IBM

OPD CUSTOMER ENGINEERING
I/O Reference Manual
Section 2

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CONTENTS

ADJUSTMENTS SECTION 2

ADJUSTMENT THEORY

MOTOR AND DRIVE

1. Drive Belt - Adjust the motor mounting brackets forward or back to obtain a minimum amount of belt noise.

   Both ends of the motor must be adjusted the same in order to maintain the rotor shaft perpendicular to the drive belt.

   The belt must never be so loose that jumping cogs on the motor pulley is a possibility. Check by operating the shift mechanism while holding the carrier with the carrier return in operation. This loads the motor to a point where failure will be most probable.

2. Motor Pulley - Adjust the motor pulley left or right so that the drive belt rides fully on the teeth of both pulleys without rubbing the flange of either. Position the retaining clip for .005" to .015" end play.

3. Motor Clutch Pawl Stops (Fig. 1) - Form for a clearance of .010" to .020" between the clutch pawl tip and pulley ratchet when the pulley is manually rotated.

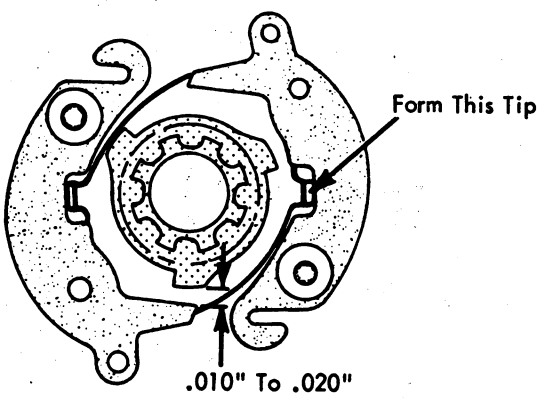


FIGURE 1. Motor Clutch Pawls

4. Idler Gears - Adjust the idler gear studs so that minimum backlash is present between mating gears. The mechanism must be free of binds throughout 360° rotation of the gears.

   Minimum backlash is necessary to prevent erratic operation of the drive train and to insure minimum overthrow of the driven shafts.

   The lower idler gear must be adjusted first because the upper idler gear is adjusted to the final position of the lower gear.

   CAUTION: After any removal and replacement of the left hand cycle shaft bearing, the mesh of the lower idler gear must be checked. The lower idler gear stud is mounted to the bearing plate; therefore any slight rotation of the plate will affect the gear mesh.

KEYBOARD SECTION

1. Filter Shaft - With the cycle shaft in the rest position, the working surface of the filter shaft should clear a depressed interposer by .005" to .010" (Fig. 2).

   Adjust by rotating the filter shaft to the correct position after loosening the filter shaft gear.

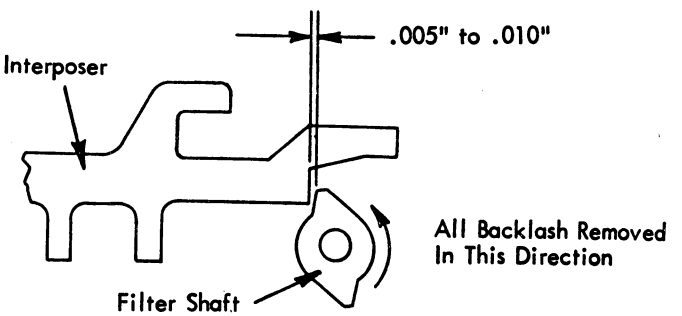


FIGURE 2. Filter Shaft Adjustment

All backlash of the gear train should be taken out forward when checking the filter shaft adjustment. This simulates a powered operation in which the momentum rotates the top of the filter shaft to its extreme forward position.

Insufficient clearance between the filter shaft and the interposers could allow the filter shaft to stop just under the rear of the interposers. The keyboard would then be inoperative, because the interposers could not be depressed.

Excessive clearance would delay the operation of the interposers. The selector latches would not be pulled forward until after having been pulled down slightly by the latch bail. This would result in excessive wear and a noisy operation as the latches were snapped forward from under the bail.

CAUTION: Excessive clearance will also cause malselection.

NOTE: Be sure to maintain .002" to .004" end play of the filter shaft within the left hand filter shaft bearing. The mounting of the left hand filter shaft bearing allows .011" lateral play of the bearing. Do not confuse this lateral play of the bearing with the filter shaft end play.

2. Rear Interposer Guide Comb - Adjust the interposer guide comb up or down so there is .020" to .030" clearance between the bottom edge of the interposers and a vane of the filter shaft (Fig. 3).

   The four interposer guide screws are accessible by inserting the medium screwdriver between the letter keylevers, beneath the front row of keybuttons.

   CAUTION: Check the clearance at several points along the filter shaft.

   NOTE: The purpose of this adjustment is to prevent "bridging". "Bridging" is a form of malselection caused by two or more interposers being depressed in front of the filter shaft and driven forward at the same time. Proper adjustment of the rear interposer guide comb allows only one interposer to be positioned in the path of the filter shaft at one time. An easy method of check-

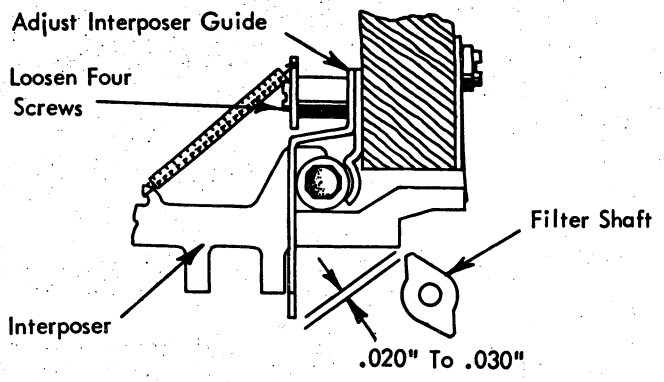


FIGURE 3. Rear Interposer Guide Comb

ing the guide comb adjustment is to latch one interposer down, depress an adjacent interposer until it is locked out by the selector compensator, and then slowly hand cycle the machine. The filter shaft should contact the interposer that is latched down and miss the adjacent interposer by at least .005". This check should be performed at several places along the filter shaft.

WARNING: The selector compensator tube is mounted to the rear of the interposer guide comb by four clamps and must move up and down with the guide comb when the guide comb adjustment is made. Be sure to loosen the guide comb mounting screws completely before attempting to move the guide comb. Do not hammer the guide comb into position as this can cause the compensator tube to shift with respect to the guide comb. The vertical position of the tube on the guide comb is set with respect to the stop strap riveted along the bottom of the guide comb and should not be disturbed.

3. Bail Parallel

a. Loosen cycle bail up stop and move it up out of the way of the cycle bail.

b. Adjust the left hand bail anchor plate forward or back in its oversized mounting holes so that the selector bails will be parallel to the lugs on the interposers.

c. Adjust the bail anchor plate up or down so that the cycle bail will rest as evenly as possible on all the interposers.

NOTE: The selector bails must be parallel to the interposer lugs so that the same travel will be given to the bails by the various interposers. A loss of motion to the selector latches could result from an unparallel condition. The cycle bail must be parallel so that the interposer latch springs can be adjusted evenly.

4. Interposer Latch Springs (Preliminary) With the H interposer latched down, adjust the left hand end of the right hand section of latch springs so that there will be approximately .015" remaining travel of the interposer before it bottoms (Fig. 4). Check this clearance by pulling the interposer down with a spring hook.

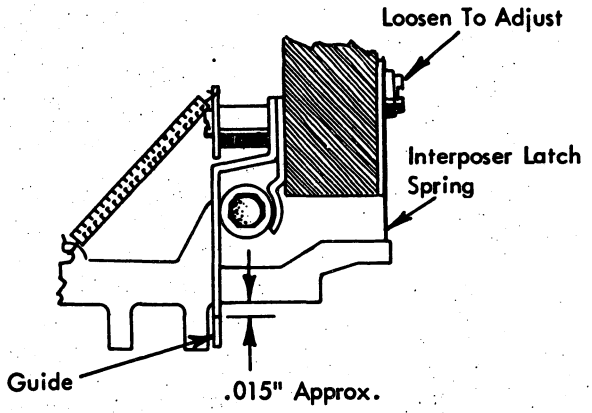


FIGURE 4. Interposer Latch Spring Adjustment

5. Cycle Clutch Latch Bite - Adjust the cycle clutch keeper bracket forward or back so that the cycle clutch latch overlaps the step on the cycle clutch sleeve by .030" to .035" (the thickness of the metal plate). (Fig. 5)

The overlap can readily be observed from the bottom of the machine.

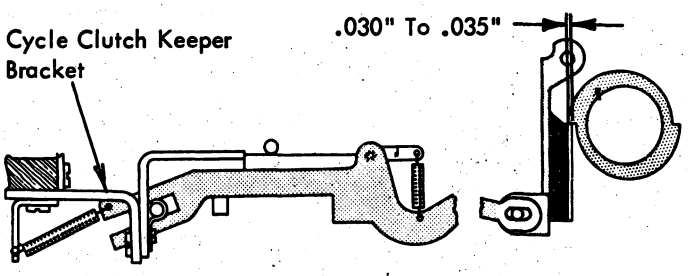


FIGURE 5. Cycle Clutch Latch Bite Adjustment

Insufficient overlap could allow the cycle clutch sleeve to kick past the latch and cycle again. Excessive overlap would slightly delay the unlatching action of the latch and create a sluggish action.

6. Cycle Clutch Latch Restoring

a. Late Style - Position the restoring roller so that the latch pawl overthrows the keeper by .020" to .025" with the restoring cam on its high point. Check on both restoring cam lobes and adjust on the lobe providing the least motion (Fig. 6).

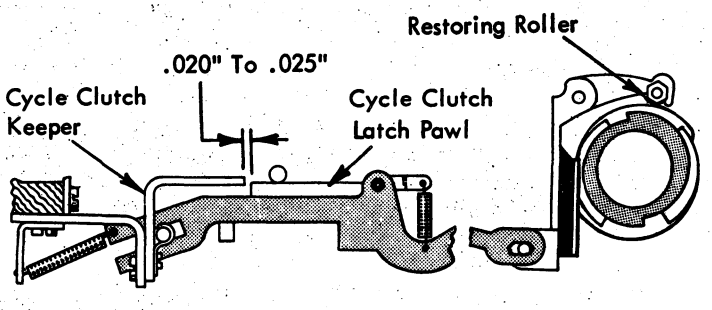


FIGURE 6. Cycle Clutch Latch Restoring, Late Style

b. Early Style - Adjust the restoring lever so that the latch pawl overthrows the keeper by .030" to .045" (Fig. 7).

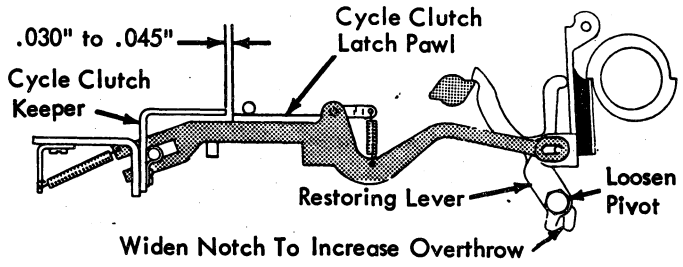


FIGURE 7. Cycle Clutch Latch Restoring Adjustment

7. Cycle Clutch Release Point - Adjust the cycle clutch keeper vertically for .002" to .008" clearance between the pawl and the keeper with the H interposer latched down. The clearance must be observed at the point of unlatching because it increases as the latch moves forward (Fig. 8).

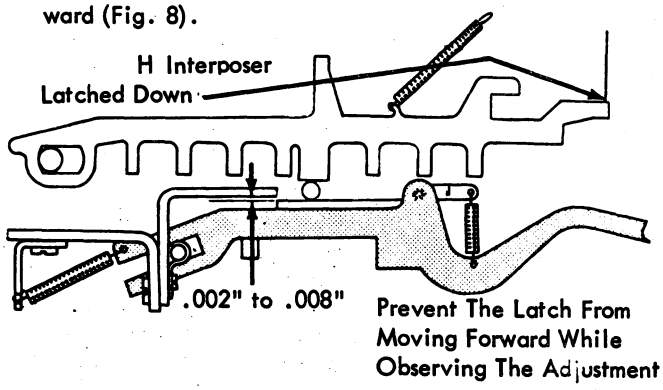


FIGURE 8. Cycle Clutch Release Point Adjustment

Too much clearance indicates that the clutch is being released too early in the travel of the interposer. Erroneous selection can occur because a flicking action on the keylevers can cause the cycle clutch to be released without latching an interposer down. As a result, the filter shaft will not drive an interposer forward and the hyphen or underscore will be printed.

Insufficient clearance does not insure that the clutch will be released when an interposer is latched down. If an interposer is latched down without releasing the clutch, the keyboard will be locked because the interposer will remain in the compensator. The keyboard can be unlocked only by depressing the latched interposer a second time sufficiently to unlatch the clutch.

8. Interposer Latch Spring Adjustment, Final - Position the left and right interposer latch spring sections vertically so that the .002" to .008" latch pawl to keeper clearance is maintained with various interposers latched down.

NOTE: Adjusting the interposer latch springs by this method provides a simultaneous interposer latching with respect to cycle clutch release for all interposers. It also compensates for any deviation in parallelness between the rear interposer guide comb and the cycle bail.

The interposer latch springs are adjusted as low as possible to minimize "flicking". "Flicking" is caused by the interposer failing to remain in the path of the filter shaft vane when the shaft is operated. By adjusting the latch springs as low as possible, a lower cycle clutch release point can be achieved. This helps to minimize "flicking" because the interposer must now travel further into the path of the filter shaft vane in order to release the cycle clutch and remains in the path of the filter shaft for a longer period of time during a "flicking" condition.

9. Cycle Clutch Latch Pawl Bite - Adjust the cycle clutch bail upper stop to provide .030" to .035" bite between the latch pawl and its keeper (1/2 the thickness of the keeper) (Fig. 9).

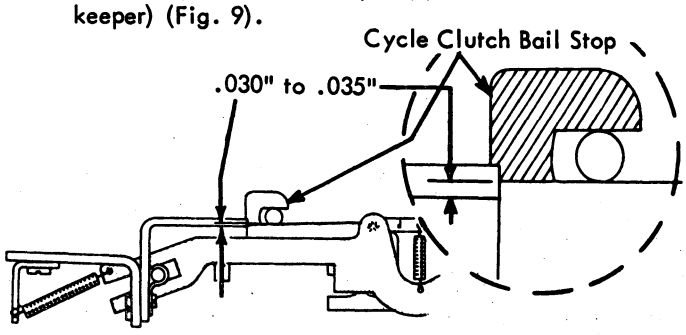


FIGURE 9. Cycle Clutch Latch Pawl Bite Adjustment

The bail stop is mounted with two nuts and two screws. These nuts and screws also control the position of the character interrupter bail plate. In order to adjust the cycle clutch bail stop it is only necessary to loosen both nuts and the front screw. Do not loosen the rear screw.

Insufficient bite increases the possibility of a repeat cycle because positive latching is not insured. Excessive bite will affect the touch of the keyboard because the latch pawl must be moved farther in order to trip the clutch.

10. Front Keylever Guide Comb - Position the guide comb vertically to allow the keylevers to travel .010" to .020" after the keylever pawl resets (Fig. 10).

NOTE: An individual keylever may be adjusted by opening or closing the horseshoe slot on the keylever.

CAUTION: Movement of the front keylever guide comb will affect the adjustment of the operation keylevers.

The character interposer should not bottom in the rear interposer guide comb slots when the keylever bottoms in the front keylever guide comb. This could result in a keyboard touch problem and possibly keylever pawl breakage.

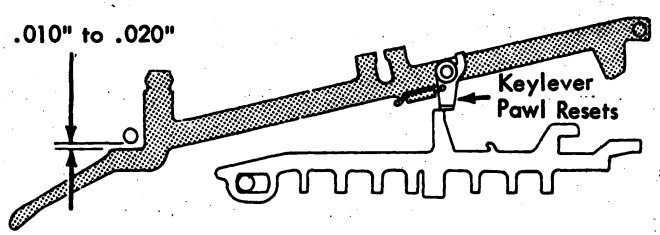


FIGURE 10. Front Keylever Guide Comb

11. Selector Compensator - Adjust as follows:

a. Late Style (Fig. 11)
   1. Loosen locking set screws in the LH and RH nylon blocks.
   2. Latch the extreme RH interposer down.
   3. Tighten the RH adjusting plug so that the end ball will trap the interposer in the latched position when the interposer latch is manually disengaged.
   4. While holding the latch spring away from the interposer, back out the adjusting plug slowly until the interposer restores freely - then back out 1/6 turn more (one flat on the hexagon nut is 1/6).

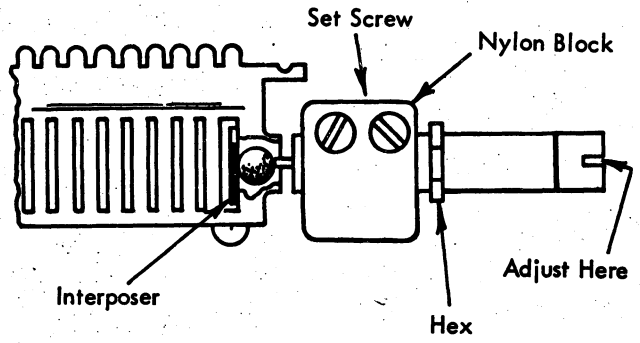


FIGURE 11. Compensator Adjustment, Late Style

   5. Repeat the same procedure on the LH side.
   6. Tighten the locking screws in the nylon blocks.

b. Early Style (Fig. 12) - With the extreme RH interposer latched down and held against the right side of its guide slot, adjust the adjusting screw (or slider) until the extreme RH ball is trapped between the interposer and the adjusting screw (or slider). Follow the same procedure for the left side.

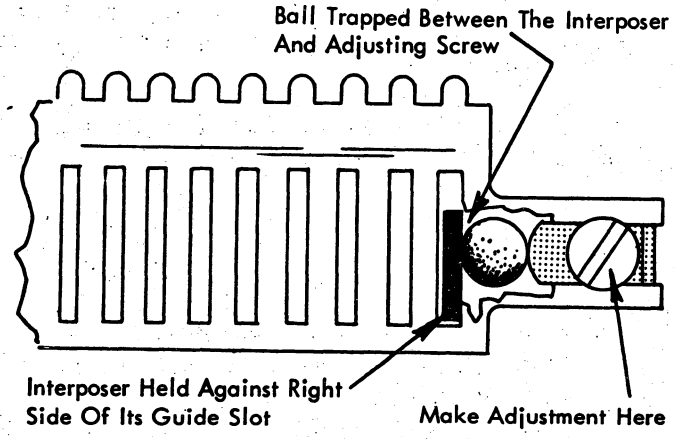


FIGURE 12. Compensator Adjustment, Early Style

12. Latch Bail Shaft - Adjust the plate that supports the right end of the bail shaft so that the bail shaft is parallel to the cycle shaft.

This adjustment is extremely important because the rollers on the latch bail MUST contact their respective selector cams at the same point and with the same pressure in order to insure that both cams operate the bail together.

The bail shaft is set at the factory and should not require a readjustment unless the plate becomes loosened or parts replacement is necessary. This is a difficult adjustment to make and should not be loosened unless absolutely necessary.

The adjustment can be made if necessary by loosening and tightening the bail shaft plate mounting screws with a hammer and screwdriver. The screws should be left friction-tight until the correct position of the plate is obtained in order to facilitate the adjustment.

The bail shaft plate must be adjusted both vertically and horizontally in order to make the rollers of the latch bail ride their respective cams equally. Changing either the vertical or horizontal position will affect the other; therefore both adjustments must be considered together and adjusted alternately until both are correct. If a readjustment is necessary, the following procedure may be used.

a. The correct vertical position is obtained by raising or lowering the bail shaft mounting plate until both bail rollers have equal pressure against their respective cams. Check by testing the drag on strips of paper inserted between the rollers and the cams.

b. The front to rear position of the bail shaft plate can be set relative to the cycle shaft. Set the Hooverometer to span the distance between the cycle shaft and the left end of the bail shaft as illustrated in Fig. 13. Move the Hooverometer to the right and adjust the bail shaft plate forward or back to the same clearance as at the left side. With the bail shaft parallel to the cycle shaft, the bail rollers should be contacting their respective cams at the same point.

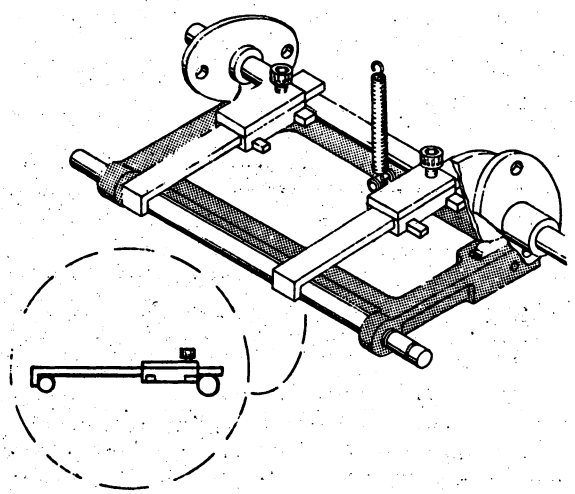


FIGURE 13. Latch Bail Shaft Plate Adjustment

NOTE: As a final check for the adjustment of the latch bail plate, hand cycle the machine using a zero tilt, zero rotate character (all latches removed from the bail). Both latch bail rollers should maintain contact with their respective cams throughout the cycle.

CAUTION: On early level machines the cycle bail stop and the character interrupter must be readjusted after any change in the position of the bail shaft plate, because both of these parts are mounted on the plate.

13. Differential Guides

a. The rotate differential guide should be adjusted left or right so that the vertical links of the system hang in a true vertical position (Fig. 14).

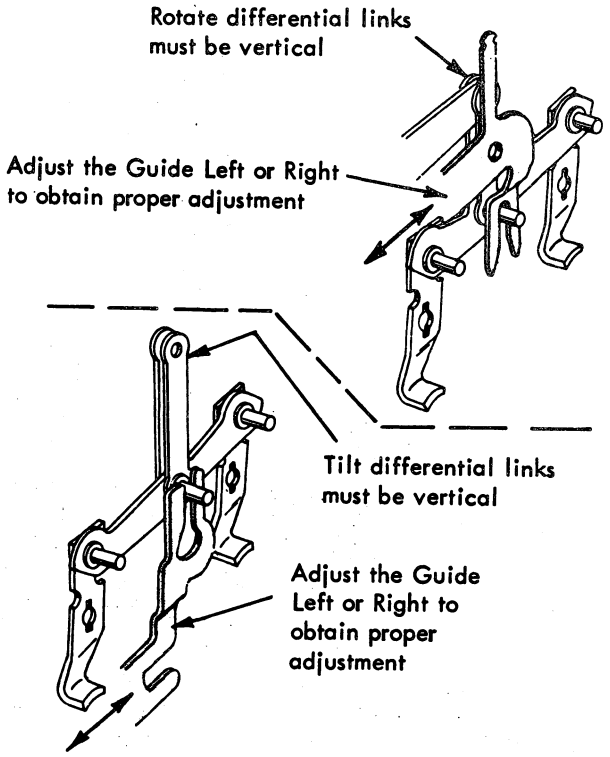


FIGURE 14. Selector Latch Guides

The guide for the rotate differential is attached to the top of the differential mounting bracket by two screws just behind the balance lever. The screws are accessible from the rear with the motor removed.

The tilt differential guide is attached to the bottom of the differential mounting bracket and is easily accessible from beneath the machine.

b. The latch bail guide should be adjusted left or right so that all positive rotate and tilt selector latches hang vertically in the latch bail. The guide is attached to the lower left corner of the differential mounting bracket (Fig. 15).

14. Latch Bail Stop - The latch bail stop, located just beneath the bail, prevents the bail from getting beneath the selector latches during shipment. Adjust the stop to clear the latch bail by .005" to .015" when the bail is at the high point of the cycle shaft cams (Fig. 16).

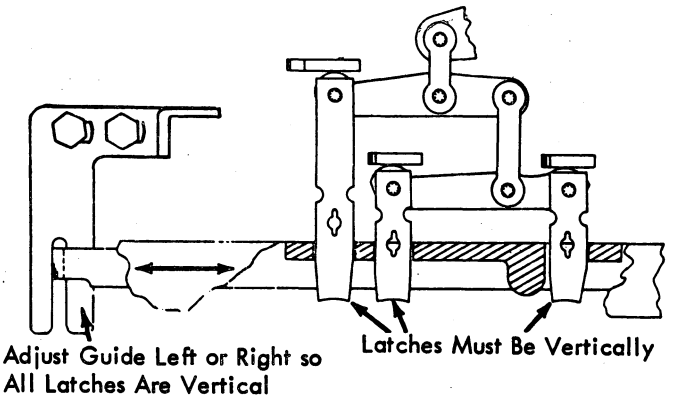


FIGURE 15. Latch Bail Guide

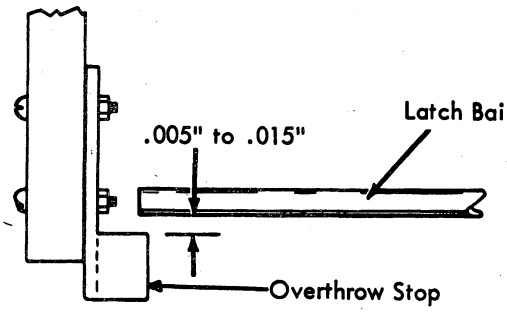


FIGURE 16. Latch Bail Overthrow Stop

NOTE: Excessive clearance will allow the bail to overthrow at the high point of the cams. During the overthrow it is possible for the latches to get on top of and bind off the bail. This condition is more prevalent with the check latch.

15. Latch Interposer Stop - Form the stop lugs to obtain .001" to .005" clearance between each latch interposer and its respective selector bail (Fig. 17 or 18).

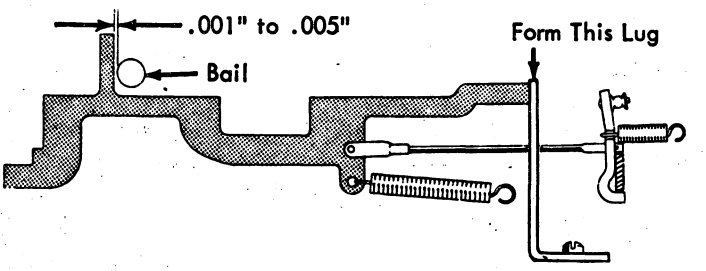


FIGURE 17. Latch Interposer Stop (Early Style)

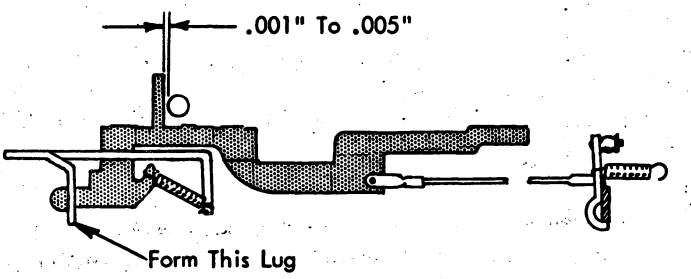


FIGURE 18. Latch Interposer Stop (Late Style)

NOTE: On the late style, be sure that the left to right position of the front interposer mounting bracket is such that the latch links will exert a straight pull on the selector latches.

The latch interposer stop lugs establish a position for the latch interposers so that the correct adjustment of the selector latch links can be obtained. Selection timing will be directly affected by an erroneous stop lug adjustment.

16. Selector Latch Links

a. With the machine at rest adjust the negative 5 latch link so that the negative 5 latch will overlap the stop screw head by .050" to .060" (Fig. 19).

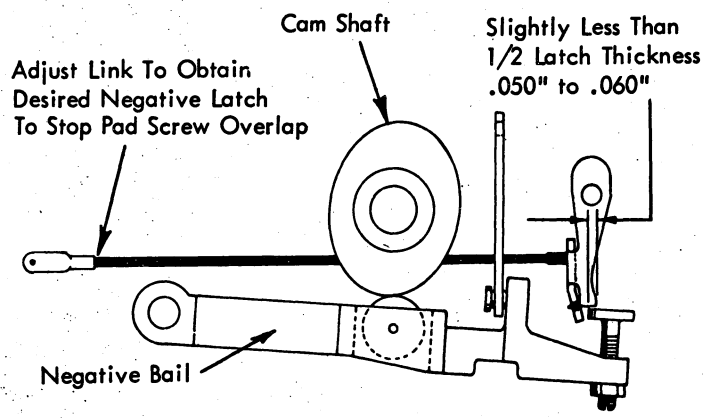


FIGURE 19. Negative Latch Link

b. With the machine at rest adjust the tilt and positive latch links so that their latches will overlap the latch bail with .005" to .015" overhang (Fig. 20).

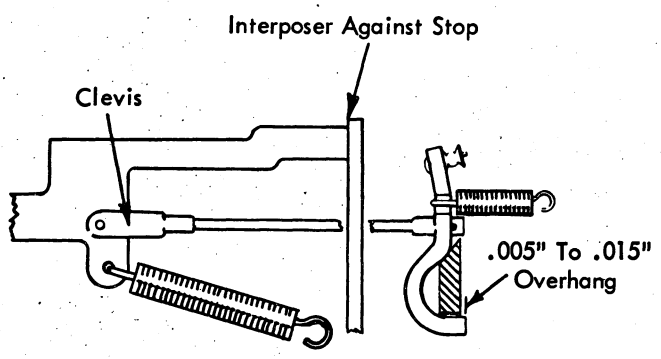


FIGURE 20. Tilt and Positive Latch Links

Adjusting a link too short can result in erroneous selection because the latch will not have a secure bite on the latch bail plate (or negative-five stop screw). The force of operation could cause the latch to slip off part of the way through a cycle and cause a noisy operation as well as erroneous selection.

17. Check Latch

a. Upstop (Fig. 21) - With the selector cams at the low point, form the upstop so that the latch clears the bail by .020" to .025".

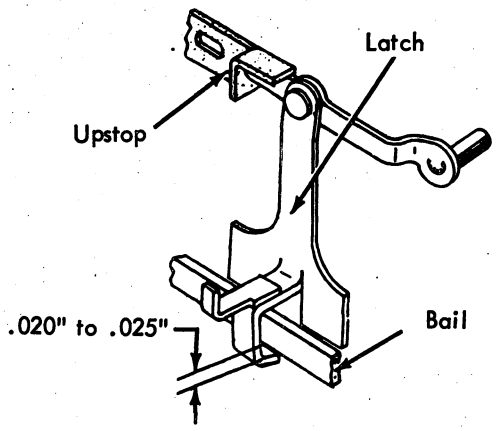


FIGURE 21. Check Latch Upstop

Insufficient clearance may cause the check latch to fail to reset under the bail plate. It may allow the check latch to get on top of the bail and bind off the bail.

b. Spring Return Arm (Fig. 22) - Position to hold the pivot arm against the upstop.

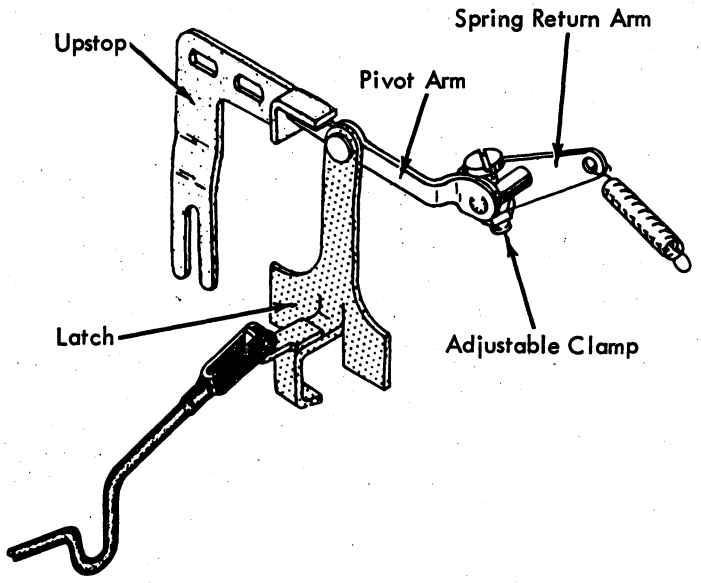


FIGURE 22. Check Latch Spring Return Arm

c. Check Latch Link - With the machine at rest adjust the check latch link so that the check latch clears the bail by .001" to .010" (Fig. 23).

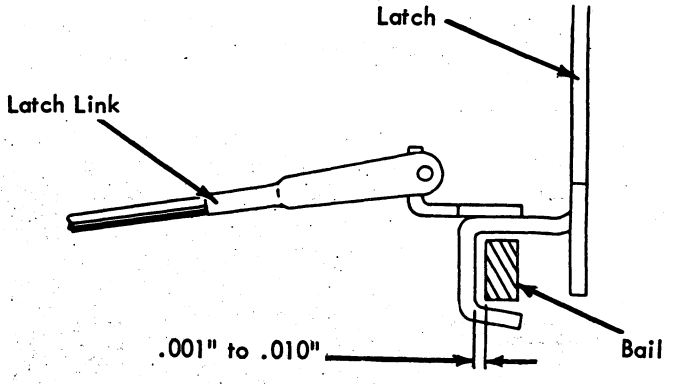


FIGURE 23. Check Latch Link

LATCH PUSHER ASSEMBLY

NOTE:

a. Do not remove pusher plate unless replacement of the plate is required.

b. The selector latch link adjustments (Figure #'s 19, 20, and 23) must be correct before making any pusher to latch extension adjustments.

c. When removal of the Latch Pusher Assembly is required, scribe (for reinstallation reference) the pusher plate to power frame relationship. If the original relationship can be maintained, the adjustments will not have been destroyed by removal. In case of loss of relationship, position the pusher plate as nearly as possible for the prescribed latch to pusher clearances (Fig. 25A) and proceed with the following adjustments.

1. Pusher Bail Eccentrics (Fig. 24) - Adjust so that the top edge of the follower arms are flush with the pusher bail.

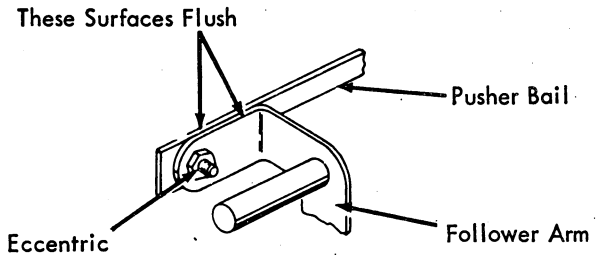


FIGURE 24. Pusher Bail

2. Latch Pushers T2, T1, R2, R1, & R5 (Fig. 25A) - Form to clear their respective latch extensions by .025" to .035".

3. Latch Pusher, R2A (Fig. 25A) - Form to clear latch extension by .040" to .050".

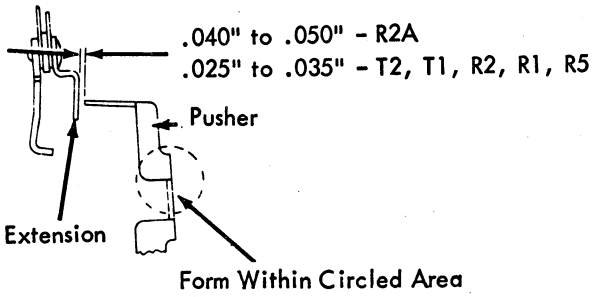


FIGURE 25A. Latch Pushers

Malselection or parity errors may be caused by the latch pushers contacting their latch extensions when an unselected pusher is against its armature. There should be a minimum of .002" clearance (Fig. 25B) between the pusher and the latch extension when the pusher is against its armature. To check this adjustment, turn machine power off, trip the cycle clutch, and hand cycle a few degrees through a cycle. The pusher cam follower should be on the low dwell of the pusher cam.

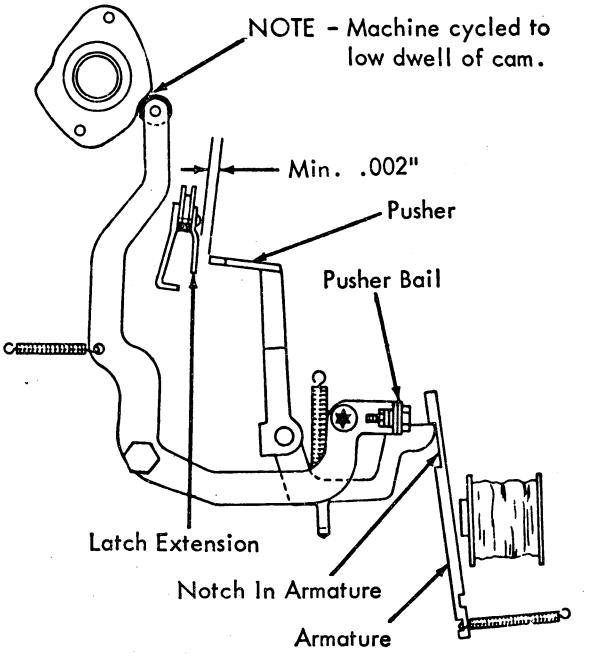


FIGURE 25B. Pusher Clearance

4. Check Latch Pusher (Fig. 26) - Form so that the check latch clears the selection bail by .020" to .030". This clearance must be observed with the selection bail lowered slightly.

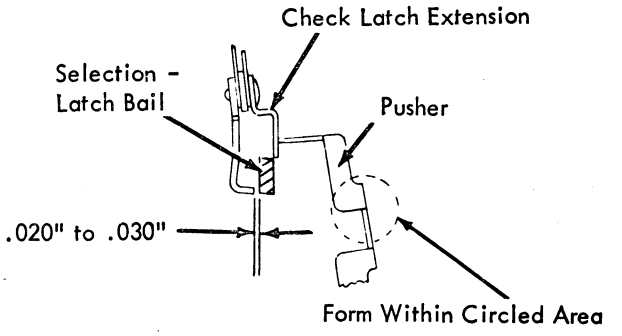


FIGURE 26. Check Latch Pusher

Adjustments 2, 3 and 4 along with the Print Magnet armature to Pusher adjustments insure that the pushers will not contact the latch extensions when the latches are active (pulled down by the bail).

PRINT SELECTION MAGNET ASSEMBLY (EARLY STYLE)

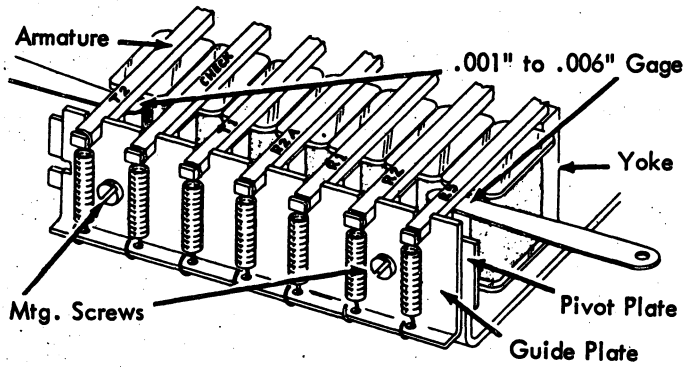
NOTE:

For complete adjustment, the magnet unit should be removed. To prevent interference from the trip bail, turn the high points of the pivot eccentrics to the top.

1. Pivot Plate (Fig. 27) - Adjust for a clearance of .001" to .006" between the yoke and armatures with the armatures manually attracted. Measure clearances at the outside armatures (T2 & R5).

2. Guide Plate (Fig. 27) - Position as follows:

a. Vertically - to provide equal spring tension on all armature springs.
b. Horizontally - so that all armatures are centered in the guide slots.



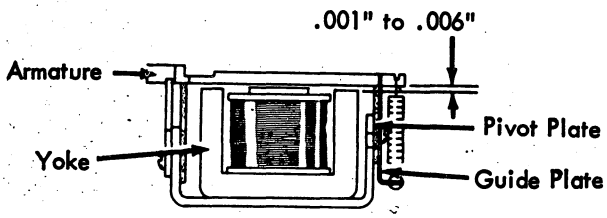


FIGURE 27. Pivot Plate

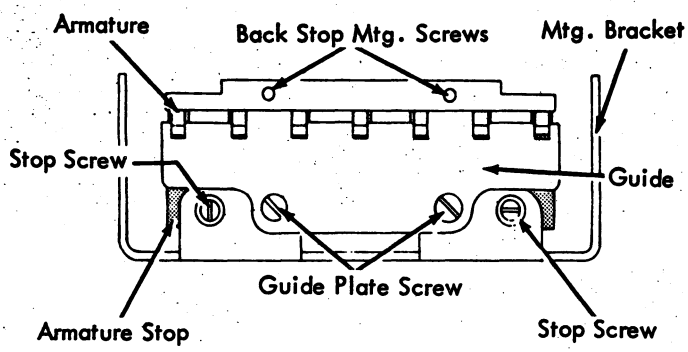


FIGURE 28. Armature Stop

3. Armature Stop - With the armature manually attracted, adjust for a clearance of .004" to .008" between the armatures and yokes (Fig. 29 - see Fig. 28 for assembly end view). Measure clearances at the outside armatures (T2 & R5).

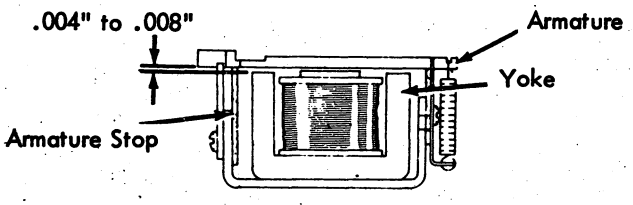


FIGURE 29. Armature Stop

4. Armature Guide - Position horizontally so that the armatures are centered in the guide slots (Ref. Fig. 28).

5. Back Stop (Fig. 30) - Position vertically (with armatures at rest) for a clearance of .041" to .044" between the armature stop and armatures. Measure clearance at the outside armatures (T2 & R5).

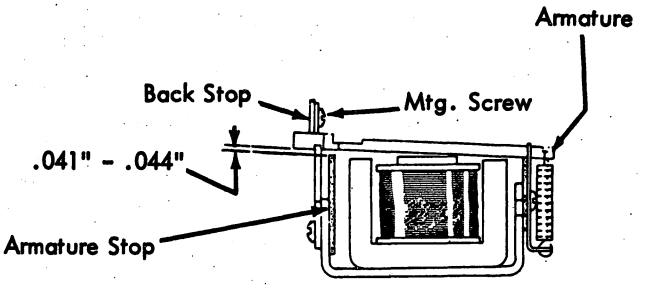


FIGURE 30. Armature Backstop

6. Pivot Eccentrics (Fig. 31) - Adjust so that the cycle clutch trip bail is parallel to the armatures. The following procedure may be used.

a. Disconnect the trip link (Fig. 35).
b. Apply slight pressure to the knock off extension (Fig. 34) or trip link extension to hold the bail in contact with the armatures.
c. Apply slight pressure to the T2 and R5 armatures (Ref. Fig. 27). Both armatures should be touching the trip bail. If not, adjust the pivot eccentrics to satisfy this condition.

NOTE: The high point of the pivot eccentrics must be toward the top (paper feed area) of the machine.

d. After completing step c, while holding the trip bail against the armatures, check the center armatures to be sure they are touching the trip bail or clear it by a maximum of .002". Excessive clearance can cause extra cycles.

NOTE: Item 6 is a preliminary adjustment. For final adjustment, see note under Item 3 of cycle clutch trip mechanism.

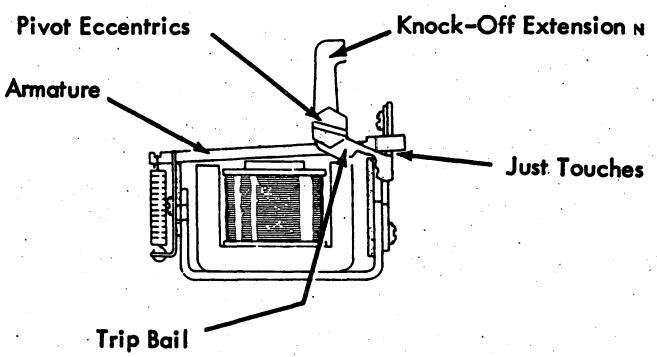


FIGURE 31. Pivot Eccentrics

7. Magnet Unit (Fig. 32) - Position under its two mounting screws for .005" to .010" clearance between the pusher tails and armature latching surfaces (armatures at rest).

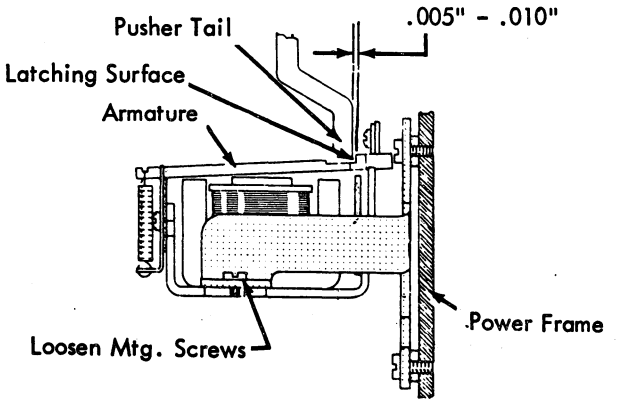


FIGURE 32. Magnet Unit Position

This adjustment insures that the pusher does not contact its latch extension when the pusher is against its armature during a print cycle. If allowed to touch mal-selection will result.

8. Mounting Bracket (Fig. 33) - Position under its four mounting screws for .001" to .010" clearance between the pusher tails and armatures.

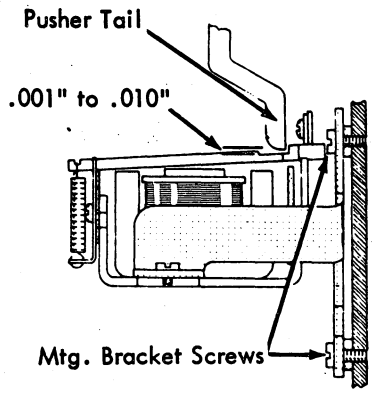


FIGURE 33. Mounting Bracket Position

NOTE:

Adjustments 7 & 8 are interacting - both requirements must be satisfied.

Excessive clearance may cause mal-selection since the armature may not hold the pusher tail when the magnet is not energized.

No clearance (the pusher holding the armature away from rest) can cause mal-selection since the pusher may not be released when the armature is attracted by its magnet. Also extra cycles may result since the armature at rest would be holding the cycle clutch trip bail partially rotated.

9. Knock Off Eccentrics (Fig. 34) - Adjust (T2 and R5 armatures manually attracted) to clear the trip bail extensions by .003" to .008".

Excessive clearance will cause extra cycles due to the armatures not being knocked off. It is necessary to knock off the armatures since residual magnetism is present.

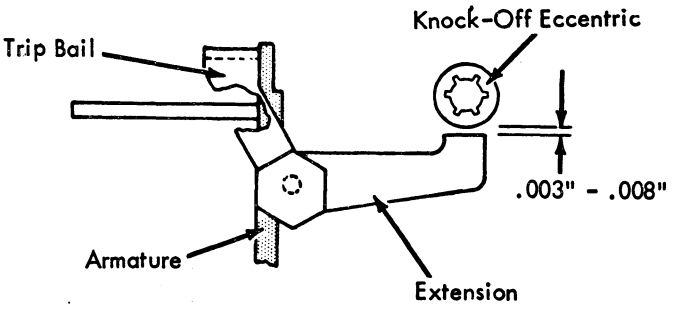


FIGURE 34. Knock Off Eccentrics

No clearance will cause failure to cycle because the trip bail will not be able to rotate to trip the cycle clutch.

PRINT SELECTION MAGNET ASSEMBLY (Late Style)

NOTE: The late style magnet assembly may be identified by the absence of pivot eccentrics, and the single knock-off extension (Fig. 34.1).

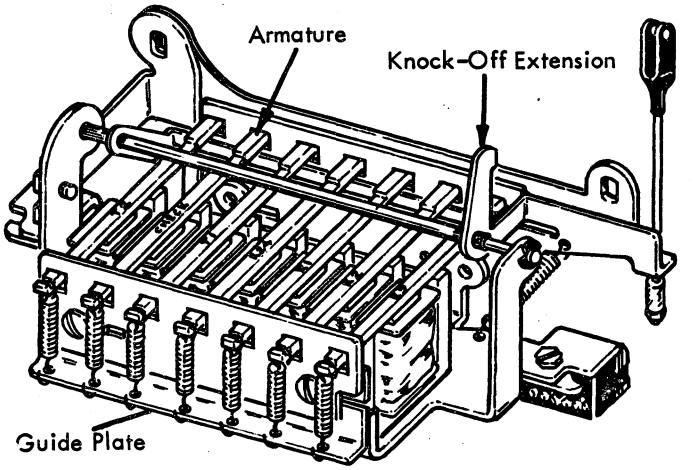


FIGURE 34.1 Magnet Assembly

1. Guide Plate (Fig. 34.1) - The position of the guide plate is predetermined by holes which fit over stamped projections on the pivot plate.

2. Pivot Plate (Late Style) Fig. 34.2 - Adjust for a clearance of .002" to .005" between the yoke and armatures with the armatures manually attracted. Measure clearance of the outside armatures (T2 & R5).

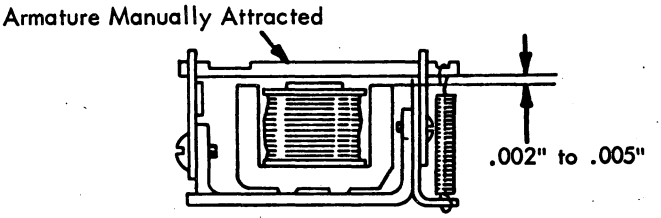


FIGURE 34.2 Pivot Plate

3. Armature Stop (Late Style - With the armature manually attracted, adjust armature stop for a clearance of .003" to .007" between the armature and yoke (Fig. 34.3).

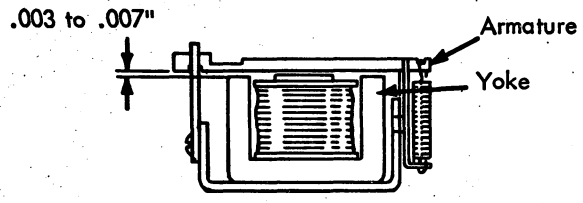


FIGURE 34.3 Armature Stop

4. Knock-Off Eccentric (Late Style) - The redesigned trip bail contains only one extension. It is adjusted to .003" to .008" as shown on Fig. 34.

5. Trip Bail (Late Style) - Adjust so that the cycle clutch trip bail is parallel to the armatures. The following procedure may be used:

   a. Disconnect the trip link.

   b. Loosen screw (Fig. 34.4).

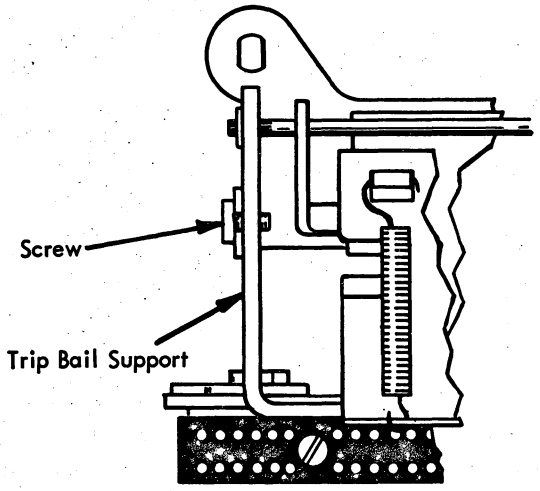


FIGURE 34.4 Trip Bail

   c. Apply slight pressure to the knock-off extension (Fig. 34.1).

   d. Apply slight pressure to the T-2 and R-5 armatures (Fig. 34.1). Both armatures should be touching the trip bail. If not, form the left trip bail support to obtain this condition.

   e. Tighten screw in Fig. 34.4.

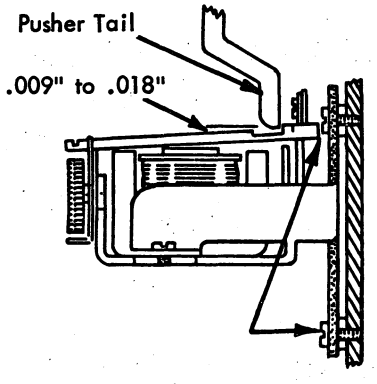


FIGURE 34.5 Mounting Bracket

6. Magnet Unit (Fig. 32) - Position under its two mounting screws for .005" to .010" clearance between the pusher tails and the armature latching surfaces (armatures at rest).

7. Mounting Bracket (Fig. 34.5) - Position under its four mounting screws .009" to .018" clearance between the pusher tails and armatures.

8. Trip Link (Late Style) - The clevis is now attached to the link and the adjustment is made with a self-locking nut. The adjustment is the same as in Fig. 37.

CYCLE CLUTCH TRIP MECHANISM, LATE

1. Latch Stop (Unit Removed) (Fig. 35) - Position so that the latch lever overlaps the trip lever lug by .040" to .045".

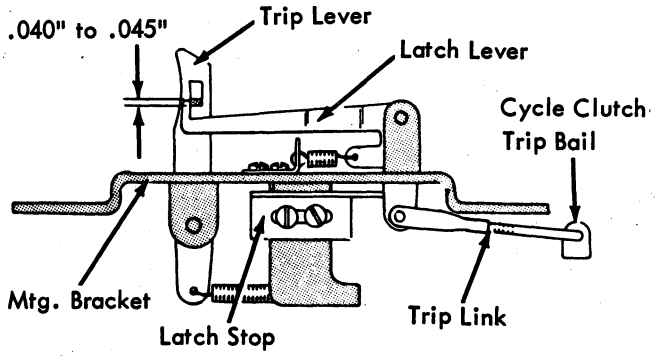


FIGURE 35. Latch Lever

Insufficient "bite" could cause extra cycles since the trip lever may slip off the latch lever.

Excessive "bite" may cause failure to cycle since there is a limited amount of motion available from the armatures to pull the latch lever down.

2. Mounting Bracket (Unit Installed) (Fig. 35) - Position front to rear so that the trip lever clears the cycle clutch latch by .003" to .010" (Fig. 36).

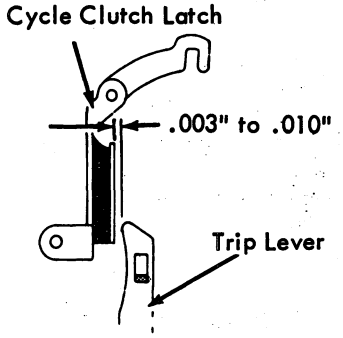


FIGURE 36. Mounting Bracket Position

Excessive clearance may cause extra cycles since the trip lever is restored by the cycle clutch latch restoring motion.

Insufficient clearance may cause extra cycles due to the cycle clutch latch bouncing off the trip lever.

3. Trip Link Clevis (Fig. 35) - With either the T2 or R5 armature manually attracted, adjust the clevis so that the latch lever overthrows the trip lever lug by .005" to .020" (Fig. 37).

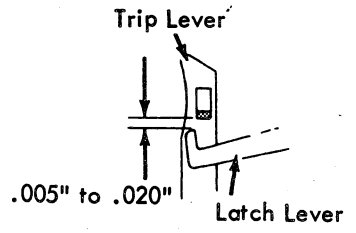


FIGURE 37. Trip Link Adjustment

NOTE:
If necessary, refine the pivot eccentric adjustment to obtain equal latch lever overthrow from the T2 and R5 armatures (Ref. Fig. 31).

CYCLE CLUTCH TRIP MECHANISM, EARLY

1. Trip Link (Fig. 38) - Hold a print magnet armature attracted and adjust the cycle clutch trip link clevis to move the cycle clutch latch .002" to .007" away from the clutch sleeve.

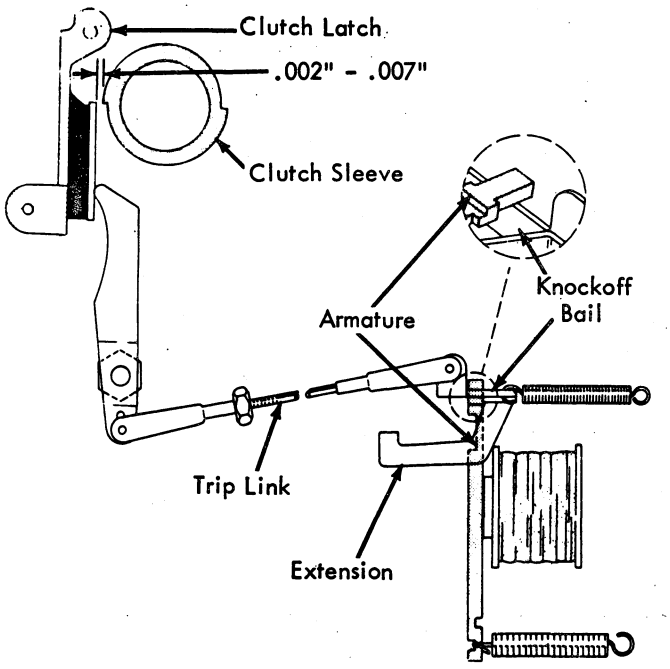


FIGURE 38. Early-Style Cycle-Clutch Trip-Link Adjustment

INHIBITOR

1. Adjust the inhibitor trip lever (Fig. 39) so that the bottom edge of the inhibitor pawl is flush with the bottom edge of the cycle clutch latch (Fig. 39) with all parts at rest.

This adjustment provides an adequate "bite" between the cycle clutch latch and inhibitor pawl to prevent extra cycles.

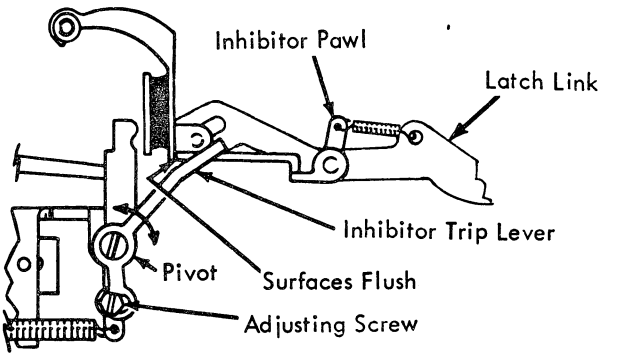


FIGURE 39. Inhibitor

PRINT SELECTION CONTACT ASSEMBLY

1. Contact Stacks (Fig. 40) - Align so that the strap edges are parallel. Loosen mounting screws and shift contact blocks for adjustment.

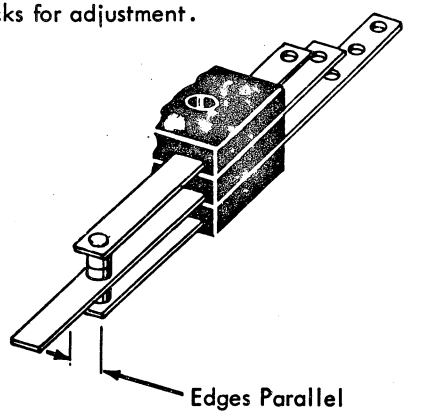


FIGURE 40. Contact Stacks

NOTE:
The contact assembly should be removed for complete adjustment.

2. Actuator Guides (Fig. 41) - Mount squarely against the rear edge of the contact mounting plate with the actuators centered between the contact operating straps. The actuator guide and contact mounting screws must both be loosened for this inter-related adjustment.

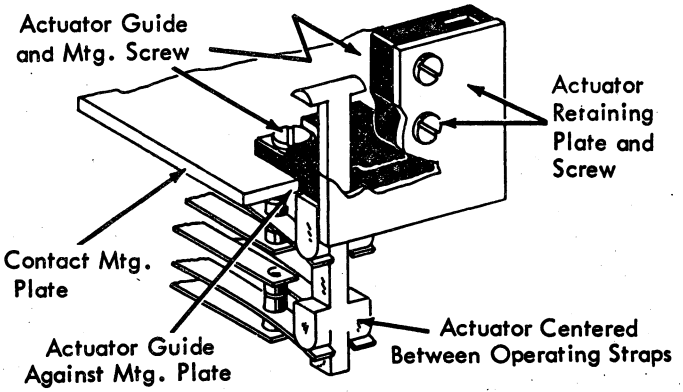


FIGURE 41. Actuator Guides

3. Contact Straps (Fig. 42) - Form (actuators at rest) as required to satisfy the following conditions.

a. The O/P should just touch the actuator camming surface.
b. The O/P should produce a slight rise of the N/C straps.
c. The N/O to O/P clearance should be .020" to .030". The low end of the tolerance is preferable.

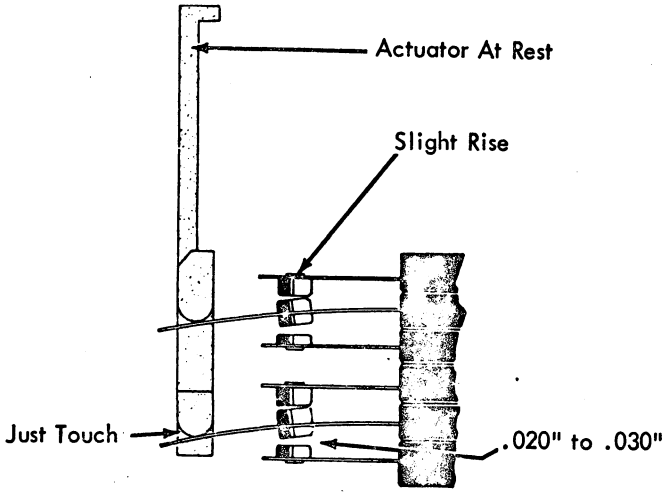


FIGURE 42. Contact Straps

4. Contact Assembly Mounting Plate - Position for the following conditions.

a. To the rear so that the actuator retaining plates contact the differential plate.

b. Left to right so that the step in the actuator guide plate clears the L.H. side of the R-5 bail.

PRINT FEEDBACK CONTACT ASSEMBLY, C1 and C2

On present production machines, C2 is nearest the power frame with C1 on the outside. Some low serial number Printers have this arrangement reversed. The longer (C2) and shorter (C1) duration can easily be distinguished by inspection since the cam land is widest on the longest duration (C2) cam.

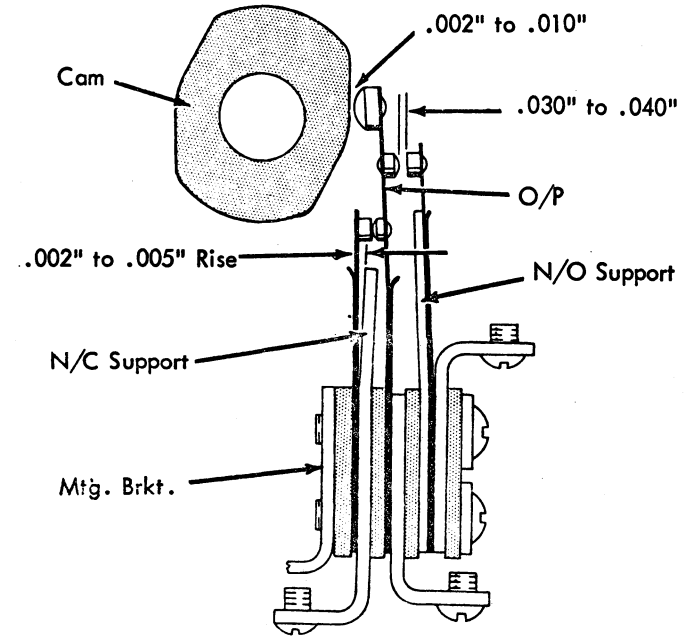


FIGURE 43. Print Feedback Contacts

1. Form the N/C supports so that the O/P's lift the N/C contacts .002" to .005" from the N/C supports (Fig. 43).

2. Preliminary adjustment of N/O support straps is for .030" to .040" air gap between O/P and N/O contact. Adjust for correct timing after Adjustment 3.

3. Position the contact mounting bracket so that the O/P's clear the cam (at the low point) .002" to .010" (Fig. 43).

NOTE:
Print feedback contacts #1 and #2 are mounted on different tabs to permit equalization of the O/P to cam clearance (Fig. 44).

