Volume II

2200/2300 Series Machines

SERVICE MANUAL

SINGER
FRIDEN DIVISION

Composition for this manual
was set on the JUSTOWRITER*
automatic composing machine.

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HOW TO USE THE MANUAL (Volume II)

This volume is divided into three sections. The sections are identified by designated colored tabs as follows:

Yellow tabs - Adjustments

Orange tab - Special Features

Blue tab - Maintenance

The page numbers in the adjustments section are hyphenated. For example, the pages following the first yellow tab are numbered 1-1, 1-2, 1-3, etc. The pages following the orange tab (Special Features section) and blue tab (Maintenance section) are not hyphenated. These pages are numbered consecutively.

The pages of the Special Features section are consecutively numbered within each feature. The titles of the individual mechanisms in the Special Features section appear across the bottom of each page.

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Friden 2200/2300 SERIES MACHINES

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Automatic Vertical Spacer (AVS)
Carbon Ribbon Mechanism
Automatic Color Shifting Mechanism
Secretary Shift Mechanism
Model 9510 And Model 9515 Modular Desks
Intermediate Margin Control Mechanism
Front Feed Posting Carriage
Automatic Carriage Return And Tab
Single Tab Card Reader
Tape Punch & Edge Card Punch Back Space
Label Holder

MAINTENANCE

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OTHER MODELS

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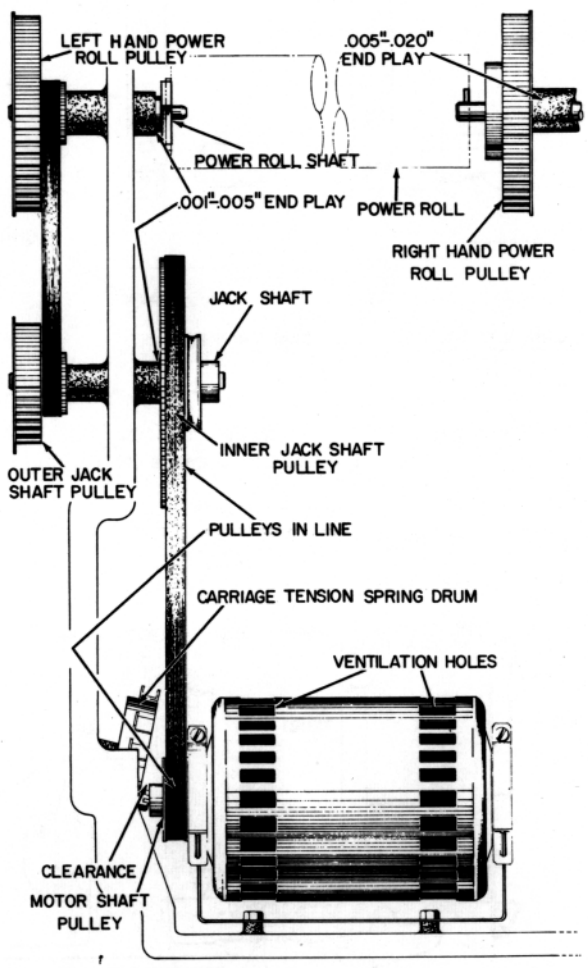
2211 Flexowriter Automatic Writing Machine
2261 Flexowriter Automatic Writing Machine
2302 Flexowriter Automatic Writing Machine
2303 & 2304 Flexowriter Automatic Writing Machines
2331 Flexowriter Verifier System Automatic Writing Machine
2321 Auxiliary Verifier Reader
2336 & 2337 Flexowriter Automatic Writing Machines
2340 & 2341 Flexowriter Document Revision Machines
2351 Flexowriter Automatic Writing Machine
2352 Flexowriter Automatic Writing Machine
2353 & 2354 Flexowriter Automatic Writing Machines
2360 Flexowriter Automatic Writing Machine
2361 Flexowriter Automatic Writing Machine
2363 Flexowriter Automatic Writing Machine
2371 Flexowriter Automatic Writing Machine
2373 Flexowriter Automatic Writing Machine

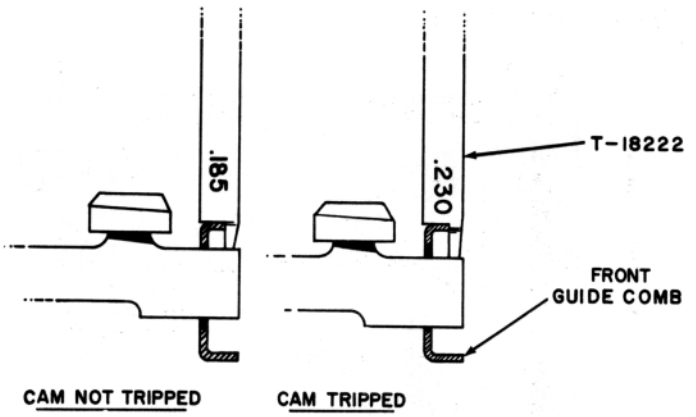
WRITING MACHINE

ADJ. 1 MOTOR AND POWER SHAFTS



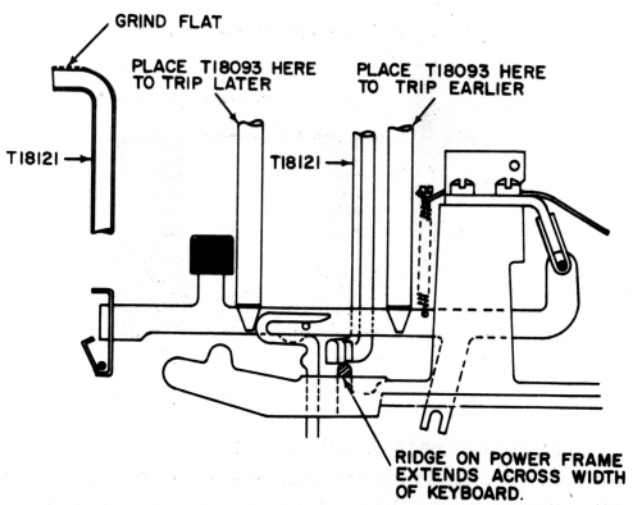
1. Adjust the jack shaft pulleys for .001" to .005" end play.
2. With the power roll removed, adjust the left hand power roll pulley for .001" to .005" end play.
3. With the power roll removed, adjust the right hand power roll pulley for .005" to .020" end play.
4. Adjust the motor shaft pulley to align with the inner jack shaft pulley maintaining clearance to the carriage tension spring drum.

ADJ. 2A FRONT GUIDE COMB



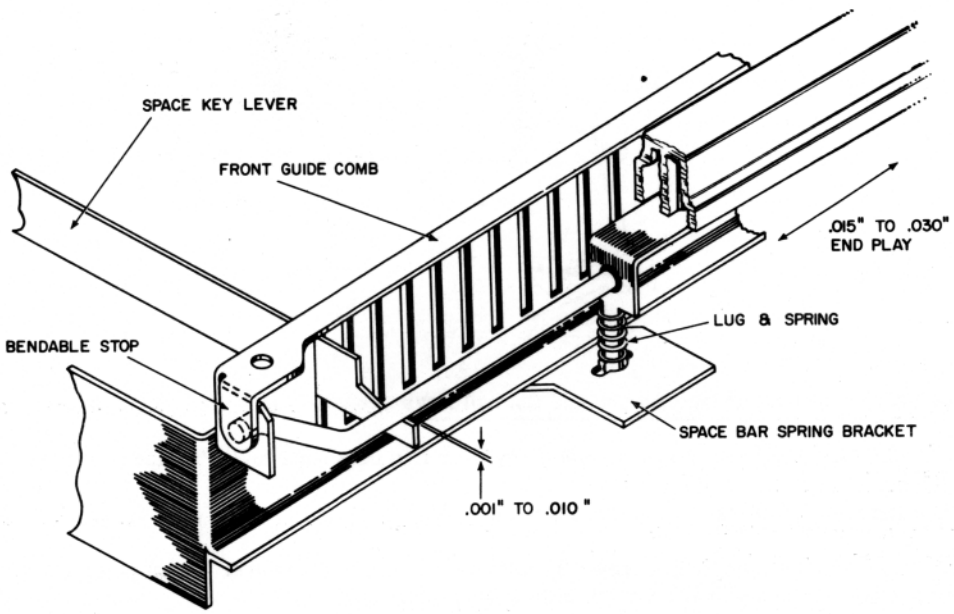
Adjust the height of the front guide comb so that the majority of keylevers trip their cams between .185" and .230" downward movement. Use the trip lever gauge (T-18222) to check this requirement.

ADJ. 2B INDIVIDUAL KEYLEVER TRIP



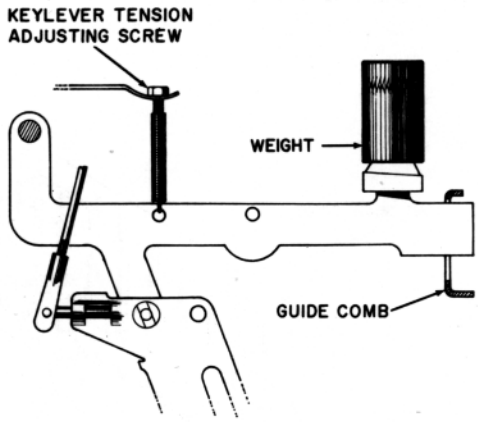
For those keylevers that fall outside the guide comb adjustment range, an individual keylever trip adjustment can be made by forming the keylever. With the keylever supported by selector slide forming tool (T-18121) as shown, place a T-Bender (T-18093) either in front of the support for later cam tripping or behind the support for eariler cam tripping and tap with a hammer.

ADJ. 3 SPACE BAR HEIGHT AND END PLAY



Form the space bar spring bracket to obtain .001" to .010" clearance between the space bar and the space keylever. The bendable stops on the front guide comb may be formed to obtain .015" to .030" end play of the space bar.

ADJ. 4 KEYLEVER TENSION



All Keylevers Except Carriage Return and Control Keys

Adjust the tension adjusting screw to obtain keylever trip between 2 to 3 1/2 ounces of pressure.

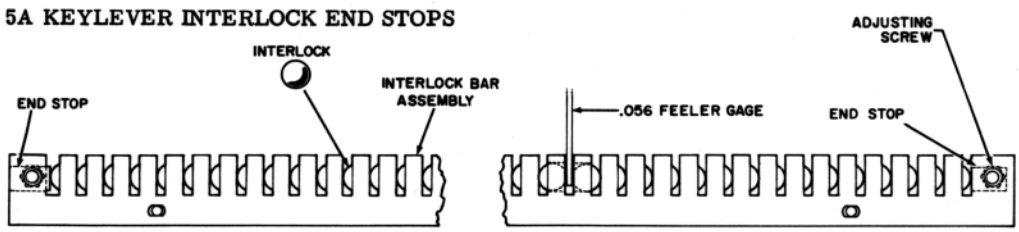
Carriage Return Keylevers

Adjust both tension adjusting screws to obtain a combined keylever trip between 2 to 4 ounces of pressure. Check both keylevers for full individual restoring.

Control Group Keylevers

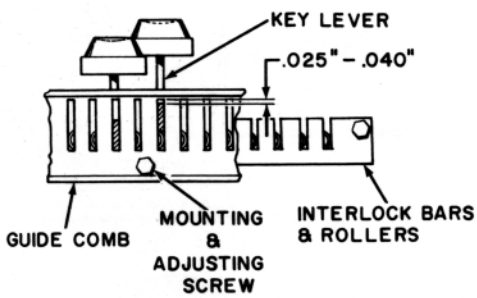
Adjust the tension adjusting screws to obtain micro switch operation between 4 to 6 ounces of pressure.

ADJ. 5A KEYLEVER INTERLOCK END STOPS



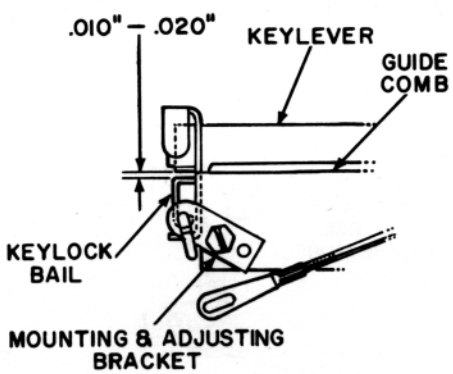
Combine the flat feeler gauges .020", .013", .010", .008", .003" and .002" to obtain .056" and insert into a central slot of the keylever interlock. Position the end stops against the interlocks and tighten their adjusting screws.

ADJ. 5B KEYLEVER INTERLOCK HEIGHT AND ALIGNMENT



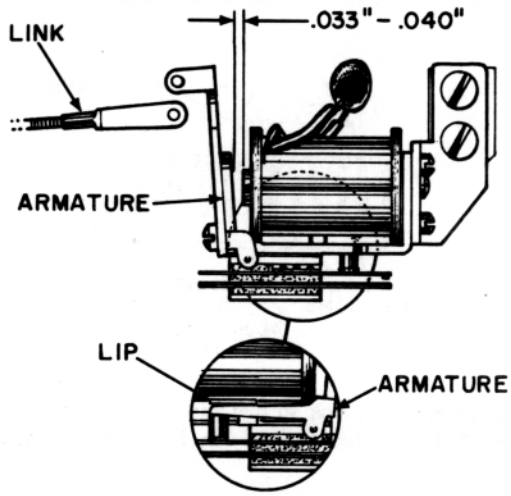
Adjust the height of the keylever interlock so that with a keylever depressed, the other keylevers are interlocked at .025" to .040" of their depression. Check to see that the slots in the guide comb and interlock are aligned.

ADJ. 6 KEYLEVER LOCK BAIL HEIGHT



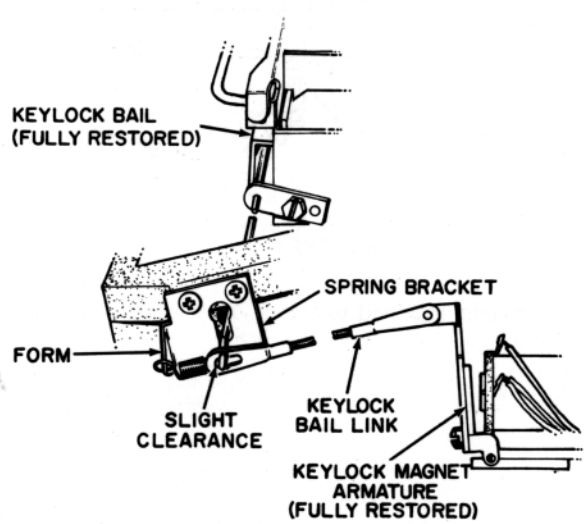
Adjust the height of the keylever lock bail to obtain .010" to .020" clearance to the restored keylevers.

ADJ. 7A KEYLOCK MAGNET ARMATURE GAP



1. With the armature fully restored against the lip, there should be .033" to .040" armature gap at the center of the core.
2. Check for sufficient tension of the moveable contact spring to fully restore the armature against the lip.

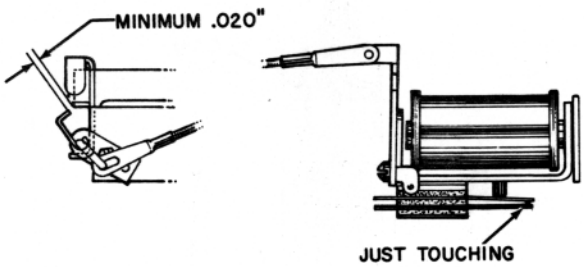
ADJ. 7B KEYLEVER LOCK BAIL LINK RESTORE SPRING BRACKET



1. Form the spring bracket as required to obtain full restoring of the keylever lock bail without excess tension.

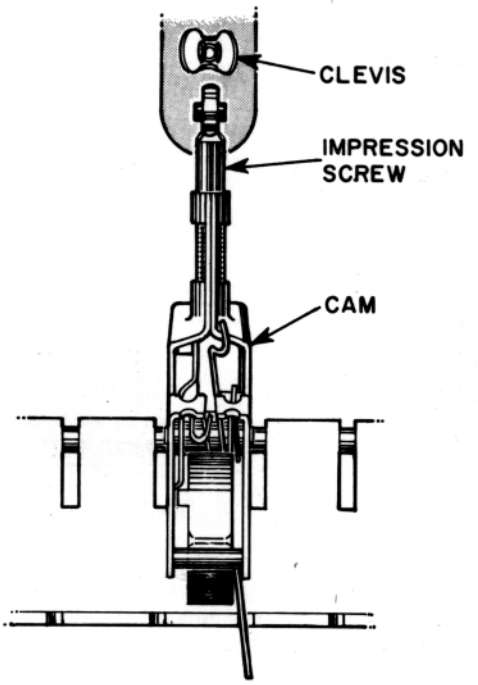
2. Adjust the keylever lock bail link for a slight clearance at the end of the clevis slot with the keylever lock bail and magnet fully restored.

ADJ. 7C KEYLEVER LOCK BAIL CONTACTS



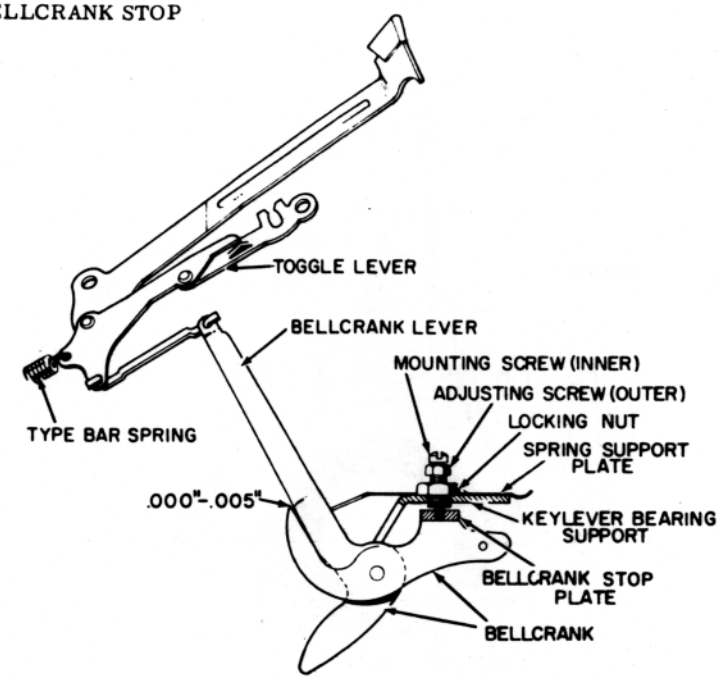
Manually operate the keylock magnet armature. Adjust the stationary contact to make with the moveable contact just as the keylever lock bail has cleared the keylevers by at least .020". Check for .010" minimum contact follow with the armature fully attracted.

ADJ. 8A IMPRESSION SCREWS



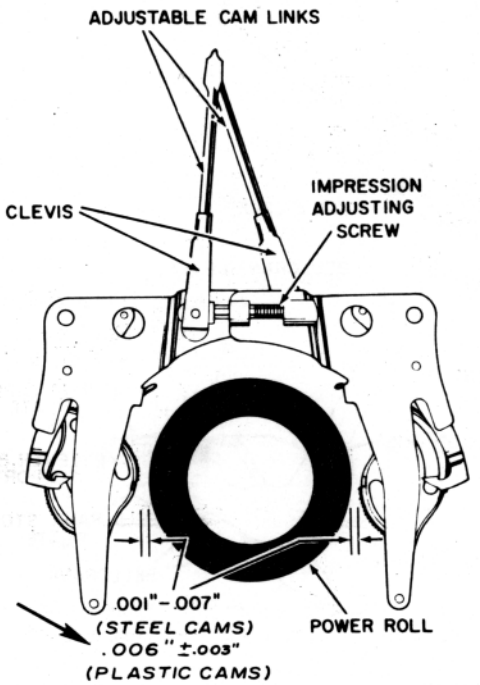
The impression screw is adjusted to increase or decrease the character impression of an individual typebar. Those cams which do not operate typebars should have their impression screws set at the midrange of adjustment keeping in mind that it will affect the distance that parts move when operated by the cam and may be adjusted to prevent a choking off condition if necessary.

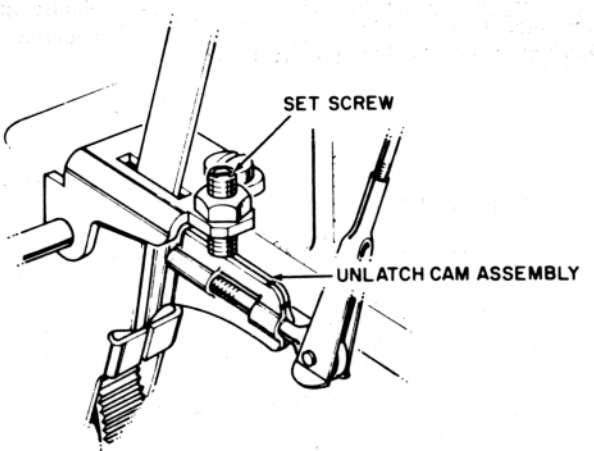
ADJ. 8B BELLCRANK STOP

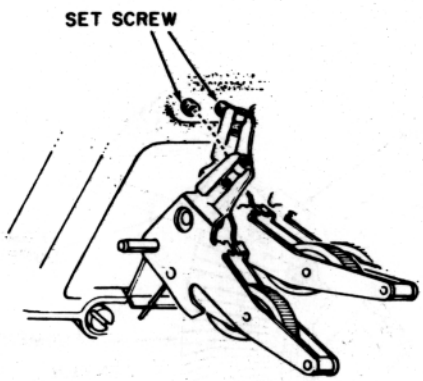


With the power roll removed, adjust the bellcrank adjusting plate up or down to obtain .000" to .005" clearance at the point shown. This clearance can be observed by manually operating the cam assemblies and checking for pressure or excessive lost motion. The inner mounting screws must be loose to change the adjustment and tight when checking the clearance.

ADJ. 8C CAM ASSEMBLIES







The clearance between steel cam assemblies and the power roll must be .001" to .007"; between plastic cam assemblies and the power roll the clearance must be .006" ± .003".

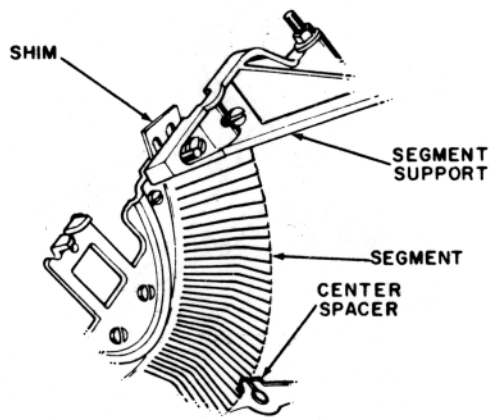
Turn the machine on and determine the eccentricity in the power roll. If the eccentricity exceeds .002", turn the machine off and re-position the power roll 180°. This sometimes reduces the eccentricity in the power roll. This specified clearance between a cam and the rotating power roll is obtained by turning the clevis on the adjustable cam link as required.

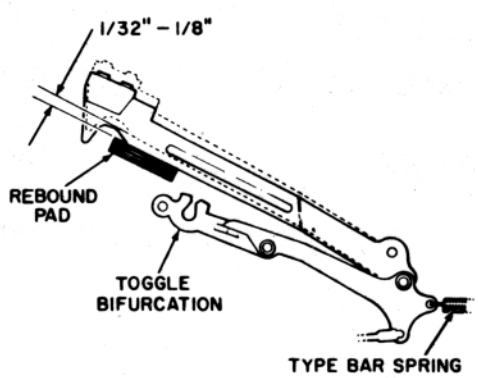
The unlatch cam is adjusted by turning the setscrew in a mounting bracket located above the unlatch cam.

Cam assemblies on machines that have auxiliary keyboards are adjusted by means of setscrews located directly over these cams in the power frame casting.

Each cam must clear the rotating power roll a minimum of .001" when its associated keylever is held down.

ADJ. 9 TOGGLE LOCKING

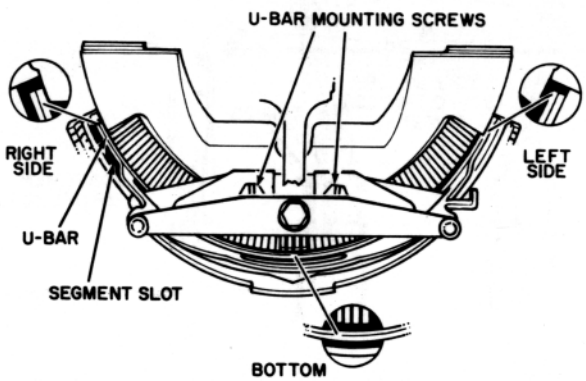




1. The segment can be positioned forward or rearward by adding or removing shims at the upper ends or by opening or closing the bifurcation in the center spacer. Adjusting the center spacer will affect the middle typebars and the placement or removal of shims at either upper end will tend to affect the typebars near the upper ends of the segment. Adjust the position of the segment so that the majority of typebars can be raised off the rebound pad 1/16" plus or minus 1/32".

2. Individual typebars which do not fall within the segment's range of adjustment can be individually adjusted by opening or closing the toggle bifurcation on the typebar.

ADJ. 10A U-BAR FRONT BRACKET

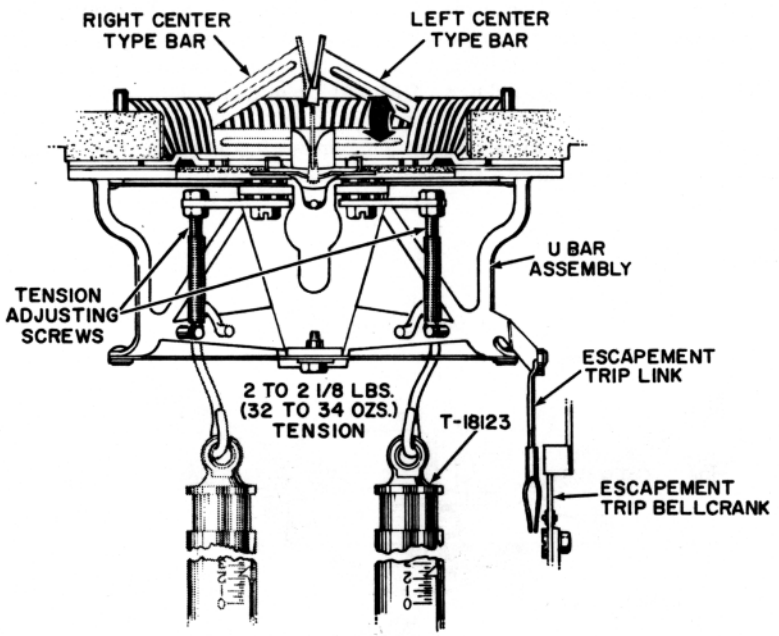


With front and rear U-bar mounting screws loose, position the U-bar in the segment slot as follows:

Right Side - Close to the top (inside) of the slot without touching.
Bottom - Approximately centered in the slot.
Left Side - Close to the bottom (outside) of the slot without touching.

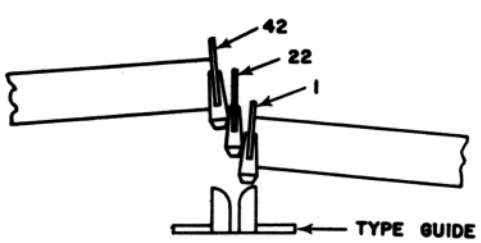
Tighten the mounting screws.

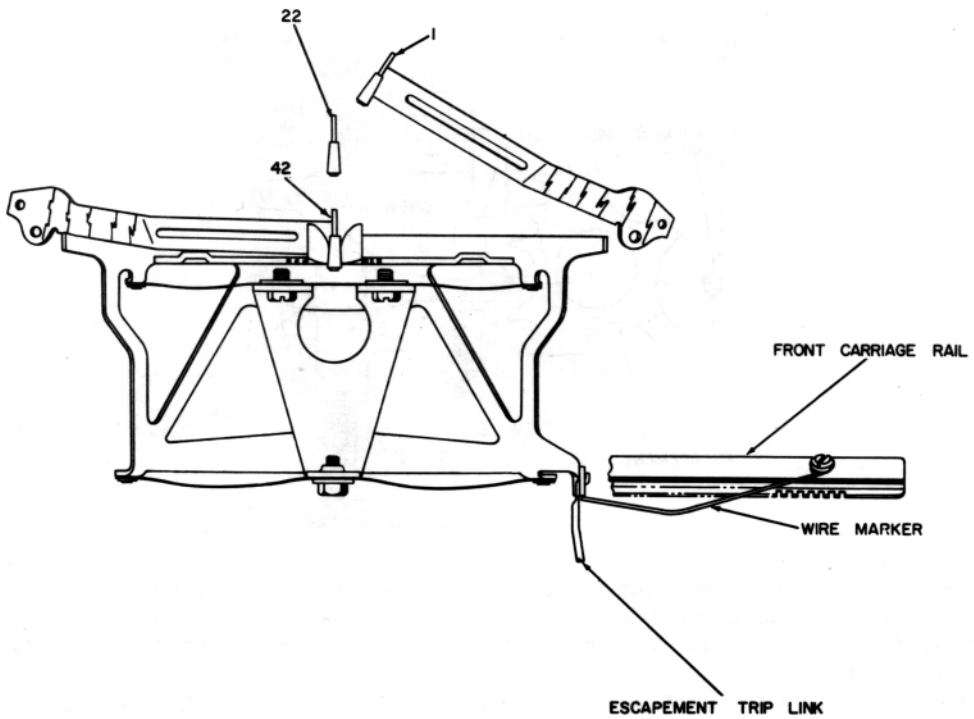
ADJ. 10B U-BAR TENSION



The tension adjusting screws should be evenly set to obtain 2 to 2 1/8 lbs. (32 to 34 ozs.) of tension at the points shown. To check the adjustment, first disconnect the escapement trip link from the escapement trip bellcrank then jog a typebar (opposite the scale) against the U-bar and into the typeguide while steadily increasing the tension of the scale (T-18123). When the U-bar has been drawn far enough rearward by the scale so that the typebar just touches the platen and the U-bar simultaneously, back off the typebar and read the tension indicated on the scale.

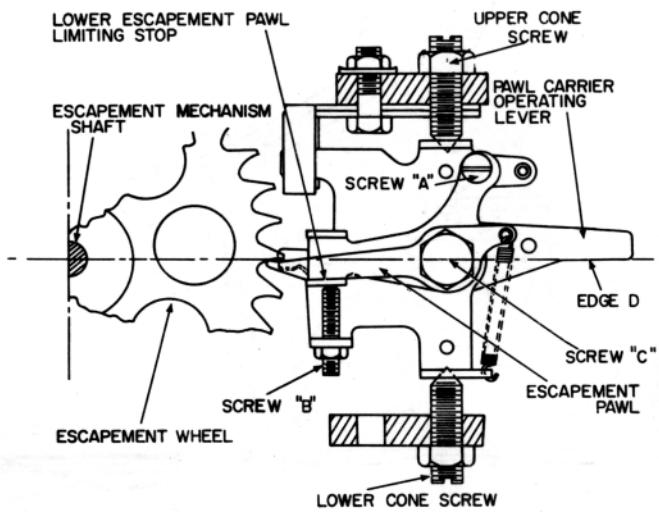
ADJ. 10C U-BAR REAR SPRING





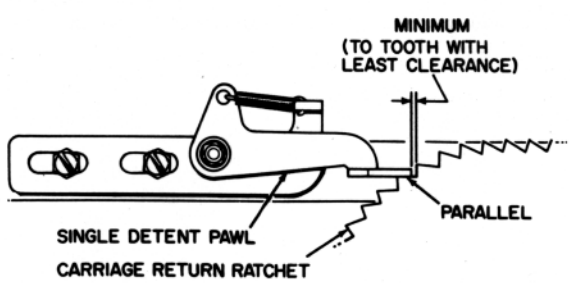
The U-bar spring is adjusted to compensate for the difference in its movement by right, left and center typebars. The major amount of this difference in movement is eliminated by the offset adjustment of the front U-bar spring, however a small difference may still exist. A convenient method of adjustment is to position right, left and center typebars slightly staggered as shown and allow the U-bar to position itself; the amount of stagger determining the adjustment. Using a wire marker for a gauge as shown, check for equal U-bar movement by right, left and center typebars. Disconnect the escapement trip link if necessary to prevent choking of U-bar movement.

ADJ. 11 ESCAPEMENT PAWL CARRIER



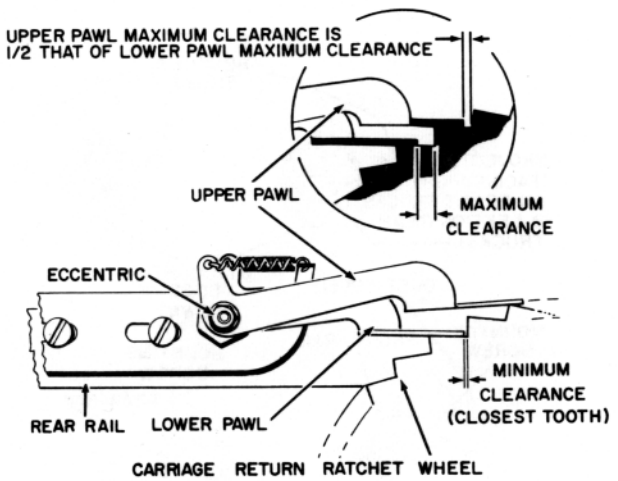
1. With the upper cone screw slightly loose, adjust the lower cone screw to position the center of screw C on the horizontal centerline that passes through the escapement shaft.
2. Adjust the upper cone screw to eliminate all play of the escapement pawl carrier without binding its movement.
3. With screws A, B and C loose, adjust the escapement pawl at screw A to position its upper surface at the tip to fall on the horizontal centerline of the escapement shaft. Turn screw B up snug without changing the adjustment and tighten.
4. Mono-Escapement machines only - Position the pawl carrier operating lever so that edge D falls on the horizontal centerline of the escapement shaft. Tighten screw C.

ADJ. 12A DETENT PAWL - SINGLE



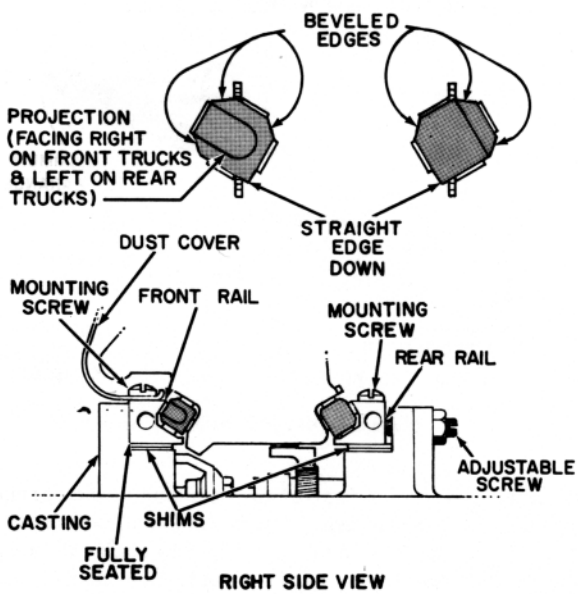
Adjust the detent pawl to have minimum clearance to the closest tooth of the carriage return ratchet.

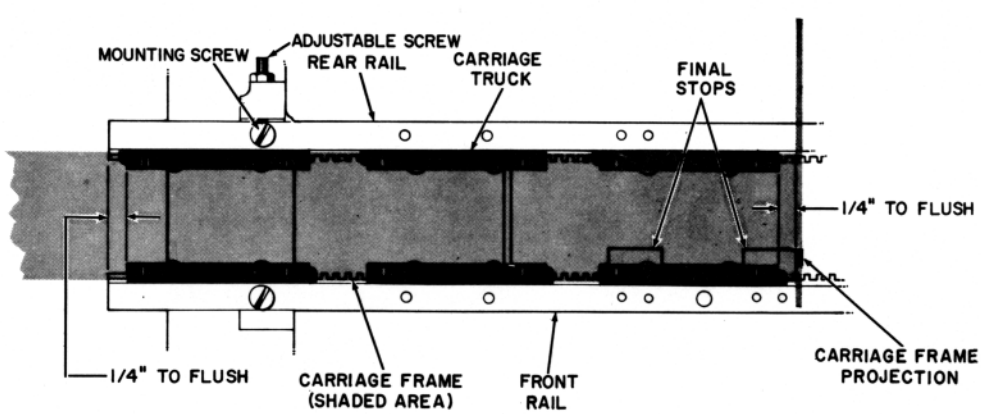
ADJ. 12B DETENT PAWL - DOUBLE



The purpose of the upper pawl is to "halve" the backlash in the carriage return ratchet. The lower pawl should have previously been adjusted for minimum clearance to the closest tooth. Escape the carriage from the left margin (one unit at a time) to obtain the maximum clearance between the carriage return ratchet and the lower pawl. Adjust the eccentric to position the upper pawl for a clearance of approximately one half of the maximum clearance to the lower pawl.

ADJ. 13. CARRIAGE RAILS





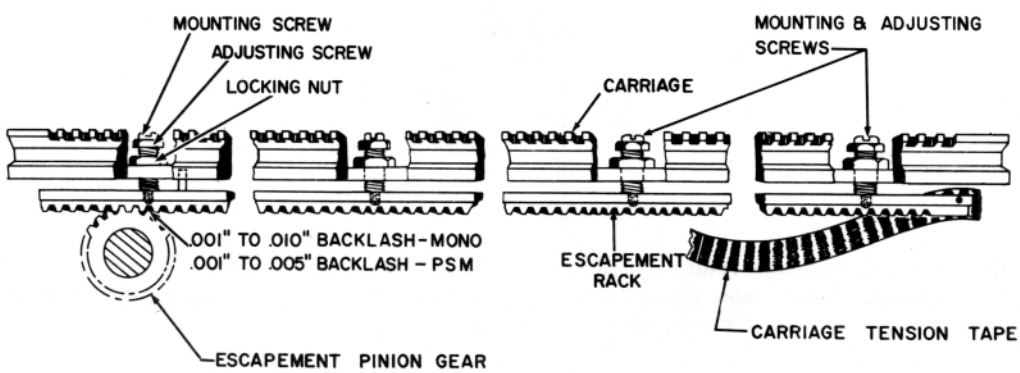
1. The front rail should be fully seated against the casting and laterally centered on its mounting screws.

2. Insert the carriage trucks between the rails and the carriage with their straight edges down. The projection at the end of the trucks should face to the right side on the front rail and to the left side on the rear rail.

3. With the carriage at the right margin and against the final stop, the trucks on the right end should be flush to 1/4" in from the carriage end plate not including the projection. The trucks on the left end should be flush to 1/4" in from the end of the rails. The middle trucks should be centered between the two outer trucks.

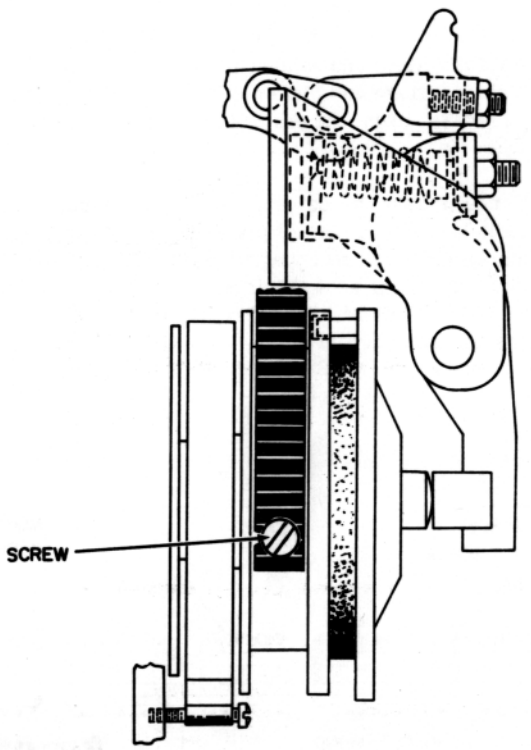
4. Adjust the rear rail by positioning the carriage so that a carriage truck is beside the mounting screw. Move the rear rail forward to eliminate all play, and tighten the mounting screws. The adjustment of the rear rail should eliminate all side play without creating binds in the carriage movement. When checking the carriage for binds, have the carriage return and tension tapes disconnected and the escapement rack removed. When the position is correctly set, turn the adjustable screw up snug and tighten without changing the adjustment.

ADJ. 14 ESCAPEMENT RACK



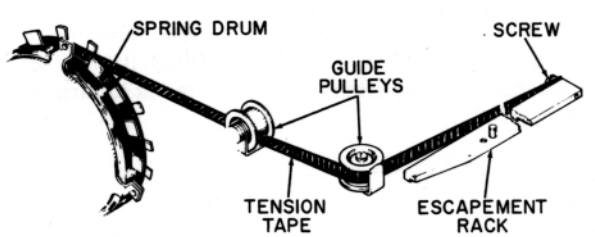
Adjust the escapement rack to escapement pinion gear backlash at .001" to .010" on mono-space machines and at .001" to .005" on PSM machines. Raise or lower the escapement rack evenly by loosening the locking nut and mounting screw and turning the adjustment screw. The mounting screw must then be drawn up to check the adjustment. Do not attempt to turn the adjustment screw while the mounting screw is tight.

ADJ. 15A CARRIAGE RETURN CLUTCH PULLEY SPRING



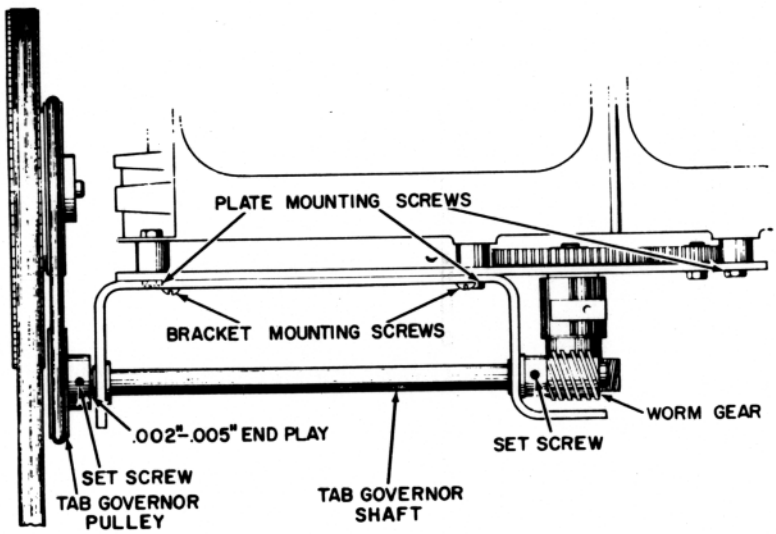
The tension of the carriage return clutch spring should be set by first winding the spring completely with the carriage return tape disconnected; then backing off 8 full turns. Locking the clutch toggle will hold the pulley positioned for reconnecting the tape.

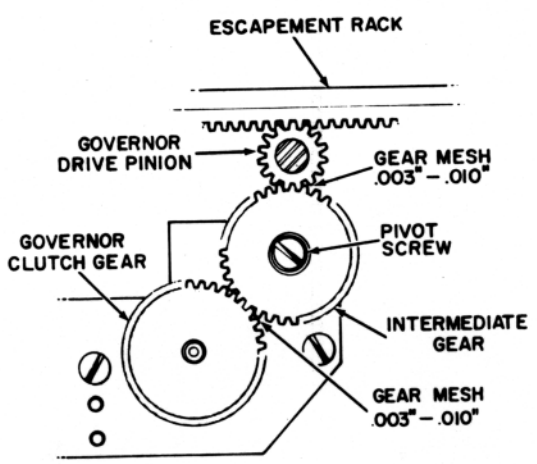
ADJ. 15B MAIN SPRING



Adjust the tension of the main spring to obtain an escapement pressure of the carriage to between 3 3/4 to 5 1/2 pounds measured at the right margin. Increase the tension as necessary up to 5 1/2 pounds to overcome the tension of the escapement pawl spring(s) and field control switches with the carriage near the right margin.

ADJ. 16 TAB GOVERNOR





1. The tab governor pulley or the worm gear should be adjusted to obtain .002" to .005" end play in the tab governor shaft.
2. There should be .003" to .010" backlash between the governor clutch gear and the intermediate gear. Move the pivot screw to obtain the required backlash.
3. Loosen the plate mounting screws and position the tab governor assembly to obtain a .003" to .010" backlash between the intermediate gear and the governor drive pinion.

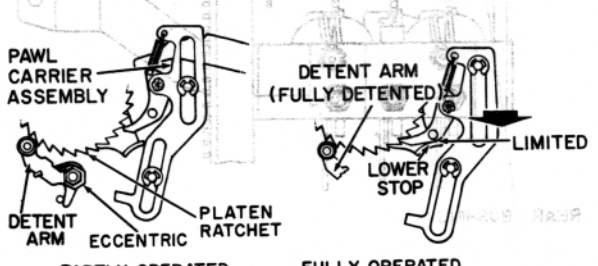
ADJ. 17

LINE SPACING CHART

ADJ. 17 LINE SPACING

1 tooth, 2, 3, 4 and 5 teeth indicate the number of ratchet teeth detented by one carriage return operation. For each ratchet there are two (three optional) settings of the line space lever that will give the lines per inch indicated. To find the correct ratchet and parts necessary to obtain a desired number of lines on a form, count the number of lines in 10" of form, move the decimal one space to the left, and find the nearest number in the chart.

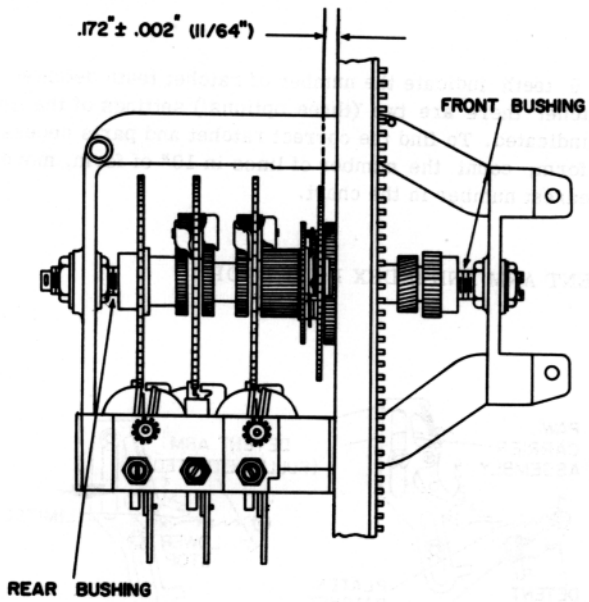
ADJ. 18 RATCHET DETENT ARM AND INDEX PAWL STOP



1. With the line space lever in its forward position, the detent arm should hold the platen ratchet for engagement by the index pawl approximately 1/3 down the face of the tooth. Adjust the detent arm eccentric.

2. Adjust the lower stop to limit further downward movement of the index pawl once the ratchet is fully detented.

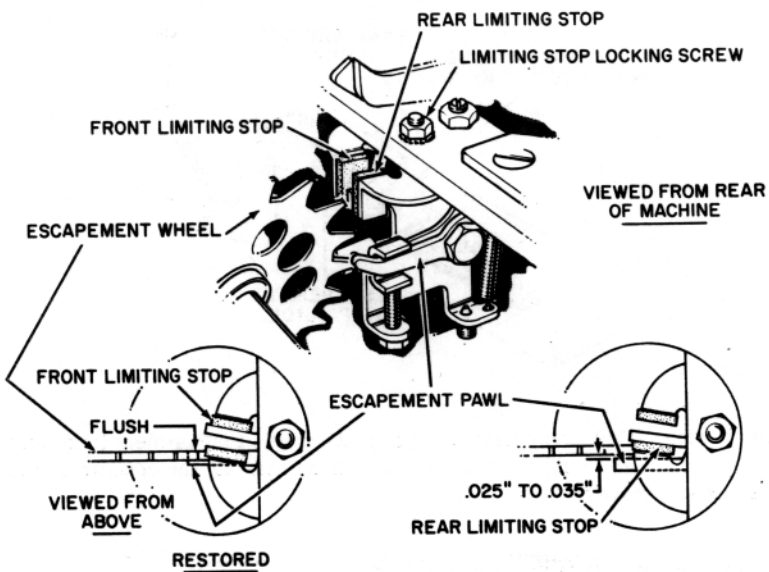
ADJ. 19A ESCAPEMENT SHAFT BUSHINGS



1. With the rear bushing slightly loose, adjust the front bushing to position the front surface of the carriage return ratchet .172" plus or minus .002" (11/64") from the rear surface of the rear rail.

2. Adjust the rear bushing to eliminate all end play of the parts on the escapement shaft without binding their movement.

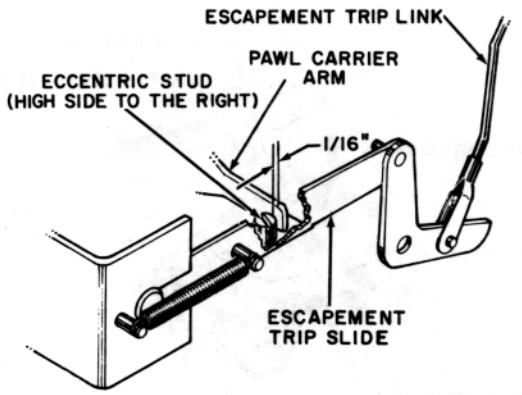
ADJ. 19B FRONT AND REAR PAWL CARRIER STOPS



1. With the limiting stop locking screw loose, set the front limiting stop so that when restored, the front of the escapement pawl is flush with the front of the escapement wheel.

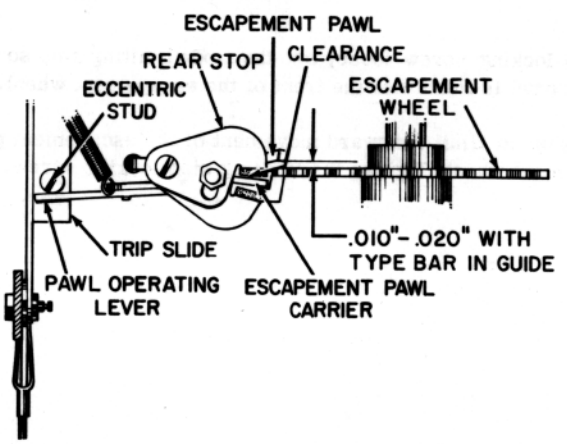
2. Set the rear limiting stop to limit rearward movement of the escapement pawl with .025" to .035" clearance to the escapement wheel. Tighten the limiting stop locking screw.

ADJ. 19C ESCAPEMENT TRIP LINK



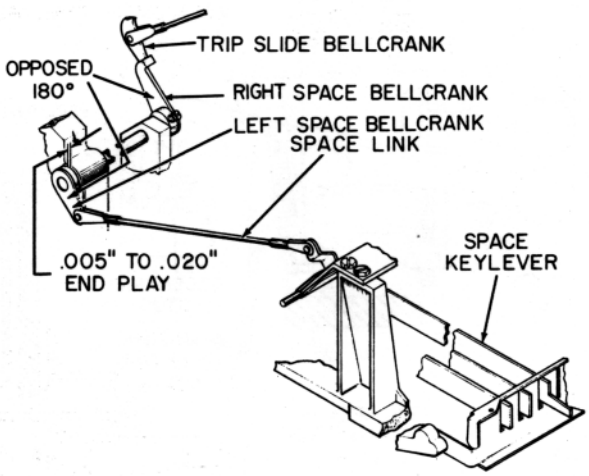
With the escapement trip slide eccentric at its mid-range of adjustment (high side to the right) adjust the escapement trip link length of 1/16" clearance between the eccentric stud and the pawl carrier arm with all parts restored.

ADJ. 19D ESCAPEMENT TRIP SLIDE ECCENTRIC STUD



With a type bar in the guide, the escapement pawl should be moved to the rear with .010" to .020" clearance to the escapement wheel. Adjust the eccentric stud on the trip slide for this clearance. Check for clearance between the rear stop and the pawl carrier with a type bar in the guide.

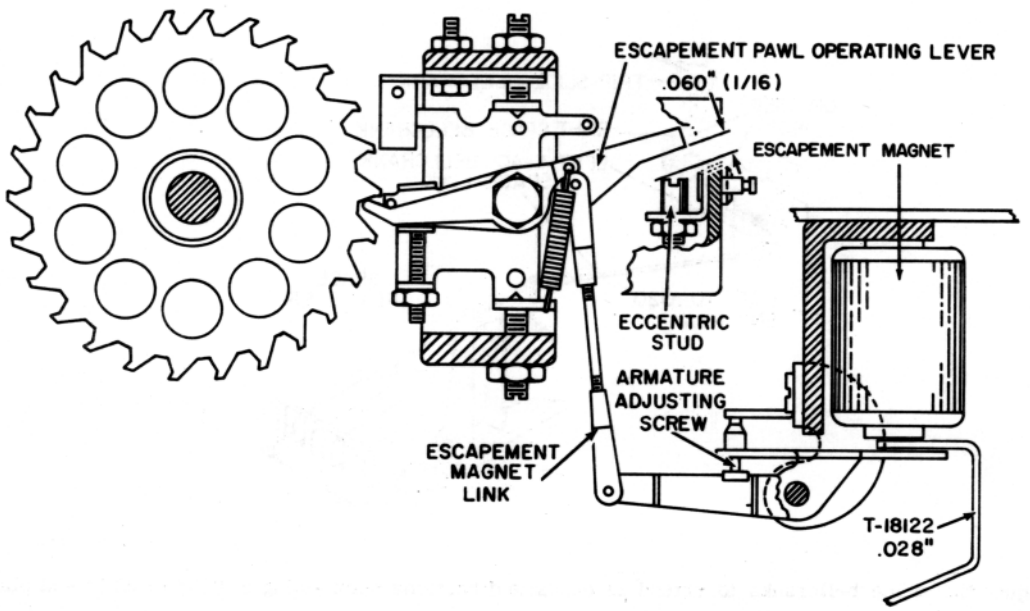
ADJ. 19E SPACE BELLCRANKS AND LINK



1. Adjust the space bellcranks to extend in opposite directions maintaining a .005" to .020" end play of the shaft.

2. Adjust the space link to operate the escapement pawl for .010" to .020" clearance to the escapement wheel with the high point of the space cam against the power roll.

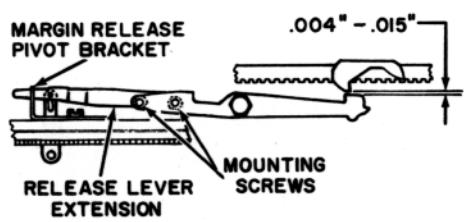
ADJ. 20 ESCAPEMENT MAGNET ARMATURE AND LINKS $\frac{I}{M}$ PSM



1. Adjust the escapement magnet armature for an air gap of .028". Check the clearance with escapement magnet armature gauge (T-18122).

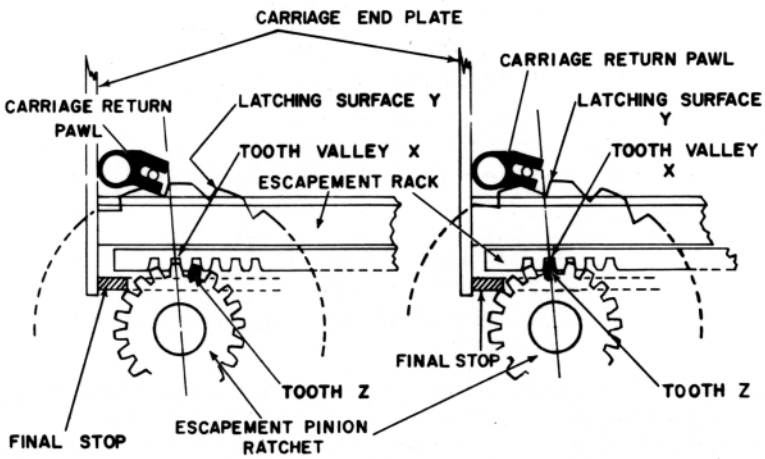
2. Adjust the escapement magnet link for .060" (1/16") clearance between the escapement pawl operating lever and the eccentric stud with all parts restored.

ADJ. 21 MARGIN RELEASE LEVER



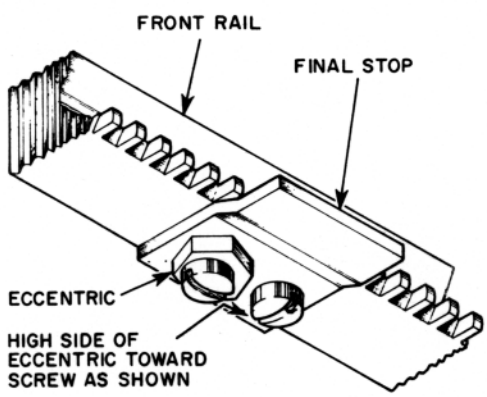
Adjust the margin release lever for .004" to .015" clearance to the margin stop when the release lever extension is raised.

ADJ. 22A ESCAPEMENT RACK ENGAGEMENT - 10 PITCH



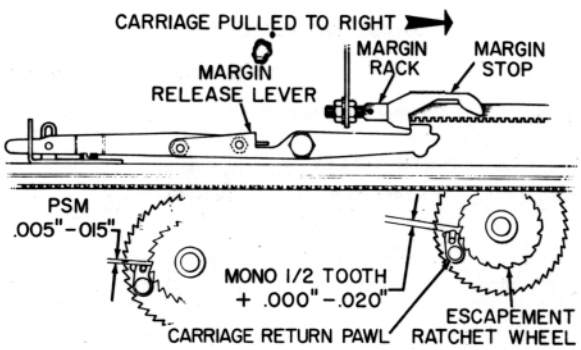
As illustrated, the mesh between the escapement pinion ratchet and the escapement rack can be varied. Obtain that particular mesh which results in the least overtravel of the carriage return pawl to the escapement ratchet gear when the carriage is pulled to the right, so that the carriage end plate is against the final stop as shown.

ADJ. 22B ESCAPEMENT RACK ENGAGEMENT - 12 PITCH



On 12 pitch machines, the left final stop is adjustable and is to be adjusted for minimum carriage return pawl over latch with the carriage end plate against the final stop.

ADJ. 22C MARGIN RACKS

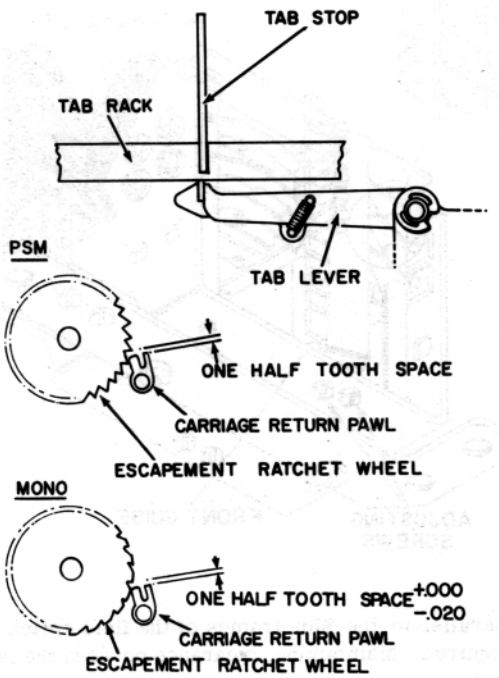


The margin rack should be roughly adjusted so that its ends protrude equally from the carriage end plates. (On mono-space machines, begin with the margin rack roughly set to correspond to the paper scale giving primary consideration to carriage return pawl overlatch). With the carriage pulled to the right so that the margin stop is limited by the margin release lever, the final margin rack adjustment should give:

1. Mono - Space machines - 1/2 tooth + .000" - .020" overlatch of the carriage return pawl.

2. PSM machines - .005" to .015" overlatch of the carriage return pawl.

ADJ. 22D TAB RACK



Adjust the tab rack right or left to match the margin rack. This can be checked by setting a tab stop and the margin stop at corresponding positions. Operate the carriage return key and type a character. Then pull the carriage to the right beyond the margin stop and operate the tab key. At this position the same character retyped should be in the same escaped position.

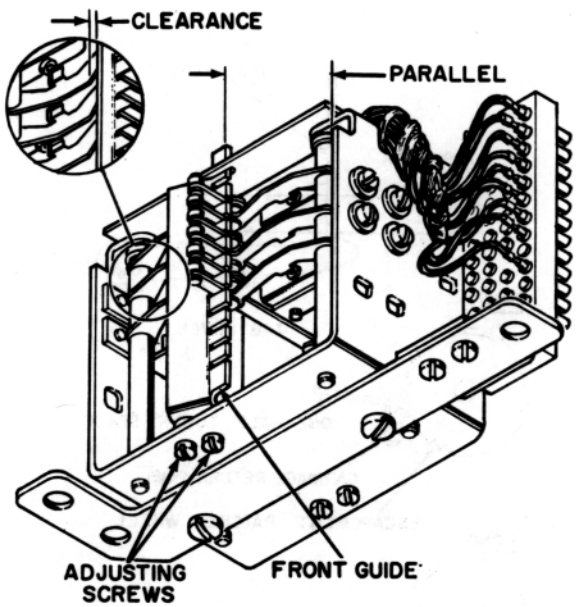
When the tab rack position corresponds to the margin rack, a final adjustment is made (with the carriage held by a tab stop engaged with the tab lever) to obtain:

1. Mono-Space machines - 1/2 tooth + .000" -.020" overlatch of the carriage return pawl to the escapement ratchet wheel.

2. PSM machines - 1/2 tooth overlatch of the carriage return pawl to the escapement ratchet wheel.

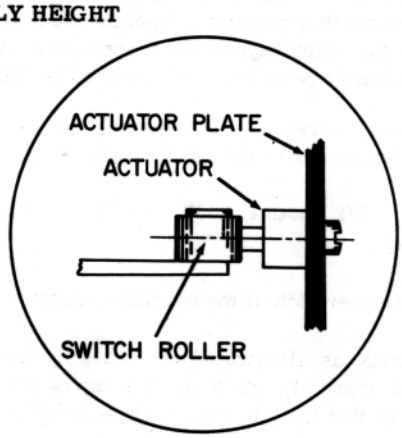
NOTE: To position the parts as illustrated for checking the adjustment, slip the tab governor belt off its pulley and manually latch up the tap operating lever with the power off. Allow the carriage to escape so that the tab lever engages a tab stop and check the adjustment.

ADJ. 22E FRONT GUIDE



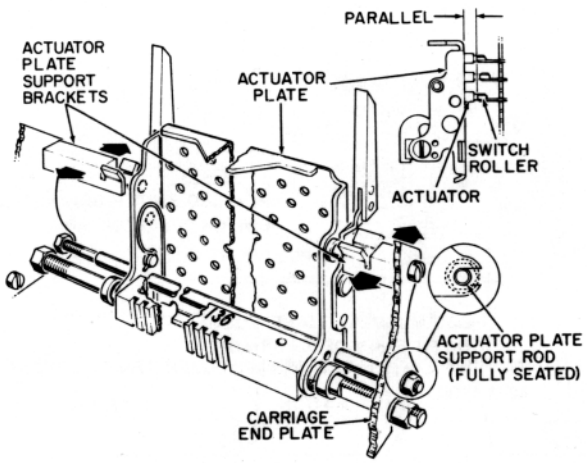
The front guide should be parallel to the side frames of the field switch assembly. Adjust the guide to the front or rear as required, maintaining clearance between the left side of the guide and the switch operating arms as shown.

ADJ. 22F FIELD SWITCH ASSEMBLY HEIGHT



The field switch assembly should be raised or lowered using shims equally placed so that the actuators are vertically centered to the switch rollers.

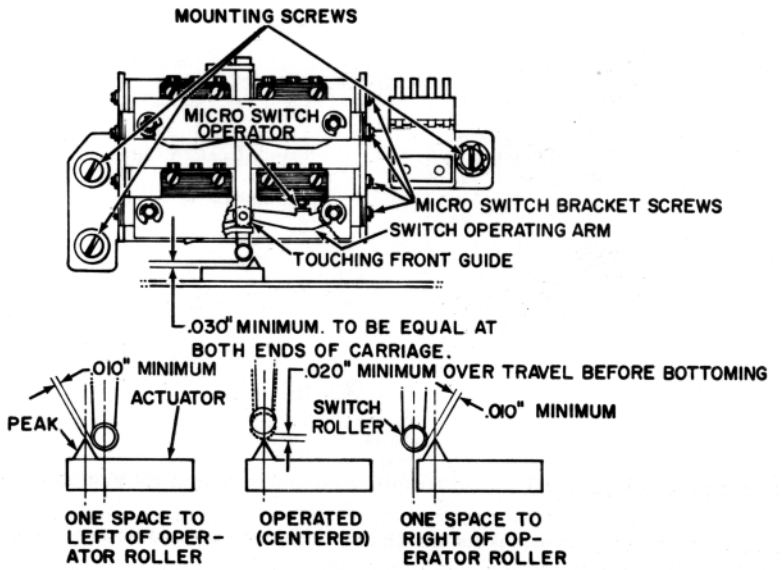
ADJ. 22G ACTUATOR PLATE ALIGNMENT



1. The actuator plate support rod should be fully seated forward in its slot as shown.

2. The actuator plate support brackets should be adjusted forward or rearward to align the actuator plate parallel with the fully restored switch rollers.

ADJ. 22H FIELD CONTROL ASSEMBLY AND MICRO SWITCH POSITIONING

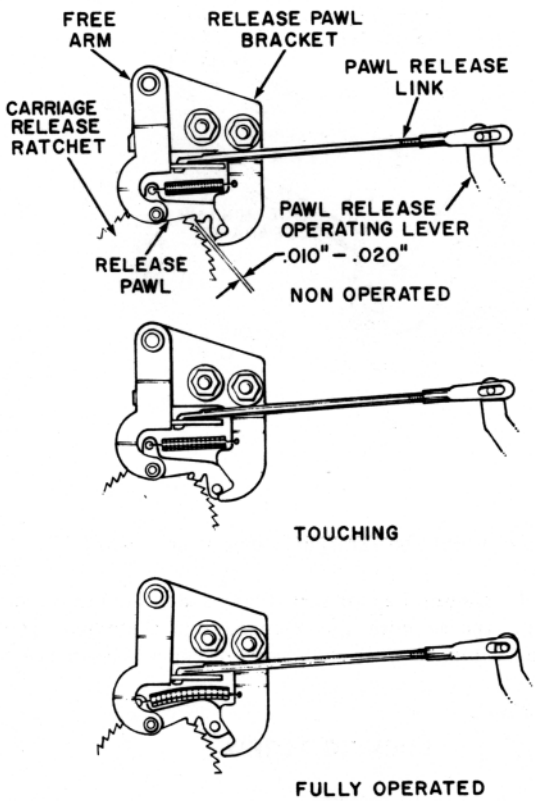


1. Adjust the micro switches forward to fully restore the switch operating arm against the front guide without operating the switch.

2. Position the field switch assembly laterally to center the peak of the actuator on an operated switch roller and to the front or rear to obtain .020" minimum overtravel after the roller is operated.

Check for .010" minimum clearance between the switch roller and the peak of the actuator when they are one space to either side of the operated position. Check also for .030" minimum clearance of the switch roller to the low dwell of the actuator which should be equal at either end of the carriage.

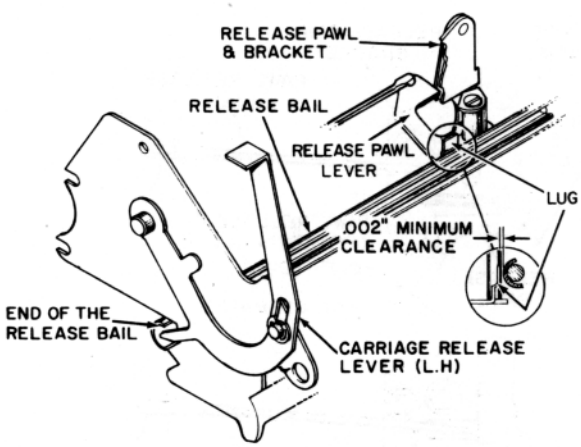
ADJ. 23A RELEASE PAWL BRACKET



1. The release pawl bracket should be positioned to obtain .010" to .020" clearance between the release pawl and the carriage release ratchet in the non-operated position. When operated, the release pawl should make contact at the center of the horizontal face of the lowest tooth possible.

2. Check the free arm and release pawl for free movement and good front to rear engagement. Form the parts as required.

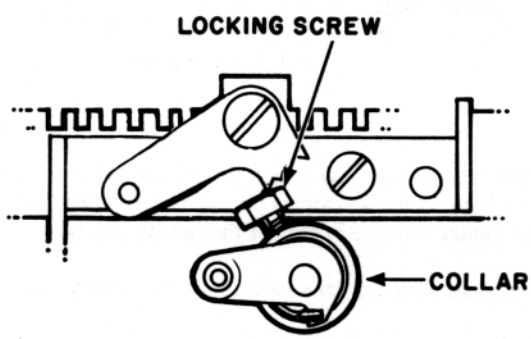
ADJ. 23B RELEASE BAIL



1. The lug on the release pawl lever should be straight. Form if necessary.

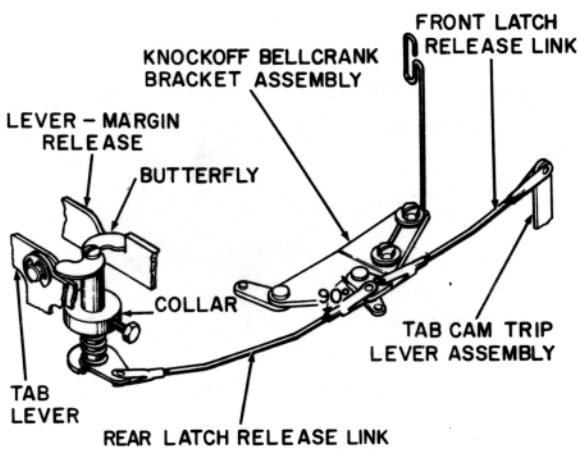
2. The ends of the release bail should be formed if necessary to obtain a minimum clearance of .002" throughout the carriage travel with the release bail restored. Excessive clearance will prevent the carriage from being released when the carriage release lever is operated.

ADJ. 24 BUTTERFLY LEVER TENSION



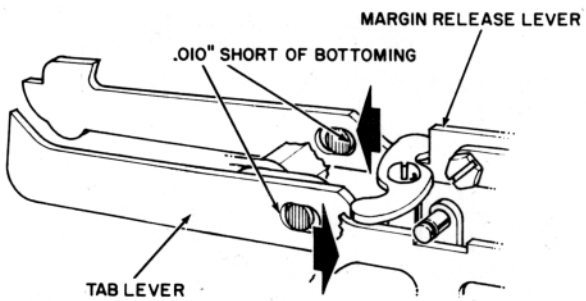
With the collar adjusted so that its locking screw is positioned as shown, there should be only enough tension necessary to fully restore the butterfly lever. Excessive tension can cause tab failures.

ADJ. 25A REAR LATCH RELEASE LINK

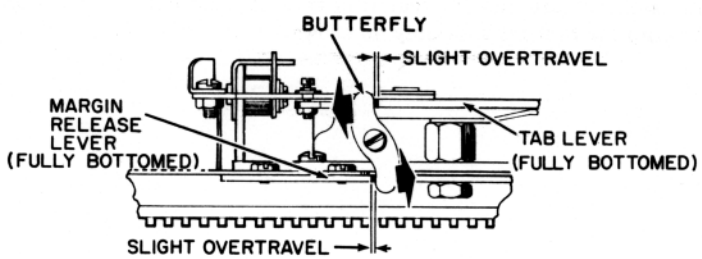


Adjust the rear latch release link so that it is at an approximately 90^{0} relationship to the bellcrank on the knockoff bellcrank bracket assembly as shown.

ADJ. 25B FRONT LATCH RELEASE LINK

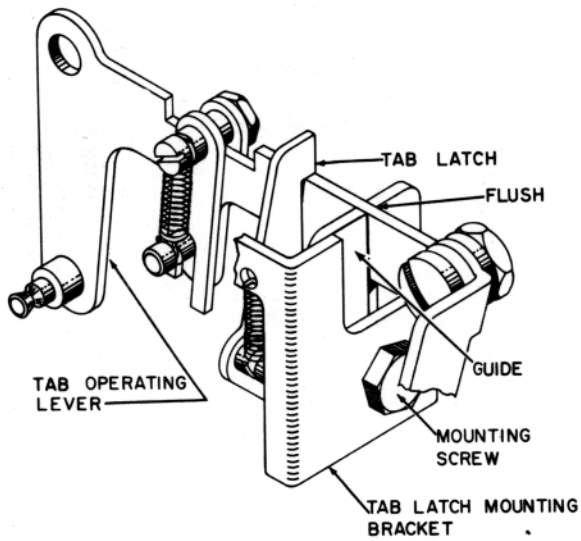


UNLATCH CAM TRIPPED



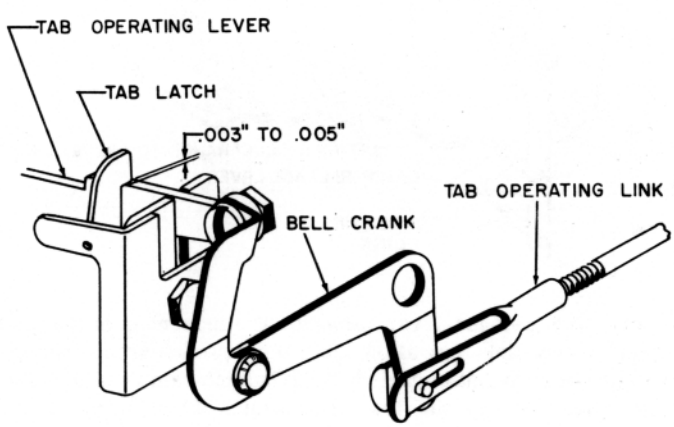
Manual operation of the margin release lever should cause it to trip the unlatch cam not later than .010" before it bottoms. The tab lever should meet the same requirement when manually operated to the left as it would be in a tab operation. With the margin release lever or the tab lever fully bottomed, there should be a slight overtravel of the butterfly. This overtravel insures that the levers are bottoming on their mounting studs rather than the unlatch cam linkage. However, the clearance will not exist if the unlatch cam is tripping too soon. Adjust the front latch release link to obtain these requirements.

ADJ. 26A TAB LATCH MOUNTING BRACKET



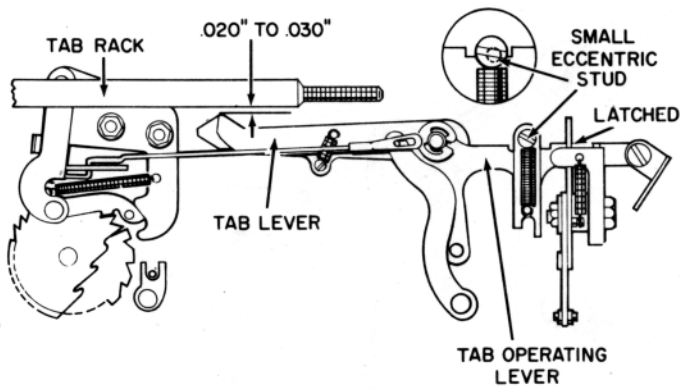
With the tab operating lever latched under the tab latch, adjust the tab latch mounting bracket up or down to position the top of the tab operating lever flush with the top of the guide.

ADJ. 26B TAB OPERATING LINK



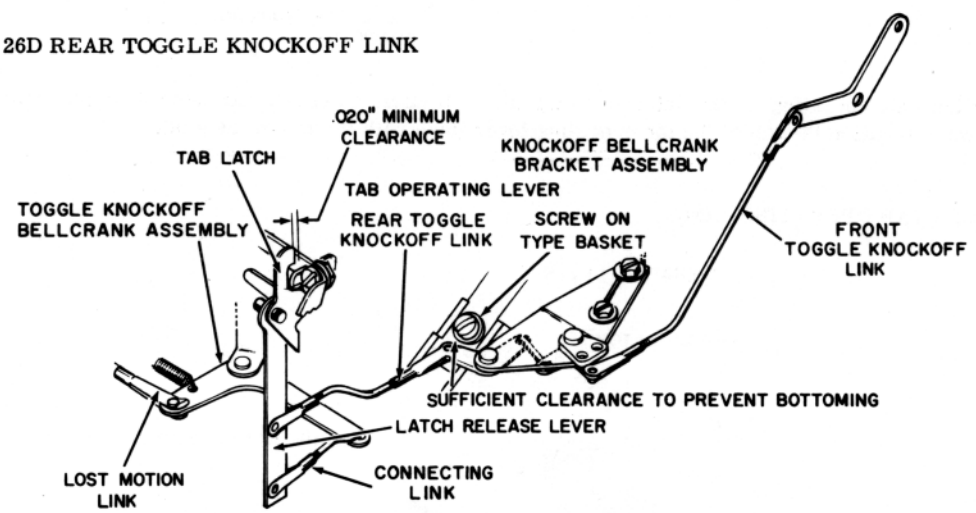
With the high point of the tab cam against the power roll, the tab operating link should be adjusted to hold the tab operating lever for .003" to .005" overlatch to the tab latch.

ADJ. 26C SMALL ECCENTRIC STUD



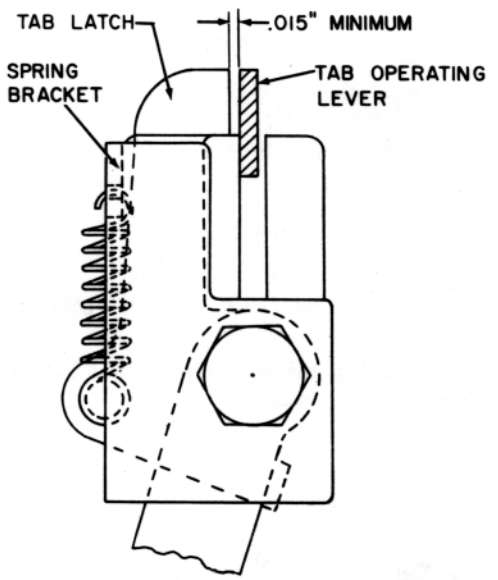
With the tab operating lever latched, the small eccentric stud should be adjusted with its high point toward the right side of the machine to obtain .020" to .030" clearance between the tab lever and the tab rack.

ADJ. 26D REAR TOGGLE KNOCKOFF LINK



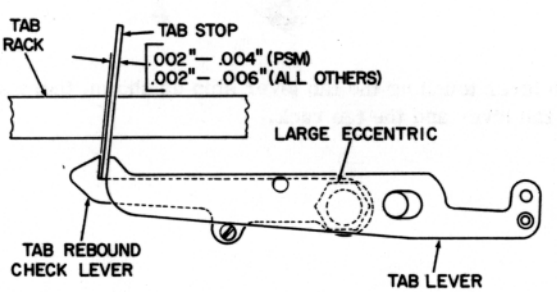
Push the bottom of the latch release lever forward. The movement of the latch release lever should be limited by the lost motion link, but allow .020" minimum clearance between the tab latch and the tab operating lever to prevent any bottoming when the unlatch cam is adjusted for tab latch delatching. Make a preliminary adjustment of the lost motion link if necessary. With the latch release lever held forward as shown for the .020" minimum clearance between the tab latch and the tab operating lever, there should be sufficient clearance to prevent bottoming between the front of the rear toggle knockoff link and the screw on the type basket. Adjust the rear toggle knockoff link if necessary.

