

HIGH SPEED TAPE PUNCH UNIT

(BRPE TYPE)

ADJUSTMENTS

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Tape feed-out lever spring . . . . .	18	1.01 This section contains adjustment proce-	
Tape lid spring . . . . .	14	dures for the high speed tape punch unit	
Ten to the inch . . . . .	13	(BRPE type). It is reissued to include engineer-	
Wedge block . . . . .	16	ing changes for a new stop plate guide and to	
		correct an illustration error. Marginal arrows	
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		<b>CAUTION: REMOVE POWER FROM PUNCH</b>	
		<b>UNIT BEFORE MAKING AN ADJUSTMENT</b>	
		<b>UNLESS STATED OTHERWISE.</b>	

SECTION 592-802-700TC

1.02 Read the entire adjustment procedure carefully before making the adjustment. When directed, loosen nuts and screws friction tight; then tighten when adjustment is complete. Adjustments are arranged in a sequence that is followed when a complete readjustment of the punch unit is undertaken.

1.03 Parts or assemblies that are removed to simplify a particular series of adjustments should not be replaced until that particular series of adjustments is complete.

1.04 Unless stated otherwise, references to left or right, front or rear, and up or down are front views of the punch unit in its

normal operating position. If more than one adjustment appears on an illustration, follow the letter sequence (A), (B), (C), etc.

1.05 For tools needed to make adjustments, refer to Section 570-005-800TC. For parts ordering information on the late-design punch units and the early-design punch units, refer to Sections 592-802-800TC and 592-802-802TC respectively.

1.06 The spring tension ratings given are indications, not exact values. Check springs with the proper scales in the positions shown. If no adjustment procedure is given, replace springs not meeting requirements.

2. BASIC UNIT (Late Design)

2.01 Punch Mechanism

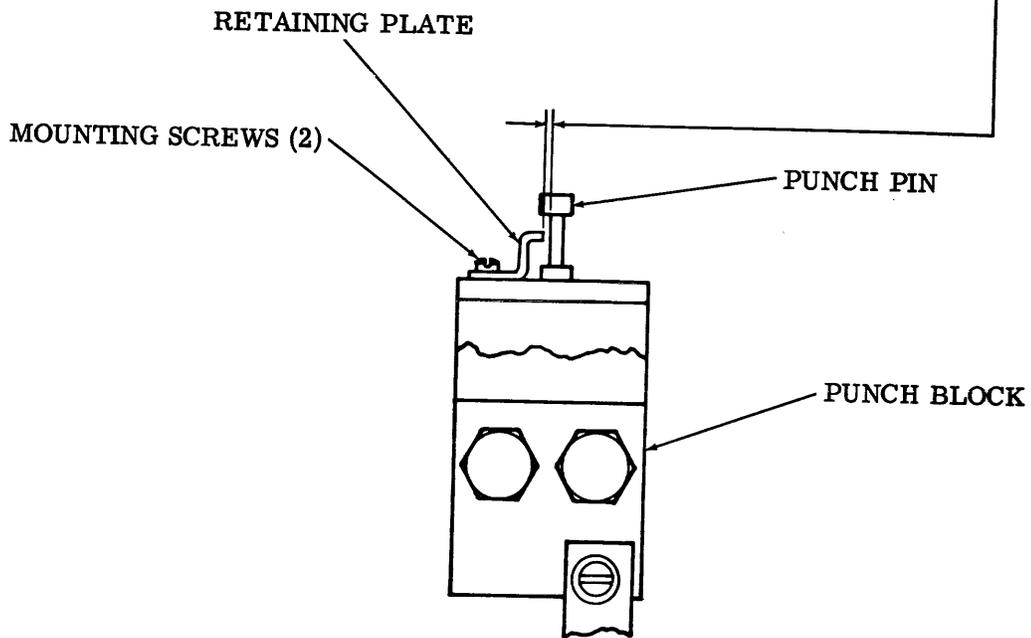
PUNCH PIN RETAINING PLATE

**Requirement**

Punch pins should move freely with minimum clearance between punch pins and retaining plate.

**To Adjust**

Loosen mounting screws. Position retaining plate to meet requirement.



(Front View)

**Note:** If punch block is removed, make the adjustment before remounting it.

**CAUTION:** DO NOT ADJUST PUNCH BLOCK DIE PLATE.

2.02 Punch Mechanism (continued)

→ STOP PLATE WITHOUT GUIDES

To Check

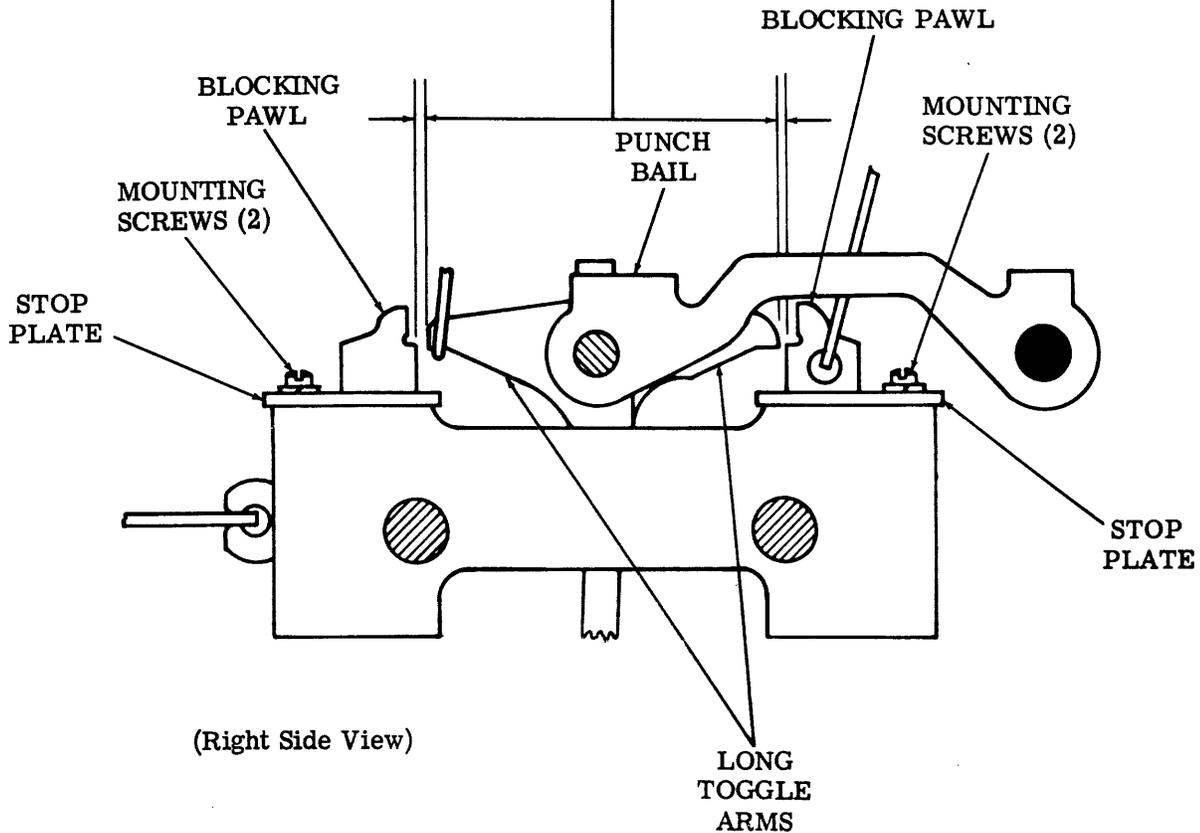
Hold the blocking pawls against their stop plates. Rotate main shaft until the long toggle arms are below the engaging surfaces of the blocking pawls.

Requirement

Clearance between the long toggle arms and the blocking pawls should be  
--- Min 0.002 inch---Max 0.010 inch

To Adjust

Loosen mounting screws. Position stop plates to meet requirement.



2.03 Punch Mechanism (continued)

STOP PLATE WITH GUIDES

To Check

Hold blocking pawls against stop plates away from toggle arms. Rotate main shaft until long toggle arms are below engaging surfaces of blocking pawls.

(1) Requirement

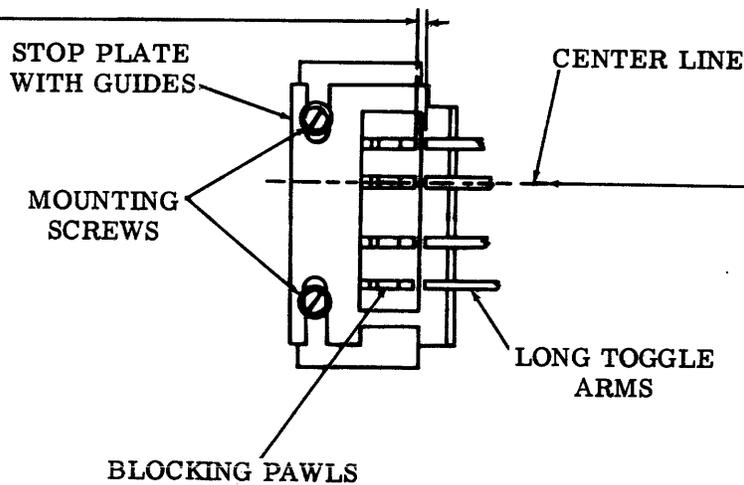
Clearance between long toggle arms and their blocking pawls should be  
 Min 0.002 inch---Max 0.010 inch

(2) Requirement

Center line of blocking pawl and long toggle arm should be in line within  
 0.010 inch gauged by eye

To Adjust

Position stop plates with mounting screws loosened for both requirements.  
 When requirements are made, tighten screws.



2.04 Punch Mechanism (continued)

LONG TOGGLE ARM SPRINGS

To Check

(1) Code Magnets

Set punch bail to its uppermost center position. Hook scale under long toggle arm and pull until knee buckles.

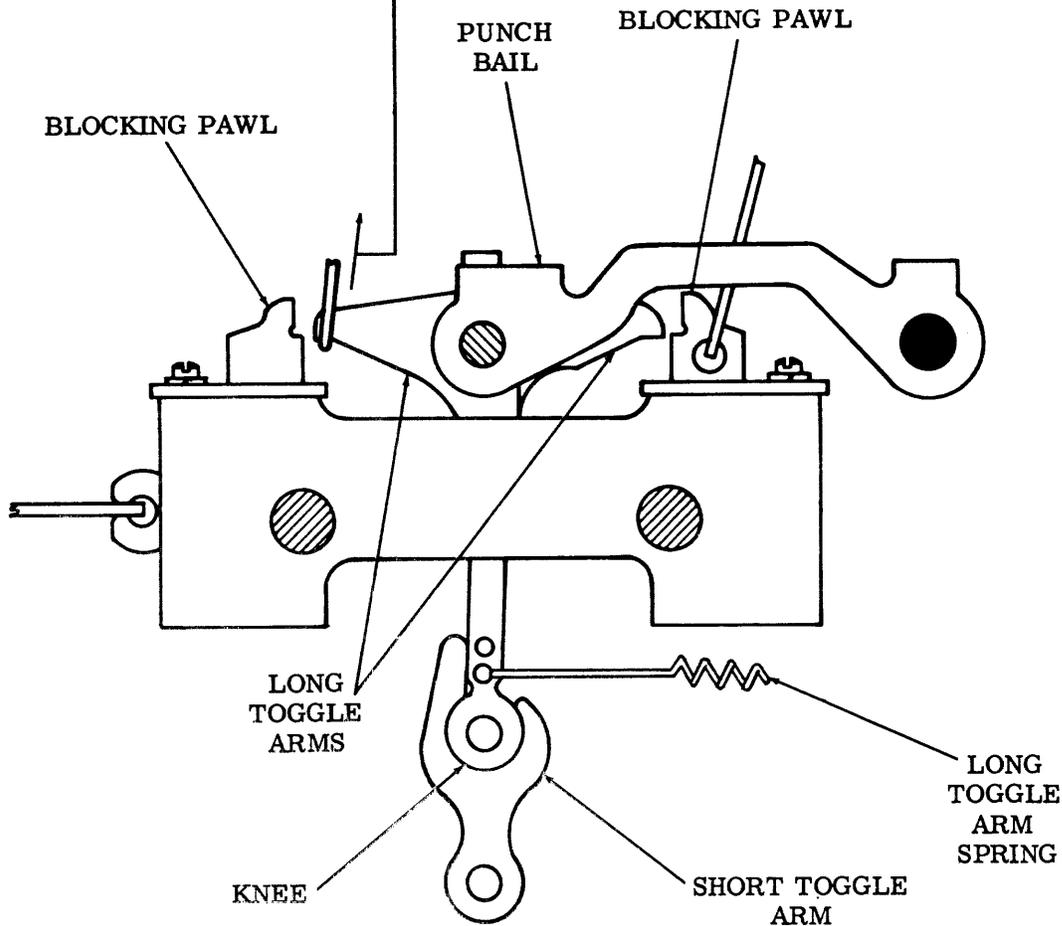
(2) Feed Magnet

Rotate main shaft counterclockwise until the code magnet long toggle arms touch their respective blocking pawls. Release feed magnet long toggle arm from its blocking pawl. Hook scale under long toggle arm and pull until knee buckles.