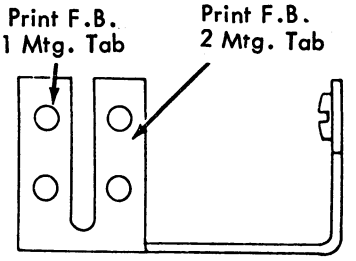


FIGURE 44. Print Feedback Bracket

TIMING CHART

	C-1 N/O		C-2 N/C	
MACHINE	MAKE	BREAK	BREAK	MAKE
731 ET	85° ±3	130° ±3	20° ±3	120° ±3
735 ET	85° ±3	130° ±3	20° ±3	120° ±3
775 MT/ST	85° ±3	130° ±3	20° ±3	120° ±3

FIGURE 45. Timing Chart

CAM CHART

Contact	N/O Duration	Color
C-1	45°	Blue
C-1	65°	Black
C-2	90°	White
C-2	110°	Orange

FIGURE 46. Cam Chart

KEYLEVER CONTACTS

NOTE:
The contact assembly should be removed from the contact and stop screw mounting bracket for adjustments 1 & 2.

1. Stop Screw (Fig. 47)

   a. Position the mounting bracket (left or right) so that the stop screws are directly under the keylever.
   b. Adjust the keylever stop screws so that the keylevers do not go further down than the tab keylever.

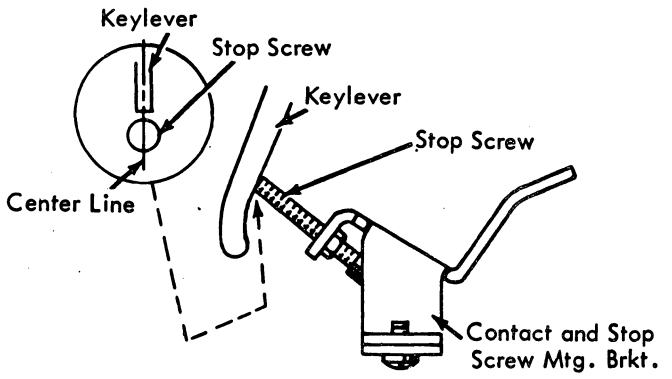


FIGURE 47. Stop Screw

2. Contact Position (Fig. 48)

   a. Position the contacting actuating springs relative to the O/P's for vertical alignment.
   b. Form the N/C contact so that the O/P (at rest) lifts the N/C contact adequately. In this condition, check for sufficient O/P to N/O contact air gap. The N/C contact must break before the N/O contact makes.

NOTE:
Contact assembly must be installed for adjustments.

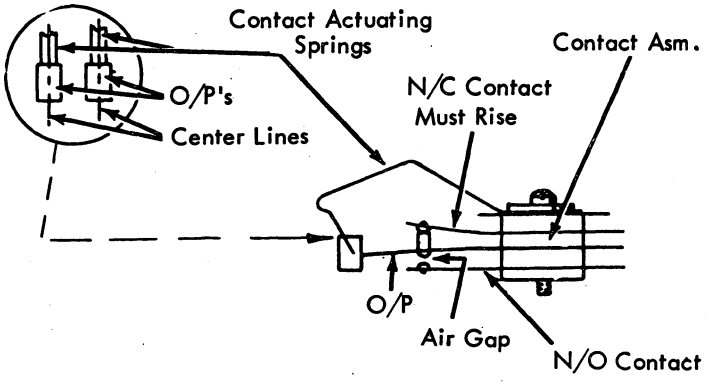


FIGURE 48. Contact Position & Air Gap

3. Contact Assembly Position, unit installed (Fig. 49)

   a. Position the contact assembly (left or right) on the mounting bracket so that the keylevers are centered on their contact actuating springs.
   b. With the keylevers held against their stop screws, position the mounting bracket (front to rear) for adequate rise of the N/O contacts.

   Check the following conditions:
   1. The N/C contact must open.
   2. Overthrow after the N/O contact makes must not be great enough to damage the contact straps.

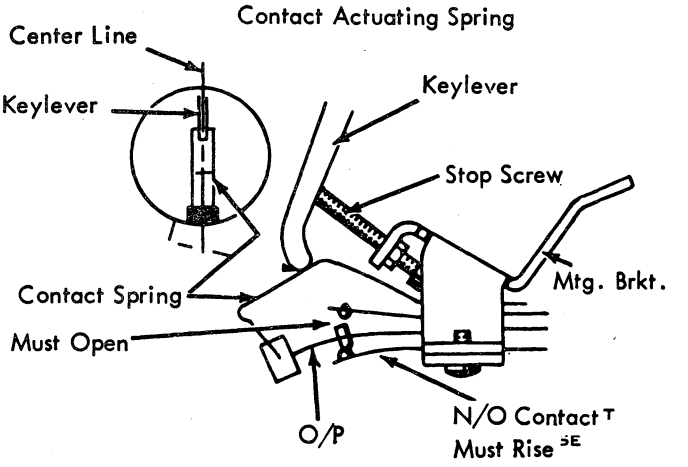


FIGURE 49. Keylever Contact Adjustment

4. Index Keylever Contacts - Position the contact bracket so that the O/P just touches the index keylever.

KEYBOARD LOCK MECHANISM

1. Switch Link - With the On/Off Switch in the off position adjust the switch link so that the On/Off keybutton matches the slope of the keyboard (Fig. 50).

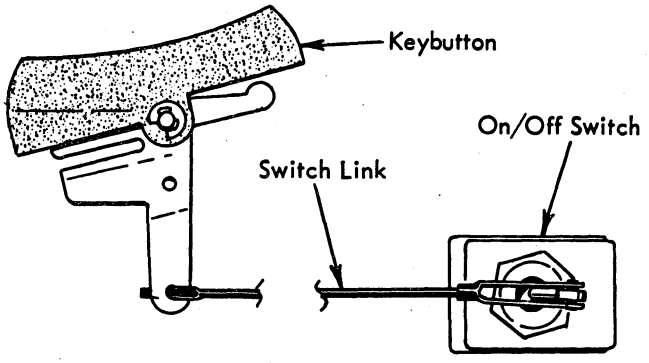


FIGURE 50. On/Off Switch

Adjusting the link too long can cause the switch to turn off due to the spring load in the off direction and also the load from the lockout shaft.

2. Lockout Bail Link - Position the clevis approximately half way on the threads of the link (Fig. 51).

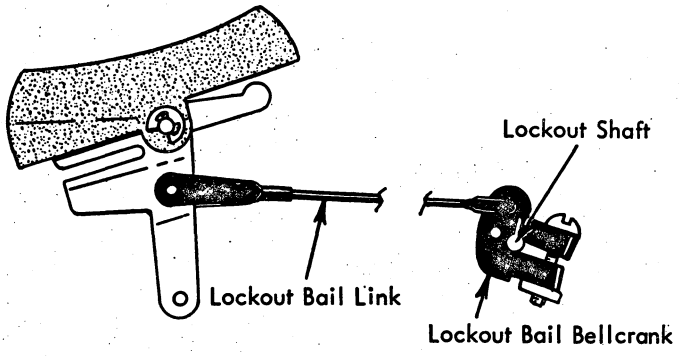


FIGURE 51. Lockout Link

3. Lockout Bail Bellcrank - With the On/Off switch in the off position rotate the lockout bail relative to the lockout bail bellcrank (Ref. Fig. 51) so that the cycle clutch pawl stop overlaps the cycle clutch pawl by 1/3 to 1/2 (Fig. 52).

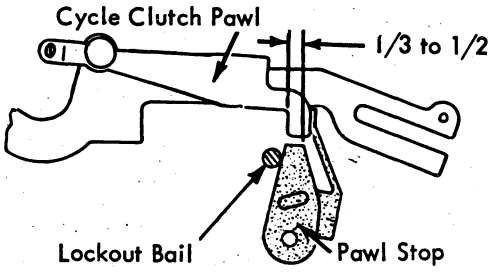


FIGURE 52. Cycle Clutch Pawl Stop

Excessive overlap between the pawl stop and cycle clutch pawl can cause keyboard lockup to occur since the pawl stop must move to the rear and the cycle clutch pawl to the front to unlock the keyboard.

4. Keyboard Lock Bellcrank Link - Adjust the link so that the bellcrank is fully bottomed in the selector compensator without choking off the action of the lockout bail (Fig. 53).

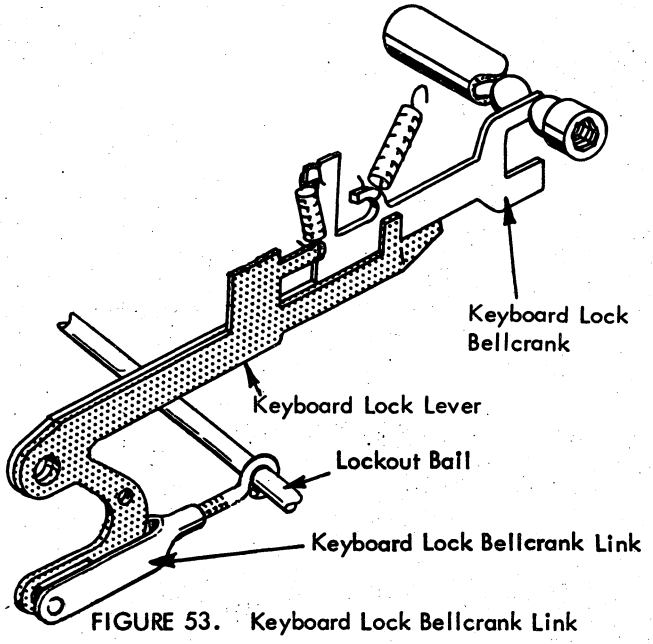


FIGURE 53. Keyboard Lock Bellcrank Link

5. Operational Lockout Shaft Link - With the switch in the on position adjust the operational lockout shaft link so that the flat portion of the lockout shaft is toward the top of the machine and parallel to the bottom power frame (Fig. 54).

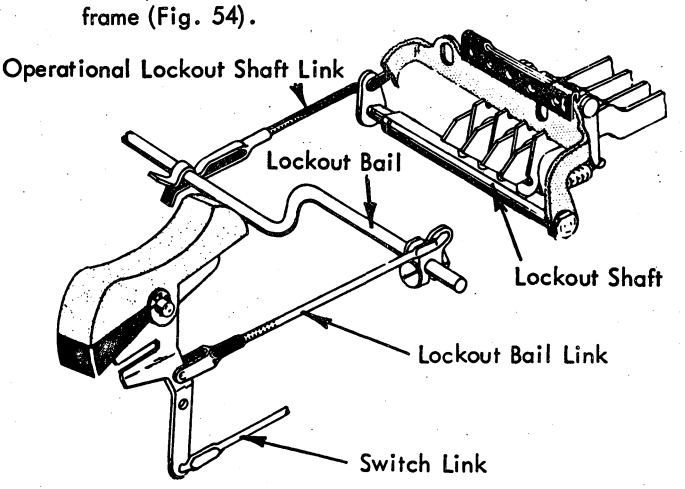


FIGURE 54. Operational Lockout Shaft Link

CAUTION: Be sure the switch lever operates easily after making the adjustment. Be sure that the operational keys are positively locked and unlocked in the two switch positions. Be sure the keyboard lockout bail is not restricted by the adjustment.

A mal-adjusted link may cause the lockout shaft to rotate further than normal. When this happens the operational interposers may be locked or slow releasing since the interposers will rub on the lockout shaft when released.

KEYBOARD LOCK MECHANISM (SOLENOID OPERATED)

1. Solenoid (Fig. 55) - Adjust as follows:

   a. Screw plunger spring on plunger to cover all threads.
   b. With the plunger engaged, screw adjustable core "in" until the plunger shoulder begins to lift off the plunger guide, then back off 1/2 turn (Fig. 55).

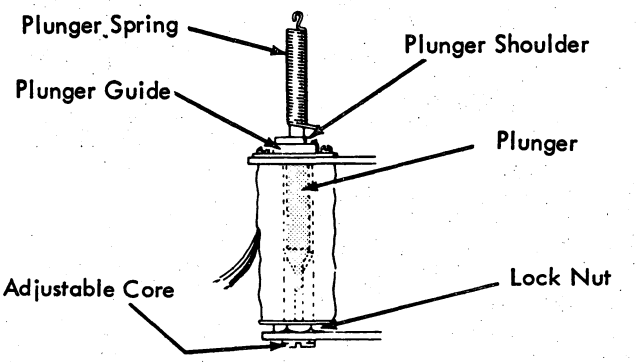


FIGURE 55. Solenoid

   c. Position the solenoid directly beneath the lockout lever (Fig. 56).

      This adjustment insures the plunger will bottom against the plunger guide and not against the adjustable core.

2. Eccentric Stop (Fig. 56) - Adjust (lockout lever resting against the eccentric stop) so that the plunger shoulder clears the plunger guide by .078" to .110".

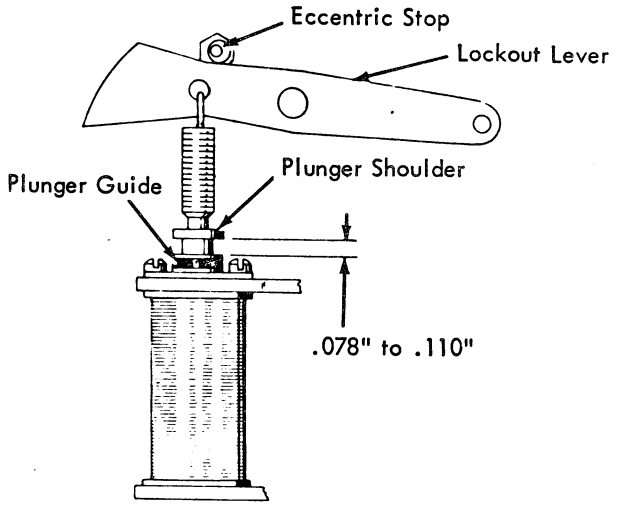


FIGURE 56. Eccentric Stop

NOTE:
The adjustment of the plunger spring to the plunger may require refinement so that adjustment #2 falls within the range of the eccentric.

This adjustment insures adequate motion to lock or unlock the keyboard depending upon the lockout lever which may be installed as shown in Figure 56 or inverted.

3. Keyboard Lock Link Clevis - With the keyboard unlocked, adjust the keyboard lock link clevis so that the operational keylevers clear the lockout adjusting comb by .005" to .015" (Fig. 57). This insures that the lockout mechanism will not interfere with the operational keylevers and also will not require excessive motion to lock the functions.

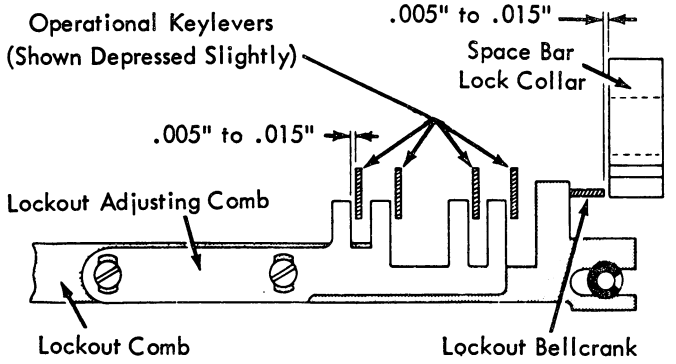


FIGURE 57. Adjusting Comb, Keyboard Unlocked

NOTE:
Adjustments 3, 4, and 5 are for the early style lockout adjusting comb. Only adjustment 3 applies for the late style lockout comb (Fig. 58.1).

4. Position the spacebar lock collar:

a. Left or right to clear the lockout bellcrank by .005" to .015" with the keyboard unlocked (Fig. 57).

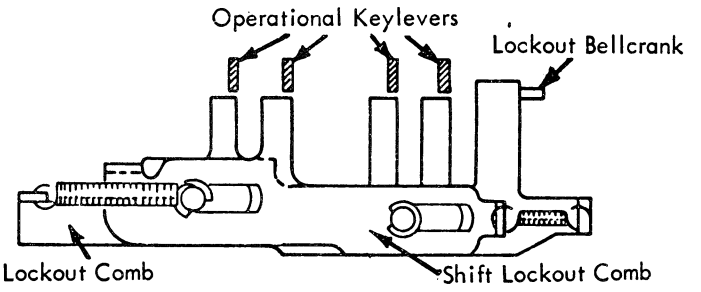


FIGURE 58.1 Adjusting Comb - Late Style

b. Radially, so that the leading edge on the step of the collar clears the lockout bellcrank by .005" to .015" with the keyboard locked (Fig. 58).

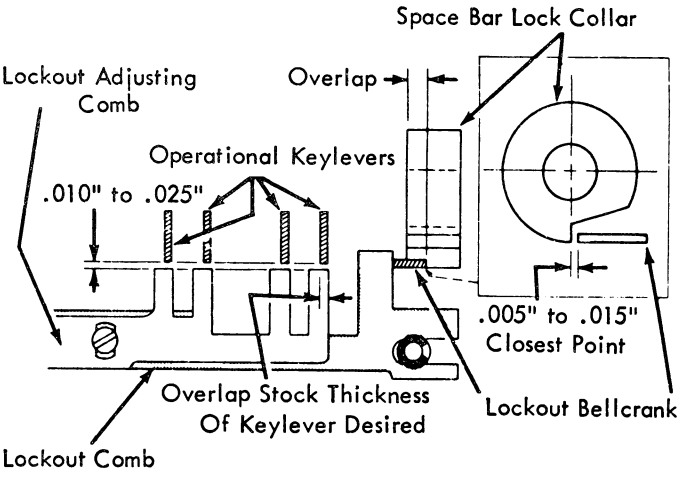


FIGURE 58. Adjusting Comb, Keyboard Locked

5. Lockout Adjusting Comb - Position (up or down) the lockout adjusting comb to clear the bottom of the operational keylevers by .010" to .025" with the keyboard locked (Fig. 58).

This adjustment insures that the lockout adjusting comb will not bind off on the operational keylevers when the keyboard lock is operated.

6. Shift Lock Link - Adjust the clevis to reliably unlatch the shift lock (Fig. 59).

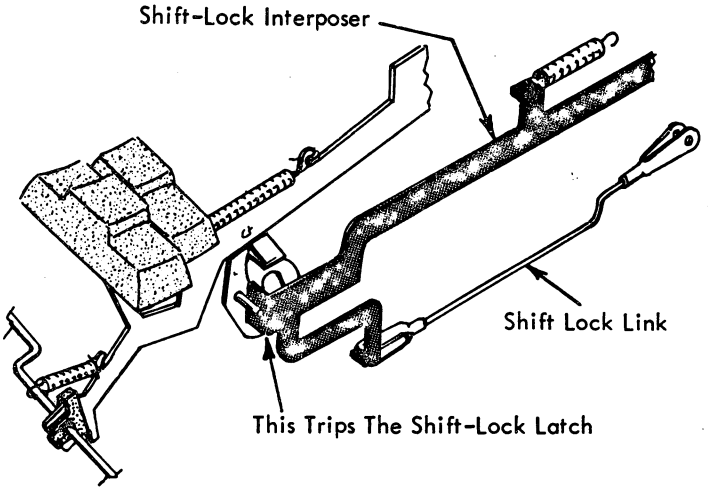


FIGURE 59. Shift-Lock Link

NOTE:

Check to insure that the shift lock can be latched with the keyboard lock de-activated.

7. Keyboard Interposer Lock Assembly

a. Adjust the keyboard interposer lock assembly by loosening the four mounting screws and moving the assembly up or down for .003" to .015" clearance between the bottom of the interposer and the keyboard interposer lock assembly when the keyboard interlock assembly is activated (Fig. 60).

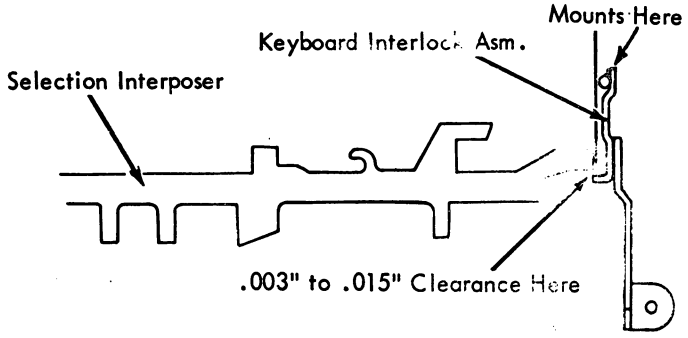


FIGURE 60. Keyboard Interposer Lock Assembly

This adjustment insures that the interposer lock does not bind off on the selection interposers when the keyboard lock solenoid is operated. It also prevents the selection interposer from moving down far enough to trip the cycle clutch.

b. Adjust the keyboard interposer lock link so there is .010" to .020" clearance between the interposer and the interposer lock assembly with everything in the unlocked position (Fig. 61).

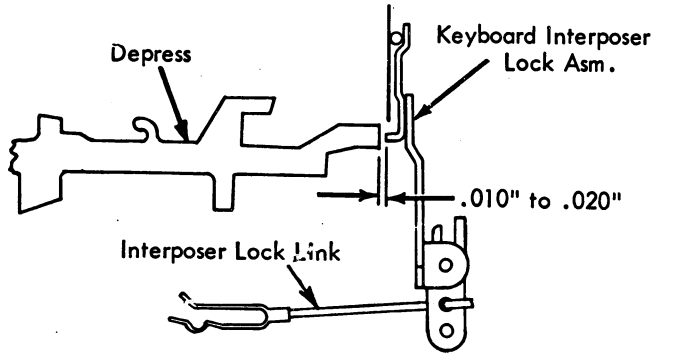


FIGURE 61. Keyboard Interposer Lock Link

This insures that the interposers will not bind on the interposer lock when operating the printer from the keyboard.

8. Cycle Clutch Pawl Stop - Adjust the pawl stop mounting bracket so that the cycle clutch pawl stop clears the cycle clutch pawl by .010" to .020" with keyboard locked. Best results are obtained on the high side of the adjustment (Fig. 62).

9. Pawl Stop Link - Adjust the pawl stop link so that there is 1/3 to 1/2 overlap of the cycle clutch pawl stop to the cycle clutch pawl with the keyboard lock mechanism in the lock position (Fig. 62).

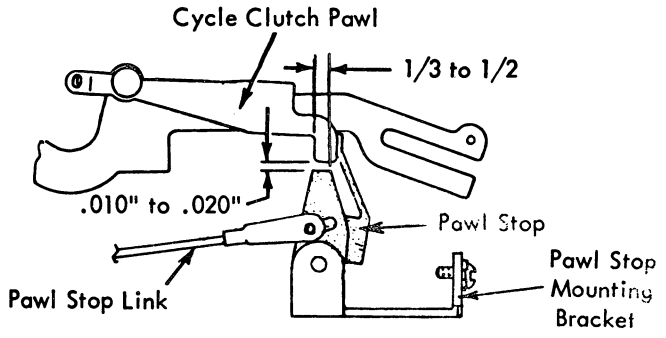


FIGURE 62. Cycle Clutch Pawl Stop

10. Keyboard Mode Contacts - Form the N/C support so that the O/P lifts the N/C contact by .002" to .005" (Fig. 63).

11. Form the N/O support so that the N/O contact clears the O/P by .002" (Fig. 63).

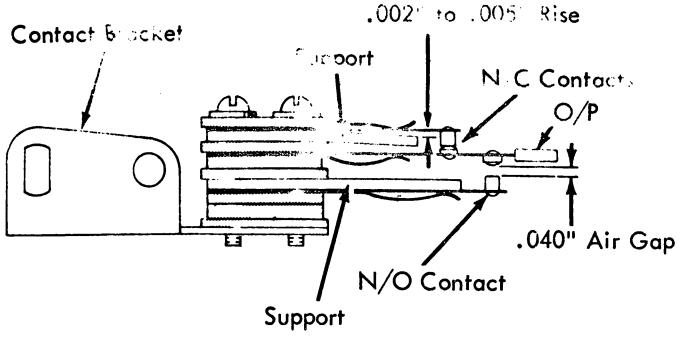


FIGURE 63. Mode Contact

12. Position the contact bracket for a clearance of .003" to .007" between the operating strap and actuating lever (Fig. 64).

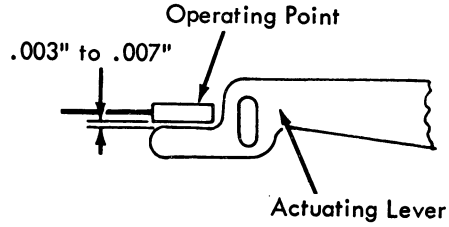


FIGURE 64. Mode Contact Actuating Lever

SHIFT MECHANISM

1. Shift Cam Back-Up Roller - Adjust the back-up roller eccentric left or right so that .001" to .004" of the cam bearing extends beyond the cam (Fig. 65). The eccentric should be kept in the bottom half of its orbit.

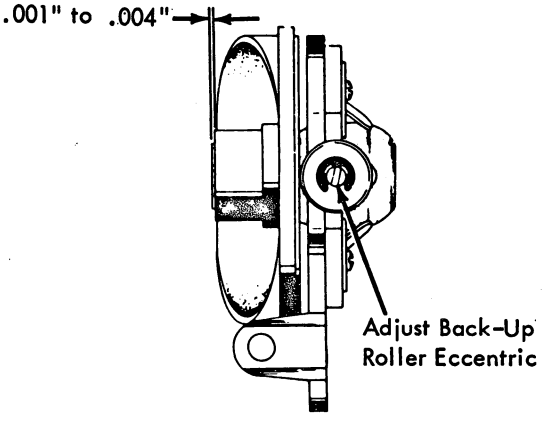


FIGURE 65. Shift Cam Back-Up Roller Adjustment

If the bearing did not extend beyond the cam, the shift clutch arbor could rub against the cam and create a noise as well as a drag on the cam when the cam was stationary.

Two problems could be created by having too much of the bearing extending beyond the cam. A gap would exist between the cam and the shift clutch arbor. This could allow a coil of the shift clutch spring to wedge into the gap and lock the machine. If the back-up roller were excessively far to the left, the cam would be forced to the left at the rear causing it to cock and bind at the pivot.

The set screw for the back-up roller eccentric is accessible through a hole in the cam with the cam in the lower case position. The shift clutch mechanism including the arbor should be removed in order to best observe the adjustment. Be sure that .002" to .004" end play exists in the operational shaft when the arbor is replaced.

CAUTION: Any change in the position of the back-up roller directly affects the typehead homing and the shift arm motion adjustments. Be sure to recheck these adjustments.

2. Shift Clutch Spring Retaining Plate - Adjust the retaining plate attached to the shift cam (Fig. 66) to satisfy the following condition. With the machine turned OFF and the shift cam detented, the shift clutch ratchet should

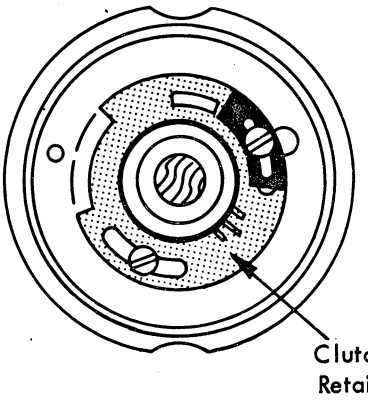


FIGURE 66. Shift Clutch Spring Retaining Plate

rotate .028" - .059" when the shift release arm releases the ratchet. The rotation can be observed relative to the shift interlock (Fig. 67). Half the distance from the center of one ratchet tooth to the next is 3/64" or .047".

The adjustment of the retaining plate determines how much the clutch spring will be expanded when the shift mechanism is at rest. Expanding the spring too much may cause failure of the cam to reach the detented position, because the spring would be expanded too soon. Insufficient expansion would allow the clutch spring to drag when at rest creating a load on the motor and on the shift release mechanism.

NOTE: If sufficient adjustment cannot be obtained with the retaining plate, the right end of the clutch spring may be placed in another hole in the ratchet. The adjustment can then be refined with the plate.

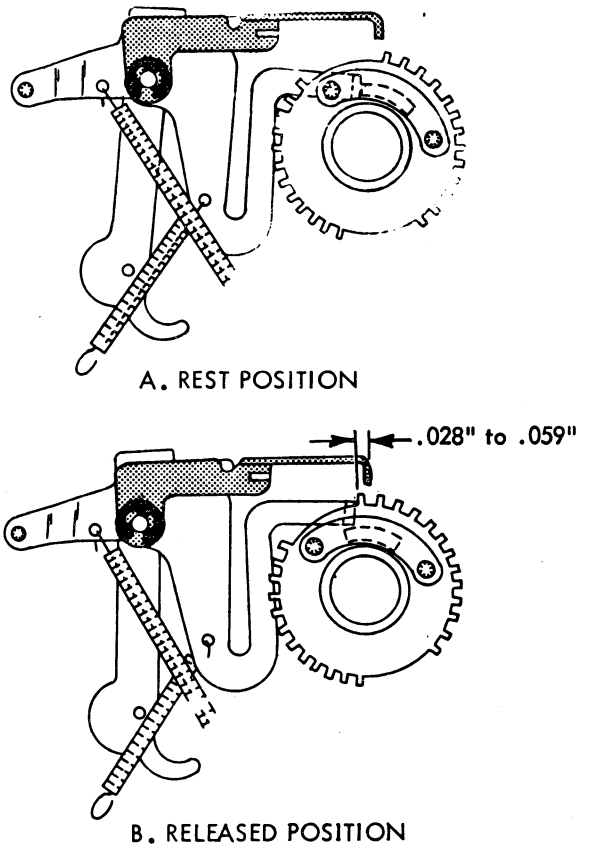


FIGURE 67. Shift Clutch Spring Retaining Plate Adjustment

2.1 Shift Clutch Ratchet Adjustment (Late) (Fig. 67.1) - Adjust the shift clutch ratchet to satisfy the following condition. With the machine turned off and the shift cam detented, the shift clutch ratchet will rotate .028" to .050" when the shift release arm releases the ratchet. The rotation can be observed relative to the shift release arm and the shift cam stop. Be sure to loosen the set screw in the ratchet before adjusting. Note: Remove play from the shift ratchet in a clockwise direction before checking this adjustment.

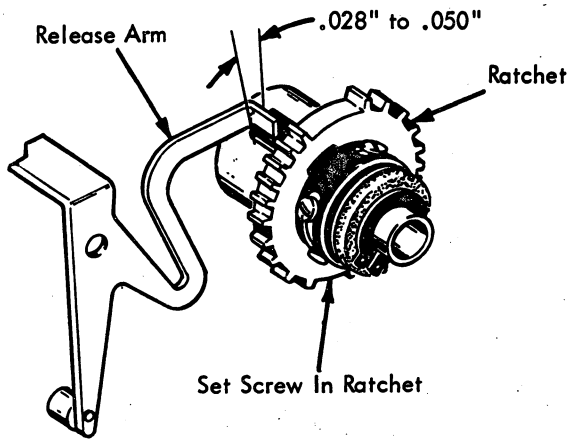


FIGURE 67.1 Shift Clutch Ratchet Adjustment

The adjustment of the shift clutch ratchet determines how much the clutch spring will be expanded when the shift mechanism is at rest. Expanding the spring too much may cause failure of the cam to reach the detented position, because the spring would be expanded too soon. Insufficient expansion would allow the clutch spring to drag when at-rest creating a load on the motor and on the shift release mechanism.

3. Shift Cam Stop - Adjust the stop so that the shift clutch ratchet has .010" to .030" rotary motion between the shift cam stop and the shift release arm with the mechanism at rest (Fig. 68).

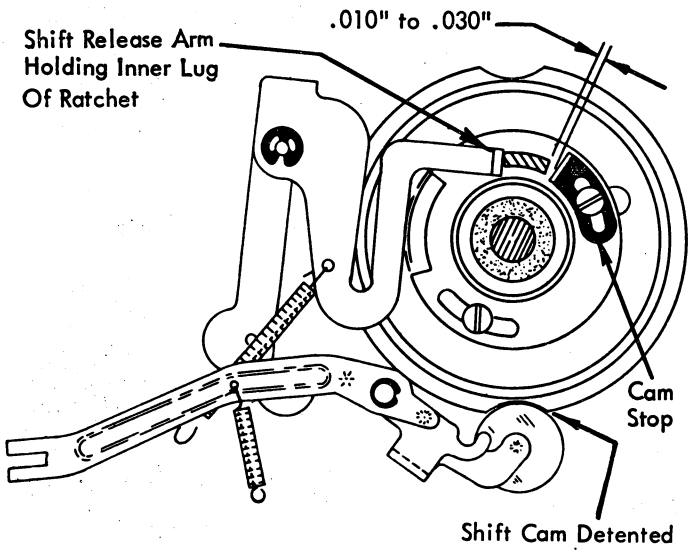


FIGURE 68. Shift Cam Stop Adjustment

The adjustment insures that the shift cam will not be allowed to travel past the detented position.

NOTE: The stop should not bind against the spring clutch when the adjustment is made.

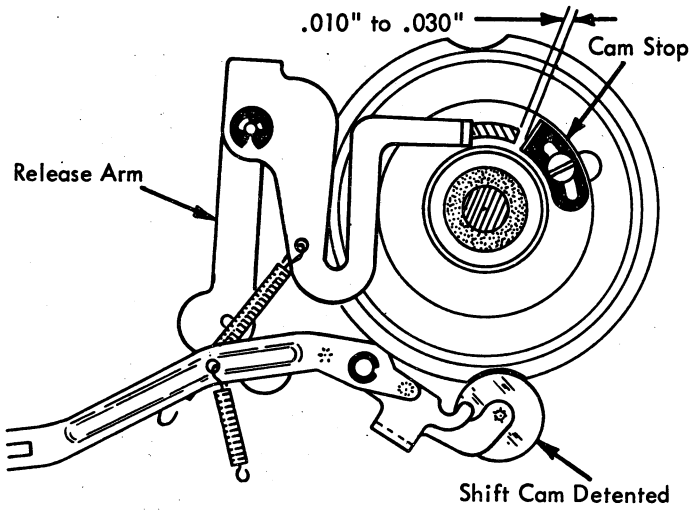


FIGURE 68.1 Shift Cam Stop Adjustment (Late)

CAUTION: Be sure the cam is detented at the time the stop adjustment is checked.

4. Shift Cam Brake (Fig. 69) - The shift cam brake shall be so adjusted, that the shift cam will stop in the center of the detent position ± .015", when the detent roller is held away from the cam during the shift from upper case to lower case.

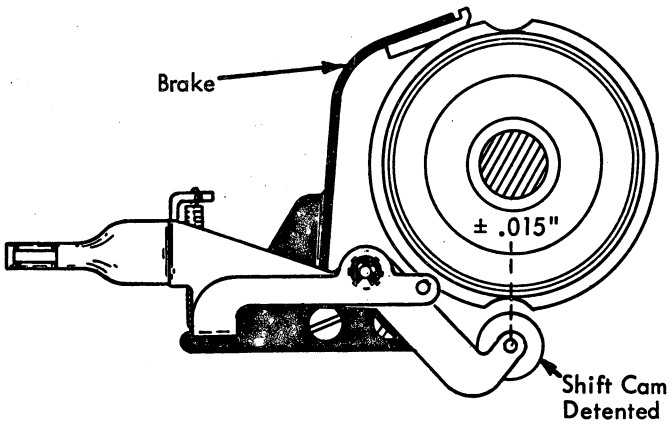


FIGURE 69. Shift Cam Brake Adjustment

Excessive braking action could prevent the cam from reaching the detented position in the lower case. Insufficient braking action would result in a noisy shift operation and expose the mechanism to possible parts breakage.

5. Shift Release - Adjust the shift release link (Fig. 70). With the shift keylever bottomed, the shift release arm shall clear the shift clutch ratchet stop by .010" to .030". A balance between the two releasing points insures the proper adjustment.

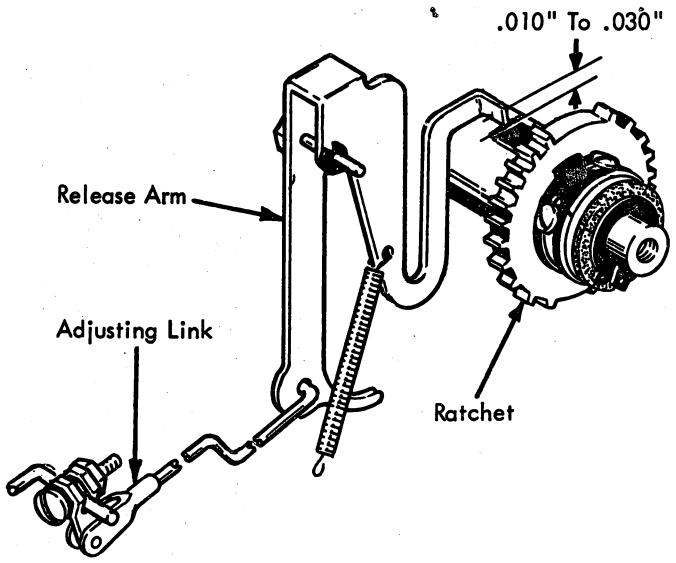


Figure 70. Shift Release Mechanism

NOTE: The shift bellcrank (Fig. 70) attached to the right end of the bail should be set prior to making the link adjustment. For proper leverage the bellcrank should operate with same over-center travel in both directions.

6. Shift Lock - Adjust the shift lock bracket up or down so that the shift lock engages just as the shift release occurs or slightly afterward. The lock should never engage before the shift release occurs. Keep the lock bracket vertical during the adjustment.

The shift lock must be released easily by depressing either shift keybutton.

7. Shift Interlock

a. 15 Inch Machine - With the shift interlock on the high point of the cam, adjust the interlock by its adjusting screw so that the tip just bottoms between two teeth on the shift clutch ratchet (Fig. 71a).

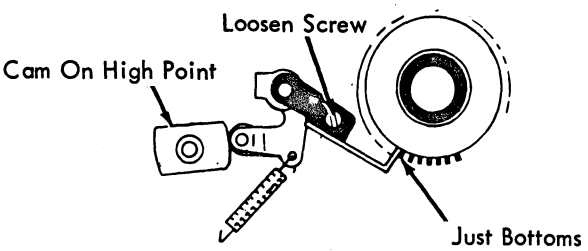


FIGURE 71A. Shift Interlock

b. 11 Inch Machine - With the shift interlock on the high point of the cam, form the interlock so that the tip just bottoms between two teeth on the ratchet (Fig. 71b).

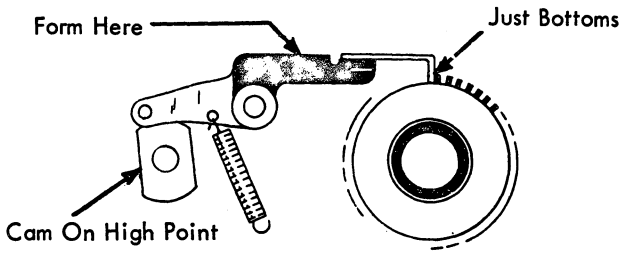


FIGURE 71B. Shift Interlock

8. Shift Interlock Cam - With the cycle clutch latched at rest and the backlash of the cycle shaft and filter shaft removed in the operating direction, advance the cam until a clearance of .030" to .060" exist between the tip of the interlock and the top of a tooth on the shift clutch ratchet (Fig. 72).

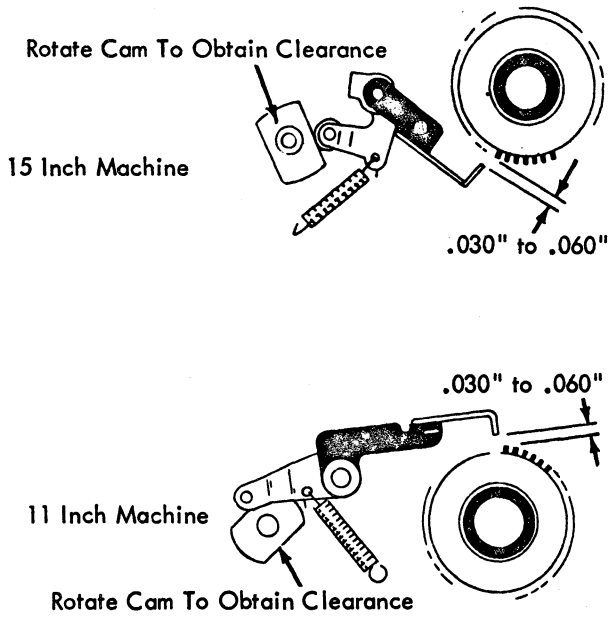
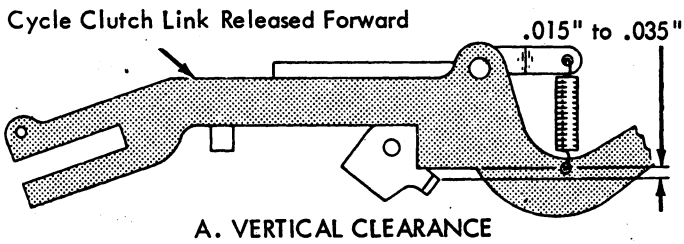


FIGURE 72. Shift Interlock Cam

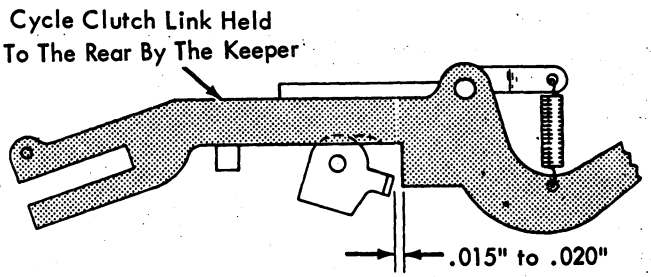
9. Character Interrupter - The character interrupter bail plate is adjusted in its elongated slot to satisfy 2 conditions.

a. With the shift cam detented in lower case and the cycle clutch latch link released forward, the character interrupter pawl should clear the bottom of the link by .015" to .035" (Fig. 73A).

b. With the shift cam undetented and the cycle clutch latched to the rear, the character interrupter pawl should clear the front of the cycle clutch latch link by .015" to .020". For the 767 printer adjust for .005" to .010" (Fig. 73B).



A. VERTICAL CLEARANCE



B. HORIZONTAL CLEARANCE

FIGURE 73. Character Interrupter Adjustments

SHIFT MAGNET ASSEMBLY

NOTE: Shift mechanism adjustments must be correct before the following adjustments are attempted.

1. Hinge Plates (Fig. 74) - Position the hinge plates with the armatures manually attracted to obtain .001" to .003" clearance between the armatures and hinge plates.

   This clearance insures free operation of the armature. With no clearance and oil on the two surfaces the armature would have a sluggish operation. Excessive clearance may cause slow operation due to the relationship between the magnetic field and armature.

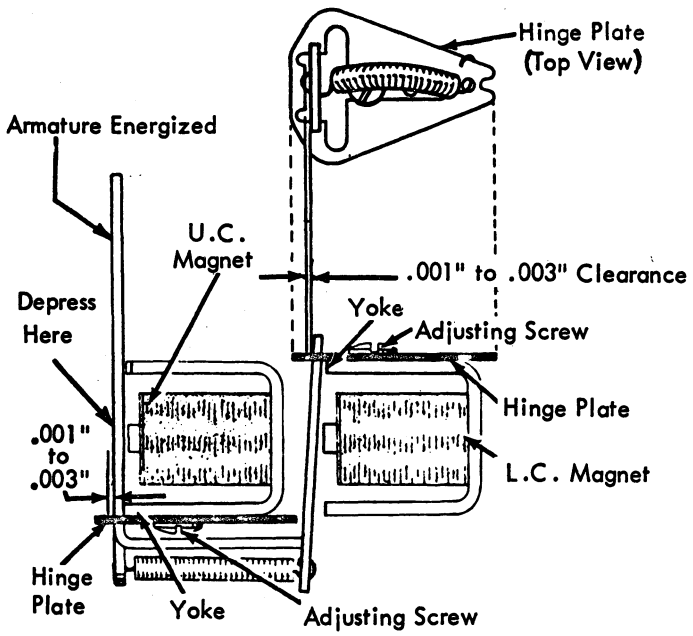


FIGURE 74. Hinge Plates

2. Armature Stops (Fig. 75) - Position (magnets energized) so that the armatures clear their yokes by .003" to .007".

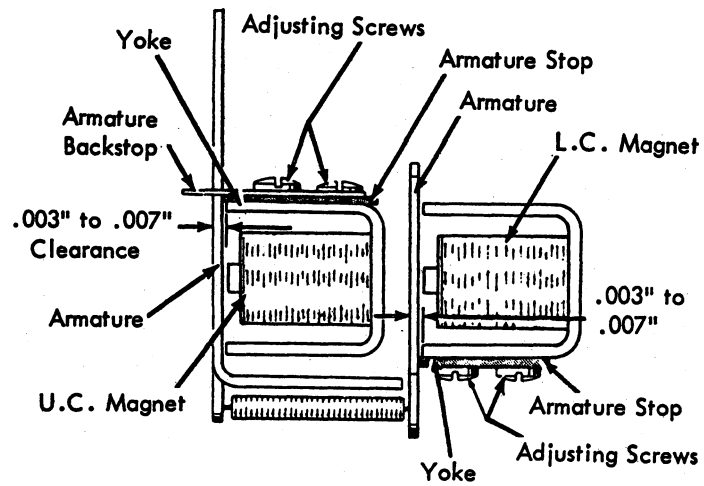


FIGURE 75. Armature Stops

The adjustment insures that the armature will not touch magnet core. If an armature does touch a core it may be held by residual magnetism.

3. Armature Backstop, 11 Inch Machine (Early) (Fig. 76) - Adjust the armature backstop (UC magnet - armature at rest) so that the armature clears the core by .028".

   Insufficient clearance may reduce the armature motion enough to cause shift failure. Excessive clearance may cause shift failure since the magnetic field may not be able to pull in the armature.

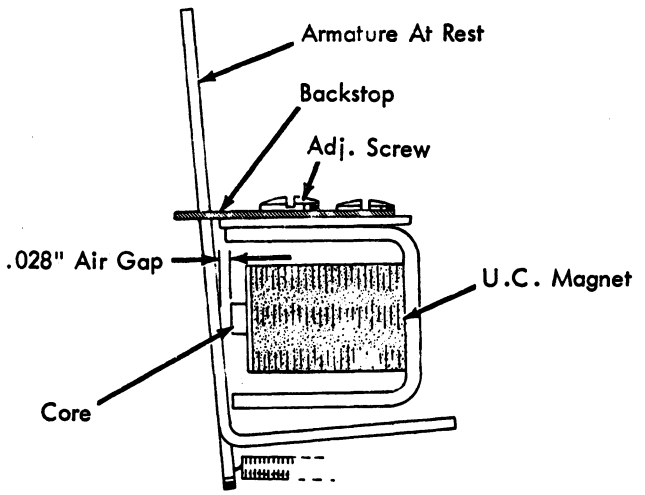


FIGURE 76. Armature Backstop, 11 Inch Machine

4. UC Magnet Assembly - Position so that its mounting screws are centered in the elongated holes with the hinge plates (Fig. 74) parallel with the assembly mounting plate.

5. LC Magnet Assembly - Position as follows:

   a. Front to Rear - LC armature (energized) clears the UC armature (at rest) by .010" (Fig. 77).

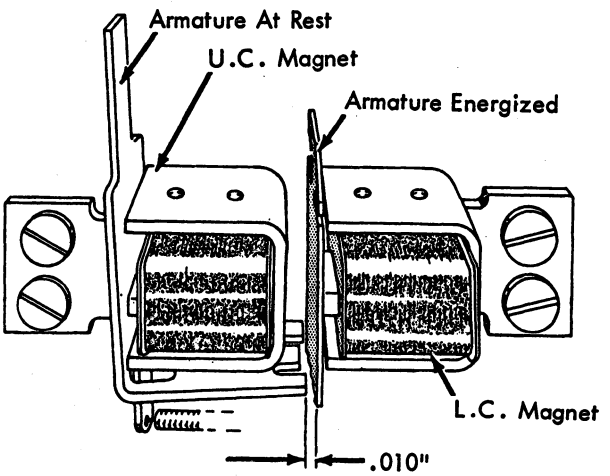


FIGURE 77. LC Magnet Assembly (Front to Rear)

This clearance insures positive unlatching of the upper case armature.

b. Up or Down - UC armature (energized) clears the LC armature (at rest) by .003" to .006" (Fig. 78).

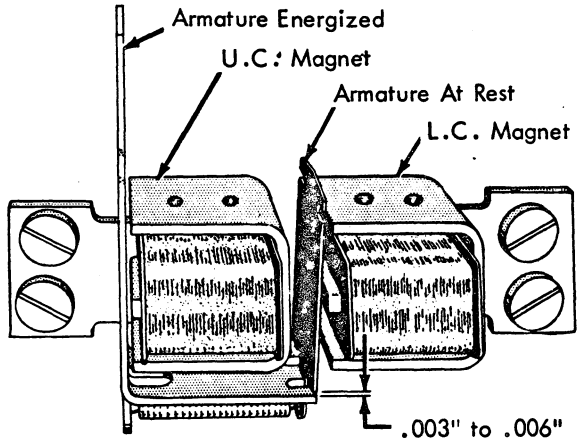


FIGURE 78. LC Magnet Assembly (Up or Down)

When the upper case armature is picked the lower case armature must be able to snap forward and latch the upper case armature. If the clearance is excessive the upper case armature may move far enough to allow a shift to take place. When this happens the printer will be in lower case while the magnet assembly is latched in upper case.

6. Magnet Assembly Mounting Bracket (Early)

a. 11 Inch Machine (Fig. 79) - Position the magnet assembly mounting plate (front to rear) so that the UC armature (at rest) clears the release arm pin by .002" to .008".

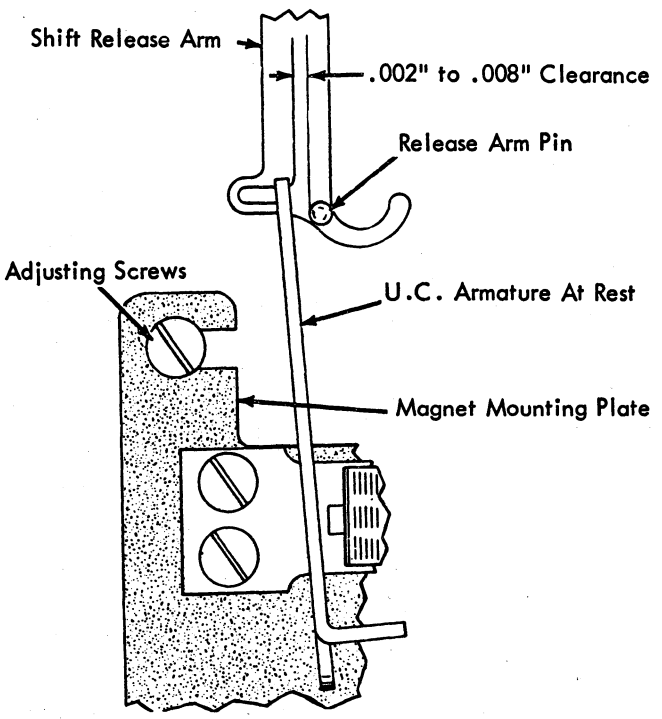


FIGURE 79. Magnet Assembly Mounting Bracket

b. 15 Inch Machine And All Late Style Shift (Fig. 80) - Position the magnet assembly mounting plate (UC armature energized) so that the release arm clears the shift ratchet lug by .005" to .015".

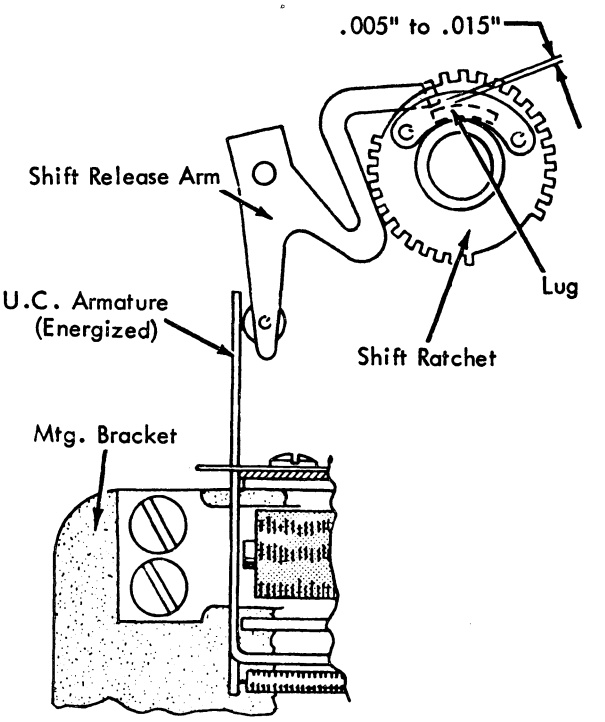


FIGURE 80. Magnet Assembly Mounting Bracket

7. UC Armature Backstop, 15 Inch Machine (Early) Fig. 81) - Position (armature at rest) so that the UC armature clears the release arm roller by .002" to .008".

The clearance between the UC armature and shift release arm allows the armature to be in motion prior to picking up the load of the release arm. With no clearance the armature may fail to pick.

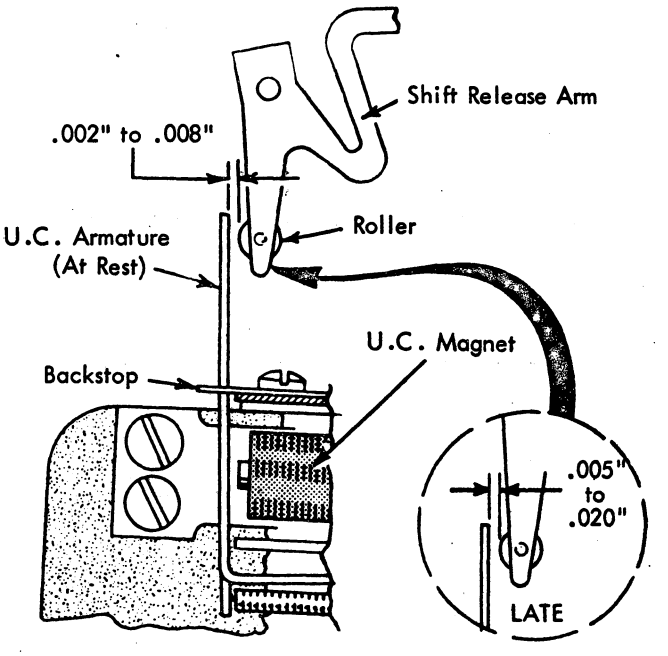


FIGURE 81. U.C. Armature Backstop

7.1 UC Armature Backstop (Late) (Fig. 81) - Position armature backstop (armature at rest) so that the UC armature clears the release arm roller by .005" to .020".

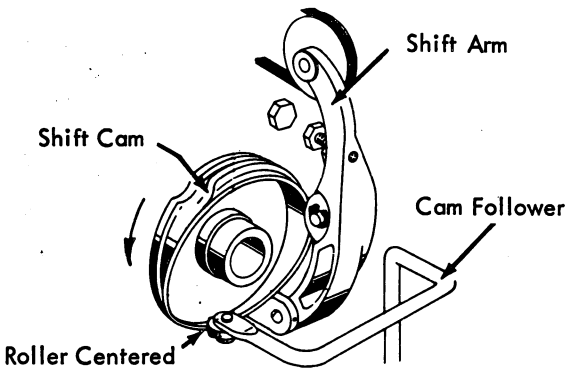


FIGURE 82. Contact Mounting Plate

SHIFT CONTACT ASSEMBLY

1. Contact Mounting Plate (Fig. 82) - Position vertically so that the cam follower roller is centered on the shift cam surface.

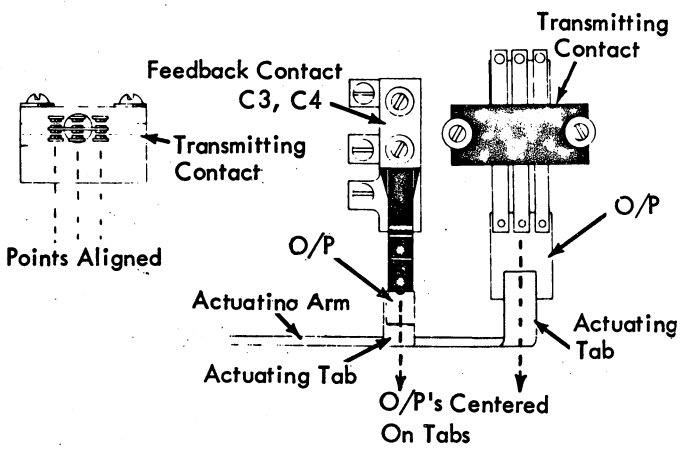


FIGURE 83. Contact Positioning

2. Contact Positioning (Fig. 83) - Position the feedback and transmitting assemblies under their mounting screws for the following conditions:

   a. Operating points centered on actuating tabs.
   b. All contact points (or straps) in stack aligned.

3. Contact Actuating Arm (Fig. 84) - Position (with the cam follower roller held against the detented shift cam) so that the O/P ball is centered between the actuating arm tabs.

NOTE: If a starting reference is required, form the O/P so that the center of the O/P ball is 9/16" from the contact mounting plate.

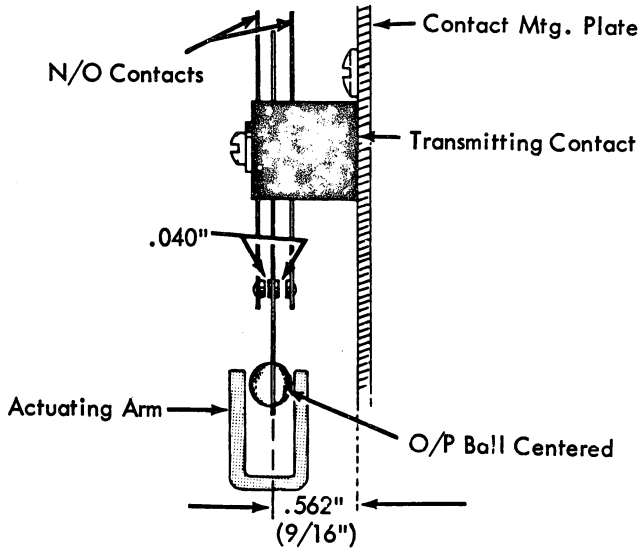


FIGURE 84. Contact Actuating Arm

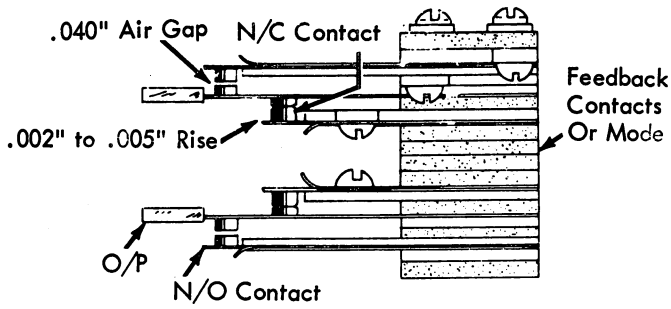


FIGURE 85. Contact Rise and Air Gap

4. Transmitting Contacts Air Gap (Fig. 84) - Form the N/O contacts to clear the O/P's by .040".

5. Feedback or Mode Contact Rise and Air Gap (Fig. 85) -

   a. Form the N/C contact supports so that the O/P's lift the N/C contact straps .002" to .005".
   b. Form the N/O contact supports so that the N/O contacts clear the O/P's by .040".

6. Actuator Tabs (Fig. 86) - Form so both N/O contacts receive equal motion as the shift cam rotates through 360°.

NOTE: If necessary, the actuator tabs may be formed to achieve timing requirements - see the timing charts for specifications.

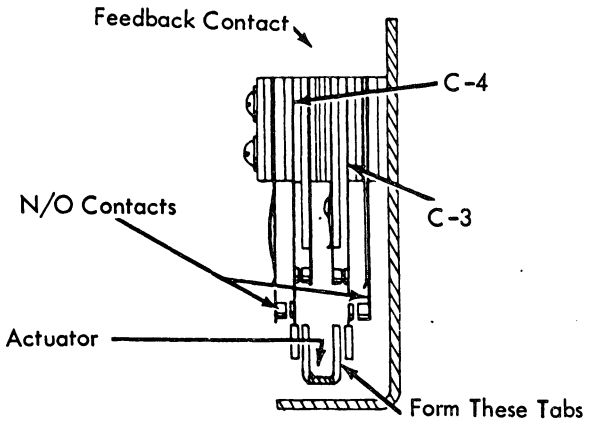


FIGURE 86. Actuator Tabs

TIMING CHART

Shift	N/O Make	Break
C3 & C4	35° ± 5°	145° ± 5°

Note: Each Shift operation is 180°

7. Mode Contact Actuating Arm - With the shift ratchet released, hand cycle from lower to upper case and adjust as follows (Fig. 87).

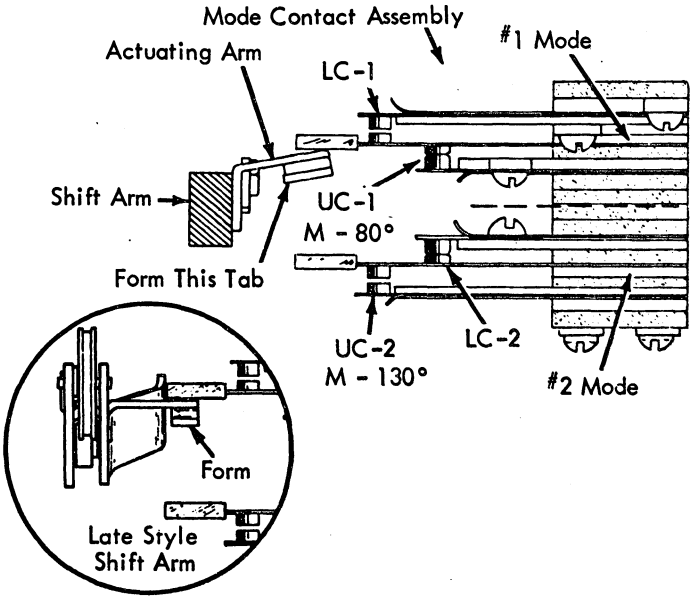


FIGURE 87. Mode Contact Actuating Arm

TIMING CHART

Shift	N/O-Make	Break
Mode #1	80° ± 10°	100° ± 10°
Mode #2	130° ± 10°	50° ± 10°

Note: Each Shift operation is 180°

a. Position the actuating arm so that the UC-1 contact closes at 80° of shift cam rotation.

Note: Form actuating arm on machines with "Late Style" shift arm.

b. Form the actuating tab so that the UC-2 contact closes at 130° of shift cam rotation. For Model 775 (MT/ST) Mode #3, use Mode #2 specifications.

NOTE: The shift ratchet teeth are spaced 10° apart and may be used as a timing indicator.

CYCLE CLUTCH

1. Cycle Shaft - Shim the cycle shaft to obtain .001" to .003" end play of the shaft. The shims are placed between the left hand bearing and the check ratchet. The shims are available in various thicknesses and are coded by shape as described in the Parts Catalog.

CAUTION: The slight end play of the shaft insures that it will rotate freely. Excessive play could allow a coil of the cycle clutch spring to wedge between the two hub members of the clutch causing a machine lock-up. (End play can most easily be measured with the spring clutch removed.)

NOTE: With the end play removed to the right, maintain .002" clearance between the cycle shaft gear and the left hand bearing.

2. Cycle Clutch Latch Bracket - Adjust the bracket vertically so that the steps of the cycle clutch sleeve are horizontal when the sleeve is stopped by the latch (Fig. 88).

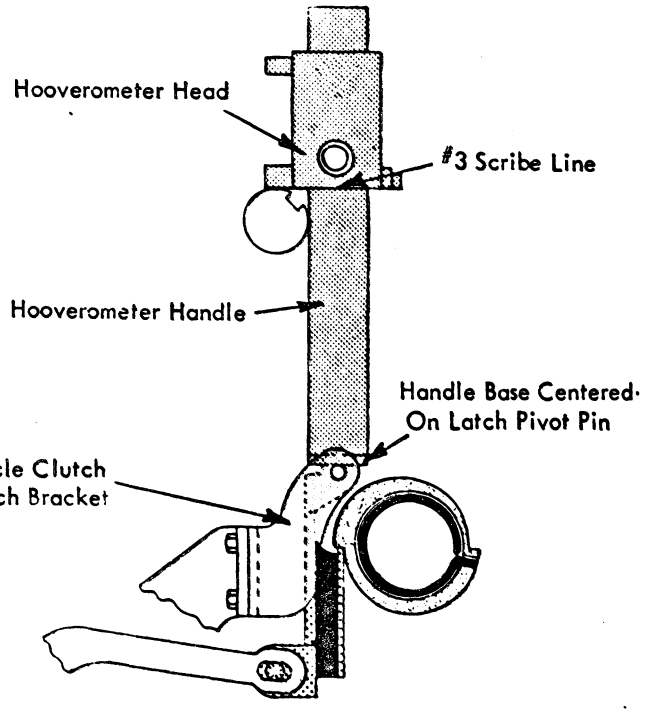


FIGURE 88. Cycle Clutch Latch Bracket Adjustment

To insure that the latch is parallel to the sleeve, it should be adjusted in the following manner:

a. Loosen the two latch mounting screws and pull the latch to the top of its adjustment.
b. Snug the screws "lightly".
c. Turn the print or cycle shaft in a print direction. (This will force the cycle clutch sleeve down on the cycle clutch latch.) Using the Hooverometer, check the latch height until it is correct (#3 scribe line).
d. Tighten the cycle clutch latch mounting screws.