ADJ. 26E FRONT TOGGLE KNOCKOFF LINK



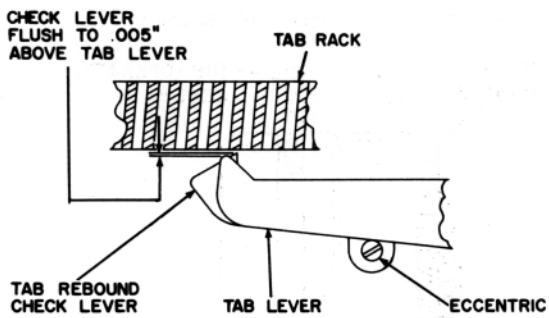
With the high point of the unlatch cam against the power roll, there should be a .015" minimum clearance between the tab latch and the tab operating lever. Excessive clearance will cause the unlatch cam to choke off due to limiting of the tab latch. Adjust the front toggle knockoff link.

ADJ. 27A TAB REBOUND CHECK LEVER - LATERAL ADJUSTMENT



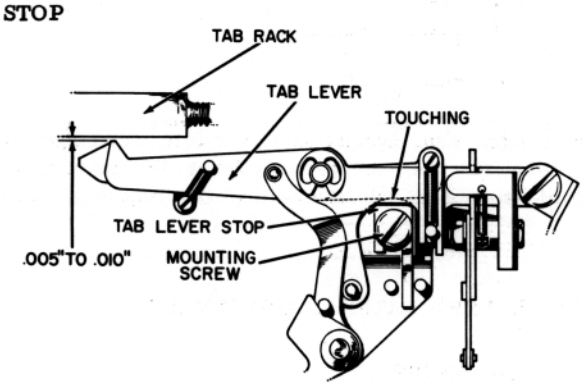
With the power off, the tab governor belt disengaged, the tab operating lever latched and a tab stop engaged as shown, adjust the large eccentric for clearance of the tab rebound check lever to the tab stop as follows: .002" to .004" - PSM; .002" to .006" - all others.

ADJ. 27B TAB REBOUND CHECK LEVER HEIGHT



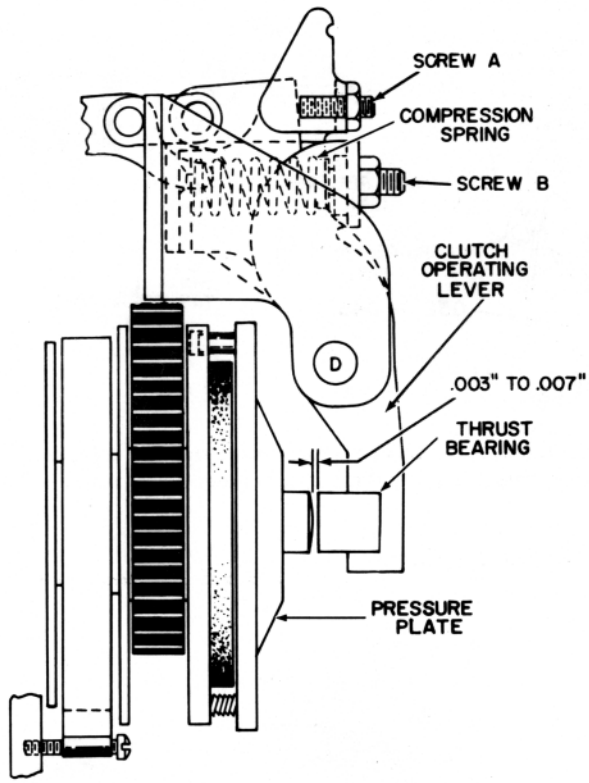
With the tab operating lever latched, adjust the eccentric on the right end of the tab rebound check lever so that it is flush to .005" above the tab lever.

ADJ. 28 TAB LEVER STOP



With the left end of the tab lever touching the tab lever stop as shown, there should be .005" to .010" between the right end of the tab lever and the tab rack.

ADJ. 29 CARRIAGE RETURN CLUTCH THRUST BEARING AND COMPRESSION SPRING

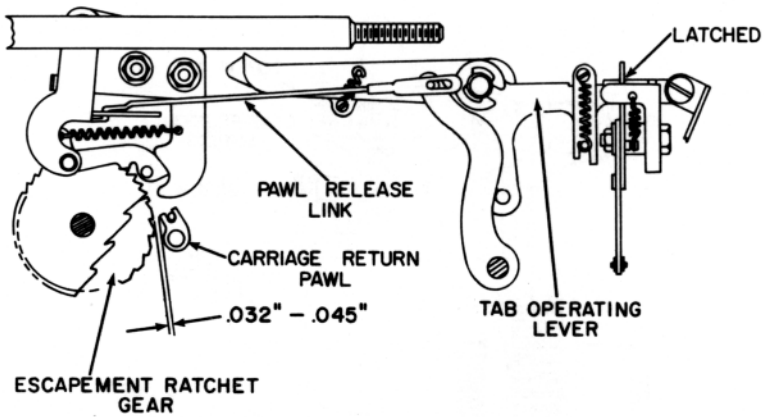


HOME POSITION
(TOGGLE NOT LOCKED)

1. Adjust screw A for .003" to .007" clearance between the thrust bearing and the pressure plate with the toggle restored (not in a carriage return operation). This clearance should be felt rather than seen due to spring tension on the pressure plate. Insert first a .003" and then an .008" flat feeler gauge (T-18009) between the thrust bearing and pressure plate and rotate the pressure plate by pulling on the carriage return tape. The pressure plate should rotate freely with the .003" gauge inserted, but bind on the .008" gauge.

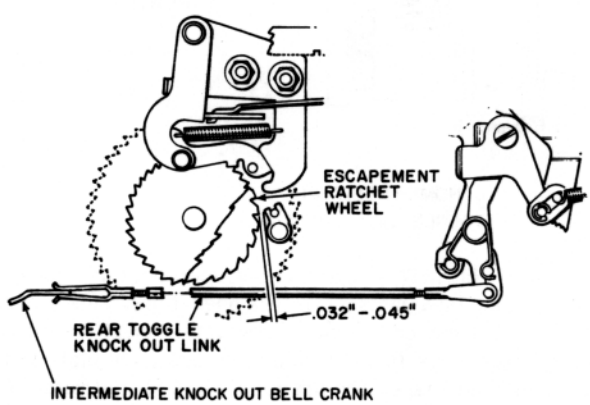
2. With the carriage approximately 1" from the extreme left margin and in a carriage return operation, the pull on the carriage should be from 4 to 6 pounds. Adjust screw B to increase or decrease the carriage return clutch tension.

ADJ. 30A PAWL RELEASE LINK



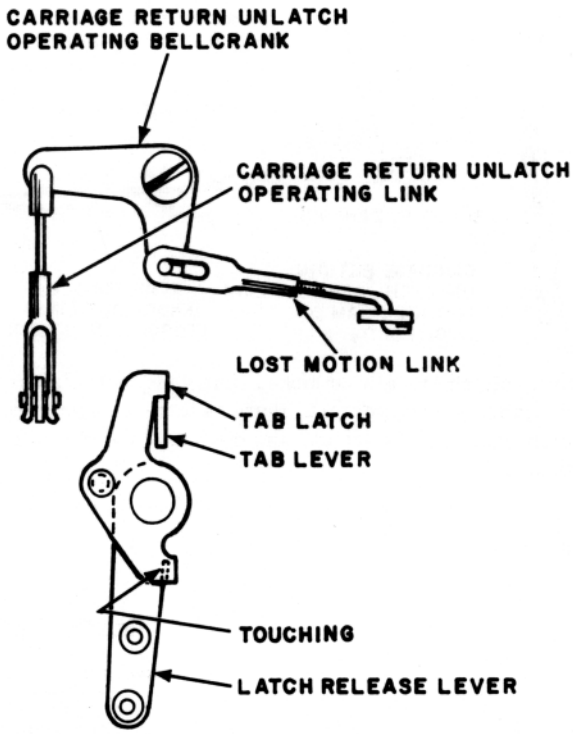
With the tab operating lever latched, the pawl release link should be adjusted to obtain .032" to .045" clearance between the carriage return pawl and the escapement ratchet gear.

ADJ. 30B REAR TOGGLE KNOCKOUT LINK



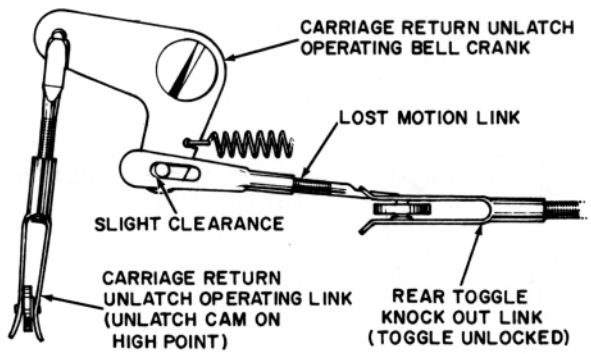
With the carriage return clutch toggle locked, there should be .032" to .045" clearance between the carriage return pawl and the escapement ratchet wheel. Adjust the rear toggle knockout link as required.

ADJ. 30C CARRIAGE RETURN UNLATCH OPERATING LINK



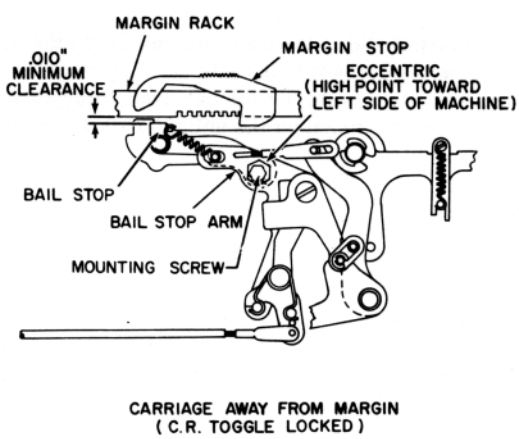
With the tab lever latched and the latch release lever just touching the tip of the tab latch, the arms of the carriage return unlatch operating bellcrank should be approximately at right angles to the carriage return unlatch operating link and the lost motion link. Adjust the carriage return unlatch operating link as required. This adjustment insures proper tension on the unlatch cam for reliable tripping.

ADJ. 30D LOST MOTION LINK

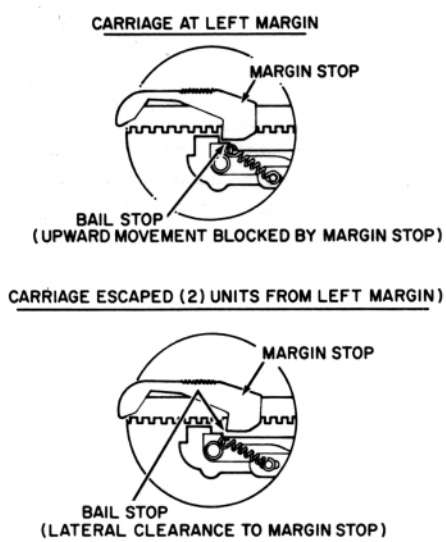


With the carriage return clutch toggle unlocked (machine not in a carriage return) and the high point of the unlatch cam against the power roll, there is to be a slight clearance between the stud on the carriage return unlatch operating bellcrank and the end of the slot in the lost motion link. Adjust the lost motion link as required.

ADJ. 31 BAIL STOP ARM - PSM



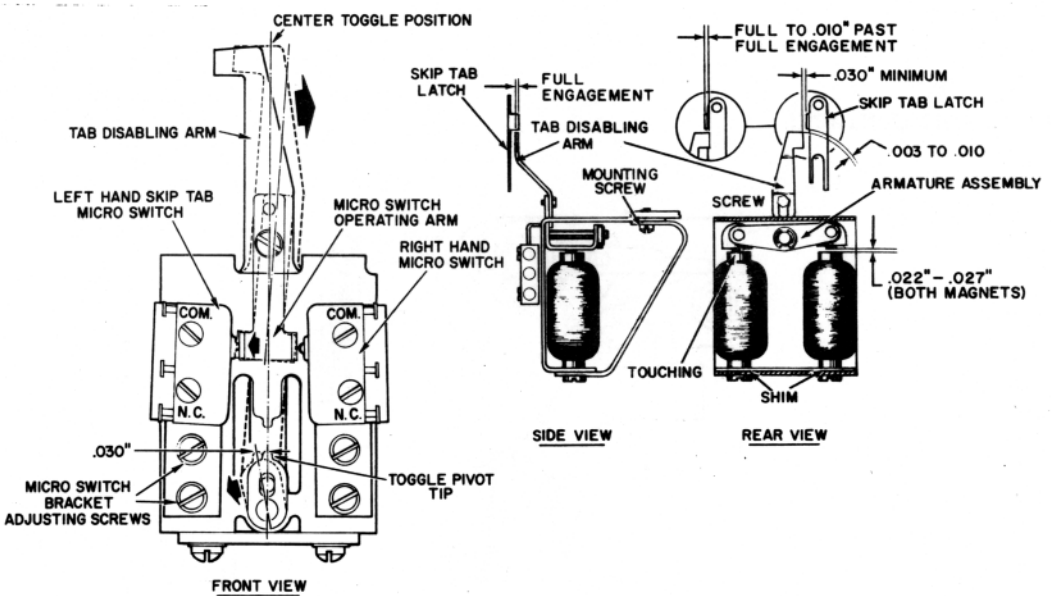
CARRIAGE AWAY FROM MARGIN
(C.R. TOGGLE LOCKED)



Start with the bail stop arm eccentric high point to the left. With the carriage return clutch toggle locked and the carriage away from the margin as shown (Power Off), there should be .010" minimum clearance between the margin rack and the bail stop. With the carriage at the left margin, the bail stop is to be blocked by the underside of the margin stop during a carriage return operation. With

the carriage escaped two units from the left margin, the margin stop should not restrict the upward movement of the bail stop during a carriage return.

ADJ. 32 SKIP TAB



1. To obtain the proper movement of the tab disabling arm, there should be .022" to .027" air gap at either magnet core. With the other magnet touching the armature assembly, shim the bottom of the magnets as necessary.

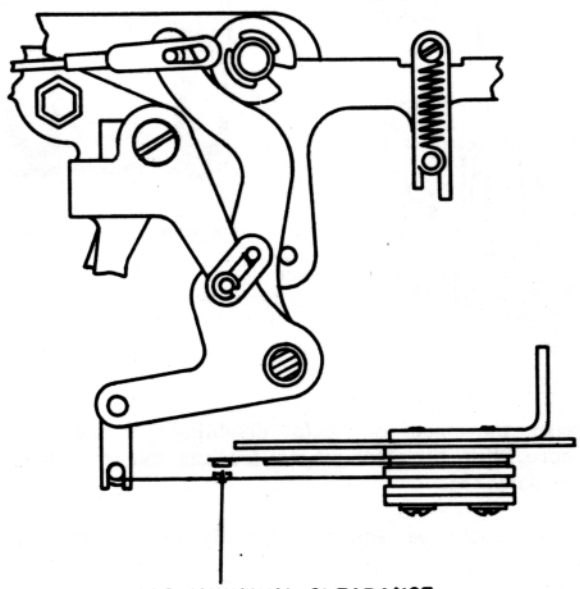
   NOTE: The magnets should be shimmed equally to maintain equal detenting action of the tab blocking arm.

2. With the power switch off, connect an ohmmeter across the N/C contacts of the left-hand skip tab micro switch. Manually operate the tab disabling arm from a "center of toggle" position toward the right side of the machine. The N/C contacts in the left-hand micro switch must remain closed until the pivot tip is .030" past a "center of toggle" position. Position the micro switch bracket to obtain the adjustment. Repeat the adjustment in the opposite direction for the right-hand micro switch.

3. Position the skip tab assembly by loosening its mounting screws to obtain full front to rear engagement of the tab disabling arm to the skip tab latch as shown in the side view.

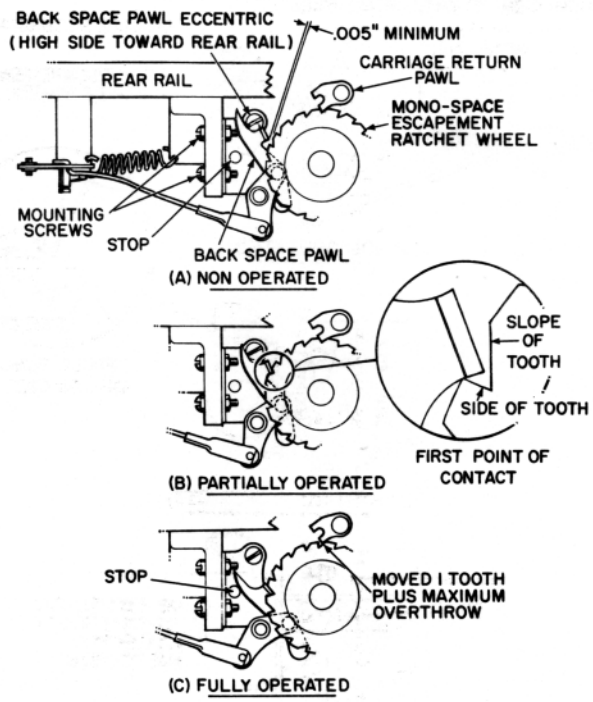
4. Adjust the tab disabling arm to obtain .003" to .010" clearance below the skip tab latch and a full to .010" past full engagement of the skip tab latch when the tab disabling arm is in a blocking position (detented toward left side of machine). Check for .030" minimum lateral clearance between the skip tab latch and the tab disabling arm with the disabling arm in restore position (detented toward the right side of the machine). Readjustment of the skip tab assembly at its mounting (step 3) may be necessary to obtain the requirements of step 4.

ADJ. 33 SCRT CONTACTS



When operated, the carriage return and tab contacts should open with .020" minimum clearance. Adjust the stationary springs or the contact mounting bracket as necessary. Check the clearance. in both tab and carriage return operations. The contacts should have .010" minimum follow when non-operated.

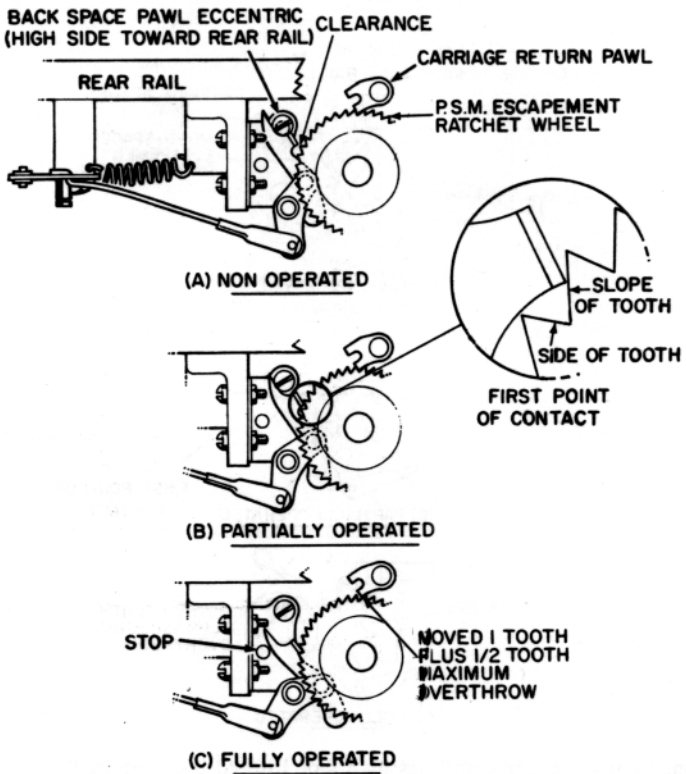
ADJ. 34A BACK SPACE PAWL BRACKET & ECCENTRIC - MONO



1. Set the back space pawl eccentric with its high side toward the rear rail.

2. First, position the back space pawl bracket upward to engage the tooth closest to the rear rail. The main consideration of positioning the bracket from that point is a full but not excessive engagement to the side of a tooth (not the slope) as the back space pawl first contacts the escapement ratchet wheel. With the bracket adjusted for good engagement to the highest tooth possible, check for .005" minimum clearance between the back space pawl and the escapement ratchet wheel in their non-operated position. With the bracket and the eccentric adjusted, the back space pawl should rotate the escapement ratchet wheel for 1 tooth plus maximum over throw to the carriage return pawl before limiting on its stop.

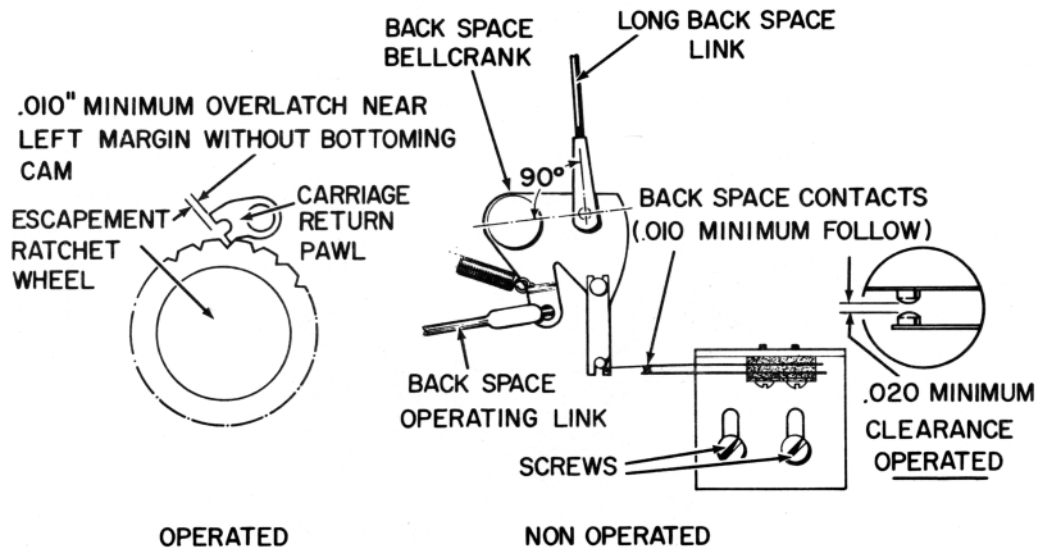
ADJ. 34B BACK SPACE PAWL BRACKET & ECCENTRIC - PSM



1. Set the back space pawl eccentric with its high side toward the rear rail.

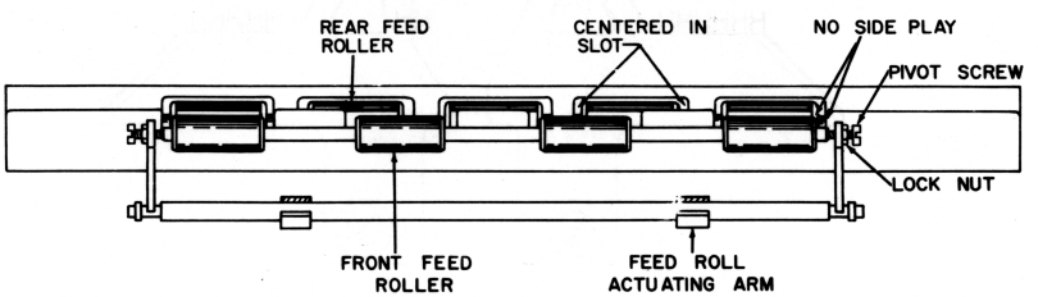
2. First, position the back space pawl bracket upward to engage the slope of a tooth (not the side) closest to the rear rail, and then make a final adjustment of the bracket so that the back space pawl rotates the escapement ratchet wheel 1 1/2 teeth before limiting on its stop. Check for clearance between the back space pawl and the escapement ratchet wheel in their non-operated position.

ADJ. 34C BACK SPACE LINKS & CONTACTS



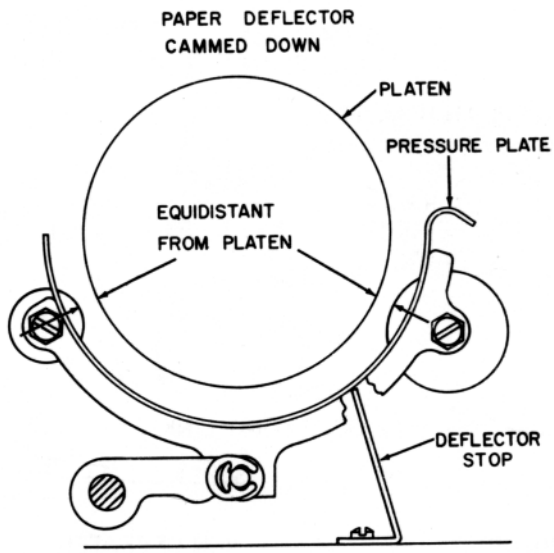
1. The long back space link should be adjusted if necessary to obtain approximately a 90^0 angle between the long back space link and the back space bellcrank.
2. Adjust the back space operating link so that with the back space cam high point against the power roll, the escapement ratchet wheel is operated one full tooth plus .010" minimum overlatch to the carriage return pawl with the carriage near but not at the left margin. The overlatch should not be so great as to cause the back space cam to choke off on the power roll.
3. With the high point of the back space cam against the power roll, the back space contacts should open with .020" minimum clearance. The contacts should have a .010" minimum follow when non-operated.

ADJ. 35 PAPER DEFLECTOR FEED ROLLERS



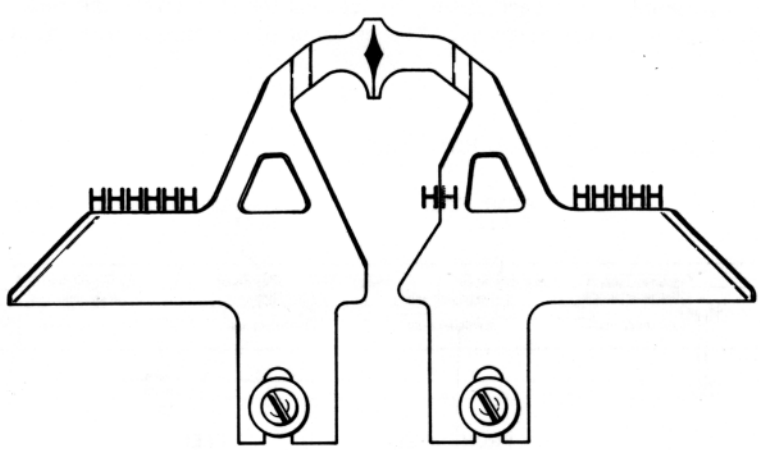
The pivot screws are to be adjusted to center the front and rear feed rollers in their slots without side play but perfectly free to rotate.

ADJ. 36 PAPER DEFLECTOR STOP



When the paper release lever is forward, the deflector stop should be adjusted to hold the front and rear rollers an equal distance from the platen.

ADJ. 37 LINE GAUGE CARD HOLDER - PSM



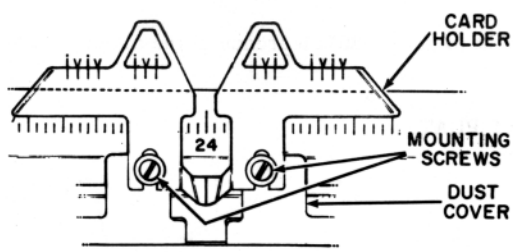
Type a series of H's (5 or 6). Space the carriage 20 or 30 times and type another series of H's. Move the carriage back as indicated below and type two H's approximately in the center of the spaced

portion of the line.

1/32" - Back space the carriage 16 units.
1/36" - Back space the carriage 18 units.
1/40" - Back space the carriage 20 units.
1/48" - Back space the carriage 22 units.

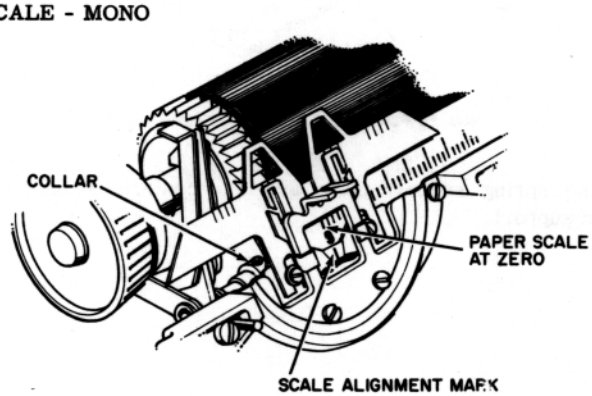
Position the card holder to fall on the writing line and so that the right hand vertical edge is midway between the two H's as shown.

ADJ. 38A LINE GAUGE CARD HOLDER - MONO



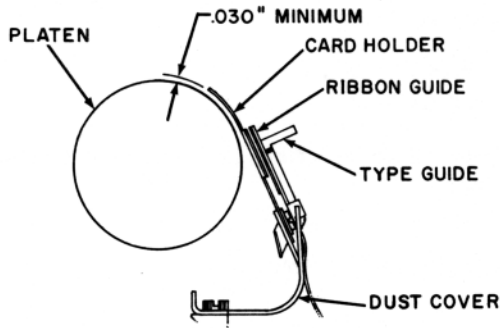
Strike several characters and align the small vertical lines on the line gauge card holder to the center of the characters as shown. Position the card holder up or down to fall on the "writing line".

ADJ. 38B PAPER SCALE - MONO



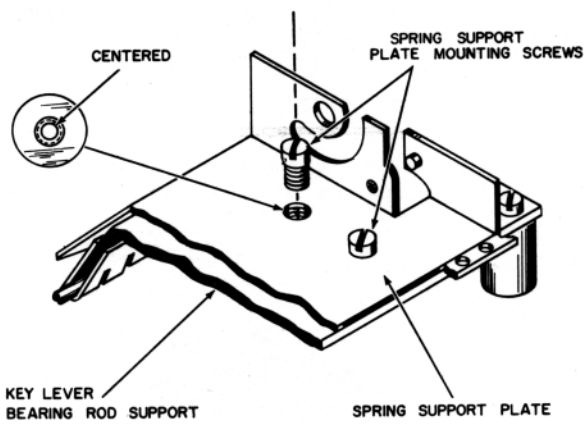
Pull the carriage to the extreme right against the final stop and then release. In this position, the paper scale should read zero at the scale alignment mark. Adjust the collar to the right or left to position the paper scale.

ADJ. 39 LINE GAUGE CARD HOLDER CURVATURE



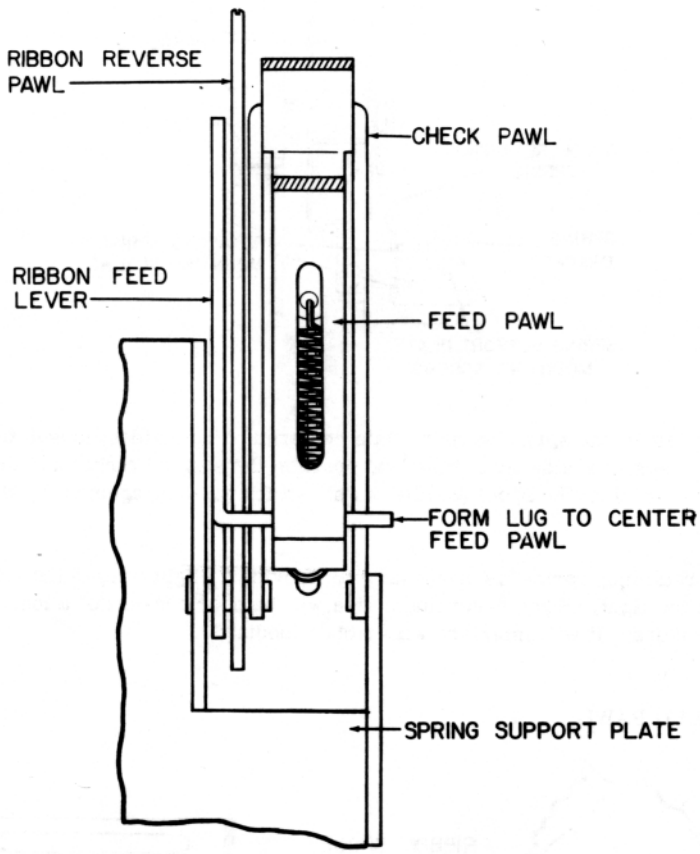
The line gauge-card holder is to have .030" clearance to the platen. Form the card holder as required.

ADJ. 40A SPRING SUPPORT PLATE



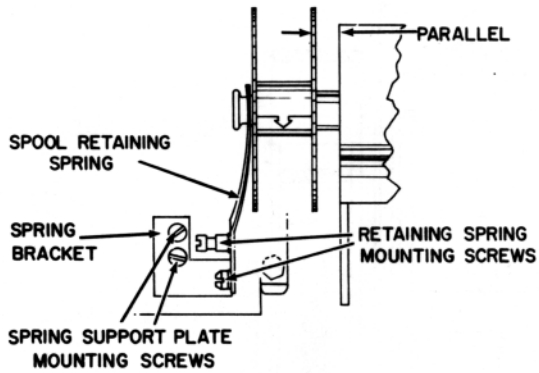
The screw holes in the spring support plate are to be centered as shown over the screw holes in the keylever bearing rod support.

ADJ. 40B RIBBON FEED LEVER LUG



The feed pawl is to be centered in the check pawl as shown so that it is free of all binds. Form the lug of the ribbon feed lever as required.

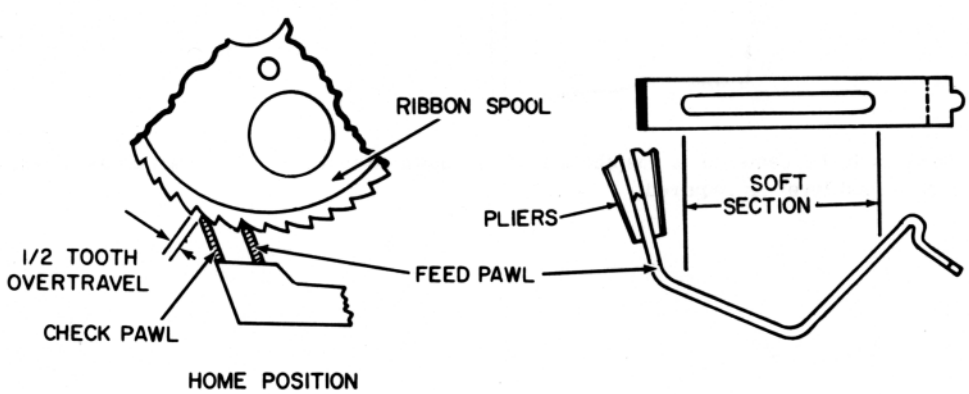
ADJ. 40C RIBBON SPOOL TENSION & ALIGNMENT



1. With the screw holes in the spring support plate centered on both sides, loosen the spring support plate mounting screws one side at a time and position the spring bracket and the spool retaining spring if necessary, to align the spool parallel as shown for good engagement by the feed and check pawls.

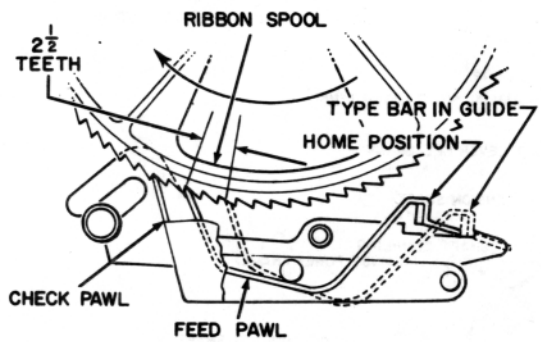
2. Form the spool retaining spring as necessary to provide a slight drag to the ribbon spool. If the amount of drag is too light, ribbon reversing action will be poor because of a loosely wound ribbon. If there is too much drag, it will interfere with ribbon feeding.

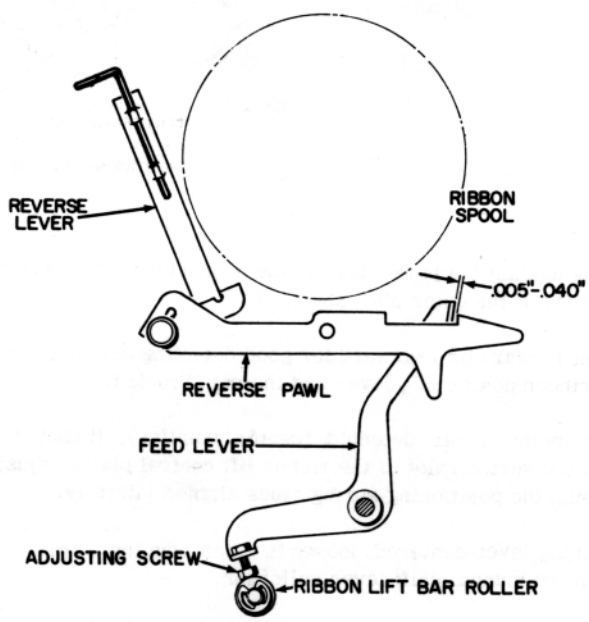
ADJ. 40D RIBBON FEED PAWL



With the ribbon feed mechanism in home position, the check pawl should have approximately 1/2 tooth overtravel to the ribbon spool when the spool is held against the feed pawl. Carefully form the feed pawl as shown to obtain this requirement. Check to see that the feed pawl has good engagement and disengagement from the spool after forming by operating the manual ribbon reverse lever.

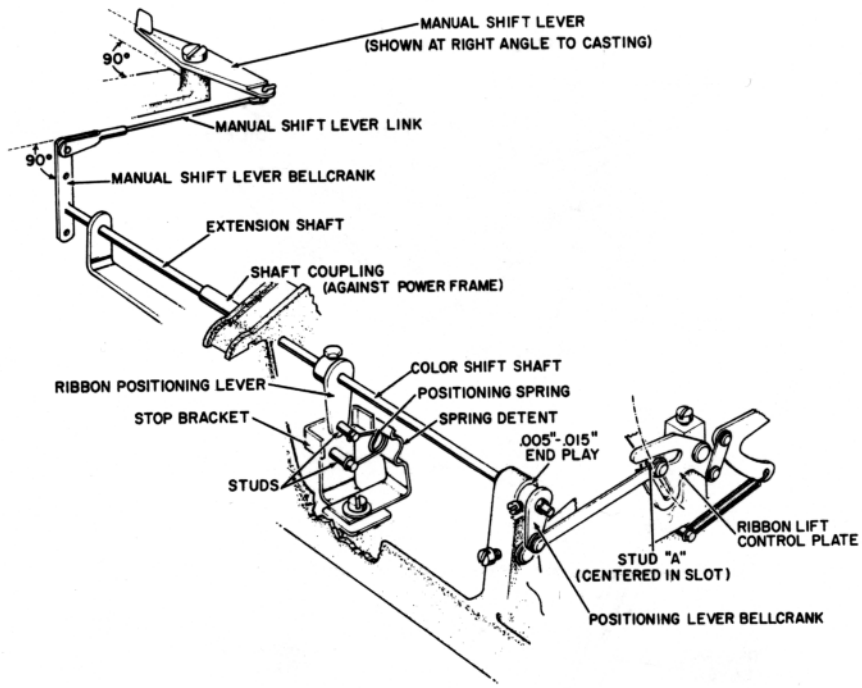
ADJ. 40E RIBBON FEED LEVER





The movement of the ribbon feed lever should operate the feed pawl for an overlatch of approximately 2 1/2 teeth as a typebar is manually raised against the platen. A .005" to .040" clearance between the ribbon reverse pawl and the ribbon feed lever should also be maintained. It is only necessary to have clearance at this point, but a .040" maximum clearance will insure reliable ribbon reversing. Adjust the ribbon feed lever adjusting screw to obtain the above requirements.

ADJ. 41 COLOR SHIFT ADJUSTMENT



1. With the shaft coupling against the power frame, the positioning lever bellcrank should be adjusted for .005" to .015" end play of the color shift shaft.

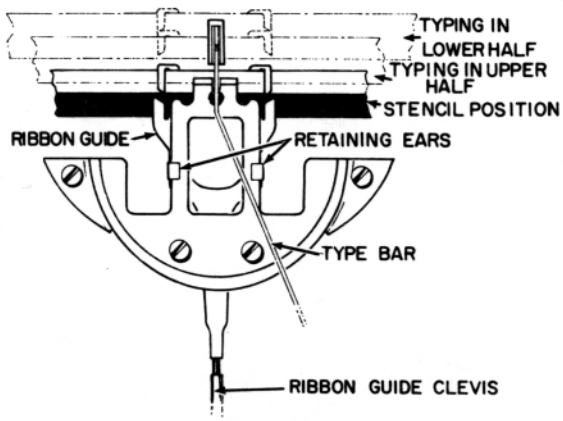
2. Form the spring detent forward or rearward for good detenting action and up or down to vertically align the studs on the ribbon positioning lever and the stop bracket.

3. With the ribbon positioning lever detented (center position), it should position the color shift shaft to align stud A in the vertical slot of the ribbon lift control plate. Adjust the ribbon positioning lever as required keeping the positioning spring studs aligned laterally.

4. With the ribbon positioning lever centered, loosen the shaft coupling screws and rotate the extension shaft to vertically align the manual shift lever bellcrank.

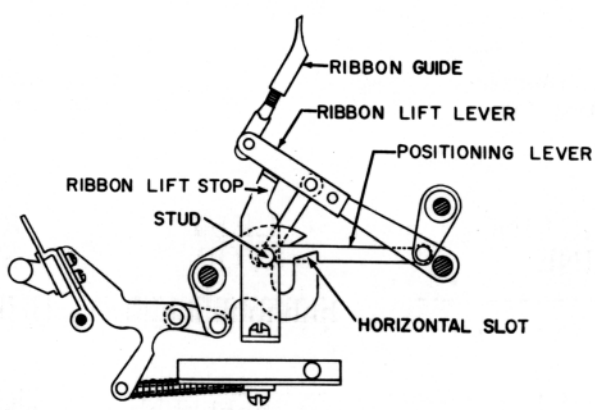
5. Adjust the manual shift lever link with the ribbon positioning lever centered so that the manual shift lever will extend at right angles to the side of the machine.

ADJ. 42 RIBBON GUIDE



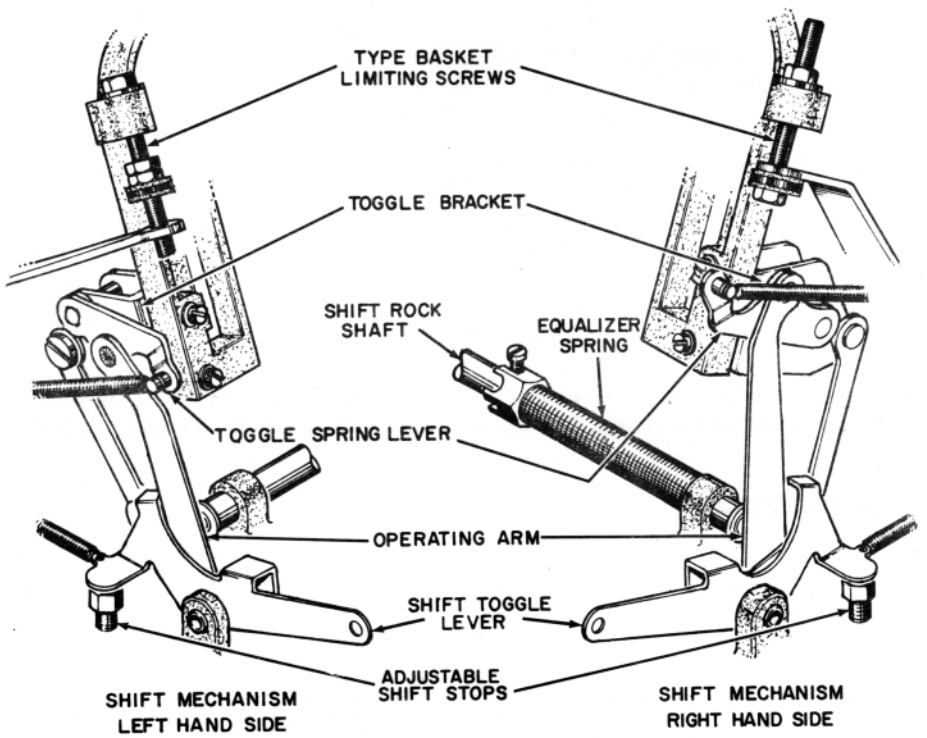
The ribbon guide clevis should be adjusted so that a typebar character will strike the full upper half or the full lower half of the ribbon. Check with a long character such as a diagonal (/).

ADJ. 43 RIBBON LIFT STOP



The stud at the end of the positioning lever should be approximately centered in the horizontal slot of the ribbon lift control plate when the ribbon guide is restored. Form the ribbon lift stop.

ADJ. 44A TYPE BASKET



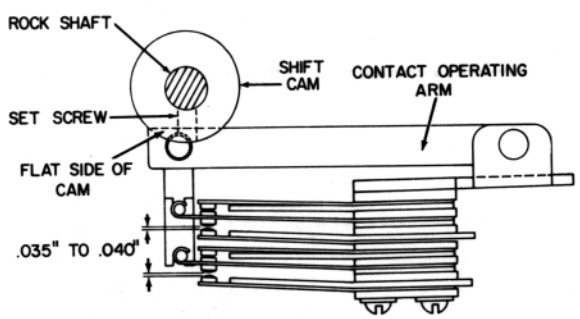
	WRITING LINE	LEFT STOP	RIGHT STOP
TOO HIGH			
TOO LOW			
RIGHT			

1. The equalizer spring is adjusted to counteract the weight of the type basket and enables it to shift upward as easily as it shifts downward. However, a more precise setting of the spring is necessary to establish a writing line guide for the upper and lower case adjustments of the type basket. With the front of the springs unhooked from the toggle spring levers, adjust the equalizer spring tension to float the basket at a point where equal portions of upper and lower case full height characters (H, L, B, etc.) can be typed as shown by the writing line example.

2. Back off the type basket limiting screws so they can not interfere with the adjustments. Unhook the springs from the toggle spring levers and type several lines of full height characters with the basket floating (equalizer spring correctly adjusted). Rehook the springs, shift the basket to lower case and type several full height characters between the previously typed floating characters. Adjust the left adjustable shift stop to position the lower case characters an equal distance between the floating characters as shown by the left stop examples. With the basket in upper case, adjust the right adjustable shift stop for the same requirements as shown by the right stop examples.

3. The type basket limiting screws are to be adjusted for no pressure-no clearance and are not to change the basket positioning in upper or lower case.

ADJ. 44B SHIFT CAM & CONTACTS

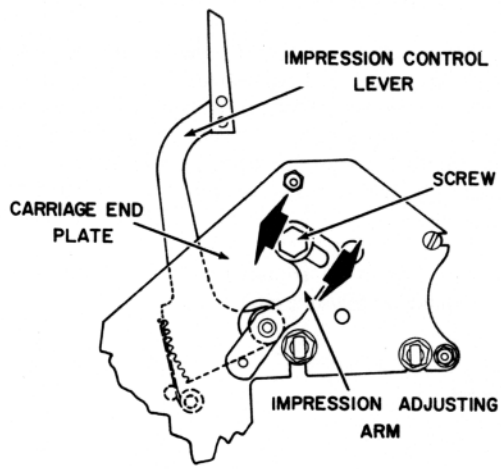


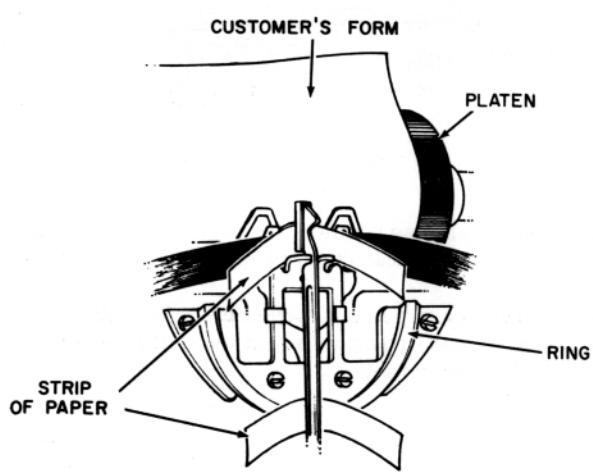
LOWER CASE (LTRS) POSITION

1. With the type basket in the lower case position, the contact operating arm should rest fully against the flat side of the shift cam. Loosen the set screw and rotate the shift cam.

2. With the type basket in lower case position, adjust the N/O contacts for .035" to .040" clearance. With the type basket in upper case position, adjust the N/C contacts for .035" to .040" clearance. Check all contacts for .010" minimum follow.

ADJ. 45 RING & CYLINDER

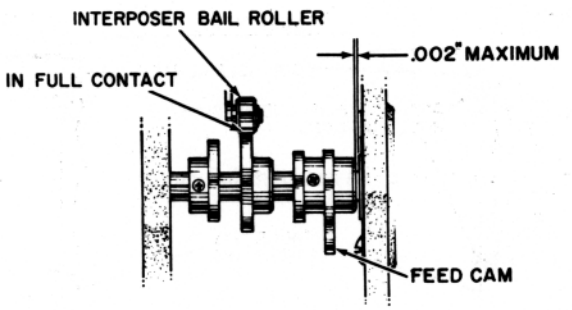




Set the impression control lever in its most forward position. Bring a typebar against the platen (including the fabric ribbon and the customers form). In lower case the typebar should touch the ring with pressure equal to the pressure against the platen. Also the pressure against the platen should be equal throughout the movement of the carriage. Adjust for these requirements by setting the impression adjusting arms at either side of the carriage. Check the adjustment by inserting a strip or paper first between the ring and a typebar and then between the ribbon and a typebar, with the typebar held against the platen. The drag on the strip of paper as it is pulled should be equal for both ring and cylinder (platen) anywhere on the platen. Use several typebars to insure accuracy. Set carbon ribbon machines for less pressure against the platen than the ring; the amound determined by the quality of typing.

READER

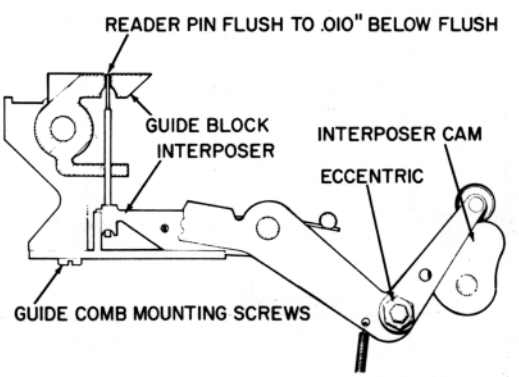
ADJ. 1 FEED CAM & INTERPOSER CAM



1. Position the feed cam so that the cam shaft turns freely but with no more than .002" end play.

2. The lateral positioning of the interposer cam should be such that the bail roller engages the cam 100%.

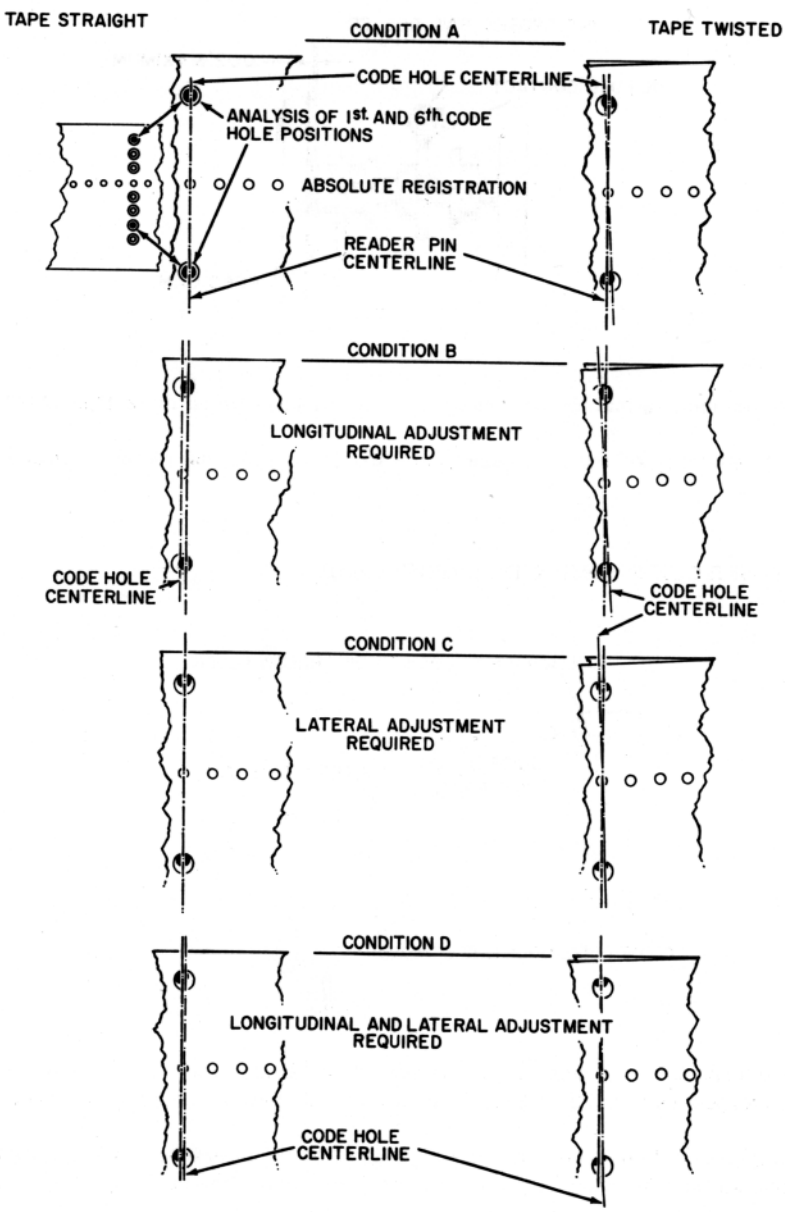
ADJ. 2 INTERPOSER GUIDE COMB & INTERPOSER BAIL

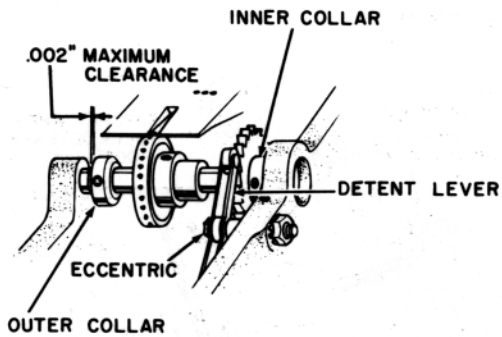


1. Loosen the interposer guide comb mounting screws and center the guide comb over the interposers so that the interposers and reader pins move freely. Tighten the mounting screws.

2. With the interposer bail roller on the high dwell of the interposer cam, position the interposer bail eccentric so that the reader pins are flush to .010" below the guide block surface.

ADJ. 3A LATERAL & LONGITUDINAL REGISTRATION





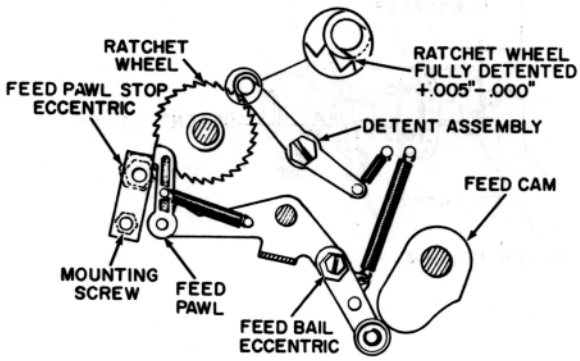
Exercise caution when interpreting an existing tape registration condition. As shown on the chart, Condition A can be seen as an absolute tape registration with the centerlines aligned, but can be misinterpreted as requiring adjustment when the tape is twisted. With the tape straight, the centerlines under Condition B are parallel and a longitudinal adjustment is required only, but appears to require lateral adjustment also when the tape is twisted. When the centerlines under Condition C are aligned, the condition can easily be recognized as requiring a lateral adjustment only. With the tape twisted, the centerlines cross each other and the condition appears to require longitudinal and lateral adjustment. When the center lines are aligned under Condition D they show that a lateral and longitudinal adjustment are required but with the tape twisted it appears to require lateral adjustment only.

1. Using a length of standard punched tape, loosen the setscrews on the front pinwheel collar and laterally center the code holes over the reader pins. Tighten the setscrews.

2. Limit the front pinwheel shaft end play by positioning the shaft collar to allow a .002" maximum clearance with the shaft rotating freely.

3. Loosen the detent lever eccentric and position the eccentric so that the code holes are longitudinally centered over the reader pins. Tighten the eccentric.

ADJ. 3B FEED BAIL & FEED PAWL STOP

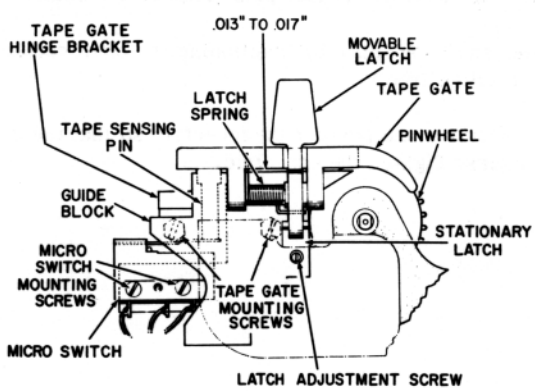


1. Adjust the feed bail eccentric so that the feed pawl rotates the ratchet wheel one full tooth +.005" - .000" when the feed bail roller is on the high dwell of the feed cam.

2. With the feed bail roller on the high dwell of the feed cam, loosen the feed pawl stop mounting screw and eccentric and position the stop to prevent any tendency of the feed pawl and ratchet wheel to over travel without choking off the feed pawl.

TAPE READER

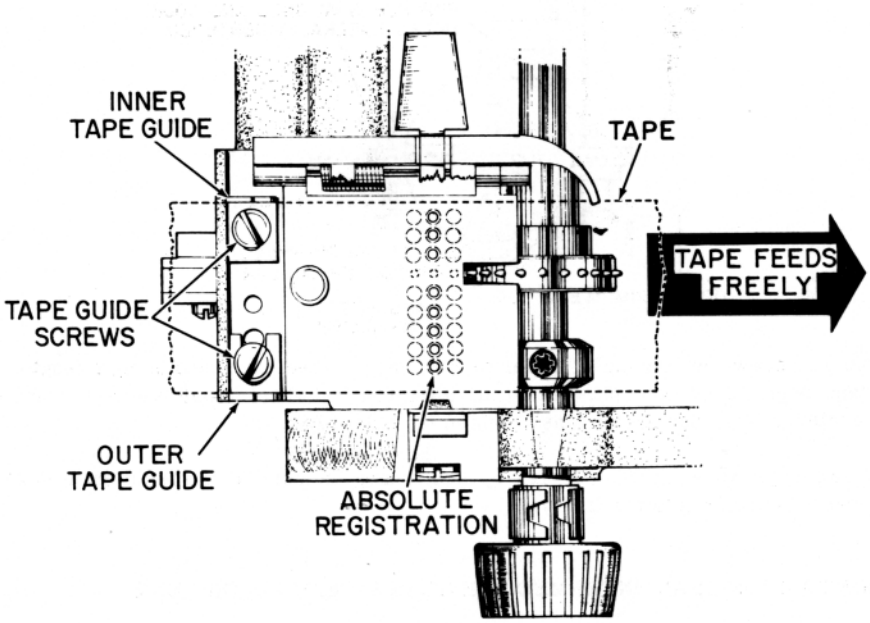
ADJ. 4 TAPE GATE & SRT MICRO SWITCH



1. Loosen the tape gate adjustment screws and the stationary latch adjustment screw and position the gate and the latch to allow an even clearance of .013" to .017" between the surface of the guide block and the tape gate. Tighten the adjustment screws. The gate must operate freely and unlatch with ease.

2. Loosen the micro switch mounting screws and position the micro switch so that with tape in the reader, the micro switch is operated by the tape sensing pin. With the removal of the tape, the micro switch should be non-operative. Tighten the mounting screws.

ADJ. 5 INNER & OUTER TAPE GUIDES

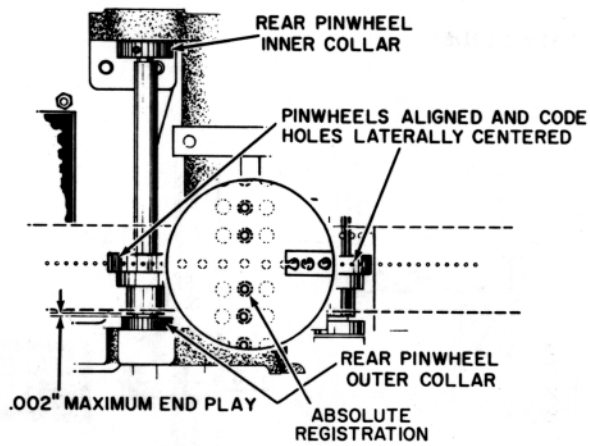


1. Loosen the inner tape guide screw and with tape in the reader, center the code holes over the reader pins and position the guide just to the edge of the tape. Tighten the screw.

2. Loosen the outer tape guide screw and limit the side movement of the tape by positioning the guide to the tape but allowing the tape to feed freely. Tighten the screw.

EDGE CARD READER

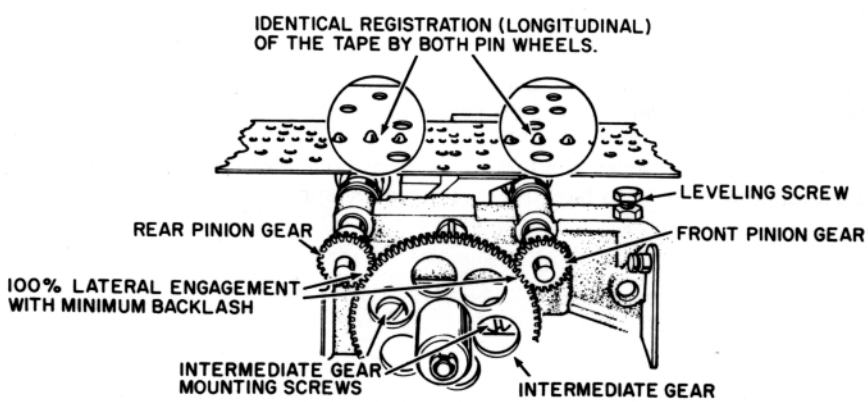
ADJ. 6A REAR PINWHEEL LATERAL REGISTRATION & END PLAY



1. Loosen the setscrews on the inner collar of the rear pinwheel shaft and using a length of standard punched tape engaged by both pinwheels, align the rear pinwheel to hold the code holes in the tape laterally centered over the reader pins. Tighten the setscrews.

2. Limit the rear pinwheel shaft end play by positioning the outer collar to allow a .002" maximum clearance with the shaft rotating freely.

ADJ. 6B FRONT PINION GEAR, INTERMEDIATE GEAR & REAR PINION GEAR

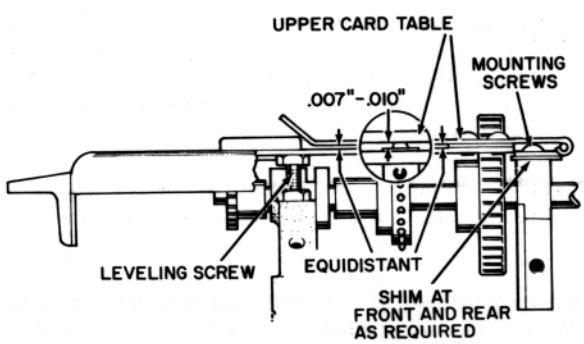


1. Loosen the setscrews on the front pinion gear and position the gear to engage the intermediate gear 100%.

2. Loosen the intermediate gear mounting screws and position the intermediate gear so that with the detent lever held away from the ratchet wheel, all three gears rotate freely without drag or binding areas. When the ratchet wheel is engaged, there should be a minimum of backlash in the intermediate gear. Tighten the mounting screws.

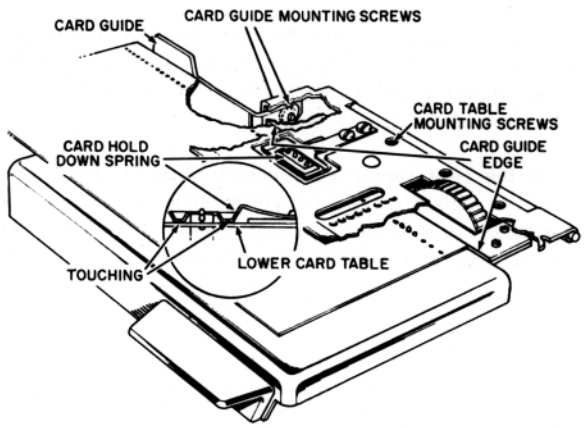
3. Loosen the setscrews on the rear pinion gear and position the rear pinwheel for full engagement of the feed holes in the tape. Position the rear pinion gear laterally for 100% engagement with the intermediate gear and rotationally so that the rear pinwheel tracks evenly with the front pinwheel without creating slack in the tape between the pinwheels or elongating the feed holes. Tighten the setscrews.

ADJ. 7A CARD TABLE HEIGHT



Loosen the card table mounting screws. Shim the right side of the table equally and adjust the leveling screw to allow a clearance of .007" to .010" between the body of the pinwheel and the upper card table with equal spacing across the surface of the guide block. Tighten the screws.

ADJ. 7B CARD TABLE REGISTRATION, CARD GUIDE & CARD HOLD DOWN SPRING

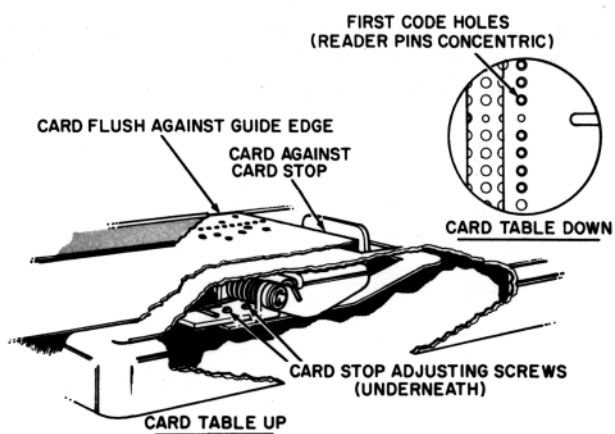


1. Remove the card hold down spring. Loosen the card table mounting screws and with a length of standard punched tape or edge card engaging both pinwheels, position the card table so that the guide edge is just touching the edge of the tape or card without pressure and the reader pin holes in the upper card table are as nearly centered as possible over the reader pins. Tighten the mounting screws and install the card table spring.

2. With an edge card against the right guide edge, loosen the card guide mounting screws and position the card guide so that its surface is fully touching the edge of the card. Tighten the mounting screws.

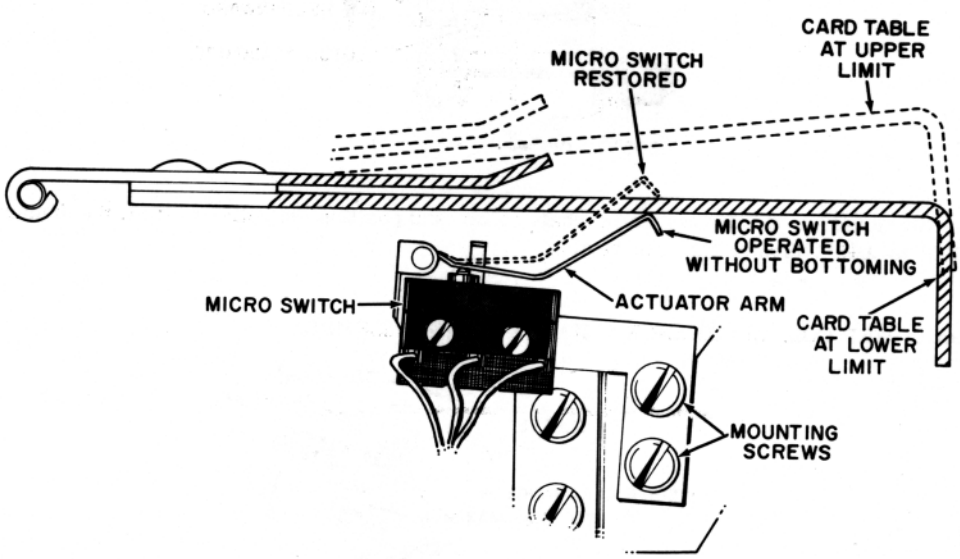
3. Loosen the card hold down spring mounting screws and form the spring so that it just touches the lower card table and the rectangular opening is visually centered over the pinwheel. Tighten the mounting screws.

ADJ. 7C CARD STOP



With the card table in its raised position, insert an edge card in the reader so that it is fully against the right guide edge. Loosen the card stop mounting screws and position the stop with the leading edge of the card flush against the full length of the card stop so that the first code holes in the card are concentric with the reader pins when the card table is lowered. Tighten the mounting screws.

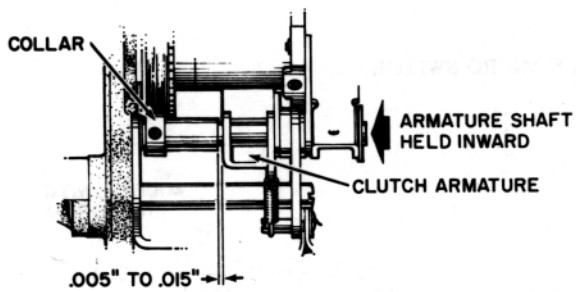
ADJ. 7D CARD TABLE MICRO SWITCH



The reader cuts off when the card table is in its raised position and reads when in its lowered position. Loosen the micro switch bracket mounting screws and position the bracket or form the actuator arm so that the micro switch operates or restores before the card table reaches its limit in either direction. Tighten the mounting screws.

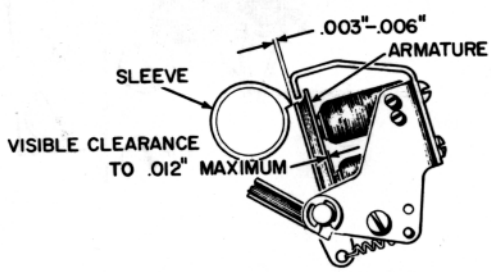
ALL READERS

ADJ. 8 ARMATURE SHAFT COLLAR



Loosen the setscrew on the armature shaft collar and position the collar to limit the armature side play .005" to .015". Tighten the setscrew.

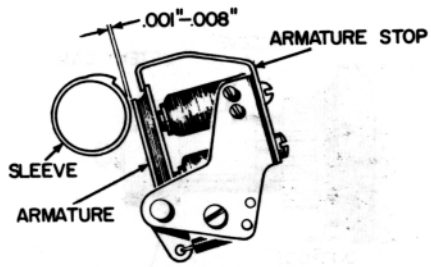
ADJ. 9A LOWER COIL CLEARANCE & MAGNET YOKE ASSEMBLY



1. While holding the armature flat against the upper magnet core, there should be visible clearance to .012" maximum between the armature and the lower coil core. A clearance in excess of .012" indicates replacement of the upper coil and/or the armature.

2. Position the magnet yoke assembly to allow a clearance of .003" to .006" between the armature and the clutch sleeve lip when the armature is held flat against the upper coil core.

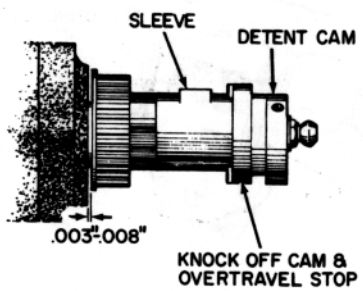
ADJ. 9B ARMATURE STOP

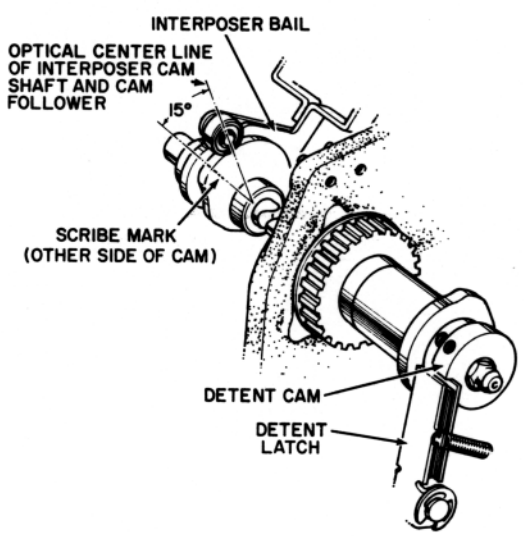


Form the armature stop to allow a clearance of .001" to .008" between the armature and the low surface of the clutch sleeve when the armature is in its non-attracted position.

ADJ. 9C CLUTCH HOME POSITION & PULLEY END PLAY

725 RPM READERS



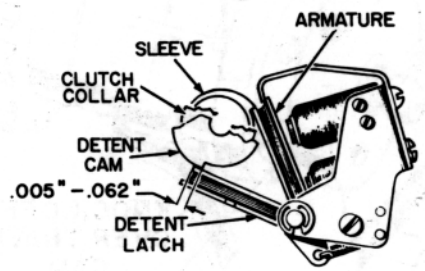


To obtain the clutch home position, attach timing dial T-18088 to the left end of the cam shaft. Rotate the shaft so that the scribe mark on the interposer cam is aligned with the center of the roller on the interposer bail. Set the timing dial for zero degrees at any fixed point on the outer casting and tighten the dial. Retard the cam shaft 15^0 and set the detent cam to just engage the detent latch. At this time check the lateral position of the detent cam so that the pulley has an end play of .003" to .008".

675 RPM READERS

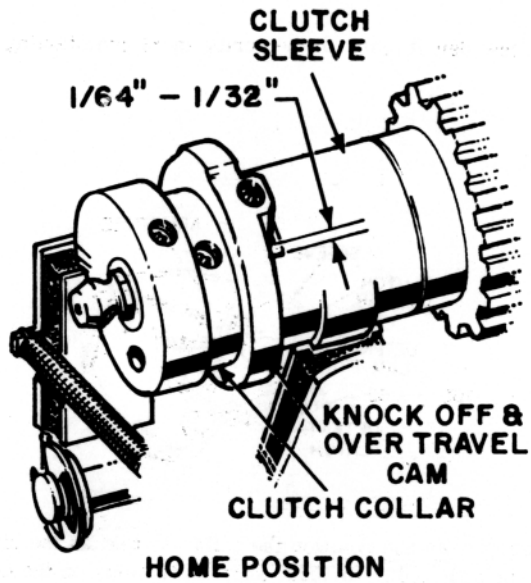
Set the home position of the detent cam to the scribe mark maintaining .003" to .008" end play of the pulley.

ADJ. 9D CLUTCH COLLAR



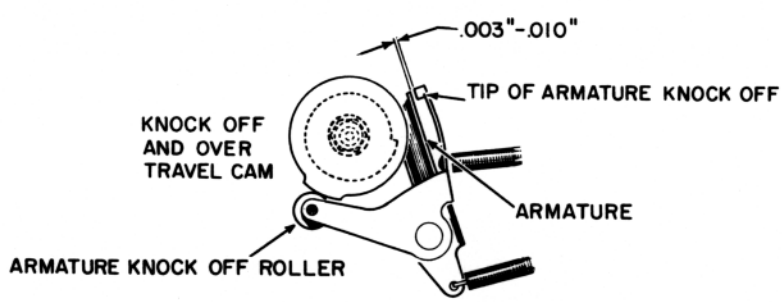
Loosen the clutch collar setscrews and position the collar so that as the clutch sleeve lip touches the armature, the detent cam is still .005" to .062" short of latching on the detent latch. Pull the collar towards the detent cam while tightening the setscrews.

ADJ. 9E KNOCK OFF & OVER TRAVEL CAM



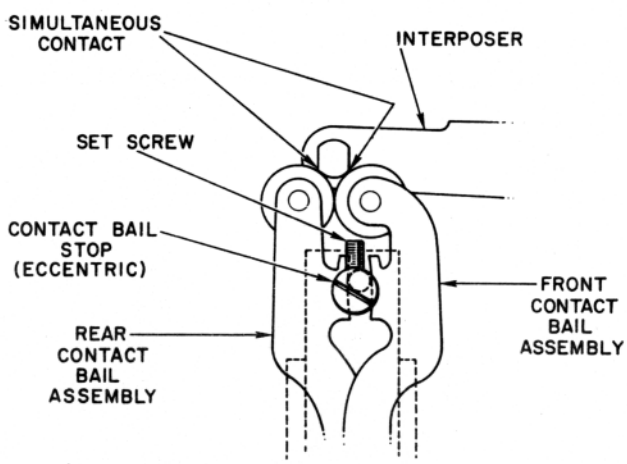
With the clutch in home position, loosen the setscrews on the knock off & over travel cam. Rotate the cam towards the lower end of the cut out in the clutch sleeve and allow a gap of 1/64" to 1/32". This should allow sufficient over travel distance between the detent cam and the detent latch. Pull the cam towards the clutch collar while tightening the setscrews.

ADJ. 9F ARMATURE KNOCK OFF



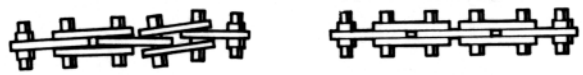
Form the armature knock off to allow a .003" to .010" clearance between the tip of the armature knock off and the armature when the armature knock off roller is on the high dwell of the knock off and over travel cam.

ADJ. 10 CONTACT BAIL ECCENTRIC STOP



The studs on the interposer bails must contact the rollers on the front and rear contact bails simultaneously. To adjust, loosen the setscrews which retain the ends of the eccentric stop in the inside and the outside contact bracket ties. Turn the eccentric stop as necessary to meet the requirement. Tighten the setscrews.

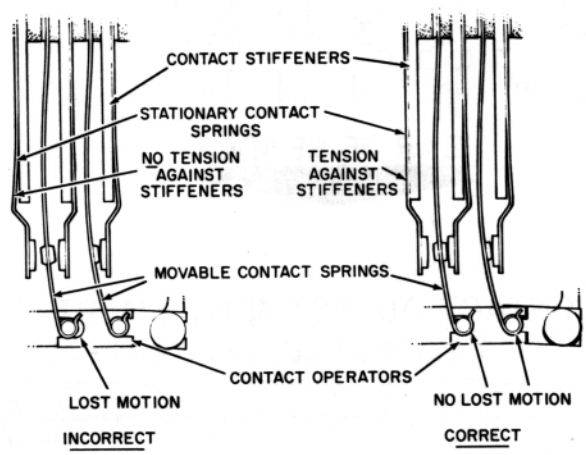
ADJ. 10A CONTACT STACKUP ALIGNMENT



INCORRECT CORRECT

Check to see that the contact stackups are aligned sideways and that the mating contact points are no more than .015" out of alignment. When necessary, loosen the contact assembly mounting screws to align the stackups.

ADJ. 10B CONTACT SPRING TENSION

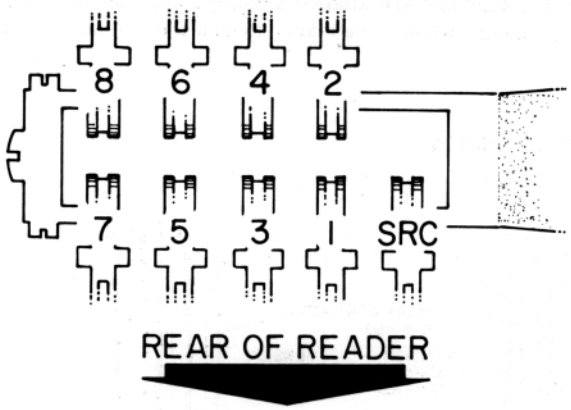


1. The moveable contact springs should have sufficient tension to follow the operators without lost motion. Form or replace the moveable contact springs when necessary.

2. The stationary contact springs should have sufficient tension against the contact stiffeners. When necessary, form or replace the stationary contact springs.

