

## 2.94 Form Feed Area

FORM FEED BELT TENSION - S

**Note 1:** Check tension only if the form feed belt is suspected of not meeting its requirement.

**Requirement**

The form feed belt tension should not be too tight or too loose.

**To Adjust**

Loosen three form feed assembly bracket mounting screws and hook a spring scale under the trip shaft at the latchlever. Position and pull up with a force of 7 pounds and hold. Tighten the three form feed assembly bracket mounting screws in the following order: first, the right front mounting screw; then, the right rear mounting screw, and finally, the left mounting screw.

**Related Adjustments****Affects**

FORM-OUT LEVER OVERTRAVEL - S  
(2.98)

FORM-OUT LEVER — RESET CLEARANCE - S (Late Design) (2.102) - and (Early Design) (2.101)

TRIP LEVER ENGAGEMENT — LINE FEED - S (Early Design) (2.104)

TRIP LEVER UPSTOP POSITION - S  
(Early Design) (2.106)

LINE FEED SELECTION - S (2.108)

IDLER POSITION - S (2.100)

DETENT POSITION - S (2.109)

RESET FOLLOWER LEVER — RESET POSITION - S (2.110)

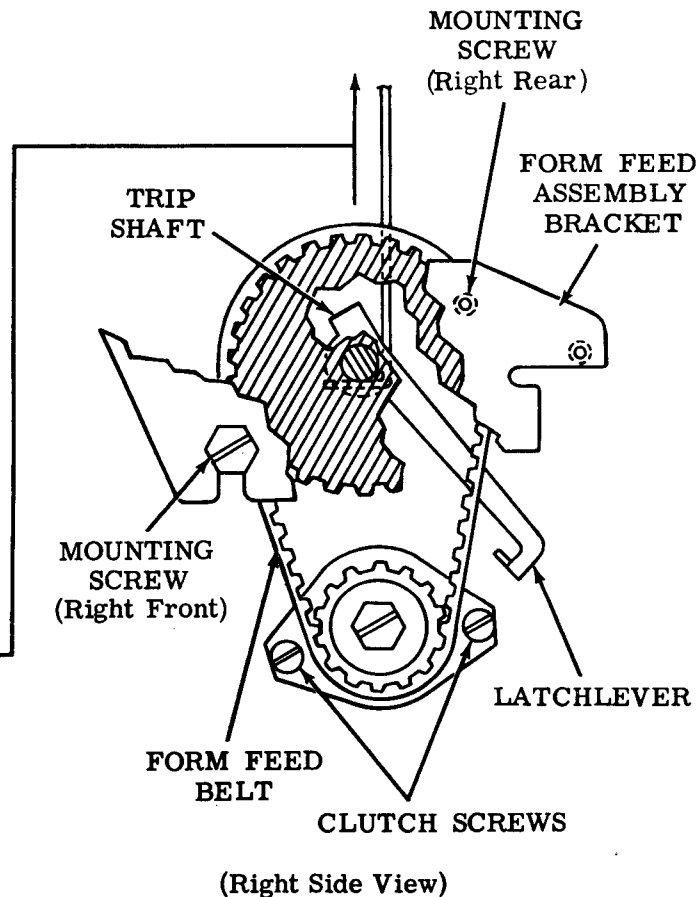
CAM ZERO POSITION - S (2.110)

CLUTCH SHOE LEVER GAP - S (2.95)

TRIP SHAFT ENDPLAY - S (2.97)

TRIP LEVER ENGAGEMENT — FORM-OUT - S (2.103)

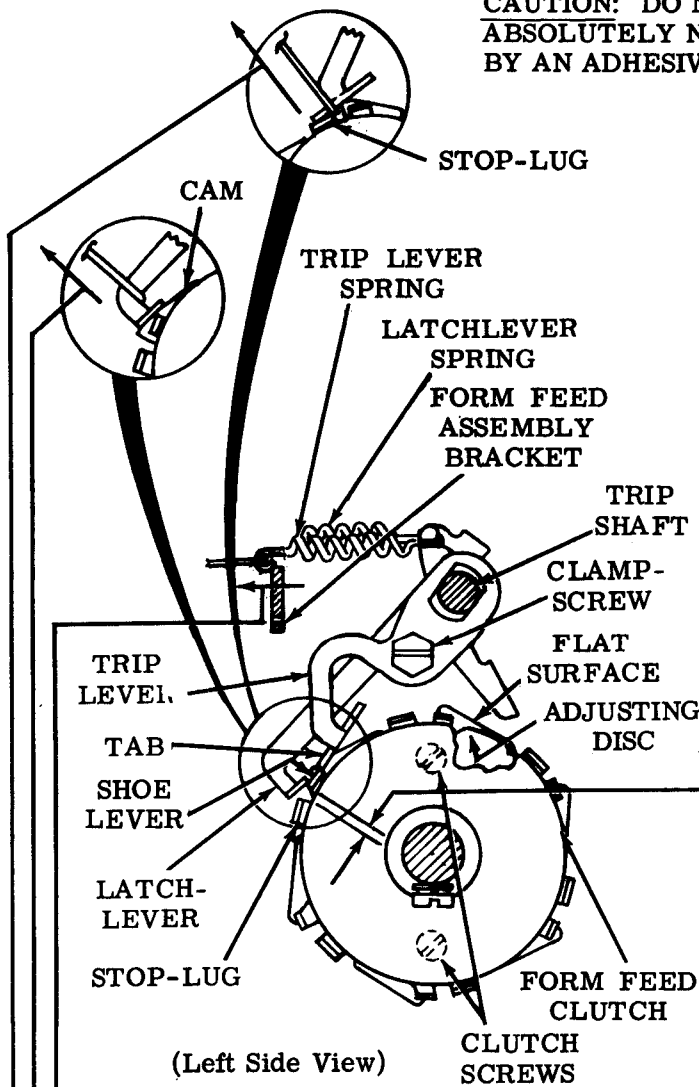
FORM-OUT CONTACT PRESSURE AND GAP - S (2.113)



**Note 2:** Make certain that the shaft is free by rotating reset follower lever. If necessary, free trip shaft by repositioning the left mounting bracket of the form feed assembly bracket against the form feed assembly bracket.

**Note 3:** The left mounting screw is located on the left side of the form feed bracket.

## 2.95 Form Feed Area (continued)



**CAUTION: DO NOT DISTURB THE CLUTCH SCREWS UNLESS ABSOLUTELY NECESSARY. CLUTCH SCREWS ARE SECURED BY AN ADHESIVE AT THE FACTORY.**

CLUTCH SHOE LEVER GAP - S

## (1) To Check

Rotate the main shaft until the form feed clutch is in that stop position which brings the flat surface of the adjusting disc to the position illustrated. Disengage (latch) the form feed clutch.

## Requirement

Min 0.015 inch---Max 0.040 inch between the stop-lug and the shoe lever.

## To Adjust

Loosen clampscrew and position trip lever. Tighten clampscrew.

**Note:** Do not make the following adjustment unless requirement (1) cannot be met. If the clutch screws are disturbed, they must be resealed with and application of TP186171 Glyptal adhesive.

## (2) To Check

With form feed clutch conditioned as in (1) To Check, measure and record clearance between shoe lever and stop-lug. Raise trip lever to trip (engage) form feed clutch. Fully seat clutch shoes by applying slight pressure against shoe lever along its normal path of forward travel. Again measure and record shoe lever, stop-lug clearance.

## Requirement

Clearance between stop-lug and shoe lever.

Min 0.055 inch---Max 0.085 inch greater when form feed clutch is engaged than when disengaged.

## To Adjust

Loosen the two clutch screws friction tight and position adjusting disc. Apply appropriate adhesive (Glyptal) to clutch screw threads. Tighten both screws before adhesive dries.

## Related Adjustments

## Affects

TRIP LEVER ENGAGEMENT — LINE FEED - S (Early Design) (2.104)

TRIP LEVER ENGAGEMENT — FORM-OUT - S (2.103)

TRIP LEVER ENGAGEMENT — (Preliminary) - S (2.96)

## Affected By

FORM FEED BELT TENSION - S (2.94)

LATCHLEVER SPRING - S

## Requirement

With latchlever resting on the high part of the cam

Min 3 oz---Max 7 oz to start latchlever moving.

TRIP LEVER SPRING - S

## Requirement

With trip lever tab resting on top of a stop-lug  
Early Design

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

Late Design

Min 14 oz---Max 18 oz to pull trip lever spring to installed length.

## 2.96 Form Feed Area (continued)

TRIP LEVER ENGAGEMENT (Preliminary) - S

Note: This adjustment applies to late design typing units containing the TP185998 nickel plated plate.

**To Check**

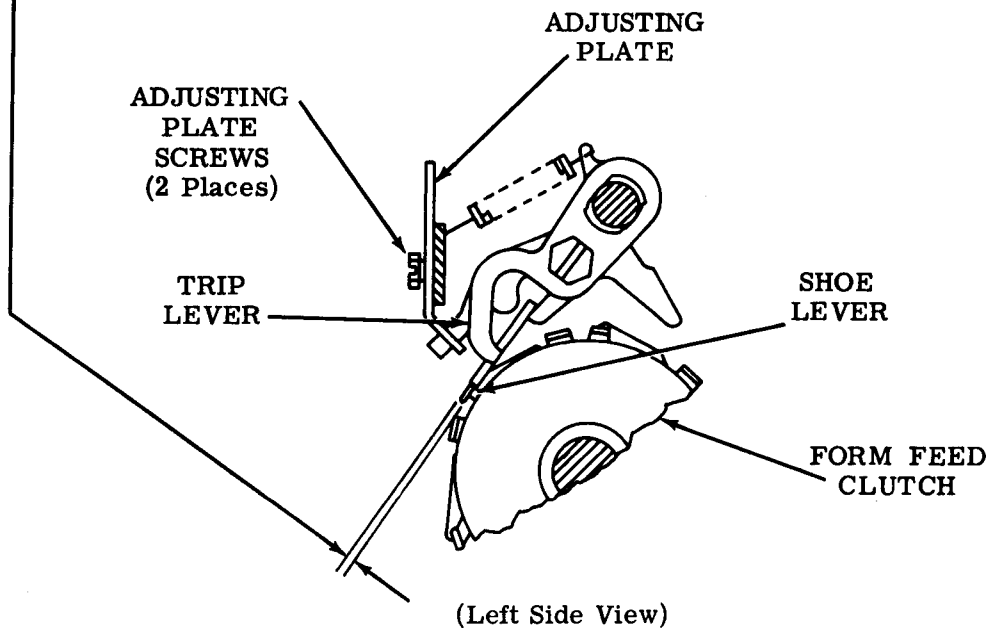
Rotate form feed clutch until a shoe lever is just about to contact the trip lever.

**Requirement**

Top surface of trip lever should be flush to 0.010 inch below top surface of shoe lever.

**To Adjust**

Loosen the two adjusting plate screws and position adjusting plate. Tighten both screws.

**Related Adjustments****Affects**

TRIP LEVER ENGAGEMENT (Final) - S (Late Design) (2.104)

**Affected By**

CLUTCH SHOE LEVER GAP - S (2.95)

2.97 Form Feed Area (continued)

TRIP SHAFT ENDPLAY - S

Requirement

Min some---Max 0.012 inch endplay of the trip shaft.

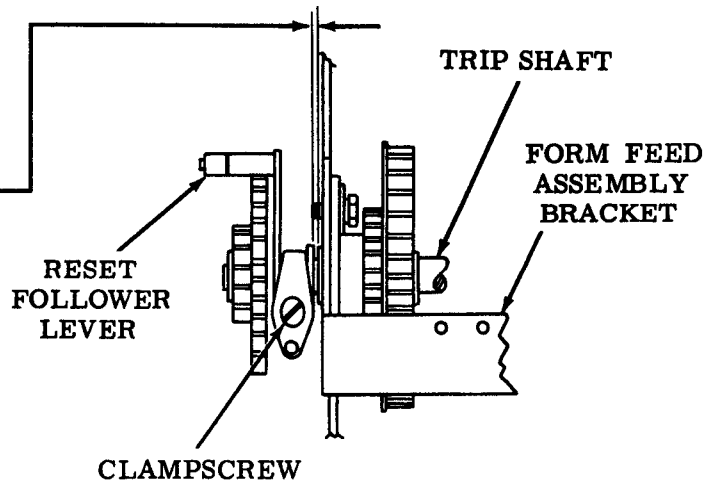
To Adjust

Loosen clampscrew and position reset follower lever on trip shaft. Tighten clampscrew.

Related Adjustments

Affected By

FORM FEED BELT TENSION - S (2.94)



(Rear View)

LINE FEED LEVER LINE-UP AND ENDPLAY - S

(1) Requirement

The line feed pawl should engage the flat on the tab of the line feed lever.

(2) Requirement

With all endplay taken up toward the right --- Min some---Max 0.012 inch between line feed lever and collar.

(3) Requirement

There must be some clearance between the line feed lever and the main shaft gear.

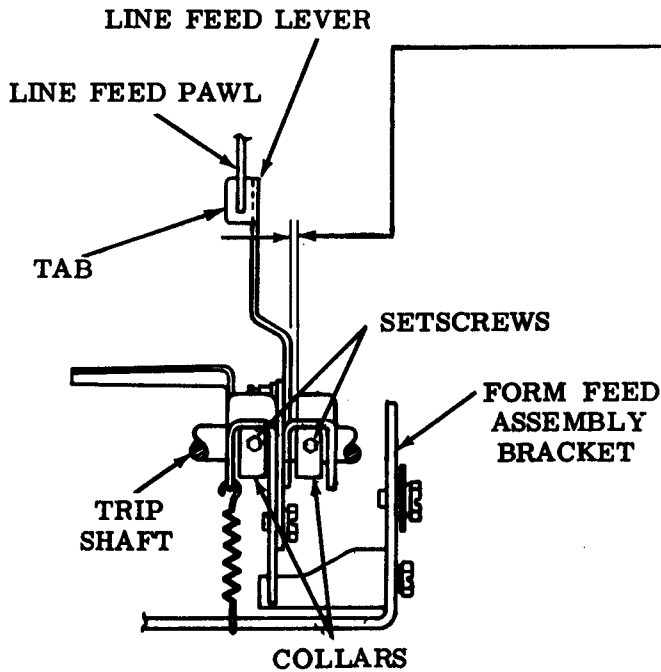
To Adjust

Loosen collar setscrews and position collars to meet Requirements (1) and (2). Loosen main shaft gear screw and position main shaft gear to meet Requirement (3). Tighten all screws.

Related Adjustment

Affected By

FORM FEED BELT TENSION - S (2.94)



(Front View)

## 2.98 Form Feed Area (continued)

FORM-OUT LEVER OVERTRAVEL - S**To Check**

With the form-out code combination (--34---8) set up in selector, rotate the main shaft until the form-out function lever is in its lowermost position.

**Requirement**

Min 0.010 inch---Max 0.020 inch clearance between form-out lever and notch of arm.

**To Adjust**

Loosen screw, hold form-out function lever against its pawl, and position arm using pry points. Tighten screw.

**Related Adjustment****Affected By**

RIGHT ROCKER DRIVE (Function Area)

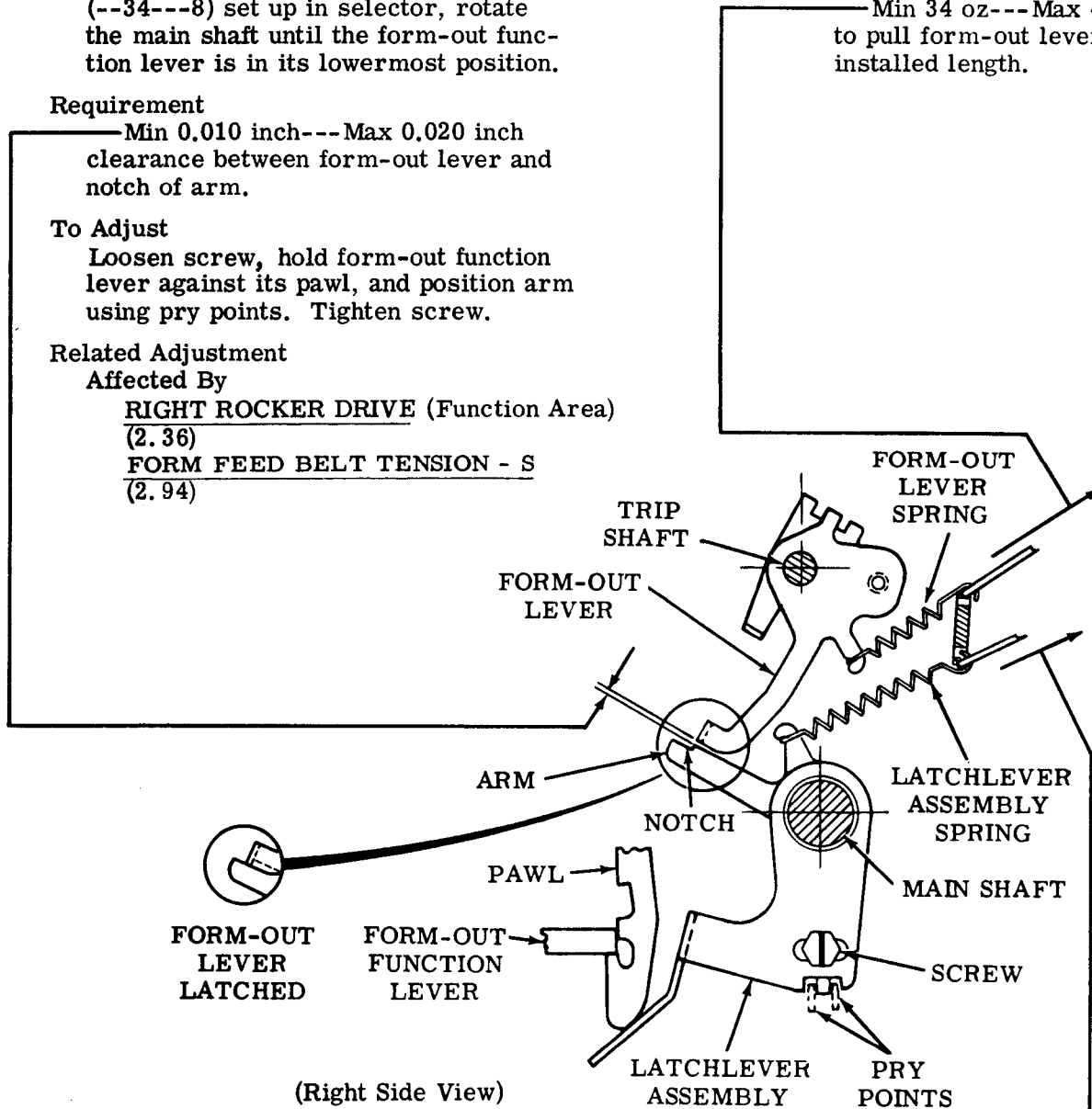
(2.36)

FORM FEED BELT TENSION - S

(2.94)

FORM-OUT LEVER SPRING - S**Requirement**

With the form-out lever latched  
Min 34 oz---Max 44 oz  
to pull form-out lever spring to installed length.

LATCHLEVER ASSEMBLY SPRING - S**Requirement**

With the form-out lever latched

Min 9 oz---Max 11 oz

to pull latchlever assembly spring to installed length.

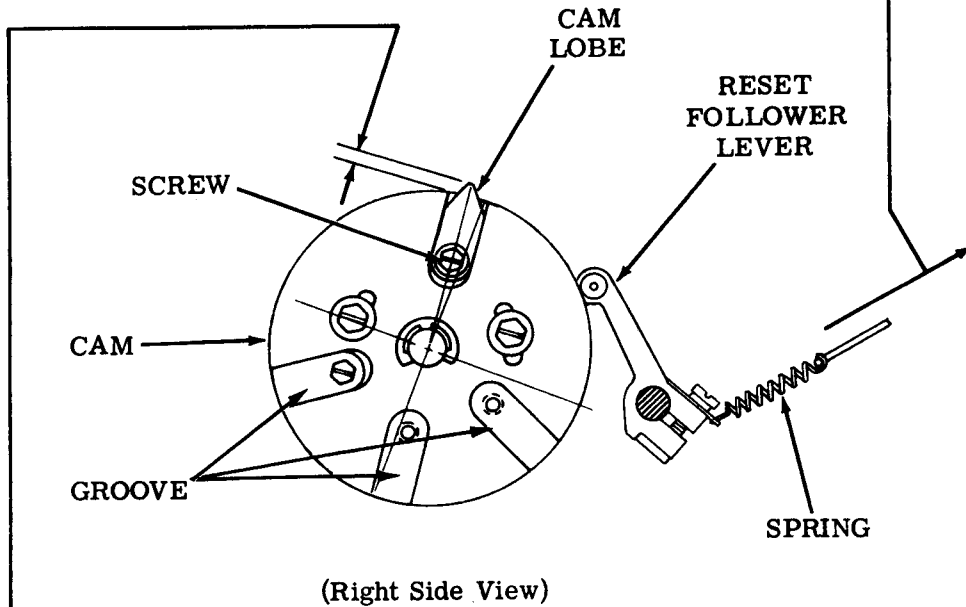
2.99 Form Feed Area (continued)

RESET FOLLOWER LEVER SPRING - S

Requirement

With reset follower lever on low part of cam

Min 12 oz---Max 16 oz to pull reset follower lever spring to installed length.



CAM LOBE POSITION - S

Note: Cam lobes, in addition to the one opposite the three closely spaced grooves, should be adjusted according to the FORM-OUT LEVER — RESET CLEARANCE - S (2.101 or 2.102) adjustment.

Requirement

The top of the cam lobe should be  
Min 0.065 inch---Max 0.070 inch above the low point of the cam.

To Adjust

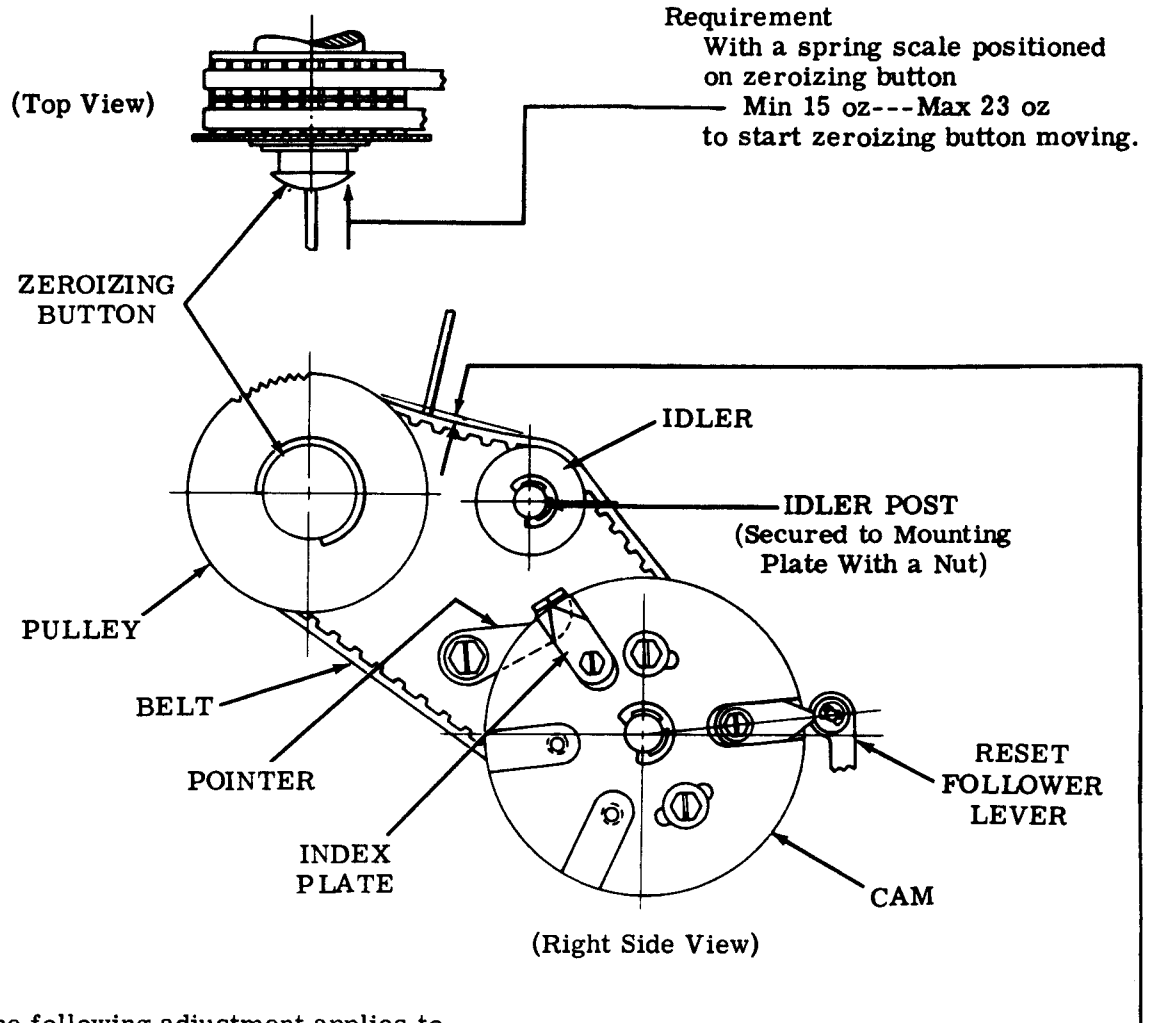
Loosen screw and position the cam lobe.  
Tighten screw.

Related Adjustment

Affects

FORM-OUT LEVER — RESET CLEARANCE - S (2.101 or 2.102)

## 2.100 Platen Area (continued)

ZEROIZING BUTTON - S

## Requirement

With a spring scale positioned on zeroizing button  
Min 15 oz---Max 23 oz  
to start zeroizing button moving.

Note: The following adjustment applies to the tighter of two belts. If there is little difference in tightness of the two belts, the adjustment applies to the outer belt.

IDLER POSITION - S

## To Check

Place a 16 oz spring load to the belt between the idler and the pulley and note the amount of deflection.

## Requirement

Min 0.062 inch---Max 0.125 inch  
deflection of belt.

## To Adjust

Loosen idler post and position. Tighten idler post.

Related Adjustments  
Affects

DETENT POSITION - S (2.109)  
RESET FOLLOWER LEVER —  
RESET POSITION - S (2.110)  
CAM ZERO POSITION (2.110)  
PRINTING LINE POSITION FINAL - S  
(2.115)

## Affected By

PLATEN — HORIZONTAL POSITION - S  
(2.89)  
VERTICAL TYPE ALIGNMENT - S  
(2.90)

## 2.101 Form Feed Area (continued)

FORM-OUT LEVER — RESET CLEARANCE - S (Early Design)

## To Check

With the typing unit in stop condition, rotate the main shaft until all clutch mounting screw-heads are in the vertical position. Place the reset follower lever on the high point of the cam lobe by pushing in on the zeroizing button and rotating the pulley.

## (1) Requirement

Min 0.005 inch---Max 0.020 inch  
between the latching surface of the arm and the form-out lever.

## (2) Requirement

The trip lever and latchlever should have  
Min some---Max 0.012 inch  
endplay.

## To Adjust

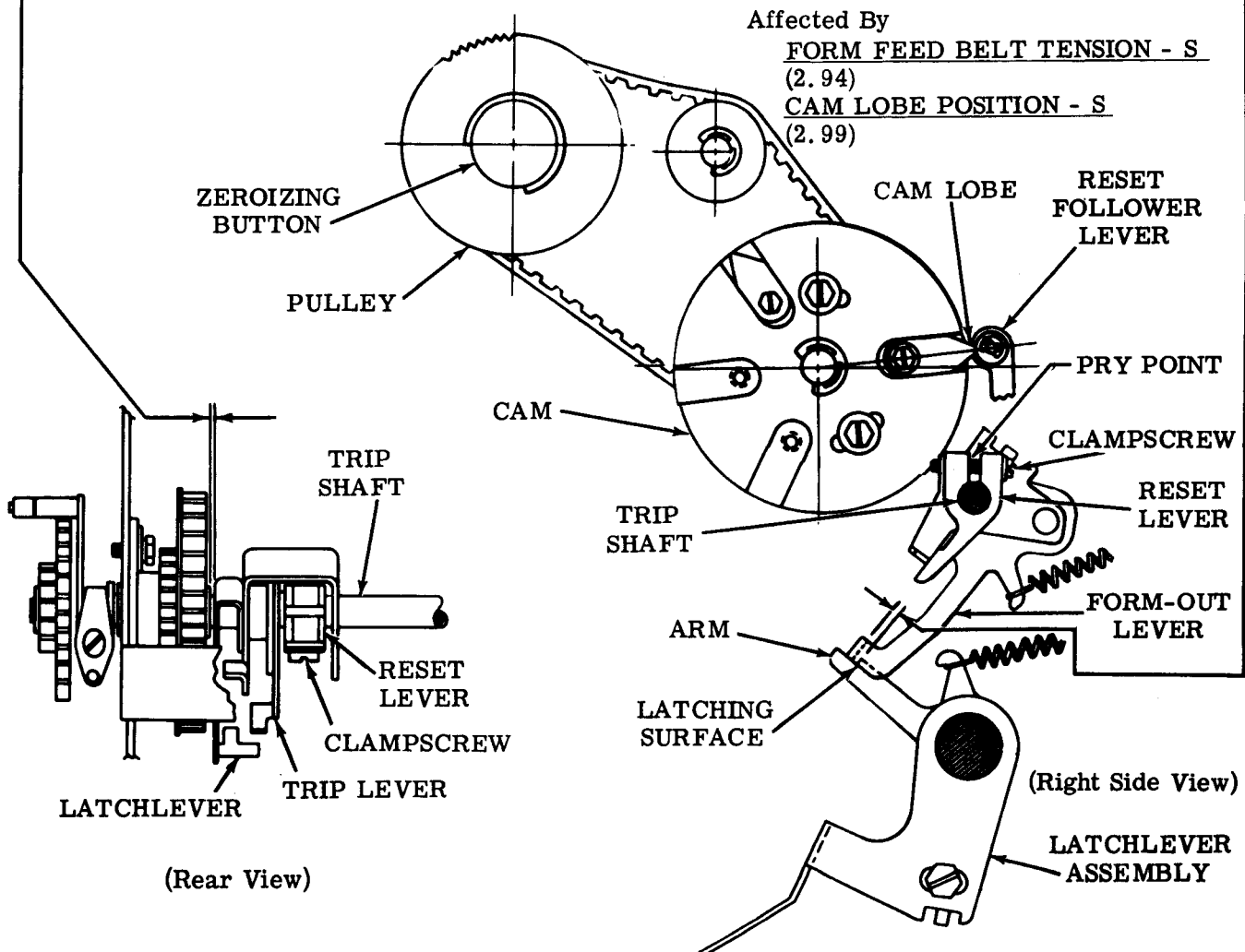
Place reset follower lever on high point of cam lobe. Loosen clampscrew friction tight and, using pry point, position the reset lever. Tighten clampscrew.

## Related Adjustments

## Affects

TRIP LEVER ENGAGEMENT — LINE FEED - S (Early Design) (2.104)

FORM-OUT CONTACT OPERATING BAIL CLEARANCE - S (2.113)





## 2.102 Form Feed Area (continued)

FORM-OUT LEVER — RESET CLEARANCE - S (Late Design)

Note: Check To Check (1) only when making a complete readjustment of typing unit.

## (1) To Check

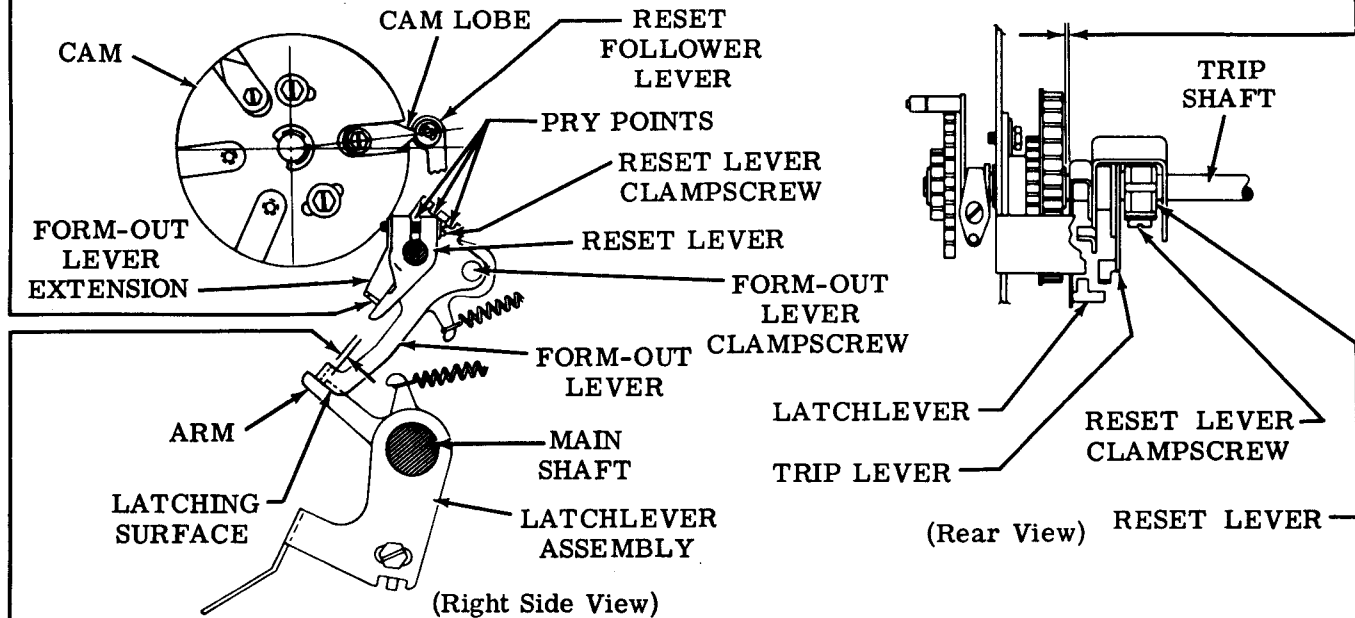
With typing unit in stop condition rotate main shaft until all clutch mounting screwheads are in vertical position. Place reset follower lever on low part of cam by pushing in on zeroizing button and rotating pulley. Push down on arm of latchlever assembly to unlatch form-out lever.

## Requirement

- (a) Reset lever should just touch underside of form-out lever extension.  
 (b) The trip lever and latchlever should have  
 Min some---Max 0.012 inch  
 endplay.

## To Adjust

Loosen reset lever clampscrew and position reset lever using pry point.  
 Tighten clampscrew.



## (2) To Check

With typing unit in stop condition rotate main shaft until all clutch mounting screwheads are in vertical position. Place reset follower lever on high point of cam lobe by pushing in on zeroizing button and rotating pulley.

## Requirement

- Min 0.005 inch---Max 0.020 inch  
 between latching surface of arm and form-out lever.

## To Adjust

With form-out lever clampscrew friction tight, position form-out lever using pry points. Tighten clampscrew.

## Related Adjustments

## Affected By

- FORM FEED BELT TENSION - S (2.94)  
CAM LOBE POSITION - S (2.99)

## 2.103 Form Feed Area (continued)

TRIP LEVER ENGAGEMENT - FORM-OUT - S

Note 1: The following adjustment applies only to early design typing units.

**To Check**

Rotate form feed clutch until a shoe lever just about contacts the trip lever. Hold form-out lever against latching surface of latchlever assembly.

Note 2: If the reset lever and/or line feed bail interfere when checking this adjustment,

- (a) Loosen reset lever clampscrew and position reset lever so that it does not interfere.
- (b) Loosen line feed downstop screw and position downstop to lowermost position. Position line feed lever so that line feed bail does not interfere.

## (1) Requirement

Top surface of shoe lever should not be above top surface of trip lever.

## (2) Requirement

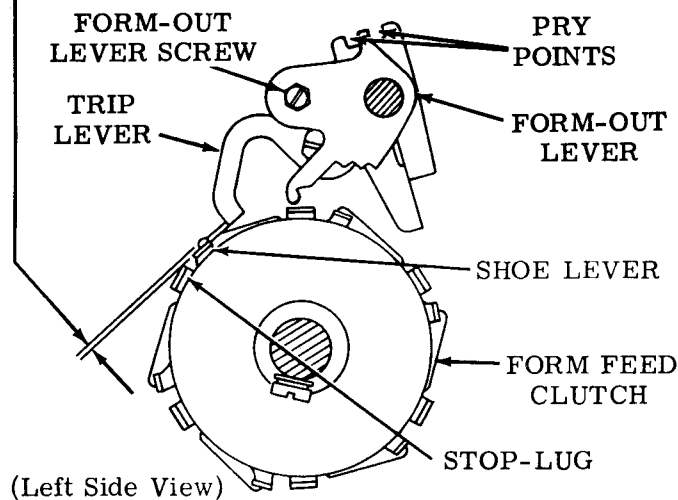
Shoe lever should engage trip lever

— Min 2/3 thickness  
of trip lever.

Note 3: Check requirements at each of the six shoe levers.

**To Adjust**

Loosen form-out lever screw. Hold form-out lever against latching surface of latchlever assembly and position trip lever using form-out lever pry points. Tighten all screws.



(Left Side View)

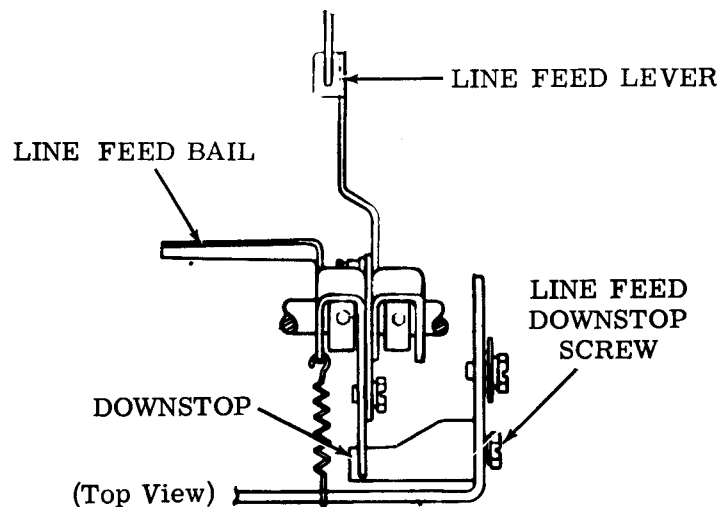
**Related Adjustments**

Affects

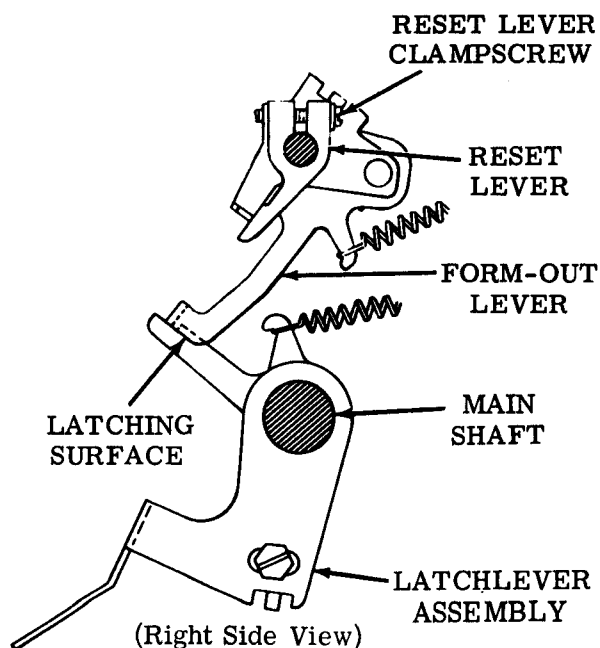
TRIP LEVER ENGAGEMENT —  
LINE FEED - S (Early Design) (2.104)  
LINE FEED SELECTION (2.108)

Affected By

FORM FEED BELT TENSION - S (2.94)  
CLUTCH SHOE LEVER GAP - S  
(2.95)



(Top View)



(Right Side View)

## 2.104 Form Feed Area (continued)

**Note 1:** The following adjustment applies only to early design typing units.

**TRIP LEVER ENGAGEMENT — LINE FEED - S (Early Design)**

**To Check**

Rotate form feed clutch until a shoe lever just about contacts the trip lever. Place the reset follower lever on the high point of the cam lobe by pushing in on the zeroizing button and rotating the pulley.

**(1) Requirement**

Top surface of shoe lever should never be above top surface of trip lever.

**(2) Requirement**

Shoe lever should engage trip lever  
Min 2/3 thickness of trip lever.

**Note 2:** Check Requirement (1) and (2) at each of six shoe levers.

**To Adjust**

Loosen downstop screw and position downstop so that line feed bail positions trip lever to meet Requirements (1) and (2). Tighten screw.

**Related Adjustments**

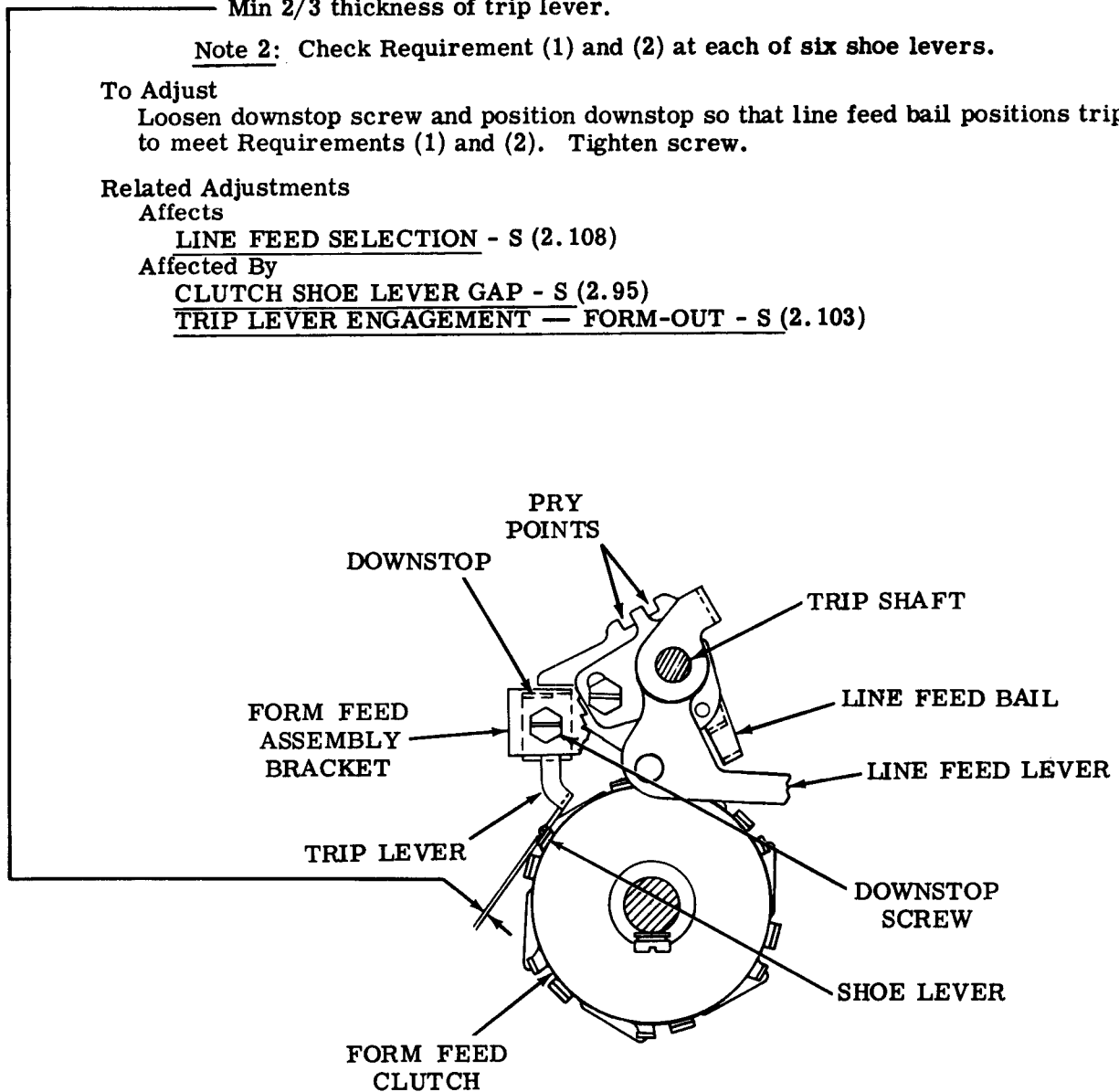
**Affects**

**LINE FEED SELECTION - S (2.108)**

**Affected By**

**CLUTCH SHOE LEVER GAP - S (2.95)**

**TRIP LEVER ENGAGEMENT — FORM-OUT - S (2.103)**



(Left Side View)

2.105 Form Feed Area (continued)

TRIP LEVER ENGAGEMENT (Final) - S (Late Design)

Note: This adjustment applies to late design typing units containing the TP185998 nickel plated plate.

To Check

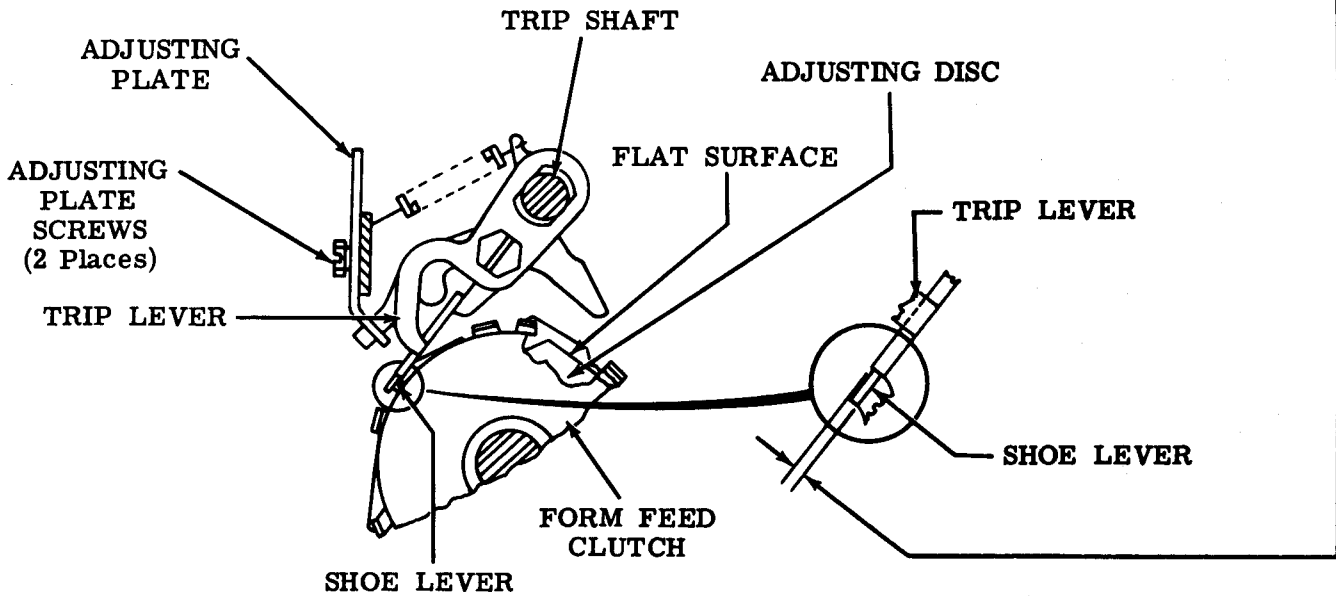
Rotate main shaft until the flat surface of the form feed clutch adjusting disc is positioned as illustrated. Disengage (latch) form feed clutch. Continue rotating main shaft until all clutch mounting screwheads are in a vertical position. Trip form feed clutch and rotate main shaft until the advancing shoe lever is just about to contact the trip lever.

Requirement

Shoe lever should be aligned with trip lever.

To Adjust

Loosen two adjusting plate screws and position adjusting plate. Tighten both screws.



(Left Side View)

Related Adjustments

Affects

FORM-OUT CONTACT OPERATING BAIL CLEARANCE - S (2.113)

Affected By

TRIP LEVER ENGAGEMENT (Preliminary) - S (2.96)

## 2.106 Form Feed Area (continued)

TRIP LEVER UPSTOP POSITION - S (Early Design)

Note: The following adjustment applies only to early design typing units.

**To Check**

Rotate main shaft until the flat surface of the form feed clutch adjusting disc is positioned as illustrated. Disengage (latch) the form feed clutch. Resume rotating the main shaft until all the clutch mounting screwheads are in a vertical position. Press down the line feed bail to trip clutch and rotate main shaft until stop-lug is directly under the trip lever.

**Requirement**

Min 0.020 inch---Max 0.035 inch  
between trip lever and stop-lug.

**To Adjust**

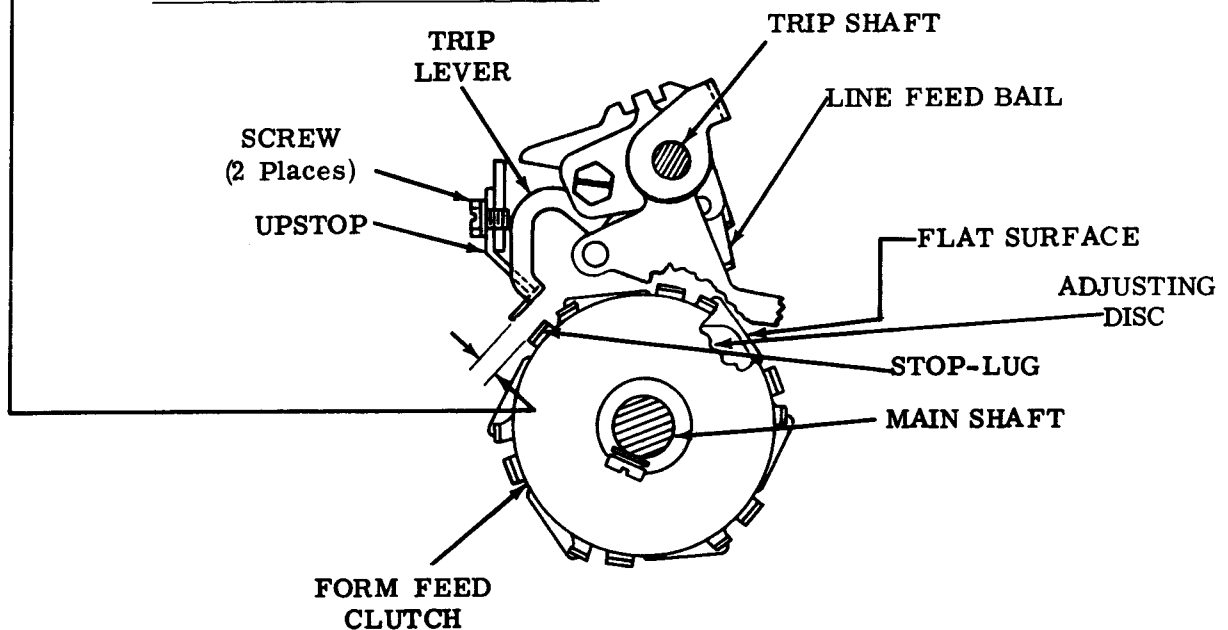
Loosen upstop screws and position upstop. Tighten screws.

**Related Adjustments****Affects**

FORM-OUT CONTACT PRESSURE AND GAP - S (2.113)

**Affected By**

FORM FEED BELT TENSION - S (2.94)



(Left Side View)

## 2.107 Form Feed Area (continued)

LINE FEED PAWL STRIPPING - S

## To Check

Set up the typing unit for single line feed (LINE FEED SELECTION - S (2.105) adjustment). Push the line feed strip lever down and allow the line feed upstop pawl to assume its normal position against the line feed strip lever. Manually set up the line feed code combination (-2-4---8) in the selector and rotate the main shaft until the line feed pawl just strips off the line feed function lever.

## Requirement

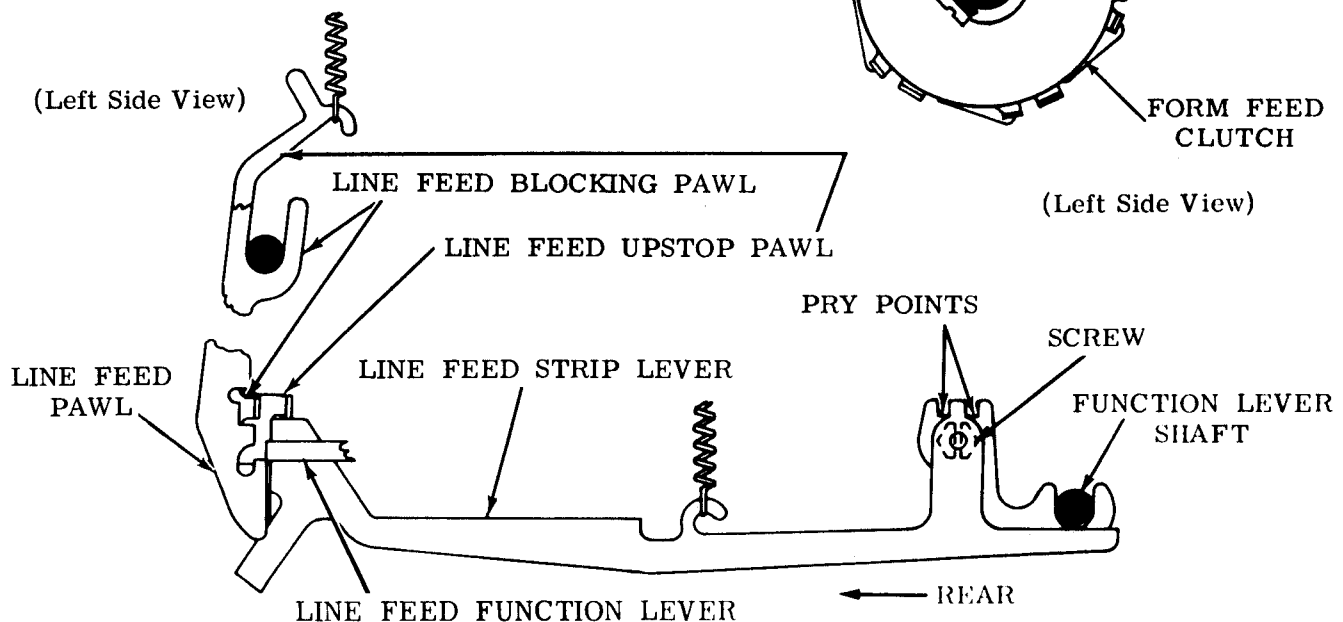
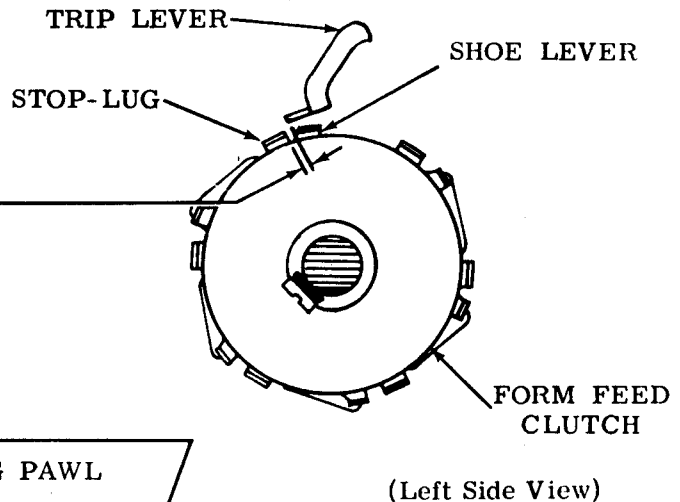
The trip lever should fall  
— Min on---Max 0.035 inch  
before stop-lug.

## To Adjust

- Loosen screw friction tight. Using pry points position line feed strip lever rearward three-fourths of its full adjusting range.
- Check LINE FEED SELECTION - S (2.108) adjustment for single line feed.
- Set up line feed code combination (-2-4---8) in selector and rotate main shaft until line feed pawl just strips off line feed function lever.
- Check requirement and tighten screw if requirement is met.
- If requirement is not met, move line feed strip lever slightly toward front of typing unit. Repeat steps (b), (c), and (d). Continue this procedure until requirement is met.

## Related Adjustments

Affected By  
RIGHT ROCKER DRIVE (Function Area)  
(2.36)



2.108 Form Feed Area (continued)

LINE FEED BAIL SPRING - S

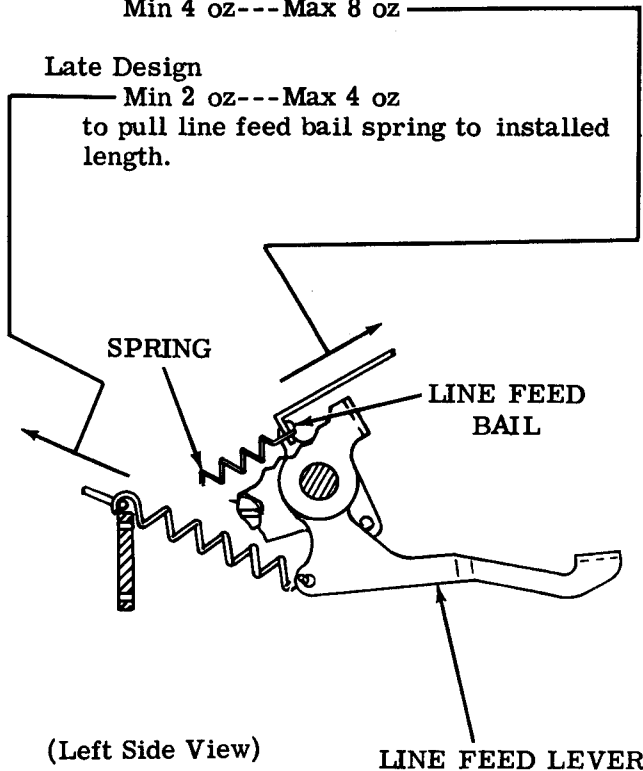
Requirement

Early Design

Min 4 oz---Max 8 oz

Late Design

Min 2 oz---Max 4 oz  
to pull line feed bail spring to installed length.



(Left Side View)

LINE FEED LEVER SPRING - S

Requirement

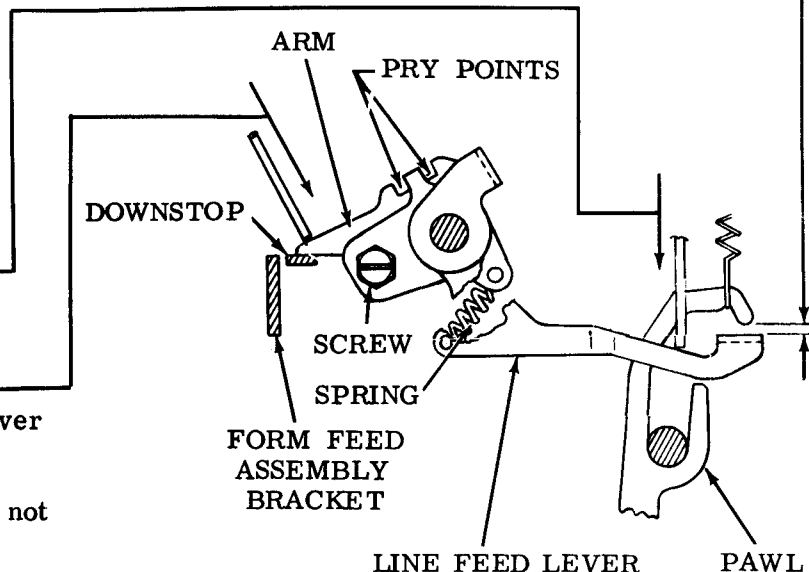
Early Design

With arm held against downstop  
Min 21 oz---Max 35 oz  
to start line feed lever moving.

Late Design

Min 27 oz---Max 40 oz  
to push arm down until line feed lever contacts pawl.

Note: Late design typing units are not equipped with a downstop.



(Left Side View)

LINE FEED SELECTION

To Check

Place typing unit in stop condition.

Requirement

Single line feed

Min 0.110---Max 0.130 inch  
between pawl and line feed lever.

Double line feed

Min zero---Max 0.010 inch  
between pawl and line feed lever.

To Adjust

Early Design

While holding rear part of line feed lever against downstop, loosen screw friction tight. Position line feed lever using pry points. Tighten screw.