Requirement (Each Spring)

Min 8 oz---Max 11 oz

to start short toggle arm moving away from long toggle arm.



(Right Side View)

2.05 Punch Mechanism (continued)

(A) MAGNET PLATE

**Requirement**

With armature attracted, there should be  
— Min 0.004 inch---Max 0.006 inch  
clearance between armature and pole face.

**To Adjust**

Loosen mounting screws. Position magnet plate to meet requirement.

Note: Clearance may be altered to meet range and operational requirements.

(B) MAGNET ARMATURE SPRING (Feed Level Only)

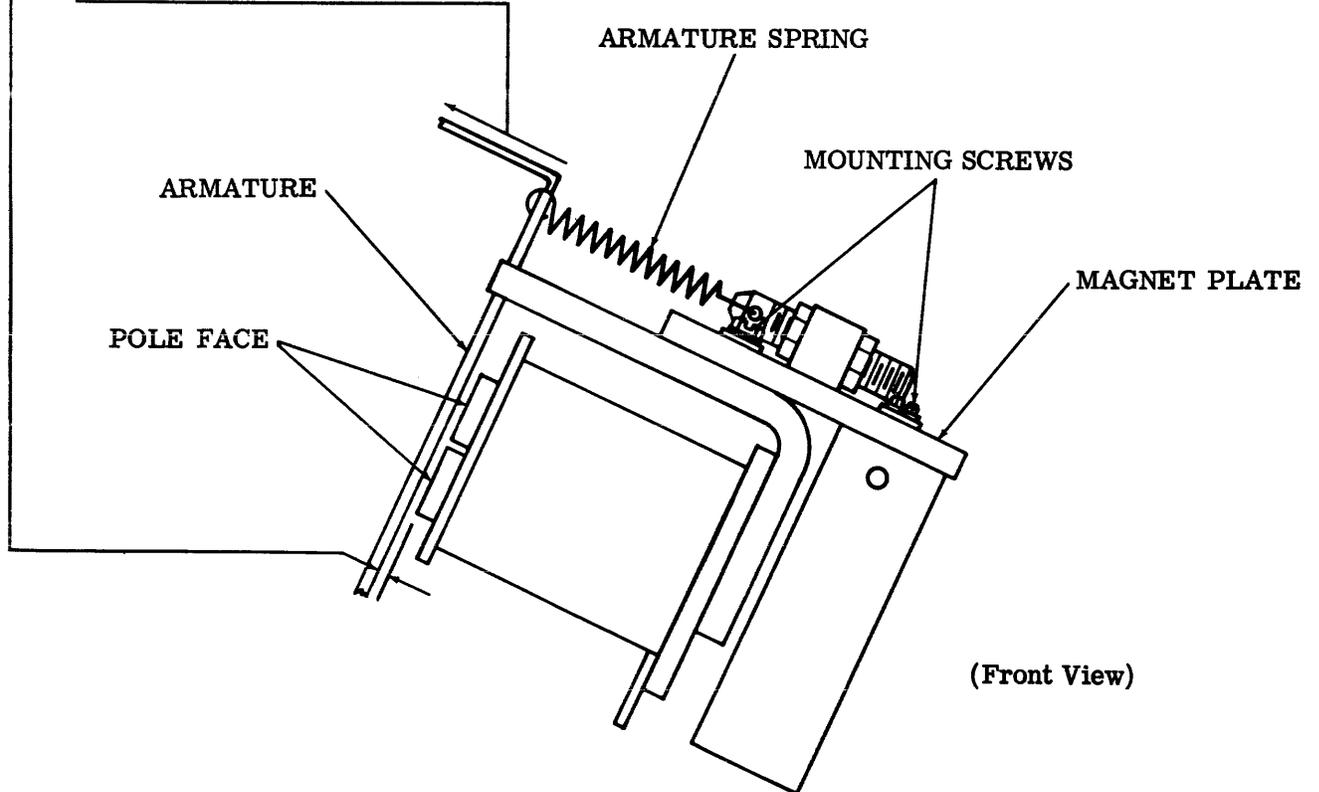
**To Check**

Set punch bail to its uppermost center position.

**Requirement**

— Min 14 oz---Max 17 oz  
to move armature.

Note: Spring tension may be altered to meet range and operational requirements.



2.06 Punch Mechanism (continued)

MAGNET ARMATURE SPRING (Each Code Level)

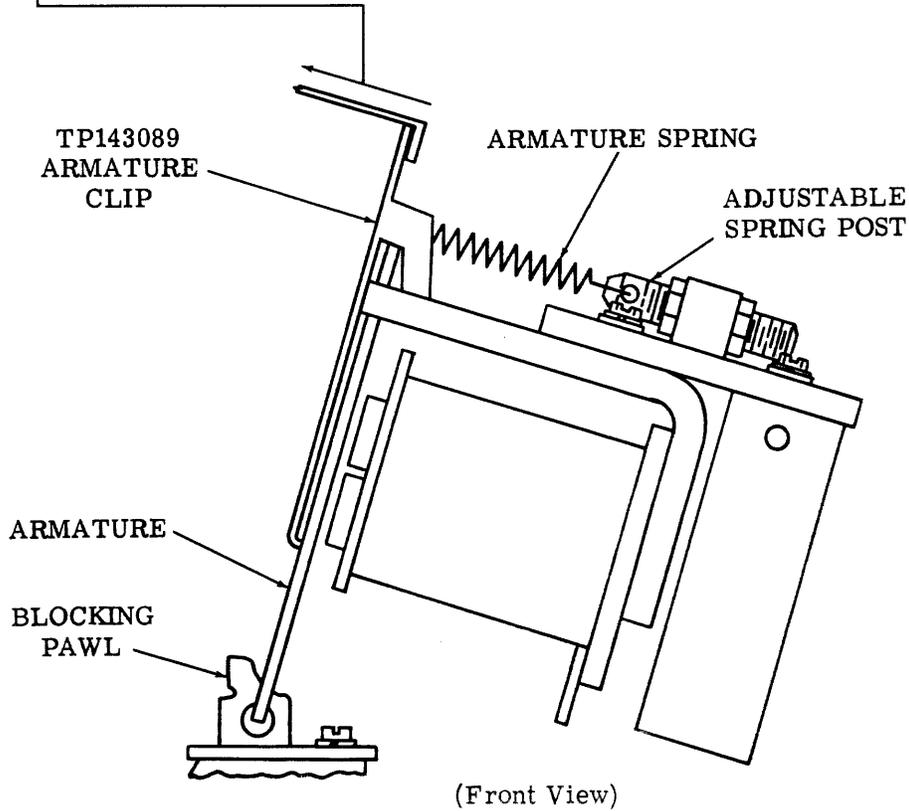
To Check

Insert armature clip TP143089 as shown. Set punch bail to its uppermost position. Hook scale under armature clip and pull in on a line with the armature spring until armature moves.

Requirement

Min 5-1/2 oz---Max 6-1/2 oz  
to move armature.

Note: Spring tension may be altered to meet range and operational requirements.



2.07 Punch Mechanism (continued)

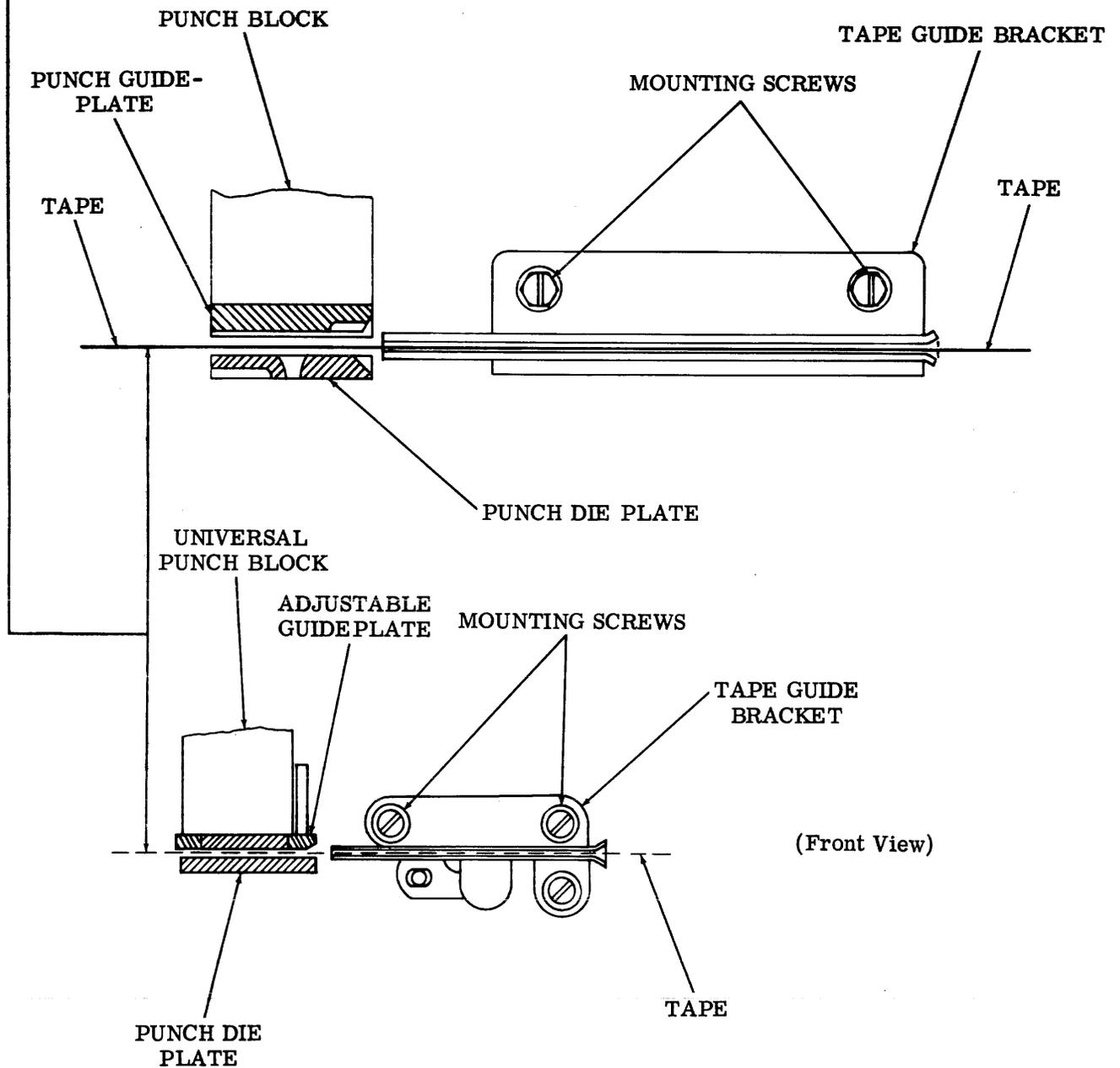
TAPE GUIDE ALIGNMENT

**Requirement**

With punch bail in uppermost position, tape should pass freely from tape guide bracket through punch die plate.

**To Adjust**

Loosen tape guide bracket mounting screws. Position tape guide bracket to meet requirement.