ADJ. 10C READER CONTACT ADJUSTMENTS

TAPE AND EDGE CARD READERS
(BOTTOM VIEW)



CONTACT ADJUSTMENT CHART
2200 – 2300 SERIES FLEXOWRITER READERS

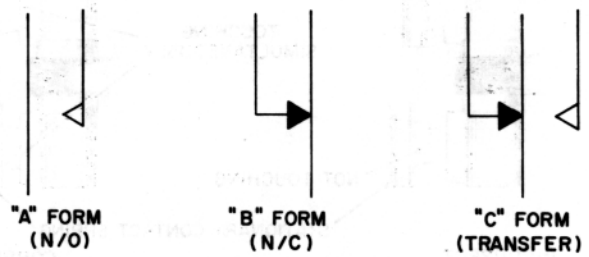
SPRINGS		1	2	3	4	5	6	7	8	9	10	11	12
SR-1	N/O												
	N/C												
SR-2	N/O												
	N/C												
SR-3	N/O												
	N/C												
SR-4	N/O												
	N/C												
SR-5	N/O												
	N/C												
SR-6	N/O												
	N/C												
SR-7	N/O												
	N/C												
SR-8	N/O												
	N/C												

ADJUST ALL CONTACTS
TO A .015" – .020" AIR GAP

1. With a length of blank tape in the reader and the interposer bail roller on the low dwell of its cam, adjust the normally open (N/O) contacts to the air gap indicated on the above chart.

2. With the tape removed from the reader and the interposer bail roller on the low dwell of its cam, adjust the normally closed (N/C) contacts to the air gap indicated on the above chart.

ADJ. 10D READER COMMON CONTACT ADJUSTMENTS



CONTACTS SHOWN UNOPERATED

(INTERPOSER BAIL ON HIGH DWELL OF CAM)

The following adjustments for "A" Form (N/O), "B" Form (N/C) and "C" Form (Transfer) contacts are to be considered standard.

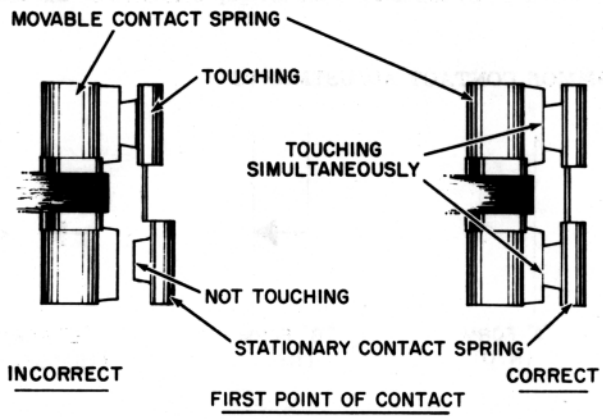
1. "A" Form (N/O) - With the clutch in home position (interposer bail on the high dwell of its cam) adjust the normally open (N/O) contacts to a .015" to .020" air gap.

2. "B" Form (N/C) - With the cam shaft cycled (interposer bail on the low dwell of its cam) adjust the normally closed (N/C) contacts to a .015" to .020" air gap.

3. "C" Form (Transfer) - With the clutch in home position (interposer bail on the high dwell of its cam) adjust the normally open (N/O) contacts to a .015" to .020" air gap. With the cam shaft cycled (interposer bail on the low dwell of its cam) adjust the normally closed (N/C) contacts to a .015" to .020" air gap.

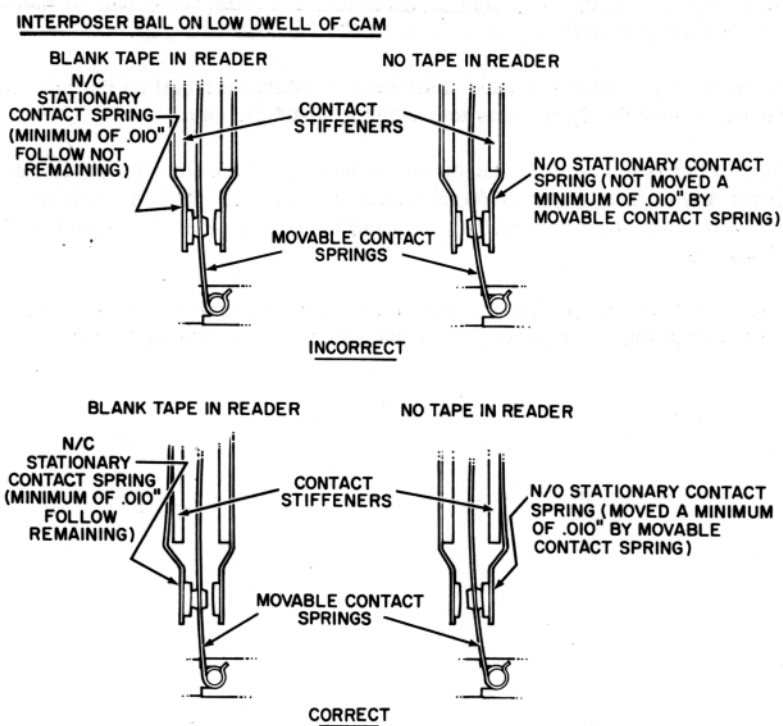
NOTE: The "C" Form (Transfer) adjustment listed provides a break before make operation. If other than this is required, it will be listed per the Reader Manufacturing Specification.

ADJ. 10E CONTACT MATING



Both contacts on all stationary springs (N/O and N/C) should touch the contacts on the moveable contact springs simultaneously.

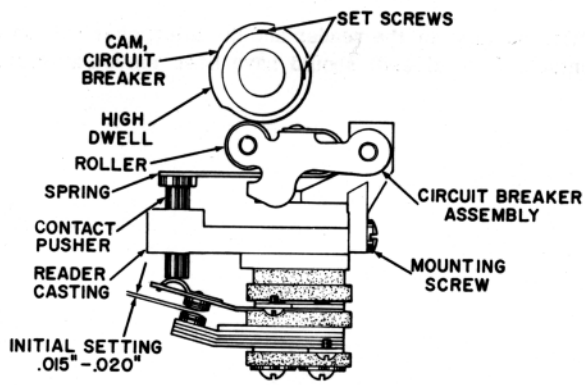
ADJ. 10F CONTACT FOLLOW



1. N/C Contacts - With a blank tape in the reader and the interposer bail on the low dwell of its cam, all normally closed contacts should have a minimum of .010" follow still remaining.

2. N/O Contacts - With no tape in the reader and the interposer bail on the low dwell of its cam, all normally open contacts (now closed) should have been moved a minimum of .010" by the movable contact spring.

ADJ. 11 CIRCUIT BREAKER ASSEMBLY TIMING (SRCC-1, SRCC-2)



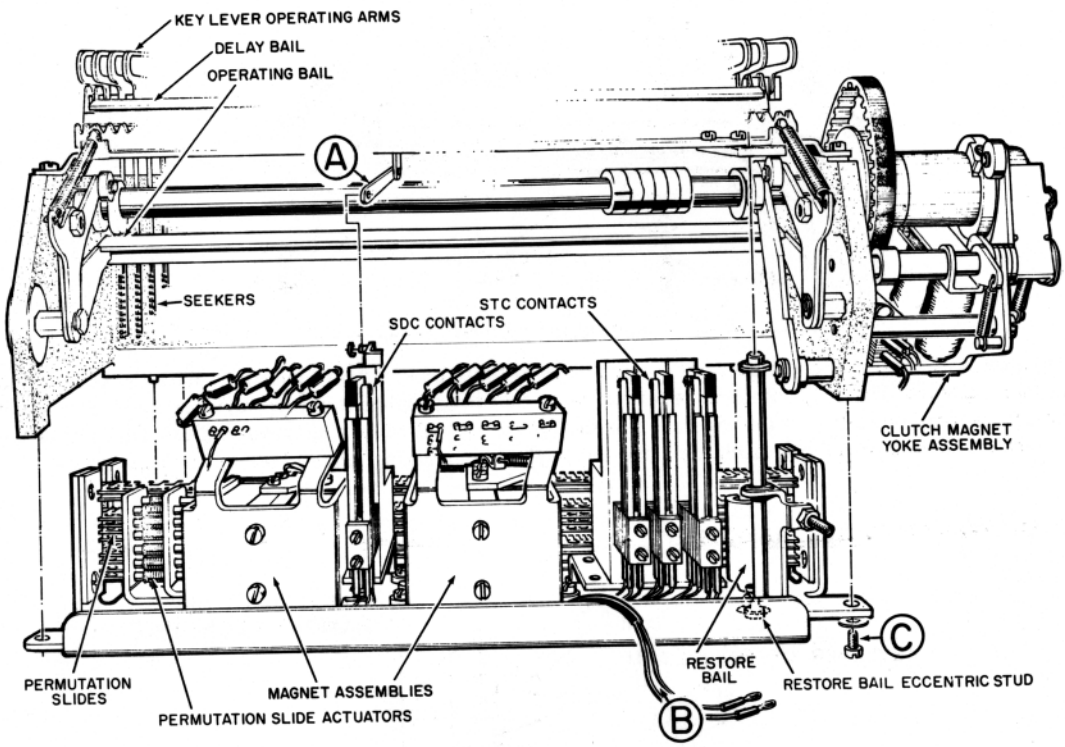
CONTACT	MAKE	BREAK	DURATION OF CLOSURE
SRCC-1 (675 RPM READERS)	59°	136°	77°
SRCC-1 (725 RPM READERS)	74°	151°	77°
SRCC-2	310°	20°	70°

1. Duration - Raising or lowering the circuit breaker assembly by loosening the mounting screws determines the contact clearance with the roller on the low dwell of the cam and therefore the duration or length of time the contacts are made on the high dwell of the cam. Begin with the circuit breaker assembly adjusted to give an initial setting of .015" to .020" clearance between the contacts with the roller on the low dwell of the cam. With a timing dial (T-18088) attached to the reader shaft, determine the number of degrees the contacts remain closed when operated by the high dwell of the cam as the drive shaft is cycled. Raise the circuit breaker assembly to increase the duration of contact closure and lower to decrease until the correct duration of contact closure is obtained as outlined in the timing chart.

   NOTE: Distortion or weakening of the spring which operates the contact pusher may make it impossible to obtain the correct contact duration. If necessary, replace the circuit breaker assembly.

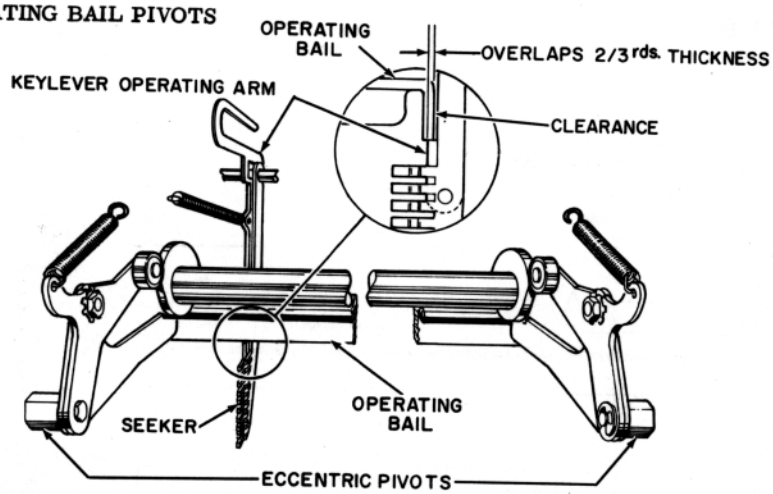
2. Timing - Once the correct duration of contact closure has been obtained, set the SRCC timing cams to make and break according to the specifications called for in the timing chart.

TRANSLATOR



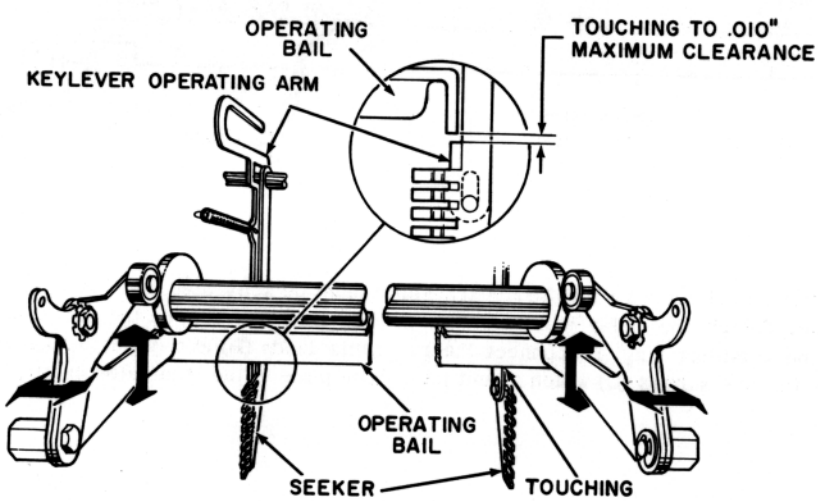
To accomplish adjustments 1A thru 3B, the translator must be separated into two major subassemblies. To separate, detach the delay bail arm (A) from the operator arm on the SDC contact assembly by removing the retaining ring. Disconnect the two cable leads (B) at the clutch magnet yoke assembly and remove the five screws (C) which mount the bottom plate to the translator casting.

ADJ. 1A OPERATING BAIL PIVOTS



1. Turn the left hand and right hand eccentric pivots to their most upward position. With the eccentrics in their upward position, adjust the eccentrics so that the shoulders on the keylever operating arms overlap approximately 2/3 the thickness of the operating bail while maintaining a clearance between the rear surface of the operating bail and the keylever operating arms. Tighten the eccentrics.

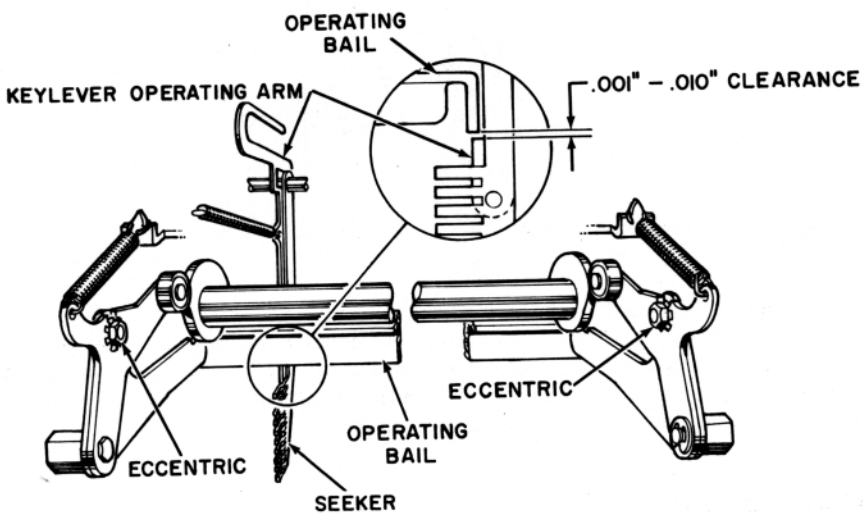
ADJ. 1B OPERATING BAIL ALIGNMENT



1. With the operating bail tension springs detached and the cam shaft rotated so that the seekers are in their forward position, the operating bail should touch the shoulders of the keylever operating arms evenly within .010". Remove and twist the operating bail accordingly to correct a poor condition.

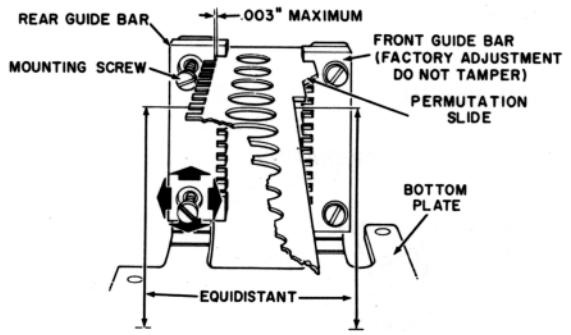
2. Form the ends of the operating bail inward or outward so that the operating bail moves freely. Attach the tension springs.

ADJ. 1C OPERATING BAIL HEIGHT



Adjust the left hand and right hand operating arm eccentrics to allow a vertical clearance of .001" to .010" between the lower edge of the operating bail and the shoulders on the keylever operating arms when the cam shaft is rotated and the seekers have just reached their full forward position.

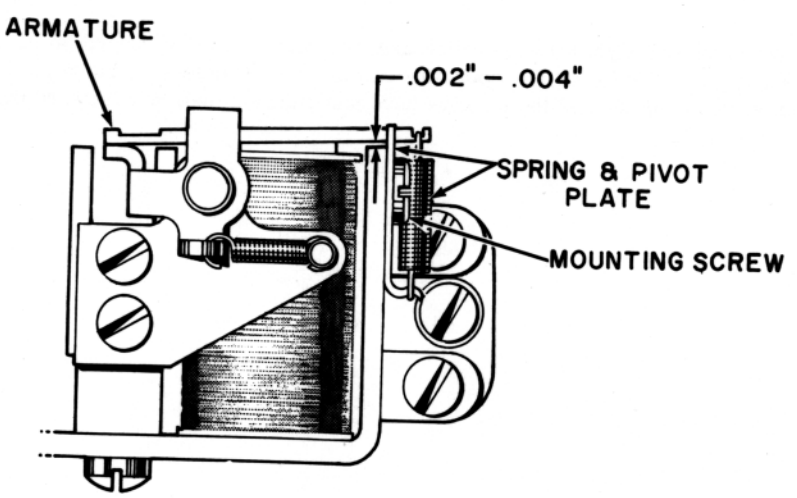
ADJ. 2 FRONT AND REAR PERMUTATION GUIDE BARS



1. Do not tamper with the front permutation guide bars as they are adjusted in a special jig at the factory.

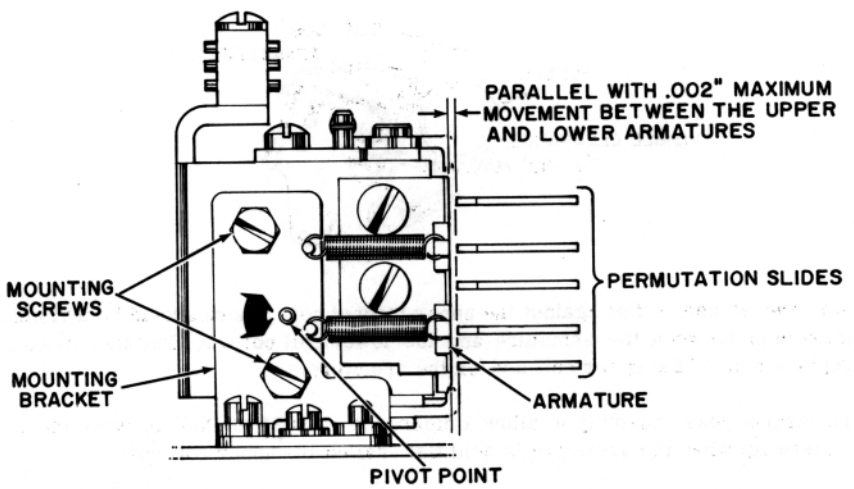
2. Remove the actuator assembly and the SDC contact and block assembly and detach the two magnet yoke assemblies. Loosen the rear permutation guide bar mounting screws and raise or lower the guide bars so that the permutation slides are held parallel to the bottom plate. Position the guide bars forward or rearward to allow free movement of the slides with a maximum of .003" side play. Replace the assemblies and tighten the mounting screws.

ADJ. 3A ARMATURE PIVOT



With the magnet yoke assemblies detached from the translator, loosen the armature pivot mounting screws and with the armatures in their attracted position, adjust the armature pivots to provide a clearance of .002" to .004" using feeler gauges T-18451 and T-18453. Position the armature pivots so that the armatures are aligned with the centers of the magnet cores. Tighten the mounting screws.

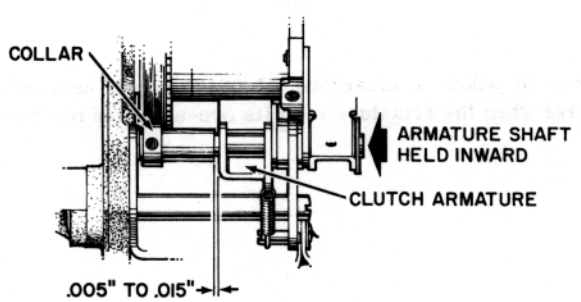
ADJ. 3B MAGNET YOKE ASSEMBLY MOUNTING BRACKETS



Loosen the magnet yoke assembly mounting bracket mounting screws and position the magnet yoke assemblies at their pivot points so they are parallel to the permutation slides. The movement of the upper and lower armatures should not vary more than .002". Tighten the mounting screws.

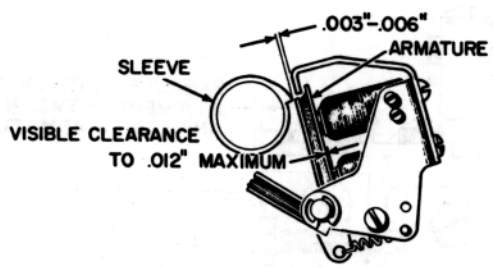
NOTE: To accomplish the remainder of the adjustments, re-assemble the translator.

ADJ. 4 ARMATURE SHAFT COLLAR



Loosen the setscrew on the armature shaft collar and position the collar to limit the armature side play .005" to .015". Tighten the setscrews.

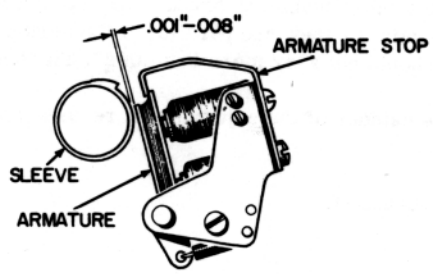
ADJ. 5A LOWER COIL CLEARANCE AND MAGNET YOKE ASSEMBLY



1. While holding the armature flat against the upper magnet core, there should be a visible clearance to .012" maximum between the armature and the lower coil core. A clearance in excess of .012" indicates replacement of the upper coil and/or the armature.

2. Position the magnet yoke assembly to allow a clearance of .003" to .006" between the armature and the clutch sleeve lip when the armature is held flat against the upper coil core.

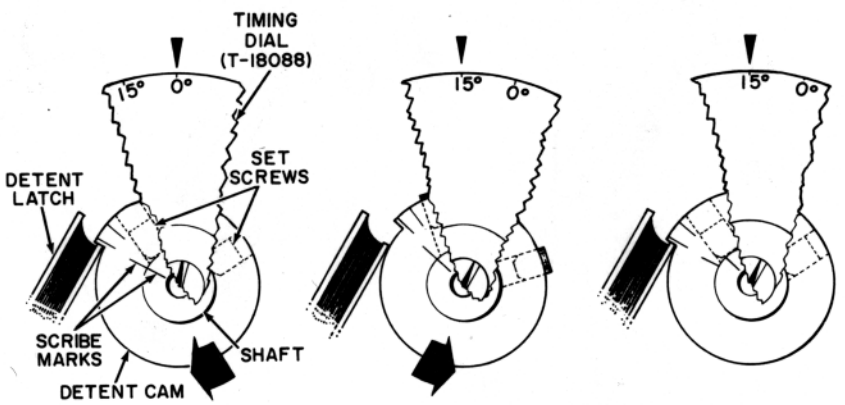
ADJ. 5B ARMATURE STOP



Form the armature stop to allow a clearance of .001" to .008" between the armature and the low surface of the clutch sleeve when the armature is in its non-attracted position.

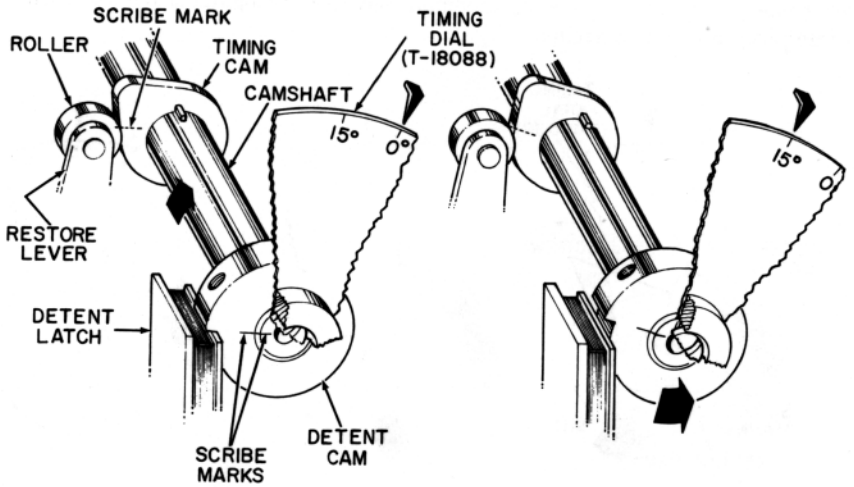
ADJ. 5C CLUTCH HOME POSITION AND PULLEY END PLAY

The clutch home position adjustment is accomplished after recognizing the particular translator concerned within three production groups.



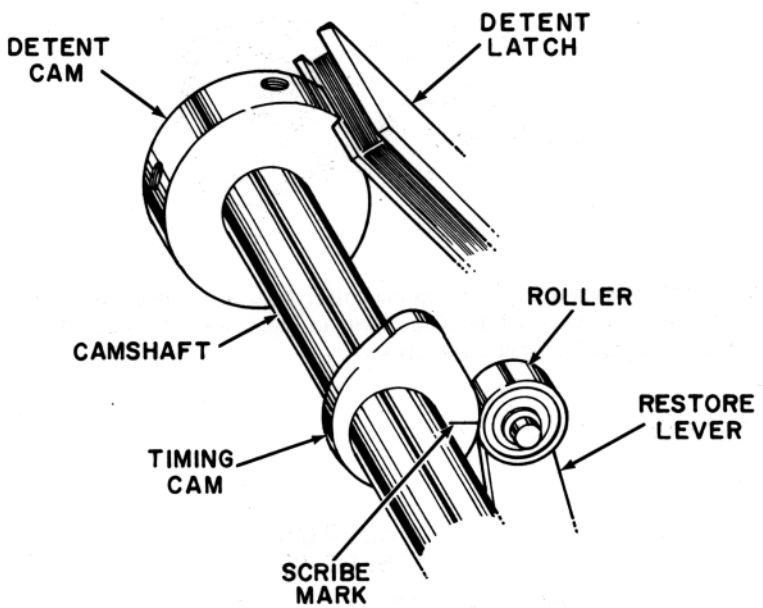
GROUP 1

Group 1. Scribe mark on the end of the cam shaft and detent cam only and no restore bail eccentric stud. Loosen the detent cam setscrews and align the scribe mark on the inner circumference of the detent cam with the scribe mark on the end of the cam shaft. Tighten the setscrews. Attach timing dial T-18088 to the end of the cam shaft and using a fixed point in the vicinity of the timing dial, set the dial for zero degrees. With the detent latch against the detent dam, rotate the cam shaft 15° into its cycle and reset the detent cam to just engage the detent latch. Check the lateral position of the detent cam so that the pulley has an end play of .003" to .008". Tighten the setscrews.



GROUP 2

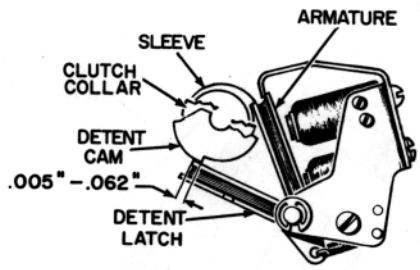
Group 2. Scribe mark on the timing cam, detent cam and on the end of the cam shaft and no restore bail eccentric stud. Rotate the cam shaft so that the roller on the restore lever is centered over the scribe mark on the timing cam. Attach timing dial T-18088 to the end of the cam shaft and using a fixed point in the vicinity of the timing dial, set the dial for zero degrees. With the detent latch against the detent cam, rotate the cam shaft 15^0 into its cycle and reset the detent cam to just engage the detent latch. Check the lateral position of the detent cam so that the pulley has an end play of .003" to .008". Tighten the setscrews.



GROUP 3

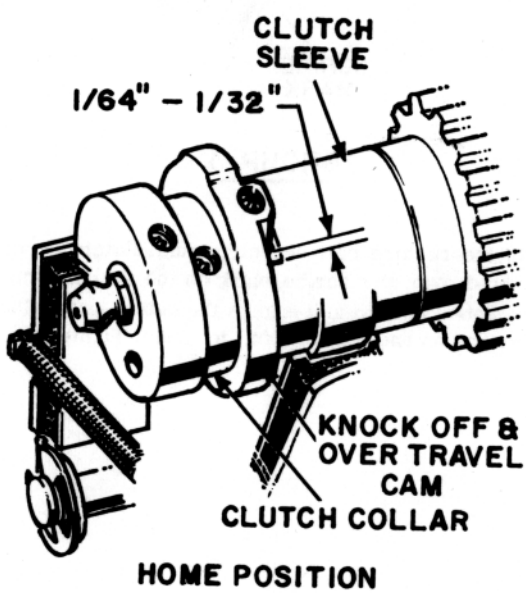
Group 3. Translators with the restore bail eccentric stud. Rotate the cam shaft so that the roller on the restore lever is centered over the scribe mark on the timing cam. Loosen the setscrews on the detent cam and position the detent cam to just engage the detent latch. Check the lateral position of the detent cam so the the pulley has an end play of .003" to .008". Tighten the setscrews.

ADJ. 5D CLUTCH COLLAR



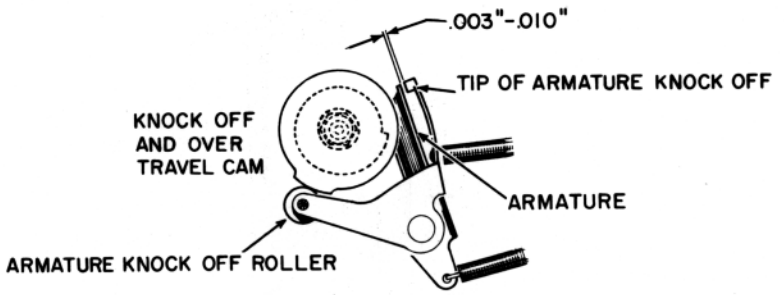
Loosen the clutch collar setscrews and position the collar so that as the clutch sleeve lip touches the armature, the detent cam is still .005" to .062" short of latching on the detent latch. Pull the collar towards the detent cam while tightening the setscrews.

ADJ. 5E KNOCK OFF AND OVER TRAVEL CAM



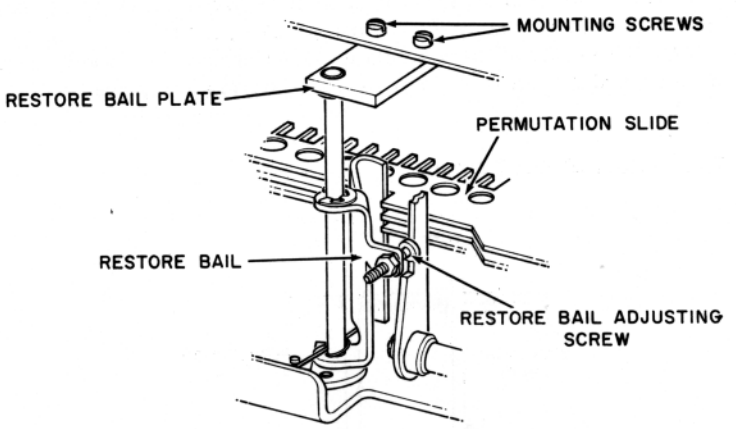
With the clutch in home position, loosen the setscrews on the knock off and over travel cam. Rotate the cam towards the lower end of the cut out in the clutch sleeve and allow a gap of 1/64" to 1/32". This should allow sufficient over travel distance between the detent cam and the detent latch. Pull the cam towards the clutch collar while tightening the setscrews.

ADJ. 5F ARMATURE KNOCK OFF



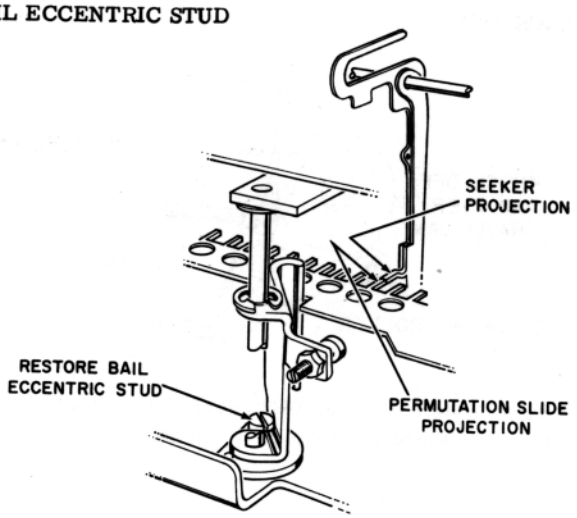
Form the armature knock off to allow a .003" to .010" clearance between the tip of the armature knock off and the armature when the armature knock off is on the high dwell of the knock off and over travel cam.

ADJ. 6A RESTORE BAIL PLATE



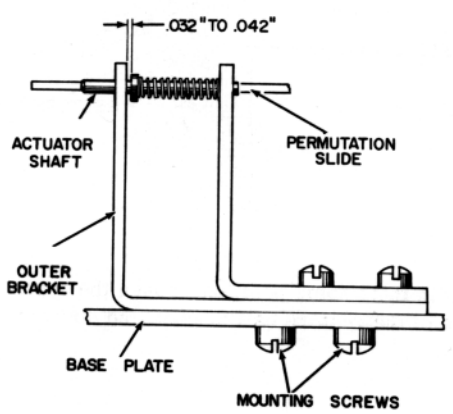
With the permutation slides in their home position, loosen the restore bail plate mounting screws and position the plate so the edge of the restore bail touches and operates the slides as evenly as possible. Tighten the mounting screws.

ADJ. 6B RESTORE BAIL ECCENTRIC STUD



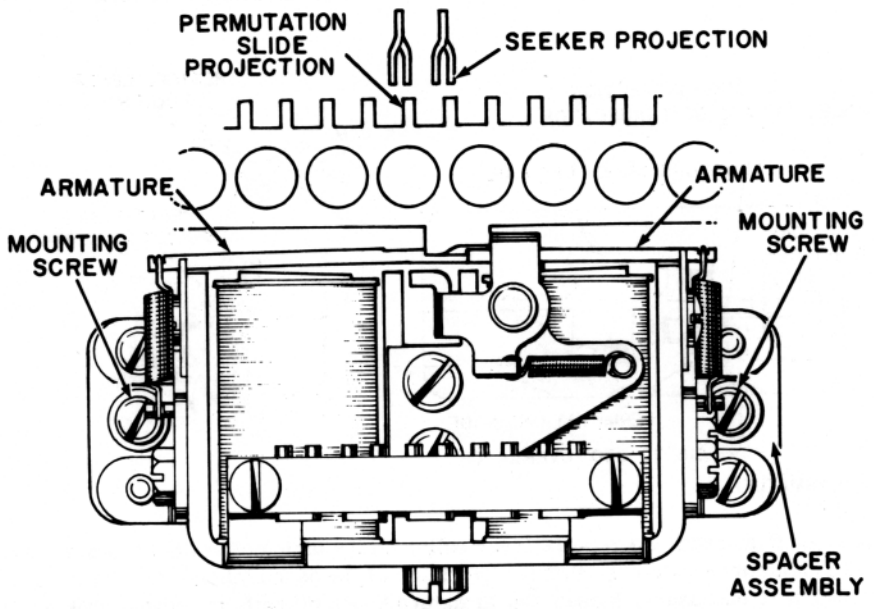
Unlatch all the permutation slides and rotate the cam shaft to fully release the slides to the left. Adjust the restore bail eccentric stud so that when the cam shaft is rotated, the seekers come forward and their projections strike the center of the permutation slide projections. The adjustment is ideal when the slides do not move toward the left from their center position after contact by the seekers.

ADJ. 6C PERMUTATION SLIDE ACUTATOR

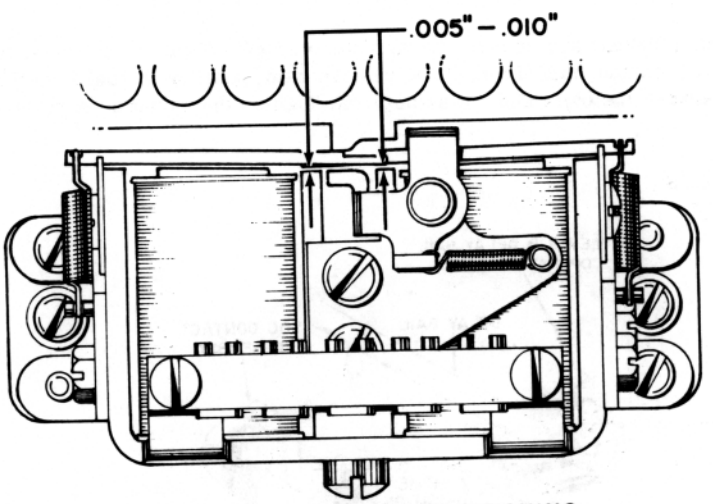


With the permutation slides unlatched and in their extreme left position, loosen the permutation slide actuator mounting screws and position the actuator to allow a .032" to .042" clearance between the outer bracket and the shoulders of the actuator shafts. Tighten the mounting screws.

ADJ. 7A MAGNET YOKE ASSEMBLY POSITIONING



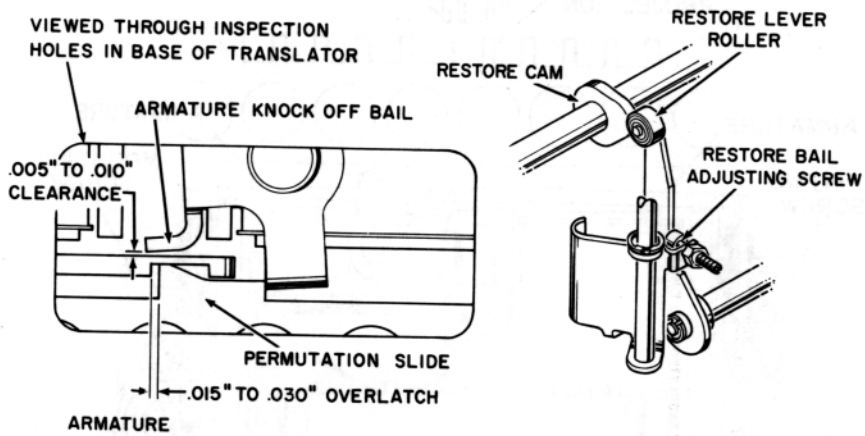
LEFT OR RIGHT POSITIONING



FORWARD OR REARWARD POSITIONING

Detach the SDC and STC contact and block assemblies and rotate the cam shaft so that the permutation slides are latched by the magnet yoke armatures (home position). Loosen the magnet yoke spacer assembly mounting screws and position the magnet yokes left or right to center the permutation slide projections to the seeker projections and forward or rearward to allow a detectable movement of .005" to .010" in the armatures when in their unlatched position. Tighten the mounting screws.

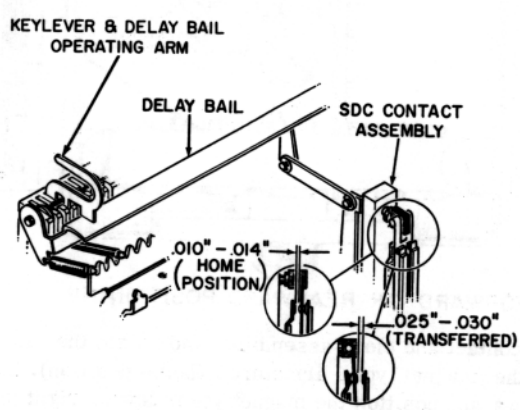
ADJ. 7B RESTORE BAIL ADJUSTMENT SCREW AND ARMATURE KNOCK OFF BAILS



1. Rotate the cam shaft and with the restore lever roller on the high dwell of the restore cam, adjust the restore bail adjustment screw so that the overlatch of the permutation slides by the armatures is .015" to .030". If necessary, loosen the armature knock off bails to prevent choking off while making the adjustment.

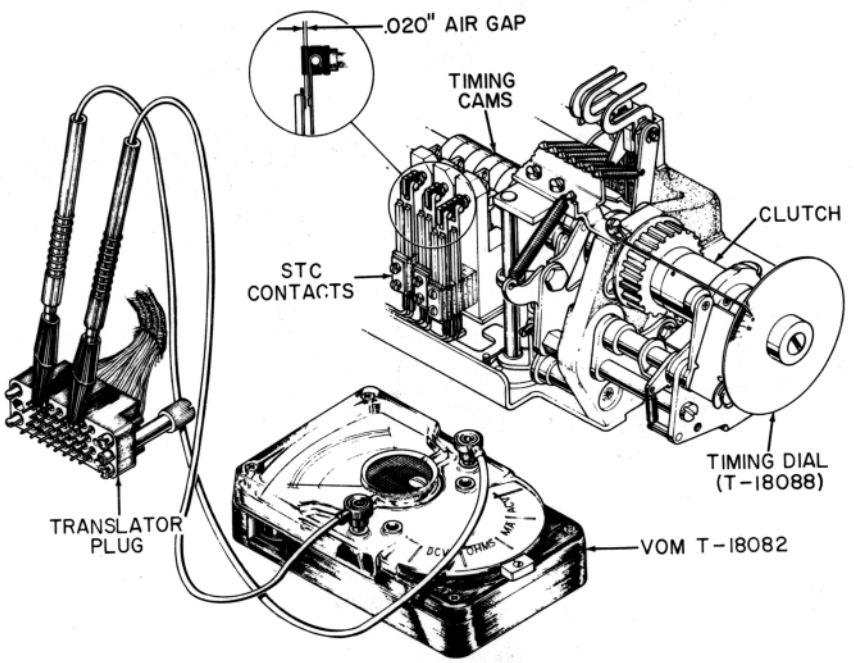
2. Detach the terminal blocks and loosen the armature knock off bail mounting screws and with the restore lever roller on the high dwell of the restore cam, position the bails so there is a .005" to .010" clearance between the bails and the armatures. Tighten the mounting screws.

ADJ. 8 SDC CONTACTS



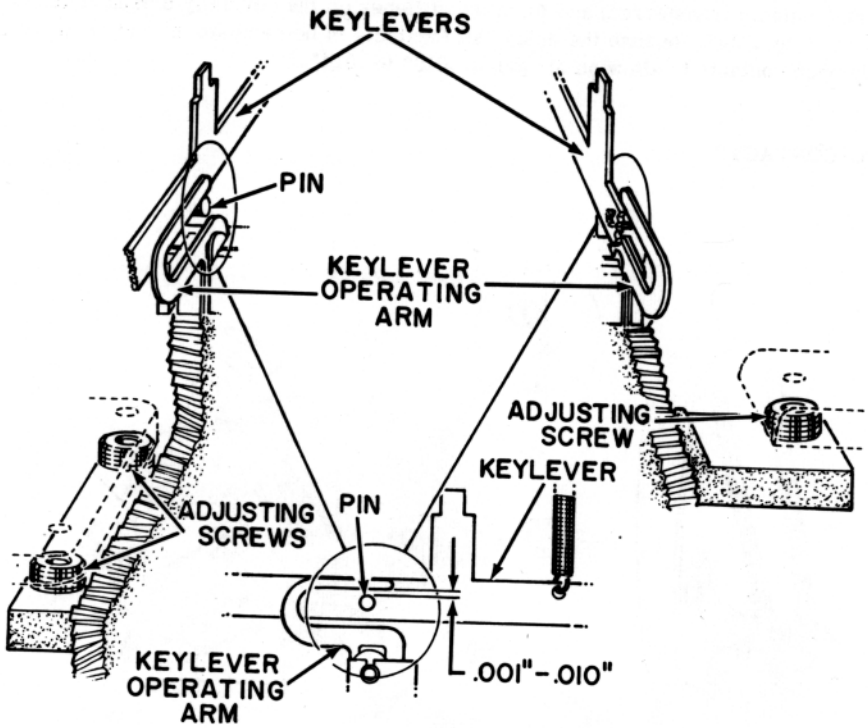
Press and hold the delay bail downward so that the plunger on the SDC contacts bottoms against the contact block (contacts transferred) and form the stiffener on the normally closed contacts to allow an air gap of .025" to .030". Release the delay bail (contacts in home position) and form the stiffener on the normally open contacts to allow an air gap of .010" to .014".

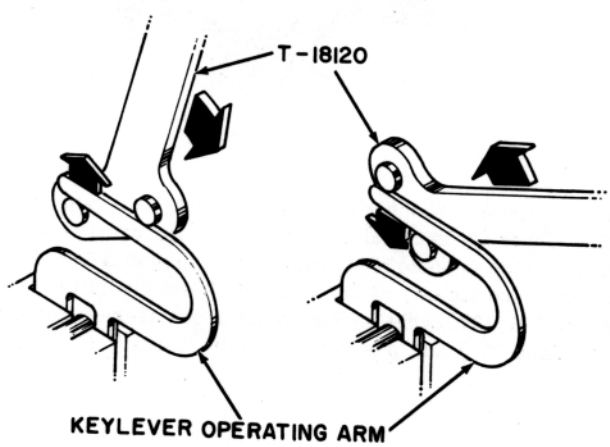
ADJ. 9 STC CONTACTS



Rotate the cam shaft to the point at which all the STC contacts are open and form the stiffeners to allow an air gap of .020". Check to see that each pair of timing cams is aligned and fully engaged by its related roller. With the clutch in home position, attach timing dial T-18088 to the end of the cam shaft and using a fixed point in the vicinity of the timing dial, set the dial for zero degrees. Using VOM T-18082 or circuit tracer T-18187, cycle the cam shaft to the degrees rotation specified on the machine schematics (plus or minus 2^{0}) and position the timing cams to allow the contacts to make or break as required.

ADJ. 10 TRANSLATOR ADJUSTING SCREWS AND KEYLEVER OPERATING ARMS



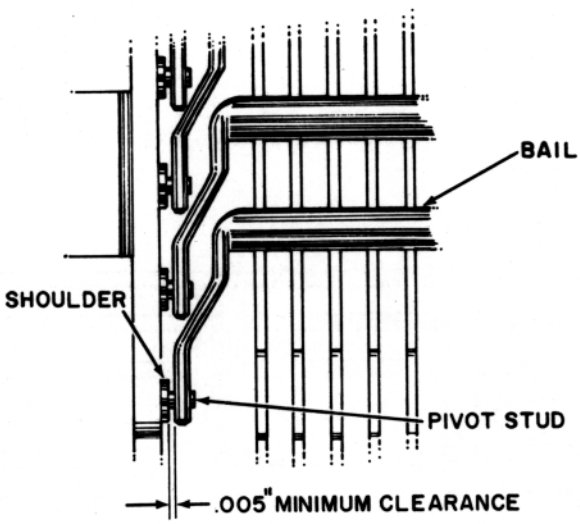


1. The adjusting screws are factory adjusted and locked in position with a sealant compound (Loctite) and should not be disturbed unnecessarily. When the adjustment is required, remove the first, second and third rows of keybuttons from their keylevers to expose the keylever operating arms and the keylevers. Remove the mounting screws and turn the adjusting screws as required to allow a detectable clearance of .001" to .010" between the majority of keylever operating arms and the pins on the keylevers. (The two adjusting screws on the left end of the translator should be turned equally to raise or lower the keylever operating arms to prevent the possibility of tilting the translator in a forward or rearward position). The clearance should be felt rather than seen by pushing the keylever operating arm toward the pin on the keylever and observing the movement of the keylever. The absence of movement between the keylever operating arm and the pin on the keylever indicates the possibility that the keylever operating arm is holding the keylever down. When the adjustment is completed, reseal the adjusting screws with Loctite (or a similar compound) and tighten the mounting screws.

2. Using seeker forming tool T-18120, form the individual keylever operating arms that are still out of adjustment to conform with the required .001" to .010" clearance between the keylever operating arms and the keylevers. Replace the keybuttons.

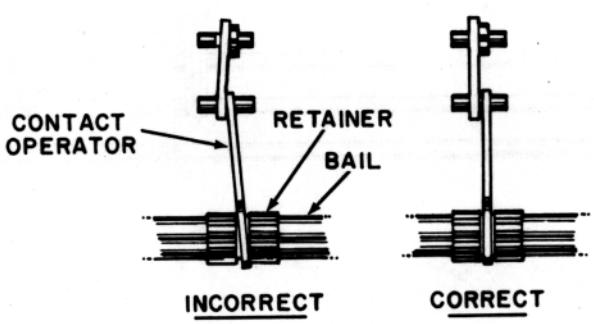
SELECTOR

ADJ. 1. CONTACT BAIL END PLAY



There should be a minimum of .005" clearance between the ends of the contact bails and the shoulders on their pivot studs. Form the ends of the bails to obtain the adjustment. Check to see that the bails operate freely.

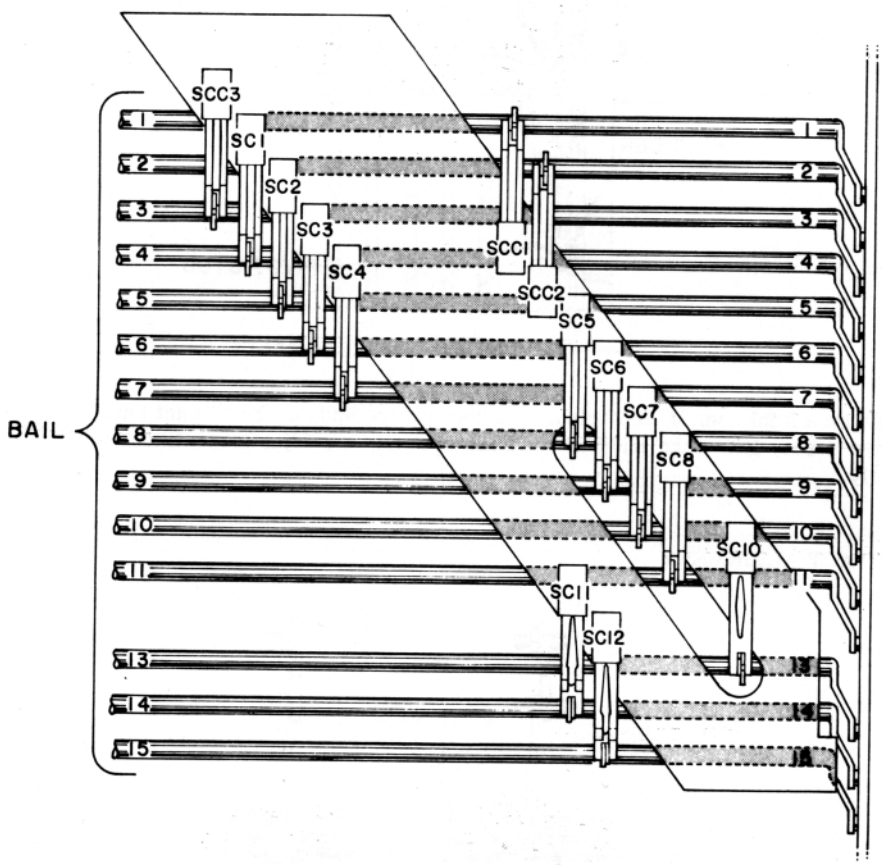
ADJ. 2 CONTACT ALIGNMENT



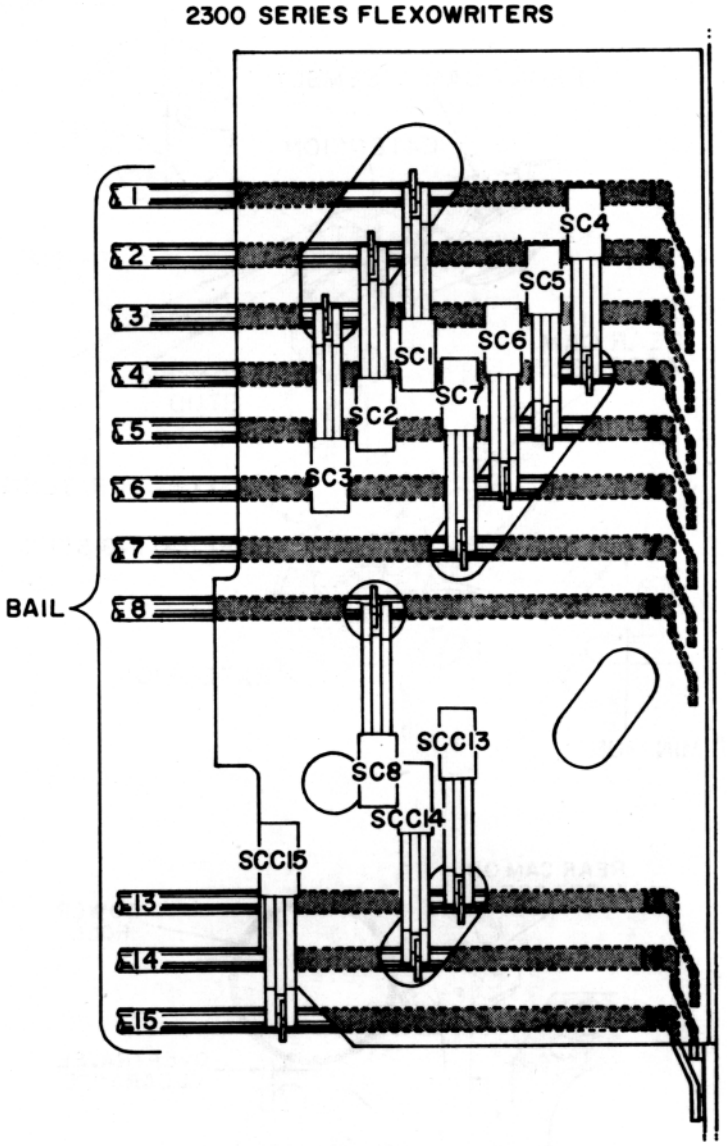
Check to see that all contact stackups are vertically aligned. The mating contacts should be no more than .015" out of alignment and the contact operators should not bind. When necessary, loosen the contact assembly mounting screws to align the contacts and operators.

ADJ. 3 CONTACT LOCATIONS

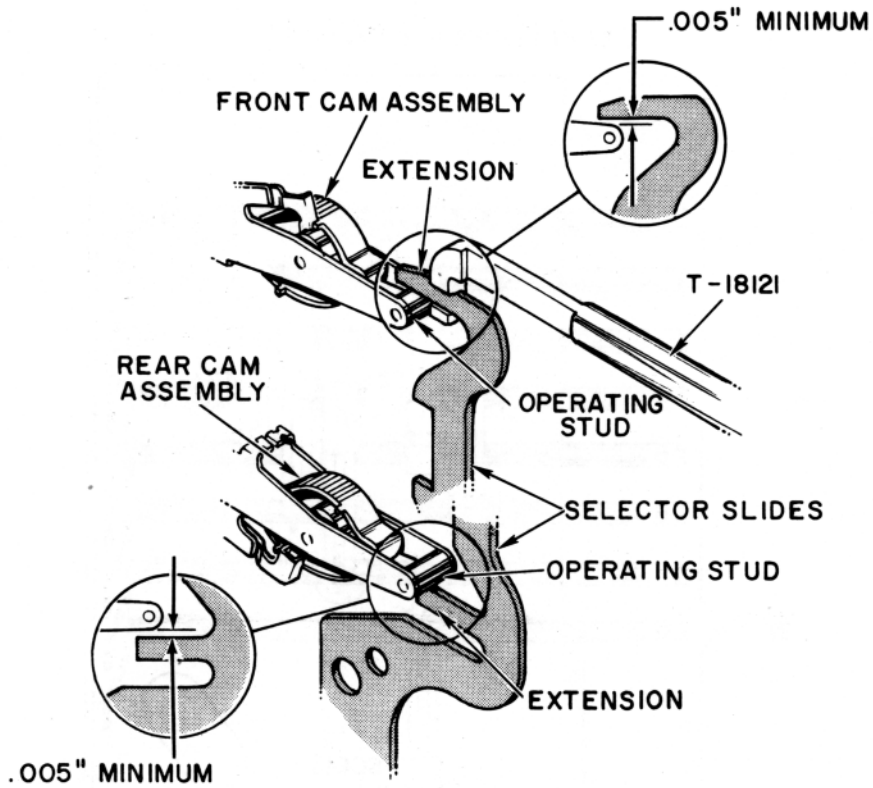
2200 SERIES FLEXOWRITERS

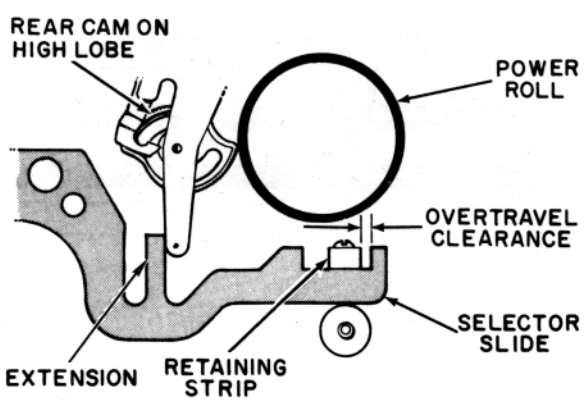


2300 SERIES FLEXOWRITERS



ADJ. 4A PRELIMINARY SELECTOR ADJUSTMENTS





The selector slide extensions provide a means of adjusting the pulse length of the selector common contacts to an individual keylever when it can not be obtained by the over-all adjustment of the contacts. These adjustments are covered later in this section; however, some preliminary adjustments of the machine are necessary.

1. The cam assemblies should have the proper clearance to the power roll (refer to the writing machine section - ADJ. 7).

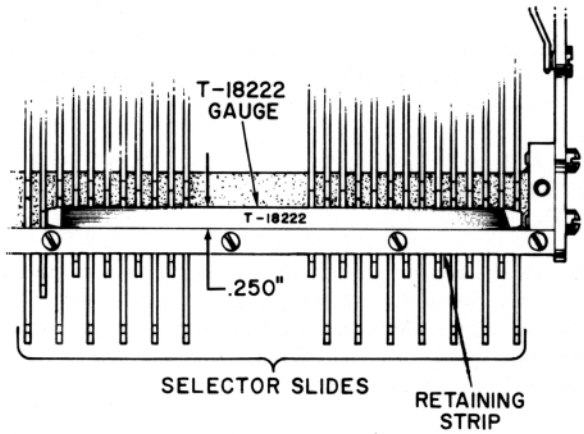
2. Check to see that the extensions on the selector slides have a minimum of .005" clearance to the operating studs on the cam assemblies in home position. Also check to see that there is overtravel clearance between the selector slides and the retaining strip when the high lobe of the cam assemblies are against the power roll. If it is necessary to make this preliminary adjustment, form the extensions on the front and rear selector slides.

ADJ. 4B CONTACT AIR GAP ADJUSTMENTS

2200/2300 SERIES SELECTOR CONTACTS

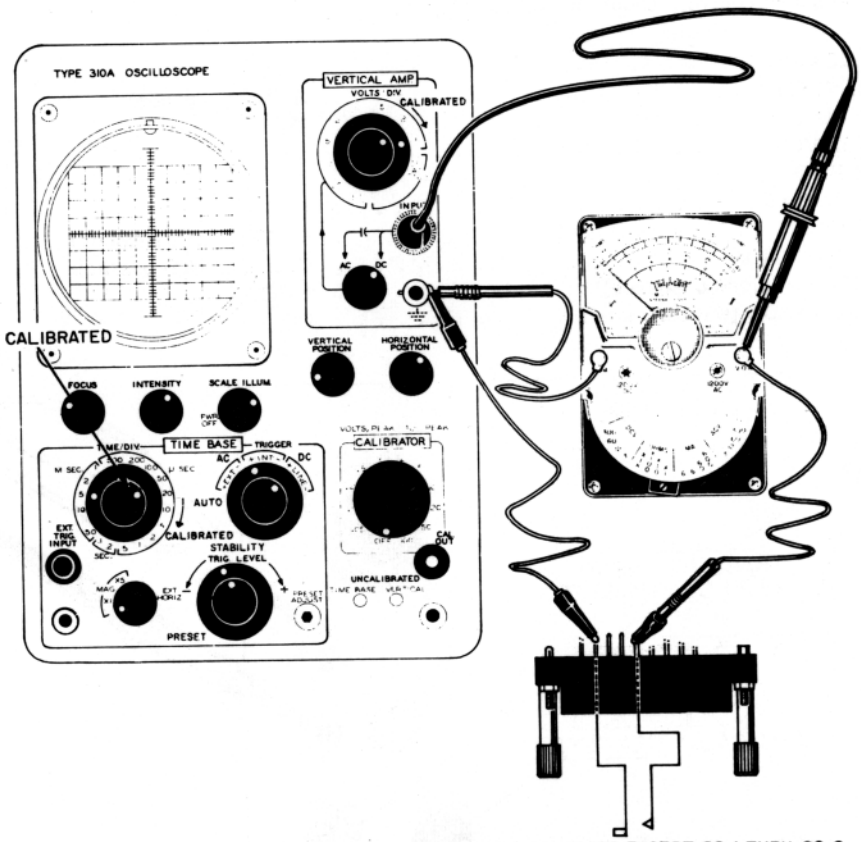
OPERATOR	AIR GAP	LOCATION		PULSE LENGTH
		COMMON CONTACTS (SCC-)		
GREEN	.024" TO .029"	CAR. RET., TAB, BACKSPACE		20 TO 35 MS
BLACK		ALL OTHERS		
		CODE CONTACTS (SC-1 TO 8)		
GREEN	.016" TO .021"	CAR. RET., TAB, BACKSPACE		PRECEDE THE COMMON PULSE BY A MIN. OF 2 MS
BLACK		ALL OTHERS		
		SC-10 CONTACTS (MODEL II)		
BLACK	.020" TO .025"	NORMALLY OPEN CONTACTS		20 TO 30 MS
	.020" TO .025"-SLIDE MOVED .250" FROM HOME POSITION REFER TO N/C CONTACT ADJUSTMENT	NORMALLY CLOSED CONTACTS		
		SC-11+12 CONTACTS (MODEL II)		
BLACK	.024" TO .029"	NORMALLY OPEN CONTACTS		20 TO 30 MS
	MAKE BEFORE BREAK	NORMALLY CLOSED CONTACTS		
		BRIDGE CONTACTS (SB-)		
2021296	.045" TO .050"	N/O	CAR. RET., TAB, BACKSPACE	20 TO 30 MS
2021297	.032" TO .037"	N/O	ALL OTHERS	
	.032" TO .037"-SLIDE MOVED .250" FROM HOME POSITION REFER TO N/C CONTACT ADJUSTMENT	N/C	ALL	

1. N/O Contacts - Make a preliminary adjustment of all normally open contacts to the air gap specified on the contact adjustment chart with the selector slides fully restored.



2. N/C Contacts - The air gap specified on the timing chart for normally closed contacts should be set with the slide extended .250" (1/4") from its normal rest position. The keylever trip gauge (T-18222) may be inserted between the selector slides and the retaining strip to hold the slides correctly positioned. Adjust the contacts to the air gap specified on the contact adjustment chart.

ADJ. 4C SELECTOR CONTACT SCOPING (All N/O Contacts Except Selector Code Contacts - SC1-8)

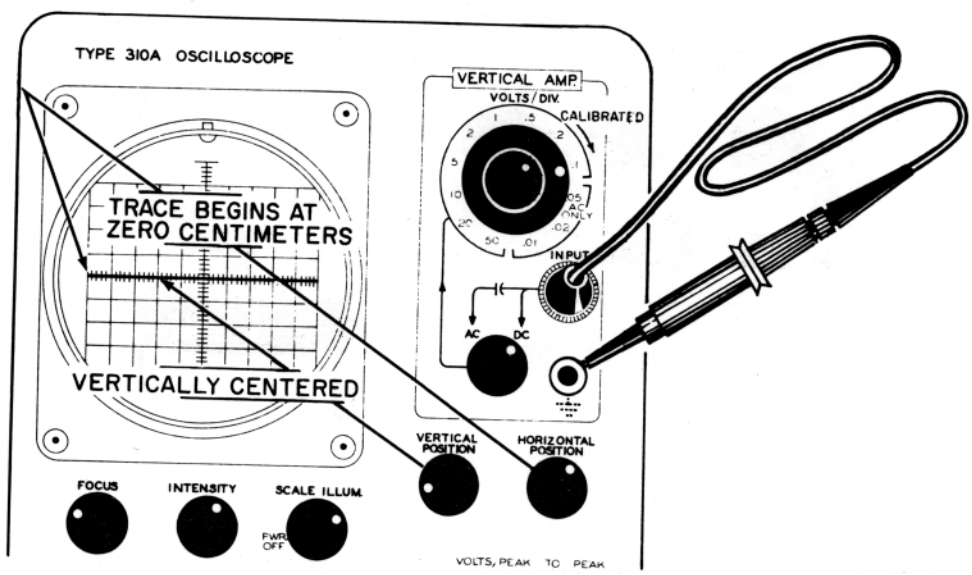


ALL N/O CONTACTS EXCEPT SC-1 THRU. SC-8

The illustration shows a TEKTRONIX Model 310A oscilloscope with a 10 to 1 ratio probe (not required) being used; however, a comparable scope with a calibrated time base (horizontal sweep) and the capacity to trigger on an external signal may be used in the following adjustments. The set up of the controls and wiring applies to most TEKTRONIX oscilloscopes and will generally be the same for other makes. The meter is being used only as a convenient source of D.C. voltage and the meter deflection is of no concern. Although a meter is ideal, a circuit tracer or similar device may be used; however, polarity must be observed. The V-O-M terminal on the meter is at approximately minus one and a half volts DC in relation to the COM terminal when the meter selector is on the X1 scale. The scope controls are set accordingly.

1. Setup - Make the connections between the scope, meter and the contacts to be checked as illustrated, with the selector in position and the machine standing on its back. The meter should be on the X1 scale. The scope controls should be set as follows:

VERTICAL AMP	
VOLTS/DIV	.1 (10 to 1 probe)
AC DC	DC
CALIBRATOR	OFF
TIME BASE	
X1 MAG X5	X1
TIME/DIV	5 MSEC (milliseconds)
CALIBRATION	CALIBRATED position
TRIGGER (slope & source)	+INT
AUTO AC DC (trigger mode)	DC



VERTICAL POSITION - HORIZONTAL POSITION Controls

It is necessary to calibrate the vertical and horizontal positioning of the trace for pulse length measurement and reliable triggering. Turn the STABILITY control to the free running position (full right) to obtain a constant trace and with the probe temporarily disconnected from the scoping circuit and connected to a ground terminal on the scope, adjust the VERTICAL POSITION control to center the trace vertically on the screen. Adjust the HORIZONTAL POSITION control so that the trace begins at exactly zero centimeters (first vertical grid line on the left side of the screen). Reconnect the probe to the scoping circuit.

TRIGGER LEVEL & STABILITY Controls

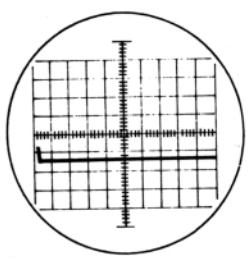
These controls are adjusted somewhat by a trial and error method. The following procedure is recommended as a starting point:

A. Connect the set of contacts to be observed into the circuit previously illustrated.

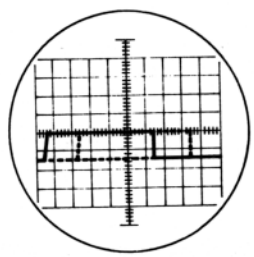
B. Turn the STABILITY control to the free run position (full right) and back to the left until the trace just disappears.

C. Turn the TRIGGER LEVEL control toward the + position (to the right) and then turn it slowly to the left until a trace just flashes across the screen. When this point is reached, back the control up to the right very slightly.

D. Readjust the STABILITY control by turning it to the right until the scope is free running (constant trace) and back to the left until the trace just disappears.

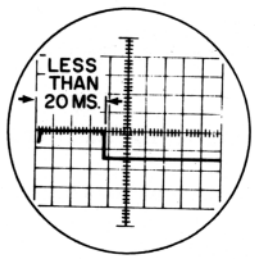


TRACE AT NEGATIVE LEVEL

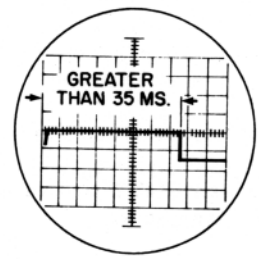


TRACE DISPLAYING RANDOM PULSES

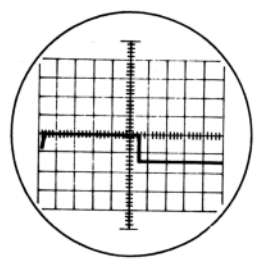
E. Strike a keylever associated with the contacts being observed (machine turned on) and observe the trace on the scope. If there is no trace, the final setting of the TRIGGER LEVEL may have been too far to the right. If there is a trace at a negative level as the keylever is operated, the TRIGGER LEVEL may not have been turned far enough to the right. If necessary, readjust the TRIGGER LEVEL until the proper trace appears. If still no trace can be obtained, turn the STABILITY control to the right (free run position) and strike the same keylever. If the pulse length of the contacts appears randomly along the horizontal axis, it will indicate that there is a pulse going into the scope but that the difficulty is in setting the trigger controls (slope-mode-level-stability). When not even a random pulse can be obtained, recheck the entire setup including the wiring and keylever selection.



SHORT PULSE DURATION



LONG PULSE DURATION



CORRECT PULSE DURATION
(20-35 MS.)

2. Selector Common Contacts (SCC-) - Hook up the selector common contacts to be checked and strike every keylever that operates that particular set of common contacts.

If most of the keylevers operate the common contacts near their minimum specified length of time (20 milliseconds) and the pulse length of some keylevers is under specifications, the common contacts may be adjusted toward their minimum specified air gap which will tend to increase the pulse length. When most of the keylevers operate the common contacts near their maximum specified length of time (35 milliseconds) and the pulse length of some keylevers is over specifications, the common contacts may be adjusted toward their maximum specified air gap which will tend to decrease their pulse length.

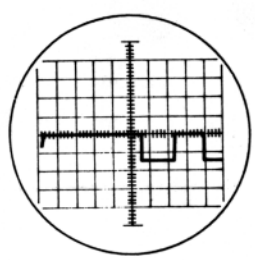
NOTE: The adjustment of the common contact air gap will affect the pulse length of the common contacts for all associated keylevers and the over-all range of pulse length should be considered before adjusting the common contacts.

When the majority of keylevers associated with the common contacts under observation show a pulse length in the mid-range of adjustment (25 to 30 milliseconds) and some keylevers are over or under the specified pulse length, their selector slide extensions should be formed, being careful to maintain the requirement outlined in ADJ. 4A PRELIMINARY SELECTOR ADJUSTMENTS. Adjusting the selector slide extension closer to the operating stud on the cam assembly will increase the pulse length for that particular keylever and forming the extension away from the operating stud will decrease the pulse length for the keylever associated with that selector slide.

3. SC-10, 11 & 12 (MOD. II) & SB (selector bridge) Normally Open Contacts - The connections and scope control settings for these contacts are the same as previously illustrated for all N/O contacts except SC 1-8. In the case of SC-10, 11 & 12 contacts there is more than one keylever which operates these contacts, and the pulse length from the operation of all cams associated with these contacts must be considered before making any adjustment. When adjustment is necessary to make all associated leylevers operate a particular set of contacts within the specified limits, adjust those contacts toward their maximum or minimum specified air gap.

   NOTE: If the proper pulse length for a particular key cannot be obtained within the limits of the specified air gap, this is an indication that the selector slide extensions may be maladjusted. In this instance it would be necessary to recheck the pulse length for the common contacts associated with that particular keylever, so that the selector slide extension may be correctly adjusted.

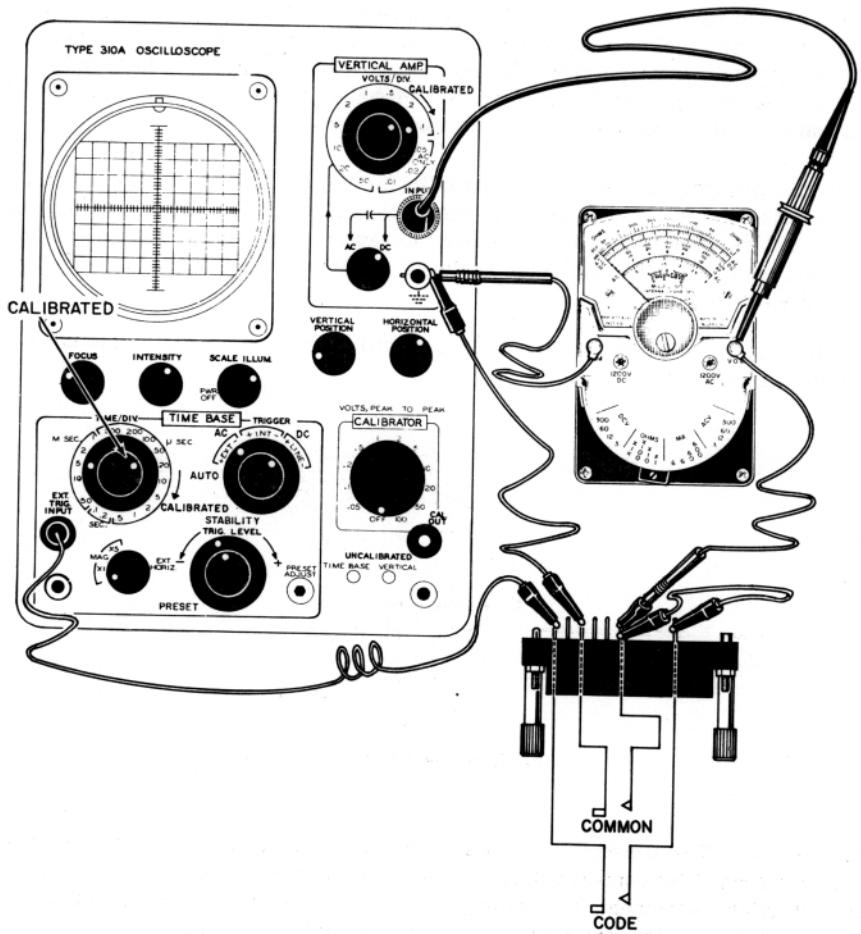
   Selector Bridge contacts should be adjusted toward their maximum or minimum settings to obtain the specified pulse length.



TRACE INDICATES CONTACT BOUNCE

4. Contact Bounce - The illustration shows a trace that would result from excessive contact bounce. It is usually caused by contact points that do not make or break simultaneously, but can be caused by an irregular movement or binding of the typing train or selector slide. Contact bounce is permissible to some extent but not desirable and should be corrected.

ADJ. 4D SELECTOR CODE CONTACT SCOPING (SC1-8)



As specified in the contact adjustment chart, the code contacts are to close at least two milliseconds before the common contacts close. This requirement is obtained by adjusting the air gap of the code contacts within the specified limits. A rough approximation of the adjustment can be obtained by visual inspection of the contacts. The following procedure is given in the event that certain auxiliary output units require a more accurate setting of the contacts. The setup of the scope for the code contact adjustment is similar to the setup used for the normally open contact adjustment, but in addition, provides a means of observing the common contact pulse length in relation to the operation of the code contacts.

1. Setup - Make the connection between the scope, meter and the contacts to be checked as illustrated, with the selector in position and the machine standing on its back. The meter should be on the X1 scale. The scope controls should be set as follows:

VERTICAL AMP	
VOLTS/DIV	.1 (10 to 1 Probe)
AC DC	DC
CALIBRATOR	OFF
TIME BASE	
X1 MAG X5	X1
TIME/DIV	5 MSEC
CALIBRATION	CALIBRATED position
TRIGGER (slope & source)	- EXT
AUTO AC DC (trigger mode)	DC

VERTICAL POSITION - HORIZONTAL POSITION Controls

It is necessary to calibrate the vertical and horizontal positioning of the trace for time measurements and reliable triggering. Turn the STABILITY control to the free running position (full right) to obtain a constant trace and with the probe temporarily disconnected from the scoping circuit and connected to a ground terminal on the scope, adjust the VERTICAL POSITION control to center the trace vertically on the screen. Adjust the HORIZONTAL POSITION control so that the trace begins at exactly zero centimeters (first vertical grid line on the left side of the screen). Reconnect the probe to the scoping circuit.

TRIGGER LEVEL AND STABILITY Controls

These controls are adjusted somewhat by a trial and error method. The following procedure is recommended as a starting point:

A. Connect the particular set of code contacts and common contacts to be observed into the selector code contact circuit previously illustrated.

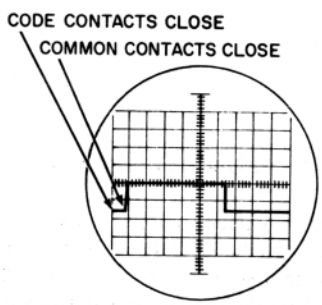
B. Turn the STABILITY control to the free run position (full right) and back to the left until th trace just disappears.

C. Turn the TRIGGER LEVEL control toward the minus position (to the left) and then turn it slowly to the right until a trace just flashes across the screen. When this point is reached, back the control up to the left very slightly.

D. Readjust the STABILITY control by turning it to the right until the scope is free running (constant trace) and back to the left until the trace just disappears.

E. Strike a keylever which will operate both the code and common contacts connected into the circui with the machine turned on to observe the trace on the scope.

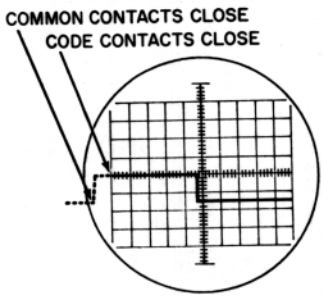
NOTE: A slight readjustment of the TRIGGER LEVEL control may be necessary to obtain a consistent trace. It is important to be certain that the proper keylever is depressed since electrical "noise" from the operation of the machine can trigger an unstable trace even though the proper code contacts do not close. An unstable trace can also be caused by noise generated from a neon light too close to the scope. If "noise" still continues to cause an unstable trace, the trigger mode control (AUTO-AC-DC) may be set in the AC position. This will lessen the effect of "noise" on the scope, but will require a more exact setting of the TRIGGER LEVEL and STABILITY controls as outlined in steps C & D.



CODE CONTACTS CLOSED BEFORE COMMON CONTACTS.

2. Selector Code Contact Adjustment (SC1-8)

The trace across the screen is shown to be starting as the code contacts close. The trace begins a the minus one and one half volt level indicating that the common contacts are not yet closed. A few milliseconds later, the common contact do close which causes the trace to rise to zero volt level and remain there until the common contacts open.



COMMON CONTACTS CLOSED BEFORE CODE CONTACTS.

In the case where the common contacts close before the code contacts, the trace will begin at the zero volt level and remain there until the common contacts open. In this instance, it would be necessary to decrease the air gap of that particular set of code contacts within the limits specified (.016" to .021") to obtain a closure of the code contact at least 2 milliseconds before the closing of its associated common contacts.

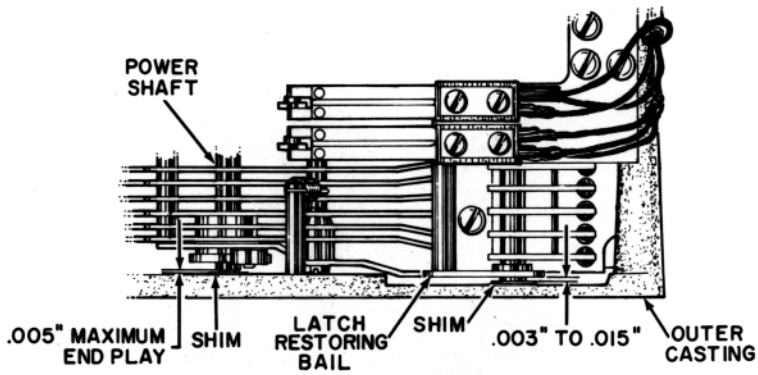
NOTE: If the adjustment can not be obtained with the code contacts set at their minimum air gap, the adjustment for the common contact pulse length should be rechecked.