Keeping the sleeve surface in contact with the latch surface will insure that the latch will remain parallel to the sleeve while you are adjusting its height.

If the bracket were adjusted too low, the steps would be at an angle to the line of motion of the cycle clutch latch. The latch would have difficulty in moving forward to release the clutch sleeve, and a slow, hesitant operation would result.

With the bracket too high, the force of stopping the cycle shaft through the cycle clutch sleeve would tend to cam the latch forward. A repeat cycle operation could result.

When properly adjusted the top of the latch pivot pin is 1.546" below the top of the print shaft. This distance can be measured with the use of the Hooverometer. With the head of the Hooverometer set at the #3 scribe line, the head should rest on top of the print shaft with the handle touching the latch pivot pin (Fig. 88). Be sure the Hooverometer handle is vertical. It will be vertical if the base of the handle is centered over the latch pivot pin.

NOTE: Changing the height of the cycle clutch latch necessitates a readjustment of the cycle clutch collar, cycle clutch stop, and the cycle clutch latch restoring mechanism.

CAUTION: The latch bracket must not become cocked so that only a corner of the latch plate is stopping the sleeve. Excessive wear could result. The cycle clutch sleeve could also be tilted by the latch causing it to bear against the cycle clutch pulley hub creating a noisy operation.

3. Cycle Clutch Spring and Collar Adjustments

a. Lateral position of the spring - Loosen the collar and position the spring left or right on its hubs so that the right hand end of the spring will clear the face of the cycle clutch pulley by .004" to .012" (Fig. 89).

NOTE: This adjustment insures that a maximum number of coils of the spring clutch will grip the driving hub during a cycle operation. Any slippage between the driving hub and the spring clutch could decrease the typehead velocity during a print operation resulting in intermittent light impression. A lack of clearance between the right end of the spring clutch and the face of the cycle clutch

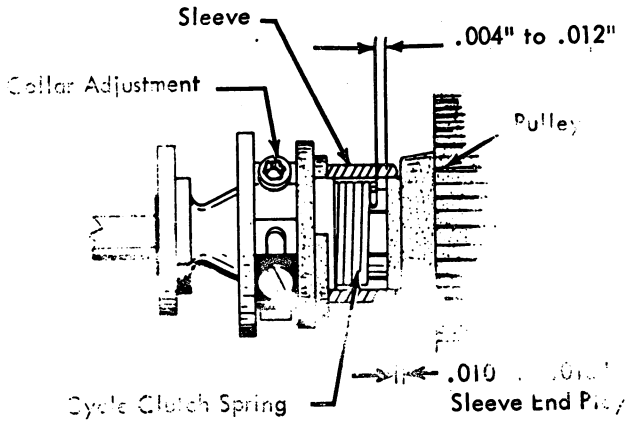


FIGURE 89. Lateral Position of the Cycle Clutch Spring and Collar

pulley would cause binding causing the spring clutch to place a load on the cycle clutch sleeve. This excessive torque on the sleeve results in a sluggish keyboard because the cycle clutch latch link spring has difficulty in pulling the latch off the sleeve.

b. Lateral position of the collar - position the collar left or right so that the sleeve will have .010" to .015" end play.

NOTE: This adjustment insures that there will be no binds between the right end of the sleeve and the cycle clutch pulley. A bind will cause a sluggish keyboard just as in the previous adjustment.

c. Radial position of the collar - (The position of the collar directly controls the radial position of the left hand end of the cycle clutch spring with respect to the cycle shaft. It determines how much the spring clutch will be expanded when the cycle clutch sleeve is latched and the cycle shaft is in its rest position.) Adjust the collar so that when a zero tilt, negative-five rotate character is hand cycled the cycle clutch spring will begin to slip (expand) when the cycle shaft is 1/16" to 3/32" from its rest position measured on the surface of check ratchet (Fig. 90).

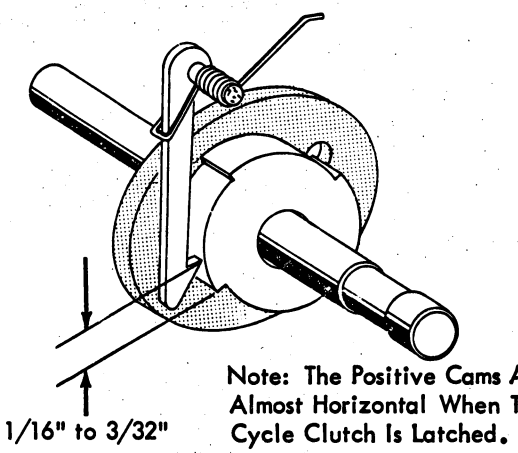


FIGURE 90. Radial Position of Cycle Clutch Collar

This adjustment is difficult to observe at the check ratchet. A 1/16" to 3/32" rotation of the cycle shaft will cause the print shaft gear to turn approximately one tooth. The adjustment can easily be read by one of the following methods.

(a) Print Shaft Gear Method

1. Hand cycle a zero tilt, negative-five character until the cycle clutch begins to slip.
2. Pencil mark the print shaft bearing in line with a tooth on the gear.
3. Release the cycle clutch again by depressing a keybutton.
4. Slowly hand cycle the machine until the check pawl just drops into a tooth on the check ratchet. The print shaft gear should have rotated

   1/2 to one tooth. If the print shaft gear rotated further than one tooth the collar must be moved top toward the rear. Less than 1/2 to one tooth, move it top toward the front.

A zero tilt, negative-five rotate character is used because it offers the greatest resistance to the cycle shaft during the restoring portion of a cycle, causing the cycle clutch spring to slip at the earliest possible time.

NOTE: If the collar should become completely loose, a good starting point may be obtained by positioning the collar so that its adjusting screw head is approximately in line with the high point of the negative-five cam.

CAUTION: The cycle clutch stop attached to the collar may prevent the shaft from reaching the latched position. Any change in the cycle clutch collar adjustment will necessitate a readjustment of the stop; therefore it is usually best to loosen the stop before attempting to adjust the collar.

(b) Degree Wheel Method - With the machine at zero degrees (cycle clutch latched at rest) select a -5 rotate, 0 tilt character and hand cycle the machine slowly. The cycle clutch spring should slip and stop driving at 170 to 175 degrees.

3.1 Cycle Clutch Spring and Collar Adjustment (Late Style Clutch (Fig. 90.1) -

a. The cycle clutch spring and collar shall be positioned laterally to the left so that the longest spring ear is against the minus 5 cam. The parts are so designed that the clearance between the cycle clutch sleeve and the pulley will be .006" to .020".

b. Radial position of the collar - (The position of the collar directly controls the radial position of the left hand end of the cycle clutch spring with respect to the cycle shaft. It determines how much the spring clutch will be expanded when the cycle clutch sleeve is latched and the cycle shaft is in its rest position.) Adjust the collar so that when a zero tilt, negative-five rotate character is hand cycled the cycle clutch spring will begin to slip (expand) when the cycle shaft is 1/16" to 3/32" from its rest position measured on the surface of check ratchet (Fig. 90.1).

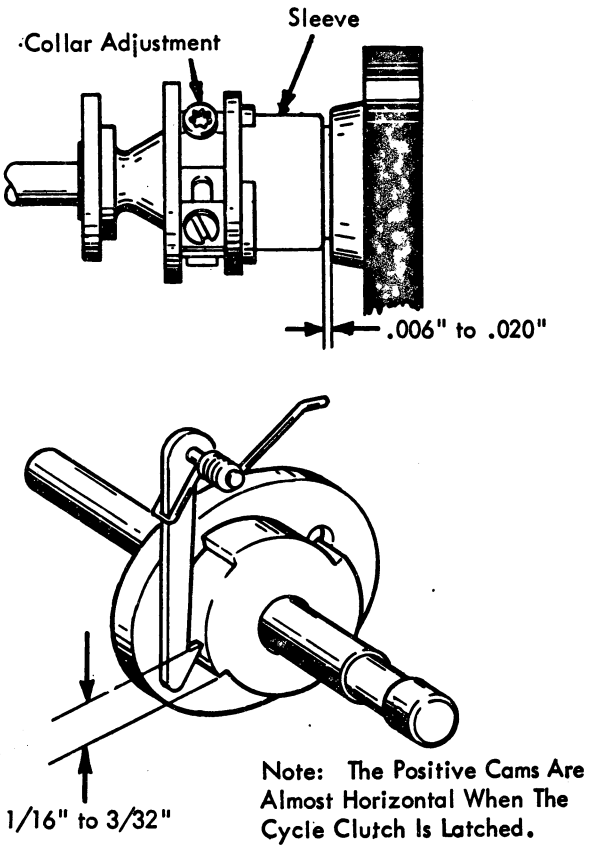


FIGURE 90.1. Radial Position of Cycle Clutch Collar

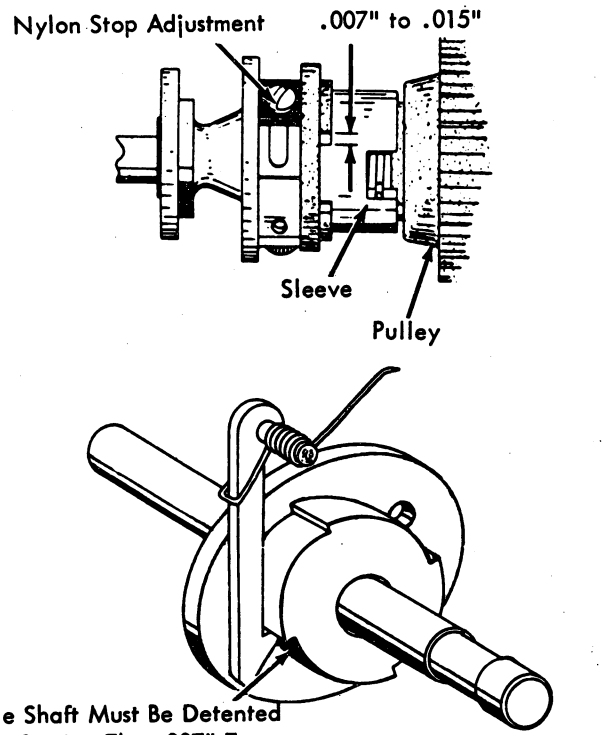


FIGURE 91. Cycle Clutch Overthrow Stop, Late Style

4. Cycle Clutch Overthrow Stop - With the cycle clutch latched and the cycle shaft backed up against the check pawl in its rest position, advance or retard the overthrow stop on the cycle clutch collar so that it will allow the cycle shaft to overthrow its latched position by .007" to .015" (Fig. 91 or Fig. 92).

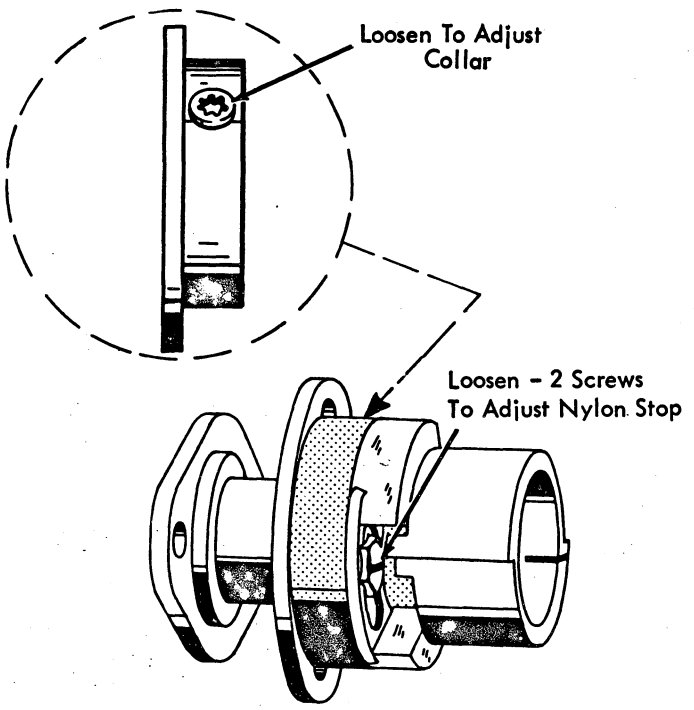


FIGURE 92. Cycle Clutch Overthrow Stop, Early Style

NOTE: It is best to set this adjustment on the low side of the tolerance. Too much cycle shaft overthrow combined with excessive backlash in the gear train could allow the filter shaft to overthrow into the path of the character interposers. This condition could result in intermittent keyboard lock-up or intermittent touch problems.

CAUTION: After adjusting the cycle clutch overthrow stop check the cycle clutch sleeve end play as the overthrow stop may bind against the sleeve.

CARRIER AND ROCKER

1. Tilt Tube End Play - (machines prior to gearless tilt). The tilt pulley should be adjusted up or down on the tilt tube so that .002" to .004" end play exist in the tilt tube (Fig. 93).

The tilt pulley is attached to the tilt tube by a set screw and key against a flat surface on the tilt tube. The set screw is accessible through a hole in the left side of the carrier. Move the carrier to the right and remove the tilt pulley spring and tilt detent spring. The tilt detent

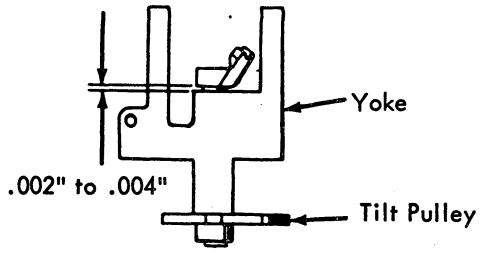


FIGURE 93. Tilt Tube End Play Adjustment

spring stud can then be removed through the hole in the carrier. The hole in the carrier and rocker will make the tilt pulley set screw accessible with a fluted wrench.

NOTE: The height of the tilt sector gear is established by shimming between the gear and the top of the yoke. The height is set to obtain the proper backlash between the tilt sector gear and the tilt ring gear. Be sure to re-install the shim if disassembly is necessary.

2. Rotate Shaft End Play - Adjust the rotate pulley up or down on the rotate shaft so that .002" to .004" end play exists in the rotate shaft relative to the tilt tube or yoke (Fig. 94 A & B).

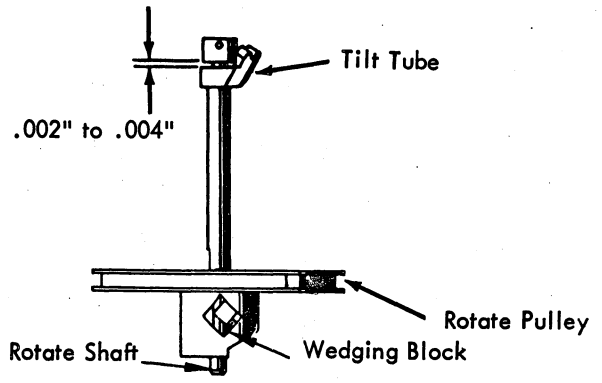


FIGURE 94A. Gear Type Tilt

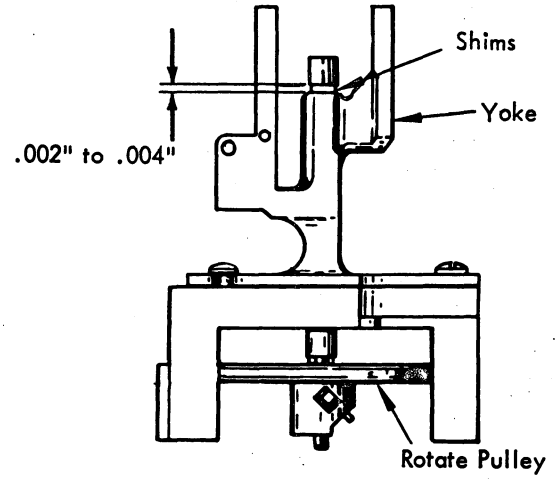


FIGURE 94B. Gearless Tilt

The rotate pulley is secured to the rotate shaft by a wedging block and a set screw. The pulley set screw is accessible from below with the carrier centered over the cycle shaft and the shift in the upper case. After loosening the set screw the grip of the block on the shaft must be broken by rotating the type head counterclockwise manually while blocking rotation of the pulley. This can be done by inserting the 3" screwdriver at the rear between the notch in the pulley and the tape guide block.

Be careful not to damage the tape or pulley with the screwdriver. DO NOT rotate the type head clockwise against the tension of the tape in an effort to break the pulley loose. Tape breakage or other parts damage may result.

NOTE: The height of the lower ball socket is controlled by a shim located between the lower ball socket and the tilt tube or yoke. The height relative to the tilt ring must be controlled in order to insure proper operation of the ball joint. If disassembly of the rocker is ever necessary, the shim must be reinstalled.

3. Tilt Ring - The upper ball socket should be centered over the lower ball socket within .002". It is adjusted by moving the tilt ring left or right after loosening the tilt ring pivot pin set screws. All side play of the tilt ring should be removed by the pivot pins while still allowing the tilt ring to pivot freely.

If the tilt ring is not properly centered, the rotate position of the head can vary slightly as the head is tilted to the different tilt positions. This could constitute a portion of the band width in the rotate system.

The tilt ring is centered at the factory and every effort should be made to maintain its centered position. If tilt ring removal or replacement is necessary, a feeler gauge should be inserted between the tilt ring and the yoke to determine the clearance before the tilt ring is removed. The tilt ring should be replaced to the same clearance.

The tilt ring can easily be removed if the machine is half cycled to a two tilt position. On machines prior to the gearless tilt mechanism, care should be taken to insure that the tilt sector gears are properly meshed whenever the tilt ring is installed. The rear tooth of the tube sector gear should enter the second notch of the tilt ring sector gear (Fig. 95).

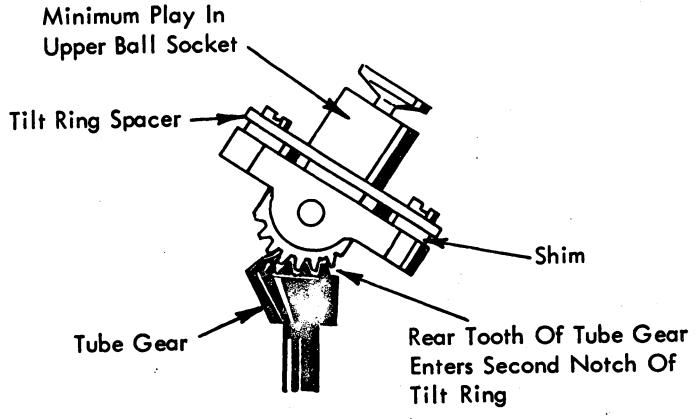


FIGURE 95. Upper Ball Socket Adjustment

CAUTION: Side play in the tilt ring can cause poor horizontal and vertical alignment. It can also affect impression.

4. Upper Ball Socket - The upper ball socket must rotate completely free of binds with little or no up and down play. The adjustment is made by raising or lowering the tilt ring spacer by installing thicker or thinner shims at the front and rear (Fig. 95).

In order to check the upper ball socket for binds it is necessary to remove the ball joint so that the upper ball socket can be rotated by hand. This can be done either by removing the tilt ring and upper ball socket together and checking them off the machine or by removing the upper ball socket and replacing it without the ball joint. If the tilt ring is removed, its position relative to the yoke must be checked by a thickness gauge before removal.

NOTE: If the upper ball socket, tilt ring, or tilt ring spacer are ever replaced by new parts, the shimming adjustment must be checked.

CAUTION: Vertical play in the upper ball socket will affect vertical alignment and impression because the typehead will not maintain a definite position.

Also, care must be taken to insure that the entire rotate system is free from binds. A bind in the upper ball socket can result in poor horizontal alignment if the rotate detent fails to fully seat in the detent notch before print occurs. An excessive bind can cause unwanted roller droppage in the wear compensator during a negative selection. Binds in the system (carrier area) can be checked by manually operating the shift arm in and out.

5. Tilt Detent - Adjust the guide and pivot screws so that the tilt detent will operate freely with no side play (Fig. 96).

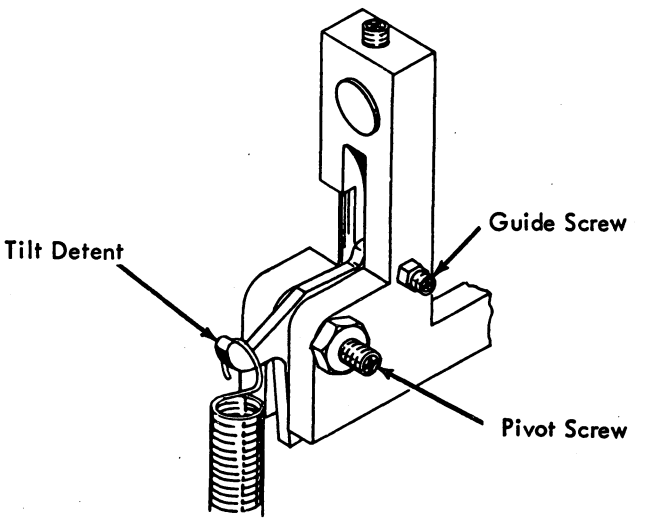
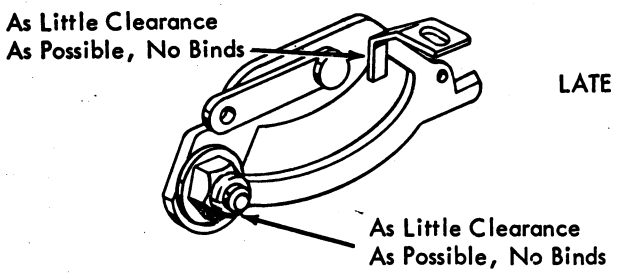


FIGURE 96. Tilt Detent Adjustment

Excessive side play in the tilt detent will cause poor vertical alignment. A bind in the tilt detent will affect both the vertical and horizontal alignment because it will retard or restrict the seating of the tilt detent which, in turn, will retard or restrict the seating of the rotate detent.

6. Rotate Detent - Adjust the front and rear guides so that the rotate detent will operate freely with no side play (Fig. 97).

Excessive play in the detent will result in poor horizontal alignment because the detent cannot positively position the type head.



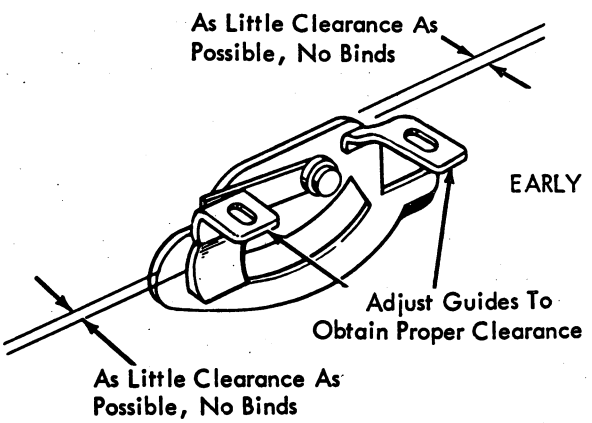


FIGURE 97. Rotate Detent Guides

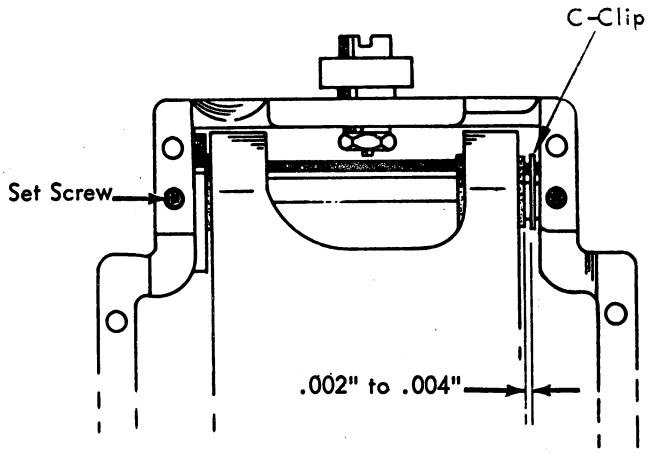


FIGURE 98. Rocker Shaft Adjustment

8. Print Sleeve End Play - Adjust the print sleeve end play to be .002" to .004". The end play is controlled by the print cam on the right hand end of the sleeve. The adjustment should not be gained with the ribbon lift cam because its set screw tightens down into a dimple in the print sleeve fixing the position of the cam (Fig. 99).

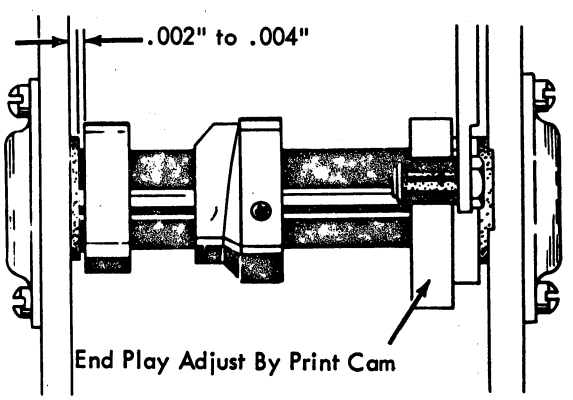


FIGURE 99. Print Sleeve End Play

7. Rocker Shaft - Adjust the rocker shaft left or right to obtain .002" to .004" side play in the rocker (Fig. 98).

The side play exists between a C-clip around the shaft at the right of the rocker and a thrust washer against the carrier casting at the left of the rocker. The rocker shaft is held in place by a set screw at the left end of the shaft.

Excessive play in the rocker could affect horizontal alignment by allowing the rocker to shift its position left to right.

9. Detent Cam Follower Bracket - Position the detent cam follower bracket which is mounted to the left side of the carrier by two screws to satisfy the following conditions:

a. Front to rear for a clearance of .015" between the print sleeve and the end of the pin on the cam follower (Fig. 100a).

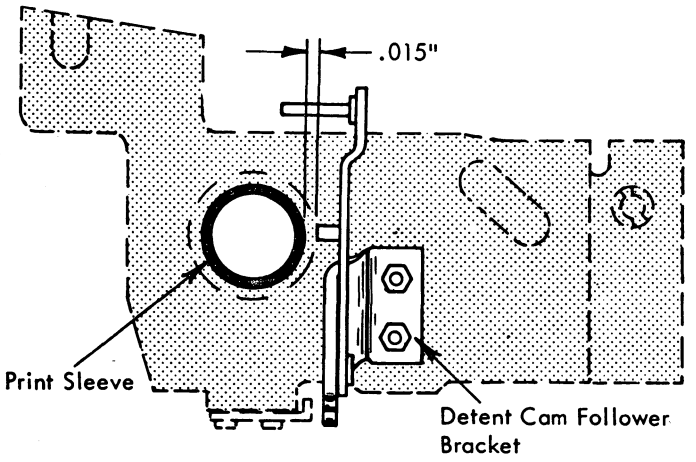


FIGURE 100A. Detent Cam Follower Bracket

b. Vertically so that the bottom surface of the pin on the cam follower lines up with the scribe line #1 on the Hooverometer when the Hooverometer is placed against the print sleeve as shown in Figure 100b.

This bracket is set at the factory with a dial indicator and should not require readjustment unless it becomes loose.

NOTE: The position of the bracket directly affects the timing relationship between the detent cam and the print cam. An improperly adjusted bracket may cause the detents to begin to withdraw before the typehead prints, or the typehead to print

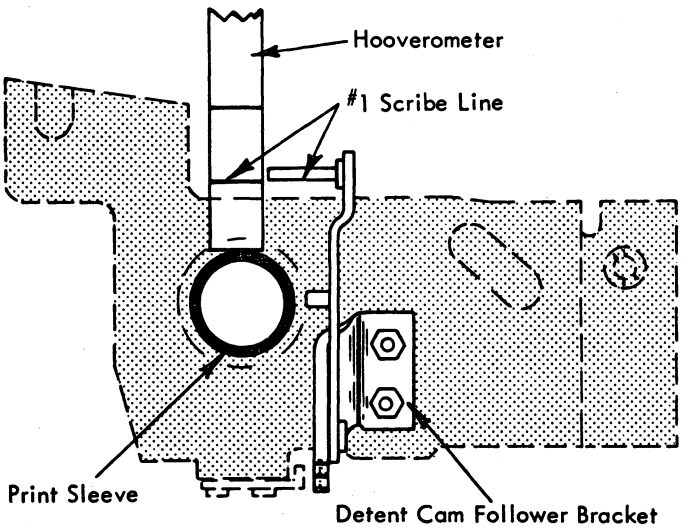


FIGURE 100B. Detent Cam Follower Bracket

before the detents have fully seated. If this occurs it will generally show up as poor vertical alignment because the tilt detent always seats and withdraws ahead of the rotate detent.

10. Detent Mechanism (Machines prior to gearless tilt) The detent mechanism must be adjusted to satisfy the following conditions:

a. Position the ribbon feed and detent cam left or right on the print sleeve so that the inside rib of the cam will be in line with the left hand edge of the ribbon feed cam follower (Fig. 101 A & B).

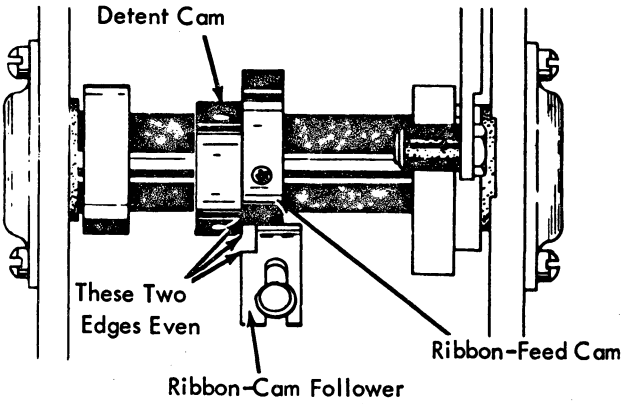


FIGURE 101B. Ribbon Feed Cam (Early)

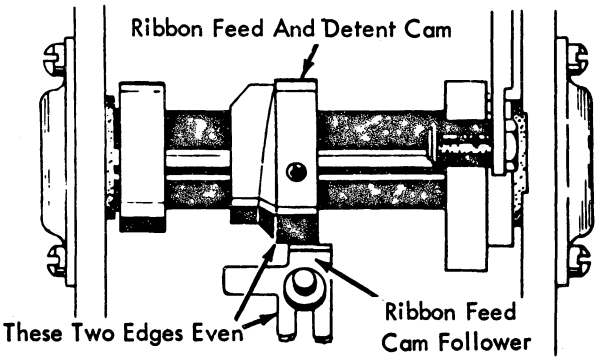


FIGURE 101A. Ribbon Feed Cam (Late)

b. Adjust the detent actuating lever support front or rear (under its locking screw) so that the rotate detent will clear the teeth on the type head skirt by .025" to .035" when the cycle shaft is at rest (Fig. 102). This clearance should be observed when the type head is manually tilted to a two tilt position since the two tilt position provides the rotate detent with the least amount of motion.

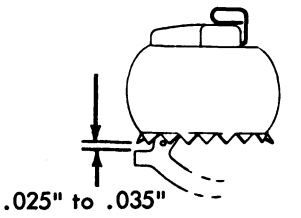


FIGURE 102. Skirt Clearance

Moving the actuating lever support to the rear will increase skirt clearance.

c. With the detent cam follower on the low dwell of the detent cam (detents fully seated) rotate the actuating lever support until .001" clearance is felt between the detent actuating lever and the detent cam follower roller. Rotating the support clockwise will increase the clearance.

NOTE: The adjustments of the detent mechanism directly affect each other and must be adjusted alternately to obtain the correct clearances.

The .001" lost motion adjusted into the system between the detent actuating lever and the detent cam follower insures that the tilt detent will fully seat in the detent notch of the tilt ring. Too much clearance would allow the detents to enter their notches too early and withdraw too late. This could cause an intermittent erroneous character to print, parts breakage, or roller droppage in wear compensator.

The .025" to .035" skirt clearance allows the rotate detent to enter and withdraw from the type head notch area at the proper time with respect to the rotating typehead. If this clearance is too small the rotate detent will enter the notch area too early and withdraw too late. This will also cause an intermittent erroneous character to print, parts breakage, or unwanted roller droppage. Too much skirt clearance will only cause premature wear on the detent mechanism due to the leverage gain.

Since the detent cam and print cam are both keyed to the print shaft, the relationship between the detent timing and the point at which the type head prints is non-adjustable. The designs of the two cams is such that the detents will be fully seated in their notches when the type head contacts the platen during a print operation. The only thing that can affect this timing relationship is the position of the detent cam follower mounting bracket. The position of this bracket is fixtured at the factory and should not be changed.

11. Detent Mechanism (Gearless Tilt)

The detent mechanism must be adjusted to satisfy the following conditions:

a. With the cycle shaft at rest and the typehead manually held in a two tilt position, adjust the ribbon feed and detent cam left or right on the print sleeve (Fig. 103) so that the rotate detent will clear the detent teeth on the typehead skirt by .025" to .035" (Fig. 104).

Moving the cam to the left will increase the clearance.

b. With the detent cam follower on the low dwell of the cam (detents fully seated), loosen the locknut on the detent actuating lever support and adjust the Bristo screw up or down until there is a clearance of .001" felt between the detent actuating lever and the detent cam follower roller (Fig. 105).

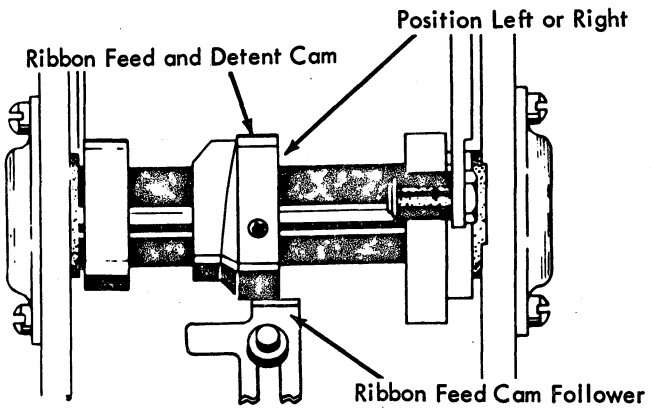


FIGURE 103. Detent Cam Adjustment

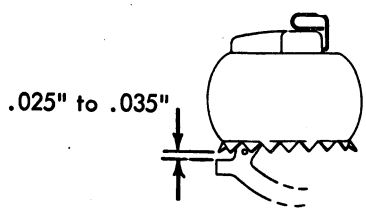


FIGURE 104. Skirt Clearance

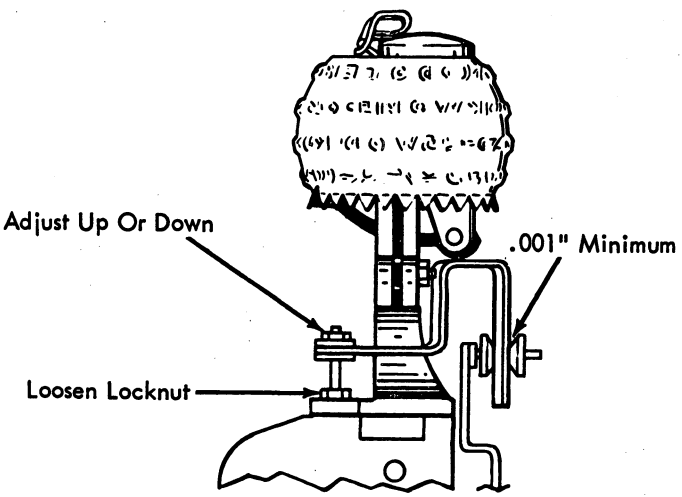


FIGURE 105. Detent Lever Support

Adjusting the Bristo screw up will increase the clearance.

NOTE: Read the "note" under Adjustment #10 as it pertains to the gearless tilt mechanism also.

ALIGNMENT

1. Preliminary Print Shaft Timing - With the cycle shaft latched in its rest position, loosen the print shaft gear and rotate the print shaft so that the keyway is approximately in line with the end of the ribbon lift cam follower pivot screw (Fig. 106). The keyway will be about 45° to the rear from the top of the shaft.

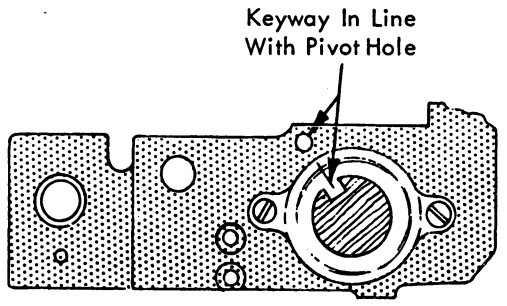


FIGURE 106. Preliminary Timing

The preliminary setting of the print shaft establishes a coarse timing of the two detent entry and withdrawal so that the detents will not be engaged in their notches when the type head and tilt ring are in motion. A more accurate timing adjustment will be made later.

2. Tilt Selector Latches - Form the two stop lugs (Fig. 107) above the tilt selector latches so that the latches will reset simultaneously (under the latch bail) just as the cycle clutch check pawl drops into the notch on the check ratchet at the rest position (Fig. 108).

The adjustment can easily be checked by hand cycling a zero-tilt character twice in succession. As the cycle shaft begins to pass its rest position, place your finger lightly against the cycle clutch check pawl while observing the selector latches. If the adjustment is correct you should feel the check pawl drop into the rest position notch on the check ratchet simultaneously as the two selector latches reset under the latch bail.

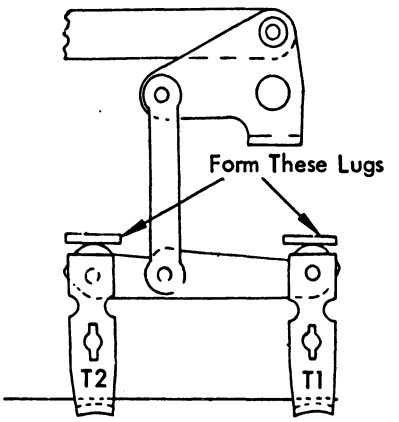


FIGURE 107. Selector Latch Stop Lugs

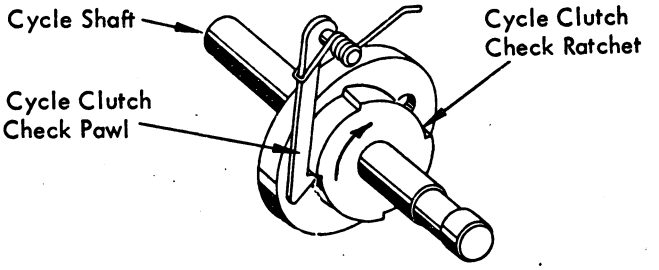


FIGURE 108. Latches Reset As Check Pawl Drops In

Form the stop lugs by tapping them up or down with a hammer and screwdriver. The stop lugs should be overformed slightly then brought back to the correct position, otherwise the "memory" of the metal will cause them to restore toward their original position.

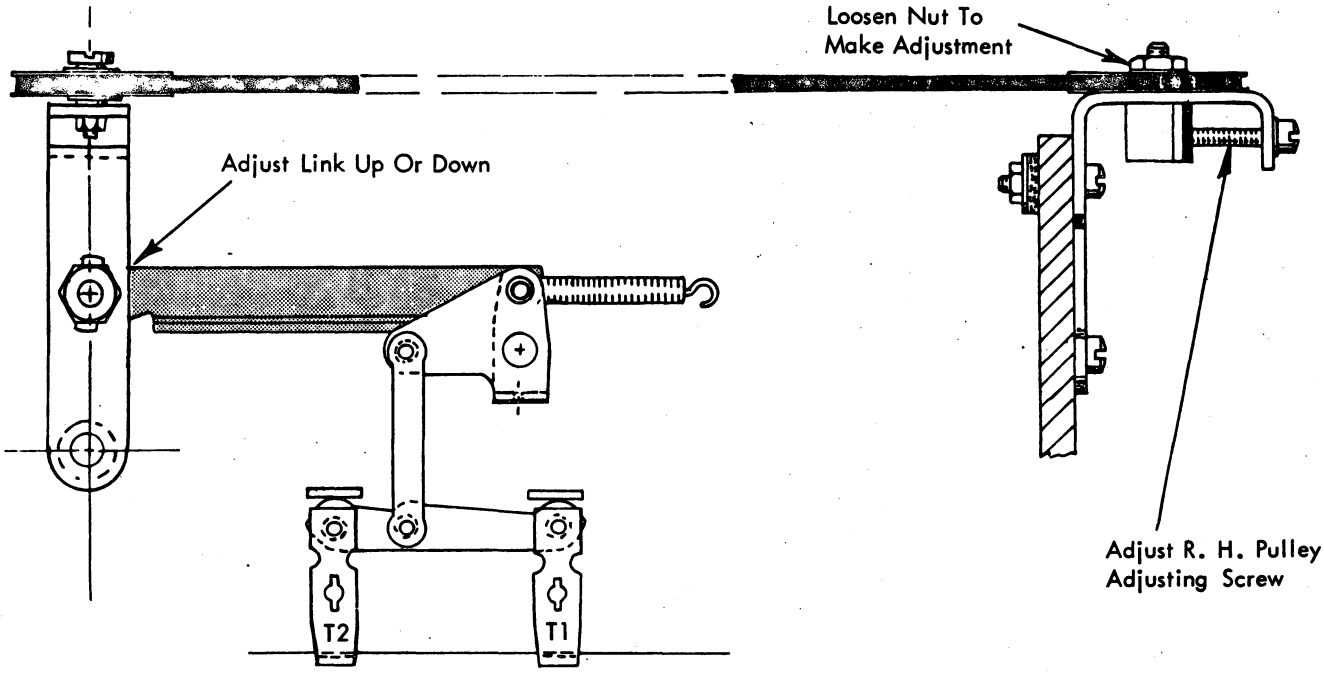


FIGURE 109. Tilt Mechanism

NOTE: It is very important for each selector latch to receive the same amount of motion from the latch bail, when operated, in order to produce the proper amount of motion to the tilt arm link for a desired selection. If one of the stop lugs is adjusted too low, its respective latch will reset early under the latch bail producing an excessive amount of latch clearance for that latch. This means that this latch when operated will not receive as much motion from the latch bail as the other latch will when it is operated. This condition which is undesirable causes the band width of the system to increase.

3. Tilt Arm Motion - Adjust the tilt link up or down on the tilt arm (Fig. 109) to control the tilt ring motion so that the tilt ring will coarse align the same for a 3-tilt character as it does for a zero-tilt character.

In order to check this adjustment, it is necessary to roughly home the tilt ring first. To rough home, half-cycle a zero-tilt character and adjust the right hand tilt pulley (Fig. 109) so that the tilt detent will enter slightly on the rear side of the V-shaped detent notch in the tilt ring when the tilt ring play is removed in the restoring direction (Fig. 110). As the tilt detent is allowed to seat itself, the rear of the tilt ring should rise slightly. This is a preliminary adjustment and will require refinement after the proper tilt arm motion is obtained.

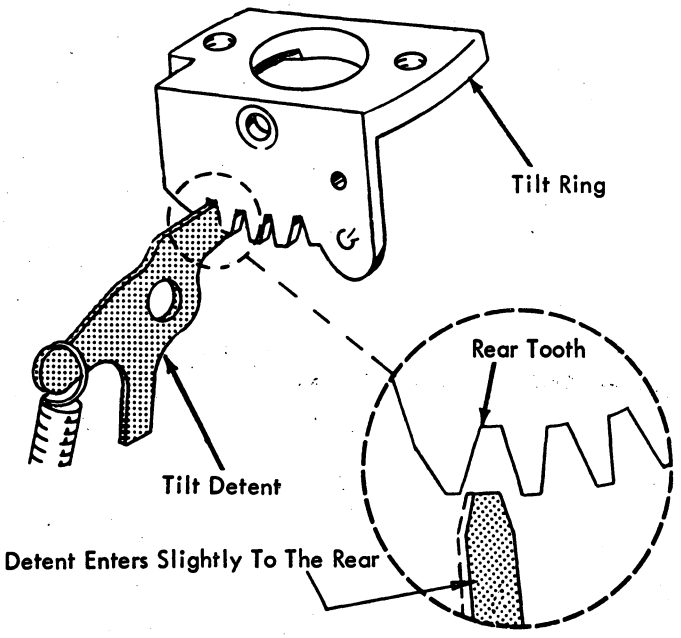


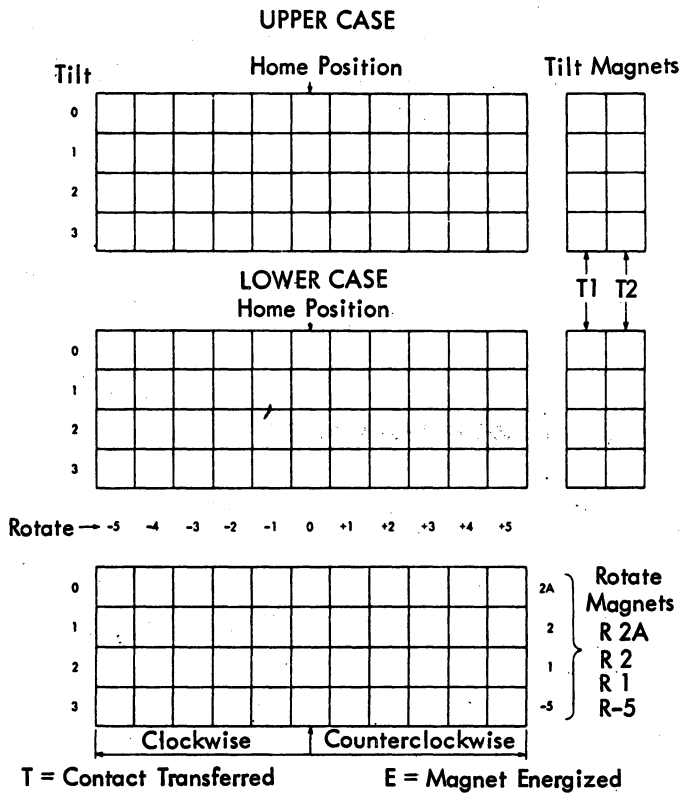
FIGURE 110. Rough Homing

Once the print shaft has been preliminarily timed and the tilt ring rough homed, all of the following adjustments that require half-cycling should be done under power so as to include all the stresses on the system.

When the tilt arm motion is adjusted properly, a half-cycled 3-tilt character will coarse align the same as a half-cycled 0-tilt character. That is, both selections will provide the same rising action to the rear of the tilt ring as the detent is allowed to seat in the detent notch. If the 0-tilt and 3-tilt coarse align the same, the 1-tilt and 2-tilt selections will also coarse align the same because of the leverage designed into the system.

NOTE: The right hand tilt pulley lock nut may be left loose while making the tilt arm motion adjustment, because a slight readjustment of the pulley may be necessary during the tilt arm motion adjustment.

On late level machines the tilt arm link has a horizontal elongated mounting hole where it fastens about the shouldered screw on the tilt arm and the tilt arm is lightly spring loaded away from the side frame by a hairpin spring. The tilt pulley spring is far stronger than the hairpin spring thus holding the tilt arm against the right hand end of the elongated mounting hole in the link. Although this modification has no definite effect on a tilt operation, its function is to remove any slack that may appear in the tilt tape. An example is when an operator changes the typehead she may accidentally tilt the head causing the tape to slacken.



NOTE: If possible CE should note what characters are I/O home and which are latch home

FIGURE 111.

4. Tilt Ring Homing - With a zero-tilt character half-cycled and the tilt ring play removed in the negative direction (Fig. 112a) (restoring direction), adjust the right hand tilt pulley so that the rear of the tilt ring will rise about .005" when the detent is manually allowed to seat in the detent notch (Fig. 112b).

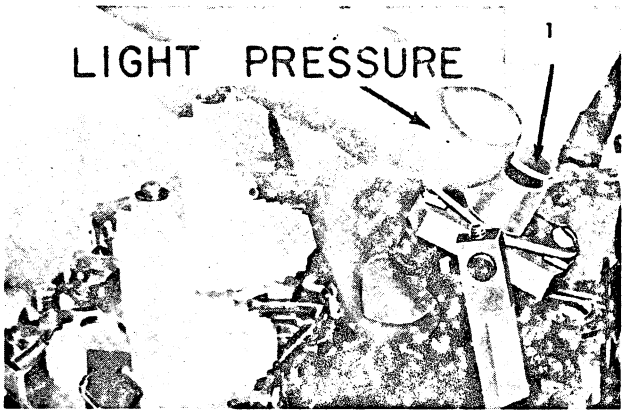
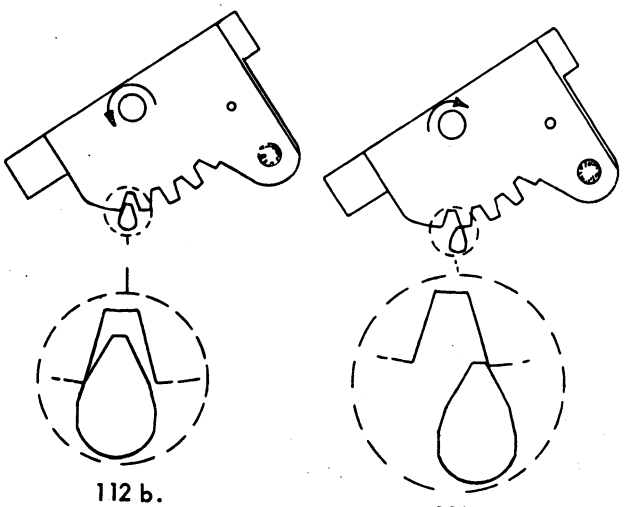


FIGURE 112a. Tilt Detent Entry

Check the other tilt positions and then refine the homing adjustment on the tilt selection that provides the least amount of rise to the rear of the tilt ring.

As a further check, remove the tilt ring play in the positive direction and observe the detent entry on the forward side of the detent notch (Fig. 112c). The detent should enter far down the forward slope of the detent notch but not so far that it contacts the tip of the tooth. By homing the tilt ring off center, favoring the positive side of the detent notch, a maximum amount of wear potential is achieved.



112 b.
Play Removed In
The Negative Direction

112 c.
Play Removed In
The Positive Direction

FIGURES 112b. and 112c. Tilt Detent Entry

5. Rotate Spring Tension - Adjust the rotate spring in the rocker so that it will have 1-7/8 to 2 pounds tension when the machine is half-cycled using a lower case negative 5 character. The least amount of tension is present in the spring when it is in this position. The type head must be removed when making this adjustment.

The rotate spring tension is adjusted by turning the spring cage from the front (Fig. 113a). The cage can be turned clockwise to increase the tension by pulling the cage toward the left with a spring hook. The spring drum retainer automatically snaps into position to retain the adjustment. If tension is to be decreased, the retainer must be pulled forward to allow the cage to rotate counter-clockwise. Care must be taken to decrease the tension slowly so that the cage does not spin freely. Spring damage could otherwise result.

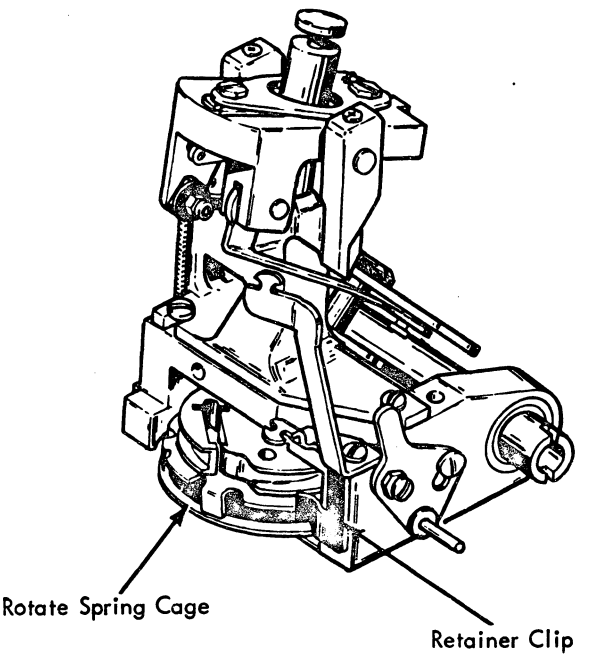


FIGURE 113a. Rocker Assembly

Tension of the spring is critical in that it must be properly balanced with the springs of the wear compensator. Excessive tension will overload the levers system and increase wear. Insufficient tension will not provide the torque necessary for rapid lower case negative rotate operations. It will also affect the wear compensator operation if the tension is not sufficient to overcome the compensator damper spring in the negative-5 position.

The rotate spring tension should be measured with a spring scale as indicated by Fig. 113b. Using a lower case -5 character, read the spring scale while slowly allowing the shift arm to move in towards its stop screw. The spring scale should read 1-7/8 to 2 pounds just as the

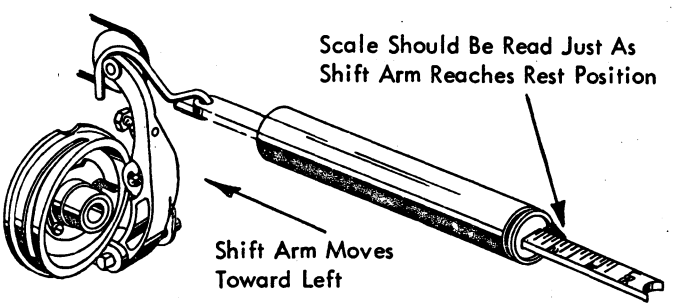


FIGURE 113b. Spring Scale Measurement For Rotate Spring Adjustment

arm reaches its stop screw. To overcome static friction, read the spring scale while the arm is moving.

If a spring scale is not available, the tension may be obtained in the following manner (Fig. 114). With the machine half-cycled at a negative five lower case (machines which are locked in upper case use upper case -5 character) position and the type head removed, insert a large spring hook around the lower compensator arm. Pull so that the rotate arm eccentric just clears the damper spring and release it. The tension of the rotate spring should be enough to completely collapse the damper spring against the power frame with the damper spring stop adjusted at the bottom of the spring.

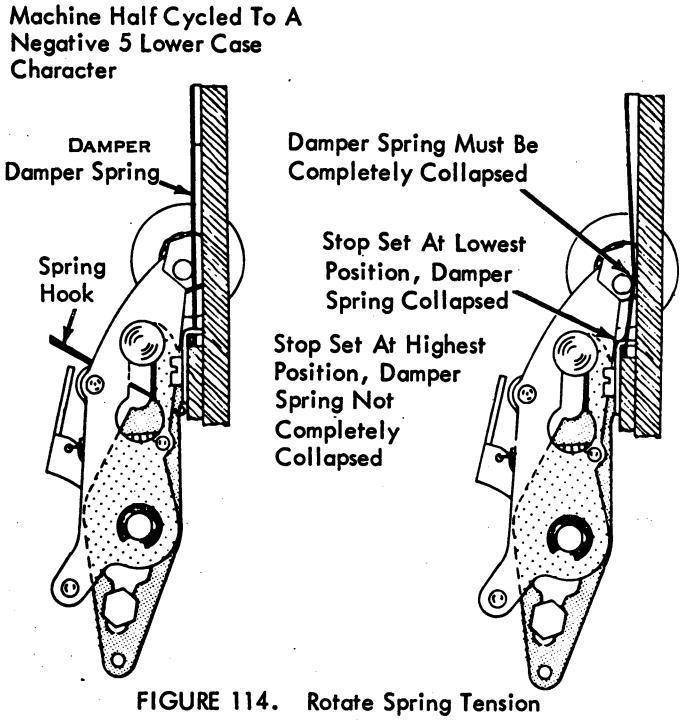


FIGURE 114. Rotate Spring Tension

With the damper spring stop all the way up, the damper spring should not be completely collapsed. Check and adjust the rotate spring to satisfy both conditions.

NOTE:

Lower damper spring stop to bottom before proceeding with sequence. CAUTION - The damper spring method is only useable when it is impossible to obtain a spring scale.

NOTE: The accuracy given to the next seven coarse alignment adjustments determines the "band width" (detenting variation) of the rotate system. Each one of these seven adjustments contributes to the band width in a different manner. Generally, it takes experience in making each adjustment to learn how much accuracy is needed to end up with an accumulated band width which is acceptable. The band width of the rotate system should never exceed .020" nor should any extra time be spent in trying to obtain one any less than .010".

6. Rotate Selector Latches

a. Form the stop lugs above the positive rotate selector latches (Fig. 115) so that the latches will reset simultaneously (under the latch bail) just as the cycle clutch check pawl drops into the notch on the check ratchet at the rest position.

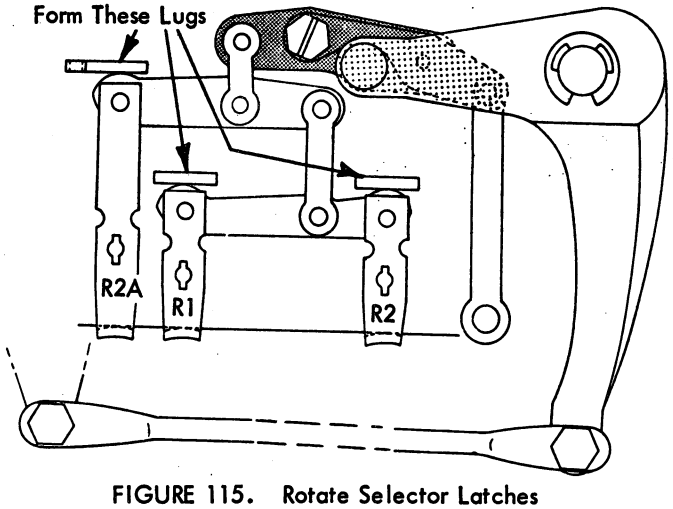


FIGURE 115. Rotate Selector Latches

NOTE: The adjustment theory under "tilt selector latches" also pertains to the rotate selector latches.

b. Adjust the negative-5 latch stop screw so that the negative-5 latch (Fig. 116) will reset simultaneously as the check pawl drops into the notch on the check ratchet at the rest position.

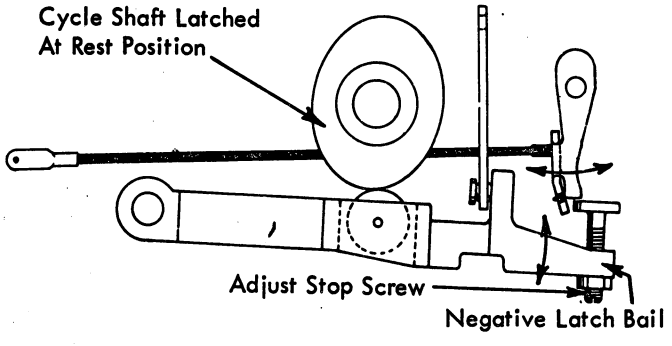


FIGURE 116. Negative 5 Latch Stop Screw

The negative-5 latch controls the position of the negative latch bail during zero and all positive rotate selections. Changing the latch adjustment causes the coarse alignment of the zero and all positive rotate selections to change equally with respect to the negative selections. No change is felt in the coarse alignment of the negative rotate selections when the negative-5 latch adjustment is altered because the latch is out of the system during all negative selections (Fig. 117).

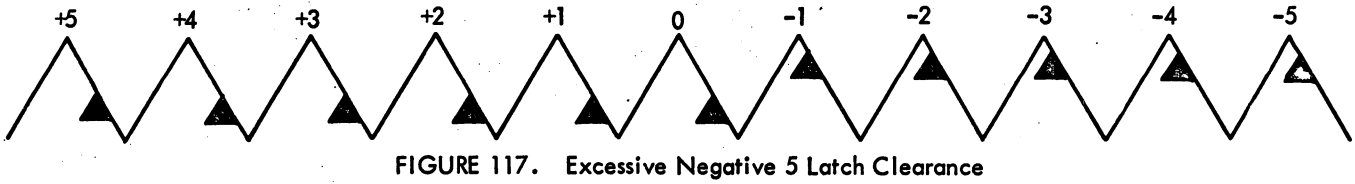


FIGURE 117. Excessive Negative 5 Latch Clearance

Considering the balance lever to be properly adjusted, the effects of the negative-5 latch adjustment on the system can be explained by the following: From the rest position the amount of movement in the negative direction given to the rotate bellcrank is fixed because the negative latch bail moves from the high point of the negative cam to its low point. From the rest position the amount of movement in the positive direction given to the rotate bellcrank can be increased or decreased by changing the negative-5 latch adjustment. In other words, when the machine is at rest the negative-5 latch bail is resting on the high point of the negative-5 cam. Whenever a no-rotate or positive selection occurs, the negative-5 latch bail is allowed to follow its cam towards the low point until it is restricted by the negative-5 latch. This small increment of negative motion to the negative-5 latch bail during a no-rotate or positive selection causes the positive motion to be reduced by an equal increment. Therefore, the adjustment of the negative latch can change the balance of motion between positive and negative selections. Even though it is possible, it is not permissible to use the negative latch adjustment for balancing purposes. The negative latch should always be adjusted for the proper reset clearance. This allows the system to operate with optimum leverage loads in both positive and negative selections. Balancing between positive and negative should always be accomplished by adjusting the balance lever.

NOTE: Figure 117 illustrates how the coarse alignment detenting would change at the typehead if only the negative-5 latch adjustment were maladjusted on a machine. It is possible for this same detenting pattern to show up on a machine that has the correct negative-5 latch adjustment but other adjustments maladjusted. For this reason it is best to adjust the negative latch as specified in the adjustment rather than by adjusting it while observing the effects that the adjustment change will produce at the typehead.

References will be made to 2 different methods of obtaining a no rotate character. These methods can be defined as:

Latched Home - zero rotate with no plus or minus rotation.

I/O Home - zero rotate with both plus 5 and minus 5 rotation.

7. Rotate Arm Vertical - With the typehead removed and the machine half-cycled to an upper case zero rotate character (latched home) adjust the rotate link so that the point at the top of the rotate arm is 15/32" from the machine sideframe. The compensator roller should be 1/16" from the top of the slot when this adjustment is made.

The adjustment sets up a vertical condition for three points in the rotate arm, the center of the pulley, the rotate arm pivot point, and the rotate link connection. With the rotate arm vertical at a half-cycled zero rotate position, the leverage within the rotate arm will be the same for positive and negative movements of the arm.

The adjustment can be measured using the #1 scribe line on the Hooverometer handle as illustrated in Fig. 118. The scribe line measurement makes allowance for the thickness of the compensator damper spring.

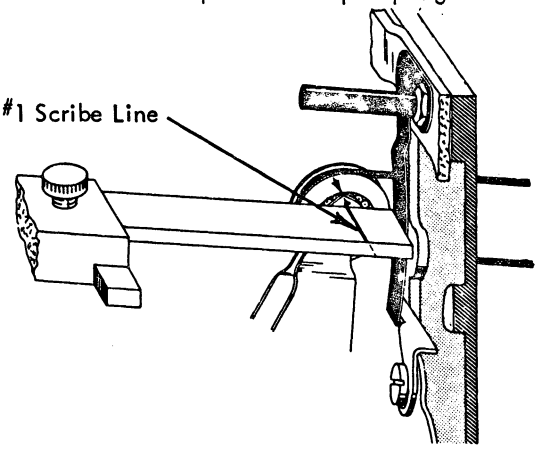


FIGURE 118. Rotate Link Adjustment Measurement

NOTE: The eccentric stud at the top of the rotate arm should be turned all the way to the left at this point to prevent interference with subsequent adjustments.

8. Preliminary Typehead Homing - Half cycle the machine under power using an upper case zero rotate (latched home) character. Check detenting, if in correct notch of typehead preliminary adjustment of .010" to .020" does not apply. Go on to next adjustment.

If detent is in wrong typehead notch, then loosen screw in bottom of rotate pulley and slip typehead so the detent will enter .010" to .020" from the center of the detent notch on the negative side of the notch when head play is lightly removed in the negative direction (Fig. 119).

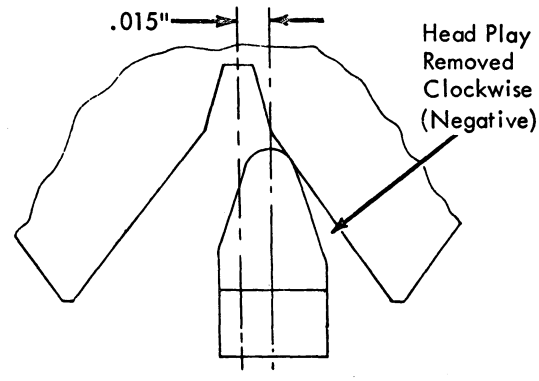


FIGURE 119. Type Head Homing

The main purpose of this preliminary homing adjustment is to aid the Customer Engineer in making the rest of the coarse alignment adjustments. It places the typehead in approximately the correct position so that its rotation, for a given selection, may be easily measured and used as a tool in making the next four adjustments. After completing this sequence of adjustments the preliminary homing adjustment may have to be refined.