2.08 Punch Mechanism (continued)

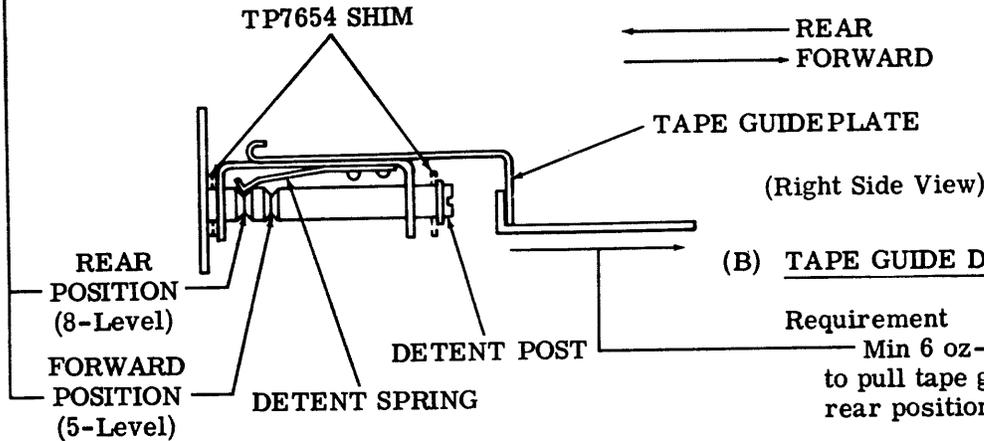
(A) TAPE GUIDE DETENT

Requirement

Tape guideplate should detent in rear and forward positions.

To Adjust

Insert shim(s) TP7654 at front or rear of detent post to meet requirement.



(B) TAPE GUIDE DETENT SPRING

Requirement

Min 6 oz---Max 14 oz  
to pull tape guideplate from detent at rear position.

To Adjust

Reform detent spring to meet requirement.

Note: Adjustments (A) and (B) pertain only to punch units with a universal punch block capable of punching either 11/16-inch or 1-inch tape.

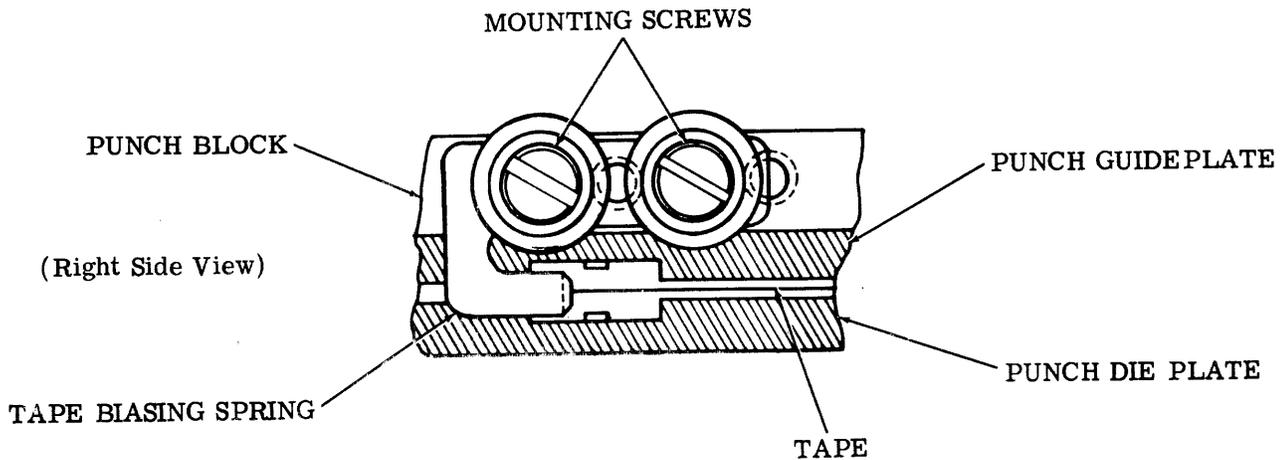
TAPE BIAS SPRING

Requirement

The tape bias spring should slant the tape toward the rear of the punch block without crimping or curling the front edge of the tape.

To Adjust

Loosen mounting screws. Position spring to meet requirement.



Note: The tape bias spring must not bind against the punch guideplate or the punch die plate.

2.09 Punch Mechanism (continued)

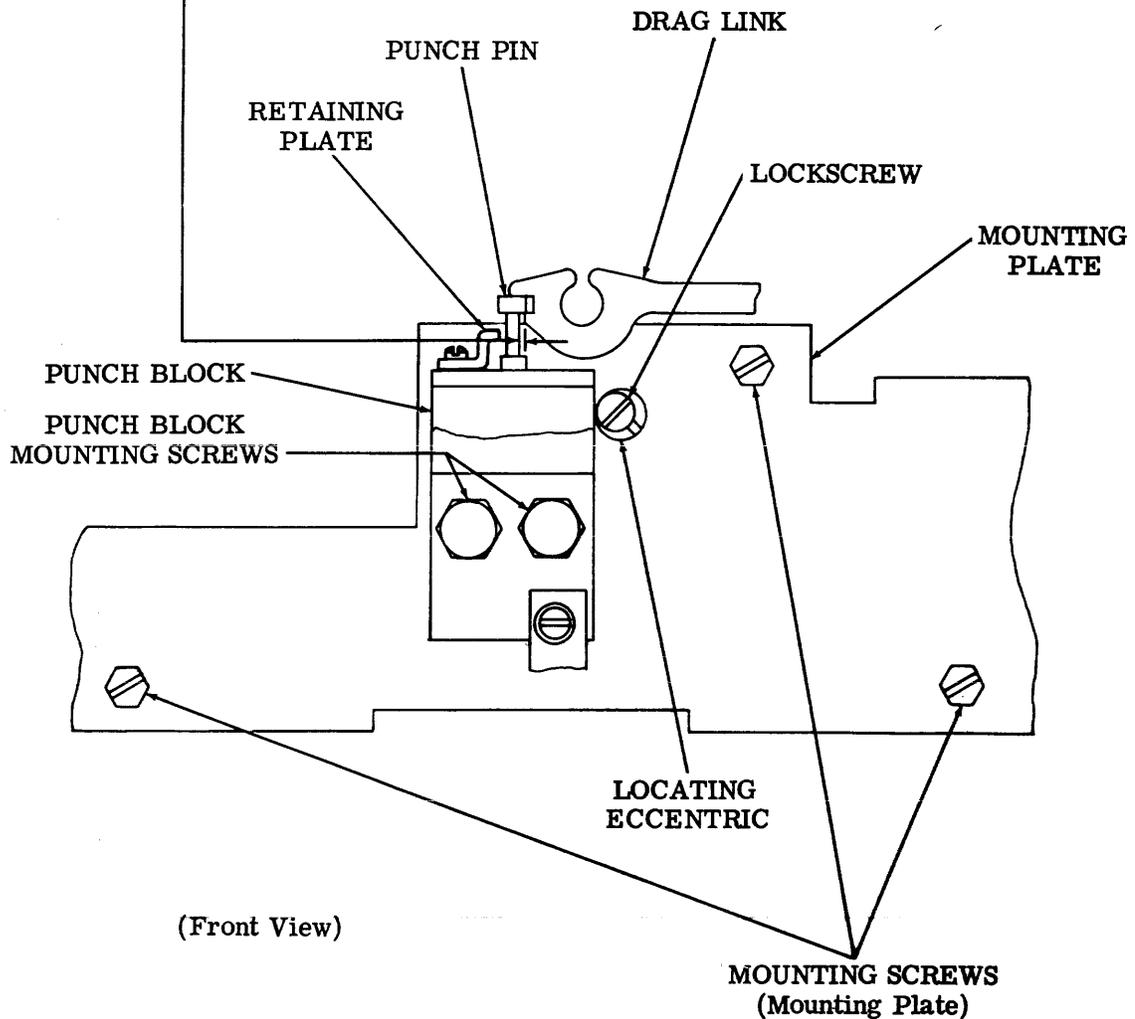
(A) PUNCH BLOCK

Requirement

Min some---Max 0.005 inch  
clearance between drag links and punch  
pins.

To Adjust

Loosen mounting plate mounting screws.  
Position punch block to meet requirement.  
To refine the adjustment, loosen punch  
block mounting screws and the locating  
eccentric lockscrew. Position punch  
block locating eccentric to meet require-  
ment.



2.10 Punch Mechanism (continued)

(B) OPERATING LINK SPRING

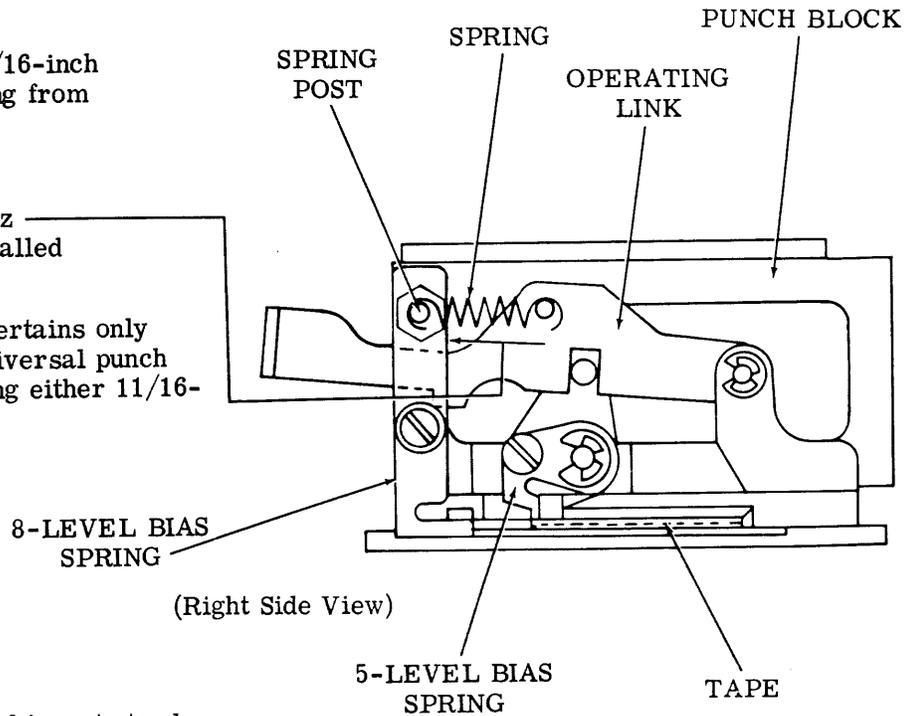
To Check

Set operating link to 11/16-inch position. Remove spring from post.

Requirement

Min 6 oz---Max 10 oz to pull spring to its installed position.

Note: Adjustment (B) pertains only to punch units with a universal punch block capable of punching either 11/16-inch or 1-inch tape.



DRAG LINKS

(1) To Check

Set punch unit to idle and insert standard tape.

Requirement

After idling five minutes, tape should be free of punch pin impressions.

(2) To Check

Apply power and punch a series of marking codes.

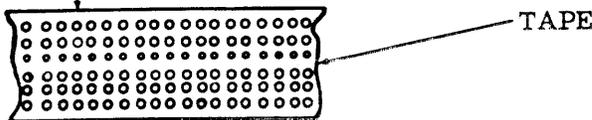
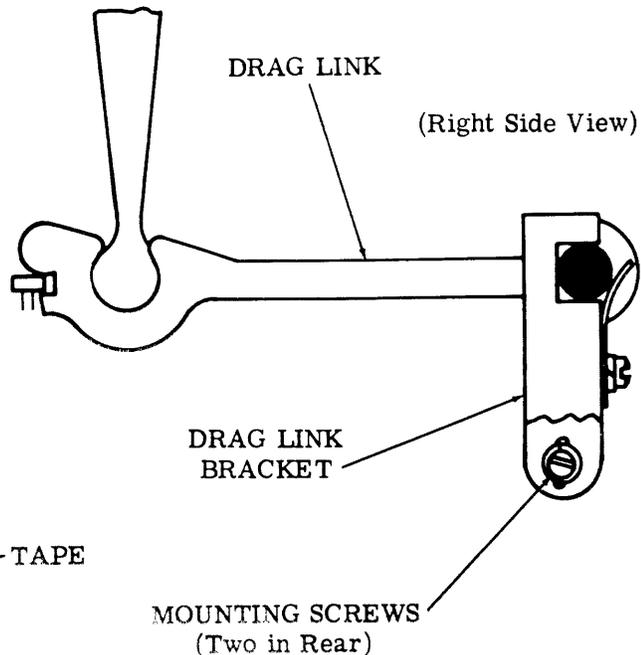
Requirement

All hole edges should be clean cut.