2201		TAPE CHANNELS								2301	
KEY	SCC	8	7	6	5	4	3	2	1	KEY	SCC
CR	2	8								CR	15
SPACE	2				5					SPACE	15
TAB	2			6	5	4	3	2		TAB	15
BACK SP	2,3			6		4		2			
) 0	2,3			6						) 0	13
! 1	2,3								1	! 1	13
@ 2	2,3							2		@ 2	13
# 3	2,3				5			2	1	# 3	13
$ 4	2,3						3			$ 4	13
% 5	2,3				5		3		1	% 5	13
¢ 6	2,3				5		3	2		¢ 6	13
? 7	2,3						3	2	1	? 7	13
* 8	2,3					4				* 8	13
(9	2,3				5	4			1	(9	13
a A	1		7	6					1	a A	15
b B	1		7	6				2		b B	15
c C	1		7	6	5			2	1	c C	15
d D	1		7	6			3			d D	15
e E	1		7	6	5		3		1	e E	15
f F	1		7	6	5		3	2		f F	15
g G	1		7	6			3	2	1	g G	15
h H	1		7	6		4				h H	15
i I	1		7	6	5	4			1	i I	15
j J	1		7		5				1	j J	15
k K	1		7		5			2		k K	15
l L	1		7					2	1	l L	15
m M	1		7		5		3			m M	15
n N	1		7				3		1	n N	15
o O	1		7				3	2		o O	15
p P	1		7		5		3	2	1	p P	15
q Q	1		7		5	4				q Q	15
r R	1		7			4			1	r R	15
s S	1			6	5			2		s S	15
t T	1			6				2	1	t T	15
u U	1			6	5		3			u U	15
v V	1			6			3		1	v V	15
w W	1			6			3	2		w W	15
x X	1			6	5		3	2	1	x X	15
y Y	1			6	5	4				y Y	15
z Z	1			6		4			1	z Z	15
FI MNP STOP	2					4		2	1	STOP	
F2	2				5	4	3			NP (AUX SP)	
F3 PR RES	2			6		4	3			PR (AUX 0)	
F4	2		7			4	3			ON1	14
F5	2		7	6		4	3	2		ON2	14
F6	2			6		4	3	2	1	OFF	14
F7	2		7		5	4	3	2		FC ON	14
F8	2					4	3		1	TSR (AUX I)	
F9	2					4	3	2		SW (AUX 2)	
F10	2				5	4	3	2	1	DS (AUX 3)	
F11	2		7			4	3	2	1	FP (AUX L)	
F12	2		7		5	4	3		1	AID (AUX J)	
F13	2			6	5	4	3		1	DUP (AUX /)	
UPPER CASE	1		7	6	5	4	3			UPPER CASE	15
LOWER CASE	1		7	6	5	4		2		LOWER CASE	15
..	1		7	6		4		2	1	..	15
,'	1			6	5	4		2	1	,'	15
"-	2,3		7							"-	13
:/	2,3			6	5				1	:/	13
_%	2,3		7		5	4		2	1	_%	13
;&	2,3		7	6	5					;&	13
± +	2,3				5	4		2		PI-1 (AUX 8)	
1/4 1/2	2,3		7	6		4	3		1	PI-5 (AUX A)	
' °	2,3		7			4		2		PI-2 (2, 8, -)	
TAPE FEED			7	6	5	4	3	2	1	TAPE FEED	

The adjustment of a particular set of code contacts must be checked in relation to all of the common contacts associated with them. For example, the SC-3 code contacts can be operated by the numeric 4 keylever, the letter D keylever and the OFF (F-6 Mod II) keylever. Each of these keylevers operate a different set of common contacts, therefore, the SC-3 code contact adjustment must be checked in relation to all three of the common contacts.

PUNCH

ADJ. 1 LATCH RESTORING BAIL & POWER SHAFT END PLAY

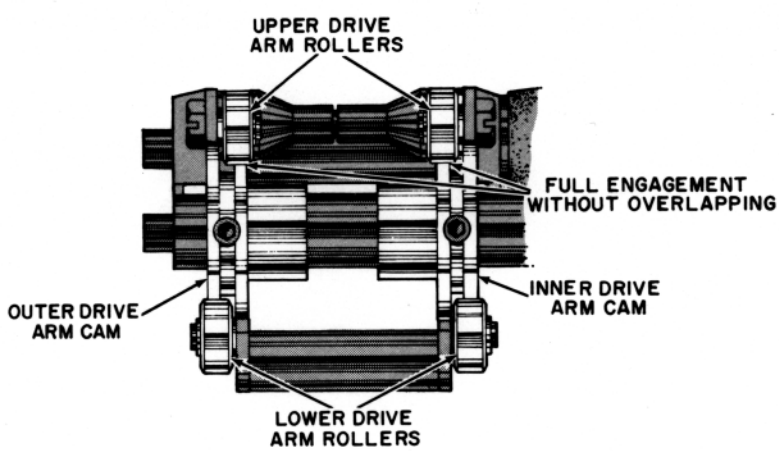


1. Latch restoring bail - .003" to .015".

2. Power shaft - .005" maximum.

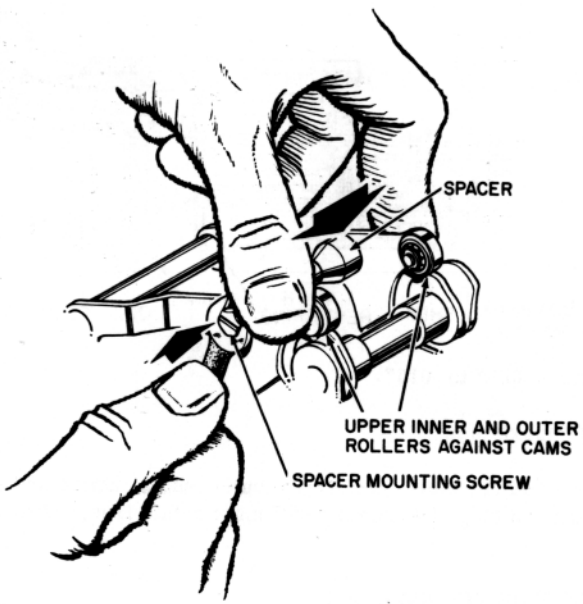
To accomplish the above adjustments, remove the outer punch casting and shim each shaft as required to obtain the necessary end play. The power shaft must rotate freely after adjustment.

ADJ. 2 INNER & OUTER DRIVE ARM CAMS



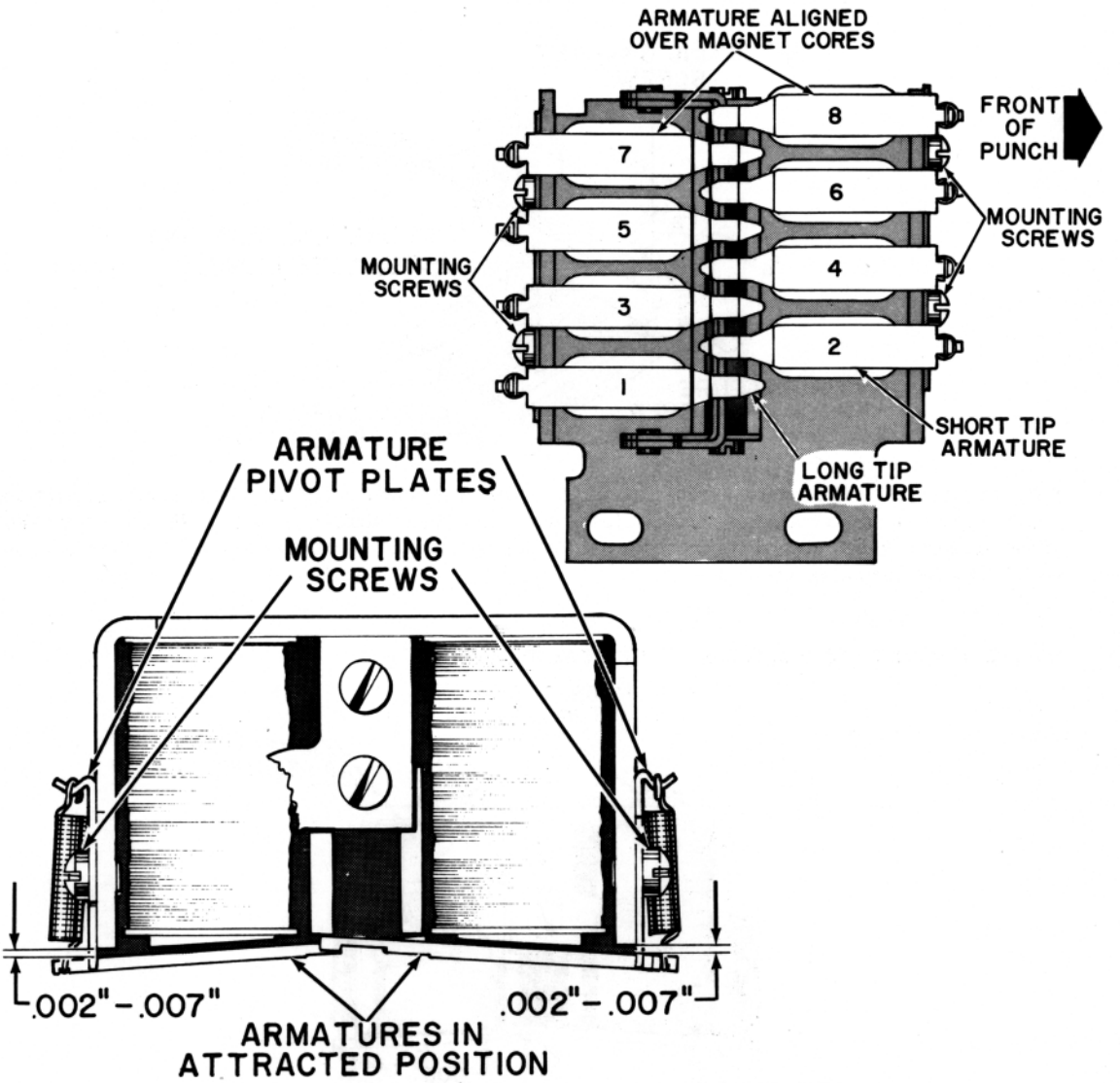
Loosen the setscrews on the inner and outer drive arm cams and laterally position the cams so that they fully engage the upper and lower drive arm rollers without overlapping. Tighten the setscrews.

ADJ. 3 DRIVE ARM ALIGNMENT



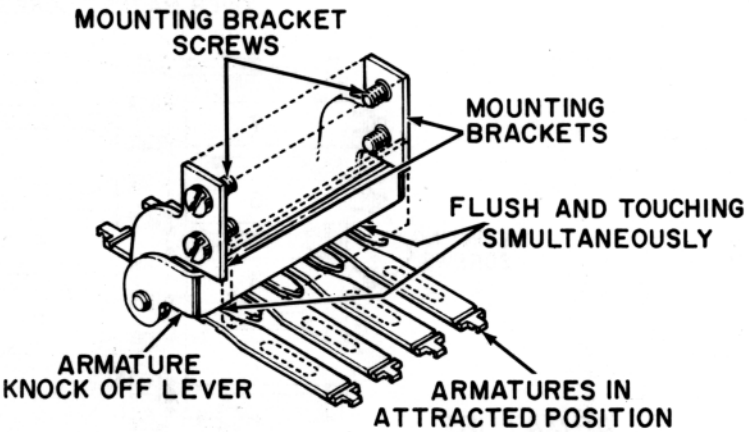
Loosen the spacer mounting screw and press down on the inner and outer drive arms simultaneously so that the upper drive arm rollers are firmly against their respective cams. Tighten the screw.

ADJ. 4 LONG & SHORT TIPPED ARMATURES & ARMATURE PIVOT



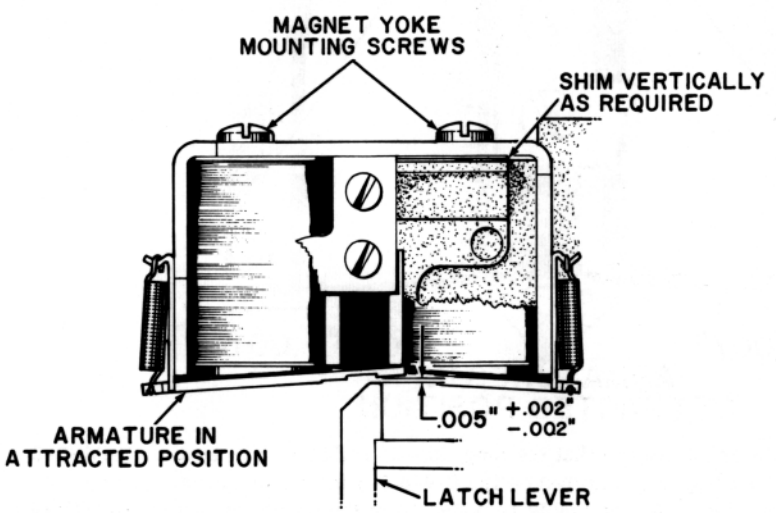
1. Position the armatures so that the long tipped armatures are used on the 1-3-5 & 7 magnet positions and the short tipped armatures on the 2-4-6 & 8 magnet position.
2. With the magnet yoke assembly removed from the punch, loosen the armature pivot plate mounting screws and with the armatures in their attracted position, vertically position the armature pivot plate to provide a clearance of .002" to .007" using Feeler Gauges T-18451 and T-18455. Position the armature pivot plates horizontally so that the armatures are aligned with the centers of the magnet cores. Tighten the mounting screws.

ADJ. 5A ARMATURE KNOCK OFF LEVER MOUNTING BRACKET



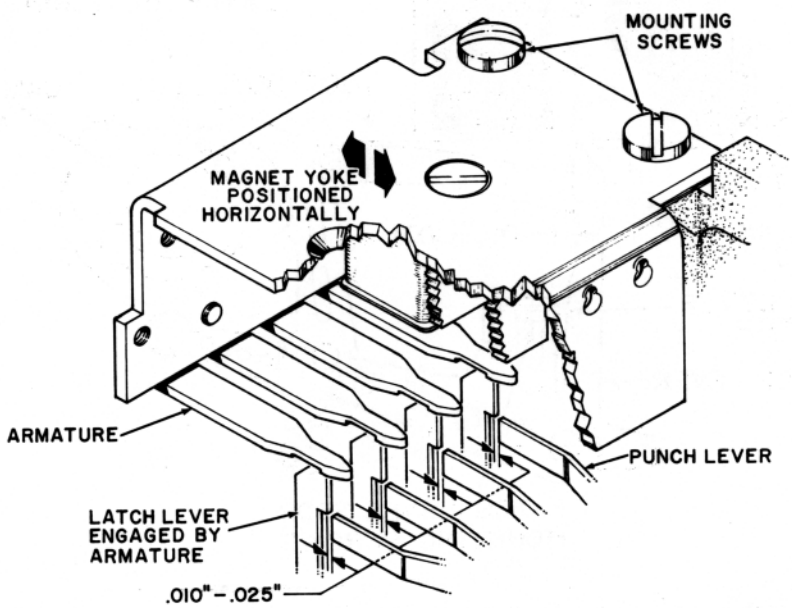
With the magnet yoke assembly removed from the punch, loosen the mounting bracket screws and position the mounting bracket so that with the armatures in their attracted position, the contact surface of the armature knock off lever is flush against the armatures and touches the armatures simultaneously. Tighten the mounting screws.

ADJ. 5B MAGNET YOKE ASSEMBLY VERTICAL POSITION



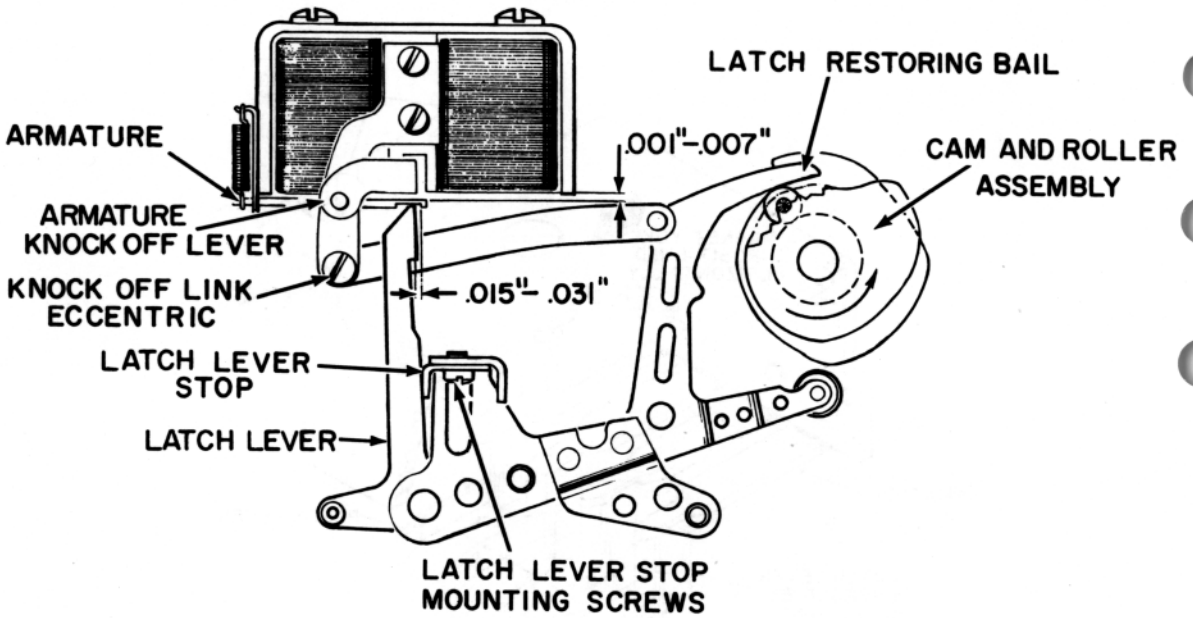
Loosen the magnet yoke assembly mounting screws and with the clutch in home position and the armatures in their attracted position (latch levers unlatched) shim the magnet yoke assembly vertically as required for a clearance of .005" ± .002" between all the latch levers and armatures. Tighten the mounting screws.

ADJ. 5C MAGNET YOKE ASSEMBLY HORIZONTAL POSITION



With the latch levers engaged by the armatures, loosen the magnet yoke assembly mounting screws and position the magnet yoke assembly horizontally to obtain a .010" to .025" clearance as equally as possible between all the front edges of the latch levers and the rear edges of the punch levers. Tighten the mounting screws.

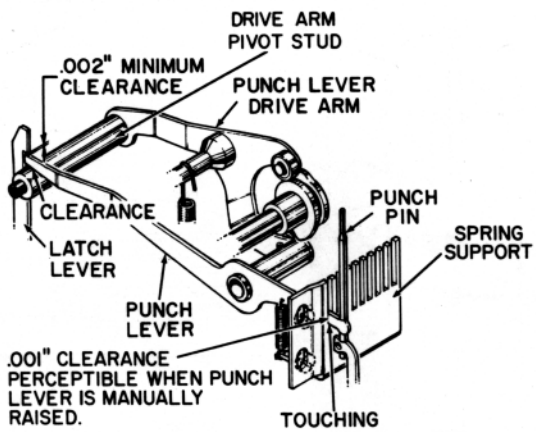
ADJ. 5D LATCH LEVER STOP & KNOCK OFF LINK ECCENTRIC



1. Loosen the latch lever stop mounting screws and with the latch restoring bail on the high point of the cam and roller assembly, position the latch lever stop to allow an over travel clearance of .015" to .031" between the forward edge of the latch levers and the latched surface of the armatures. Tighten the mounting screws.

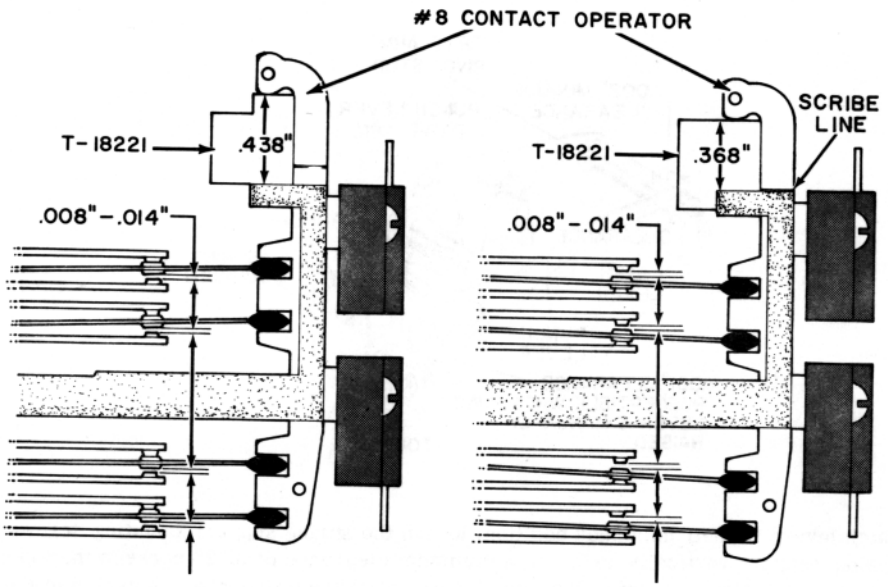
2. Loosen the knock off link eccentric and with the latch restoring bail on the high point of the cam and roller assembly, adjust the eccentric to allow an equal clearance of .001" to .007" between the armatures and the contact surface of the armature knock off lever so that the armatures restore fully without choking off.

ADJ. 6A SPRING SUPPORT



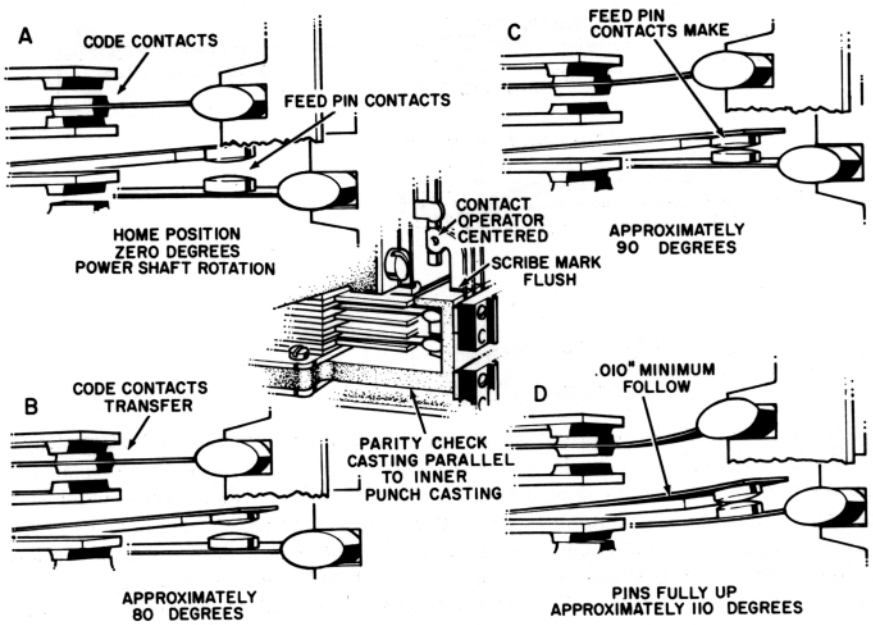
With the latch levers in their unlatched position, loosen the spring support mounting screws and position the spring support vertically to allow a minimum clearance of .002" between the top edge of the punch levers and the latching point of the latch levers, when the power shaft is cycled to the point just before the punch lever begins to travel upwards. Also maintain a perceptible movement of .001" between the lower edge of the punch levers and the bottom of the slots in the spring support (home position) with the spring support in an even vertical position, so that the punch levers do not bind in the slots and a clearance is maintained between the lower edge of the punch levers and the drive arm pivot stud. Tighten the spring support mounting screws.

ADJ. 6B PARITY CHECK CONTACT ASSEMBLY



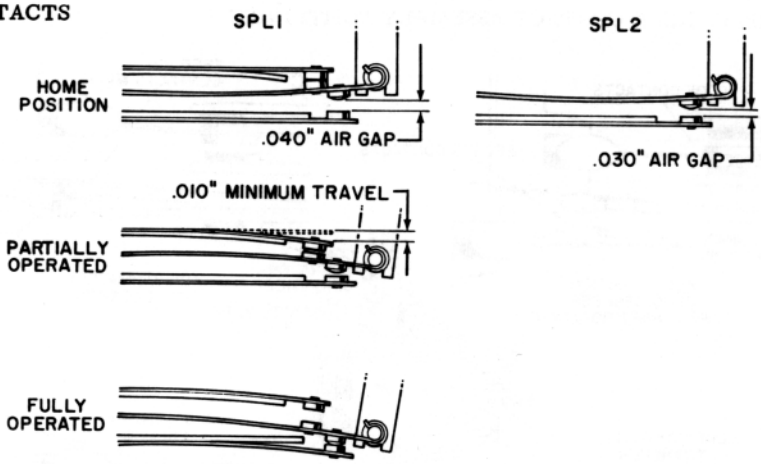
With the parity check contact assembly removed from the inner punch casting and using gauge T-18221, simultaneously hold all the contact operators tightly against the .368" side of the gauge and form the upper stationary contact springs to allow an .008" to .014" clearance to the moveable contact springs. With the contact operators simultaneously held against the .368" side of the gauge, the scribe mark on the #8 contact operator should be flush to the upper most surface of the parity check casting. With the contact operators simultaneously held against the .438" side of the gauge, form the lower stationary contact springs to allow an .008" to .014" clearance to the moveable contact springs.

ADJ. 6C PARITY CHECK CONTACT ASSEMBLY POSITIONING



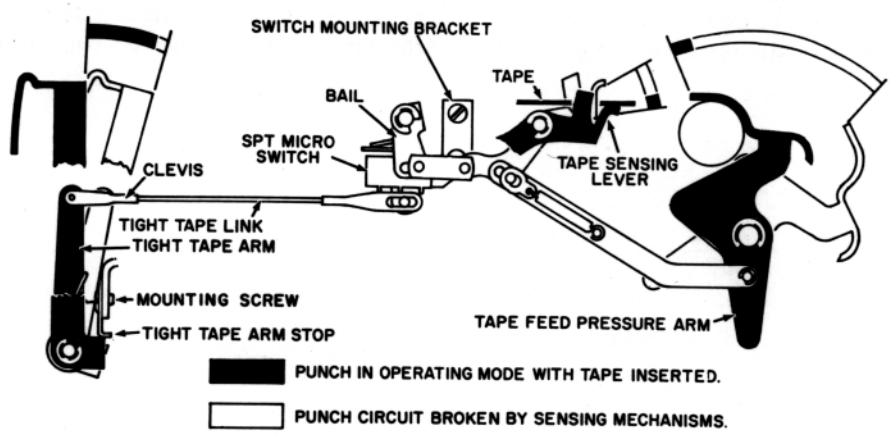
With the power shaft in home position, loosen the parity check contact assembly mounting screws and position the parity check casting so that it is parallel with the lower edge of the inner punch casting with the top of the contact operators centered in the punch pin slots and the scribe mark on the No. 8 contact operator flush with the upper most surface of the parity check casting. Adjust the normally open contact operated by the feed pin operator to make only after all the code contacts have fully transferred. Check the normally open feed pin contact for a .010" minimum follow when the pins are in their most upward position.

ADJ. 7 SPL CONTACTS



With the power shaft in home position, form the SPL-1 normally open contact stiffener for an air gap of .040". Form the SPL-1 normally closed contact stiffener so that when the shaft is cycled and the moveable contact spring begins to operate, the normally closed stationary contact spring follows the moveable contact spring a minimum of .010" but breaks before the moveable contact spring makes with the normally open stationary contact spring. With the power shaft in home position, form the SPL-2 normally open contact stiffener for an air gap of .030" and a minimum of .010" follow when the power shaft is cycled and the moveable contact spring makes with the stationary contact spring.

ADJ. 8 SPT MICRO SWITCH BRACKET, TIGHT TAPE ARM STOP AND LINK - TAPE PUNCH



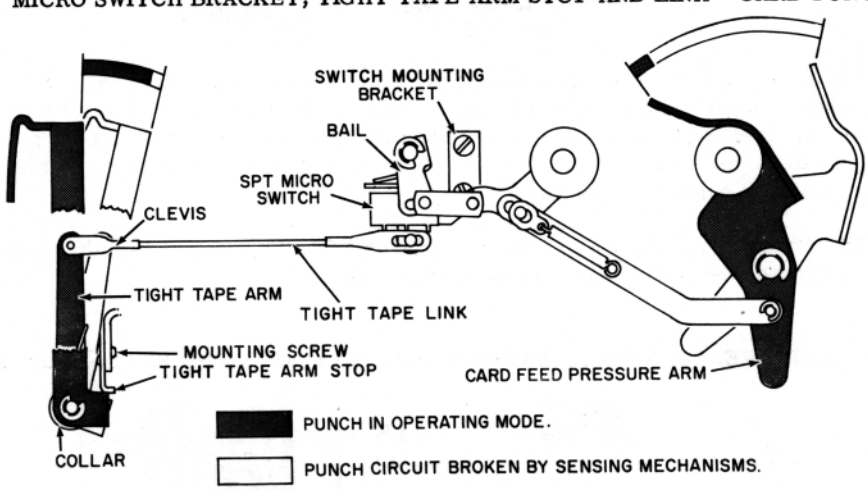
1. Loosen the switch mounting bracket mounting screws and position the switch mounting bracket so that the tape sensing lever operates the SPT micro switch when it is not held down by tape and allows the micro switch to fully restore with tape in the punch. (It may be necessary to dis-

connect the tight tape link to check the adjustment as the link may be maladjusted and interfere with operation of the tape sensing lever). Tighten the mounting screws. Also check that the SPT micro switch operates before the tape feed pressure arm is fully lowered, and that the micro switch restores before the tape feed pressure arm is fully raised.

2. Loosen the tight tape arm stop mounting screw and position the stop so that the tight tape arm is in a vertical position. Tighten the mounting screw.

3. With a length of tape in the punch, detach the tight tape arm link from the arm and adjust the clevis so that the link operates the SPT micro switch approximately 1/32" before the tight tape arm bottoms, but does not prevent the micro switch from restoring. With the tape removed from the punch, the link should not prevent full operation of the micro switch by the tape sensing lever when the sensing lever is in its upward position.

ADJ. 9 SPT MICRO SWITCH BRACKET, TIGHT TAPE ARM STOP AND LINK - CARD PUNCH

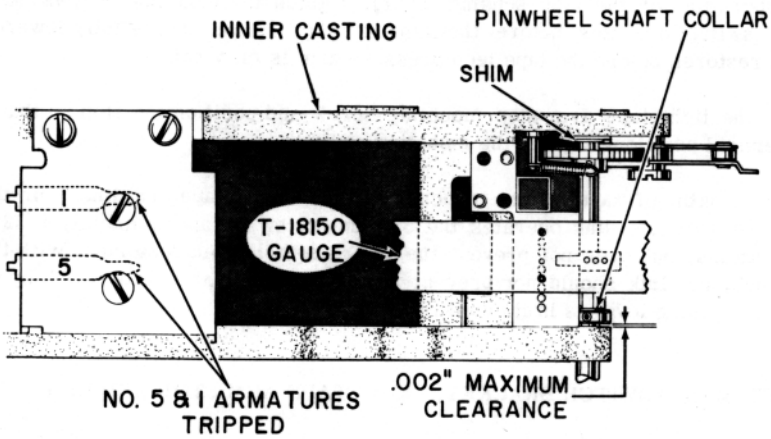


1. Loosen the switch mounting bracket mounting screws and position the switch mounting bracket so that the SPT micro switch operates before the tape feed pressure arm is fully lowered and the micro switch restores before the tape feed pressure arm is fully raised. Tighten the mounting screws.

2. Loosen the tight tape arm stop so that the tight tape arm is in a vertical position. Tighten the mounting screw.

3. With a length of tape in the punch, detach the tight tape arm link from the arm and adjust the clevis so that the link operates the SPT micro switch approximately 1/32" before the tight tape arm bottoms but does not prevent the micro switch from restoring.

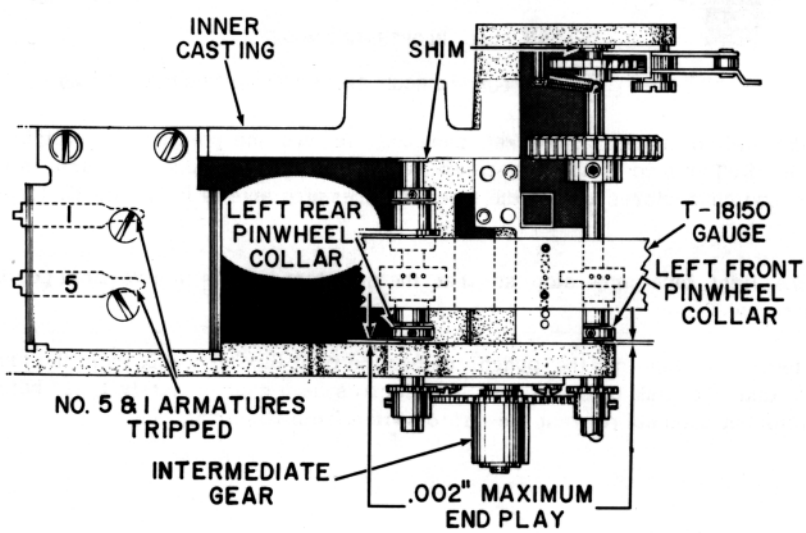
ADJ. 10 FRONT PINWHEEL LATERAL REGISTRATION - TAPE PUNCH



1. With the guide block removed from the punch, detach the spring from the ratchet detent and loosen the pinwheel shaft collar. Trip the No. 1 and No. 5 armatures and cycle the power shaft until the No. 1, feed and No. 5 pins are fully up. Place gauge T-18150 over the pins and shim the pinwheel shaft as required so that the pins on the pinwheel come up through the center of the forward pinwheel holes in the gauge.

2. Position the pinwheel collar so that the pinwheel shaft cycles freely with a maximum of .002" end play between the collar and the outer punch casting.

ADJ. 11 FRONT & REAR PINWHEEL LATERAL REGISTRATION & END PLAY - CARD PUNCH



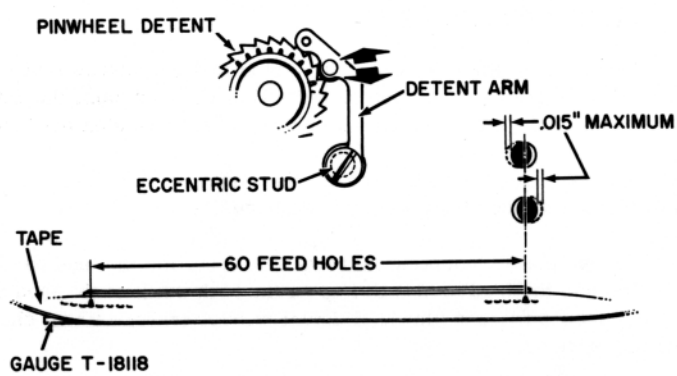
1. With the guide block removed from the punch, detach the spring from the ratchet detent and loosen the front pinwheel shaft collar. Trip the No. 1 and No. 5 armatures and cycle the power shaft until the No. 1, feed and No. 5 pins are fully up. Place gauge T-18150 over the pins and shim the front pinwheel shaft as required so that the pins on the front pinwheel come up through the center of the forward pinwheel holes in the gauge.

2. With the card guide assembly and guide block removed from the punch, detach the spring from the ratchet detent and loosen the rear pinwheel shaft collar. Trip the No. 1 and No. 5 armatures and with the intermediate gear disengaged, cycle the power shaft until the No. 1, feed and No. 5 pins are fully up. Place gauge T-18150 over the pins and shim the rear pinwheel shaft as required so that the pins on the rear pinwheel come up through the center of the pinwheel holes in the gauge.

3. Position the front pinwheel collar so that the front pinwheel shaft cycles freely with a maximum of .002" end play between the collar and the outer punch casting.

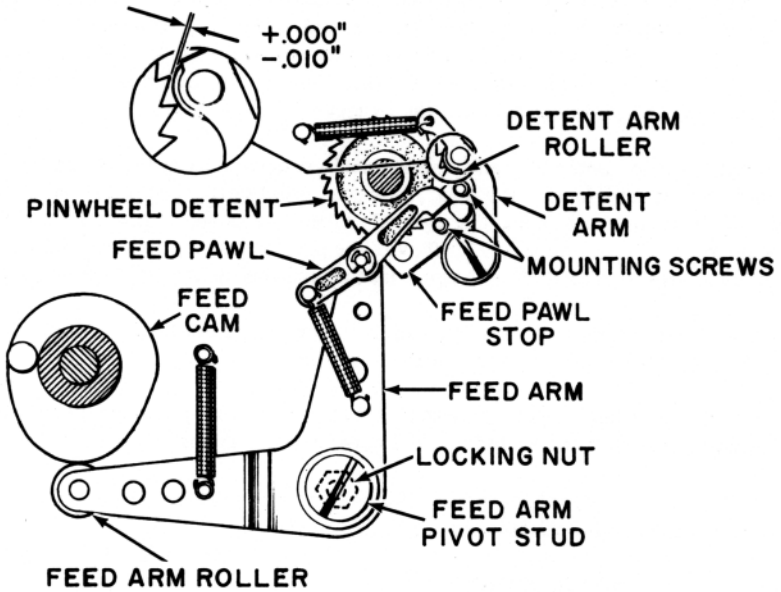
4. Position the rear pinwheel shaft collar so that the rear pinwheel shaft cycles freely with a maximum of .002" end play between the collar and the outer punch casting.

ADJ. 12A RATCHET DETENT ARM



Place a length of tape on registration gauge T-18118 and note the alignment. If the registration is incorrect, loosen the eccentric stud locking nut and turn the eccentric slightly as required to advance or retard the ratchet detent arm. Tighten the mounting nut. Feed an additional length of tape through the punch and check the registration on the gauge. When the longitudinal registration is correct, there should be 60 code holes in 6" of tape $\pm$.015".

ADJ. 12B FEED ARM PIVOT STUD & FEED PAWL STOP

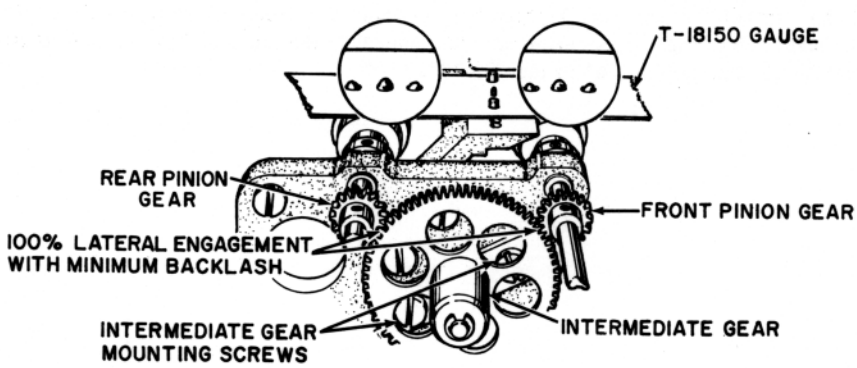


1. Loosen the feed arm pivot stud locking nut and adjust the stud so that when the power shaft is cycled and the feed arm roller is on the high dwell of the feed cam, the detent arm roller comes to rest on one full tooth of the pinwheel detent +.000" - .010". Tighten the locking nut.

NOTE: It may be necessary to manually rotate the pinwheel detent backward (till it limits on the feed pawl) to check that the undertravel is not excessive.

2. Loosen the pawl stop plate mounting screws and position the feed pawl stop so that when the power shaft is cycled and the feed arm roller is on the high dwell of the feed cam, the stop prevents any tendency of the feed pawl and pinwheel detent to over travel without choking off the feed pawl. Tighten the mounting screws.

ADJ. 13 FRONT PINION GEAR, INTERMEDIATE GEAR & REAR PINION GEAR - CARD PUNCH

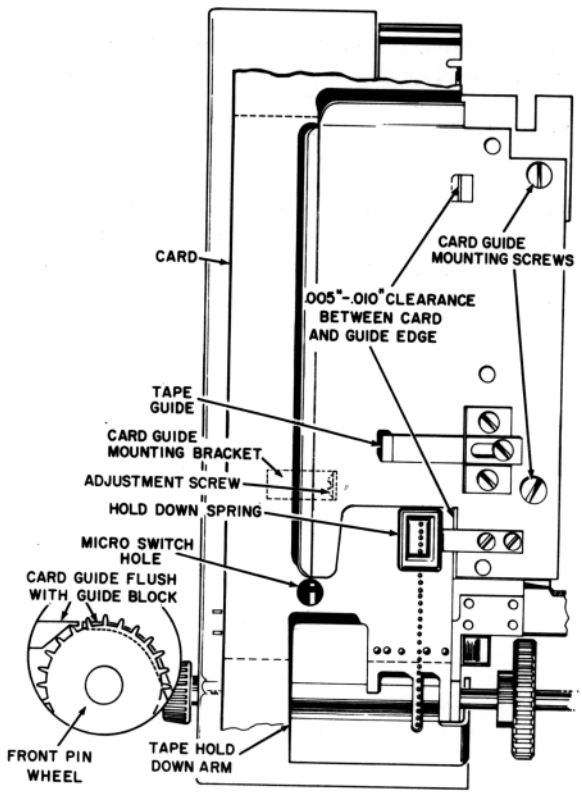


1. Loosen the setscrews on the front pinion gear and position the gear to engage the intermediate gear 100%.

2. With the front pinion fully engaging the intermediate gear, loosen the intermediate gear mounting screws and position the intermediate gear so that with the detent arm held away from the pinwheel detent, the gears rotate freely without drag or binding areas. When the pinwheel detent is engaged by the detent arm, there should be a minimum of backlash between the three gears. Tighten the mounting screws.

3. With the guide block removed from the punch and the No. 1 and No. 5 armatures tripped, cycle the power shaft and place registration gauge T-18150 over the No. 1, feed and No. 5 pins. Loosen the rear pinion gear setscrews and position the rear pinwheel so that it is engaged by the rear pin feed holes in the gauge. Position the rear pinion gear laterally for 100% engagement with the intermediate gear. Tighten the setscrews.

ADJ. 14A CARD GUIDE REGISTRATION, HEIGHT & CARD HOLD DOWN SPRING - CARD PUNCH

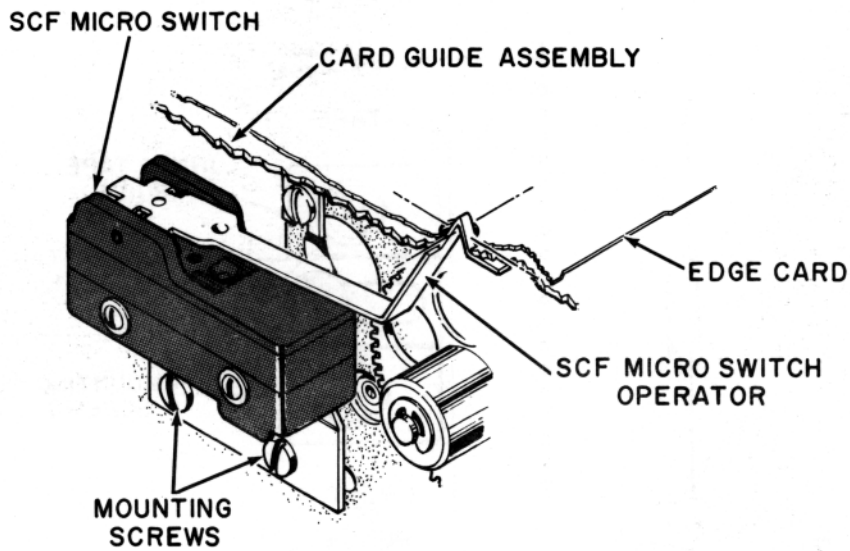


1. With an edge card inserted in the card guide, loosen the card guide mounting screws and card guide bracket adjustment screw and position the card guide laterally to allow a .005" to .010" clearance between the edge card and the guide edge. Maintaining this clearance, position the card guide forward or rearward so that the curvature of the card guide is concentric to and as near flush as possible but not above the base of the pins in the pinwheel. Tighten the screws.

2. Loosen the card guide mounting bracket screw and position the card guide so that the surface of the card guide is flush to .005" below the surface of the guide block.

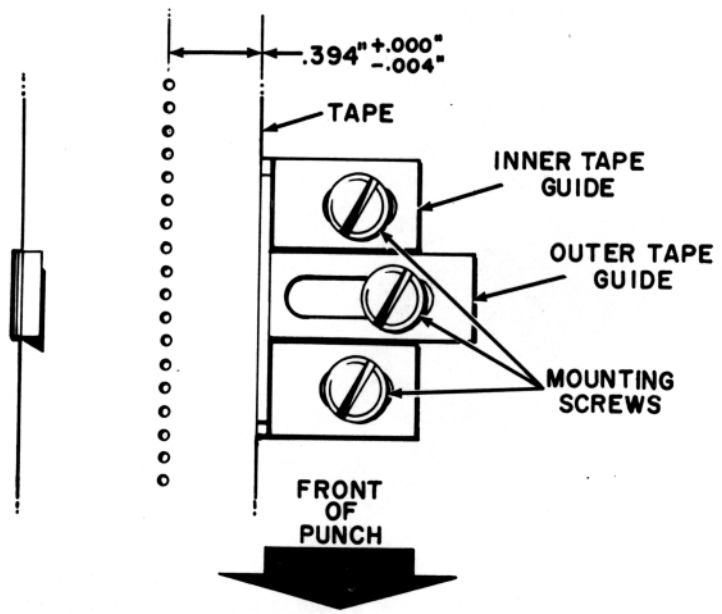
3. Loosen the card hold down spring mounting screws and form the spring so that it is flush against the surface of the card guide and has sufficient tension to hold the pinfeed holes in an edge card over the pins in the pinwheel for good registration. Position the spring so that the rectangular opening is centered over the pinwheel. Tighten the screws.

ADJ. 14B SCF MICRO SWITCH - CARD PUNCH



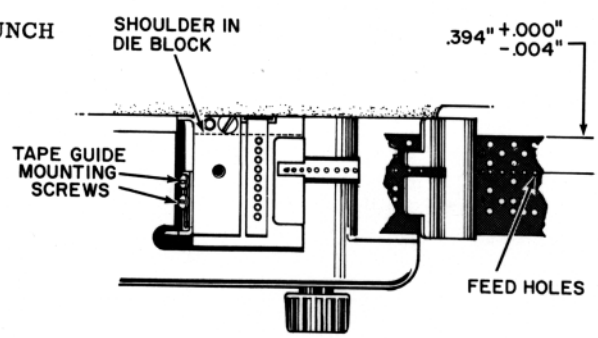
Loosen the micro switch mounting bracket screws and position the switch so that when a series of edge cards are fed through the punch, the switch is operated until the micro switch hole in the edge cards pass over the top of the micro switch arm allowing the switch to restore. The top of the switch arm should be centered in the edge card hole.

ADJ. 14C INNER & OUTER TAPE GUIDES - CARD PUNCH



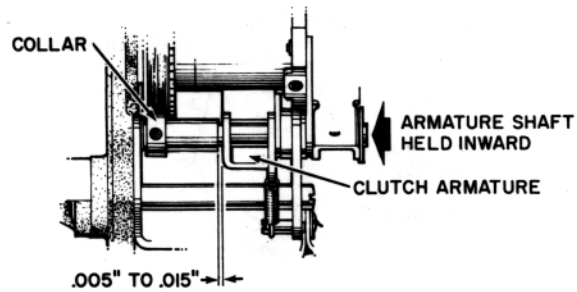
Feed a length of tape through the punch and check it on registration gauge T-18118. The distance between the center of the feed holes and the guide edge of the tape must be .394" plus .000" minus .004". To correct a poor condition, loosen the inner tape guide screws and the outer tape guide screw and position the inner guide left or right, positioning the outer tape guide simultaneoulsy so that the tape flows freely with a minimum of side play. Tighten the screws.

ADJ. 15 TAPE GUIDE - TAPE PUNCH



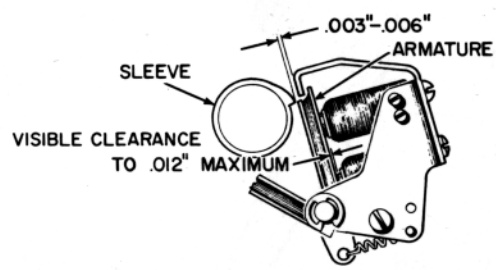
Feed a length of tape through the punch and check it on registration gauge T-18118. The distance between the center of the feed holes and the inner edge of the tape must be .394" plus .000" minus .004". To correct a poor condition, loosen the tape guide mounting screws and with the inner tape edge against the shoulder on the lower surface of the die block, position the tape guide simultaneously towards the outer edge of the tape but allowing the tape to flow freely with a minimum of side play. Tighten the screws.

ADJ. 16 ARMATURE SHAFT COLLAR



Loosen the setscrew on the armature shaft collar and position the collar to limit the armature side play .005" to .015". Tighten the setscrews.

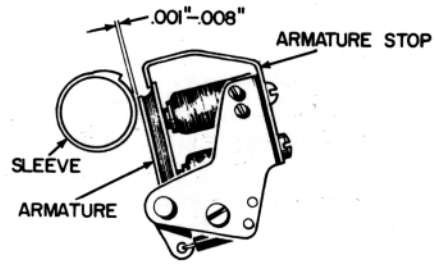
ADJ. 17A LOWER COIL CLEARANCE & MAGNET YOKE ASSEMBLY



1. While holding the armature flat against the upper magnet core, there should be a visible clearance to .012" maximum between the armature and the lower coil core. A clearance in excess of .012" indicates replacement of the upper coil and/or the armature.

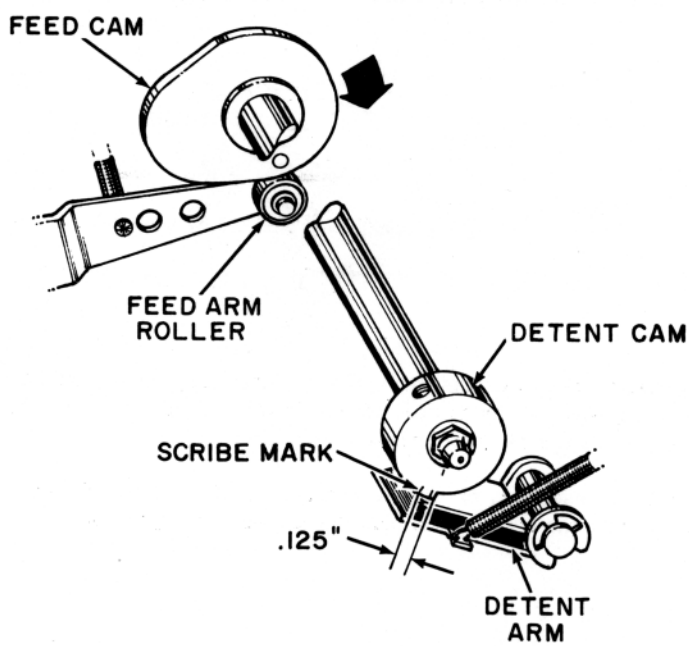
2. Position the magnet yoke assembly to allow a clearance of .003" to .006" between the armature and the clutch sleeve lip when the armature is held flat against the upper coil core.

ADJ. 17B ARMATURE STOP



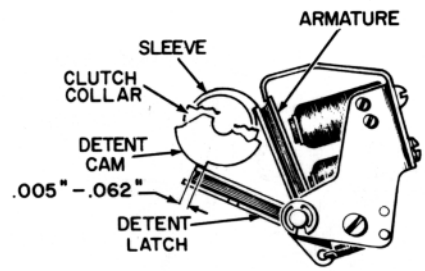
Form the armature stop to allow a clearance of .001" to .008" between the armature and the low surface of the clutch sleeve when the armature is in its non-attracted position.

ADJ. 17C CLUTCH HOME POSITION & PULLEY END PLAY



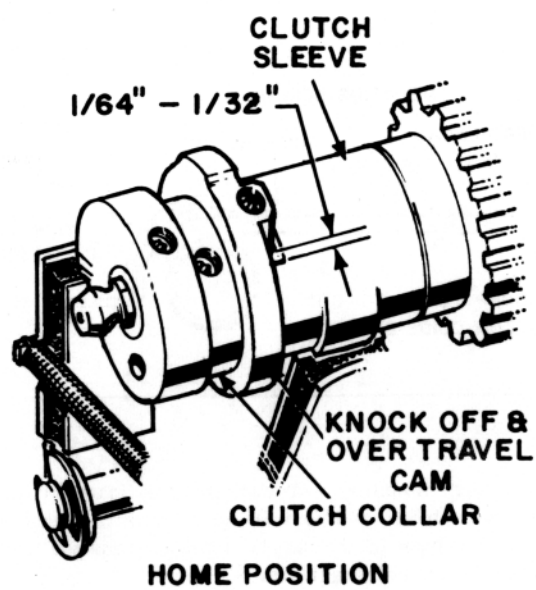
To obtain the clutch home position, rotate the power shaft to the point where the tape feed arm roller just reaches the low dwell of the feed cam. Loosen the detent cam setscrews and position the cam so that it is .125" (scribe mark on cam) short of engaging the detent latch. Maintain .003" to .008" end play at the pulley and tighten the setscrews.

ADJ. 17D CLUTCH COLLAR



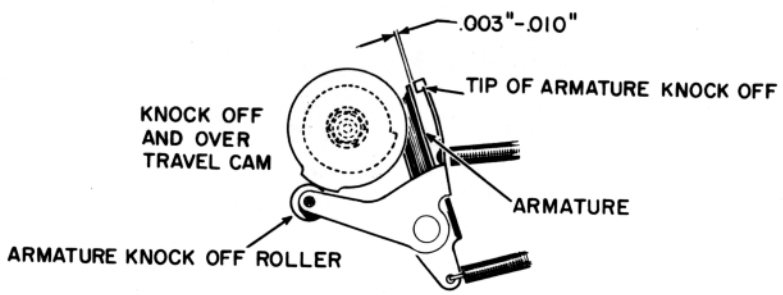
Loosen the clutch collar setscrews and position the collar so that as the clutch sleeve lip touches the armature, the detent cam is still .005" to .062" short of latching on the detent latch. Pull the collar towards the detent cam while tightening the setscrews.

ADJ 17E KNOCK OFF & OVER TRAVEL CAM



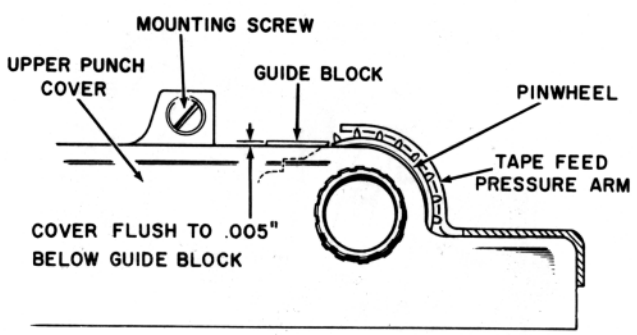
With the clutch in home position, loosen the setscrews on the knock off and over travel cam. Rotate the cam towards the lower end of the cutout in the clutch sleeve and allow a gap of 1/64" to 1/32". This should allow sufficient over travel distance between the detent cam and the detent latch. Pull the cam towards the clutch collar while tightening the setscrews.

ADJ. 17F ARMATURE KNOCK OFF



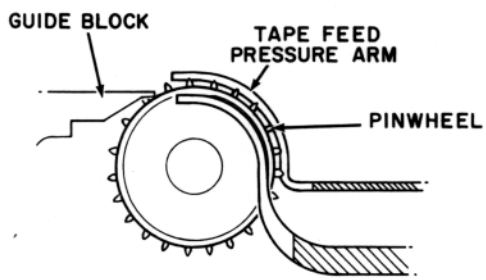
Form the armature knock off to allow a .003" to .010" clearance between the tip of the armature knock off and the armature when the armature knock off is on the high dwell of the knock off and over travel cam.

ADJ. 18 UPPER PUNCH COVER - TAPE PUNCH



Loosen the upper punch cover mounting screws and position the cover so that it is flush to .005" below the surface of the guide block and forward or rearward so that the curvature of the cover is concentric with the base of the pins in the pinwheel but allowing the tape feed pressure arm to bear against the pinwheel. Tighten the mounting screws.

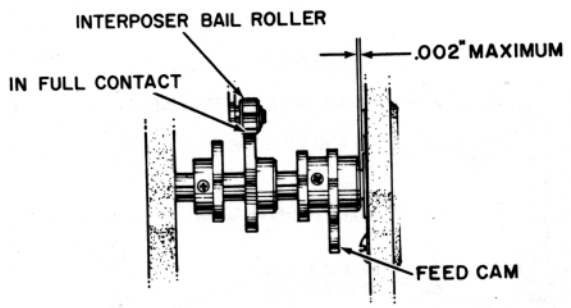
ADJ. 19 TAPE FEED PRESSURE ARM



Form the tape feed pressure arm so that the inside surface of the arm is concentric with the pinwheel and the slot is centered over the pinwheel with the rear edge above the guide block.

AUXILIARY TAPE READER

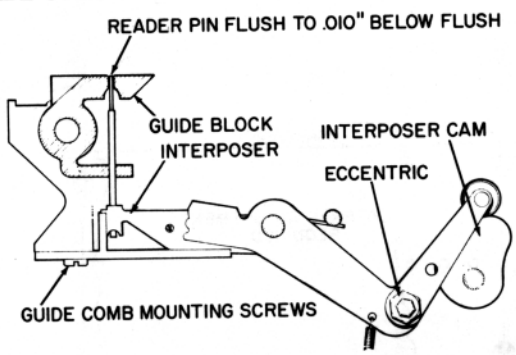
ADJ. 1 FEED CAM & INTERPOSER CAM



1. Position the feed cam so that the cam shaft turns freely but with no more than .002" end play.

2. The lateral positioning of the interposer cam should be such that the bail roller engages the cam 100%.

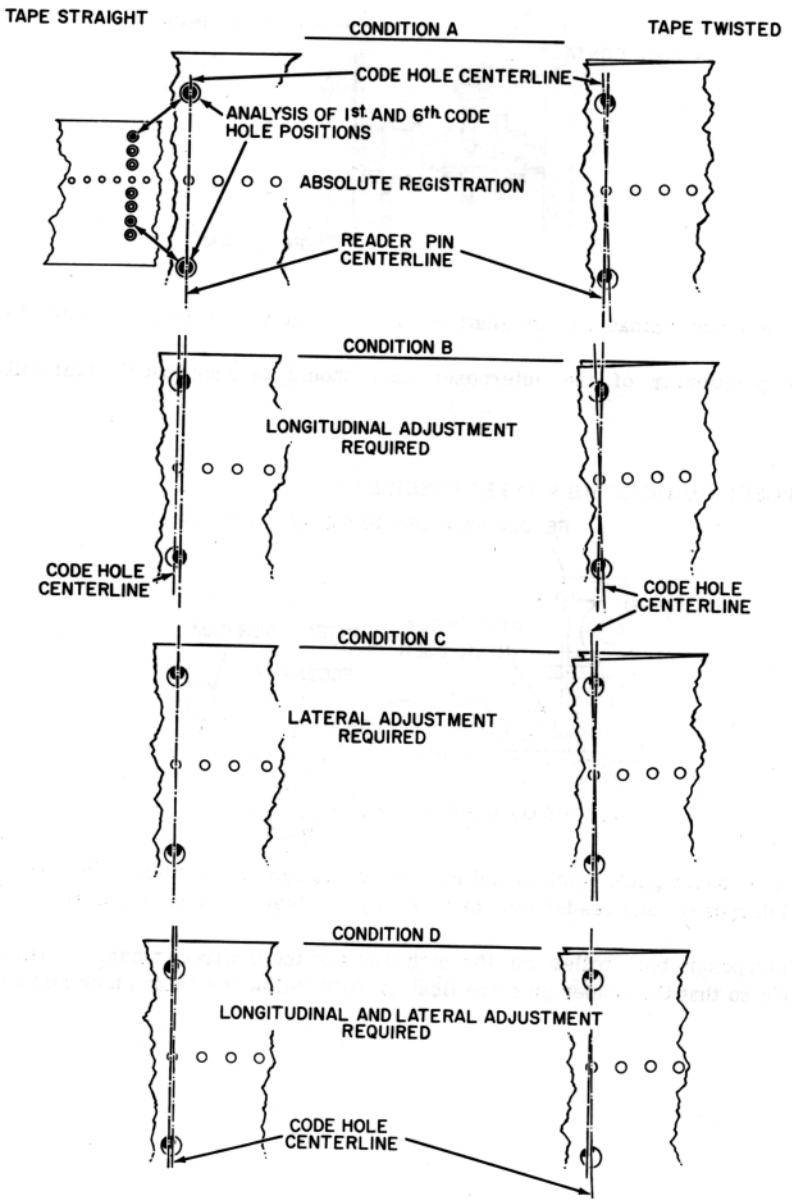
ADJ. 2 INTERPOSER GUIDE COMB & INTERPOSER BAIL

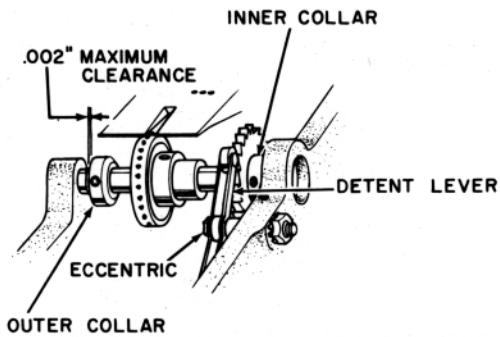


1. Loosen the interposer guide comb mounting screws and center the guide comb over the interposers so that the interposers and reader pins move freely. Tighten the mounting screws.

2. With the interposer bail roller on the high dwell of the interposer cam, position the interposer bail eccentric so that the reader pins are flush to .010" below the guide block surface.

ADJ. 3A LATERAL AND LONGITUDINAL REGISTRATION





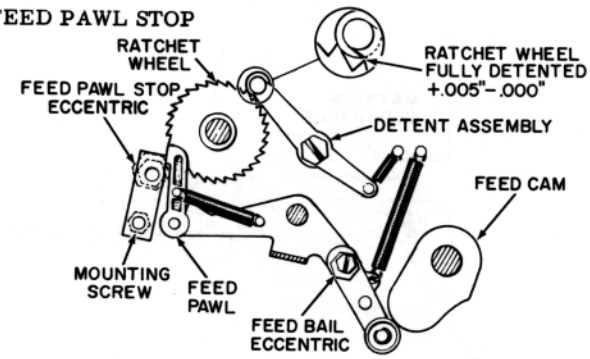
Exercise caution when interpreting an existing tape registration condition. As shown on the chart, Condition A can be seen as an absolute tape registration with the centerlines aligned, but can be misinterpreted as requiring adjustment when the tape is twisted. With the tape straight, the centerlines under Condition B are parallel and a longitudinal adjustment is required only, but appears to require lateral adjustment also when the tape is twisted. When the centerlines under Condition C are aligned, the condition can easily be recognized as requiring a lateral adjustment only. With the tape twisted, the centerlines cross each other and the condition appears to require longitudinal and lateral adjustment. When the centerlines are aligned under Condition D they show that a lateral and longitudinal adjustment are required but with the tape twisted it appears to require lateral adjustment only.

1. Using a length of standard punched tape, loosen the setscrews on the front pinwheel collar and laterally center the code holes over the reader pins. Tighten the setscrews.

2. Limit the front pinwheel shaft end play by positioning the shaft collar to allow a .002" maximum clearance with the shaft rotating freely.

3. Loosen the detent lever eccentric and position the eccentric so that the code holes are longitudinally centered over the reader pins. Tighten the eccentric.

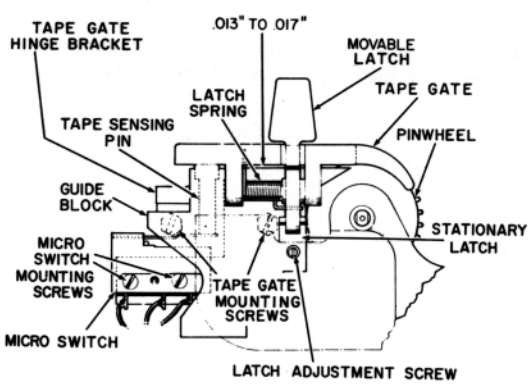
ADJ. 3B FEED BAIL & FEED PAWL STOP



1. Adjust the feed bail eccentric so that the feed pawl rotates the ratchet wheel one full tooth + .005" - .000" when the feed bail roller is on the high dwell of the feed cam.

2. With the feed bail roller on the high dwell of the feed cam, loosen the feed pawl stop mounting screw and eccentric and position the stop to prevent any tendency of the feed pawl and ratchet wheel to overtravel without choking off the feed pawl.

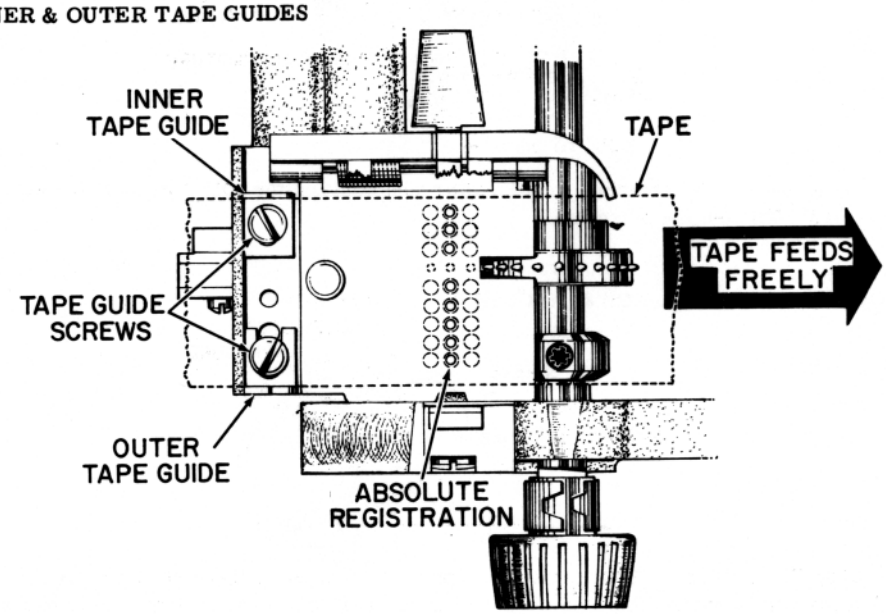
ADJ. 4 TAPE GATE & SRT MICRO SWITCH



1. Loosen the tape gate adjustment screws and the stationary latch adjustment screw and position the gate and the latch to allow an even clearance of .013" to .017" between the surface of the guide block and the tape gate. Tighten the adjustment screws. The gate must operate freely and unlatch with ease.

2. Loosen the micro switch mounting screws and position the micro switch so that with tape in the reader, the micro switch is operated by the tape sensing pin. With the removal of the tape, the micro switch should be non-operative. Tighten the mounting screws.

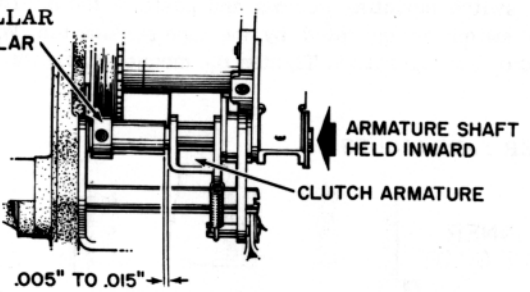
ADJ. 5 INNER & OUTER TAPE GUIDES



1. Loosen the inner tape guide screw and with tape in the reader, center the code holes over the reader pins and position the guide just to the edge of the tape. Tighten the screw.

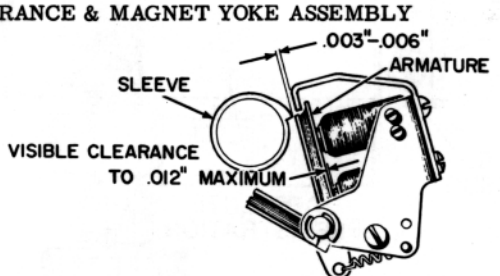
2. Loosen the outer tape guide screw and limit the side movement of the tape by positioning the guide to the tape but allowing the tape to feed freely. Tighten the screw.

ADJ. 6 ARMATURE SHAFT COLLAR



Loosen the setscrew on the armature shaft collar and position the collar to limit the armature side play .005" to .015". Tighten the setscrew.

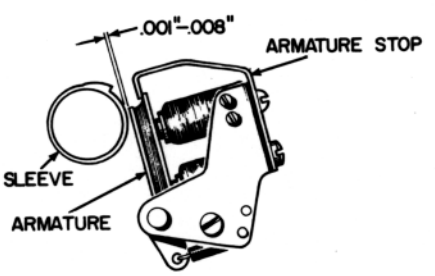
ADJ. 7A LOWER COIL CLEARANCE & MAGNET YOKE ASSEMBLY



1. While holding the armature flat against the upper magnet core, there should be visible clearance to .012" maximum between the armature and the lower coil core. A clearance in excess of .012" indicates replacement of the upper coil and/or the armature.

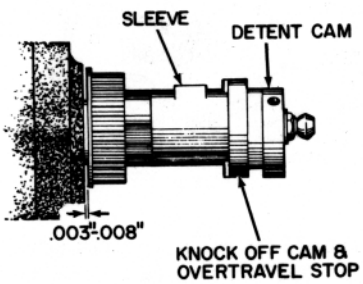
2. Position the magnet yoke assembly to allow a clearance of .003" to .006" between the armature and the clutch sleeve lip when the armature is held flat against the upper coil core.

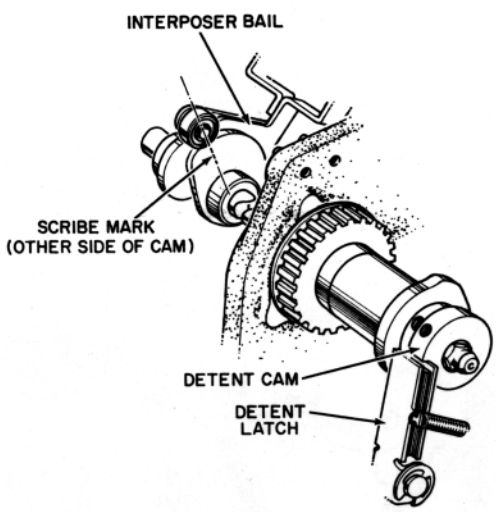
ADJ. 7B ARMATURE STOP



Form the armature stop to allow a clearance of .001" to .008" between the armature and the low surface of the clutch sleeve when the armature is in its non-attracted position.

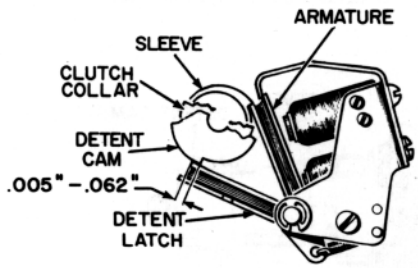
ADJ. 7C CLUTCH HOME POSITION AND PULLEY END PLAY





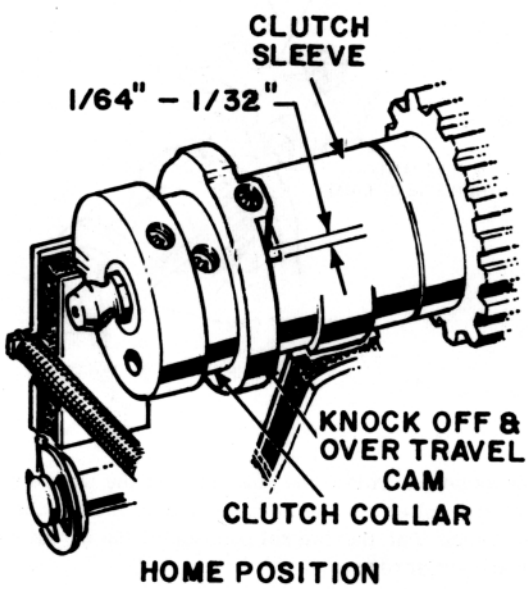
To obtain the clutch home position, rotate the shaft so that the scribe mark on the interposer cam is aligned with the center of the roller on the interposer bail and set the detent cam to just engage the detent latch. At this time check that the lateral position of the detent cam allows .003" to .008" side play of the pulley. Tighten the set screws.

ADJ. 7D CLUTCH COLLAR



Loosen the clutch collar setscrews and position the collar so that as the clutch sleeve lip touches the armature, the detent cam is still .005" to .062" short of latching on the detent latch. Pull the collar towards the detent cam while tightening the setscrews.

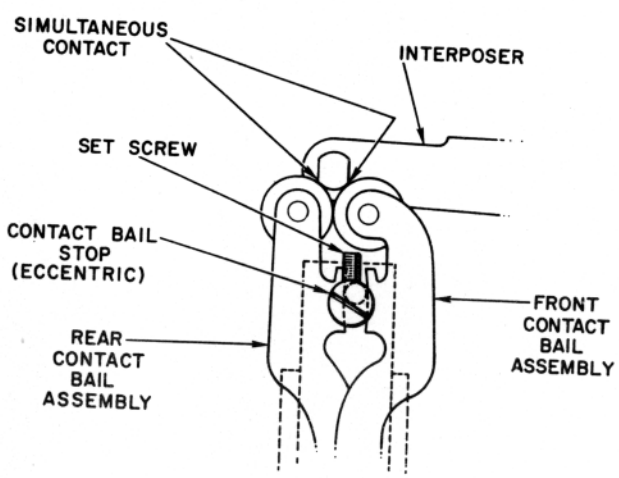
ADJ. 7E KNOCK OFF & OVER TRAVEL CAM



With the clutch in home position, loosen the setscrews on the knock off and over travel cam. Rotate the cam towards the lower end of the cut out in the clutch sleeve and allow a gap of 1/64" to 1/32". This should allow sufficient over travel distance between the detent cam and the detent latch. Pull the cam towards the clutch collar while tightening the setscrews.

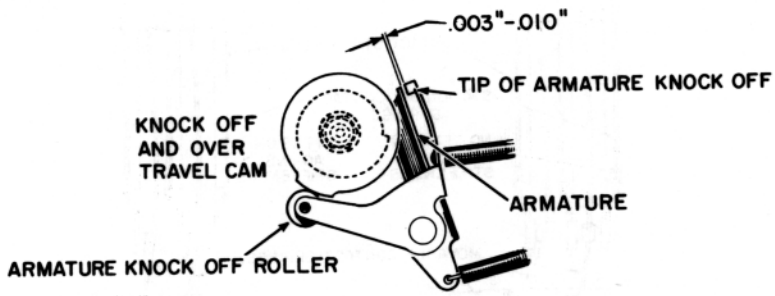
Addendum

ADJ. 8 CONTACT BAIL ECCENTRIC STOP



The studs on the interposer bails must contact the rollers on the front and rear contact bails simultaneously. To adjust, loosen the setscrews which retain the ends of the eccentric stop in the inside and the outside contact bracket ties. Turn the eccentric stop as necessary to meet the requirement. Tighten the setscrews.

ADJ. 7F ARMATURE KNOCK OFF



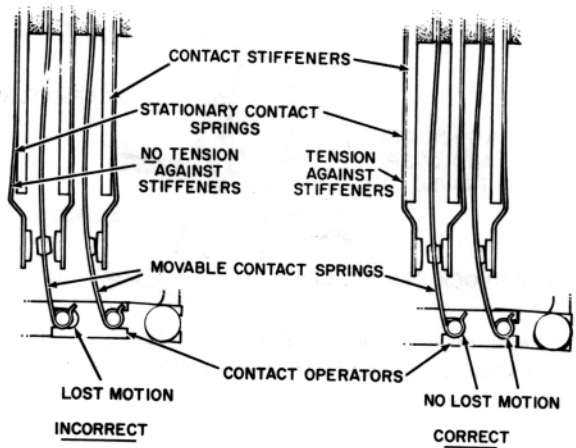
Form the armature knock off to allow a .003" to .010" clearance between the tip of the armature knock off and the armature when the armature knock off roller is on the high dwell of the knock off and over travel cam.

ADJ. 8A CONTACT STACKUP ALIGNMENT

INCORRECT CORRECT

Check to see that the contact stackups are aligned sideways and that the mating contact points are no more than .015" out of alignment. When necessary, loosen the contact assembly mounting screws to align the stackups.

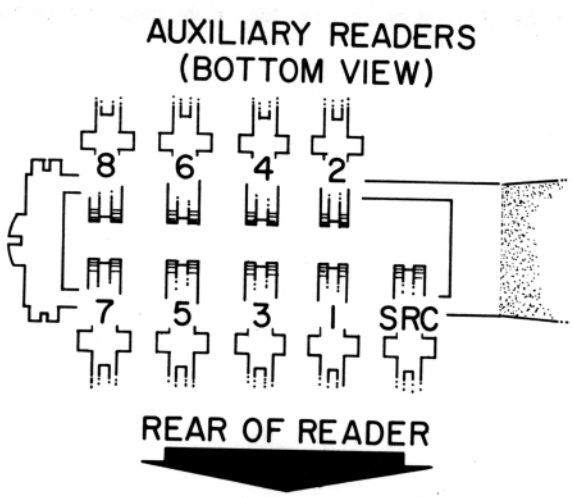
ADJ. 8B CONTACT SPRING TENSION



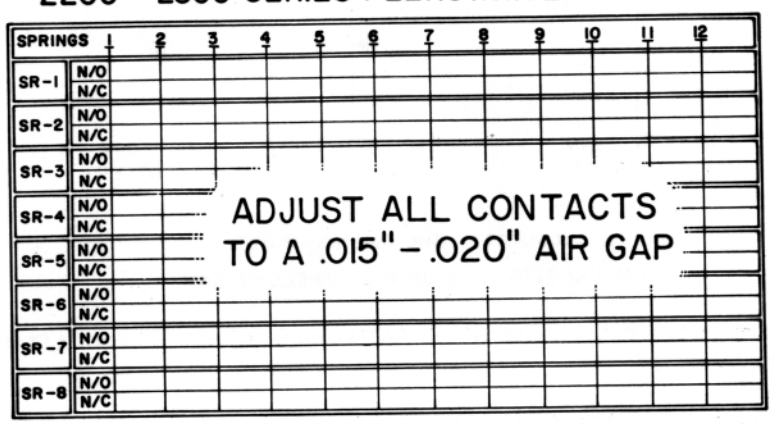
1. The moveable contact springs should have sufficient tension to follow the operators without lost motion. Form or replace the moveable contact springs when necessary.

2. The stationary contact springs should have sufficient tension against the contact stiffeners. When necessary, form or replace the stationary contact springs.

ADJ. 8C READER CONTACT ADJUSTMENTS



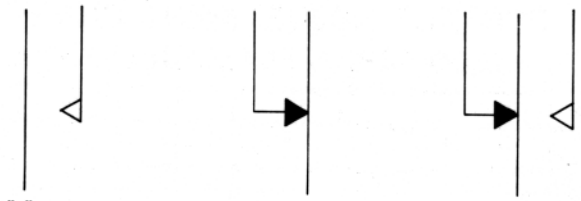
CONTACT ADJUSTMENT CHART
2200 – 2300 SERIES FLEXOWRITER READERS



1. With a length of blank tape in the reader and the interposer bail roller on the low dwell of its cam, adjust the normally open (N/O) contacts to the air gap indicated on the above chart.

2. With the tape removed from the reader and the interposer bail roller on the low dwell of its cam, adjust the normally closed (N/C) contacts to the air gap indicated on the above chart.

