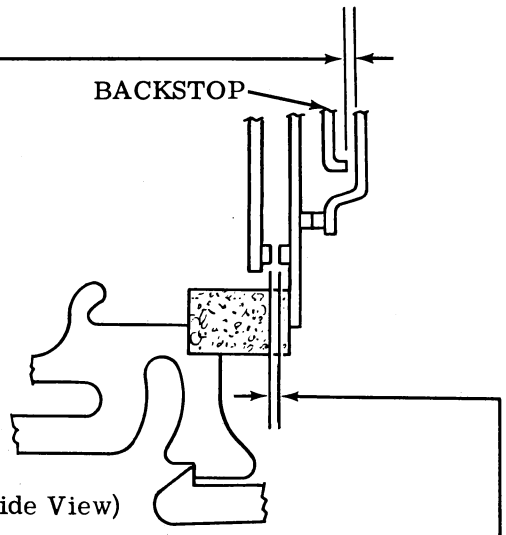
2.36 Code Reading Contacts (continued)

MOUNTING BRACKET POSITION (Preliminary)

To Check
Disengage and latch selector and function clutches. Manually select NULL combination and trip function clutch.

Requirement
Min some---Max 0.005 inch clearance between closed contact leaf and its backstop.

To Adjust
Loosen mounting bracket screws friction tight and position mounting bracket (2.35). Tighten mounting screws. To move mounting bracket toward punch mechanism, insert a screwdriver between bracket and punch mechanism side of mounting screw and pry bracket toward punch mechanism. To move mounting bracket away from punch mechanism, insert a screwdriver between bracket and receiving shaft side of mounting screw and pry bracket away from punch mechanism.



(Right Side View)

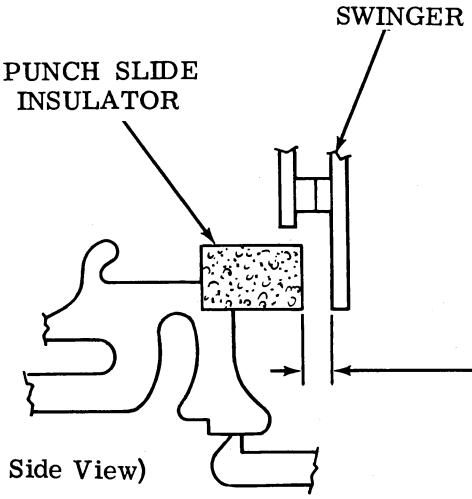
NORMALLY CLOSED CONTACT GAP

To Check
Disengage and latch selector and function clutches. Manually select NULL combination and trip function clutch.

Requirement
Min 0.025 inch---Max 0.030 inch gap between swinger and normally closed contact

To Adjust
Bend normally closed contact backstop.

Requirement
With DELETE combination selected and function clutch tripped, there should be Min 0.015 inch clearance between punch slide insulator and contact swinger.

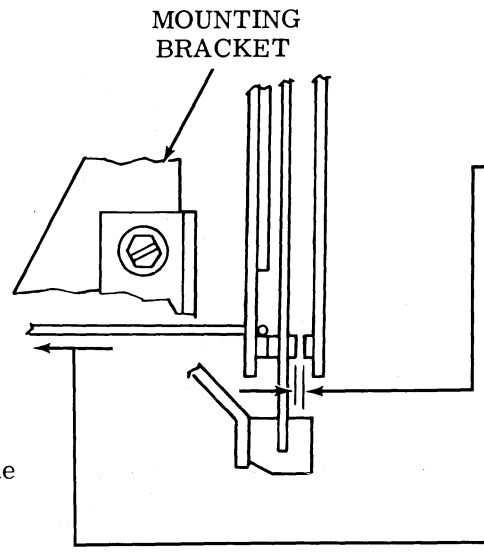


(Right Side View)

To Adjust
Refine MOUNTING BRACKET POSITION (2.36) and requirement (1) of NORMALLY CLOSED CONTACT GAP (2.36).

2.37 Auxiliary Timing Contacts

Note: The following adjustments should be made with the timing contact removed from the reperforator. Refer to the appropriate disassembly section for this procedure.



(A) NORMALLY CLOSED TIMING CONTACT GAP

Requirement
With swinger held against backstop, there should be
Min 0.020 inch---Max 0.025 inch
open contact gap.

To Adjust
Bend thick contact leaf.

(D) NORMALLY OPEN TIMING CONTACT PRESSURE (Preliminary)

Requirement
With swinger held against its backstop by associated operating bail and spring, it should require
Min 4-1/2 oz---Max 5-1/2 oz
to open operated contact.

To Adjust
Bend leaf nearest mounting bracket. Recheck contact gap adjustments and readjust if necessary.