To Adjust

Loosen three mounting screws. Move drag link bracket to its center range. If tape shows any punch pin impressions, move bracket down. If tape shows any burrs, move bracket up.

Note: If punch pins continue to make impressions when the drag link bracket is in its lowermost position, loosen punch block mounting screws and push punch block down. Repeat DRAG LINKS adjustment.



2.11 Tape Feed Mechanism

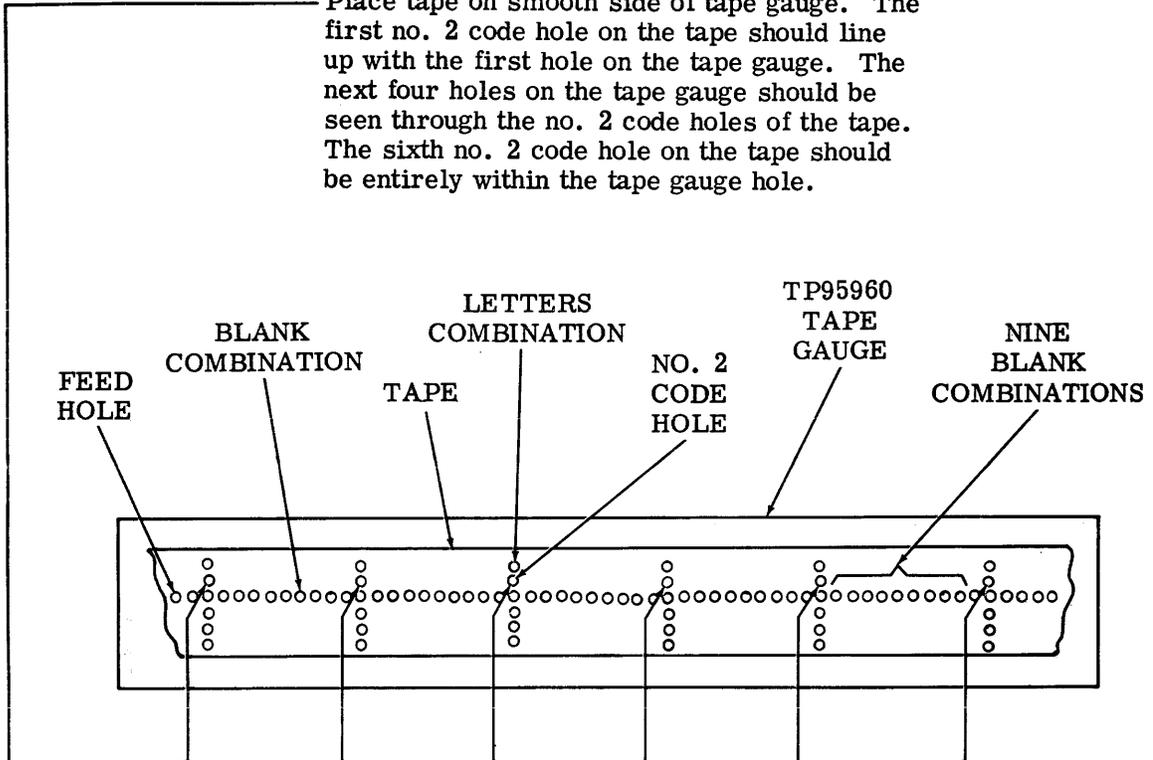
TEN TO THE INCH

To Check

With a full supply of tape, punch six series of nine "blank" codes followed by one "letters" code.

Requirement

Place tape on smooth side of tape gauge. The first no. 2 code hole on the tape should line up with the first hole on the tape gauge. The next four holes on the tape gauge should be seen through the no. 2 code holes of the tape. The sixth no. 2 code hole on the tape should be entirely within the tape gauge hole.



(Top View)

Note: The following seven adjustments (A through G) must meet the TEN TO THE INCH requirement.

2.12 Tape Feed Mechanism (continued)

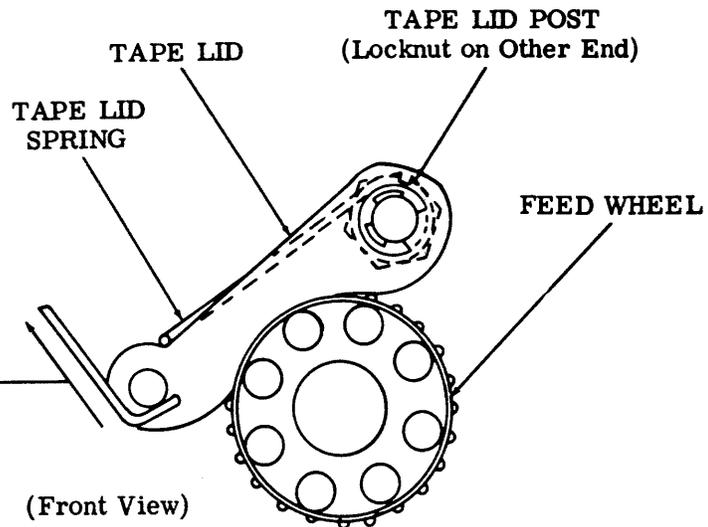
(A) TAPE LID SPRING

**Requirement**

Start tape lid moving with  
Min 4 oz---Max 6 oz

**To Adjust**

Loosen tape lid post locknut.  
Rotate tape lid post to meet  
requirement.



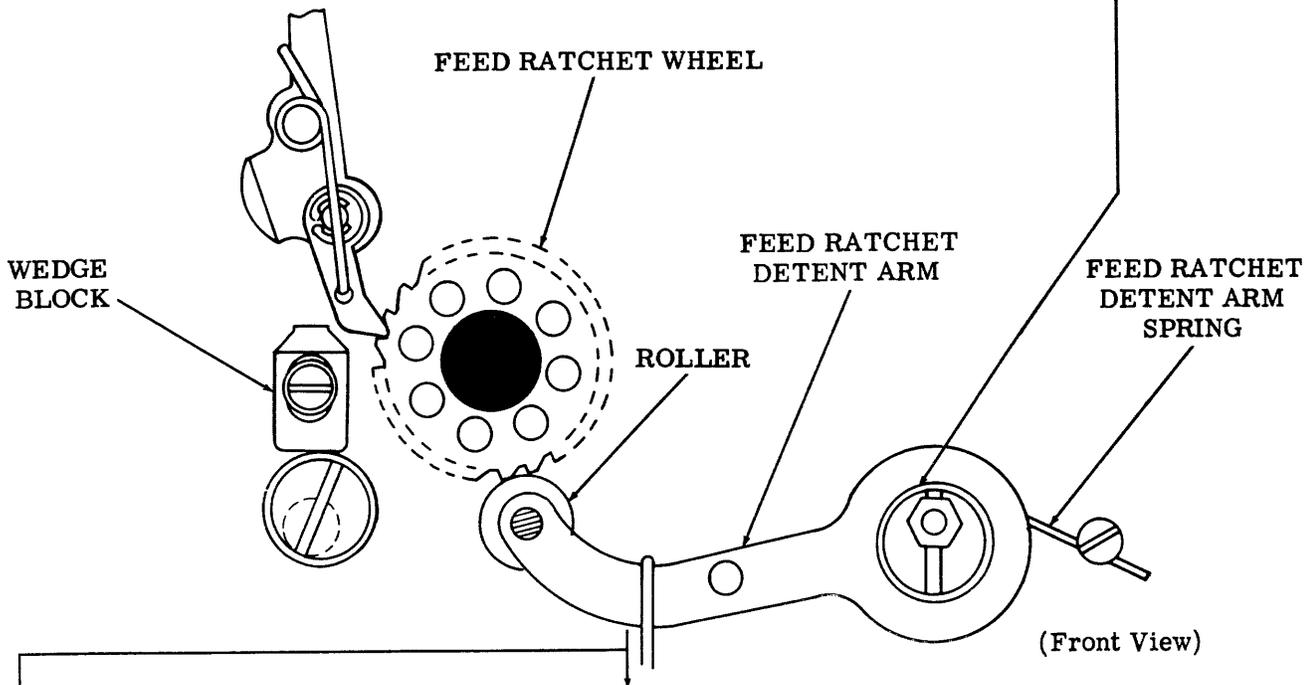
(B) FEED RATCHET DETENT ARM

**Requirement**

Set feed ratchet detent arm eccentric to its lowermost position.

**To Adjust**

Loosen eccentric locknut. Position eccentric to meet requirement.



(C) FEED RATCHET DETENT ARM SPRING

**To Check**

Hook scale over feed ratchet detent arm as shown and pull downward.

**Requirement**

To move feed ratchet detent arm it should require  
Min 36 oz---Max 46 oz

2.13 Tape Feed Mechanism (continued)

(D) FEED PAWL LINK

To Check

Loosen wedge block mounting screw and eccentric locknut. Move wedge block and eccentric to their lowermost positions. Operate feed magnet armature and rotate main shaft by hand.

Requirement

Feed pawl should advance feed ratchet one full tooth with noticeable overtravel beyond the fully detented position of the feed ratchet.

To Adjust

Loosen plate mounting screws and plate eccentric locknut. Position feed link by rotating plate eccentric. Check feed pawl at top of next feed cycle. To refine adjustment, reduce overtravel.

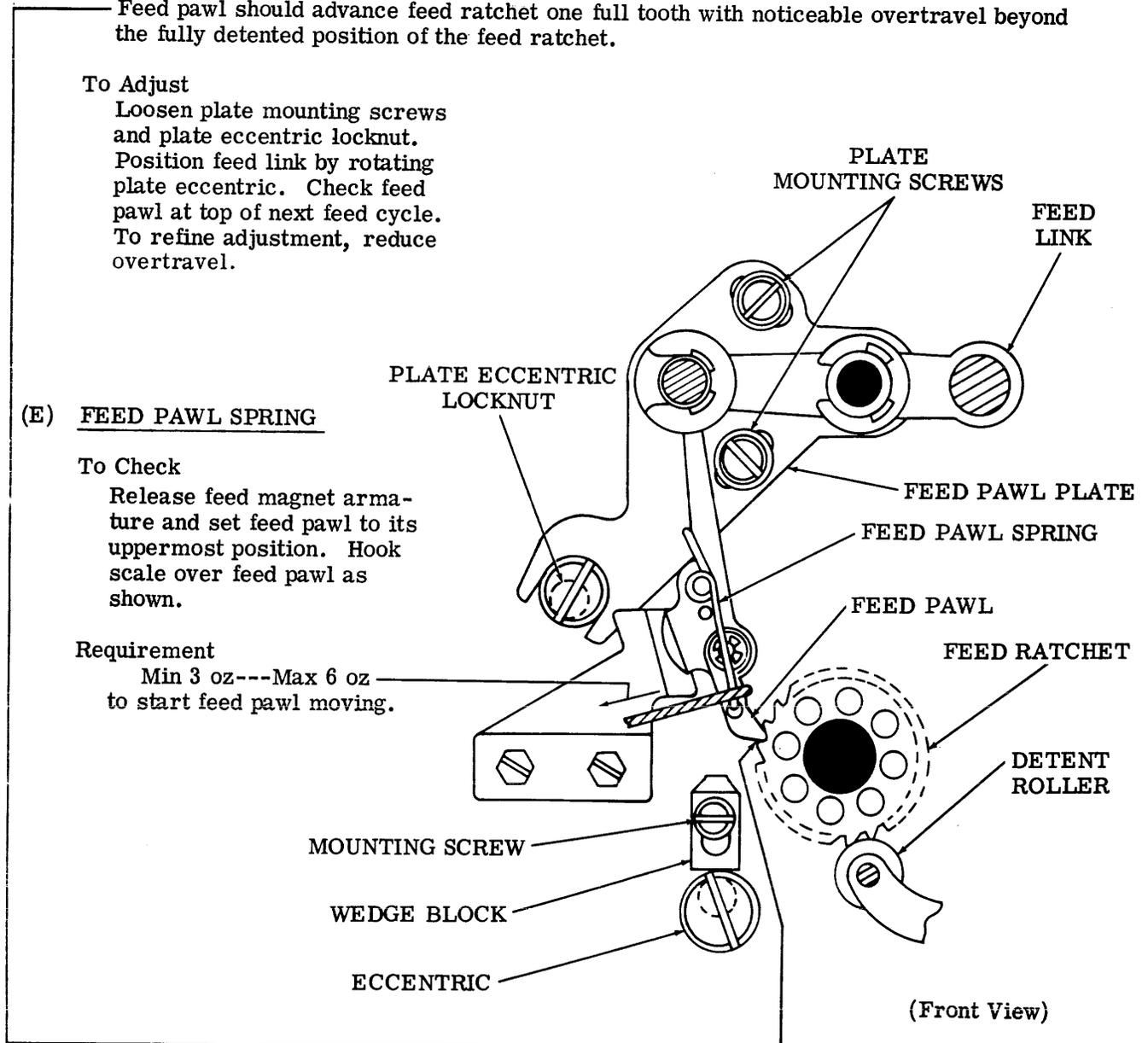
(E) FEED PAWL SPRING

To Check

Release feed magnet armature and set feed pawl to its uppermost position. Hook scale over feed pawl as shown.