ADJ. 8D READER COMMON CONTACT ADJUSTMENTS



CONTACTS SHOWN UNOPERATED

(INTERPOSER BAIL ON HIGH DWELL OF CAM)

The following adjustments for "A" Form (N/O), "B" Form (N/C) and "C" Form (Transfer) contacts are to be considered standard.

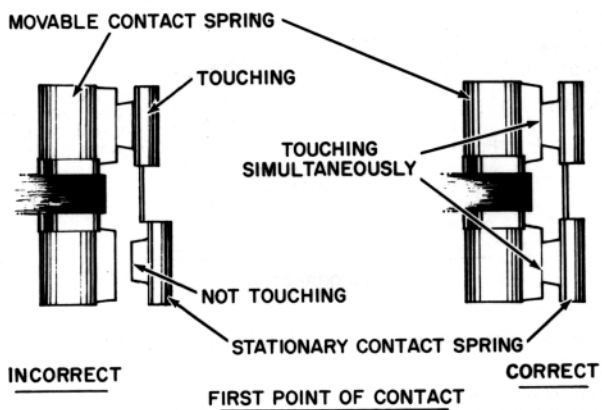
1. "A" Form (N/O) - With the clutch in home position (interposer bail on the high dwell of its cam) adjust the normally open (N/O) contacts to a .015" to .020" air gap.

2. "B" Form (N/C) - With the cam shaft cycled (interposer bail on the low dwell of its cam) adjust the normally closed (N/C) contacts to a .015" to .020" air gap.

3. "C" Form (Transfer) - With the clutch in home position (interposer bail on the high dwell of its cam) adjust the normally open (N/O) contacts to a .015" to .020" air gap. With the cam shaft cycled (interposer bail on the low dwell of its cam) adjust the normally closed (N/C) contacts to a .015" to .020" air gap.

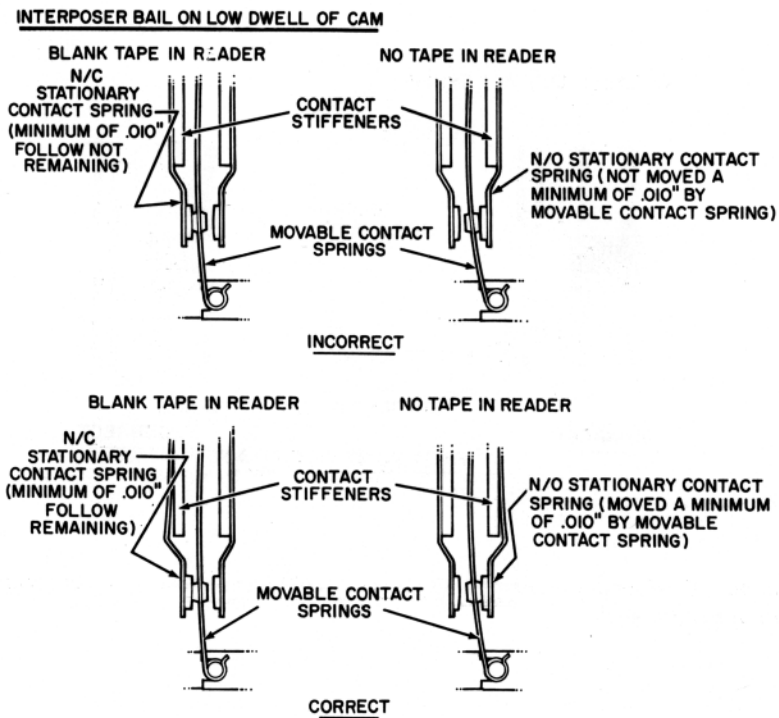
NOTE: The "C" Form (Transfer) adjustment listed provides a break before make operation. If other than this is required, it will be listed per the Reader Manufacturing Specification.

ADJ. 8E CONTACT MATING



Both contacts on all stationary springs (N/O and N/C) should touch the contacts on the moveable contact springs simultaneously.

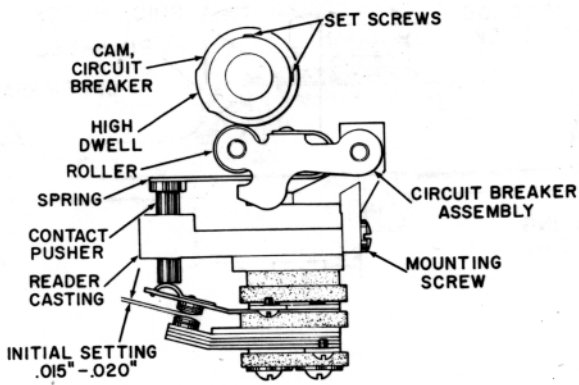
ADJ. 8F CONTACT FOLLOW



1. N/C Contacts - With a blank tape in the reader and the interposer bail on the low dwell of its cam, all normally closed contacts should have a minimum of .010" follow still remaining.

2. N/O Contacts - With no tape in the reader and the interposer bail on the low dwell of its cam, all normally open contacts (now closed) should have been moved a minimum of .010" by the moveable contact spring.

ADJ. 9 CIRCUIT BREAKER ASSEMBLY TIMING (SRCC - 1, SRCC - 2)



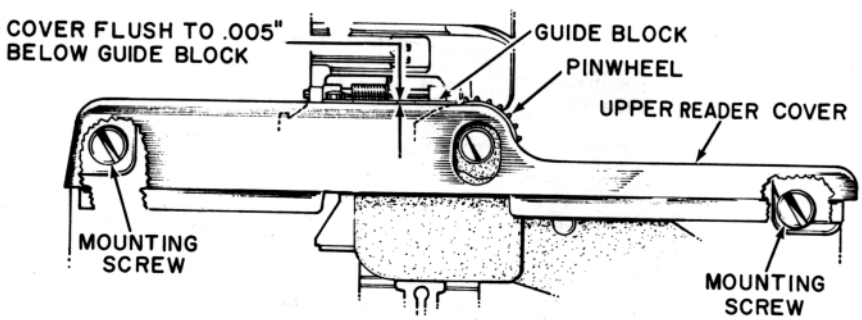
CONTACT	MAKE	BREAK	DURATION OF CLOSURE
SRCC-1	59°	136°	77°
SRCC-2	310°	20°	70°

1. Duration - Raising or lowering the circuit breaker assembly by loosening the mounting screws determines the contact clearance with the roller on the low dwell of the cam and therefore the duration or length of time the contacts are made on the high dwell of the cam. Begin with the circuit breaker assembly adjusted to give an initial setting of .015" to .020" clearance between the contacts with the roller on the low dwell of the cam. With a timing dial (T-18088) attached to the reader shaft, determine the number of degrees the contacts remain closed when operated by the high dwell of the cam as the drive shaft is cycled. Raise the circuit breaker assembly to increase the duration of contact closure and lower to decrease until the correct duration of contact closure is obtained as outlined in the timing chart.

   NOTE: Distortion or weakening of the spring which operates the contact pusher may make it impossible to obtain the correct contact duration. If necessary, replace the circuit breaker assembly.

2. Timing - Once the correct duration of contact closure has been obtained, set the SRCC timing cams to make and break according to the specifications called for in the timing chart.

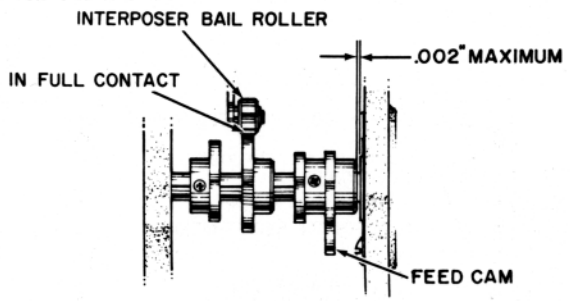
ADJ. 10 UPPER COVER



Loosen the upper cover mounting screws and position the cover so that it is flush to .005" below the surface of the guide block and forward or rearward so that the curvature of the cover is concentric with the base of the pins in the pinwheel. Tighten the mounting screws.

SELECTADATA READER

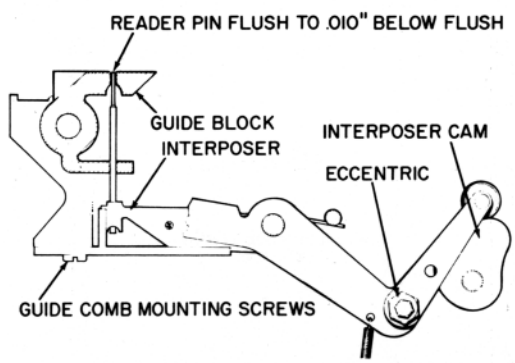
ADJ. 1 FEED CAM & INTERPOSER CAM



1. Position the feed cam so that the cam shaft turns freely but with no more than .002" end play.

2. The lateral positioning of the interposer cam should be such that the bail roller engages the cam 100%.

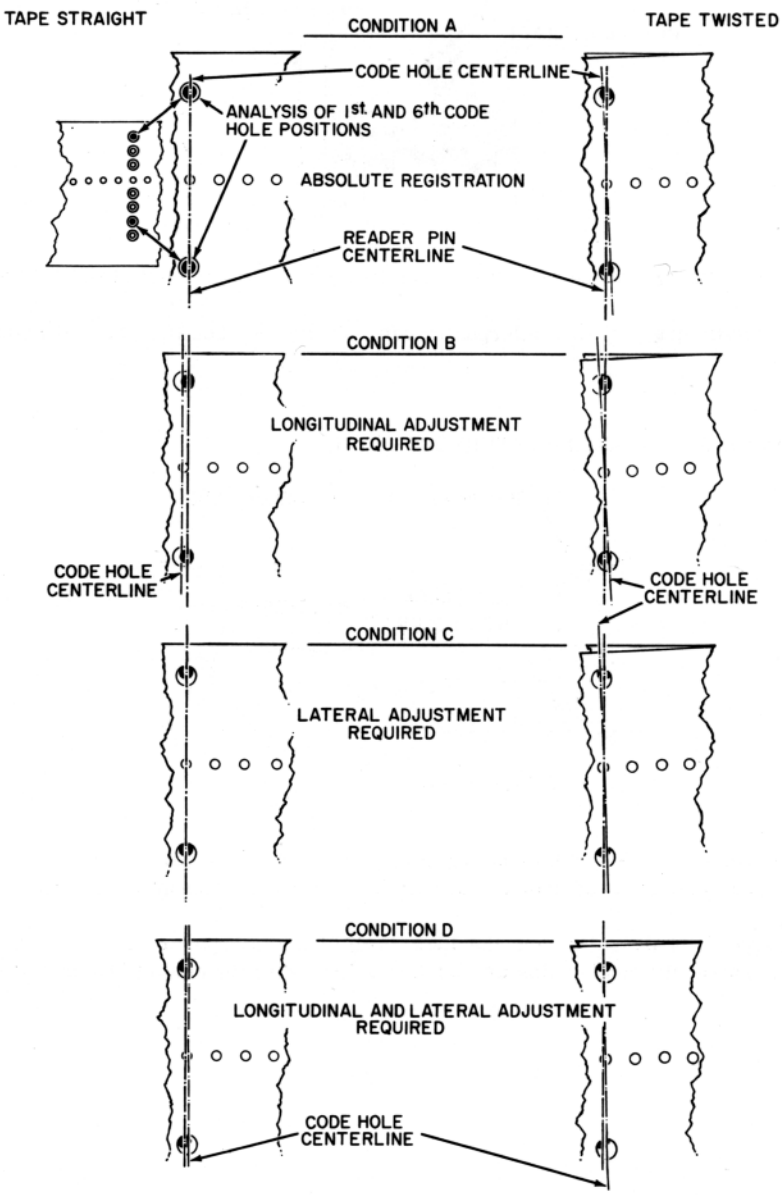
ADJ. 2 INTERPOSER GUIDE COMB & INTERPOSER BAIL

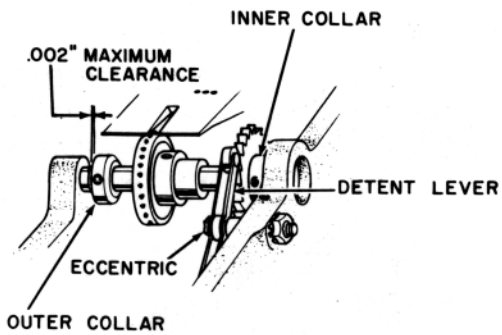


1. Loosen the interposer guide comb mounting screws and center the guide comb over the interposers so that the interposers and reader pins move freely. Tighten the mounting screws.

2. With the interposer bail roller on the high dwell of the interposer cam, position the interposer bail eccentric so that the reader pins are flush to .010" below the guide block surface.

ADJ. 3A LATERAL AND LONGITUDINAL REGISTRATION





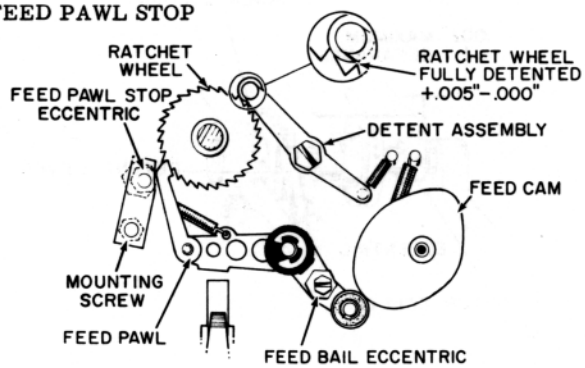
Exercise caution when interpreting an existing tape registration condition. As shown on the chart, Condition A can be seen as an absolute tape registration with the centerlines aligned, but can be misinterpreted as requiring adjustment when the tape is twisted. With the tape straight, the centerlines under Condition B are parallel and a longitudinal adjustment is required only, but appears to require lateral adjustment also when the tape is twisted. When the centerlines under Condition C are aligned, the condition can easily be recognized as requiring a lateral adjustment only. With the tape twisted, the centerlines cross each other and the condition appears to require longitudinal and lateral adjustment. When the centerlines are aligned under Condition D, they show that a lateral and longitudinal adjustment are required but with the tape twisted it appears to require lateral adjustment only.

1. Using a length of standard punched tape, loosen the setscrews on the front pinwheel collar and laterally center the code holes over the reader pins. Tighten the setscrews.

2. Limit the front pinwheel shaft end play by positioning the shaft collar to allow a .002" maximum clearance with the shaft rotating freely.

3. Loosen the detent lever eccentric and position the eccentric so that the code holes are longitudinally centered over the reader pins. Tighten the eccentric.

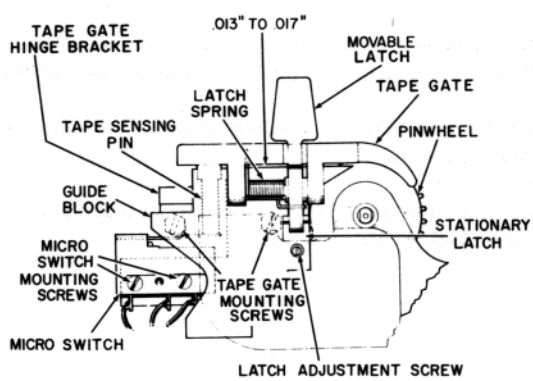
ADJ. 3B FEED BAIL & FEED PAWL STOP



1. Adjust the feed bail eccentric so that the feed pawl rotates the ratchet wheel one full tooth +.005" - .000" when the feed bail roller is on the high dwell of the feed cam.

2. With the feed bail roller on the high dwell of the feed cam, loosen the feed pawl stop mounting screw and eccentric and position the stop to prevent any tendency of the feed pawl and ratchet wheel to overtravel without choking off the feed pawl.

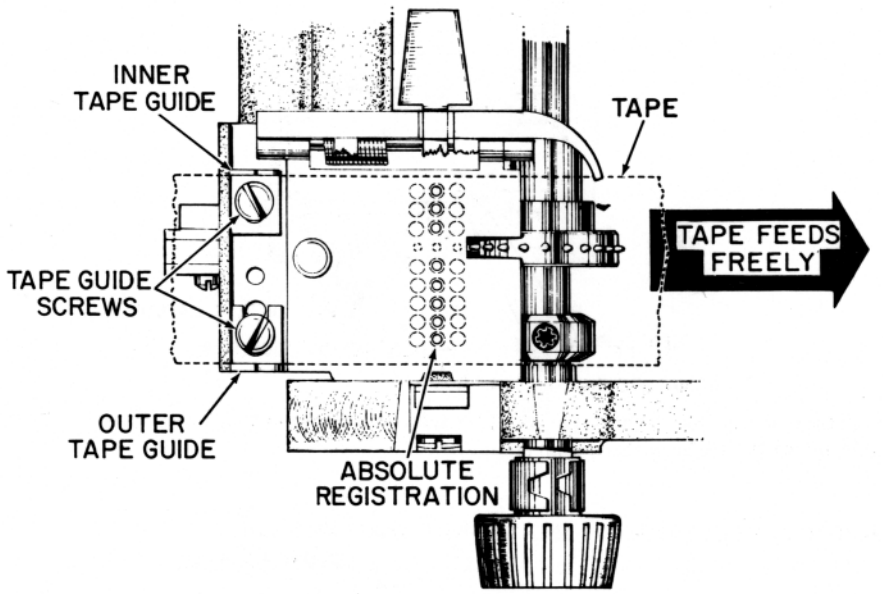
ADJ. 4 TAPE GATE & SRT MICRO SWITCH



1. Loosen the tape gate adjustment screws and the stationary latch adjustment screw and position the gate and the latch to allow an even clearance of .013" to .017" between the surface of the guide block and the tape gate. Tighten the adjustment screws. The gate must operate freely and unlatch with ease.

2. Loosen the micro switch mounting screws and position the micro switch so that with tape in the reader, the micro switch is operated by the tape sensing pin. With the removal of the tape, the micro switch should be non-operative. Tighten the mounting screws.

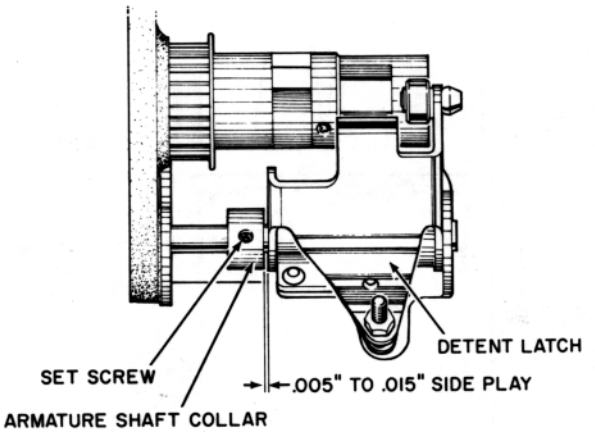
ADJ. 5 INNER & OUTER TAPE GUIDES



1. Loosen the inner tape guide screw and with tape in the reader, center the code holes over the reader pins and position the guide just to the edge of the tape. Tighten the screw.

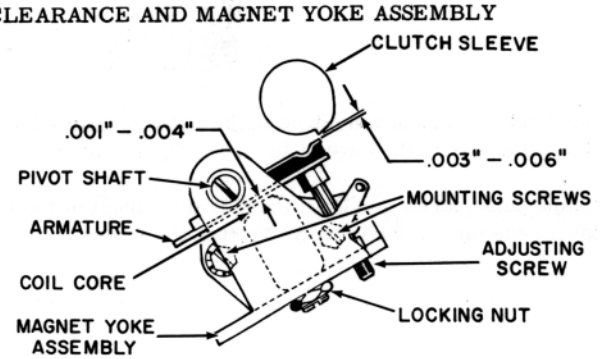
2. Loosen the outer tape guide screw and limit the side movement of the tape by positioning the guide to the tape but allowing the tape to feed freely. Tighten the screw.

ADJ. 6 ARMATURE SHAFT COLLAR



Loosen the setscrew on the armature shaft collar and position the collar to limit the detent latch side play .005" to .015". Tighten the setscrew.

ADJ. 7A MAGNET COIL CLEARANCE AND MAGNET YOKE ASSEMBLY

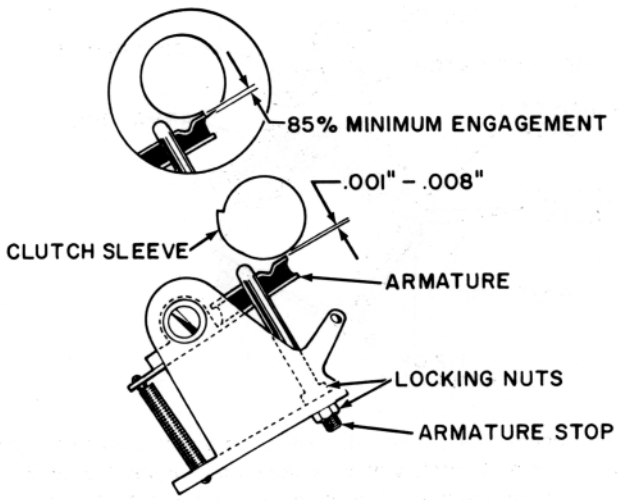


1. Hold the armature against the coil cores and adjust the adjusting screw to allow a .001" to .004" clearance between the armature and the coil cores.

   NOTE: Although the coils are individually adjustable, unnecessarily disturbing their setting will affect the adjustments which follow. However, the coil should be adjusted when it is necessary to make the air gap between the armature and the coils equal. The factory adjustment requires approximately two threads of the coil to protrude from the locking nut.

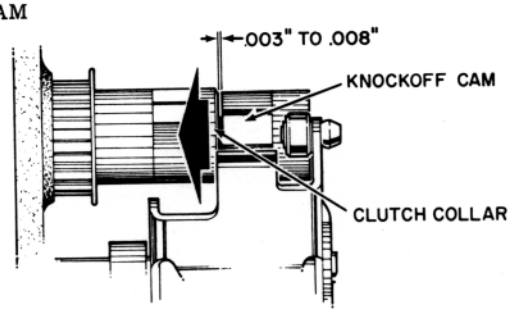
2. Loosen the pivot shaft and the magnet yoke assembly mounting screws and while holding the armature against the adjusting screw, position the magnet yoke assembly to allow a .003" to .006" clearance between the armature and the lip on the clutch sleeve. Tighten the pivot shaft and the mounting screws.

ADJ. 7B CLUTCH ARMATURE STOP



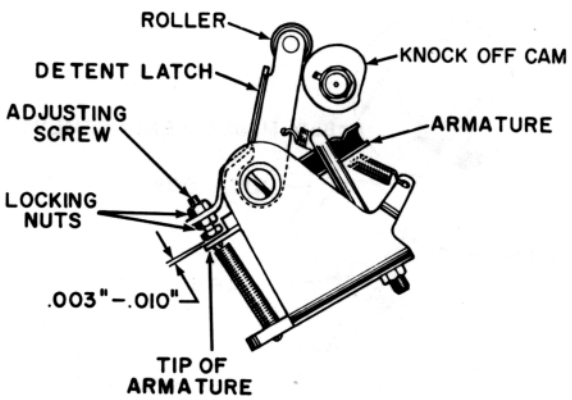
With the armature in its non-attracted position, loosen the armature stop locking nuts and position the stop to allow a .001" to .008" clearance between the armature and the low dwell of the clutch sleeve. The armature stop should be adjusted evenly so that it lies flat across the armature with a maximum of .002" clearance permissible at one side of the stop. Check to see that the armature engages a minimum of 85% of the lip on the clutch sleeve. Tighten the locking nuts.

ADJ. 7C KNOCK OFF CAM



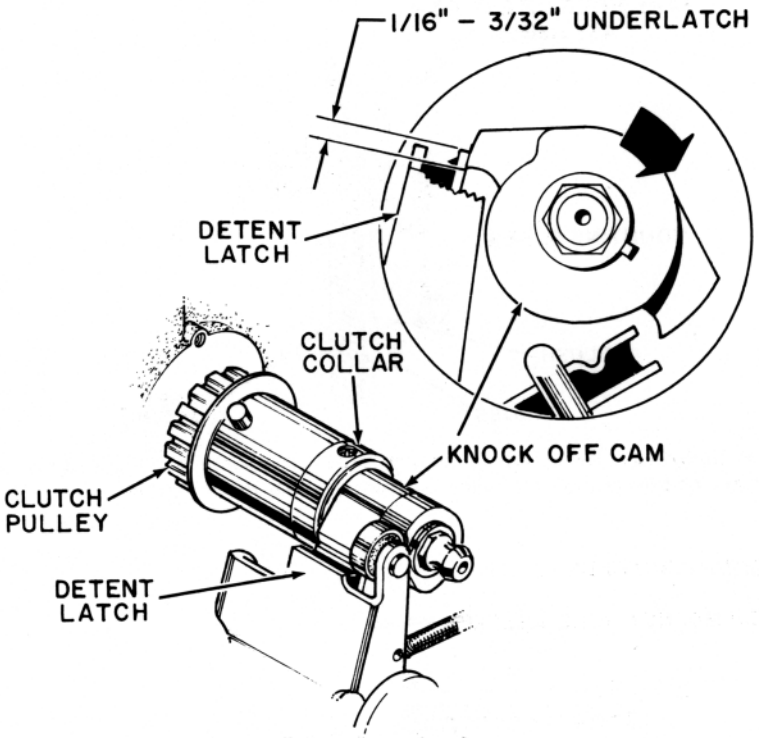
Loosen the setscrews on the clutch collar and move the collar towards the inner casting as far as possible. Loosen the setscrew on the knock off cam and position the cam to allow a .003" to .008" clearance between the collar and the cam. Tighten the setscrews.

ADJ. 7D DETENT LATCH



Cycle the clutch to the point where the detent latch roller is on the high dwell of the knock off cam. Loosen the locking nut on the detent latch adjusting screw and adjust the screw to allow a .003" to .010" clearance between the tip of the armature and the head of the screw. Tighten the locking nut.

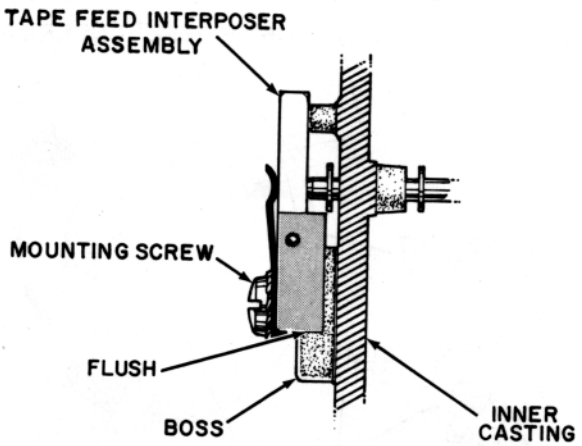
ADJ. 7E CLUTCH COLLAR



Loosen the setscrews on the clutch collar and position the collar so that it is against the knock off cam and rotationally, so that the detent latch is 1/16" to 3/32" short of latching the knock off cam. Tighten the setscrews and check to see that the clutch pulley rotates freely.

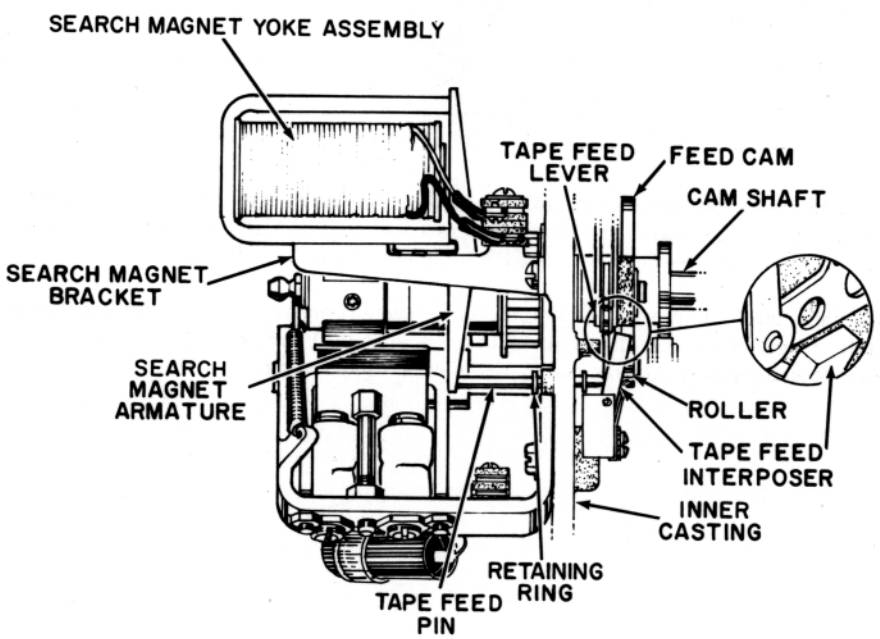
NOTE: The underlatch may vary depending on the condition of the clutch spring. The pulley should rotate freely when the clutch is in home position (clutch latched) and the clutch should latch reliably under power. If necessary, replace the clutch spring.

ADJ. 8A TAPE FEED INTERPOSER ASSEMBLY



Loosen the tape feed interposer assembly mounting screw and position the assembly to limit flush against the upper surface of the boss on the inner casting. Tighten the mounting screw.

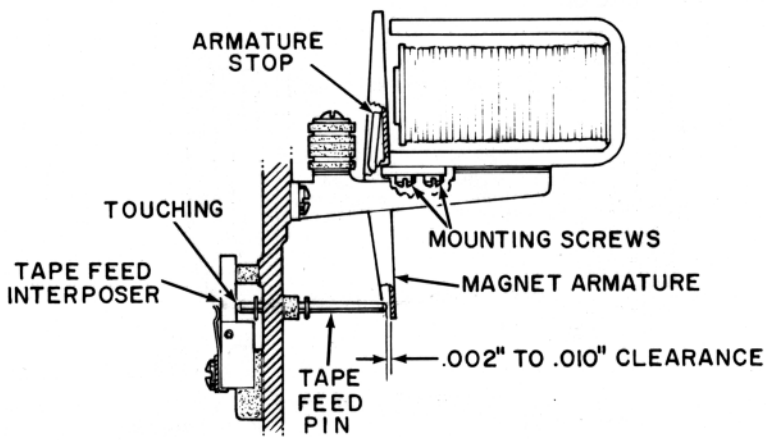
ADJ. 8B SEARCH MAGNET BRACKET



Hold the upper part of the search magnet armature against the magnet yoke assembly and rotate the cam shaft to the point where the tape feed lever roller is on the low dwell of the feed cam. At this time there should be a visible clearance between the tape feed lever and the tape feed interposer. When necessary, form the search magnet bracket slightly downward to obtain the clearance.

NOTE: Forming the bracket downward excessively causes the retaining ring on the tape feed pin to limit against the casting and prevents the upper part of the search magnet armature from touching the search magnet yoke assembly. Check to see that when the tape feed interposer assembly is manually held away from the tape feed pin, the upper part of the search magnet armature touches the search magnet yoke assembly when a slight pressure is applied.

ADJ. 8C SEARCH MAGNET ARMATURE STOP



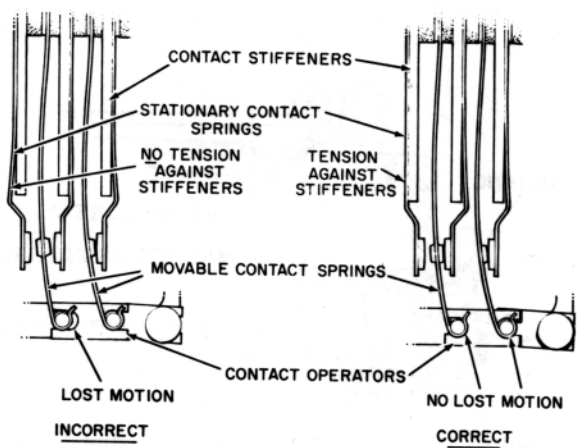
With the clutch in home position, loosen the armature stop mounting screws and position the stop to allow a clearance of .002" to .010" between the lower end of the magnet armature and the end of the tape feed pin with the opposite end of the pin touching the tape feed interposer. Tighten the mounting screws.

ADJ. 9A CONTACT STACKUP ALIGNMENT

INCORRECT CORRECT

Check to see that the contact stackups are aligned sideways and that the mating contact points are no more than .015" out of alignment. When necessary, loosen the contact assembly mounting screws to align the stackups.

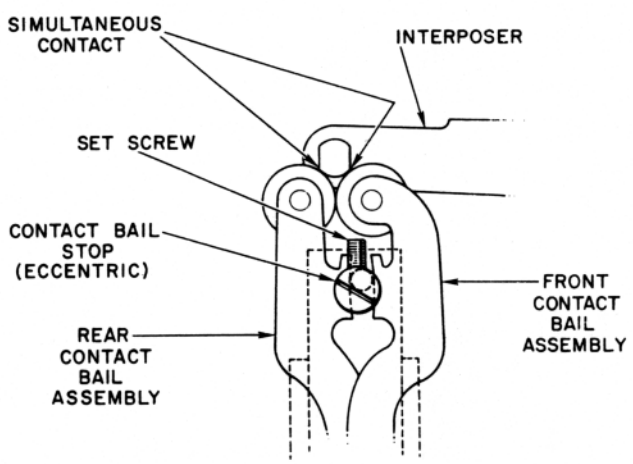
ADJ. 9B CONTACT SPRING TENSION



1. The moveable contact springs should have sufficient tension to follow the operators without lost motion. Form or replace the moveable contact springs when necessary.

2. The stationary contact springs should have sufficient tension against the contact stiffeners. When necessary, form or replace the stationary contact springs.

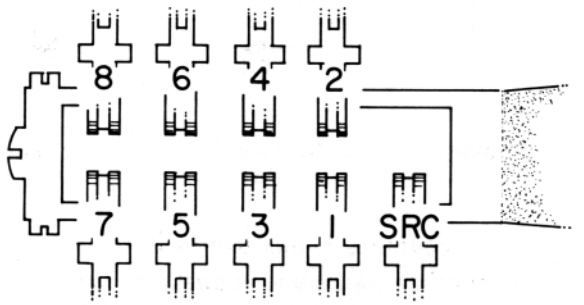
ADJ. 9 CONTACT BAIL ECCENTRIC STOP



The studs on the interposer bails must contact the rollers on the front and rear contact bails simultaneously. To adjust, loosen the setscrews which retain the ends of the eccentric stop in the inside and the outside contact bracket ties. Turn the eccentric stop as necessary to meet the requirement. Tighten the setscrews.

ADJ. 9C READER CONTACT ADJUSTMENTS

AUXILIARY READERS
(BOTTOM VIEW)



REAR OF READER

CONTACT ADJUSTMENT CHART

2200 – 2300 SERIES FLEXOWRITER READERS

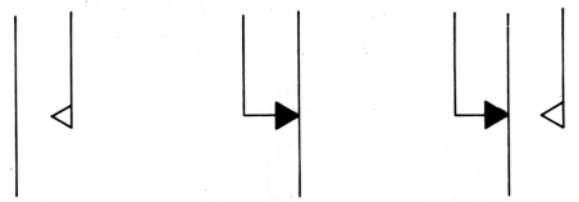
SPRINGS		1	2	3	4	5	6	7	8	9	10	11	12
SR-1	N/O												
	N/C												
SR-2	N/O												
	N/C												
SR-3	N/O												
	N/C												
SR-4	N/O												
	N/C												
SR-5	N/O												
	N/C												
SR-6	N/O												
	N/C												
SR-7	N/O												
	N/C												
SR-8	N/O												
	N/C												

ADJUST ALL CONTACTS
TO A .015" – .020" AIR GAP

1. With a length of blank tape in the reader and the interposer bail roller on the low dwell of its cam, adjust the normally open (N/O) contacts to the air gap indicated on the above chart.

2. With the tape removed from the reader and the interposer bail roller on the low dwell of its cam, adjust the normally closed (N/C) contacts to the air gap indicated on the above chart.

ADJ. 9D READER COMMON CONTACT ADJUSTMENTS



CONTACTS SHOWN UNOPERATED

(INTERPOSER BAIL ON HIGH DWELL OF CAM)

The following adjustments for "A" Form (N/O), "B" Form (N/C) and "C" Form (Transfer) contacts are to be considered standard.

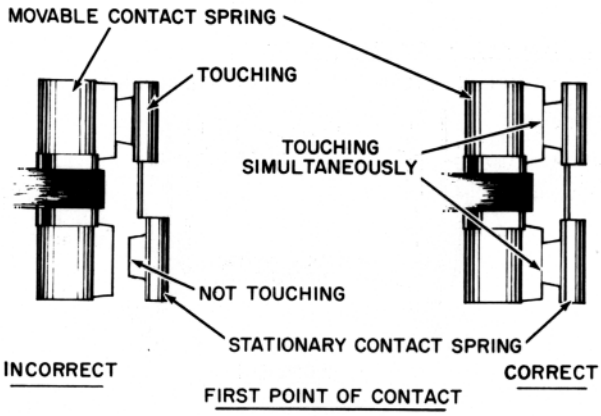
1. "A" Form (N/O) - With the clutch in home position (interposer bail on the high dwell of its cam) adjust the normally open (N/O) contacts to a .015" to .020" air gap.

2. "B" Form (N/C) - With the cam shaft cycled (interposer bail on the low dwell of its cam) adjust the normally closed (N/C) contacts to a .015" to .020" air gap.

3. "C" Form (Transfer) - With the clutch in home position (interposer bail on the high dwell of its cam) adjust the normally open (N/O) contacts to a .015" to .020" air gap. With the cam shaft cycled (interposer bail on the low dwell of its cam) adjust the normally closed (N/C) contacts to a .015" to .020" air gap.

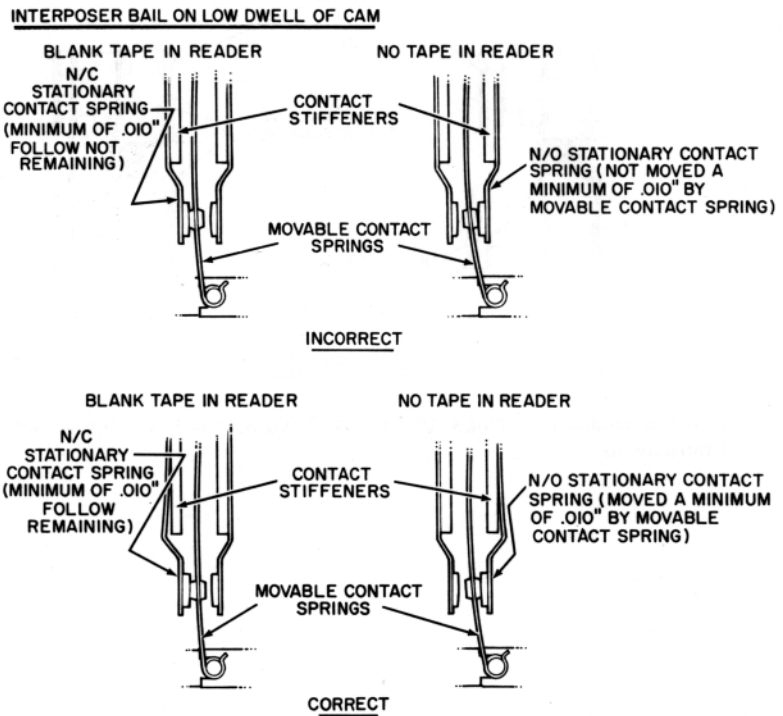
NOTE: The "C" Form (Transfer) adjustment listed provides a break before make operation. If other than this is required, it will be listed per the Reader Manufacturing Specification.

ADJ. 9E CONTACT MATING



Both contacts on all stationary springs (N/O and N/C) should touch the contacts on the moveable contact springs simultaneously.

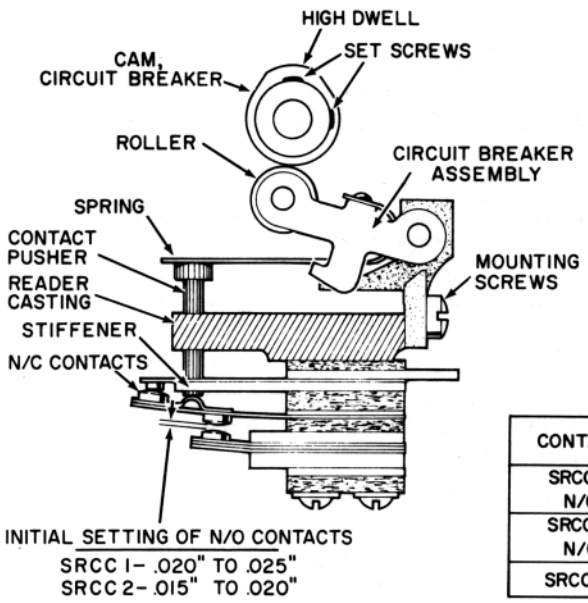
ADJ. 9F CONTACT FOLLOW



1. N/C Contacts - With a blank tape in the reader and the interposer bail on the low dwell of its cam, all normally closed contacts should have a minimum of .010" follow still remaining.

2. N/O Contacts - With no tape in the reader and the interposer bail on the low dwell of its cam, all normally open contacts (now closed) should have been moved a minimum of .010" by the moveable contact spring.

ADJ. 10 CIRCUIT BREAKER ASSEMBLY TIMING (SRCC-1, SRCC-2)



CONTACT	MAKE	BREAK	DURATION OF CLOSURE
SRCC-1 N/O	86°	192°	106°
SRCC-1 N/C	196°	82°	246°
SRCC 2	340°	20°	40°

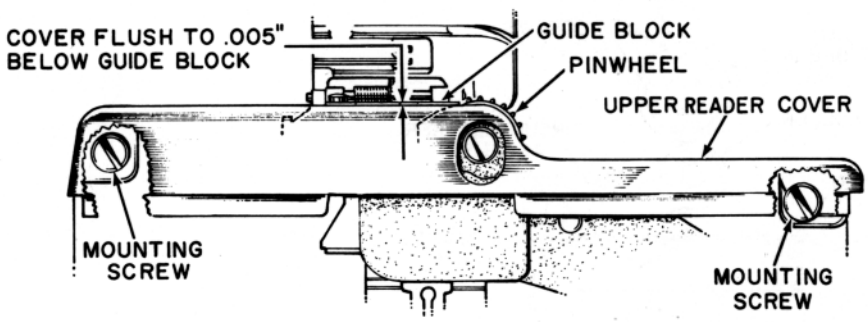
1. N/O Contact Duration - Raising or lowering the circuit breaker assembly by loosening the mounting screw, determines the contact clearance (N/O) with the roller on the low dwell of the cam and therefore the duration or length of time the contacts are made on the high dwell of the cam. Begin with the circuit breaker assembly adjusted to give an initial setting of SRCC-1 (N/O) .020" to .025", SRCC-2 (N/O) .015" to .020" between the contacts when each roller is on the low dwell of its respective circuit breaker cam. With timing dial (T-18088) attached to the reader shaft, determine the number of degress the contacts remain closed when operated by the high dwell of the cam. Raise the circuit breaker assembly to increase the duration of contact closure and lower to decrease until the correct duration of contact closure is obtained as outlined in the timing chart.

   NOTE: Distortion or weakening of the spring which operates the contact pusher may make it impossible to obtain the correct contact duration. If necessary, replace the circuit breaker assembly.

2. N/O Contact Timing - Once the correct duration of contact closure has been obtained, set the circuit breaker cams so that the contacts (N/O) make and break according to the specifications called for in the timing chart.

3. N/C Contact Timing - Form the stiffener for the normally closed contact (SRCC-1) to make and break according to the specifications called for in the timing chart. Check for a minimum of .010" follow in home position.

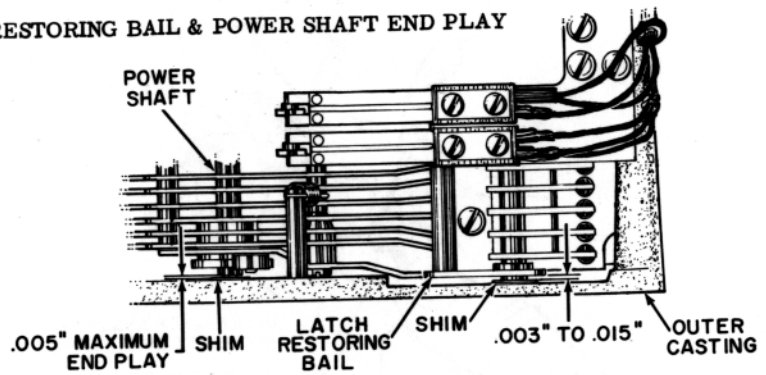
ADJ. 11 UPPER COVER



Loosen the upper cover mounting screws and position the cover so that it is flush to .005" below the surface of the guide block and forward or rearward so that the curvature of the cover is concentric with the base of the pins in the pinwheel. Tighten the mounting screws.

AUXILIARY TAPE PUNCH

ADJ. 1 LATCH RESTORING BAIL & POWER SHAFT END PLAY

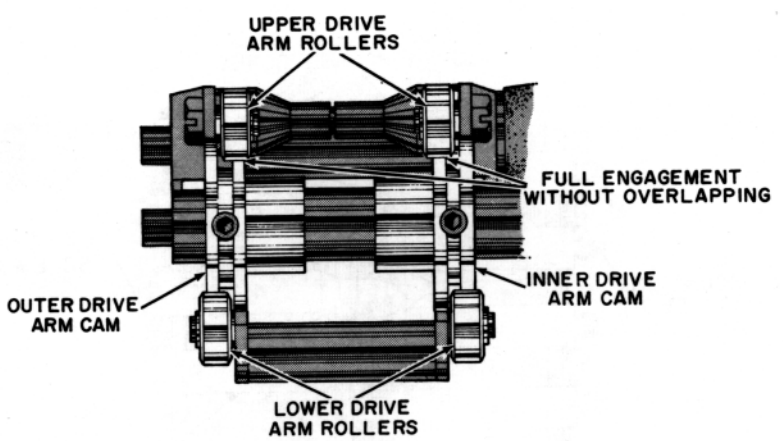


1. Latch restoring bail - .003" to .015".

2. Power shaft - .005" maximum.

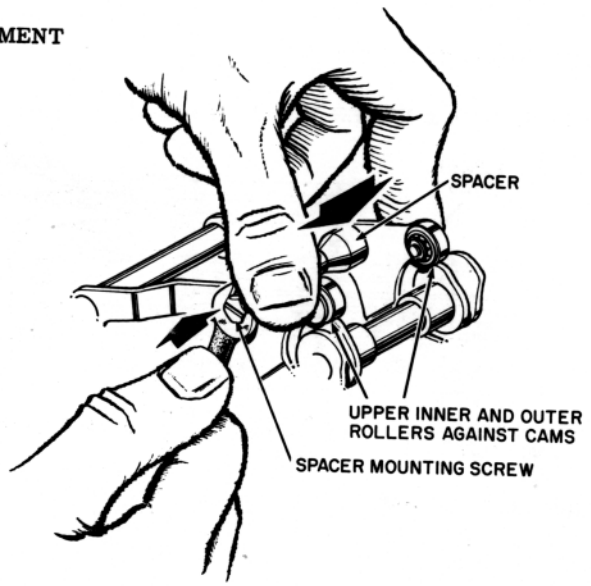
To accomplish the above adjustments, remove the outer punch casting and shim each shaft as required to obtain the necessary end play. The power shaft must rotate freely after adjustment.

ADJ. 2 INNER & OUTER DRIVE ARM CAMS



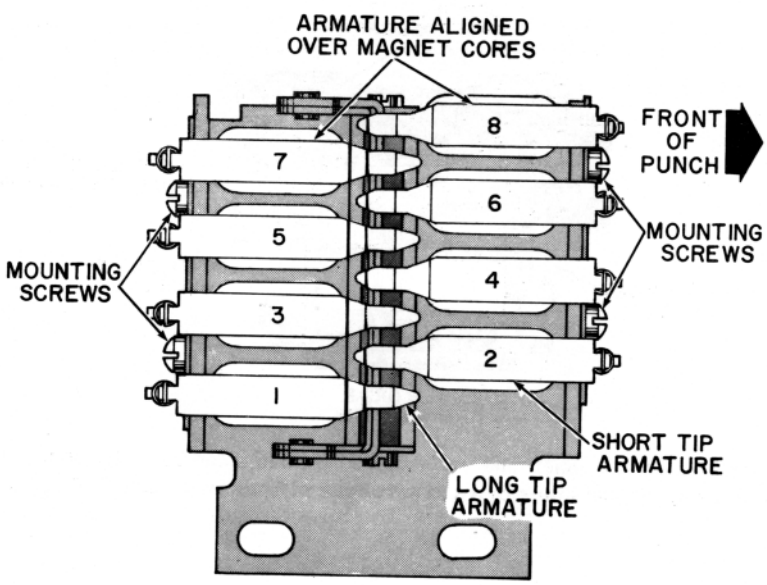
Loosen the setscrews on the inner and outer drive arm cams and laterally position the cams so that they fully engage the upper and lower drive arm rollers without overlapping. Tighten the setscrews.

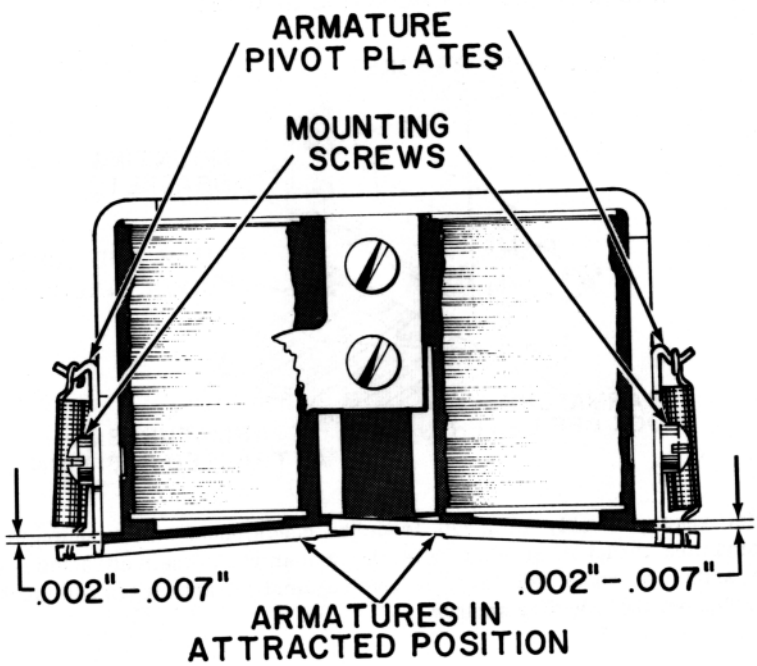
ADJ. 3 DRIVE ARM ALIGNMENT



Loosen the spacer mounting screw and press down on the inner and outer drive arms simultaneously so that the upper drive arm rollers are firmly against their respective cams. Tighten the screw.

ADJ. 4 LONG & SHORT TIPPED ARMATURES & ARMATURE PIVOT

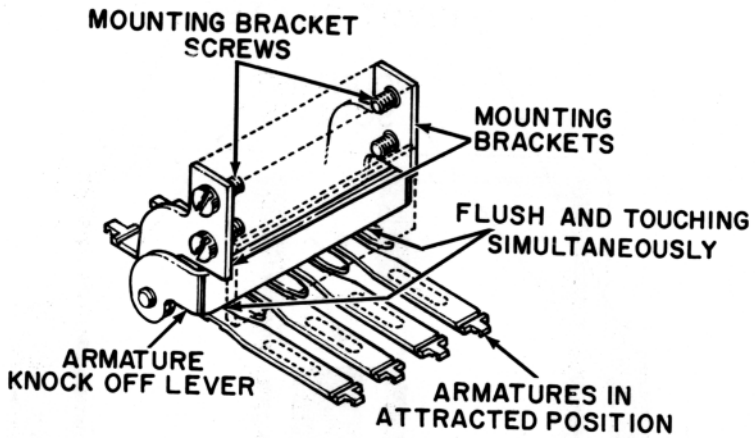




1. Position the armatures so that the long tipped armatures are used on the 1-3-5 & 7 magnet positions and the short tipped armatures on the 2-4-6 & 8 magnet positions.

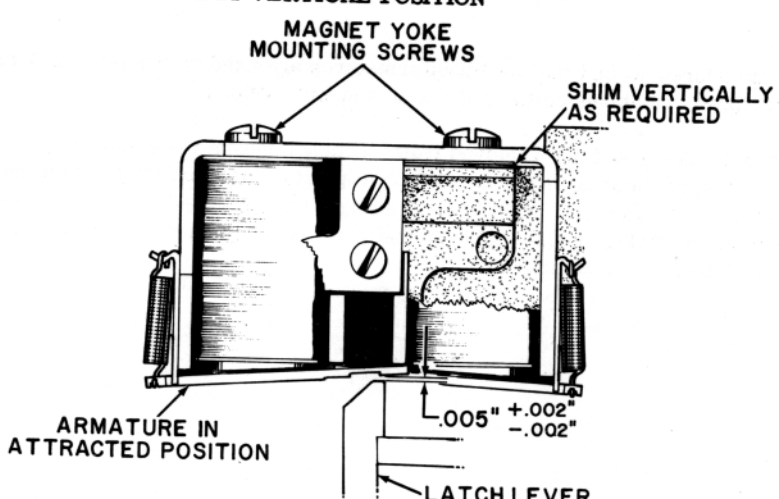
2. With the magnet yoke assembly removed from the punch loosen the armature pivot plate mounting screws. With the armatures in their attracted position, vertically position the armature pivot plate to provide a clearance of .002" to .007" using Feeler Gauges T-18451 and T-18455. Position the armature pivot plates horizontally so that the armatures are aligned with the centers of the magnet cores. Tighten the mounting screws.

ADJ. 5A ARMATURE KNOCK OFF LEVER MOUNTING BRACKET



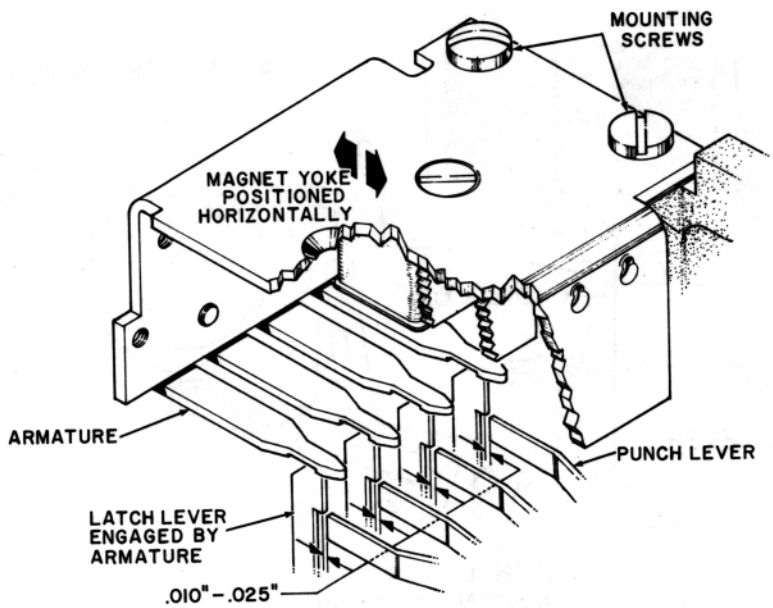
With the magnet yoke assembly removed from the punch, loosen the mounting bracket screws and position the mounting bracket so that with the armatures in their attracted position, the contact surface of the armature knock off lever is flush against the armatures and touches the armatures simultaneously. Tighten the mounting screws.

ADJ. 5B MAGNET YOKE ASSEMBLY VERTICAL POSITION



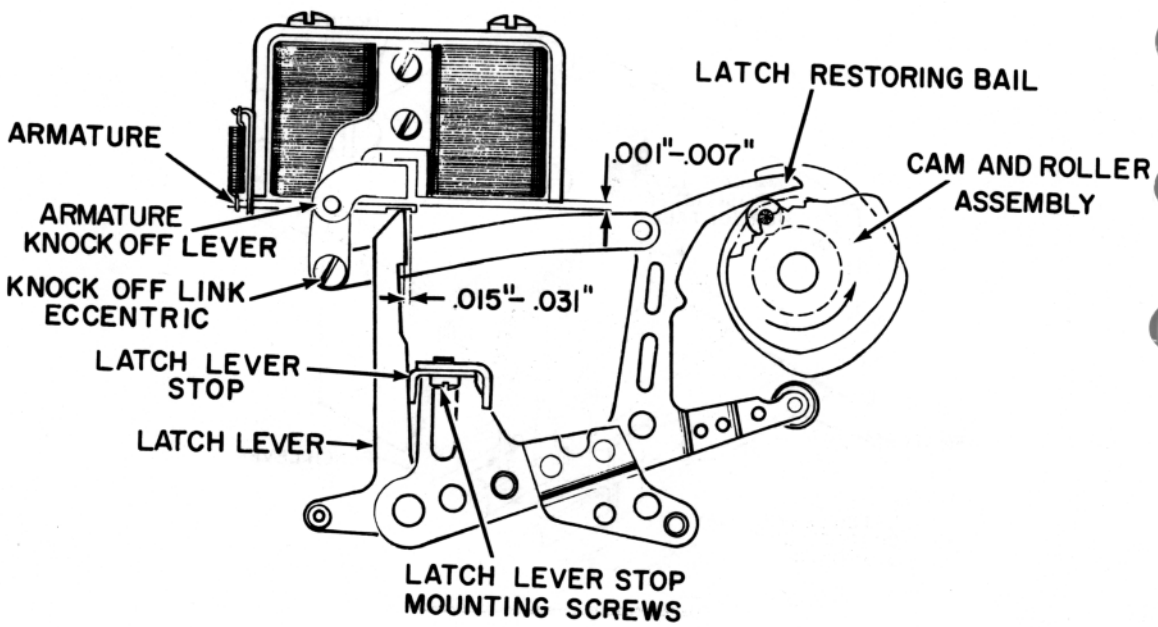
Loosen the magnet yoke assembly mounting screws and with the clutch in home position and the armatures in their attracted position (latch levers unlatched) shim the magnet yoke assembly vertically as required for a clearance of .005" ± .002" between all the latch levers and armatures. Tighten the mounting screws.

ADJ. 5C MAGNET YOKE ASSEMBLY HORIZONTAL POSITION



With the latch levers engaged by the armatures, loosen the magnet yoke assembly mounting screws and position the magnet yoke assembly horizontally to obtain a .010" to .025" clearance as equally as possible between all the front edges of the latch levers and the rear edges of the punch levers. Tighten the mounting screws.

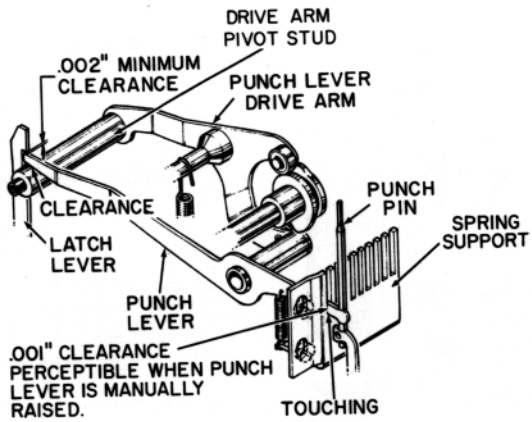
ADJ. 5D LATCH LEVER STOP & KNOCK OFF LINK ECCENTRIC



1. Loosen the latch lever stop mounting screws and with the latch restoring bail on the high point of the cam and roller assembly, position the latch lever stop to allow an over travel clearance of .015" to .031" between the forward edge of the latch levers and the latched surface of the armatures. Tighten the mounting screws.

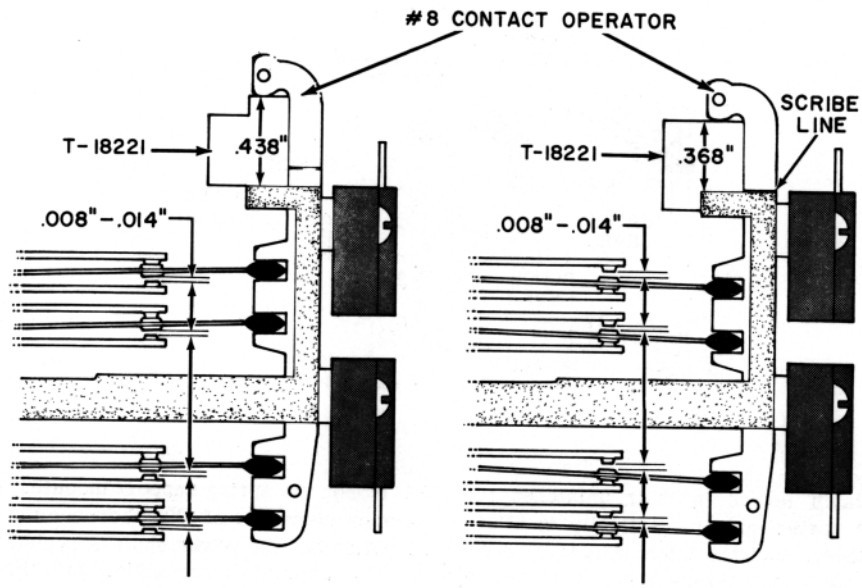
2. Loosen the knock off link eccentric and with the latch restoring bail on the high point of the cam and roller assembly, adjust the eccentric to allow an equal clearance of .001" to .007" between the armatures and the contact surface of the armature knock off lever so that the armatures restore fully without choking off.

ADJ. 6A SPRING SUPPORT



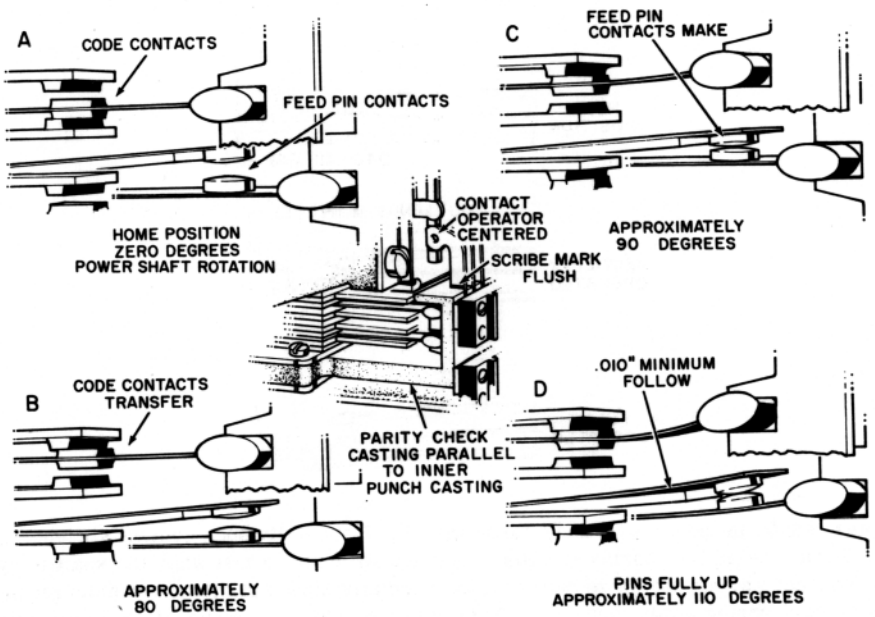
With the latch levers in their unlatched position, loosen the spring support mounting screws and position the spring support vertically to allow a minimum clearance of .002" between the top edge of the punch levers and the latching point of the latch levers when the power shaft is cycled to the point just before the punch levers begin to travel upward. Also maintain a perceptible movement of .001" between the lower edge of the punch levers and the bottom of the slots in the spring support (home position) with the spring support in an even vertical position so that the punch levers do not bind in the slots and a clearance is maintained between the lower edge of the punch levers and the drive arm pivot stud. Tighten the spring support mounting screws.

ADJ. 6B PARITY CHECK CONTACT ASSEMBLY



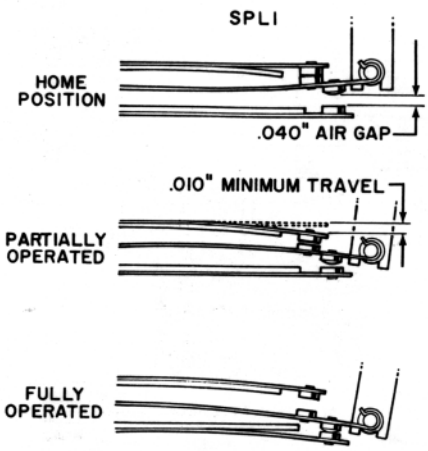
With the parity check contact assembly removed from the inner punch casting and using gauge T-18221, simultaneously hold all the contact operators tightly against the .368" side of the gauge and form the upper stationary contact springs to allow an .008" to .014" clearance to the moveable contact springs. With the contact operators simultaneously held against the .368" side of the gauge, the scribe mark on the #8 contact operator should be flush to the upper most surface of the parity check casting. With the contact operators simultaneously held against the .438" side of the gauge, form the lower stationary contact springs to allow an .008" to .014" clearance to the moveable contact springs.

ADJ. 6C PARITY CHECK CONTACT ASSEMBLY POSITIONING



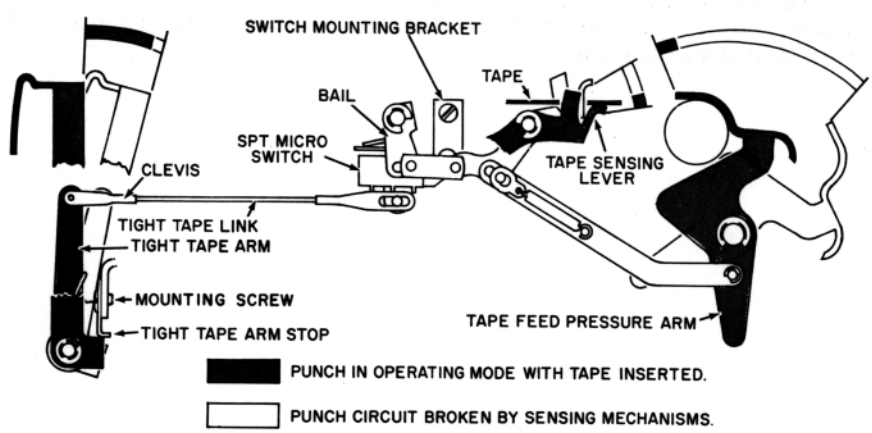
With the power shaft in home position, loosen the parity check contact assembly mounting screws and position the parity check casting so that it is parallel with the lower edge of the inner punch casting with the top of the contact operators centered in the punch pin slots and the scribe mark on the No. 8 contact operator flush with the upper most surface of the parity check casting. Adjust the normally open contact operated by the feed pin operator to make only after all the code contacts have fully transferred. Check the normally open feed pin contact for a .010" minimum follow when the pins are in their most upward position.

ADJ. 7 SPL CONTACTS



With the power shaft in home position, form the SPL-1 normally open contact stiffener for an air gap of .040". Form the SPL-1 normally closed contact stiffener so that when the shaft is cycled and the moveable contact spring begins to operate, the normally closed stationary contact spring follows the moveable contact spring a minimum of .010" but breaks before the moveable contact spring makes with the normally open stationary contact spring.

ADJ. 8 SPT MICRO SWITCH BRACKET, TIGHT TAPE ARM STOP AND LINK

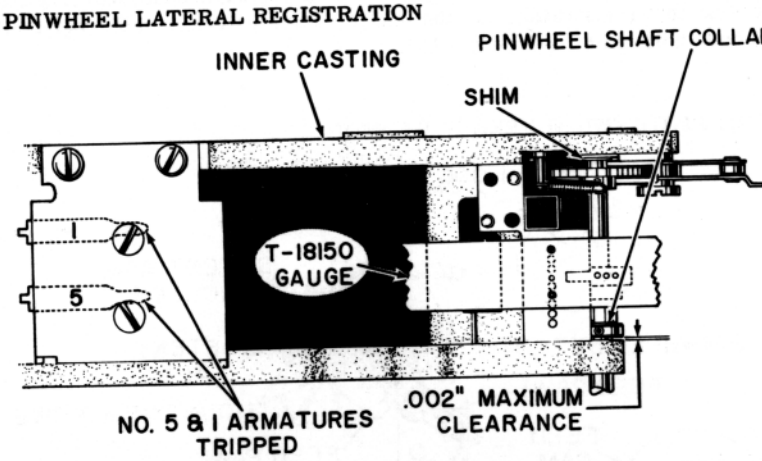


1. Loosen the switch mounting bracket mounting screws and position the switch mounting bracket so that the tape sensing lever operates the SPT micro switch when it is not held down by tape and allows the micro switch to fully restore with tape in the punch. It may be necessary to disconnect the tight tape link to check the adjustment as the link may be maladjusted and interfere with operation of the tape sensing lever. Tighten the mounting screws. Also check that the SPT micro switch operates before the tape feed pressure arm is fully lowered and that the micro switch restores before the tape feed pressure arm is fully raised.

2. Loosen the tight tape arm stop mounting screw and position the stop so that the tight tape arm is in a vertical position. Tighten the mounting screw.

3. With a length of tape in the punch, detach the tight tape arm link from the arm and adjust the clevis so that the link operates the SPT micro switch approximately 1/32" before the tight tape arm bottoms, but does not prevent the micro switch from restoring. With the tape removed from the punch, the link should not prevent full operation of the micro switch by the tape sensing lever when the sensing lever is in its upward position.

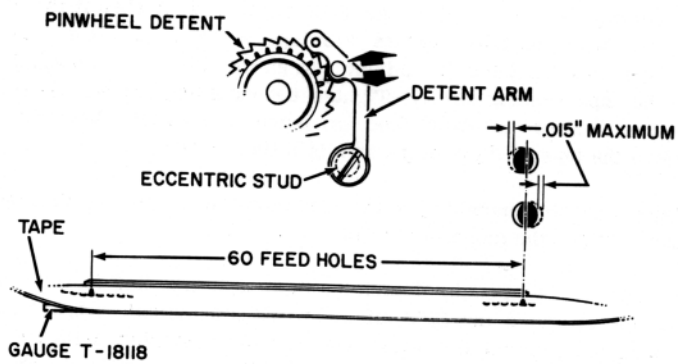
ADJ. 9 FRONT PINWHEEL LATERAL REGISTRATION



1. With the guide block removed from the punch, detach the spring from the ratchet detent and loosen the pinwheel shaft collar. Trip the No. 1 and No. 5 armatures and cycle the power shaft until the No. 1, feed and No. 5 pins are fully up. Place gauge T-18150 over the pins and shim the pinwheel shaft as required so that the pins on the pinwheel come up through the center of the forward pinwheel holes in the gauge.

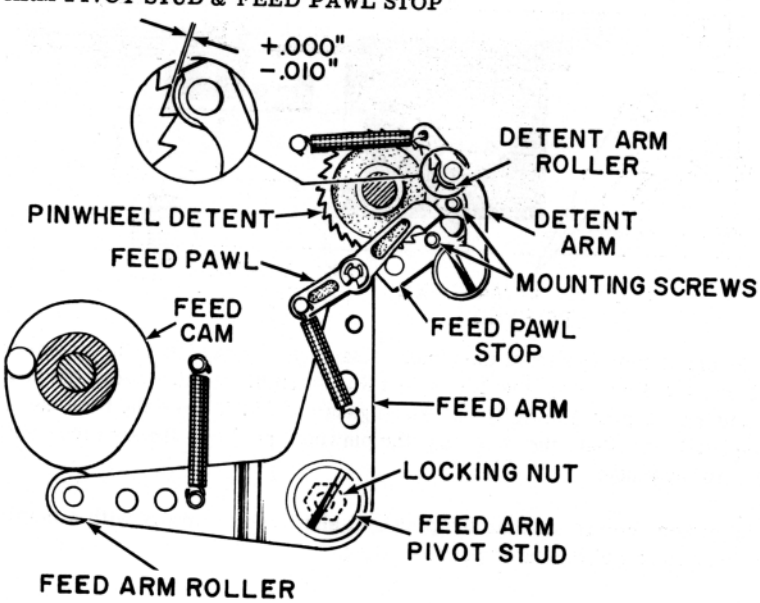
2. Position the pinwheel collar so that the pinwheel shaft cycles freely with a maximum of .002" end play between the collar and the outer punch casting.

ADJ. 10A RATCHET DETENT ARM



Place a length of tape on registration gauge T-18118 and note the alignment. If the registration is incorrect, loosen the eccentric stud locking nut and turn the eccentric slightly as required to advance or retard the ratchet detent arm. Tighten the mounting nut. Feed an additional length of tape through the punch and check the registration on the gauge. When the longitudinal registration is correct, there should be 60 code holes in 6" of tape ± .015".

ADJ. 10B FEED ARM PIVOT STUD & FEED PAWL STOP

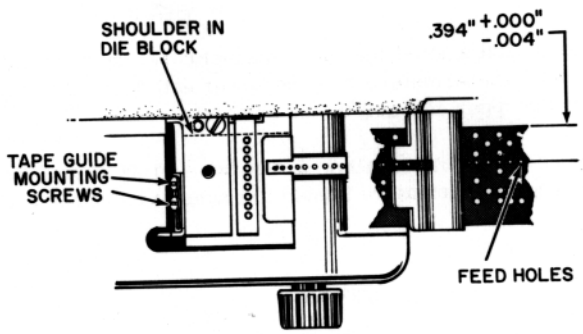


1. Loosen the feed arm pivot stud locking nut and adjust the stud so that when the power shaft is cycled and the feed arm roller is on the high dwell of the feed cam, the detent arm roller comes to rest on one full tooth of the pinwheel detent + .000" - .010". Tighten the locking nut.

NOTE: It may be necessary to manually rotate the pinwheel detent backwards (till it limits on the feed pawl) to check that the undertravel is not excessive.

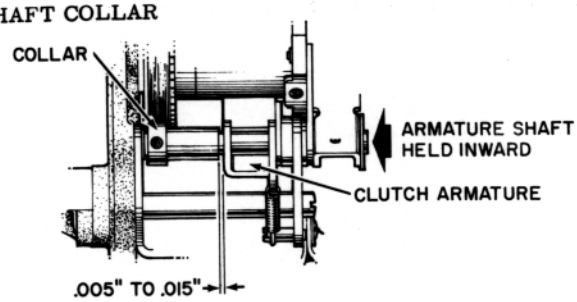
2. Loosen the pawl stop plate mounting screws and position the feed pawl stop so that when the power shaft is cycled and the feed arm roller is on the high dwell of the feed cam, the stop prevents any tendency of the feed pawl and pinwheel detent to over travel without choking off the feed pawl. Tighten the mounting screws.

ADJ. 11 TAPE GUIDE



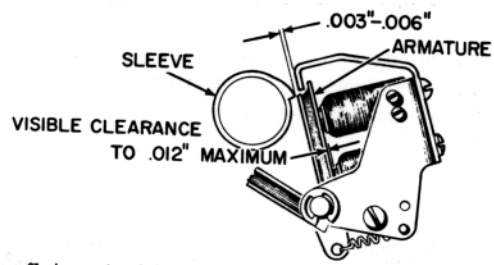
Feed a length of tape through the punch and check it on registration gauge T-18118. The distance between the center of the feed holes and the inner edge of the tape must be .394" plus .000" minus .004". To correct a poor condition, loosen the tape guide mounting screws and with the inner tape edge against the shoulder on the lower surface of the die block, position the tape guide simultaneously towards the outer edge of the tape but allowing the tape to flow freely with a minimum of side play. Tighten the screws.

ADJ. 12 ARMATURE SHAFT COLLAR



Loosen the setscrew on the armature shaft collar and position the collar to limit the armature side play .005" to .015". Tighten the setscrews.

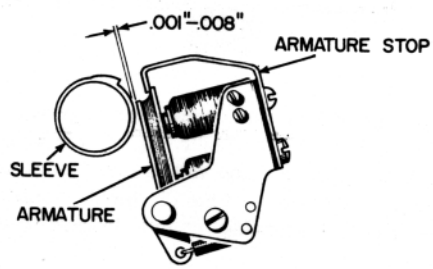
ADJ. 13A LOWER COIL CLEARANCE & MAGNET YOKE ASSEMBLY



1. While holding the armature flat against the upper magnet core, there should be a visible clearance to .012" maximum between the armature and the lower coil core. A clearance in excess of .012" indicates replacement of the upper coil and/or the armature.

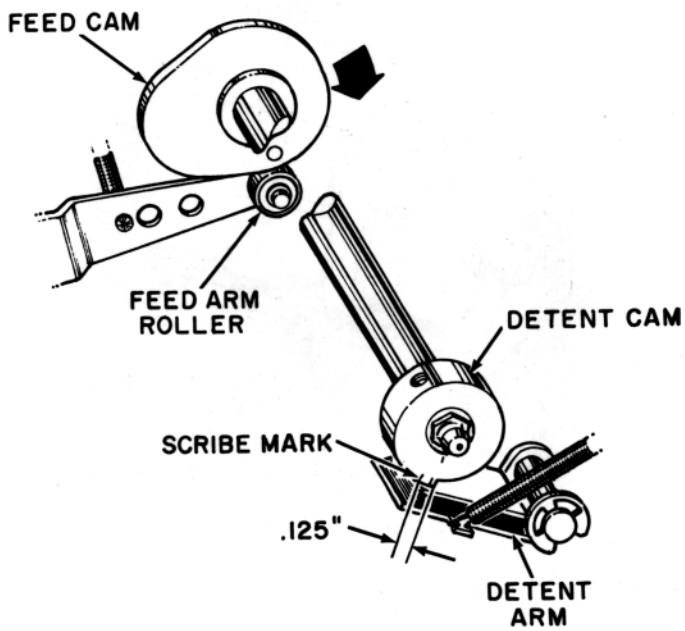
2. Position the magnet yoke assembly to allow a clearance of .003" to .006" between the armature and the clutch sleeve lip when the armature is held flat against the upper coil core.

ADJ. 13B ARMATURE STOP



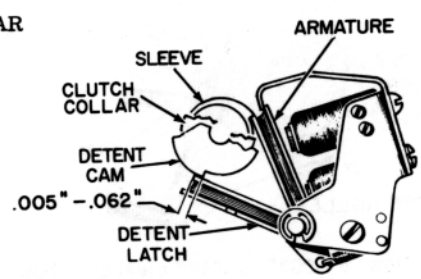
Form the armature stop to allow a clearance of .001" to .008" between the armature and the low surface of the clutch sleeve when the armature is in its non-attracted position.

ADJ. 13C CLUTCH HOME POSITION & PULLEY END PLAY



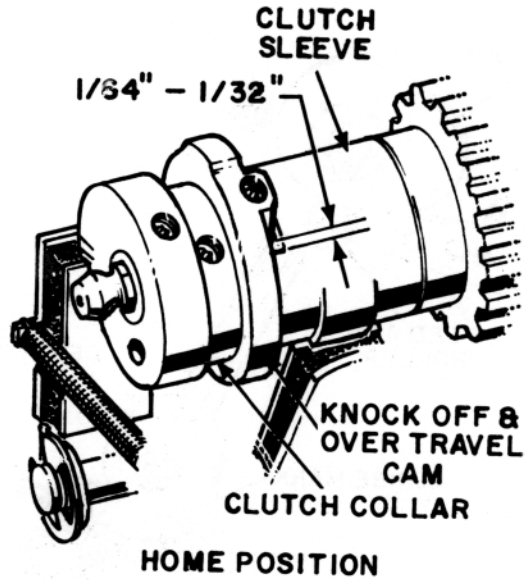
To obtain the clutch home position, rotate the power shaft to the point where the tape feed arm roller just reaches the low dwell of the feed cam. Loosen the detent cam setscrews and position the cam so that it is .125" (scribe mark on cam) short of engaging the detent latch. Maintain .003" to .008" end play at the pulley and tighten the setscrews.