Late Design

With screw friction tight, position line feed lever using pry points. Tighten screw.

Related Adjustments

Affected By

FORM FEED BELT TENSION - S  
(2.94)

TRIP LEVER ENGAGEMENT -  
LINE FEED - S (Early Design) (2.104)

TRIP LEVER ENGAGEMENT -  
FORM-OUT - S (2.103)

2.109 Platen Area (continued)

DETENT POSITION - S

**CAUTION: TO PREVENT ELECTRICAL SHOCK EXERCISE CARE WHEN WORKING WITH TYPING UNIT UNDER POWER.**

To Check

Set up line feed code combination (-2-4---8) in selector. Place TP185832 armature clip so as to hold armature attracted. Plug in typing unit plugs into proper call control receptacles and apply power to typing unit. Engage code-bar clutch to permit a line feed cycle to complete itself under power. Check requirement. Remove all power connections.

(1) Requirement

The pawl should be fully seated with a  
 Max 0.007 inch  
 between pawl and detent ratchet  
 tooth.

(2) Requirement

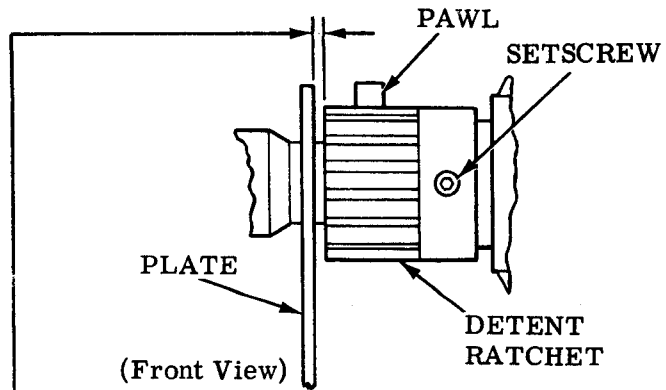
Min some---Max 0.030 inch  
 between the plate and detent ratchet.

To Adjust

Loosen both setscrews. Use finger pressure to engage and hold pawl firmly in detent ratchet. Depress line feed keytop. Tighten setscrews.

Related Adjustments  
 Affected By

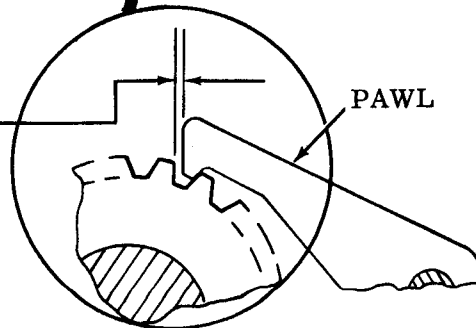
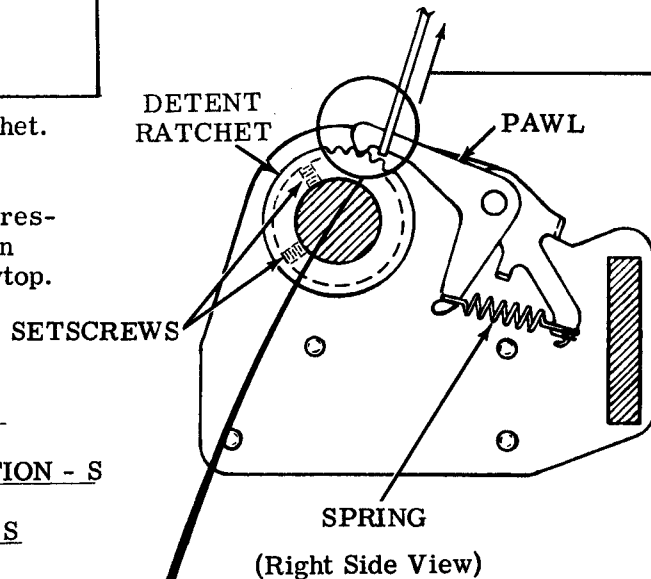
- FORM FEED BELT TENSION - S  
(Form Feed Area) (2.94)
- PLATEN — HORIZONTAL POSITION - S  
(2.89)
- VERTICAL TYPE ALIGNMENT - S  
(2.90)
- IDLER POSITION - S (2.100)



DETENT RATCHET PAWL SPRING - S

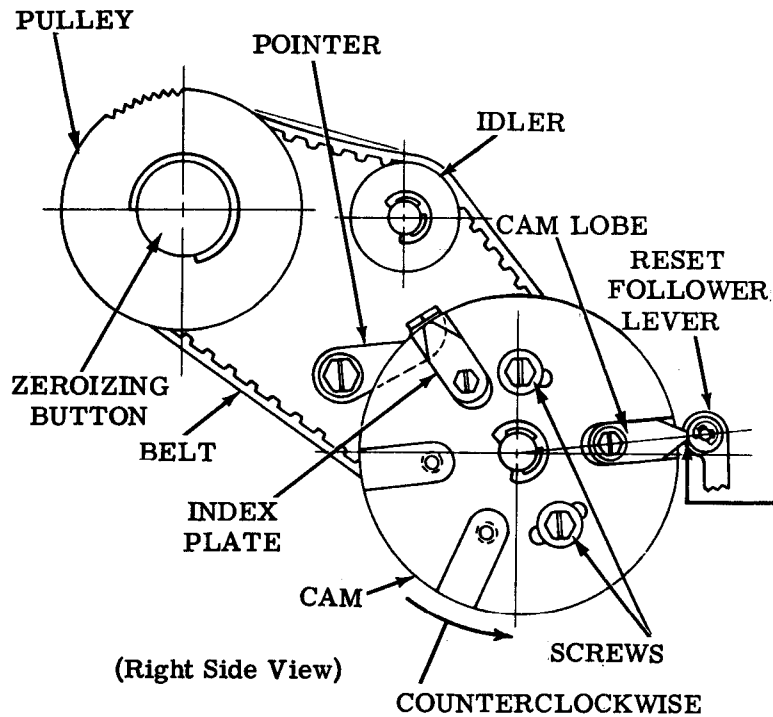
Requirement

With a spring scale positioned  
 under detent ratchet pawl  
 Min 24 oz---Max 30 oz  
 to start pawl moving.





## 2.110 Platen Area (continued)

(A) RESET FOLLOWER LEVER — RESET POSITION - S

**CAUTION: TO PREVENT ELECTRICAL SHOCK EXERCISE CARE WHEN WORKING WITH TYPING UNIT UNDER POWER.**

**To Check**

Set up form-out code combination (--34---8) in selector. Place TP185832 armature clip so as to hold armature attracted. Plug typing unit plugs into proper call control unit receptacles and apply power to typing unit. Engage codebar clutch to permit a form-out cycle to complete itself under power. Check requirement. Remove all power connections.

**Requirement**

At the end of form-out cycle, reset follower lever should come to rest on flat surface of cam lobe.

**To Adjust**

Loosen screws and adjust cam. Tighten screws.

**Related Adjustments****Affects**

CAM ZERO POSITION (2.110)

**Affected By**

FORM FEED BELT TENSION - S (2.94)

IDLER POSITION - S (2.100)

PLATEN — HORIZONTAL POSITION - S (2.89)

VERTICAL TYPE ALIGNMENT - S (2.90)

(B) CAM ZERO POSITION**To Check**

With cam lobes and index plates located on cam as shown on associated line drawings, place typing unit in stop condition.

**Note:** Reset follower lever must rest on proper cam lobe to zero a sprocket form. Place it in such position by depressing zeroizing button and rotating pulley until reset follower lever rests on cam lobe opposite three closely spaced grooves (on cam) facing toward the front of typing unit.

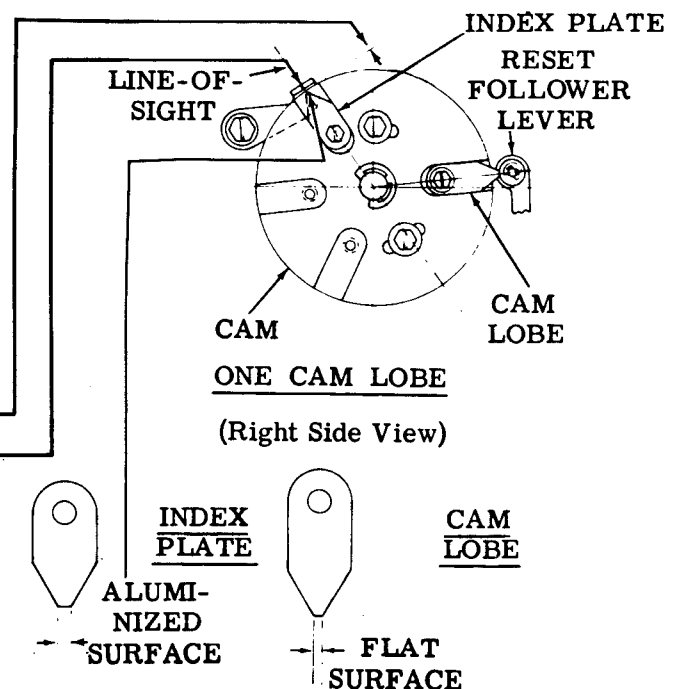
**One cam lobe:**(1) **Requirement**

With reset follower lever on flat surface of cam lobe and zeroizing button in its right most position

Min some---Max 0.035 inch between bottom surface of pointer and low part of cam.

(2) **Requirement**

When viewed along line-of-sight shown, tip of pointer should be aligned with index plate aluminized surface, as gauged by eye.



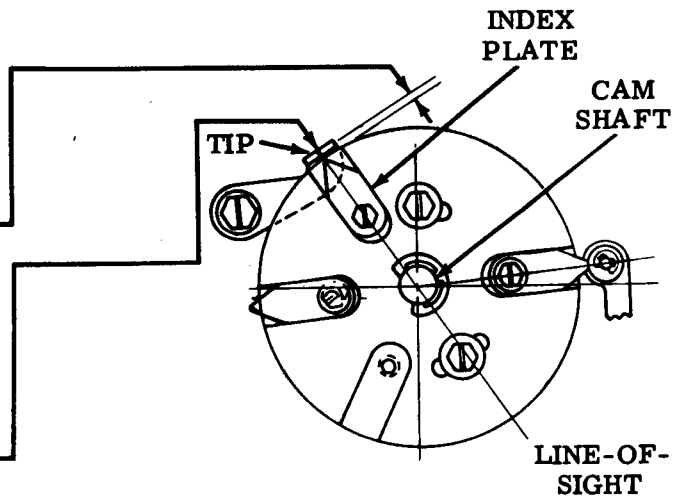
2.111 Platen Area (continued)

CAM ZERO POSITION (continued)

Two cam lobes:

- (1) Requirement  
With reset follower lever on flat surface of cam lobe and zeroizing button in its rightmost position  
Min some---Max 0.035 inch  
between bottom surface of pointer and low part of cam.

- (2) Requirement  
When viewed along line-of-sight shown, tip of pointer should be aligned with index plate aluminized surface, as gauged by eye.

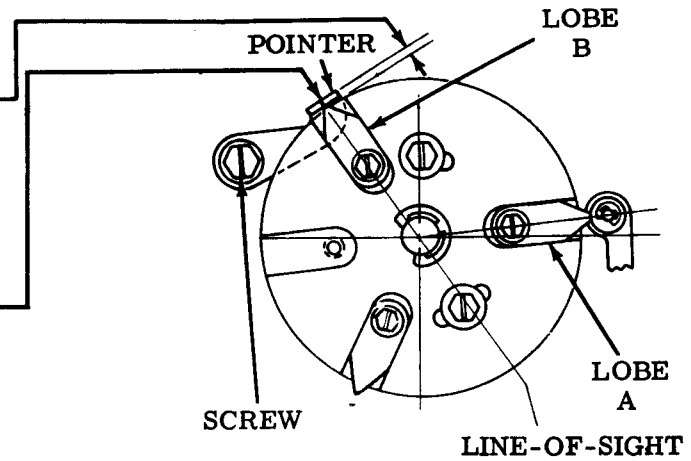


TWO CAM LOBES

Three cam lobes:

- (1) Requirement  
With reset follower lever on flat surface of cam lobe A and zeroizing button in its rightmost position  
Min some---Max 0.035 inch  
between bottom surface of pointer and low part of cam.

- (2) Requirement  
When viewed along line-of-sight shown, tip of pointer should be aligned with flat surface of lobe B, as gauged by eye.



THREE CAM LOBES

(Right Side Views)

To Adjust

Loosen screw and position pointer. Tighten screw.

Related Adjustments

Affected By

- FORM FEED BELT TENSION - S  
(2.94)
- IDLER POSITION - S (2.100)
- RESET FOLLOWER LEVER —
- RESET POSITION - S (2.110)

## 2.112 Platen Area (continued)

**FORM LENGTH SELECTION - S****To Check**

The control cam of the platen drive mechanism normally will come with two cam lobes. This causes sprocket forms to feed out one-half the basic form length.

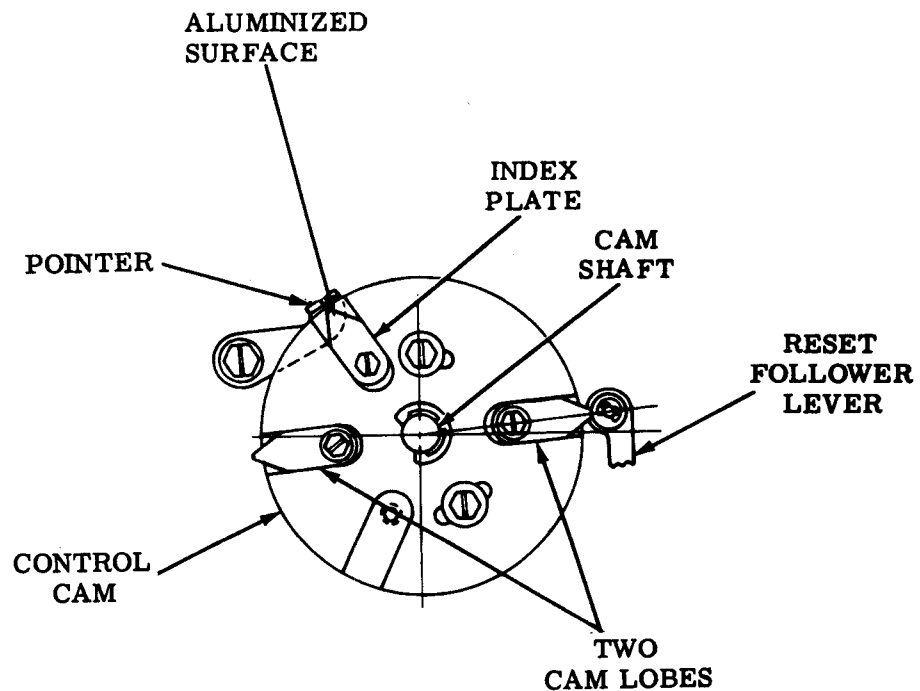
**Requirement**

A longer form length.

**To Adjust**

Line up the pointer with the aluminized surface of the index plate. Remove and discard the cam lobe which is located in the other side of the control cam opposite the reset follower lever.

Note: A listing of gears which provide various form feed lengths can be found in the appropriate parts section.



(Right Side View)

2.113 Form Feed Area (continued)

FORM-OUT CONTACT OPERATING BAIL CLEARANCE - S

To Check

With the typing unit in stop condition, place the reset follower lever on the low part of the cam by pushing in on the zeroizing button and rotating the pulley until the required situation is obtained.

Requirement

Min 0.005 inch---Max 0.015 inch between form-out bail and insulator.

To Adjust

Loosen clampscrew and position contact bracket. Tighten clampscrew.

Related Adjustments

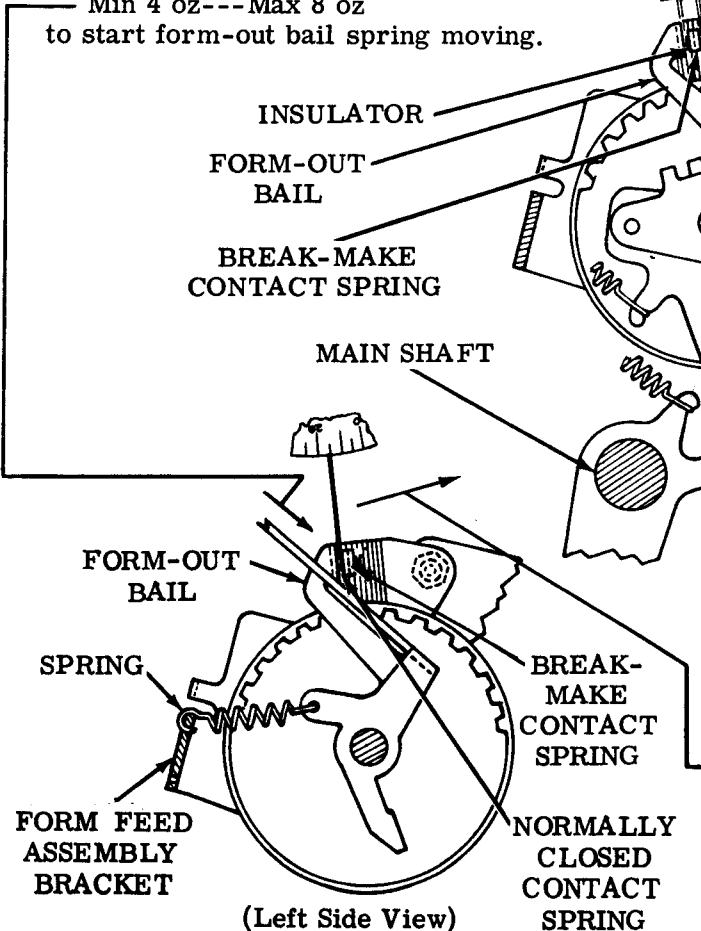
Affected By

TRIP LEVER ENGAGEMENT — FORM-OUT - S (2.103)

FORM-OUT BAIL SPRING - S

Requirement

With the form-out lever latched  
Min 4 oz---Max 8 oz  
to start form-out bail spring moving.



FORM-OUT CONTACT PRESSURE AND GAP - S

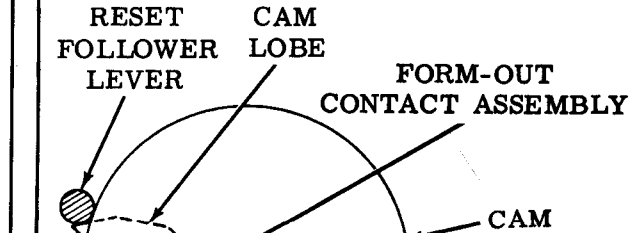
(1) Requirement

With the form-out bail not in contact with the insulator

Min 0.008 inch---Max 0.018 inch between a contact of the break-make contact spring and the contact of the normally open contact spring.

To Adjust

Bend the normally open contact spring.



(2) Requirement

With the form-out bail not in contact with the insulator

Min 15 grams---Max 20 grams to separate break-make contact spring and the normally closed contact spring.

To Adjust

Bend the normally closed contact spring.

Related Adjustments

Affected By

FORM FEED BELT TENSION - S (2.94)  
TRIP LEVER UPSTOP POSITION - S (Early Design) (2.106)

## 2.114 Platen Area (continued)

PRINTING LINE POSITION (Preliminary) - S

## (1) Requirement

The left sprocket ring pins should be centrally located within the paper guide slot.

## To Adjust

Loosen setscrews and position the left sprocket ring.

Note: Do not tighten setscrews until adjustment has been completed.

## (2) Requirement

With the setscrews of the left and right sprocket rings in line, place a single sprocket form on the platen with the sprocket form feed holes over the left and right sprocket ring pins. The left and right sprocket ring pins should be in line and centrally located in the sprocket form feed holes.

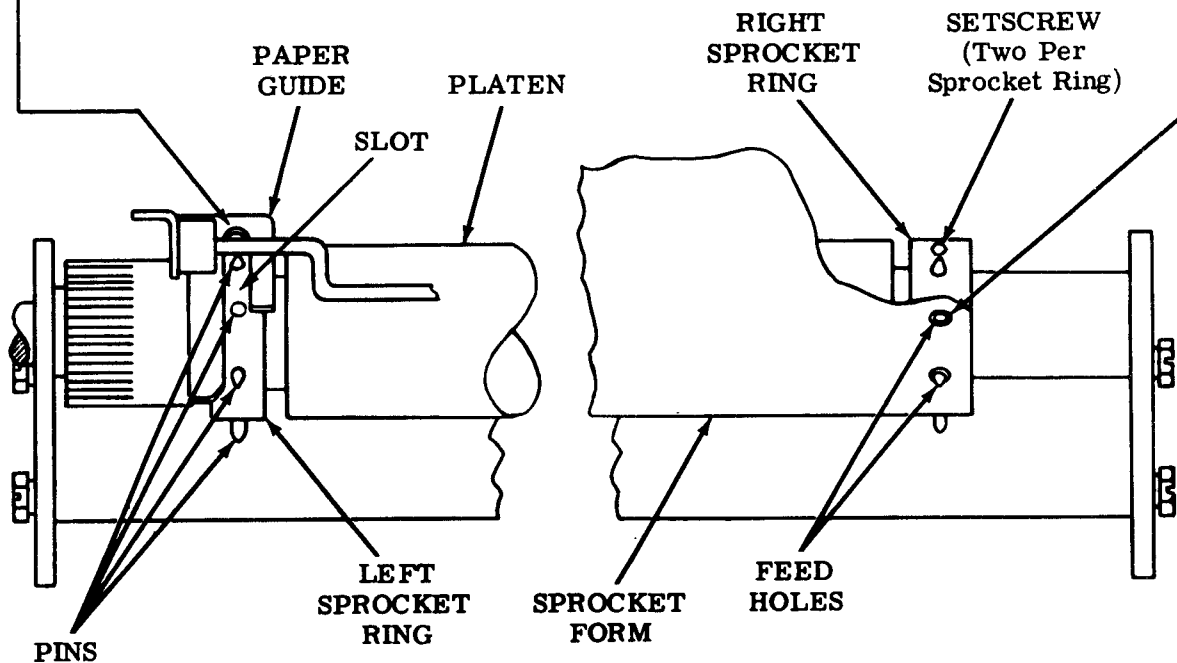
## To Adjust

Loosen setscrews and position the left and/or right sprocket rings as required. Tighten all setscrews.

## Related Adjustments

Affects

RIGHT PAPER GUIDE POSITION - S  
(2.116)



(Front View)

2.115 Platen Area (continued)

PRINTING LINE POSITION (Final) - S

To Check

Place a single sheet of sprocket form in platen mechanism. Print the character M several times to establish a printed line.

Note: On nonprinted forms, draw a horizontal line across form connecting bottom of sprocket feed holes.

Requirement

Printed Form

Printed line should be aligned with sprocket form lines.

Nonprinted Form

- (a) Printed line should be aligned with drawn line.
- (b) Printed line should not touch drawn line.
- (c) Printed line should not be more than 1/16 inch above drawn line with no more than 1/32 inch variation along its entire length.

To Adjust

Early Design

Modify Requirement (2) of PRINTING LINE POSITION (Preliminary) - S (2.114)

Late Design (containing adjusting clampscrew)

Loosen clampscrew and position platen. Tighten clampscrew.

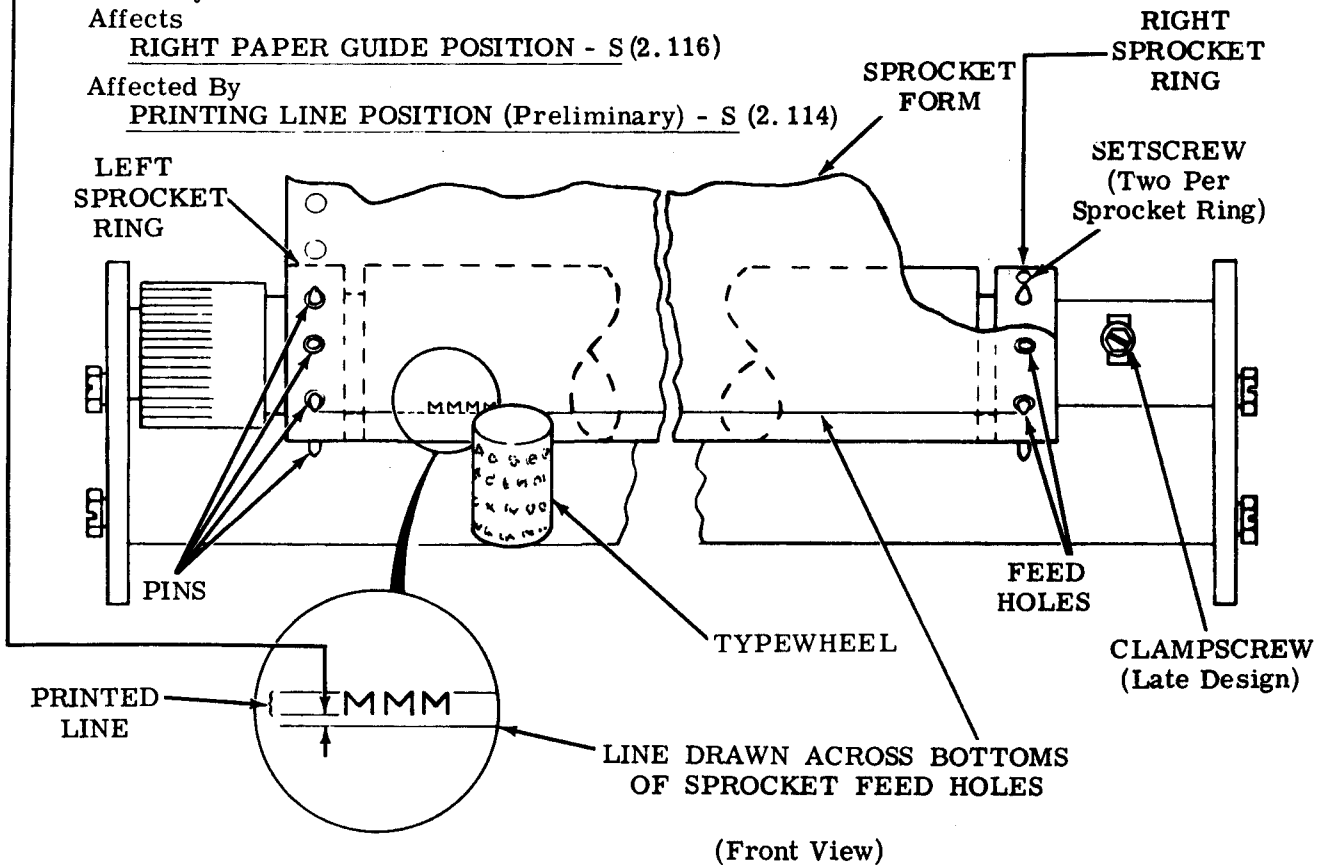
Related Adjustments

Affects

RIGHT PAPER GUIDE POSITION - S (2.116)

Affected By

PRINTING LINE POSITION (Preliminary) - S (2.114)



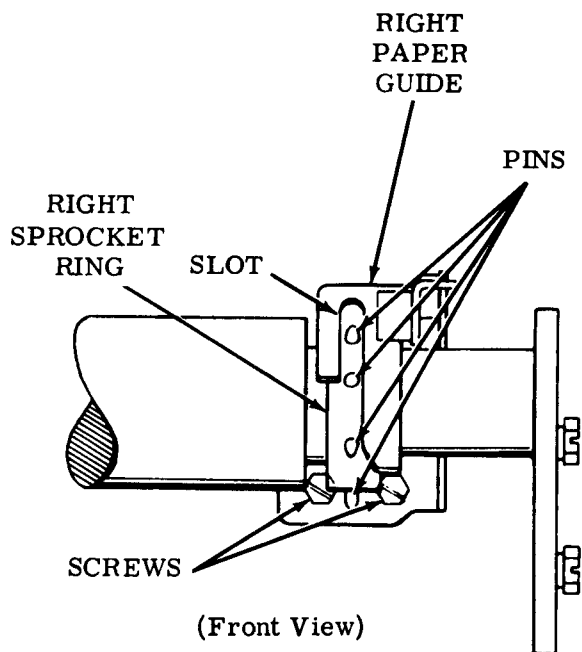
## 2.116 Platen Area (continued)

RIGHT PAPER GUIDE POSITION - S**Requirement**

The right sprocket ring pins should be centrally located within the paper guide slot.

**To Adjust**

Loosen screws and position right paper guide.  
Tighten screws.

**Related Adjustments****Affected By**

PRINTING LINE POSITION (Final) - S (2.115)

## 2.117 Platen Area (continued)

WIRE GUIDE POSITION - S**To Check**

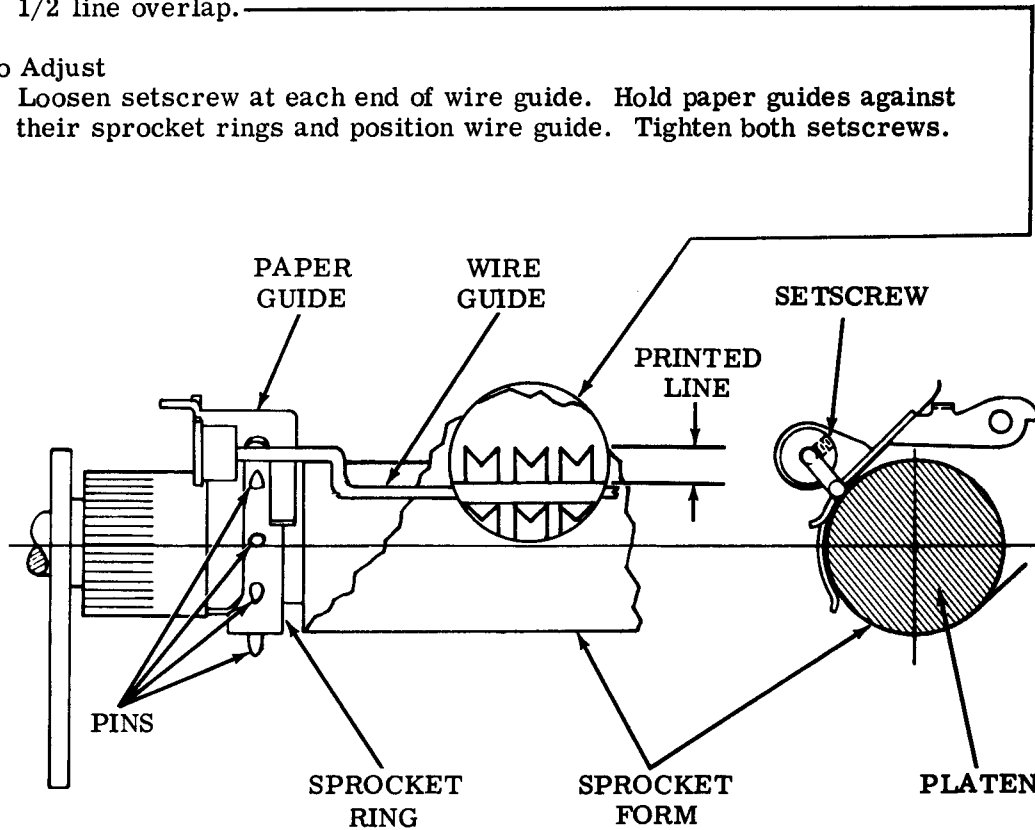
Put a sprocket form containing several lines of printed copy in the unit. Place platen in its detented position with top edge of form feed holes engaging top edge of sprocket ring pins. Place left and right paper guides in contact with their associated sprocket rings.

**Requirement**

The wire guide should fully contact the sprocket form and should be centrally located between the lines of printed copy with a maximum of 1/2 line overlap.

**To Adjust**

Loosen setscrew at each end of wire guide. Hold paper guides against their sprocket rings and position wire guide. Tighten both setscrews.



(Front View)

(Right Side View)

**Related Adjustments****Affected By**

PLATEN — HORIZONTAL POSITION - S (2.89)

VERTICAL TYPE ALIGNMENT - S (2.90)



## 2.118 Platen Area (continued)

LEFT MARGIN POSITION - S

## To Check

Place platen knob screw in a vertical position and carriage to the left hand margin. Fully seat piston in dashpot cylinder.

## (1) Requirement

Approximately 3/8 inch between edge of sprocket ring pin and V-projection.

## (2) Requirement

Min 0.030 inch between the closest sprocket ring pin and ribbon guide.

## To Adjust

Loosen two dashpot cylinder mounting screws and position dashpot cylinder. Tighten screws.

## Related Adjustments

## Affects

RIGHT MARGIN POSITION - S (2.118)  
CARRIAGE RETURN LEVER —  
UNLATCH CLEARANCE (2.75)  
LEFT MARGIN PRINTING (2.120)

RIGHT MARGIN POSITION - S

## To Check

Place carriage to the right to the 72nd character position. Hold feed pawl out of engagement with spacing ratchet, so that only check pawl is engaged.

## Requirement

Min 0.030 inch between right sprocket ring pin and ribbon guide.

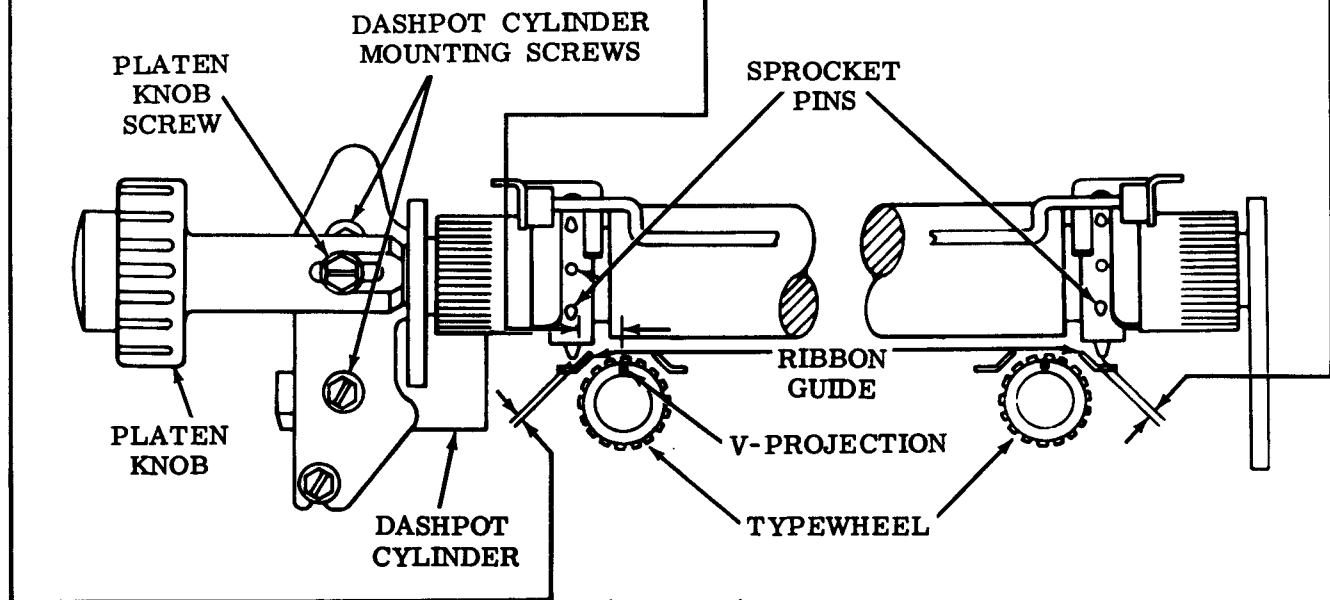
## To Adjust

Refine LEFT MARGIN POSITION - S (2.118) adjustment.

## Related Adjustments

## Affected By

LEFT MARGIN POSITION - S (2.118)



(Top View)

2.119 Paper Controls (Paper Alarm Control Area)

(A) PAPER ALARM CONTACT PRESSURE AND GAP - S

(1) Requirement

With the paper alarm lever not in contact with insulator  
 — Min 15 grams---Max 20 grams to separate the contacts of the break-make contact spring and normally closed contact spring.

(C) PAPER LEVER SPRING - S

To Check

Place a single sheet of a sprocket form between the paper alarm lever and paper guideplate. Hold the sprocket form taut over the cutout in the paper guideplate and allow the paper alarm lever to rest on the sprocket form. Position a spring scale over the paper alarm lever at the rectangular opening in the paper guideplate.

Requirement

Min 1 oz---Max 1-1/2 oz to move paper alarm lever from sprocket form.

(2) Requirement

With the paper alarm lever not in contact with insulator  
 — Min 0.010 inch---Max 0.020 inch between the contacts of the break-make contact spring and the normally open contact spring.

To Adjust

Bend normally closed contact spring.

Related Adjustment

Affected By

PAPER GUIDEPLATE CLEARANCE - S (Platen Area) (2.92)

(B) PAPER ALARM CONTACT LEVER CLEARANCE - S

To Check

Place a single sheet of a sprocket form between the paper alarm lever and paper guideplate. Hold the sprocket form taut over the cutout in the paper guideplate.

Requirement

— Min 0.005 inch---Max 0.030 inch between insulator and paper alarm lever.

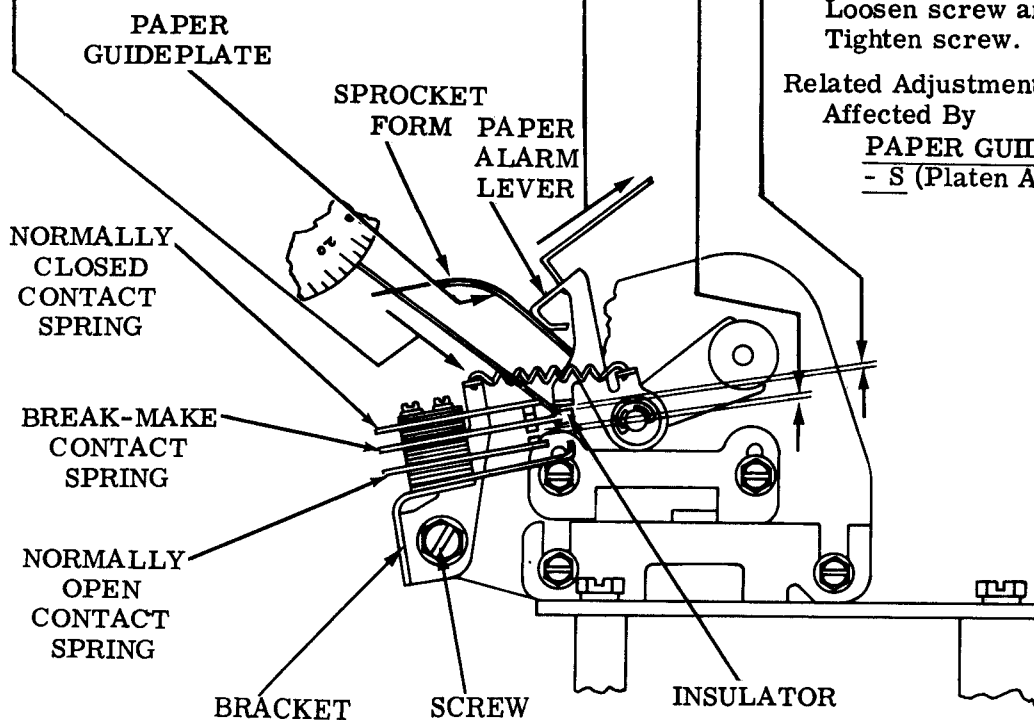
To Adjust

Loosen screw and position bracket. Tighten screw.

Related Adjustment

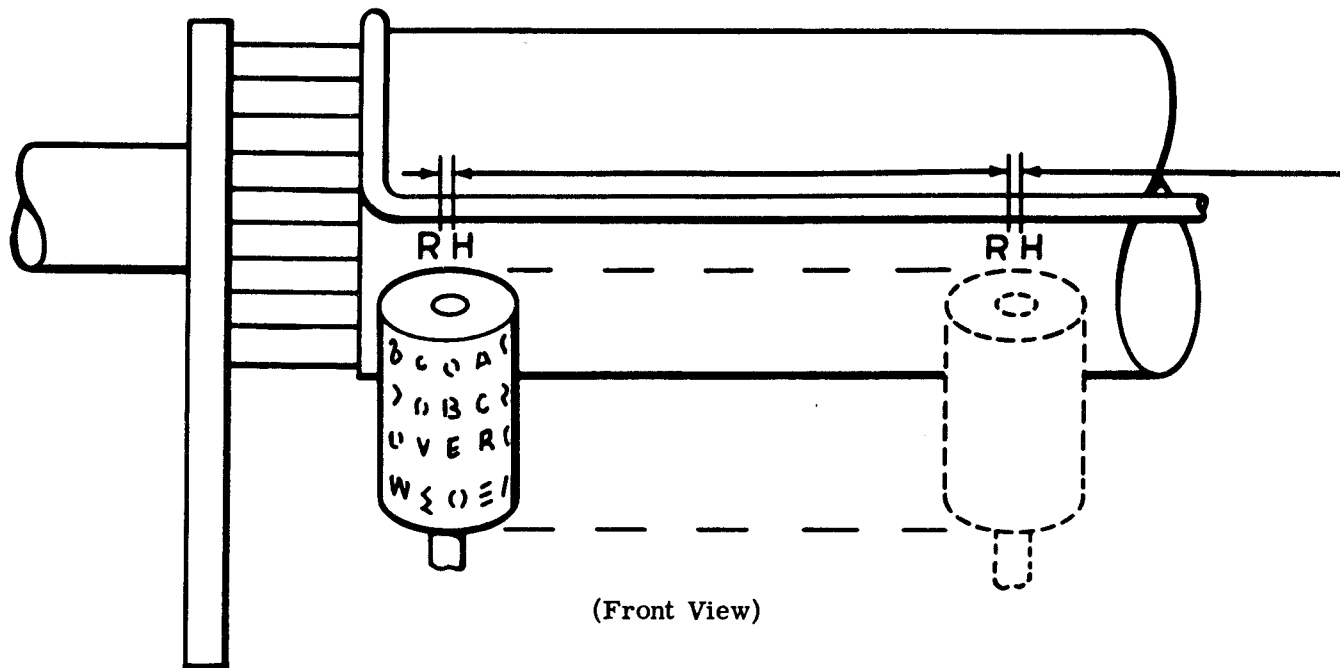
Affected By

PAPER GUIDEPLATE CLEARANCE - S (Platen Area) (2.92)



(Left Side View)

## 2. 120 Spacing Area (continued)

LEFT MARGIN PRINTING**To Check**

Print two or more characters such as RH at left margin and at center of line.

**Requirement**

Character to character spacing approximately same as center of line as at left margin.

**To Adjust**

With spacing ratchet clampscrews friction tight, seat piston firmly in the dashpot. Rotate the carriage return arm counter-clockwise to permit the feed pawl and check pawl to move toward the spacing ratchet. Position the spacing ratchet so that the check pawl rests on top of a spacing ratchet tooth. Tighten spacing ratchet clampscrews. Recheck Requirement and refine adjustment if necessary.

**Related Adjustments****Affected By**

SPACING BELT TENSION (2. 69)

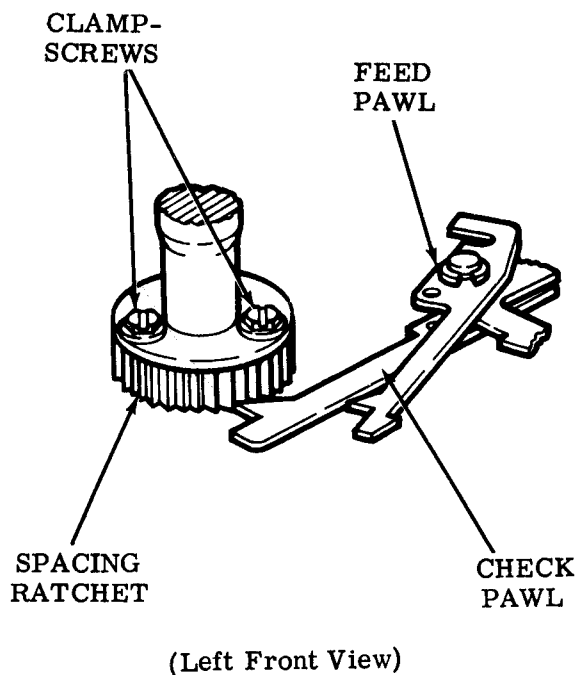
LEFT MARGIN POSITION - S

(Platen Area) (2. 118)

LEFT MARGIN POSITION - F

(Platen Area) (2. 72)

RIGHT MARGIN POSITION (2. 118)



2. 121 Function Area (continued)

LINE LENGTH SELECTION

- (1) Requirement (Units with end-of-line space suppression)

Select the proper line length as follows:  
 With the carriage located one character before the end of a line (for example: character 71 on a 72 character line), rotate the main shaft until the carriage drive bail reaches its rearmost position  
 Min 0.025 inch---Max 0.100 inch between end-of-line lever and spacing toggle link.

To Adjust

Early Design: Loosen clampscrew and position belt clamp and extension. Tighten clampscrew.

Late Design: Bend tabs away from belt and position belt clamp. Crimp belt clamp and tabs securely on belt.

Note: Use either TP180948 or TP183498 automatic codebar and no other on typing units equipped with end-of-line space suppression.

- (2) Requirement (Units with automatic carriage return-line feed)

Select either a 69, 72, or 74 character line length.

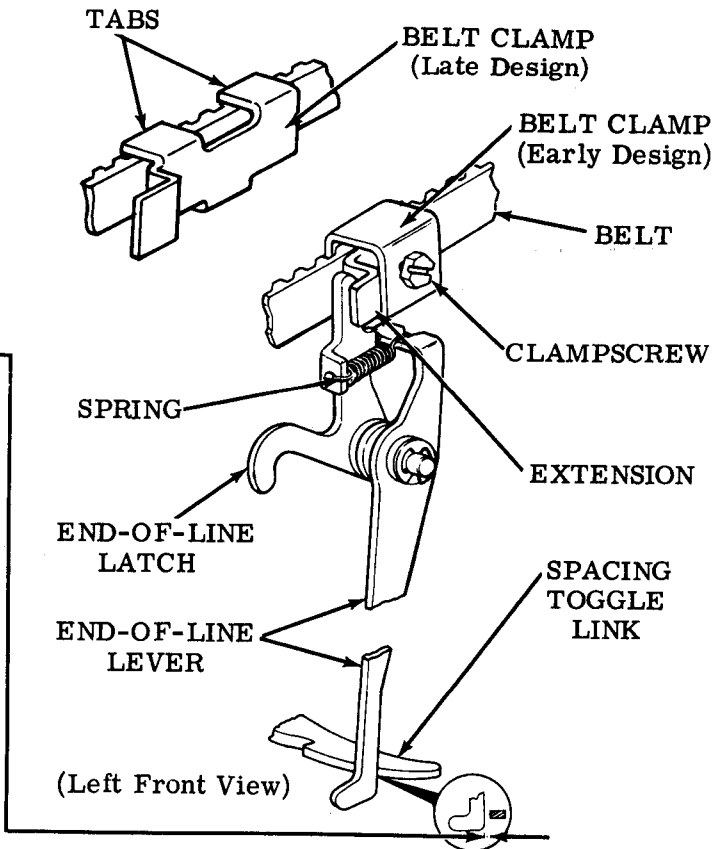
To Adjust

TP180948 Automatic Codebar: Break off projection(s) as follows:

Line Length (Characters)	End-of-Line Bell (Characters)	Projection Removed
69	65	None
72	68	1
74	70	1 and 2

TP183495, TP183496, TP183497 automatic codebars: Use the proper automatic codebar as follows:

Line Length (Characters)	End-of-Line Bell (Characters)	Automatic Codebar
69	69	TP183495
72	71	TP183496
74	73	TP183497



Note 1: On friction feed typing units using TP180948 automatic codebar, break off projection(s) as instructed in Automatic Carriage Return — Line Feed above so that the end-of-line bell will ring at the proper time.

Note 2: On sprocket feed typing units using TP180948 automatic codebar, do not break off any projections. Leave the automatic codebar as shown on the line drawing so that the end-of-line bell will ring at the proper time.

Note 3: Use either TP180948 or TP183498 automatic codebar and no other on typing units equipped with end-of-line space suppression.

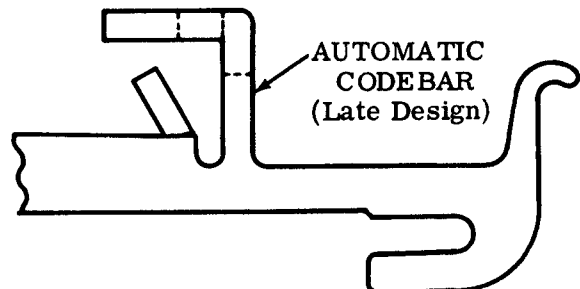
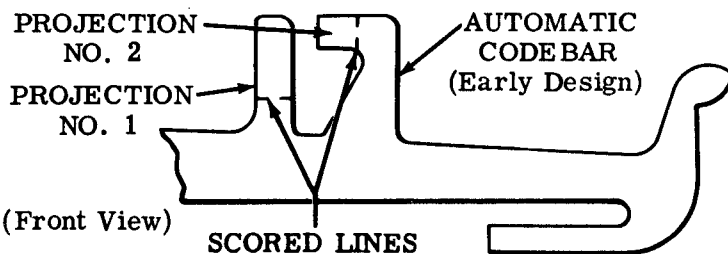
Note 4: The late design TP183495-96-97-98 codebars must be used with the TP185971 set of parts providing the end-of-line bell to ring on the 62nd character.

Related Adjustments

Affected By

LEFT MARGIN PRINTING (2. 120)

LEFT MARGIN POSITION - S (2. 118)



## 2.122 Function Area (continued)

MARGIN BELL BELLCRANK CLEARANCE

## (A) To Check

Place carriage at left margin. Function bail at high point of its travel and the end-of-line bell function lever unselected.

## (1) Requirement

Min 0.005 inch---Max 0.020 inch between the bellcrank extension and the automatic codebar.

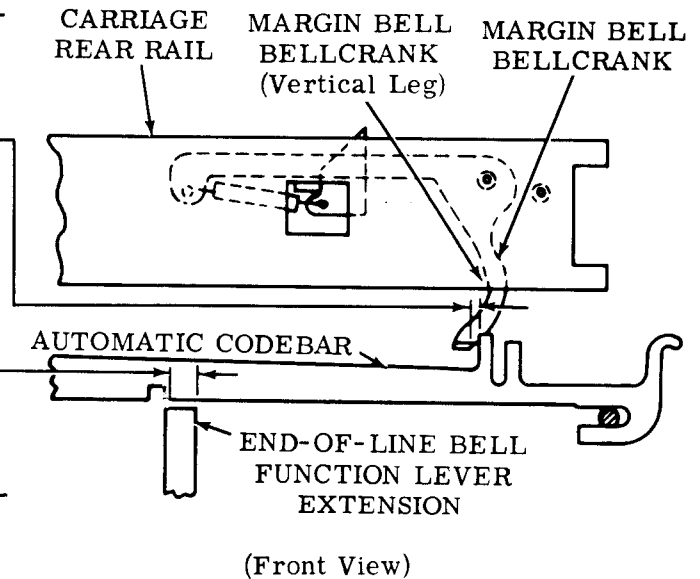
## (2) Requirement

The end-of-line bell function lever extension and the automatic codebar should fully engage.

## To Adjust

Using the TP180993 bending tool, bend vertical leg of bellcrank to meet Requirement (1) and bend the end of line bell function lever extension to meet Requirement (2).

Note: This adjustment applies only to typing units equipped with the end-of-line bell to ring on approximately the 62nd character.



## (B) To Check

By positioning carriage to approximately the 61st character, upper rear carriage roller will fully depress latch on margin bell bellcrank.

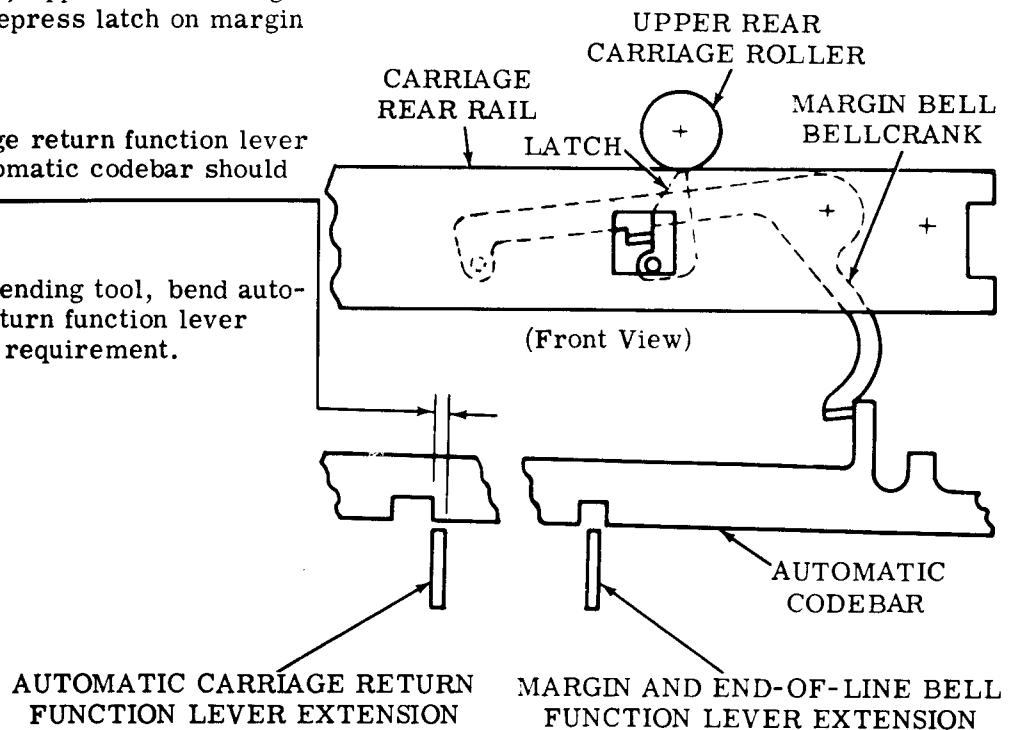
## Requirement

Automatic carriage return function lever extension and automatic codebar should fully engage.

## To Adjust

Using TP180993 bending tool, bend automatic carriage return function lever extension to meet requirement.

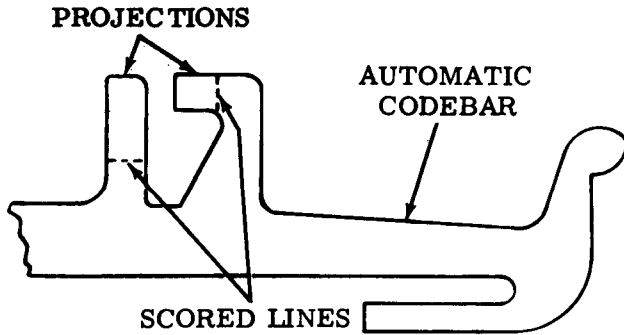
Note: This adjustment applies only to typing units equipped with combination of automatic carriage return and margin bell features.



2.123 Function Area (continued)

END-OF-LINE BELL SIGNAL - S

Note: This requirement applies only to sprocket feed typing units equipped with TP180948 automatic codebar.



(Front View)

Requirement

The automatic codebar projections must not be removed.

To Adjust

Replace codebar.

2.124 Selector Area (continued)

RECEIVING MARGINS

To Check

Set up test situation using typing unit and Signal Distortion Test Set to check selector receiving margins.

Requirement

Obtain minimum selector receiving margins as follows:

<u>SPEED</u>	<u>RANGE ZERO DISTORTION</u>	<u>OVERALL BIAS</u>	<u>END DISTORTION</u>
All Speeds	No Requirement	35 Percent*	33 Percent*

\*At same range scale setting.

To Adjust

Refine ARMATURE SPRING (2.20) and, if necessary, refine ARMATURE BRACKET POSITION (Preliminary) (2.18) and/or BELT TENSION (Motor Area) (2.02) adjustments.

Note: The refinement of the ARMATURE BRACKET POSITION (2.18) or BELT TENSION (Motor Area) (2.02) adjustment need not be performed unless the refinement of the ARMATURE SPRING (2.20) adjustment fails to bring about the minimum selector receiving margins.

Related Adjustments

Affected By

- ARMATURE BRACKET POSITION (2.18)
- ARMATURE SPRING (2.20)
- SHOE LEVER GAP AND TRIP LEVER ENGAGEMENT (2.19)

## 2.125 Carriage Area (continued)

FINAL PRINTING ALIGNMENT

Note: When typing unit is adjusted as instructed on previous pages, quality of printed copy should be good. However, minor readjustments may be necessary.

## To Check

Print TH at various points along length of printing line.

## Requirement

Quality of printed characters should be good.

## To Adjust

Use the following guide in making readjustments.

Shading of top and bottom of characters not equal and/or underscoring or overscoring of characters ---

---refine VERTICAL TYPE ALIGNMENT - FS (Platen Area) (2. 71 - F and 2. 90 - S) adjustment by either moving typewheel vertically (late design) or moving platen toward portion of light shading (early design).

Note: The following punctuation marks comma (,), apostrophe ('), dash (-), underline ( \_ ), and period (.), may exhibit underscoring or overscoring. The overscoring or underscoring is acceptable on these characters provided the nature of another character is not changed and the mark is not interpreted as a character.

Left character T or poor quality ---

---using left pry points, refine TYPEWHEEL POSITIONING (2. 51) adjustment.

Right character H of poor quality ---

---using right pry points, refine TYPEWHEEL POSITIONING (2. 51) adjustment.

Characters spread out ---

---refine TYPEWHEEL POSITIONING (2. 51) adjustment by moving plate frontward.

Characters run together ---

---refine TYPEWHEEL POSITIONING (2. 51) adjustment by moving plate rearward.

Both characters of light shading on left side ---

---refine TYPEWHEEL "HOME" POSITION (2. 58) adjustment by rotating wheel clockwise as viewed from top.

Both characters of light shading on right side ---

---refine TYPEWHEEL "HOME" POSITION (2. 58) adjustment by rotating wheel counterclockwise as viewed from top.

## Related Adjustments

Affected By

TYPEWHEEL "HOME POSITION (2. 58)

3. VARIATIONS TO BASIC ADJUSTMENTS

3.01 Answer-Back Area

Note: The answer-back trip lever adjusting tap should clear the control lever before proceeding with the following adjustments.

BLOCKING LINK CLEARANCE

To Check

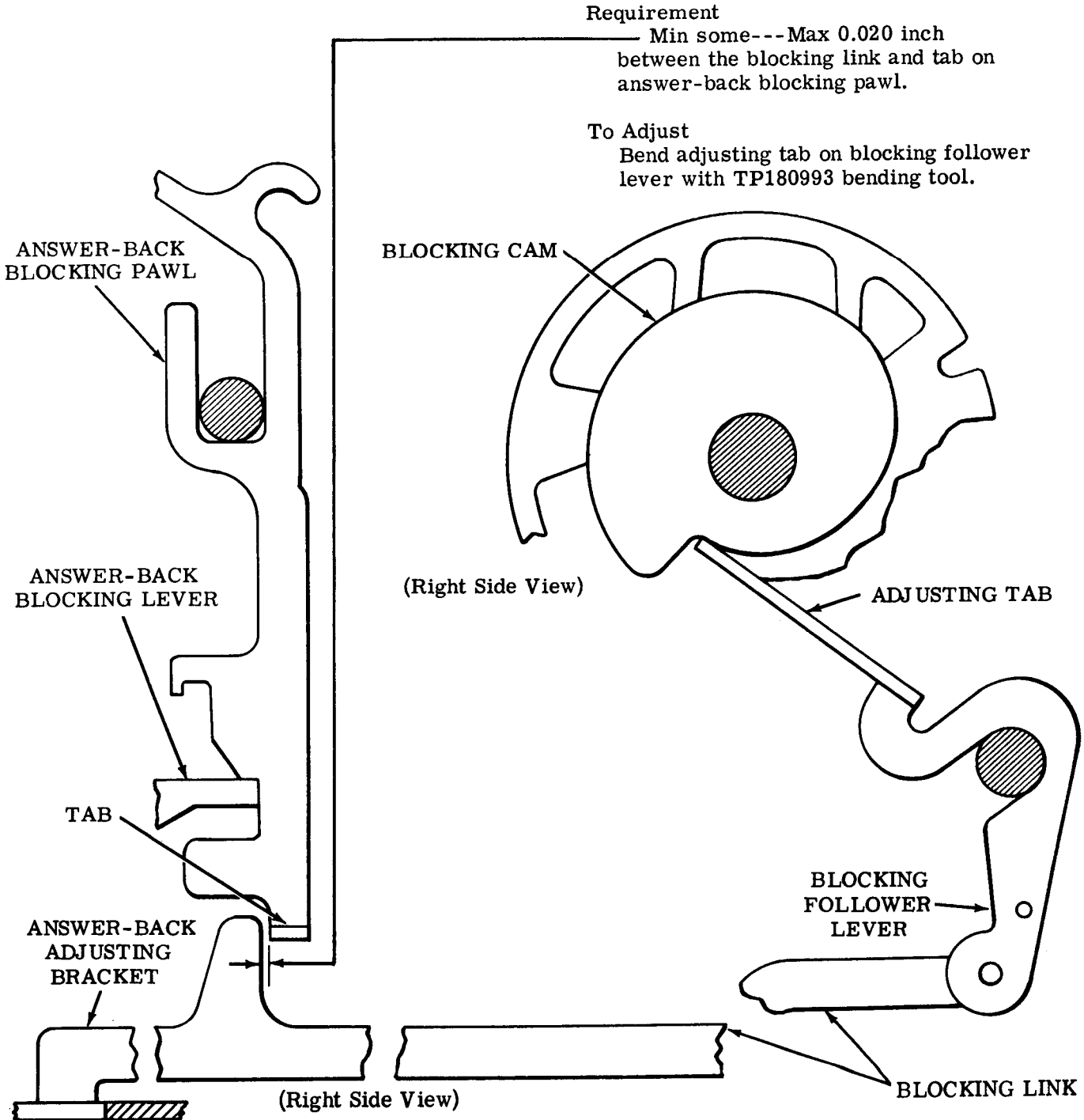
Disengage (latch) distributor and function clutches, engage the answer-back blocking lever fully in indent of answer-back blocking pawl. Take up play in the answer-back blocking pawl toward the front of the typing unit.