Requirement

Min 3 oz---Max 6 oz to start feed pawl moving.



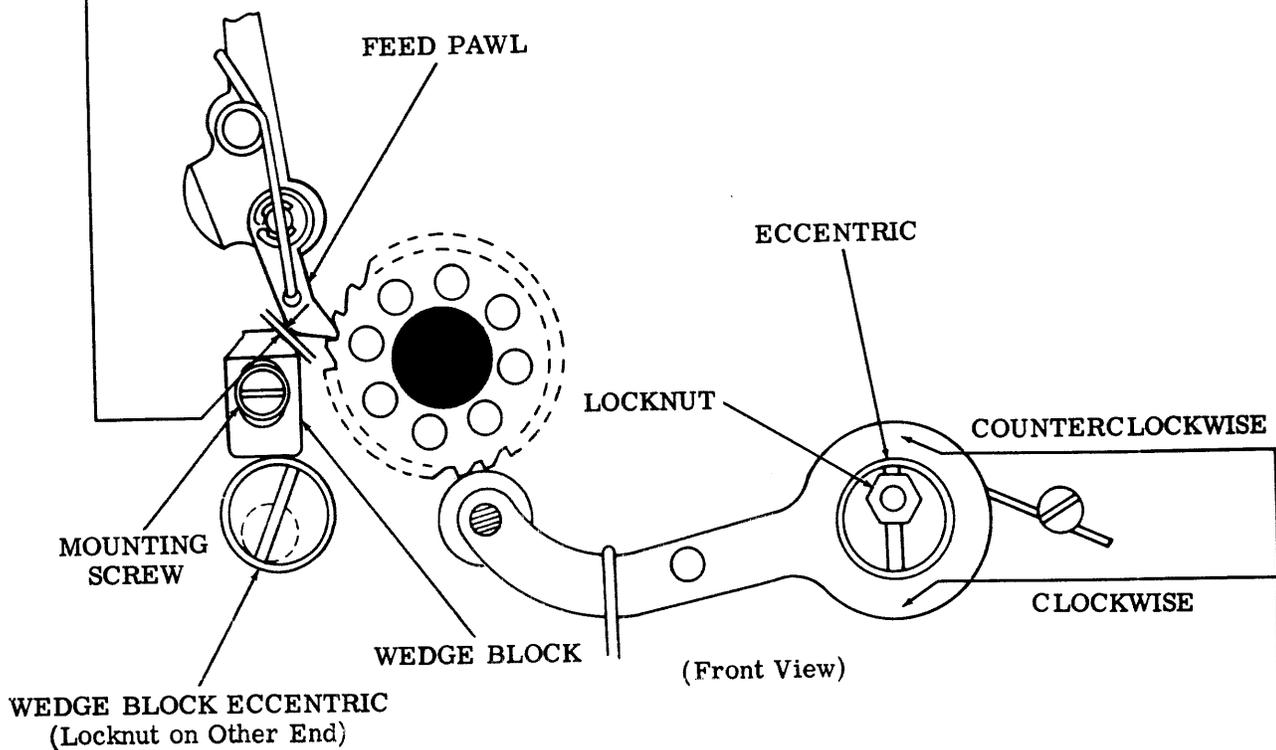
## 2.14 Tape Feed Mechanism (continued)

**(F) WEDGE BLOCK****Requirement**

With feed pawl in lowermost position, clearance between wedge block and feed pawl should be  
Min some---Max 0.002 inch

**To Adjust**

Loosen wedge block mounting screw and eccentric locknut. Move wedge block to uppermost position, and wedge block eccentric to lowermost position. Release feed magnet armature. Rotate main shaft by hand to position wedge block. Move wedge block eccentric to touch bottom of wedge block.

**(G) CHECK FOR TEN TO THE INCH****Requirement**

Repeat TEN TO THE INCH (2.11) requirement.

**To Adjust**

Loosen eccentric locknut. If punched holes are too far apart, move eccentric slightly clockwise. If punched holes are too close, move eccentric slightly counterclockwise.

## 2.15 Tape Feed Mechanism (continued)

MAGNETIC PICKUP**To Check**

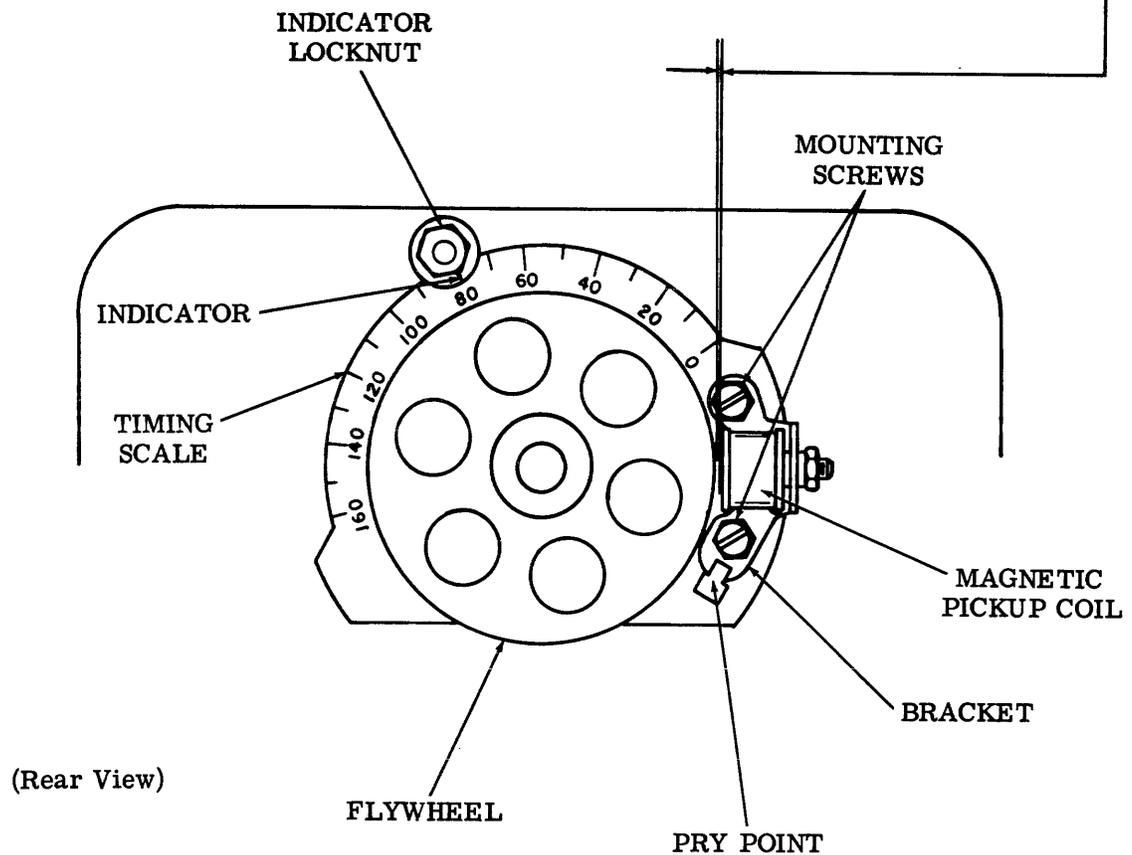
Set timing scale on 80 opposite indicator. Take up play between flywheel and magnetic pickup for least clearance.

**Requirement**

Min 0.010 inch---Max 0.015 inch  
at point of least clearance.

**To Adjust**

Loosen mounting screws. Position bracket at pry point to meet requirement.

OPERATING RANGE**To Check**

Connect punch unit to its control circuits. Using test tape TP146605 or equivalent, rotate the magnetic pickup bracket in one direction and then in the other until errors occur. Note the numbers on the range scale at the points of error.

**Requirement**

A minimum 80 points of error free operation for 110 ops and 115 v dc at 1 ampere.

**To Adjust**

Loosen mounting screws. Set operating range indicating line opposite middle of operating range.

2.16 Tape Feed Mechanism (continued)

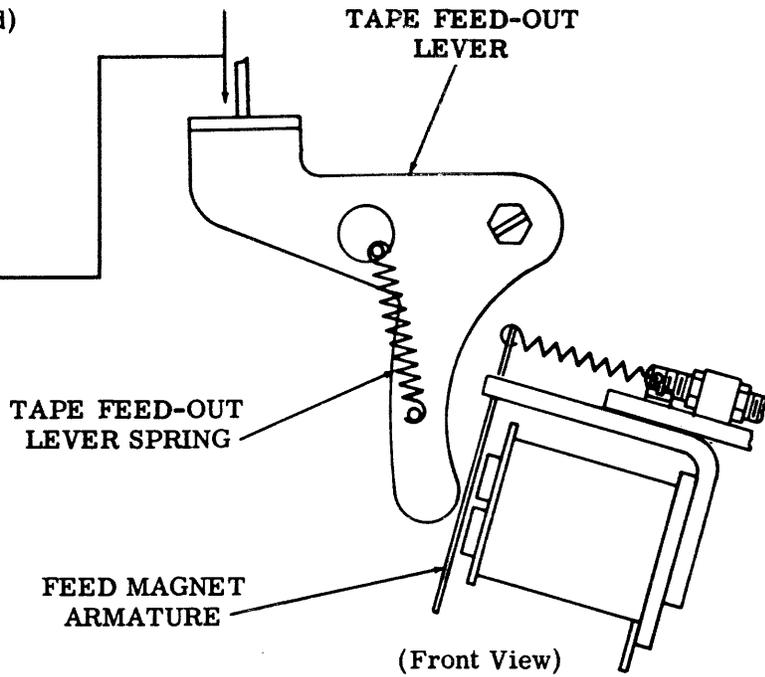
TAPE FEED-OUT LEVER SPRING

**Requirement**

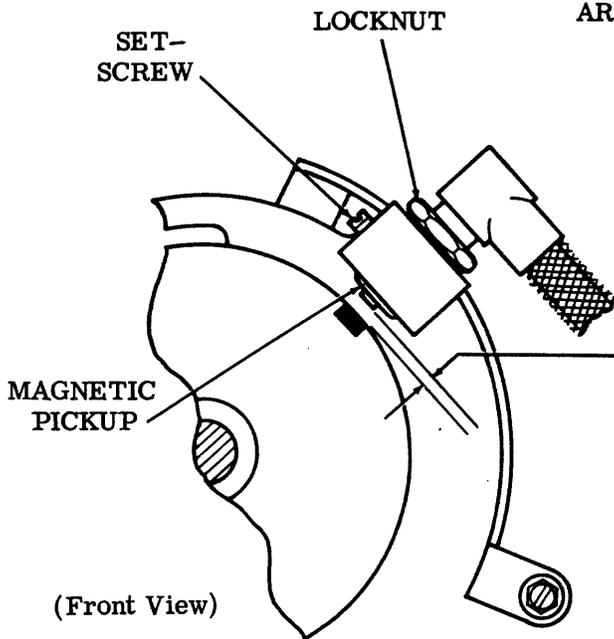
Move tape feed-out lever  
Min some---Max 1 oz

**To Measure**

Place scale on top of tape feed-out lever and push down.