ADJ. 13D CLUTCH COLLAR



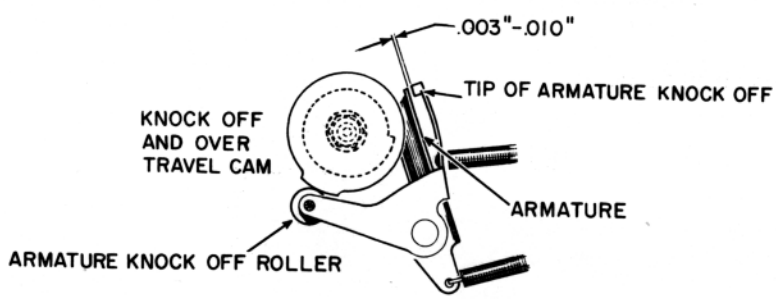
Loosen the clutch collar setscrews and position the collar so that as the clutch sleeve lip touches the armature, the detent cam is still .005" to .062" short of latching on the detent latch. Pull the collar towards the detent cam while tightening the setscrews.

ADJ. 13E KNOCK OFF & OVER TRAVEL CAM



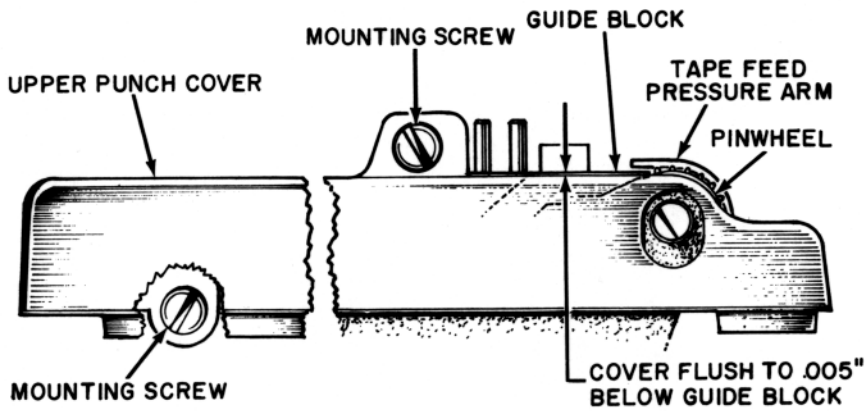
With the clutch in home position, loosen the setscrews on the knock off and over travel cam. Rotate the cam towards the lower end of the cut out in the clutch sleeve and allow a gap of 1/64" to 1/32". This should allow sufficient over travel distance between the detent cam and the detent latch. Pull the cam towards the clutch collar while tightening the setscrews.

ADJ. 13F ARMATURE KNOCK OFF



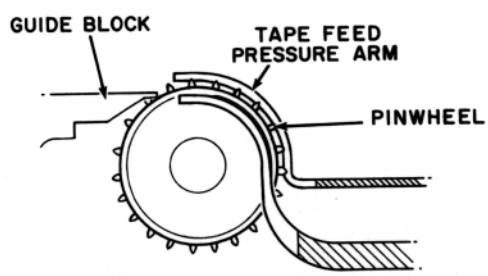
Form the armature knock off to allow a .003" to .010" clearance between the tip of the armature knock off and the armature when the armature knock off is on the high dwell of the knock off and over travel cam.

ADJ. 14 UPPER PUNCH COVER



Loosen the upper punch cover mounting screws and position the cover so that it is flush to .005" below the surface of the guide block and forward or rearward so that the curvature of the cover is cencentric with the base of the pins in the pinwheel but allowing the tape feed pressure arm to bear against the pinwheel. Tighten the mounting screws.

ADJ. 15 TAPE FEED PRESSURE ARM



Form the tape feed pressure arm so that the inside surface of the arm is concentric with the pinwheel and the slot is centered over the pinwheel with the rear edge above the guide block.

MODEL 2323 AUXILIARY PRINTING CARD PUNCH

GENERAL DESCRIPTION

Purpose And Use

Plugboard Programming

GENERAL DESCRIPTION

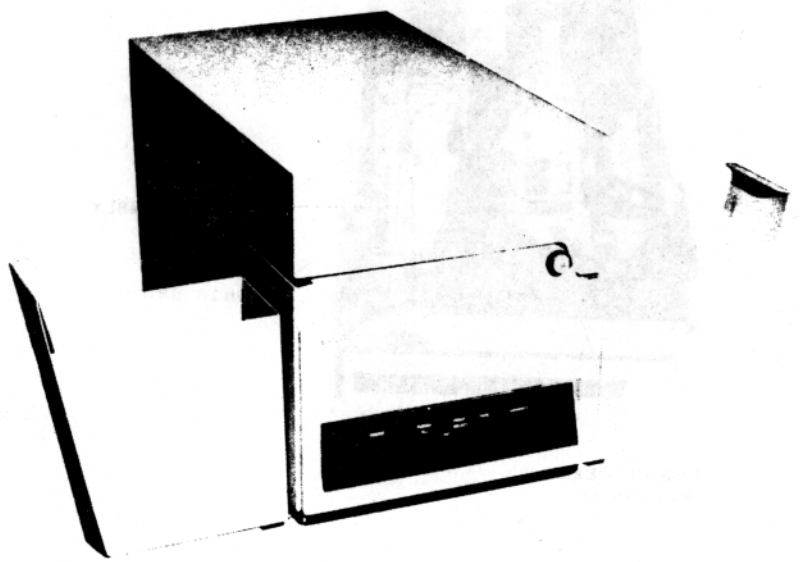


Figure 1

PURPOSE AND USE

The Model 2323 Auxiliary Printing Card Punch (Figure 1) is an output unit which may be connected to any 2200 or 2300 series Flexowriter, Automatic Writing Machine that is equipped to accommodate output units. The card punch punches the standard Binary Coded Decimal (B.C.D.) code system on one inch paper tape, three inch edge cards, or three and one quarter inch edge cards. While punching three and one quarter inch edge cards, printing may occur along the edge opposite the code holes.

The Model 2323 Auxiliary Printing Card Punch can print the alphabet, numbers 0 through 9, and eleven symbols. Printing is accomplished by moving one or more of 35 print wires against the card through a fabric ribbon. The arrangement of the wires determines the character to be printed.

The punch may be operated either Selectively, by Field Control or in the All condition. Printing may be controlled either Selectively, by Field Control or in the All condition. The program board of the automatic writing machine must be patched to provide Selective or Field Control of printing. Parity is a standard feature on the unit.

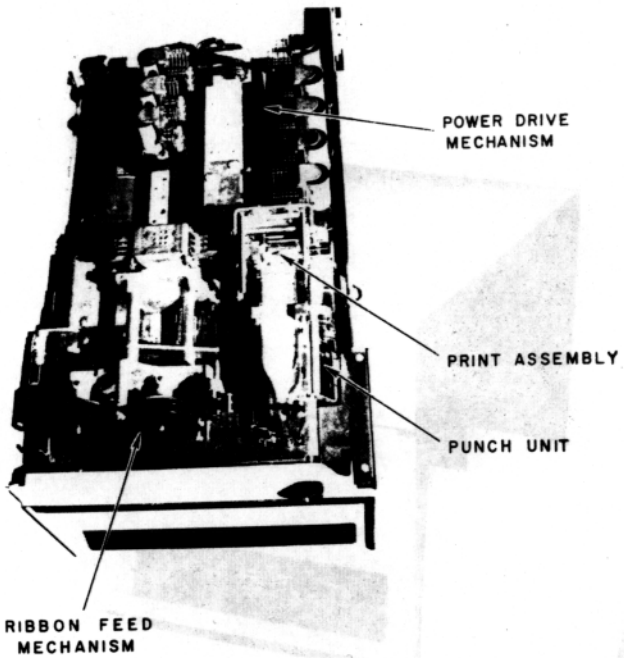


Figure 2

The Model 2323 Auxiliary Printing Card Punch is basically composed of a power drive mechanism, a punch unit, a print assembly and a ribbon feed mechanism (Figure 2).

The code plate positions for the various characters that may be printed are listed in the code chart (Figure 3).

PLUGBOARD PROGRAMMING

When the Model 2323 Auxiliary Printing Card Punch is connected to a Flexowriter, the necessary plugboard programming according to the model of Flexowriter is as follows:

Model 2201 Flexowriter

1. To turn on the Auxiliary Printing Card Punch selectively, a pulse must be directed to hub L-10 of the plugboard.
2. To turn off the Auxiliary Printing Card Punch selectively, a pulse must be directed to hub L-11 of the plugboard.

3. To turn on selectively the printing of the Auxiliary Printing Card Punch, a pulse must be directed to hub L-13 of the plugboard.

4. To turn off selectively the printing of the Auxiliary Printing Card Punch, a pulse must be directed to hub L-12 of the plugboard.

5. To initiate a card feed operation in the Auxiliary Printing Card Punch, a pulse must be directed to hub L-15 of the plugboard.

Model 2301 Flexowriter

1. No plugboard programming is necessary to turn on or turn off the Auxiliary Printing Card Punch.

2. To turn on selectively the printing of the Auxiliary Printing Card Punch, a pulse must be directed to hub BB of the plugboard.

3. To turn off selectively the printing of the Auxiliary Printing Card Punch, a pulse must be directed to hub DD of the plugboard.

4. To initiate a card feed operation in the Auxiliary Printing Card Punch, a pulse must be directed to hub FF of the plugboard.

2323 CODE CHART

FLEXOWRITER KEYBOARD U.C.	L.C.	B. C. D. CODE	PRINTED CHARACTER	CODE PLATE POSITIONING UNITS HOR.	UNITS VERT.
A	a	1-6-7	A	1	6
B	b	2-6-7	B	2	6
C	c	1-2-5-6-7	C	3	6
D	d	3-6-7	D	4	6
E	e	1-3-5-6-7	E	5	6
F	f	2-3-5-6-7	F	6	6
G	g	1-2-3-6-7	G	7	6
H	h	4-6-7	H		7
I	i	1-4-5-6-7	I	1	7
J	j	1-5-7	J	1	4
K	k	2-5-7	K	2	4
L	l	1-2-7	L	3	4
M	m	3-5-7	M	4	4
N	n	1-3-7	N	5	4
O	o	2-3-7	O	6	4
P	p	1-2-3-5-7	P	7	4
Q	q	4-5-7	Q		5
R	r	1-4-7	R	1	5
S	s	2-5-6	S	2	2
T	t	1-2-6	T	3	2
U	u	3-5-6	U	4	2
V	v	1-3-6	V	5	2
W	w	2-3-6	W	6	2
X	x	1-2-3-5-6	X	7	2
Y	y	4-5-6	Y		3
Z	z	1-4-6	Z	1	3
1	!	1	1	1	
2	@	2	2	2	
3	#	1-2-5	3	3	
4	$	3	4	4	
5	=	1-3-5	5	5	
6	¢	2-3-5	6	6	
7	?	1-2-3	7	7	
8	*	4	8		1
9	(	1-4-5	9	1	1
0	)	6	0		2
-	"	7	-		4
&	;	5-6-7	&		6
%	—	1-2-4-5-7	%	3	5
,	,	1-2-4-5-6	,	3	3
.	.	1-2-4-6-7	.	3	7
/	:	1-5-6	/	1	2
SPACE	5				
Carriage Return		8	↵	7	5
T A B		2-3-4-5-6	→	6	3
Back Space		2-4-6	←	2	3
Upper Case		3-4-5-6-7	↑	4	7
Lower Case		2-4-5-6-7	↓	2	7

NOTE: Any other code that is punched by the card punch will not have a symbol printed.

Figure 3.

AUXILIARY PRINTING CARD PUNCH

POWER DRIVE MECHANISM ADJUSTMENTS

The Power Drive adjustments are interrelated and must be made in the sequence in which they are listed.

DRIVE SHAFT POSITION

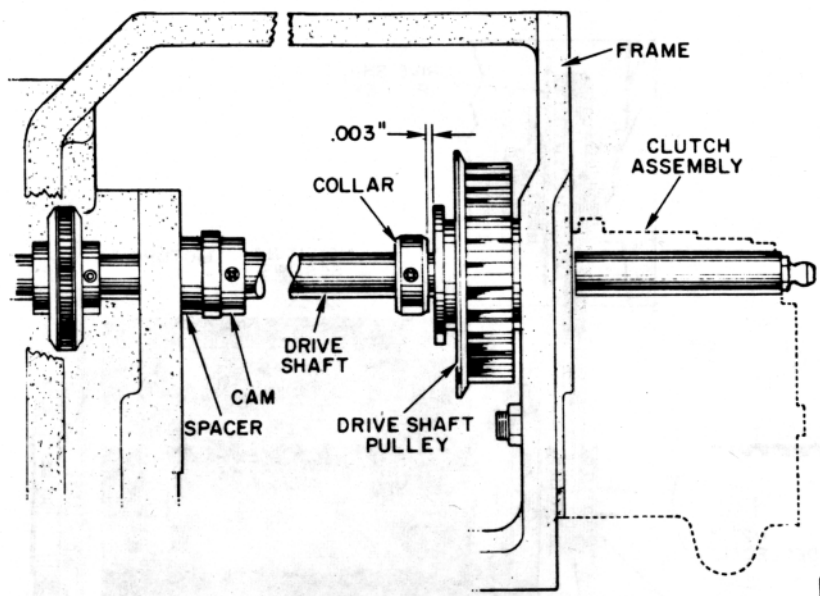


Figure 1.

With the punch mounted on the frame assembly, there should be no clearance between the punch coupling plate and the rubber coupling on the drive shaft. Make this adjustment with the clutch assembly removed (Figure 1).

To position the drive shaft, loosen the setscrews on the circuit breaker cams and the collar located on the drive shaft. Move the drive shaft forward. Move the cams forward until they just limit against the bearing. Tighten the setscrews on the cams. For the rotation position of the cams, refer to the circuit breaker adjustment. Perform the drive shaft end play adjustment that follows.

DRIVE SHAFT END PLAY

The drive shaft should rotate freely with no binds. The maximum allowable drive shaft end play is .003". Make this adjustment with the clutch assembly removed (Figure 1).

To adjust the drive shaft end play, loosen the two setscrews located on the collar that retains the drive shaft pulley. Move the drive shaft forward and move the collar rearward against the pulley. Tighten the two setscrews on the collar. Using a feeler gauge, determine that the space between the drive shaft pulley and collar is .003" maximum. There should be no drive shaft and play, however, the drive shaft should rotate freely with no binds.

DRIVE BELT TO PULLEY RELATIONSHIP - DRIVE BELT TENSION

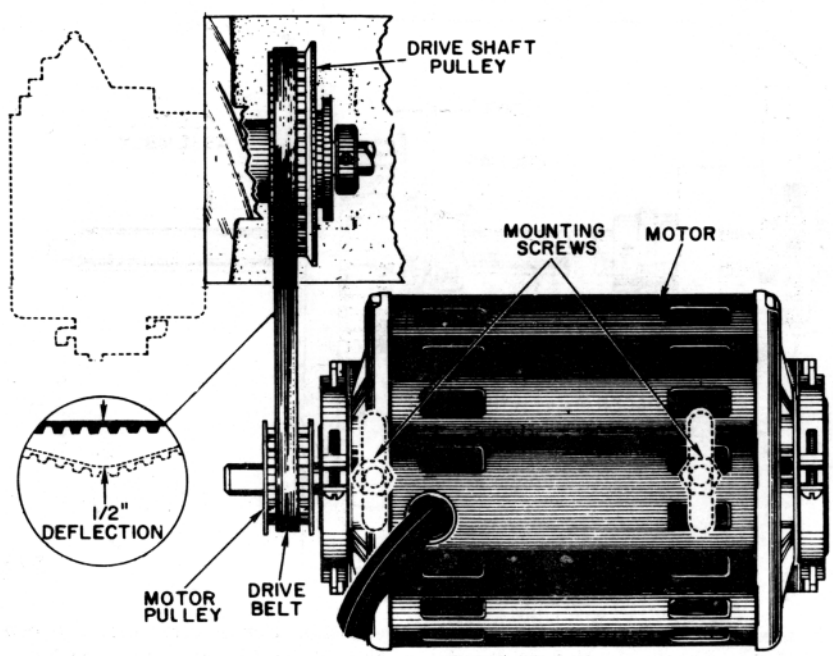


Figure 2.

The drive belt should operate centered on the motor pulley and drive shaft pulley while the motor is running. The drive belt should have approximately 1/2" deflection when depressed from the normal position (Figure 2).

Belt tension is controlled by the position of the motor. The position of the belt on the pulleys is controlled by the position of the motor and the location of the pulley on the motor shaft. Therefore, when making the motor positioning adjustments, both the belt tension and belt centering conditions must be obtained simultaneously. The adjustments are made in the sequence that follows:

1. Loosen the two screws that retain the motor mounting bracket.

2. Place the power switch to the ON position so that the motor is running.

3. Move the motor laterally and forward and back to obtain the best possible centering of the belt on both pulleys. Retain an outward pressure on the motor to insure belt tension.

4. If necessary, loosen the motor pulley setscrews and position the pulley to obtain the center operation of the belt on both pulleys. Tighten the setscrews.

NOTE: Steps 4 and 5 are interrelated and may have to be repeated until belt centering is obtained.

Check the drive belt tension with the motor not running. The belt should have approximately 1/2" deflection when depressed without moving the motor on its mounts.

KNOCK OFF ARM END PLAY

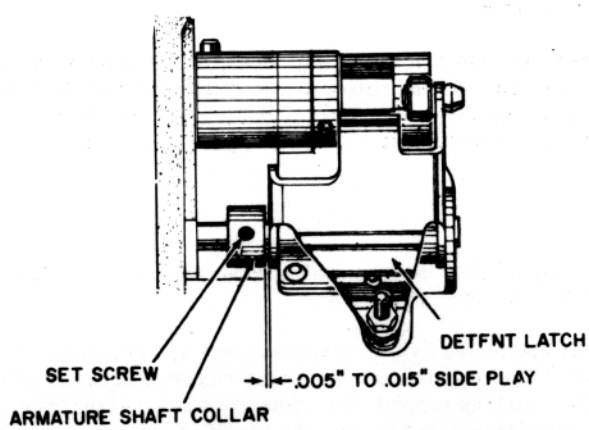


Figure 3.

The clutch knock off arm end play must be .005" to .015" (Figure 3).

To adjust the knock off arm end play, loosen the setscrew on the armature shaft collar. Position the collar so that the clearance between the knock off arm and the collar is .005" to .015". Tighten the collar setscrew and verify that the knock off arm end play is within the specified tolerance.

RESIDUAL STOP

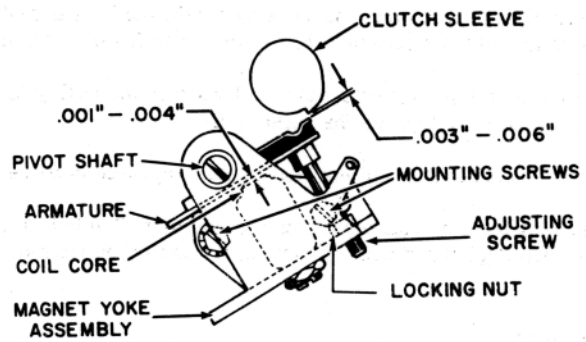


Figure 4.

With the armature against the residual stop, the clearance between the armature and cores of the magnets must be .001" to .004" (Figure 4).

To adjust the clearance between the armature and cores, the residual stop must be reset. Loosen the residual stop locking nut. Position the residual stop so that the clearance between the attracted armature and core is within the specified tolerance of .001" to .004". Tighten the residual stop locking nut and verify that the clearance between the armature and core is .001" and .004"

ATTRACTED ARMATURE

When in the attracted position against the residual stop screw, the clutch armature must clear the lip on the clutch sleeve by .003" to .006" (Figure 4).

The armature adjustment is controlled by the location of the clutch magnet yoke assembly. To make this adjustment, slightly loosen the magnet yoke assembly mounting screws and nut. Rotate the drive shaft so that the lip on the clutch is opposite the armature which is positioned against the residual stop. Position the magnet yoke assembly to obtain the specified clearance of .003" to .006". Tighten the yoke assembly mounting screws and nut. Verify that when the armature is against the residual stop, the clearance between the armature and the lip on the clutch is .003" to .006".

NOTE: Check this adjustment with the lip of the sleeve at the closest position to the armature.

UNATTRACTED ARMATURE

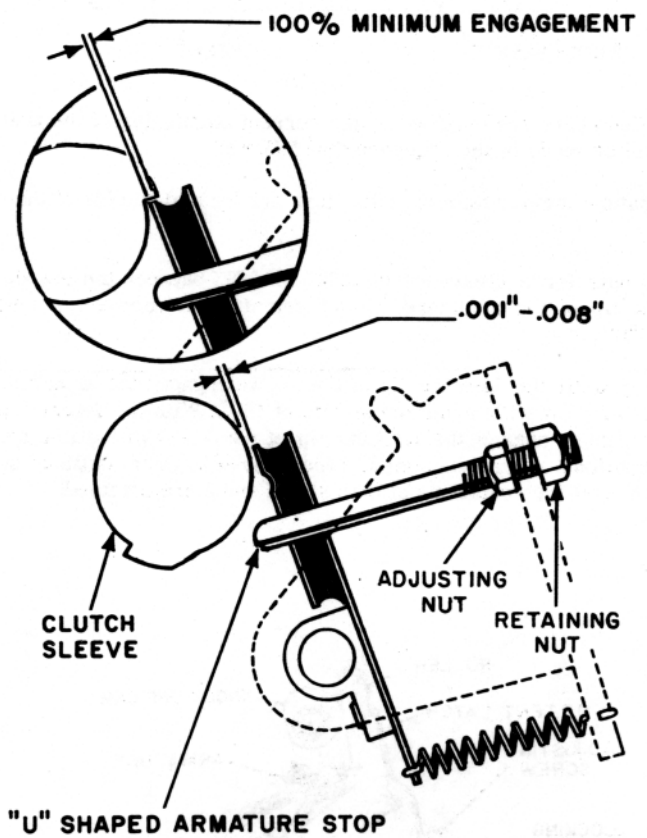


Figure 5.

With the clutch armature in the restored position against the U shaped armature stop, the clearance between the low dwell of the clutch sleeve and the tip of the armature must be .001" to .008" (Figure 5). Both sides of the armature stop must be parallel to the armature within .002". The armature must engage the latching lip of the sleeve with a bite of 100% or greater. With the detent in a full overthrow position, the armature must engage the latching lip of the detent with a minimum bite of 100% (Figure 6).

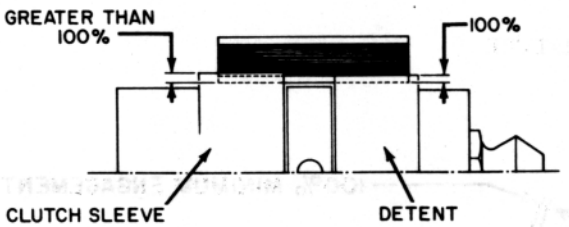


Figure 6.

The four conditions specified above are obtained by the correct positioning of the U shaped armature stop. The adjustments must be made in the sequence that follows:

1. Loosen the two armature stop retaining nuts that are located outside of the clutch assembly bracket.

2. Adjust the adjusting nuts for a clearance of .001" to .008" between the low dwell point on the clutch sleeve and the tip of the armature. Both sides of the armature stop must be parallel to the armature within .002".

3. Rotate the drive pulley until the latching lip of the sleeve engages the armature. The armature must engage the latching lip with a minimum bite of 100%. With the detent in a full overthrow position, the armature must engage the latching lip of the detent with a minimum bite of 100%. If the above two conditions are not obtained, repeat the adjustment outlined in step 2. Adjustment must be repeated until the conditions of both step 2 and 3 are obtained.

ARMATURE KNOCK OFF

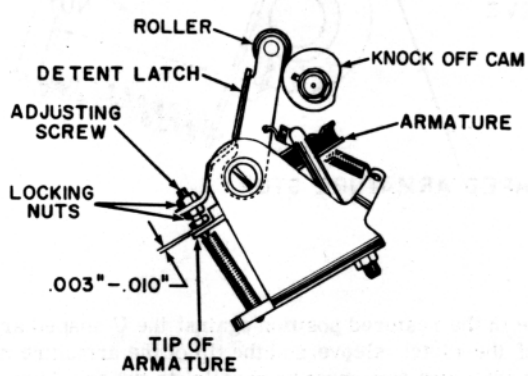


Figure 7.

With the armature knock off roller on the high dwell of its cam and the armature resting against the armature stop, the clearance between the head of the adjusting screw and the armature must be .003" to .010" (Figure 7).

The armature knock off adjustment is obtained by positioning the knock off arm adjusting screw. To make this adjustment, rotate the drive shaft until the armature roller is on the high dwell of its cam. The armature should rest against the U stop. Loosen the retaining nut on the adjusting screw. Turn the adjusting screw until the clearance between the armature and head of the adjusting screw is .003" to .010". Tighten the adjusting screw retaining nut. Verify the clearance between the armature and adjusting screw.

CLUTCH SLEEVE END PLAY

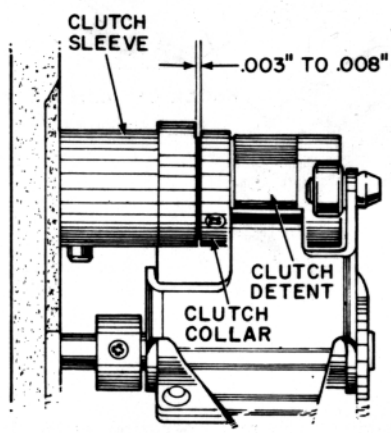


Figure 8.

The end play of the clutch sleeve must be .003" to .008" (Figure 8).

The position of the detent and the clutch collar on the punch shaft determines the amount of end play. The adjustment should be made in the sequence that follows:

1. Loosen the setscrew on the detent.
2. Loosen the two setscrews on the clutch collar.
3. Insert a .006" feeler gauge between the collar and sleeve and press on the detent until the sleeve makes contact with the punch shaft bearing. Tighten the detent setscrew.
4. The collar must be further adjusted as outlined under the clutch collar adjustment that follows.

CLUTCH COLLAR

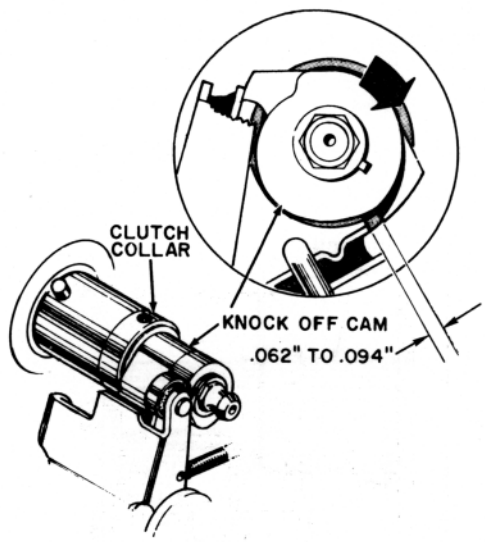


Figure 9.

As the punch shaft rotates during a normal operation, at the time the lip of the clutch sleeve just touches the armature, the clearance between the overtravel stop and armature must be .062" to .094" (Figure 9).

The rotational position of the clutch collar on the punch shaft determines this clearance. Perform the adjustment in the sequence that follows:

1. Loosen the two setscrews located on the clutch collar.
2. With the punch shaft midway in rotation, manually rotate the clutch pulley until the lip on the clutch sleeve contacts the armature.
3. Place an accumulation of all thickness gauges (T-18009), which totals a thickness of .0675", between the armature and the overtravel stop.
4. Rotate the punch shaft until the overtravel stop limits against the thickness gauges. Maintaining the clutch collar against the detent cam, tighten the two setscrews on the clutch collar.
5. Recheck the adjustment to verify that the specified tolerance is maintained.

PUNCH MECHANISM ADJUSTMENTS

Remove the punch assembly from the machine before making these adjustments.

PUNCH MAGNETS

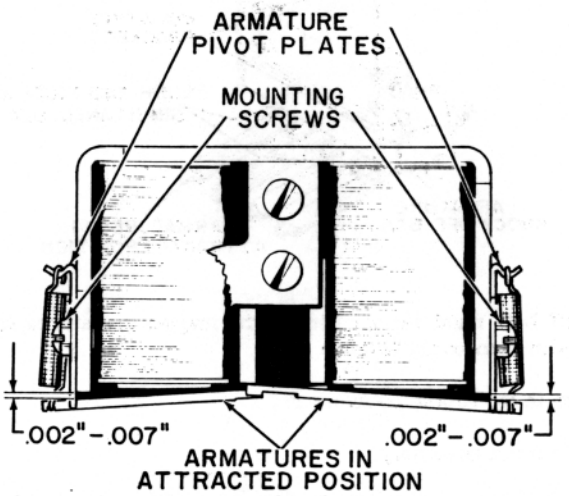


Figure 1.

With the armatures of the punch magnet assembly in the attracted position, the clearance between the heel piece and armature must be .002" to .007" (Figure 1).

The position of the spring and pivot plate determines the clearance between the heel piece and armature. The adjustment must be performed in the sequence that follows:

1. Remove the card table.
2. Remove the punch magnet assembly.
3. Remove the four screws that retain the terminal block located on the rear section of the magnet assembly.
4. Loosen the screws that retain the armature spring and pivot plates on both front and rear magnet assemblies.
5. On the armatures, insert a .004" feeler gauge between the armatures and the heel piece. Depress the armatures.
6. Position the plate horizontally to align the armatures to their respective cores. Tighten the mounting screws.

ARMATURE KNOCK OFF BAIL

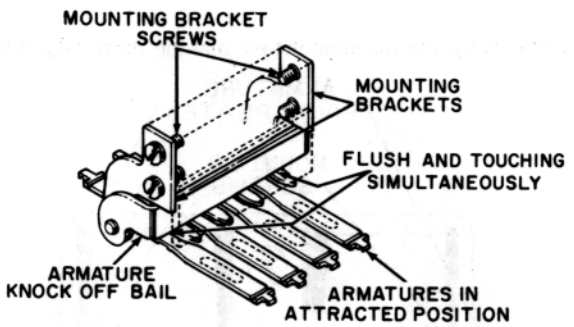


Figure 2.

The armature knock off bail must be parallel to the magnet armatures so that the bail will contact all magnet armatures simultaneously (Figure 2).

Perform the adjustment in the following manner:

1. Remove the punch magnet assembly.
2. Loosen the screws that retain both knock off mounting brackets.
3. Position the mounting bracket so that the knock off bail is parallel to the magnet armatures.
4. Tighten the mounting bracket screws and check the adjustment.

MAGNET ASSEMBLY

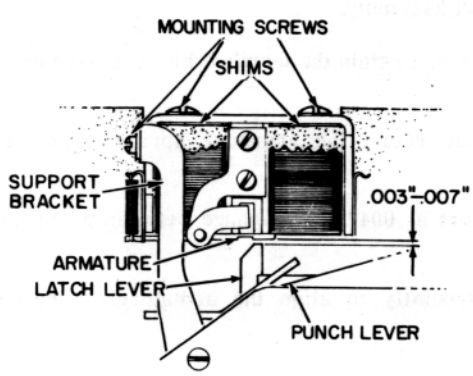


Figure 3.

With the armatures of the punch magnet assembly in the attracted position, the clearance between the tips of the latch levers and the underside of the armature must be .003" to .007" (Figure 3).

Adjustment of the magnet assembly is obtained by shims placed between the assembly and inner punch casting and by positioning of the magnet assembly. The adjustment must be performed in the sequence that follows:

1. Remove the two mounting screws that mount the punch magnet assembly to the inner casting, and loosen the screw that mounts the magnet assembly to the support bracket.

2. Insert shims between the magnet assembly and punch inner casting to provide a clearance of .003" to .007" between the tips of the rear section of latch levers and the underside of the armatures with the armatures in the attracted position. Insert the two rear mounting screws, but do not tighten.

3. Position the magnet assembly on the front mounting bracket for a clearance of .003" to .007" between the front section of latch levers and the underside of the armatures with the armatures in the attracted position. Before tightening the mounting screws, make the adjustment that follows.

LATCH LEVERS

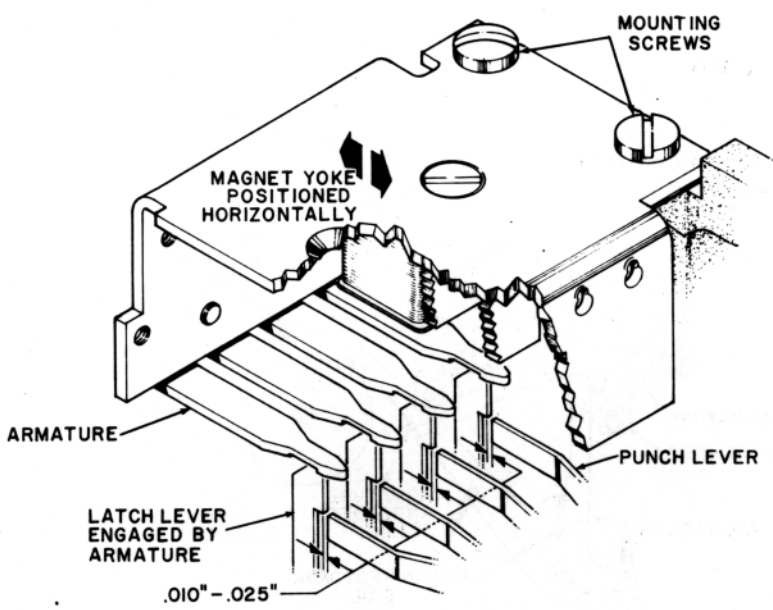


Figure 4.

With the latch levers engaged with their armatures, the clearance between the front edge of the latch levers and the rear edge of the punch levers must be .010" to .025" (Figure 4). The armatures must be in line with the latch levers.

The position of the magnet assembly, on the casting, provides for this adjustment. Perform the adjustment in the sequence that follows:

1. Loosen the punch magnet assembly mounting screws.

2. With the latch levers latched by their respective armatures, position the magnet assembly left to right on the inner casting. The clearance between the right edge of the latch lever and the left edge of the punch levers must be .010" to .025".

3. Simultaneously, position the magnet assembly front to rear to align the armatures with their respective latch levers.

4. Tighten the two mounting screws that mount the magnet assembly to the inner casting.

5. Tighten the mounting screw which mounts the magnet assembly to the support bracket. Maintain the clearance of .010" to .025" between the tips of the latch levers and the underside of the attracted armatures.

LATCH RESTORING BAIL

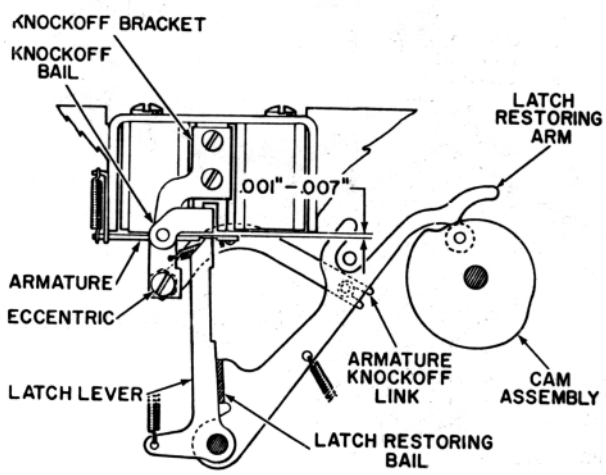


Figure 5.

When the latch restoring bail is fully operated by the cam roller, the clearance between the knock off bail and the armatures must be .001" to .007" (Figure 5).

To perform this adjustment, loosen the locking nut on the armature knock off bail eccentric. Adjust the eccentric so there is a clearance of .001" to .007" between the knock off bail and the armatures when the latch restoring bail is fully operated by the roller on the cam assembly. Tighten the locking nut. If adequate adjustment cannot be obtained by rotating the eccentric screw, reposition the knock off bail as described in the knock off bail adjustment and repeat the armature knock off bail and latch restoring bail adjustments.

PUNCH LEVER DRIVE ARMS

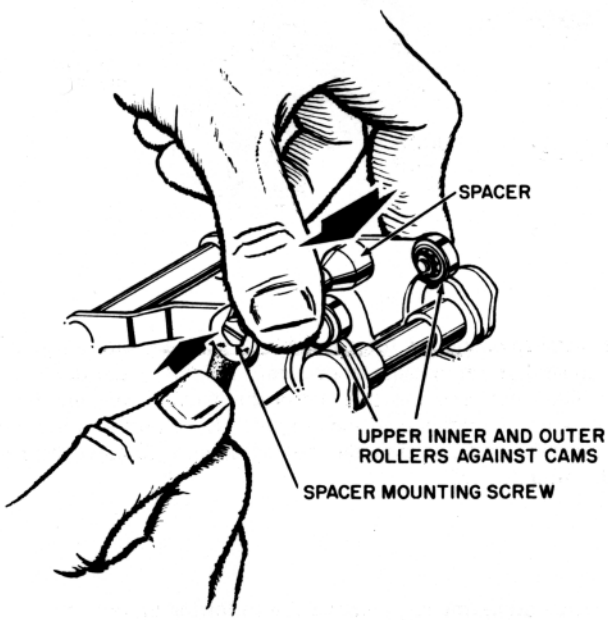


Figure 6.

The inner and outer punch lever drive arms must be parallel and operate equally by the punch cams (Figure 6).

Check the adjustment by rotating the drive shaft until the inner and outer rollers just begin to move toward the high dwell of the punch cams. If the rollers do not contact the cams and begin to turn simultaneously, loosen the adjustment screw on the punch lever drive arms. Hold both of the rollers against the cams. Tighten the nuts and recheck the adjustment.

PUNCH LEVER SPRING SUPPORT

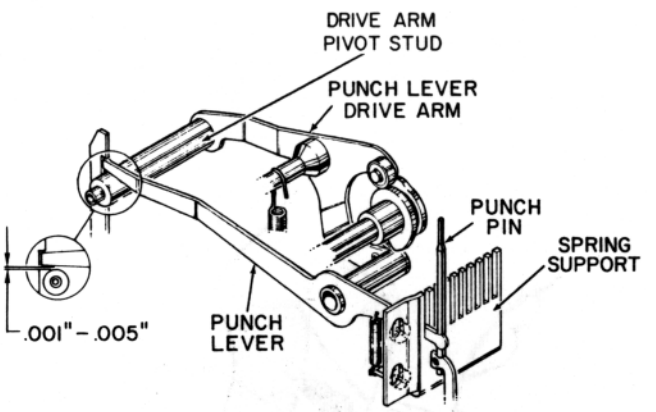


Figure 7.

When the punch pins are withdrawn below the guide block surface, the left ends of the punch levers should not be able to be moved up far enough to prevent latching by the latch levers. There must be a clearance of .001" to .005" between the left end of the punch levers and the top of the pivot stud when the punch pins are down in home position (Figure 7). To perform the adjustment, loosen the spring support mounting screws and position the spring support to meet the requirements. Tighten the screws and recheck the adjustment.

REGISTRATION

Before making the registration adjustments, remove the following units:

Punching Mechanism
Printing Mechanism
Ribbon Feed Mechanism
Card Table
Punch Die Block

PIN WHEELS

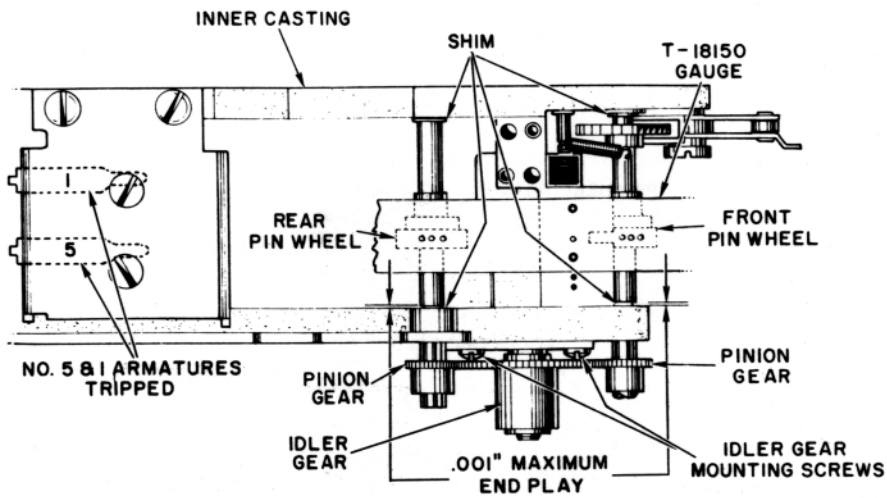


Figure 8.

The end play of the front and rear pin wheel shaft assemblies must be .001' maximum. The shafts must rotate freely without binding (Figure 8). This adjustment is made at the factory and under normal conditions is not necessary in the field.

To check, manually trip the number one and number five latch levers and cycle the punch until the number one, number five, and feed hole punch pins operate and place the pin to gauge T-18150 on the punch pins. The feed holes of the gauge must line up laterally with the pins on both pin wheels.

To adjust the amount of end play, shim the pin wheel assemblies between the bearings. Locate the shims so that the pins on the pin wheels are aligned with the feed hole punch pin in the guide block.

IDLER GEAR TO PINIONS

The idler gear is to be positioned so there is minimum backlash between it and each of the pinions. The pinions must be positioned on the pin wheel shafts so that they have 100% engagement with the idler gear (Figure 8). Make the adjustment in the following sequence:

1. Loosen the setscrews on each pinion and position them on their shafts so that they are in line with the idler gear.
2. Tighten the setscrews on the pinions.
3. Loosen the mounting screws on the large idler gear and position the gear to engage the two pinions so that there is a minimum of backlash. Simultaneously, the gear assembly must rotate freely with no binds throughout its 360° of rotation. To check for binds, lift the detent roller off of the right pin wheel ratchet and turn the pin wheels. The pin wheels must rotate freely.
4. Tighten the mounting screws and check the adjustment.

PIN WHEEL DETENT

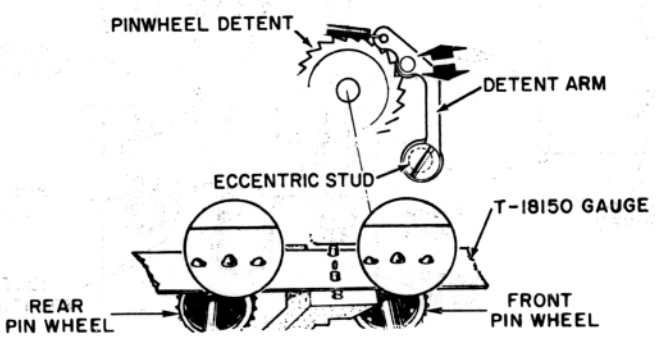


Figure 9.

With pin to pin gauge T-18150 placed on the punch pins, the feed holes at the gauge must line longitudinally with the pins on the front (right) pin wheel (Figure 9).

To position the front pin wheel, the detent eccentric must be adjusted. To perform this adjustment, loosen the locking nut on the detent eccentric and rotate the eccentric until the pins fall into the feed holes of the gauge. Tighten the locking nut and check the adjustment.

LEFT PINION GEAR

With pin to pin gauge T-18150 placed on the punch pins, the feed holes at the gauge must line longitudinally with the pin on the rear (left) pin wheel (Figure 8).

To adjust the rear pin wheel, loosen the setscrew on the rear pinion and rotate the pin wheel until the pins fall into the feed holes of the gauge. Tighten the setscrew on the pinion. Be sure the pinion engages the idler gear fully.

Reinstall the Die Block, Card Table, Ribbon Feed Mechanism, Printing Mechanism and the Punch Mechanism.

TAPE STRIPPER

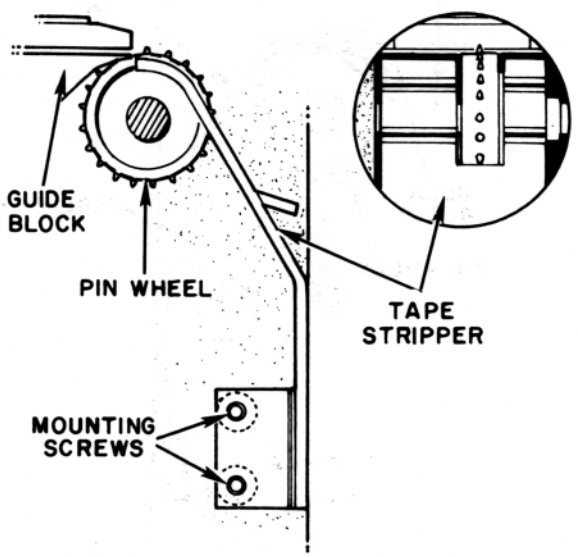


Figure 10.

The tape stripper must be flush or below the top surface of the punch guide block and should not touch the pin wheel. The groove in the stripper must be centered on the pin wheel assembly (Figure 10).

To center the groove in the stripper to the pin wheel, remove the mounting screws and insert shims as required between the stripper and the inner casting. With the mounting screws loose, position the stripper so that its top surface is flush or slightly below the top surface of the guide block. If necessary, form the stripper being careful not to mar the surface.

TAPE PRESSURE ARM

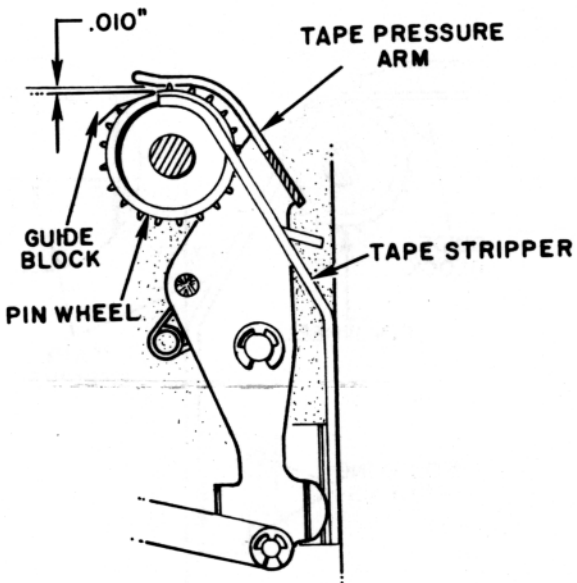


Figure 11.

The inside surface of the tape pressure arm must be concentric to the curved surface of the tape stripper and slightly above (.010" maximum) the top surface of the guide block to allow for tape or card clearance (Figure 11).

To adjust the tape pressure arm, form as required to obtain the above specified conditions being careful not to mar the surface of the pressure arm.

FEED PAWL ARM AND STOP

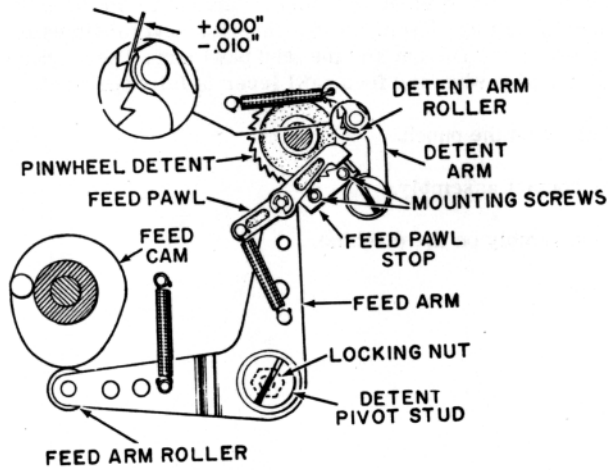


Figure 12.

The feed pawl must move the ratchet on the pin wheel shaft assembly to within .010" of the fully detented position. The travel should never be past the fully detented position (Figure 12).

Perform this adjustment in the sequence that follows:

1. Remove the punch assembly from the machine.
2. Remove the parity contact assembly mounting screws and position the assembly away from the adjustment area.
3. Remove the chad chute from the punch assembly.
4. Loosen the feed pawl stop mounting screws and position the feed pawl stop away from the feed pawl.
5. Loosen the lock nut on the feed arm detent pivot stud.
6. Adjust the feed arm detent pivot stud so that the feed arm moves the ratchet to the fully detented position. The travel should never be past the fully detented position. The travel can be checked by holding the pin wheel shaft firmly and cycling the punch so the feed pawl is at the limit of its travel. At this time, the location of the ratchet can be seen in respect to the detent arm roller. The ratchet must be fully detented or within .010" of fully detented, but not past the fully detented position.

7. Cycle the punch shaft until the feed pawl is fully operated with the ratchet fully detented. Loosen both mounting screws and adjust the feed pawl stop eccentric, bringing the feed pawl stop so it just touches the feed pawl without pressure. Tighten the mounting screws being careful not to change the eccentric setting. Cycle the punch shaft several times to be sure that the feed pawl is not binding between the ratchet and the feed pawl stop. There should be no clearance between the feed pawl and the stop when the feed pawl lever is fully operated.

8. Install the chad chute on the punch.

9. Install the parity contact assembly.

10. Install the punch assembly on the machine.

11. Install the card table.

CARD TABLE

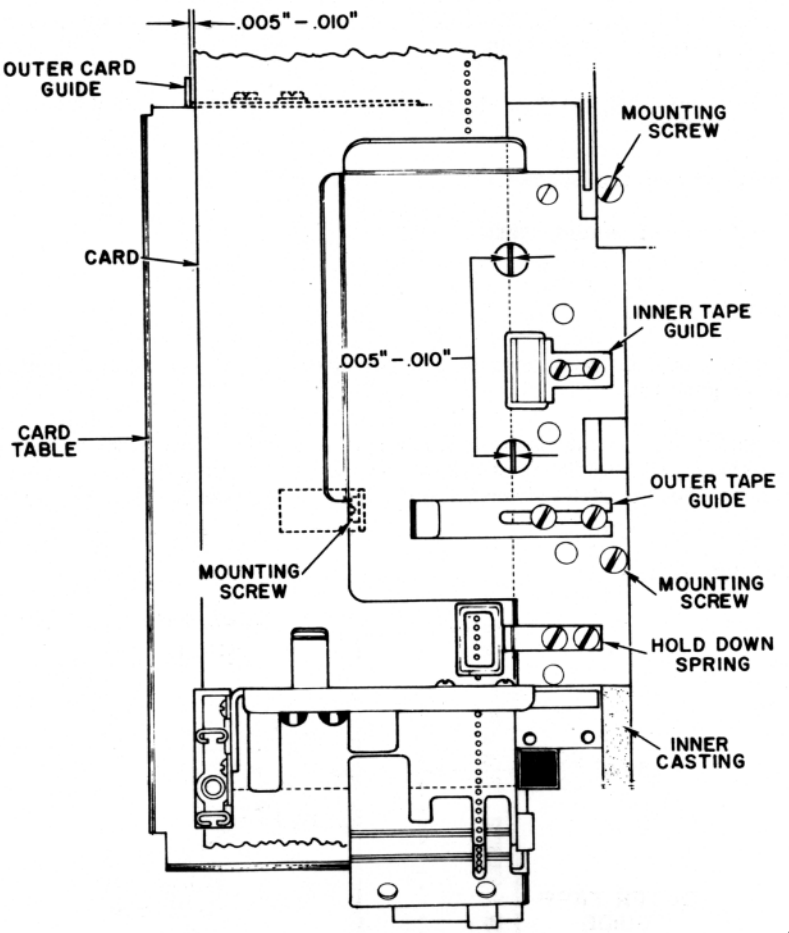


Figure 13.

The card table is to be positioned on the punch from left to right centered in relation to the two mounting screws that mount to the inner casting. The card table should be positioned, front to rear, so that there is a clearance of .005" to .010" between the guide edge of the card table to the edge of a card which is held in place by the two pin wheels (Figure 13). Perform the adjustment in the sequence that follows:

1. Loosen all mounting screws to retain the table in place.

2. Position the card table, left to right, so that it is centered in relation to the two mounting screws that mount the table to the inner casting. Further position the card table, front to rear, so that with a card placed on the pin wheels there is a clearance of .005" to .010" between the edge of the card and the guide edge of the table.

3. Tighten the two mounting screws on the top of the card table. Tighten the nut that retains the bracket under the table.

4. Tighten the bracket mounting screws.

5. Tighten the lower table mounting screw.

OUTER CARD GUIDE

The outer card guide must be positioned to accommodate a 3 1/4" card with a slight clearance for normal expansion (Figure 13).

To perform the adjustment, feed standard cards through the machine. Loosen the two mounting screws and position the outer card guide against the edge of the card. Slightly position the guide away from the card edge to allow .005" to .010" clearance for expansion. Tighten the mounting screws.

INNER - OUTER TAPE GUIDES

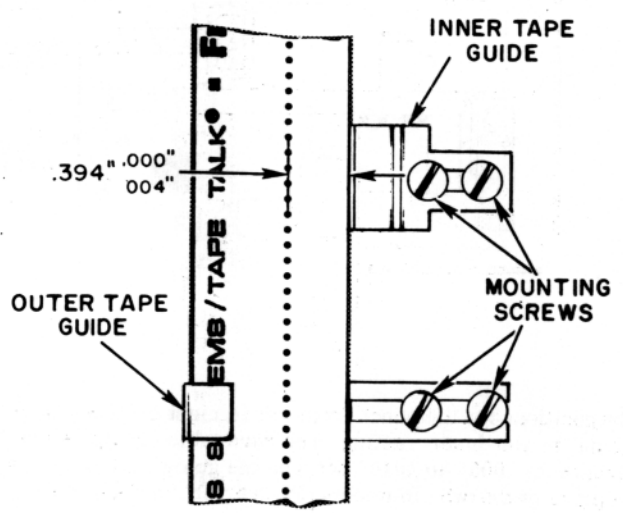


Figure 14.

The inner tape guide must be positioned so there is .394" plus .000" minus .004" from the center line of the feed hole to the right edge of the tape using gauge No. T-18118. The outer tape guide must be positioned to accommodate the standard 1 inch tape (Figure 14). Perform the adjustment in the sequence that follows:

1. To check this adjustment, feed a length of tape through the machine. Check the location of the holes in the tape with gauge T-18118.

2. If adjustment of the tape guides is necessary, loosen the mounting screws and position the guides. Position the outer guide to accommodate the one inch tape. Tighten the mounting screws and recheck the adjustment as instructed in step one.

TAPE REGISTRATION

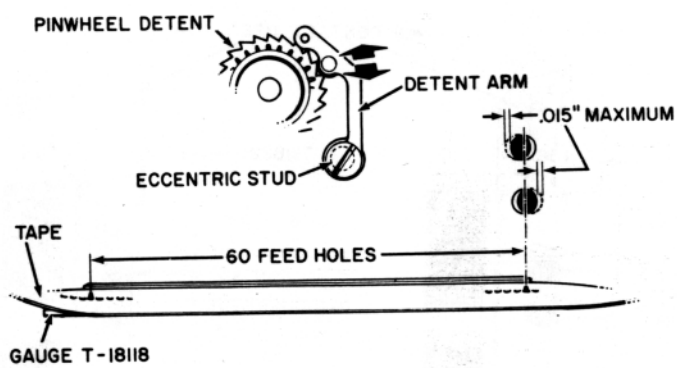


Figure 15.

The spacing between feed holes must be .100" ± .001" from center to center or 60 code holes in 6.000" ± .015" overall (Figure 15).

To check registration, feed a length of tape through the machine. Place the tape on registration gauge T-18118 and note the alignment. If the registration is incorrect, perform the adjustment as follows:

1. Loosen the locking nut on the detent eccentric.

2. Slightly rotate the detent eccentric as required. Tighten the eccentric locking nut.

3. Feed a length of tape through the machine and recheck registration usage gauge T-18118. Repeat steps one through three as necessary until the adjustment is obtained.

NOTE: If this adjustment cannot be obtained, refer to the beginning of the sequence of registration adjustments and make them all again.

PARITY CHECK CONTACT ASSEMBLY

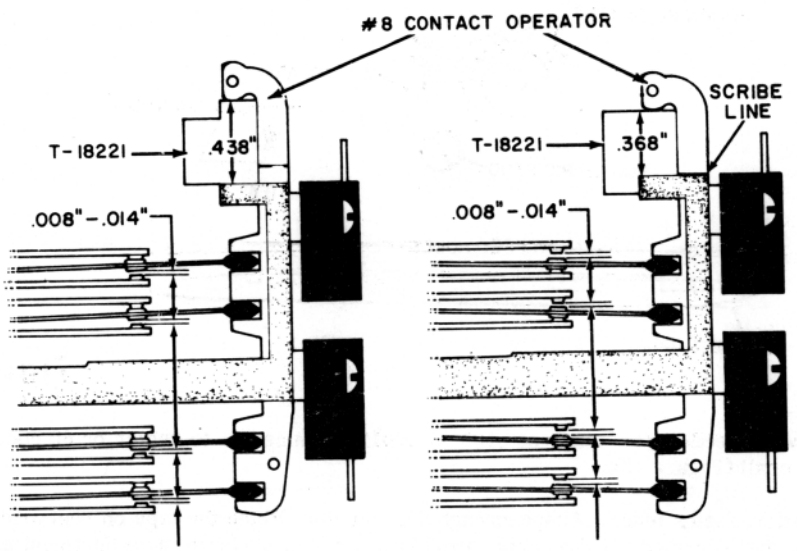


Figure 16.

With the parity check contact assembly removed from the inner punch casting and using gauge T-18221, simultaneously hold all the contact operators tightly against the .368" side of the gauge and form the upper stationary contact springs to allow an .008" to .014" clearance to the moveable contact springs. With the contact operators simultaneously held against the .368" side of the gauge, the scribe mark on the #8 contact operator should be flush to the upper most surface of the parity check casting. With the contact operators simultaneously held against the .438" side of the gauge, form the lower stationary contact springs to allow an .008" to .014" clearance to the moveable contact springs.

PARITY CHECK CONTACT ASSEMBLY POSITIONING

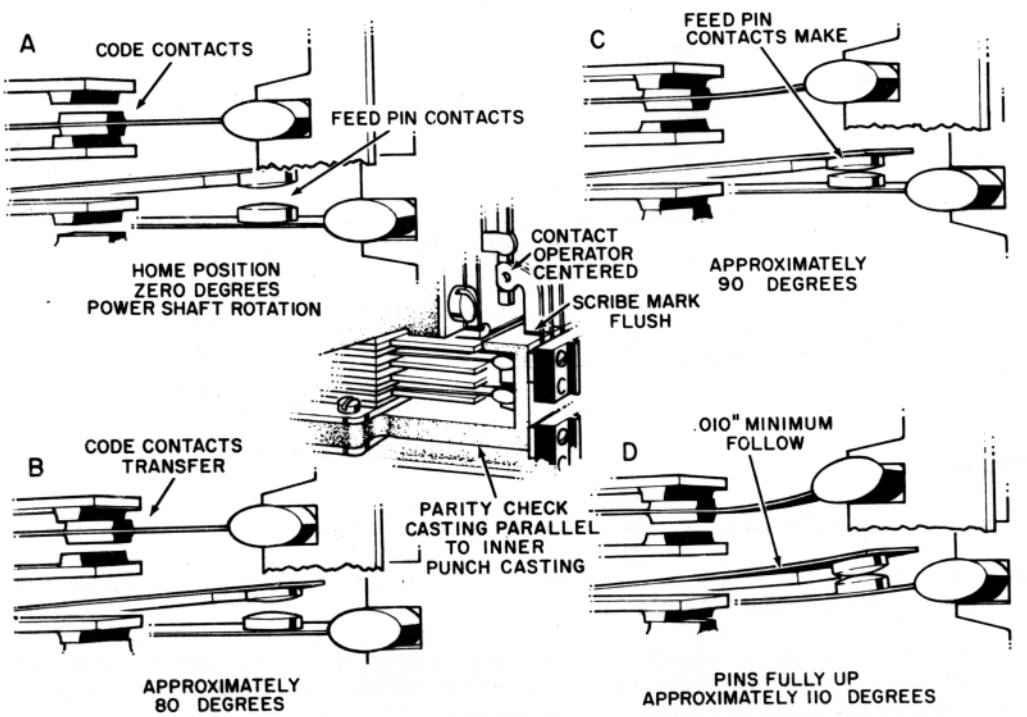


Figure 17.

With the power shaft in home position, loosen the parity check contact assembly mounting screws and position the parity check casting so that it is parallel with the lower edge of the inner punch casting and with the top of the contact operators centered in the punch pin slots and the scribe mark on the No. 8 contact operator flush with the upper most surface of the parity check casting. Adjust the normally open contact operated by the feed pin operator to make only after all the code contacts have fully transferred. Check the normally open feed pin contact for a .010" minimum follow when the pins are in their most upward position.

PRINTING MECHANISM ADJUSTMENTS

PRINT HEAD POSITIONING

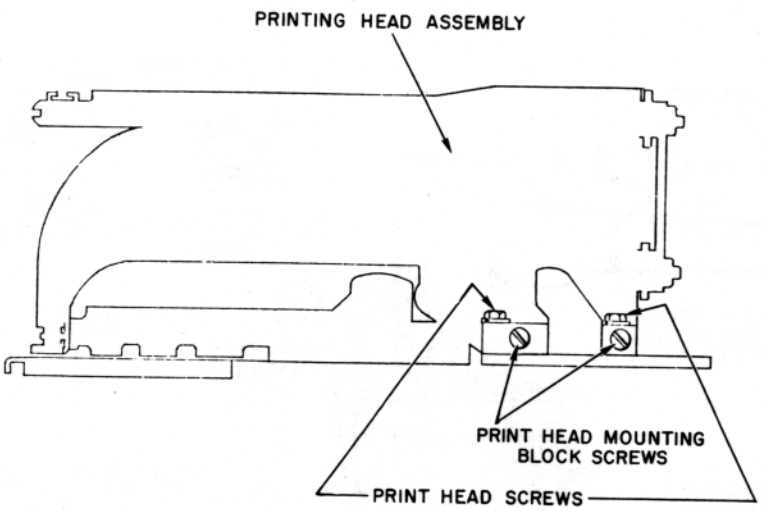


Figure 1.

The card table adjustments must be correct before making this adjustment.

The gap between the card table and the tip of the print wire head must be .022". The print head tip must be in line with the code holes (Figure 2).

The position of the print head is adjusted by loosening the 4 print head screws and the 4 print head mounting block screws (Figure 1). The print head must be adjusted for proper height and lateral position simultaneously. The adjustment should be in the sequence that follows:

1. Remove the ribbon.
2. Loosen the ribbon guide and separator mounting screws.
3. Slightly loosen the printing head screws and the mounting block screws.
4. Position the tip of the print head in line with the code holes. Tighten the mounting block screws.
5. Using a feeler gauge, set the gap between the card table and tip of the print head to .022".
6. Tighten the print head mounting screws and recheck the adjustment.

NOTE: All printing adjustments are affected by this adjustment and must be made again.

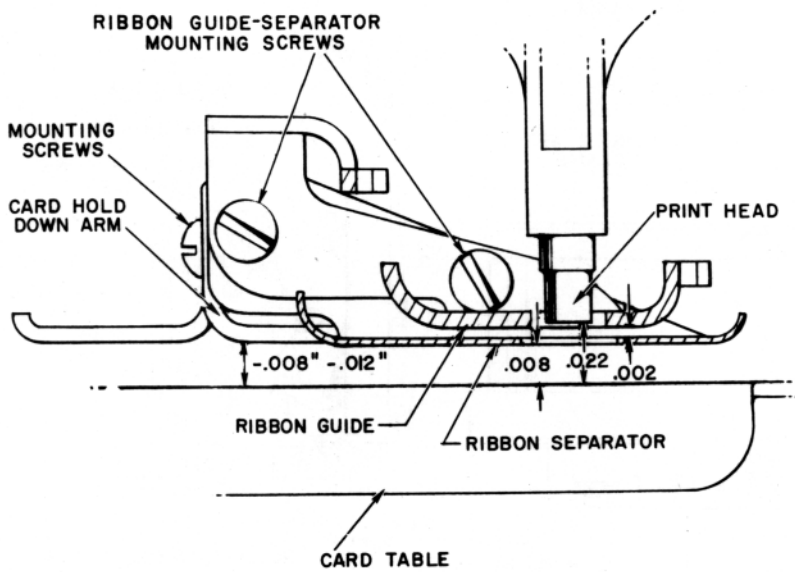


Figure 2.

CARD HOLD DOWN ARM HEIGHT

The gap between the card table and the card hold down arm must be .008" to .012".

To adjust the height of the card hold down arm, loosen the two mounting screws located on the left side of the die block. Using a .010" feeler gauge, set the gap between the arm and the card table. Tighten the two mounting screws and recheck the adjustment.

RIBBON GUIDE AND RIBBON SEPARATOR POSITION

The gap between the card table and the ribbon separator must be .008". The gap between the ribbon guide must be .002" (Figure 2).

The ribbon guide and the ribbon separator must be adjusted simultaneously. These adjustments are interrelated and, therefore, must be performed in the sequence that follows:

1. Loosen the ribbon guide - separator guide assembly mounting screws.
2. Insert a .008" feeler gauge between the card table and the ribbon separator.
3. Insert a .002" gauge between the ribbon separator and ribbon guide.
4. Holding the ribbon guide down against the gauge, tighten the ribbon guide - ribbon separator mounting screws and recheck the adjustment.

PRINT LEVER ASSEMBLY STROKE

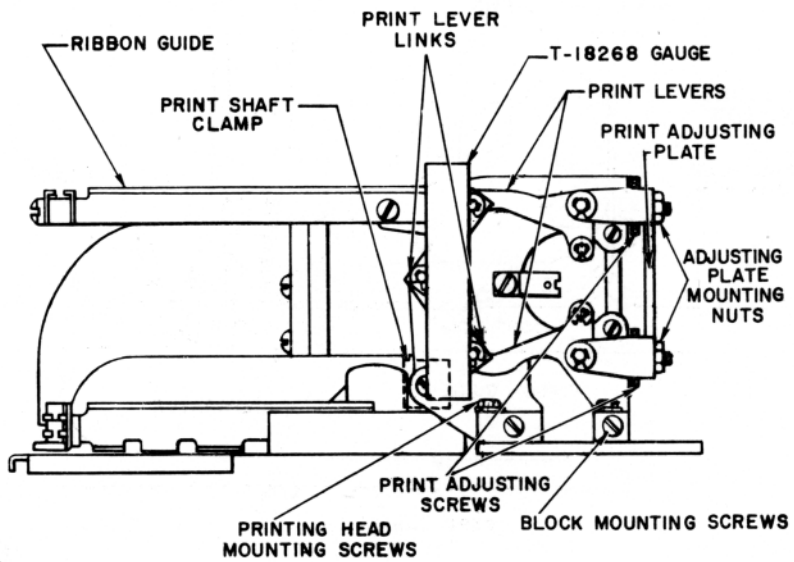


Figure 3.

The stroke of the print levers is determined by the position of the print adjusting plate. The print adjusting nuts permit adjustment of the plate position (Figure 3).

The adjustment of the stroke should be made in the sequence that follows:

1. Place the clutch in the latched up position.
2. Loosen the print adjusting plate mounting nuts.
3. Rotate the three knurled print adjusting nuts several turns clockwise.
4. Loosen the 4 screws that retain the print shaft clamp.
5. Place the .485" stroke gauge (T-18268) between the studs of the print lever and print lever links as shown in the illustration.
6. While holding the gauge in place, turn the print adjusting nuts back to move the print adjusting plate until the gauge is held in position by the scissor action of the print lever links.

NOTE: Do not turn the nuts back so tightly as to cause excessive pressure to be applied to the gauge.

7. Tighten the 3 mounting nuts that retain the print adjusting plate. Exercise care so that the setting of the knurled adjusting nuts is not disturbed.

8. Tighten the four screws that retain the print shaft clamp.

9. Remove the stroke gauge.

SELECTOR ARMATURE HEEL PIECE

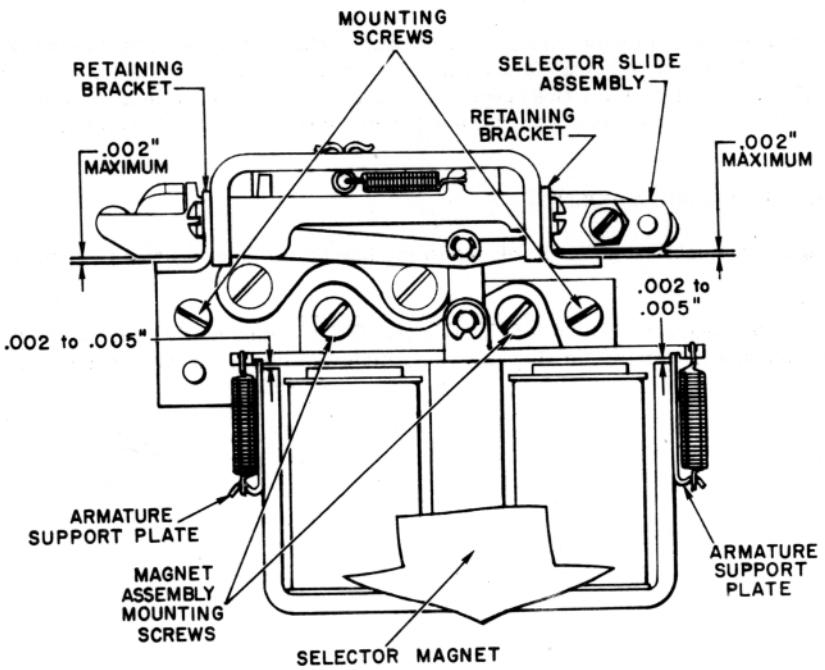


Figure 4.

In order to make these adjustments, the punch assembly must be removed.

With the horizontal and vertical armatures in the attracted (depressed) position, the clearance between the armature and its associated heel piece must be .002" to .005" (Figure 4).

The position of the selector armature is determined by the location of the armature support plate that is mounted to the heel piece by two retaining screws.

To obtain the proper clearance between the armature and the heel piece, perform the adjustment in the sequence that follows:

1. Loosen the armature support plate mounting screws.

2. Insert a .004" feeler gauge between the armature and its associated heel piece.

3. Depress the armatures and position them laterally to center them to the core.

4. Tighten the mounting screws and verify that the clearance is .002" to .005".

NOTE: The vertical selector assembly must be removed to make the mounting screws accessible.

SELECTOR SLIDE RETAINING BRACKETS

The gap between the selector slides and the selector slide retaining brackets must be .002" maximum. The selector slides should not bind (Figure 4).

To adjust the gap between the selector slides and each slide retaining bracket, loosen the two screws that retain the bracket. Insert a .0015" feeler gauge between all slides and the bracket. Holding the bracket against the gauge, tighten the two screws. To make this adjustment on the vertical selector, the complete assembly must be removed so that the bracket screws will be accessible.

SELECTOR MAGNET ASSEMBLY POSITION

The selector magnet assemblies must be placed to the lowest possible position from the armature (Figure 4).

To adjust the selector magnet assemblies, loosen the two mounting screws located on the magnet bracket. Set the magnet assembly to the lowest possible position from the armature. Tighten the two screws.

SELECTOR SLIDE ASSEMBLY POSITIONING

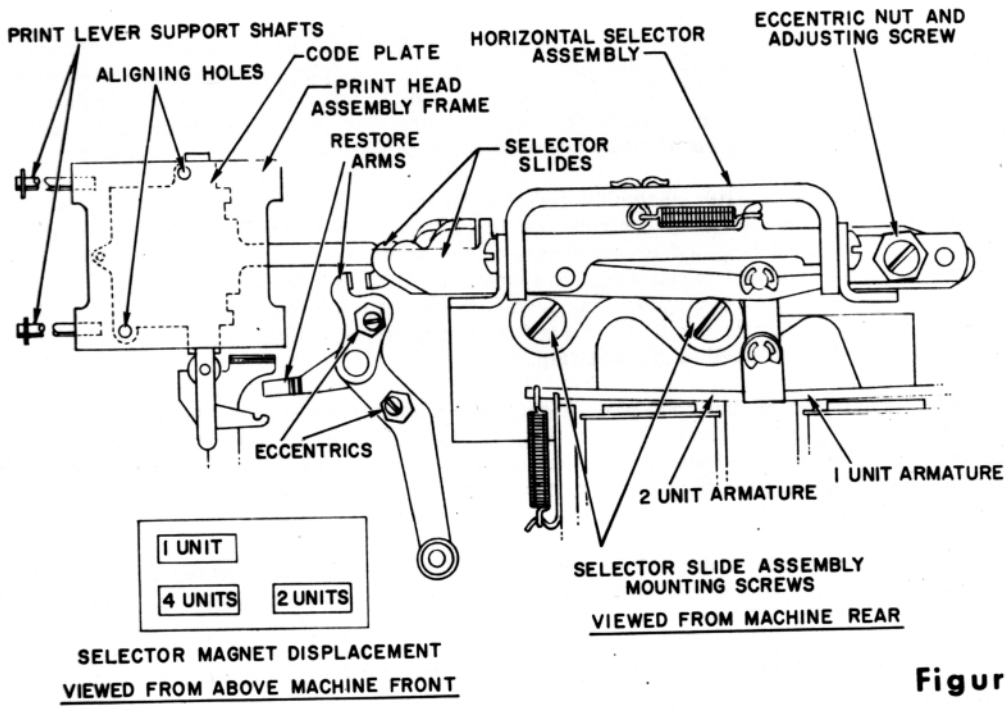


Figure 5.

The vertical and horizontal position of the code plate is determined by the location of the vertical and horizontal selector slide assemblies. The code plate is positioned by both a course and fine adjustment of the appropriate selector slide assembly. A course adjustment is made by movement of the selector assembly on its mounting screws. The fine adjustment is made by means of the eccentrics located on the assembly (Figure 5).

The selector slide assemblies are to be adjusted so that when the code plate is positioned, three units vertically and three units horizontally, the alignment holes of the code plate are in line with the guide holes of the frame of the print assembly.

This adjustment is made in the following manner:

1. Remove the left side retaining clips from the upper and lower print lever support shafts. Partially remove the shafts until the locator pin (T-18267) may be inserted into the adjusting holes in the code plate.

2. Trip the clutch and cycle the shaft so that the restore arms have moved away from the selector slides, but not so far as to cause the pressure plate to move the code plate against the print wires.

3. Manually attract (depress) the armatures of the one unit and two unit selectors of both the horizontal and vertical selector assemblies.

4. Insert the locator pin through the hole in the print adjusting plate and through the aligning holes located in the code plate, guide plate, and rear frame. The locator pin must move freely in and out of both the top and bottom code plate holes and the associated holes in the guide plate and rear frame. If the code plate holes do not line up properly, adjust the horizontal or vertical selector slide assembly as required by following the procedure outlined in the next step.

5. The horizontal selector slide assembly controls the horizontal position of the code plate. The vertical selector slide assembly controls the vertical position of the code plate. Therefore, as required, on the horizontal and/or vertical selector slide assembly loosen the screw that retains the eccentric nut and adjust the screw until the locator pin freely moves in and out of the holes in the code plate, guide plate, and frame. In the event the locator pin binds or cannot be inserted, set the eccentric nut to the center of its adjustment and tighten the retaining screw. Follow the procedure outlined in the next step.

6. If proper adjustment of the code plate cannot be obtained in the previous step, loosen the appropriate selector slide assembly mounting screws. Move the selector assembly for the optimum position of the code plate as indicated by the location of the adjusting holes. Tighten the selector assembly mounting screws. If necessary, repeat the fine adjustment of the eccentric nut as indicated in step number 5.

NOTE: This adjustment may be difficult to obtain, steps 5 and 6 should be repeated until the locator pin freely moves in and out of the top and bottom adjusting holes in the code plate, guide plate, and frame.

7. Place the upper and lower print lever support shafts to their normal position and insert the retaining springs.

RESTORE ARMS

The restore arms are adjusted to assure that their respective selector assemblies are fully restored at home position of the punch shaft. The assemblies must not be restored any further than is necessary to latch up the one unit slide. The restore arms must not limit the movement of the selector slides when they are operated seven units (Figure 5). Make this adjustment in the following sequence:

1. Rotate the clutch to the latched up position.

2. Loosen the locking screw for each eccentric and rotate the eccentric so that their respective restore arms are at the minimum restore postion.

3. Trip the one unit selector slide on each assembly.

4. Rotate the eccentrics until the one unit slide latches; tighten the locking screws.

5. Trip the clutch and cycle the shaft until the restore arms have reached the maximum point of travel but not so far as to cause the pressure plate to operate the code plate against the print wires.

6. Trip all three armatures of each selector assembly and check to see that the restore arms do not restrict the movement of the slides.

7. Further cycle the shaft to home position and check to see that all slides have restored fully and latched.

PRINTING RIBBON FEED MECHANISM ADJUSTMENTS

RIBBON REVERSE LINK

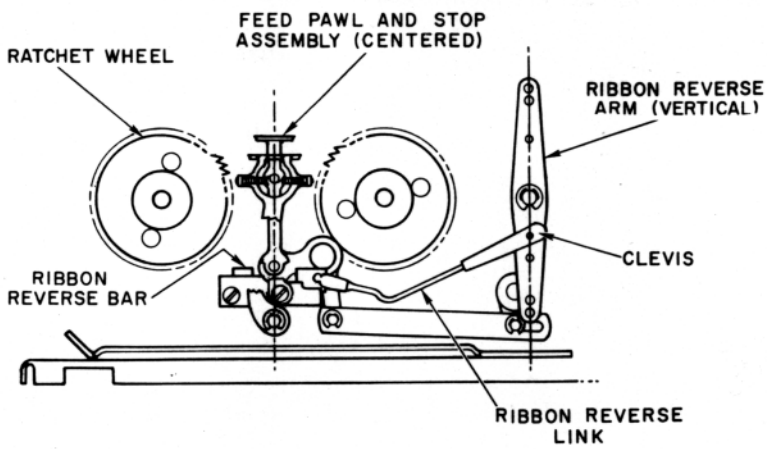


Figure 1.

With the ribbon reverse arm positioned vertically and the feed pawl and stop assembly centered between ratchet wheels, the base of the feed pawl should be centered horizontally in the cutout on the ribbon reverse bar (Figure 1).

Center adjustment is obtained by shortening or lengthening the ribbon reverse link. Perform the adjustment in the sequence that follows:

1. Remove both ribbon spools.
2. Place the ribbon reverse arm in a vertical position which is the center of toggle action. The toggle action is overcome when the exact center of the toggle is located.
3. Hold the feed pawl and stop assembly so that it is centered between the ratchet wheels.
4. Shorten or lengthen the ribbon reverse link by turning the clevis as required until the base of the feed pawl is centered horizontally in the coutout on the ribbon reverse bar.

REVERSE ARM STOP

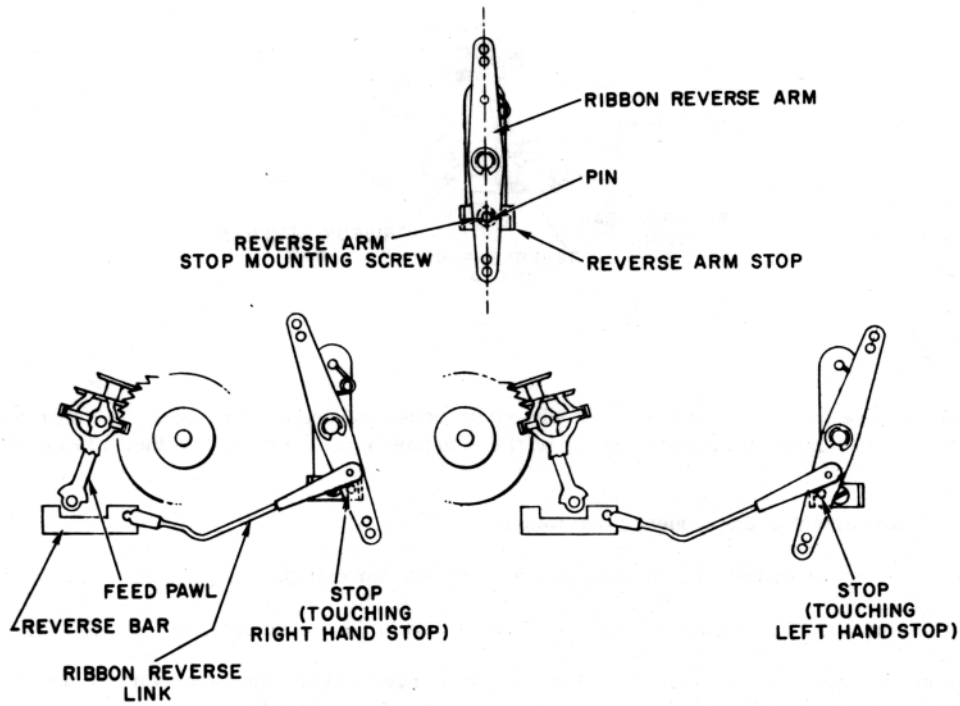


Figure 2.