NOTE: Be sure to maintain .002" to .004" end play in the rotate shaft when making this adjustment. Also, make sure that the compensator roller is 1/16" from the top of the slot.

Machines locked in upper case can sometimes be adjusted by the stud in the shift arm.

9. Balance Lever - With the machine in upper case loosen the lock nut on the balance lever and move the right hand member of the balance lever (Fig. 120) left or right until a half-cycled +5/-5 (I/O Home) combination detents (coarse aligns) the same as a half-cycled zero rotate character. The combination can easily be obtained by holding the negative-5 latch interposer forward with the fore finger while striking a +5 character with the thumb.

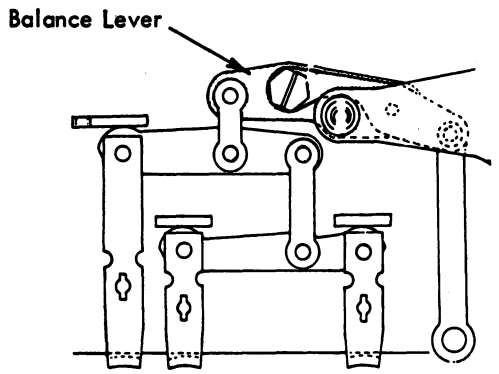


FIGURE 120. Balance Lever Adjustment

Begin the adjustment by half-cycling a zero rotate character in the normal manner. Check the detent entry to see exactly how much off-center the detent enters with the head play removed clockwise. Next half-cycle using the cancellation method described above and check the detent entry. If it is different from the normal zero rotate character, it indicates that the typehead has moved because of an unbalanced condition between the positive and negative motions.

With the machine in the half-cycled position using the cancellation method, adjust the right hand member of the balance lever left or right until the detenting is exactly as it is when a zero rotate character is half-cycled normally. Changing the balance lever adjustment will not appreciably affect the detenting of the half-cycled zero rotate character.

NOTE: The nut on the balance lever screw can be left loose until the correct adjustment is obtained. Be sure not to move the adjustment when tightening the nut.

In Fig. 121 the effects of the wear compensator are disregarded and all adjustments are correct except the balance lever. The right hand member of the balance lever is maladjusted too far to the left creating too much negative motion and not enough positive motion. Looking at the positive side of Fig. 121 you can see that the maladjusted balance lever causes a progressive loss of motion to the rotate bellcrank from the zero to a positive five rotate position. The greatest loss of motion is felt at the positive five position because the left end of the balance lever receives the most motion for this selection. When the negative side of the balance lever is operated, the maladjusted balance lever causes the rotate bellcrank to receive an excessive amount of motion as illustrated by the detenting of the negative five rotate position. This excessive motion is felt equally in all of the negative selections because the negative end of the balance lever receives the same motion from the cam for all negative selections. The progressive loss of motion felt from the negative five to the negative one rotate position is caused by the positive side of the balance lever. It produces a deficiency of motion in the negative selections just as it did during the positive selections.

Notice the detenting of a negative one selection in Figure 121. This selection combines the error of a positive four and a negative five causing the negative one to be the worst detenting selection with respect to the zero rotate selection. Although the cancellation method (+5/-5) combines even a greater error than the negative one selection, either one may be used to effectively make the balance lever adjustment. Checking the detenting of the other positions is not necessary.

If the balance lever were out of adjustment in the opposite direction so that there was too much positive and not enough negative motion, the error pattern would remain the same except that the detents would move towards the opposite side of the detent notches.

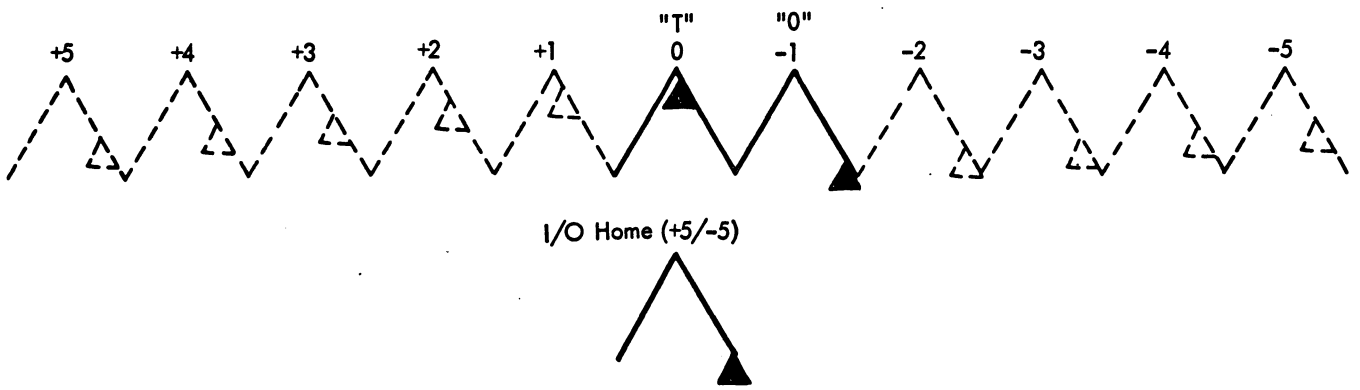


FIGURE 121. Excessive Negative Balance

10. Rotate Arm Motion - The adjustable plate on the bottom of the rotate arm (Fig. 122) should be adjusted up or down so that a half-cycled upper case +5 rotate character detents the same as a half-cycled upper case -3 rotate character. When observing the detenting remove the head play lightly in the negative direction.

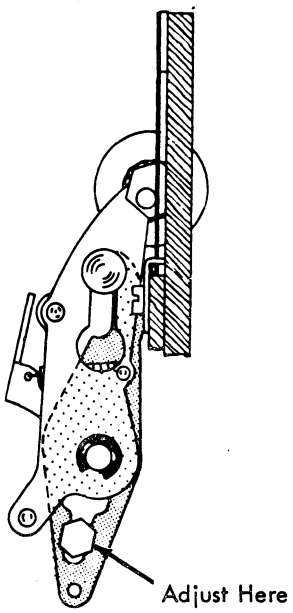


FIGURE 122. Rotate Arm Movement

The rotate arm motion is measured only as far as the negative three position in the negative direction. The negative four and five positions are not used because these two positions are affected by the ratio change operation of the wear compensator.

By comparing the detenting of the -3 and +5 characters, it can be determined whether or not the rotate arm is multiplying the motion, received from the rotate link, enough to rotate the typehead to the selected position. Once the -3 and +5 characters are detenting the same, then all of the selections between positive five and negative three will detent well within the acceptable band width provided that all of the previous adjustments have been made correctly. If a slight difference in detenting must exist between the -3 and +5 characters it is permissible and sometimes desirable provided that the -3 character detents more negative than the +5 character. In other words, it is better to have too much rotate arm motion than too little. The reason for this is to place a small amount of wear potential into the system for the areas of the differential mechanism where wear cannot be compensated for (positive latches and latch bail). Thus, as wear occurs in these areas causing the rotate arm motion to decrease, the detenting variation between the +5 and -3 characters will also reduce.

Figure 123 illustrates the effects on detenting caused by insufficient rotate arm motion. Notice that the largest detenting variation occurs between the +5 and -3. This is because the +5 and -3 characters operate in opposite directions and the error that appears when these two positions are compared is the combined error of both positive and negative motion.

If the rotate arm motion was excessive the detenting pattern would remain the same except that each detent would be on the opposite side of its detent notch.

NOTE: The adjustment may be left loose during each check until the correct position is obtained.

11. Eccentric Stud Adjustment (Typehead Homing) - Use the following procedure to adjust the eccentric stud:

a. Damper spring stop - as a preliminary adjustment, slide the damper spring stop down as low as it will go behind the damper spring (Fig. 124).

b. Raise the compensator roller all the way to the top of the V-shaped wedging slot.

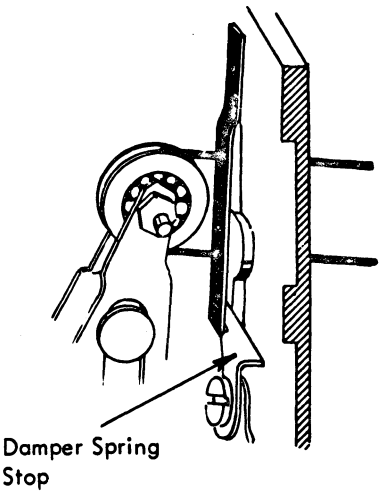


FIGURE 124. Damper, Spring Stop - Preliminary Adjustment

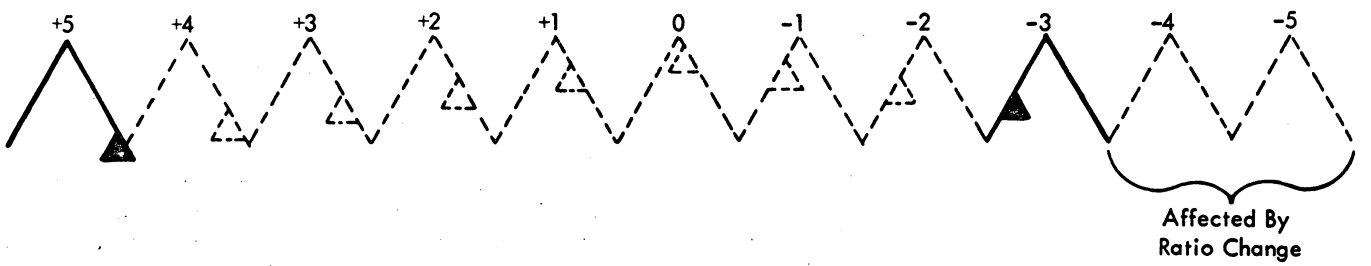


FIGURE 123. Insufficient Rotate Arm Motion

c. Half-cycle an upper case -5 character and adjust the eccentric stud (Fig. 125) in against the machine sideframe until the -5 character detents .010" to .020" in the negative direction from the center of the detent notch when the head play is lightly removed in the negative direction (Fig. 126). Make sure that the damper spring is fully collapsed against the machine sideframe.

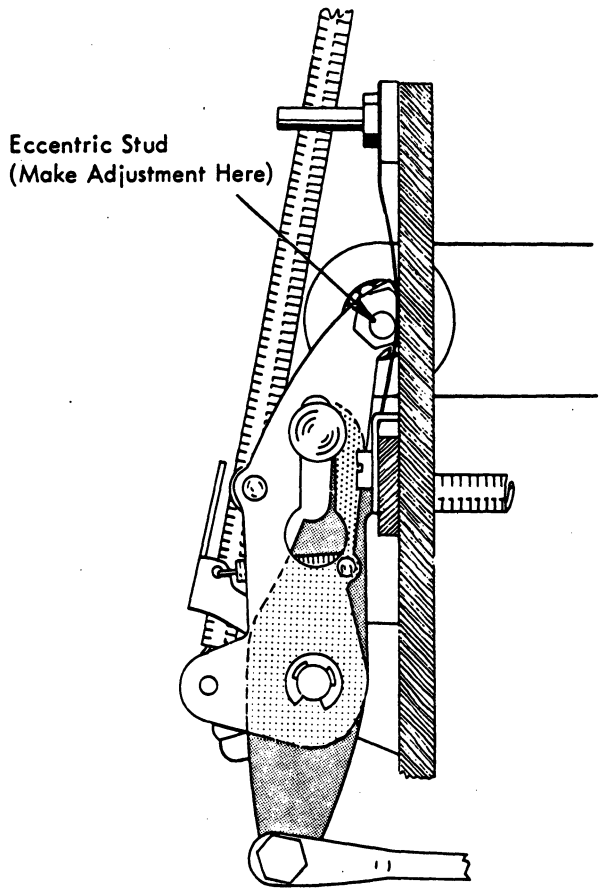


FIGURE 125. Eccentric Stud

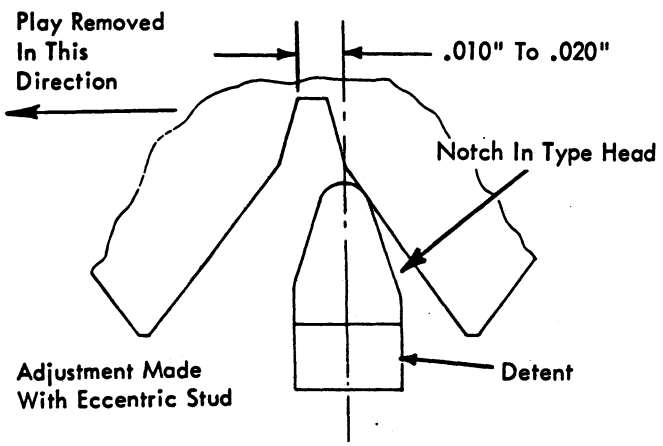


FIGURE 126. Eccentric Stud

After the eccentric stud has been properly adjusted the compensator roller must be reseated by raising it to the top of the V-shaped slot and striking a series of -5 characters. The compensator roller should seat 1/16" down from the top of the slot. If it drops too little or too much the rotate link should be adjusted and the roller reseated until the 1/16" is obtained. Having the roller seat 1/16" from the top of the slot sets up a vertical condition between the compensating arm and the rotate arm so that the leverage within the arm assembly will be the same for both positive and negative movements of the arm.

In some cases it may be found that after the eccentric stud is adjusted the roller will not drop but remain trapped at the top of the V-shaped slot. If this occurs, lengthen the rotate link and then recheck the eccentric stud adjustment.

NOTE: The eccentric stud should always be kept in the lower half of its orbit so that it will tend to turn in the tightening direction as it operates against the sideframe. Also, if the correct detenting of the -5 character cannot be easily obtained with the eccentric stud adjustment the preliminary homing adjustment (Adj. #8) must be readjusted.

d. Damper spring stop - with the typehead removed, raise the stop so that when a lower case -5 character is half-cycled the damper spring will just collapse against the sideframe. Check by pulling the compensator arm away from the sideframe with a spring hook and then allow it to go back in slowly (Fig. 127).

Machine Half Cycled To Negative 5 Lower Case Character

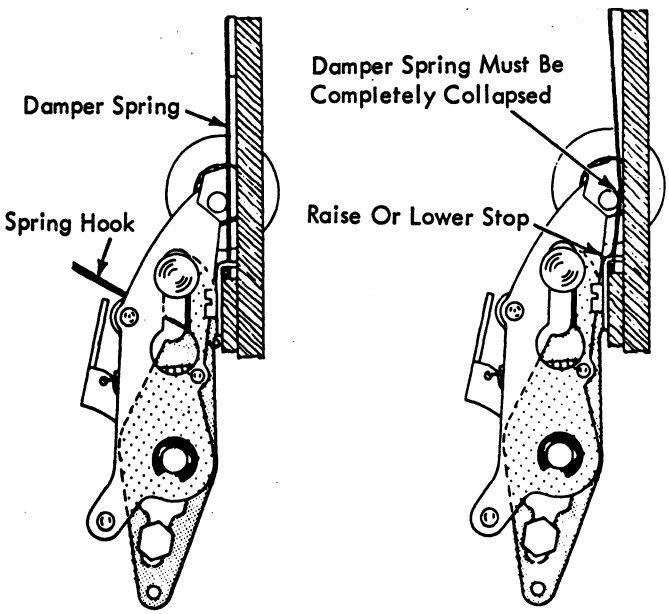


FIGURE 127. Damper Spring Stop

The main purpose of the eccentric stud adjustment is to stop the negative motion of the rotate arm as it approaches the negative five position so that all of the pressure on the compensator roller will be relaxed when the compensating arm has reached its full negative position. Assuming that no ratio change was felt in the system at the time of making the eccentric stud adjustment, stopping the rotate arm early to relax the pressure on the roller will cause the negative motion of the rotate arm between

the negative four and negative five rotate positions to be reduced, or the detenting of the negative five to be positive with respect to all the other rotate positions.

Since the ratio change adjustment will not affect the negative five position, the typehead is then rehomed to the negative five position making it detent properly but causing all of the other positions (-4 through +5) to detent too far negative. The lost motion of the rotate arm is still felt between the negative four and negative five rotate positions. The rotate arm motion in this area can be controlled by the ratio change adjustment which will be discussed under the next adjustment. This rehoming of the typehead to the negative five position (which is usually a slight refinement of the original homing adjustment) is accomplished by the eccentric stud adjustment rather than by slipping the rotate shaft within the rotate pulley. It has been found that the homing adjustment can readily be refined to the negative five position with the eccentric stud while at the same time obtaining a relaxed condition for the compensator roller (accomplished by controlling the length of the rotate link and reseating the compensator roller).

12. Ratio Change Adjustment - With the machine half-cycled under power to an upper case -3 character, form the paddle on the rotate eccentric arm until the upper case -3 character detents the same as the upper case -5 character. Each time the paddle (Fig. 128) is formed the machine must be recycled under power before observing the detenting of the -3 character. This allows the eccentric shoulder to reseat itself in the compensating arm.

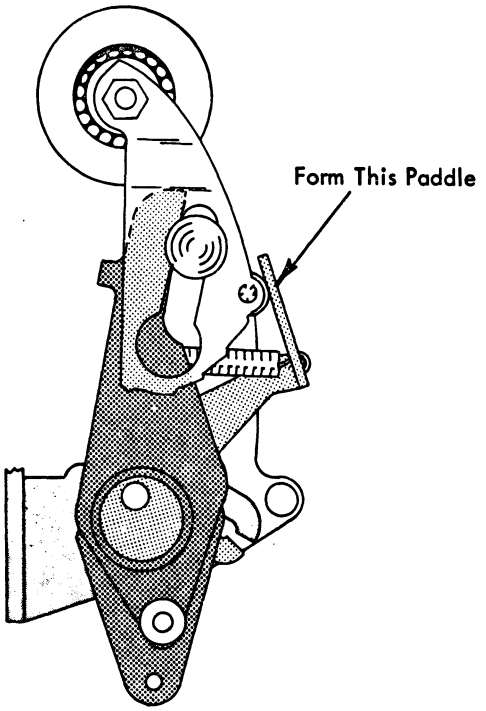


FIGURE 128. Arm Assembly In -3 Position

CAUTION: When forming the paddle the V-shaped wedging slot may accidentally open up causing the roller to drop. If this occurs, reseat the roller by raising it to the top and striking a series of -5 characters. This adjustment should require only slight forming of the paddle. Forming the paddle has no effect on the negative five position. This can be easily seen by looking at Figure 129 which shows the arm assembly in a negative five position. In this position there is a large clearance between the paddle and the barrel on the rotate arm therefore any change in the paddle position just increases or decreases this clearance without affecting the negative five position of the rotate arm.

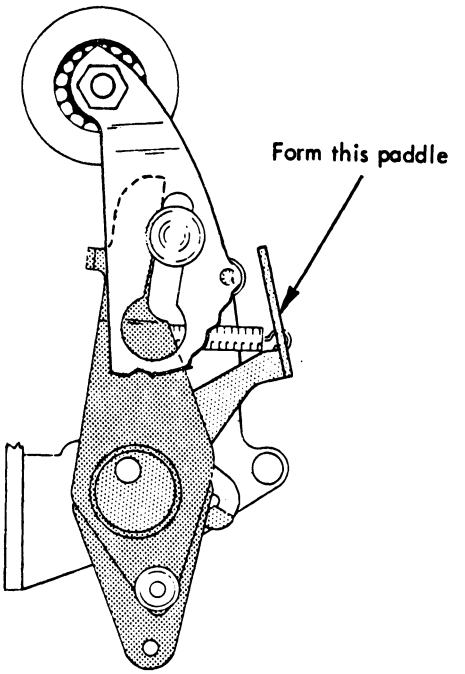


FIGURE 129. Arm Assembly in -5 Position

The paddle adjustment does affect all of the rotate positions from a negative three to a positive five position equally because it controls how long the compensating arm will rotate about the eccentric shoulder on the rotate eccentric arm as it travels from the negative five position towards the negative three position. In other words the more clearance there is between the rotate arm and the paddle, the farther the compensating arm can travel under a ratio change condition as it moves towards the negative three position.

Figure 130 illustrates how the detenting pattern of the typehead is affected by the ratio change adjustment.

Notice in Figure 130A that all the rotate positions from the -3 to the +5 detent equally but much less negative than the -5. This indicates that there is too much ratio change (too much motion) in the system between the -5 and the -3. The paddle should be formed in until the -3 detents the same as the -5.

Figure 130B illustrates the detenting pattern of a system that lacks a sufficient amount of ratio change. All the rotate positions from -3 to +5 detent alike but too far negative with respect to the -5. The system lacks motion between the -5 and the -3 therefore the paddle should be formed out to increase the amount of ratio change. Note that the negative four position is detenting the same as the -3 in Figure 130B. This is because the ratio

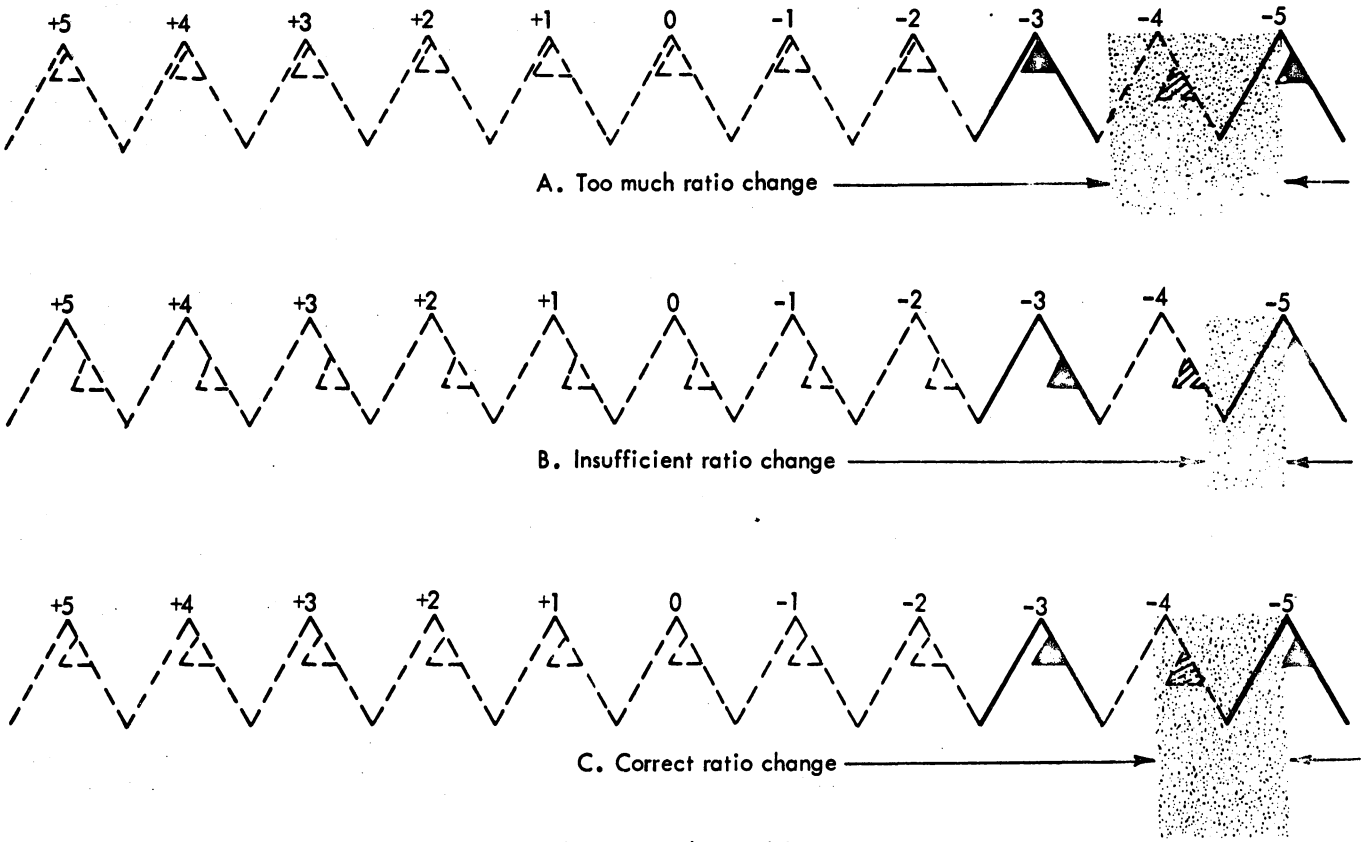


FIGURE 130. Ratio Change Adjustment

change is not occurring at the negative four position, thus the arm assembly is operating as one solid arm at this position.

In Figure 130C the correct amount of ratio change is in the system. All positions from the -3 to the +5 detent the same as the -5. Note that when the -3 detents the same as the -5, the detenting of the -4 is slightly different. This is caused by the ratio change. No attempt should be made to control the detenting of the -4 position because its position may vary on each machine depending on the amount of ratio change required (of each machine) to make the -3 detent the same as the -5.

13. Print Shaft Timing - Advance or retard the print shaft relative to its gear to obtain the proper timing of the rotate detent. Hand-cycle an upper case -5 character and observe the rotate detent as it operates in the typehead notch. The detent must enter the correct detent notch and withdraw without restricting the restoring of the typehead. There should be .002" to .004" backlash felt in the typehead when the detent is near the bottom of the detent notch (Fig. 131).

After adjusting the timing of the rotate detent to an upper case -5 character, check the detent entry and withdrawal of an upper case +5 character. If the detent restricts the typehead from restoring on withdrawal when the +5 is slowly hand-cycled, advance the print shaft slightly until the +5 has a withdrawal backlash of .002" to .004". When the withdrawal adjustment has been completed check the detent entry on both the +5 and -5. The detent must enter the correct notch.

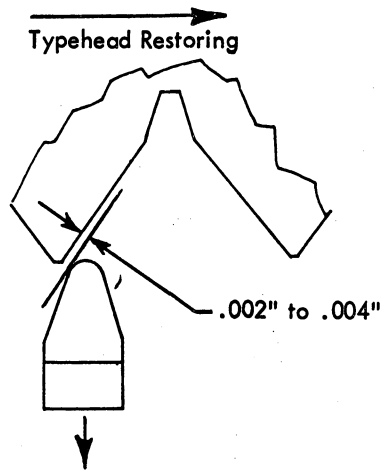


FIGURE 131. Withdrawal Clearance For The -5 Character

CAUTION: After hand-cycling the machine the compensator roller must be raised to the top of the wedging slot and reseated under power by striking a series of -5 characters.

If difficulty is encountered in obtaining the correct detent timing, check the following items:

a. Detent skirt clearance - favor the high side of the tolerance.
b. Typehead homing - favor the high side of the tolerance.
c. Band width - make sure that it is not excessive.

d. Head play - it should be .045" measured at the typehead skirt. If excessive head play is suspected the ball joint should be replaced and the typehead homing adjustment refined.

CAUTION: Excessively advanced or retarded timing can cause parts damage as well as poor horizontal alignment or improper selection. This could happen if the detent entered the wrong notch or remained in the notch too long.

NOTE: Be sure to maintain .002" to .004" end play in the print shaft.

14. Shift Motion - The shift arm adjusting screw (Fig. 132) should be adjusted in or out to obtain 180° rotation of the typehead during a shift operation.

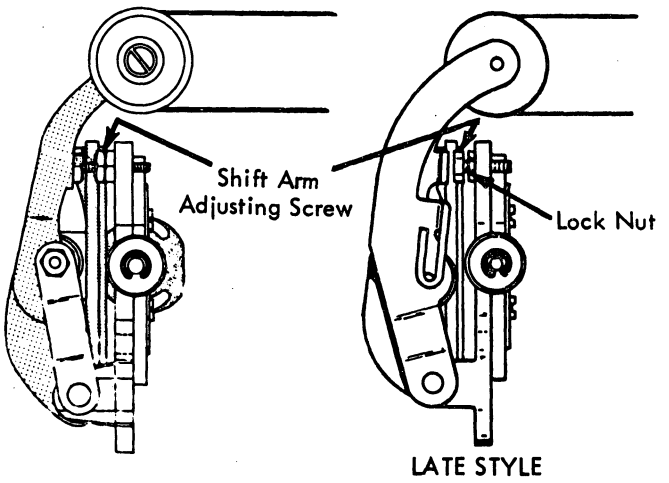


FIGURE 132. Shift Motion Adjustment

The adjustment can be checked by observing the detenting in the lower case compared to the upper case using a -5 character. The detent MUST enter the lower case notch EXACTLY the same as it does the upper case notch. Check by half-cycling the machine and manually withdrawing the detent. Remove the head play clockwise and allow the detent to re-enter slowly. A final check can be made by comparing the detent withdrawal timing of the upper and lower case. They must be exactly alike.

Maladjustment can cause misalignment in the lower case while the upper case remains good.

CAUTION: Be sure that the shift cam is detented at each position during the check and that the cycle shaft is properly latched at the half-cycle position.

15. Final Check - After completing the foregoing adjustments, a final check should be made to see if any refinements are necessary. Compare the coarse alignment of 0 rotate compared to +5, -1, -3, -4, -5. The band width of this group should not exceed .030" and none of the group should detent closer than .010" to the center of the notch when the head play is removed in the negative direction.

The following table can be used to diagnose the cause of excessive band width between a 0 rotate and +5, -1, -3, -4, -5. If an excessive band width exists, it will be greatest among these characters. In making the diagnosis follow the sequence as listed.

Excessive Band Width Between	Cause
0 (zero) and -1	Incorrect balance
-3 and +5	Incorrect rotate arm motion
-3, +5 and 0 (zero)	Incorrect latch clearances
-5 and -3	Incorrect paddle adjustment

Unwanted compensator roller droppage may result from one or more of the following.

a. Improper detent timing

b. Malselection (popping latches)

c. Incorrect rotate spring tension or damper spring tension.

d. Binds in the typehead, upper ball socket, rotate shaft, rotate pulley, or rotate spring.

e. Binds in the compensator or lever system.

f. Loose differential mounting bracket.

g. Excessive band width or head play.

If the band width appears to be all right but the alignment is not satisfactory, check the following items:

a. Detent timing

b. Play or binds in the tilt or rotate detents. Side play in the rotate detent can be checked by holding down the interposer for the letter "N" so that it repeats for a full line. Move the carrier back manually and repeat the operation without indexing. The second line should cover the first line exactly. If any of the characters are shadowed, side play in the rotate detent could be the cause.

c. Loose fitting upper ball socket.

d. Excessive play in the carrier or rocker.

e. Binds in the rocker parts.

f. If the -5 characters vary horizontally, improper damper spring tension could be the cause.

g. Improper tilt adjustments can cause poor horizontal alignment by delaying the detent seating.

NOTE: After the machine has been in use for some time, wear in the tape system will allow the typehead to drift in the negative direction. It is not necessary to slip the rotate shaft within the rotate pulley to REFINE the typehead position. The proper position may be gained by refining the eccentric stud adjustment. Be sure to RESEAT the compensator roller after changing the eccentric stud adjustment. (Maintain the roller position 1/16" from the top of the slot by adjustment of the rotate link.)

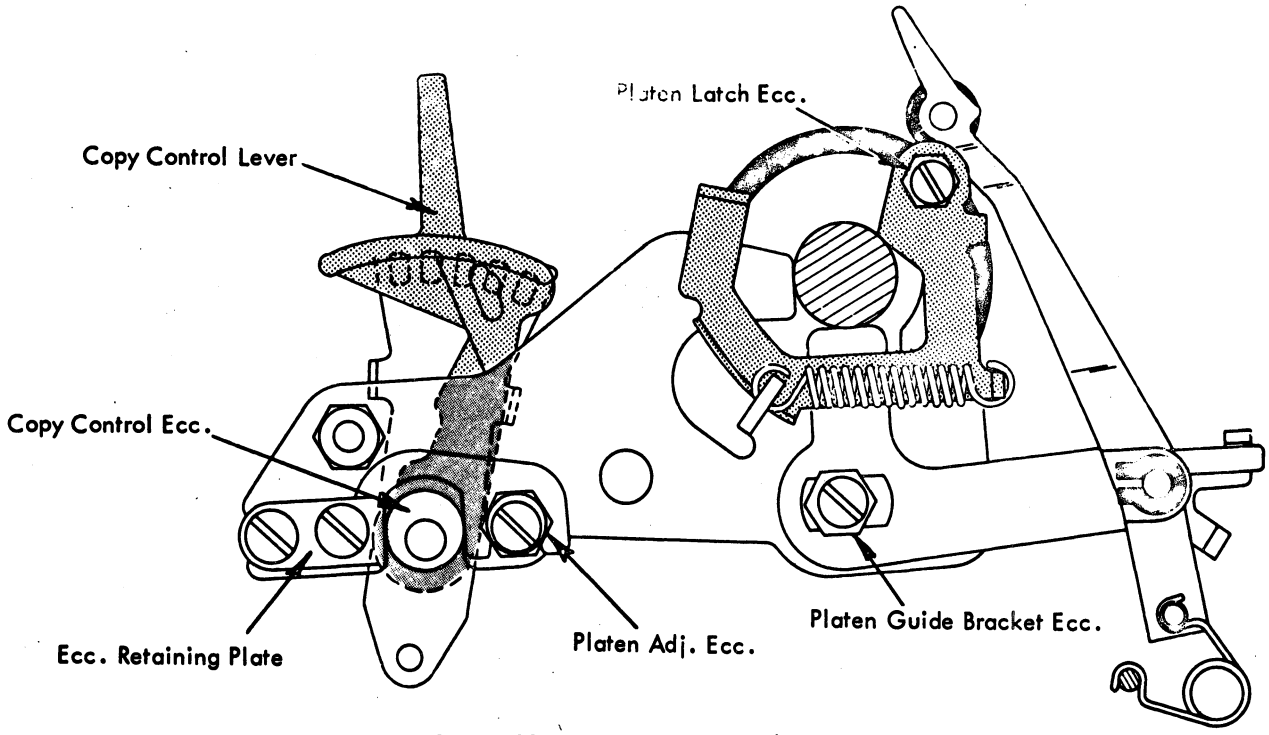


FIGURE 133. Copy Control Mechanism

PRINT MECHANISM - EARLY STYLE

1. Copy Control Lever - With the copy control lever detented in the forward position, the high points of the eccentrics should be vertical (Fig. 133). Adjust the copy control lever on the shaft to satisfy this condition.

   This adjustment provides the most effective operation of the eccentrics in moving the platen forward and back.

   NOTE: The stop ears on the copy control detent spring should be formed to provide positive detenting in the extreme front and rear positions of the lever.

   CAUTION: The adjustment of the copy control lever, while important as a preliminary setting, should not require adjustment unless it becomes loose or parts replacement is necessary. Any change in the adjustment will affect the front to rear position of the platen requiring that other adjustments be altered to compensate.

   The copy control lever should be all the way forward unless stated otherwise for the following adjustments.

2. Eccentric Retaining Plates - For maximum efficiency of the copy control eccentrics, adjust the plate on each side of the machine so that no front to rear play exists between the eccentrics and the retaining plates (Fig. 133). Be sure that no binds exist.

3. Platen Latches - Adjust the platen latch eccentrics (Fig. 133) with the high part down so that the platen is held firmly in position vertically and horizontally. The latches should latch and unlatch freely with the feed rolls released.

4. Platen Position - To properly adjust the print mechanism, the correct position of the platen must be established first and then the print adjustments made relative to the platen position. This involves both a height adjustment and a front to rear position. Because of the method used in measuring these positions, it is necessary to consider them together and adjust them alternately until both are correct.

   a. Platen Height - With the head of the Hooverometer set at the #4 scribe line, the platen should just touch the base of the handle when the head is resting on the escapement rack (Fig. 134).

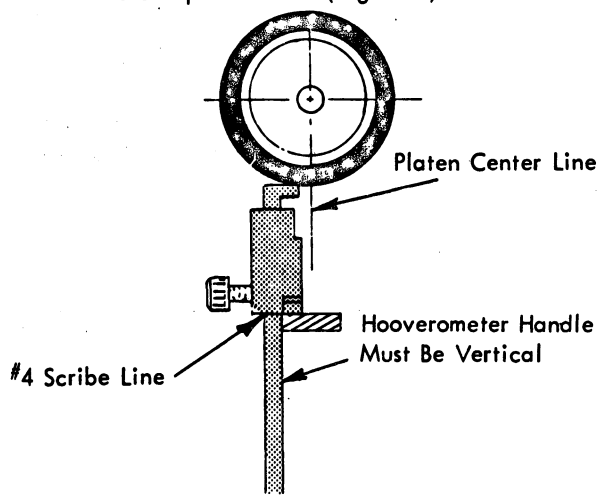


FIGURE 134. Platen Height Adjustment

   Adjust the platen guide bracket eccentrics to obtain this condition (Fig. 133). The high part of the eccentrics should be kept to the rear. It is necessary to remove the deflector and front feed rolls when checking the adjustment with the Hooverometer.

   NOTE: The Hooverometer should be inserted at a position just to the left of the escapement cord drum when checking the right side and directly in line

with the rotate-two latch when checking the left side. The handle of the Hooverometer must be as nearly vertical as possible during the checks. The base of the handle does not reach the center line of the platen when the handle is vertical, but the difference in height has been compensated for in the location of the scribe line.

b. Platen Front to Rear - With the head of the Hooverometer set at the #2 scribe line, the tool should just span the distance between the platen and the print shaft as illustrated in Fig. 135. Adjust the platen adjusting eccentrics to obtain this condition (Fig. 133).

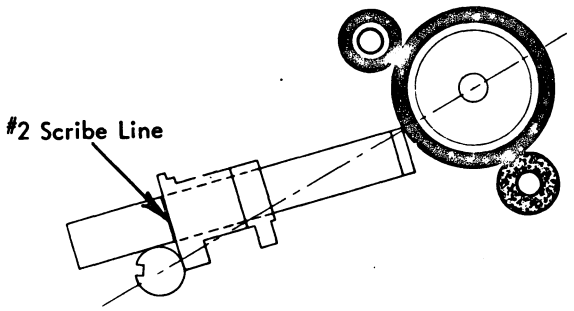


FIGURE 135. Front to Rear Platen Adjustment

Check at both ends of the platen. In order to adjust the platen adjusting eccentrics it is also necessary to loosen the front screws in the eccentric retaining plates. (Be sure that the Hooverometer does not rest on the print shaft keyway.)

NOTE: After the correct vertical and horizontal positions of the platen are obtained with the Hooverometer, the vertical position may be refined to provide even printing between the tops and bottoms of the characters. Check at both ends of the writing line.

CAUTION: Any change in the front to rear position of the platen necessitates a readjustment of the velocity control plate and anvil. Also, any change in the platen position may alter the paper feed adjustments. All paper feed adjustments should be checked and readjusted if necessary.

5. Carrier Shoe Adjustment

a. Carrier Shoe (Early) - Adjust the upper carrier shoe eccentric mounting stud to provide .001" to .004" vertical motion of the cartier at the rear (Fig. 136). Check at several points along the writing line.

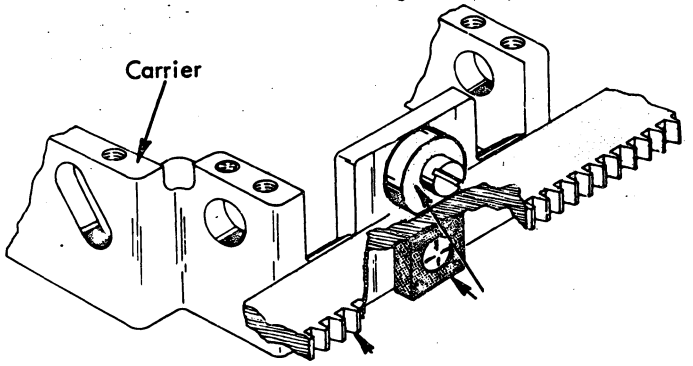


FIGURE 136. Carrier Shoe - Early

This amount of play insures free lateral movement of the carrier yet restricts the vertical movement to help prevent variation in the vertical alignment of the type.

NOTE: The eccentric is accessible with the 3" screwdriver through the opening in the escapement bracket just above the tab torque bar. The side of the screwdriver blade should be used if possible.

b. Carrier Shoe (Late) - Adjust the upper carrier shoe eccentric mounting stud to provide .002" to .006" vertical motion of the carrier at the rear (Fig. 137) when the spring load on the upper shoe is suppressed.

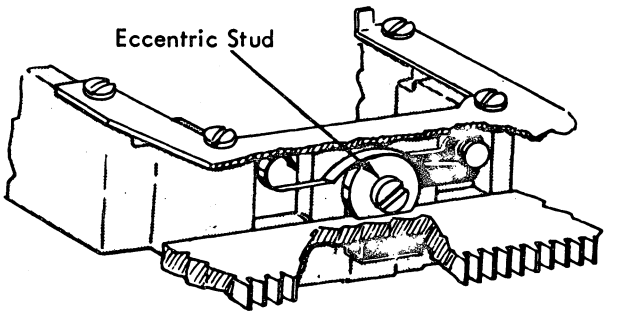


FIGURE 137. Carrier Shoe - Late

NOTE: The vertical motion may be felt by firmly moving the carrier up and down at the rear, so as to overcome the effects of the spring load on the upper shoe.

6. Velocity Control Plate - The velocity control plate must be adjusted to satisfy the following two conditions.

a. With the cam follower held lightly against the low point of the print cam, the center of the home character should clear the platen by .260" to .270".

b. With the cam follower held lightly against the high point of the print cam, the home character should clear the platen by .020" to .030".

The copy control lever should be forward for both adjustments. These adjustments should be made with the carrier positioned in the center of the writing line. On long carriage machines the adjustments should be made with the carrier at the extreme left hand position.

The print cam has a fixed amount of rise from its low point to its high point. For this reason, the print cam follower always receives the same amount of powered travel or motion from the print cam. However, the amount of powered travel that the rocker and typehead receive, from the print cam follower, is directly dependent upon the position of the velocity control plate pin the the forked slot of the follower (Fig. 138). Moving the pin to the front of the slot decreases the powered travel of the typehead as shown by dimension A (Fig. 138). Moving it to

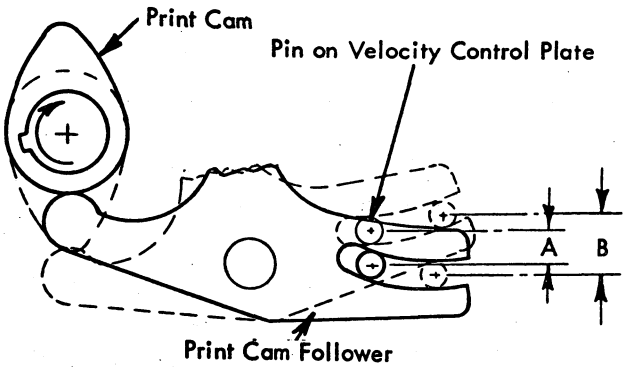


FIGURE 138. Velocity Control Plate Adjustment

the rear increases the powered travel, as shown by dimension B.

Because of the constant operational speed of the print cam and follower, the typehead velocity must increase or decrease proportional to the increase or decrease in powered travel. An accompanying change in typehead velocity occurs when the powered travel is changed because the typehead must always travel from its rest position to its active position in the same amount of time regardless of what this distance may be.

The proper impact velocity of the typehead can be achieved by controlling the amount of powered travel of the typehead while maintaining at the same time the correct amount of free flight. Since the position of the platen has been previously fixed and the amount of free flight is determined by the point at which the limit of powered travel occurs relative to the platen, only the rest position (beginning of powered travel) may change when the amount of powered travel is changed. Therefore, in order to maintain a fixed amount of free flight to the typehead when the amount of powered travel is changed, the velocity control plate pin must also be adjusted up or down relative to the rocker.

The eccentric shouldered nut (Fig. 139) on the velocity control plate provides a means of controlling the vertical position of the velocity control plate pin relative to the rocker thereby controlling the free flight of the typehead. The elongated hole in the velocity control plate (behind the binding screw) allows the velocity control plate pin to be adjusted front or rear in the forked slot of the follower thereby controlling the amount of powered travel that the typehead will receive. Each adjustment affects the other and must be adjusted alternately until both are correct.

The adjustments can be made easily if the following procedure is used.

a. Raise the anvil adjusting eccentrics and the restoring cam follower eccentric to prevent any interference, and remove the ribbon feed plate for accessibility.

b. If the velocity control plate is loose or completely out of adjustment, set the high part of the eccentric forward and tighten it in place. Adjust the plate so that about 1/32" of the adjusting slot is visible above the binding screw and tighten the screw friction tight. These settings provide a good starting point.

c. Hand cycle the machine using a zero rotate, zero tilt character until the print cam follower is on the high point of the cam. Do not hold the typehead toward the platen. With the mechanism in this position, adjust the velocity control plate eccentric until a slight drag is felt on three tab cards inserted between the typehead and the platen (Fig. 139). A heavy drag should be felt on four cards. No drag should be felt on two cards. You should not be able to insert five cards.

   This will place the limit of powered travel of the typehead .020" to .030" away from the platen (providing the typehead with the proper amount of free flight).

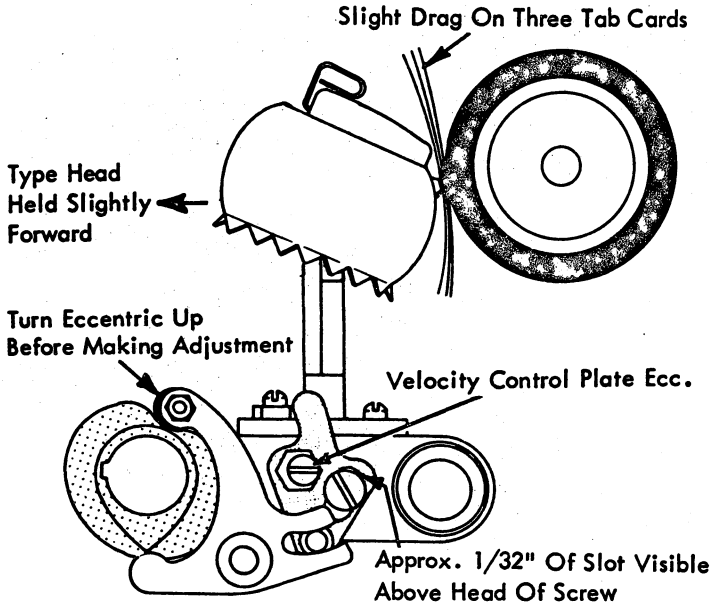


FIGURE 139. Velocity Control Plate Eccentric Adjustment

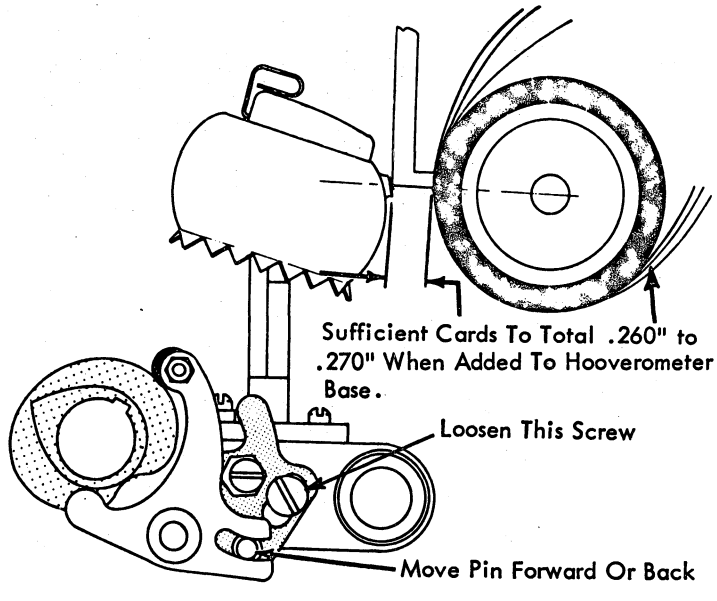


FIGURE 140. Velocity Control Plate Adjustment

d. Hand-cycle the machine until the print cam follower is at the low point of the cam. This may not be at the rest position. The low point of the cam can be determined by observing the movement of the head toward the front of the machine. With the typehead at its most forward point, adjust the velocity control plate pin forward or back in the cam follower slot until a clearance of .260" to .270" exists between the center of a zero rotate, zero tilt character and the platen (Fig. 140).

Since this .260" to .270" is measured between the typehead and the platen it is not a measurement of the powered travel of the typehead. The .020" to .030" free flight is included in this .260" to .270" and must be subtracted in order to determine the amount of powered travel. The powered travel must never exceed .265" as this will cause typehead breakage.

The base of the Hooverometer handle can be used as a measuring device as illustrated in Fig. 140. The handle base is about .250" thick; however they do not all measure the same. Each handle should be measured with a dial indicator or micrometer to determine its exact size. When the size of the handle base is determined, a thickness of tab cards should be placed around the platen that will total .260" to .270" when added to the thickness of the handle base.

e. Both adjustments must be rechecked and refined until these conditions are obtained. Be sure to tighten both screws firmly when the adjustments are completed.

NOTE: The adjustments should be checked with the ribbon removed.

These adjustments are designed to produce optimum print quality for most applications; however, a certain amount of variation in velocity is permissible in order to satisfy a customer's application. Be cautious of creating an excessive increase or reduction in velocity as this will adversely affect the uniformity of impression between characters and the general appearance of the printed copy.

7. Anvil - The eccentric at each end of the anvil is adjusted so that the anvil properly restricts the free flight of the typehead. The adjustment can be checked by typing a period with the copy control lever set all the way back. The period should fail to print or print very faintly. With the copy control lever pulled forward one notch (fourth position), the period should print lightly. The ribbon and one sheet of paper should be used when making the check. The check should be made at each end of the platen only, because flexing of the parts will allow a slightly different condition in the middle of the platen. The high part of each eccentric should be kept to the rear.

NOTE: The restoring cam follower eccentric should be adjusted all the way up while the anvil is being set. On 15 inch machines the carrier buffers must also be moved up out of the way of the anvil (Fig. 141).

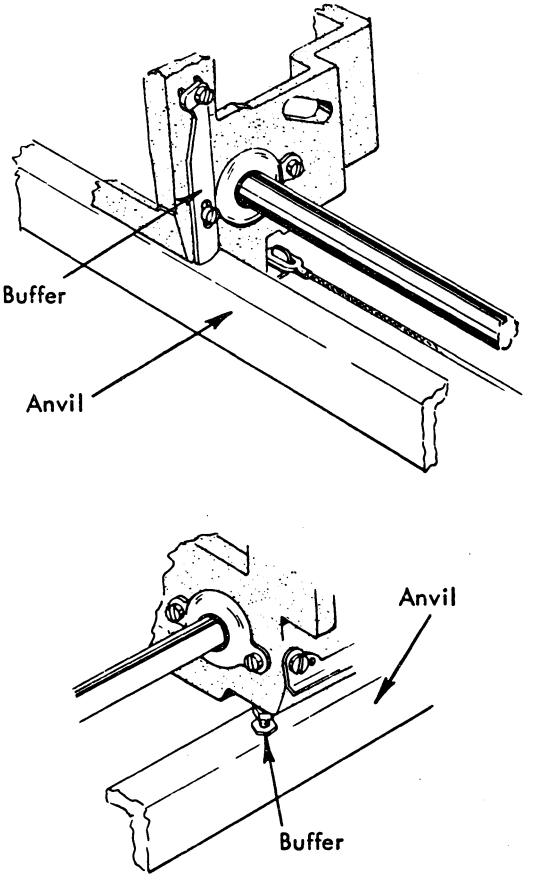


FIGURE 141. Carrier Buffers (15 Inch Machines)

The free flight must be restricted to insure that the characters will all emboss the paper to the same depth. If no restriction were applied, the smaller characters such as punctuation marks would be allowed to emboss too deeply. The surface area somewhat restricts the amount of embossing for the larger characters; thus if the free flight of the rocker is stopped at the right point, even impression between all characters will result.

CAUTION: Raising or lowering either end of the anvil will slightly affect the adjustment at the other end. Be sure to recheck each adjustment. A clearance of .010" to .045" must be maintained between the left anvil bracket and the sideframe for noise reduction purposes. Adjust the bracket left or right on the anvil to obtain the clearance (11 inch only).

8. Carrier Buffers (15 Inch Machines) - A buffer plate attached to the right side of the carrier and an adjusting screw under the left side strike the top of the anvil to prevent the print shaft from flexing downward. Each should have .002" to .004" clearance with the top of the anvil (Fig. 141).

9. Print Cam Follower

a. Print Cam Follower Stud - Adjust the pivot stud left or right so that the rubber roller on the follower is centered on the surface of the restoring cam. The stud is held in place in the carrier by a set screw that is accessible from the bottom of the machine.

b. Restoring Cam Follower Eccentric - With the print

cam follower at the high point of the cam and the platen removed, hold the typehead toward the rear until it is restricted by the anvil and striker. The rubber roller should just touch the restoring cam (Fig. 142). Adjust the eccentric, keeping the high point forward, to satisfy the condition.

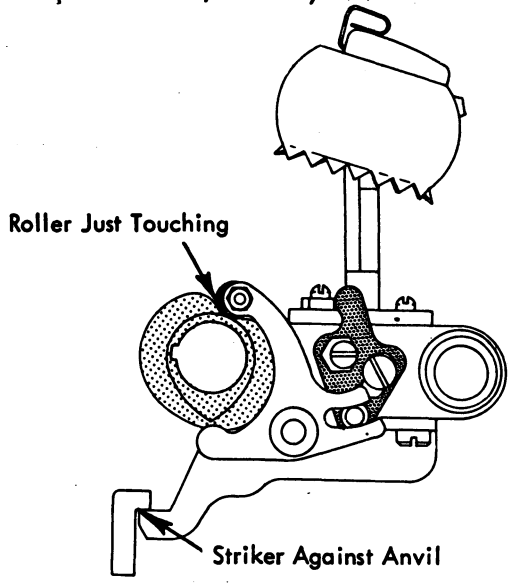


FIGURE 142. Restoring Cam Follower Eccentric Adjustment

NOTE: If the roller is too close to the restoring cam, it may bind against the cam during print shaft rotation. If too much clearance exists, the typehead may not be restored as quickly as it should and blurred characters may result.

10. Even Printing - Position the yoke under its mounting screws so that the density of the left and right sides of a printed character will be uniform.

CAUTION: This adjustment affects the tilt ring homing adjustment, the typehead homing adjustment, and the detent cam and actuating lever adjustments (skirt clearance). Be sure to check these after changing the position of the yoke.

PRINT MECHANISM - LATE STYLE

1. Adjustments one through five remain exactly the same as they appear on the early style print mechanism. After completing these five adjustments, begin here with adjustment number six.

6. Carrier Support (long carriage machines) - Adjust both ends of the support vertically to maintain .001" to .004" clearance with the bottom of the ribbon feed bracket along the entire length of the writing line (Fig. 142.1).

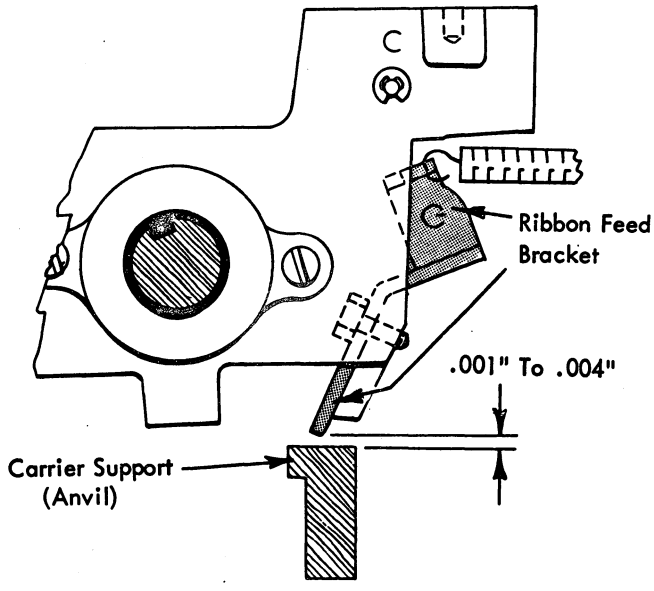


FIGURE 142.1 Carrier Support (Long Carriage Machines)

The support is secured to the machine power frame by two binding screws at each end. Elongated holes in the machine power frame enables the support to be adjusted vertically. This adjustment serves the same purpose as the carrier buffers on the early level machines.

7. Print Cam Follower Stop Screw - Adjust the cam follower stop screw so that the print cam follower roller clears the print cam by .020" when the machine is at rest (Fig. 142.2). This clearance ensures that the rocker will restore fully on every cycle. On dual velocity machines, this clearance allows the roller to shift from one lobe to the other without rubbing on the cam. Use the following procedure to obtain this adjustment:

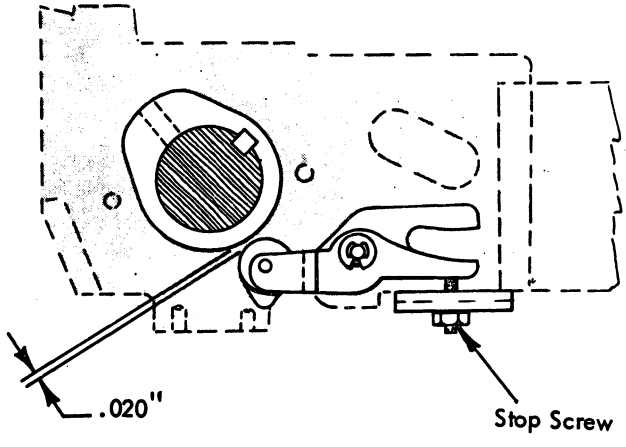


FIGURE 142.2 Print Cam Follower Stop Screw

NOTE: The following adjustments, thru and including number 11, apply only to printers with dual velocity keyboard.

a. With the machine resting on its back, slowly hand cycle a high velocity character until the leading edge of the print shaft keyway lines up with the center of the roller pin on the cam follower (Fig. 142.3).

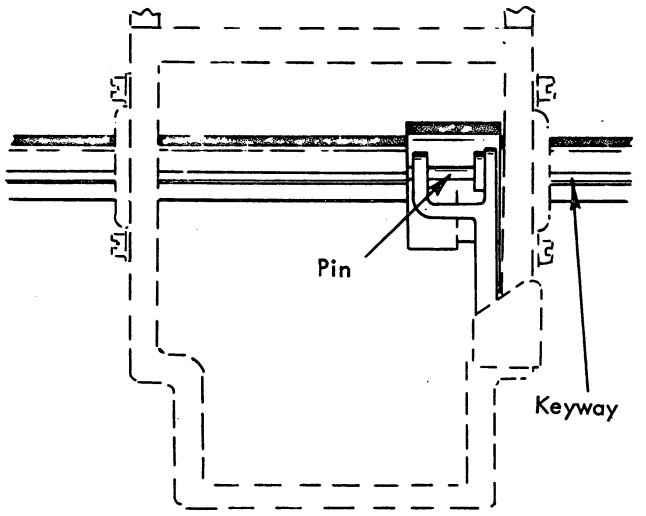


FIGURE 142.3 Keyway In Line With Roller

b. Loosen the stop screw locking nut and back out the stop screw approximately two turns. (The roller should be resting against the cam at this point.)

c. With the machine resting on its back, place a .001" or .002" feeler gauge between the print cam and the follower roller (Fig. 142.4). This can be accomplished by manually holding the rocker toward the platen while inserting the feeler gauge from the front of the carrier (to the right of the carrier pointer) just above the line lock bracket. With the gauge in position, allow the rocker to come back to rest. The feeler gauge should become trapped between the roller and the cam. Then, slowly turn the stop screw in until a minimum drag is felt on the feeler gauge as it is withdrawn.

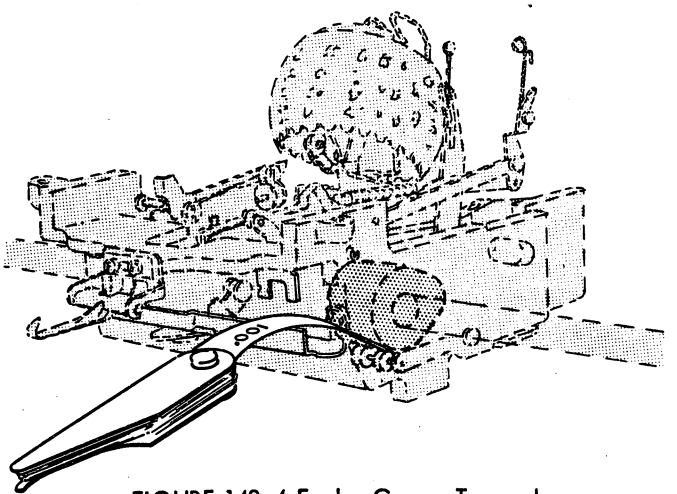


FIGURE 142.4 Feeler Guage Trapped

d. Tighten the locking nut without moving the screw.

NOTE: This adjustment may be checked by applying a light film of #17 grease on the print cam (in the area indicated in Fig. 142.5) and then observing the track that the roller makes in the grease when the machine is hand-cycled. If the stop screw has been adjusted properly, the roller track in the grease should begin at point "A" (Fig. 142.5) which is the beginning of the second low dwell on the print cam.

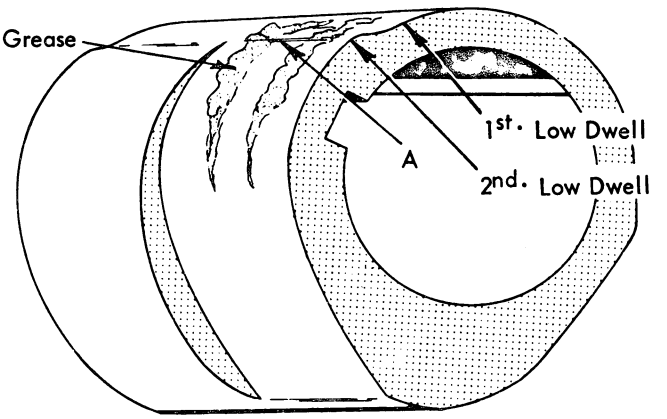


FIGURE 142.5 Roller Track In Grease

If the roller track begins before point "A", the roller is adjusted too close to the print cam when the machine is at rest. Improper roller to cam clearance may cause the roller to drag on the print cam as it shifts during a low velocity selection. Thus, the roller may fail to shift, or shift improperly. If the roller is adjusted too close to the cam at rest, it may receive a ski-jump effect from the print cam as it attempts to follow the print cam from the first low dwell to the second low dwell. This will create excessive noise and wear along with an adverse effect on the typehead impact velocity.

If the roller track begins after point "A", the roller rests too far away from the first low dwell of the print cam and a loss in typehead velocity may result.

8. Velocity Control Cable Adjustments - The velocity control cable is adjusted to satisfy the following conditions:

a. Carrier Cable Clamp - Loosen the clamp screw and slide the cable sheath left or right under the clamp until the end of the sheath is flush to .010" recessed with the right hand edge of the clamp (Fig. 142.6). This adjustment prevents the yoke actuating lever from choking off against the cable sheath.

b. Carrier Cable Guide - Position the cable guide horizontal and as high as possible without binding the cable against the carrier (Fig. 142.7). This adjustment holds the cable up as high as possible yet allows it to slide freely front and rear as the carrier moves along the writing line.

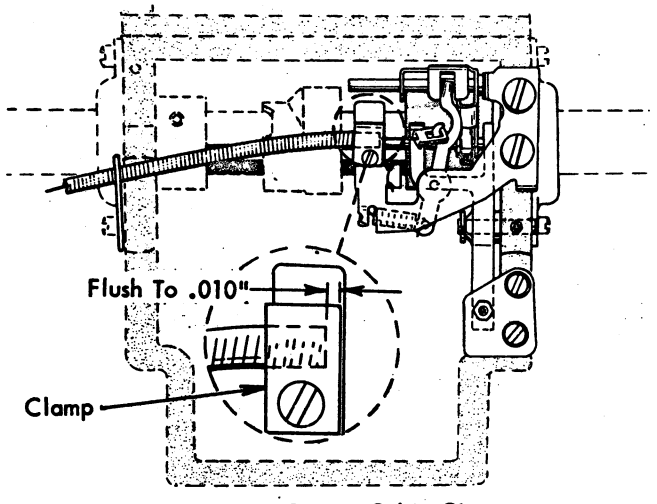


FIGURE 142.6 Carrier Cable Clamp

c. Carrier Cable Deflector - Form the deflector front or rear to prevent the cable from getting behind the carrier (Fig. 142.7). Check along the entire writing line to make certain that the deflector does not rub on the powerframe.