2.17 Timing



MAGNETIC PICKUP (Early Design)

**To Check**

Set indicator on range scale to 30.  
Take up play between flywheel and magnetic pickup for minimum clearance.

**Requirement**

Min 0.005 inch---Max 0.010 inch  
at point of minimum clearance.

**To Adjust**

Loosen setscrew and locknut.  
Position magnetic pickup to meet requirement.

MAGNETIC PICKUP (Late Design)

**To Check**

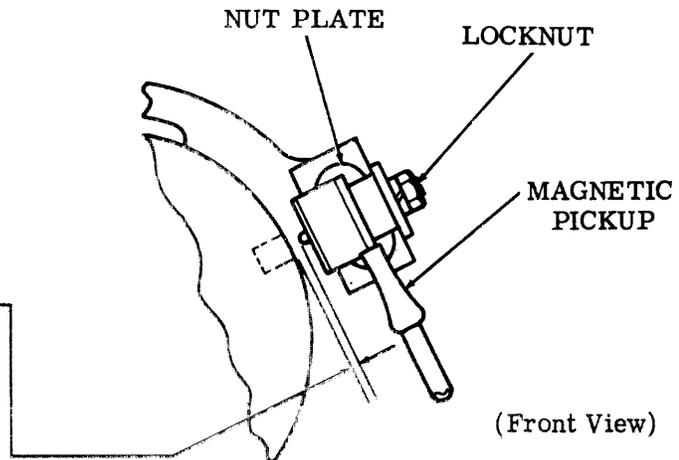
Set indicator on range scale to zero.  
Take up play between flywheel and magnetic pickup for minimum clearance.

**Requirement**

Min 0.010 inch---Max 0.015 inch  
at point of minimum clearance.

**To Adjust**

Loosen locknut. Position magnetic pickup to meet requirement.



## 2.18 Timing (continued)

RANGE

## To Check

With test tape TP146605 or equivalent, operate punch from its control circuits. Loosen bracket locknut. Rotate pickup bracket in one direction and then in the other until errors occur. Note the numbers on range scale at the points of error.

## (1) Requirement

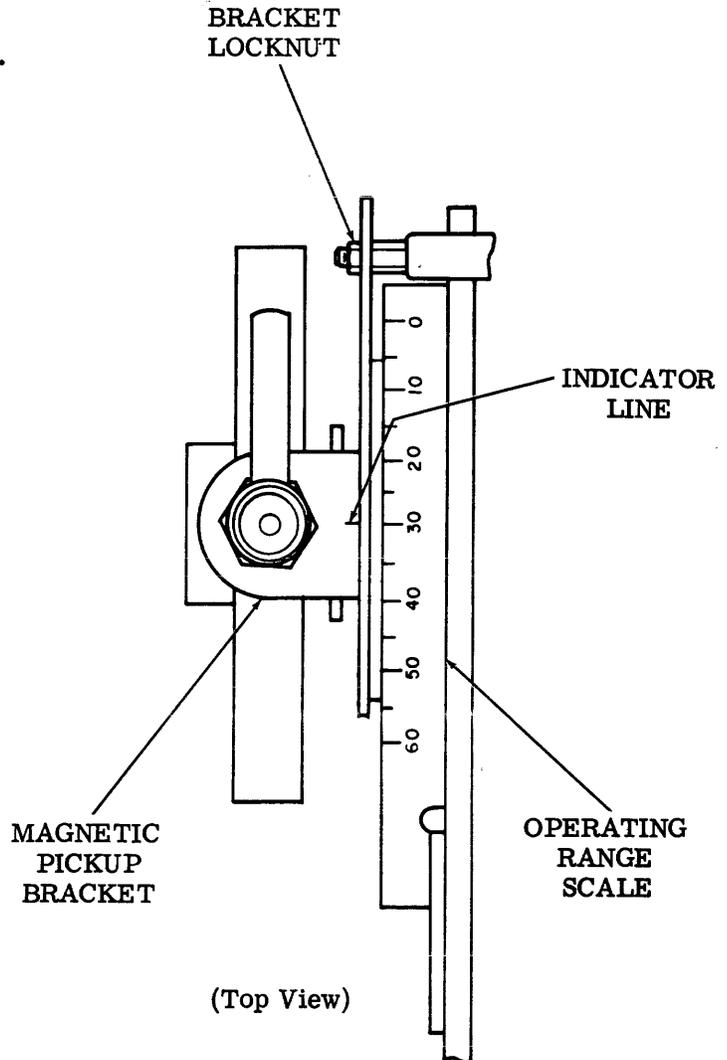
Minimum 80 points of error free operation for 110 ops and 28 v dc at 1 amp.

## (2) Requirement

Minimum 40 points of error free operation for 110 ops and 115 v dc at 0.15 amp.

## To Adjust

Loosen bracket locknut. Set range scale indicator line opposite middle of operating range.



**Note:** Check and correct MAGNET ARMATURE SPRING (2.05 and 2.06) and MAGNET PLATE (2.05) adjustments to meet the requirements (1) and (2) as follows:  
MAGNET ARMATURE SPRING (Feed Level) Min 12 oz---Max 20 oz  
MAGNET ARMATURE SPRING (Code Levels) Min 4-1/2 oz---Max 7-1/2 oz  
MAGNET PLATE Min some---Max 0.003 inch

3. BASIC UNIT (Early Design)

3.01 Punch Mechanism

PUNCH BAIL

To Check

Rotate main shaft slowly until lower surface of the long toggle arm contacts the surface of the blocking pawl. Set armature to attracted position, and place blocking pawl against stop plate. Continue rotating main shaft until the engaging surface of the long toggle arm is slightly below the engaging surface of its corresponding blocking pawl.

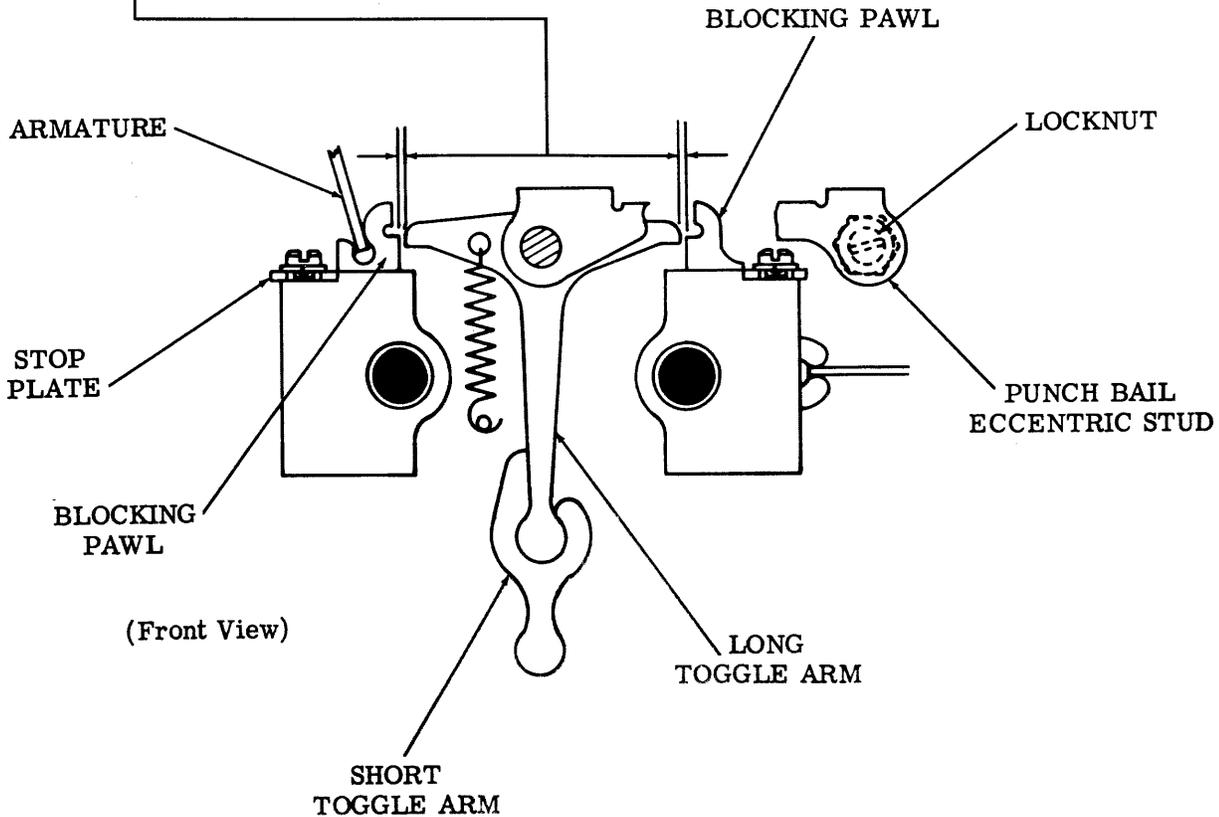
Requirement

Clearance between blocking pawl and long toggle arm should be

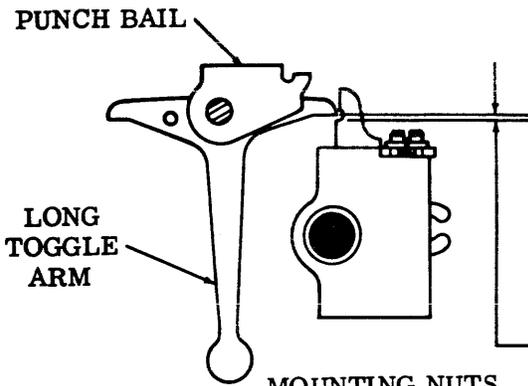
Min 0.003 inch---Max 0.015 inch

To Adjust

Loosen punch bail eccentric stud locknut. Position eccentric stud to meet requirement.



3.02 Punch Mechanism (continued)



(A) BLOCKING PAWL

To Check

Set punch bail to uppermost position. Place each blocking pawl to blocking position.

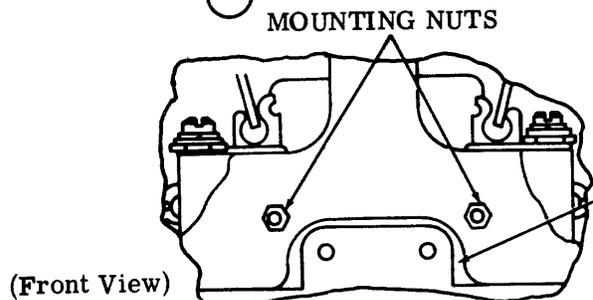
Requirement

Overtravel between each pawl and lower surface of long toggle arms should be

Min some---Max 0.003 inch

To Adjust

Loosen mounting nuts. Tap down stop arm bracket to meet requirement.



STOP ARM BRACKET

(Front View)

(B) LONG TOGGLE ARM SPRING

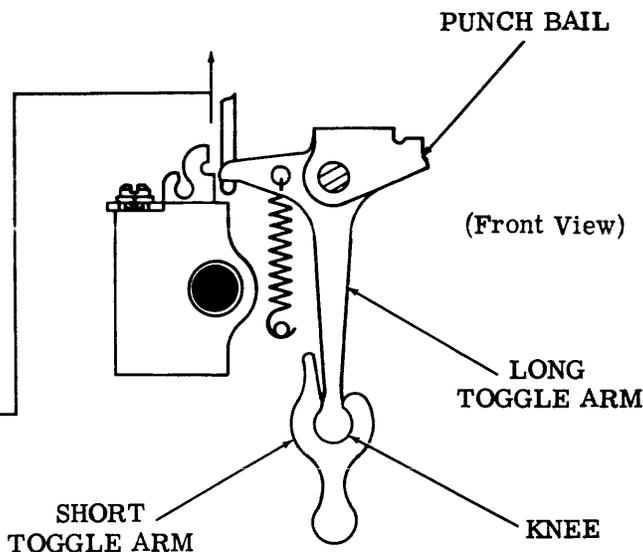
To Check

Hold armature operated. Set punch bail to lowermost position. Hook 8 oz scale under long toggle arm as shown and pull until knee buckles.