With the ribbon reverse arm positioned vertically, the pin on the reverse arm must be centered between the reverse arm stop (Figure 2).

To perform the adjustment, loosen the mounting screw on the reverse arm stop and with the ribbon reverse arm positioned vertically, center the stop to the pin on the reverse arm. The reverse arm pin must rest against the stop in both the right and left positions. As a final check, position the feed pawl and stop assembly to the right and the reverse bar to the right and note the relationship of the reverse bar to the feed pawl. Position the feed pawl and stop assembly to the left and the reverse bar to the left and note the relationship of the reverse bar to the feed pawl. The relationship must be the same in both the left and right positions. If this adjustment cannot be obtained, readjust the ribbon reverse link and repeat the complete reverse arm stop adjustment.

RIBBON REVERSE BAR

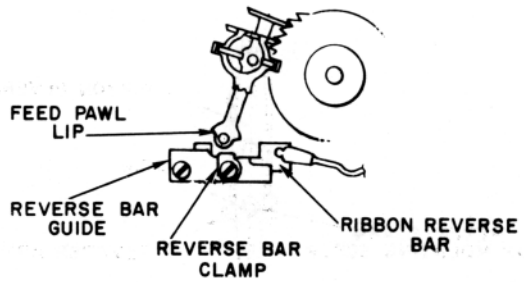


Figure 3.

The ribbon reverse bar must be free to slide without unnecessary vertical movement. The edge of the ribbon reverse bar must slide under the lip on the feed pawl when the pawl is in the raised position (Figure 3).

Perform the adjustment in the sequence that follows:

1. Loosen the screws on the reverse bar guide and reverse bar clamp.

2. Trip the clutch and cycle the shaft until the feed pawl is in the raised position.

3. Position the reverse bar guide so that the ribbon reverse bar slides freely under the lips on the pawl and stop in both directions. Tighten the reverse bar guide screw.

4. Position the reverse bar clamp for a minimum vertical movement of the ribbon reverse bar. The ribbon reverse bar must slide freely back and forth toward the ribbon spools. Tighten the reverse bar clamp screw. As a final check, place the feed pawl against the left ratchet wheel and move the reverse bar to the right. Note the clearance between the reverse bar and the feed pawl. Place the feed pawl against the right ratchet wheel and move the reverse bar to the left. The clearance must be the same in each position.

RIBBON FEED PAWL

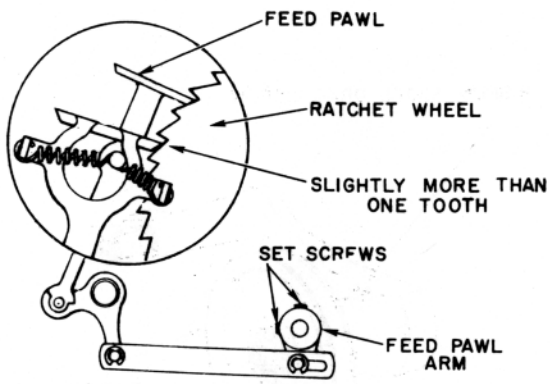


Figure 4.

When the feed pawl is positioned fully upward, the feed pawl should be adjusted so that the ratchet wheel has been fed slightly more than one tooth. The ribbon reverse bar edge must be free to move under the lip of the feed pawl (Figure 4). Perform the adjustment in the sequence that follows:

1. Rotate the drive shaft until the ribbon feed pawl is positioned fully upward.
2. Loosen the feed pawl arm setscrews and position the feed pawl arm so that the ratchet wheel has been fed slightly more than one tooth and the ribbon reverse bar edge is free to move under the lip of the feed pawl. Tighten the setscrews.
3. Rotate the drive shaft until the ribbon feed ratchet is in the fully downward positions.
4. The feed pawl must fall into the next tooth space.

NOTE: These conditions must be checked at both ratchet wheels.

RIBBON SPOOL DRAG

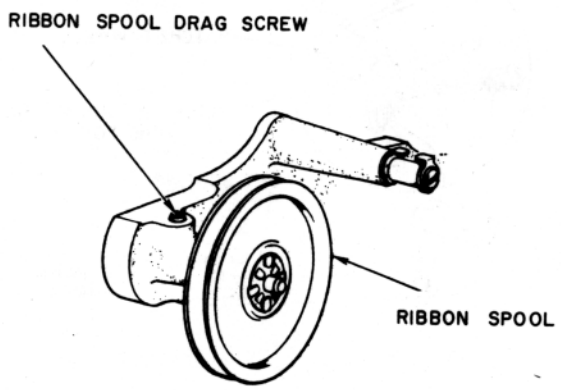


Figure 5.

There must be a slight amount of drag on the ribbon spools. The drag must be sufficient to prevent overtravel during feed but not so tight so as to cause the ribbon to slide off the guide sideways (Figure 5).

To perform the adjustment, rotate the ribbon tension screws located in the ribbon spool shaft housing until there is a slight drag on the ribbon spools as specified.

MISCELLANEOUS ADJUSTMENTS

MICRO SWITCHES

The V of the operator arms of each micro switch must be centered in the hole of the card table. The switch must operate as outlined in the adjustment sequence that follows:

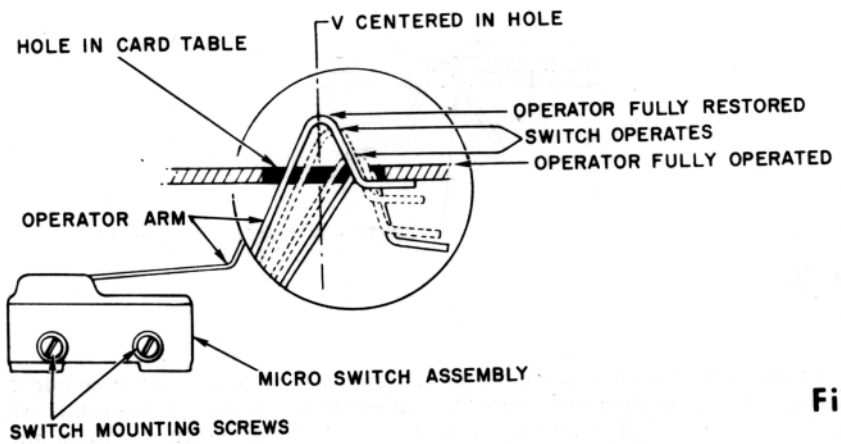


Figure 1.

1. Slightly loosen the switch mounting screws so that each switch may be positioned as required (Figure 1).

2. Move each micro switch left and right until the V of the operator arm is centered in the hole in the card table.

3. Feed a card through the machine. When each operator arm is depressed by the card, the switch must operate before the arm reaches the point of optimum travel. Remove the card from the machine. Each switch must restore before the arm reaches the point of maximum upward travel. Position each micro switch vertically to obtain this adjustment.

4. Tighten the switch mounting screws. Do not tighten the screws so tight that the switch assembly is damaged.

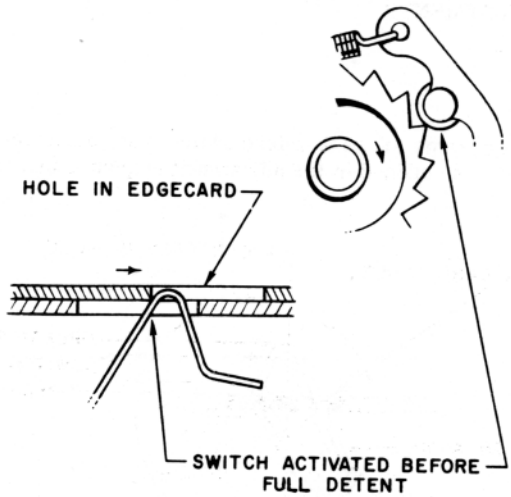


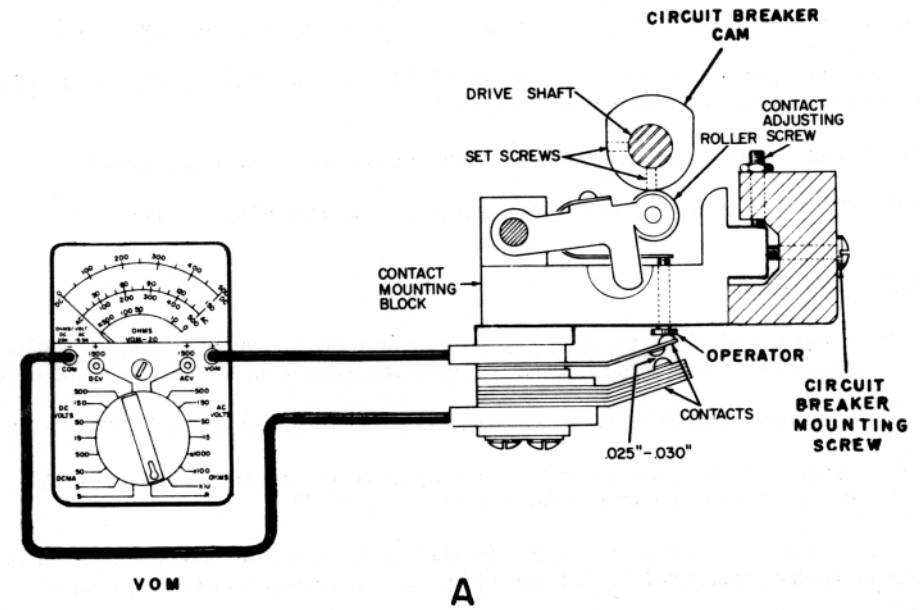
Figure 2.

5. Feed a card through the machine until the operator arm of the card position micro switch comes up through the hole in the card (Figure 2). Continue to rotate the pin wheel; the switch must operate before the pinwheel assembly fully detents. Position the card position micro switch vertically to obtain this adjustment; tighten the mounting screws.

6. As a final check for the card position micro switch, with the machine running, initiate a card feed operation. The card must stop at the second code column past the perforation over the punch pins. The micro switch must be operated.

CIRCUIT BREAKERS

When the roller of a circuit breaker is on the low dwell of its cam, there must be a clearance between the head of the plunger shaped operator and the body of the frame. The contact gap must be .025" to .030". Perform the adjustment in the sequence that follows:


CIRCUIT BREAKER CAM
DRIVE SHAFT
SET SCREWS
ROLLER
CONTACT ADJUSTING SCREW
CONTACT MOUNTING BLOCK
OPERATOR
CONTACTS
.025"-.030"
CIRCUIT BREAKER MOUNTING SCREW
VOM
A

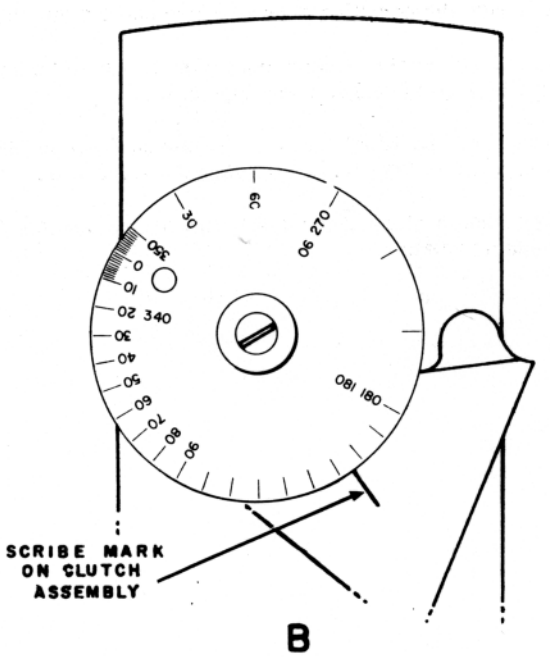

SCRIBE MARK ON CLUTCH ASSEMBLY
B

Figure 3.

1. Rotate the drive shaft until the circuit breaker roller is on the low dwell of its cam (Figure 3a).

2. Loosen the circuit breaker mounting screw and the locking nut on the adjusting screw.

3. Adjust the adjusting screw for a contact gap of .025" to .030". There must be a clearance between the operator head and the body of the breaker.

4. Tighten the lock nut on the adjusting screw and the circuit breaker mounting screw.

NOTE: This adjustment may have to be changed if proper duration of operation cannot be obtained.

CIRCUIT BREAKER CAMS

The cams must open and close their respective circuit breaker contacts at specific points in the clutch cycle as indicated on timing dial T-18088. Perform the adjustment in the sequence that follows:

1. Remove the grease fitting from the drive shaft and connect the timing dial T-18088 to the shaft.

2. With the clutch at home position, set the timing on the end of the drive shaft so that the zero degree setting is lined up with some reference point (Figure 3b).

3. Connect the ohmmeter across the cam operated contacts. Cycle the drive shaft and note the duration of contact operation. SPCC1 and SPCC2 are to remain operated for a duration of 155 degrees.

4. If adjustment is required, loosen the adjusting screw locking nut and the slotted screw.

5. Rotate the adjusting screw to obtain the contact operation as specified. Tighten the locking nut on the adjusting screw and the circuit breaker mounting screw.

6. Loosen the cam setscrew and position the cam on the shaft so that the SPCC1 and SPCC2 operate at 70 degrees and restore at 225 degrees. Tighten the setscrews.

NOTE: SPCC3 circuit breaker should close at the same time parity contacts 1 through 8 close and restore when these contacts restore.

SPECIAL FEATURES

AUTOMATIC VERTICAL SPACER
2200/2300 SERIES FLEXOWRITER

Automatic Writing Machines

General Description

Installation Procedure

Theory of Operation

Maintenance

- Adjustments
- Lubrication
- Troubleshooting
- Schematics

GENERAL DESCRIPTION

The Automatic Vertical Spacer is a forms feeding device which may be attached to the automatic writing machine. Designed to speed document handling, the Automatic Vertical Spacer accepts the forms being fed while at the same time maintaining precise control of the forms. Since the forms are fed vertically up through the writing machine and the distance or spacing of the form in the writing machine is automatically controlled, this forms feeding mechanism is known as the Automatic Vertical Spacer (or A.V.S.).

The five basic components of the Automatic Vertical Spacer are the Tractors, V-Guides, Program Assembly, Motor, and Power Supply.

1. Tractors engage the punched holes in the margins on the forms. The Tractors pull the forms through the writing machine and maintain the necessary form control for registration. With the tractors located above the platen, the tractors become completely flexible, permitting rapid changes from one form to another without removing or replacing any components in the system.

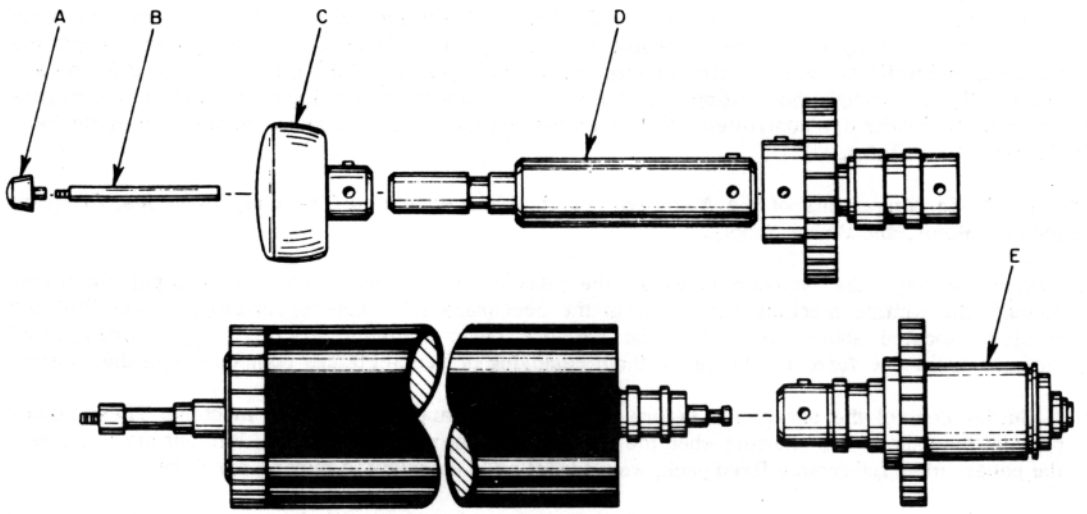
2. V-Guides control the documents before and after they are in the writing machine. These guides prevent the paper from skewing when the carriage moves from side to side. Without the V-Guides the paper, when fed from a fixed pack, would twist as it entered the moving carriage.

3. The Program Components control the format and spacing of specified program forms. Two-bead chain sprockets carry a pair of bead chains on which the specified program is placed. For example, if the program calls for 8 1/2" form depth, then an 8 1/2" program chain is used. Capping (program) beads are attached to the chain in the same pattern of spacings as required on the form. These beads are sensed by program switches.

4. The Motor is geared to the platen and drives the tractors and the program assembly.

5. The Power Supply and Control Box is attached to the feeder through a cable connection. The control box controls the motor and program assembly. Unnecessary carriage weight is minimized by separating the control box from the other components.

INSTALLATION PROCEDURE



PLATEN MODIFICATION

Figure 1.

When installing the Automatic Vertical Spacer, the following directions should be observed in the order listed.

1. Platen Modification (Figure 1)

   a. Remove the left hand platen knob (C) and vernier button (A) which has a right hand thread.

   b. Install the shaft extension assembly (D) and secure, making certain shaft D does not make contact with the collar when the platen is rotated. This can be insured by inserting a piece of paper between the shaft extension end and the platen collar while installing. Remove the paper shim after installation.

   c. Replace the platen knob (C).

   d. Screw the vernier button (A) to the vernier shaft (B) and install in shaft D.

   e. Remove the right hand platen knob.

   f. Install the platen-gear shaft assembly (E) and secure.

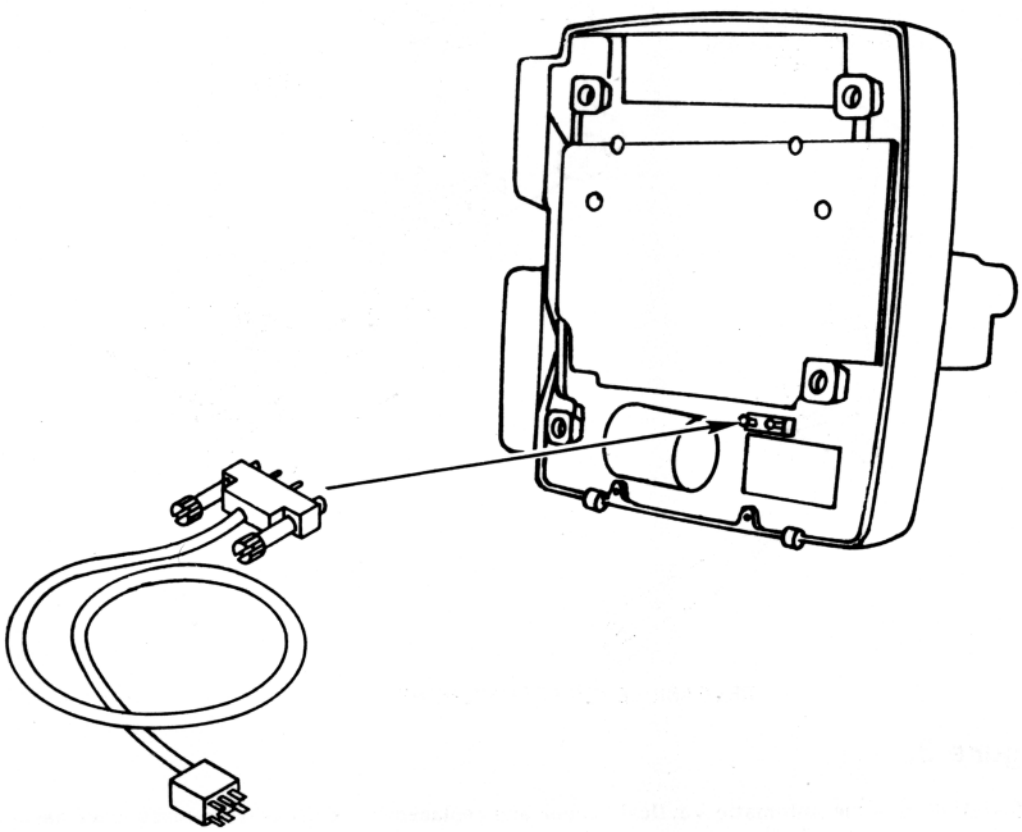
NOTE: Make sure shaft D does not make contact with the collar when the shaft is rotated.

2. Machine Modification (Figure 2)

   a. Place the machine in an upright position and remove the bottom rear cover.

b. Remove the male connector from the location shown in Figure 2.

c. Install the male connector of the vertical spacer input cable. Because of its design, this can be inserted in one way only.

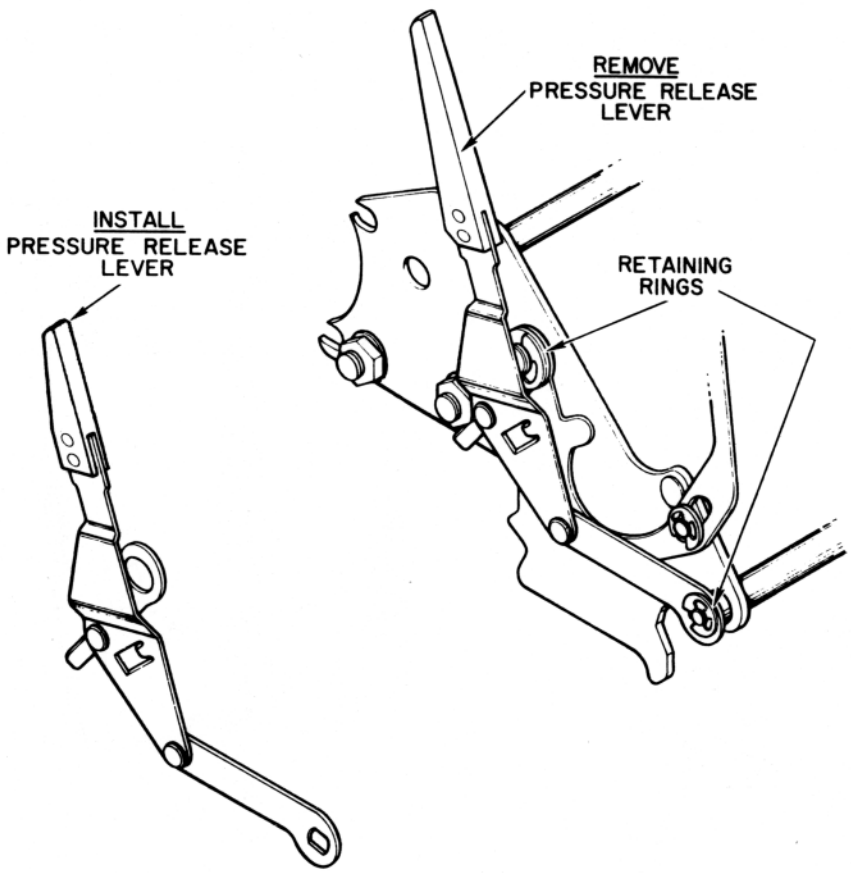


FLEXOWRITER MODIFICATION

Figure 2.

d. Replace the bottom rear cover. The input cable should come through the opening at the lower right hand part of the cover.

e. Place the machine in its normal operating position.



RELEASE LEVER REPLACEMENT

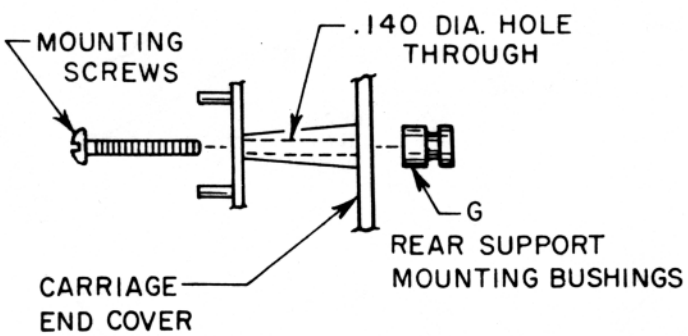
Figure 3.

3. Installation of the Automatic Vertical Spacer and replacement of pressure release lever assembly is accomplished as follows:

   a. Remove the screws from the left hand and right hand carriage end covers.

   b. Remove the pressure release lever assembly by removing the two retaining rings (Figure 3).

   c. Install the pressure release lever assembly provided and insert the two retaining rings in place.



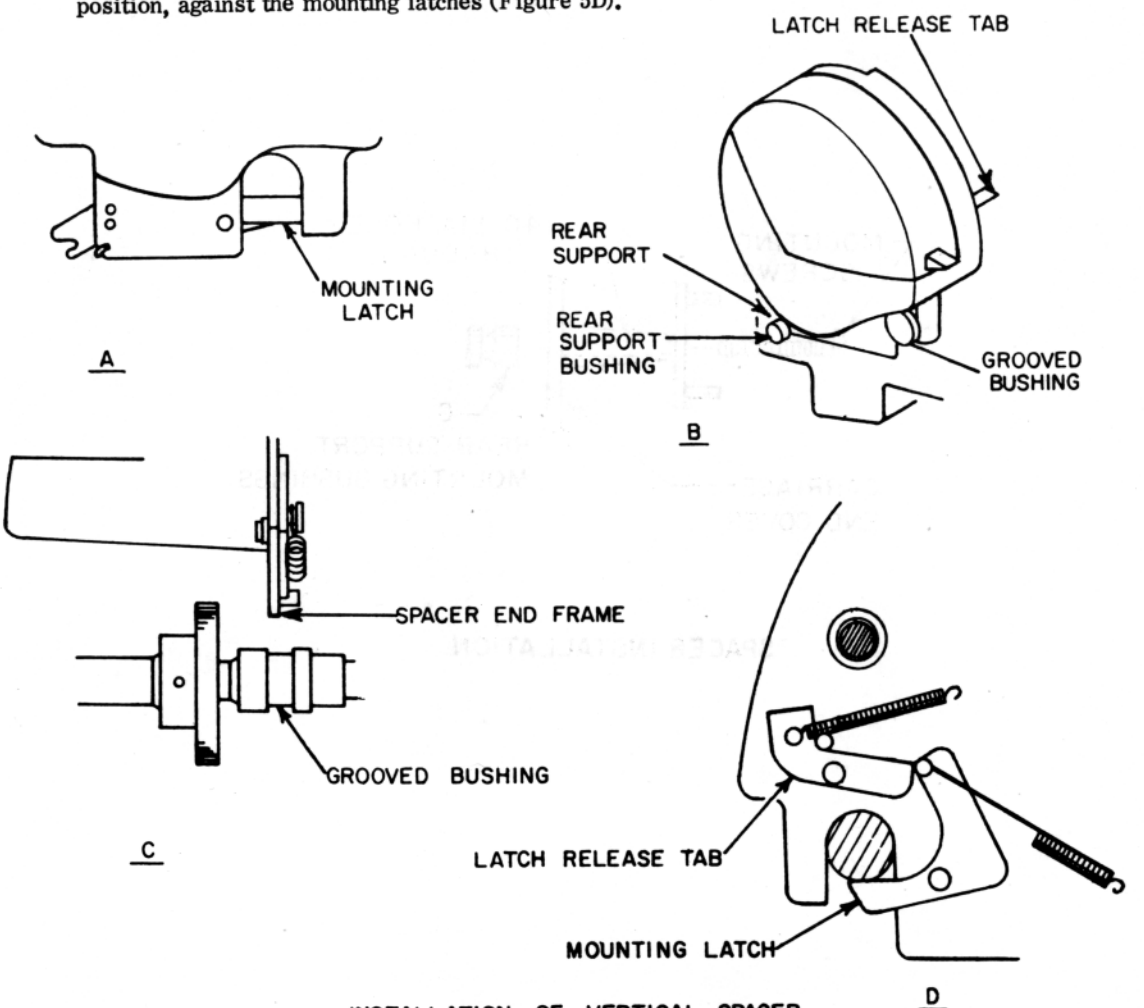
SPACER INSTALLATION

Figure 4.

d. Install the replacement end covers by installing the mounting screws (screws and end covers supplied). The rear spacer mounting screws are inserted from inside the end covers Figure 4. The rear support mounting bushing (G) is installed to the rear spacer mounting screws. Make sure the wide shoulder of the bushing is toward the carriage.

e. Check the mounting latches to be sure they are positioned as shown in Figure 5A.

f. Install the Automatic Vertical Spacer by setting the rear supports (Figure 5B) into the rear support studs. Snap the vertical spacer into place on the carriage. Place the end frames into the grooved bushings as shown in Figure 5C. The latch release tabs should be in a raised position, against the mounting latches (Figure 5D).



INSTALLATION OF VERTICAL SPACER

Figure 5.

General Information:

A. If the forms are less than 5 inches wide, do not use either of the upper or lower "V" guides.

B. If the forms are not to be refolded after typing, do not use the upper "V" guide.

4. Positioning the Upper "V" Guides:

   a. The end covers must be removed to remove or install the upper "V" guides. (Remove the end cover retaining screws (A) (Figure 6).

   b. Tension is supplied to the upper "V" guide by a bowed washer on each side (B) (Figure 6). One retainer ring inside each end cover holds the upper "V" guide in place.

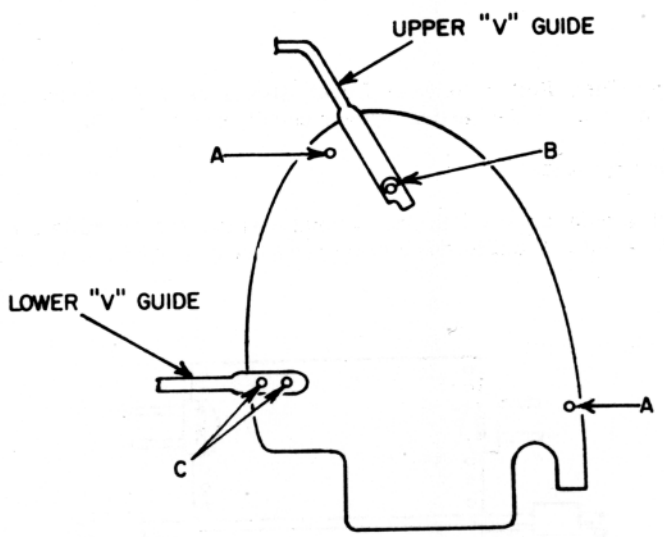
5. Lower "V" Guides:

   a. The end covers need not be removed to remove or install the lower "V" guides.

   b. Two screws (C) (Figure 6) through each end frame hold the lower "V" guide in place.

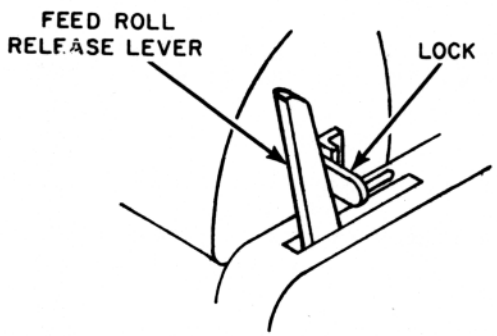
6. Typewriter Pressure Rollers:

   a. When the tractors are feeding forms, all pressure feed action (from feed rollers or bail rod rollers) must be eliminated.



"V" GUIDES AND END FRAME

Figure 6.



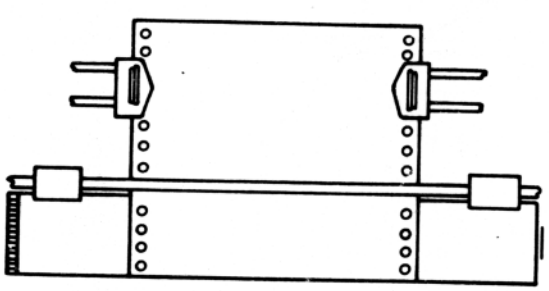
FEED ROLL RELEASE LOCK

Figure 7.

b. The typewriter Feed Roller Release Lever should be locked in the disengaged position by using the lock mounted on the vertical spacer end frame (Figure 7).

7. Bail Position-Normal Forms:

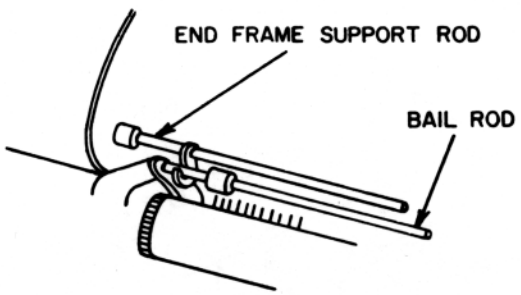
a. The bail rod should be used in its normal position with the rollers moved to the extreme ends of the rod so they do not touch or exert pressure on the form (Figure 8).



BAIL POSITION

Figure 8.

b. If the width of the form causes interference with the rollers, raise the bail rod behind the end frame support rod so the rollers are resting on the support rod (Figure 9).



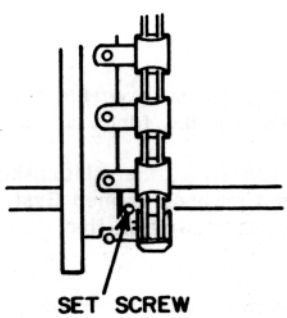
BAIL ROD IN LIFT POSITION

Figure 9.

8. Tractor Pin Alignment:

a. The alignment of the tractor pins has been set at the factory to insure a horizontal writing line.

b. If it is necessary to reset this alignment, it may be done by loosening the setscrew on one tractor chain sprocket (Figure 10).



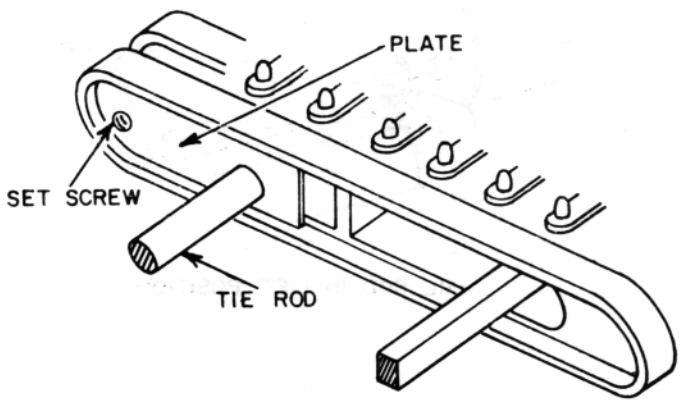
PIN ALIGNMENT

Figure 10.

9. Tractor Frame Alignment:

   a. The tractor frames are held square on the tie rod by the plate as shown in Figure 11.

   b. If necessary, the alignment may be adjusted by loosening the setscrew on the plate and allowing the plate to shift slightly. Make sure the setscrew is tightened securely after the adjustment is made.



FRAME ALIGNMENT

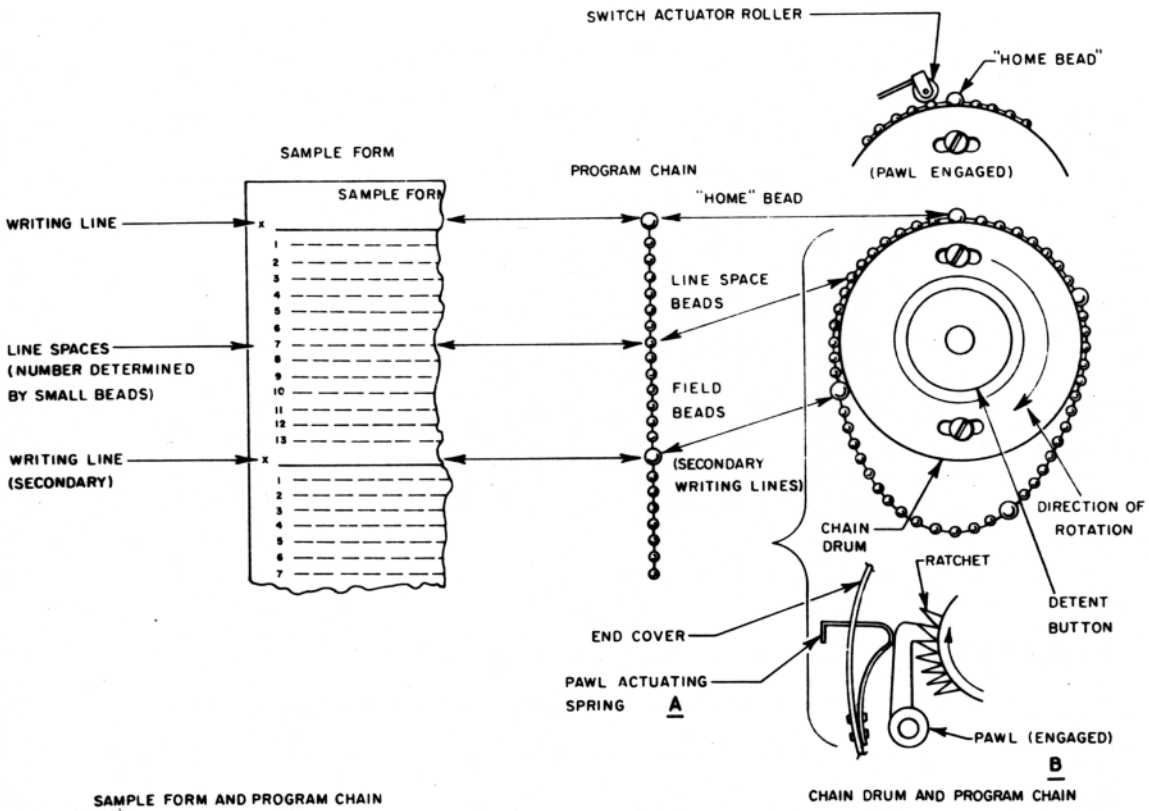
Figure 11.

10. Bead Chain Programming:

   a. The number of beads required to make one program chain is directly related to the number of writing lines and line spaces on the form. Figure 12 illustrates these parts of a form.

   b. The chain depicted in Figure 12A shows the relationship of beads and writing spaces. There is a large "Home" bead for the preprogrammed first primary writing line, a large "Field" bead for each additional (secondary) writing line, and a small bead for each line space between the writing lines.

   c. This relationship remains constant for each form and chain.



PROGRAMMING OF THE BEAD CHAIN

Figure 12.

Example 1: Form depth - 8 1/2"; chain will have a total of 51 beads. One of these is a large "Home" bead which represents the first writing line on the form. For each additional writing line desired, a "Field" position bead, or another large bead will be necessary. The number of small beads then left between the large beads will determine the number of line spaces between the writing lines.

Example 2: Form depth - 6"; chain will have a total of 72 beads, with two "home" beads. This chain represents two 6" forms. The programming of this chain will have to be duplicated for both segments.

Example 3: Form depth - 3"; chain will have a total of 54 beads, representing three 3" forms.

d. Install the chain under the switch actuator roller, as shown in Figure 12B. The program side of the chain should be on the left hand side of the chain drum, as viewed from the program end (chain drum rotates clockwise, the platen rotates counterclockwise).

CHAIN LENGTH IN INCHES	8 1/2	10	11	12	14	16	17	
NUMBER OF BEADS	51	60	66	72	84	96	102	
FRIDEN PART NO.								FORM DEPTH
2012739							6	2 5/6
2012740				4				3
2012741		3						3 1/3
2012742					4			3 1/2
2012743			3					3 2/3
2012744				3				4
2012745					3			4 2/3
2012746		2						5
2012747						3		5 1/3
2012748			2					5 1/2
2012749							3	5 2/3
2012750				2				6
2012751					2			7
2012752						2		8
2012753	1							8 1/2
2012754		1						10
2012755			1					11
2012756				1				12
2012757					1			14
2012758						1		16
2012759							1	17

Figure 13. CHAIN PROGRAMMING CHART

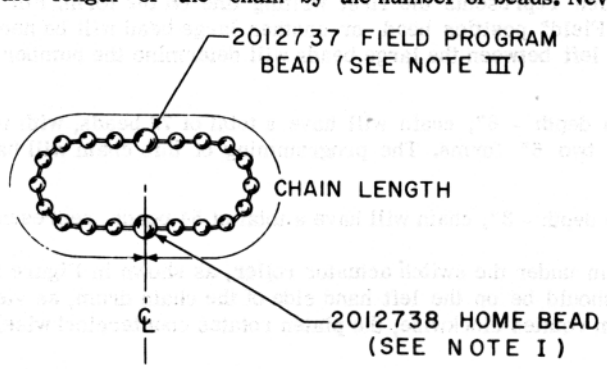
NOTE I. When multiple home beads are used they are to be spaced equidistant in the chain.

NOTE II. Numbers in body of the chart represent number of home beads (2012738) per chain.

NOTE III. "Field" beads (2012737) will not be installed on the chain unless specifications are supplied by the customer. Three beads will be packaged with each chain.

NOTE IV. Customers purchasing only the 7 basic chains (2012753 through 2012759) will have to purchase additional "Home" beads (2012738) in order to make the remaining combinations.

NOTE V. To order a chain whose length is other than those shown on the chart, use control number 1050393, specifying the length of the chain by the number of beads. Never less than 48 beads.



11. Timing the Automatic Vertical Spacer:

    a. The first writing line on the form is aligned with the typewriter writing line in the usual manner. This adjustment is made with the Automatic Vertical Spacer in the "ON" condition.

    b. Once the form is aligned, the program drum must be timed to the form. The drum has been preset at the factory to the ratchet so the switch actuator roller will fall between two heads.

    c. To register the program drum with the form, depress the program detent and rotate the drum until the switch actuator roller rests between the first and second beads following the "Home" bead as shown at the top of Figure 12B. Manually engage the pawl with the ratchet; release the detent button; then release the pawl.

12. Form Skip Option:

    a. Automatic Vertical Spacers equipped to perform the "Form Skip" operation have two program switches, two drums, and two chains.

    b. The inboard, or "Field" position chain is standard on all machines and is covered in the preceding instructions.

    c. The outboard, or "Form Skip" chain is the same length as the "Field" chain and contains the same "Home" beads, but no "Field" or secondary writing line beads.

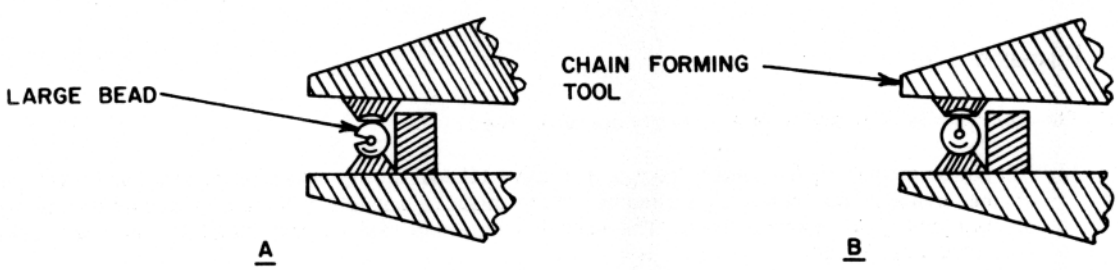
    d. The "Home" beads of the two chains must be aligned with each other on the drums.

13. Chain Programming Option:

    a. The chain forming tool (T-18474) is used to program the programming chain.

    b. Place a large bead in the cavity of the Chain Forming Tool as shown in Figure 14A. The large bead is placed over a small bead at a predetermined position.

    c. Crimp the large bead with the Chain Forming Tool until it just closes, then turn the bead 90° until it is in position as shown in Figure 14B. Crimp the bead again to obtain good sphericity, or roundness.

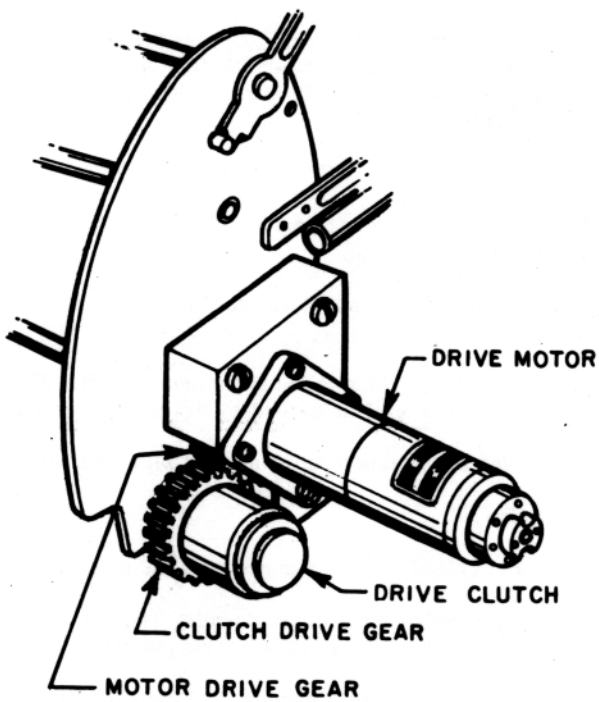


CHAIN FORMING

Figure 14.

THEORY OF OPERATION

Examine the Automatic Vertical Spacer before inserting any forms to insure mechanism is properly mounted and not binding. Turn the power switch to the "ON" position and manually rotate the platen back and forth. The platen should be free when rotating forward, and slightly resistant when rotating in reverse. If the system does not operate freely, refer to the troubleshooting part of this section.



DRIVE CLUTCH

Figure 15.

The following is an example of a properly operating feed cycle:

1. With power turned on, the clutch drive gear (Figure 15) will slowly rotate in the reverse direction. (At the moment the power is turned on, there might be a single "clicking" sound as the rotary solenoid and pawl operate once.) The operator may now easily rotate the platen back and forth while threading forms.

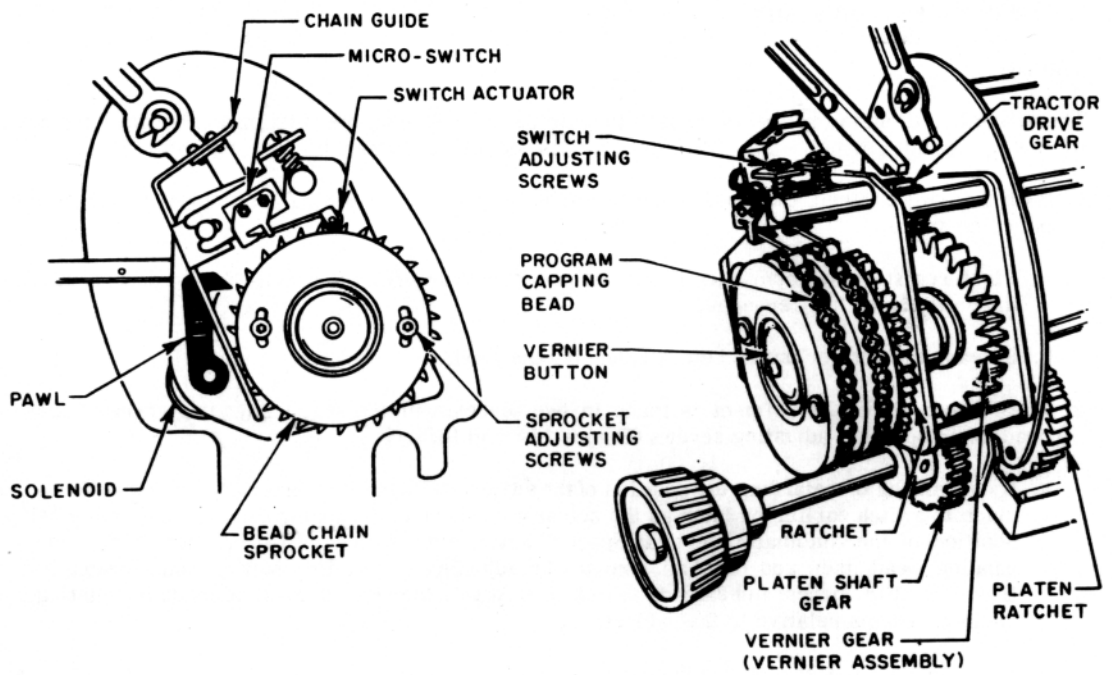
NOTE: Unless the Automatic Vertical Spacer is on and the motor is slowly rotating in the reverse direction, it will be extremely difficult for the operator to turn the platen counterclockwise.

2. The Automatic Vertical Spacer may now receive a "Field" signal (vertical tab) from the writing machine. It may also receive a "Home" signal (form advance) from the writing machine or from the "Home" tab switch on the right hand side of the feeder. A "Home" signal will energize the motor control relay through the home (outboard) program switch. A "Field" signal will energize the motor control relay through the field (inboard) program switch.

3. When the relay (identified as K1 on schematic #4503727) actuates, it switches the motor to its forward "Form Advance" mode. At the same time, the interlock relay K contacts 14 & 15 open, thereby disabling the writing machine keyboard and reader.

4. The drive clutch (Figure 15) which was slowly idling in a counterclockwise direction, is now driven clockwise by the motor as viewed from the right of the platen. The clutch is now engaged and the Automatic Vertical Spacer is now pulling the forms through the writing machine.

5. The platen shaft gear (Figure 16A) and the vernier gear (Figure 16B) have the same number of teeth as the bead chain sprocket and ratchet. Each gear tooth on these gears is equal to one line space on the form. The program beads on the bead chains pass under the program switch actuators at the same rate as line spaces on the form pass the writing position. Whichever program switch is activated, "Home" or "Field", that switch is now able to sense the next program capping bead. When a program bead opens a switch, the motor control relay is restored to its normal state.



PROGRAM COMPONENTS

Ⓐ Ⓑ

Figure 16.

6. When the relay restores to its normal state, three things happen:

   a. Relay K1 contacts 5 & 7 and 8 & 10 open and reverse the direction of the motor.

   b. Relay K1 contacts 15 & 16 close, thereby releasing the writing machine keyboard and reader.

   c. Relay K1 contacts 11 & 12 initiate a 0.1 second timed pulse to the rotary solenoid LS1.

7. While the motor is being braked, the LS1 solenoid is driving a stop pawl (Figure 16A) into the ratchet. This insures that the Automatic Vertical Spacer will stop at a desired position.

8. To complete the feed cycle, the machine must perform a carriage return function. With a carriage return function complete, the machine feeds one line space.

9. The carriage return function is complete, the program switch is on a small bead, the stop pawl is out of the ratchet, and the clutch gear is turning slowly in the reverse direction. The Automatic Vertical Spacer is ready for the next feed command.

MAINTENANCE - ADJUSTMENTS

TIMING

There are two timing adjustments on the Automatic Vertical Spacer; the relationship between positions of the program ratchet when the micro switch opens, and when the pawl engages. (Figure 16B.)

1. With the pawl engaged, the platen detent must be fully seated when the form is properly registered on a line space.

   a. First register the form, then rotate the program drum with the vernier button depressed until the pawl can be fully engaged.

   b. Release the vernier button before releasing the pawl.

2. The second timing adjustment is made in two places; with the switch adjusting screws and with bead chain sprocket adjusting screws (Figure 16A and 16B).

   a. By advancing or retarding the position of the switches (Figure 16A and 16B), each switch can be made to switch earlier or later as the actuators ride up on a capping bead. To obtain the "stop" position of the Automatic Vertical Spacer, advance the switch until it just begins to open on a capping bead, then add one half turn to the adjusting screw. This setting limits switch overtravel to .015 inches and extends switch life. Any further timing must be made by rotating the chain sprockets relative to the ratchet.

   b. The range of the sprocket adjustment is one half line space. This range decreases with a decrease in speed of the Automatic Vertical Spacer. The micro switch should be set so the switch roller rests just off center from the top of a capping bead (with pawl engaged). The pawl insertion time remains constant and the Automatic Vertical Spacer speed can vary slightly (depending on load). If the sprocket is advanced too far, the Automatic Vertical Spacer can occasionally register one space early. Conversely, if retarded too much, the Automatic Ver-

tical Spacer can occasionally misregister one line space late.

VERNIER GEAR

The program assembly and vernier gear is made to swing about the small tractor gear (Figure 16B). Two binding head screws are located in slots in the left hand main frame and serve to lock this assembly to the main frame. Adjustment of these gears permit the Automatic Vertical Spacer to be used with a number of different platen gears.

1. With the two screws finger-tight, there should be a small amount of backlash between the vernier and platen gears. Check backlash while rotating the platen so that "high spots" do not cause interference and bind.

2. Tighten screws and check backlash again.

SPEED

Unusually stiff and difficult forms cause the Automatic Vertical Spacer speed to drop or fluctuate severely. It is possible to increase motor voltage and therefore speed.

1. A three-position tap switch (identified as S2 on the schematic, Figure 17) is located on the printed circuit board for this purpose. This switch will always be factory set in the extreme counterclockwise position.

2. Turn the S2 switch in a clockwise direction until the desired speed is obtained.

CAUTION: Increasing motor speed unnecessarily, only decreases program timing reliability and increases wear on the Automatic Vertical Spacer.

DRIVE GEAR

The motor mount is attached to the main frame with three screws (Figure 15). In the event the motor and clutch drive gear bind, adjust as follows:

1. Loosen the mounting screws and push the motor assembly away from clutch gear, then retighten the screws. The mounting holes have sufficient clearance to permit adequate adjustment of one gear to the other.

2. Interference between platen gears and the Automatic Vertical Spacer may be easily located by manually rotating the platen while alternately locking and unlocking each main frame. If the platen turns considerably harder with the main frame locked, the gears are binding.

TRACTORS

A small setscrew on the bottom tractor sprocket permits alignment of one tractor to another.

1. Adjust the tractors with the platen knob so that one is aligned to the scribe mark on the plastic chain support.

2. Loosen the setscrew on the other tractor and adjust so that this tractor also is aligned to mark.

"V" GUIDES

The "V" guides are adjustable from side to side.

1. The "V" guides should be set so that the apex of V is centered on the form as the paper feeds. The paper guides should loosely contain the paper without buckling.

2. The positioning of paper and "V" guides is very important for proper feeding and registration.

LUBRICATION

The Automatic Vertical Spacer was designed to operate without field lubrication. The only element that accumulates substantial running time is the motor and the gear head which are permanently lubricated and sealed at the factory. However, after one year the main frame and program frame sleeve bearings may be very lightly oiled using Friden CCC #2 machine oil.

TROUBLESHOOTING

1. Will not operate:

   a. Check power switch; it should be on and lighted.

   b. Check line cord; it should be connected to 115V/60 cycle outlet.

   c. Check fuse; for replacement use 1/2 amp. slo-blo maximum.

   d. Check relay.

   e. Check motor brushes; on old machines the brushes may be worn.

   f. Replace circuit board.

2. Operates from manual input only:

   a. Check input cable; it should be properly connected to the control box and writing machine.

   b. Check "Field" chain; the program switch should not be resting on a program capping bead.

3. Power On, Motor Idling - will not feed:

   a. Check program chains; the program switches should not be resting on a program capping bead.

   b. Check relay.

4. Will not stop feeding reliably:

   a. Check program switches; the screws may have backed out.

   b. If above adjustment does not correct, replace the circuit board.

5. Will not stop feeding after feed signal:

a. Check program switches; the screws may have backed out.

b. Replace circuit board.

6. Feeds continually when power is turned on :

a. Replace circuit board.

7. Misregisters by one line space :

a. Check timing.

b. Check control switch if one line late.

c. Check pawl solenoid; it should be operating every cycle.

8. Pawl will not release :

a. Check leaf spring on pawl; it may not be deflecting enough when pawl is inserted.

b. Replace the circuit board.

9. Skewed type on form :

a. Check tractor alignment.

b. Check bail; the rollers should be off paper.

c. Adjust "V" guides and paper guide so paper feeds squarely into platen.

10. Paper will not feed properly on tractors :

a. Check bail; it should be off paper.

b. Check platen pressure rolls; they should be off paper.

11. Runs slow or fluctuates:

a. Check for binding; the platen extensions against collars, or platen and Automatic Vertical Spacer gears interfering.

b. See section on adjustments.

12. Blows fuses repeatedly:

a. If not severely overloaded, replace the circuit board.

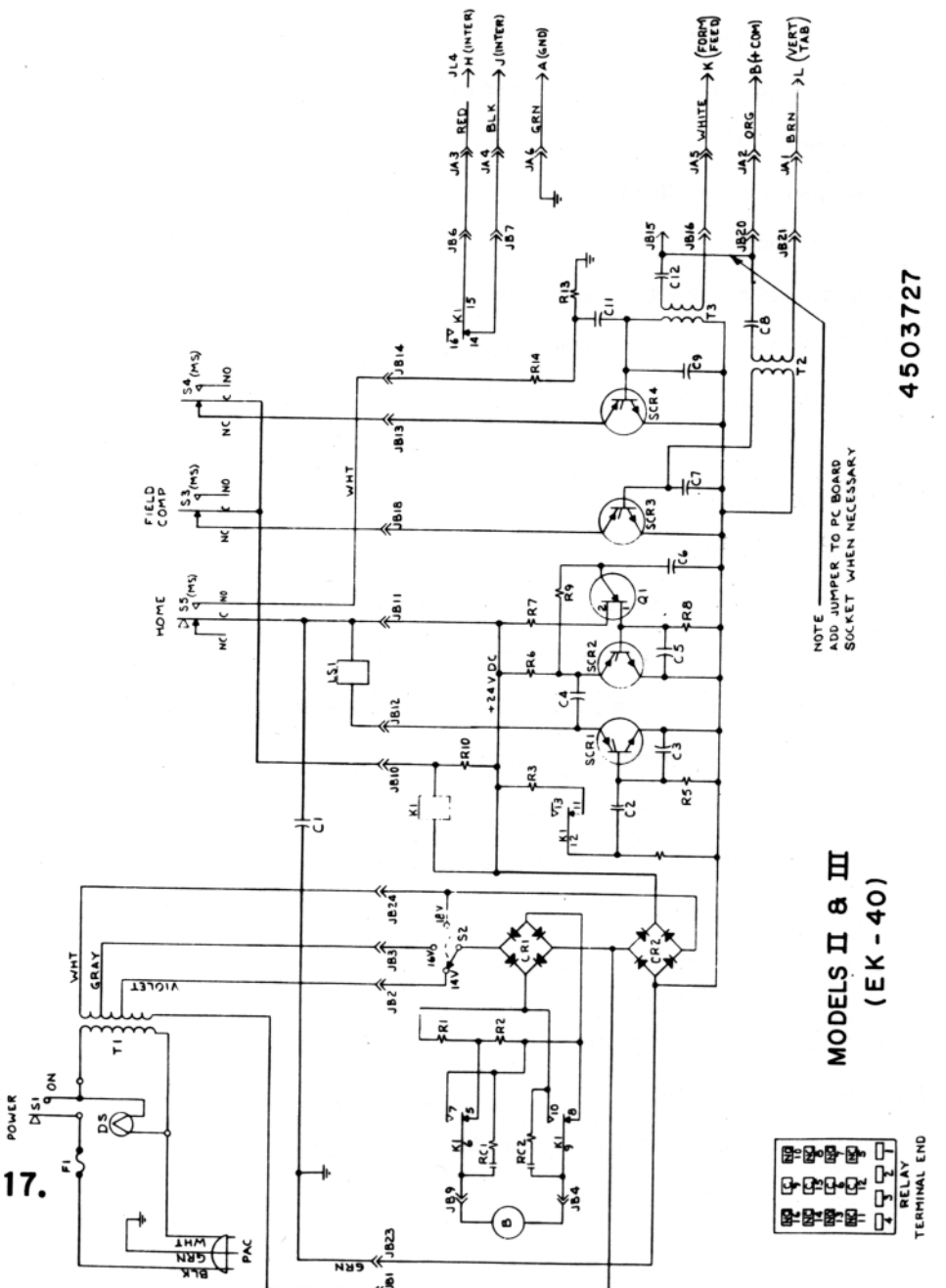
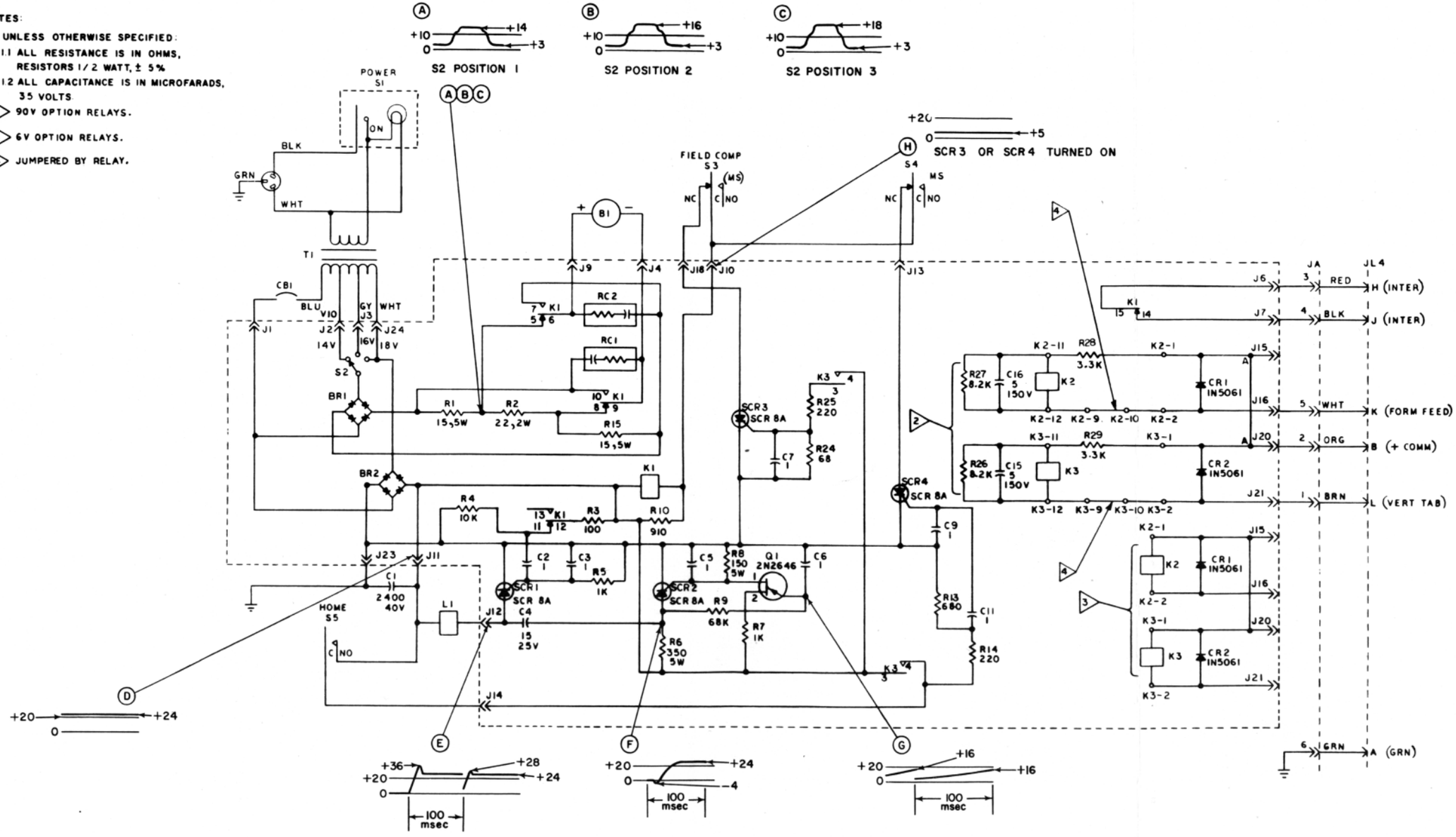

4503727
MODELS II & III
(EK-40)
NOTE
ADD JUMPER TO PC BOARD
SOCKET WHEN NECESSARY
RELAY
TERMINAL END
POWER
ON
FIELD COMP
HOME
+24 V DC
WHT
GRAY
VIOLET
BLK
GRN
WHT
BLUE
GRN
RED
BLK
GRN
WHITE
ORG
BRN
J14
H (INTER)
J (INTER)
A (GND)
K (FORM FEED)
B (+COM)
L (VERT TAB)

Figure 17.

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   1.1 ALL RESISTANCE IS IN OHMS, RESISTORS 1/2 WATT, ± 5%
   1.2 ALL CAPACITANCE IS IN MICROFARADS, 35 VOLTS.
2. 90V OPTION RELAYS.
3. 6V OPTION RELAYS.
4. JUMPERED BY RELAY.



NOTE: WAVEFORMS (E), (F), (G), AND (H) OCCUR AS THE HOME OR ADVANCE SWITCH IS DEPRESSED.

NOTE: ALL WAVEFORMS WITH RESPECT TO GROUND (J23)

REFERENCE:

PRINTED CIRCUIT ASSY	1059987
WIRING DIAG CONTROL BOX	2012856
CABLE ASSY CONTROL	2012232

1059986/TP

SPECIAL FEATURES

CARBON RIBBON MECHANISM

2300 SERIES FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical Description

Theory of Operation

Adjustments

Troubleshooting

CARBON RIBBON MECHANISM

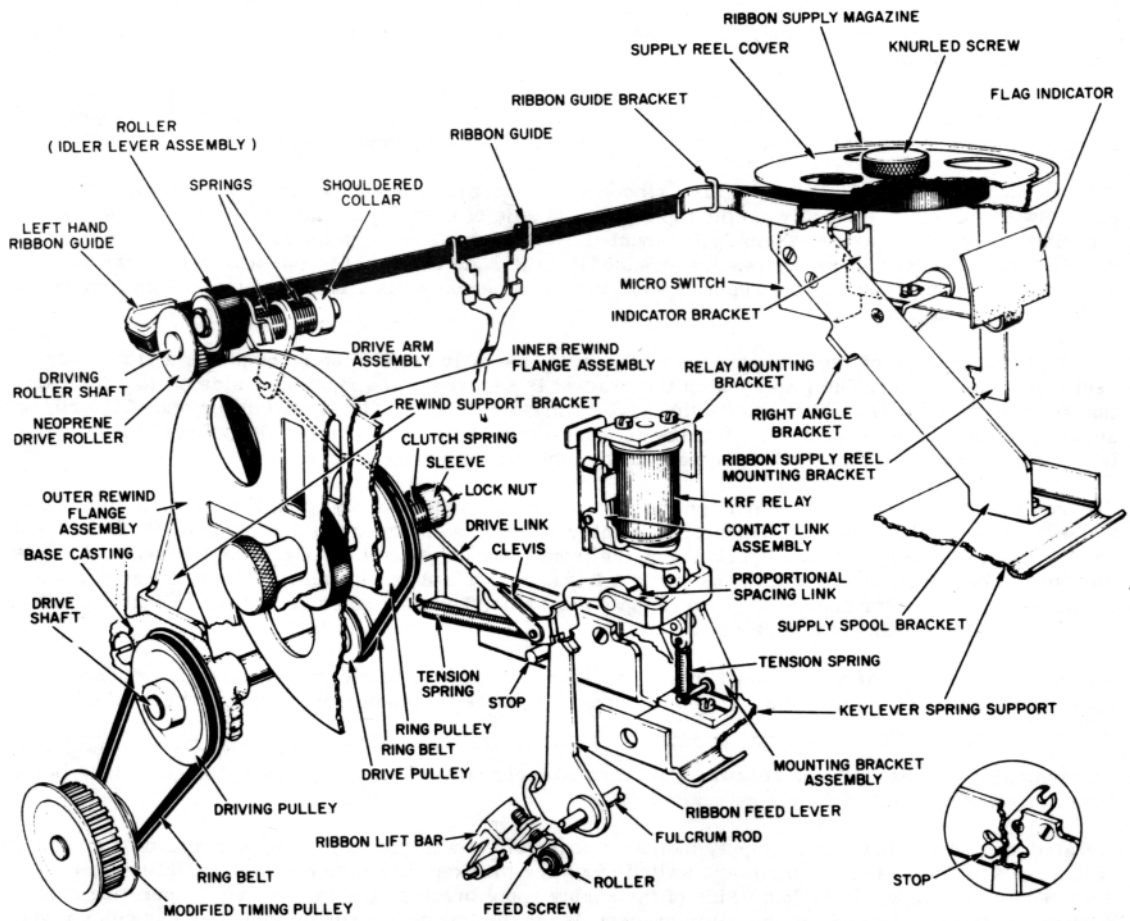


Figure 1.

PURPOSE AND USE

The carbon ribbon mechanism (Figure 1) is used for the preparation of highly refined, executive-type letter writing. It is also used for the preparation of all normal repetitive writing functions.

The carbon ribbon mechanism is a special feature adaptable to 2300 series Flexowriter automatic writing machines. It is a standard mechanism used in the Model 2304.

PHYSICAL DESCRIPTION

General. The carbon ribbon mechanism is located on the top front part of the writing machine. It utilizes the space normally occupied by the cloth ribbon feed mechanism. The carbon ribbon mechanism consists of a ribbon supply magazine assembly, a rewind reel assembly, a drive mechanism, and a ribbon feed mechanism.

The carbon ribbon mechanism will function on machines equipped with either the mono-spacing escapement or with the proportional spacing escapement mechanism. When used on a machine equipped with a proportional escapement mechanism, a carbon ribbon feed relay must also be used.

Ribbon Supply Magazine Assembly. The ribbon supply magazine assembly is positioned over the program switch & light assembly on the top right hand side of the writing machine. The left hand part of the ribbon supply magazine assembly is mounted by two screws through the slots in the lower end of a supply spool bracket. These screws are threaded into the right hand part of the keylever spring support assembly. The upper end of the supply spool bracket is permanently attached to the bottom part of the ribbon supply magazine.

The right hand part of the ribbon supply magazine assembly is mounted by means of a ribbon supply reel mounting bracket. The lower end of the bracket is secured to the right hand side of the base casting by the same screws that mount the keylock magnet bracket. The slotted upper end of the ribbon supply reel mounting bracket is secured by one screw to a right angle bracket. This right angle bracket is permanently attached to the bottom part of the ribbon supply magazine.

Secured by two screws to a bent part on the right hand side of the supply spool bracket is a right angle bracket. A low ribbon supply indicator assembly is mounted by means of the pivot studs on the right hand side of the supply spool bracket and the front left hand side of the right angle bracket. The low ribbon supply indicator assembly consists of a flag indicator and an indicator bracket. These parts are positioned front to rear under the ribbon supply magazine. The flag indicator and the indicator bracket are connected by means of a screw and a nut.

The flag indicator extends forward where its front surface is visible in a rectangular window in the upper front cover of the machine. The upper front half of the flag indicator is light in color; the bottom half is dark in color.

The indicator bracket extends rearward; its formed upper end is positioned in a rectangular hole in the bottom part of the ribbon supply magazine.

Located behind the low ribbon supply indicator assembly is a micro switch. It is mounted by means of two screws and a double nut to a micro switch mounting bracket. The micro switch mounting bracket is screwed to the upper right hand side of the supply spool bracket. The micro switch operating arm is positioned directly behind the indicator bracket. When the low ribbon supply indicator assembly pivots the micro switch is operated, stopping the operation of the reader and the printing in the writing machine.

Rewind Reel Assembly. The rewind reel assembly is located on the top left hand side of the writing machine. It consists of an inner rewind flange assembly and a removable outer rewind flange assembly. The rewind reel assembly is mounted by means of the shaft in the inner rewind flange assembly. The right hand end of the shaft fits through a bearing in a rewind support bracket. The rewind support bracket is mounted by two screws to the left hand part of the keylever spring support assembly and by two screws and two nuts to the left hand side of the base casting. The shaft is retained in the rewind support bracket by a collar located adjacent to the right hand side of the rewind support bracket. The collar is setscrewed to the shaft of the inner rewind flange assembly.

Drive Mechanism. A drive shaft is mounted in a bearing in the left hand side of the base casting beneath the rewind reel assembly. The lateral position of the shaft is determined by a collar setscrewed adjacent to the right hand end of the bearing in the base casting. Setscrewed on the left hand end of the drive shaft is a driving pulley. A ring belt engages the driving pulley and the ring pulley attached to the right hand side of a modified timing pulley. The modified timing pulley is setscrewed on the left hand end of a shaft. This shaft is mounted in a bearing in the left hand side of the base casting below the drive shaft.

The mechanical power required to operate the drive mechanism is by means of a cog belt engaging the modified timing pulley. The cog belt engages the modified timing pulley by means of the tension applied by a nylon roller against the surface of the cog belt. This cog belt is a part of the power drive mechanism in the writing machine. It engages the small pulley on the outer jack shaft pulley assembly and the small pulley on the left hand power roll pulley assembly. The nylon roller is a part of an idler assembly. The idler assembly is mounted by two screws to the left hand side of the base casting.

Setscrewed on the right hand end of the drive shaft is a drive pulley. The drive pulley is connected by means of a ring belt to a ring pulley mounted adjacent to the collar on the shaft of the inner rewind flange assembly. Also mounted on the shaft to the right hand side of the ring pulley is a clutch spring and a sleeve. Together, the ring pulley, the clutch spring and the sleeve are retained on the shaft by a lock nut. The tension of the clutch spring insures constant rotation of the ring pulley and the rotation of the rewind reel assembly which is governed by the ribbon feed mechanism.

Ribbon Feed Mechanism. A driving roller shaft is mounted in a bearing in the rear top part of the rewind support bracket. A neoprene drive roller is mounted on the left hand end of the shaft. Centrally positioned between two springs on the right hand part of the shaft is a drive arm assembly. A shouldered collar is setscrewed on the right hand end of the shaft.

The drive arm assembly consists of a drive arm and a drive arm shaft bearing. The bearing is permanently secured in the drive arm.

One end of the spring on the left hand side of the drive arm assembly overlaps the shoulder on the driving roller shaft; the other end of the spring overlaps the left hand part of the drive arm shaft bearing. One end of the spring on the right hand side of the drive arm assembly overlaps the right hand end of the drive arm shaft bearing; the other end overlaps the shoulder on the collar. The close tolerance to which the inside diameters of the springs are held insures a secure grip on the hub of the driving roller shaft, the ends of the drive arm shaft bearing, and the shoulder of the collar.

The drive arm assembly is connected by means of a drive link and a clevis to the top part of a left hand ribbon feed lever assembly. The ribbon feed lever assembly is mounted on the same fulcrum rod that mounts the rear ends of the keylevers.

A ribbon feed screw is retained by a nut in the rear bottom part of the ribbon feed lever. The head of the ribbon feed screw is positioned above the roller on the left hand end of the ribbon lift bar. The ribbon feed lever is under the tension of a spring anchored to the formed top part of the ribbon feed lever and to the rear part of a spring bracket. The spring bracket is mounted by two screws to the inner left hand vertical extension of the keylever spring support. Rearward movement of the top part of the ribbon feed lever is limited by the stop on an arm assembly. The arm assembly is retained by a lock nut to the inner vertical extension of the keylever spring support (Insert, Figure 1).

An idler lever assembly is mounted on a pivot stud attached to the left hand side of the rewind support bracket. Mounted on a shaft attached to the top left hand side of the idler lever assembly is an idler roller and a spring. One end of the spring overlaps the hub on the right hand side of the idler roller; the other end overlaps a shoulder on the shaft in the idler lever assembly. The close tolerance to which the inside diameter of this spring is held, insures a secure grip on the hub of the idler roller and the shoulder on the shaft.

The idler lever assembly is locked in either a rearward position or in a forward position by the tension of a torsion spring. The torsion spring is anchored to a stud on the right hand side of the idler lever assembly and to the left hand side of the rewind support bracket.

When the idler lever assembly is in the rearward position the carbon ribbon is restrained by the tension of the idler roller against the grooves of the neoprene drive pulley. The idler lever assembly is moved to the forward position so that a used carbon ribbon supply can be removed and a new supply can be installed on the machine.

The core around which a new supply of carbon ribbon is wound fits over a hub in the center of the ribbon supply magazine. The carbon ribbon spool is retained in the ribbon supply magazine by a supply reel cover. The supply reel cover is secured by a knurled screw which is threaded into the hub in the center of the ribbon supply magazine. The ribbon is fed through a ribbon guide bracket attached to the rear curved part of the ribbon supply magazine and through the slots in the top part of the ribbon guide. The ribbon is then fed through the top part of a left hand ribbon guide. The left hand ribbon guide is mounted by two screws to the right hand side of the rewind support bracket. The ribbon is then fed over the neoprene drive pulley where it is retained by the roller on the idler lever assembly. Finally, the end of the ribbon is wound around one of four tabs in the center part of a removable outer rewind flange assembly. The outer rewind flange assembly is retained on the shaft of the inner rewind flange assembly by two spring loaded ball bearings in the hub of the outer rewind flange assembly. These ball bearings engage the groove in the left hand end of the shaft.

Proportional Link Magnet Assembly. The proportional link magnet assembly is used on machines that employ proportional spacing escapement. It is a standard assembly on the Model 2304 Flexowriter automatic writing machine.

The proportional link magnet assembly is located in front of the rewind reel assembly. It is mounted by a mounting bracket assembly and two screws to the top left hand part of the keylever spring support. Located in the upper part of the assembly is the carbon ribbon feed (KRF) relay. It is mounted by means of a relay mounting bracket and two screws to the mounting bracket assembly.

A proportional spacing link assembly is mounted on a shaft at the left hand side of the mounting bracket assembly. The hooked rear end of the proportional spacing link assembly is positioned over the formed top part of the left hand ribbon feed lever. The front end of the proportional spacing link assembly is connected by a connecting link to a contact link assembly located beneath the KRF relay. The connecting link and the proportional spacing link assembly are under the tension of a spring anchored to the bottom part of the connecting link and to a shaft extending from the left hand bottom part of the mounting bracket assembly. The contact link assembly is screwed to the armature of the KRF relay. The entire proportional link magnet assembly is housed under a cover. This cover is secured by two screws to the right hand side of the mounting bracket assembly.

THEORY OF OPERATION

Each time a printing keylever is operated, the ribbon lift bar pivots. When it pivots, it causes the operation of the carbon ribbon mechanism parts as follows:

1. The roller secured to the left hand end of the ribbon lift bar contacts the head of the ribbon feed screw. Because the ribbon feed screw is secured to the bottom part of the ribbon feed lever, the ribbon feed lever is pivoted.

2. When the ribbon feed lever pivots, it pulls down the drive link which is connected to the top part of the ribbon feed lever and to the drive arm assembly.

3. The drive arm assembly, positioned on the driving roller shaft, rotates toward the front of the machine.

4. As the drive arm assembly rotates it causes the coils of the springs on the left hand and right hand sides of the drive arm assembly to expand. These springs securely grip the hubs of the drive arm assembly and the shoulders of the shaft and the collar which is setscrewed on the end of the driving roller shaft.

NOTE: The carbon ribbon has now been lifted, a typebar is in the typebar guide, and a character is printed. Now the carbon ribbon is lowered from the printing point as the ribbon lift bar and the typebar restore to their home positions.

5. When the ribbon lift bar restores, the ribbon feed lever also restores by spring tension. As the ribbon feed lever restores, it simultaneously pushes the drive link upwards. This causes the drive arm assembly to rotate toward the rear of the machine.

6. The springs on the left hand and right hand sides of the drive arm assembly contract their coils. Because the ends of the springs grip the hubs of the drive arm assembly and the shoulders of the shaft and the collar and because the collar is setscrewed to the shaft, the driving roller shaft rotates.

7. The neoprene drive roller is pressed onto the left hand end of the driving roller shaft and, as such, must rotate with the shaft.

8. The carbon ribbon, held against the grooves of the neoprene drive roller by the tension of the roller on the idler lever assembly, is drawn between the rollers. The carbon ribbon has now fed across the printing point from the freely rotating spool in the ribbon supply magazine.