Requirement

Min some---Max 0.020 inch between the blocking link and tab on answer-back blocking pawl.

To Adjust

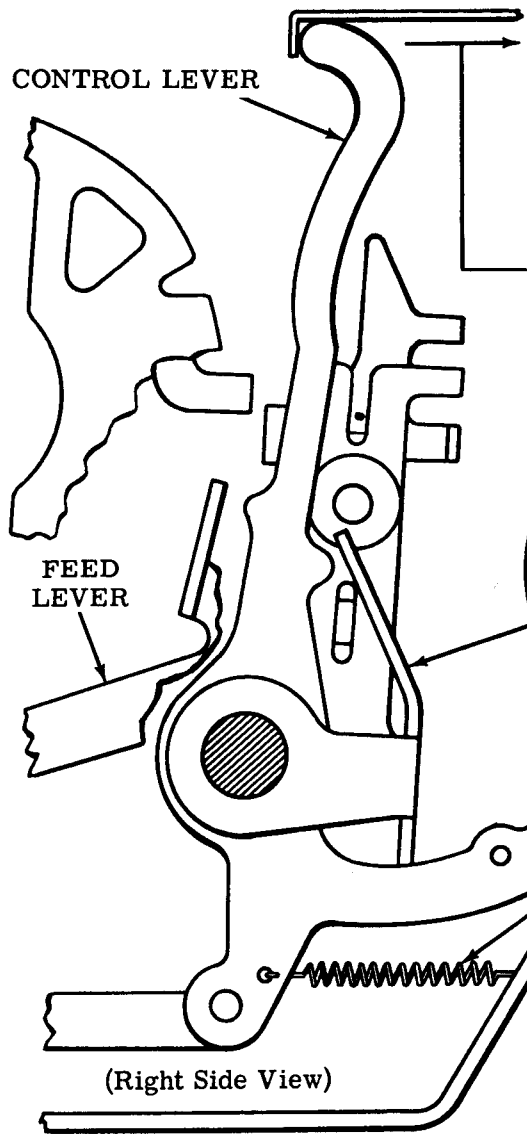
Bend adjusting tab on blocking follower lever with TP180993 bending tool.





3.02 Answer-Back Area (continued)

CONTROL LEVER SPRING — HORIZONTAL

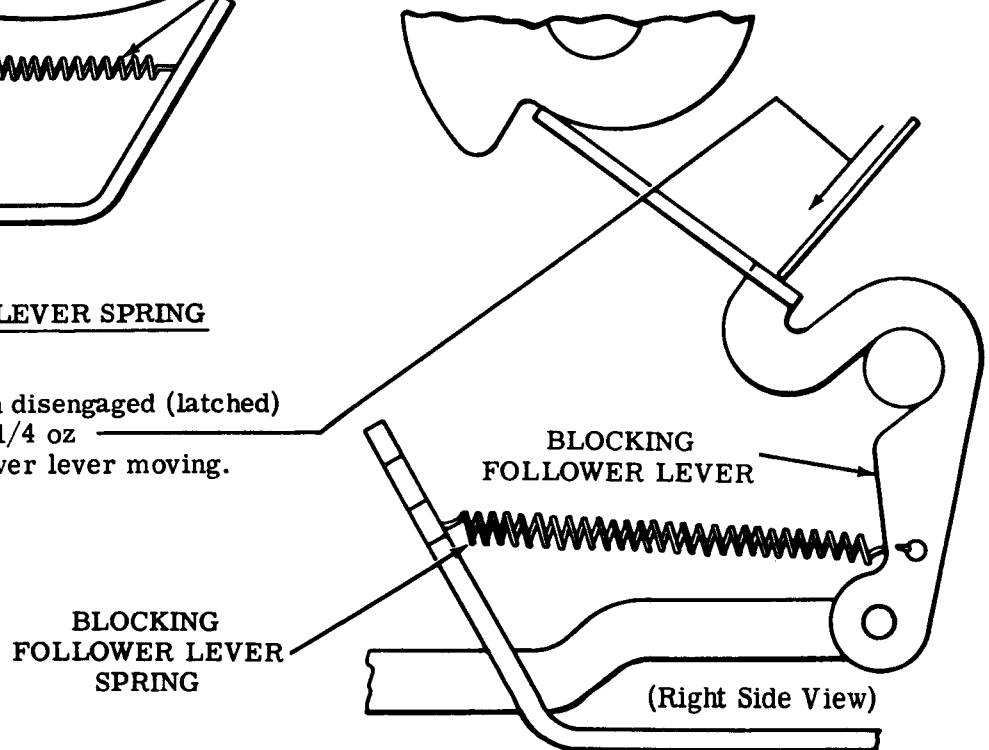


To Check  
Place control lever out of indent and on high part of answer-back drum. Rotate main shaft until feed lever is moved by cam roller to its lowest point. Hold stop bail away from control lever.

Requirement  
Min 6 oz---Max 8 oz  
to start control lever moving.

BLOCKING FOLLOWER LEVER SPRING

Requirement  
With distributor clutch disengaged (latched)  
Min 1 oz---Max 2-1/4 oz  
to start blocking follower lever moving.



3.03 Answer-Back Area (continued)

DRUM POSITION

To Check

Engage lower extension of control lever in indent of answer-back drum and locate detent lever between ST and 20 rows on answer-back drum. Disengage (latch) distributor clutch. Hold the feed pawl out of engagement with the answer-back drum and manually move the upper extension of the control lever toward the rear of the typing unit while checking to see that the answer-back drum is fully detented. With finger pressure, push lightly on drum in a counterclockwise direction. While maintaining this light pressure, pull drum detent lever out of engagement with drum.

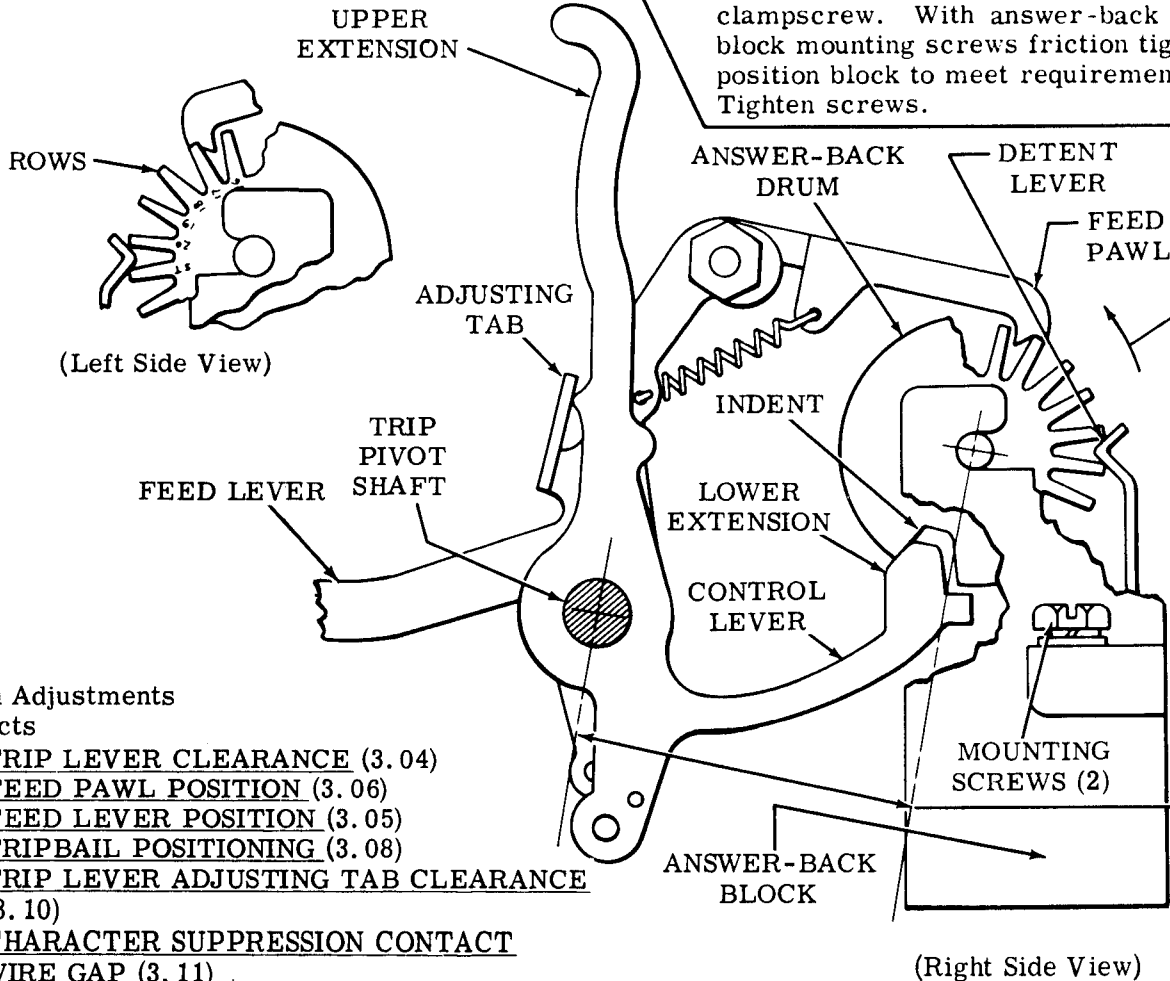
Note: If necessary to insure clearance between the feed lever adjusting tab and the control lever, bend the feed lever adjusting tab toward the front of the typing unit.



(1) Requirement  
Barely perceptible counterclockwise movement of answer-back drum.

(2) Requirement  
The axis of the answer-back drum should be parallel to the trip pivot shaft as gauged by eye.

To Adjust  
Loosen HERE IS adjusting bracket clampscrew and answer-back bracket clampscrew. With answer-back block mounting screws friction tight, position block to meet requirements. Tighten screws.



Related Adjustments  
Affects

- TRIP LEVER CLEARANCE (3.04)
- FEED PAWL POSITION (3.06)
- FEED LEVER POSITION (3.05)
- TRIPBAIL POSITIONING (3.08)
- TRIP LEVER ADJUSTING TAB CLEARANCE (3.10)
- CHARACTER SUPPRESSION CONTACT WIRE GAP (3.11)

## 3.04 Answer-Back Area (continued)

TRIP LEVER CLEARANCE**To Check**

Trip distributor clutch and manually rotate main shaft to place upper edge of clutch shoe lever in line with upper edge of trip lever. Lift feed pawl and manually rotate answer-back drum counterclockwise until detent lever is located between row 1 and 2 on answer-back drum. Take up play in clutch shoe lever toward trip lever.

**Requirement**

Min 0.015 inch---Max 0.035 inch  
between clutch shoe lever and trip lever.

**To Adjust**

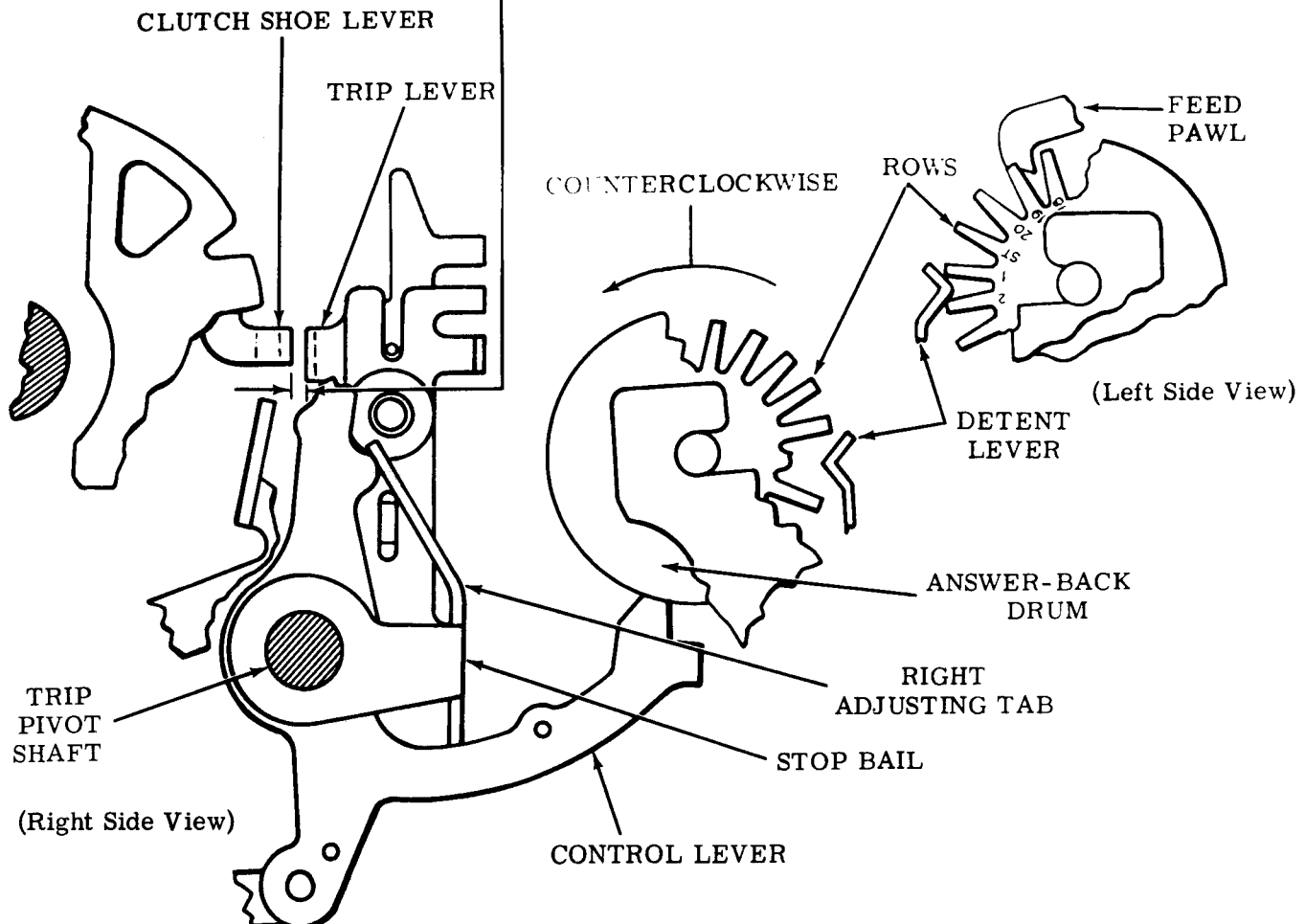
Bend right adjusting tab using TP180993 bending tool.

Note: The plane of right adjusting tab should be parallel to the axis of trip pivot shaft, as gauged by eye.

**Related Adjustments**

Affected By

DRUM POSITION (3.03)



3.05 Answer-Back Area (continued)

FEED LEVER POSITION

To Check

With answer-back drum fully detented in its home position, trip distributor clutch and manually rotate main shaft until cam roller is adjacent to high part of feed lever. Rotate cam roller to minimize clearance. Hold feed pawl clear of answer-back drum.

Requirement

Min some---Max 0.010 inch  
between feed lever and cam roller.

To Adjust

Bend feed lever adjusting tab with TP180993 bending tool.

Related Adjustments

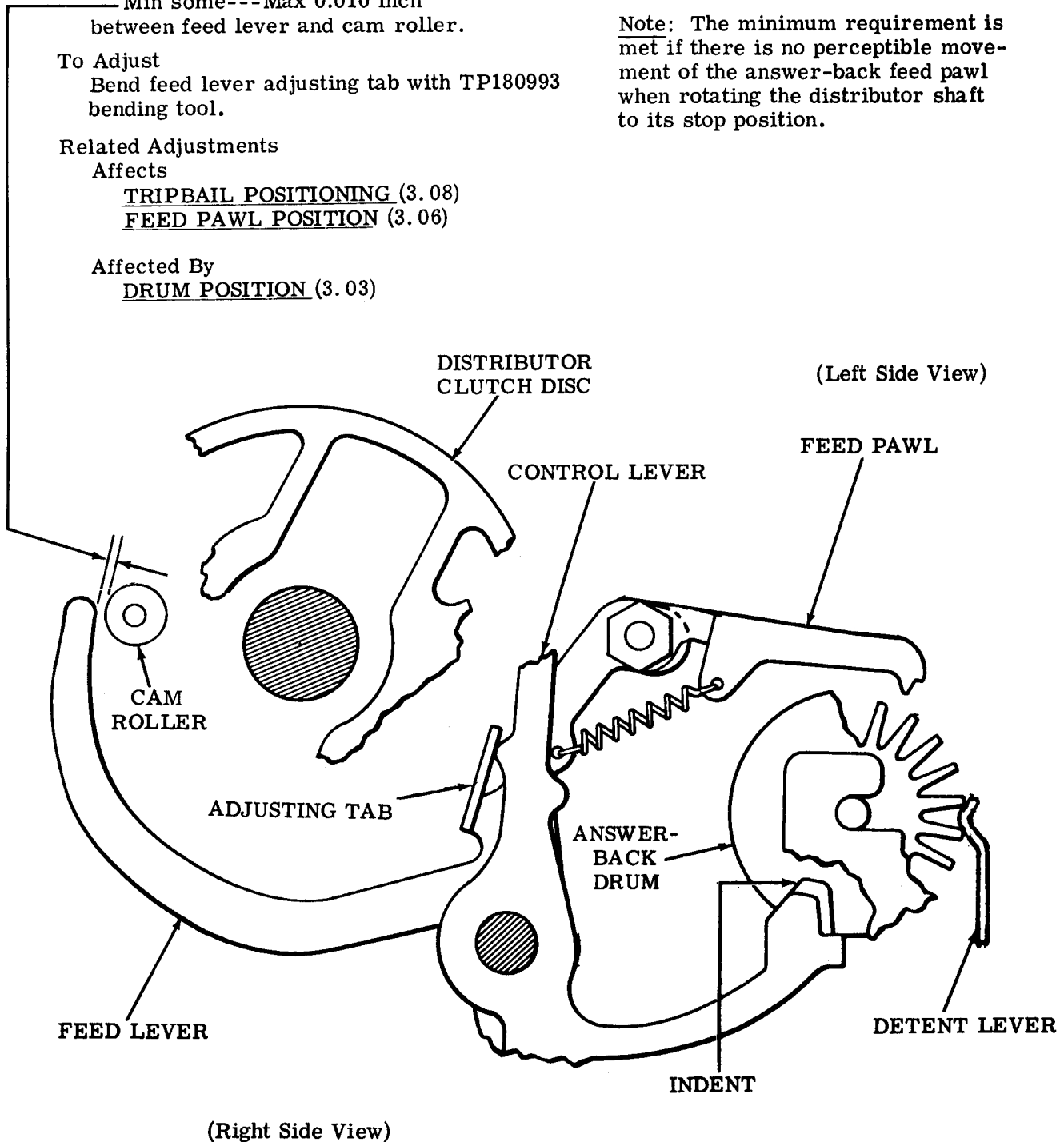
Affects

- TRIPBAIL POSITIONING (3.08)
- FEED PAWL POSITION (3.06)

Affected By

- DRUM POSITION (3.03)

Note: The minimum requirement is met if there is no perceptible movement of the answer-back feed pawl when rotating the distributor shaft to its stop position.



3.06 Answer-Back Area (continued)

FEED PAWL POSITION

(1) To Check

With answer-back drum fully detented in its home position, disengage (latch) distributor clutch. Manually trip distributor clutch and rotate main shaft until the cam roller is adjacent to high part of feed lever. Manually rotate drum two notches (detent between no. 1 and no. 2 teeth). Again, manually rotate drum until a 0.020 inch gauge can be placed between detent lever and the no. 1 tooth. Position feed pawl fully within answer-back ratchet. Take up all play to maximize clearance.

Requirement

Min some---Max 0.005 inch between feed pawl and rear face of no. 18 drum tooth.

Note: With the 0.020 inch gauge between detent and no. 1 tooth, "some" requirement is met if when feed pawl is raised above no. 18 tooth it returns behind it under its own spring force.

To Adjust

With adjusting nut and screw friction tight, position feed pawl against rear surface of no. 18 tooth. Tighten nut and screw.

(2) To Check

Push the top of the control lever toward the rear of typing unit and simultaneously rotate the main shaft. Observe the operation of the feed pawl.

Requirement

While operating, the feed pawl should be centrally located on feed ratchet teeth.

To Adjust

Bend feed lever just below feed pawl.

Related Adjustments

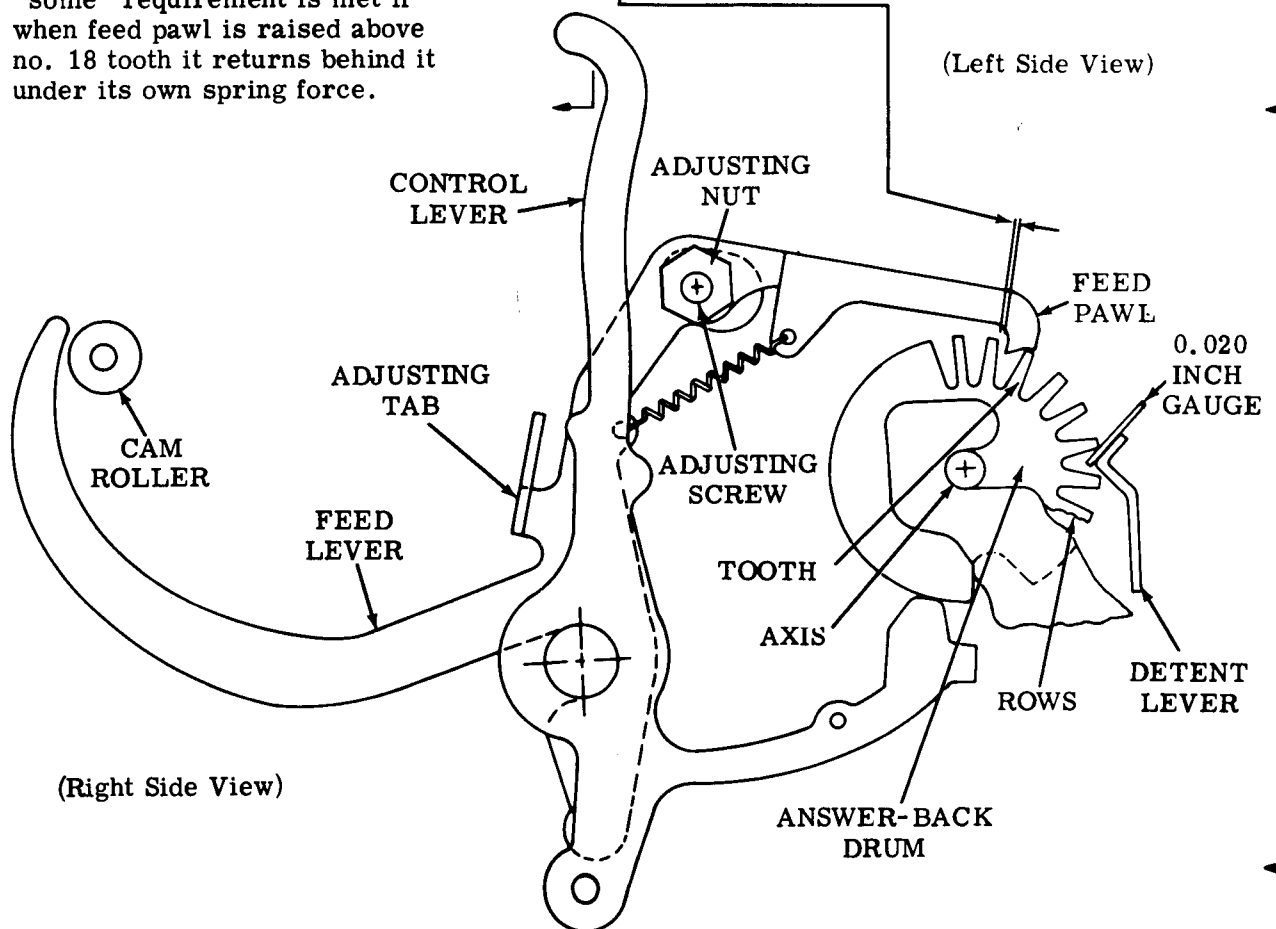
Affects

TRIPBAIL POSITIONING (3.08)

Affected By

DRUM POSITION (3.03)

FEED LEVER POSITION (3.05)



3.07 Answer-Back Area (continued)

"HERE IS" BELLCRANK POSITIONING

Note: This adjustment cannot be checked unless the typing unit is replaced on the subbase with the keyboard.

(1) To Check

With the keyboard positioned fully forward (keyboard side brackets touching the bosses on the front of the subbase) and answer-back drum fully detented in its home position, trip distributor clutch and manually rotate main shaft until cam roller is positioned above the top edge of feed lever. Depress HERE IS key with a force of from 20 oz to 24 oz.

Requirement

Early design typing units — HERE IS adjusting bracket does not have a stop projection:

Min 0.015 inch---Max 0.030 inch  
 overtravel between feed pawl and face of answer-back drum feed ratchet tooth of row 17.

Late design typing units — HERE IS adjusting bracket has a stop projection:

Min 0.010 inch---Max 0.040 inch

(2) To Check

overtravel between feed pawl and face of answer-back drum feed ratchet tooth of row 17.

With the answer-back drum fully detented in its home position and HERE IS key in its unoperated position, disengage (latch) distributor clutch.

Requirement

Some clearance between tip of HERE IS key and bell-crank.

To Adjust

With clampscrew friction tight, position HERE IS adjusting bracket using pry points. Tighten clampscrew.

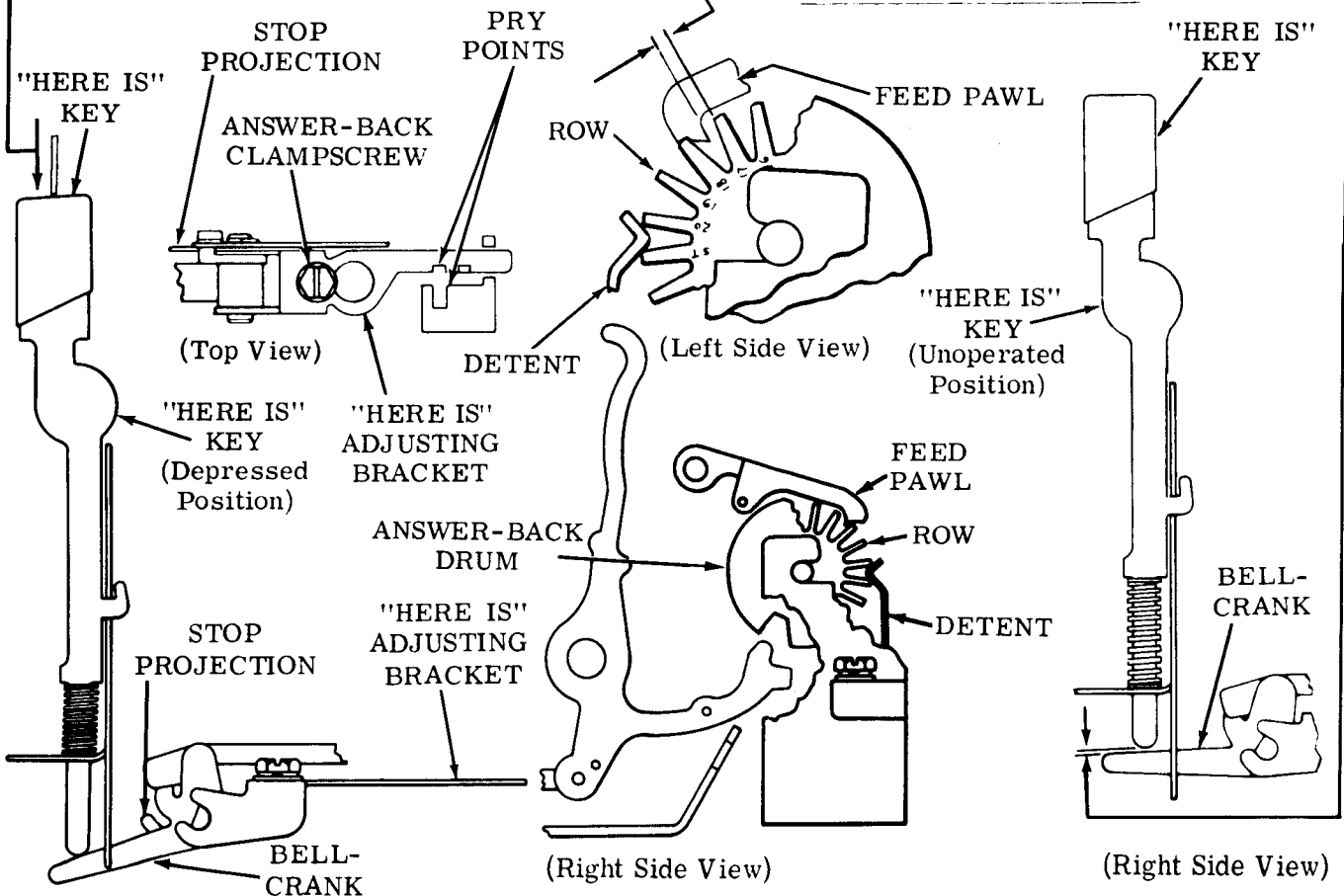
Related Adjustments

Affects

TRIPBAIL POSITIONING (3.05)  
CHARACTER SUPPRESSION CONTACT WIRE GAP (3.11)

Affected By

DRUM POSITION (3.03)  
FEED PAWL POSITION (3.06)  
FEED LEVER POSITION (3.05)



## 3.08 Answer-Back Area (continued)

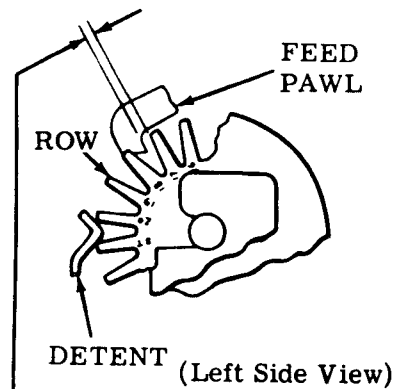
TRIPBAIL POSITIONING

## (1) To Check

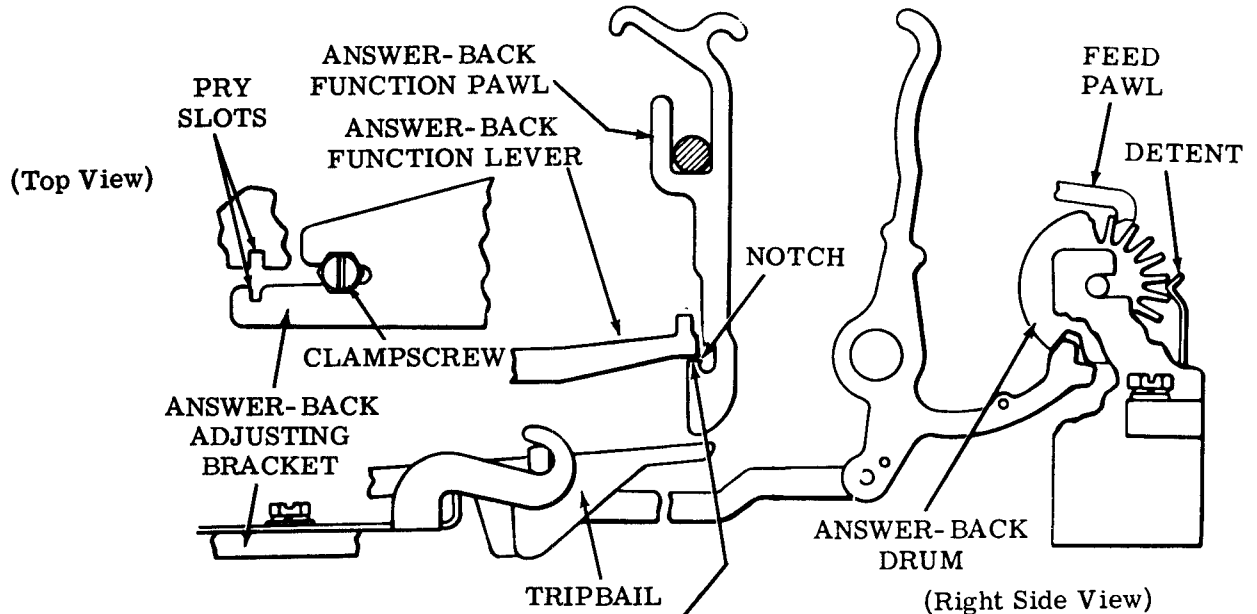
Place the typing unit in stop condition. Trip function clutch and rotate main shaft until the function bail is in its highest position. Push the answer-back function pawl down until its notch is engaged by its function lever. Trip the distributor clutch and continue to rotate the main shaft until the answer-back function pawl reaches its lowest point of travel.

Note: The feed pawl will move back to pick up the next tooth on the answer-back drum feed ratchet.

With the feed pawl centered on the answer-back drum feed ratchet, take up play in feed pawl toward the rear.

**Requirement**

Min 0.010 inch---Max 0.040 inch  
overtravel between feed pawl and face of answer-back drum feed ratchet of row 17.



## (2) To Check

With typing unit in stop condition, set up the code combination for the answer-back call character in the selector. Rotate the main shaft until the answer-back function pawl moves forward to its selected position. Observe the forward movement of the answer-back function pawl.

**Requirement**

Answer-back function pawl must move forward freely to its selected position without hesitation.

**To Adjust**

Loosen clampscrew friction tight. Position answer-back adjusting bracket using pry slots. Tighten clampscrew.

**Related Adjustments****Affected By**

DRUM POSITION (3.03)

FEED PAWL POSITION (3.06)

RIGHT ROCKER DRIVE (2.36)

3.09 Answer-Back Area (continued)

**Note:** The adjustment on this page applies only to typing units equipped with an answer-back trip magnet mechanism.

**TRIP LEVER OVERTRAVEL AND ARMATURE GAP**

**To Check**

With the answer-back drum fully detented in its home position, trip distributor clutch and rotate main shaft until the pointer of the distributor brush holder is in line with the intersection of the conductor path and the stop segment. Control lever must be clear of answer-back to trip lever adjusting tab — if necessary, bend tab forward to provide clearance. Place armature in its attracted position, and take up play toward rear of typing unit.

(1) Requirement

Min 0.006 inch--Max 0.015 inch between the end of armature extension and the blocking surface of the answer-back blocking latch.

To Adjust

Loosen armature extension mounting screw friction tight. Position the armature extension using pry points. Tighten screw.

(2) Requirement

Units with early design blocking latch. Front end of armature extension should be vertically centered between the top and bottom surfaces of the answer-back blocking latch as gauged by eye.

Units with late design blocking latch  
Min 0.055 inch---Max 0.075 inch between armature extension and lower surface of answer-back trip lever.

To Adjust

Loosen armature extension adjusting screw locknut friction tight. Position armature extension using armature extension adjusting screw. Tighten locknut.

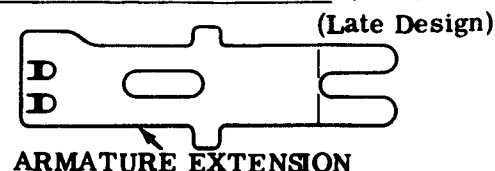
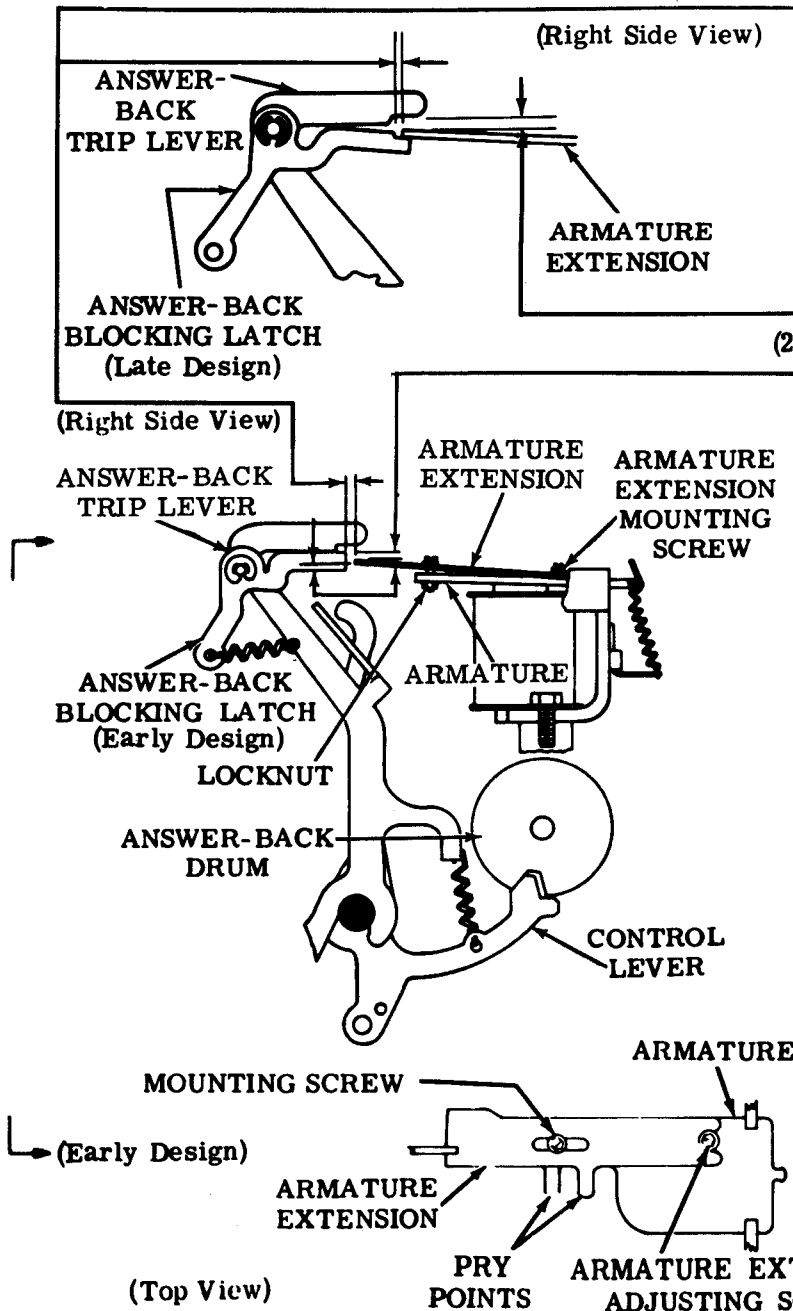
Related Adjustments

Affects

TRIP LEVER ADJUSTING TAB CLEARANCE (3.10)  
CHARACTER SUPPRESSION CONTACT WIRE GAP (3.11)

Affected By

TRIP MAGNET POSITION (3.10)





### 3.10 Answer-Back Area (continued)

**Note:** The following adjustment applies only to typing units equipped with an answer-back trip magnet mechanism.

#### TRIP LEVER ADJUSTING TAB CLEARANCE

##### To Check

With the answer-back drum fully detented in its home position, place the typing unit in its stop position. With the armature in its unattracted position, take up the play in the trip lever toward the right and the play in the control lever toward the left. Take up play in the armature toward the rear.

##### Requirement

Min some---Max 0.020 inch  
between adjusting tab and tip of control lever.

##### To Adjust

Bend adjusting tab with TP180993 bending tool.

##### Related Adjustments

###### Affects

CHARACTER SUPPRESSION CONTACT WIRE GAP (3.11)

###### Affected By

TRIP MAGNET POSITION (3.10)  
TRIP LEVER OVERTRAVEL AND ARMATURE GAP (3.09)  
DRUM POSITION (3.03)

#### TRIP MAGNET POSITION

##### Requirement

Magnet bracket to be positioned as far forward and to the left on base casting post as possible.

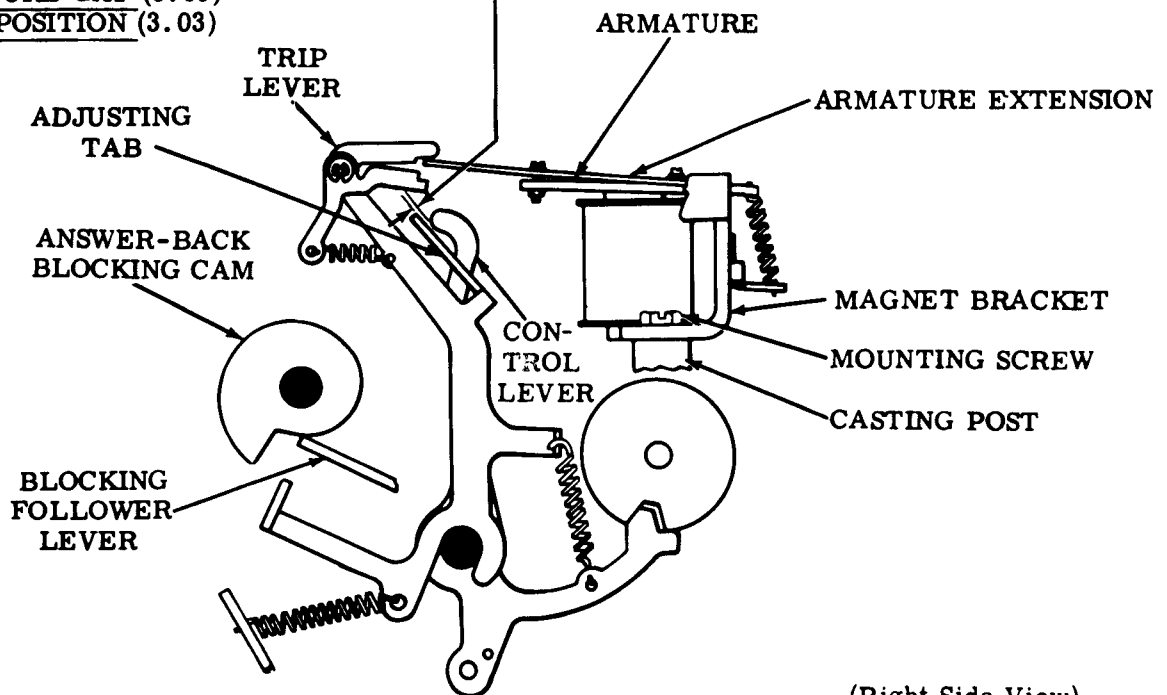
##### To Adjust

Loosen three mounting screws. Position magnet bracket. Tighten screws.

##### Related Adjustments

###### Affects

TRIP LEVER OVERTRAVEL AND ARMATURE GAP (3.09)  
TRIP LEVER ADJUSTING TAB CLEARANCE (3.10)  
TRIP MAGNET (Appropriate tape reader section)  
CHARACTER SUPPRESSION CONTACT WIRE GAP (3.11)



(Right Side View)

3.11 Answer-Back Area (continued)

CHARACTER SUPPRESSION CONTACT WIRE GAP

To Check

With answer-back drum fully detented in its home position, disengage (latch) distributor clutch.

Requirement

Min 0.030 inch---Max 0.055 inch  
between suppression contact wire and  
common contact.

To Adjust

Position adjusting spring on the tie link.

Related Adjustments

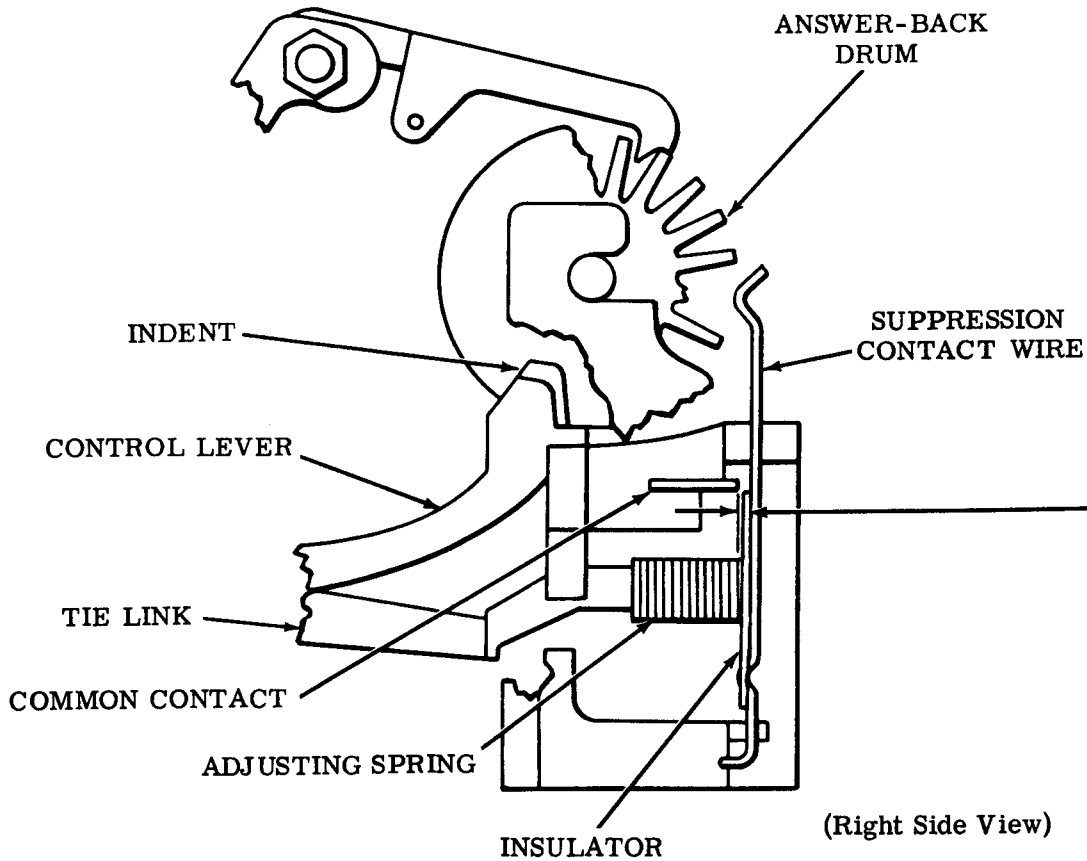
Affected By

TRIP LEVER OVERTRAVEL AND ARMATURE GAP (3.09)

DRUM POSITION (3.03)

TRIP LEVER ADJUSTING TAB CLEARANCE (3.10)

TRIP MAGNET POSITION (3.10)



## 3.12 Answer-Back Area (continued)

CONTROL LEVER SPRING — VERTICAL (Early Design)

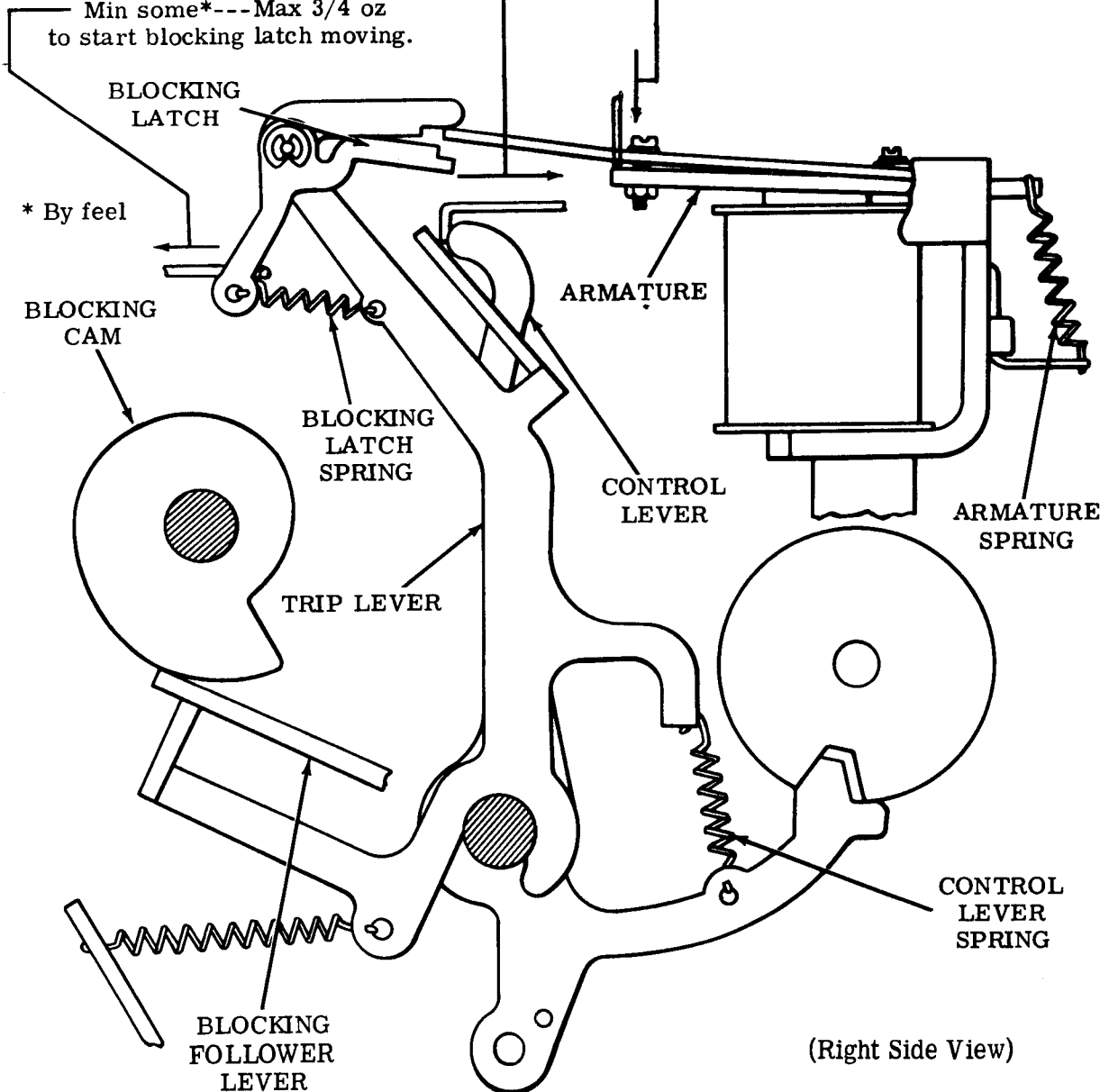
Note: This adjustment applies to early design typing units with TP180843 trip lever.

Requirement

With distributor clutch tripped and blocking follower lever on high part of blocking cam  
Min 7-1/2 oz---Max 10-1/2 oz  
to start control lever moving.

BLOCKING LATCH SPRINGRequirement

With distributor clutch disengaged (latched)  
Min some\*---Max 3/4 oz  
to start blocking latch moving.

ARMATURE SPRINGTo Check

Trip distributor clutch. Rotate main shaft until blocking follower lever is on high part of blocking cam and armature is in its un-attracted position.

Requirement

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

3.13 Answer-Back Area (continued)

TRIP LEVER SPRING

To Check

Disengage (latch) distributor clutch. Manually trip armature. Position stop bail so that its adjusting tab does not interfere with control lever. Hold armature in its attracted position.

Requirement

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

CONTROL LEVER SPRING — VERTICAL  
(Late Design)

Note: This adjustment applies to late design typing units with TP182276 trip lever.

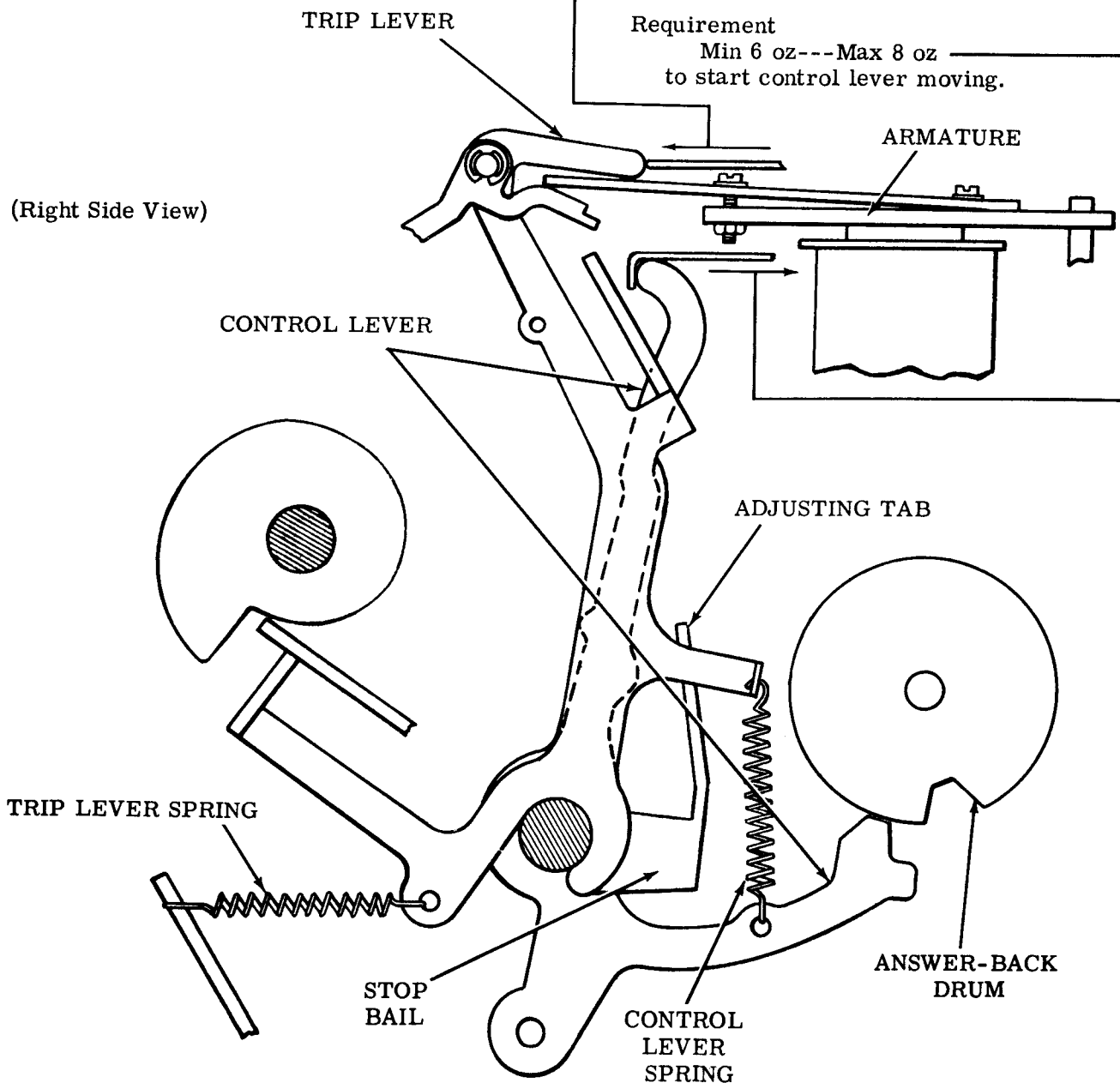
To Check

Disengage (latch) distributor clutch. Manually rotate the answer-back drum until control lever is on high part of answer-back drum. Position stop bail so that its adjusting tab does not interfere with control lever.

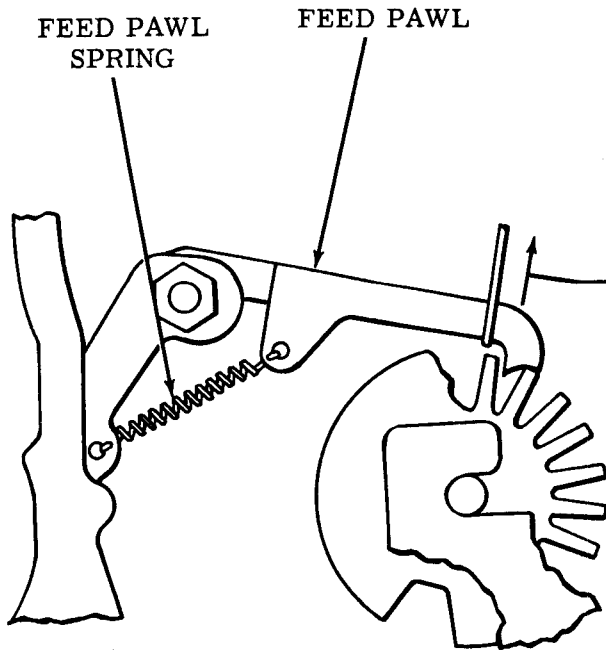
Requirement

Min 6 oz---Max 8 oz  
to start control lever moving.

(Right Side View)



3.14 Answer-Back Area (continued)



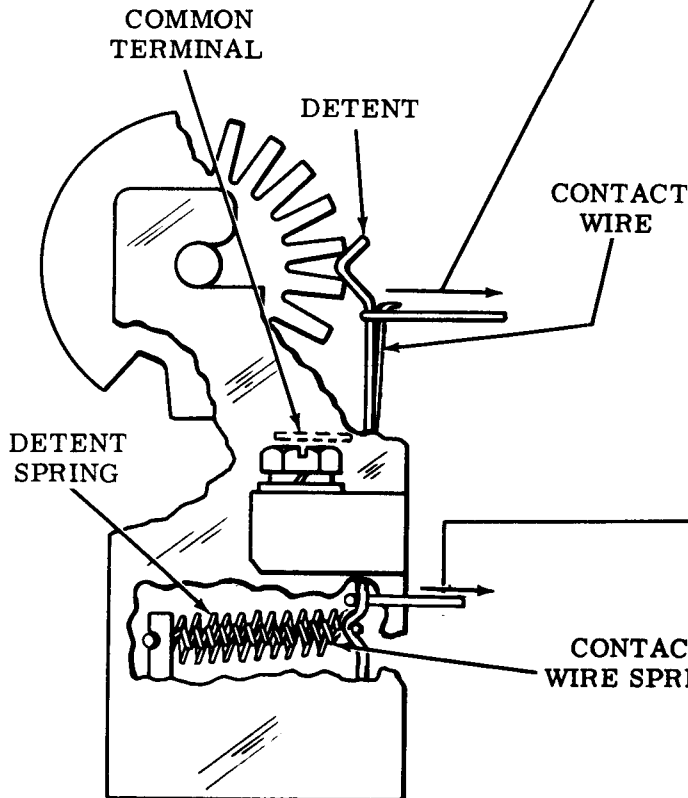
(Right Side View)

FEED PAWL SPRING

Requirement  
 With distributor clutch disengaged  
 (latched)  
 Min 1/2 oz---Max 1-1/4 oz  
 to start feed pawl moving.

DETENT SPRING

Requirement  
 Min 8 oz---Max 12 oz  
 to start detent moving.