(B) NORMALLY CLOSED TIMING CONTACT PRESSURE (Preliminary)

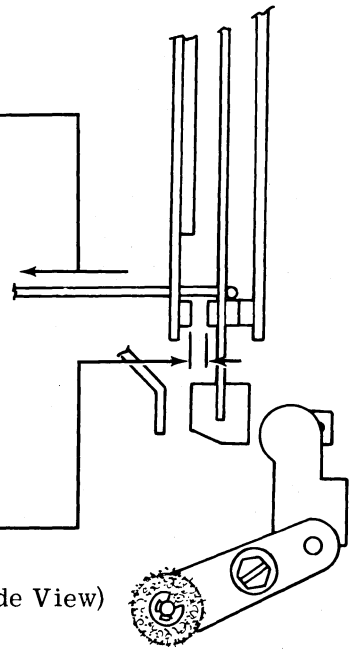
Requirement
With operating lever held away from swinger insulator, it should require
Min 4-1/2 oz---Max 5-1/2 oz
to open normally closed contact.

To Adjust
Bend swinger. Recheck and if necessary readjust NORMALLY CLOSED TIMING CONTACT GAP (2.37).

(C) NORMALLY OPEN TIMING CONTACT GAP

Requirement
With bail held away from swinger, there should be
Min 0.020 inch---Max 0.025 inch
open contact gap.

To Adjust
Bend stiffener.



2.38 Auxiliary Timing Contacts (continued)

Note: To make the following adjustments, loosen cam follower arm locking screw and position the cam follower arm in its elongated mounting holes so that it is as long as possible. Tighten the locking screw. Reinstall timing contact assembly before proceeding. Centrally locate timing contact mounting screws in their slots.

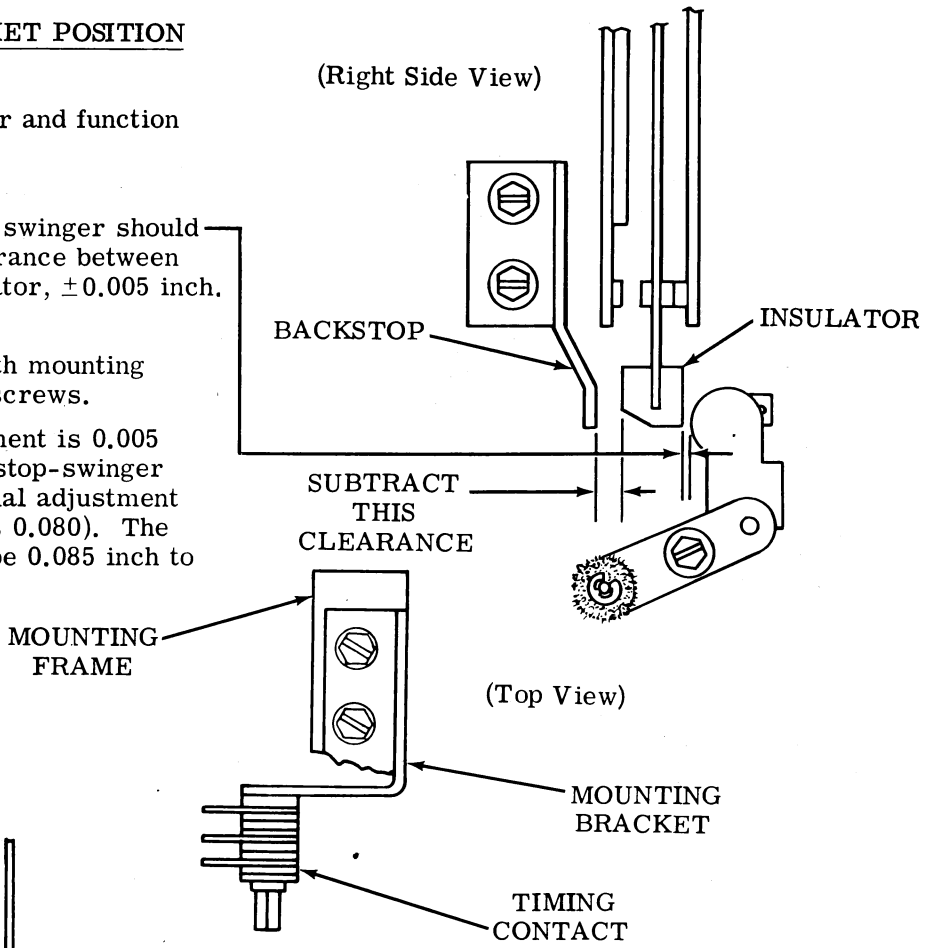
CONTACT MOUNTING BRACKET POSITION

To Check
Disengage and latch selector and function clutches.

Requirement
Clearance between bail and swinger should be 0.165 inch, less the clearance between backstop and swinger insulator, ±0.005 inch.