Requirement

Min 3 oz---Max 6 oz

to prevent the long and short toggle arms from rejoining when there is just a perceptible separation between them.

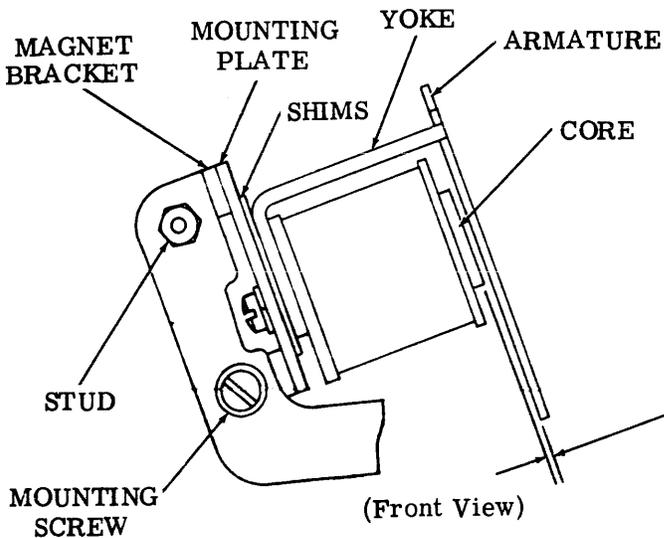


(Front View)

SHORT TOGGLE ARM

LONG TOGGLE ARM

KNEE



(C) MAGNET BRACKET

Requirement

With armature operated, clearance between armature and core should be Min 0.003 inch---Max 0.006 inch

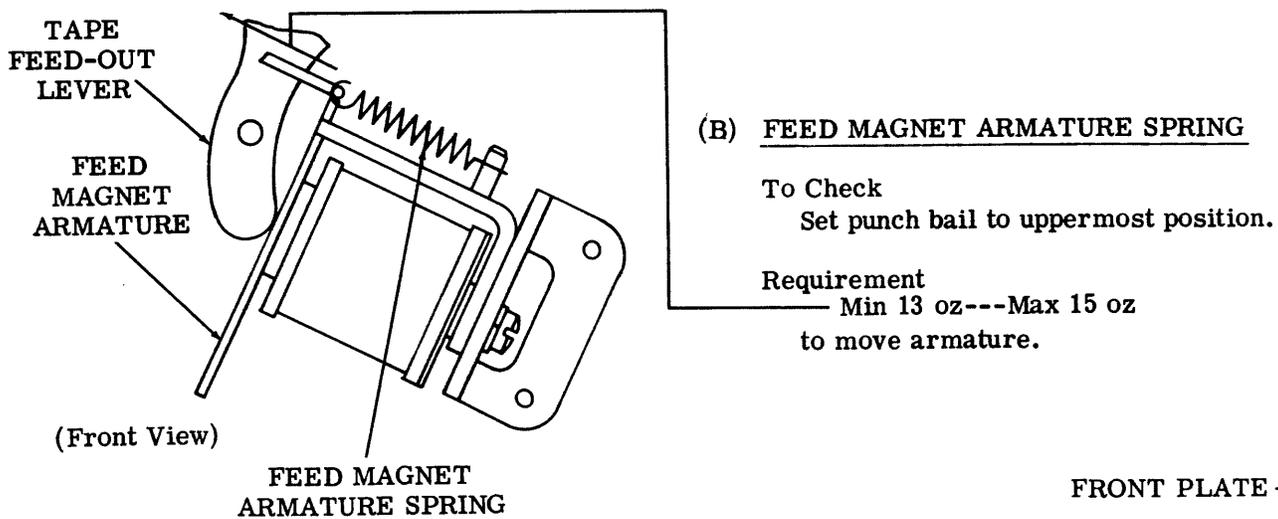
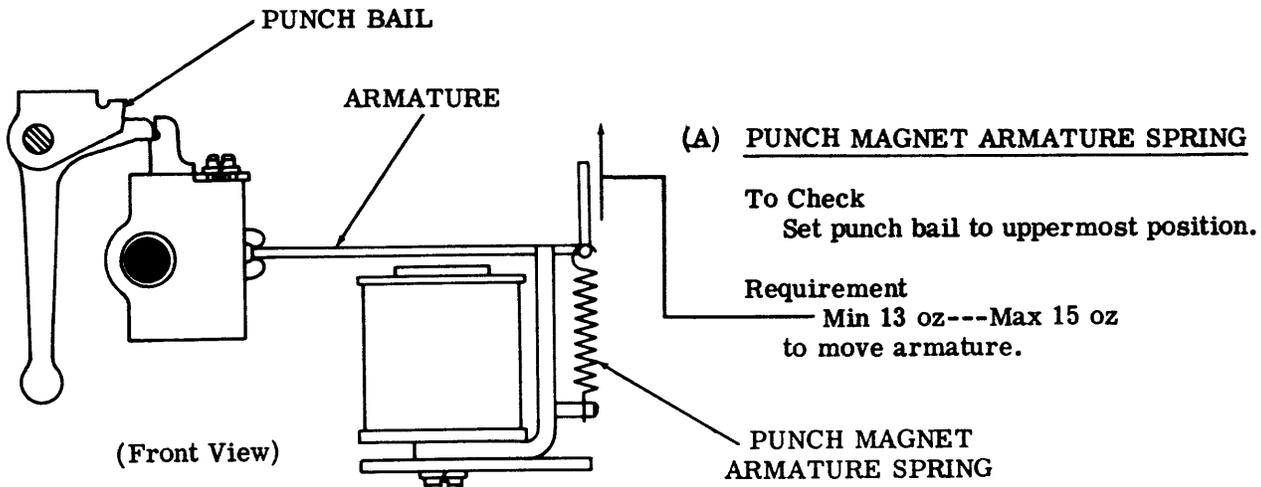
To Adjust

Loosen magnet bracket mounting screws. Rotate bracket to meet requirement.

MOUNTING SCREW

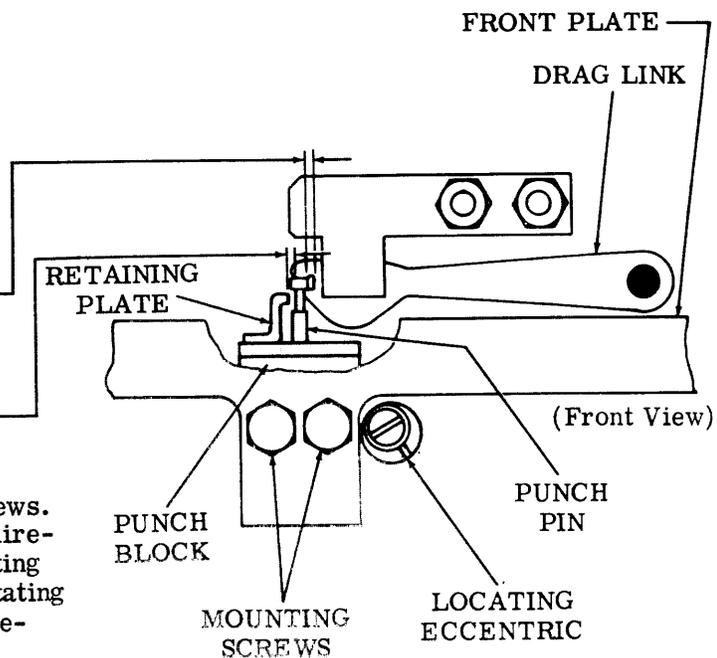
(Front View)

3.03 Punch Mechanism (continued)



**(C) PUNCH BLOCK**

- (1) Requirement  
Punch pins should move freely in punch block with minimum clearance between punch pins and drag links.
- (2) Requirement  
Some clearance between retaining plate and punch pins.
- To Adjust  
Loosen retaining plate mounting screws. Position retaining plate to meet requirement (2). Loosen punch block mounting screws. Position punch block by rotating its locating eccentric to meet requirement (1).



3.04 Tape Feed Mechanism

(A) FEED RATCHET DETENT

To Check

Apply power and punch a series of marking codes. Inspect feed holes for TEN TO THE INCH (2.11). spacing with tape gauge TP95960.

Requirement

Same as 2.11.

To Adjust

Loosen feed ratchet detent eccentric locknut. Position feed ratchet detent eccentric to meet requirement.

(B) FEED PAWL ADJUSTABLE LINK

To Check

Hold feed magnet armature operated. Rotate main shaft by hand.

(1) Requirement

Feed pawl should advance the feed ratchet one full tooth without noticeable overtravel. Detent roller should fully detent ratchet wheel.

(2) Requirement

With feed magnet armature released and feed pawl in its lowest position, the feed pawl should make contact with the next tooth.

To Adjust

Loosen clamp screw. Using a screwdriver, move feed pawl up or down to meet requirements.

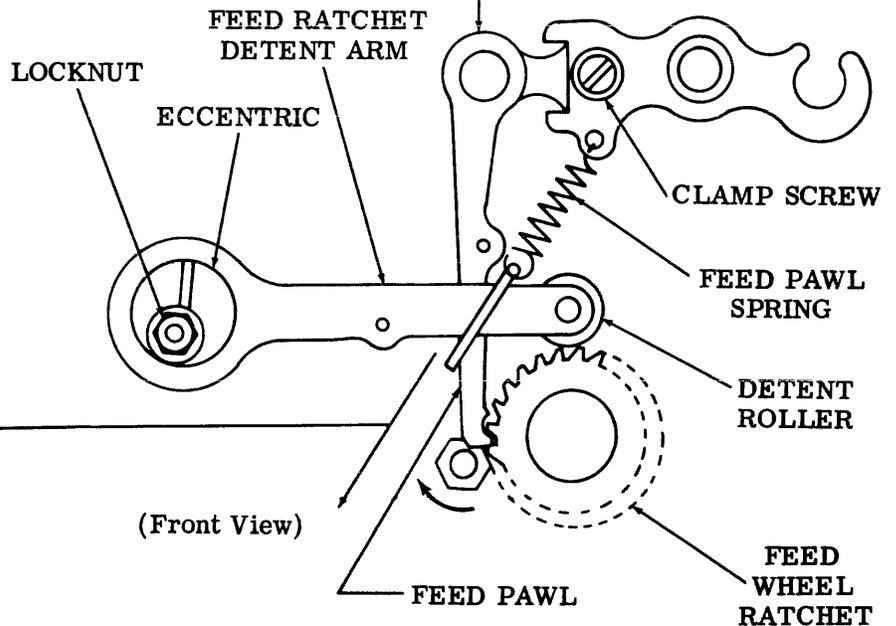
(C) FEED PAWL SPRING

To Check

Set punch bail drive assembly to highest position.

Requirement

Min 4 oz---Max 5 oz to pull spring to position length.