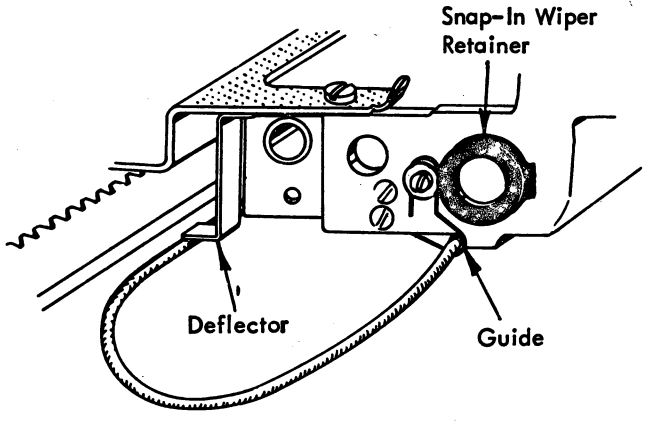


FIGURE 142.7 Carrier Cable Guide

d. Center Cable Clamp - Position the cable sheath left or right within the center cable clamp so that the bend in the cable will just touch the machine sideframe (left) when the carrier is resting two spaces from the extreme left hand margin. This adjustment allows the carrier to operate freely along the entire length of the writing line and allows the velocity control cable to operate with a minimum of flexing.

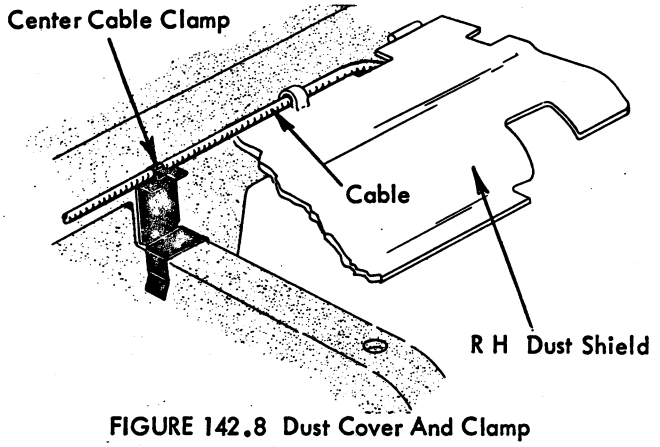


FIGURE 142.8 Dust Cover And Clamp

e. Keyboard Cable Clamp - Loosen the clamp screw (Fig. 142.9) and move the cable sheath forward or back under the clamp to satisfy the following condition:

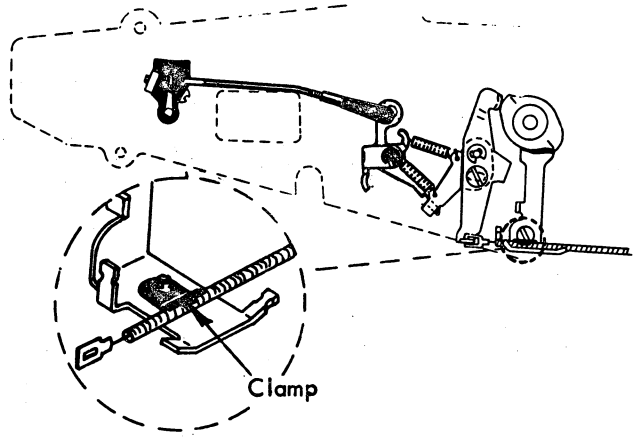


FIGURE 142.9 Keyboard Cable Clamp

When a low velocity character is half-cycled, the print cam follower roller must shift onto the low velocity lobe of the print cam by the width of the roller plus .030" to .040" (Fig. 142.10). Moving the cable sheath to the rear will produce more motion to the roller by reducing the amount of lost motion felt within the oversized eyelets of the cable.

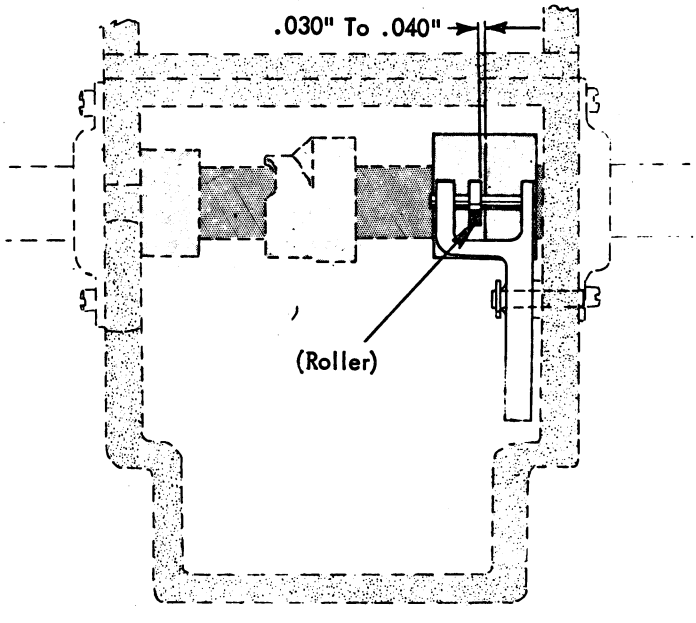


FIGURE 142.10 Roller Shifted To Low Velocity Lobe

NOTE: This adjustment may be checked by alternately cycling a low and high velocity character after applying a light film of #17 grease to both lobes of the print cam. Observe the tracking of the roller in the grease to determine if the roller is shifting properly. Make certain that the roller restores fully under the high velocity lobe when the machine is at rest.

9. Low Velocity Latch Link - Adjust the low velocity latch link (Fig. 142.11) in the following manner: With the machine latched at rest and the low velocity latch held against the adjusting stop on the cam follower, match the pin clevis on the link with the hole in the latch. When matching the clevis, be sure to hold the link toward the rear of the machine so that the low velocity vane will be against the tail of the interposers.

NOTE: This link adjustment ensures that the latch will take up slack on the adjusting stop and that there will be no lost motion in the system.

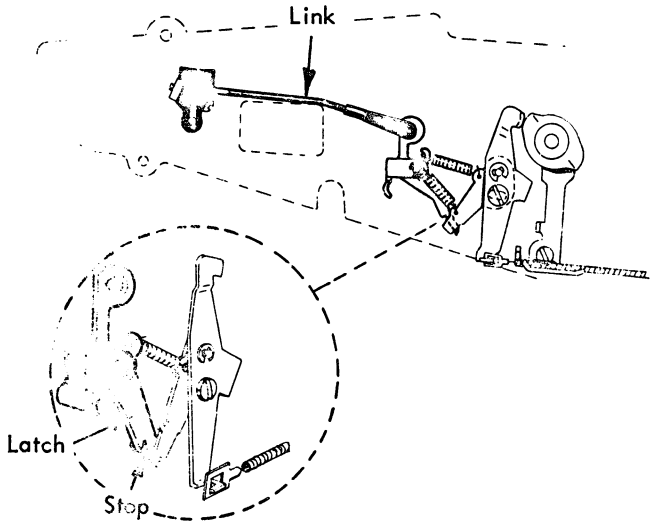


FIGURE 142.11 Low Velocity Latch Link

10. Low Velocity Cam Adjustment - The cam should be adjusted radially on the filter shaft so that the following condition will exist: When a low velocity character is slowly hand-cycled, the low velocity latch should clear the adjusting stop on the cam follower by .008" to .012" (Fig. 142.12) just as the cam follower begins to move down off the high dwell of the low velocity cam. Advance or retard the cam to satisfy this condition.

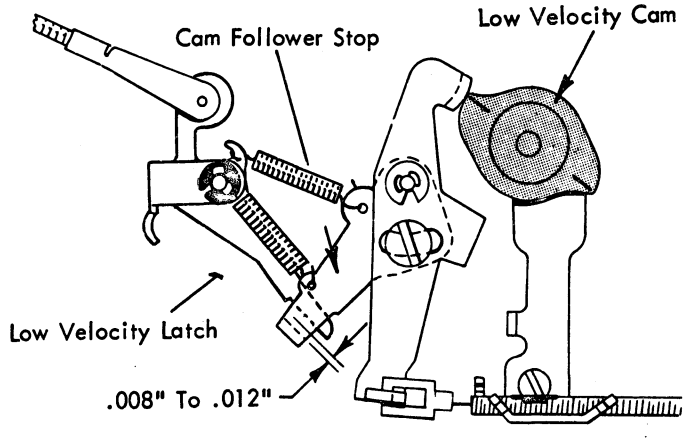


FIGURE 142.12 Low Velocity Cam Adjustment

This adjustment can be easily made in the following manner:

a. Slowly hand-cycle a low velocity character until one of the scribe marks on the cam is in line with the center of the shoe on the cam follower (Fig. 142.12).

b. Without moving the cam, loosen its set screws and then slightly advance or retard the filter shaft (within the cam) until the .008" to .012" between the latch and the stop is obtained. Advancing the filter shaft will increase the clearance; retarding will decrease it.

c. Tighten the low velocity cam set screws. Make sure that the cam does not move in relation to the follower. Also make certain that the cam is positioned laterally on the filter shaft so that it is centered between the cable anchor bracket and the shift release arm.

NOTE: This adjustment ensures that the print cam follower roller will shift to the low velocity lobe at the earliest possible time during a low velocity cycle.

CAUTION: "Safety" - be sure to disconnect the line cord before attempting to rotate the filter shaft by hand.

11. Low Velocity Cam Follower Stop - With the cycle shaft latched at rest, adjust the stop for .008" to .012" clearance with the low velocity latch (Fig. 142.13). Loosen the binding screw "A" to make this adjustment.

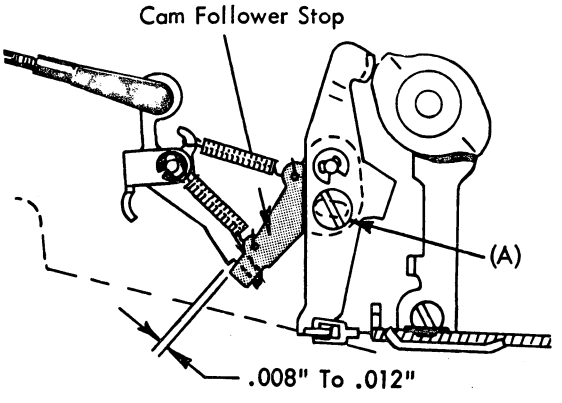


FIGURE 142.13 Cam Follower Adjusting Stop

NOTE: Too little clearance may prevent latching of the low velocity latch resulting in a continuous low velocity operation for all characters. Too much clearance might allow a slight pull to be produced on the cable during a high velocity operation which could shift the follower roller partially onto the low velocity lobe.

12. Printers Without Dual Velocity

a. Powered Travel - With the cycle shaft latched at rest and the impression control lever set at position 5 and the copy control lever set at 5 (all the way back), loosen the binding screw and move the detent plate forward or backward until a clearance of .250" exists between the platen and the center of the "home" character (Fig. 142.14). This clearance may be measured with the foot of the Hooverometer which is approximately .250". When measuring the adjustment, remove the tilt ring play by depressing the typehead lightly toward the front of the machine.

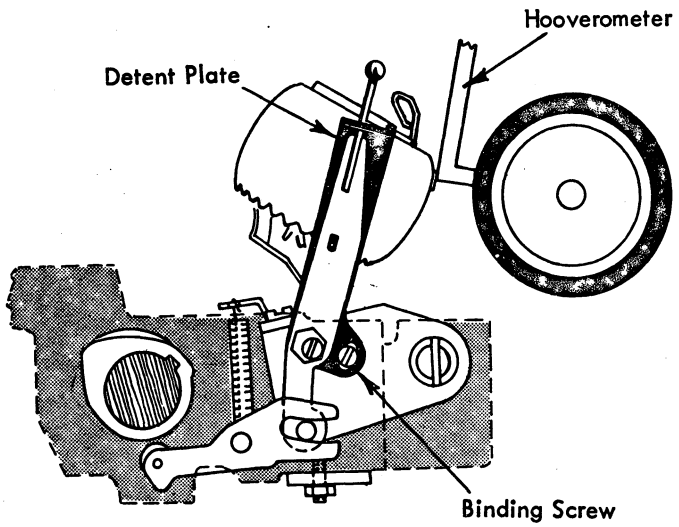


FIGURE 142.14 Powered Travel

b. Free Flight - Set the impression control lever at 5 and the copy control lever at 4 and hand-cycle the machine until the print cam follower is resting on the high point of the print cam. At this point, there should be .035" of free flight between the platen and the center of a half-cycled "home" character. Adjust the eccentric on the impression control lever for this clearance (Fig. 142.15). Keep the high part of the eccentric toward the front of the machine.

13. Printers With Dual Velocity

a. Powered Travel - With the cycle shaft latched at rest and the impression control lever set at 4 and the copy control lever all the way forward, loosen the binding screw and move the detent plate forward or back until a clearance of .250" exists between the platen and the center of the "home" character (Fig. 142.14). This clearance can easily be measured with the foot of the Hooverometer which is approximately .250". When measuring the adjustment, remove the tilt ring play by depressing lightly on the rear of the tilt ring.

b. Free Flight - Set the impression control lever at 4 and the copy control lever all the way forward and hand-cycle the machine until the print cam follower roller is resting on the high point of the cam. At this point .035" of free flight should exist between the platen and the center of the "home" character. Adjust the eccentric on the impression control lever to obtain this condition (Fig. 142.15). Keep the high part of the eccentric forward.

NOTE: The pusher end of the large spring hook measures approximately .033" and may be used to gauge this clearance. When measuring this clearance, remove the tilt ring play by depressing the typehead lightly toward the front of the machine.

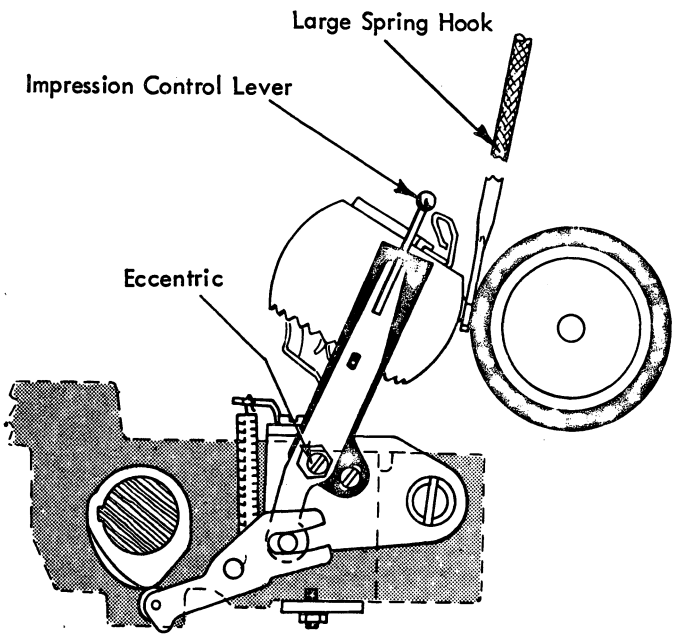


FIGURE 142.15 Free Flight

CAUTION: Each of these adjustments (powered travel and free flight) directly affect each other and must be adjusted alternately until both are correct.

14. Dual Velocity Magnet Assembly (Removed)

a. Adjust the pivot plate for .001" to .003" between the armature and the yoke with the armature attracted (Fig. 142.16). This will ensure a free armature.

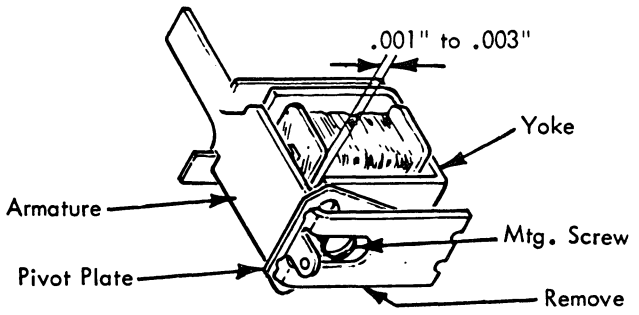


FIGURE 142.16 Pivot Plate

b. Check to see that the residual is flush against the yoke (Fig. 142.17).

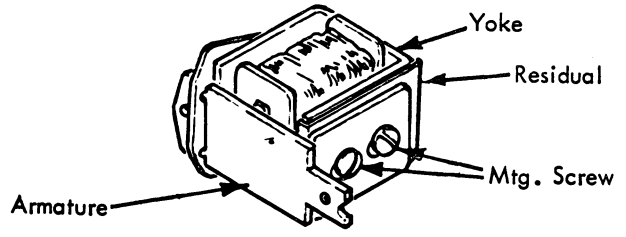


FIGURE 142.17 Residual

c. Position the backstop for .030" to .035" between the armature and yoke with the magnet de-energized (Fig. 142.18).

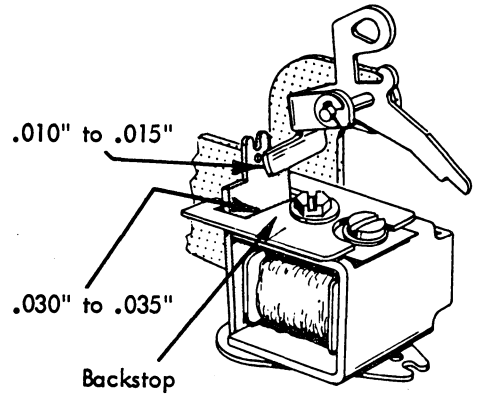


FIGURE 142.18 Dual Velocity Magnet Assembly

15. Dual Velocity Magnet Assembly (Installed) - With the armature held in a de-energized position, adjust the magnet front to rear to obtain .010" to .015" clearance between the armature and the low velocity latch (Fig. 142.18).

ESCAPEMENT MECHANISM

1. Escapement Bracket (Printers With Tab)

a. With the carrier to the left, adjust the escapement bracket front to rear so that .001" to .002" exists between the raised area of the escapement bracket and the tab torque bar. The rear surface of the escapement bracket should be kept parallel with the tab torque bar (Fig. 143). Early printers which do not have a raised area should be adjusted for .011" to .017" between the escapement bracket and tab torque bar. To aid in adjustment on 767, remove or loosen the tab torque bar support bracket.

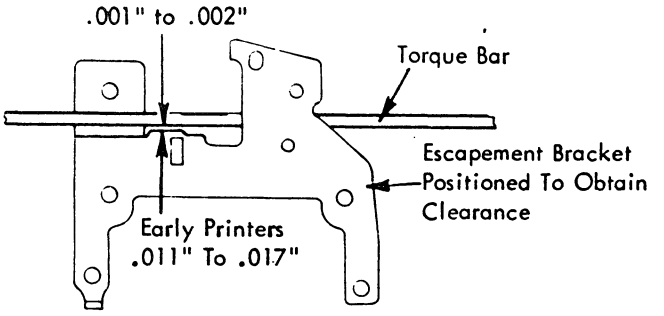


FIGURE 143. Escapement Bracket (With Tab)

b. With the carrier to the right, form the extension on the tab rack plate so that .001" to .002" exists between the raised area of the escapement bracket and the tab torque bar. This is the extension which supports the tab torque bar on the right side (Fig. 144). Note: This part is case hardened on early machines. Use caution when forming. Adjustment a. should be rechecked if this extension is formed.

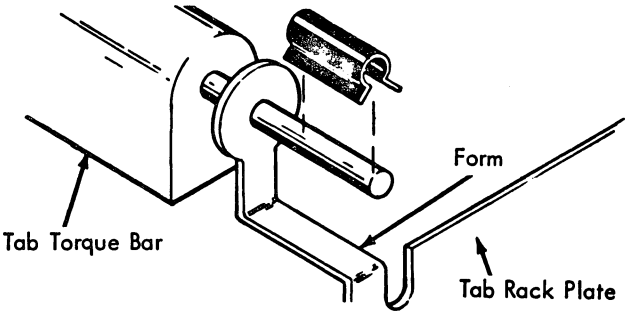


FIGURE 144. Tab Rack Plate

NOTE: The following relationships are affected by the position of the escapement bracket - tab lever trigger to tab torque bar, tab lever pawl to tab rack, tab lever to escapement and backspace pawls, tab lever trigger to tab overthrow stop, escapement and backspace pawls to escapement torque bar, escapement torque bar to pawl pivot stud, and escapement torque bar to tab latch. Each of these relationships must be checked and readjusted if necessary after any adjustment of the escapement bracket.

Escapement Bracket (Printers Without Tab) - Position the escapement bracket so that a 5" screwdriver blade spans the distance between the rocker shaft set screws and escapement bracket as shown in Fig. 145. Be sure and check both sides.

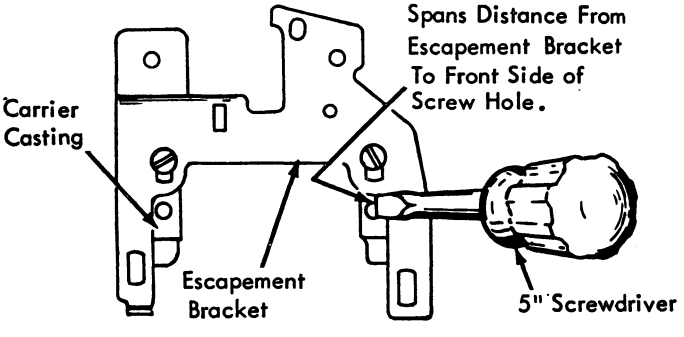


FIGURE 145. Escapement Bracket (Without Tab)

2. Escapement Torque Bar Stop

a. Late - The torque bar stop located at the right end of the torque bar should be adjusted for a rest position clearance of .008" to .010" between the torque bar and the lug on the escapement pawl (Fig. 146).

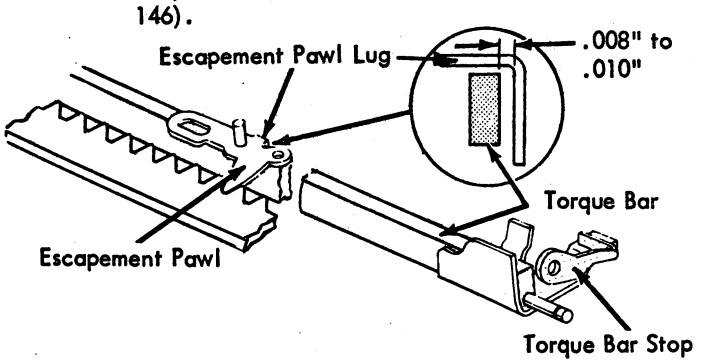


FIGURE 146. Torque Bar Stop (Late)

b. Early - Form the torque bar stop located at the left end of the torque bar so that a clearance of .002" to .006" exists between the torque bar and the lug on the escapement pawl (Fig. 147).

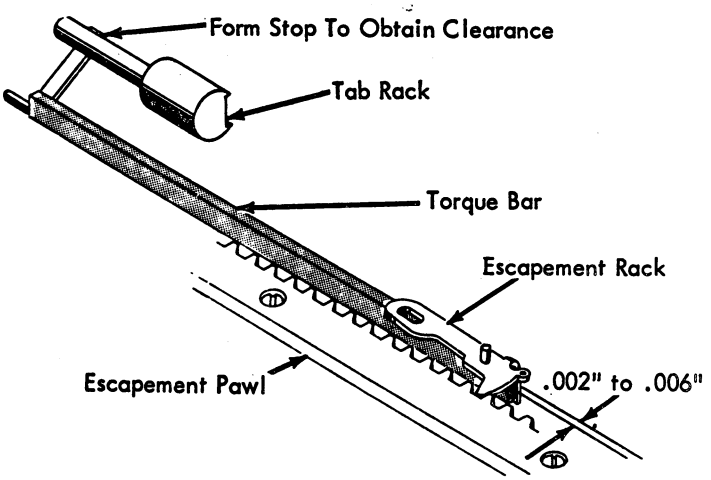


FIGURE 147. Torque Bar Stop (Early)

The escapement cam used with the new style escapement mechanism provides greater available travel for all escapement parts; therefore more clearance is permissible and desirable between the torque bar and the escapement pawl lug.

CAUTION: Make certain that the escapement trigger does not prevent the escapement torque bar from resting against the stop when making the torque bar stop adjustment. Also, check the pawl mounting stud and, on long carriage machines, the torque bar back stop. Neither one of these should be touching the torque bar when the stop adjustment is being made.

3. Pawl Mounting Stud - Rotate the pawl mounting stud so that it clears the escapement torque bar by .001" at the closest point along the writing line (Fig. 148). Keep the high part of the eccentric toward the left so that the force of the torque bar will tend to tighten the stud instead of loosen it.

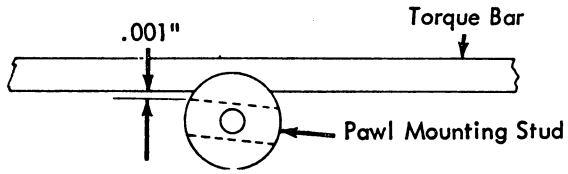


FIGURE 148. Pawl Mounting Stud Adjustment

4. Torque Bar Back Stop (long carriages only) - Adjust the back stop forward or back on its mounting stud so that there is a .001" to .005" clearance with the torque bar (Fig. 149).

NOTE: Position carrier so back stop is opposite pawl mounting stud.

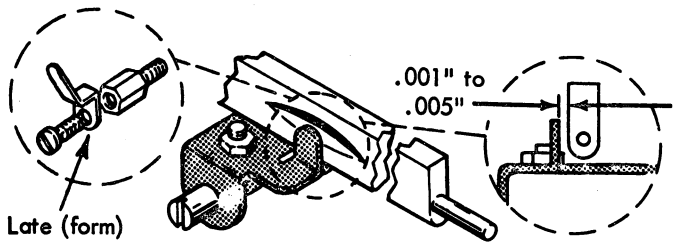


FIGURE 149. Torque Bar Backstop

For 767 adjust escapement torque bar backstops front to rear for .001" motion of torque bar between pawl mounting stud and backstops when carrier is positioned at each backstop. Position stops vertically to contact torque bar no higher than the center of lower radius of torque bar.

5. Pivot Pin Eccentric (found on early level machines only) The eccentric collar should be adjusted with the high point up so that it just touches the operational latch bracket (Fig. 150). This prevents the pivot pin from bowing during a print escapement operation. On long carriage machines the eccentric should also be adjusted laterally on the pivot pin so that the end play of the pivot pin will be .002" to .005".

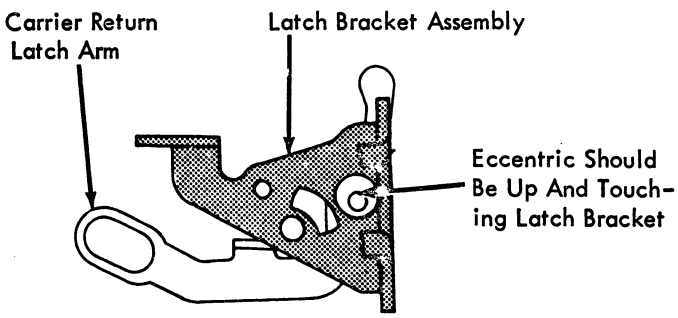


FIGURE 150. Pivot Pin Eccentric
(Early Level Machines Only)

NOTE: The eccentric may require a readjustment if the rest position of the pivot pin is changed during carrier return adjustments.

6. Escapement Cam - Adjust the cam by rotating it on the filter shaft so that the cam follower roller just reaches the low point of the cam at the rest position (Fig. 151).

The cam is accessible from the top by inserting the Bristol wrench between the carrier return and backspace keylevers just in front of the margin rack.

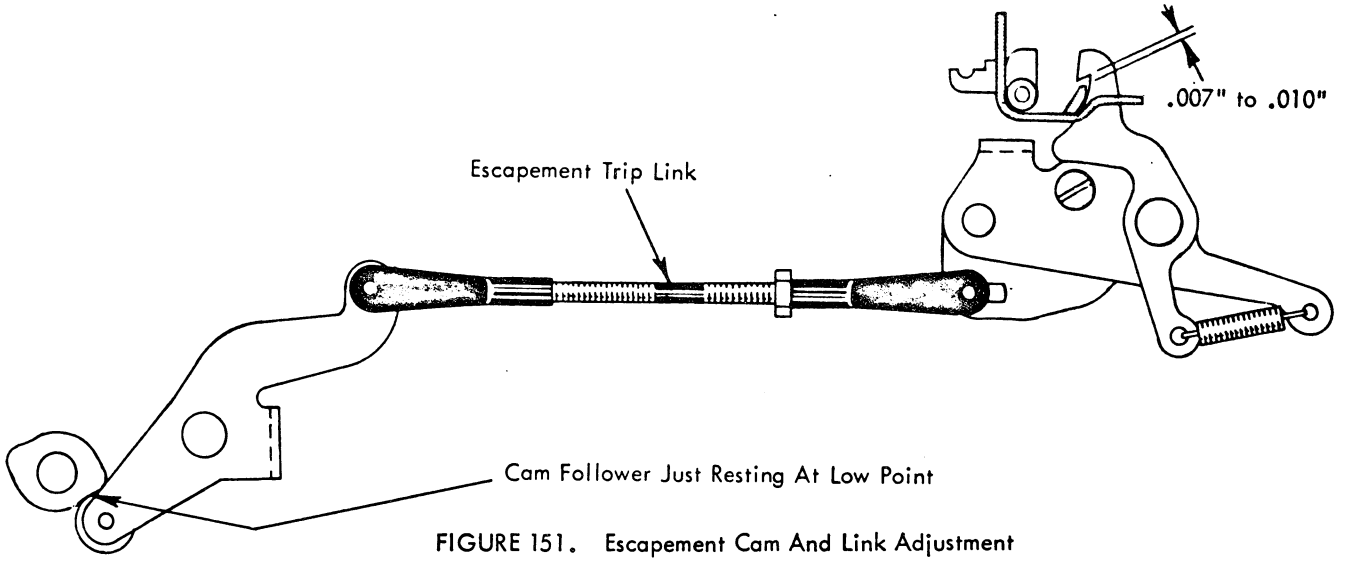


FIGURE 151. Escapement Cam And Link Adjustment

Check the adjustment by holding the cycle clutch check pawl out of the way so that the cycle shaft can be rotated backward. Rotate the filter shaft gear backward slightly and observe that the escapement trip link moves forward immediately. This will insure that the escapement cam is not resting past the low point. To insure that the cam follower has fully reached the low point, hand-cycle a print operation. The escapement trip link should not move during the first part of the cycle.

The cam adjustment affects the timing of the print escapement. Advanced timing could cause the trip to occur before the print action, resulting in crowding or blurring of the printed characters. Retarded timing will cause the cam follower to rest part of the way up the incline of the cam. This could restrict the escapement trigger from resetting over the torque bar lug as the filter shaft returns to its rest position. The spacebar mechanism would then be disabled.

On machines equipped with the old style spacebar lockout mechanism, the lockout cam adjustment must be checked each time the escapement cam adjustment is changed. Advancing or retarding the escapement cam could allow the lockout cam to disable the spacebar mechanism.

CAUTION: On machines equipped with the old style spacebar lockout mechanism, a lateral position of the escapement cam on the filter shaft must be maintained. When the machine is at rest the lateral position of the escapement cam should allow .050" to .060" left to right movement of the spacebar lockout cam.

7. Escapement Trip Link - Adjust the trip link so that a clearance of .007" to .010" exists between the torque bar lug and the hook of the escapement trigger in the rest position (Fig. 151).

CAUTION: In adjusting the escapement trip link be sure that the trigger lever stop (if present) and the adjustable screw in the spacebar latch lever do not restrict the upward travel of the trigger lever. (Reference Spacebar mechanism adjustment #2.)

The adjustment insures that the torque bar will always be rotated far enough to trip the pawls from their racks.

If excessive clearance is present, the escapement may eventually fail as wear occurs in the system and reduces the amount of travel given to the trigger.

Insufficient clearance may prevent the trigger from resetting over the torque bar lug at the end of each cycle. It may also cause the escapement trip to occur too early in the cycle. The trip should not occur before the print action.

8. Escapement Trigger Action - Adjust the trigger guide (early style machines) or the trigger knock-off eccentric stud (late machines) so that the escapement trigger will become disengaged from the torque bar lug when the escapement pawl clears the rack by .010" to .015" (Fig. 152).

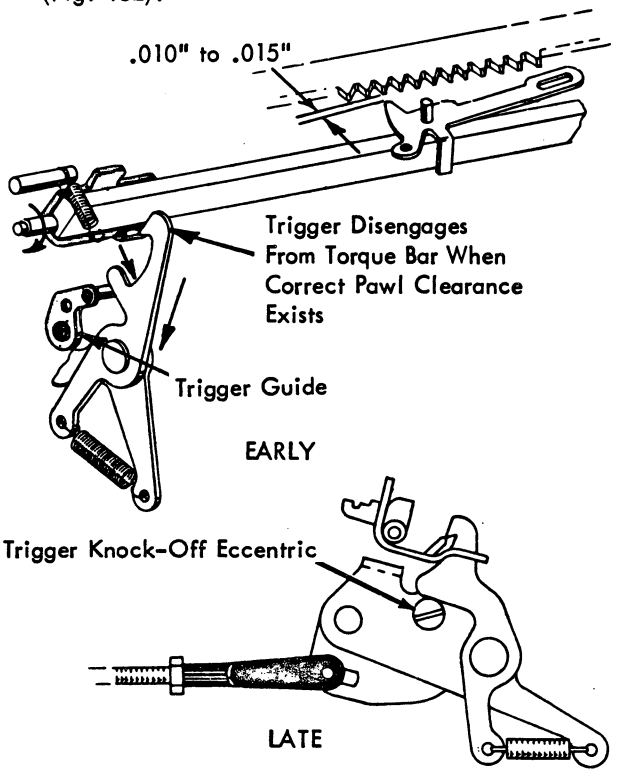


FIGURE 152. Escapement Trigger Guide Adjustment

9. Trigger Lever Upstop (long carriage machines) - With the machine at rest and a clearance of .007" to .010" existing between the trigger and the lug on the torque bar, adjust the trigger lever upstop so that it has a clearance of .001" to .005" with the trigger lever (Fig. 153).

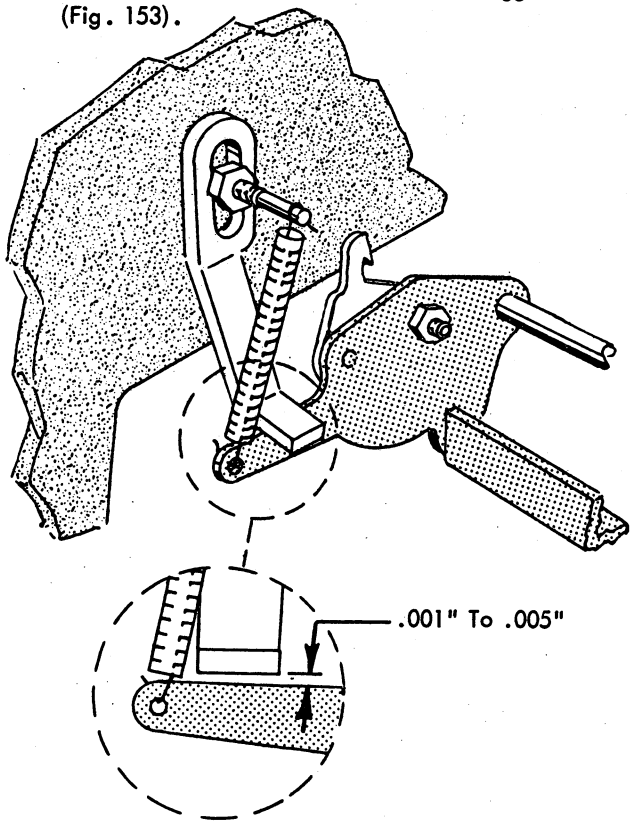


FIGURE 153. Trigger Lever Upstop (Long Carriage Only)

The trigger upstop prevents the trigger lever from bouncing as it returns to its rest position.

MAINSPRING AND CORDS

1. Gear Mesh - The proper gear mesh between the escapement cord drum and the carrier return pinion involves two adjustments. Both must be considered together.

   a. Adjust the operational shaft laterally so that the crown surfaces of the escapement cord drum gear and the carrier return pinion are even (Fig. 154). On the 11 inch machines, the position of the operational shaft is controlled by the operational cam ratchet and the shift clutch arbor. On long carriage machines the position is controlled by a collar set screwed to the shaft and the shift clutch arbor. Be sure to maintain .002" to .004" end play in the operational shaft.

   b. The escapement cord drum gear should be adjusted forward or back to obtain .002" to .004" backlash at the point of tightest mesh with the carrier return pinion. Be sure that no binds exist throughout the travel of the carrier (Fig. 154).

   CAUTION: The mainspring tension should be RELAXED before the escapement cord drum gear is loosened. The cord tension should also be relaxed by removing the cord from the pulley on the cord tension arm. Be sure that no end play exists in the escapement shaft before attempting the gear mesh adjustment.

   NOTE: No attempt should be made to adjust the cord tension with the escapement cord drum because the drum is set-screwed to a flat spot on the escapement shaft.

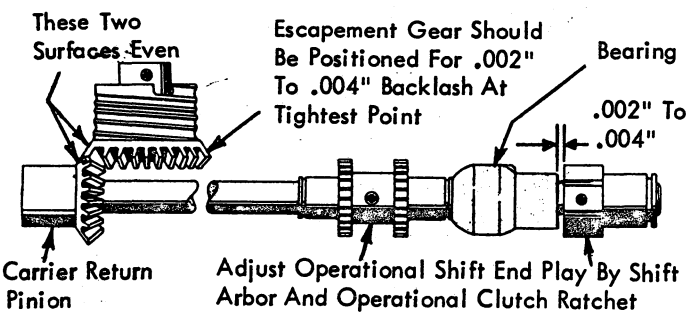


FIGURE 154. Gear Mesh And Operational Shaft Adjustment

2. Tab Governor Pinion - Adjust the tab governor pinion to have .002" to .004" backlash at the point of closest mesh with the escapement cord drum gear. Adjust the pinion by moving both the tab governor hub and collar located on each side of the pinion. The pinion should have a minimum of end play yet still rotate freely (Fig. 155).

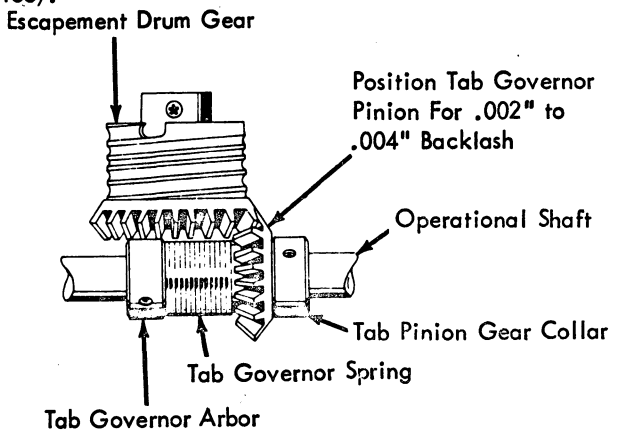


FIGURE 155. Tab Governor Pinion

3. Cord Tension - With the cords properly threaded (Fig. 156A & B) adjust carrier return drum until the flange of the right hand transport pulley is clearing side frame by 1/8 to 1/4" (Fig. 156C).

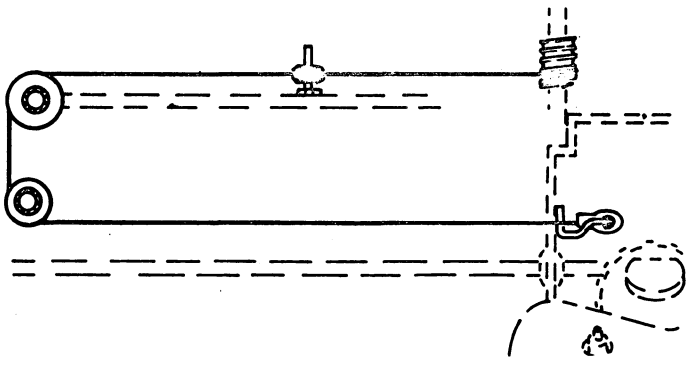


FIGURE 156A. Carrier Return Cord Threading

A time saving method of transport card adjustment may be accomplished by tying a knot in the end of the cord as close to the hook as possible.

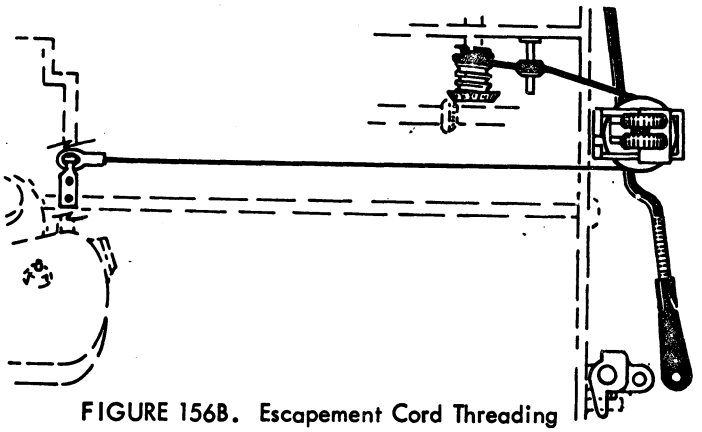


FIGURE 156B. Escapement Cord Threading

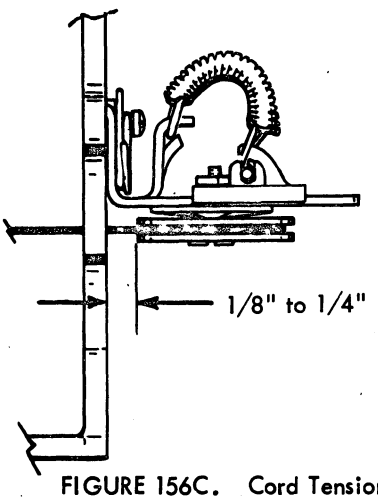


FIGURE 156C. Cord Tension

The position of the pulley insures that it will not contact the cover as it compensates for the cord stretch. Adjusting the pulley nearer the powerframe puts an unnecessary load on the cords.

CAUTION: Be sure to remove all end play from the escapement shaft before tightening the carrier return cord drum. End play is removed by holding the escapement shaft forward while the cord drum is moved to the rear against the rear bearing.

NOTE: The eccentric mounting stud for the front idler pulley should be set so that the pin is horizontal and above center on the eccentric. The pin will then be angled toward the left slightly.

4. Mainspring Tension - The mainspring tension should be 1/2 to 3/4 pounds measured at the carrier as it escapes through the line lock load at the extreme right hand margin. Adjust by turning the mainspring cage. The capacitor (if present) and the cage stop screw must be removed in order to make the adjustment.

NOTE: An approximate setting (for all machines except 100 inch mainspring) can be obtained by making 5 full turns on the mainspring with the carrier at the extreme right hand limit of its travel. On printers with 100 inch mainspring, 6-2/3 to 7-2/3 turns will be necessary. (100 inch spring has 100 stamped on mainspring cage).

CAUTION: The mainspring should be handled carefully to prevent it from slipping when the tension is being increased or decreased. The outside loop of the mainspring must not be in a position to contact C-5.

OPERATIONAL CONTROL MECHANISM

1. Keylever Pawl Overlap - Adjust each keylever pawl guide stud so that all the keylever pawls, except the index keylever pawl, overlap their respective interposers by .035" to .045" with both parts at rest (Fig. 157). The index keylever pawl guide should be adjusted for .040" to .050" overlap. The overlap insures proper repeat/non-repeat action.

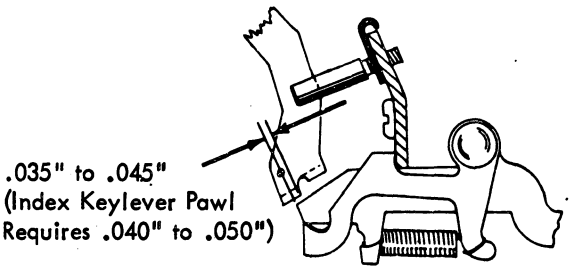


FIGURE 157. Keylever Pawl Overlap Adjustment

2. Keylever Pawl To Interposer Clearance

   a. Adjust the height of the interposers by positioning the keylever pawl guide bracket up or down to obtain a clearance of .020" to .025" between the index keylever pawl and the index interposer at rest (Fig. 158). The keylever pawl guide bracket should be kept horizontal.

   b. The adjusting slot in the carrier return, backspace and tab keylevers should be formed to obtain .020" to .025" clearance between the keylever pawl and the interposer at rest (Fig. 158).

   c. Adjust spacebar lever eccentric with the high part forward to obtain a keylever pawl to interposer clearance of .005" to .015" (Fig. 158).

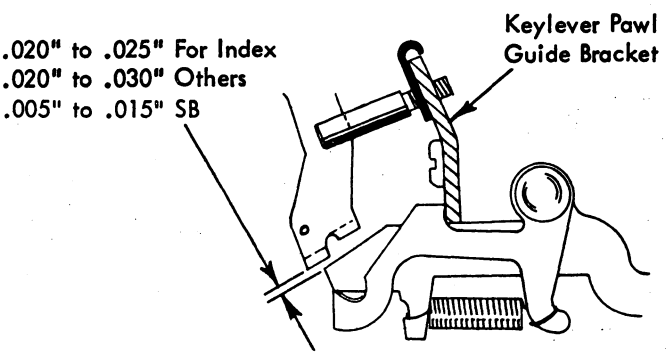


FIGURE 158. Keylever Pawl To Interposer Clearance Adjustment

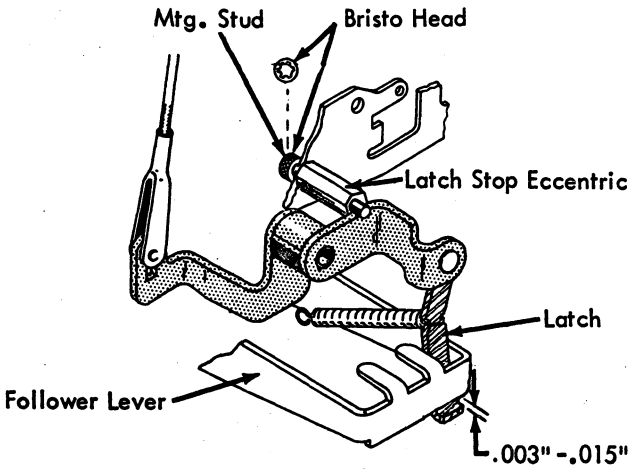


FIGURE 159A. Tab Latch Height

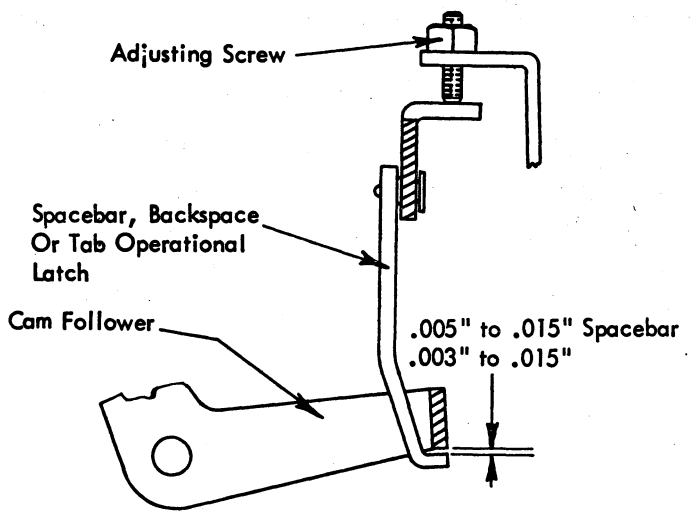


FIGURE 159B. Latch Height

3. Operational Latch Height - The adjustable latch screws (eccentric stop on tab latch Fig. 159A) for the backspace, spacebar, and tab operational latches should be adjusted so that the latches will pass under the cam follower lever with a clearance of .003" to .015" (Fig. 159B). The carrier return operational latch adjustable stop should be adjusted so that the latch will pass under the cam follower with .003" to .010" clearance (Fig. 160).

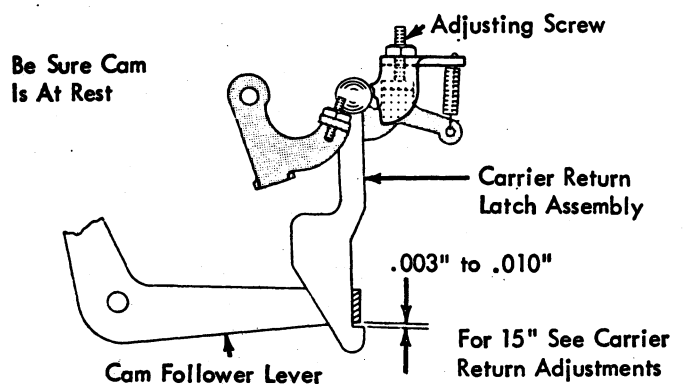


FIGURE 160. Latch Height (11 Inch)

NOTE: Be sure that the cams are at rest when this clearance is observed. The high side of the specification is preferred.

NOTE: The clearances may be observed by pulling the latches to the rear with a spring hook while the machine is at rest.

4. Interposer Adjusting Screws - Adjust the interposer adjusting screws so that a front to rear clearance of .015" to .020" exists between all the operational latches and their respective cam followers, with the exception of the spacebar latch. The spacebar latch should have a clearance of .025" to .035" (Fig. 161).

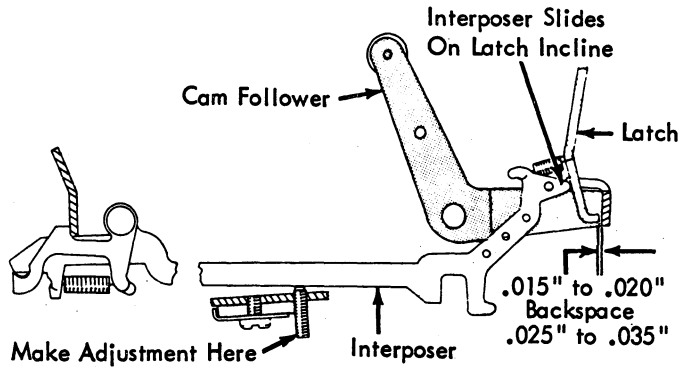


FIGURE 161. Interposer Adjusting Screw

NOTE: Machines which have the carrier return latch-spring loaded to the rear (under the cam follower) should be adjusted as follows:

a. Hold the carrier return latch to the front against its interposer. (The interposer should be latched at rest).

b. Adjust the interposer adjusting screw for .035" to .045" between the latch and cam follower.

c. Release the interposer and proceed with the next adjustment.

NOTE: The operational interposer springs should be placed in the center hole at the rear of the interposer. (Fig. 164).

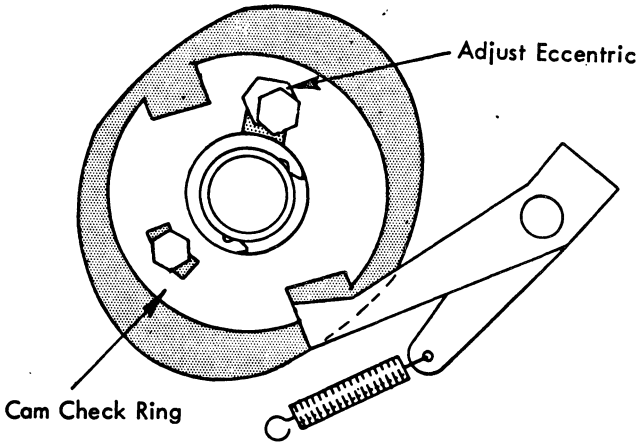
The adjustment directly affects the timing between the cam release and the positioning of the operational latches under the cam follower. Excessive clearance can allow the cam follower to move down at the rear before the latch has moved fully under the follower.

The adjustment may be checked after operating the cams enough to move the cam followers down slightly at the rear. With the machine on its back the latches can be pushed against the cam followers to estimate the clearance.

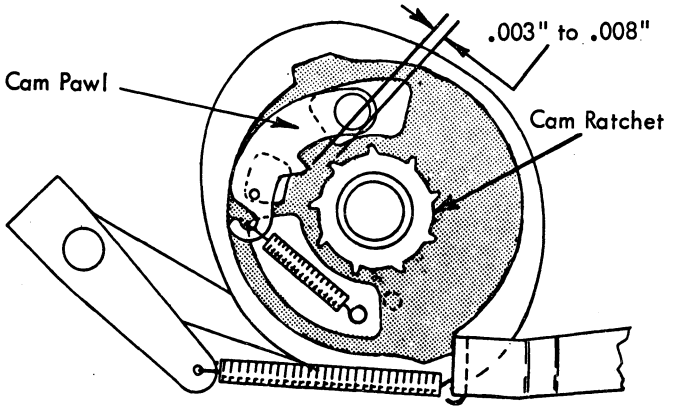
All of the operational interposer springs should be placed in the middle hole at the rear of the interposer.

CAUTION: If the cam followers are operated too far when this adjustment is being checked, the interposer restoring bail will force the interposers forward slightly and an erroneous adjustment will result. The keylever pawl to interposer clearance should be rechecked after this adjustment.

5. Cam Check Ring - Adjust the cam check ring eccentric (Fig. 162A) so that a clearance of .003" to .008" exists between the tip of the cam pawl and the teeth of the cam ratchet with the cam latched in the rest position (Fig. 162B). Keep the high part of the eccentric radially outward. The check ring mounting screws must be loosened before the adjustment can be made.



A. LEFT SIDE OF CAM



B. RIGHT SIDE OF CAM

FIGURE 162. Cam Check Ring Adjustment

The adjustment insures that the pawl will clear the ratchet and that the check ring will latch positively at the completion of each cam operation.

6. Clutch Release Arm Stop Pad (Fig. 163) - Form the stop pads so that with the clutch release arm at rest (against its stop pad) the clutch release arm has a 5/8 to 3/4 bite on the latching surface of the clutch wheel. This should be observed from the rear of the machine.

Make certain that the interposers are latched forward and are not in contact with the clutch release arms when observing this adjustment.

NOTE: On long carriage machines the operational clutch ratchet must be positioned laterally on the operational shaft so that each clutch release arm will take an equal lateral bite on its respective clutch wheel. This insures that neither clutch release arm can slip sideways off its respective clutch wheel causing an unwanted cam operation. This condition is most serious on the carrier return/index cam as it will cause an index operation to occur each time the cam is released.

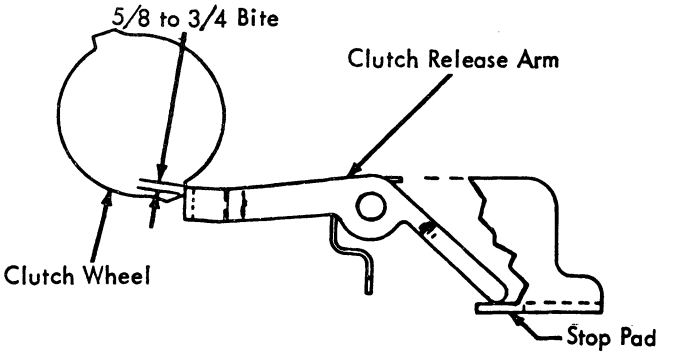


FIGURE 163. Clutch Release Arm Stop Pad

7. Clutch Release Arm (Fig. 164) - The lug at the bottom of each clutch release arm should be formed so that it clears the interposer lug by .025" to .035" on Carrier Return, Index and .035" to .045" on Tab, Backspace, and Spacebar. On 767 printer BS adjust clearance fr .040" to .050".

NOTE: The interposers and cams must be latched when the adjustment is observed.

Insufficient clearance will cause the cams to be released too early in the rearward travel of the interposers; consequently the operational latch involved will not have sufficient bite on the cam follower lever as it is operated down at the rear. The operational latch may slip from beneath the cam follower and result in an incomplete operation. Excessive clearance could allow the interposer to reach the limit of its travel before the cam is released.

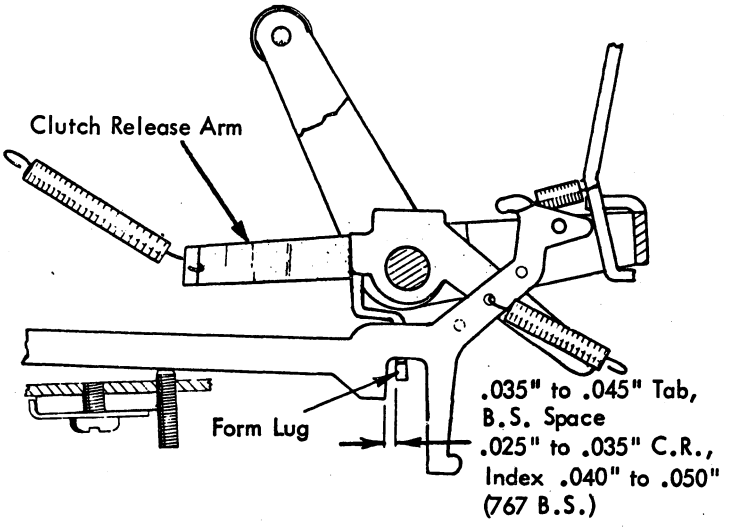


FIGURE 164. Clutch Release Arms

NOTE: The clearance may be judged with the use of the push end of the large spring hook. The end of the spring hook is approximately .035" thick.

8. Interposer Restoring Bail - Form the lug at each side of the restoring bail so that the interposers will be restored forward .010" to .030" past the latching point (Fig. 165) when either cam is operated. Be sure to check the interposers at each side and form the lug on the side being checked.

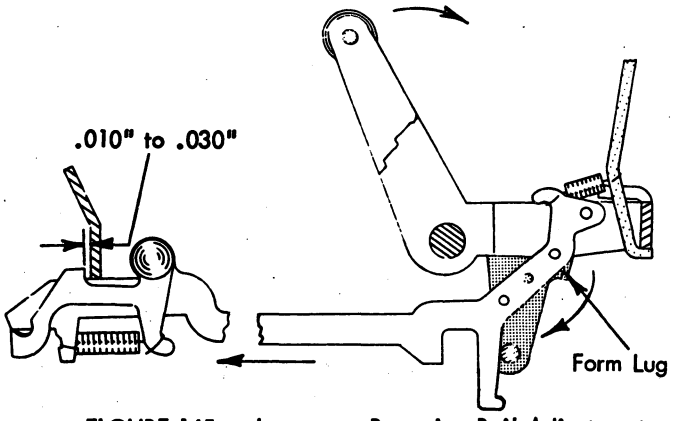


FIGURE 165. Interposer Restoring Bail Adjustment

The adjustment insures positive relatching of the interposers without excessive overthrow.

NOTE: The lugs should be formed forward or back to obtain the adjustment. Forming the lugs forward increases the throw of the interposers. Too much forming will cause them to break.

OPERATIONAL MAGNET ASSEMBLY (Early Style)

1. Tab, Backspace, and Index Magnets (Fig. 166 & 167) -

   a. Backspace Pivot Plate - Position, vertically, so that the armature (manually attracted) clears its yoke by .001" to .003" (all three screws must be loose). Position, horizontally, so that all armatures center their yokes.

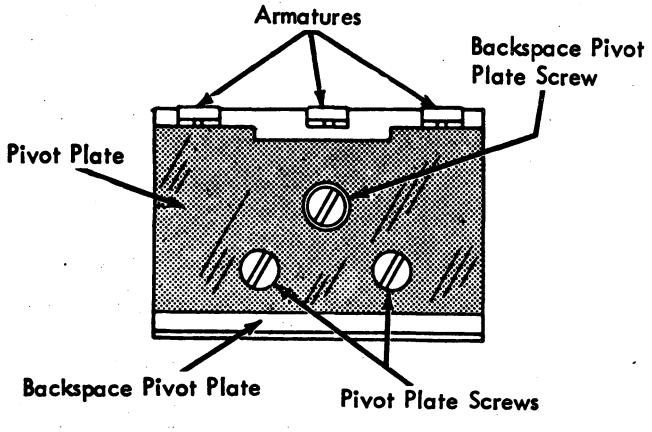


FIGURE 166. B/S Pivot Plate Location

   b. Pivot Plate - Tighten the backspace pivot plate screw and position so that the left and right armatures clear their yokes by .001" to .003".

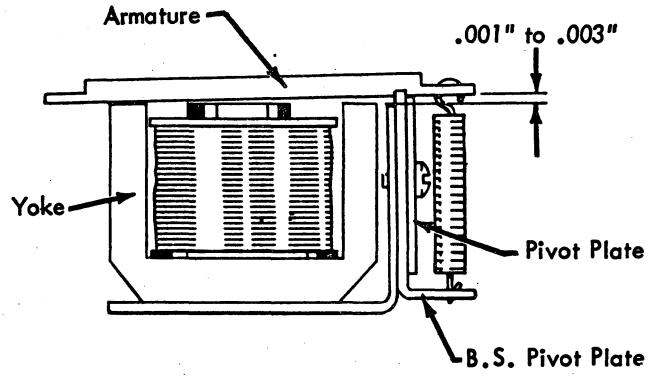


FIGURE 167. Backspace Pivot Plate

2. Carrier Return and Space Bar Magnet Pivot Plate (Fig. 168) - Position as follows:

   a. Vertically - so that the left and right armatures clear their yokes by .001" to .003".

   b. Horizontally - so that the armatures center their guide slots.

Adjustments 1 and 2 provide free operation of the armatures and prevent binding or choke-off.

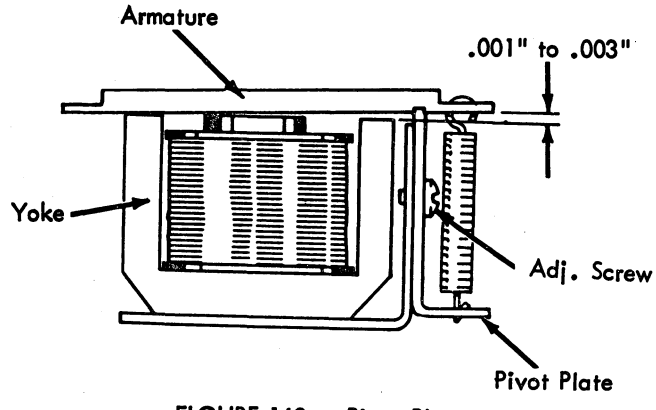


FIGURE 168. Pivot Plate

3. Armature Backstop (Fig. 169) - Position (armatures at rest) so that the armatures clear their yokes by .020" to .025".

This adjustment provides sufficient motion to unlatch the interposers and also insures the armatures will be attracted by the magnet coils when they are energized.

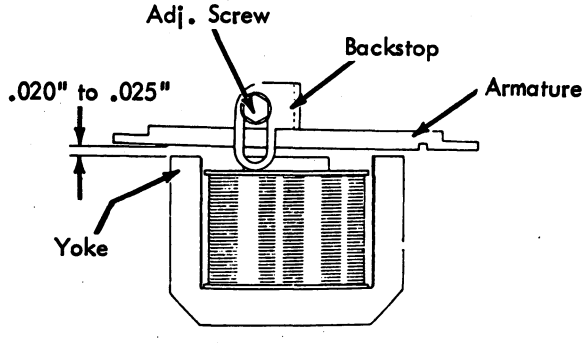


FIGURE 169. Armature Backstop

4. Magnet Unit Position - Position as follows:

a. Left to Right - so that the armatures are directly beneath their corresponding interposers (Fig. 170).

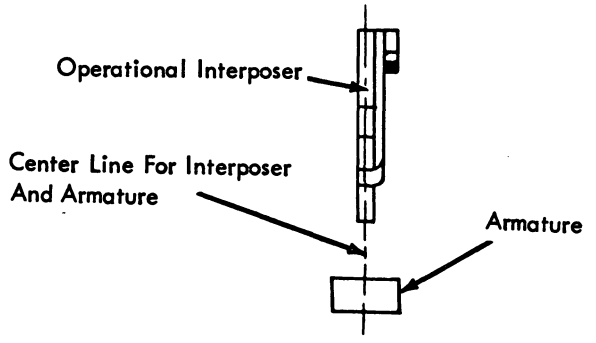


FIGURE 170. Left To Right

b. Front to Rear - so that the armature link holes are slightly to the rear of the interposer link holes (Fig. 171).

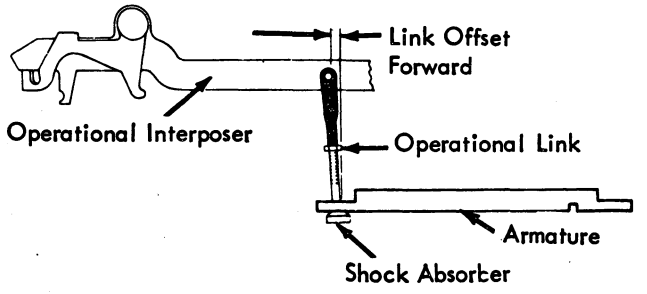


FIGURE 171. Front To Rear

Having the trip link offset insures unlatching of the interposer since the link pulls downward and also to the rear.