(Right Side View)

CONTACT WIRE SPRING

Requirement  
 Min 1 oz---Max 2 oz  
 to start contact wire moving away from  
 common terminal.

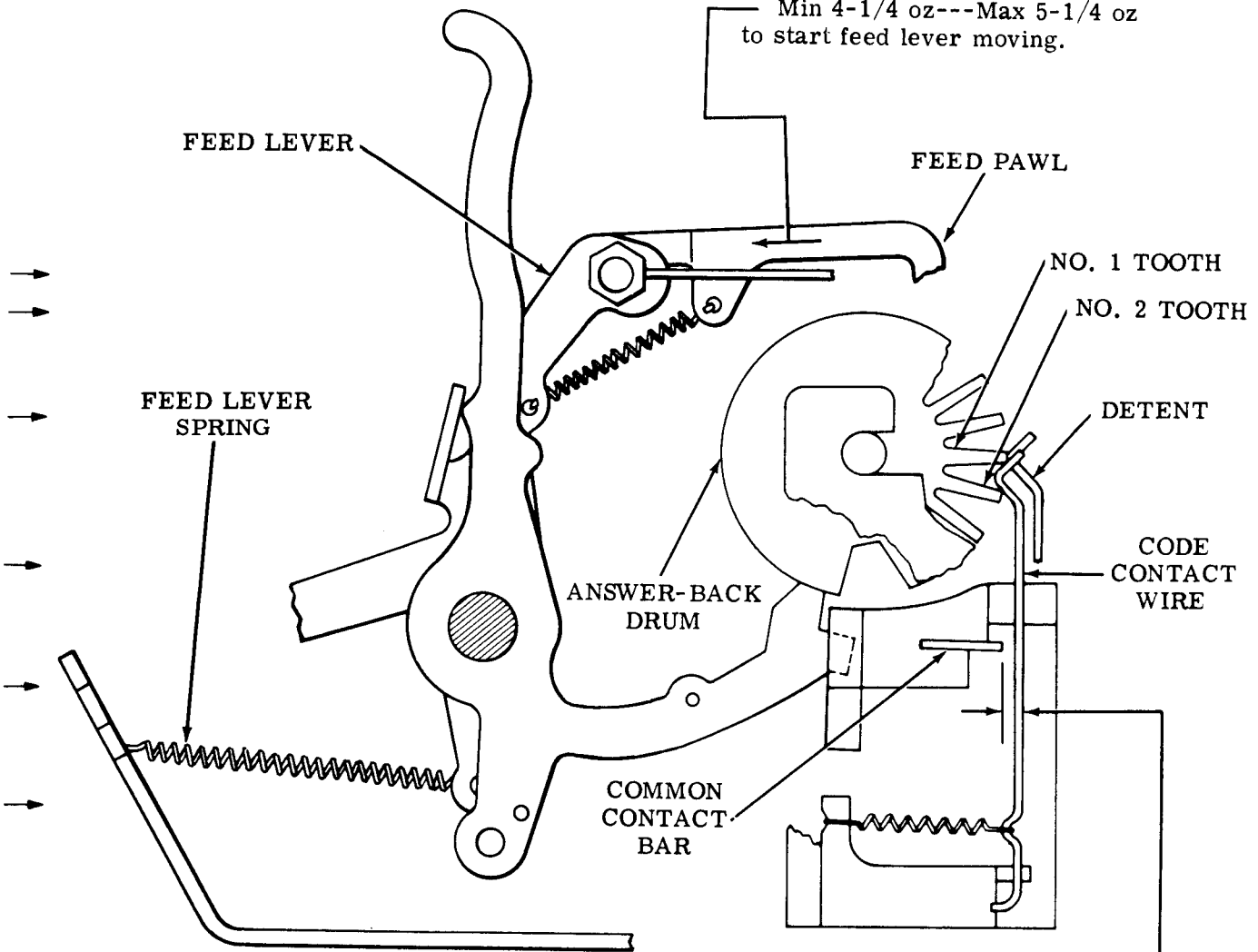
3.15 Answer-Back Area (continued)

FEED LEVER SPRING

Requirement

With distributor clutch disengaged (latched) and feed pawl held out of engagement with answer-back drum

Min 4-1/4 oz---Max 5-1/4 oz to start feed lever moving.



(Right Side View)

CODE CONTACT WIRE GAP

To Check

Manually rotate drum until contact wires are riding between no. 1 and no. 2 tooth (detent riding on top of no. 1 tooth).

Requirement

Min 0.010 inch---Max 0.035 inch between code contact wires and common contact bar.

To Adjust

Bend contact wires.

## 3.16 Function Box Switches (Function Area)

CONTACT ASSEMBLY POSITION

## (1) To Check

Set up code combination in selector that is to operate the function pawl associated with a contact arm and rotate the main shaft until the function bail is in its highest position.

## Requirement

Min 0.010 inch---Max 0.020 inch  
between the contact arm and the contact at the closest point as illustrated.

## (2) To Check

Place typing unit in stop condition.

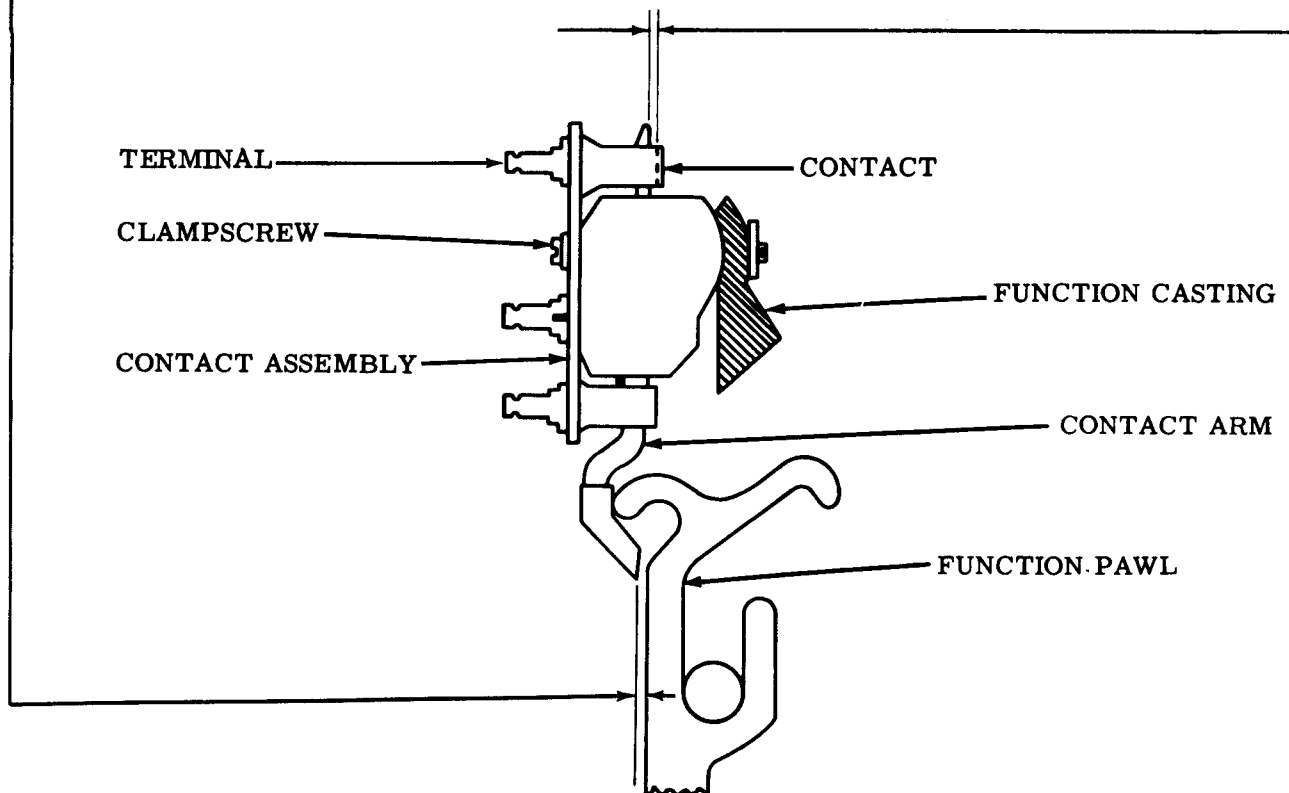
## Requirement

Min some  
clearance between the function pawl and the tip of the contact arm.

## To Adjust

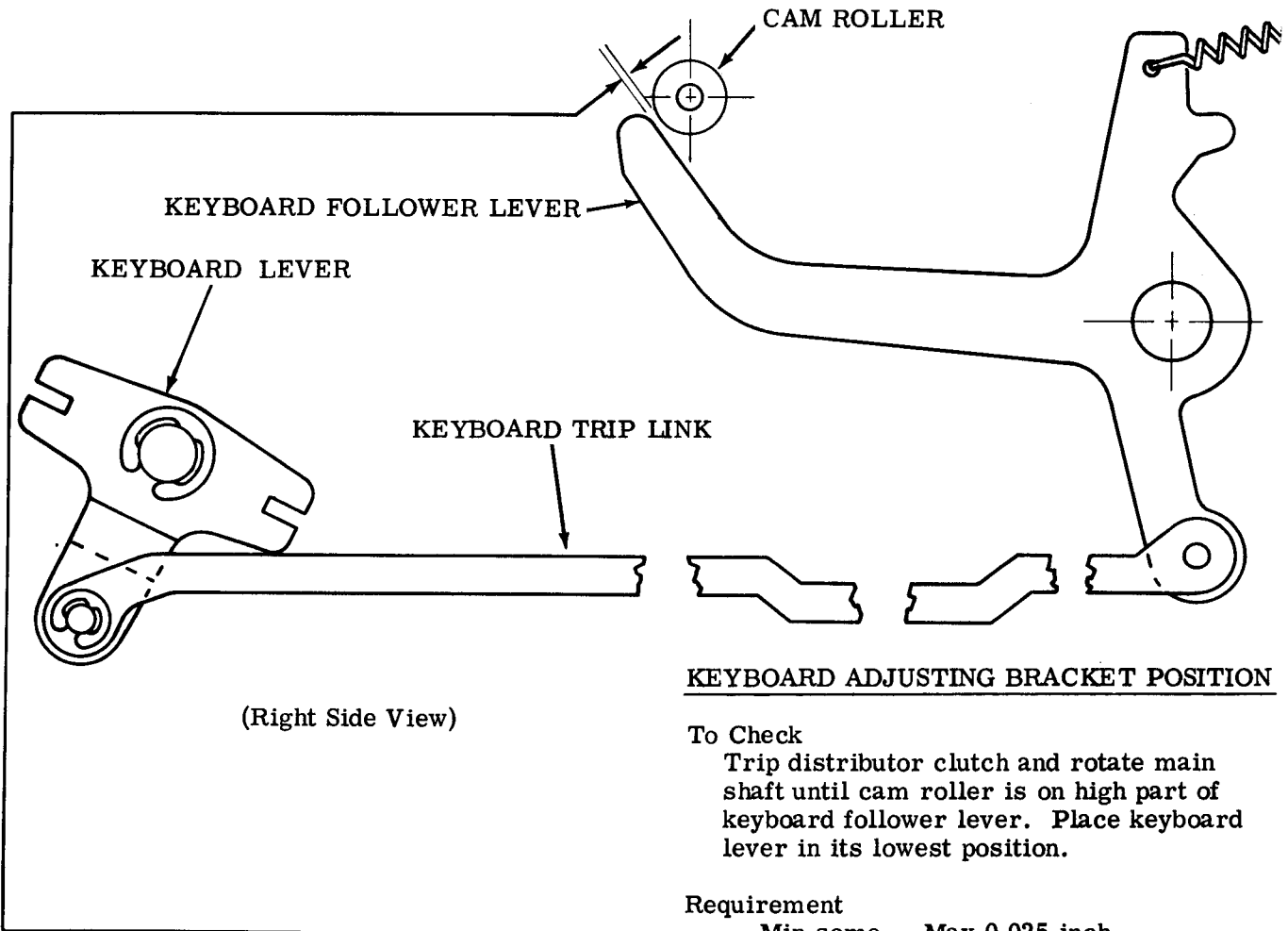
With two clampscrews friction tight, position the contact assembly on the function casting. If necessary, bend the upper contact. Tighten clampscrews.

Note: For (1) To Check, be sure that the contact arm lines up with and is in contact with the function pawl.



(Left Side View)

3.17 Receive-Only Sets (Distributor Area)



KEYBOARD ADJUSTING BRACKET POSITION

**To Check**

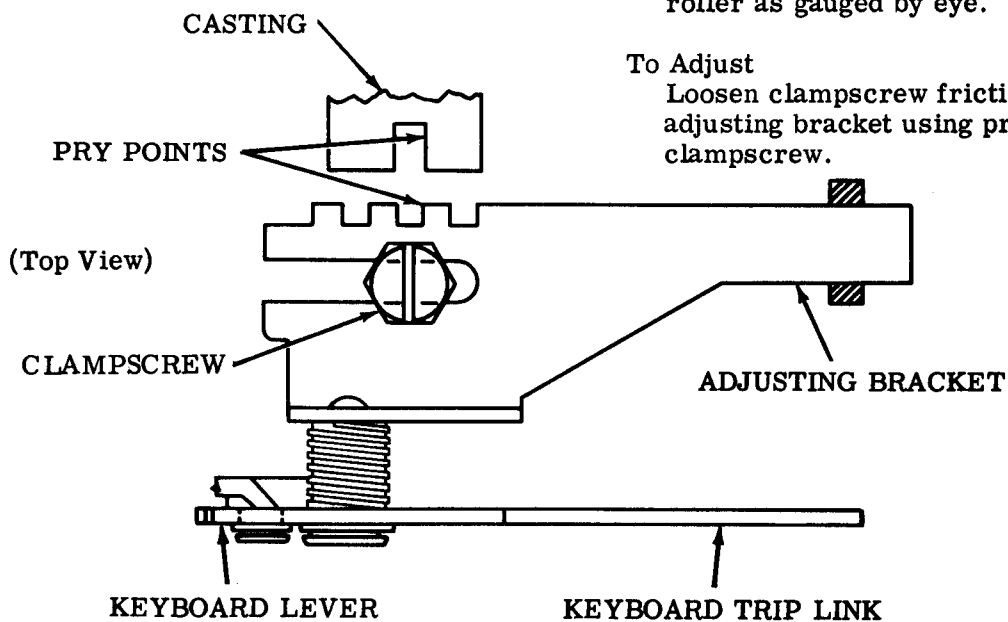
Trip distributor clutch and rotate main shaft until cam roller is on high part of keyboard follower lever. Place keyboard follower lever in its lowest position.

**Requirement**

Min some---Max 0.025 inch between keyboard follower lever and cam roller as gauged by eye.

**To Adjust**

Loosen clampscrew friction tight. Move adjusting bracket using pry points. Tighten clampscrew.





3.18 Auxiliary Contact Assembly (TP183594) (Main Shaft Area)

TIME DELAY CONTACT BRACKET POSITION

To Check

Place the typing unit in the stop condition. Engage the function clutch and rotate the main shaft until the cam follower is on high part of its cam.

Requirement

Max 0.010 inch separation of front contact spring from stiffener.

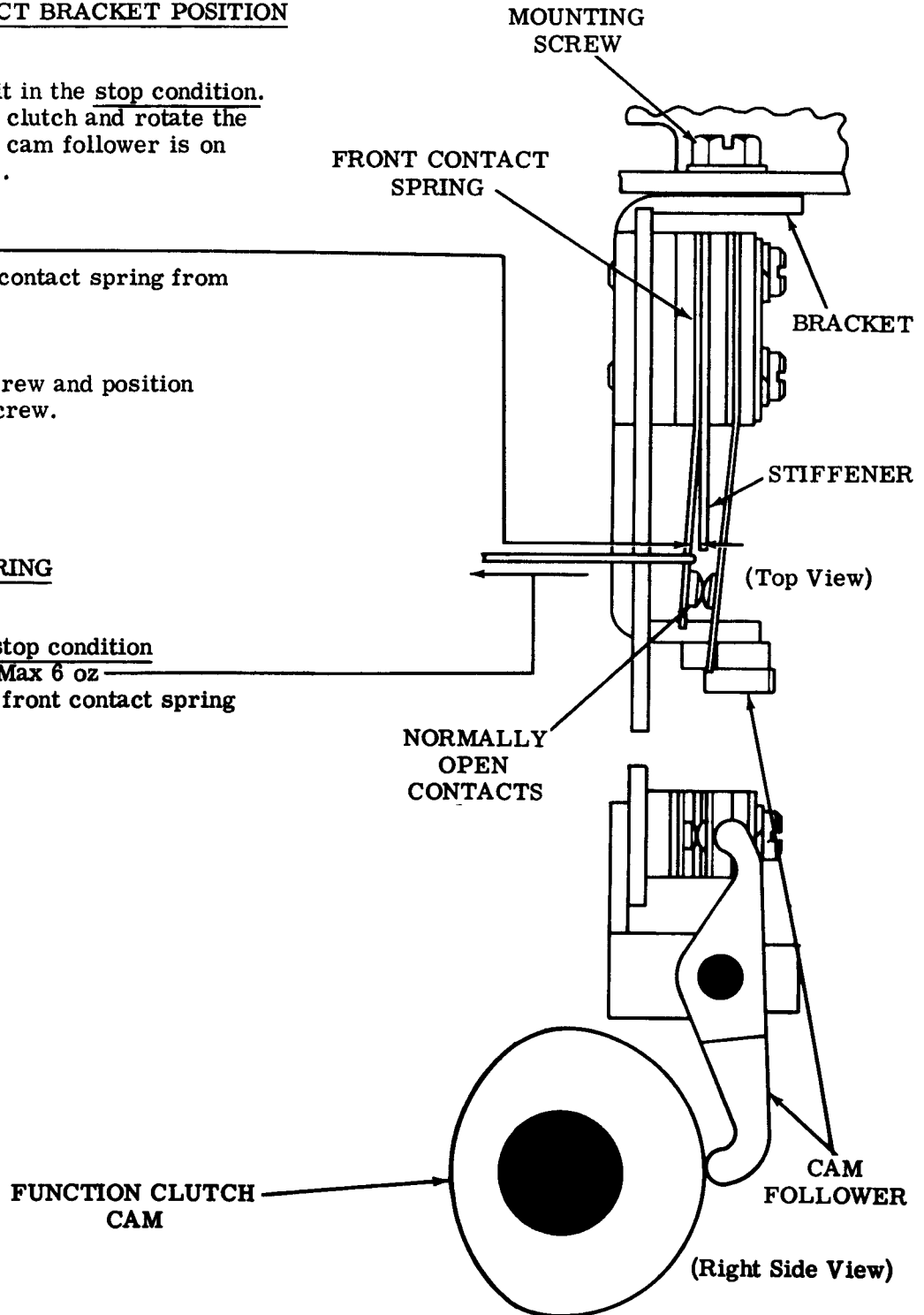
To Adjust

Loosen mounting screw and position bracket. Tighten screw.

FRONT CONTACT SPRING

Requirement

With typing unit in stop condition  
Min 4-1/2 oz---Max 6 oz  
to just separate the front contact spring from the stiffener.



3.19 Print-Nonprint (Function Area)

Note: The following adjustment applies only to typing units equipped with automatic print-nonprint feature.

NONPRINT FUNCTION LEVER CLEARANCE

To Check

Push the nonprint codebar to the right until trip armature latches the latch bellcrank. Rotate main shaft until function lever is at its highest point of travel. Take up all play to minimize the required clearance.

Requirement

Min 0.005 inch---Max 0.025 inch  
between the function lever in slot 4 in function casting and tine of nonprint codebar.

To Adjust

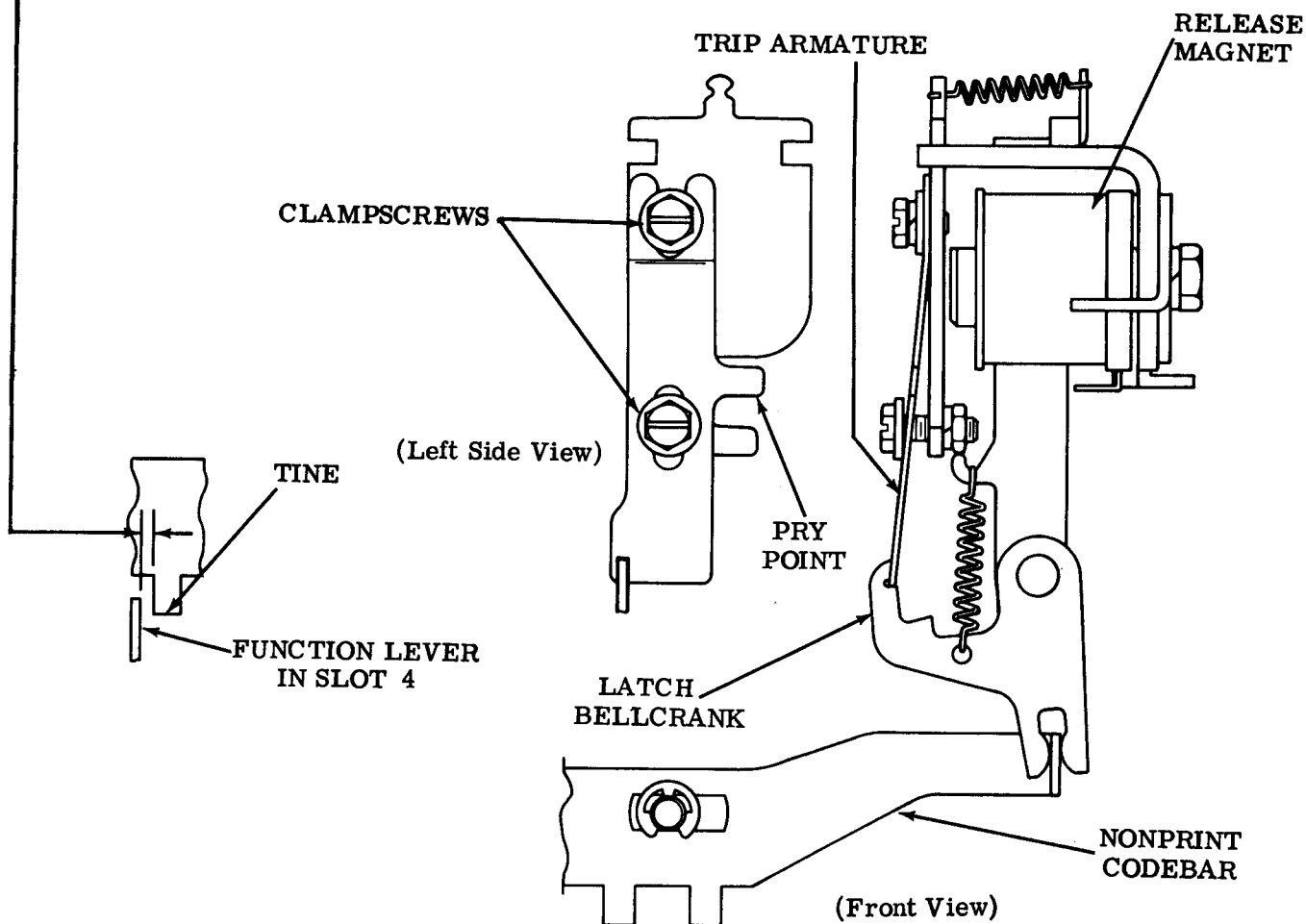
Loosen clampscrews and adjust length of trip armature using pry point. Tighten clampscrews.

Related Adjustments

Affects

SOLENOID BRACKET POSITION (3.20 or 3.22)

RELEASE MAGNET OVERTRAVEL (3.21)



### 3.20 Print-Nonprint (Function Area)(continued)

**Note:** The following adjustments apply only to typing units equipped with the automatic print-nonprint feature — for units containing the manual print-nonprint feature, refer to 3.22.

#### ARMATURE SPRING

##### To Check

With release magnet de-energized, place plunger to position it assumes when solenoid is energized. Hold plunger seated in that position.

##### Requirement

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

#### SOLENOID BRACKET POSITION

##### To Check

Energize solenoid.

##### Requirement

Min 0.015 inch---Max 0.030 inch  
between trip armature and latch bellcrank.

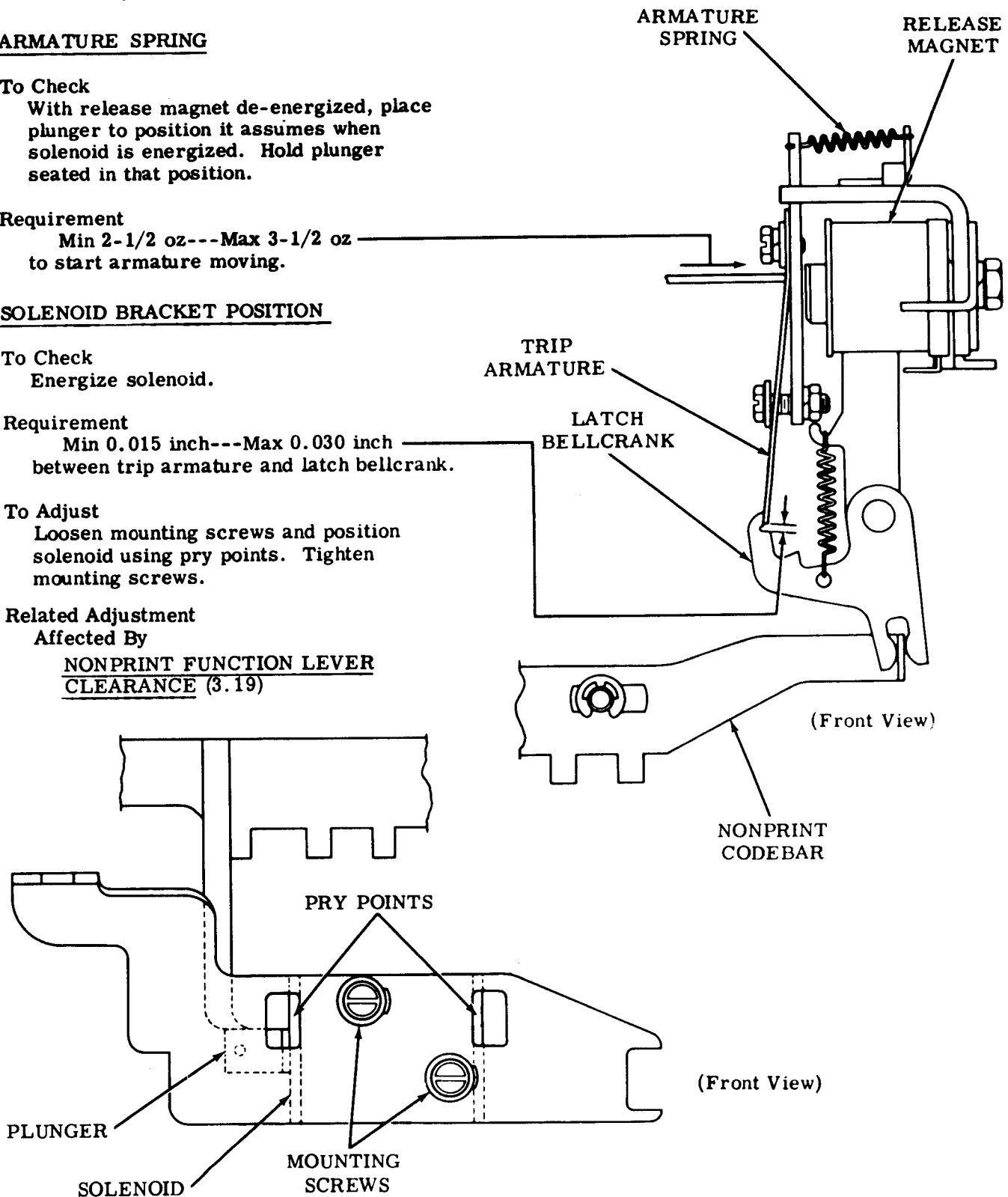
##### To Adjust

Loosen mounting screws and position solenoid using pry points. Tighten mounting screws.

##### Related Adjustment

Affected By

NONPRINT FUNCTION LEVER  
CLEARANCE (3.19)



3.21 Print-Nonprint (Function Area) (continued)

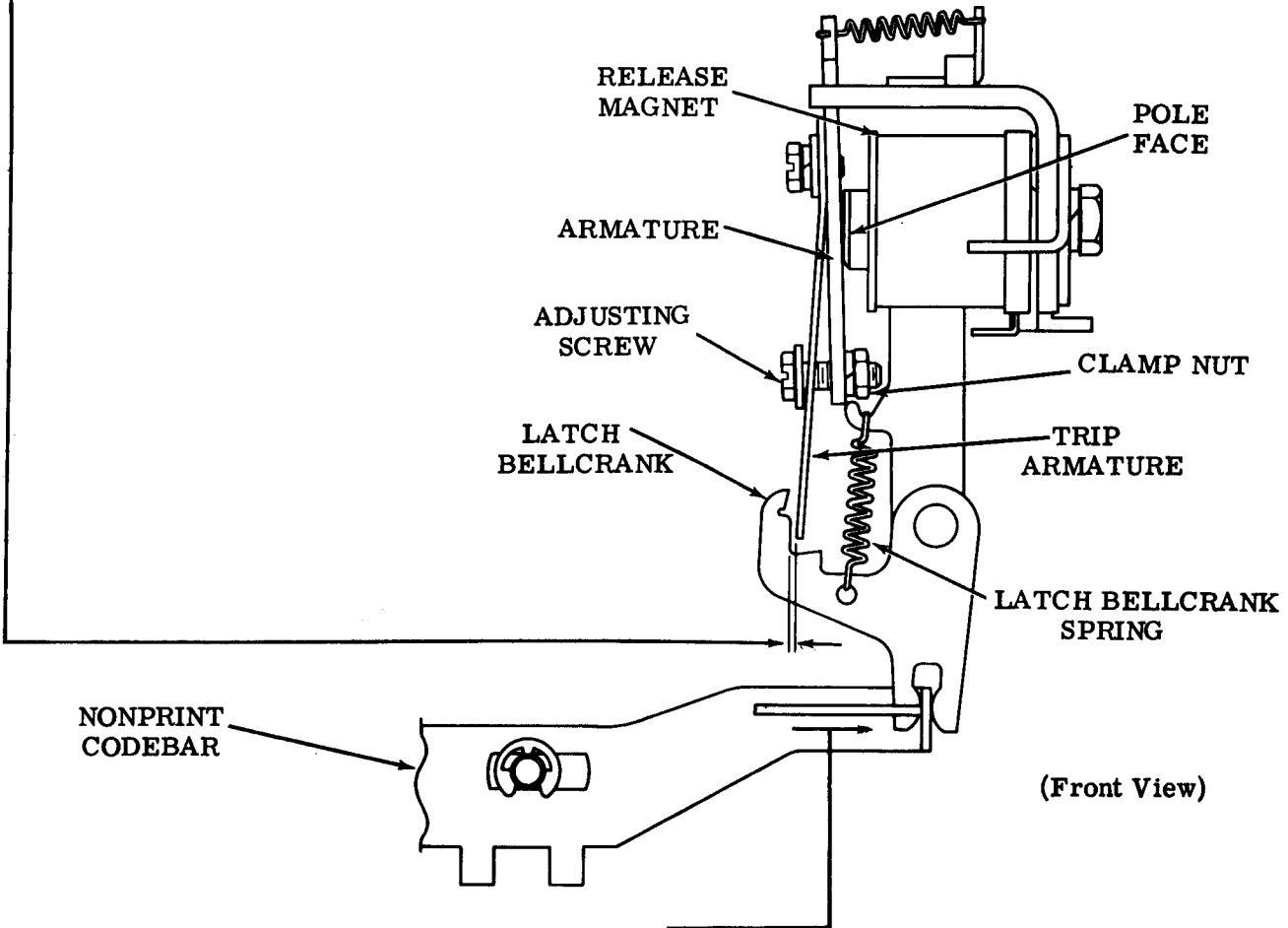
RELEASE MAGNET OVERTRAVEL

To Check  
Hold armature against release magnet pole face.

Requirement  
Min 0.010 inch---Max 0.015 inch  
between trip armature and latch bellcrank.

To Adjust  
Loosen clamp nut and position trip armature by turning adjusting screw. Tighten clamp nut.

Note: The following adjustments apply only to typing units equipped with the automatic print-nonprint feature.



Related Adjustment  
Affected By  
NONPRINT FUNCTION LEVER  
CLEARANCE (3.19)

LATCH BELLCRANK SPRING

To Check  
Hold armature against pole face of release magnet.

Requirement  
Min 2 oz---Max 3 oz  
to start typing unit suppression codebar moving.

## 3.22 Print-Nonprint (Function Area) (continued)

Note: The following adjustment applies only to typing units equipped with the manual print-nonprint feature — for units containing the automatic print-nonprint feature, refer to 3.21.

SOLENOID BRACKET POSITION**To Check**

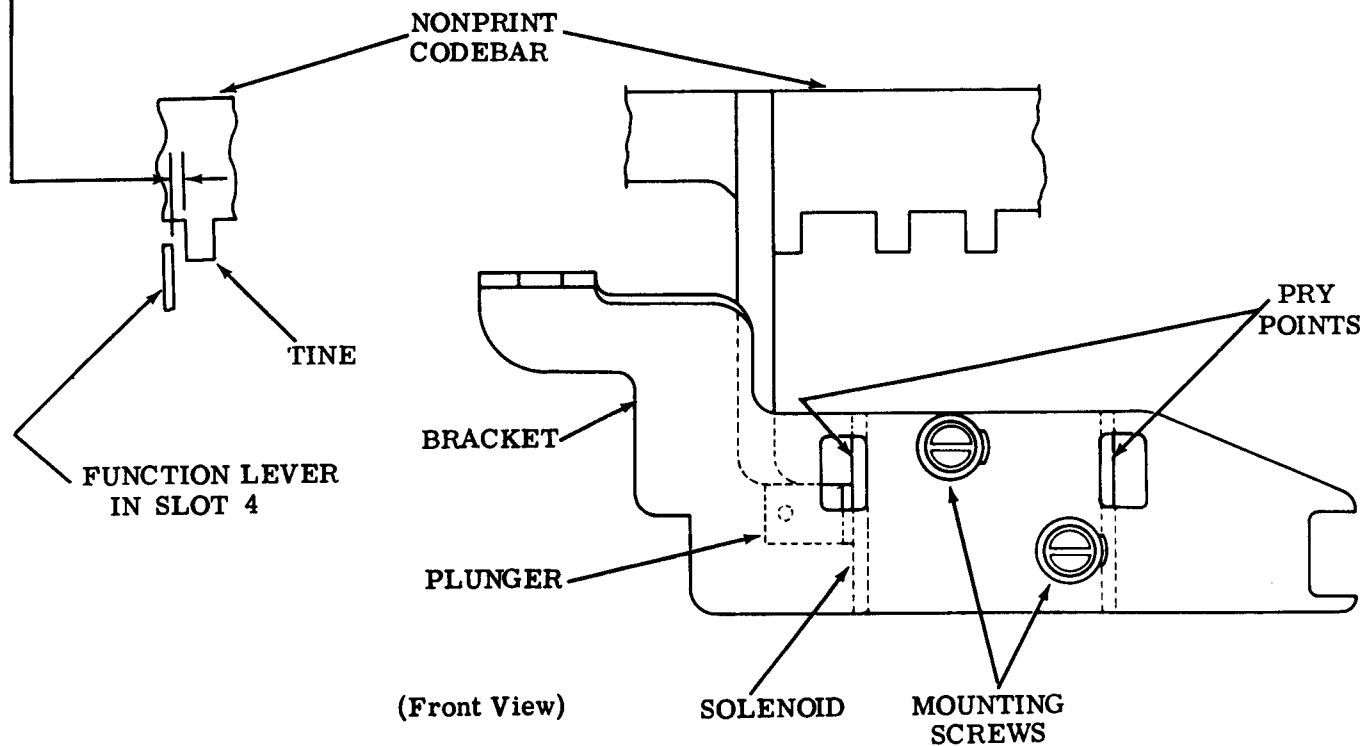
Place plunger to position it assumes when solenoid is energized. Hold plunger seated in that position.

**Requirement**

Min 0.005 inch---Max 0.025 inch  
between the function lever in slot 4 in function casting and tine of nonprint codebar.

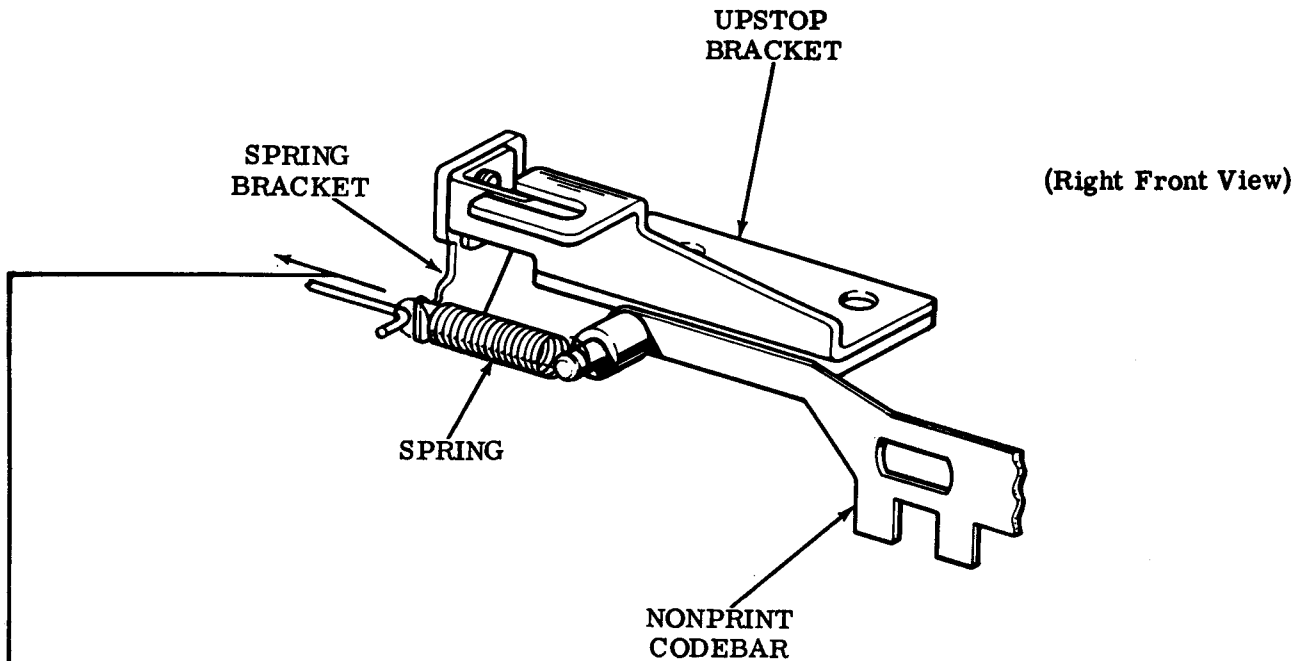
**To Adjust**

Loosen mounting screws and position solenoid using pry points.



3.23 Print-Nonprint (Function Area) (continued)

Note: The following adjustment applies only to typing units equipped with the manual print-nonprint feature.



NONPRINT CODEBAR SPRING

**To Check**

Place nonprint codebar in its unoperated position.

**Requirement**

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

## 3.24 Function Area

CODING AND INSTALLATION OF TP180801 UNIVERSAL FUNCTION LEVER

Note: The following instructions do not apply to the answer-back function lever and the carriage return drive function lever.

- (a) The tines on the universal function lever are numbered from right to left in the illustration as follows: PS, 1, 2, 3, 4, 5, 7, 6, 8.
- (b) There are two rows of tines on the universal function lever. The straight row of tines corresponds to the marking pulses of a given code combination. The bent row of tines corresponds to the spacing pulses of a given code combination.
- (c) Break both the marking and spacing no. 8 tines on units without parity. On units with parity do not break off the marking and spacing no. 8 tines.
- (d) The tines on the universal function lever are easily broken off with long nose pliers.
- (e) The TP180801 universal function lever is to be installed only in the numbered slots of the function casting.
- (f) If the typing unit is equipped with a function lever retainer, lower the retainer sufficiently to allow the universal function lever to be installed under the codebar basket. Readjust the function lever retainer.
- (g) Place the universal function lever under the codebar basket with the open end of the pivot slot on the pivot shaft.
- (h) Holding the lever vertically, squeeze it onto the pivot shaft with a pair of pliers. This is a "snap" fit and sufficient pressure should be applied with the pliers to get the lever fully on the shaft. The lever should pivot freely once on the shaft.
- (i) Locate the proper numerical slot on the function casting, place the lever in the slot, and install a TP91120 spring.

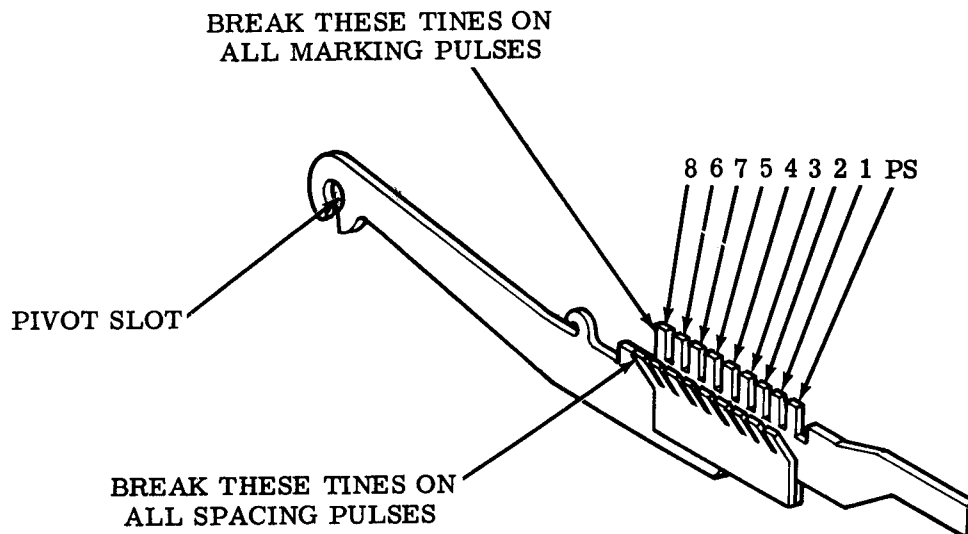


CHART  
FUNCTION LEVER CODE ARRANGEMENT

SLOTS	FRICITION FEED	SPROCKET FEED
* SEE NOTE 2	LINE FEED BLOCKING	
1 SEE NOTE 2	LINE FEED NEW LINE	NEW LINE
A	AUTOMATIC CARRIAGE RETURN NEW LINE	NEW LINE
2	CARRIAGE RETURN NEW LINE	CARRIAGE RETURN NEW LINE
B	CARRIAGE RETURN ACTUATING	CARRIAGE RETURN ACTUATING
3	SPACE	SPACE
4	PRINT SUPPRESSION ON DELETE, DC1, AND NUL	PRINT SUPPRESSION ON DELETE, DC1, AND NUL
5	PRINT SUPPRESSION ON DELETE	PRINT SUPPRESSION ON DELETE
6	PRINT SUPPRESSION ON ALL CONTROL CHARAC- TERS	PRINT SUPPRESSION ON ALL CONTROL CHARAC- TERS
7	BELL	BELL
F	MARGIN BELL	MARGIN BELL
8	SO ENQ	SO ENQ
9	SI ACK DC1	SI ACK DC1
10	ACK ENQ EOT ENQ/EOT (See Note 3) DC1 DC2	ACK ENQ/EOT (See Note 3) DC1 DC2
11	DC3 DC4 ACK DC3/DC1 (See Note 3)	DC3 DC4 DC3/DC1 (See Note 3)
12	BELL EOT ETX ENQ	EOT ENQ ETX
13	EOT	LINE FEED
M		LINE FEED STRIP
14	ACK ETX	FORM OUT
15	ANSWERBACK (ENQ)	ANSWERBACK (ENQ)
0	ANSWERBACK BLOCKING	ANSWERBACK BLOCKING

Note 1: Some slots have more than one function lever designation. The particular function lever for these slots depends on the set. Some sets have no function lever in these slots.

Note 2: The function levers in the \* and 1 positions do not occupy slots in the function casting. They are guided by slots in brackets. The brackets are illustrated in the appropriate parts sections.

Note 3: The function lever will respond to either code combination and momentarily open a normally closed contact on the function casting.

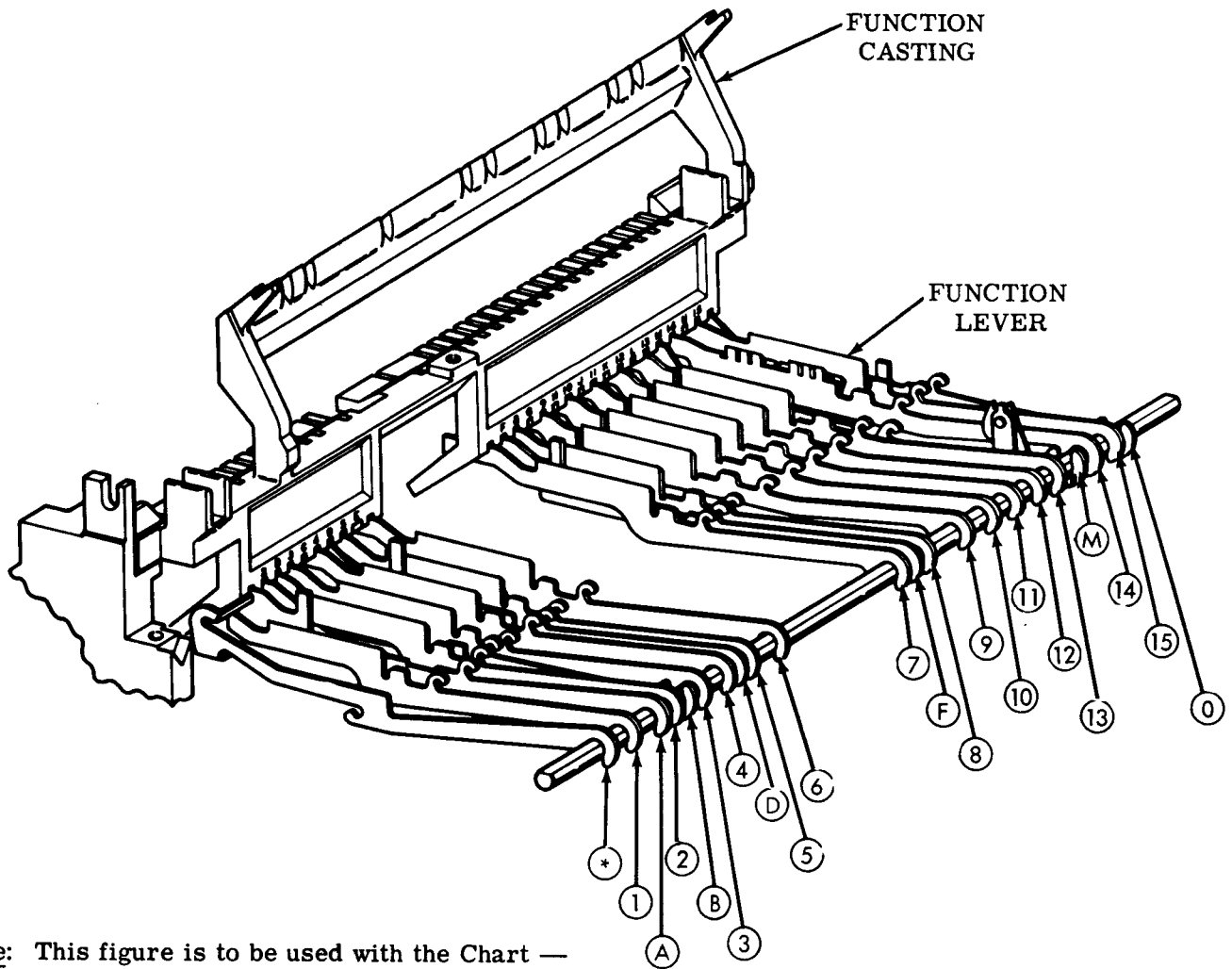
Abbreviations:

DC1 - Reader On  
DC2 - Punch On  
DC3 - Reader Off  
DC4 - Punch Off  
SI - Shift In  
SO - Shift Off  
ACK - Acknowledge  
ENQ - Enquire  
EOT - End of Trans-  
mission  
ETX - End of Text  
NUL - Null  
LF - Line Feed  
BEL - Bell

Note 4: This figure is to be used with the function lever arrangement shown in Figure 6.

Note 5: The following slots have no function levers at present: C, D, E, G, H, J, K, L, N.





Note: This figure is to be used with the Chart —  
Function Lever Code Arrangement.

Figure 5 - Function Lever Code Arrangement

## 3.25 Answer-Back Area (continued)

CODING THE ANSWER-BACK DRUM

- (a) To remove the answer-back drum for coding, press back and down on the tab portion of the TP180854 brace until it becomes detented in its open position. Lift feed pawl slightly (do not overextend its spring) and remove drum.
- (b) Code the answer-back drum in a counterclockwise direction starting with row no. 1 (see illustration).

Note: The ST row is the first row sensed at the beginning of an answer-back cycle. It is coded at the factory for character suppression and must not be recorded.

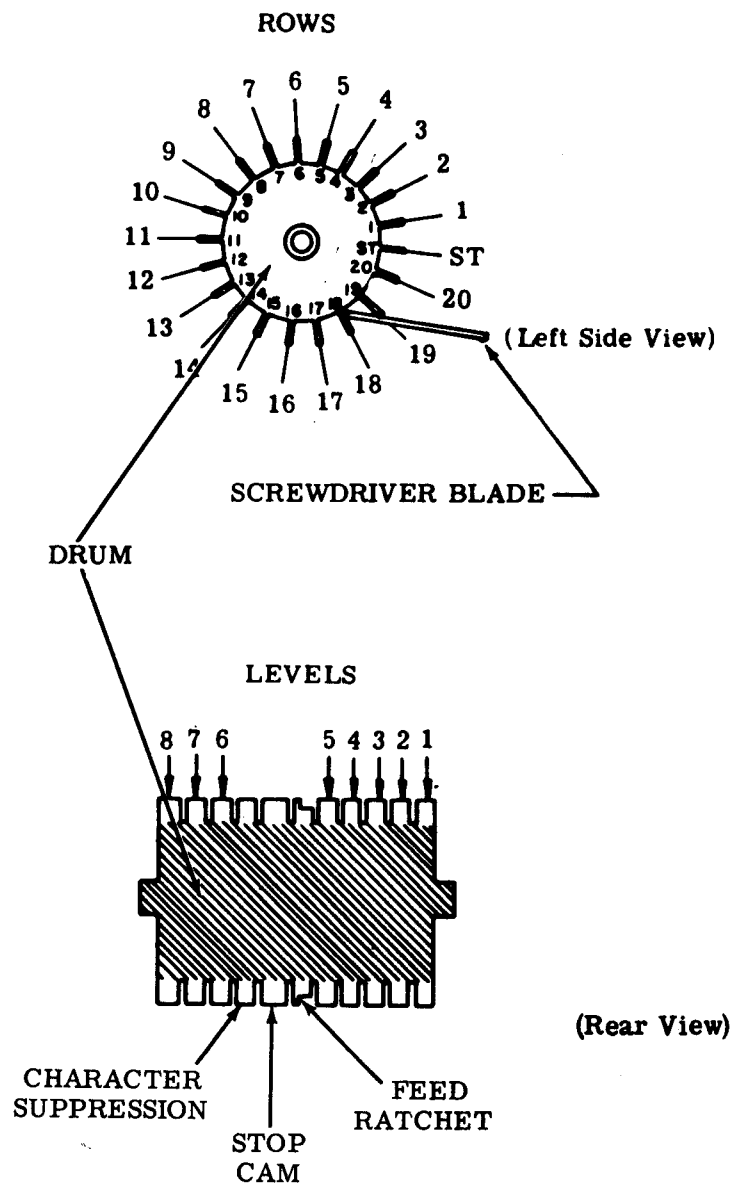


Figure 6 - Answer-Back Drum

## 3.26 Answer-Back Area (continued)

- (c) A particular character is coded by either retaining or removing tines within a row, as illustrated in Figure 6. A tine may be removed by either of the two following methods:

**Method 1:** Place the end of a screwdriver blade at the base of a tine in the row previously coded. Press the side of the blade against the top of the unwanted tine until the tine breaks off. Figure 6 illustrates this method — pressure applied to base of row no. 18 and against top of adjacent tine being removed from row no. 19.

**Method 2:** Place the unwanted tine in the slot of a TP161686 tine tool, or grasp the tine firmly with long-nose pliers. With the tool or pliers held stationary, rotate the answer-back drum back and forth until the tine breaks off near its base. Do not damage adjacent tines.

**Note:** If a coding error is made, or for some other reason it is necessary to suppress (erase) characters from the answer-back drum, remove the character suppression tine from the row(s) affected.

- (d) The length of an answer-back sequence can be varied either by removing the stop cam tine(s) and/or the character suppression tine(s).
- (e) For short sequences, code the drum for either 2- or 3-cycle operation by removing the appropriate tine(s) as indicated in Figure 7.
- (f) Removal of the character suppression tine from any row prevents transmission from the answer-back mechanism. To shorten the answer-back sequence, remove the suppression tine from any unused row(s) after the end of a message. ←

**Note:** On sets used in systems where a response to each answer-back activation signal must be obtained, do not remove the character suppression tine from the last row of each segment of the answer-back drum. For answer-back drums coded for 1-cycle operation this is row no. 20. The last row can be coded with any other character that is compatible with the particular system.

- (g) The number of rows available for message coding is shown below for 1-, 2-, or 3-cycle operation.

CYCLE OPERATION	TOTAL ROWS	AVAILABLE ROWS
1	21	20
2	10(11)*	9(10)*
3	7	6

\*Alternately one, then the other.

- (h) The number of rows available for actual station identification is less than shown above because each coded message should begin and end with CARRIAGE RETURN and LINE FEED (this may be altered in specific applications). This assures that the transmitted message will appear at the beginning of a line of the receiving teletypewriter set and eliminates overprinting.

## 3.27 Answer-Back Area (continued)

- (i) In switched network service, the station identification for 1-cycle operation may not exceed 14 characters, including spaces. The answer-back drum should be coded as follows:

<u>ABBREVIATION</u>	<u>KEY TO ABBREVIATION</u>
ACK	Acknowledge
CR	Carriage Return
LF	Line Feed
RO	Rub Out
SP	Space
SUP	Character Suppression

## (a) Example 1:

SUP CR LF RO  
 TELETYPE SP NILES CR LF ACK  
 Company City

Station Identification  
 (Maximum - 14 characters)

Note: In this system, the ACK character code combination must be the final significant character code combination in the coded answer-back message.

## (b) Example 2:

SUP CR LF RO  
 ERIE SP BOST CR LF ACK SUP SUP SUP SUP SUP  
 Company City

Station Identification  
 (Less than maximum number of characters)

Note: If the station identification is less than the maximum of 14 characters in length, then the remaining rows on the answer-back drum must be coded with the character suppression code according to Example 2 above.

- (j) To replace the answer-back drum, place the TP180854 brace in its detented open position, and lift feed pawl (do not overextend its spring). Replace drum with its shaft firmly seated in the contact block slots. Release feed pawl and TP180854 brace. Rotate answer-back drum to assure proper seating of its associated parts. Check that the contact wires are located in their proper slots.

ASCII CODE			
1967 Edition	1965 Edition	1963 Edition	MARKING REMOVE TINES
NUL		NULL	NONE
SOH		SOM	1-8
STX		EOA	2-8
ETX		EOM	1-2
EOT			3-8
ENQ		WRU	1-3
ACK		RU	2-3
BEL		BELL	1-2-3-8
BS		FE <sub>o</sub>	4-8
HT		HT/SK	1-4
LF			2-4
VT		VTAB	1-2-4-8
FF			3-4
CR			1-3-4-8
SO			2-3-4-8
SI			1-2-3-4
DLE		DC <sub>o</sub>	5-8
DC1			1-5
DC2			2-5
DC3			1-2-5-8
DC4		DC4 (STOP)	3-5
NAK		ERR	1-3-5-8
SYN		SYNC	2-3-5-8
ETB		LEM	1-2-3-5
CAN		S <sub>o</sub>	4-5
EM		S <sub>1</sub>	1-4-5-8
SUB	SS	S <sub>2</sub>	2-4-5-8
ESC		S <sub>3</sub>	1-2-4-5
FS		S <sub>4</sub>	3-4-5-8
GS		S <sub>5</sub>	1-3-4-5
RS		S <sub>6</sub>	2-3-4-5
US		S <sub>7</sub>	1-2-3-4-5-8
SP		␣	6-8
!			1-6
"			2-6
#			1-2-6-8
\$			3-6
%			1-3-6-8
&			2-3-6-8
'			1-2-3-6
(			4-6
)			1-4-6-8
*			2-4-6-8
+			1-2-4-6
,			3-4-6-8
-			1-3-4-6
.			2-3-4-6
/			1-2-3-4-6-8
0			5-6
			1-5-6-8

ASCII CODE			
1967 Edition	1965 Edition	1963 Edition	MARKING REMOVE TINES
2			2-5-6-8
3			1-2-5-6
4			3-5-6-8
5			1-3-5-6
6			2-3-5-6
7			1-2-3-5-6-8
8			4-5-6-8
9			1-4-5-6
:			2-4-5-6
;			1-2-4-5-6-8
<			3-4-5-6
=			1-3-4-5-6-8
>			2-3-4-5-6-8
?			1-2-3-4-5-6
@		@	7-8
A			1-7
B			2-7
C			1-2-7-8
D			3-7
E			1-3-7-8
F			2-3-7-8
G			1-2-3-7
H			4-7
I			1-4-7-8
J			2-4-7-8
K			1-2-4-7
L			3-4-7-8
M			1-3-4-7
N			2-3-4-7
O			1-2-3-4-7-8
P			5-7
Q			1-5-7-8
R			2-5-7-8
S			1-2-5-7
T			3-5-7-8
U			1-3-5-7
V			2-3-5-7
W			1-2-3-5-7-8
X			4-5-7-8
Y			1-4-5-7
Z			2-4-5-7
[			1-2-4-5-7-8
\	~		3-4-5-7
]			1-3-4-5-7-8
^			2-3-4-5-7-8
_			1-2-3-4-5-7
!		ACK	3-4-5-6-7-8
}		ALT, MODE	1-3-4-5-6-7
~		ESC	2-3-4-5-6-7
DEL			1-2-3-4-5-6-7-8
{			1-2-4-5-6-7

REMOVE TINES IN THE FOLLOWING ROWS TO GET THE PROPER CYCLE		
CYCLES	CHARACTER SUPPRESSION	STOP CAM
1 Cycle	Row ST	Row 6
2 Cycle	Row ST Row 11	Row 6 Row 17
3 Cycle	Row ST Row 7 Row 14	Row 6 Row 13 Row 20

Note 1: Blank spaces in the ASCII (American National Standard Code for Information Interchange) columns indicate no change from the latest edition of the code.

Note 2: Codes shown are for even parity operation. For nonparity operation, remove the eighth level tine.

Note 3: Tines present on the drum represent spacing bits. Tines removed from the drum represent marking bits.

Figure 7 - Answer-Back Drum Code Arrangement



33 TAPE READER

ADJUSTMENTS

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Reset and busy switch timing . . . . .	24

1.01 This section provides adjustment and maintenance information for the 33 tape reader. It is reissued to include engineering changes. Marginal arrows indicate changes.

1.02 In the adjustments covered in this section, location of clearances, position of parts, and point and angle of scale applications are illustrated by line drawings. Tools required to perform adjustments are contained in TP185830 Tool Kit and are listed in Maintenance Tool Section 570-005-800TC.

Note: An adjustment must be performed even if the accompanying illustration is not an exact duplication of the adjustment area.

1.03 The sequence in which the adjustments appear should be followed when a complete readjustment of the tape reader is undertaken. No adjustment should be undertaken without completely understanding the procedure and the requirements. Read a procedure all the way through before making an adjustment or checking a spring tension.

Note 1: Be sure to check all related adjustments (1.07).

Note 2: Remove all electric power before checking or performing adjustments.

1.04 References to left, right, front, rear, etc consider the tape reader to be viewed from a position where the feed wheel faces up and the lid latch is located to the viewer's right. Orientation references to the clutch trip area consider the armature extension to be facing up with the contact bracket pry points located to the viewer's right.