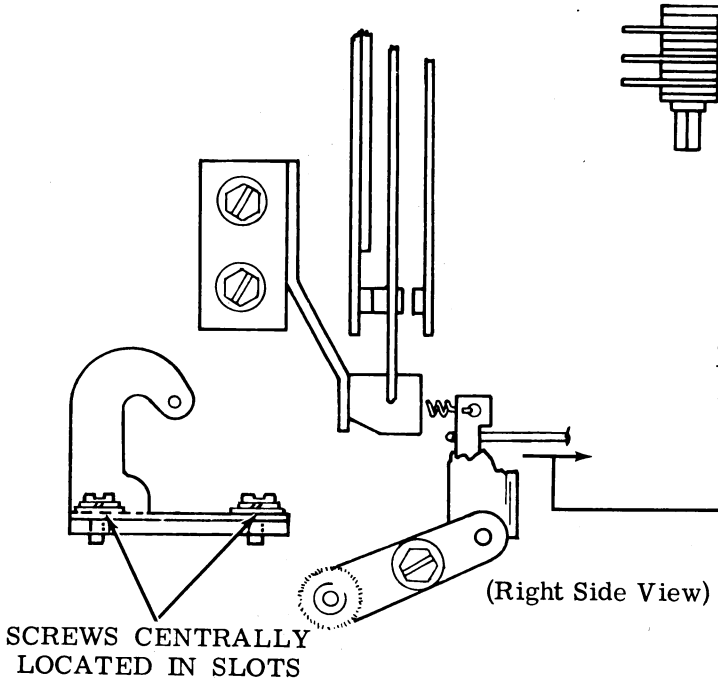
To Adjust
Position contact bracket with mounting screws loosened. Tighten screws.

Note: Range of this adjustment is 0.005 inch. For example, if backstop-swinger gap is 0.080 inch, the nominal adjustment would be 0.085 (0.165 minus 0.080). The range of adjustment would be 0.085 inch to 0.090 inch.



OPERATING BAIL SPRING

Requirement
With contact swinger held against its backstop by associated operating bail, it should require
Min 7 oz---Max 12 oz
to pull spring to position length.



2.39 Code Reading Contacts and Auxiliary Timing Contacts

Note: Refer to the appropriate section for instructions on the operation of the DXD. If no DXD is available, use similar equipment.

CODE READING AND AUXILIARY TIMING CONTACTS TESTING (Final)

General

(1) Perform these tests, and complete adjustment of the contacts.

(2) Tests are made at 150 wpm with an 11.0 unit code Distortion Test Set (DXD) operating at 100 wpm, with 35 percent bias applied.

(3) When indicated specifications in these tests cannot be made, refine adjustments or change related signal lengths to facilitate timing requirements.

(4) Minimum signal lengths apply to the interval between latest start and earliest end of all contact traces. Maximum signal length applies to interval between earliest start and latest end of all contact traces.

DXD Zero Adjustment

In the following tests, observations of a neon trace on the DXD are made. The trace has a tendency to "jump" as high as ten scale divisions and become too unstable for accurate readings to be taken. Therefore, perform these steps to zero the DXD:

(1) With reperforator operating and receiving DELETE combinations, with 35 percent marking bias applied, connect the neon trace to normally open (marking) side of code contact 1. Observe and note the point at which the trace begins. This point will jump, as described above. Note only the minimum reading.

(2) Repeat step (1) for all other code contacts.

(3) Select the contact trace which starts the latest.

(4) Set the START-ZERO mark of the DXD scale to this point on the trace.

(5) The DXD is now zeroed. Record the earliest end of the neon traces for future adjustment reference.

(6) Proceed to test the code and timing contacts.

2.40 Code Reading Contacts (continued)

CODE READING CONTACTS (Final)

(1) Requirement

Connect neon trace lamp to contact normally open (marking) when unit is in idle position. With unit receiving DELETE combinations, and 35 percent marking bias applied, the combined code contact traces should have a minimum signal length of 33 ms (363 divisions) and a maximum signal length of 47 ms (517 divisions). See diagram below. All bounce should end within 20 divisions of the earliest start and the latest end of trace.