5. Pull Link (Fig. 172) - Adjust the operational pull links so that a .002" to .010" clearance exists between the interposer latch bracket and the interposer latch at the point of relatching.

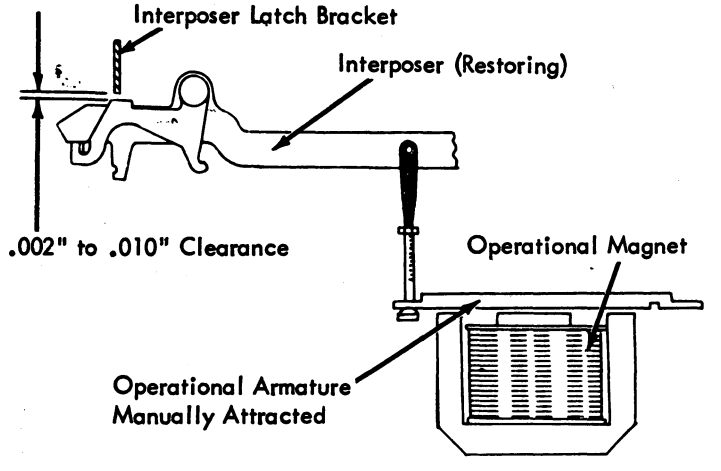


FIGURE 172. Check, Trip Link

NOTE: Test this adjustment by manudlly attracting the armature and turning the operational shaft so that the interposer is being restored toward the front.

With all parts at rest (Fig. 173) be sure a clearance exists between the pull link and the armature.

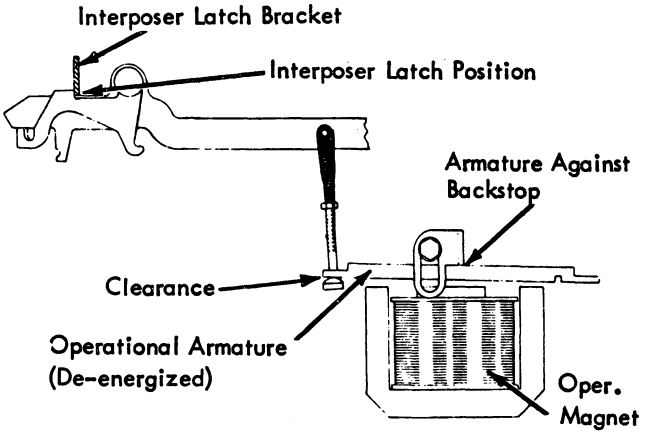


FIGURE 173. Trip Link

The pull link must be approximately 1/2 turn too long to insure that the armature is moving prior to picking up the load of the interposer. A trip link adjusted too short can cause an intermittent operation or complete failure to release.

OPERATIONAL MAGNET ASSEMBLY (LATE STYLE)

1. Pivot Plate (Late Style) All Magnets- Position so that the armatures (manually attracted) rest on the non-magnetic shim (Fig. 128.1). This will provide .001" to .003" clearance between the armature and the yoke. Early production units not incorporating this shim should be adjusted for .001" to .003" clearance between the armature and the yoke.

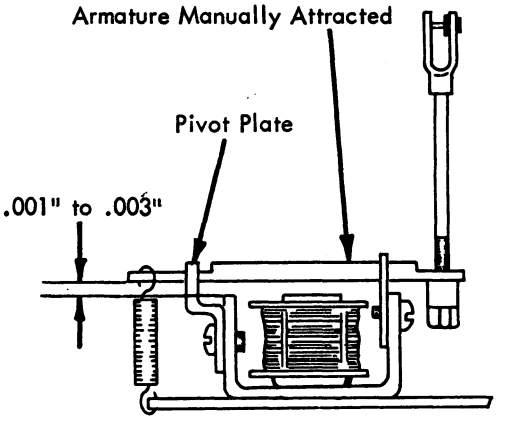


FIGURE 173.1 Pivot Plate

2. Armature Backstop (Late Style) (Fig. 173.2) -

Position, vertically, so that the armatures (at rest) clear their yokes by .020" to .025".

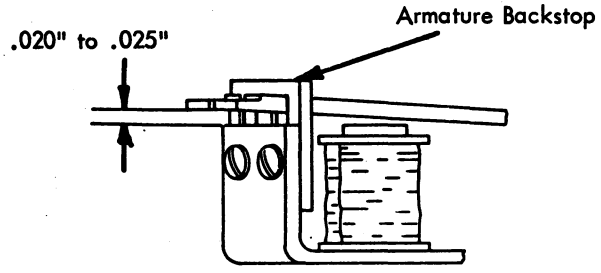


FIGURE 173.2 Armature Backstop

3. Magnet Unit Position - Position as follows:

a. Left to Right - so that the armatures are directly beneath their corresponding interposers (Fig. 173.3).

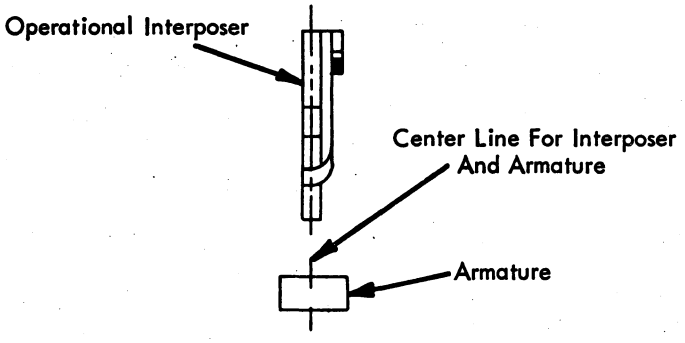


FIGURE 173.3 Left To Right

b. Front to Rear - so that the armature link holes are slightly to the rear of the interposer link holes (Fig. 173.4).

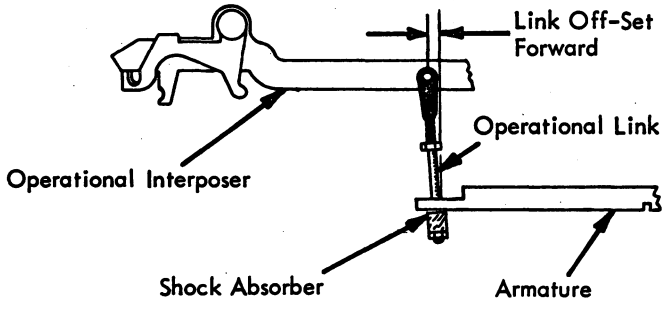


FIGURE 173.4. Front to Rear

Having the trip link offset insures unlatching of the interposer since the link pulls downward and also to the rear.

4. Pull Link (Fig. 173.5) - Adjust the operational pull links so that a .002" to .010" clearance exists between the interposer latch bracket and the interposer latch at the point of relatching.

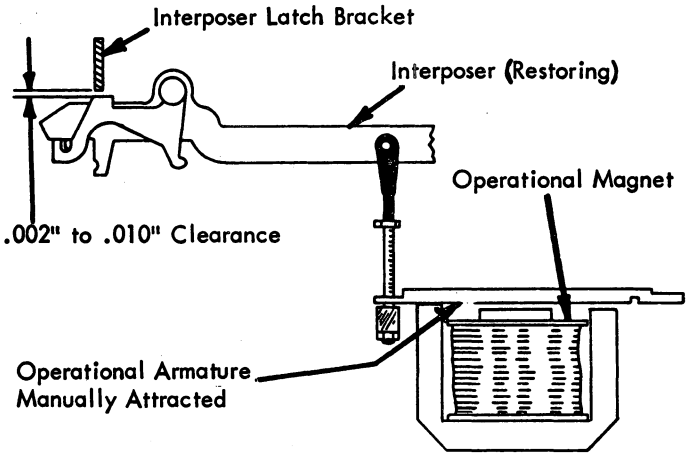


FIGURE 173.5. Check, Trip Link

NOTE: Test this adjustment by manually attracting the armature and turning the operational shaft so that the interposer is being restored toward the front.

With all parts at rest (Fig. 173.6) be sure a clearance exists between the pull link and the armature.

The pull link must be approximately 1/2 turn too long to insure that the armature is moving prior to picking up the load of the interposer. A trip link adjusted too short can cause an intermittent operation or complete failure to release.

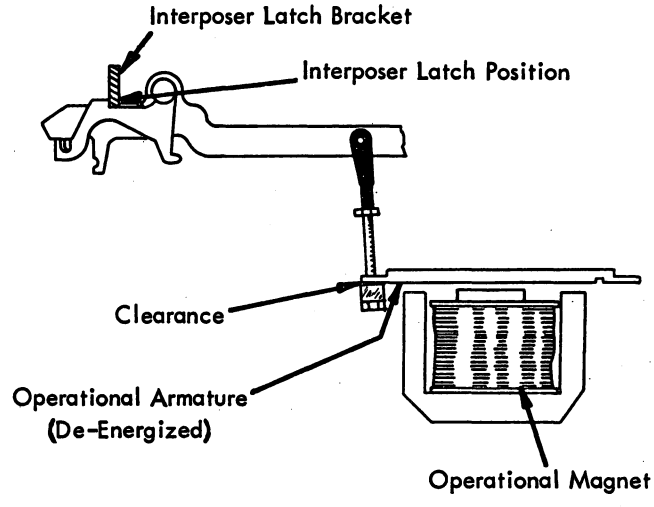


FIGURE 173.6. Trip Link

OPERATIONAL CONTACT AND LATCH ASSEMBLY ADJUSTMENTS (UNIT REMOVED)

1. Contact Strap Position (Fig. 174) - With the contacts latched, position the straps under the two mounting screws for the following conditions:

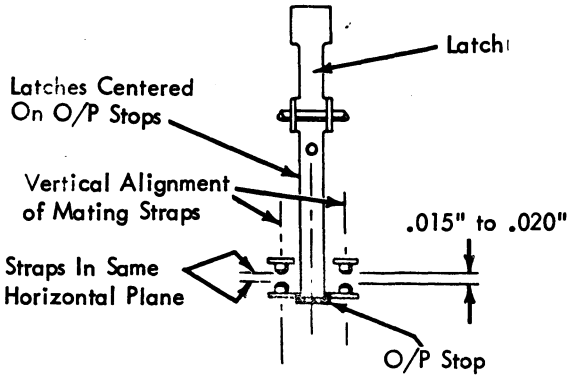


FIGURE 174. Contact Air Gap

a. Latches centered on O/P stops.
b. Vertical alignment of mating contacts.
c. All contacts of each stack must lie in the same horizontal plane (individual forming may be required.)

2. Contact Air Gap (Fig. 174) - Rotate the contact mounting bracket under its four screws for .015" to .020" contact air gap - see Fig. 175 for mounting screws.

3. Normally Open Contact Rise (Fig. 175) - With the contacts unlatched, form the N/O straps for .005" minimum rise.

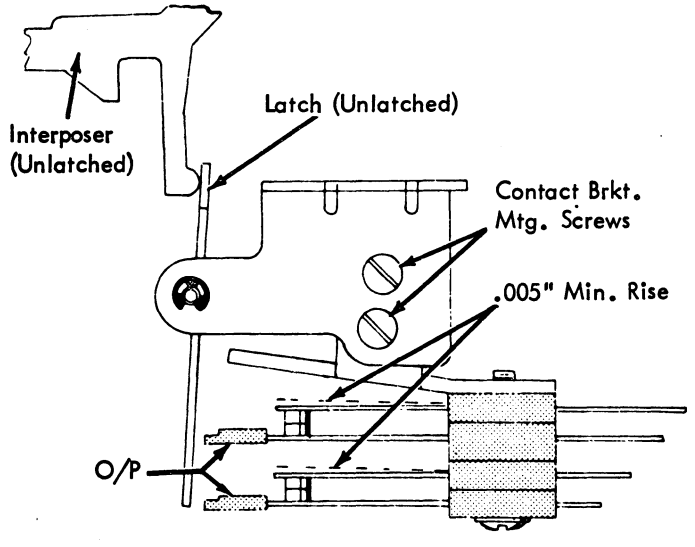


FIGURE 175. N/O Contact Rise

4. Latch Stop (Present on Late Models) Fig. 176 - Position so that the end of the O/P stops are flush with the forward latch surface.

NOTE: Form individual latches as required in the area shown in Fig. 176.

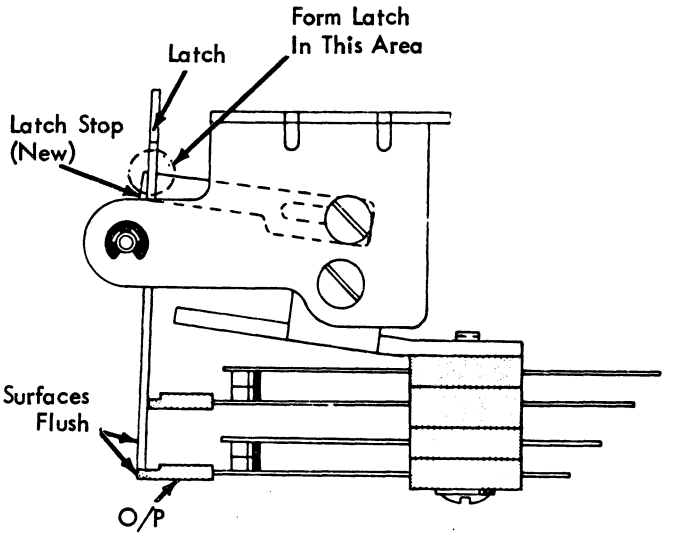


FIGURE 176. Latch Stop

OPERATIONAL CONTACT AND LATCH ASSEMBLY ADJUSTMENTS (UNIT INSTALLED)

1a. Assembly (with latch stop) Position (Fig. 177) - With the operational interposer released, position the unit (front to rear) so that the latches clear the O/P stops by .005" to .015".

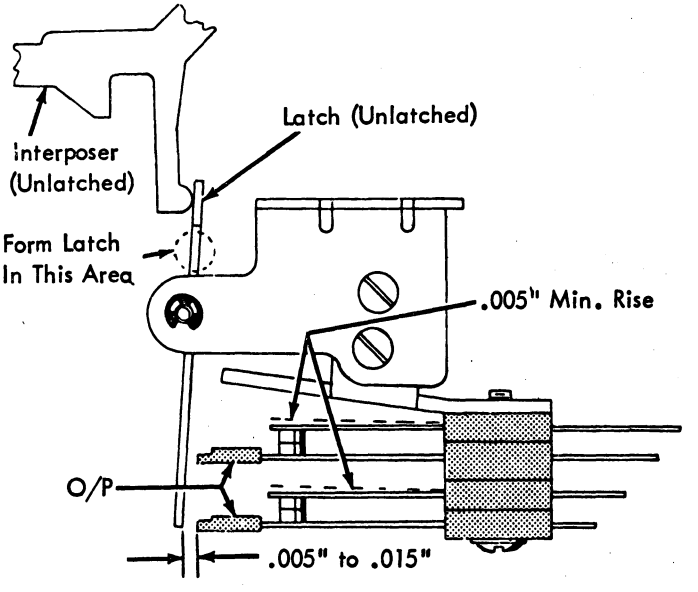


FIGURE 177. Assembly Position (With Latch Stop)

1b. Assembly (without latch stop) Position (Fig. 178) - With the contacts latched, position the assembly (front to rear) for the following inter-related conditions.

a. The latch just touches the interposer extension.
b. The forward latch surface is flush with the end of the O/P stop.

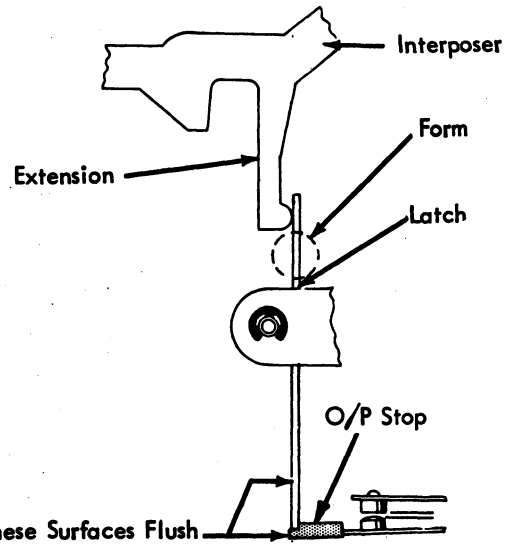


FIGURE 178. Assembly Position (Without Stop)

2. Bail Eccentric (Fig. 179) - Adjust (all operational functions restored) so that the latches clear the O/P stops by .001" to .008".

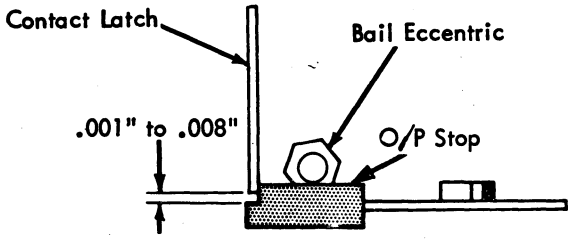


FIGURE 179. Bail Eccentric

3. Parallel Actuating Bails (Fig. 180) - Form the actuating arm slot as required to provide equal latch to O/P stop clearances where a bail actuates more than one contact.

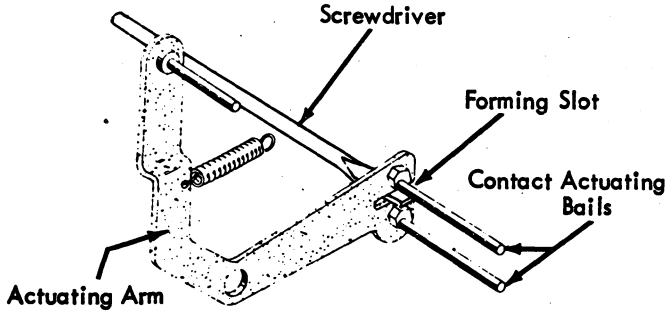


FIGURE 180. Parallel Actuating Bail

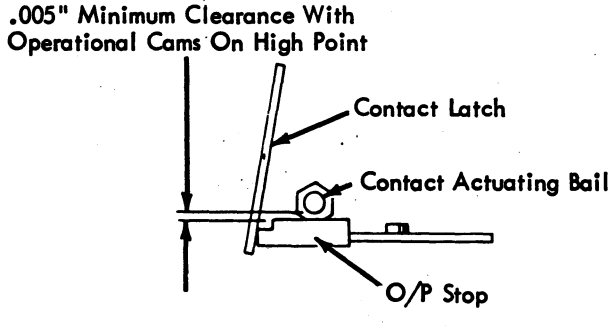


FIGURE 181. Check On Eccentric Bail

NOTE: With the operational cams on their high points, the actuating bails must clear the O/P stops by a minimum of .005" (Fig. 181).

This condition should have been satisfied by previous adjustments and is required in order to provide adequate contact rise.

OPERATIONAL CONTACT AND LATCH ASSEMBLY ADJUSTMENTS (Late Style)

1. Operational Link (Fig. 181.1) - Adjust the links (with the cams latched at rest) so that the contact actuators will have .001" to .010" travel before bottoming. This can be checked by pulling on the actuating arm and observing .001" to .010" motion of the actuator as shown in figure 181.1.

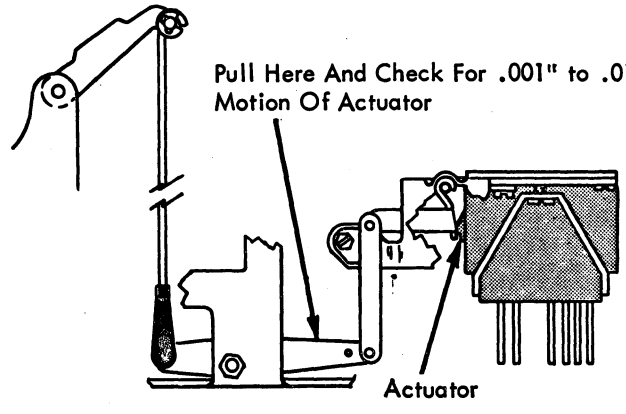


FIGURE 181.1 Operational Link

2. Contact Latches (Fig. 181.2) - Form the tails of the interposer followers so that the latches will clear the step on the actuator by .001" minumum with the interposers latched.

NOTE: The bottom of the latches should not be below the bottom of the actuator.

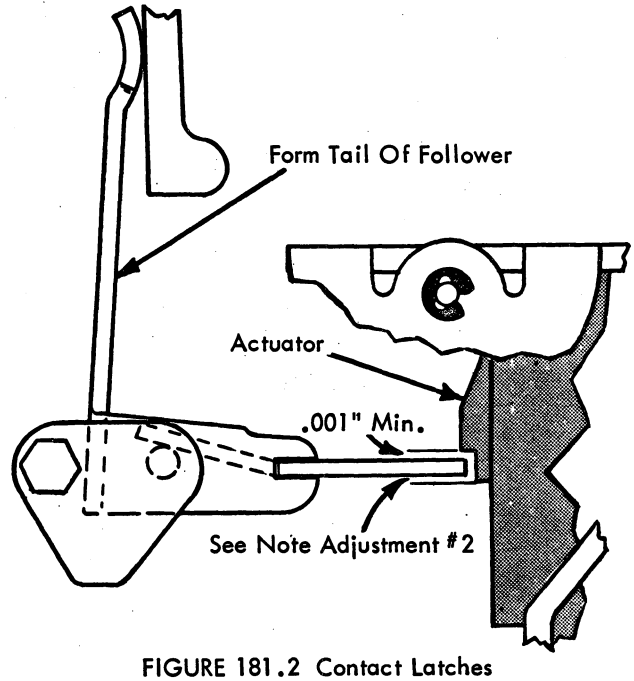


FIGURE 181.2 Contact Latches

3. Adjusting Plates (Fig. 181.3) - The actuator latch adjusting plates should be adjusted so that the actuator latches clear the rise on the actuator by .005" to .015" (With the operational cams latches at rest).

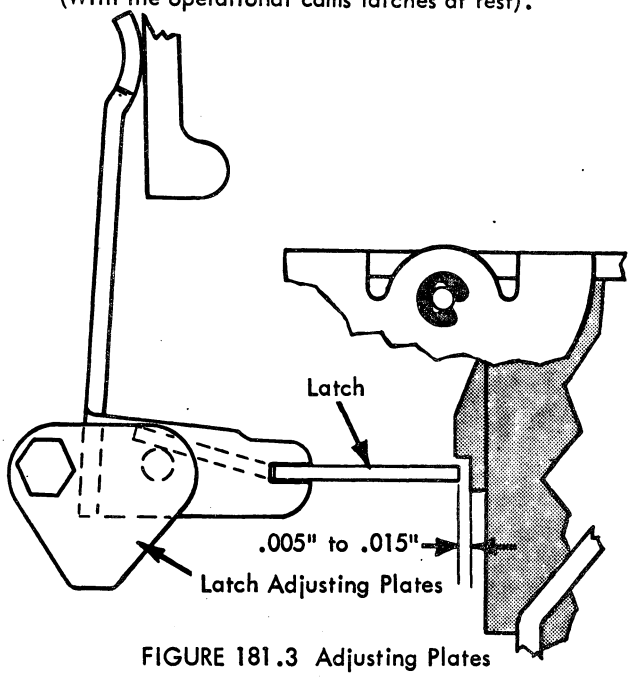


FIGURE 181.3 Adjusting Plates

OPERATIONAL FEEDBACK CONTACTS (C-5, C-6)

1. Position the O/P's centrally under the actuator tabs (Fig. 182).

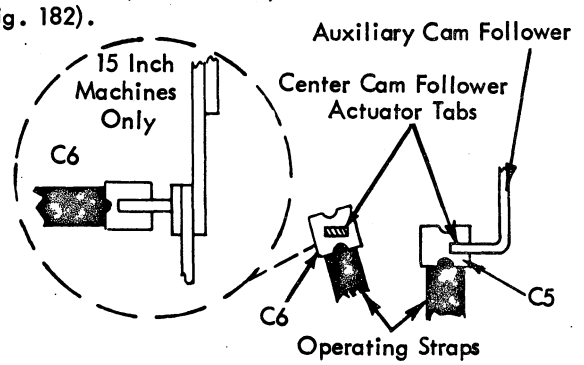
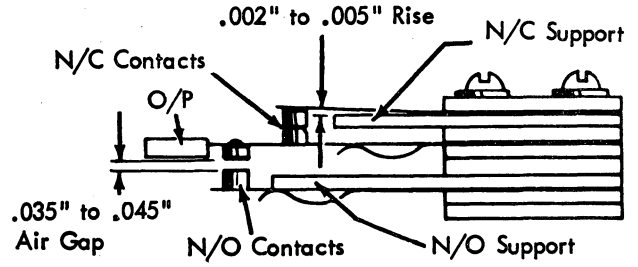


FIGURE 182. Operating Straps

2. Form the N/C supports so that the O/P's lift the N/C contacts .002" to .005" (Fig. 183).

3. Form the N/O supports for .035" to .045" air gaps between the O/P and N/O contacts (Fig. 183).



NOTE: .035" to .045" air gap may have to be altered to obtain timing.

FIGURE 183. Feedback Contacts

4. Form or adjust the contact mounting bracket (up or down) for make and break times (Fig. 183). Refer to the timing charts for contact timing and duration.

TIMING CHART

Machine	C-5 N/O Make	C-5 N/O Break	C-6 N/O Make	C-6 N/O Break
ET 731	55 ± 5	130 ± 5	170 ± 5	305 ± 5
ET 735	55 ± 5	130 ± 5	170 ± 5	305 ± 5
MTST-775	55 ± 5	130 ± 5	170 ± 5	305 ± 5

FIGURE 184. Timing Chart

SPACEBAR MECHANISM

1. All print escapement and operational control adjustments must be correct before attampting adjustments of the spacebar.

2. Spacebar Latch Lever Screw - Adjust the screw so that .007" to .010" clearance exists between the escapement trigger and the escapement torque bar (Fig. 185A). Disconnect the escapement trip link before making this adjustment.

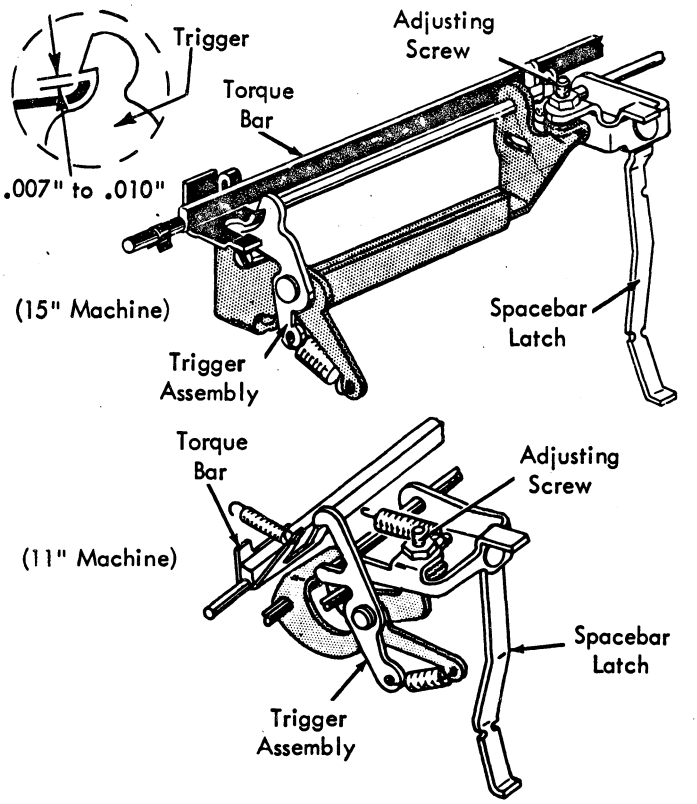


FIGURE 185A. Spacebar Latch Lever Screw

On long carriage machines the trigger upstop should be moved up out of the way when making this adjustment. After completing the adjustment the upstop should be adjusted so that it clears the trigger lever by .001" to .005" (Fig. 185B).

This adjustment insures that the trigger will properly reset over the lug on the escapement torque bar at the completion of each spacebar operation. It also insures that there will be a maximum transfer of motion from the spacebar operational latch to the trigger lever assembly, thereby placing a sufficient amount of wear potential into the system (which is felt as trigger overthrow).

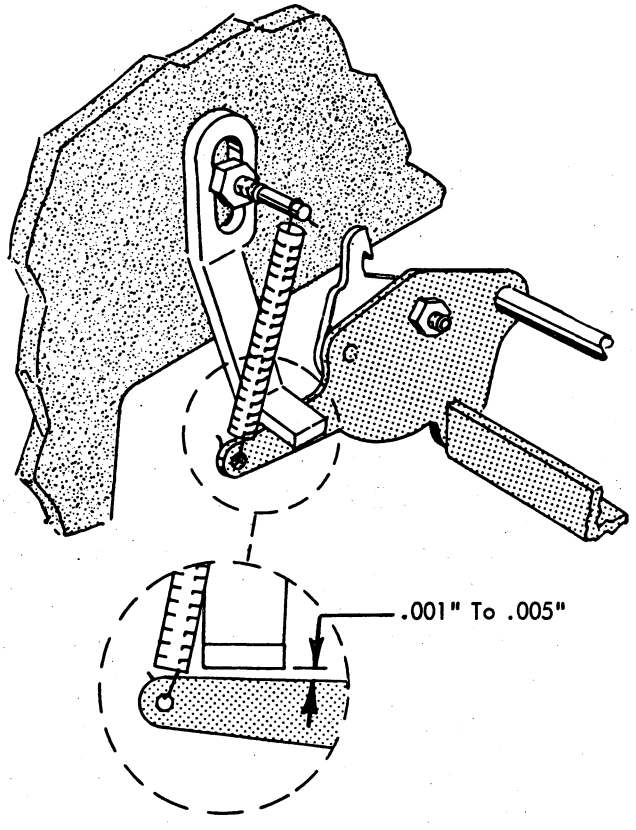


FIGURE 185B. Trigger Upstop

3. Spacebar Guide Stud

a. Early Style - Adjust the guide stud to operate freely in the spacebar stem throughout the full travel of the spacebar (Fig. 186).

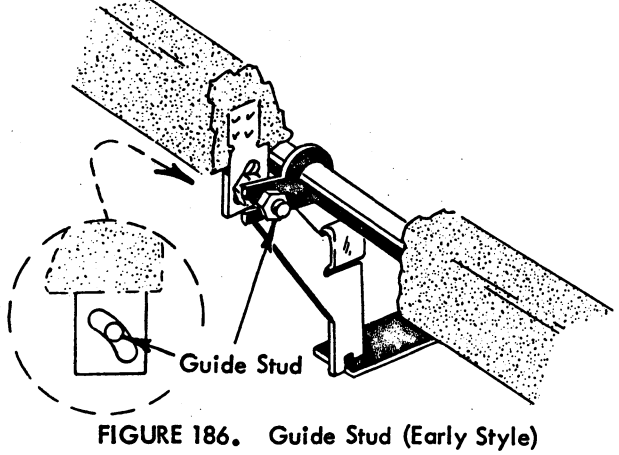


FIGURE 186. Guide Stud (Early Style)

The guide stud is accessible if the 2 upper screws of the keylever guard are removed and the guard is rotated forward out of the way. The operational keylever springs must be disconnected in order to rotate the guard.

b. Late Style - Adjust the guide stud (Fig. 187) forward or back in its elongated mounting hole so that a clearance of 1/16" to 1/32" exists between the bottom of the skirt on the spacebar and the bottom of the skirt on a depressed fourth row keybutton.

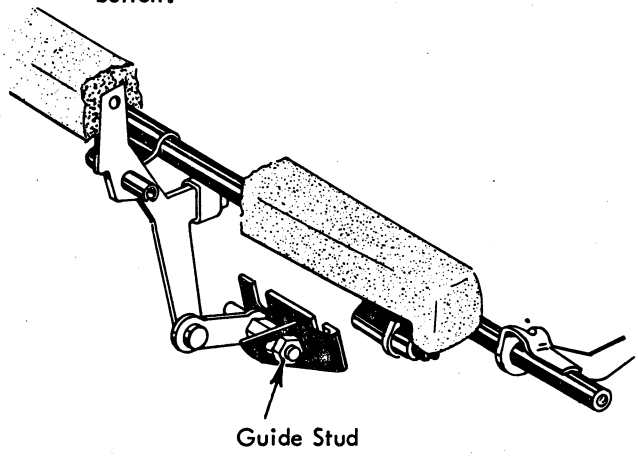


FIGURE 187. Guide Stud (Late Style)

Make certain that the guide stud mounting bracket is adjusted so that the stabilizing link on the bottom of the spacebar stem does not bind on the guide stud.

4. Spacebar Return Spring

a. Early Style - Adjust the return spring front to rear so that the top of the spacebar is level. The spring should be formed up or down so that a weight of 2-1/2 ounces will just fail to trip the spacebar interposer (Fig. 188). The medium screwdriver, which weighs 2-1/2 ounces, can be used for this check.

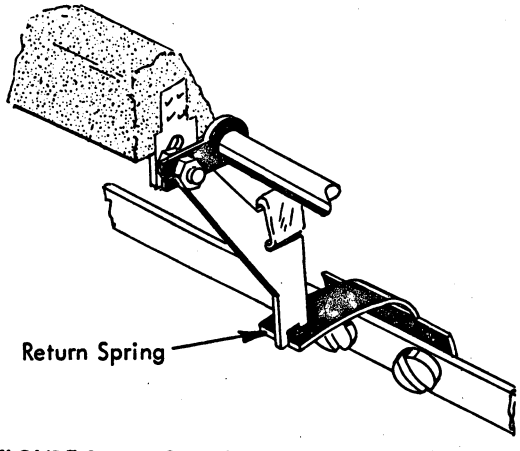


FIGURE 188. Spacebar Return Spring (Early Style)

b. Late Style - Position the spring in one of the three holes in the carrier return/backspace repeat bail so that the spacebar interposer can be tripped by a 2-3/4 to 3-1/4 ounce load (Fig. 189).

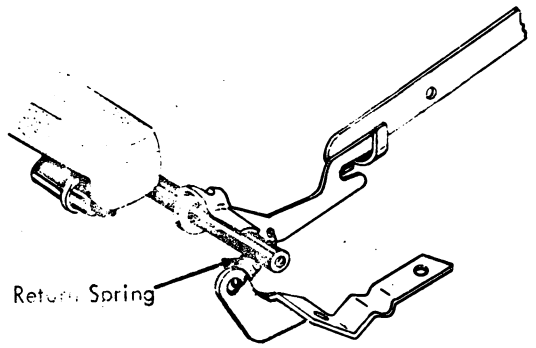


FIGURE 189. Spacebar Return Spring (Late Style)

Spacebar Repeat Stop (Optional)

a. Early Style - Adjust the stop to obtain .001" to .005" clearance between the spacebar repeat arm and the spacebar shaft at the time a single operation occurs (Fig. 190).

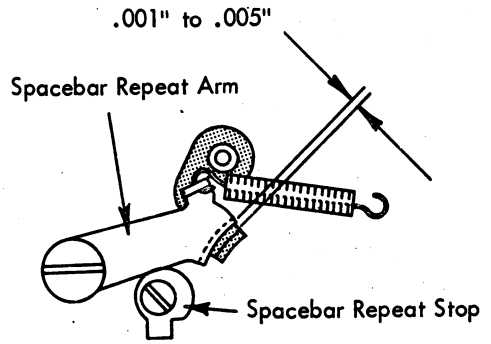


FIGURE 190. Spacebar Repeat Stop (Early Style)

b. Late Style - The spring anchor should be adjusted up or down so that .001" to .005" clearance exists between the spring and the anchor, when a single operation takes place as the spacebar is depressed slowly (Fig. 191).

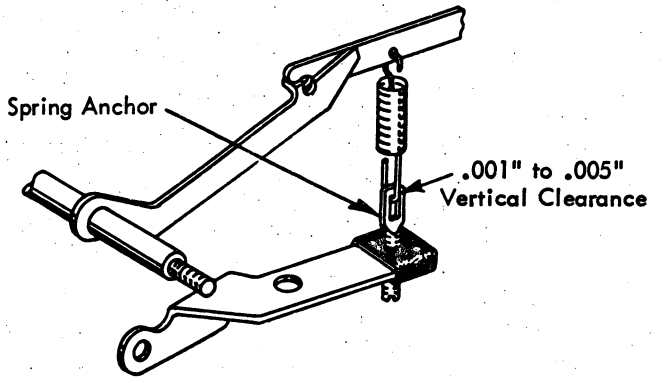


FIGURE 191. Spacebar Repeat Stop (Late Style)

6. Spacebar Final Stop - Adjust or form the stop to obtain .005" to .010" clearance between the stop and the spacebar center stem with the spacebar depressed to just trip the spacebar interposer (Fig. 192). On current level machines the final stop has been eliminated and the repeat lug is broken off the keylever pawl.

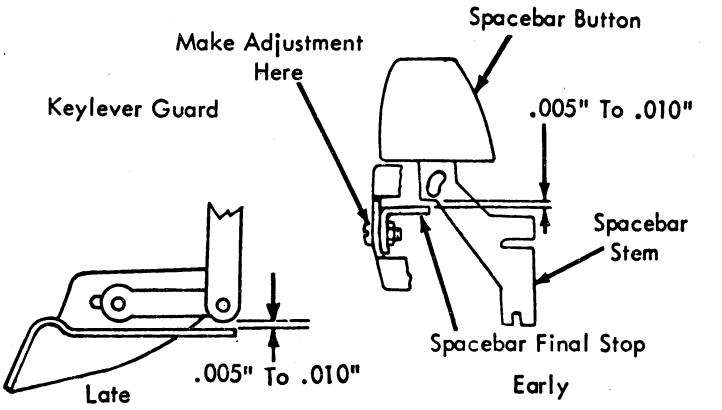


FIGURE 192. Spacebar Final Stop

7. Spacebar Interlock Mechanism (Early Style) - Perform the following adjustments:

a. Lockout Cam - Adjust the escapement cam left or right on the filter shaft so that when the lockout cam is on the high point of the escapement cam the lockout cam will have .050" to .060" lateral motion remaining toward the left (Fig. 193).

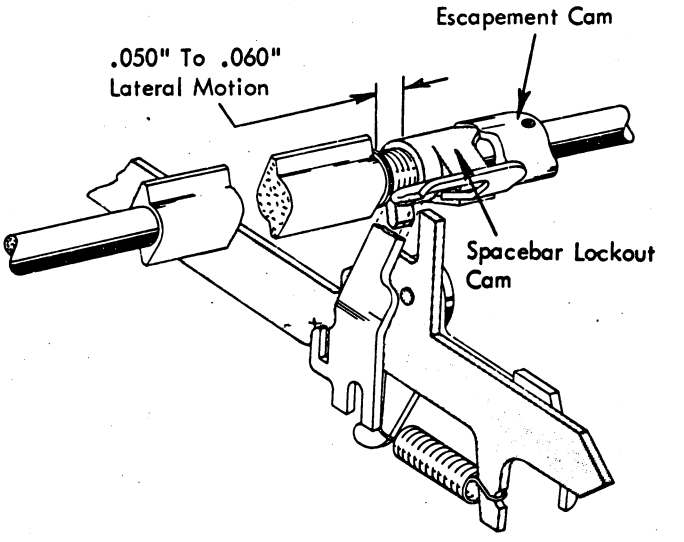


FIGURE 193. Lateral Adjustment Of The Escapement Cam

Be sure to maintain the proper radial position of the escapement cam. It should be adjusted so that the escapement cam follower is resting on, and at the beginning of, the low dwell of the cam when the filter shaft is in its rest position.

b. Lockout Cam Guide - Adjust the guide up or down so that the spacebar interposer will be allowed to move to the rear .020" to .030" when the interposer is unlatched (Fig. 194). The filter shaft must be rotated until the lockout cam moves fully to the right to check this adjustment.

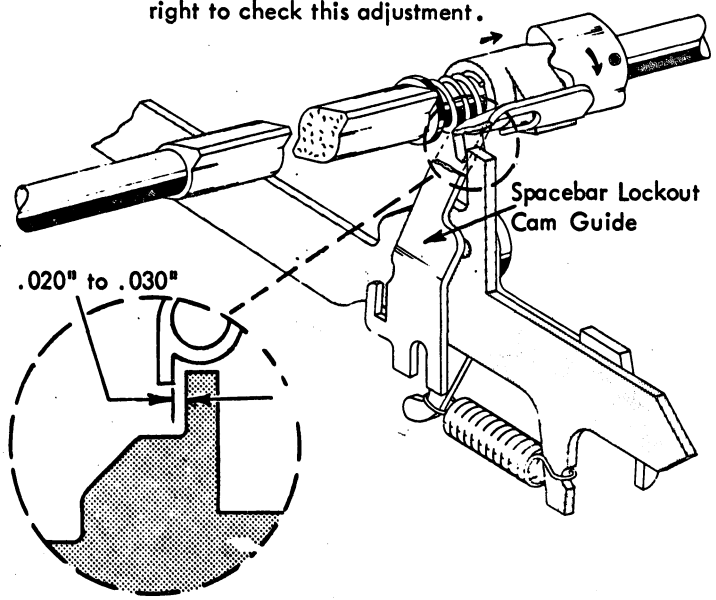


FIGURE 194. Spacebar Lockout Cam Guide Adjustment

CAUTION: Make certain that the spacebar interposer, when released and interlocked, clears the clutch release arm by .005" to .020".

c. Spacebar Interposer Guide - Adjust the interposer guide left or right to obtain .015" to .025" clearance between the interposer and the lockout cam (Fig. 195). The filter shaft should be in its rest position and the spacebar interposer released to the rear when making this adjustment.

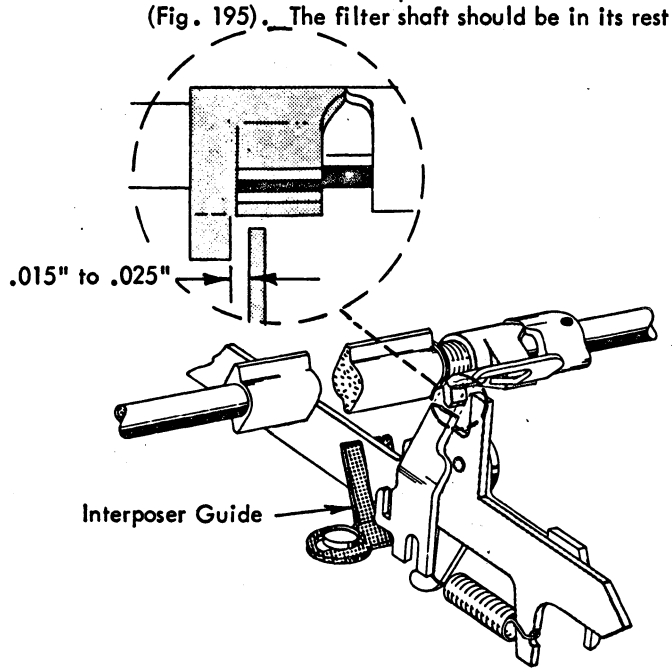


FIGURE 195. Spacebar Interposer Guide Adjustment

8. Spacebar Interlock Mechanism (Late Style) - Perform the following adjustments:

a. With the machine latched at rest adjust the spacebar interlock cam radially on the filter shaft so that the tip of the interlock interposer rests on the high point of the cam (Fig. 196).

Also, position the interlock cam laterally on the filter shaft so that the cam is against the flutes of the filter shaft and the set screw is toward the right hand side of the machine.

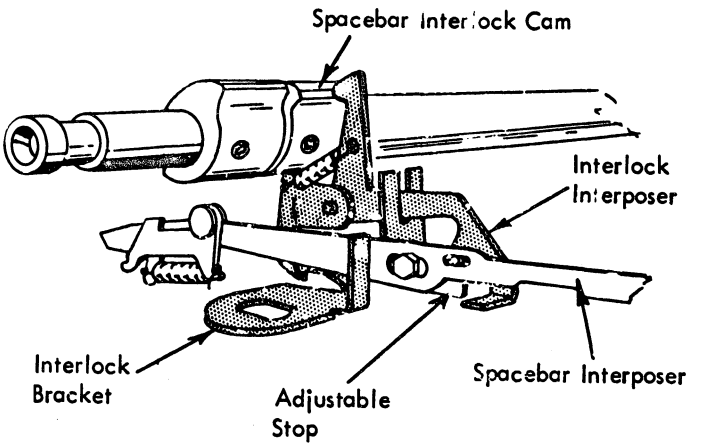


FIGURE 196. Spacebar Interlock Mechanism (Late Style)

b. With the machine latched at rest and the spacebar interposer released to the rear, adjust the interlock bracket front or rear to obtain a clearance of .040" to .050" between the interlock interposer and the adjustable stop on the spacebar interposer (Fig. 197).

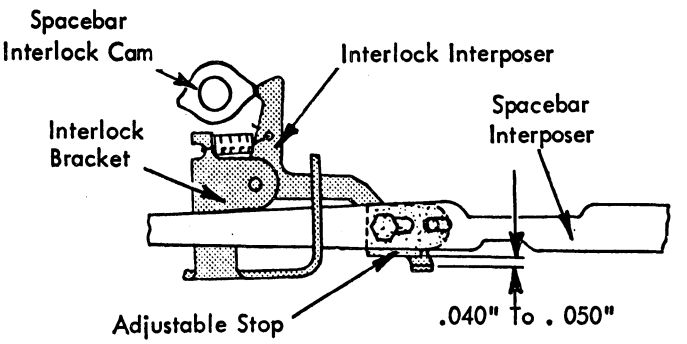


FIGURE 197. Interlock Bracket Adjustment

c. Position the adjustable stop on the spacebar interposer forward or back so that .020" to .025" clearance will exist between the stop and the interlock interposer when the machine is half-cycled and the spacebar interposer is latched at rest (Fig. 198).

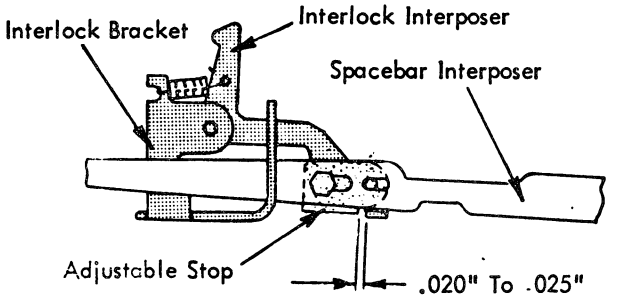


FIGURE 198. Adjustable Stop

BACKSPACE MECHANISM

1. Be sure that print escapement and operational control adjustments are correct before attempting backspace adjustments.

2. Tab Lever Stop - The rest position of the tab lever is controlled by a lug on the escapement bracket called the tab lever stop (Fig. 199). The stop should be formed front or rear so that a clearance of .001" to .003" exists between the vertical lug on the tab lever and the backspace pawl when the backspace pawl is bottomed in its rack.

   The tab lever stop may be formed by inserting the T-bender from the upper right side. It will be necessary to force the tab torque bar to the rear in order to insert the T-bender.

   This adjustment insures that the backspace pawl will not be prevented from bottoming in its rack during a backspace operation. The tab lever rest position also directly affects the adjustments of the tab mechanism. It determines how much motion must be provided to the tab lever to properly remove the backspace and escapement pawls from their racks during a tab operation.

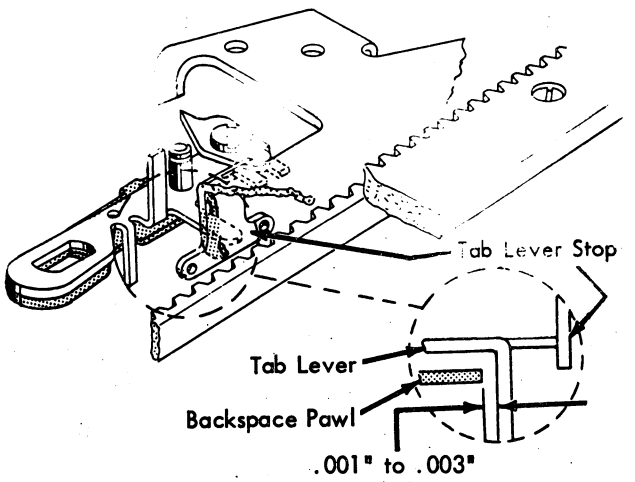


FIGURE 199. Tab Lever Stop Adjustment

3. Backspace Rack - With the backspace rack in the rest position, a clearance of .005" to .015" should exist between the working surfaces of the rack tooth and the backspace pawl (Fig. 200). Adjust the hexagon headed stud in the backspace bellcrank to obtain this condition.

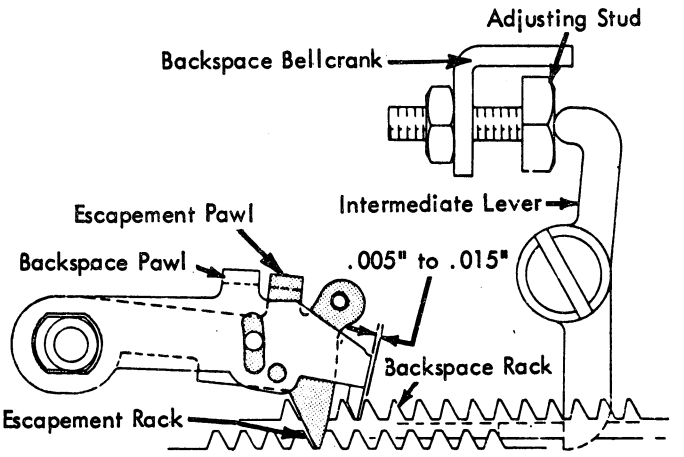


FIGURE 200. Backspace Rack Adjustment

The adjustment minimizes lost motion in the mechanism and insures that the backspace pawl will positively reset into the next rack tooth at the completion of a backspace operation. Excessive clearance can contribute to escapement problems as well as backspace failures by allowing the backspace pawl to hold the carrier against a backspace rack tooth. Partial spacing will result if the carrier alternates holding on the escapement pawl and the backspace pawl.

The adjustment may be gauged by feeling the motion of the rack as it is manually moved from its rest position into contact with the backspace pawl. The movement should be equal to the adjustment clearance. The check should be made at both extreme positions of the carrier so as to include the difference in mainspring tension in the check. Check the resetting of the pawl at both positions by operating the backspace bellcrank manually and releasing it slowly.

4. Intermediate Lever (Late Style - Identify by presence of C-5 auxiliary cam follower) - With the backspace cam manually operated to the high point, the escapement pawl should just fail to drop into the preceding rack tooth causing the manual backspace operation to fail. Adjust the intermediate lever pivot screw forward or back in its elongated mounting hole to obtain this condition (Fig. 201).

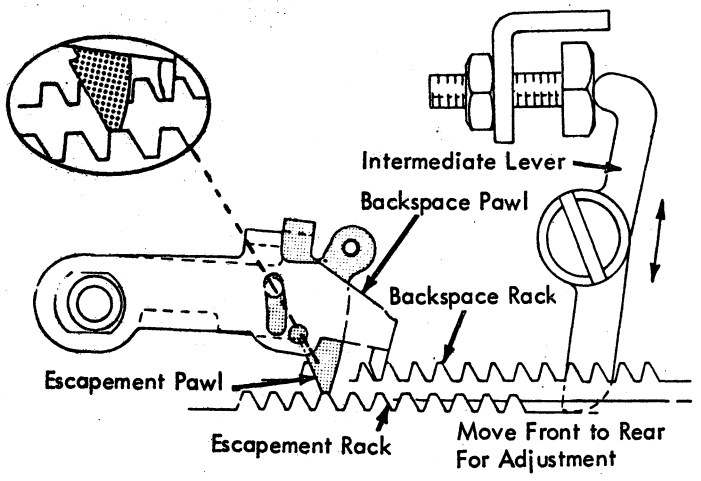


FIGURE 201. Intermediate Lever Adjustment (Late Level)

The rear portion of the intermediate lever is supplied with the same amount of motion from the hexagon headed screw on the bellcrank regardless of any change in the front to rear position of the intermediate lever. Therefore; the difference in throw to the backspace rack is achieved, when changing the front to rear position of the intermediate lever, by increasing or decreasing the leverage or distance between the pivot point of the intermediate lever and the backspace rack. Moving the intermediate lever to the rear will increase the backspace rack motion.

During a powered backspace operation the carrier develops enough momentum (allowing the escapement pawl to properly overthrow and drop into the preceding rack tooth) for a positive operation.

Too much motion to the backspace rack will cause double backspacing. Check the operation at both ends of the carriage so as to include the variation in the mainspring tension.

CAUTION: The rest position of the backspace rack should be checked and readjusted, if necessary, after any change in the front to rear position of the intermediate lever.

NOTE: On 11 inch machines below serial number 4012015, the contour or rise to the spacebar backspace operational cam is slightly different than those found on later level machines. This cam provided much less momentum to the carrier, therefore the backspace rack required more motion in order to produce a positive backspace operation. Adjust this early level backspace mechanism as follows: With the backspace cam manually operated to the high point, the escapement pawl must drop into the preceding rack tooth and overthrow by .005" to .010" (Fig. 202). Obtain this condition by adjusting the intermediate lever forward or back in its elongated mounting hole.

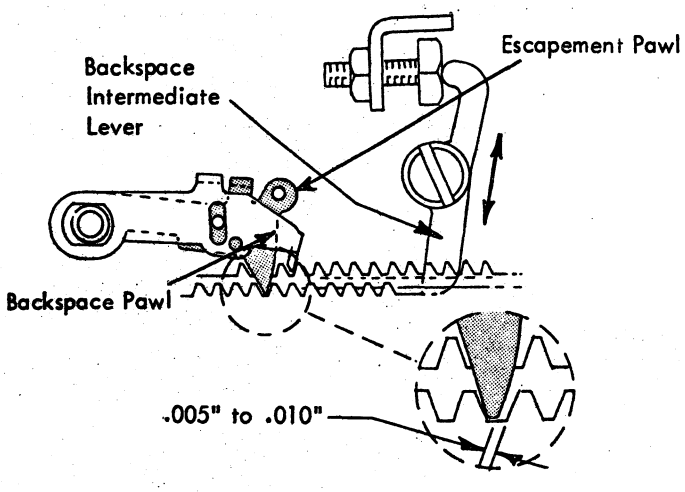


FIGURE 202. Intermediate Lever (Early Level)

CARRIER RETURN MECHANISM

Be sure that the print escapement and operational control adjustments are correct before attempting the carrier return adjustments.

1. Carrier Return Latch Height (11 inch machine) - With the carrier return/index cam at rest, adjust the carrier return latch height by the adjusting screw on the backplate (Fig. 203) so that the latch will pass under the cam follower by .001" to .010" when it is released to the rear.

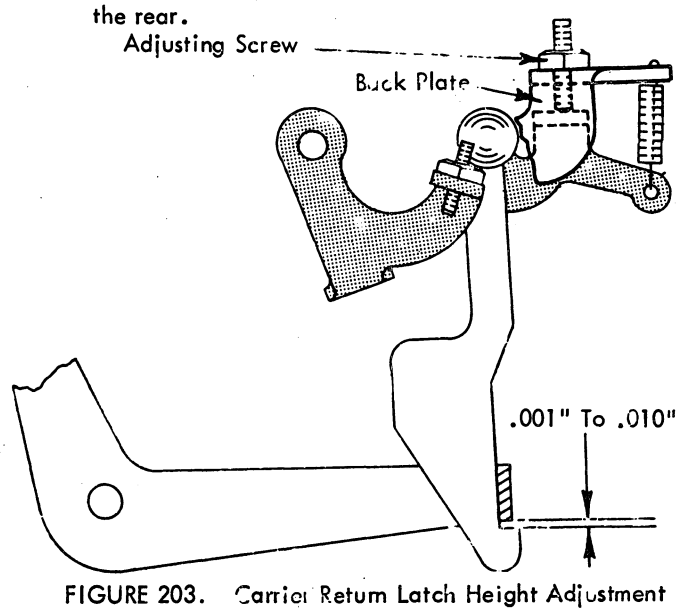


FIGURE 203. Carrier Return Latch Height Adjustment (11 Inch Machine)

The latch height adjustment insures maximum throw for the latch and that it will move under the cam follower freely.

CAUTION: Any change in the carrier return latch height directly affects the front to rear position of the latch (with respect to the cam follower) when the machine is at rest. See adjustment #4 in the Operational Control section.

NOTE: On long carriage machines the carrier return latch height cannot be obtained until after the correct pawl clearance and clutch latch overthrow adjustment is obtained.

1.1 Carrier Return Latch Height Late Style (11 Inch Machine) With the carrier return cam at rest, adjust the carrier return latch height by the adjusting screw on the carrier return adjusting plate so that the latch will pass under the cam follower by .003" to .015" (Fig. 203.1).

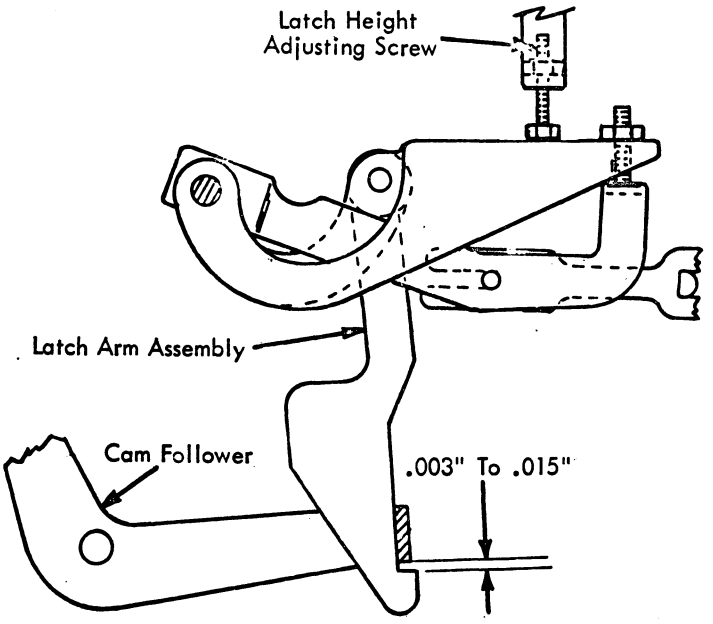


FIGURE 203.1 Carrier Return Latch Height (11 Inch Late Style)

1.2 Carrier Return Latch Height Late Style (15 Inch Machine)

a. Carrier Return Lever - Position the carrier return lever laterally on the operational pivot pin so that the carrier return latch will hang vertical without binding against its interposer (Fig. 203.2). Be sure to tighten the screw in the lever onto the flat portion of the pin.

b. Carrier Return Latch Arm Assembly Adjusting Screw - With the carrier return cam latched in the rest position, adjust the screw so that the carrier return latch will pass under the cam follower by .003" to .015" (Fig. 203.2).

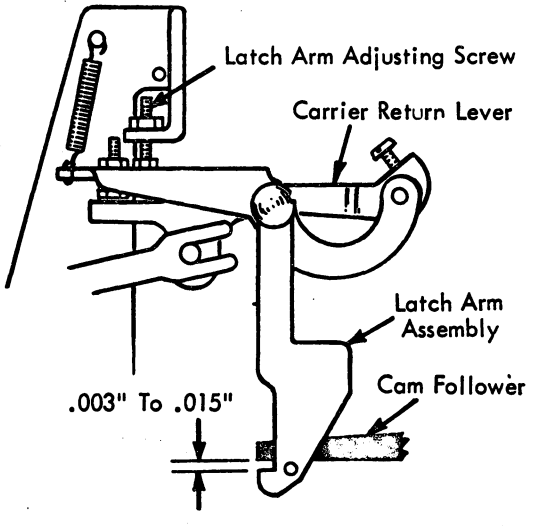


FIGURE 203.2 Carrier Return Latch Height (15 Inch Late Style)

The latch height adjustment insures maximum throw for the latch and that it will move under the cam follower freely.

CAUTION: Any change in carrier return latch height directly affects the front to rear position of the latch (with respect to the cam follower) when the machine is at rest. See Adjustment #4 in the operational control section.

2. Pawl Clearance - Adjust the clutch latch eccentric so that the escapement pawl will clear the rack teeth by .005" to .020" when the latch is being held down by the keeper (Fig. 204).

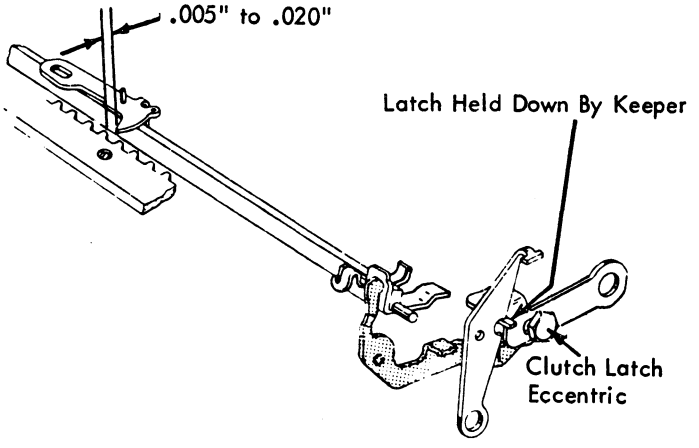
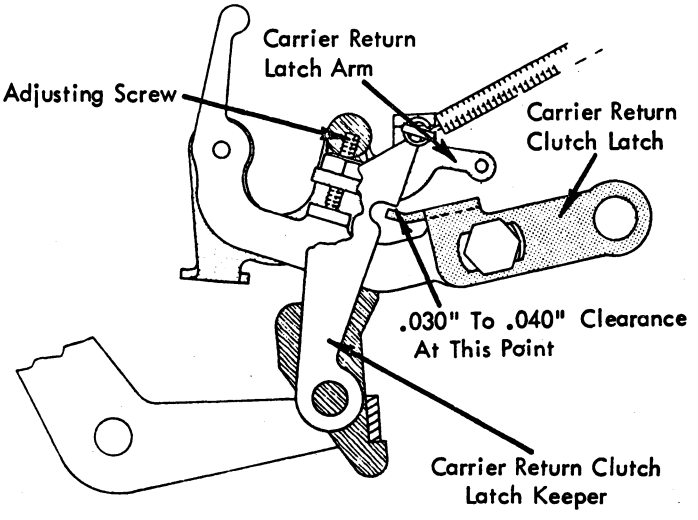


FIGURE 204. Pawl Clearance Adjustment

This adjustment insures that the escapement pawl will not drag along the rack during a carrier return and that the pawl will be allowed to re-enter the rack quickly at the completion of the return operation.

3. Clutch Latch Overthrow (11 inch machine only) - With the platen and feed rolls installed and the index selector lever set in the double index position, manually operate the carrier return cam to the high point while observing the motion of the clutch latch. It should overthrow the latching surface of the keeper by .030" to .040" (Fig. 205). Adjust the carrier return latch arm adjusting screw to obtain this condition.



(Early Style)

FIGURE 205. Clutch Latch Overthrow Adjustment (11 Inch)

NOTE: Installing the platen and feed rolls, plus setting the index selector lever in the double index position, permits the overthrow adjustment to be measured while the system operates under a load.

3.1 Clutch Latch Overthrow Late Style - Manually operate the carrier return cam to the high point while observing the motion of the clutch latch. It should overthrow the latching surface of the keeper by .010" to .020" (Fig. 205.1). Adjust the carrier return latch arm adjusting screw to obtain this condition.