## TAPE READER AREA

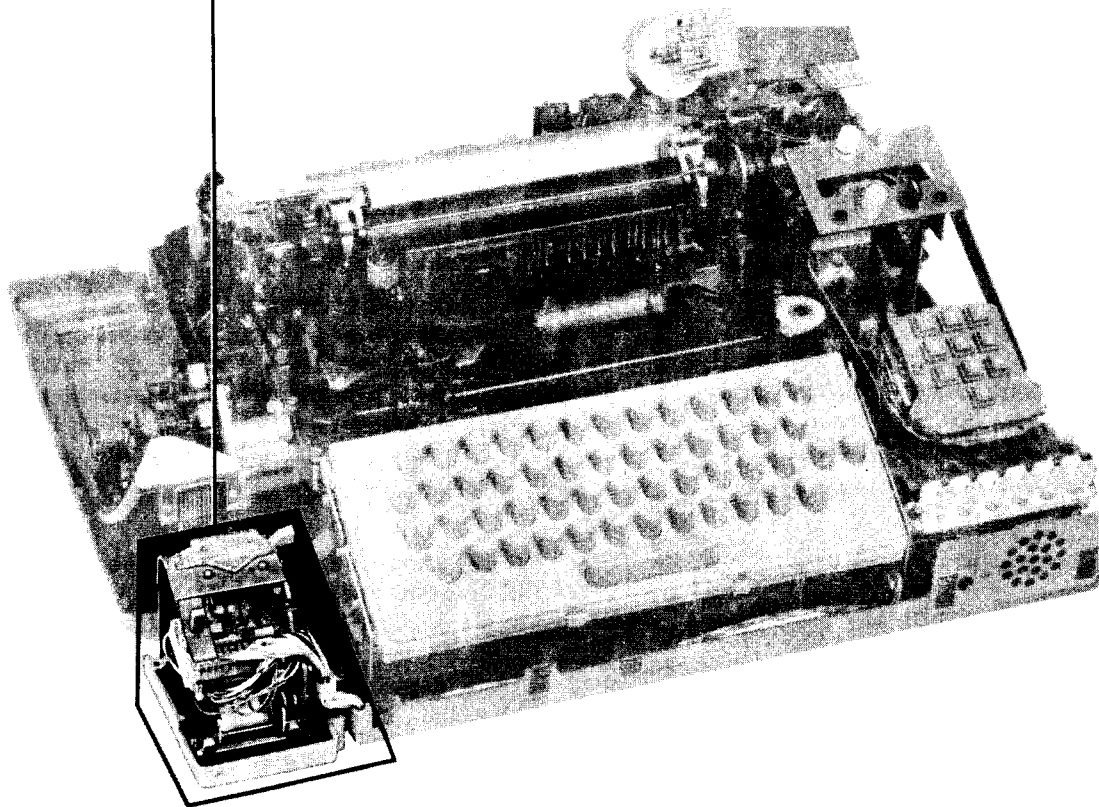


Figure 1 - Tape Reader Area

1.05 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.

1.06 If parts are removed from the tape reader to facilitate making an adjustment, be sure that they are replaced.

Note: Recheck any adjustment that may have been affected by the removal of parts.

1.07 Related adjustments are listed with some of the adjustment text and are primarily intended to aid in troubleshooting the equipment. As an example, suppose that in searching for a trouble it is discovered that the BLOCKING PAWL (Tape Reader Area) adjustment does not meet its requirement. Under "Related Adjustment," it is indicated that this adjustment is affected by the DETENT LEVER (Tape Reader

Area) and FEED PAWL (Tape Reader Area) adjustments. Check these to see if either is the cause of the trouble. Also, note that certain adjustments affect other adjustments. For example, see the DETENT LEVER (Tape Reader Area) adjustment. Note that this adjustment affects the FEED PAWL (Tape Reader Area) and BLOCK PAWL (Tape Reader Area) adjustments. If the former adjustment is changed, check the latter adjustments.

1.08 The spring tensions specified in this section are indications, not exact values. Therefore, to obtain reliable readings, it is important that spring tensions be measured by spring scales placed in the positions shown on pertinent line drawings. Springs that do not meet their requirements should be replaced by new ones. Only those springs that directly affect the operation of the tape reader are measured, however, others may be measured indirectly in the



CLUTCH TRIP AREA

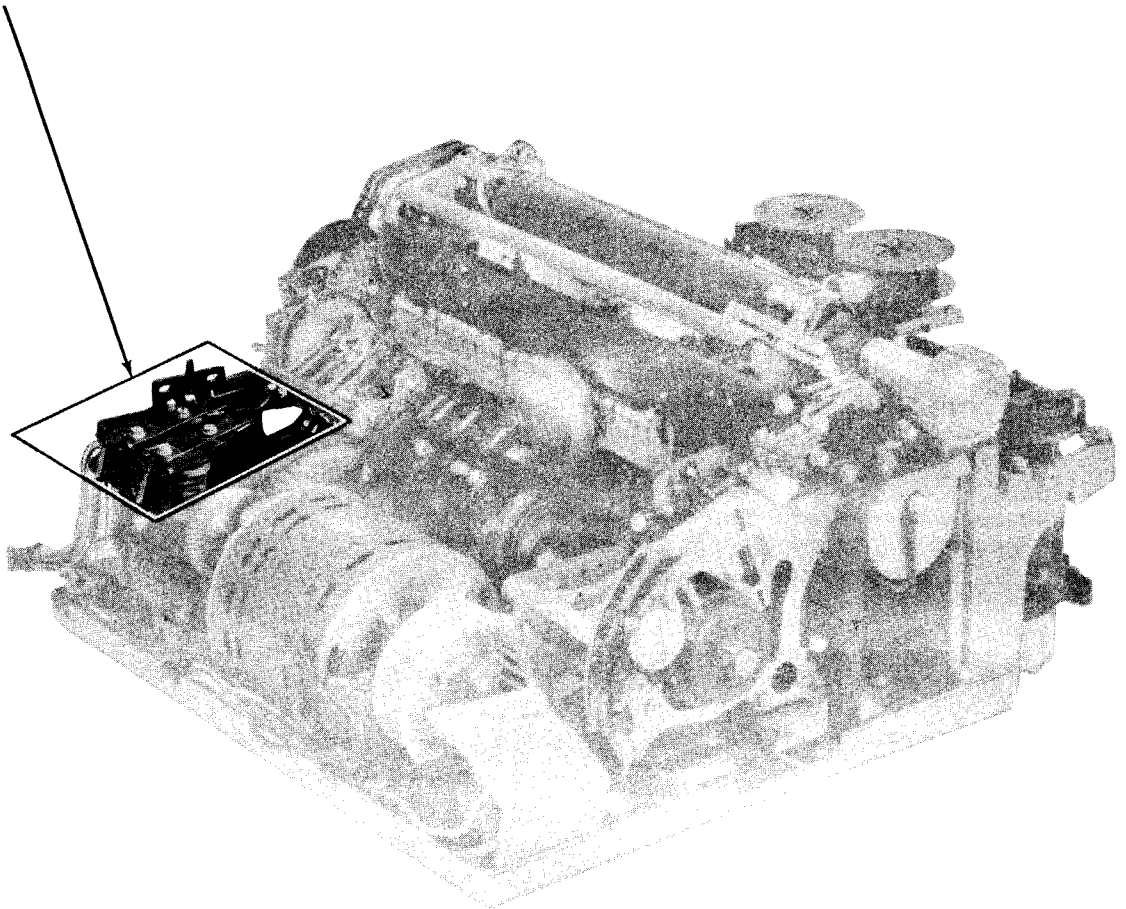


Figure 2 - Clutch Trip Area (Without Reader Feed Magnet Contact Assembly)

process. If this is the case and the requirement is not met, replace the springs one at a time, starting with the indicated spring, until the requirement is satisfied.

Note 1: Use spring scales which are listed in the Maintenance Tool Section 570-005-800TC.

Note 2: Spring tensions may be checked in any sequence.

1.09 Certain adjustments specify that an armature is to be in its attracted position prior to checking a requirement. This refers to an armature's position when it is magnetically attracted to its magnet core. If a separate power supply is not available, the armature can be held attracted by utilizing power normally supplied by the ASR set. This is accomplished with the motor power turned off and the reader trip magnet armature manually energized.

**CAUTION: THE TAPE READER FEED MAGNET OPERATES UNDER HIGH VOLTAGE.**

**PRECAUTIONARY MEASURES SHOULD BE TAKEN WHENEVER POWER TO THE TAPE READER IS TURNED ON. HIGH VOLTAGE WILL CONTINUE UNTIL APPROXIMATELY 10 SECONDS AFTER THE POWER PACK HAS BEEN DISCONNECTED.**

1.10 When inserting a tape that has originated from the tape punch, into a tape reader, allow some slack in the tape between the punch and the reader. This is done to close the reader tape lid.

Note: Do not place the control lever directly into the FREE position while the tape reader is operating under power. Place the control lever into the STOP position and wait until after the tape reader has stopped before moving it beyond the STOP position and into the FREE position. The FREE position of the control lever is used to facilitate the insertion and/or removal of paper tape from the tape reader.

1. 11 All adjustments in the "Clutch Trip Area" should be started with the typing unit in the stop condition. It is in the stop condition when the selector armature is in its attracted (frontward) position and all clutches are disengaged.

1. 12 To place the typing unit in the stop condition, hold the selector armature in its attracted (frontward) position. Rotate the main shaft clockwise (as viewed from the left) until all clutches are fully disengaged as instructed in 1. 13 below.

1. 13 When disengaged, a clutch is latched so that a shoe lever is held in its stop position by a trip lever while a corresponding latch-lever is seated in a notch of the clutch disc. This allows the clutch shoes to release their tensions on the clutch drum. With all clutches disengaged, the main shaft will turn freely without any clutch shoes dragging.

Note 1: The clutch stop position is that position where a shoe lever contacts a trip lever.

Note 2: If the shaft is turned by hand, a clutch will not fully disengage upon reaching a stop position. Where an adjustment procedure requires disengagement, rotate the clutch to a stop position, apply a screwdriver to the associated stop-lug, and push the clutch disc in the normal direction of main shaft rotation until the corresponding latchlever seats in its clutch disc notch.

Note 3: The distributor clutch will not disengage unless the answer-back drum is in its home position, which is the position where the control lever is fully detented into the indent on the answer-back drum.

1. 14 There are two areas in which tape reader adjustments and spring tensions are found. As aids in locating the areas, Figures 1 and 2 are provided. They indicate the areas as follows:

<u>Area</u>	<u>Figure</u>
Clutch trip	2
Tape reader	1

2. BASIC UNIT

2.01 Clutch Trip Area

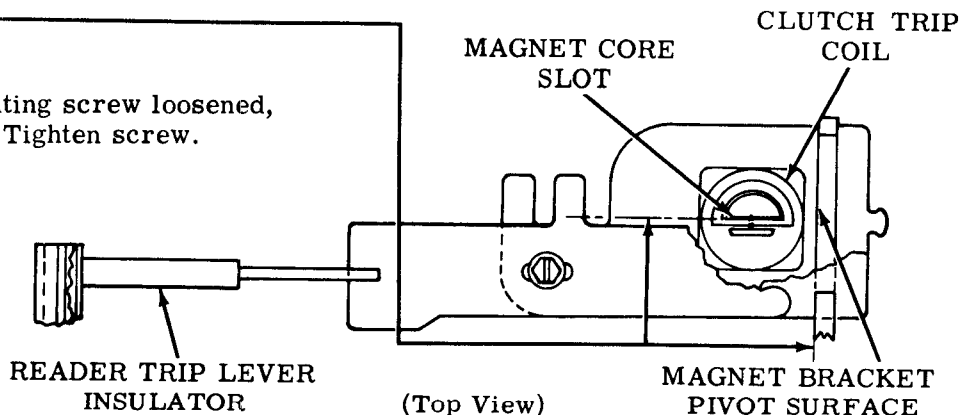
MAGNET CORE

Requirement

Magnet core slot to be perpendicular to magnet bracket pivot surface as gauged by eye.

To Adjust

With clutch trip coil mounting screw loosened, position clutch trip coil. Tighten screw.



TRIP MAGNET

Requirement

Magnet bracket to be positioned on base casting post as far forward and to the left as possible.

To Adjust

Position magnet bracket with three mounting screws loosened. Tighten screws.

Related Adjustments

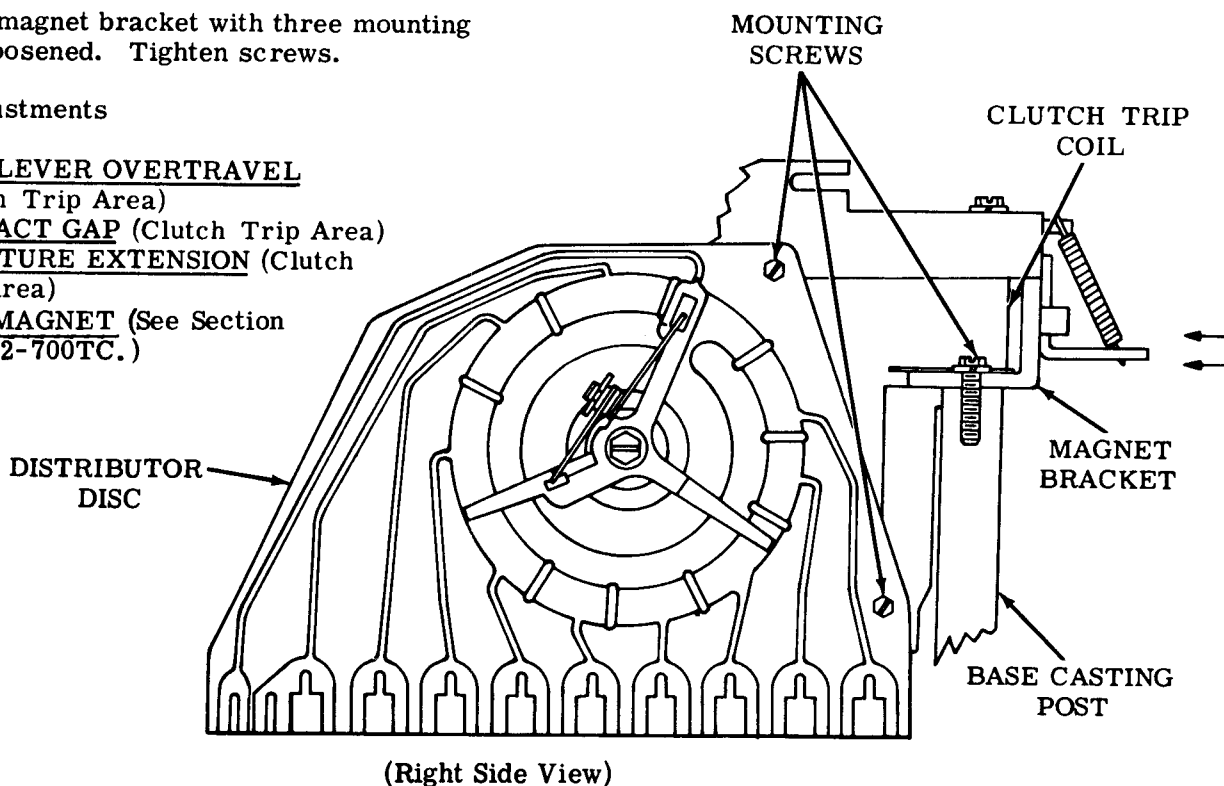
Affects

TRIP LEVER OVERTRAVEL  
(Clutch Trip Area)

CONTACT GAP (Clutch Trip Area)

ARMATURE EXTENSION (Clutch Trip Area)

TRIP MAGNET (See Section 574-122-700TC.)



2.02 Clutch Trip Area (continued)

TRIP LEVER OVERTRAVEL

To Check

Trip distributor clutch by momentarily holding armature in its attracted position. Rotate main shaft until cam roller is on high part of reader trip lever cam. Take up play in the armature extension.

Requirement

Min 0.010 inch --- Max 0.030 inch between the end of armature extension and latching surface of reader trip lever.

To Adjust

With armature extension mounting screw loosened friction tight, position armature extension using pry point. Tighten screw.

Related Adjustment

Affects

CONTACT GAP (Clutch Trip Area)

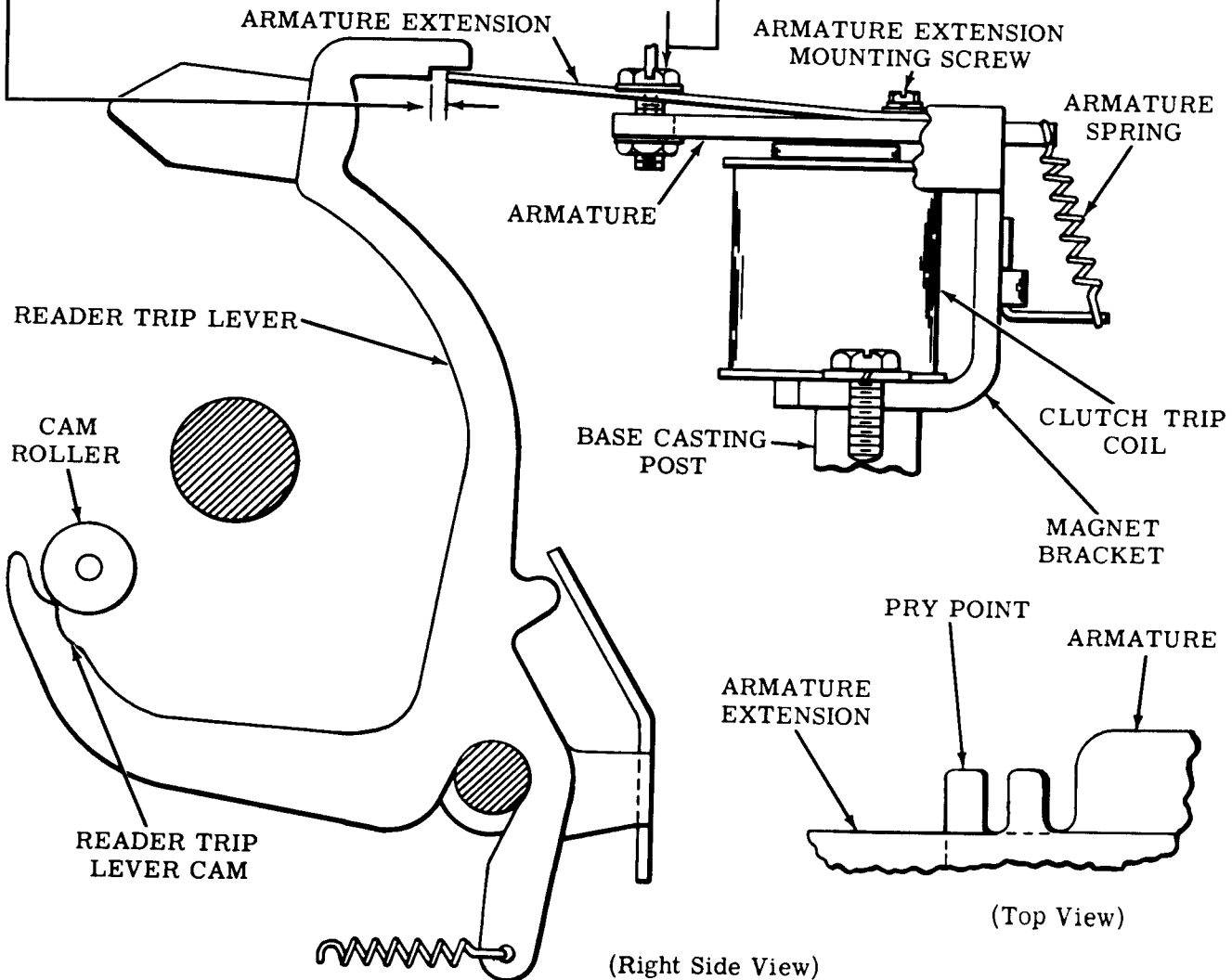
TRIP MAGNET ARMATURE SPRING

Requirement

With armature in its unattracted position and cam roller on high part of reader trip lever cam

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

Note: The requirement for readers containing busy and reset switches is Min 2 oz --- Max 3 oz



2.03 Clutch Trip Area (continued)

ARMATURE EXTENSION

To Check

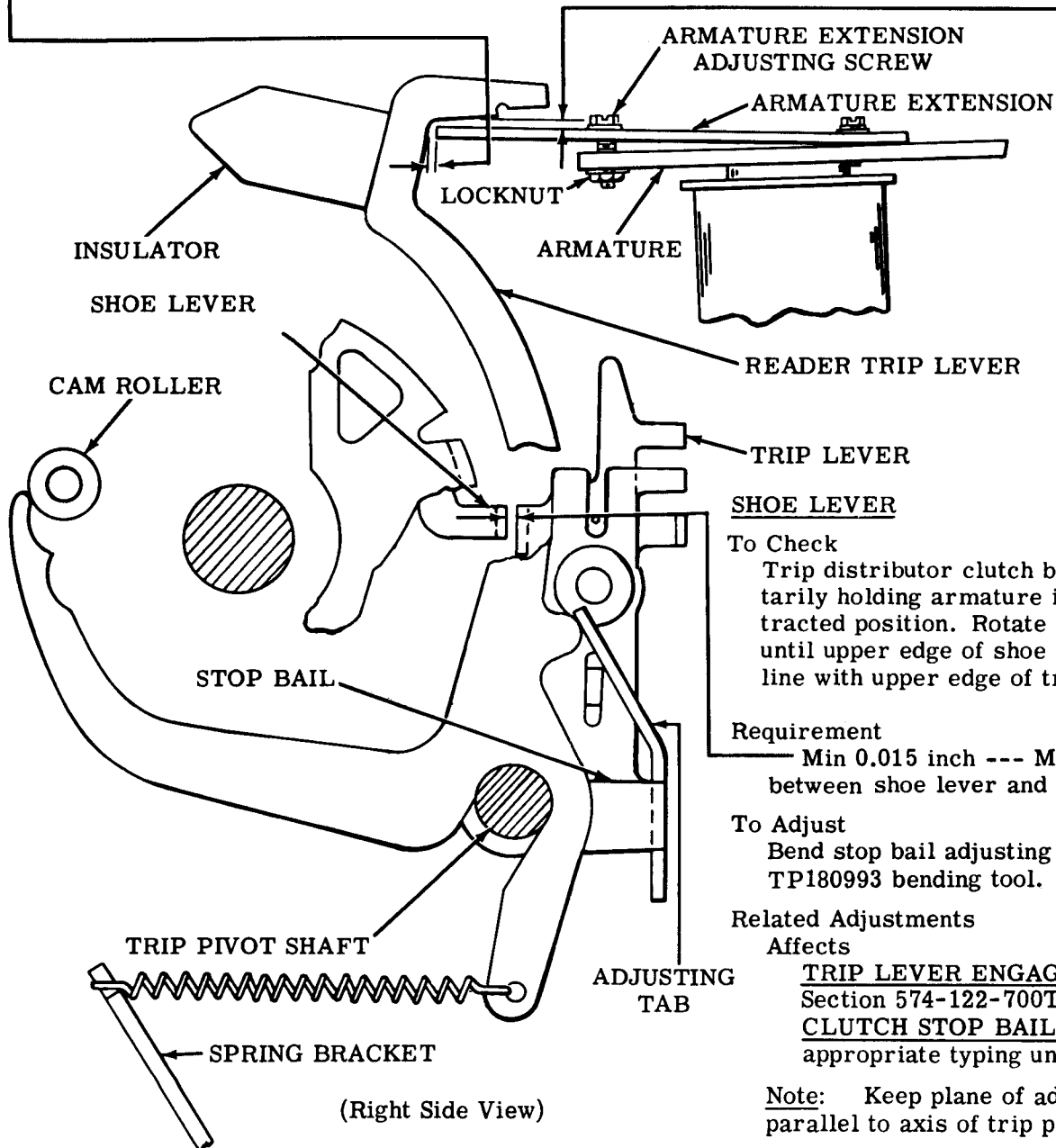
Place typing unit in stop condition. Hold armature in attracted position and rotate main shaft until a clearance of  
 Min Some --- Max 0.040 inch  
 exists between end of armature extension and reader trip lever.

Requirement

Min Some --- Max 0.030 inch  
 between the armature extension and reader trip lever at its closest point.

To Adjust

Loosen and use armature extension adjusting screw and locknut to position armature extension. Tighten adjusting screw and locknut.



To Check

Trip distributor clutch by momentarily holding armature in its attracted position. Rotate main shaft until upper edge of shoe lever is in line with upper edge of trip lever.

Requirement

Min 0.015 inch --- Max 0.035 inch  
 between shoe lever and trip lever.

To Adjust

Bend stop bail adjusting tab with TP180993 bending tool.

Related Adjustments

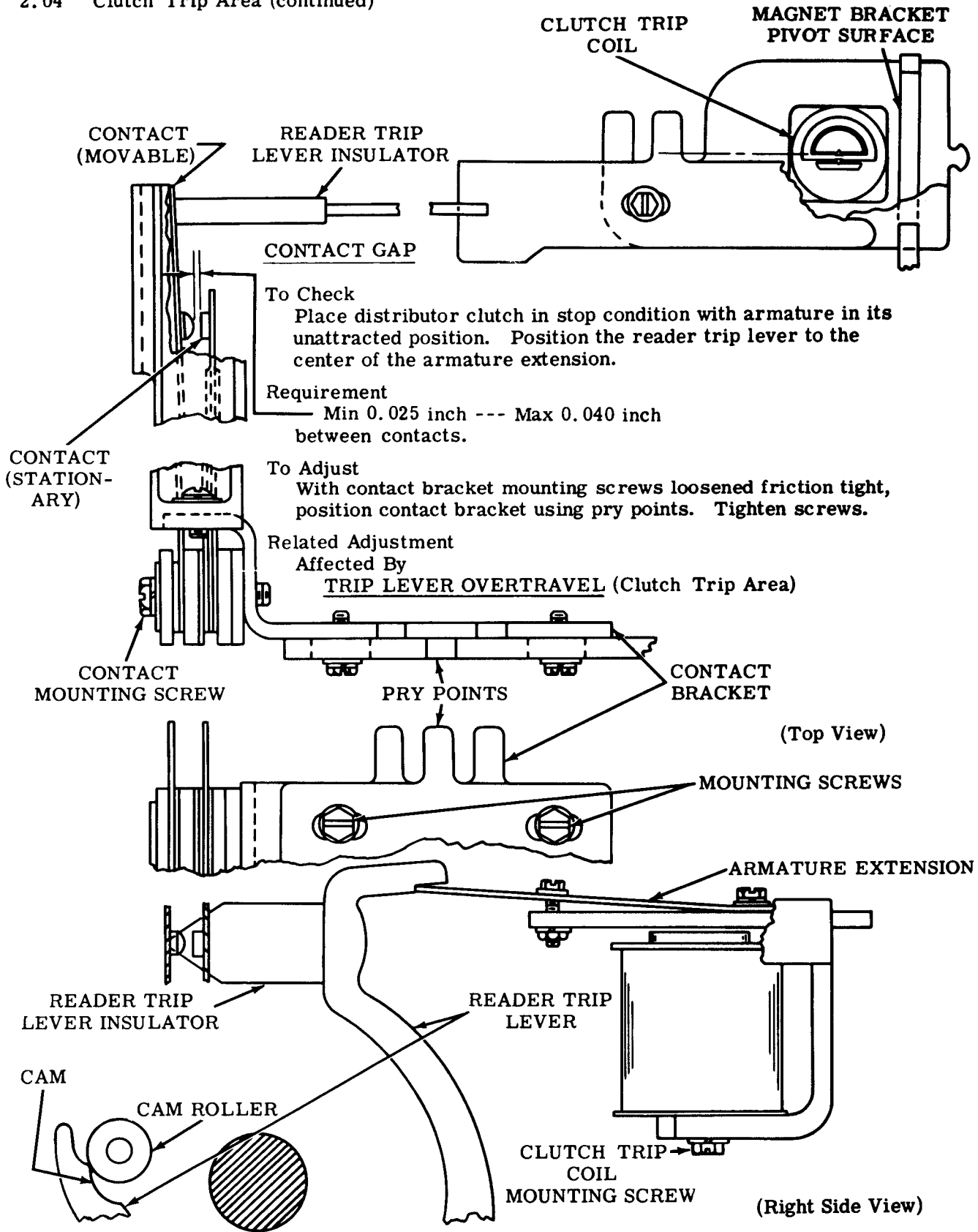
Affects

TRIP LEVER ENGAGEMENT (See Section 574-122-700TC.)

CLUTCH STOP BAIL (See the appropriate typing unit section.)

Note: Keep plane of adjusting tab parallel to axis of trip pivot shaft.

2.04 Clutch Trip Area (continued)



2.05 Clutch Trip Area (continued)

FEED MAGNET CONTACT SPRING

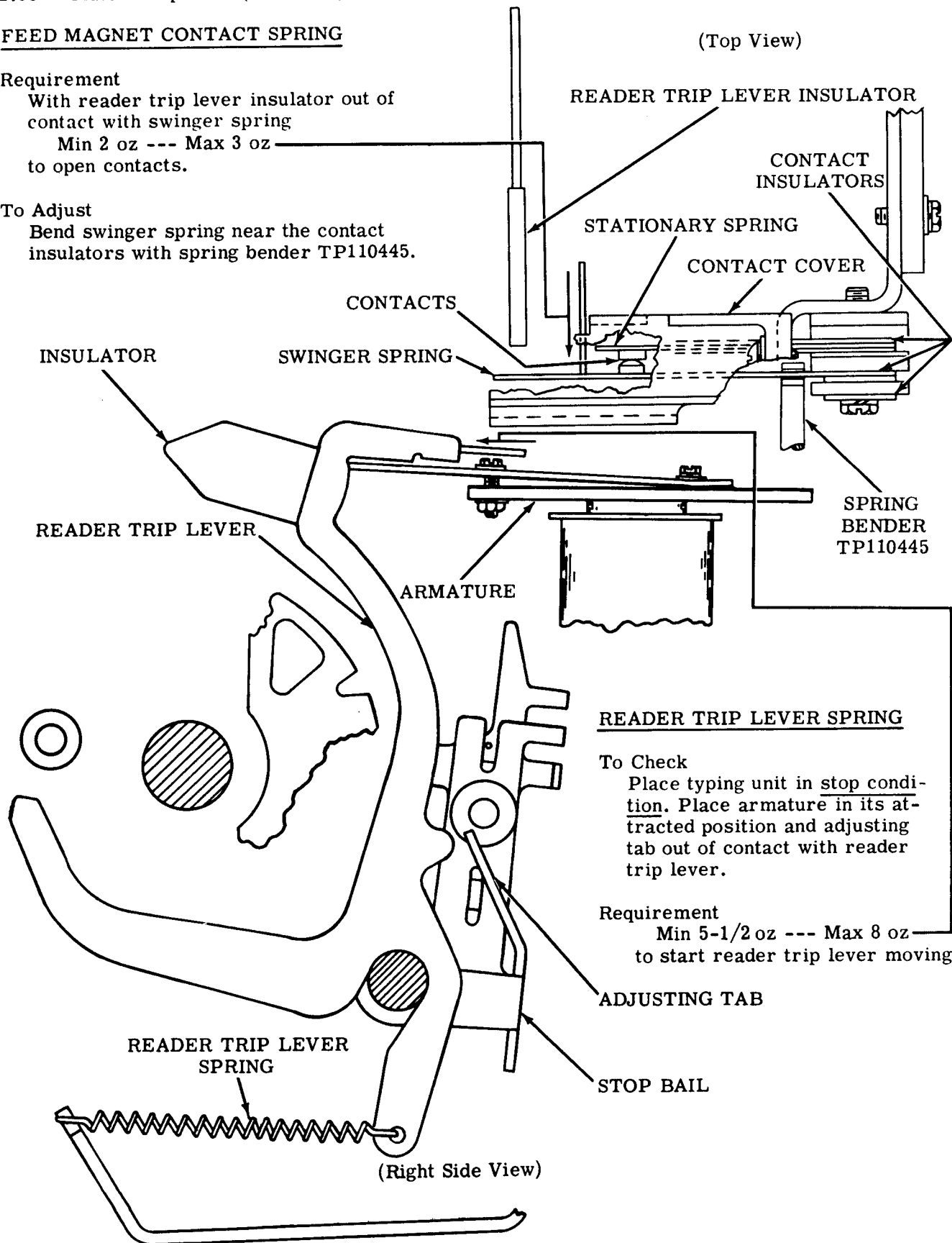
**Requirement**

With reader trip lever insulator out of contact with swinger spring

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

**To Adjust**

Bend swinger spring near the contact insulators with spring bender TP110445.



READER TRIP LEVER SPRING

**To Check**

Place typing unit in stop condition. Place armature in its attracted position and adjusting tab out of contact with reader trip lever.

**Requirement**

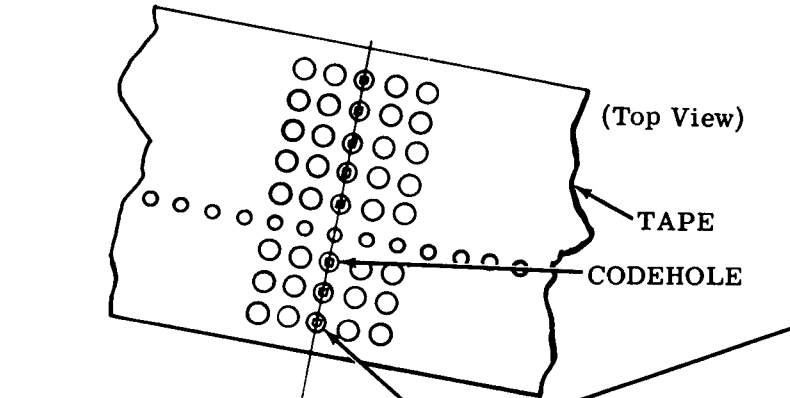
Min 5-1/2 oz --- Max 8 oz  
to start reader trip lever moving.

DETENT LEVER

Requirement

With the control lever in FREE position and the feed wheel rotated to position its gate flash towards the front, tips of sensing pins must be centrally located in the code holes of tape which has an all-marking code combination punched into it.

Note: If the tape reader is operating under power, do not push the control lever beyond the STOP position until the tape reader has stopped.



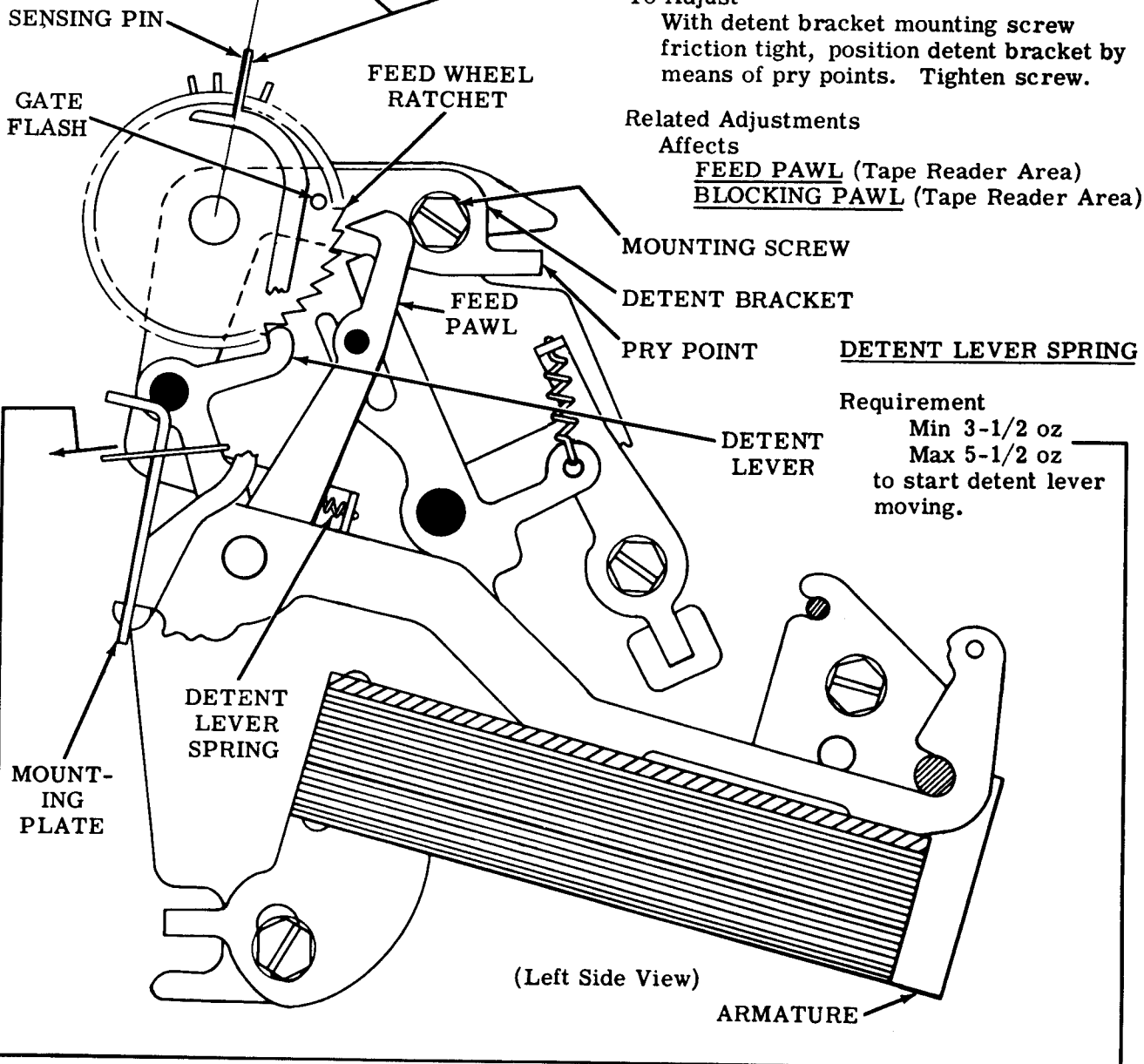
To Adjust

With detent bracket mounting screw friction tight, position detent bracket by means of pry points. Tighten screw.

Related Adjustments

Affects

- FEED PAWL (Tape Reader Area)
- BLOCKING PAWL (Tape Reader Area)



Requirement

Min 3-1/2 oz  
 Max 5-1/2 oz  
 to start detent lever moving.



2.07 Tape Reader Area (continued)

**FEED PAWL (Adjustment with Gauge TP183103)**

**To Check**

Place armature in unattracted position. Visually check to see if there is some clearance between the blocking pawl and ratchet tooth. If not, provide clearance. See **BLOCKING PAWL (Tape Reader Area)** adjustment.

**Requirement**

Rotate ratchet for least clearance between feed pawl and a ratchet tooth.

Min Some---Max 0.008 at closest point between feed pawl and this ratchet tooth with 5 ratchet teeth between feed pawl and detent lever. (Continued on next page.)

**UPSTOP SPRING**

**Requirement**

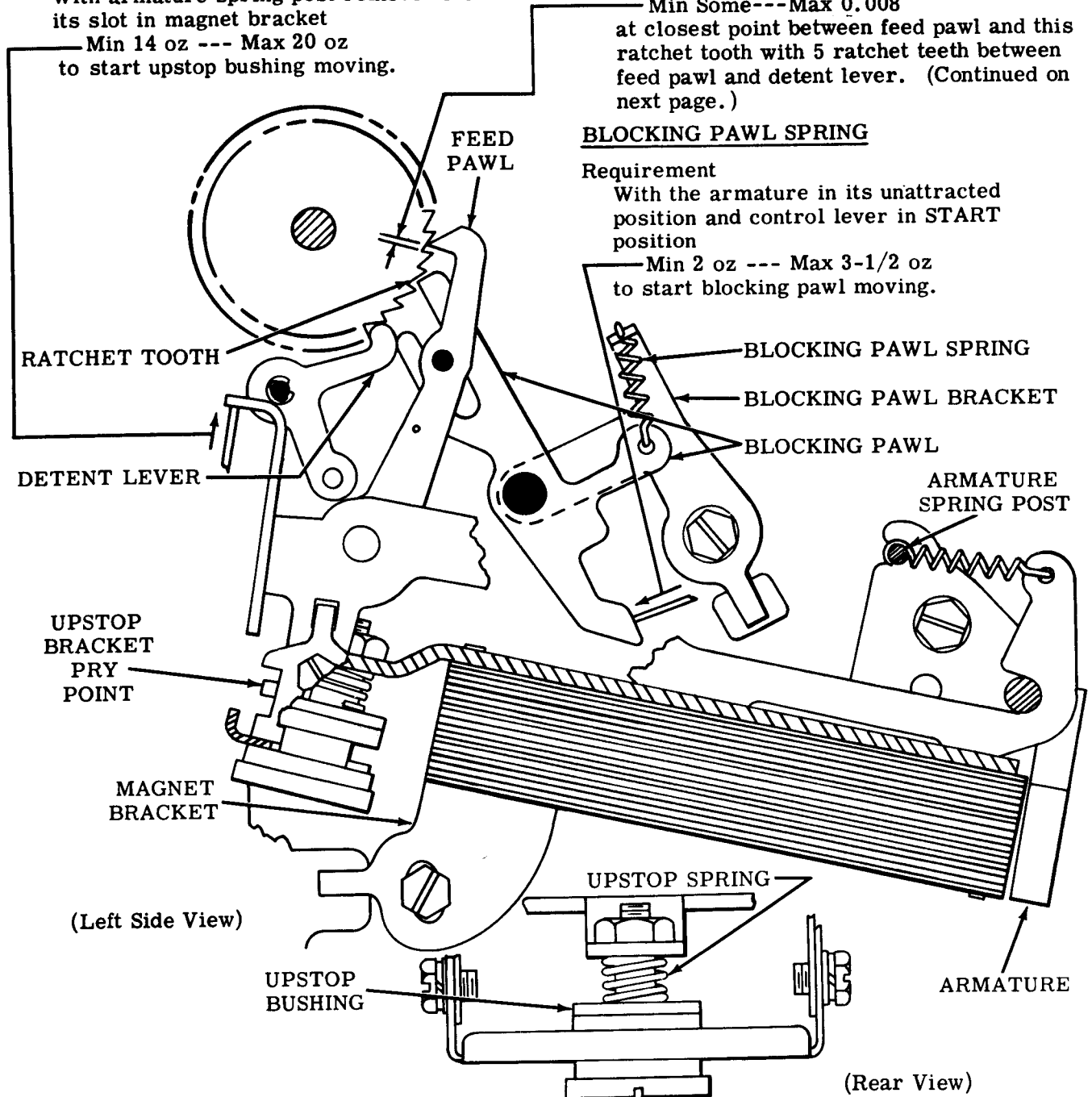
With armature spring post removed from its slot in magnet bracket  
Min 14 oz --- Max 20 oz  
to start upstop bushing moving.

**BLOCKING PAWL SPRING**

**Requirement**

With the armature in its unattracted position and control lever in START position

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



2.08 Tape Reader Area (continued)

FEED PAWL (Continued from preceding page.)

To Adjust

With armature in attracted position and two upstop bracket mounting screws friction tight, insert gauge TP183103 between upstop bracket and shoulder of upstop shoulder screw. Position upstop bracket so that it lies flat on gauge. Tighten upstop bracket mounting screws. With armature in unattracted position and three magnet bracket mounting screws friction tight, position magnet bracket by means of pry point. Tighten magnet bracket mounting screws.

**Note:** For tape readers with vibration damper plate TP183136, tighten magnet bracket mounting screws A and B first. Then, rotate the vibration dampener plate until the upper finger presses firmly on contact block extension. Finally, tighten magnet bracket mounting screw C.

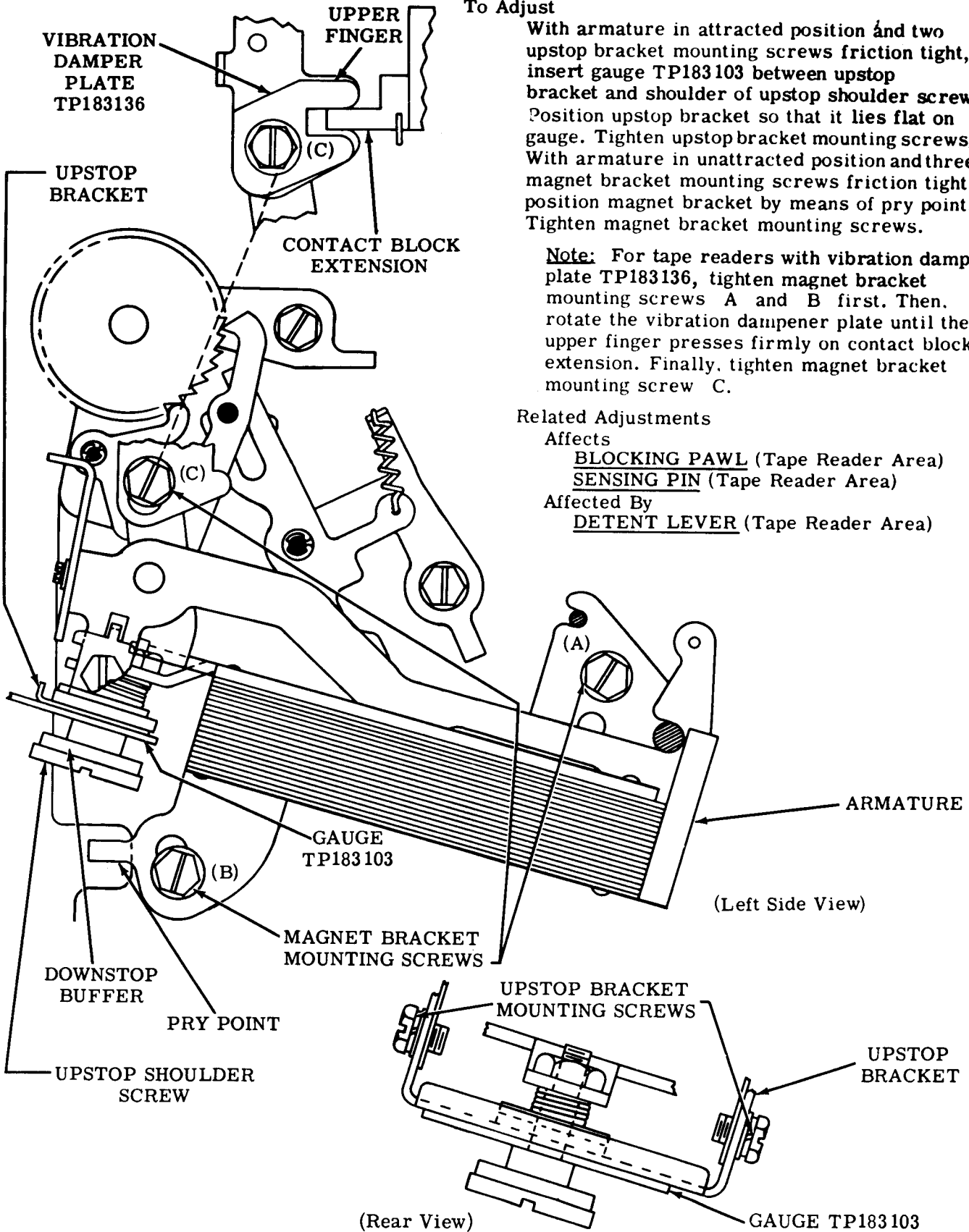
Related Adjustments

Affects

- BLOCKING PAWL (Tape Reader Area)
- SENSING PIN (Tape Reader Area)

Affected By

- DETENT LEVER (Tape Reader Area)



2.09 The Tape Reader Area (continued)

**FEED PAWL** (Adjustment without Gauge TP183103)

(1) To Check

Place armature in attracted position and loosen two upstop bracket mounting screws so that the upstop bracket does not limit the feed pawl motion.

Requirement

Min 0.020 inch --- Max 0.045 inch between feed pawl and ratchet tooth and a total of six ratchet teeth between feed pawl and detent lever.

To Adjust

With three magnet bracket mounting screws friction tight, position magnet bracket using pry point.

(2) To Check

Place armature in unattracted position. Visually check to see if there is some clearance between the blocking pawl and ratchet tooth. If not, provide clearance. See **BLOCKING PAWL** (Tape Reader Area) adjustment. Place upstop bracket flat against downstop buffer.

Requirement

Rotate ratchet for least clearance between feed pawl and a ratchet tooth  
Min Some---Max 0.008  
at closest point between feed pawl and the ratchet tooth.

To Adjust

With two upstop bracket mounting screws friction tight, position upstop bracket using upstop bracket pry point. Tighten screws.

Note 1: If the Some to 0.008 inch requirement cannot be met, refine requirement (1) until it is met.

Note 2: For tape readers with vibration damper plate TP183131, tighten magnet bracket mounting screws A and B first. Then, rotate the vibration damper plate until the upper finger presses firmly on contact block extension. Finally tighten magnet bracket mounting screw C.

Recheck Requirements (1) and (2) and refine, if necessary.

Related Adjustments

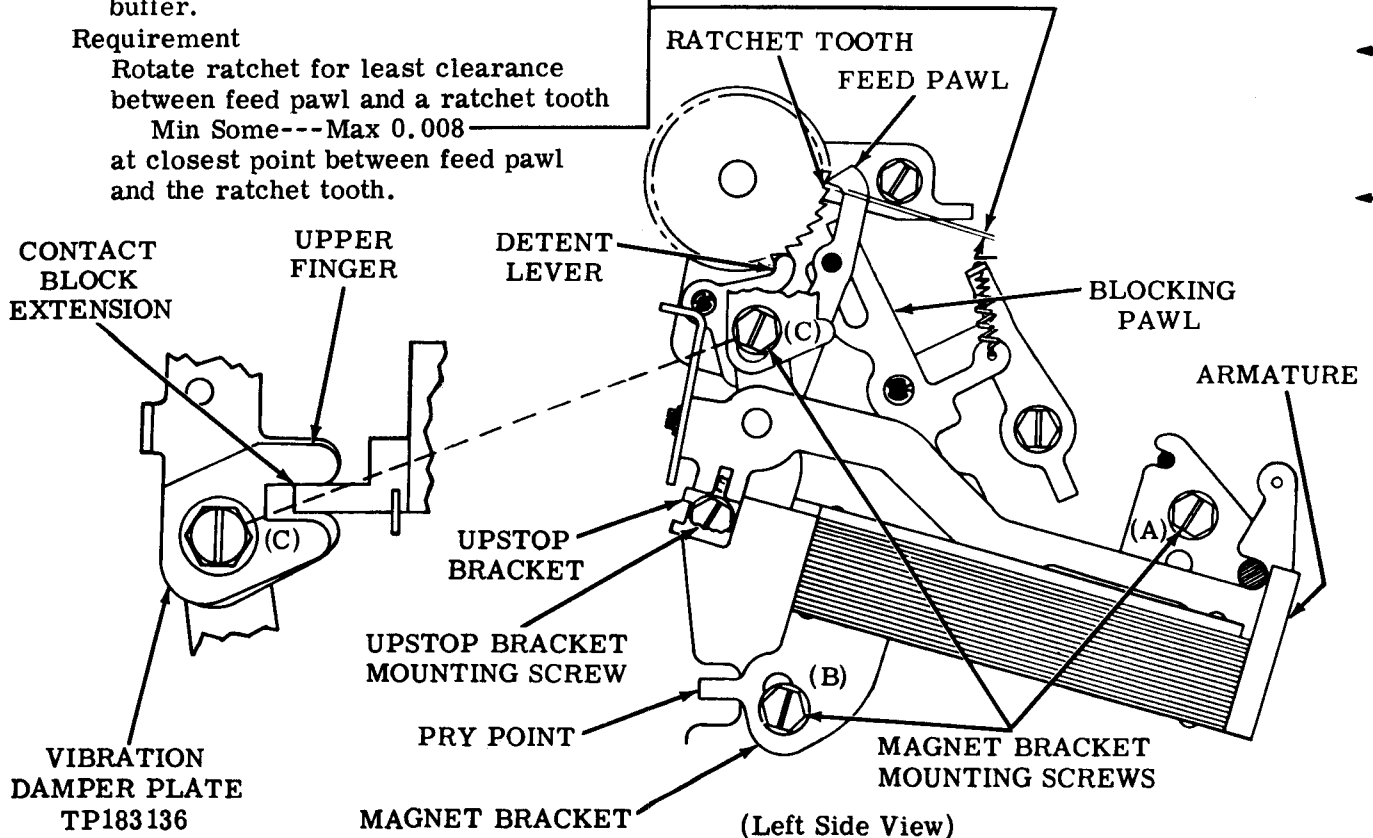
Affects

**BLOCKING PAWL** (Tape Reader Area)

**SENSING PIN** (Tape Reader Area)

Affected By

**TRIP LEVER OVERTRAVEL** (Tape Reader Area)



2.10 Tape Reader Area (continued)

BLOCKING PAWL

To Check

Place armature in unattracted position. Check to see that there is some clearance between feed pawl and ratchet tooth. If not, provide clearance. See FEED PAWL (Tape Reader Area) adjustment.

Requirement

Rotate ratchet for least clearance between end of blocking pawl and a ratchet tooth  
— Min Some---Max 0.003 inch  
at closest point between end of blocking pawl and the ratchet tooth.

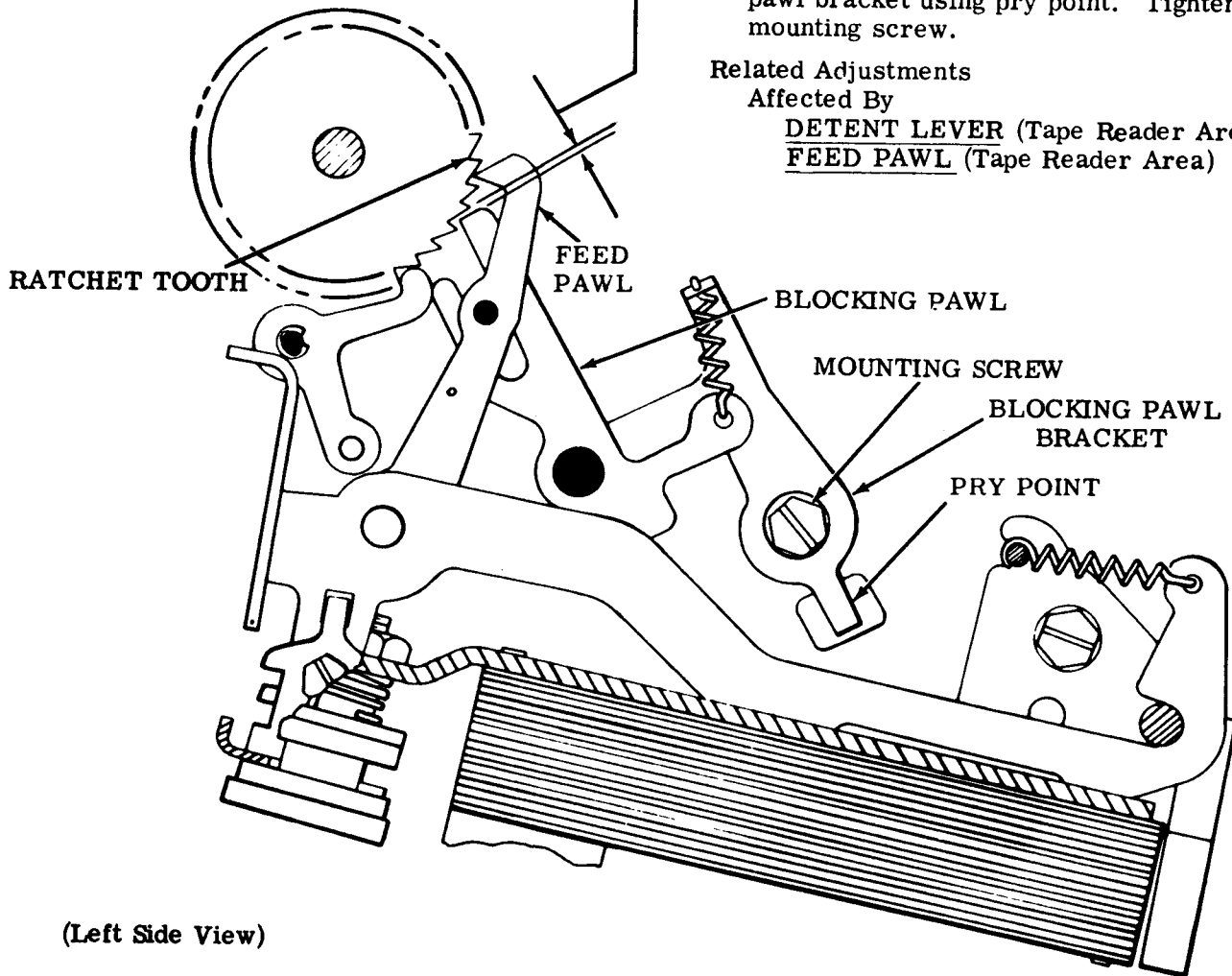
To Adjust

With blocking pawl bracket mounting screw loosened friction tight, position blocking pawl bracket using pry point. Tighten mounting screw.

Related Adjustments

Affected By

DETENT LEVER (Tape Reader Area)  
FEED PAWL (Tape Reader Area)



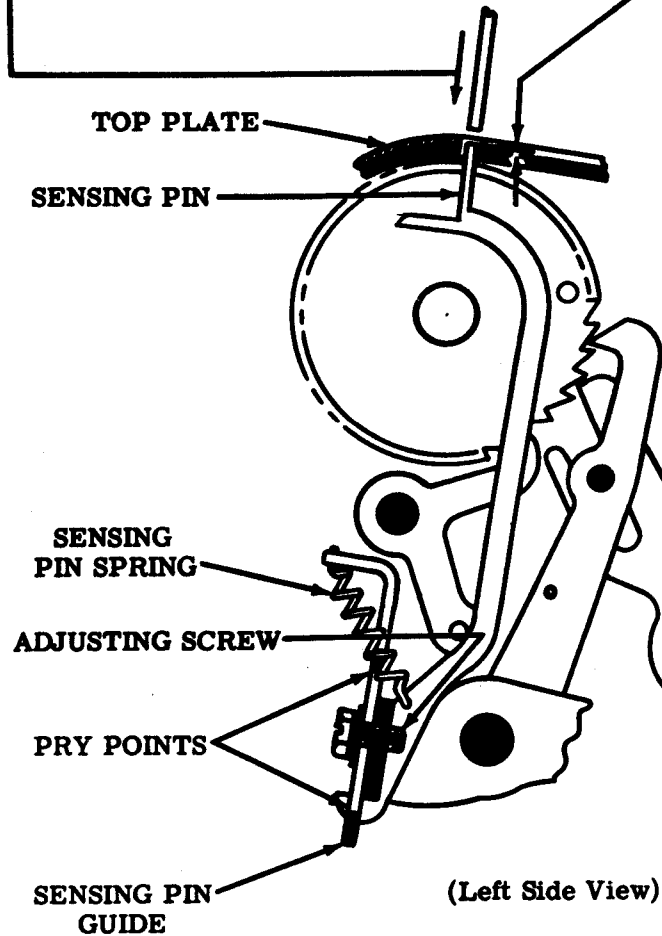
(Left Side View)

2.11 Tape Reader Area (continued)

**SENSING PIN SPRING**

**Requirement**

With armature in its attracted position  
 Min 1-1/2 oz --- Max 2-3/4 oz  
 to position sensing pin flush with top plate.



**SENSING PIN**

**Requirement**

With armature in unattracted position, the tip of all sensing pins shall be  
 Min Flush --- Max 0.015 inch  
 below top surface of top plate.

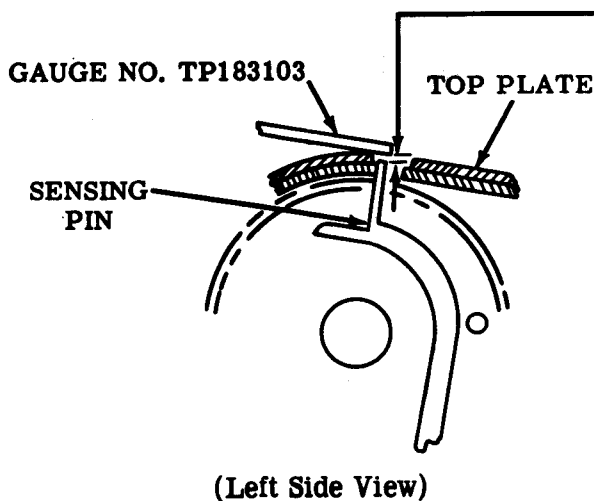
**To Adjust**

With two sensing pin guide adjusting screws loosened friction tight, position sensing pin guide using pry points. Tighten screws.