3.05 Tape Feed Mechanism (continued)

(D) FEED PAWL ECCENTRIC STUD

To Check

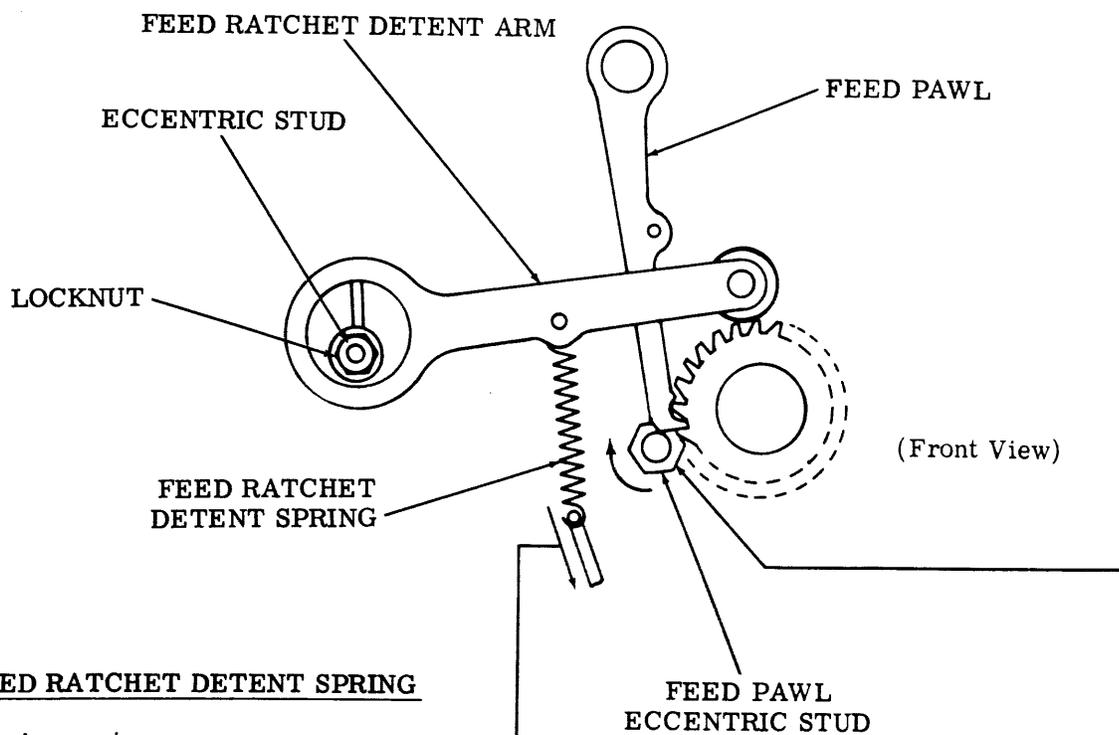
Rotate main shaft by hand until feed pawl is in lowest position.

Requirement

With feed pawl held firmly against ratchet, feed pawl should make contact with feed pawl eccentric stud.

To Adjust

Loosen eccentric stud locknut. Rotate eccentric stud counterclockwise to meet requirement.



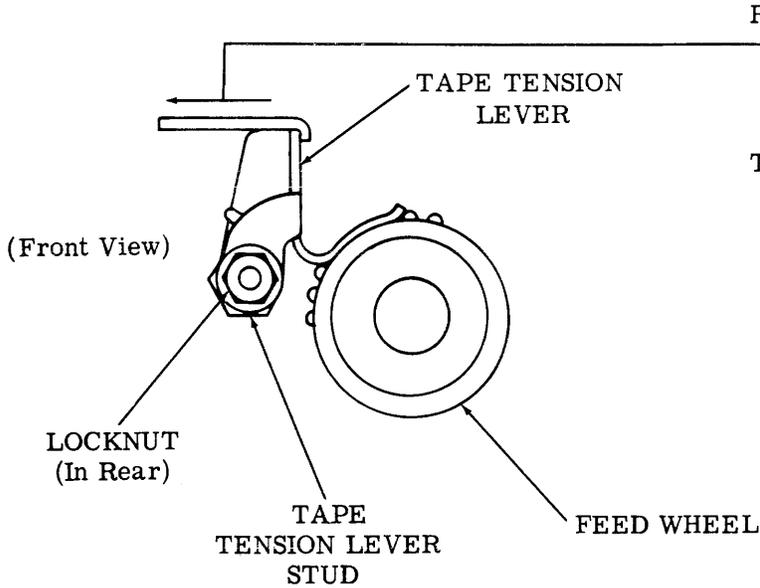
(E) FEED RATCHET DETENT SPRING

Requirement

Min 38 oz---Max 44 oz  
to pull spring to position length.

3.06 Tape Feed Mechanism (continued)

(A) TAPE TENSION LEVER SPRING



Requirement

Min 4-1/2 oz---Max 5-1/2 oz  
to start tape tension lever moving  
away from feed wheel.

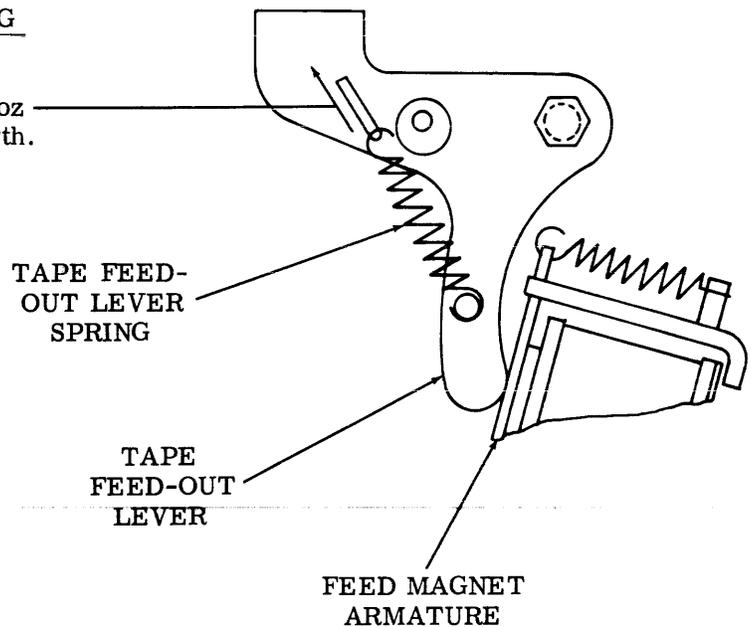
To Adjust

Loosen tape tension lever stud lock-  
nut. Rotate stud slightly in either  
direction to meet requirement.

(B) TAPE FEED-OUT LEVER SPRING

Requirement

Min 2-1/2 oz---Max 3-1/2 oz  
to move spring to position length.



3.07 Timing

Note: The following adjustments, A through D, relate to contactor operation. Contactor openings or closures can advance or delay the punching cycle by rotating the contactor mounting plates. To advance the contactor operation, rotate contactor mounting plates counterclockwise. To delay the contact operation, rotate contactor mounting plates clockwise. The contactors can be moved separately or together in either direction to simplify coupling the punch unit to auxiliary control equipment.

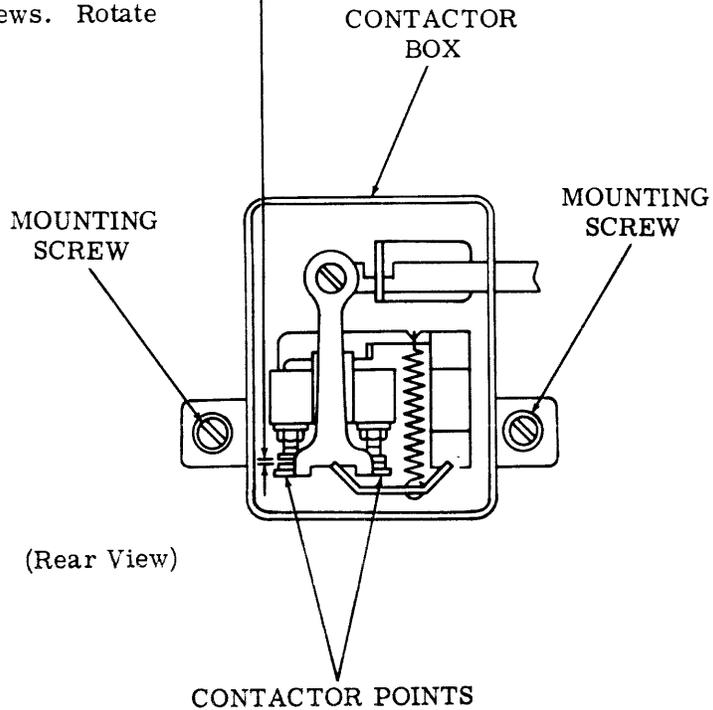
(A) CONTACTOR POINTS

Requirement

With main shaft rotating, clearance between each set of contactor points should be  
Min 0.008 inch---Max 0.012 inch  
and equal to each other within 0.002 inch.

To Adjust

Loosen contactor box mounting screws. Rotate contactor box to meet requirement.



3.08 Timing (continued)

(B) INDICATOR PLATE

Requirement

Min 0.020 inch---Max 0.030 inch clearance between indicator and no. 2 contactor mounting plates.

To Adjust

Loosen indicator plate screw. Position indicator plate to meet requirement.

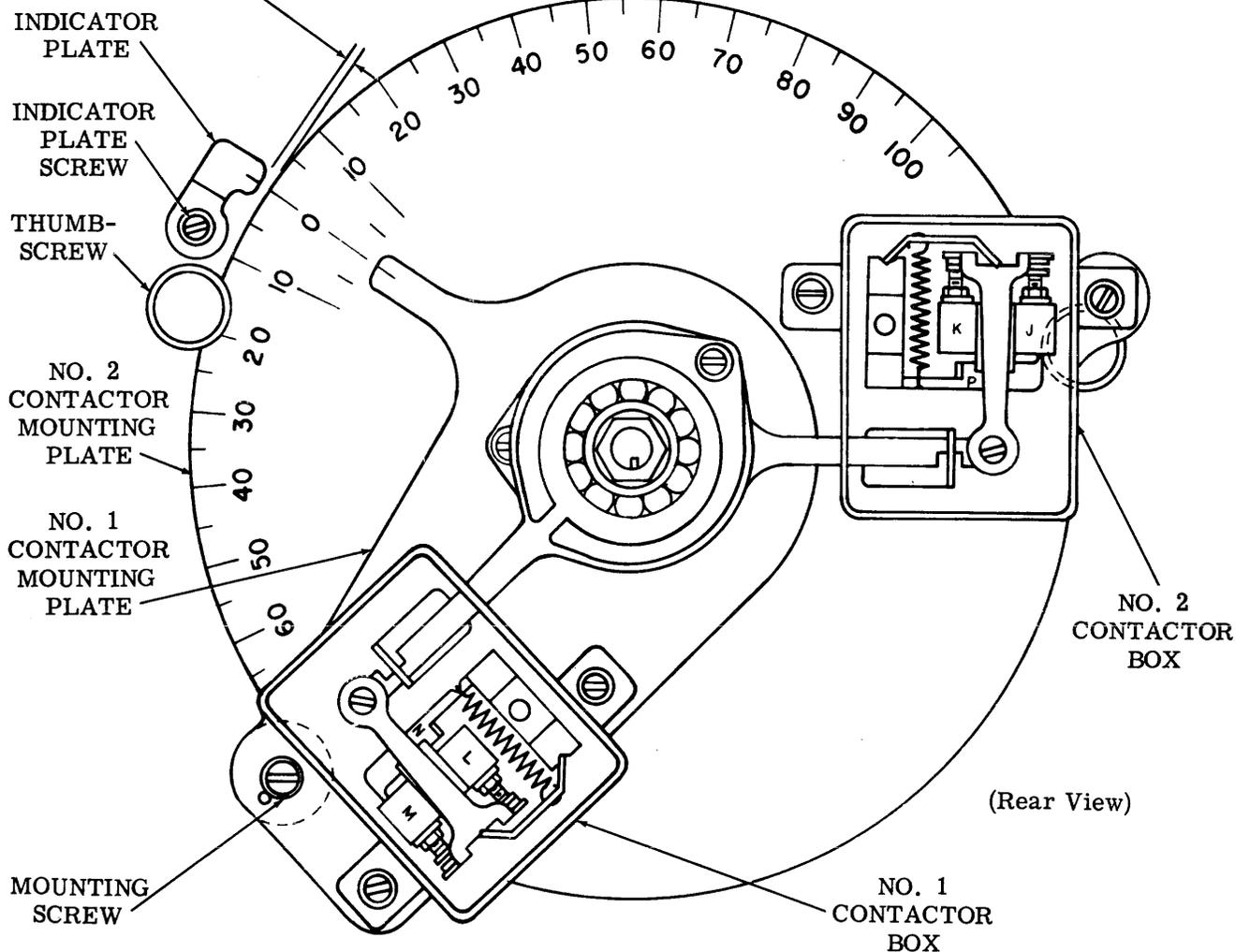
(C) NO. 2 CONTACTOR MOUNTING PLATE

Requirement

The scribed line on the indicator plate should be opposite the zero on the no. 2 contactor mounting plate.

To Adjust

Loosen thumbscrew. Position contactor mounting plate no. 2 to meet requirement.



(D) NO. 1 CONTACTOR MOUNTING PLATE

Requirement

The scribed line on the no. 1 contactor mounting plate should be opposite the zero on the no. 2 contactor mounting plate.

To Adjust

Loosen mounting screw. Position no. 1 mounting plate to meet requirement.