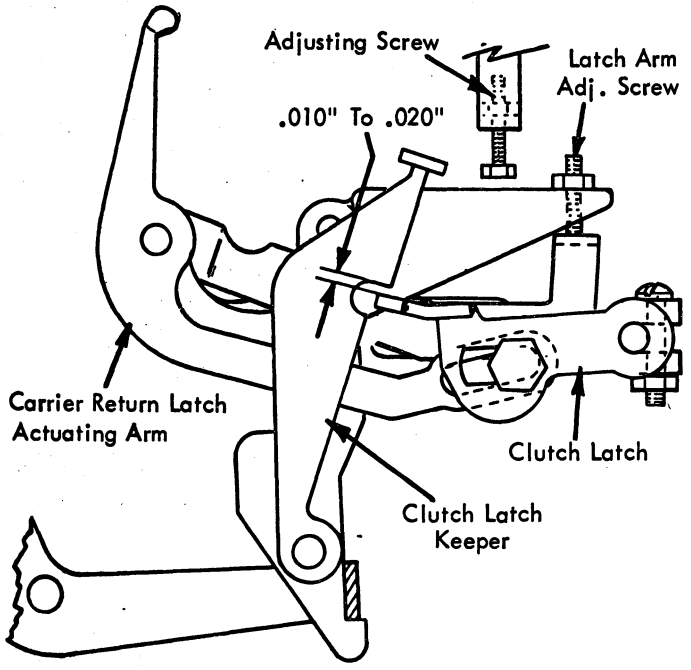


FIGURE 205.1 Clutch Latch Overthrow Adjustment (Late Style)

4. Clutch Latch Overthrow (15 inch machine
Use the following procedure to obtain the correct clutch latch overthrow and operational latch height.

a. Carrier Return Lever - Position the carrier return lever (Fig. 206) laterally on the latch actuating arm pin so that the carrier return latch will hang vertical without binding against its interposer. Be sure to tighten the Bristol screw in the lever onto the flat portion of the pin.

b. Carrier Return Latch Arm Adjusting Screw (overthrow) - With the carrier return cam on the high point adjust the latch arm adjusting screw (Fig. 206) so that the clutch latch will overthrow the latching surface of the keeper by .030" to .040". Be sure that the platen and feed rolls are installed and the index selector lever is in the double index position when checking this adjustment.

c. Carrier Return Latch Actuating Arm Adjusting Screw (latch height) - With the carrier return cam latched in the rest position, adjust the screw so that the carrier return latch will pass under the cam follower by .003" to .010" (Fig. 207). Maintain a clearance between carrier return latch arm and torque bar.

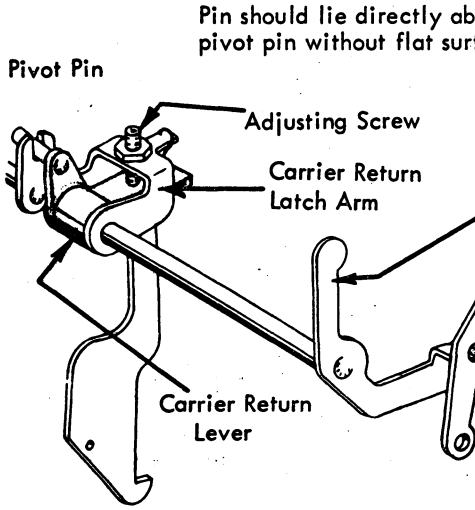


FIGURE 206. Clutch Latch Overthrow Adjustment (15 Inch Machine)

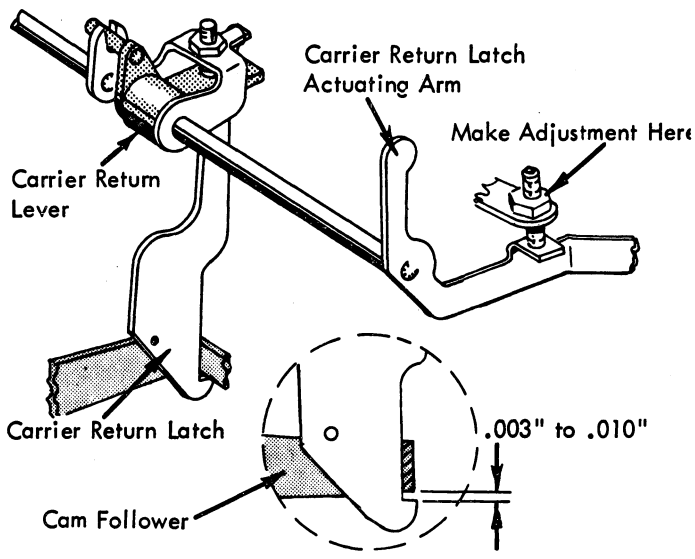


FIGURE 207. Carrier Return Latch Height (15 Inch Machine)

CAUTION: Any change in the carrier return latch height directly affects the front to rear position of the latch (with respect to the cam follower) when the machine is at rest. See adjustment #4 in the Operational Control section.

NOTE: On a limited number of 15 inch machines equipped with the early style carrier return mechanism, a carrier return latch actuating arm was used that did not have a flat surface machined on the left end of its pivot pin. These early production latch actuating arms should be replaced, before attempting to make the carrier return adjustment. The flat surface machined on the left end of the pin is required to establish the proper radial position of the carrier return lever on the pin (with respect to the latch actuating arm), and insures that the carrier return lever cannot slip on the pin.

5. Carrier Return Shoe - Adjust the carrier return actuating arm bracket left or right so that the carrier return shoe overlaps the last 3 coils on the right hand end of the clutch spring. Covering the last 3 coils insures that all the coils of the spring will be used in the clutch operation (Fig. 208).

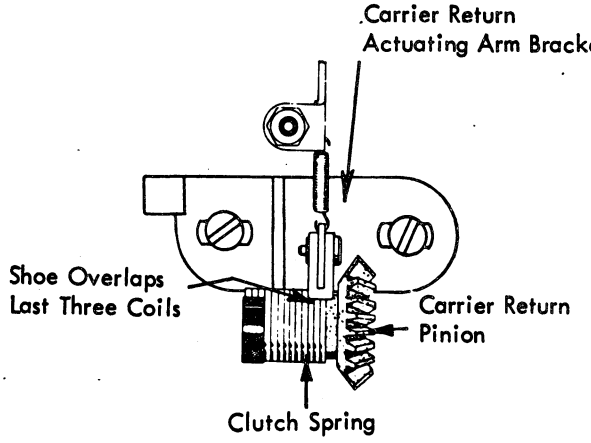


FIGURE 208. Carrier Return Shoe

6. Carrier Return Clutch Arm - Adjust the clutch arm on the carrier return clutch arm hub so that the formed lug which mounts the actuating arm stud will be horizontal when the machine is at rest (Fig. 209).

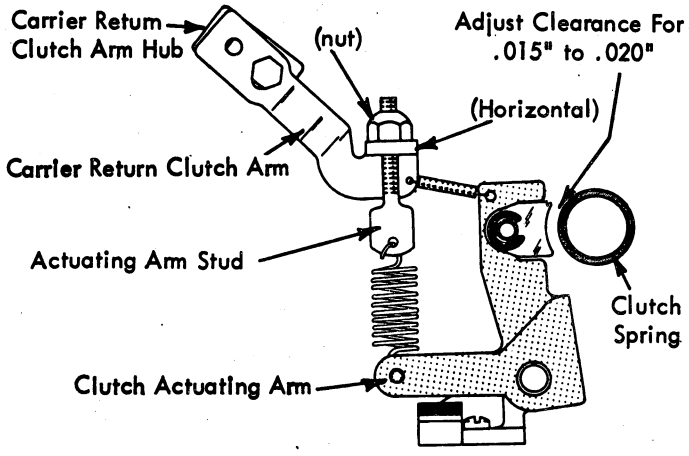


FIGURE 209. Carrier Return Actuating Arm Adjustment

7. Shoe Clearance - The nylon shoe on the clutch actuating arm should clear the carrier return clutch spring by .015" to .020" when the machine is at rest (Fig. 209). Adjust the nut on the actuating arm stud to obtain the proper clearance.

NOTE: In no case should the shoe to clutch spring clearance be less than .015".

8. Overbank Adjustment

a. Early Style - With the carrier held fully to the left against the margin stop, a clearance of .003" to .008" should exist between the working surfaces of the escapement pawl and the escapement rack tooth (Fig. 210). Adjust the left hand margin rack bushing to obtain this condition (Fig. 211).

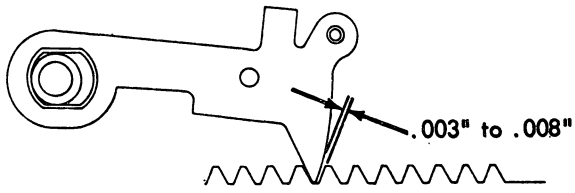


FIGURE 210. Escapement Pawl Check

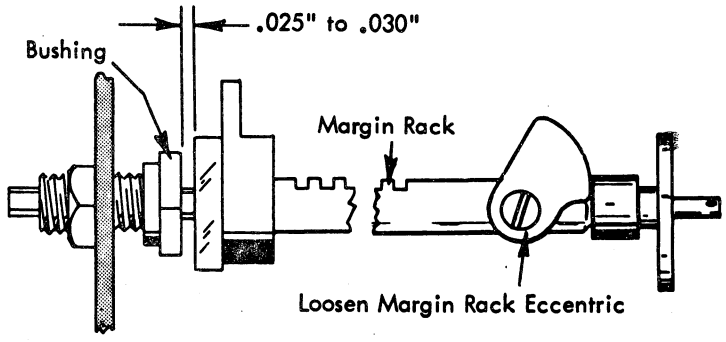


FIGURE 211. Overbank Adjustment (Early)

The overbank adjustment insures that the escapement pawl will enter the correct escapement rack tooth when the carrier return clutch is unlatched at the left margin. The adjustment may be observed from the top with the platen and deflector removed and the left margin stop positioned toward the middle of the rack. The overbank may also be adjusted by adjusting the margin rack bushing to clear the nylon washer on the margin rack by .025" to .030" with the carrier resting at the left margin. The right hand margin rack eccentric should be loose when making this adjustment (Fig. 212) so that the left margin stop will be against the stop latch on the carrier. The .025" to .030" compensates for the .022" floating action in the escapement pawl. (The correct adjustment for the margin rack eccentric is covered under the Margin Control section.)

NOTE: Any change in overbank on machines equipped with this old style margin rack assembly will directly affect the clutch unlatching adjustment.

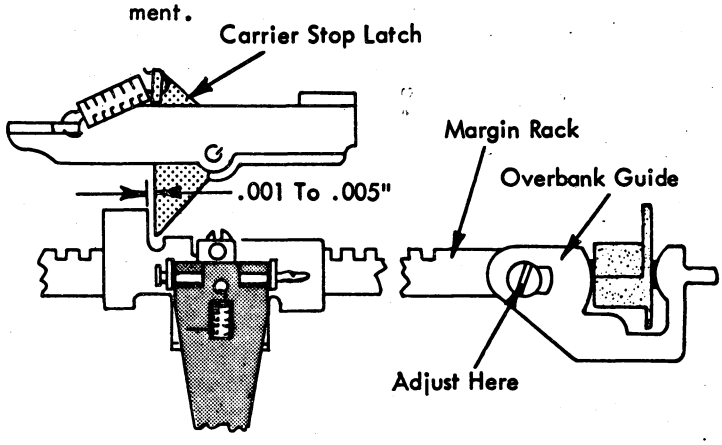


FIGURE 212. Margin Rack Overbank Guide Adjustment (Late)

b. Late Style - With the carrier resting at the left margin stop, adjust the margin rack overbank guide (Fig. 212) left or right on the margin rack to obtain a clearance of .001" to .005" between the stop latch on the carrier and the left hand margin stop. On machines equipped with a floating stop latch, the floating action of the latch must be removed, by pulling the latch to the right with a spring hook, before this clearance can be observed.

The adjustment of the overbank guide on the margin rack determines the rest position of the margin rack. The adjustment insures that the left margin stop will set accurately when the stop is slid to the right against the margin stop latch on the carrier. In addition, the adjustment of the overbank guide, plus the amount of lateral motion that the guide permits the rack (due to the design of the guide) during a carrier return operation, automatically provides the carrier with the overbank required for proper escapement pawl re-entry at the completion of a carrier return operation.

9. Clutch Unlatching - With either style margin rack held to its extreme left position, the carrier return latch keeper should clear the latch by .005" to .015" at the unlatching point (Fig. 213). Check by manually holding the latch at the unlatching point while the machine is idling. Lengthen or shorten the carrier return unlatching link to obtain this clearance.

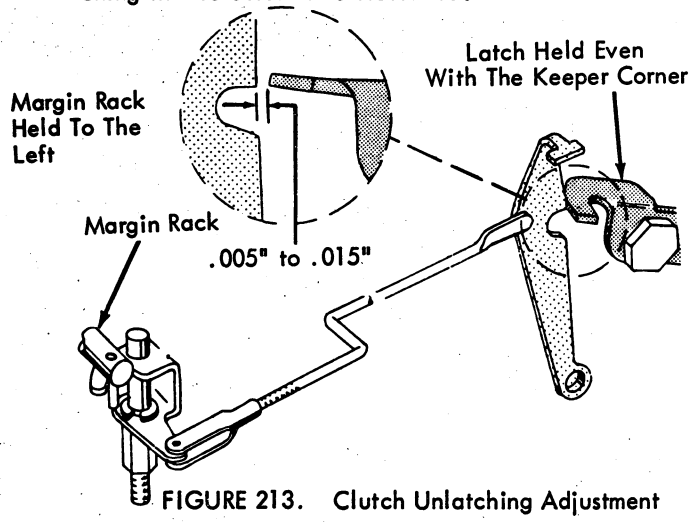


FIGURE 213. Clutch Unlatching Adjustment

NOTE: Should the clutch fail to properly latch (on machines equipped with the Early Style margin rack) after the clutch unlatching adjustment has been completed, check the margin rack eccentric adjustment which is located in the Margin Control section. The eccentric may be holding the rack too far to the left restricting the margin rack motion thereby reducing the amount of bite that the latch may take on the keeper.

10. Torque Limiter - The torque limiter should transmit 1 to 2 pounds pull on the carrier as the carrier is unlatching the clutch at the left margin.

If a spring scale is available, the adjustment may be checked by holding against the carrier with the push end of the scale and allowing the carrier to slowly unlatch the clutch at the left margin.

If no scale is available, the torque may be estimated by holding the carrier while the clutch is engaged. The torque limiter should slip readily yet return the carrier positively without any hesitation when the carrier is released.

The adjustment is made by adjusting the eccentric stud in the torque limiter hub. If sufficient adjustment is not available at the eccentric, the torque limiter spring may be shifted on the torque limited hub by positioning the torque limiter spring clamp.

NOTE: The carrier return clutch arbor should have an end play of .004" to .006" between the torque limiter hub and the C-clip on the operational shaft. Adjust the play by positioning the torque limiter hub laterally on the shaft. The end play can be adjusted easily if the torque limiter spring is moved to the right, off the torque limiter hub.

11. Carrier Return Interlock Contact -

a. Form the N/C support so that the O/P lifts the N/C contact .002" to .005" (Fig. 214).
b. Form the N/O support so that the O/P clears the N/O contact .035" to .045" (Fig. 214).

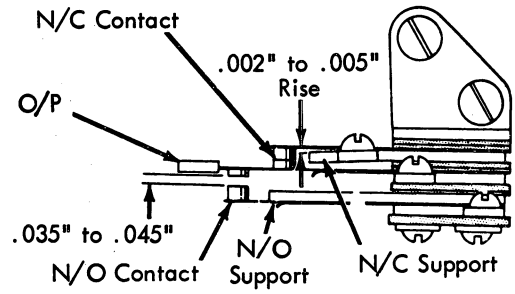


FIGURE 214. Carrier Return Interlock Inactive

c. With the carrier return clutch latched, position the mounting bracket so that the N/O contact rises .010" to .020" from the N/O support (Fig. 215).

NOTE: The N/O contacts must remain closed during return of the carrier to the left margin.

Excessive rise on the contact straps will cause the contacts to bounce.

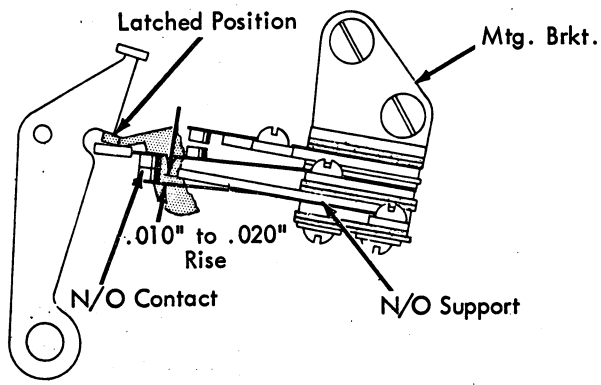


FIGURE 215. Carrier Return Interlock Active

NOTE: 835 Printer Interlock contact timing - make at 200° ± 20°.

INDEX MECHANISM - (LATE)

1. All operational control adjustments must be correct before any attempt is made to adjust the index mechanism.

2. Multiplying Lever Stop - (Fig. 216) - Adjust the multiplying lever stop front or rear to produce .360" to .375" (approximately 3/8") motion to the index link when the carrier return/index cam is operated to its high point (platen removed).

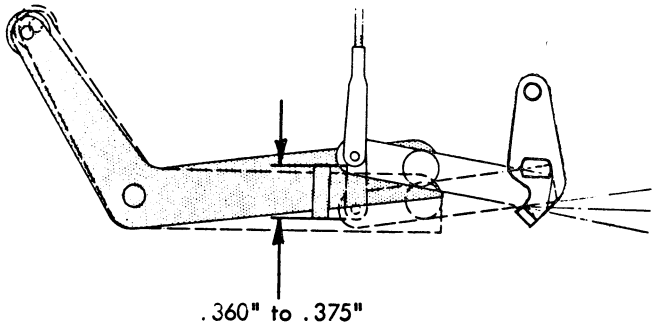


FIGURE 216. Multiplying Lever Stop (Late Style)

NOTE: This adjustment may be measured with the Hooverometer and a feeler gauge. The handle of the Hooverometer is .375" wide.

Figure 217 illustrates the first level multiplying lever stop used on the new style index mechanism. This stop should be adjusted both horizontally and vertically. The stop is adjusted vertically so that the multiplying lever will operate above and below a horizontal position by an equal amount. The horizontal and vertical adjustments of the stop must be made alternately until both are correct.

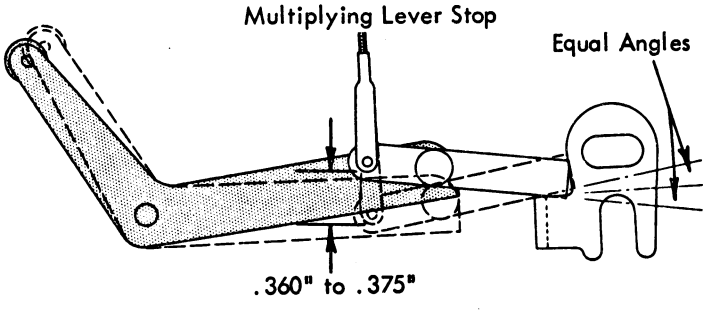


FIGURE 217. Multiplying Lever Stop (Early Level)

3. Index Link - Use the following procedure to adjust the index link:

   a. As a preliminary step, loosen the platen overthrow stop and move it to the front (Fig. 218).

   b. With the platen installed, hold the detent roller disengaged from the platen ratchet with a spring hook while an index operation is manually cycled. At the completion of the operation allow the detent roller to re-enter the platen ratchet. If the index

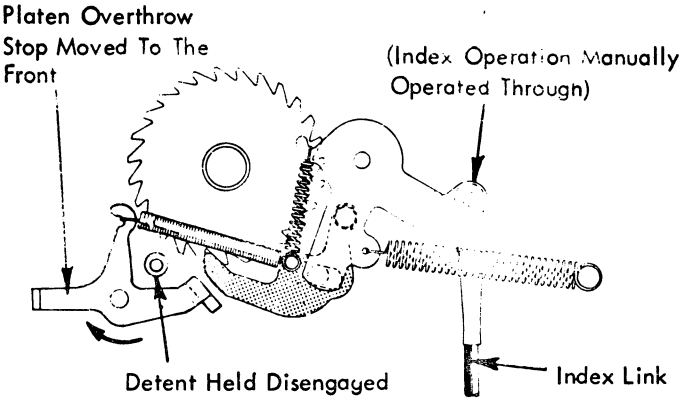


FIGURE 218. Index Link Adjustment

link is properly adjusted the detent roller will seat between two ratchet teeth without causing any rotational motion to the platen. Adjust the link to obtain this condition.

Platen Overthrow Stop - With the index cam rotated to its high point, adjust the platen overthrow stop to clear the index pawl by .005" to .020" (Fig. 219).

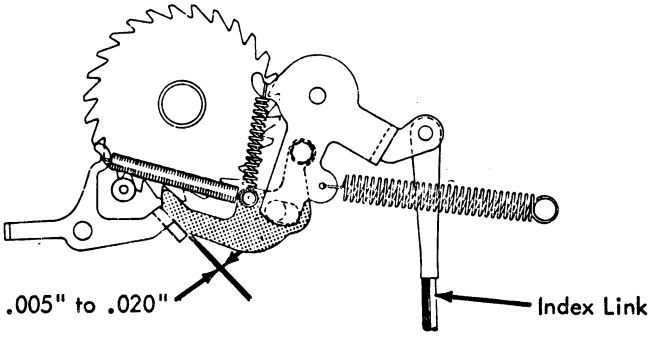


FIGURE 219. Platen Overthrow Stop Index Selector Cam

5. Index Selection Cam

   a. With the index cam latched at rest and the selection lever in the double line space position, adjust the selection cam front to rear so that the index pawl clears the platen ratchet by .015" to .050" (Fig. 220).

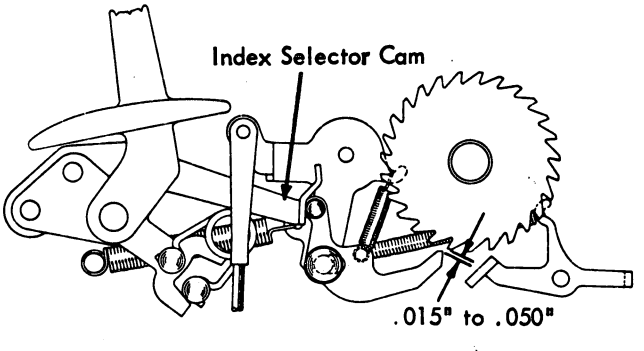


FIGURE 220. Index Selection Cam Adjustment

   b. Adjust the selection cam up or down so that the index pawl is centered on the cam surface with the selection lever in the single line space position (Fig. 221).

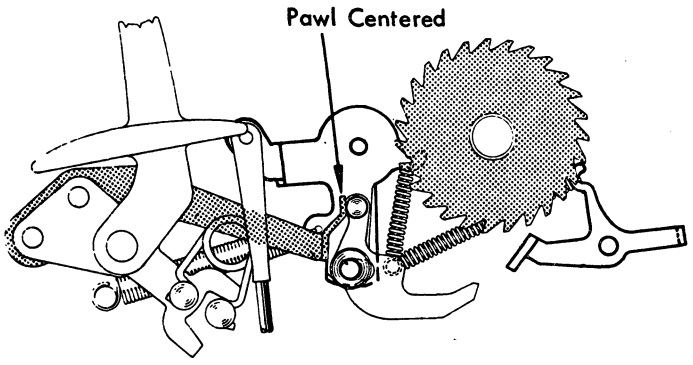


FIGURE 221. Vertical Adjustment Of Index Selection Cam

INDEX MECHANISM (EARLY STYLE)

1. All operational control adjustments must be correct before any attempt is made to adjust the index mechanism.

2. Index Link and Index Link Stud

   a. As a preliminary setting position the index link stud in the middle of the slot in the pawl carrier. The setting provides an average leverage ratio for the pawl carrier. Subsequent adjustments may require that the position be altered slightly.

   b. With the index selection lever in the single line space position, adjust the index link so that the index pawl bottoms in the ratchet against a tooth after .030" rise on the index cam (Fig. 222). Half-turn adjustments may be made by disconnecting and turning the link at the top.

      The cam rise may be simulated by leaving the cam latched in the rest position and placing four strips of IBM card stock between the cam and the cam follower (Fig. 222).

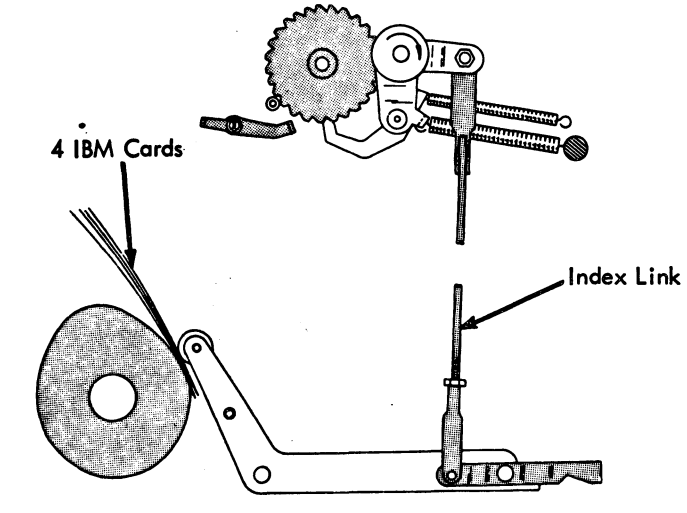
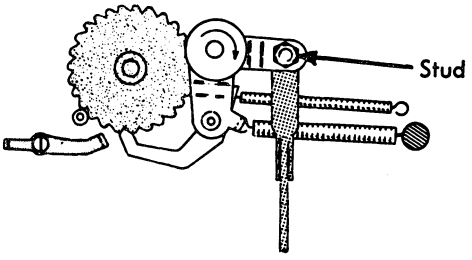


FIGURE 222. Index Link Adjustment

   c. Adjust the index link stud forward or back in the slot of the pawl carrier so that one full tooth of motion is given the index pawl after it starts to drive the platen (Fig. 223).



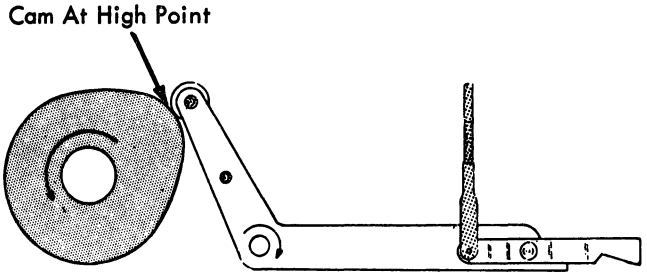


FIGURE 223. Index Link Stud Adjustment

NOTE: Adjustment of the index link and link stud must be considered together. Make these adjustments alternately until both are correct.

The upper index pawl stop must allow the index pawl to bottom in the ratchet.

3. Upper Index Pawl Stop - With the index cam latched adjust the upper index pawl stop so that the index pawl clears the ratchet by .015" to .030" (Fig. 224).

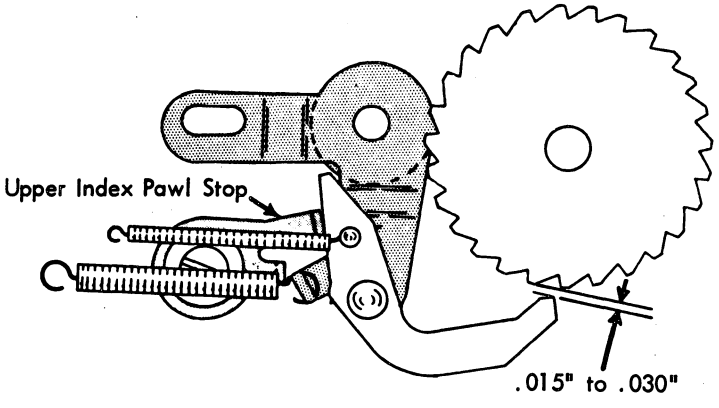


FIGURE 224. Upper Index Pawl Stop Adjustment

4. Multiplying Control Lever

a. As a preliminary setting, position the multiplying control lever stop front to rear so that its elongated hole is centered (Fig. 225). The adjustment provides an average leverage ratio for the multiplying lever. Subsequent adjustments may require that the front to rear position be changed slightly.

b. Adjust the multiplying control lever vertically to just clear the bottom edge of the multiplying lever when it is moved from the single to the double index position. The adjustment should be made with the index cam latched. Keep the high point of the eccentric toward the front of the machine.

c. Adjust the multiplying control lever stop front to rear so that two full teeth of motion is given the index pawl after it starts to drive the platen (Fig. 225).

CAUTION: Be sure that the indexing action is not choked off by the platen overthrow stop.

5. Platen Overthrow Stop - Adjust the stop forward or back so that .005" clearance exists between the stop and the pawl when the cam is on its high point (Fig. 225).

6. Index Selection Lever - Adjust the index selection lever link so that the lever lines up with the double mark on the case when the lever is in the double line space position (Fig. 225).

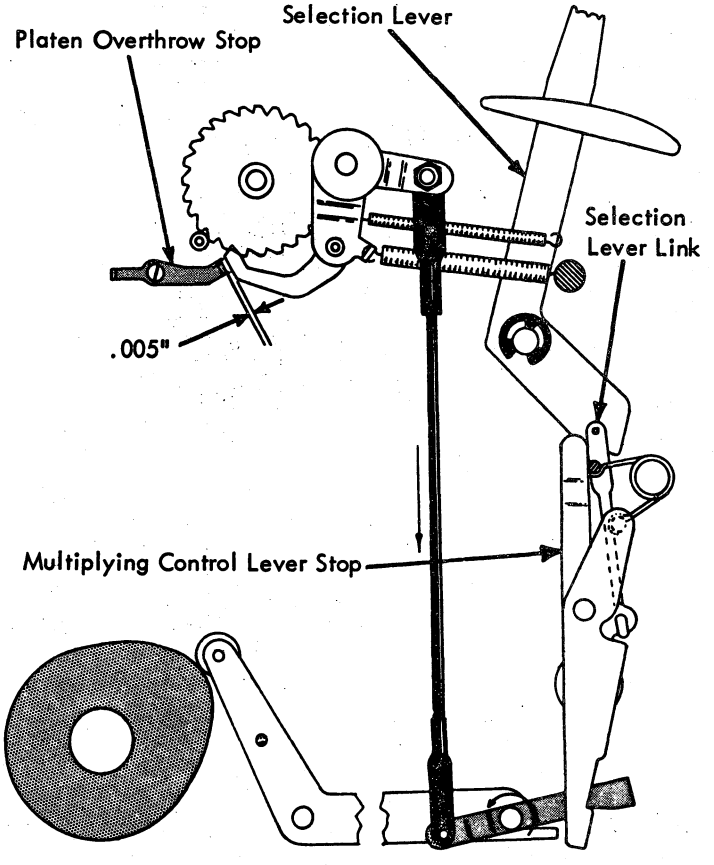


FIGURE 225. Index Travel Adjustment

TABULATOR SET AND CLEAR MECHANISM

1. Tab Rack Bellcrank - Adjust the bellcrank attached to the left end of the tab rack so that an unset tab stop is centered between the tab lever pawl and the tab set lug on the escapement bracket (Fig. 226). Latch the tab lever to the rear to check this adjustment.

CAUTION: Be sure that the tab set and clear lever is fully seated on top of the two pivot pins on the left side of the powerframe.

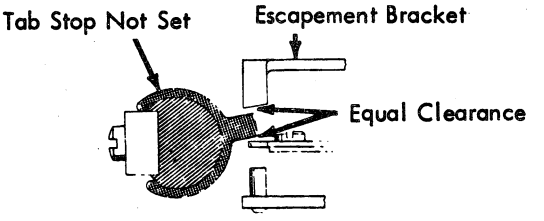


FIGURE 226. Tab Rack Bellcrank Adjustment

2. Tab Set and Clear Link - Adjust the link so that the slope of the keybutton matches the slope of the ON/OFF switch keybutton with the switch in the OFF position.

NOTE: A link guide found on the 11 inch machine should be adjusted so that it will permit free operation without allowing the link to flex during a set or clear operation. The link guide must also be positioned in the slot of the selector latch bail shaft to maintain the proper lateral position of the shaft. On 15" machines the intermediate lever should be vertical within .015".

3. Set and Clear Arm Stops - For the stop lugs on the set and clear lever bracket (Fig. 227) so that they limit the movement of the arm just as the tab stop fully reaches its set or cleared position. Also, form the extension on the rear stop lug so the tab set and clear arm cannot pivot sideways out of engagement with the tab rack bellcrank.

NOTE: On the early style tab set and clear mechanism the stop lugs were anchored and adjusted by two screws on the outside of the powerframe.

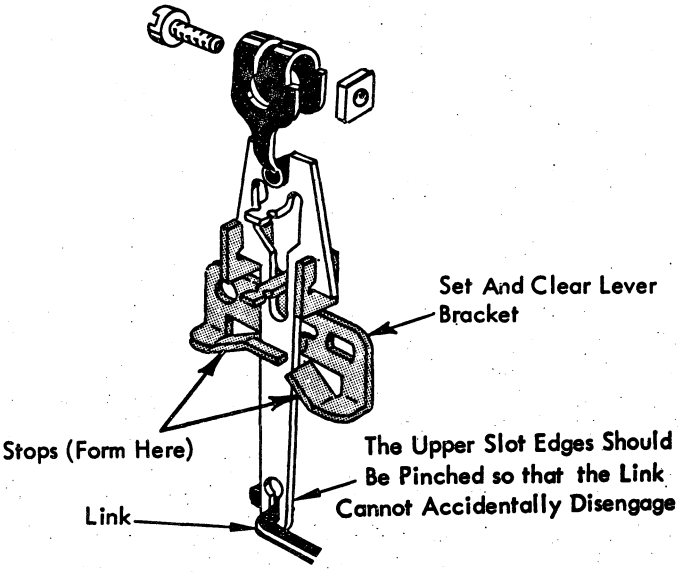


FIGURE 227. Set And Clear Arm Stops

4. Tab Rack Brake - Adjust the tab rack brake so that the tab rack will not flip past the rest position when released from either a set or clear position. The tab rack must return fully to the rest position when the keybutton is released slowly. The brake is located just inside the powerframe at the left end of the tab rack. The brake should be formed, if necessary, to spring load the tab rack toward the RH side of the machine.

CAUTION: The index detent lever will rest against the tab rack with the platen removed. Be sure the lever is clear of the tab rack when the brake adjustment is checked.

5. Gang Clear Finger (Ref. Fig. 228A)

a. Adjust the gang clear finger front to rear to obtain .001" to .020" clearance (Fig. 228B) between its tip and the nearest tab stop when all the tab stops are set.

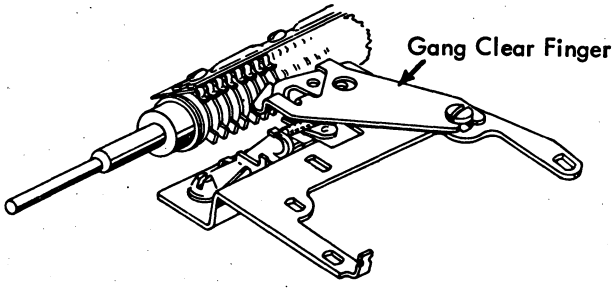


FIGURE 228A Gang Clear Finger

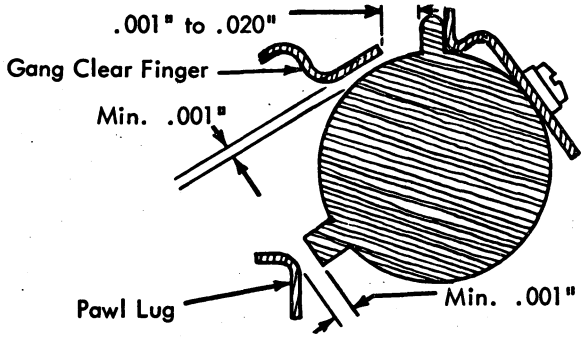


FIGURE 228B. Gang Clear

b. Form the end of the gang clear finger to obtain a minimum of .001" clearance (Fig. 228B) between the gang clear finger and the tab rack tube. Check for interference between the top of the gang clear finger and the underside of the tab set spring.

c. Check for a minimum of .001" clearance (Fig. 228B) between lugs on the rear of the escapement and backspace pawls and any set tab stop when the tab rack is rotated to the clear position and the pawls removed from the rack, as in a carrier return operation. If this clearance is not present, recheck tab rack position and pawl clearance adjustments.

NOTE: It will not always be possible to clear a single tab stop when two or more adjacent tab stops are set. The gang clear finger can be moved right or left slightly to insure positive clearing of desired stop. The tab stop directly to the left may also be cleared or partially cleared.

TABULATOR MECHANISM (LATE STYLE)

1. Interlock Switch (Fig. 229)

a. With the torque bar in the rest position, form the horizontal lug on the left end of the tab torque bar so that .010" - .015" exists between the tab switch trigger and its latching surface.

b. Tab interlock switch bracket. Adjust by its mounting screws for two conditions.

1. Up and down so that the torque bar is vertical in the rest position. Be sure that torque bar linkage does not interfere when making this adjustment.

2. Front to rear so that .001" - .002" clearance exists between the tab switch trigger and the rear edge of the tab torque bar extension.

c. Adjust the switch by its mounting screws for .002" to .008" clearance between the switch plunger and trigger.

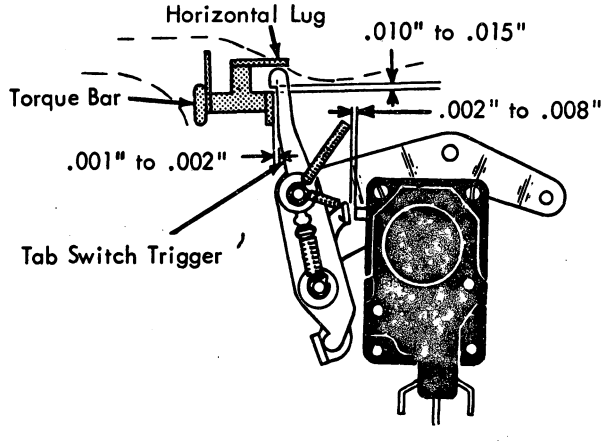


FIGURE 229. Tab Interlock Switch

2. Escapement Bracket (Fig. 143) - Observe the .001" - .002" clearance between the escapement bracket and the tab torque bar. If this adjustment is incorrect, all escapement adjustments should be made before proceeding with the tab adjustments.

NOTE: This adjustment should be checked with the overthrow stop and retaining plate removed from the printer. Leave the overthrow stop and retaining plate off for the following adjustments.

3. Tab Lever Stop (Fig. 230) - Form the stop on the escapement bracket to obtain .001" - .006" clearance between the vertical lug on the tab lever and the backspace pawl when the tab lever is at rest and the backspace pawl is fully seated in its rack.

On printers without backspace, adjust for .001" to .007" between vertical lug on the tab lever and the escapement pawl.

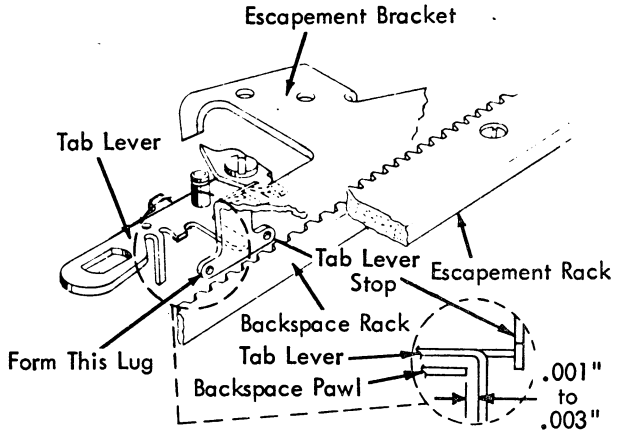


FIGURE 230. Tab Lever Stop

4. Escapement Torque Bar Stop - Observe an .008" - .010" clearance between the escapement torque bar and the lug of the escapement pawl (Fig. 146). Check the pawl mounting stud for .001" clearance between it and the escapement torque bar (Fig. 148). This adjustment should be checked at the left and right sides of the printer. On 15" printers, final adjustment should be made with a pawl mounting stud directly opposite the escapement torque bar back-up (Fig. 149).

5. Tab Lever Pawl (Fig. 231) - Adjust the pawl forward or back on the tab lever so that the tip of the pawl clears a set tab stop by .035" to .050". This adjustment should be checked on the left, center, and right of carrier travel.

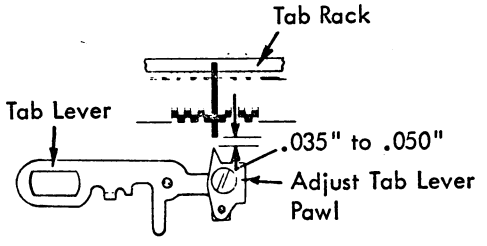


FIGURE 231. Tab Lever Pawl

6. Tab Rack (Fig. 232) - With the tab cam on its high point, adjust the tab rack left to right for .005" - .020" clearance between a set tab stop and the side of the tab lever pawl.

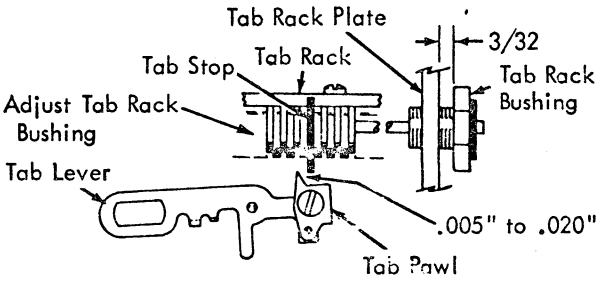


FIGURE 232. Tab Rack Bushing

7. Pawl Clearance (Fig. 233) - The upright lug of the tab latch should be formed forward or back so that the tip of the escapement pawl clears the escapement rack teeth by .005" - .015" when the tab lever is latched to the rear.

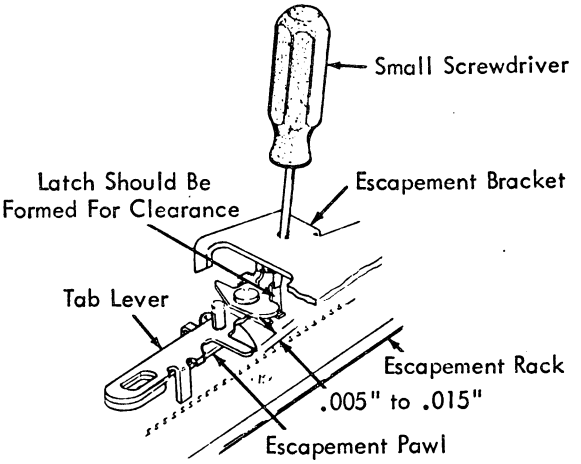


FIGURE 233. Pawl Clearance Adjustment

8. Carrier Return Tab Interlock (Fig. 234) - With the carrier return clutch latch (in a carrier return operation) the upright lug of the tab latch should clear the end of the tab lever pawl by .005" - .025". The rear lug of the tab latch should be formed forward or back to obtain this condition.

NOTE: After this adjustment is made, the carrier return mechanism should be unlatched and a tab lever latched out. The rear lug on the tab latch should again be checked to ensure that it is not touching the escapement torque bar.

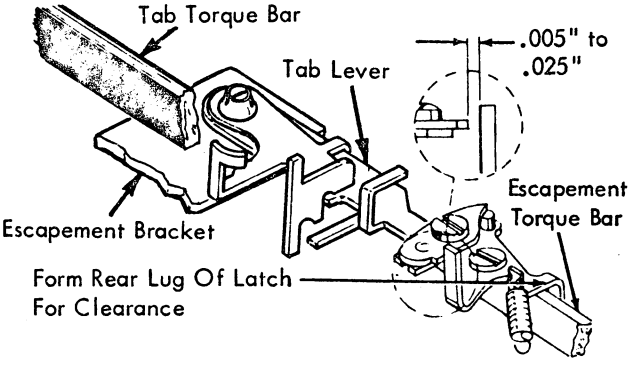


FIGURE 234. Interlock

9. Tab Trigger Extension (Fig. 235) - Form the front (curved) lug of the tab trigger to obtain .016" - .023" clearance between this lug and the tab torque bar with all parts at rest.

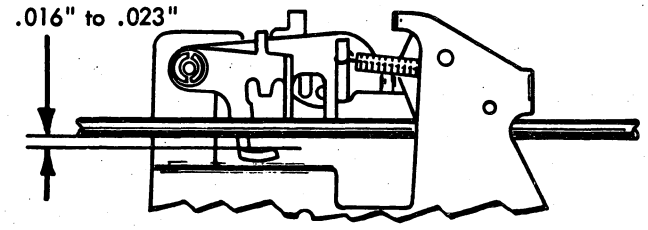


FIGURE 235. Tab Trigger Extension

10. Tab Lever Overthrow (Fig. 236) - With the tab cam on its high point, adjust the torque bar actuating link for .005" - .010" overthrow between the tab latch and tab lever.

NOTE: The carrier should be tapped lightly to the left before checking this adjustment. It should also be checked with the carrier in the center of its travel. Be sure that the overthrow stud (Fig. 237) does not interfere with this adjustment.

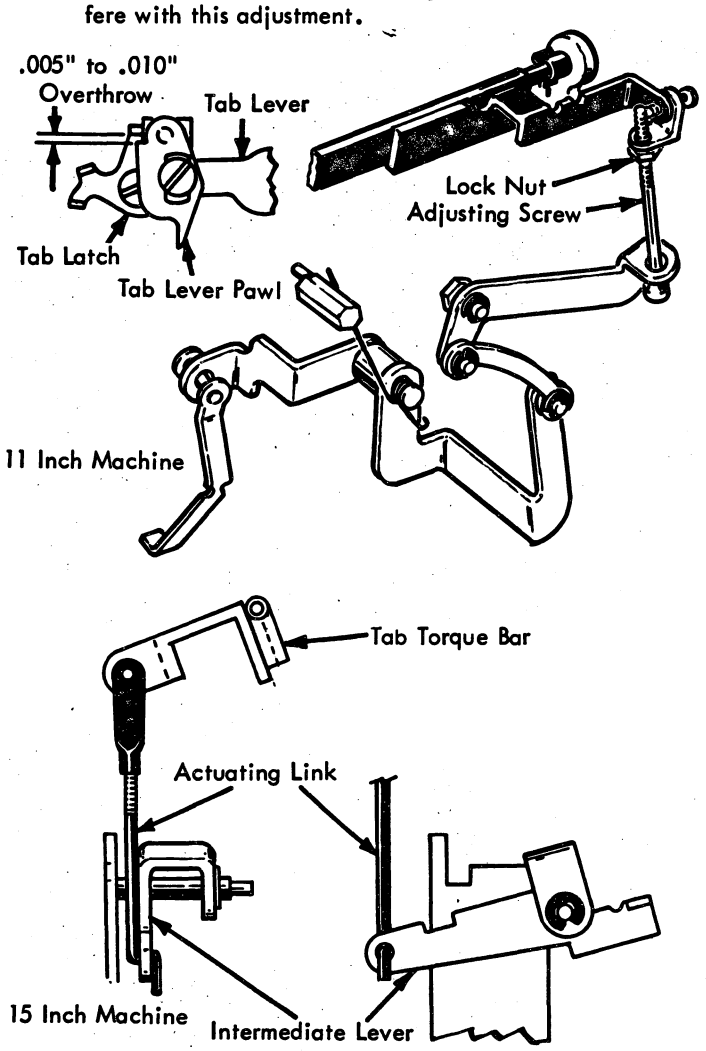


FIGURE 236. Tab Latch Adjustment

11. Tab Lever Overthrow Stop and Retaining Plate (Fig. 237) - Replace the tab torque bar overthrow stop and retaining plate and position it so that the overthrow lug falls directly in line with the upper lug on the tab trigger and retaining plate when positioned against the torque bar maintains .001" - .002" clearance between the torque bar and escapement bracket. The outer lug or overthrow stop should then be formed for .005" - .010" clearance between the tab lever trigger and the overthrow lug with the tab cam on its high point.

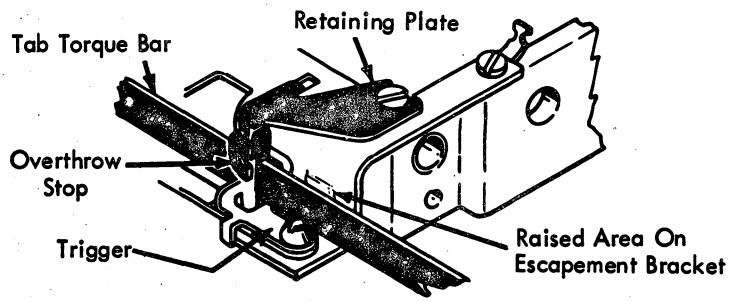


FIGURE 237. Tab Lever Overthrow Stop & Retaining Plate

12. Torque Bar Overthrow Stud (Fig. 238) - With the tab cam on its high point, form the upright lug on the LH end of the torque bar for a clearance of .001" - .010" between this lug and the overthrow stud.

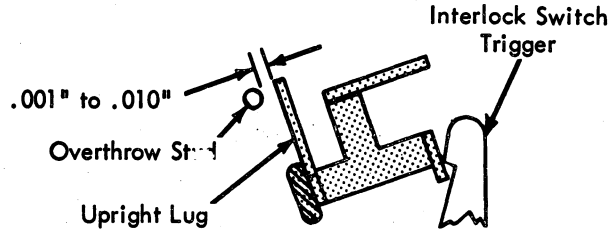


FIGURE 238. Torque Bar Overthrow Stud

TABULATOR MECHANISM (EARLY)

1. Tab Lever Stop - Form the stop on the escapement bracket (Fig. 239) to obtain .001" to .003" clearance between the vertical lug on the tab lever and the backspace pawl when the tab lever is at rest and the backspace pawl is fully seated in its rack.

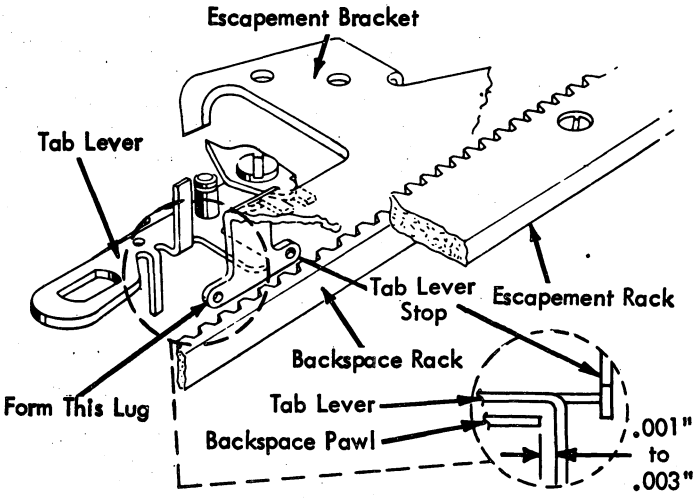


FIGURE 239. Tab Lever Stop

This small clearance insures that the backspace pawl will be allowed to bottom in its rack and that a minimum amount of tab lever motion will be required to remove both the backspace and escapement pawls from their racks during a tabulation operation.

2. Tab Lever Pawl - Adjust the pawl forward or back on the tab lever so that the tip of the pawl clears a SET tab stop by .035" to .045" with the tab lever at rest (Fig. 240).

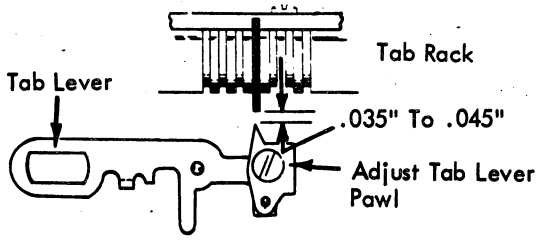


FIGURE 240. Tab Lever Pawl

The adjustment of the tab lever pawl has an effect on the amount of overlap between the tab stop and the pawl tip in the active position. It also directly affects the pawl clearance during tabulation. Unless the tab lever pawl is properly adjusted, correct pawl clearance cannot be obtained.

The adjustment of the tab lever pawl can be measured by using the push-end of the large spring hook. The push-end is approximately .035" thick.

3. Tab Rack - Adjust the tab rack left or right for a clearance of .005" to .020" between the tip of the tab lever pawl and a set tab stop with the tab lever latched out. This adjustment is made by the tab rack bushing on the RH end of the tab rack. The clearance may be observed by holding the carrier and latching the tab lever out (Fig. 241).

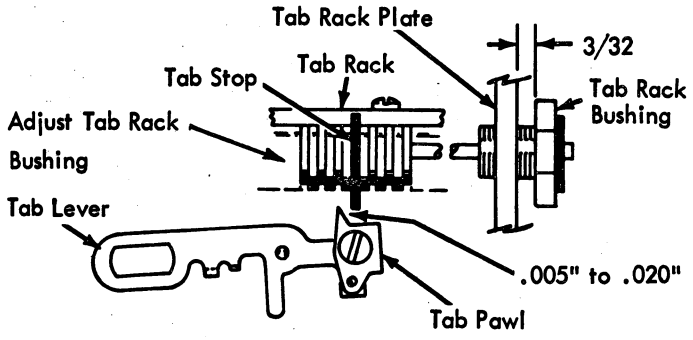


FIGURE 241. Tab Rack Bushing

NOTE: The head of the tab rack bushing should clear the tab rack plate by about 3/32" when the adjustment is complete.

The tab rack adjustment sets up a condition whereby the escapement pawl will be released into the escapement rack at the right time to safely engage the correct tooth. If the tab rack were too far to the left, the tab lever would contact the set tab stop sooner and release the escapement pawl into the rack earlier than it should. The pawl could enter the wrong escapement rack tooth and stop the carrier one space to the left of the desired stopping point. The carrier could stop one space too far to the right if the tab rack were adjusted too far to the right.

4. Pawl Clearance - The upright lug of the tab latch should be formed forward or back so that the tip of the escapement pawl clears the escapement rack teeth by .005" to .010" when the tab lever is latched to the rear.

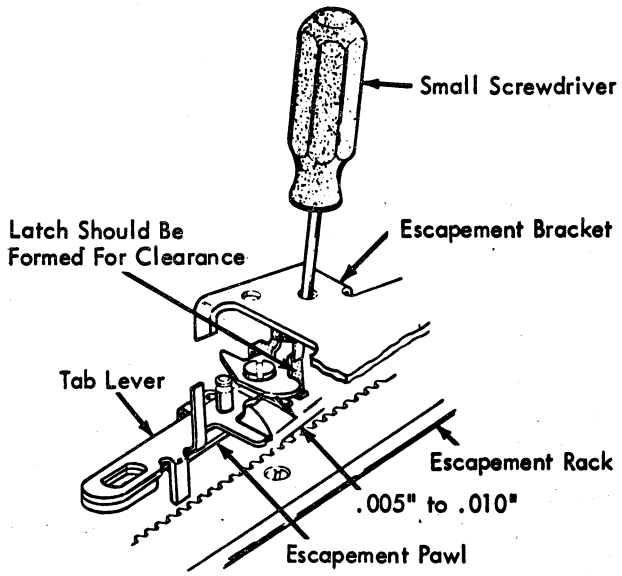


FIGURE 242. Pawl Clearance Adjustment

The adjustment insures that the escapement pawl will re-enter the rack quickly to minimize the chances of entering the wrong rack tooth. If excessive clearance is present, it is also possible that the tab keylever and associated parts might not have enough throw to positively latch the tab lever each time.

The upright lug of the tab latch may be formed with the 3" screwdriver by using it as a lever through the hole in the escapement bracket (Fig. 242). If excessive forming is required, recheck and refine the adjustment of the tab lever pawl.

5. Adjusting Plate, 11 Inch Machine (Fig. 242.1) - Position as follows:

a. Front to Rear - so that the actuator link and clevis clears the power frame.

NOTE: Clearance must be observed throughout full motion of the tab bellcrank.

b. With the tab interposer released and the backspace cam on its high point, rotate the torque bar (relative to the adjusting plate) so that the tab lever overthrows the tab latch by .005" to .010". Check to make sure the tab lever overthrow stop or the tab torque bar overthrow stud do not limit this adjustment.

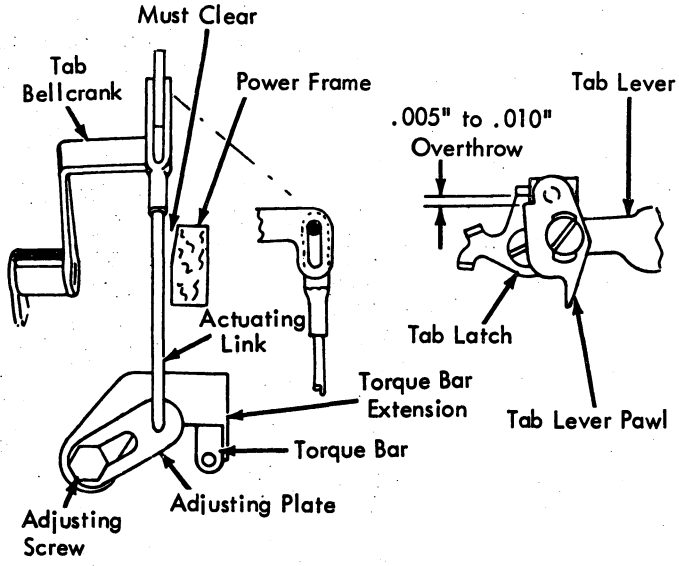


FIGURE 242.1. Adjusting Plate, 11 Inch Machine

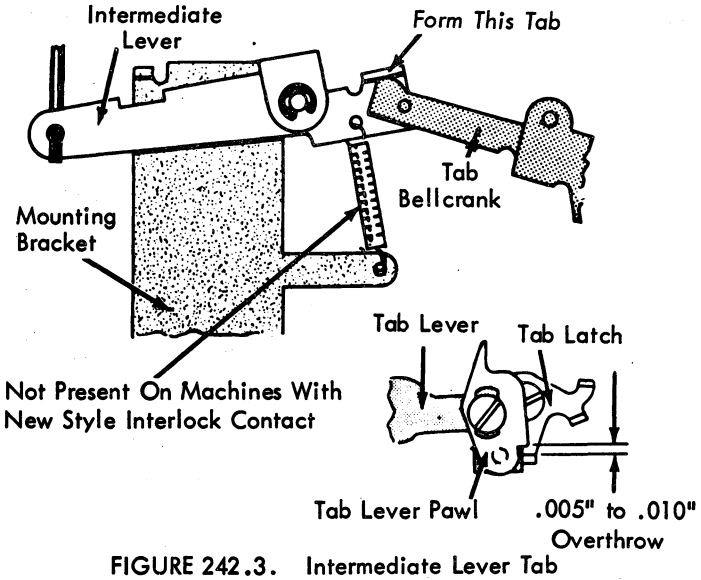


FIGURE 242.3. Intermediate Lever Tab

5. Actuating Link, 15" Machine (Fig. 242.2) - With the backspace cam latched and the intermediate lever resting against its upstop, adjust the actuating link clevis so that the tab torque bar hangs vertically.

NOTE: On machines with new style interiock contact form the upstop up out of the way.

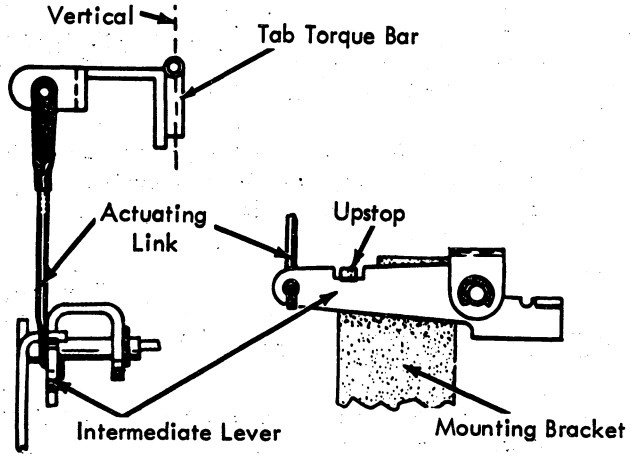


FIGURE 242.2. Actuating Link, 15" Machine

7. Intermediate Lever Tab, 15" Machine (Fig. 242.3) - With the tab interposer released and the backspace cam on its high point, form the intermediate lever tab so that the tab lever pawl overthrows the tab latch by .005" to .010".

8. Lockout Lever (Fig. 242.4) - Position to clear the torque bar by .005" to .010" with the torque bar at rest.

NOTE: The position of the lockout lever must not choke off the motion of the tab lever during unlatching.

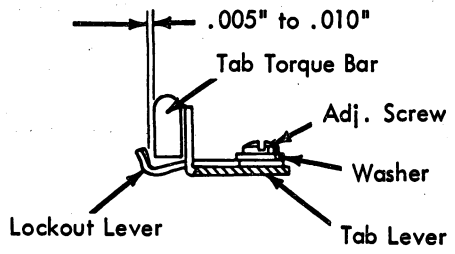


FIGURE 242.4. Lockout Lever

9. Tab Torque Bar Support (Fig. 242.5) - With the tab torque bar at rest, position the torque bar support (relative to the escapement plate) to clear the torque bar by .001" to .006"

The purpose of the torque bar support is the same as the retaining plate on the late style (Fig. 236).

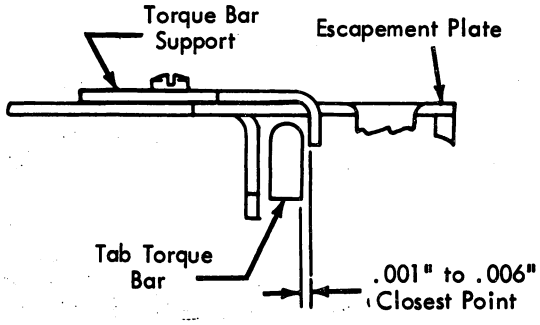


FIGURE 242.5. Tab Torque Bar Support

10. Tab Lever Overthrow Stop (Fig. 242.6) - Adjust forward or back so that .005" to .015" clearance exists between the lug of the tab lever and the overthrow stop when the tab lever is latched to the rear.

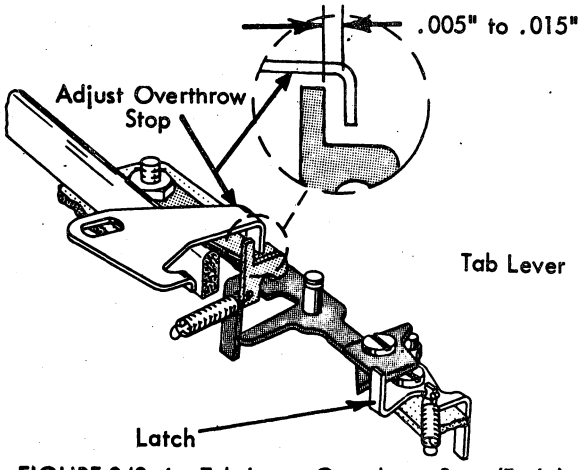


FIGURE 242.6 Tab Lever Overthrow Stop (Early)

11. Carrier Return/Tab Interlock (Fig. 242.7) - With the carrier return clutch latched, the upright lug of the tab latch should clear the end of the tab lever pawl by .005" to .025". The rear lug of the tab latch should be formed forward or back to obtain this condition.

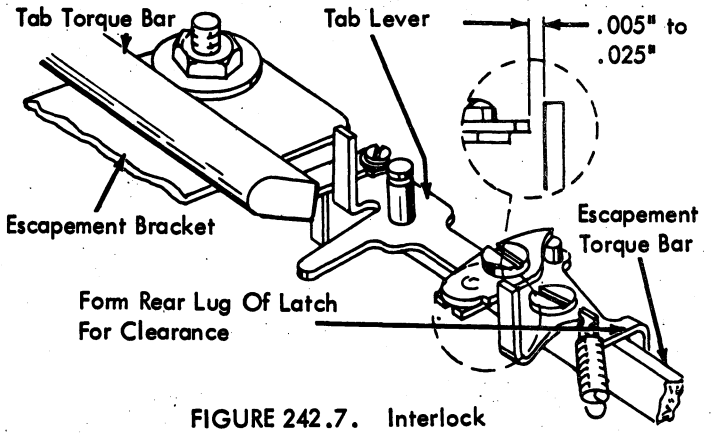


FIGURE 242.7. Interlock

The lug on the tab latch may be formed by using the push end of the large spring hook as a T-bender.

The adjustment insures that the carrier return and tab cannot both be latched simultaneously. If both were allowed to latch, the tab lever pawl would lock against a set tab stop during the carrier return operation.

12. Tab Interlock Contact

a. Form (in circled area) the actuating wire (left or right) so that it contacts the actuating arm near the right angle bend (Fig. 243).

b. With the tab interposer released and the backspace cam on its high point, position the mounting bracket (front to rear) so that the actuating arm overlaps (.040" minimum) the actuating wire (Fig. 243). This insures that the actuating wire does not get above the actuating arm.