**Related Adjustment**

Affected By

**FEED PAWL** (Tape Reader Area)



**Note:** This adjustment may be made by using the thin-slotted end of gauge TP183103. To check the above minimum requirement (Flush), hold the gauge flat against the top plate in back of the sensing pins and move it forward against sensing pins. If any sensing pin is deflected by the gauge, then the above minimum requirement is not met. The sensing pin pin guide must be lowered. To check the above maximum requirement (0.015 inch), hold the gauge directly above the sensing pins and measure the clearance. Adjust, if necessary, as indicated above.

2.12 Tape Reader Area (continued)

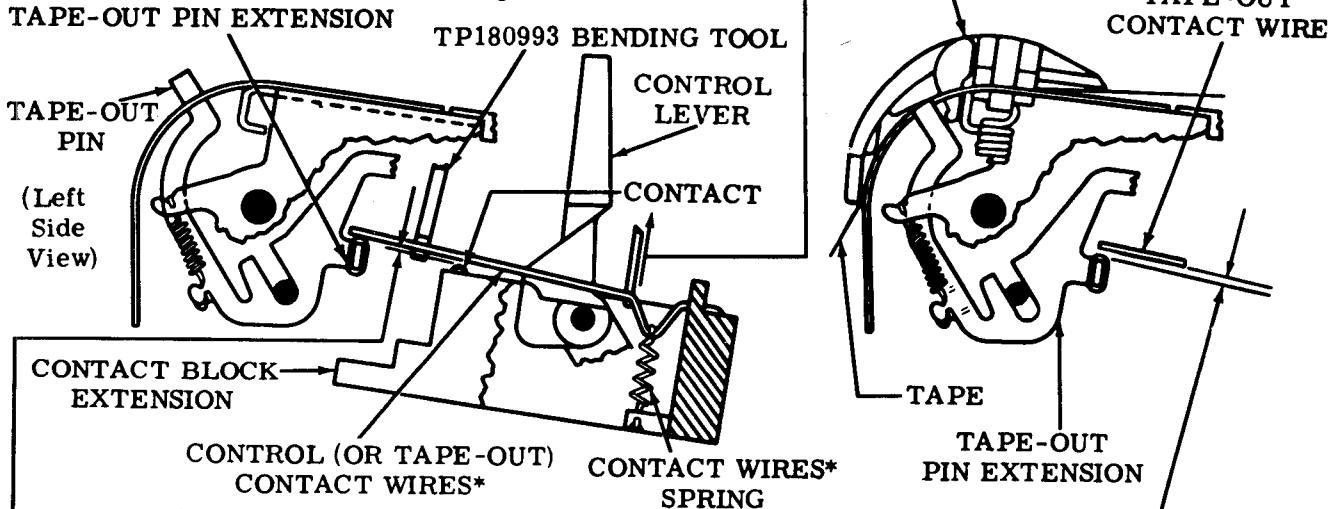
CONTACT WIRES\* SPRING

To Check

Place control lever in START position and fully depress tape-out pin.

Requirement

Min 1-1/4 oz --- Max 2-1/4 oz  
to start each contact wire\* moving



CONTROL (OR TAPE-OUT) CONTACT WIRES\*

Note 1: Tape readers without automatic reader control: Place the control lever in START position.

(1) Requirement

With tape-out pin in its fully up position,  
Min 0.010 inch --- Max 0.025 inch  
between control (or tape-out) contact wires\* and contact.

(2) Requirement

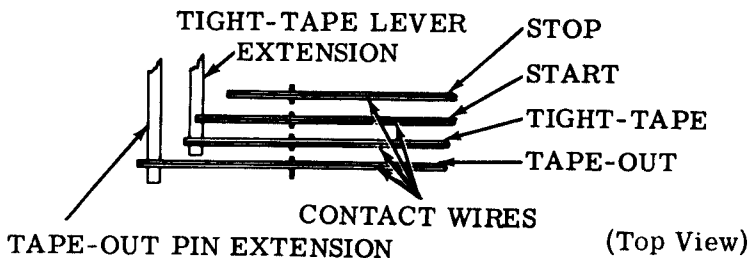
With tape in reader and reader lid closed,  
Min 0.005 inch  
clearance between the tape-out pin extension and tape-out contact wire.

To Adjust

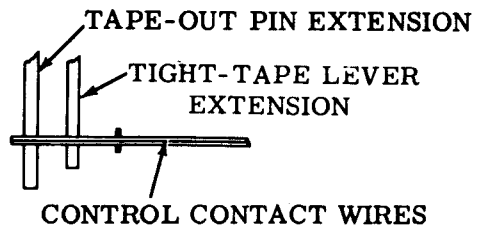
Bend control (or tape-out) contact wires\* between the contact and the tape-out pin extension with bending tool TP180993.

\*Note 2: The location of the contact wires is shown below:

TAPE READERS WITH AUTOMATIC READER CONTROL



TAPE READERS WITHOUT AUTOMATIC READER CONTROL



## 2.13 Tape Reader Area (continued)

**Note:** The following adjustment applies only to tape readers with automatic reader control.

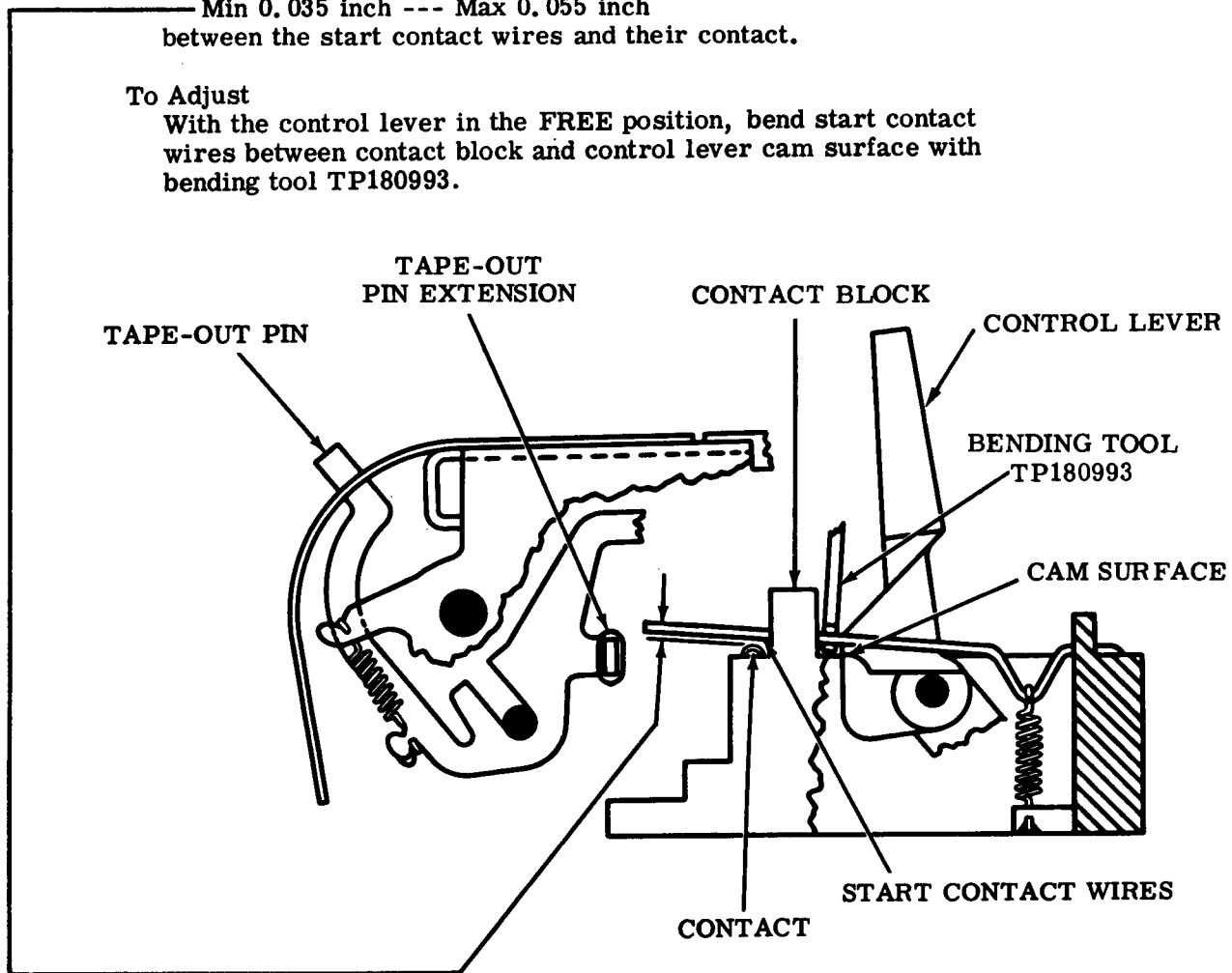
**START CONTACT WIRES****Requirement**

With the control lever in the neutral position (resting in a position midway between START and STOP positions)

— Min 0.035 inch --- Max 0.055 inch  
between the start contact wires and their contact.

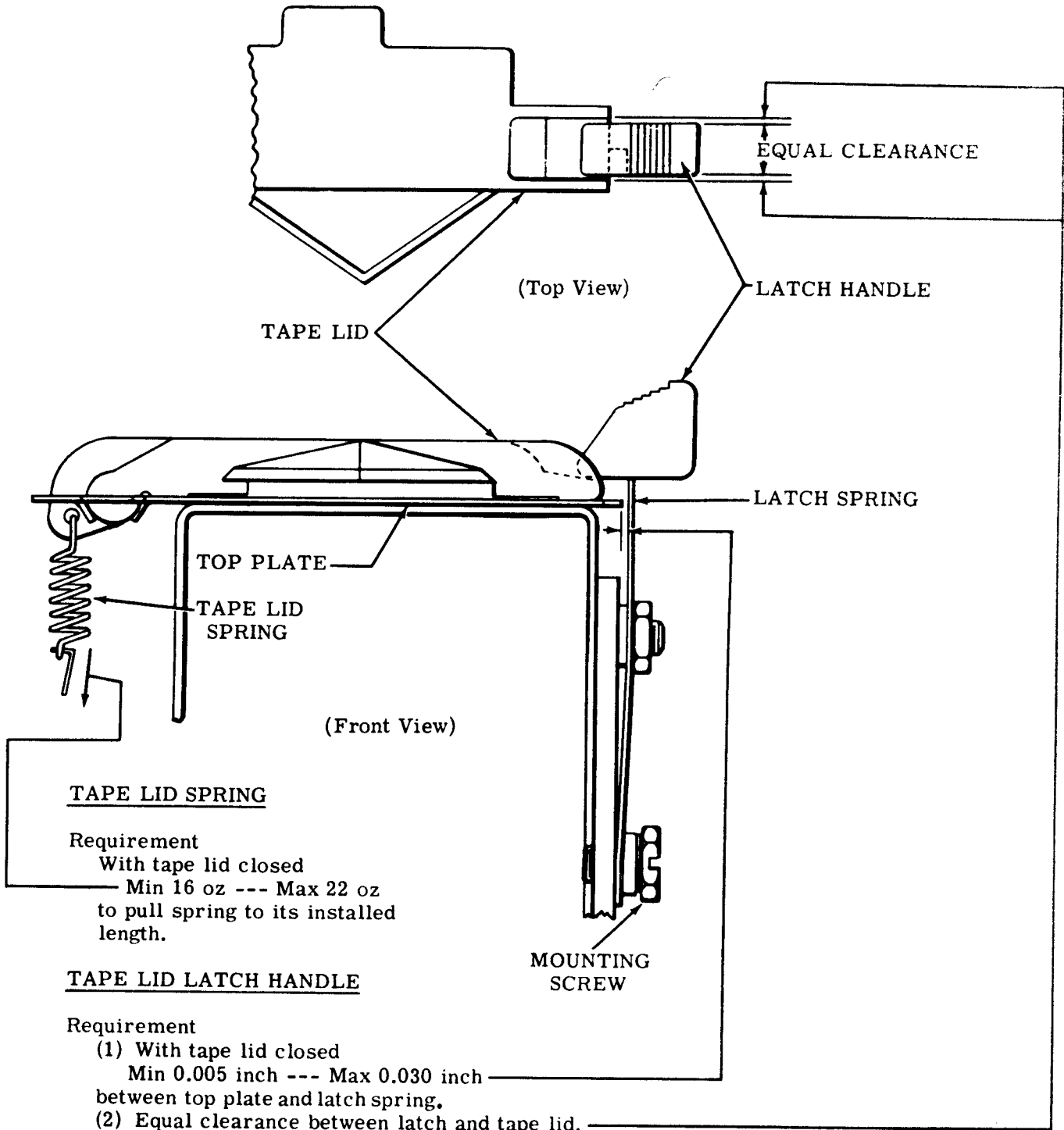
**To Adjust**

With the control lever in the FREE position, bend start contact wires between contact block and control lever cam surface with bending tool TP180993.



(Left Side View)

2.14 Tape Reader Area (continued)



To Adjust  
 With mounting screw friction tight, position  
 latch handle vertically. Tighten screw.



2.15 Tape Reader Area (continued)

TIGHT-TAPE LEVER SPRING

Requirement

With the tape lid closed  
 Min 1 oz --- Max 2-1/4 oz  
 to start tight-tape lever moving.

CONTROL DETENT SPRING

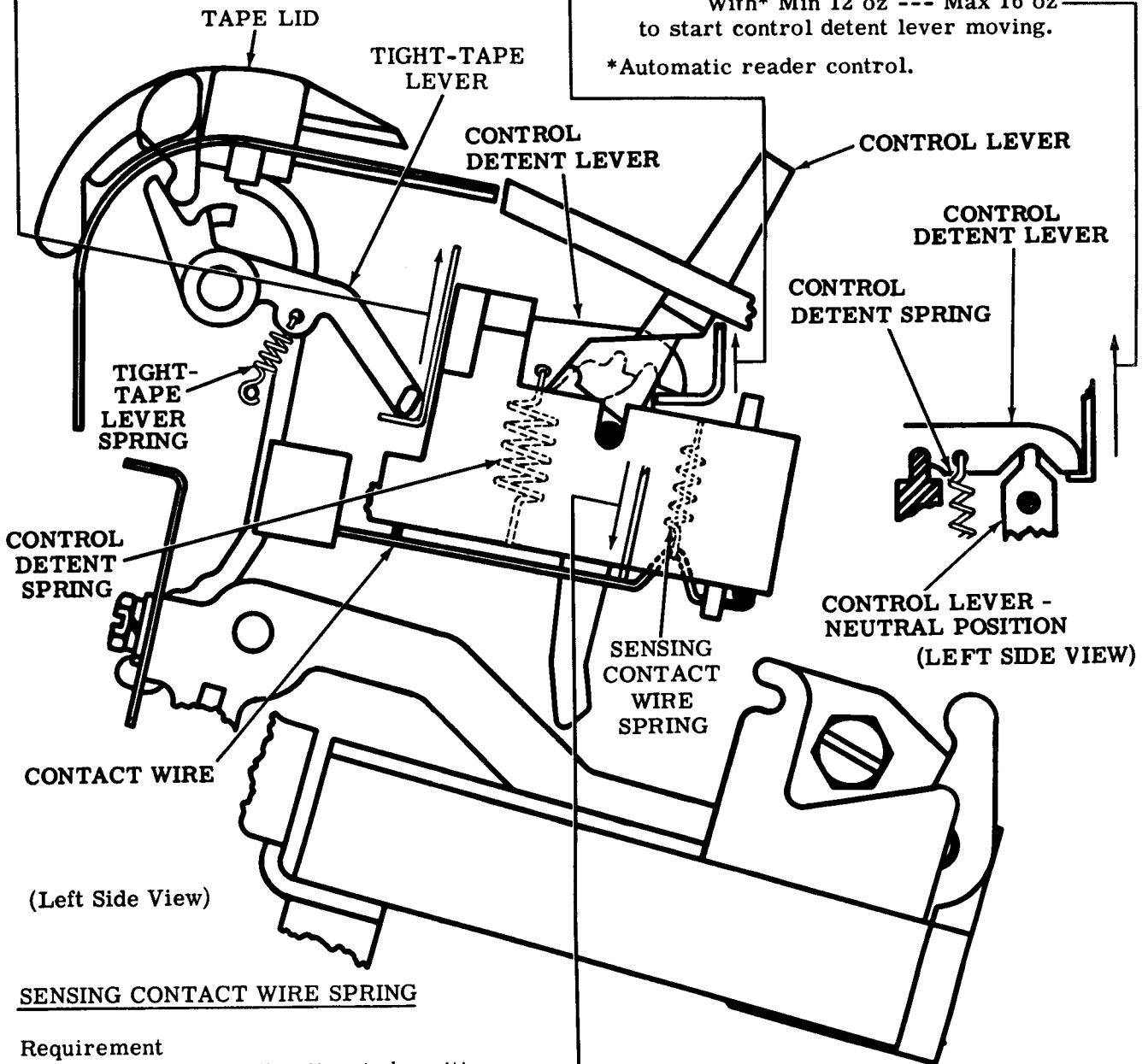
Requirement

Place control lever in STOP position,

Note: For tape readers with automatic reader control, place the control lever in the neutral position.

Without\* Min 5 oz --- Max 9 oz  
 With\* Min 12 oz --- Max 16 oz  
 to start control detent lever moving.

\*Automatic reader control.



CONTROL  
 DETENT  
 SPRING

CONTACT WIRE

(Left Side View)

SENSING CONTACT WIRE SPRING

Requirement

With armature in its attracted position  
 Min 3/4 oz --- Max 1-3/4 oz  
 to start contact wire moving.

2.16 Tape Reader Area (continued)

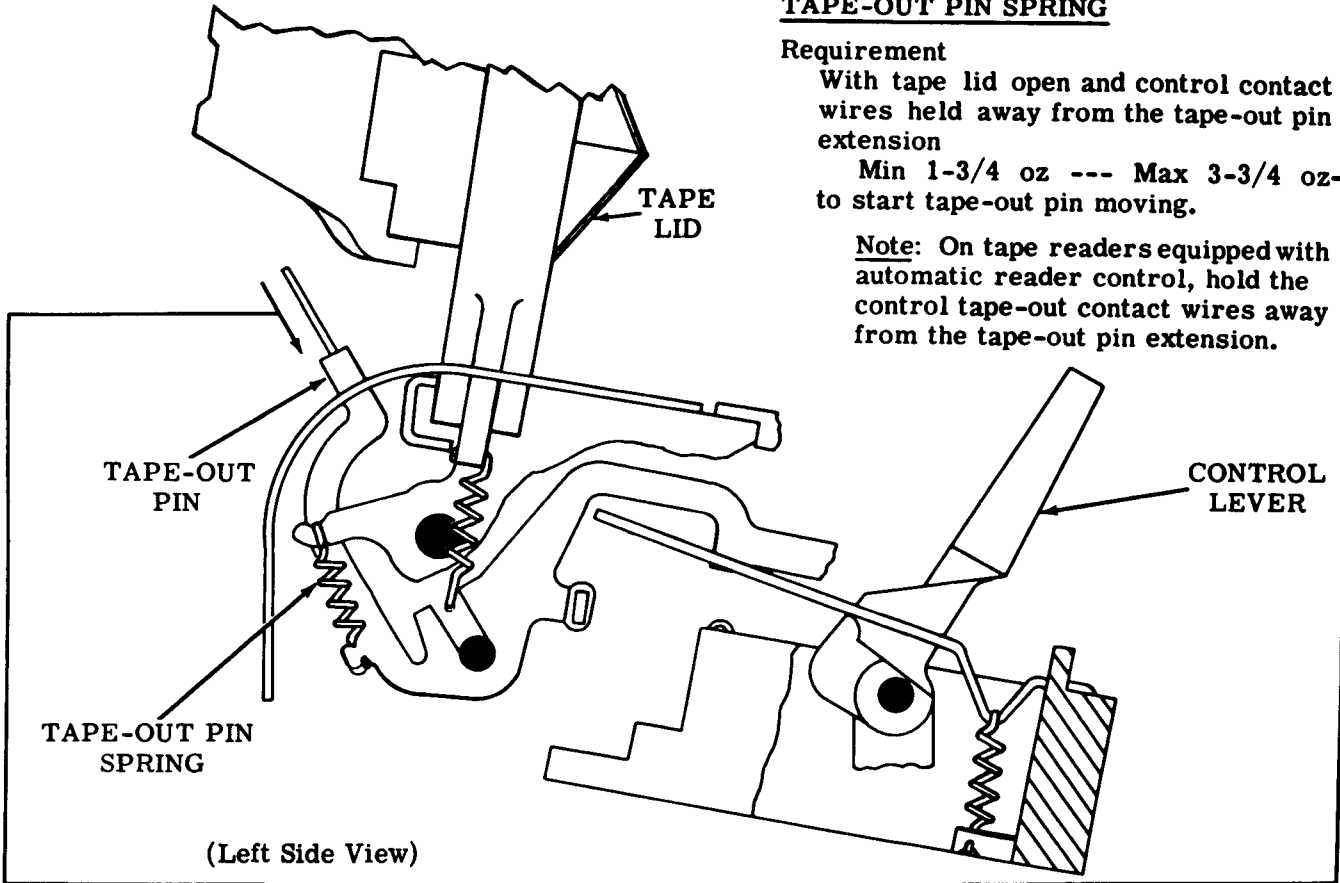
TAPE-OUT PIN SPRING

**Requirement**

With tape lid open and control contact wires held away from the tape-out pin extension

Min 1-3/4 oz --- Max 3-3/4 oz to start tape-out pin moving.

Note: On tape readers equipped with automatic reader control, hold the control tape-out contact wires away from the tape-out pin extension.

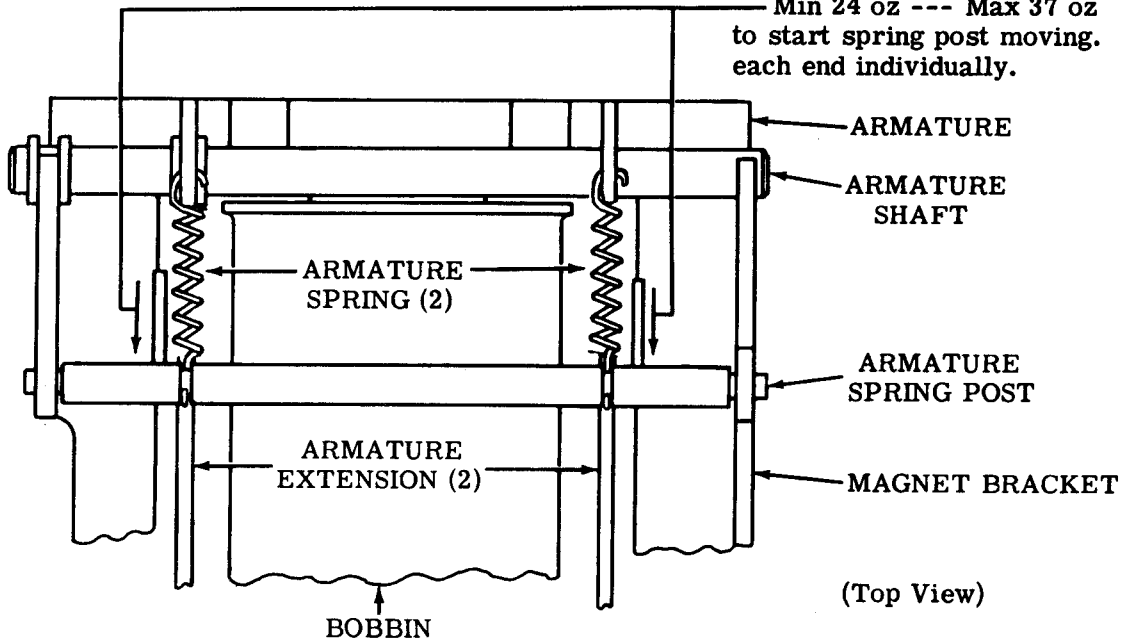


ARMATURE SPRING

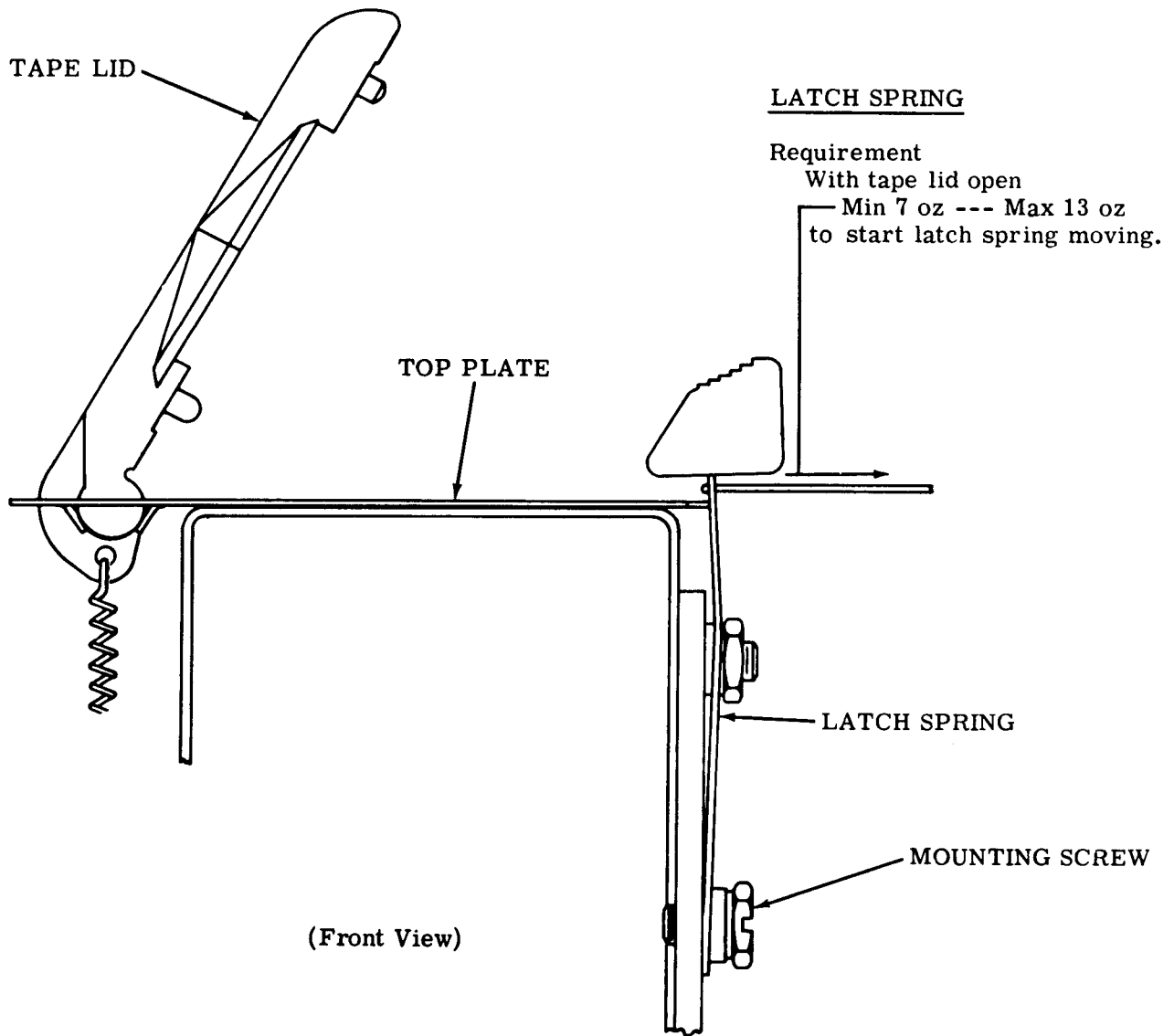
**Requirement**

With armature in its unattracted position

Min 24 oz --- Max 37 oz to start spring post moving. Measure each end individually.



2.17 Tape Reader Area (continued)



2.18 Tape Reader Area (continued)

Note: The following adjustment applies to tape readers with early design bases.

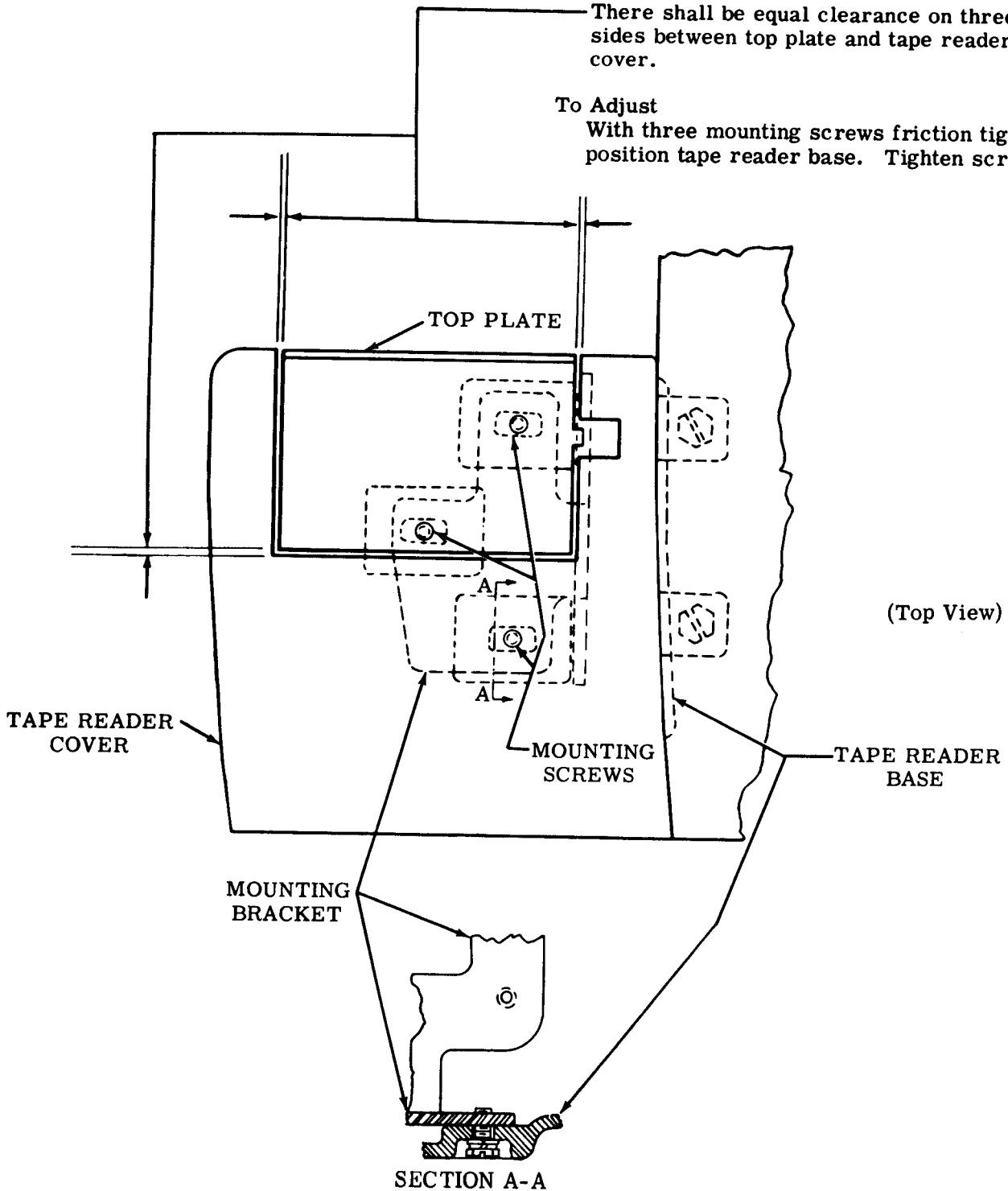
READER MOUNTING BRACKET (Early Design)

Requirement

There shall be equal clearance on three sides between top plate and tape reader cover.

To Adjust

With three mounting screws friction tight, position tape reader base. Tighten screws.



## 2.19 Tape Reader Area (continued)

Note: The following adjustment applies to tape readers with late design bases.

READER MOUNTING BRACKET (Late Design)

## (1) Requirement

Top plate to be  
Min Flush --- Max 0.030 inch  
below cover.

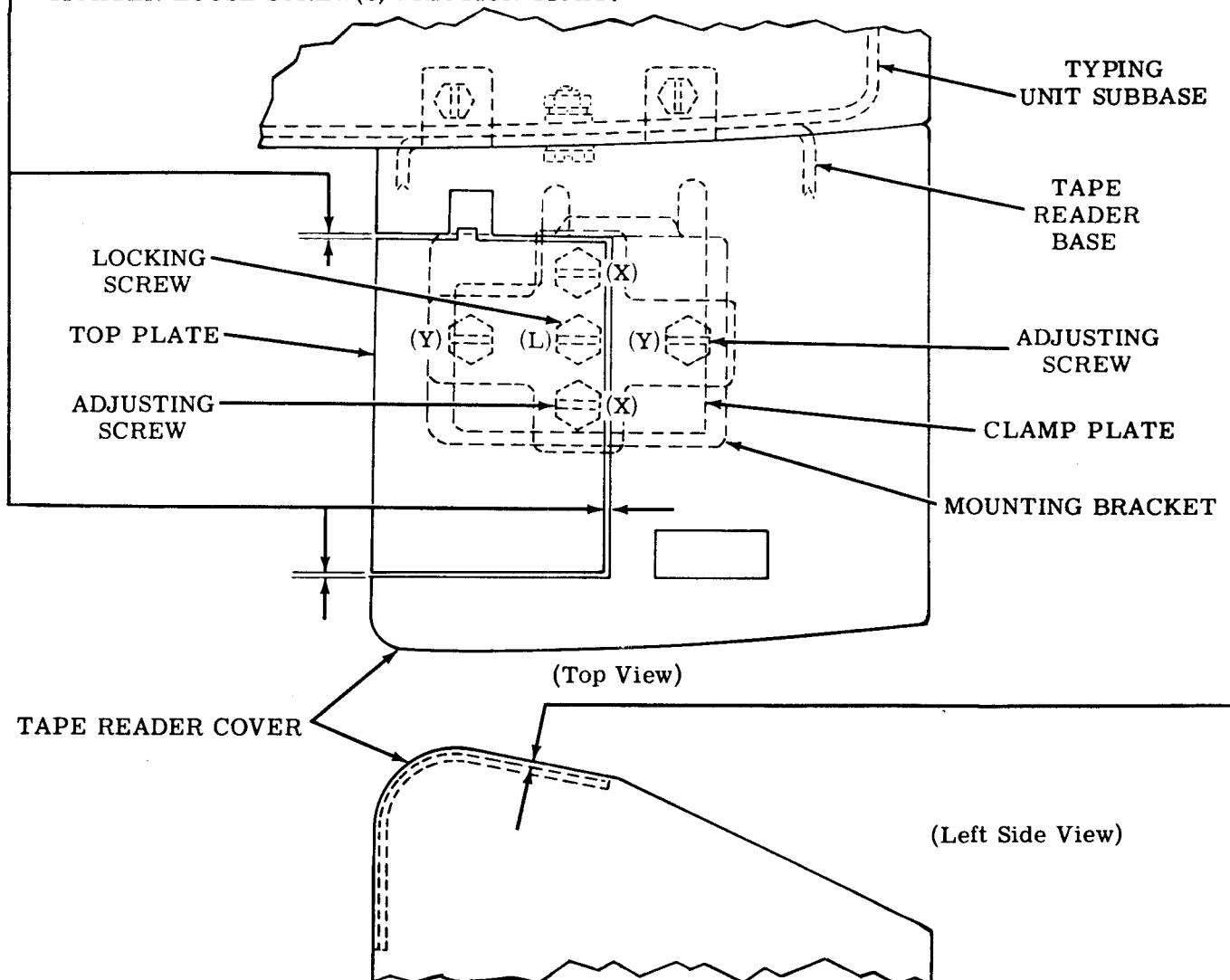
## (2) Requirement

Equal clearance between top plate and tape reader cover on three sides.

To Adjust

With four adjusting screws and locking screw (L) loosened and mounting bracket lying flat on tape reader base, position tape reader. Run two adjusting screws (X) up until requirement is approximately met. Tighten locking screw friction tight. Run two adjusting screws (Y) up until requirement is approximately met. Refine all four adjusting screws. Tighten locking screw (L).

**CAUTION:** (1) TO PREVENT STRIPPING OF THREADS IN READER BASE WHEN ADJUSTING OR REFINING (X) OR (Y) SCREWS, BACK OFF SLIGHTLY ON CENTER LOCKING SCREW WHEN RESISTANCE IS FELT. (2) AFTER COMPLETING THE ADJUSTMENT PROCEDURE, CHECK THAT ALL FOUR ADJUSTING SCREWS ARE AT LEAST FRICTION TIGHT. IF NOT, TIGHTEN LOOSE SCREW(S) FRICTION TIGHT.



3. VARIATIONS TO THE BASIC UNIT

3.01 Tape Reader Area

Note: The following adjustment applies to readers equipped with timing contacts.

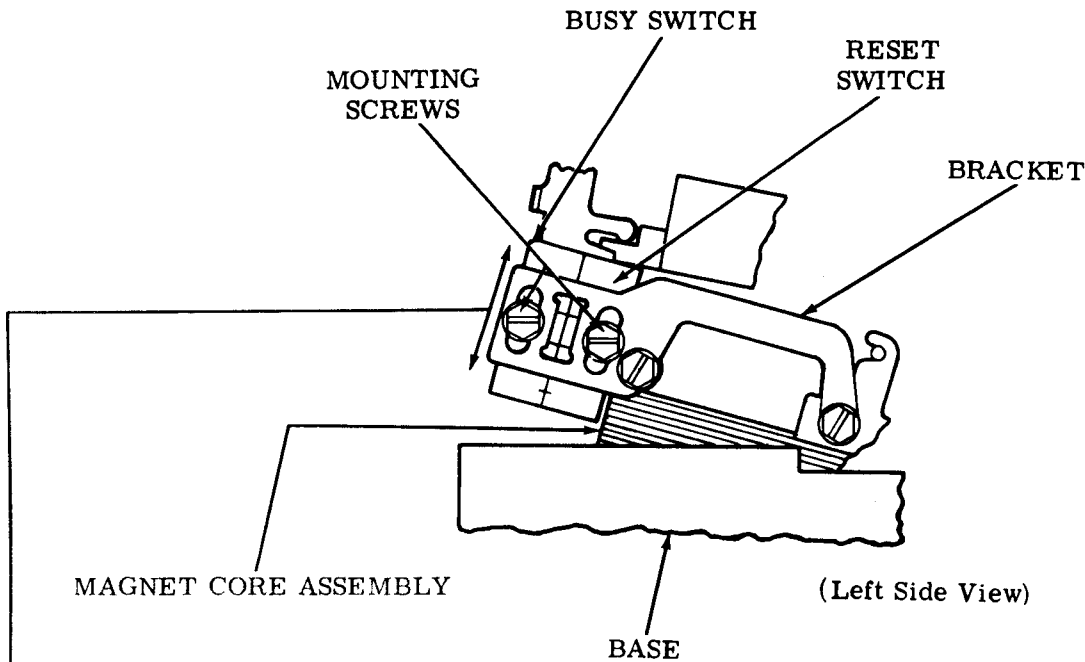
RESET AND BUSY SWITCH TIMING

(1) Requirement (Preliminary)

The busy and reset switches should be centered in their bracket slots.

(2) Requirement (Final)

With the sensing pins fully down, the reset switch should be closed and the busy switch should be open. With the sensing pins fully up (energized position), the reset switch should be open and the busy switch should be closed.



To Adjust

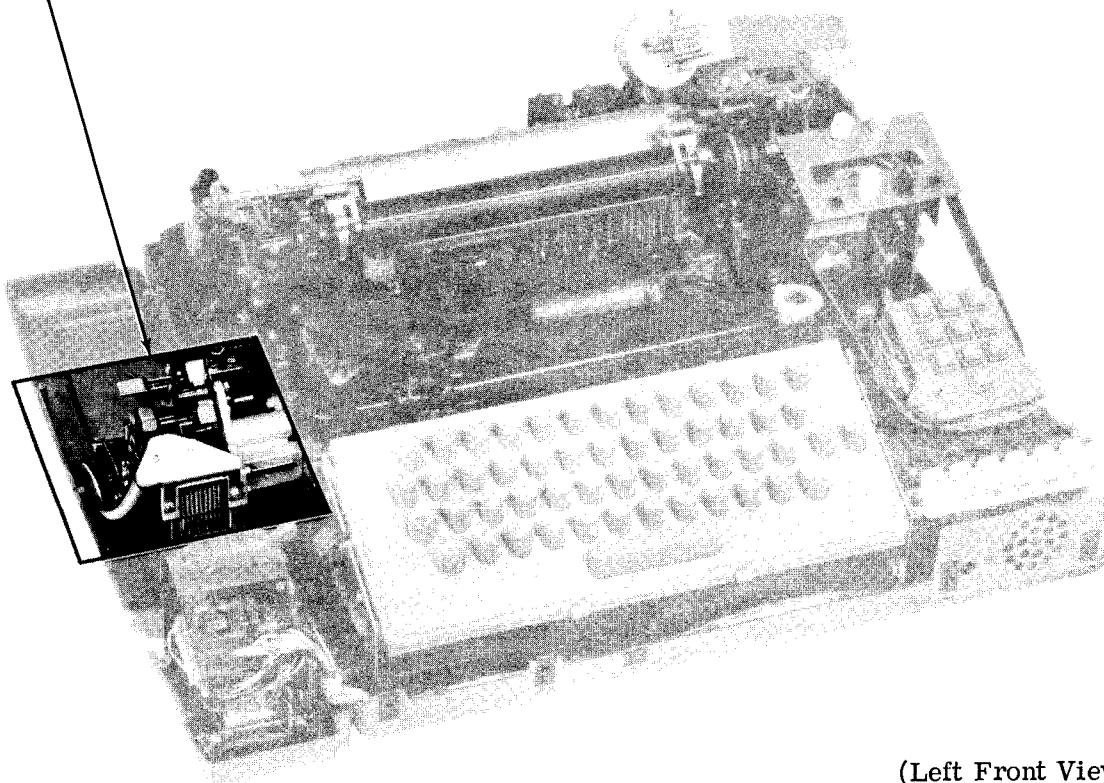
With switch mounting screws friction tight, position switches up or down. Tighten screws.

33 TAPE PUNCH

ADJUSTMENTS

CONTENTS	PAGE	CONTENTS	PAGE
1. GENERAL . . . . .	1	Lever overtravel . . . . .	21
		LOCK ON . . . . .	25
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		Miscellaneous	
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Drive link spring . . . . .	19		
Feed pawl spring . . . . .	16		
Feed wheel ratchet and pawl — final .	11	1. GENERAL	
Feed wheel ratchet and pawl — preliminary . . . . .	6	1.01 This section provides adjustment and maintenance information for the 33 tape punch. It is reissued to include engineering changes. Marginal arrows indicate the changes. ←	
Pawl and lever springs . . . . .	15		
Pawl upstop assembly — final . . . . .	10	1.02 Figure 1 shows the tape punch area where the punch adjustments and spring tension checks are made.	
Pawl upstop assembly — preliminary . . . . .	5		
Punch block assembly . . . . .	19	1.03 In the adjustments covered in this section, location of clearances, position of parts, and point and angle of scale applications are illustrated by line drawings. Requirements and procedures are set forth in several texts that accompany the line drawings. Required tools are included in TP185830 Maintenance Tool Kit and are listed in Section 570-005-800TC.	
Punch penetration . . . . .	9		
Sensing lever springs . . . . .	14	1.04 The sequence in which the adjustments appear should be followed when a complete readjustment of the tape punch is undertaken. No adjustment should be undertaken without completely understanding the procedure and the requirements. Read a procedure all the way through before making an adjustment or checking a spring tension.	
Stripper bail spring . . . . .	15		
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Automatic Control Mechanisms			
Automatic ON . . . . .	26		
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Control bail assembly . . . . .	20		
Control bail assembly spring . . . . .	25		
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Latch bail gap . . . . .	24		
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TAPE PUNCH AREA



(Left Front View)

Figure 1 - Tape Punch Area

Note: Remove all electrical power sources from unit before checking or performing any adjustments.

1.05 References to left, right, front, or rear, etc consider the tape punch to be viewed from a position where the tape guide assembly faces up and the backspace lever is located to the viewer's left.

1.06 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.

1.07 If the tape punch is removed from the typing unit to facilitate making an adjustment and then replaced, recheck any adjustment that may have been affected. Also, if parts are removed from the tape punch to facilitate making an adjustment, be sure that they are replaced. Recheck any adjustment that may have been affected by the removal of the parts.

1.08 The spring tensions specified in this section are indications, not exact values. Therefore, to obtain reliable readings, it is important that spring tensions be measured by spring scales placed in the positions shown on pertinent line drawings. Springs that do not



meet their requirements should be replaced by new ones. Only springs that directly affect the operation of the tape punch are measured, however, others may be measured indirectly in the process. If this is the case and the requirement is not met, replace the springs one at a time, starting with the indicated spring, until the requirement is satisfied.

Note 1: Use spring scales which are listed in the Maintenance Tools Section 570-005-800TC.

Note 2: Spring tensions may be checked in any sequence.

1.09 Certain adjustments require that the tape punch be either "on" or "off." These conditions can be identified as follows:

(a) "Off" condition

(1) Manual (Punch) Controls: A tape punch is "off" when the control lever is in its clockwise detented position and fully engages the drive post.

(2) Automatic (Punch) Controls: An "automatic" tape punch is "off" when the associated typing unit is in the stop condition and the On-Off bail assembly is latched by the latch bail.

Note 1: If the automatic punch is equipped with the "On Lock" option, the "unlock" button must be depressed to enable the On-Off bail assembly to be latched.

Note 2: If the automatic punch is equipped with the interlock mechanism, the nonprint codebar must be in its unoperated position — solenoid not energized.

(b) "On" condition

(1) Manual (Punch) Controls: A tape punch is "on" when the control lever is detented in its counterclockwise posi-

tion and the drive post is fully engaged by the drive link.

(2) Automatic (Punch) Controls: An automatic tape punch is "on" when the On-Off bail assembly is in its unlatched counterclockwise position.

1.10 With the tape punch and typing unit assembled together, all adjusting procedures should be started with the typing unit in the stop condition. It is in the stop condition when the selector armature is in its attracted (frontward) position and all clutches are disengaged.

Note: When the typing unit is in the stop condition and the punch is "on," the tape punch is said to be in the off position.

1.11 To place the typing unit in the stop condition, hold the selector armature in its attracted (frontward) position. Rotate the main shaft clockwise (as viewed from the left) until all clutches are fully disengaged as instructed in 1.12.

1.12 When disengaged, a clutch is latched so that a shoe lever is held in its stop position by a trip lever while a corresponding latchlever is seated in a notch of the clutch disc. This allows the clutch shoes to release their tension on the clutch drum. With all clutches disengaged, the main shaft will turn freely without any clutch shoes dragging.

Note 1: The clutch stop position is that position where a shoe lever contacts a trip lever.

Note 2: If the shaft is turned by hand, a clutch will not fully disengage upon reaching a stop position. To fully disengage a clutch, rotate the clutch to a stop position, apply a screwdriver to the associated stop-lug, and push the clutch disc in the normal direction of main shaft rotation until the corresponding latchlever seats in its clutch disc notch.

Note 3: The distributor clutch will not disengage unless the answer-back drum is in its home position, which is the position where the control lever is fully detented into the indent on the answer-back drum.

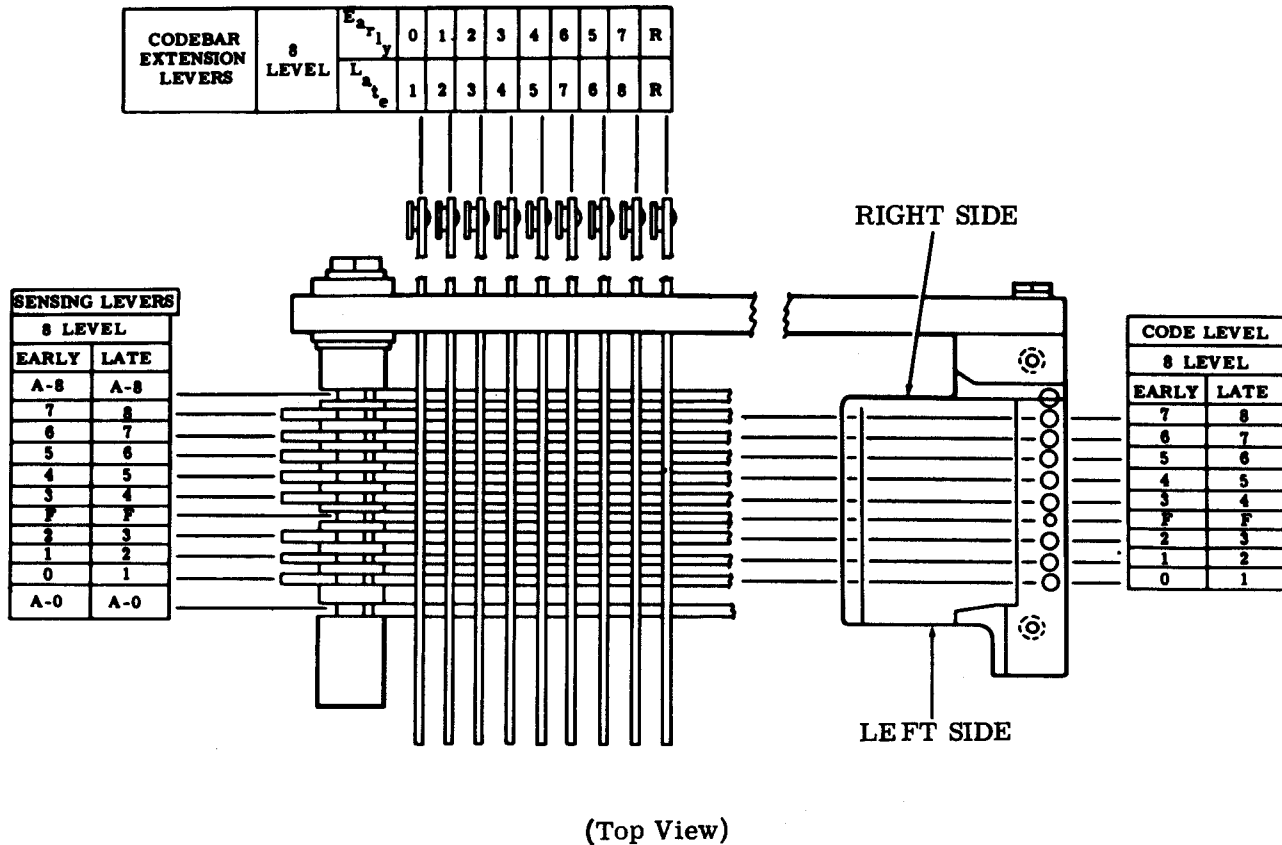


Figure 2 - Tape Punch Code Level Cross Reference Chart

1.13 Manual Operation: To manually operate the typing unit, place it in the stop condition as instructed in 1.11. Momentarily permit the armature to move to its unattracted (rearward) position to trip the selector clutch. Slowly rotate the main shaft clockwise (as viewed from the left) until all push levers have moved under their respective selector levers. Using a spring hook, strip the push levers from under the selector levers corresponding to the spacing elements of the code combination to be set up. Then continue to rotate the main shaft until the proper condition is set up or the character is cleared through the typing unit.

1.14 The selector levers are numbered 1, 2, 3, 4, 5, 7, 6, and 8 from left to right. To set up the character Y, for example, whose code combination is 1--45-78, strip the push levers from the 2, 3, and 6, selector levers.

1.15 The relationship between code levels, sensing levers, and codebar extensions is illustrated in Figure 2.

1.16 The following procedure may be used to determine the positions of the function bail on typing units having indicator marks on the function cam and carriage drive link:

(a) The function rocker shaft is in its rear-most position when the mark on the carriage drive link is centrally located within the first notch on the function cam and the hole in the cam is down.

(b) The function shaft is in its foremost position when the mark on the carriage drive link is centrally located within the third notch on the function cam and the hole in the cam is up.

## 2. BASIC UNIT

### 2.01 Tape Punch Area

**Note 1:** These adjustments are to be made only if these areas have been disturbed during disassembly.

**Note 2:** Prior to making adjustments, remove the chad extension. Reassemble when the adjustments are completed.

#### PAWL UPSTOP ASSEMBLY — PRELIMINARY

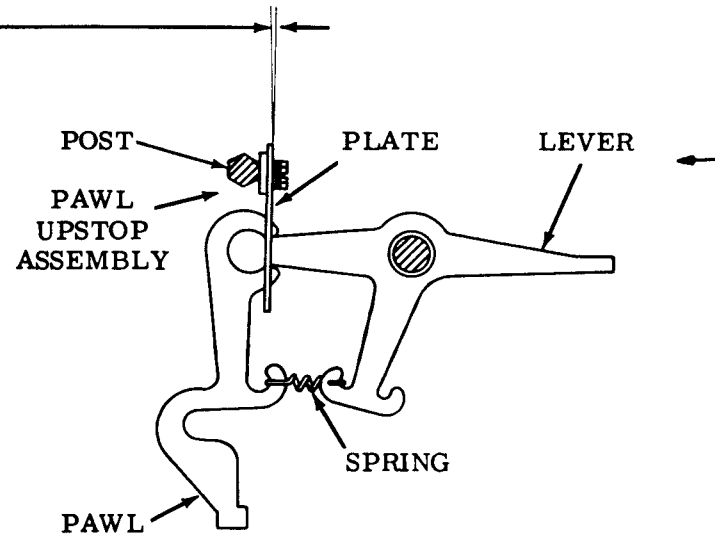
##### Requirement

The pawl upstop assembly should be positioned so that it is vertical or within 2 degrees clockwise from vertical, as gauged by eye.

##### To Adjust

Loosen the screw which secures the pawl upstop assembly post to the tape punch casting and position pawl upstop assembly. Tighten screw.

(Left Side View)



#### TAPE NUDGER

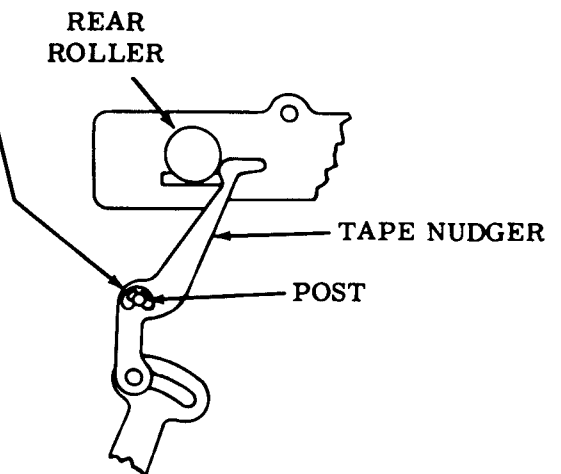
**Note 3:** This adjustment applies only to tape punch castings which have an elongated tape nudger post mounting hole.

##### Requirement

The post should be in its most rearward position.

##### To Adjust

Loosen the screw which secures the post to the tape punch casting and position the post. Tighten screw.



(Left Side View)

2.02 Tape Punch Area (continued)

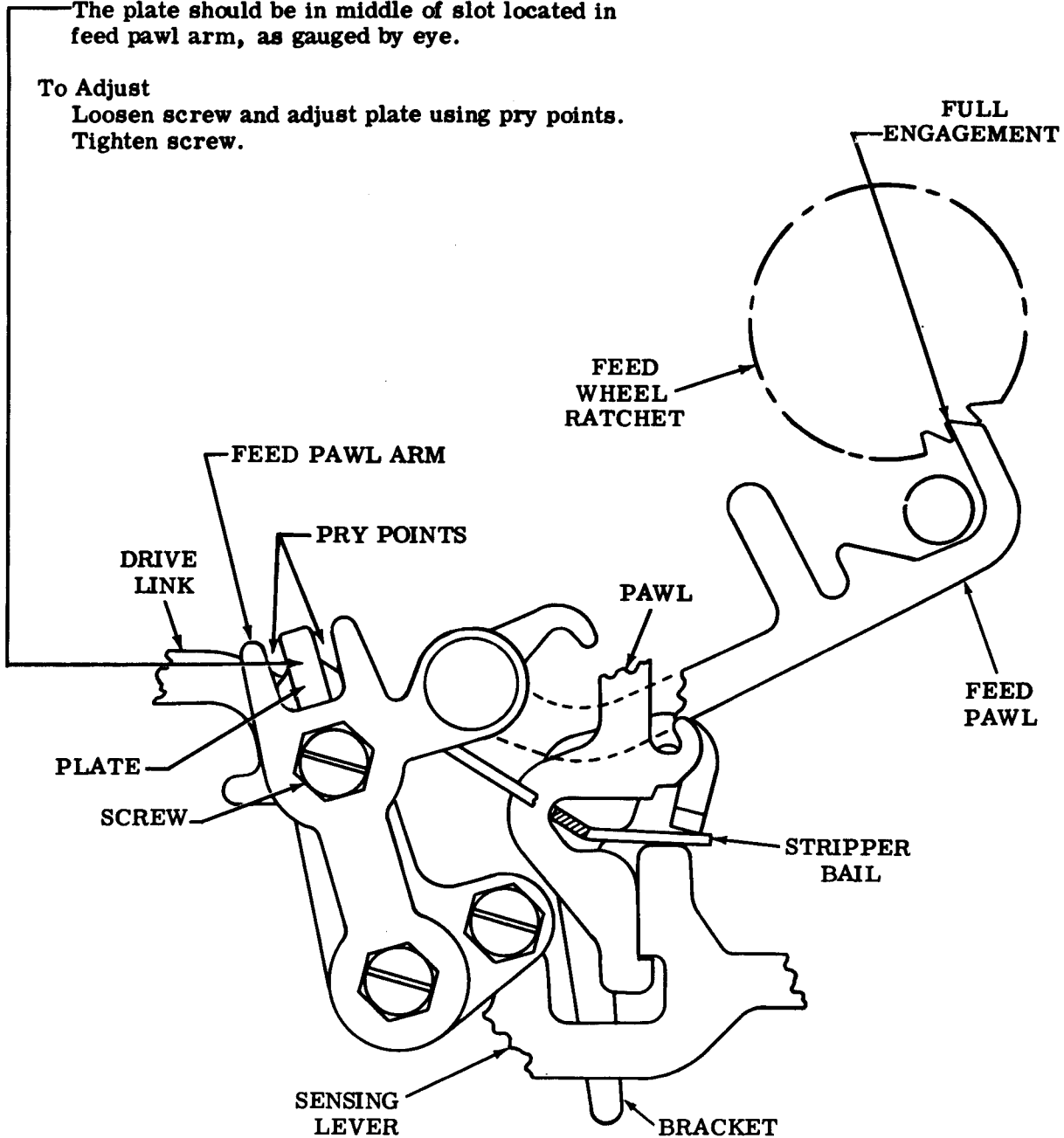
**FEED WHEEL RATCHET AND PAWL — PRELIMINARY**

**Requirement**

The plate should be in middle of slot located in feed pawl arm, as gauged by eye.

**To Adjust**

Loosen screw and adjust plate using pry points. Tighten screw.