(2) Requirement

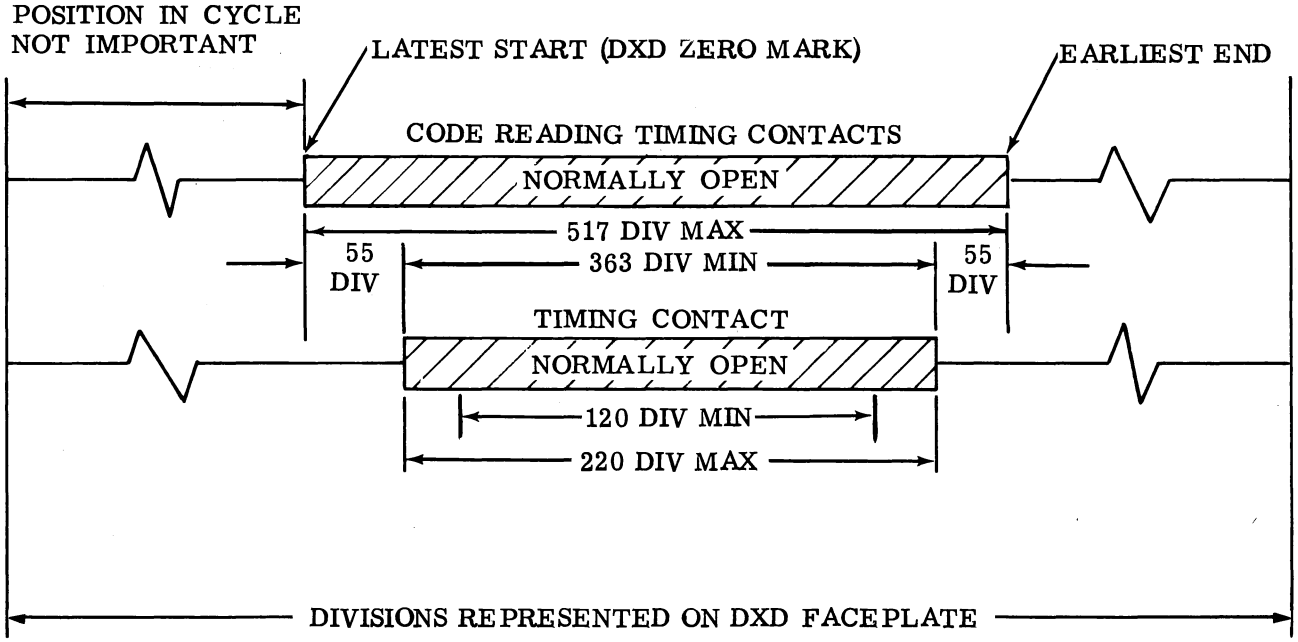
With neon trace lamp connected to both sides of this contact (normally open and normally closed) with 35 percent marking bias applied, there should be a minimum of 2 divisions gap in neon trace (2 places), indicating break-before-make contact action. Spacing contact should have a minimum of 440 divisions signal length and have no breaks within the minimum length requirement while the unit is receiving DELETE combinations. Repeat for each contact.

(3) Requirement

With unit receiving a character code, with 35 percent spacing bias applied, connect DXD neon trace lamp to normally closed (spacing) side of contacts when unit is in idle position. Trace should be on continuously and be free of breaks. Repeat for each contact.

To Adjust

Refine MOUNTING PLATE POSITION (2.35) and MOUNTING BRACKET POSITION (2.36). Refine MOUNTING PLATE POSITION (2.35) and the NORMALLY CLOSED CONTACT GAP (2.36) and adjust towards the maximum signal length. If Requirements (2) and (3) cannot be met, refine MOUNTING PLATE POSITION (2.35) and MOUNTING BRACKET POSITION adjustment. If there is excessive bounce, refine SPRING TENSION — NORMALLY CLOSED CONTACT AGAINST BACKSTOP (2.33). NORMALLY CLOSED CONTACT SPRING TENSION (2.34), and NORMALLY OPEN CONTACT SPRING TENSION (2.34). Repeat test procedure if refinements are made.



2.41 Auxiliary Timing Contacts (continued)

AUXILIARY TIMING CONTACTS (Final)

To Check

Zero the DXD (2.39). Connect neon trace lamp to normally open side of contact when unit is in idle position. With unit operating and receiving DELETE combinations, with 35 percent marking bias applied, the following requirements should meet those in diagram 2.40.

(1) Requirement

Latest trace should end a minimum of 5 ms (55 divisions) before the earliest end of code reading timing contact trace.

(2) Requirement

Longest trace should be a maximum of 20 ms (220 divisions) and a minimum of 120 divisions long. All bounce should end within 4 divisions of earliest start and latest end of a trace.

(3) Requirement

The earliest trace should start a minimum of 5 ms (55 divisions) after the DXD ZERO mark.

To Adjust

Refine CONTACT MOUNTING BRACKET POSITION (2.38) and/or NORMALLY CLOSED TIMING CONTACT GAP (2.37), NORMALLY CLOSED TIMING CONTACT PRESSURE (2.37) if requirements cannot be met. If bounce is excessive, refine NORMALLY CLOSED TIMING CONTACT PRESSURE (2.37) and/or NORMALLY OPEN TIMING CONTACT PRESSURE (2.37).