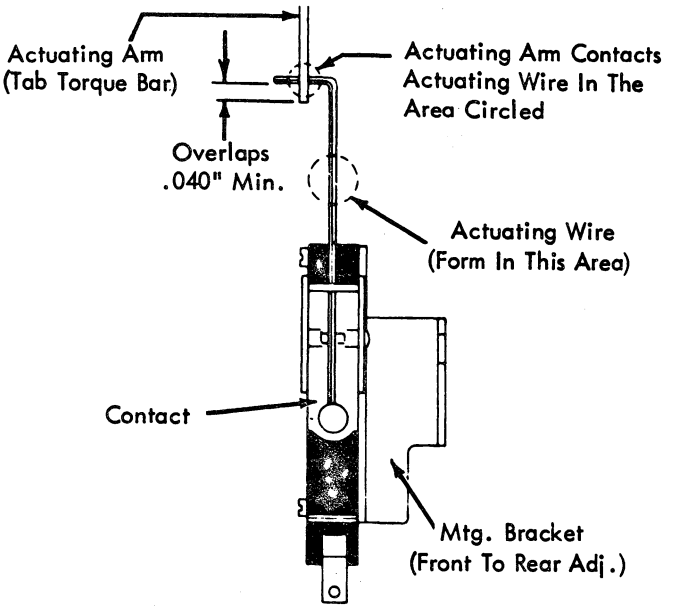


FIGURE 243. Interlock Contact

c. As the tab torque bar restores, position the mounting bracket (up or down) so that the contact actuating wire travels .031" to .062" after the contact transfers (Fig. 244). This is done to insure that machine vibration does not cause the contact to transfer.

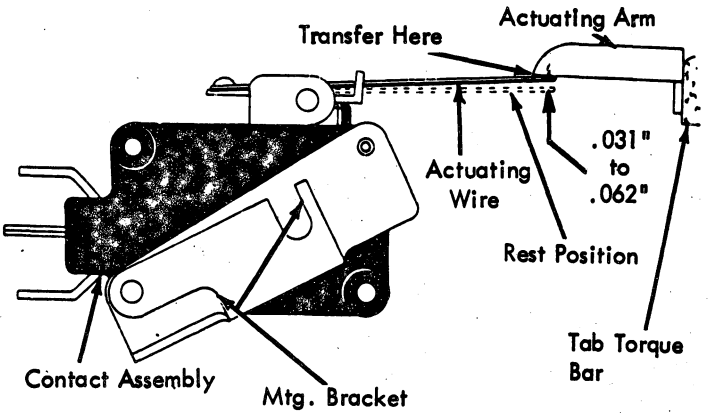


FIGURE 244. Interlock Contact

NOTE: During initiation of a tab operation, the switch must transfer (up position) before the backspace cam reaches its high point. Torque bar bounce must not retransfer the contact while the tab lever is latched out.

MARGIN CONTROL MECHANISM

1. Margin Rack Overbank Guide - With the carrier resting at the left hand margin, adjust the overbank guide (Fig. 245) left or right on the margin rack to obtain .001" to .005" clearance between the margin stop and the margin stop latch on the carrier when the margin rack is in its rest position (Fig. 245). When observing this clearance remove the floating action of the margin stop latch by pulling the stop latch to the right with a spring hook.

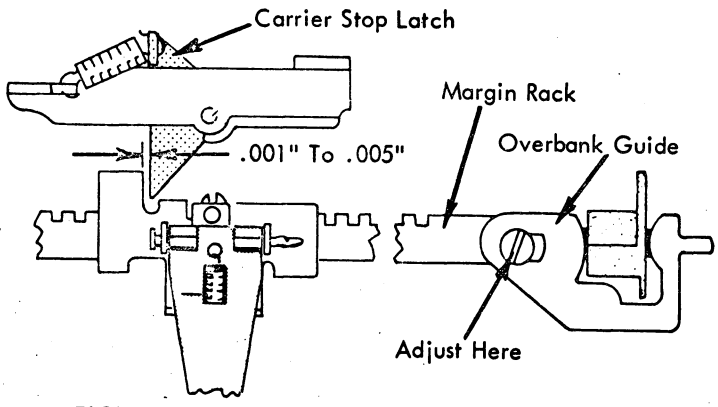


FIGURE 245. Margin Rack Overbank Guide

The adjustment insures that the left margin stop will set accurately when the stop is slid to the right against the margin stop latch on the carrier.

NOTE: Machines equipped with an early style margin rack use an eccentric plate mounted on the right end of the margin rack to control the rest position of the rack. Use the same procedure indicated above to obtain the .001" to .005" clearance between the margin stop and the stop latch on the carrier.

2. Margin Release (11 Inch Machine)

a. Early - With the margin release keylever at rest, loosen the fluted screw in the margin release lever and rotate the margin rack (within the release lever) to a level position (Fig. 246). Then tighten the Bristol screw.

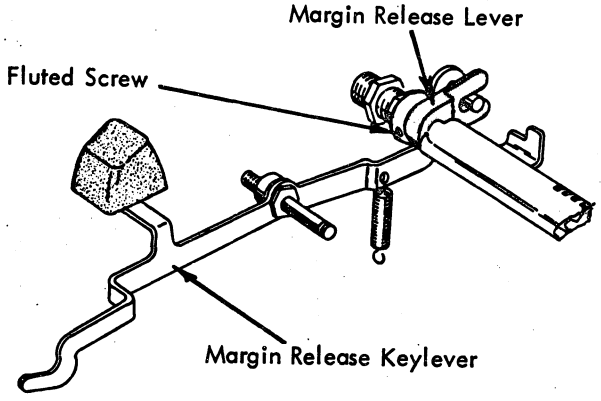


FIGURE 246. Margin Release Mechanism (11 Inch - Early)

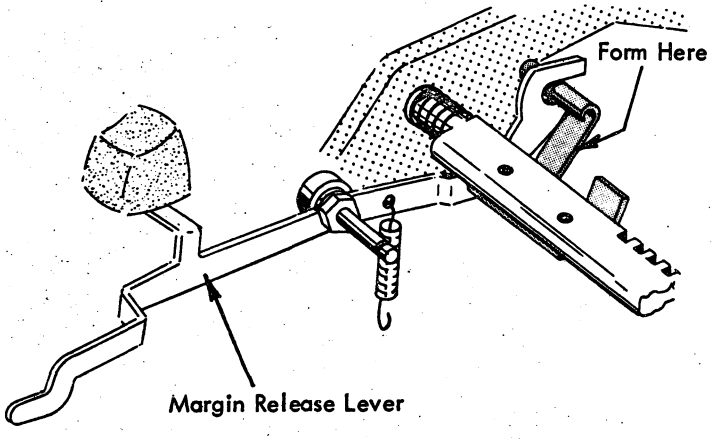


FIGURE 247. Margin Release Mechanism (11 Inch - Late)

b. Late - Form the margin set lever stop, which is fastened to the left end of the margin rack, so that the margin rack is level when the margin release keylever is at rest (Fig. 247).

3. Margin Release (15 Inch Machine)

a. Early

1. With the margin release keylever at rest, loosen the left hand margin release lever and adjust it radially about its shaft so that the top surface of the margin release lever (Fig. 248) is parallel with the slope of the sideframe. The lever should also be positioned laterally on its shaft so that it operates freely without restricting the margin rack motion when the rack is pushed to the left into its overbank position.

2. With the margin release keylever at rest, loosen the fluted screw in the margin release lever and rotate the margin rack (within the release lever) to a level position (Fig. 248). Then tighten the fluted screw.

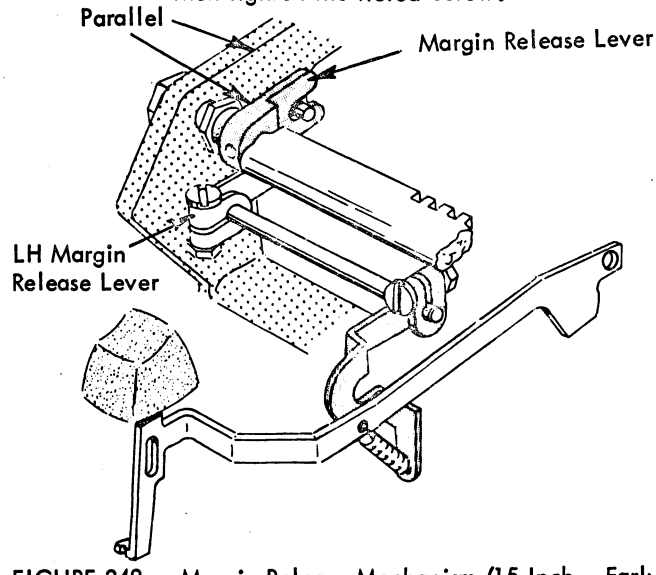


FIGURE 248. Margin Release Mechanism (15 Inch - Early)

b. Late - Position the left hand margin release lever:

1. Laterally so that 1/32" of the rolled pin on the margin set lever stop protrudes beyond the left face of the left hand margin release lever (Fig. 249).

2. Radially so that the margin rack will be horizontal when the margin release keylever is in its rest position. (This adjustment can be obtained by adjusting either the left or right margin release lever).

4. Margin Stop Final Stop

a. Early - Form the lug on the final stop (which is welded to the bottom side of the margin rack) to obtain a clearance of .001" to .010" between the final stop and the margin stop with the margin stop pin fully seated in the extreme left tooth of the margin rack.

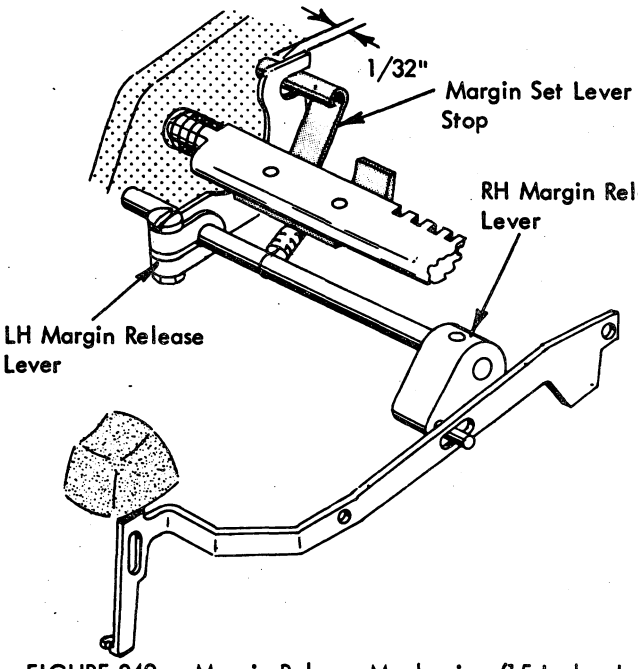


FIGURE 249. Margin Release Mechanism (15 Inch - Late)

b. Late - Position the margin set lever stop left or right on the margin rack so that it will clear the margin stop by .001" to .010" when the margin stop pin is fully seated in the extreme left hand tooth of the margin rack.

The adjustment insures that the margin stop pin will always seat itself in the tooth of the rack when the margin stop is pushed to the left against the final stop.

5. Bell Ringer Bail Adjusting Plate (Fig. 250, Late) - Position the adjusting plate so that the bellringer bail is parallel to the margin rack.

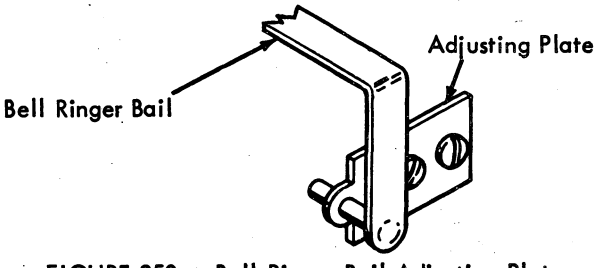


FIGURE 250. Bell Ringer Bail Adjusting Plate

6. Bellringer Bail Lever

a. Early - With the carrier positioned away from the right hand margin stop, adjust the bell bail lever located on the left end of the bellringer bail to have .005" to .020" clearance with the bell clapper bellcrank lever when the bail is at rest against the bail stop. The bail stop is located at the right end of the bail. (Fig. 251).

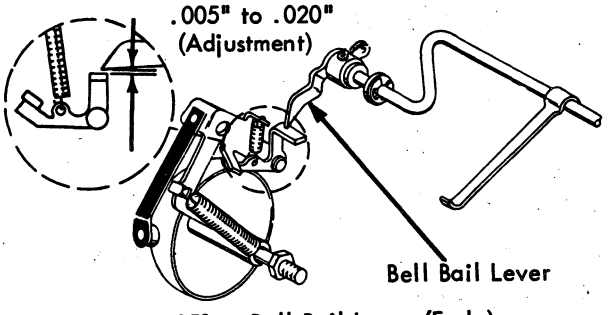


FIGURE 251. Bell Bail Lever (Early)

b. Late - With the carrier positioned away from the right hand margin stop, adjust the bell bail lever located on the left end of the bellringer bail so that when the bottom portion of the lever is allowed to contact the underside of the bell clapper bellcrank lever a clearance of .005" to .020" will exist between the bellringer bail and the bellringer bellcrank (Fig. 252).

c. Machines Without Bell - The bail stop located on the right end of the bail should be adjusted so the bellringer bail is not moved until the bellringer bellcrank begins to rise on the final ramp of the line lock bracket.

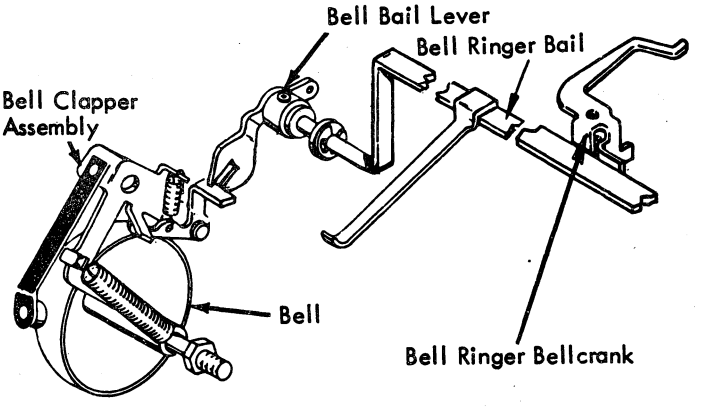


FIGURE 252. Bell Bail Lever (Late)

NOTE: When adjusting the bellringer bail lever be sure to maintain .002" to .004" end play in the bell ringer bail.

7. Line Lock Bracket - Adjust the line lock bracket up or down so that the bellringer bellcrank will ride .047" to .062" from the bottom as the carrier moves into the line lock position (Fig. 253A).

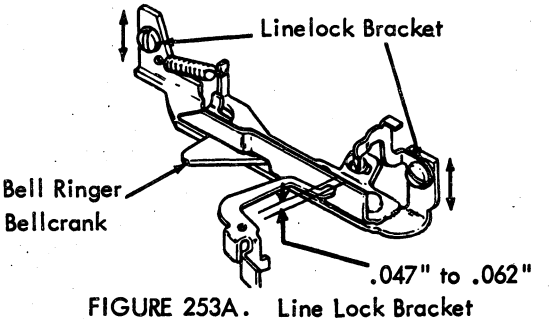


FIGURE 253A. Line Lock Bracket

The adjustment insures that the bellringer bellcrank will remain in contact with the camming surface of the line lock bracket throughout the line lock operation. It also insures that the bellringer bellcrank will ride back over the line lock bracket if the carrier is returned from a position to the right of the right hand margin.

8. Bell Clapper Bellcrank Lever - The bell should ring one space before the bellringer bellcrank moves onto the front surface of the line lock bracket.

The adjustment is obtained by forming the lug on the

bell clapper bellcrank that acts as a stop for the bell clapper bellcrank lever (Fig. 253B). The forming adjustment changes the amount of bite between the bail lever and the bell clapper bellcrank lever.

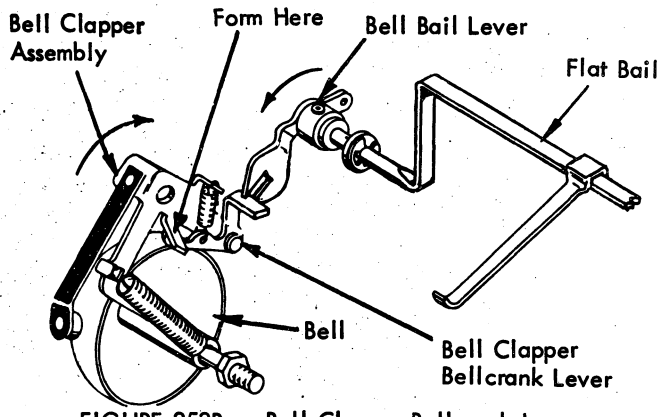


FIGURE 253B. Bell Clapper Bellcrank Lever

9. Line Lock Bracket Adjustable Plate (Fig. 254) - Position, with the carrier in the next to last space, to a point where the inclined surface just begins to deflect the bell ringer bellcrank.

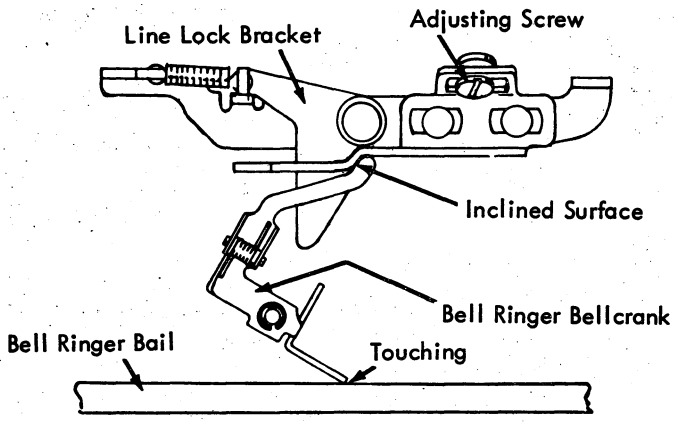


FIGURE 254. Line Lock Bracket

9.1 Line Lock Bracket Adjustable Plate (Late Style) (Fig. 254.1) - Position, with carrier in the next to last column to obtain .001" to .010" between the inclined surface and the bellringer bellcrank.

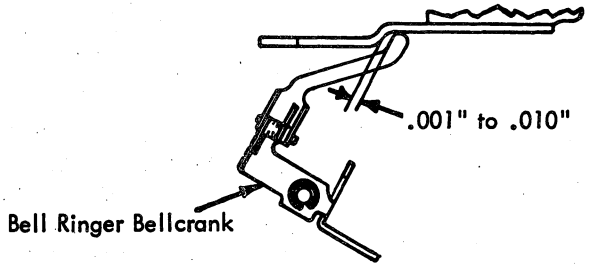


FIGURE 254.1 Line Lock Bracket

10. Line Lock - Form the line lock actuating arm on the bellringer bail so that the line lock interposer is fully depressed when the carrier pointer is in line with the mark on the right hand margin stop (Fig. 255).

CAUTION: The line lock should not be felt in the space preceding the desired locking point. The line lock actuating arm should not be choked off so as to bind the carrier as the spacebar is operated through the line lock.

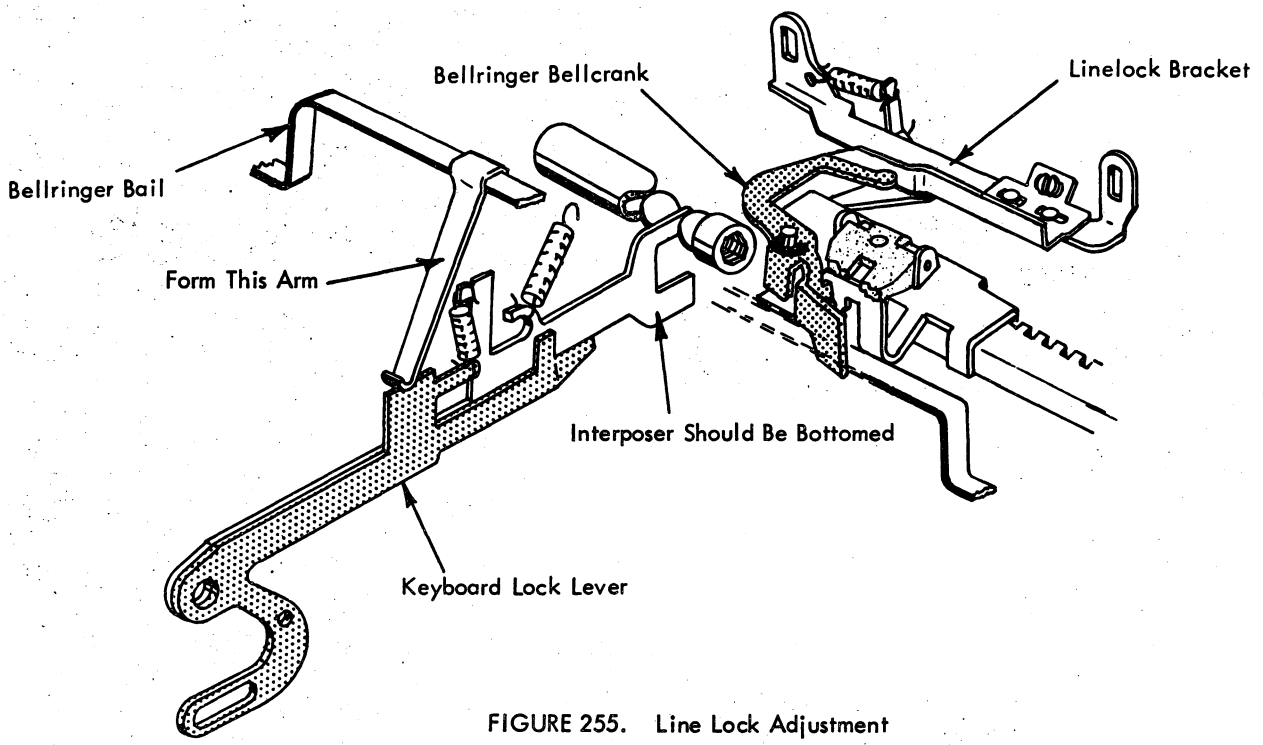


FIGURE 255. Line Lock Adjustment

LAST COLUMN CONTACT

1. Last Column Contacts (Fig. 256, Early)

   a. Form the N/C support so that the O/P (at rest) produces a slight rise of the N/C contact.

   b. Form the N/O support so that the N/O contact clears the O/P by .020" to .030".

   c. Position (carrier in next to last space) the contact actuator on the bellringer bail so that it just touches the O/P. When positioning the actuator, all back lash must be held out of the actuator to line lock bracket linkage.

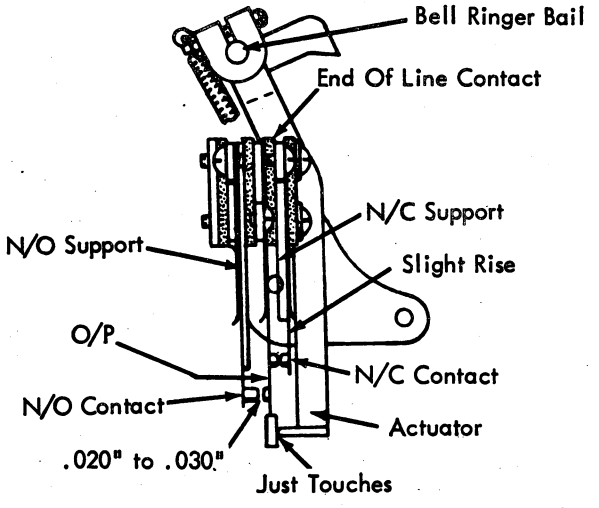


FIGURE 256. Last Column Contact Adjustment (Early)

NOTE: To place the carrier in the next to last space, proceed as follows:

1. Space to the right until the right hand margin setting locks the keyboard.

2. Backspace two spaces.

   d. As the carrier moves from the next to last space, check for the following conditions (Fig. 257).

      1. The contact transfer must be complete (and without bounce) within one space.

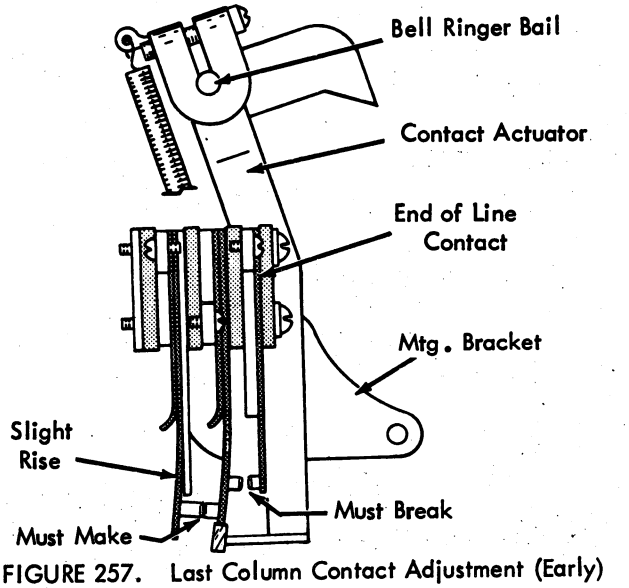


FIGURE 257. Last Column Contact Adjustment (Early)

      2. N/C contact must break.

      3. O/P must lift the N/O contact sufficiently to insure reliable make.

2. Last Column Contact (Fig. 258)

   a. With the carrier in the next to last space, the contact actuator arm shall be adjusted to give a .010" to .020" clearance between the switch wire and the actuator arm with the switch at its re-transfer point.

   b. The actuator arm shall be adjusted to give a .060" to .094" left to right clearance between the actuator arm and the formed angle on the switch wire.

   c. The contact backup spring shall be so adjusted that the actuator arm will contact the backup spring .250" to .312" before it contacts the switch wire.

3. Region Switch (MT/ST) - This switch should be adjusted so that it makes as the bell rings (Fig. 253). The make of this switch should be 10 to 13 spaces prior to the last column contact making.

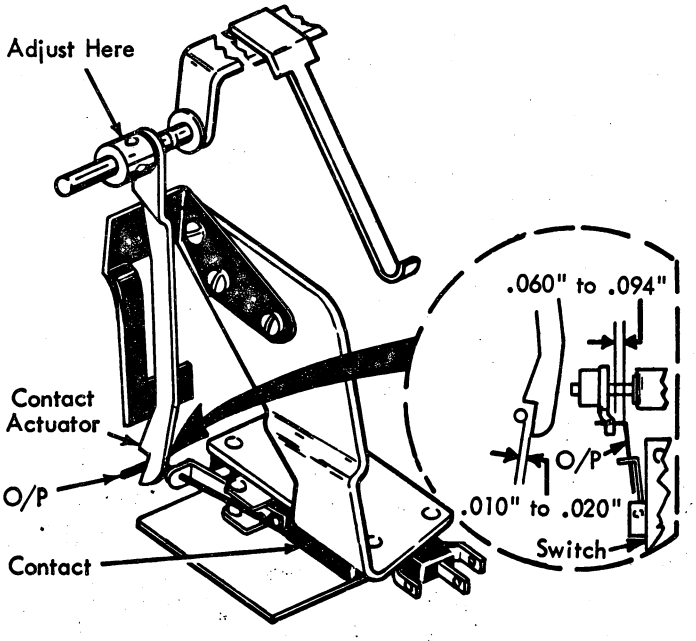


FIGURE 258. Last Column Contact (Late)

4. Last Column Contact (Late) (Fig. 258.2) - With carrier in the last column, the actuator screw shall be adjusted to obtain the following:

   A. Transfer the switch and have a .010" minimum overthrow when escaping from the last column and it will re-transfer with a backspace operation.

   B. Provide a .005" minimum clearance between the actuator screw and the switch plunger, with carrier in last column.

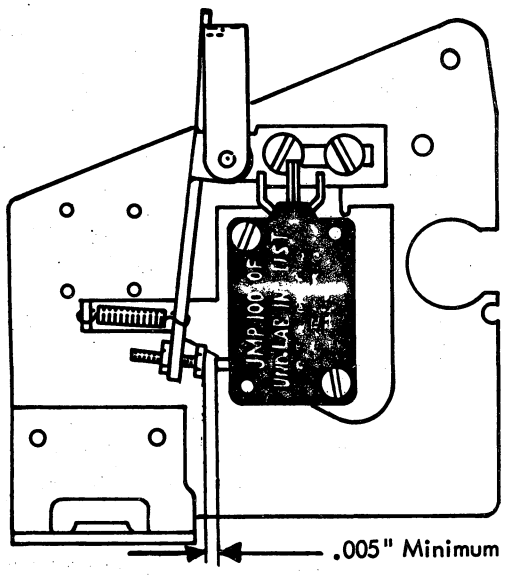


FIGURE 258.1 Last Column Contact (Late)

PAPER FEED MECHANISM

NOTE: For pin feed platen machines, use adjustments 7, 8, and 10 only.

1. Before any paper feed adjustments are attempted, the position of the platen MUST be correct.

2. Paper Feed Braces (early paper feed mechanism only) With the feed roll tension springs disconnected the adjustable braces fastened to the paper feed mounting arms should be adjusted all the way forward without deflecting either the feed roll actuating shaft or the carriage tie rod (Fig. 259).

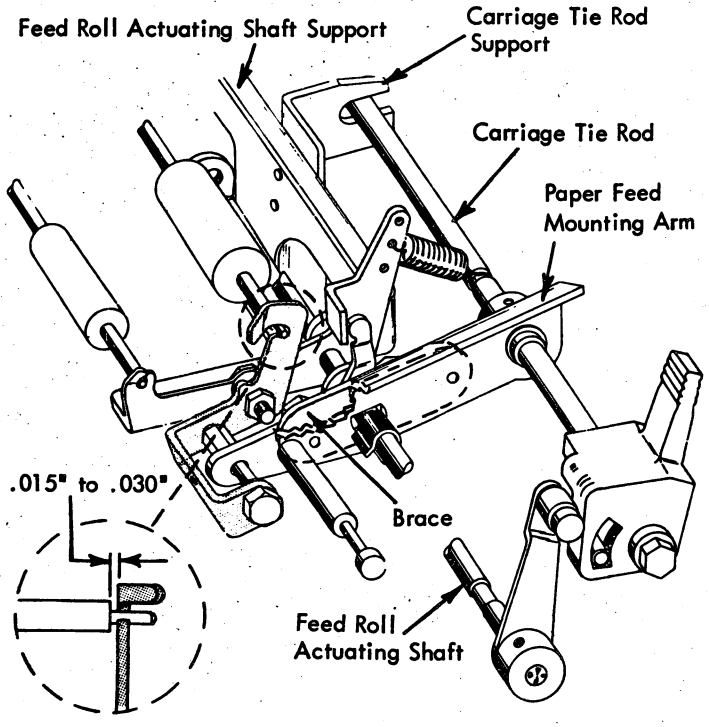


FIGURE 259. Paper Feed Mechanism

3. Paper Feed Supports

a. Early Paper Feed Mechanism - With the feed roll tension springs disconnected, the vertical supports for the carriage tie rod and the feed roll actuating shaft should be adjusted to just touch the bottom of each shaft (Fig. 259). The feed roll actuating shaft support should be loose when the tie rod support is adjusted.

b. Late Paper Feed Mechanism - With the feed roll tension springs disconnected, the center support bracket (Fig. 260) should be positioned so that the forward lug just touches the underside of the feed roll shaft while the rear lug just touches the top of the carriage tie rod. The center support bracket should not bow the copy control shaft.

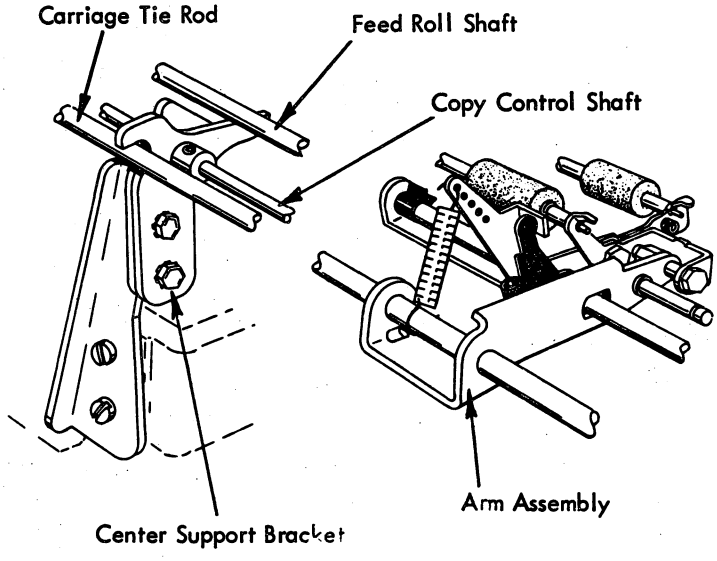


FIGURE 260. Center Support Bra...

4. Feed Roll Tension - Place the feed roll tension springs in the hole of the front feed roll arms that will provide the following tension measured at the front feed roll pivot points.

11 inch machine - 2-3/4 to 3-1/4 pounds
15 inch machine - 2 to 2-1/2 pounds

5. Feed Roll Side Play

a. Early - The right hand paper feed mounting arm on the 11 inch machine and the left and right hand paper feed mounting arms on the 15 inch machine should be adjusted to provide the rear feed roll shafts with an end play of .015" to .030" when the feed rolls are against the platen (Fig. 259).

b. Late - The right hand front feed roll arm assembly on the 11 inch machine and the left and right hand front feed roll arm assemblies on the 15 inch machine should be adjusted to give end play to the feed roll shafts that will not permit them to contact the sides of the openings in the deflector but will permit them to roll freely (Fig. 260).

6. Feed Roll Adjustment

a. Early - Adjust the eccentrics with the high points to the rear so that three tab cards inserted between the platen and the rear feed rolls will cause a clearance of .008" to .012" between the front feed rolls and the platen (Fig. 261). The clearance should be equal on both ends of the feed roll.

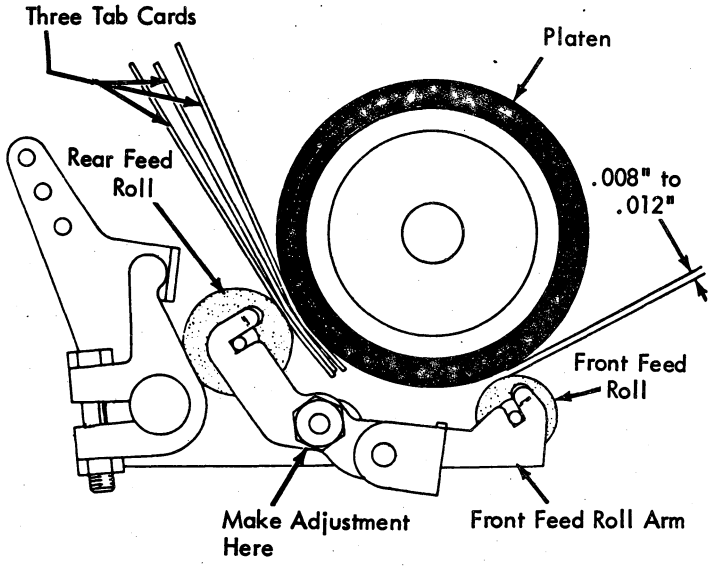


FIGURE 261. Feed Roll Adjusting Eccentrics (Early)

b. Late - The front feed roll adjusting arms should be adjusted as follows: When two tab cards are placed between the front feed rolls and the platen, the rear feed rolls should clear the platen (Fig. 262). When one tab card is placed between the front feed rolls and the platen, the rear feed rolls should touch the platen.

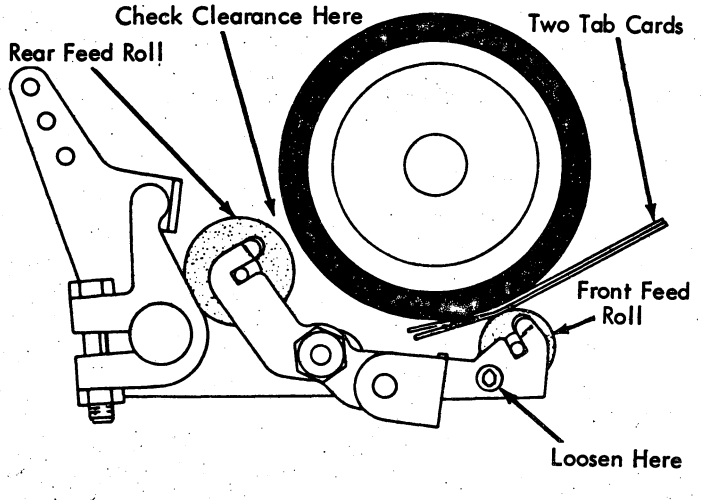


FIGURE 262. Feed Roll Adjusting Arm (Late)

7. Paper Release - Adjust the feed roll release arm (Fig. 263) to obtain a release clearance of .055" to .065" between the rear feed roll and the platen.

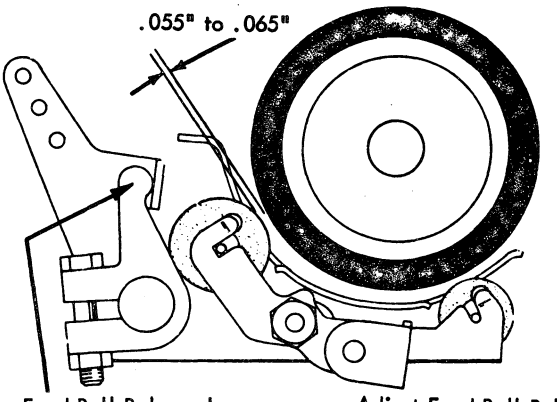


FIGURE 263. Paper Release Adjustment

Excessive clearance can cause interference between the front feed roll and the carrier; whereas insufficient clearance will not permit straightening of thick paper packs.

NOTE: The clearance should be the same at each end of the feed roll. The clearance can be equalized by adjusting either the left or right feed roll release lever (Fig. 263).

8. Deflector - Position the deflector by forming the deflector supporting tabs on the front and rear feed roll arms so that a clearance of .010" to .020" exists between the front and rear of the deflector and the platen (Fig. 264). Three tab cards inserted between the platen and the deflector (at the front and rear) should provide a slight drag. No drag should be felt when one tab card is inserted.

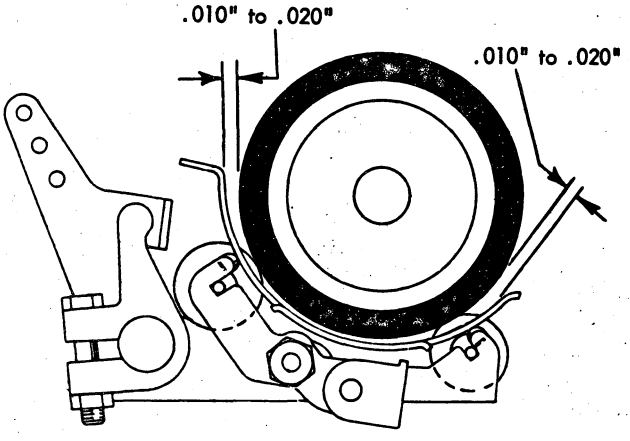


FIGURE 264. Deflector Adjustment

9. Paper Bail

a. Bail Shaft - The shaft should be positioned in the right hand bail arm so that each arm can be pulled forward the same distance from the platen before the entire bail begins to move.

The adjustment insures that both bail rollers will have equal pressure against the platen.

b. Bail Stop - The lugs that stop the rearward movement of the paper bail arms should be formed to obtain a .005" to .010" clearance between the lugs and the bail arms when the copy control lever is at its extreme rear position.

The adjustment prevents interference between the bail arms and the line gage card holder when the platen is removed.

c. Retaining Clips - The retaining clips on the right and left-hand bail lever mounting studs shall be installed to give .002" to .006" end play to each bail lever.

10. Line Gage Card Holder

a. Adjust the line gage card holder forward or back for a .005" to .010" clearance with the platen.

b. The vertical adjustment should be such that the graduated edge is parallel to and .002" to .005" below the feet of the typed characters when viewed from the operator's position.

c. Adjust the card holder left or right so that the point of a letter "V" will align with the mark in the middle of the line gage card holder.

NOTE: On pin feed platen machines, the graduations on the left hand card holders should be lined up with the bottom of a series of V's.

11. Paper Switch - Position the paper switch mounting bracket for two conditions:

a. The paper switch arm should be centered in the cover slot (Fig. 264.1).

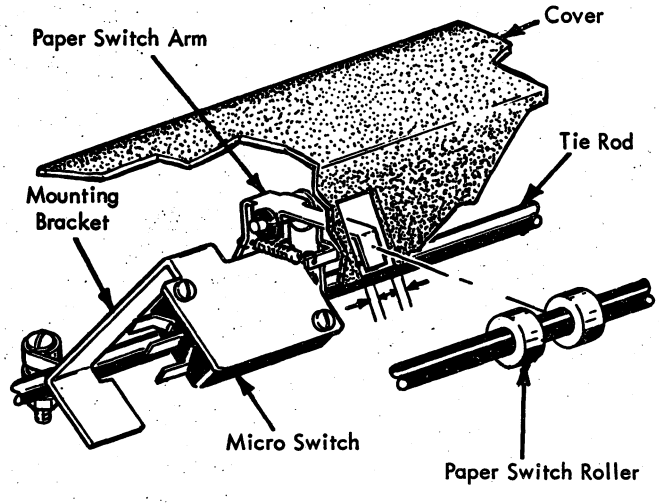


FIGURE 264.1 Paper Switch

b. The status switch should transfer and re-transfer during its travel in the slot of the paper switch roller (Fig. 264-B).

NOTE: The top portion of the paper switch arm should be approximately horizontal.

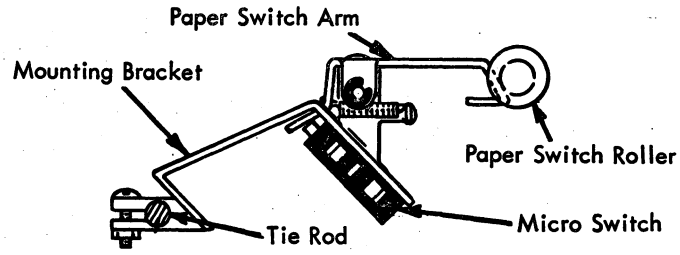


FIGURE 264.2 Paper Switch (Side View)

FABRIC RIBBON MECHANISM

1. Centering Springs - With the ribbon reverse interposer centered, form the lugs of the ribbon feed plate for .003" to .005" clearance in the centering spring loops (Fig. 265).

The adjustment insures that the springs are not extended when at rest and that they will properly restore the mechanism after a reverse operation.

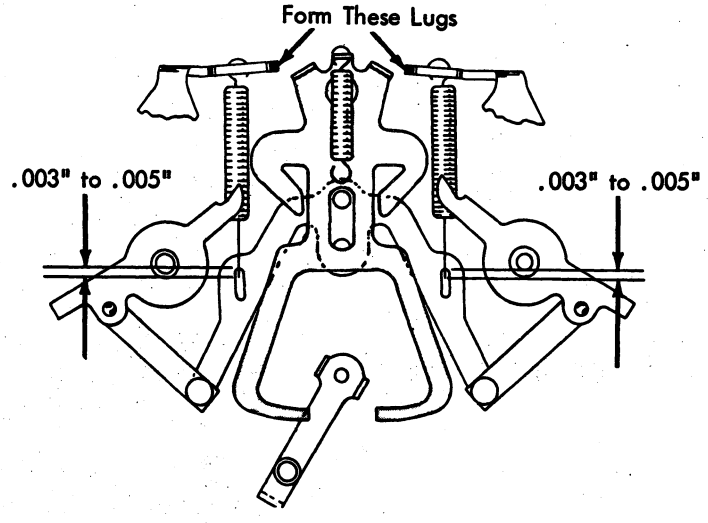


FIGURE 265. Centering Springs Adjustment

2. Ratchet Brake Spring - Form the left and right ratchet brake springs so that each will hold its ratchet in position after the ratchet has been manually rotated far enough to fully actuate the reverse mechanism (Fig. 266).

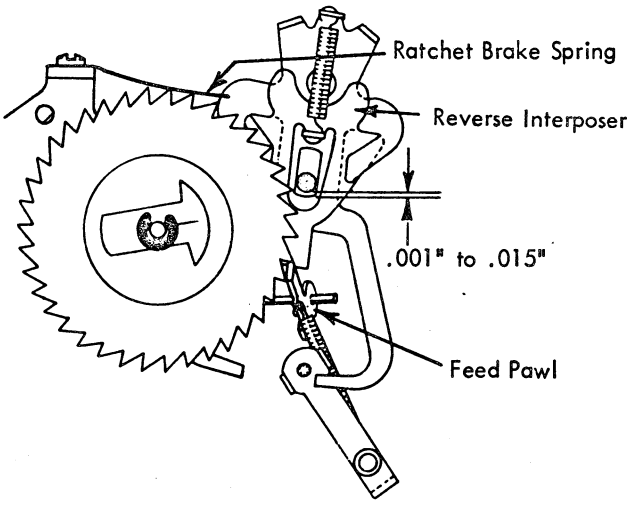


FIGURE 266. Ribbon Feed Plate Adjustment

The ratchets should be checked alternately with the cartridge removed. The check as described is merely a method of testing for the correct braking action of the springs and has little to do with the reversing action.

3. Ribbon Feed Plate - With the ribbon mechanism set for a reversing operation and the ribbon cam at its high point, adjust the ribbon feed plate forward or back so that the ribbon feed pawl holds the reverse interposer within .001" to .015" of its total travel (Fig. 266).

The adjustment not only insures sufficient throw for a reversing operation, but also gives optimum ribbon feed results by determining the rest and active positions for the pawl.

CAUTION: After completing the adjustment, manually cycle a character to check that two teeth feed is obtained plus .005" to .020" overthrow.

Be sure that the feed pawl does not contact the interposer lever as the pawl is manually reversed from side to side.

4. Cartridge Guides - Form the ribbon feed plate lug that guides the cartridge into position so that the ribbon spools are centered in the holes of the cartridge and there is .001" to .010" lateral movement of the cartridge.

5. Ribbon Lift Guide Plate - Adjust the plate as low as possible without causing a change in the ribbon lift guide height as the ribbon lift lever is moved from the low lift to the high lift position (Fig. 267). The ribbon lift cam should be at the low point when the check is made.

The adjustment insures the same relative throw for both the high and low lift positions.

6. Ribbon Lift Control Link - Adjust the link forward or back by means of the clevis so that the underscore will

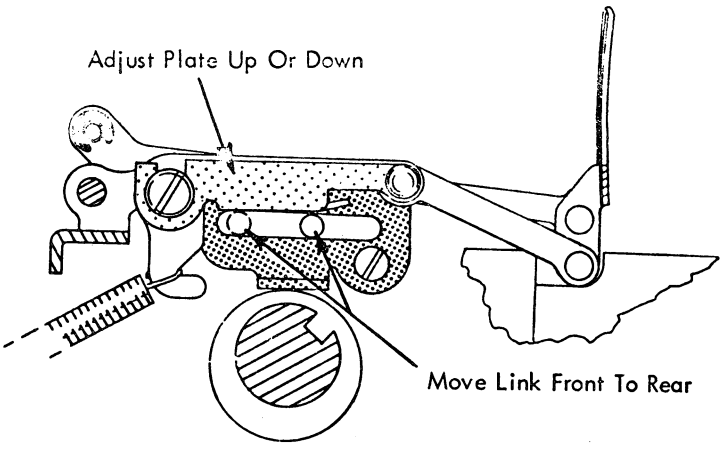


FIGURE 267. Ribbon Lift Guide Plate Adjustment

strike the ribbon 1/16" from the bottom edge. The ribbon lift lever must be in the high lift position when the check is made.

CAUTION: Do not adjust the link so short that it chokes off in the front end of the cam follower slot as the ribbon lift lever is moved into the high lift position.

7. Ribbon Lift Lock - Adjust the ribbon lift lock so that it will positively hold the ribbon lift guide in the load position. The lock is located under the right front corner of the carrier.

8. Stencil Lockout (Fig. 268) - With the lift lever in stencil position and the cam follower on the high point of the ribbon feed cam, form the ribbon feed latch for .010" clearance with the lug on the cam follower.

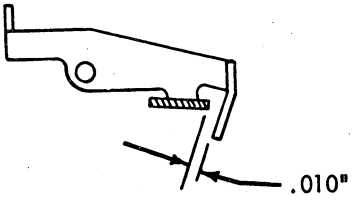


FIGURE 268. Stencil Locking

RIBBON SHIFT MECHANISM

1. Magnet Adjustments (2 Magnet)

a. With the armatures energized, position the hinge plates so that the armatures clear the magnet yokes by .003" to .005" (Fig. 269).

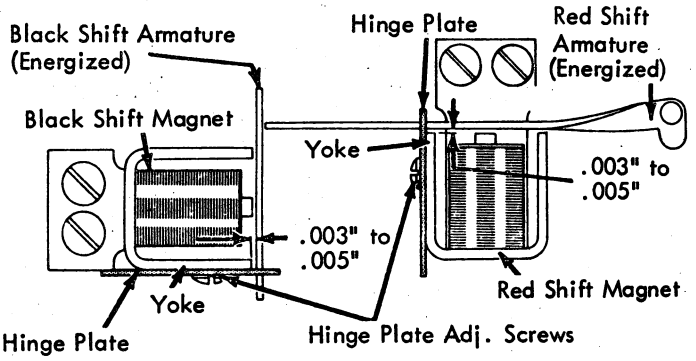


FIGURE 269. Hinge Plates

b. With the armatures energized, position the armature stops so that the armatures clear the magnet yoke by .003" to .005" (Fig. 270).

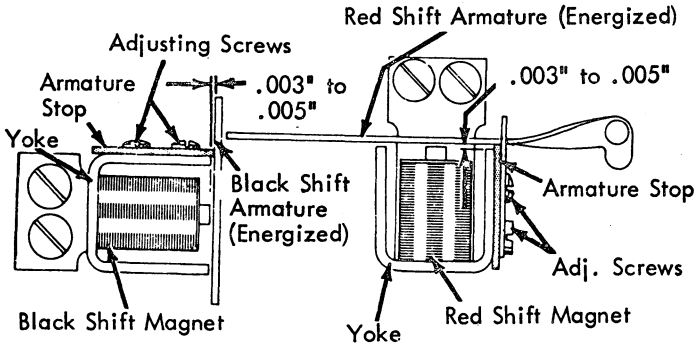


FIGURE 270. Armature Stops

2. Black Shift Magnet - With the black shift magnet armature energized and the red shift magnet armature de-energized, position the black shift magnet for a clearance of .010" between the black and red shift armatures (Fig. 271).

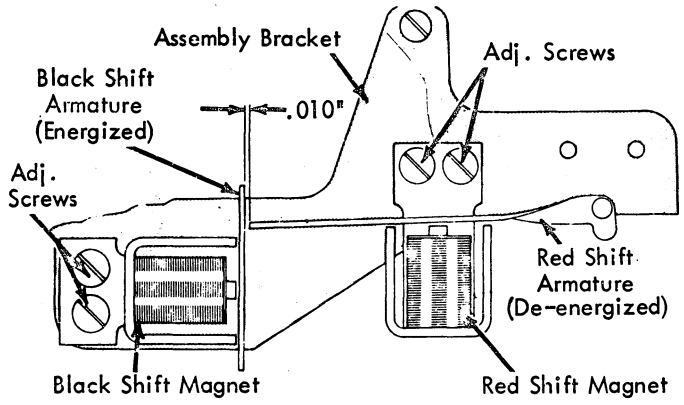


FIGURE 271. Magnet Positioning

NOTE: With the red shift armature energized and the black shift armature de-energized, the black shift armature must overthrow the red shift armature by .003" to .006" (Fig. 272).

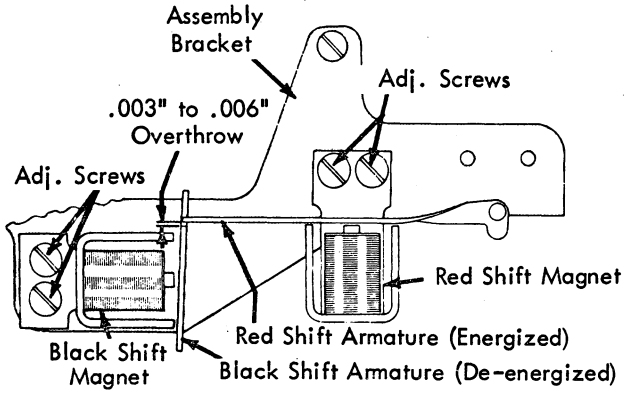


FIGURE 272. Black Shift Armature Overthrow

3. Mcgnet Adjustments (1 Magnet, Fig. 273) - With the red shift magnet armature energized, position the hinge plate and armature stop so that the armature clears the yoke (both inner and outer poles) by .003" to .005".

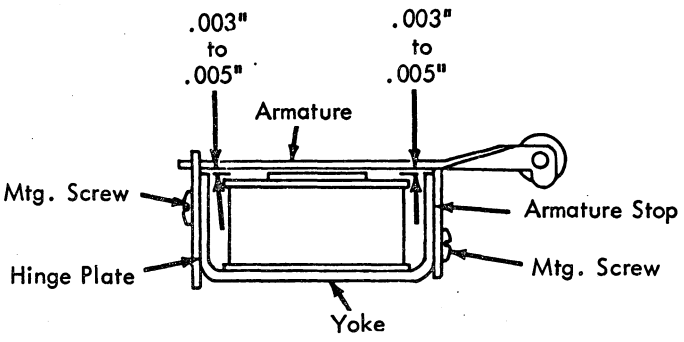


FIGURE 273. Magnet Adjustments (1 Magnet)

4. Pivot Arm (Fig. 274) - With the manual ribbon lift lever in the black position, form the pivot arm extension (up or down) so that the latch does not drag when moved from the latched to the unlatched position.

NOTE: Position the pivot arm bracket so that the highest and lowest characters print equidistant from the top and bottom of the red portion of a black and red ribbon.

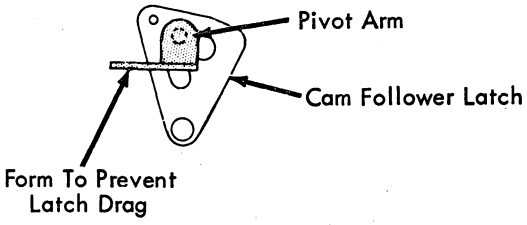


FIGURE 274. Pivot Arm

5. Right Hand Pulley (Fig. 275 & 276) - With the red shift armature energized, position the right hand pulley pivot to obtain .002" to .005" clearance between the stud and follower latch slot.

NOTE: The pulley nut must be loosened before adjusting the pivot screw.

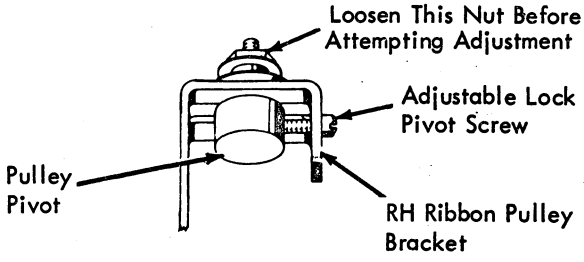


FIGURE 275. Right Hand Pulley

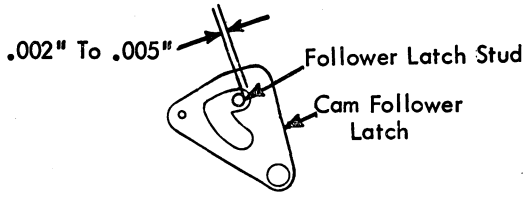


FIGURE 276. Cam Follower Latch

6. Red Shift Armature Backstop (Fig. 277 & 278) - With the armature de-energized, position the red shift armature backstop to obtain .002" to .005" clearance between the stud and the follower latch slot.

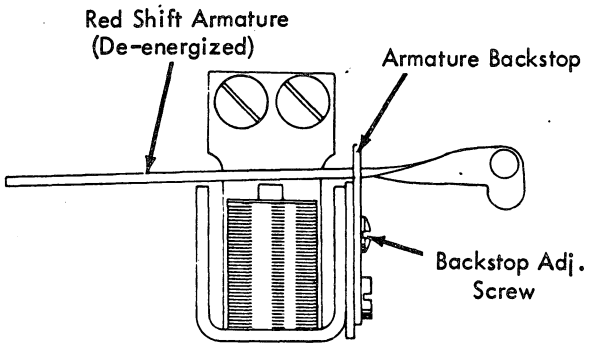


FIGURE 277. Red Shift Armature Backstop

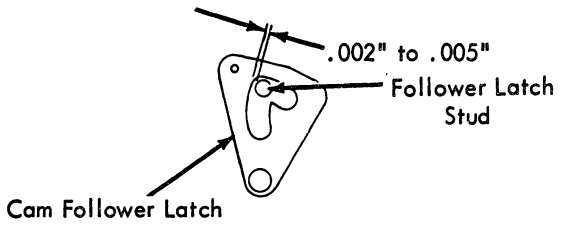


FIGURE 278. Cam Follower Latch

7. Ribbon Mode Contacts (Fig. 279) -

a. Form the O/P so that it lifts the N/C contact by .005" to .008".

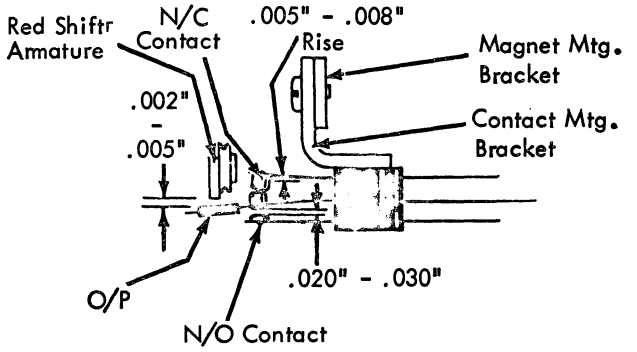


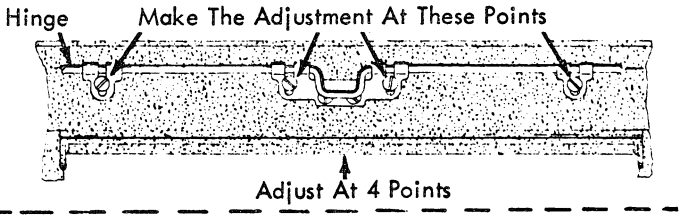
FIGURE 279. Ribbon Transmit Contact Assembly

b. Form the N/O contact so that it clears the O/P by .020" to .030".

c. Position the contact mounting bracket on the magnet mounting bracket so that red shift armature (at rest) clears the O/P pad by .002" to .005".

Excessive wipe on the N/O contact may cause failure of the red magnet armature to latch. When the N/O point makes the pulse to the magnet is removed. This is just before the armature latches. Therefore, we are depending on red armature overthrow to latch the mechanism on red ribbon.

1. Top Cover Hinge - The hinge should be adjusted so that the contour of the top cover matches the contour of the center cover (Fig. 280).



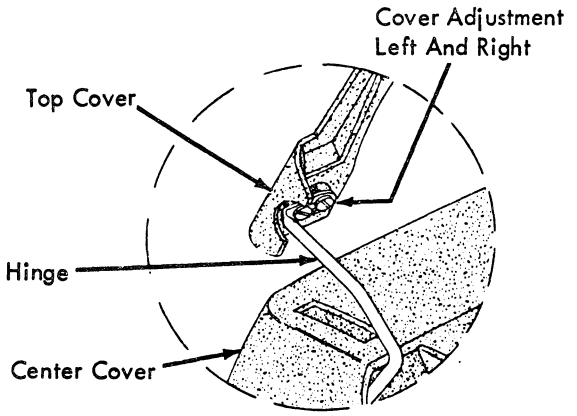


FIGURE 280. Top Cover Hinge

2. Center Cover Latch (Fig. 281) - Position so that the top cover is latched securely in the closed position.

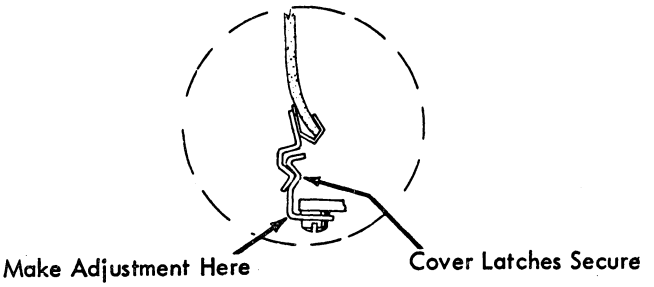


FIGURE 281. Center Cover Latch

3. Hinge Spring (Fig. 282) - Position so that the top cover will be detented and held in the open position.

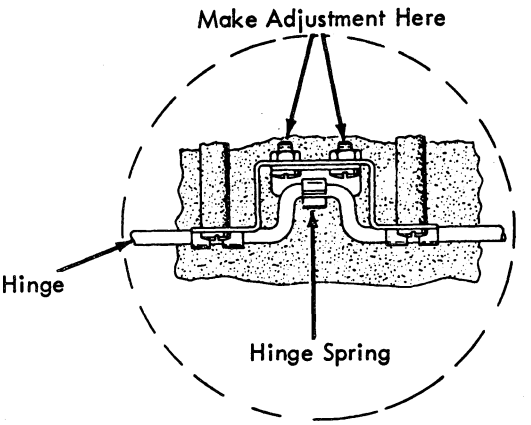


FIGURE 282. Hinge Spring

4. Center Cover Mounts - Adjust the center cover mounts so that with the machine suspended in the covers the following four requirements are met:

   a. All of the openings for keybuttons will have equal clearance on each side.

   b. The platen will clear the covers in the extreme front or rear position.

   c. The clearance between the paper guide and the deflector will be .020" to .040" (Fig. 283).

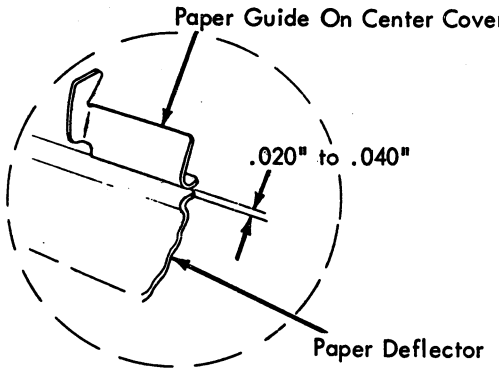


FIGURE 283. Shock Mounts

   d. The top of the spacebar will be 1-3/8" above the bottom of the center cover section.

The shock mount brackets are adjustable front to rear as well as up and down. The cover brackets are adjustable left and right on the shock mounts.

5. Tilt-Up Covers - With the printer resting in the bottom cover position the printer relative to is mounting brackets (Fig. 284) for the following conditions:

   a. The keybuttons have equal front and rear clearance with the center cover (Fig. 284).

   b. The platen clears the covers in the extreme front and rear positions (Fig. 284).

   c. The paper guide clears the deflector .020" to .040" (Fig. 284).

   d. The top of the space bar should be approximately 1-1/2" above the top edge of the bottom cover (Fig. 284).

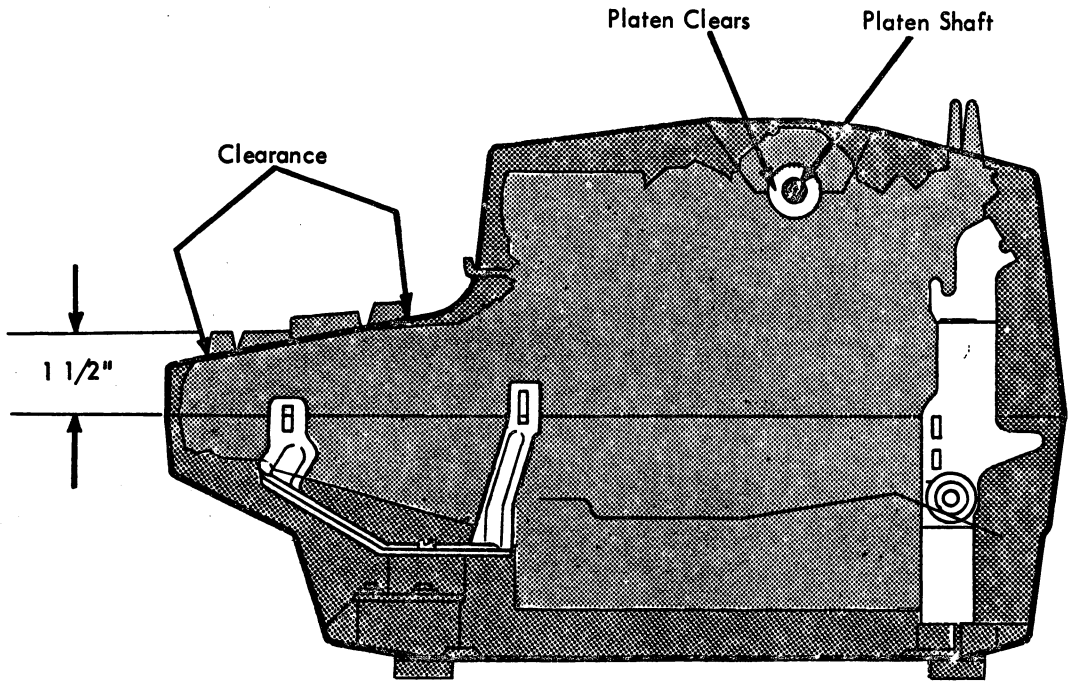


FIGURE 284. Tilt Up Covers