(Left Side View)

2.03 Tape Punch Area (continued)

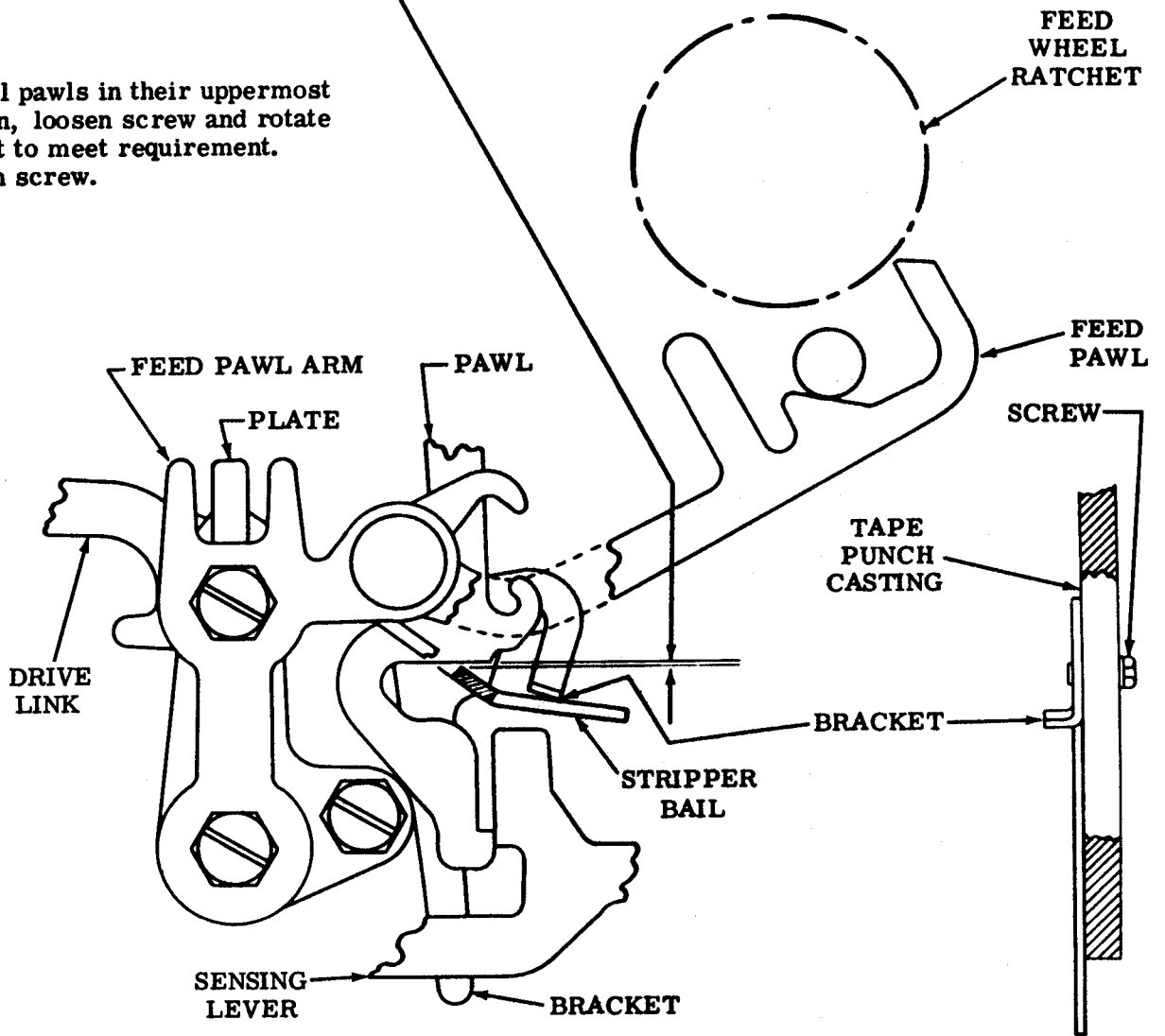
**STRIPPER BAIL UPSTOP**

**Requirement**

With the tape punch "off" and all pawls in their uppermost position, the stripper bail should clear bottom corner of the stripping surface of lowermost pawl by  
Min some---Max 0.012 inch

**To Adjust**

With all pawls in their uppermost position, loosen screw and rotate bracket to meet requirement.  
Tighten screw.



(Left Side View)

(Front View)

2.04 Tape Punch Area (continued)

Note 1: For the adjustments which follow, the tape punch should be mounted to the typing unit. For instructions, see section titled "33 Tape Punch, Disassembly and Reassembly."

Note 2: The following Tape Punch Area adjustments must be made in sequence: TAPE PUNCH DRIVE, PUNCH PENETRATION, PAWL UPSTOP ASSEMBLY — FINAL, and FEED WHEEL RATCHET AND PAWL — FINAL. Prior to making the above adjustments, check or make the following Tape Punch Area adjustments: PAWL UPSTOP ASSEMBLY — PRELIMINARY, TAPE NUDGER, FEED WHEEL RATCHET AND PAWL — PRELIMINARY, and STRIPPER BAIL UPSTOP.

TAPE PUNCH DRIVE

To Check

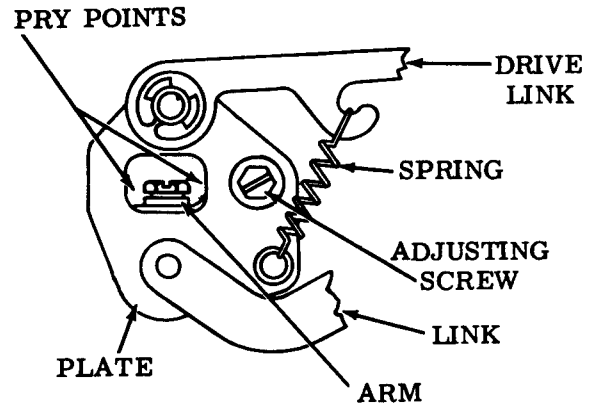
With no tape in the tape punch and with the tape punch "on," manually rotate the main shaft until the stripper bail is in its most forward position. Take up rear roller play toward rear and tape nudger play in a clockwise direction.

Requirement

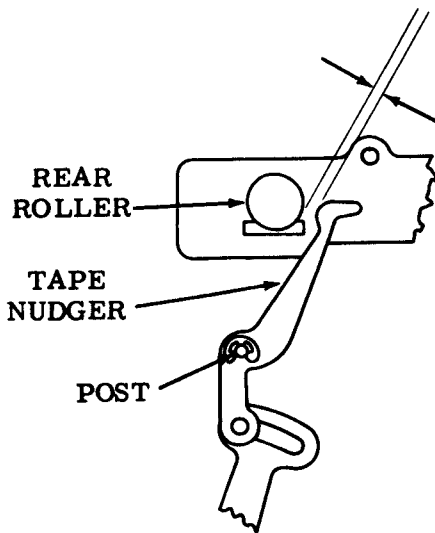
Min 0.030 inch---Max 0.080 inch  
at point of least clearance between rear roller and tape nudger.

To Adjust

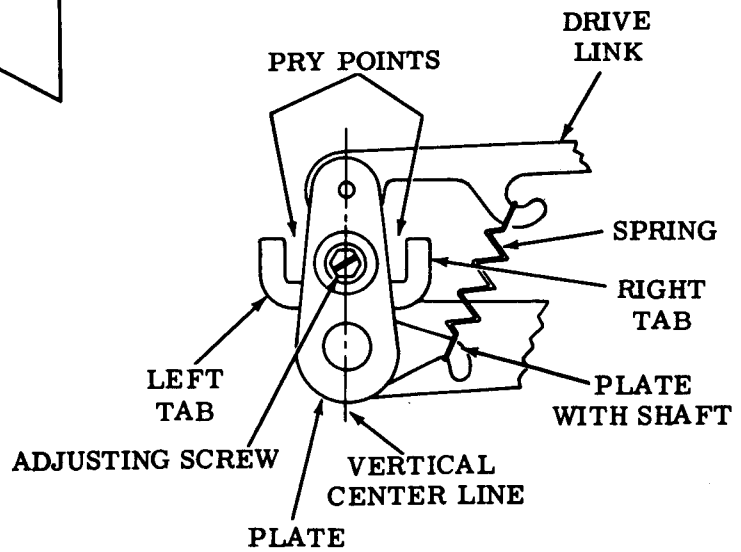
Loosen adjusting screw and use pry points to position plate. Tighten screw.



EARLY DESIGN  
(Left Side View)



EARLY OR  
LATE DESIGN  
(Left Side View)



LATE DESIGN  
(Left Side View)

2.05 Tape Punch Area (continued)

PUNCH PENETRATION

To Check

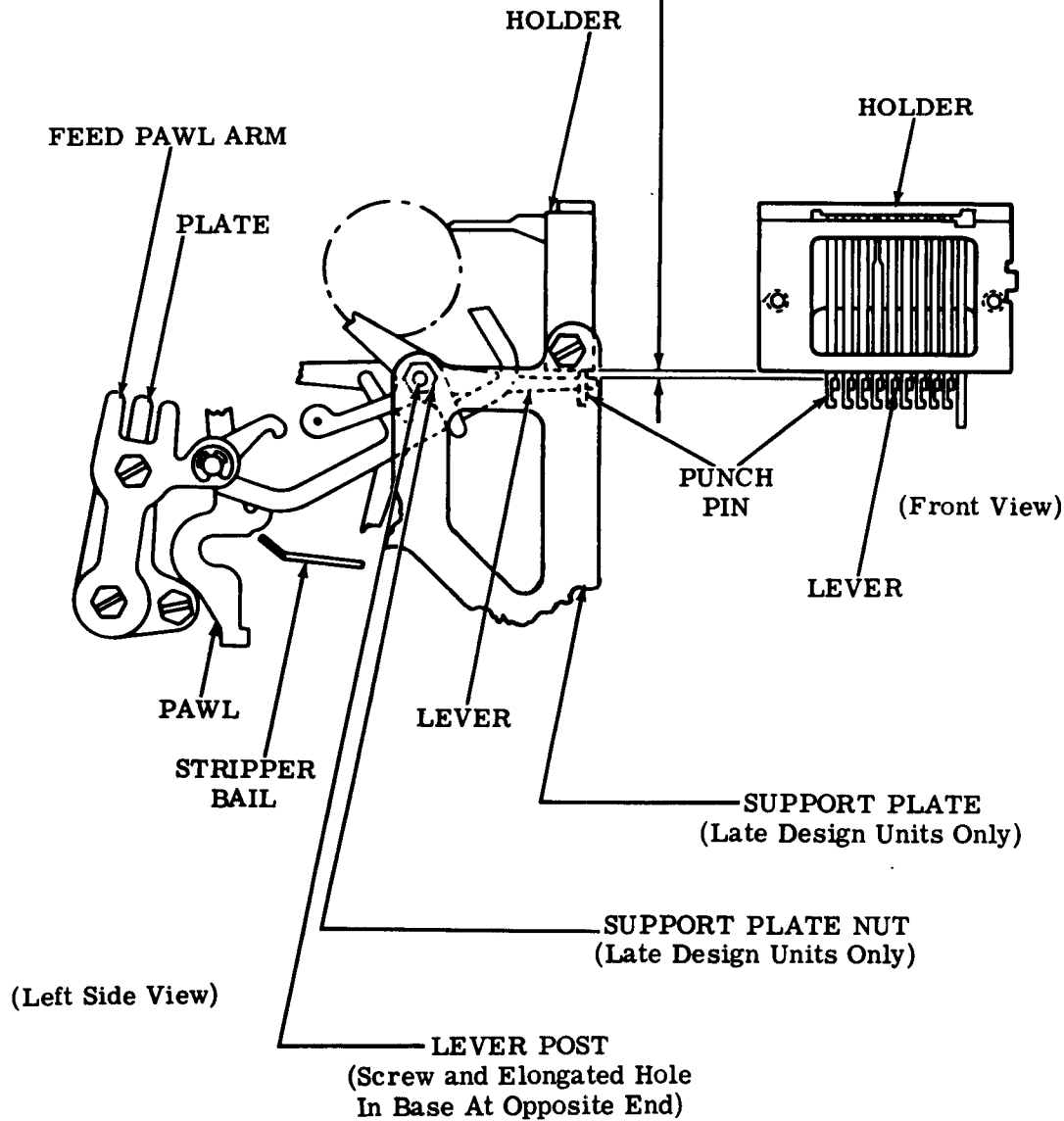
With the tape punch "on," set up an all-marking code combination in the selector. Manually rotate the main shaft until the stripper bail is in its most forward position.

Requirement

Min 0.017 inch---Max 0.037 inch  
between bottom surface of holder and  
top surface of any lever.

To Adjust

With code lever post mounting screw  
(and support plate nut on late design  
units) friction tight, position post  
within the elongated base hole (and  
support plate hole — late design units).  
Tighten screw and nut.



## 2.06 Tape Punch Area (continued)

PAWL UPSTOP ASSEMBLY — FINAL

## To Check

With the tape punch "on," set up an all-marking code combination in the selector. Manually rotate the main shaft until the stripper bail is in its rearmost position.

Note 1: For tape punches equipped with the answer-back blocking option or automatic controls, use the following "To Check" procedure:

## To Check

With the tape punch "on," set up the code combination in the selector that will cause the special feature to operate. Manually rotate the main shaft until the stripper bail is in its rearmost position. Check requirement (1). Then, set up an all-marking code combination in selector. Manually rotate the main shaft until the stripper bail is in its rearmost position. Check requirement (2).

## (1) Requirement

Min 0.005 inch---Max 0.020 inch  
between the leftmost sensing lever  
(Figure 2) and its associated pawl.

Note 2: For tape punches equipped with automatic controls, the requirement will be checked between the second from the left sensing lever (Figure 2) and its associated pawl.

Note 3: There should also be some clearance between the rightmost sensing lever (Figure 2) and its associated pawl.

Note 4: "Some clearance" can be determined by feeling movement when pressing down on a sensing lever while holding its assembled lever in its most downward position.

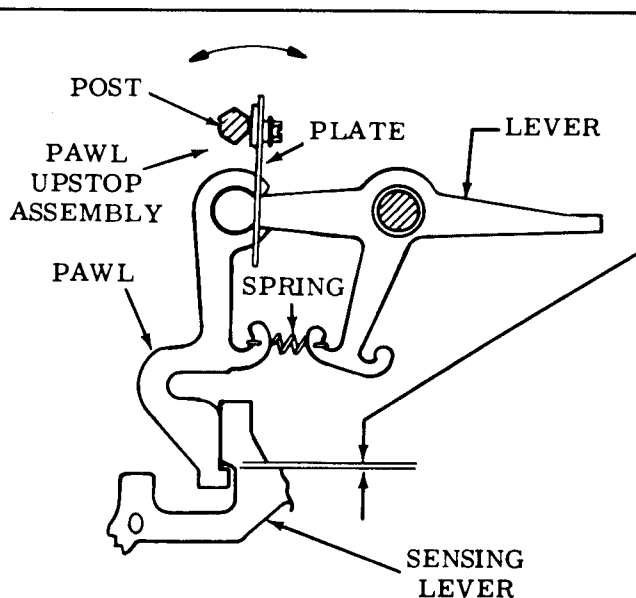
## (2) Requirement

Some clearance between the feed lever and its associated pawl and each sensing lever and its associated pawl.

## To Adjust

Loosen the screw which secures the pawl upstop assembly post to the tape punch casting. Provide proper clearance by rotating the pawl upstop assembly. Tighten screw. Recheck requirement (1) above and refine if necessary. Remake STRIPPER BAIL UPSTOP (Tape Punch Area) adjustment.

**CAUTION:** EXERCISE CARE AND SEE THAT THE PLATE OF THE PAWL UPSTOP ASSEMBLY ALWAYS GUIDES THE PAWL AND LEVER SIMULTANEOUSLY. AVOID ROTATING PLATE IN A COUNTERCLOCKWISE DIRECTION FROM ITS VERTICAL POSITION IF POSSIBLE.



(Left Side View)



2.07 Tape Punch Area (continued)

FEED WHEEL RATCHET AND PAWL – FINAL

Note 1: Prior to checking the adjustment, the PLATE in the illustration should be located in the center of the slot, as gauged by eye.

To Check

With no tape in the tape punch and with the tape punch "on," set up an all-marking code combination in the selector. Manually rotate the main shaft until the stripper bail is in its rearmost position. Take up all play in stripper bail toward the front.

Requirement

With feed wheel ratchet in its fully detented position

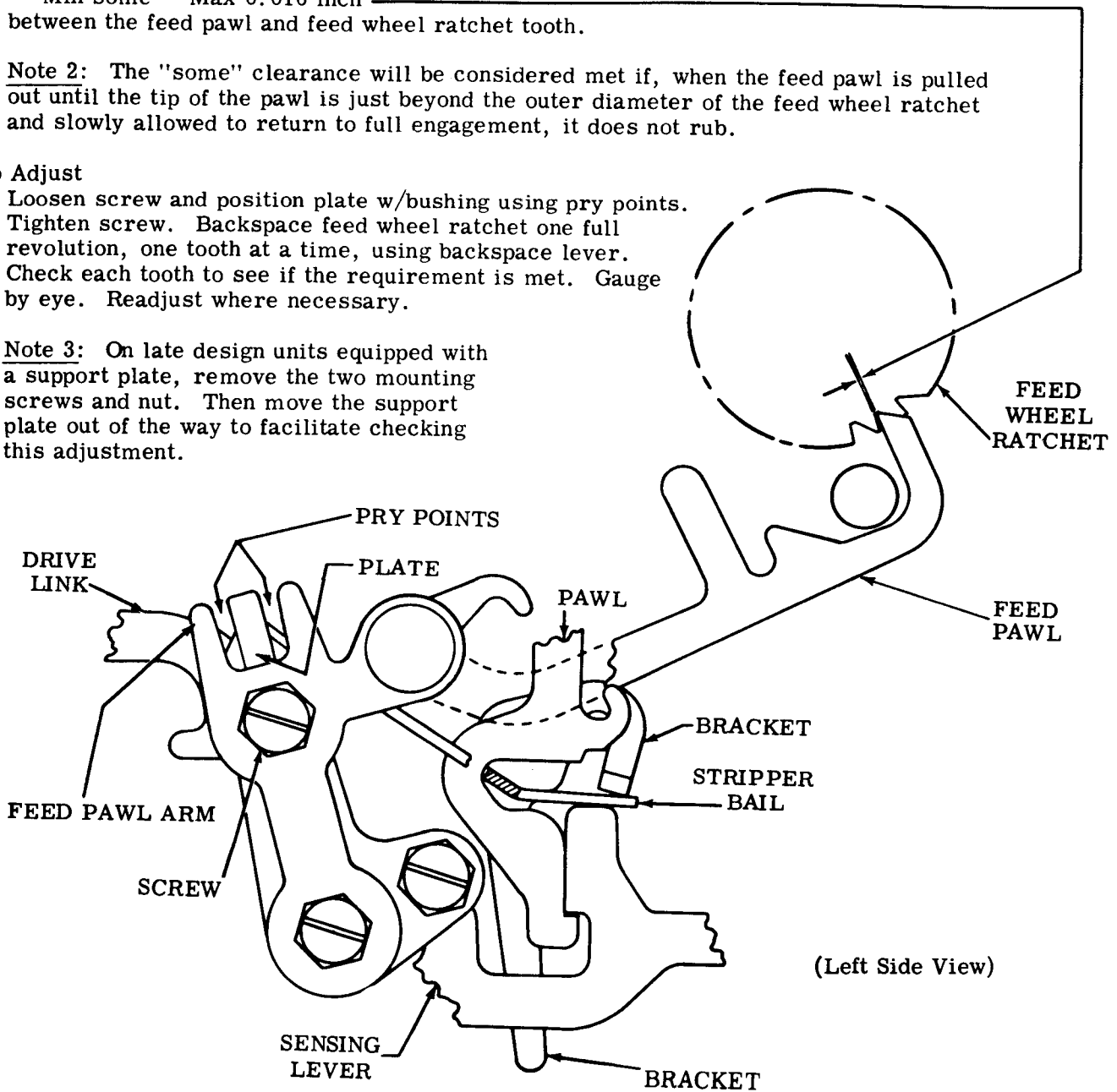
Min some---Max 0.010 inch between the feed pawl and feed wheel ratchet tooth.

Note 2: The "some" clearance will be considered met if, when the feed pawl is pulled out until the tip of the pawl is just beyond the outer diameter of the feed wheel ratchet and slowly allowed to return to full engagement, it does not rub.

To Adjust

Loosen screw and position plate w/bushing using pry points. Tighten screw. Backspace feed wheel ratchet one full revolution, one tooth at a time, using backspace lever. Check each tooth to see if the requirement is met. Gauge by eye. Readjust where necessary.

Note 3: On late design units equipped with a support plate, remove the two mounting screws and nut. Then move the support plate out of the way to facilitate checking this adjustment.



2.08 Tape Punch Area (continued)

TEN CHARACTERS PER INCH

Note: From left to right, with the smooth side of TP156011 gauge up, there are six holes in line — five holes with 0.072-inch diameters and one hole with a 0.086-inch diameter.

To Check

Position one end of spring to lower notch of arm w/bushing. Operate the typing unit under power and perforate an alternate R and "hyphen" code combination in approximately 8 inches of tape. Tear the 8-inch length of punched tape from the tape punch and place it to the smooth side of TP156011 gauge. Concentrically align a no. 2 code hole of the punched tape with the first 0.072-inch diameter hole of TP156011 gauge.

(1) Requirement

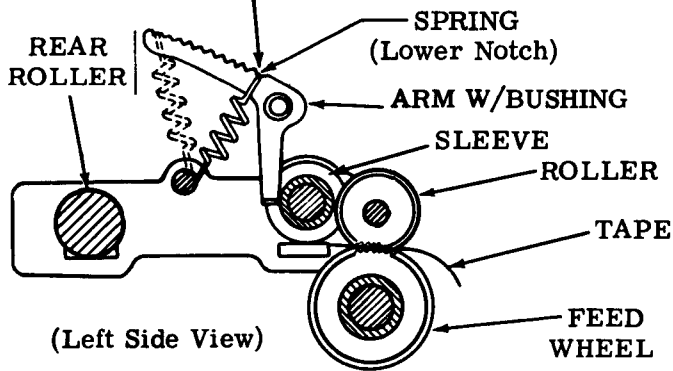
The four remaining 0.072-inch diameter gauge holes should be visible through corresponding no. 2 code holes in the punched tape.

(2) Requirement

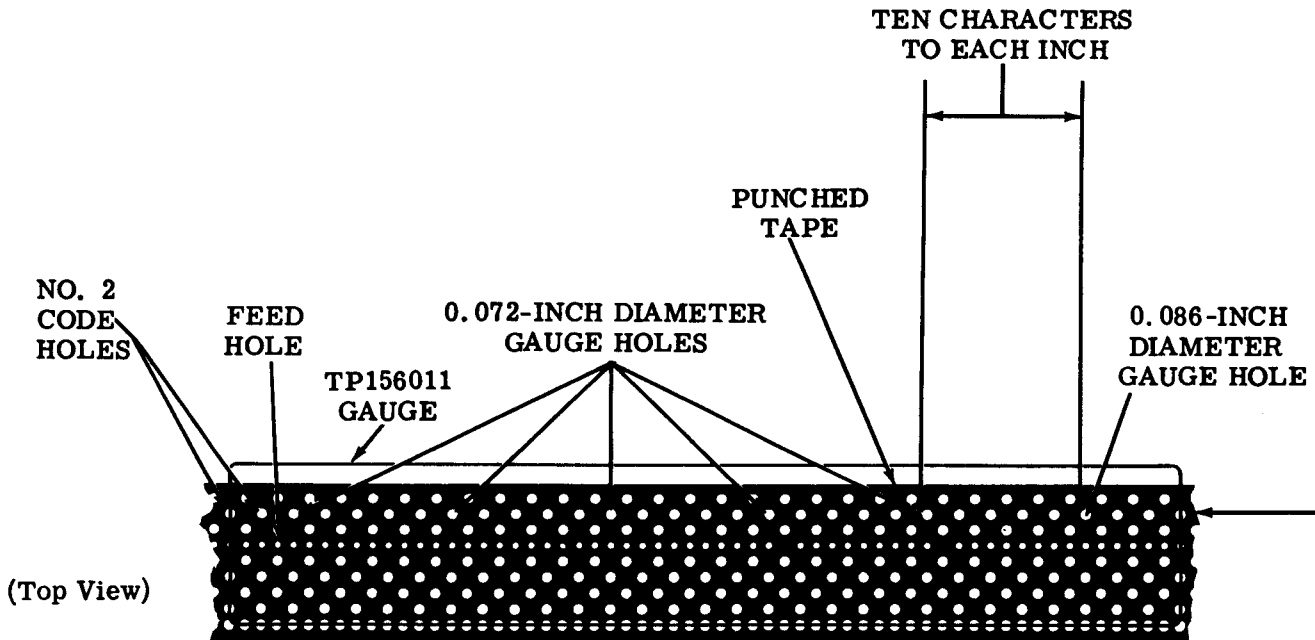
The no. 2 code hole which corresponds with the 0.086-inch diameter gauge hole should lie entirely within the perimeter of that gauge hole.

To Adjust

Position spring up arm w/bushing, notch by notch, until requirement is met.



(Left Side View)



(Top View)

2.09 Tape Punch Area (continued)

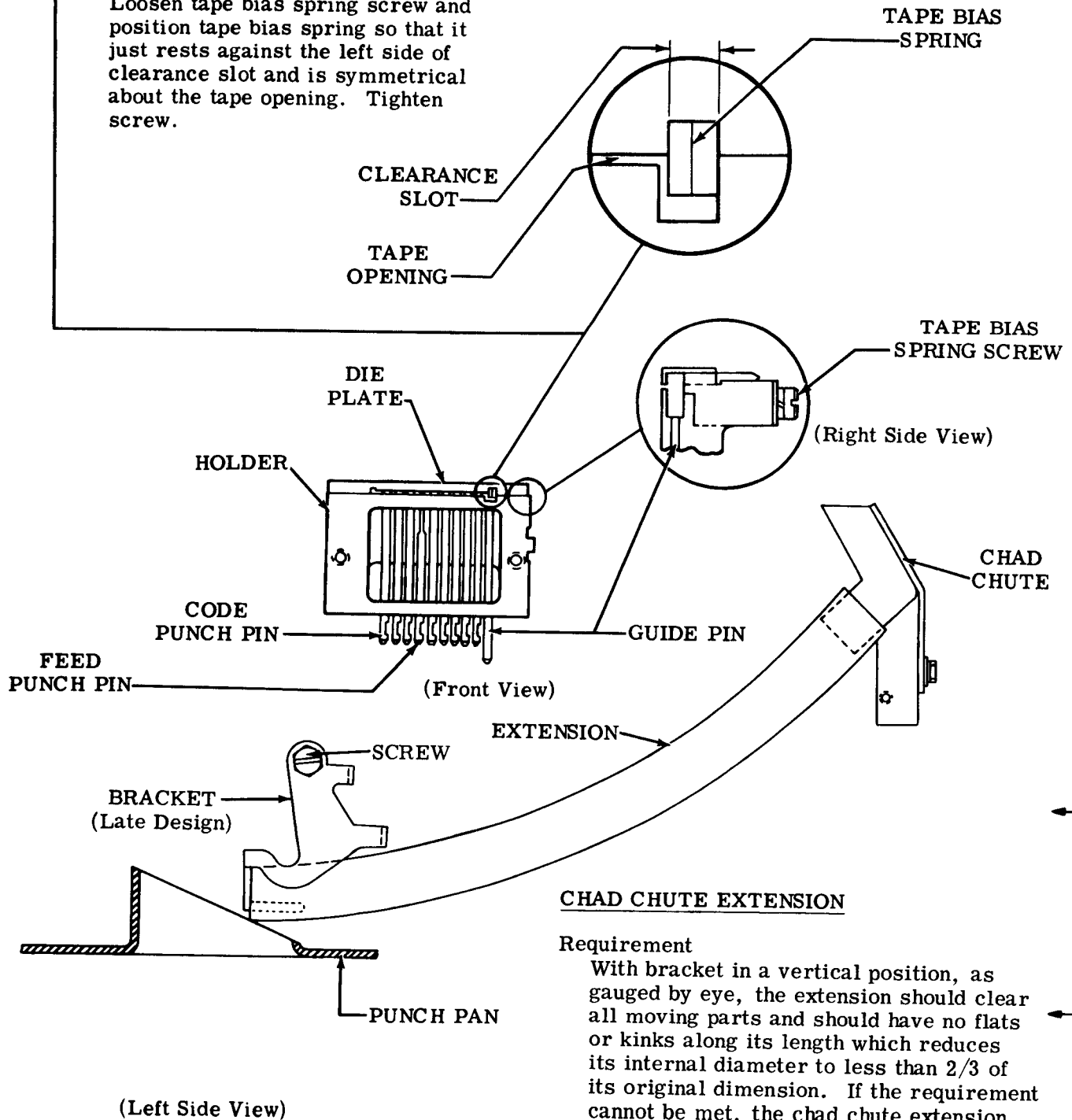
TAPE BIAS SPRING

**Requirement**

With tape removed from the tape punch, tape bias spring should rest against side of die plate and should be symmetrical about the tape opening, as gauged by eye.

**To Adjust**

Loosen tape bias spring screw and position tape bias spring so that it just rests against the left side of clearance slot and is symmetrical about the tape opening. Tighten screw.



CHAD CHUTE EXTENSION

**Requirement**

With bracket in a vertical position, as gauged by eye, the extension should clear all moving parts and should have no flats or kinks along its length which reduces its internal diameter to less than 2/3 of its original dimension. If the requirement cannot be met, the chad chute extension should be replaced.

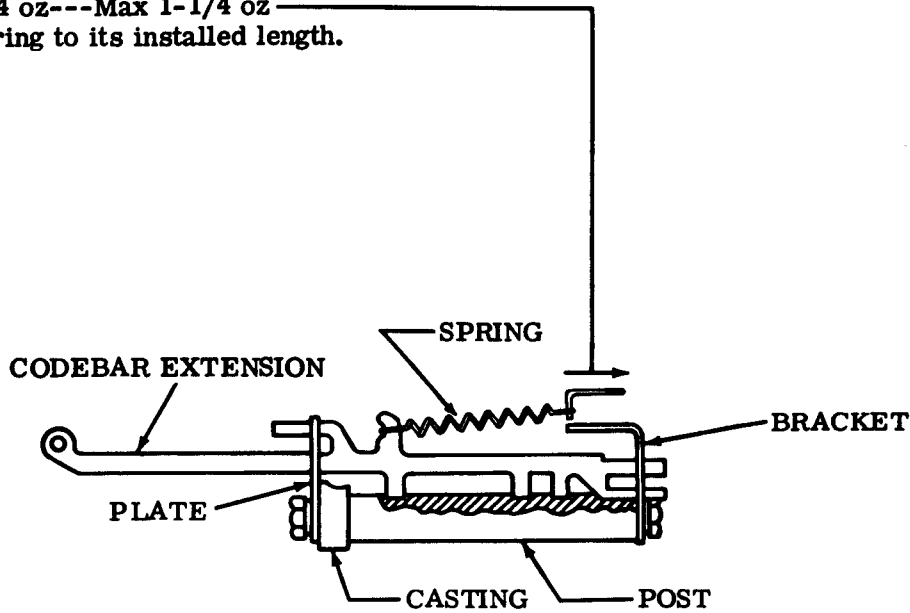
2.10 Tape Punch Area (continued)

CODEBAR EXTENSION SPRINGS

**Requirement**

With the typing unit in stop condition

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



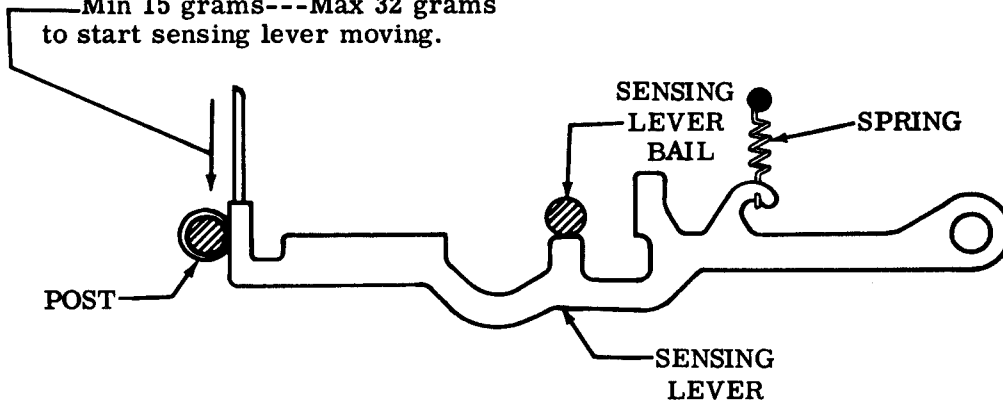
(Rear View)

SENSING LEVER SPRINGS

**Requirement**

With the tape punch in off position

Min 15 grams---Max 32 grams  
to start sensing lever moving.

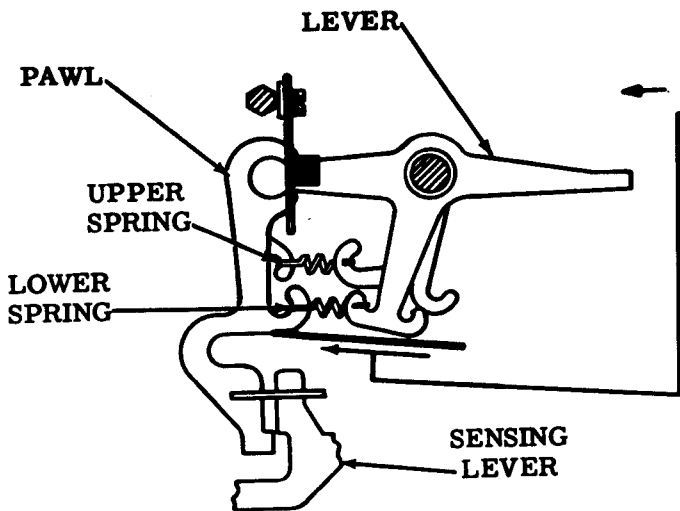


(Left Side View)

2.11 Tape Punch Area (continued)

PAWL AND LEVER SPRINGS

Requirement  
With the tape punch "off"

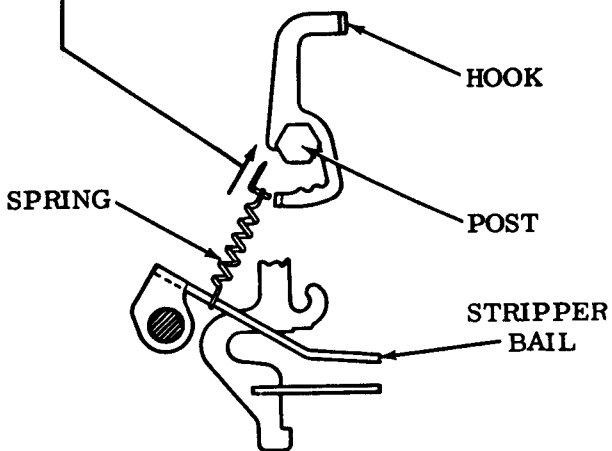


Upper spring  
Min 1 oz---Max 2 oz

Lower spring  
Min 1-1/2 oz---Max 2-1/2 oz  
to start pawl moving.

STRIPPER BAIL SPRING

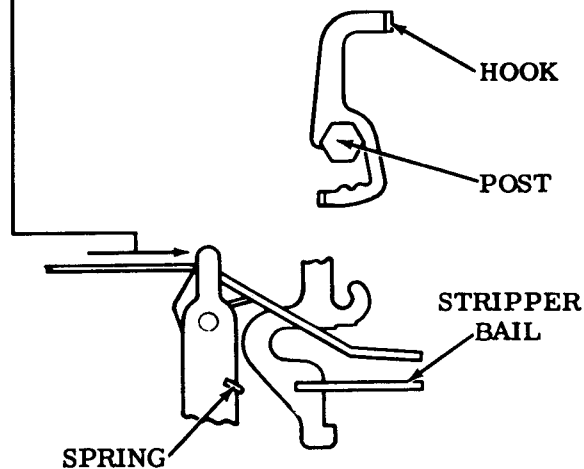
Requirement  
With the tape punch in off position  
Min 12 oz---Max 15 oz  
to pull spring to its installed length.



EARLY DESIGN

STRIPPER BAIL SPRING

Requirement  
With tape punch in off position  
Min 7 oz---Max 13 oz  
to start the stripper bail moving.



LATE DESIGN

(Left Side Views)

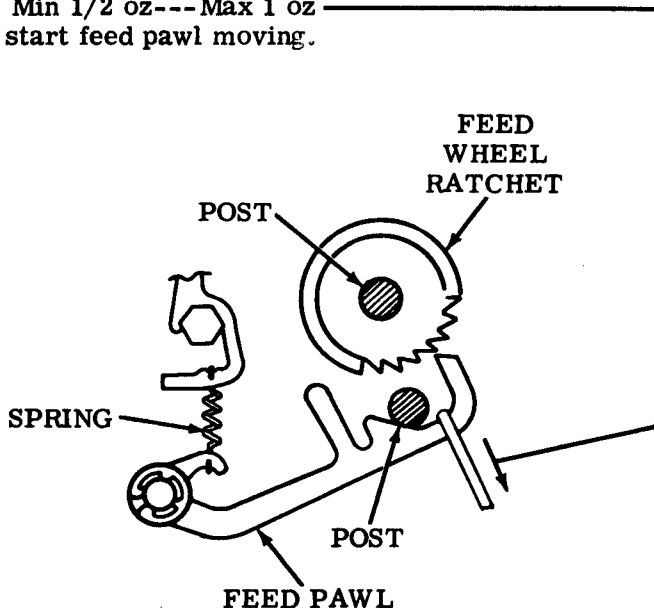
2.12 Tape Punch Area (continued)

FEED PAWL SPRING

Requirement

With tape punch in off position

Min 1/2 oz---Max 1 oz  
to start feed pawl moving.



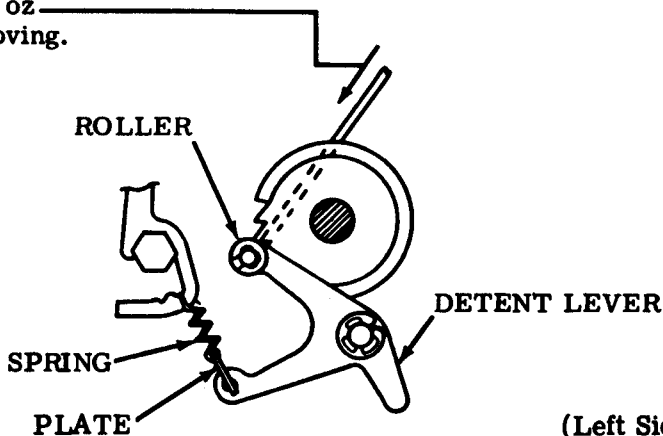
(Left Side View)

DETENT LEVER SPRING

Requirement

With the tape punch "off"

Min 13 oz---Max 17 oz  
to start detent lever moving.



(Left Side View)

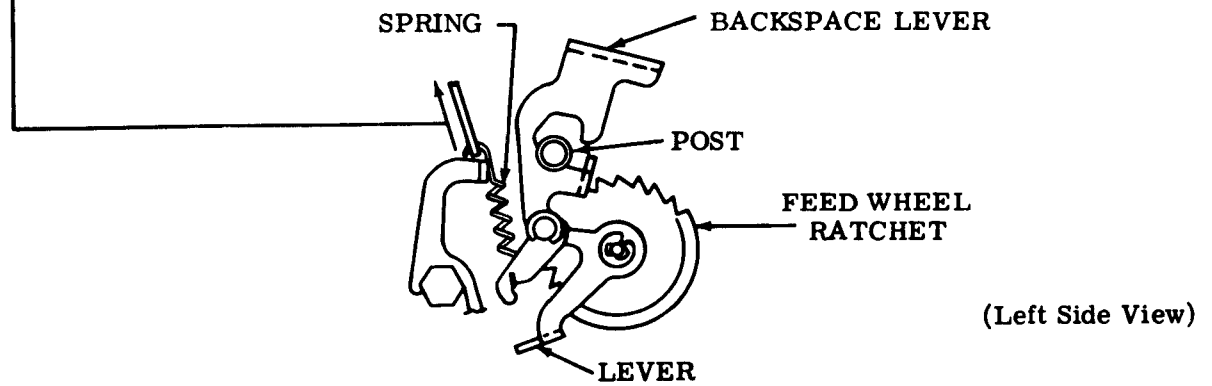
## 2.13 Tape Punch Area (continued)

BACKSPACE LEVER SPRING

## Requirement

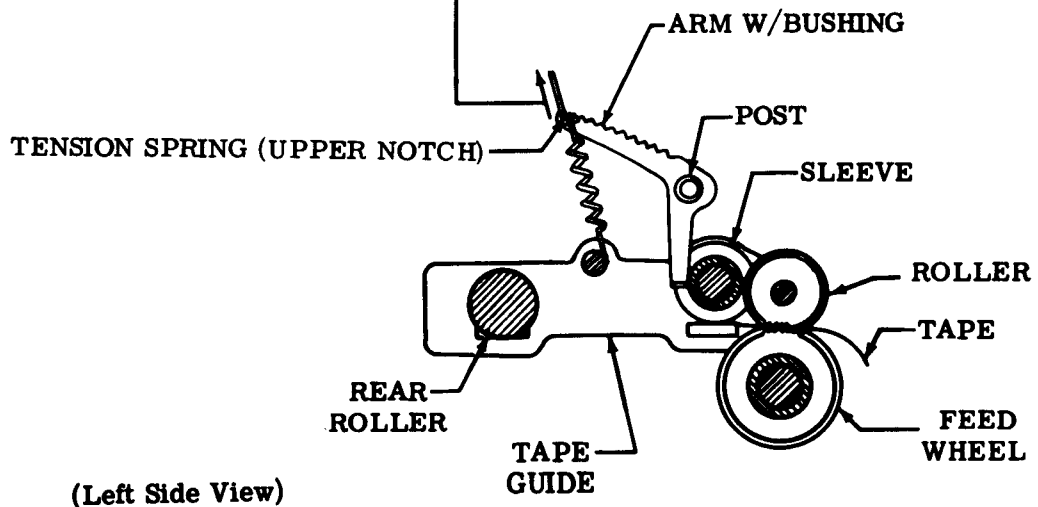
With the tape punch in off position

Min 3-1/2 oz---Max 5-1/2 oz  
to pull spring to its installed length.

TAPE GUIDE TENSION SPRING

## Requirement

Min 34 oz---Max 38 oz  
to pull spring to its installed  
(upper notch) length.

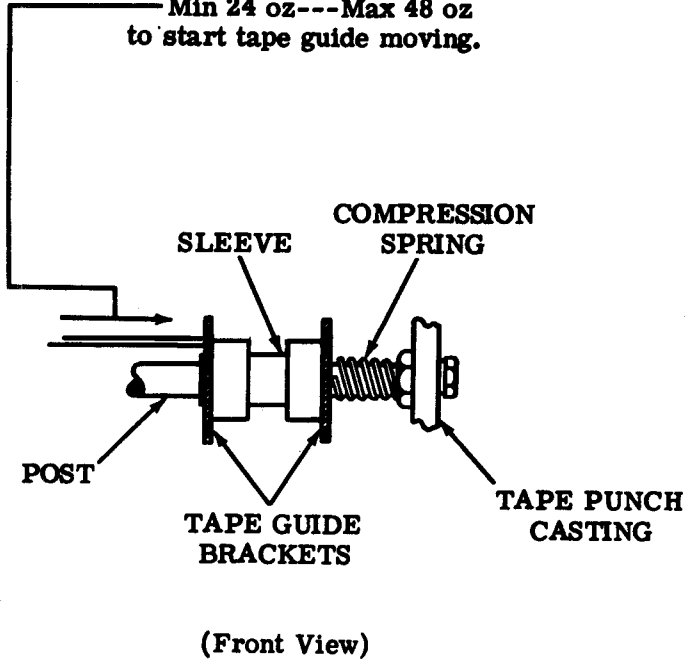


2.14 Tape Punch Area (continued)

**TAPE GUIDE COMPRESSION SPRING**

**Requirement**

Remove the tape guide tension spring. Place roller slightly above the feed wheel  
 Min 24 oz---Max 48 oz  
 to start tape guide moving.

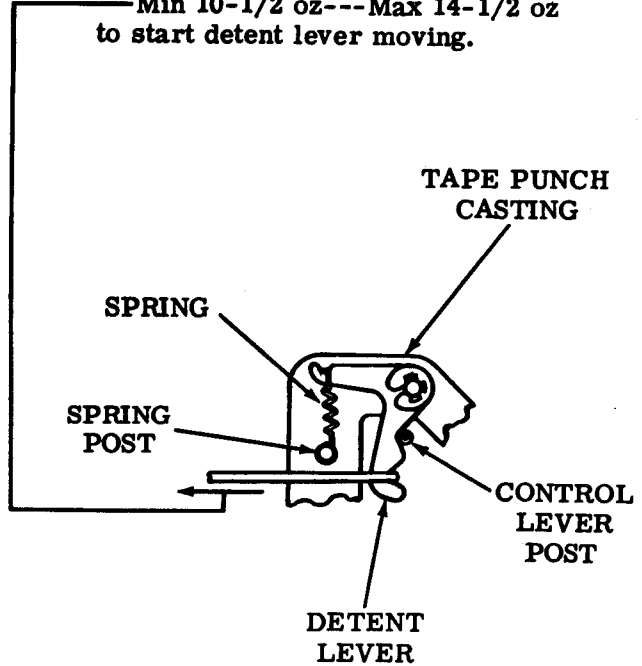


**CONTROL DETENT LEVER SPRING**

**Note:** This adjustment applies only to tape punches equipped with TP182843 detent lever.

**Requirement**

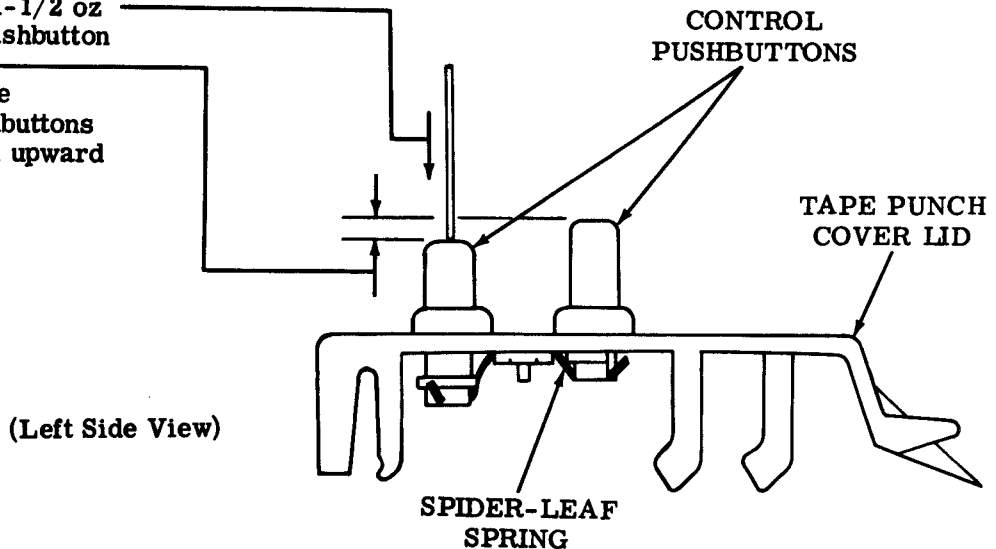
With the tape punch "off"  
 Min 10-1/2 oz---Max 14-1/2 oz  
 to start detent lever moving.



**CONTROL PUSHBUTTONS**

**Requirement**

Min 1/2 oz---Max 1-1/2 oz  
 to push each control pushbutton  
 down 1/8 inch  
 as gauged by eye, while  
 remaining control pushbuttons  
 remain in their normal upward  
 positions.

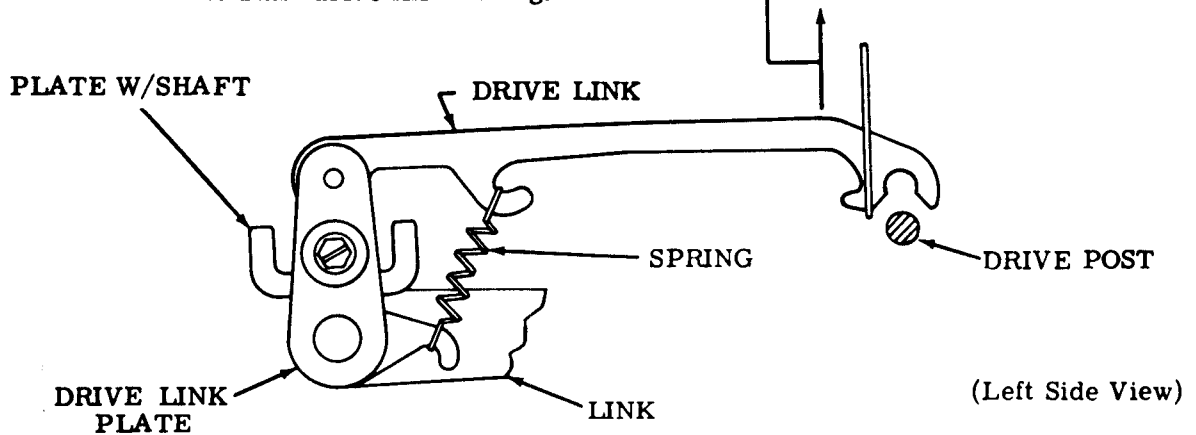




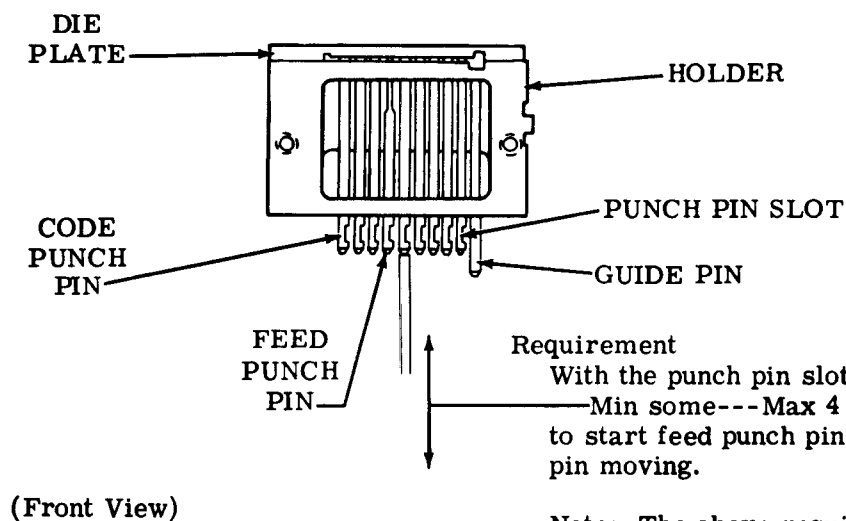
## 2.15 Tape Punch Area (continued)

DRIVE LINK SPRING**Requirement**

With tape punch "off"  
Min 7 oz---Max 9 oz  
to start drive link moving.

PUNCH BLOCK ASSEMBLY**To Check**

Remove the punch block assembly from the tape punch. Replace after performing this adjustment. (For instructions, see the appropriate tape punch section.)

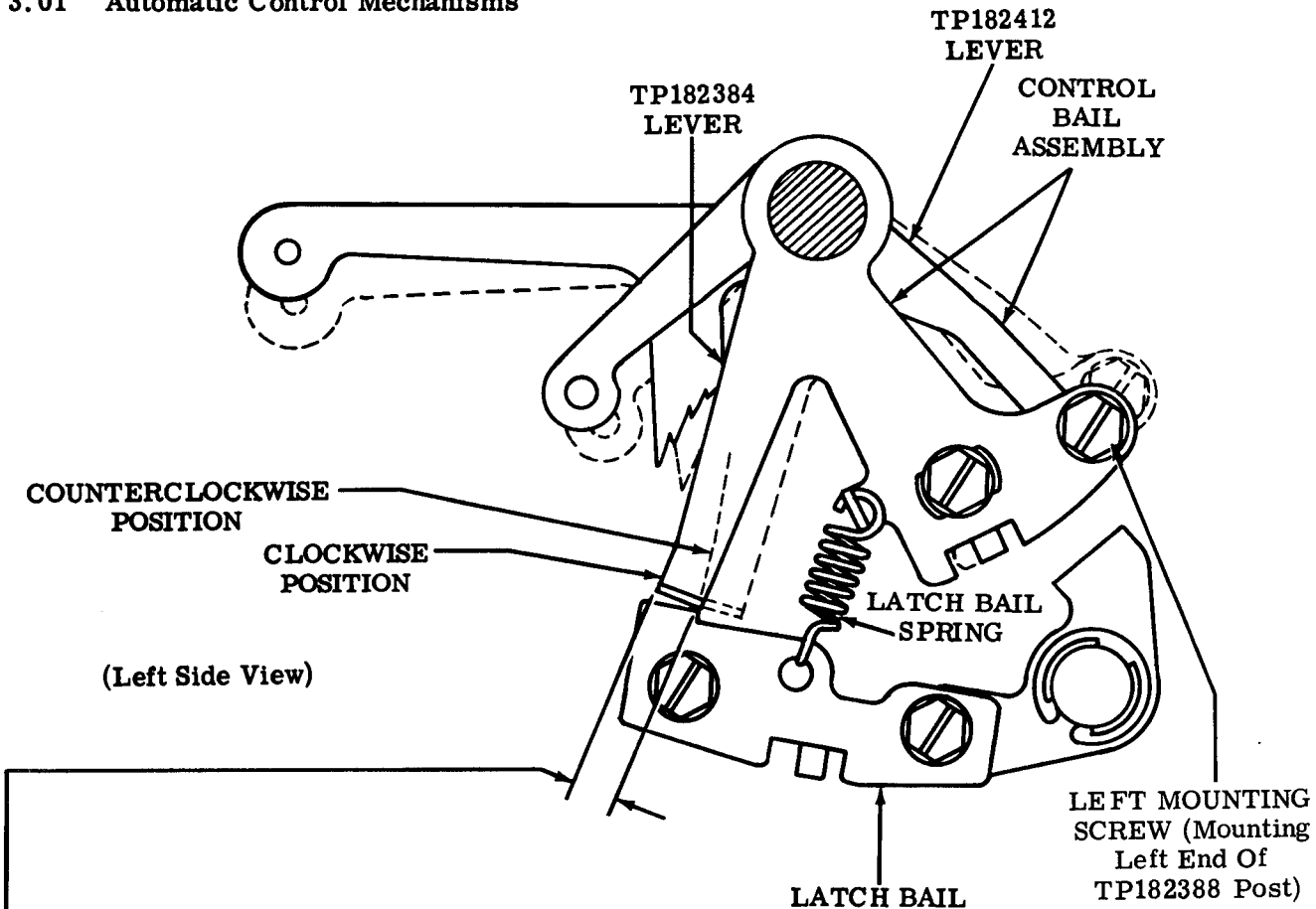
**Requirement**

With the punch pin slots facing the guide pin  
Min some---Max 4 oz  
to start feed punch pin and each code punch  
pin moving.

**Note:** The above requirement must be met  
anywhere along each punch pin's upward  
and downward travel in holder.

3. VARIATIONS TO THE BASIC UNIT

3.01 Automatic Control Mechanisms



CONTROL BAIL ASSEMBLY

To Check

With the typing unit in the stop condition and the tape punch "on," gently oscillate the control bail assembly from its clockwise position to its counterclockwise position and back again. Repeat this oscillating motion several times while noting requirements.

(1) Requirement

The control bail assembly should be free from binds along its normal travel.

(2) Requirement

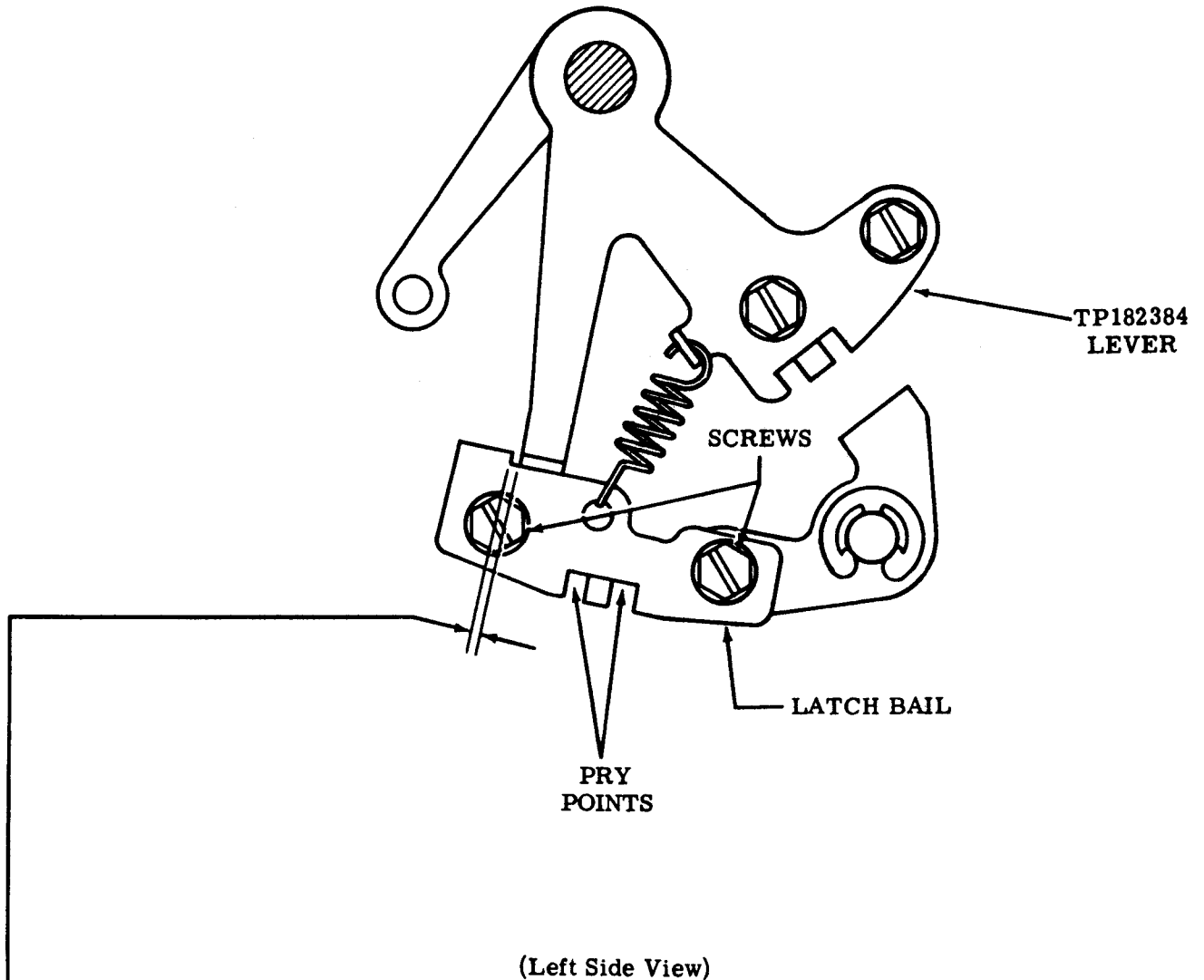
When released from its counterclockwise position, the control bail assembly should return to its clockwise position under spring tension.

To Adjust

Note: Parts should not be bent, other than specifically directed.

Remove the latch bail spring, control bail spring (not illustrated), and left mounting screw which secures the left side of TP182388 post. The TP182388 post threaded hole should be concentric to the left mounting screw hole. If necessary, bend TP182388 post about its right mounting screw (not illustrated). Reassemble left mounting screw and tighten. Replace springs. Recheck requirements and refine adjustment if necessary.

## 3.02 Automatic Control Mechanisms (continued)

**LEVER OVERTRAVEL****To Check**

With the tape punch "on," set up the ~~TAPE~~ (--3-5---) code combination in the selector. Manually rotate the main shaft until the function rocker shaft is in its most forward position.

**Requirement**

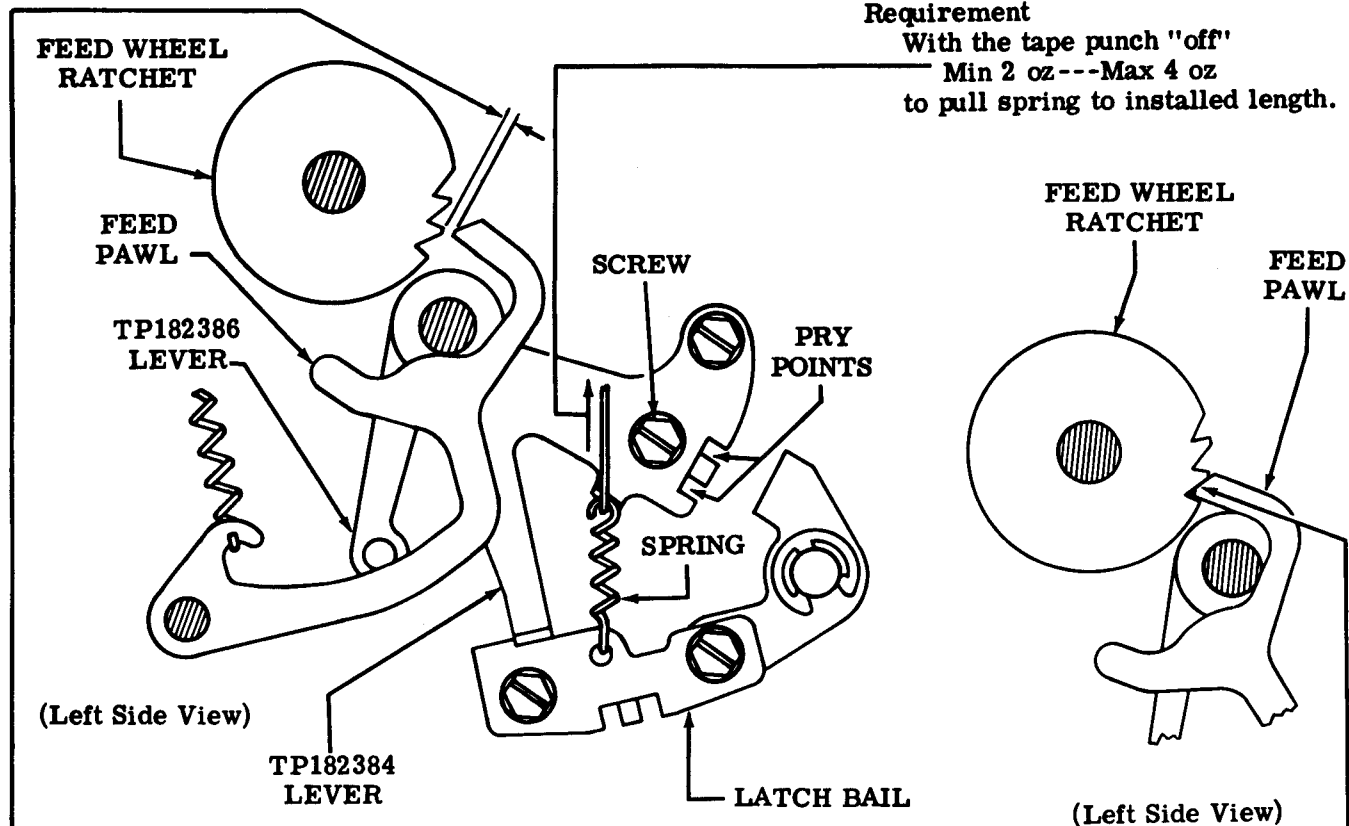
Min 0.005 inch---Max 0.015 inch  
between the TP182384 lever and latch bail.

**To Adjust**

Loosen screws and position latch bail using pry points. Tighten screws.

3.03 Automatic Control Mechanisms (continued)

LATCH BAIL SPRING



FEED WHEEL RATCHET AND PAWL GAP

- (1) To Check  
With the tape punch "off," manually rotate the main shaft until the function rocker shaft positions the feed pawl so that there is a minimum clearance between it and a tooth of the feed wheel ratchet.

Requirement  
Min 0.015 inch ---Max 0.030 inch  
between the feed pawl and a tooth of the feed wheel ratchet.

To Adjust  
Loosen the screw and position the TP182386 lever using the pry points.  
Tighten screw.

- (2) To Check  
With the tape punch "on," manually rotate the main shaft until the function rocker shaft positions the feed pawl so that it engages a tooth of the feed wheel ratchet.

Requirement  
The feed pawl should fully engage a tooth of the feed wheel ratchet.

To Adjust  
Refine requirement under (1) To Check.

## 3.04 Automatic Control Mechanisms (continued)

SENSING LEVER AND BAIL GAP

Note: This adjustment applies only to tape punches equipped with the sense suppression option — TP182430 bail etc.

**To Check**

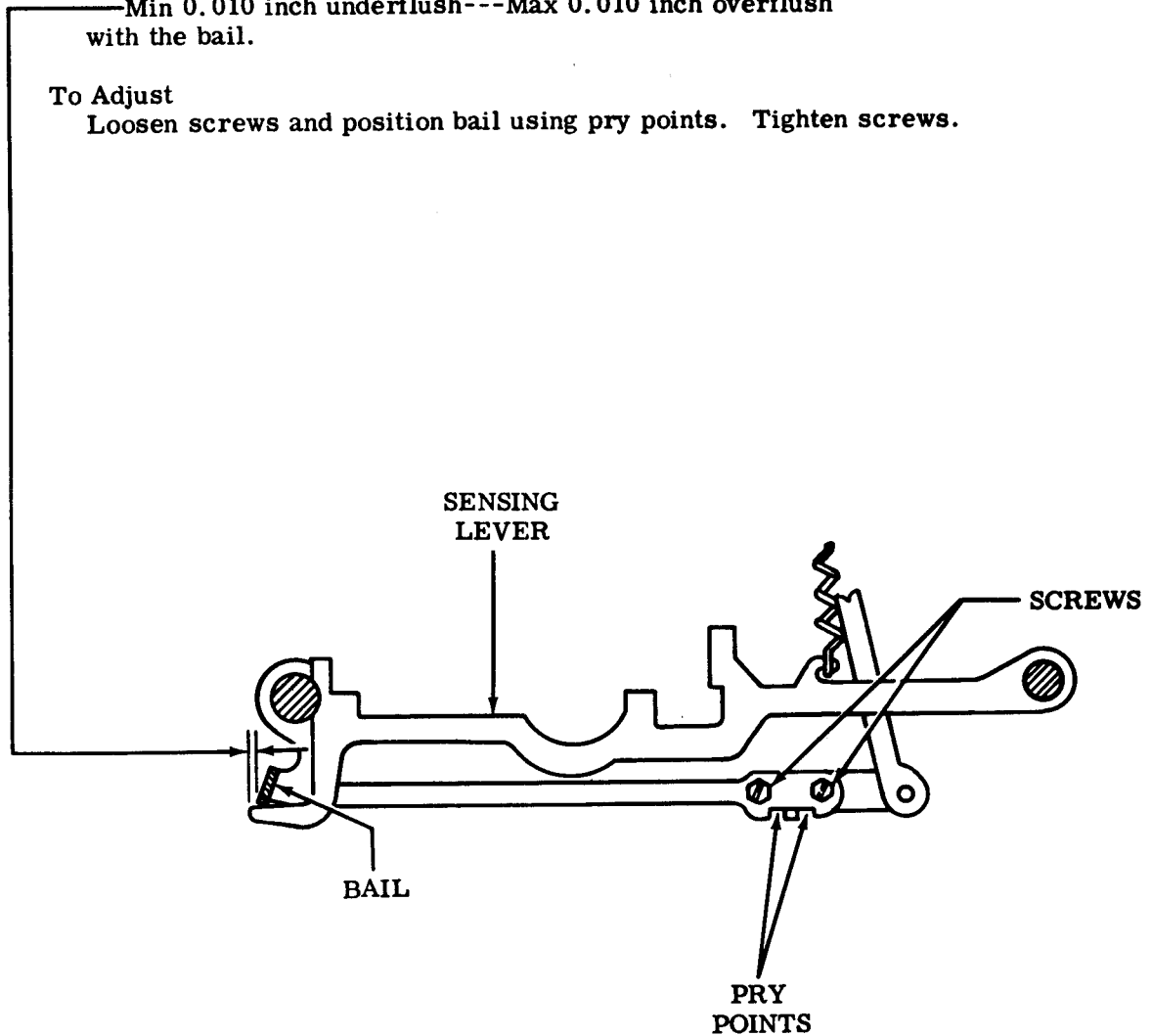
Place the tape punch "off."

**Requirement**

The sensing lever associated with the leftmost code level (Figure 2) should be  
 ---Min 0.010 inch underflush---Max 0.010 inch overflush  
 with the bail.

**To Adjust**

Loosen screws and position bail using pry points. Tighten screws.



(Left Side View)

3.05 Automatic Control Mechanisms (continued)

**LATCH BAIL GAP**

**Note:** This adjustment applies only to tape punches equipped with tape punch interlock mechanism.

**To Check**

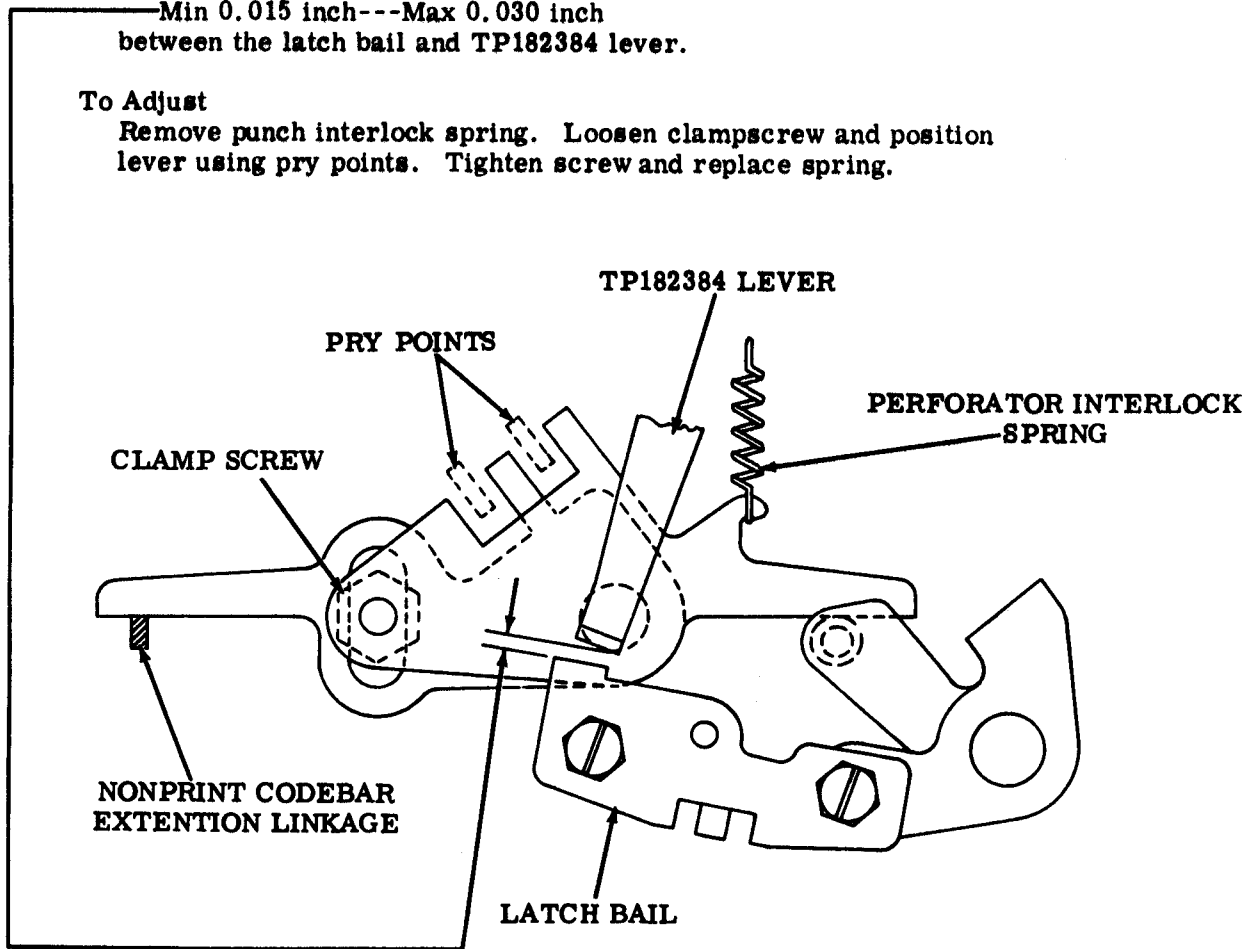
Place the typing unit in the **stop condition** and the tape punch "off."  
Place the nonprint codebar in its operated position (solenoid energized).

**Requirement**

Min 0.015 inch---Max 0.030 inch  
between the latch bail and TP182384 lever.

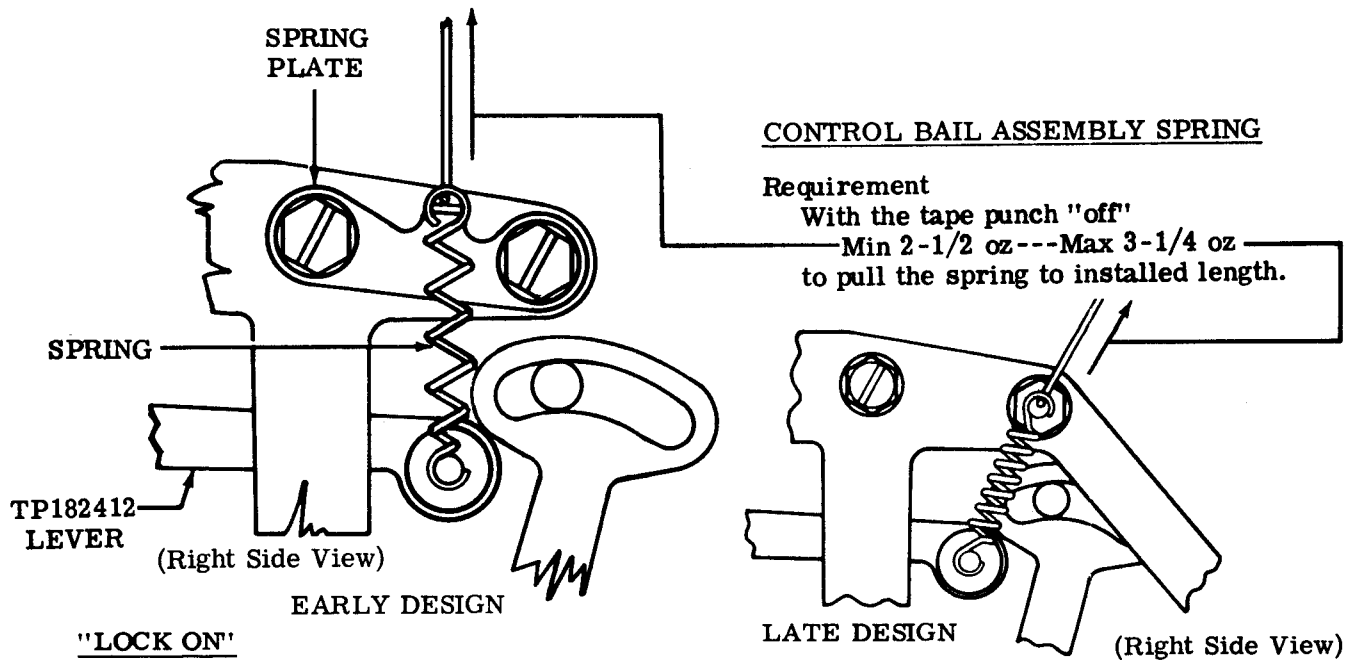
**To Adjust**

Remove punch interlock spring. Loosen clampscrew and position lever using pry points. Tighten screw and replace spring.



(Left Side View)

3.06 Automatic Control Mechanisms (continued)



**Note:** This adjustment applies only to tape punches equipped with the **LOCK ON** option — TP184200 lock bail, etc.

**To Check**

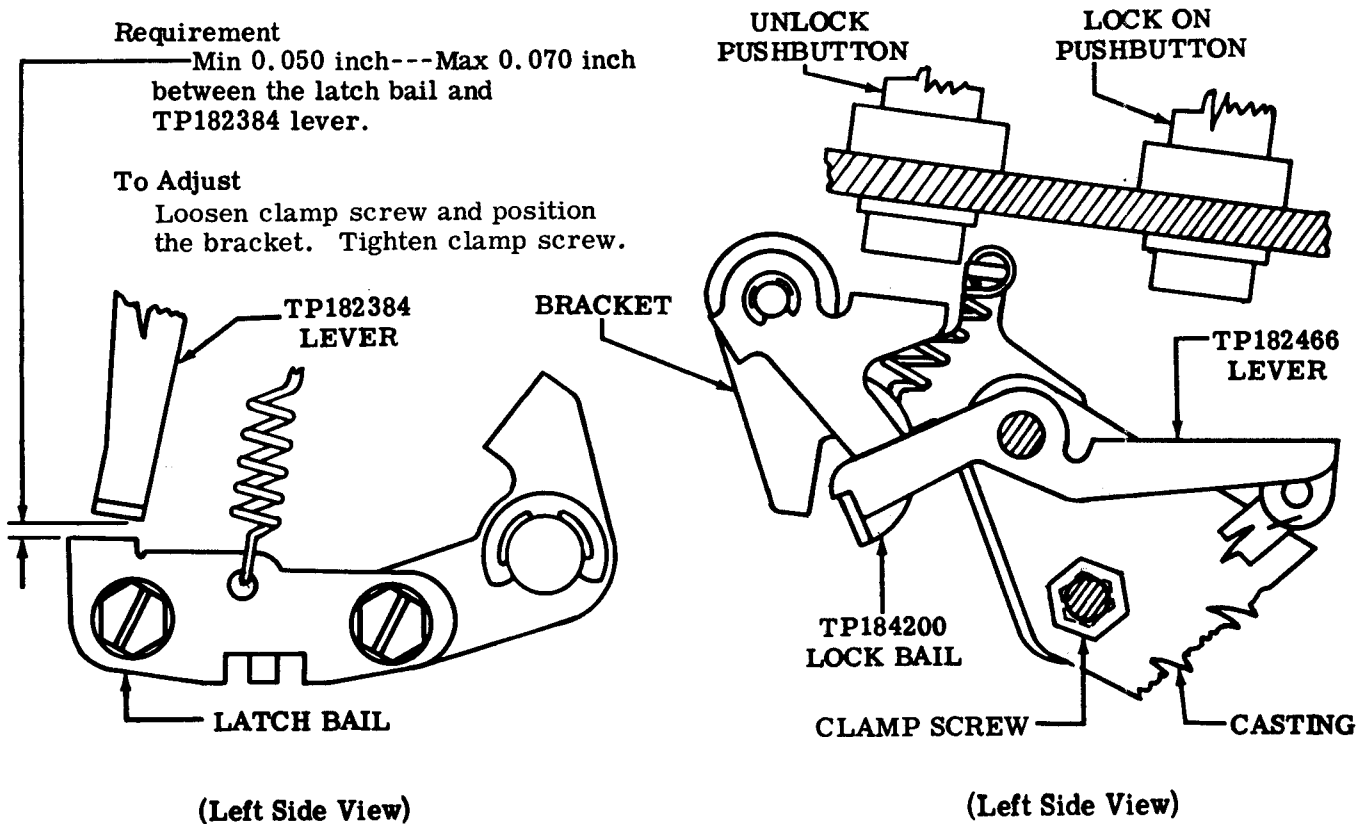
Place the tape punch in the "off" condition. Depress the **LOCK ON** pushbutton and allow the TP184200 lock bail to latch the TP182466 lever.

**Requirement**

---Min 0.050 inch---Max 0.070 inch  
 between the latch bail and  
 TP182384 lever.

**To Adjust**

Loosen clamp screw and position  
 the bracket. Tighten clamp screw.



3.07 Automatic Control Mechanisms (continued)

**AUTOMATIC "ON"**

**Note:** This adjustment applies only to tape punches equipped with the LOCK ON option.

**To Check**

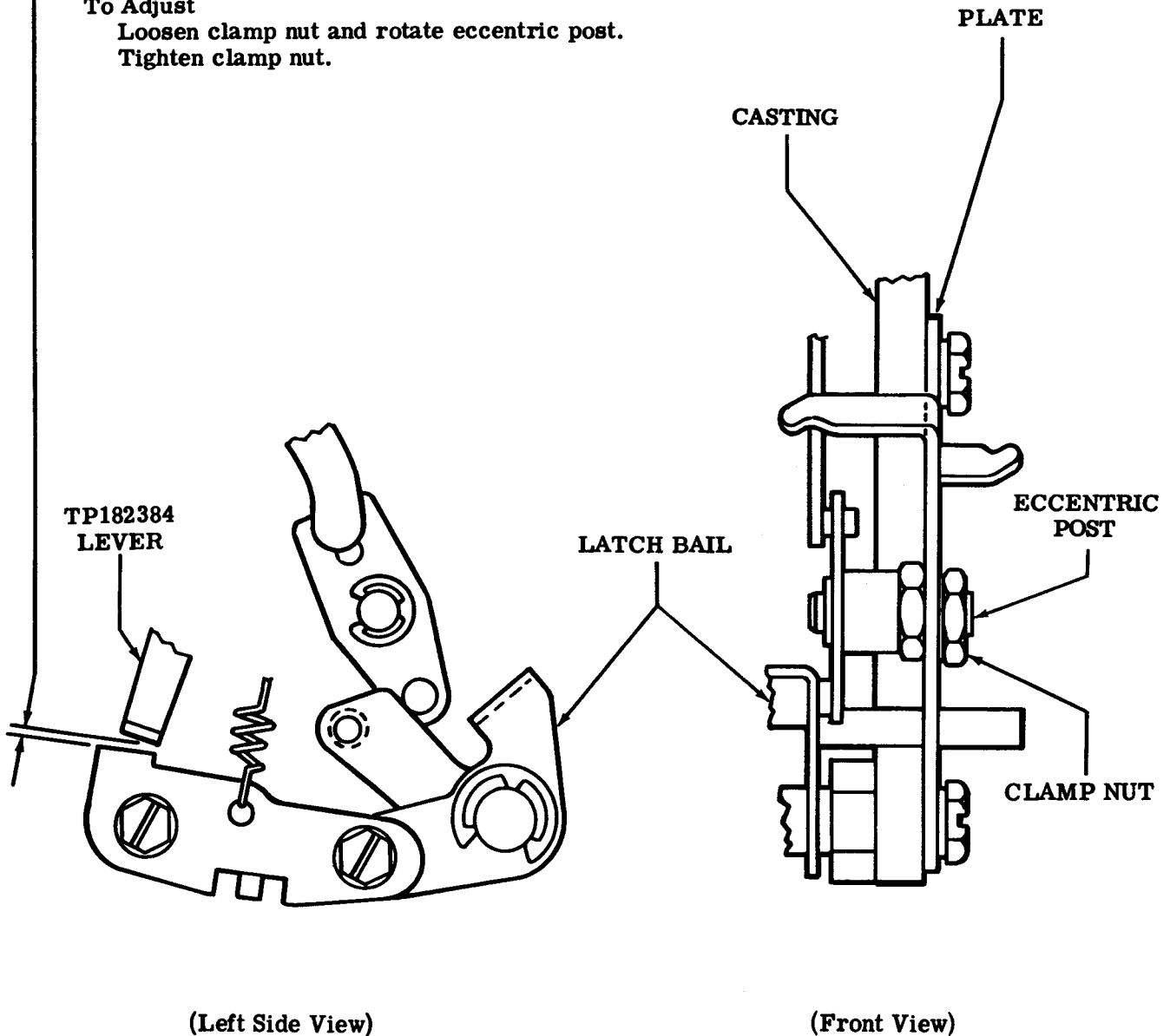
With the tape punch "on," depress the UNLOCK pushbutton. Set up the TAPE (-2--5---) code combination in the selector. Manually rotate the main shaft until the drive link is in its most forward position.

**Requirement**

Min 0.010 inch---Max 0.025 inch  
between the latch bail and TP182384 lever.

**To Adjust**

Loosen clamp nut and rotate eccentric post.  
Tighten clamp nut.



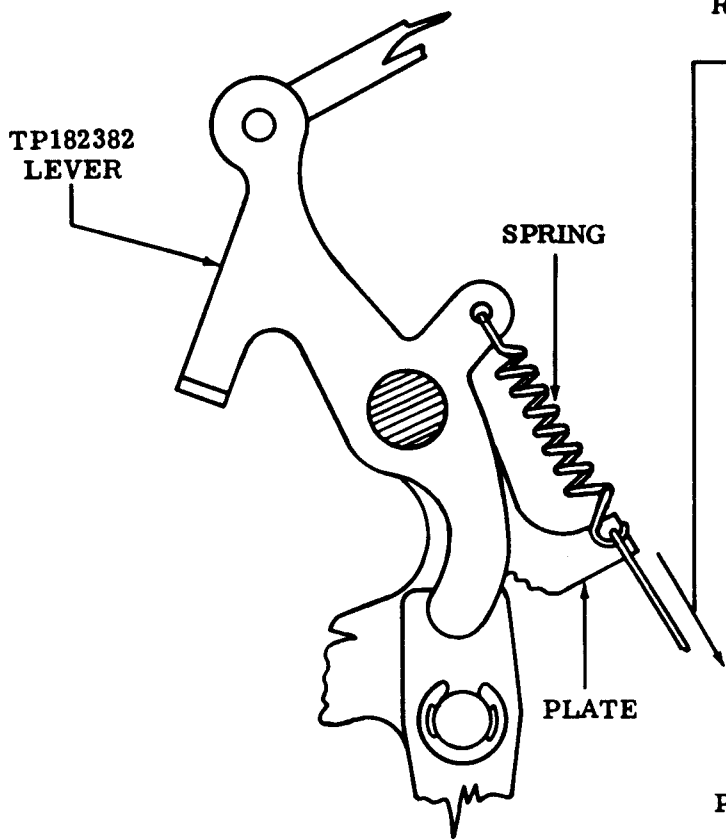


3.08 Automatic Control Mechanisms (continued)

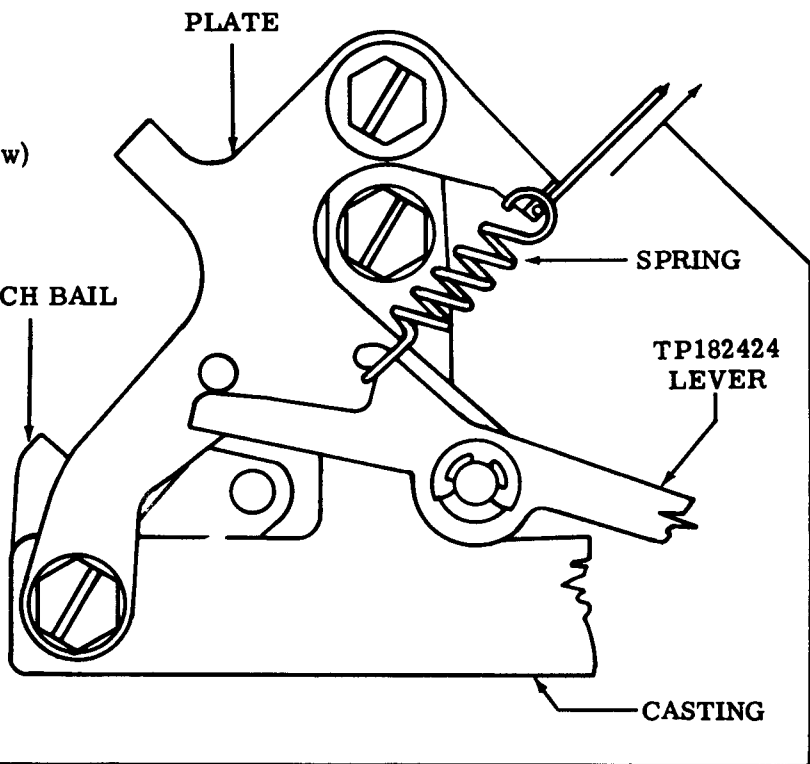
"ON" MECHANISM RETURN SPRING

Requirement

With the tape punch "off"  
 Min 1/2 oz --- Max 2-1/2 oz  
 to pull spring to installed length.



(Left Side View)



(Right Side View)

AUTOMATIC PUNCH INTERLOCK SPRING

Note: This adjustment applies only to tape punches equipped with the interlock mechanism.

Requirement

With nonprint codebar in its operated position (solenoid energized)  
 Min 4 oz --- Max 6 oz  
 to pull spring to installed length.

3.09 Miscellaneous

FOLDED TAPE GUIDE

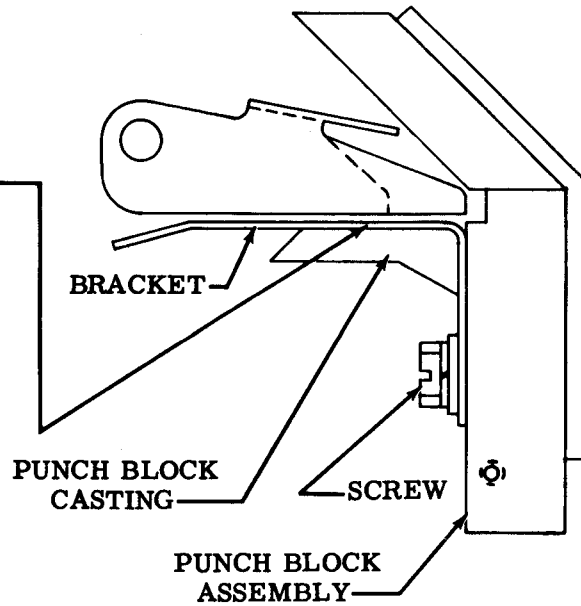
(1) Requirement

With no tape in the punch, the bracket should be flush to the top surface of the punch block casting.

To Adjust

Loosen screw and position bracket.  
Tighten screw.

Note 1: This adjustment applies only to tape punches equipped with TP185705 folded tape guide modification kit.

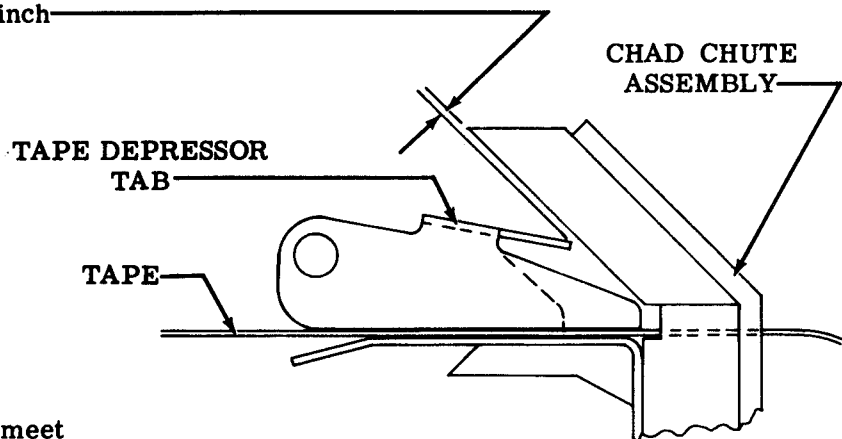


(Left Side View)

(2) Requirement

With tape in punch

Min some---Max 0.015 inch  
between the tape depressor  
tab and underside of the  
chad chute.



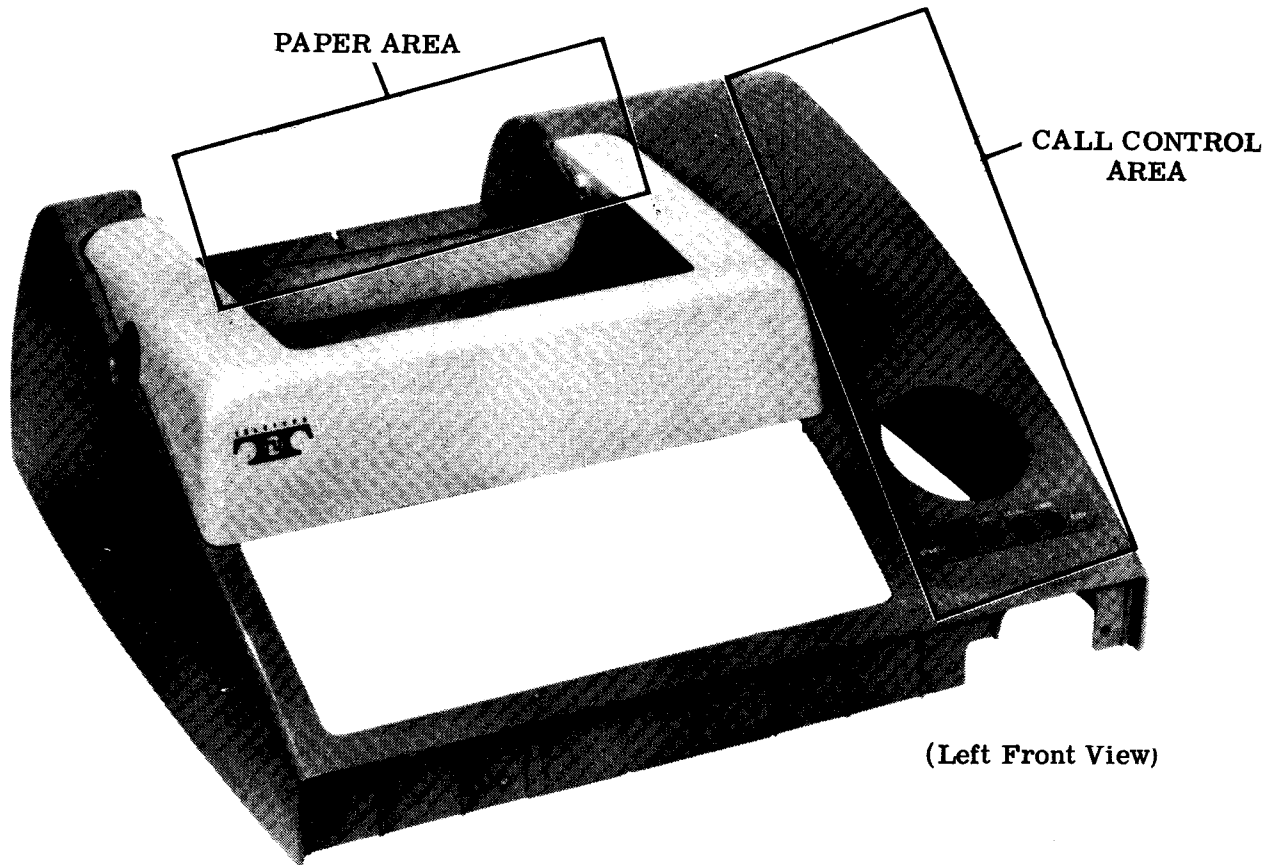
To Adjust

Bend tape depressor tab to meet  
requirement.

Note 2: Check TEN CHARACTERS  
PER INCH requirement and refine  
if necessary.

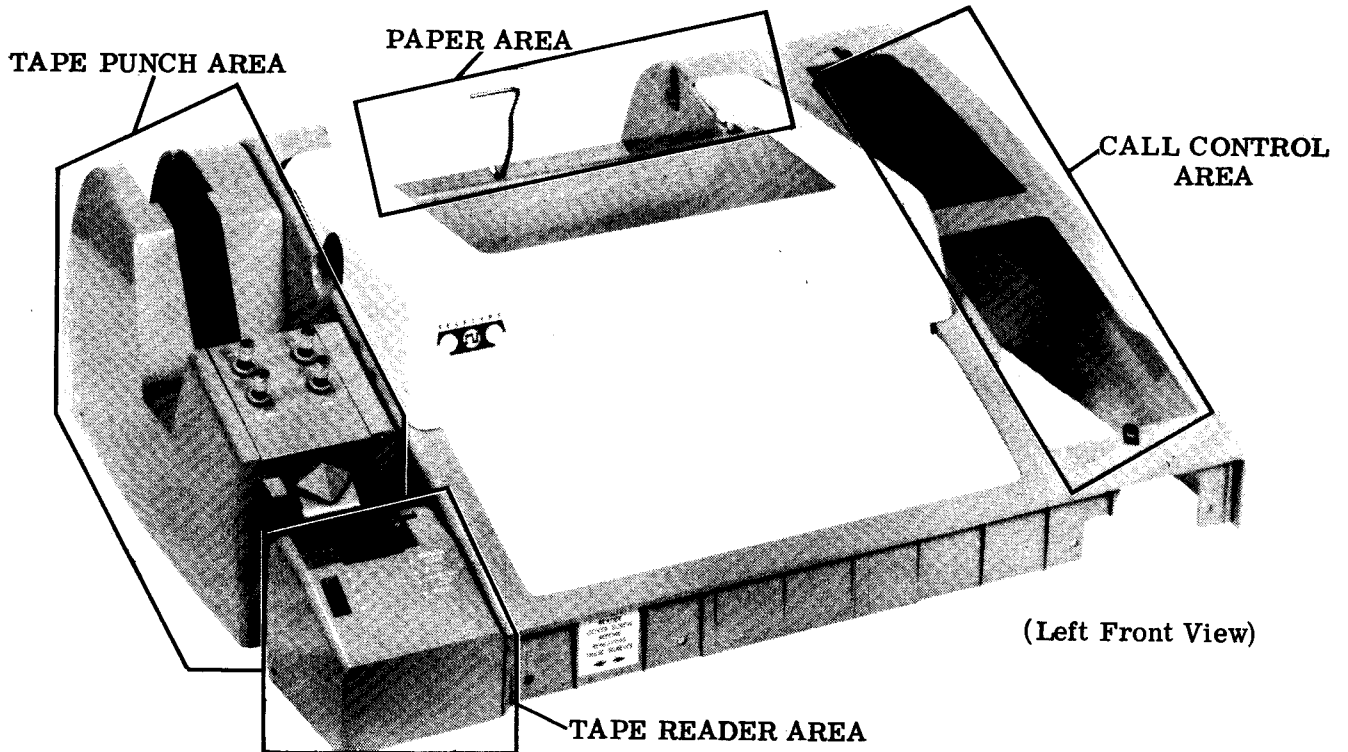
33 COVERS  
ADJUSTMENTS

CONTENTS	PAGE	
1. GENERAL . . . . .	1	Receive (KSR) and Automatic Send-Receive (ASR) Sets (Figures 1 and 2).
2. BASIC UNIT . . . . .	3	1.02 After completing an adjustment, replace cover and/or any parts that were removed. Check any adjustments affected by the removal of the cover and/or parts.
Call Control Area		
Dial to cover . . . . .	3	
Knob to bezel . . . . .	3	<b>CAUTION: ELECTRICAL POWER MUST BE REMOVED FROM UNIT BEFORE ANY ADJUSTMENTS ARE MADE.</b>
Paper Area		
Low paper contact operating arm . . .	4	1.03 In the adjustments covered in this section, location of clearances and position of parts are illustrated by line drawings. Requirements and procedures are set forth in the texts that accompany the line drawings.
Tape Punch Area		
Control pushbuttons . . . . .	7	
Visual "ON-OFF" indicator . . . . .	7	1.04 Reference to left, right, front, or rear, etc, consider the cover to be viewed from a position where the lid is up and the nameplate position is facing the viewer.
Tape Reader Area		
Reader mounting bracket (early design) . . . . .	5	1.05 Unless specifically stated otherwise, position screws or nuts friction tight to make an adjustment, and tighten them securely once the adjustment has been made.
Reader mounting bracket (late design) . . . . .	6	
1. GENERAL		1.06 Tools needed to perform adjustments are included in TP185830 maintenance tool kit and are listed in Section 570-005-800.
1.01 This section is issued to provide adjustment information for the 33 typing unit, tape punch, and reader covers. The requirements apply to covers for both Keyboard Send-		1.07 Check appropriate disassembly and re-assembly section for approved procedure of cover and parts removal.



(Left Front View)

Figure 1 - Cover (Keyboard Send-Receive Set)



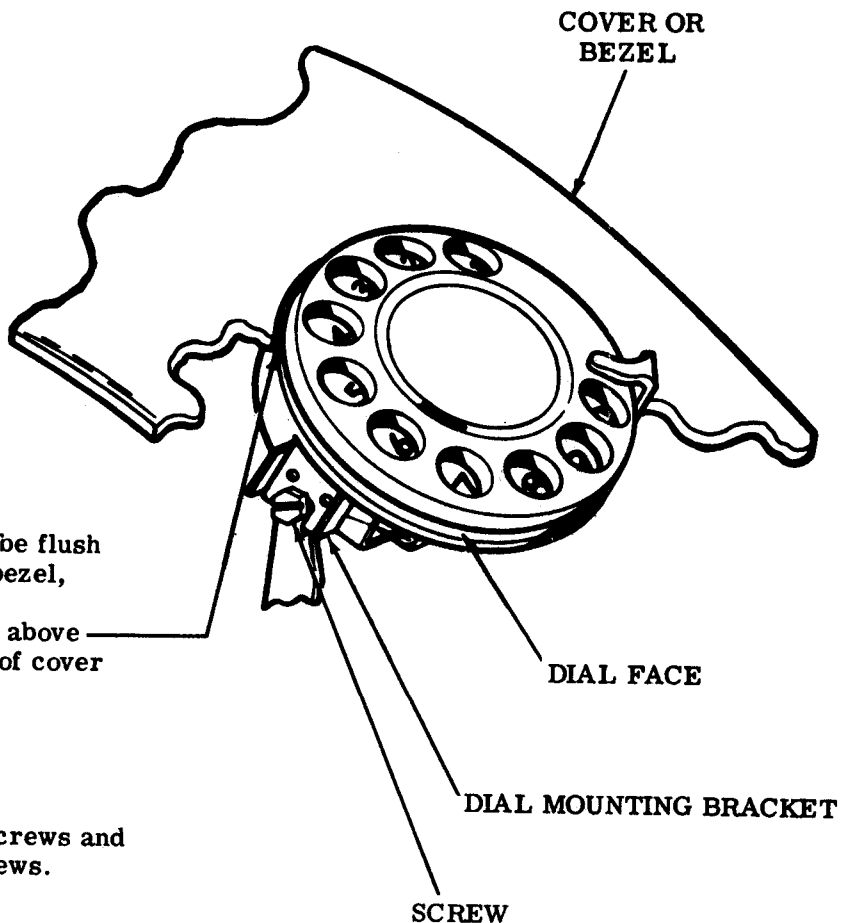
(Left Front View)

Figure 2 - Cover (Automatic Keyboard Send-Receive Set)

2. BASIC UNIT

2.01 Call Control Area

(Left Front View)



DIAL TO COVER

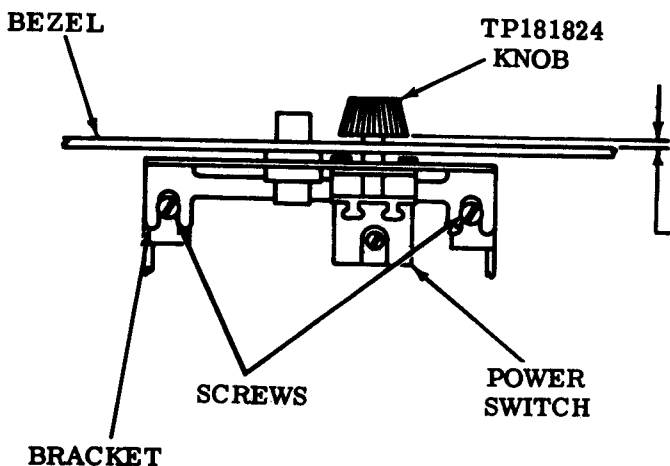
**Requirement**

The numbered dial face should be flush to outside surface of cover or bezel, within

1/16 inch below---3/32 inch above and parallel to outside surface of cover or bezel, within 1/16 inch as gauged by eye.

**To Adjust**

Loosen dial mounting bracket screws and position dial face. Tighten screws.



(Rear View)

KNOB TO BEZEL

**To Check**

Fully seat the TP181824 knob on the power switch.

**Requirement**

Min some---Max 1/8 inch between the bottom of the knob and the face of the bezel.

**To Adjust**

Remove the TP181824 knob and the cover (refer to appropriate disassembly and reassembly section). Loosen screws and position bracket. Tighten screws and replace cover and knob. Recheck Requirement.

2.02 Paper Area

Note 1: The following adjustment applies only to typing units with TP181441 switch mounted on the base casting next to the left function shaft clamp.

LOW-PAPER CONTACT OPERATING ARM

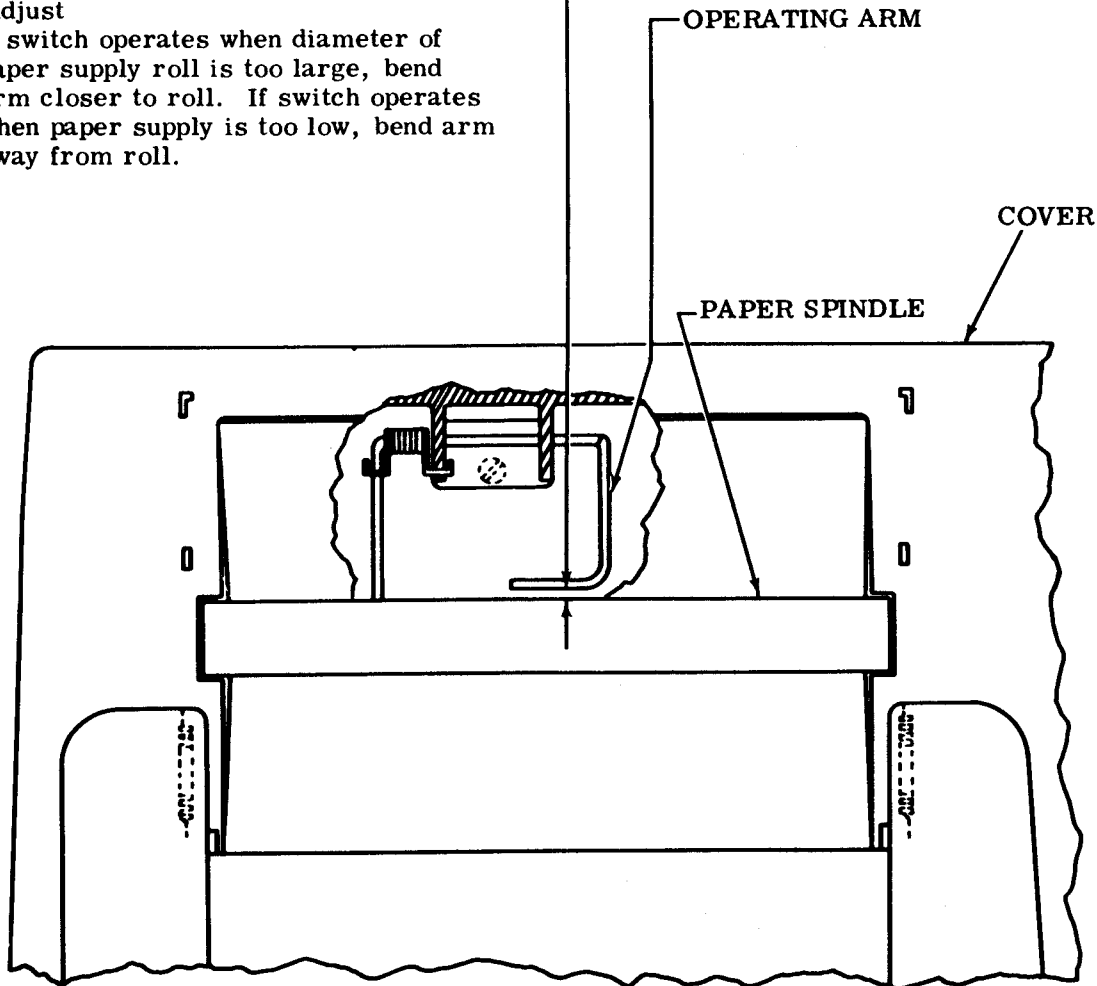
- (1) Requirement (Preliminary)  
With paper spindle in place  
Min 1/16 inch---Max 3/16 inch  
between operating arm and spindle.

To Adjust  
Bend the wire operating arm.

- (2) Requirement (Final)  
Switch will operate when predetermined  
low paper supply is reached.

To Adjust  
If switch operates when diameter of  
paper supply roll is too large, bend  
arm closer to roll. If switch operates  
when paper supply is too low, bend arm  
away from roll.

Note 2: The operating arm should pass through the cover slot, free from any contact with the cover.



(Top View)

2.03 Tape Reader Area

Note: The following adjustment applies to tape readers with early design bases.

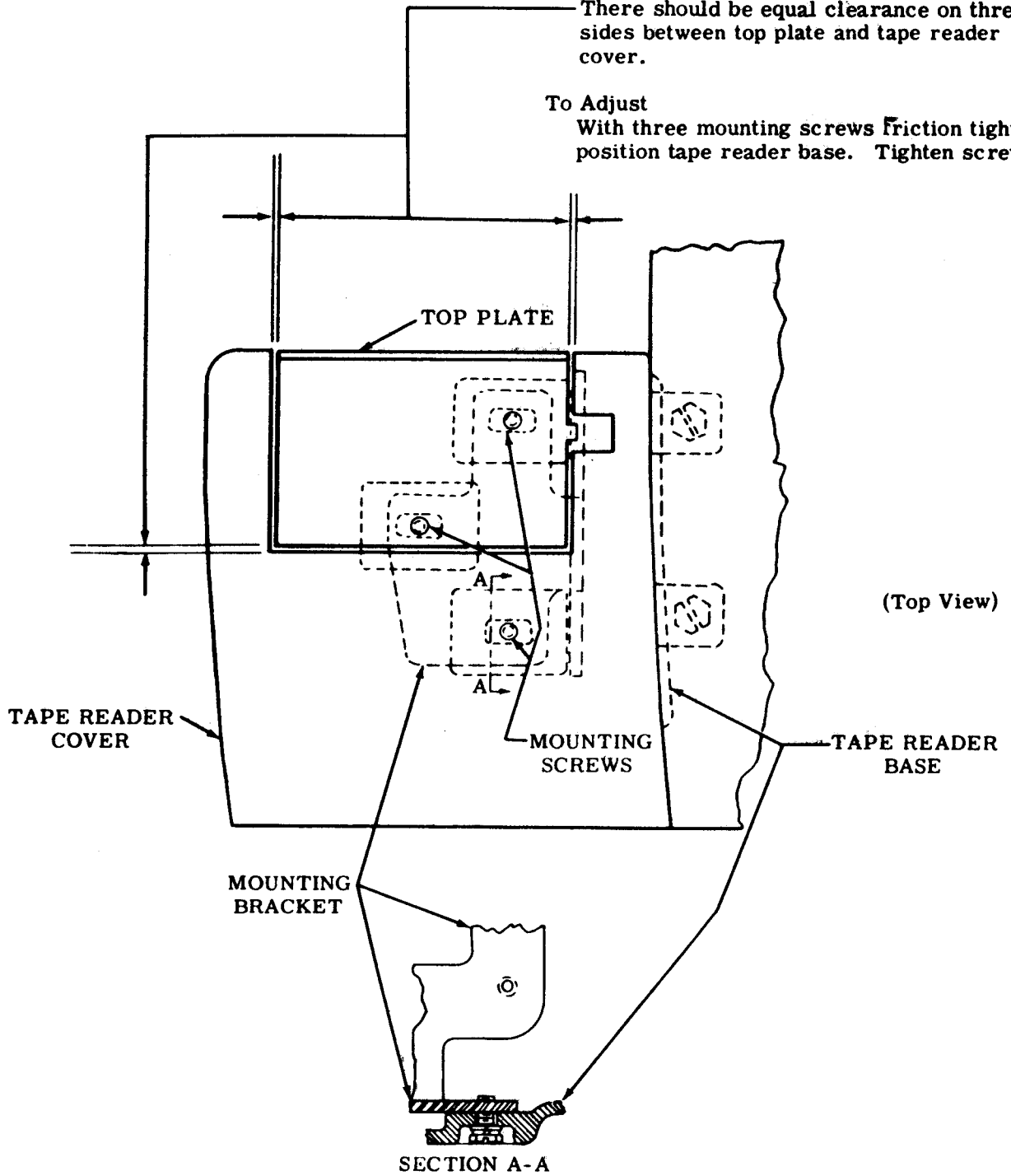
READER MOUNTING BRACKET (Early Design)

Requirement

There should be equal clearance on three sides between top plate and tape reader cover.

To Adjust

With three mounting screws friction tight, position tape reader base. Tighten screws.



2.04 Tape Reader Area (continued)

Note: The following adjustment applies to tape readers with late design bases.

READER MOUNTING BRACKET (Late Design)

(1) Requirement

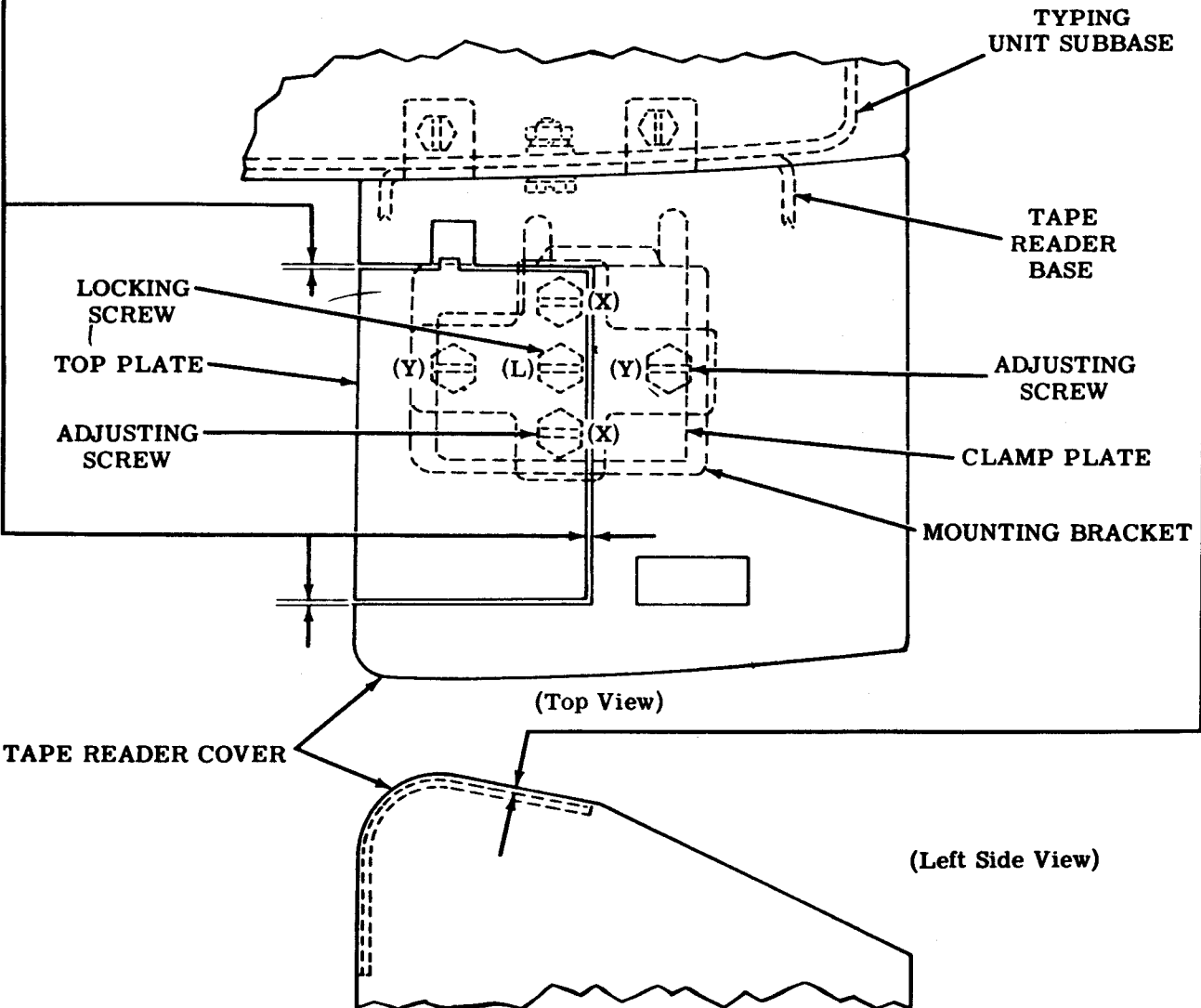
Top plate to be  
Min flush---Max 0.030 inch  
below cover.

(2) Requirement

Equal clearance between top plate and tape reader cover on three sides.

To Adjust

With four adjusting screws and locking screw (L) loosened and mounting bracket lying flat on tape reader base, position tape reader. Run two adjusting screws (X) up until requirement is approximately met. Tighten locking screw friction tight. Run two adjusting screws (Y) up until requirement is approximately met. Refine all four adjusting screws, loosen locking screw if necessary. Tighten locking screw.





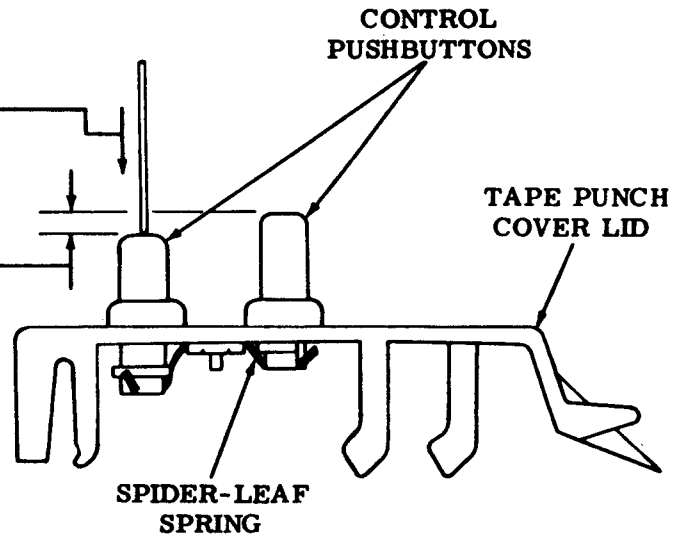
2.05 Tape Punch Area

CONTROL PUSHBUTTONS

**Requirement**

Min 1/2 oz---Max 1-1/2 oz  
to push each control pushbutton  
down 1/8 inch  
as gauged by eye, while  
remaining control pushbuttons  
remain in their normal upward  
positions.

(Left Side View)



VISUAL "ON-OFF" INDICATOR

**Note:** This adjustment applies only to tape punches equipped with the automatic control visual ON-OFF indicator option.

**To Check**

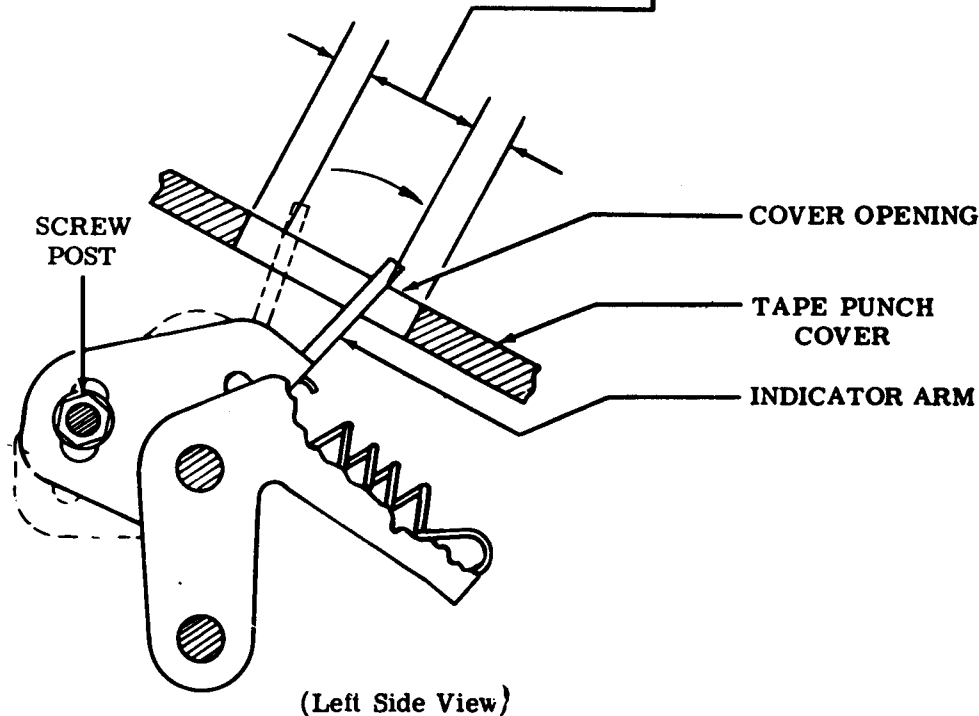
With the tape punch cover in place over the tape punch, place the tape punch "off." Note the gap between the rear edge of the cover opening and the rear edge of the indicator arm. Place the tape punch "on." Note the gap between the front edge of the cover opening and the front edge of the indicator arm.

**Requirement**

The gaps should be equal, as gauged by eye.

**To Adjust**

With the tape punch lid removed from the tape punch cover, loosen screw post and position indicator arm. Tighten screw post.



(Left Side View)