9. After the carbon ribbon is drawn between the neoprene drive roller and the roller on the idler lever assembly, the carbon ribbon is immediately drawn taut by the rewind reel assembly.

10. The rewind reel assembly rotates by means of friction. This friction is created by the tension of the clutch spring against the continuously rotating ring pulley. In turn, the ring pulley transfers this friction to the collar setscrewed to the shaft.

The escapement distance on mono-spacing machines is uniform for all characters; that is, each character occupies the same amount of printing space. Thus, when the carbon ribbon is fed in a machine employing mono-spacing escapement, the carbon ribbon is advanced in uniform increments. Each increment is equal to three units of escapement.

The escapement distance on proportional spacing machines corresponds with the individual widths of the printing characters. As such, the carbon ribbon is advanced in increments corresponding to the widths of the printing characters. The increments in which the carbon ribbon advances is governed by the energized or the de-energized condition of the KRF relay. These increments are equal to three units of escapement or to five units of escapement.

The KRF relay is in the energized condition when printing characters requiring up to three units of ribbon feed are printing; it is in the de-energized condition when printing characters requiring four or five units of ribbon feed are printing. When the KRF relay is in its energized condition, the hooked rear end of the proportional spacing link engages the formed top part of the ribbon feed lever, restricting ribbon feed to three units. De-energized, the linkage between the relay armature and the proportional spacing link causes the hooked end of the proportional spacing link to rise. This permits unrestricted movement of the ribbon feed lever, allowing increments of five units of ribbon feed.

ADJUSTMENTS

→1. RIBBON FEED SCREW (Preliminary Adjustment)

Assure a maximum of ribbon feed by proceeding as follows:

1. Adjust the ribbon feed lever stop so that it is positioned to the rear (toward the bellcranks).
2. Adjust the ribbon feed screw so that its head is as close as possible to the roller on the ribbon lift bar, but without choking off against the roller.

NOTE: The rate at which the ribbon must feed is described in Adjustment 7 (Ribbon Feed).

2. DRIVE LINK

When a typebar is manually lifted to the platen, an imaginary vertical line through the drive arm assembly must seem parallel with the rear edge of the rewind support bracket. Turn the clevis on the bottom end of the drive link as necessary to meet the requirement.

→3. LOW RIBBON SUPPLY INDICATOR ASSEMBLY

1. The flag indicator must fall freely of its own weight when no ribbon or a low ribbon supply is in the ribbon supply magazine.
   a. Loosen the screws that mount the right angle bracket consisting of the pivot stud.
   b. Position the right angle bracket left or right as required.
   c. Tighten the screws.
2. Install a new carbon ribbon supply. When ribbon supply magazine is loaded, a smooth unwinding of the ribbon is essential. (Check to assure nylon washer, part #2008996 is in place before inserting ribbon.)
3. Form the top part of the indicator bracket so that it clears a 1.555" diameter gauge (core of a carbon ribbon spool) by .001' to .005".
4. A maximum clearance of 3/32" is required between the front surface of the flag indicator and the inside surface of the upper front cover.
   a. Loosen the screw that connects the flag indicator to the flag indicator bracket.
   b. Position the flag indicator as required.
   c. Tighten the screw.
   d. Form the flag indicator as required so that only the light-colored portion of the indicator flag is visible in the window of the front cover when a low ribbon supply condition exists. Only the dark-colored portion of the flag indicator must be visible when a sufficient supply of carbon ribbon is in the supply magazine.

→ 4. MICRO SWITCH (Optional)

1. The micro switch must operate when the low ribbon supply indicator assembly pivots, indicating a low ribbon supply.

   a. Loosen the screws which mount the micro-switch.

   b. Position the micro switch as required.

   c. Tighten the screws.

2. When operated, the low ribbon supply micro switch is designed to blow down the KRC relay upon reading a carriage return code. This is accomplished as follows: With standing negative potential on the number 2 strap of SB-56 (CR) and upon reading a carriage return code to operate SB-56, a circuit is established through the micro switch to the blow down coil of KRC. (See Figure 1.)

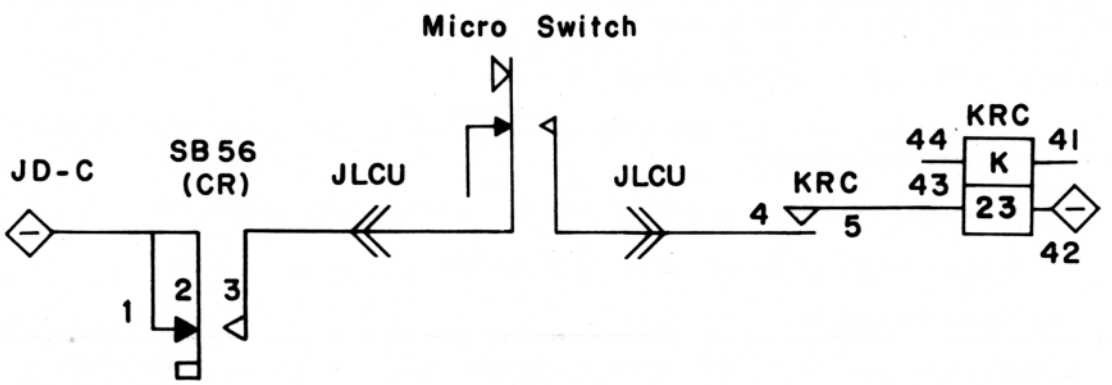


Figure 1.

→ 5. FEED SPRINGS

With ribbon installed, and with the ribbon lift selector in the black position, the feed springs must be adjusted for a minimum of lost motion between the drive arm assembly and the driving roller shaft when a manually lifted typebar is lowered from the platen and the drive arm assembly begins its rearward (feed) motion.

1. To eliminate excessive lost motion, loosen the setscrews which retain the shouldered collar to the driving roller shaft. Slide the collar closer to the drive arm assembly.

2. Tighten the screws and recheck adjustment.

→6. CLUTCH SPRING

Without manual assistance, the carbon ribbon must feed slowly through the top part of the left hand ribbon guide when the roller on the idler lever assembly is moved from the neoprene drive pulley.

1. If necessary, loosen the screws that mount the left hand ribbon guide and position the guide so that the carbon ribbon is centered over the grooves in the neoprene drive roller. Tighten the screws.

2. With the machine idling, move the idler lever assembly forward.

3. If the carbon ribbon does not feed, turn the lock nut on the end of the shaft of the inner rewind flange assembly clockwise. This will increase the tension of the clutch spring, also increasing the friction between the clutch spring and the ring pulley. Turn the lock nut counterclockwise if the carbon ribbon feeds too rapidly.

→7. RIBBON FEED

A distance of .015" must prevail between each character when a series of upper case "M" and upper case "W" are struck on the carbon ribbon. To achieve the adjustment:

1. Loosen the nut that retains the ribbon feed lever stop to the keylever spring support.

2. Turn the stop rearward to increase the distance between characters; turn the stop forward to decrease the distance.

3. Tighten the nut and recheck adjustment.

→8. KRF RELAY (Optional)

1. The ribbon feed (ribbon saver) relay must be adjusted to maintain a clearance of 1/16" to 1/32" between the inside hooked end of the proportional spacing link and the top rear part of the ribbon feed lever. This clearance is measured by individually sampling two typebars located on the extreme left hand side, two centrally located typebars, and two typebars on the extreme right hand side.

   a. Manually lift each typebar to the platen.

   b. When the clearance is incorrect, loosen the two screws which fasten the mounting bracket to the keylever spring support. Position the relay mounting bracket to obtain the clearance.

   c. Tighten the mounting screws and recheck adjustment.

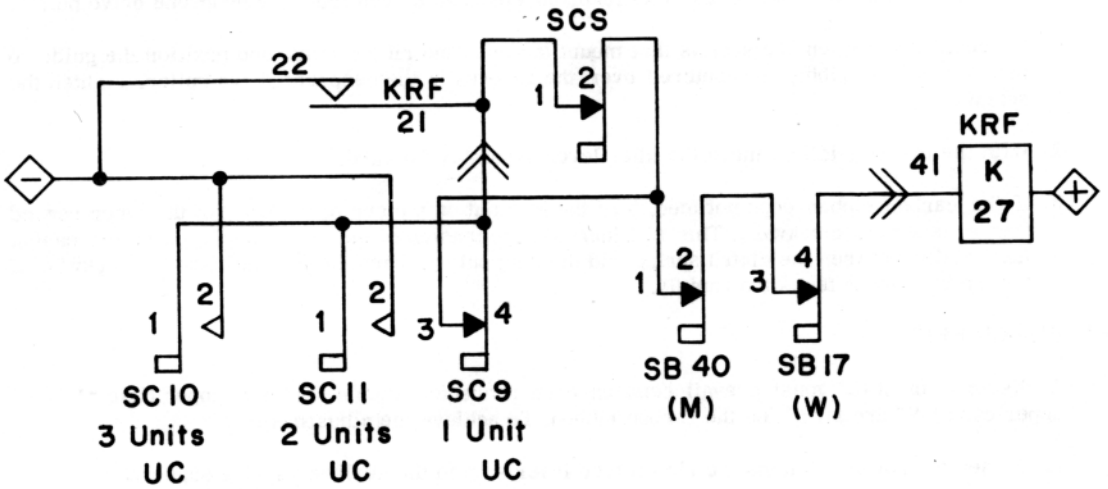
2. When the KRF relay is energized, there must be a minimum of .020" engagement of the proportional spacing link to the ribbon feed lever. To meet this requirement:

   a. With machine turned off, loosen the screws that secure the relay mounting bracket to the mounting bracket assembly.

   b. Manually "energize" the KRF relay, simultaneously raising the assembly to increase engagement, or lowering the assembly to decrease the engagement.

c. Tighten the screws and recheck adjustment.

3. The KRF relay governs the increments at which the carbon ribbon advances. These increments are equal to three units of escapement (energized) or to five units of escapement (deenergized). This is accomplished as shown in the logic which follows:



TROUBLESHOOTING

1. Check to insure that all parts are the latest manufacture.

2. The most common problems reported are listed below along with the items to be checked.

a. Carbon ribbon fails to feed. Check:

1. Ribbon Feed Lever Adjustment.
2. Clutch Spring Adjustment.
3. Drive Belt Train Binding.

b. Take-up Spool does not accept a full roll. Check:

1. Clutch Spring Adjustment.
2. Drive Belt Train Binding.

c. Excessive space or insufficient space between characters in the ribbon. Check:

1. Idler Roller Assembly Adjustment.
2. Idler Roller Riding on Drive Roller.
3. Tension of Clutch Spring.

d. Failure to rewind the ribbon. Check:

1. Dirt Around Clutch Area.
2. Clutch Spring Adjustment.
3. Drive Belt Train Binding.

SPECIAL FEATURES

AUTOMATIC COLOR SHIFTING MECHANISM

2200/2300 SERIES FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical Description

Theory of Operation

Adjustments

AUTOMATIC COLOR SHIFTING MECHANISM

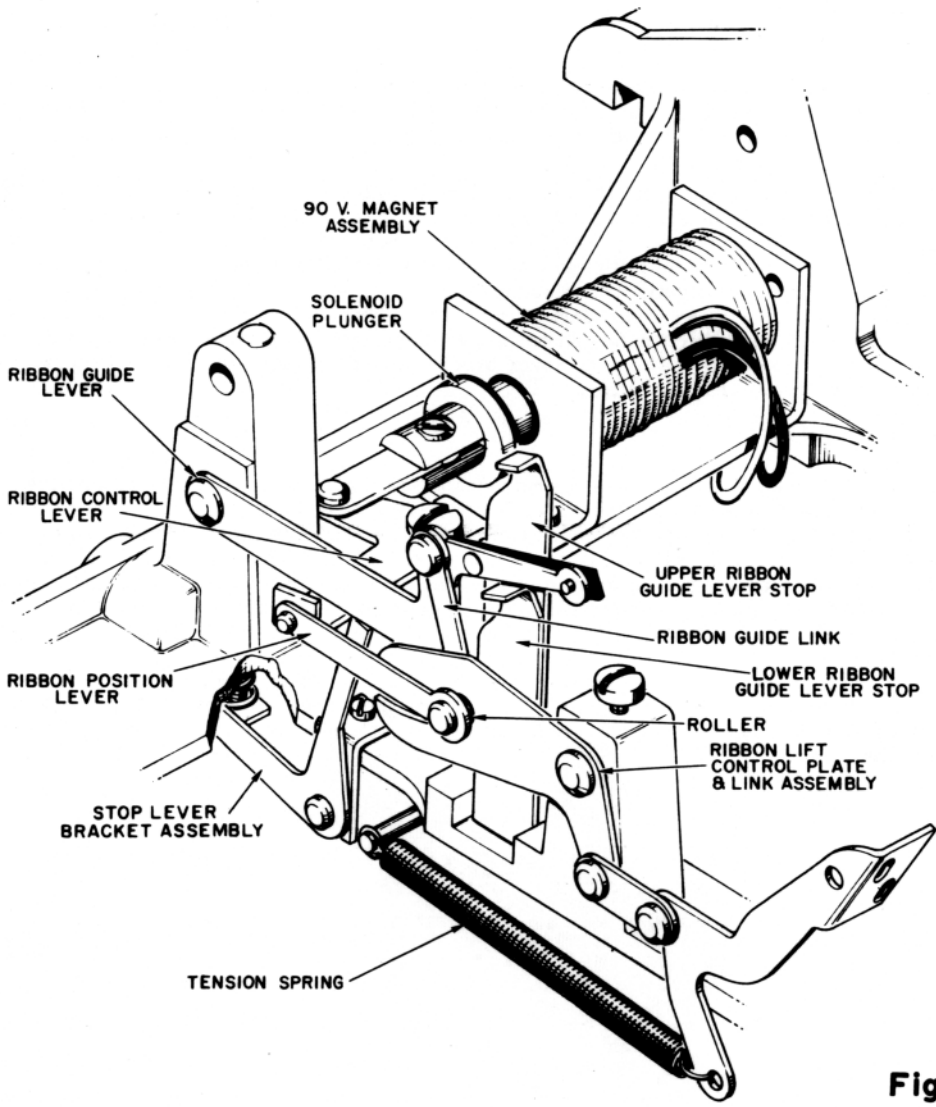


Figure 1.

PURPOSE AND USE

The automatic color shifting mechanism is used for the preparation of documents that require the printing color to be alternated automatically in the writing machine. When coded tape or edge cards feed through the reader, the data is printed in red; manual entries, through the keyboard of the writing machine, are printed in black. Another application may require that input data print in black; manual entries in red (Figure 1).

The automatic color shifting mechanism is adaptable to 2200 series and 2300 series Flexowriter automatic writing machines. It is recommended that this special feature be installed at the factory.

PHYSICAL DESCRIPTION

General. The printing color in the writing machine is alternated when a dual-colored cloth ribbon is shifted upward or downward. The attitude of the ribbon is dependent upon the energized or the de-energized condition of the coil in a 90 volt magnet assembly.

The 90 volt magnet assembly is mounted by two screws to the right hand rear part of the power frame casting. It is connected by means of its solenoid plunger to the ribbon lift mechanism. (The Ribbon Lift Mechanism is described in detail in the General Description Section, page 25.) The right hand end of the plunger is positioned in the left hand end of the coil core. When the coil is energized, the plunger moves into the core of the coil. The plunger is under the tension of a spring anchored to the ribbon control lever and to the lower rear part of the lower ribbon guide lever stop. When the coil is in the de-energized condition, the left hand end of the ribbon control lever contacts the upper rear edge of a stop lever bracket assembly. The stop lever bracket assembly is mounted by two screws to the rear bottom part of the power frame casting.

THEORY OF OPERATION

When the 90 volt magnet assembly is energized, the solenoid plunger is attracted into the core of the coil. As the plunger moves into the core, it rotates the ribbon control lever to which it is secured. This causes the left hand end of the ribbon control lever to move to the rear. Because the rear end of the ribbon position lever is attached to the left hand end of the ribbon control lever, it too must move to the rear. As the ribbon position lever moves to the rear, the roller on its front end is positioned in the rear end of the slot in the ribbon lift control plate. With the roller positioned in the rear end of the slot, the slug on a typebar will strike the lower portion of the cloth ribbon which is lifted to its maximum limit.

When the 90 volt magnet assembly is in the de-energized condition, the roller on the front end of the ribbon position lever is in the front end of the slot in the ribbon lift control plate. With the roller in this position, the slug on a typebar will strike the upper portion of the cloth ribbon which is lifted to its lower printing limit.

ADJUSTMENTS

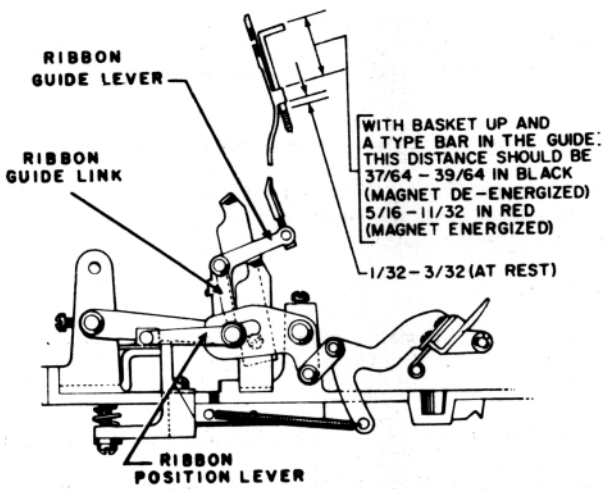


Figure 2.

1. While the coil in the 90 volt magnet assembly is in the de-energized condition, the roller in the open part of the control plate must move freely when it is manually positioned back and forth. Position the lower ribbon guide lever stop as required to raise or lower the front part of the ribbon guide lever.

2. When the roller in the open part of the control plate is moved manually as in step 1, the front surface of the ribbon lift bar must not move from the tails of the bellcrank levers.

   a. Loosen the screws that secure the front part of the ribbon lift control plate & link assembly to the rear of the ribbon lift bar.

   b. Position the front part of the assembly as required and tighten the screws.

   c. Unhook the rear end of the tension spring the front end of which is anchored to the bottom of the ribbon lift control plate & link assembly. Make the following checks:

      1. The front part of the ribbon lift control plate & link assembly falls freely.

      2. A .005" to .010" end play is maintained in the ribbon lift bar.

3. With the segment support assembly in its lower case position (up) and with the ribbon guide lever resting on the top of the lower ribbon guide lever stop, the bent tabs on the cloth ribbon guide must be 1/32" to 3/32" short of bottoming on the typebar guide. To adjust, turn the ribbon guide link screw as required.

4. When the segment support assembly is in its lower case position (up) and a typebar is manually lifted fully to the platen, a distance of 37/64" to 39/64" is required from the tops of the bent tabs on the cloth ribbon guide to the top edge of the typebar guide (Figure 2).

a. Turn the adjustable screw that mounts the spring loaded stop lever bracket assembly in to increase the distance between the tops of the bent tabs and the top edge of the typebar guide; turn the screw out to decrease the distance.

5. With the segment support assembly in its lower case position (up) and with the magnet assembly manually "energized", a distance of 5/16" to 11/32" must prevail between the tops of the bent tabs on the cloth ribbon guide and the top edge of the typebar guide when a typebar is lifted to the platen.

   a. Loosen the screws that mount the magnet assembly to the power frame casting.

   b. Move the magnet assembly to the left to decrease the distance between the tops of the bent tabs on the cloth ribbon guide and the top edge of the typebar guide; move the magnet assembly to the right to increase the distance.

   c. Tighten the screws.

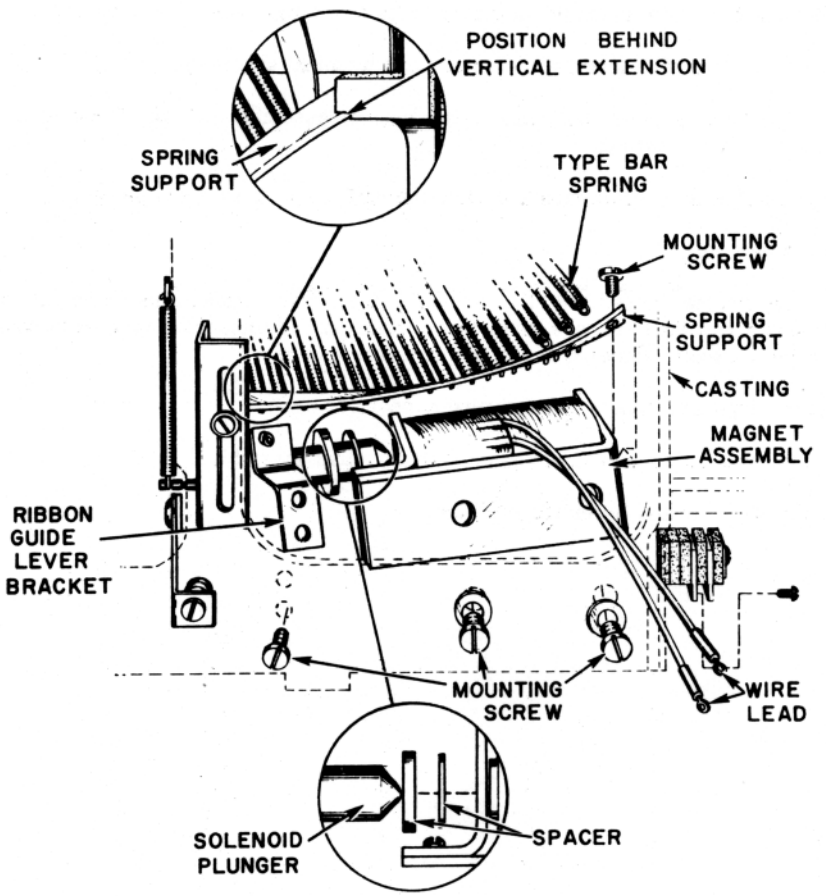
6. After accomplishing steps 1 through 5 above, the upper ribbon guide lever stop must be repositioned to allow no more than 3/64" additional upward movement of the guide lever without choking off.

7. When all of the adjustments have been completed, make the following checks:

   a. No appreciable movement of the control plate when the solenoid plunger moves into the core of the coil. Excess movement of the control plate causes the front surface of the ribbon lift bar to move from the tails of the bellcrank levers.

   b. All linkage, pivots, and levers are free of binds.

REMOVAL AND INSTALLATION OF THE COIL IN THE MAGNET ASSEMBLY



REMOVAL AND INSTALLATION OF THE COIL IN THE MAGNET ASSEMBLY

1. Shift the power frame to its lower case (up) position.
2. Remove the screw that mounts the right hand end of the spring support to the power frame casting.

NOTE: This will cause several of the typebar springs to become disconnected from the spring support.

3. Lift the front end of the machine so that it rests on its rear side; lower the selector.
4. Disconnect the two wire leads at the color shift terminal assembly.
5. Remove the four screws that mount the magnet assembly and the ribbon guide lever bracket to the power frame casting.
6. Pivot the rear of the coil upward and slide the coil from the solenoid plunger.
7. Install the new coil.
8. Secure the magnet assembly, the ribbon guide lever bracket, and the right hand end of the spring support. Check to see that the bottom part of the spring support is positioned behind the smaller vertical extension on the power frame casting.
9. Connect the typebar springs to the spring support.
10. Connect the two wire leads to the color shift terminal assembly.
11. Secure the selector and lower the machine.

SPECIAL FEATURES

SECRETARY SHIFT MECHANISM

2200/2300 SERIES FLEXOWRITER
Automatic Writing Machines

Purpose And Use

Physical Description

Theory Of Operation

Adjustments

Acceptance Test

SECRETARY SHIFT MECHANISM

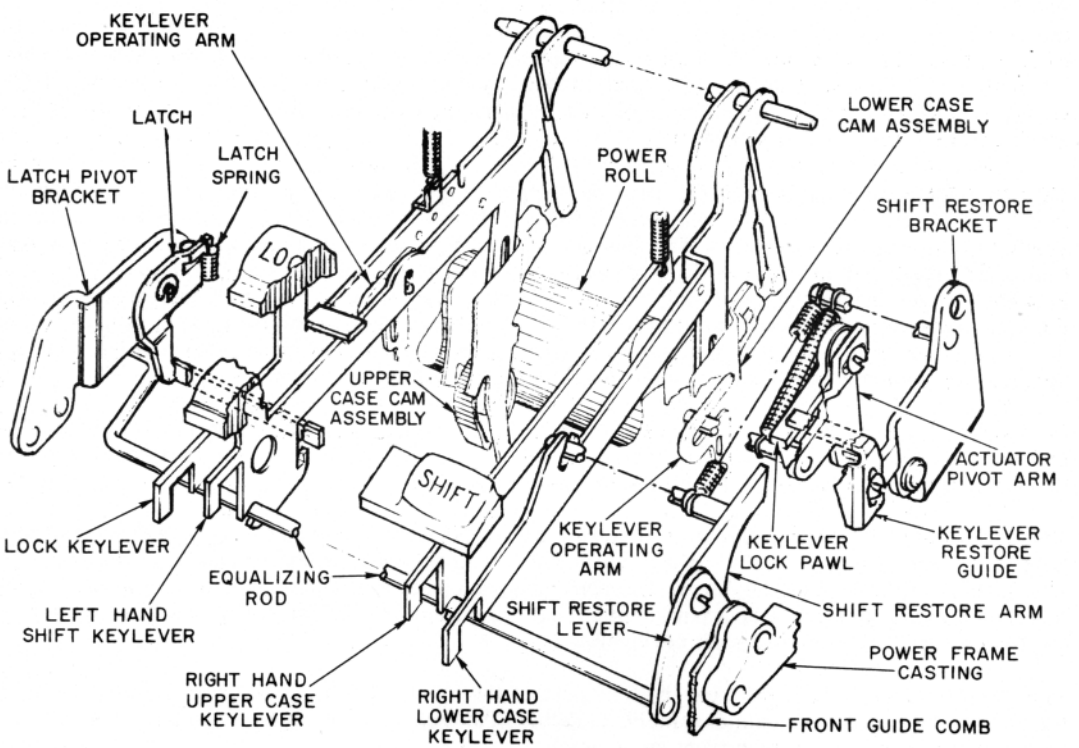


Figure 1.

PURPOSE AND USE

→ The secretary shift mechanism (Figure 1) provides a rhythmical means of shifting the segment support assembly to its upper and lower case positions.

Installation of this special feature must be made at the factory.

PHYSICAL DESCRIPTION

General. The shifting of the segment support assembly determines the printing of one of two characters represented on a typebar slug.

When the segment support assembly is in its up position, depression of a character printing keylever will cause lower case printing of a typebar slug. In its down position, depression of a character printing keylever will cause upper case printing of a typebar slug.

The segment support assembly can be shifted to the upper case position by holding depressed either the left hand shift keylever or the right hand upper case keylever. These keylevers are identified by keybuttons engraved: SHIFT. For as long as either shift keylever is held down, manual operation of character printing keylevers will cause upper case printing. If the punch is on when either shift keylever is depressed, the upper case code will be punched; releasing either shift keylever will cause the lower case code to be punched.

The segment support assembly can also be shifted to the upper case position by depressing a keylever, the keybutton on which is engraved: LOCK. This keylever will "lock" the segment support assembly in its upper case position. The segment support assembly will remain in its upper case position until either the left hand shift keylever or the right hand upper case keylever is depressed and released, reverting the segment support assembly to its lower case position. If the punch is on when the lock keylever is depressed, the upper case code will be punched. When the segment support assembly reverts to its lower case position, the lower case code will be punched after the left hand shift keylever or the right hand upper case keylever is depressed and released.

On the left hand end of the keyboard, the left hand shift keylever is located adjacent to the right hand side of the lock keylever. The rear ends of these keylevers are mounted on the same fulcrum rod that mounts the rear ends of character printing keylevers.

The lock keylever is under the tension of a spring anchored to a stud on the lock keylever and to the keylever spring support. A stud on the right hand side of the lock keylever is positioned in a vertical slot in the left hand shift keylever. The hooked upper end of a translator keylever operating arm is positioned over the stud. A bent part on the front top edge of the lock keylever is positioned over the top front part of the left hand shift keylever.

The forked extension on the rear bottom part of the left hand shift keylever is positioned over the top part of the upper case cam assembly. Together, the front ends of the lock and left hand shift keylevers extend into a slot in the front guide comb.

On the right hand end of the keyboard the right hand upper case keylever is located adjacent to the left hand side of a right hand lower case keylever. These keylevers are mounted in the same manner as the lock keylever and the left hand shift keylever. The forked extension on the rear bottom part of the right hand lower case keylever is positioned over the top part of the lower case cam assembly.

When the keylock relay in the writing machine is in the de-energized condition, the front ends of the keylevers in the secretary shift mechanism are not restricted by the keylever lock bail or the keylever interlock. This permits, if desired, shifting of the segment support assembly during a carriage return operation.

The hooked bottom edges of the left hand shift keylever and the right hand upper case keylever, and the extended bottom edges of the lock keylever and the right hand lower case keylever are positioned over an equalizing rod. The left hand end of the equalizing rod fits into the left hand end of the front guide comb. Permanently secured to the right hand end of the equalizing rod is a shift restore lever. It mounts the right hand end of the equalizing rod by means of a shift restore arm. The front part of the shift restore arm is screwed to the top part of the shift restore lever; the bottom part of the shift restore arm contains a stud which fits through the rear bottom part of the shift restore lever, and through the right hand end of the front guide comb. Together, the shift restore arm and the right hand part of the equalizing rod are under the tension of a spring anchored to a stud on the shift restore arm and to a stud on a shift restore bracket. The stud on the shift restore arm is positioned in the slot in the top extended edge of the right hand lower case keylever.

The shift restore bracket is screwed to the power frame casting. An actuator pivot arm is mounted by means of a pivot stud on the bottom part of the shift restore bracket. The actuator pivot arm is under the tension of a spring anchored to a stud on the actuator pivot arm and to the stud on the shift restore bracket. The hooked upper end of a keylever operating arm is positioned over the stud on the actuator pivot arm.

Mounted by means of a shouldered screw and a nut to the top part of the actuator pivot arm is a keylever lock pawl. The front part of the keylever lock pawl is positioned under the formed top part of a keylever restore guide. The keylever restore guide is mounted by a screw threaded into the front part of the shift restore bracket.

➤The lock latch stop is permanently secured to the left hand side of the lock keylever. The latch is mounted on the latch pivot stud and is retained by a clip. When the segment support assembly is shifted by means of the lock keylever, a formed front part of the latch engages the hooked bottom edge of the left hand shift keylever.

THEORY OF OPERATION

Manual Operation of the Lock Keylever - When the segment support assembly is in the lower case position and the lock keylever is depressed:

1. Under spring tension, the lock keylever pivots on the fulcrum rod on which it is mounted.
2. Simultaneously, the bent part on the front top edge of the lock keylever descends on the top edge of the left hand shift keylever; the keylevers pivot in unison.
3. Because the equalizing rod is contained in the hooked bottom front part of the left hand shift keylever, the equalizing rod is pushed downward.
4. The formed bottom front part of the latch has now pivoted forward slightly and engages the second hooked bottom edge of the left hand shift keylever. The upper rear formed part of the latch is now under the tension of the latch spring. This insures good engagement of the latch to the second hooked bottom part of the left hand shift keylever. It also insures that the lock keylever will remain in the down position.
5. The shift restore lever, permanently attached to the end of the equalizing rod, is rotated toward the front of the machine.
6. Because the shift restore arm is secured to the shift restore lever, it too pivots toward the front of the machine under spring tension.

7. As the shift restore arm pivots, the stud which rides in the slot in the top edge of the right hand → lower case keylever, and which is attached to the shift restore arm raises the right hand lower case keylever.

NOTE: When the left hand shift keylever is pushed down by the lock keylever, the double-lobed upper case cam rotates 180°. When the right hand lower case keylever is lifted by the stud on the → shift restore arm, the lower case cam restores from its anti-repeat lug. The tripping of → the upper case cam and the restoring of the lower case cam is simultaneous.

8. The segment support assembly has now shifted to its upper case position.

Automatic Operation Of The Lock Keylever. When the upper case code is read in the reader, the electrical pulses representative of the upper case code are converted into mechanical operations in the translator. This results in the operation of the keylever operating arm, the hooked upper end of which is positioned over the stud on the right hand side of the lock keylever.

Aside from the operation of the lock keylever by the keylever operating arm in the translator, the automatic operation of the lock keylever affects the same interaction of the secretary shift mechanism parts as the manual operation of the lock keylever.

Operation Of The Left Hand Shift Keylever/Right Hand Upper Case Keylever. The manual operation of the left hand shift keylever or of the right hand upper case keylever is similar to the previously outlined manual operation of the lock keylever. The interaction of the secretary shift mechanism parts, when either keylever is depressed and the segment support assembly is in its lower case position, is the same as the manual operation of the lock keylever with two exceptions: the lock keylever and the latch do not function.

If, however, the segment support assembly is in its upper case position when either keylever is depressed, then the latch will disengage and pivot from the hooked bottom part of the left hand shift keylever. Because the lock keylever is under spring tension, its front end will pivot upward upon the disengagement of the latch.

When manual pressure is removed from the left hand shift keylever or the right hand upper case keylever, they too pivot upward by means of the equalizing rod which is under spring tension. As the keylevers pivot, the lower case cam (also double-lobed) engages the power roll and rotates 180°. The segment support assembly now shifts to its lower case position.

The reasons for depressing either the left hand shift keylever or the right hand upper case keylever are:

1. To shift the segment support assembly momentarily to print an upper case character or,

2. Revert the segment support assembly to its lower case position after it has been "locked" in its upper case position.

As has been previously explained, automatic shifting of the segment support assembly to its upper case position involves the ultimate operation of a keylever operating arm in the translator. Likewise, the automatic shifting of the segment support assembly to its lower case position is also by means of a keylever operating arm in the translator.

Because the latch is engaged with the hooked bottom edge of the left hand shift keylever when the segment support assembly has been shifted automatically to its upper case position, then the left hand shift keylever must be released in order for the segment support assembly to revert to its lower case position. The automatic reversion of the segment support assembly to its lower case position is effected as follows:

1. The lower case code is read in the reader. Electrical pulses representative of the lower case code are converted into mechanical operation in the translator. This results in the operation of a keylever operating arm, the hooked upper end of which is positioned over the stud on the left hand side of the actuator pivot arm.

2. The keylever operating arm pivots the actuator pivot arm forward on its mounting stud.

3. Simultaneously, the keylever lock pawl which is mounted on a shouldered screw in the top part of the actuator pivot arm, pivots freely as it is carried forward by the actuator pivot arm.

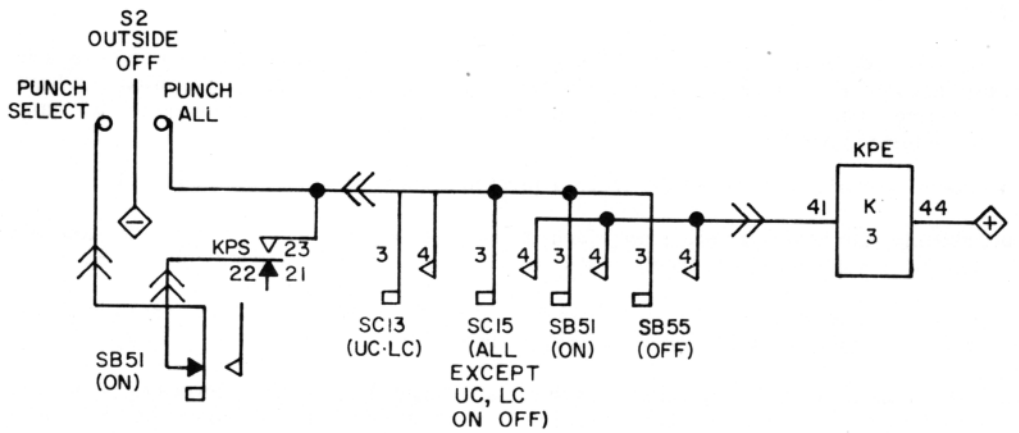
4. The front part of the keylever lock pawl rides through the top part of the keylever restore guide, as its front end strikes the rear end of the shift restore arm.

NOTE: When the latch and the left hand shift keylever are engaged, the four keylevers of the secretary shift mechanism are not bottomed in their slots in the front guide comb. As such, when the front end of the keylever lock pawl strikes the raised rear end of the shift restore arm, the equalizing rod is pushed down further until the keylevers bottom in their slots in the front guide comb.

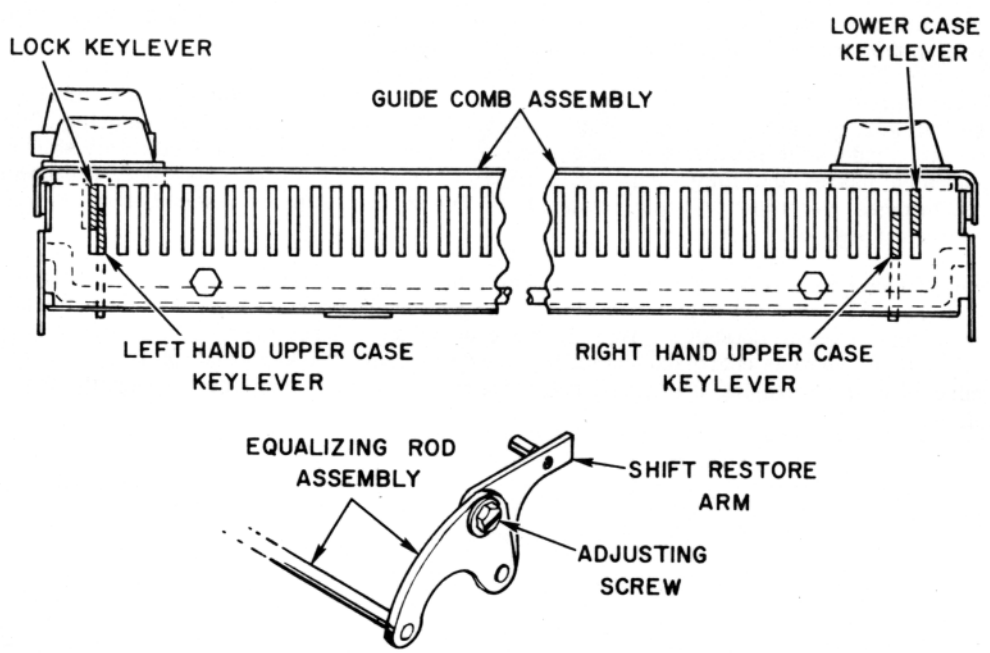
→5. When the left hand shift keylever is pushed downward by the equalizing rod far enough to disengage from the lock latch, the keylever tension spring on the lock keylever pulls the lock keylever up pivoting the lock latch clear of the left hand shift keylever.

→6. When the lower case keylever operating arm in the translator is restored, the shift keylevers are allowed to restore to their "up" position under spring tension. The restoring of the shift keylevers raises the equalizing rod and pivots the shift restore arm. The stud on the shift restore arm then pushes the lower case keylever down releasing the lower case cam. The lower case cam engages the power roll and rotates 180°. The segment support assembly now reverts to its lower case position.

Overpunching, as a result of depressing a character printing keylever simultaneously with the lock keylever, the left hand shift keylever, or the right hand upper case keylever, is ascertained by means of an error detecting circuit in the code selector. When overpunching occurs, the punch error (KPE) relay is energized and the keyboard is locked. The keyboard can then be unlocked by
→depressing and releasing the Tape Feed keylever. This is accomplished through the logic which follows:



→ SHIFT RESTORE ARM



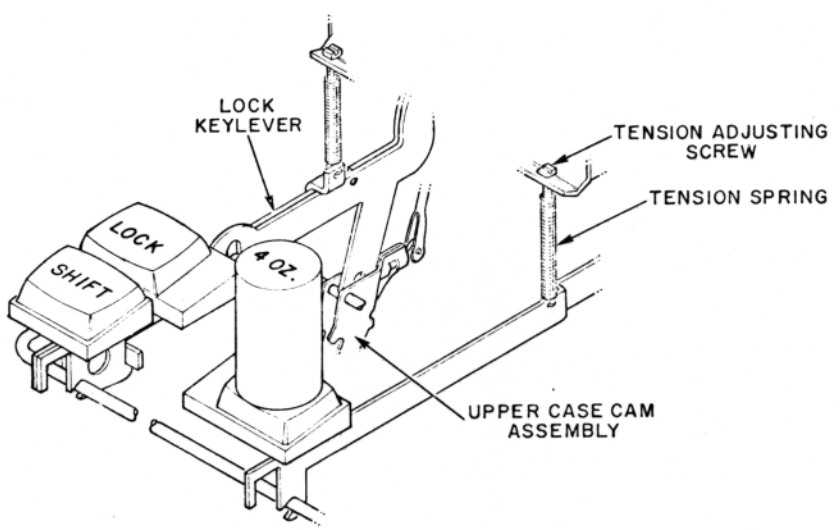
1. Keylever float must be maintained between the lock keylever and the left hand upper case keylever. The lower case keylever and the right hand upper case keylevers must also float. Form keylevers as necessary. (Check to assure that the translator seekers are not restricting the keylever float adjustments.)

2. Check to see that both upper case keylevers are even in the tops of their slots in the front guide comb. Form or replace the equalizing rod as required.

3. The right hand lower case keylever must be located at the top of its slot in the front guide comb when either of the upper case keylevers is depressed. Depress the upper case keylever and lift up on the shift restore arm. Tighten the adjusting screw.

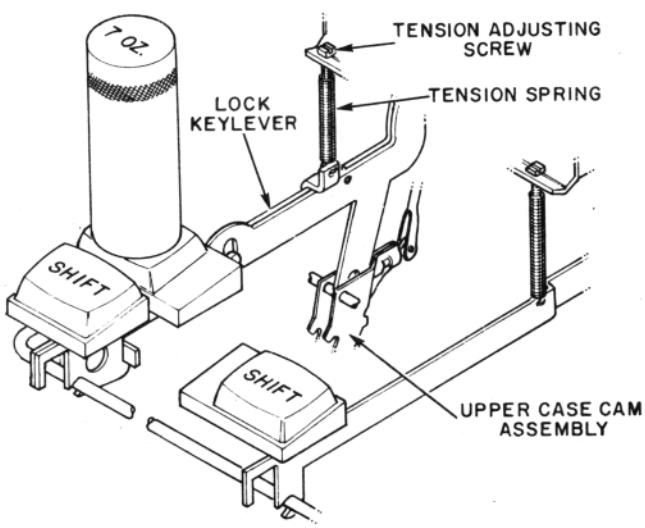
4. The lower case cam must be checked for proper trip by slowly depressing either shift keylever, while visually watching the lower case cam. The lower case cam release must allow the cam to move off of the anti-repeat lug simultaneously to .015" before the upper case cam trips. If necessary, form the right hand lower case keylever and recheck adjustments 2 and 3.

→KEYLEVER TENSION



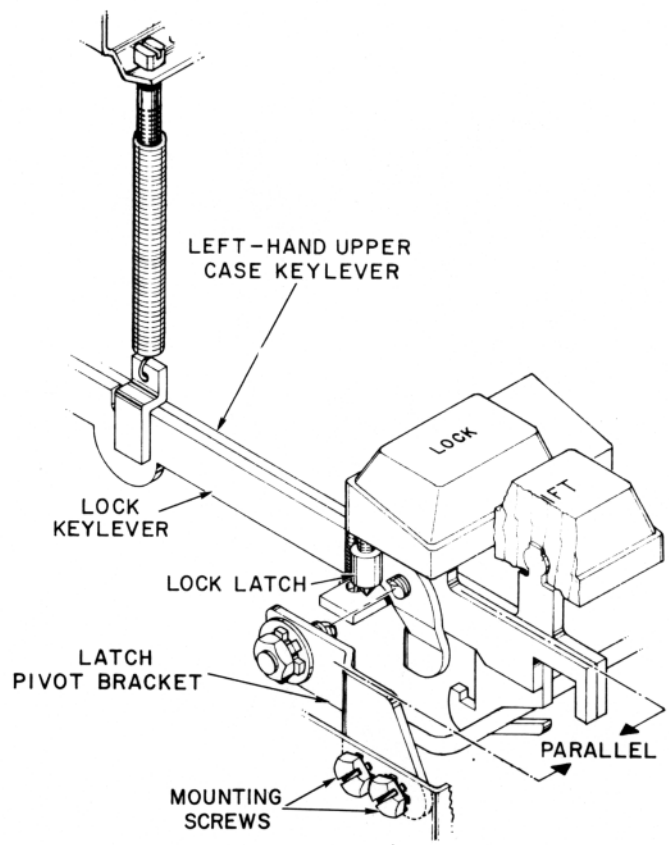
The upper case cam must trip when 4 ounces of weight is placed on the right hand shift keylever; a 3 ounce weight must not trip the cam. However, this adjustment must be held as close as possible to 4 ounces. Turn the keylever spring adjusting screw as necessary. Check to see that the keylevers fully restore in their slots in the front guide comb.

→ LOCK KEYLEVER TENSION



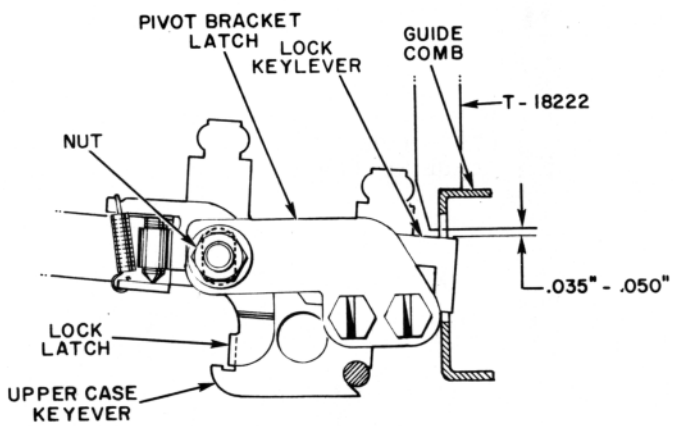
The upper case cam must trip when 7 ounces of weight is applied to the lock keylever; 6 ounces of weight must not trip the cam. However, this adjustment must be held as close as possible to 6 ounces. This and the previous adjustment will assure that the upper case keylever has more tension (4 ounces) than the lock keylever (2 ounces). This condition must be maintained to prevent reverting back to lower case while in a locked condition and reading a lock code. Turn the tension adjusting screw to meet the requirement.

LATCH PIVOT BRACKET



The top edge of the latch pivot bracket must be parallel with the top edge of the lock keylever. Loosen the two screws which mount the latch pivot bracket and position as required. Tighten the mounting screws.

LOCK LATCH



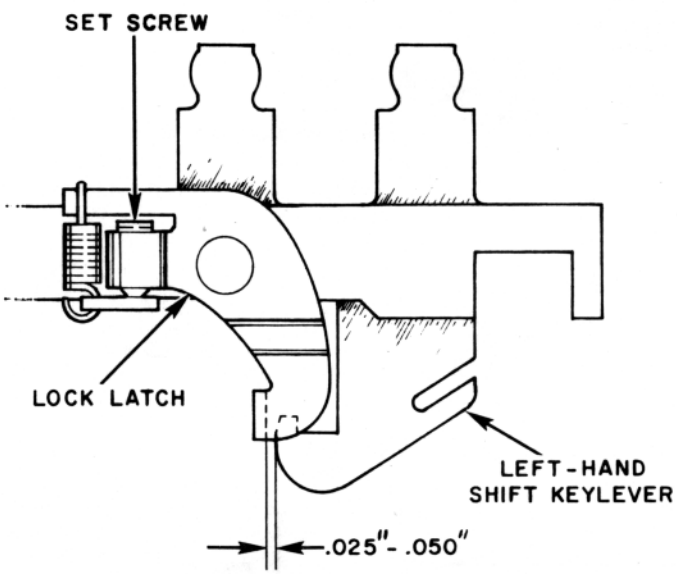
When the lock keylever is depressed and the upper case cam rotates, there must be approximately .035" to .050" additional downward travel of the lock and left hand shift keylevers before the lock latch engages the left hand shift keylever. To meet this requirement:

1. Loosen the nut which retains the lock latch on its pivot stud.

2. Using trip gauge T-18222 to depress the keylevers and holding a wrench on the head of the pivot stud, position the lock latch up or down as required.

3. Tighten the nut.

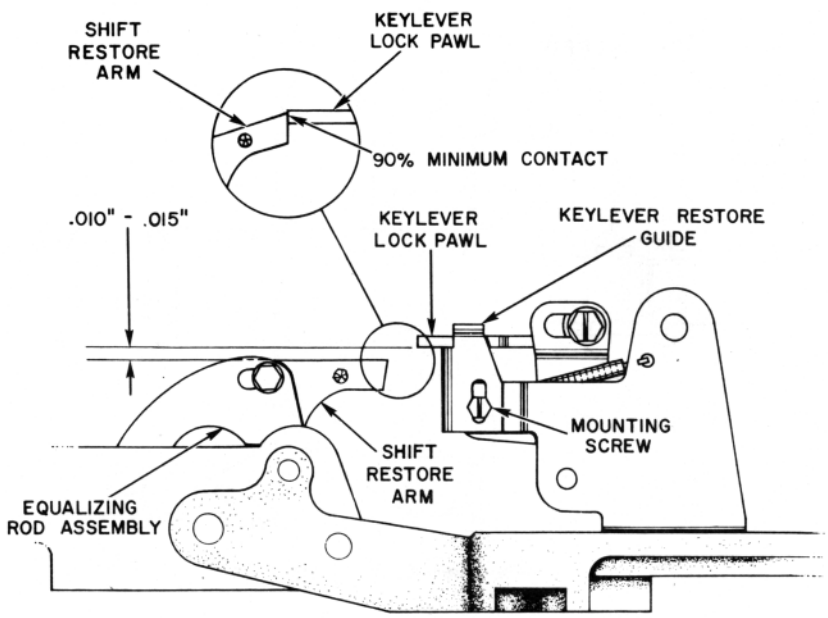
LOCK LATCH TO LEFT HAND SHIFT KEYLEVER CLEARANCE



A clearance of .025" to .050" is required between the lug on the bottom part of the lock latch and the hooked bottom edge of the left hand shift keylever, while in the lower case position. Turn the setscrew in the rear part of the lock latch to meet the requirement.

NOTE: The setscrew in the lock latch is sealed with Loctite, but will not require re-sealing if it is turned slightly. If the setscrew is turned excessively, it must be re-sealed with Loctite #59.

KEYLEVER RESTORE GUIDE



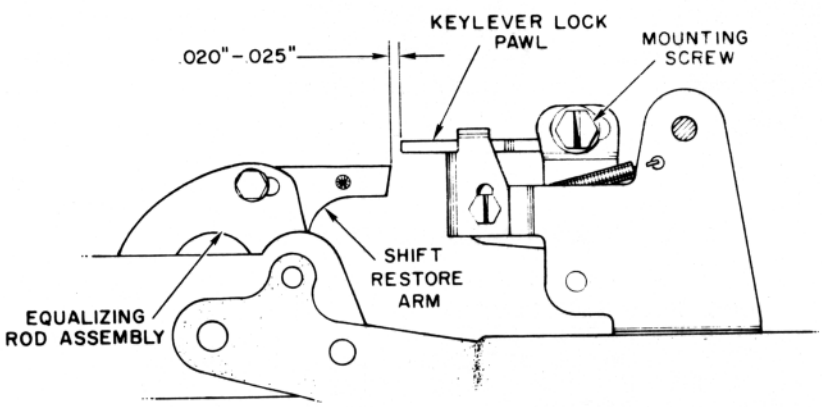
There must be .010" to .015" clearance between the bottom of the keylever lock pawl and the top edge of the shift restore arm. This clearance is measured with the segment support assembly in its lower case position. When the keylever lock pawl is manually pulled forward, there must be 90% to 100% contact of the keylever lock pawl to the shift restore arm while in upper case.

1. Loosen the screw which mounts the keylever restore bracket.

2. Position the keylever restore guide as necessary.

3. Tighten the screw.

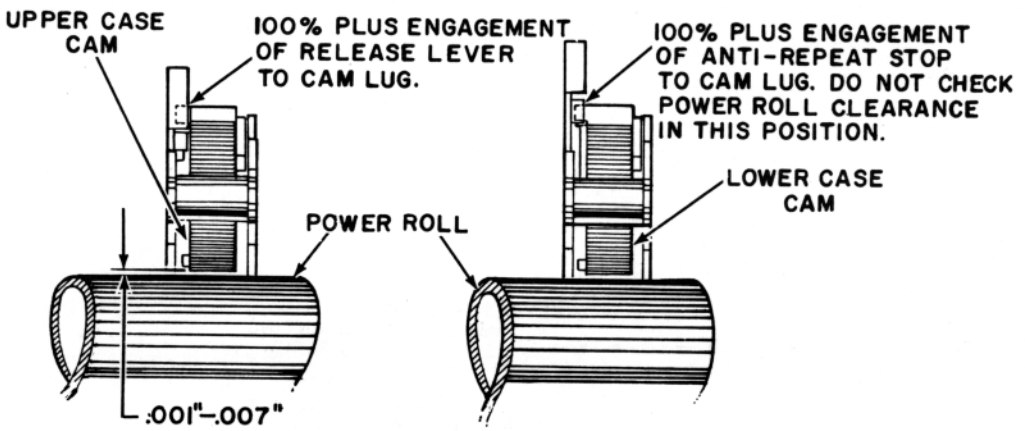
KEYLEVER LOCK PAWL



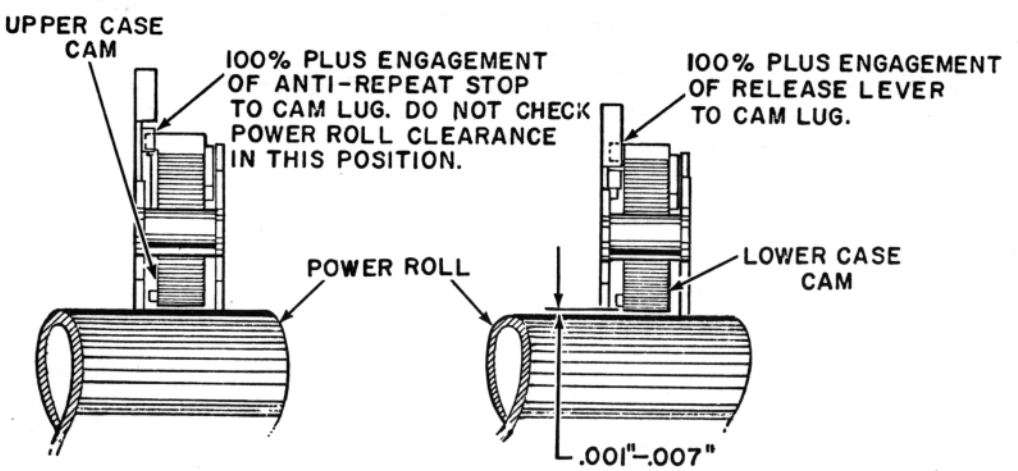
When the segment support assembly is in its lower case position, there must be a clearance of .020" to .025" between the rear edge of the shift restore arm and the front edge of the keylever lock pawl. Loosen the screw and the nut which mount the keylever lock pawl. Position the keylever lock pawl as required and tighten the mounting hardware.

→ SHIFT CAM POSITIONS

LOWER CASE (UNLOCKED) POSITION VIEW



UPPER CASE (LOCKED) POSITION VIEW



After all typewriter shift adjustments have been made, the cam release levers must be in the positions shown above. The complete readjustment of the keylevers and typewriter shift settings must be done if these conditions do not exist.

ACCEPTANCE TEST

The following procedure is recommended for insuring proper operation of the Secretary Shift Mechanism:

1. With the punch in the ALL condition, punch a series of shift codes.

2. Install the tape in the reader with an upper case code over the reader pins. The tape must not engage the pinwheel.

3. Read 300 to 400 continuous upper case codes. Reading the first upper case code will shift the basket to the upper case condition and punch the upper case code in the tape. Each additional upper case code will be read but not punched and the basket should remain locked in the upper case condition. If the basket does revert back to a lower case condition while reading continuous upper case codes, recheck all the adjustments in their proper order.

4. With this test completed, run a general shift test using all the characters on the keyboard.

   EXAMPLE: Aa Bb Cc Dd

SPECIAL FEATURES

MODEL 9510 AND MODEL 9515 MODULAR DESKS

2200/2300 SERIES FLEXOWRITER
Automatic Writing Machines

Purpose And Use

Physical Description

Functional Description

Assembly Instructions

Adjustments

MODEL 9510 AND MODEL 9515 MODULAR DESKS

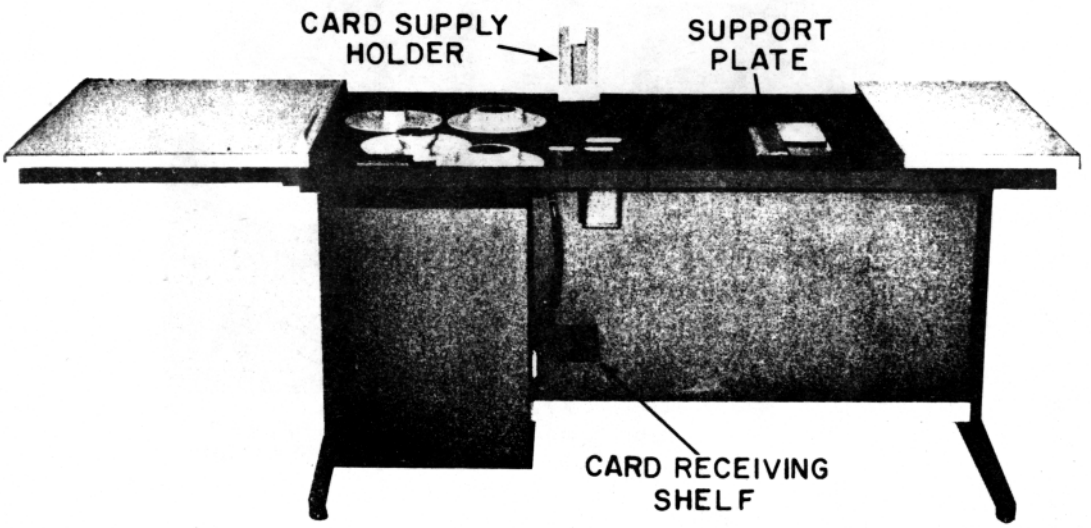


Figure 1.

PURPOSE AND USE

The Model 9510 and the Model 9515 Modular Desks are designed to replace the Model 2301 Flexowriter Stand and the Model 2201 Flexowriter Stand. The Model 9510 is designed exclusively for use with the 2300 Series Flexowriters; the Model 9515 is designed to accommodate both the 2300 Series and the 2200 Series Flexowriters.

There are no provisions for input and output connections in the Model 9510; the wiring facilities in the Model 9515 can accommodate any Flexowriter input or output device, including the Model 4501 Electronic Accumulator. Figure 1 is the Model 9515 Modulator Desk.

Figure 2.

PHYSICAL DESCRIPTION

Tape Facility. The Model 9515 provides a tape facility consisting of two tape supply reels and two tape take-up reels. The Model 9510 provides a tape facility consisting of one tape supply reel and one tape take-up reel. The reels are located on the left hand top sides of the desks. Access to the reels is by sliding a shelf which covers the reels (Figure 2).

Card Facility. The card facility consists of a card supply holder located on the top rear edge of the desk, and a card receiving shelf located on the lower front side of the desk (Figure 1).

Rewind Switch. Power to the take-up reels is controlled by the rewind switch. This switch is located on the left hand front of the Model 9515, and under the left hand front of the Model 9510 (Figure 2).

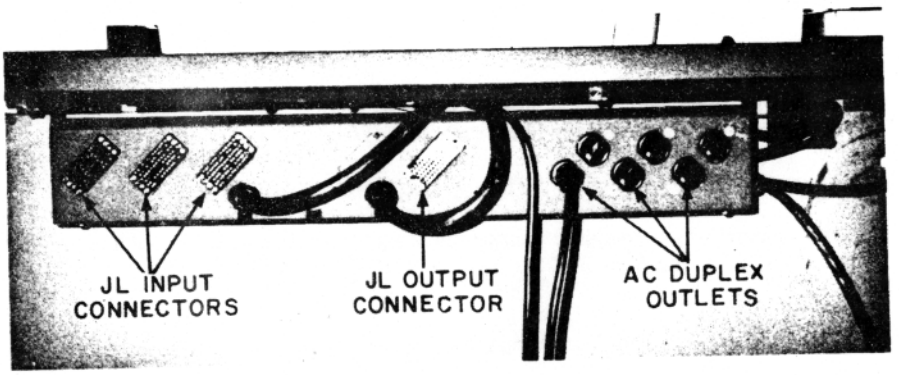


Figure 3.

AC Outlets. The AC outlets are located on the rear panels of the desks. There are three AC duplex outlets on the Model 9515 (Figure 3); two AC duplex outlets on the Model 9510. The AC outlets on the Model 9510 are energized for as long as the desk power cord is connected to the local power source. Power to the AC outlets on the Model 9515 is controlled by a power switch.

Power Switch. The power switch is located adjacent to the rewind switch on the Model 9515 (Figure 2).

JL Connectors. There are three JL input connectors and one JL output connector located on the rear panel of the Model 9515 (Figure 3). These connectors provide jumpering for auxiliary equipment used with the Flexowriter.

Rear Cover Assembly. Houses the AC outlets and the JL connectors on the Model 9515.

Support Plate. The support plate (Figure 1) is placed on the left hand side of the opening in the top of the Model 9515 when a 2200 Series Flexowriter is used. When a 2300 Series Flexowriter is used, the plate is placed on the right hand side of the opening.

Dimensions (Model 9515)

Width - 55 13/16 inches (Shelf not extended).
77 13/16 inches (Shelf extended).

Height - 29 1/2 inches.

Depth - 26 7/8 inches.

Dimensions (Model 9510)

Width - 38 inches (Shelf not extended).
50 5/8 inches (Shelf extended).

Height - 29 1/2 inches.

Depth - 26 7/8 inches.

FUNCTIONAL DESCRIPTION

The Model 9510 and the Model 9515 desks are designed to incorporate into one compact system, the operation of the Flexowriter with associated auxiliary units.

The JL connectors on the Model 9515 desk permit jumpering for auxiliary units as follows:

JL1 - An input connector which provides jumpering for an Auxiliary Tape Reader, the Automatic Card Reader (ACRA), the Manual Data Selector (MDS), or the Model 4501 Electronic Accumulator.

JL2 - An output connector which provides jumpering for an Auxiliary Tape Punch.

JL3 - A Verifier connector.

ASSEMBLY INSTRUCTIONS

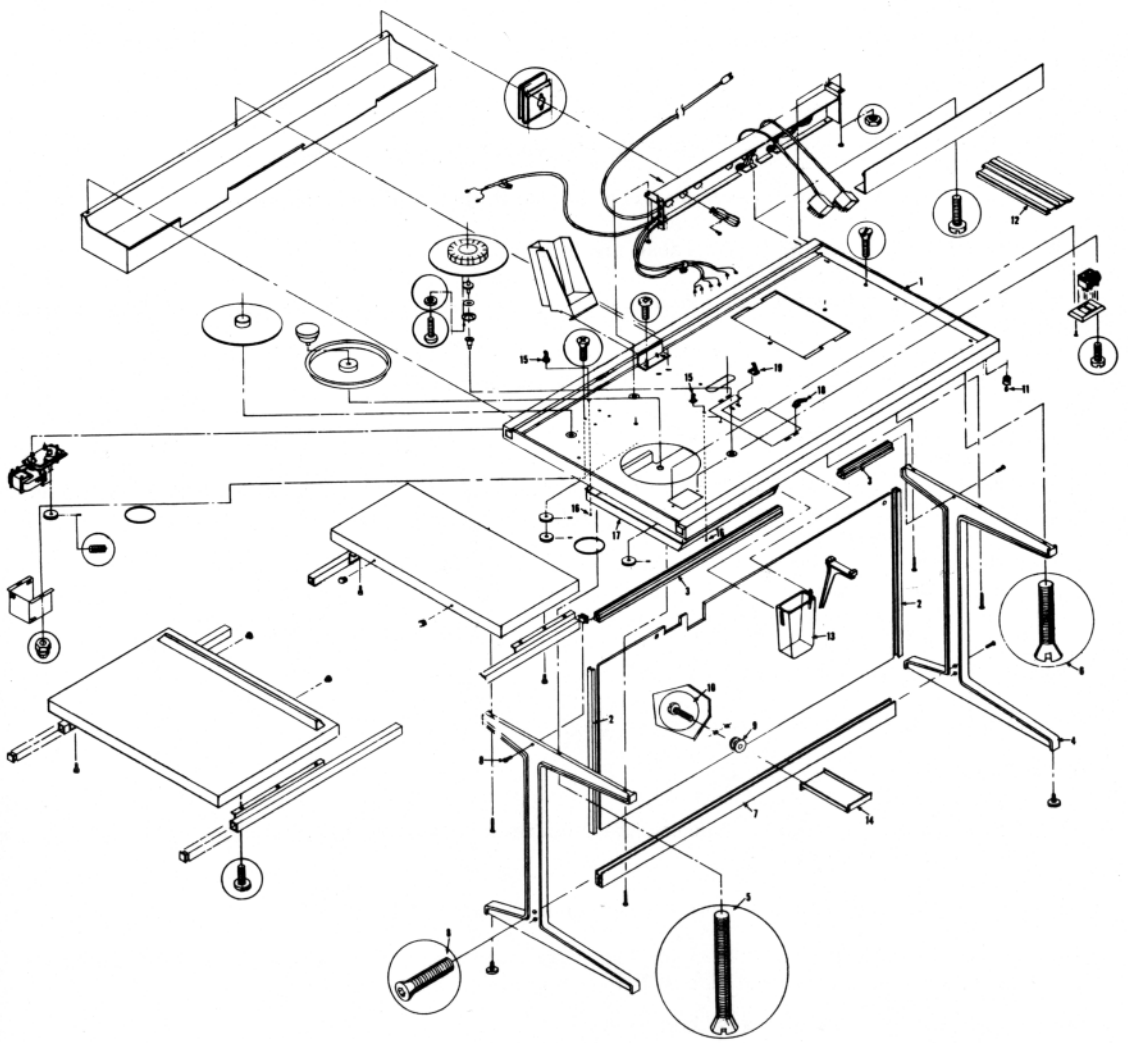


Figure 4.

Refer to Figure 4 when reference is made to a number enclosed within parenthesis.

Tools Required

1 - Medium size screw driver.

1 - Phillips screw driver.

1 - Allen wrench.

1 - Remove the two long side filler strips and place them on the floor.

2 - Lift out the main panel assembly (1) and place it upside down on the strips.

3 - Locate the leg screws (5, 6). These are in a bag tied to the leg.

4 - Apply the modesty panel extrusions (vinyl strips) (2) to the ends of the modesty panel and trim them to length.

5 - Place the modesty panel into the slot in the top extrusion (3).

6 - Place the legs (4) into position.

7 - Locate the screws (5, 6) through the legs into the underside of the desk (do not tighten). Observe that the long screw (5) goes into the center location.

8 - Locate the bottom extrusion (7) along the bottom edge of the modesty panel.

9 - Attach the legs to the extrusions using Allen screws (8). Tighten the screws.

10 - Tighten the leg screws (5, 6), step 7.

11 - Attach the spacers (9) to the modesty panel with screws (10).

12 - Place the desk right side up.

13 - Using an Allen wrench, release the setscrews located on the underside of the desk to allow the top to slide freely.

14 - Unpack the tape reels and install them in their proper places.

15 - Place the support plate (12) on the right hand side of the opening for a 2300 Series Flexowriter and on the left hand side of the opening for a 2200 Series Flexowriter.

16 - Install the following items in their proper locations:

Chad box (13)

Card shelf (14) on the spacers (9)

Purse hook (Model 9510)

Tape Guides

Post Guides (15) - Install with #6 (16) self-tapping screws. To perform this step the front cover (17) must be removed.

Flexible snap-in (19) - Insert to the left edge for card and Tape units, and to the right for tape only Punches and Readers.

Snap-in (18) - Insert to the left for edge card and tape units and to the right for tape only Punches and Readers.

ADJUSTMENTS

CARD HOLDER

To ensure good card feed to the Flexowriter, the card holder must be properly positioned on the top rear edge of the desk. To adjust the card holder:

1. Engage the lip on the top edge of the card holder with the lip on the card holder bracket.
2. Loosen the Phillips screws which retain the card holder bracket to the top of the desk.
3. Position the card holder bracket so that the shoulders on the card holder are fully against the top rear edge of the desk.
4. Tighten the screws.

TAKE-UP REEL CLUTCH TENSION

To obtain proper clutch tension for a take-up reel:

1. Lift the take-up reel from its spindle.
2. Equally turn the three screws on the bottom side of the reel clockwise to increase clutch tension; counterclockwise to decrease clutch tension.
3. Install the reel and check the tension.

RING PULLEYS

The ring pulleys must be aligned to properly engage the ring belt. To adjust the pulleys:

1. Remove the cover which shields the pulleys beneath the desk.
2. Loosen the setscrews in the pulleys and raise or lower the pulleys for good alignment and proper engagement to the ring belt.
3. Tighten the setscrews and install the cover.

SPECIAL FEATURES

INTERMEDIATE MARGIN CONTROL MECHANISM

2200/2300 SERIES FLEXOWRITER
Automatic Writing Machines

Purpose And Use

Theory of Operation

Adjustments

INTERMEDIATE MARGIN CONTROL MECHANISM

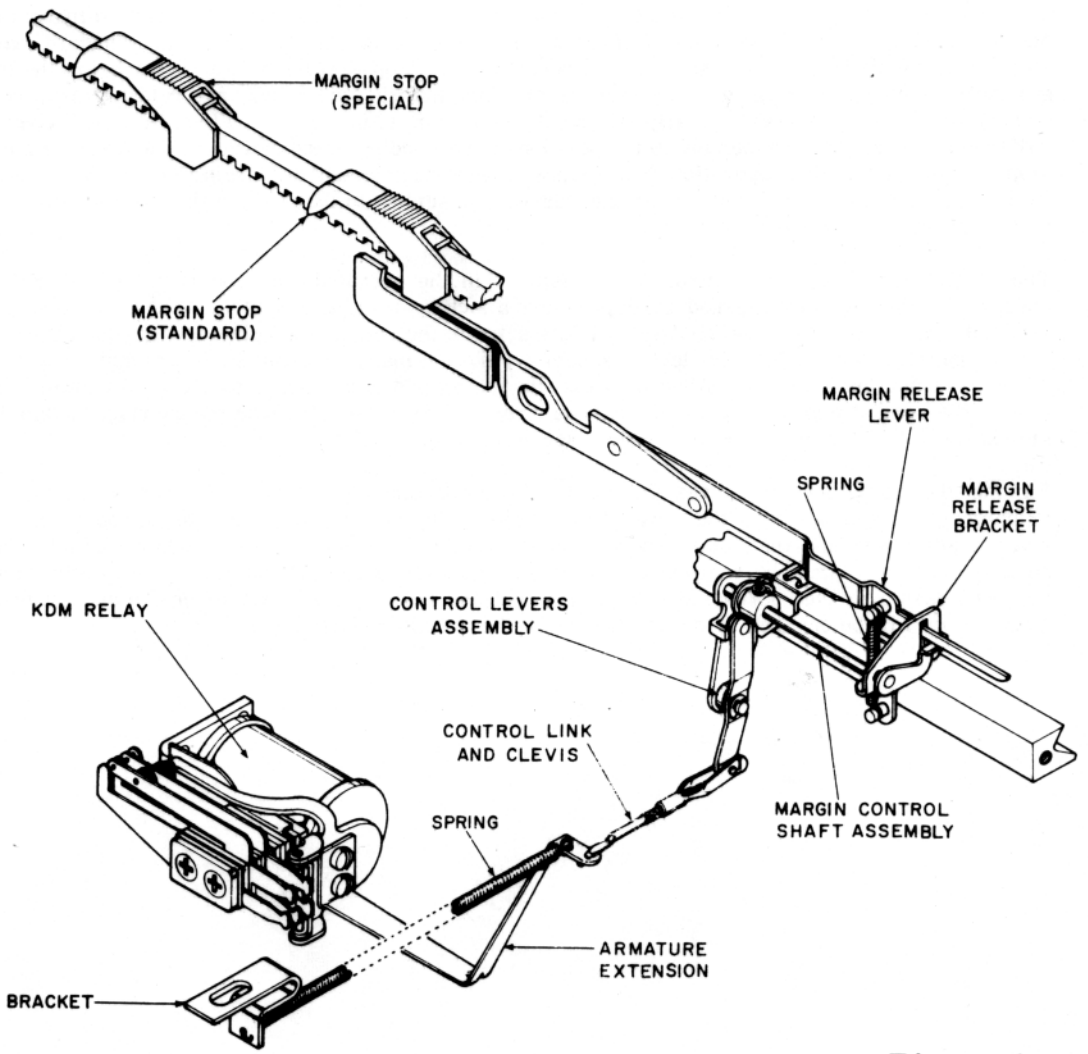


Figure 1.

PURPOSE AND USE

The Intermediate Margin Control Mechanism (Figure 1) provides the means for selecting one of two pre-set left hand margins at which the carriage assembly will stop during a carriage return operation. It is used for the preparation of documents on which two columns of printing are required, or on documents that require printing at a particular indention.

THEORY OF OPERATION

Two margin stops are used in the Intermediate Margin Control Mechanism: a standard margin stop and a special margin stop. The special margin stop is located to the right of the standard margin stop. Because the lower extension of the special margin stop does not extend as far below the margin rack as does the lower extension of the standard margin stop, a carriage return operation that occurs when the Intermediate Margin Control Mechanism is in the normal (non-operated) condition will move the carriage assembly to the position corresponding to the setting of the standard margin stop. A carriage return operation that occurs when the Intermediate Margin Control Mechanism is in the operated condition will move the carriage assembly to the position that corresponds to the setting of the special margin stop.

The Intermediate Margin Control Mechanism is in the operated condition when the KDM relay is energized. This is accomplished by depressing a locking-type panel switch. When the switch is depressed, the armature of the KDM relay is attracted to the core of the relay. In turn, the interaction of the margin control link, the levers assembly, and the margin control shaft assembly, causes the margin release lever to pivot. When it pivots, its hooked end is positioned to engage the lower extension of the special margin stop. Thus, a carriage return operation will cause the carriage assembly to stop at the position that corresponds to the setting of the special margin stop.

Raising the panel switch causes the KDM relay to de-energize. When the relay de-energizes, the armature moves away from the core of the relay and the interaction of the margin control link, the lever assemblies, and the margin control shaft assembly is reversed. The hooked end of the margin release lever will then be positioned so that during a carriage return operation, the special margin stop will pass over the hooked end of the margin release lever but the lower extension of the standard margin stop will be engaged by the hooked end of the margin release lever.

TAPE PUNCH & EDGE CARD PUNCH BACK SPACE

PURPOSE AND USE

This feature provides automatic back spacing in the punch for the purpose of deleting an incorrect code.

This feature can be installed on a Tape Punch that is not equipped with parity check, or it can be installed on an Edge Card Punch equipped with or without parity check.

Installation of this special feature must be made at the factory.

PHYSICAL DESCRIPTION

The Tape Punch and the Edge Card Punch back space features are solenoid operated mechanisms. The solenoid is pulsed by back space bridge contacts in the selector assembly. Each time the back space keylever is depressed, the solenoid operates and the punch backs up one code on a tape or on an edge card.

The solenoid is mounted on the bottom of a plate assembly. It is connected by means of its plunger and a link to an arm assembly. The left hand end of the solenoid plunger is positioned in the right hand end of the solenoid core. When the solenoid is energized, the plunger moves into the core of the solenoid and operates the arm assembly. The pawl on the arm assembly rests against the pawl stop when the plunger is in its fully operated position. The pawl stop is screwed to the top of the plate assembly.

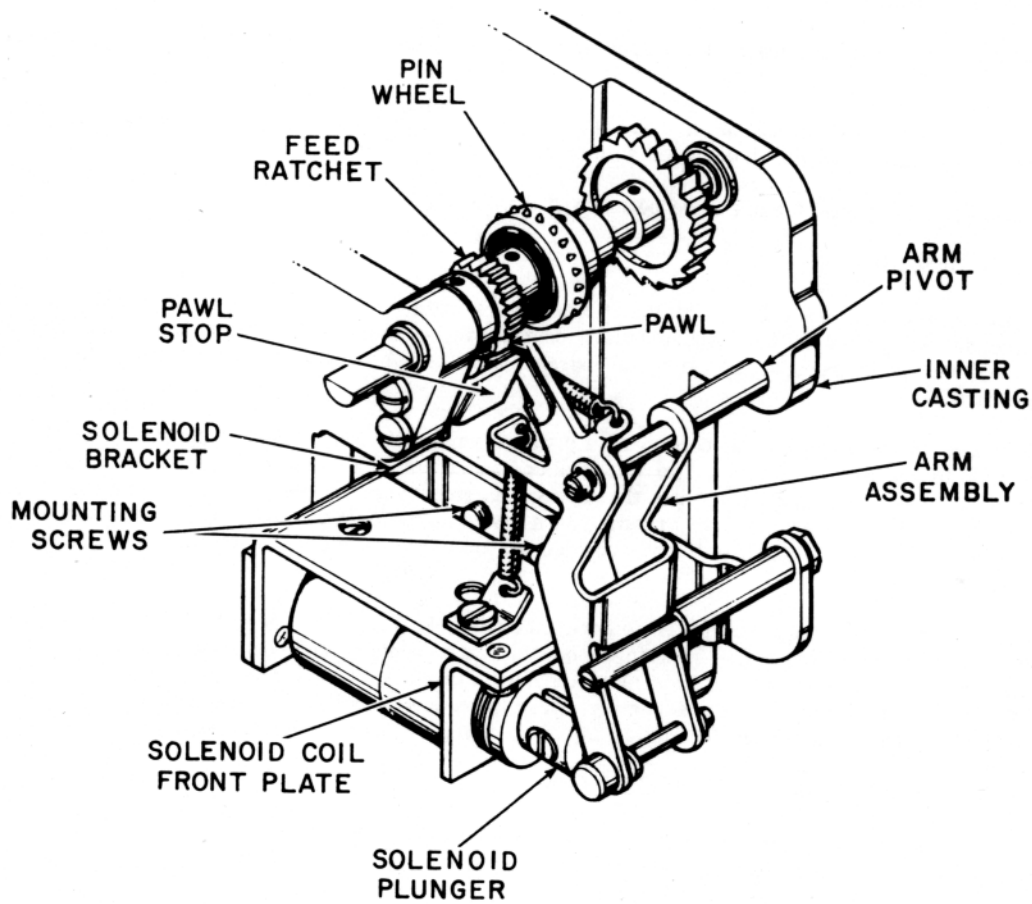
On a Tape Punch equipped with this feature, the solenoid plunger is under the tension of a spring anchored to the solenoid bracket. When the solenoid is in the de-energized condition, the arm assembly rests against a stud. On an Edge Card Punch equipped with this feature, the plunger is under the tension of a spring anchored to the plate assembly. When the solenoid is in the de-energized condition, the arm assembly rests against an eccentric stop. The eccentric stop is secured to the plate assembly.

FUNCTIONAL DESCRIPTION

When the backspace keylever is depressed, the associated selector slide closes SB57 contacts 1 and 2 and a pulse is applied to the backspace solenoid LPBS. When the solenoid is energized, the solenoid plunger is attracted into the core of the coil. As the plunger moves into the core the bottom of the arm assembly, which is connected to the plunger, moves toward the rear of the punch. The arm assembly pivots and the top of the arm moves toward the front of the punch. As the arm assembly continues to move forward the pawl, which pivots on the top of the arm assembly, engages the feed ratchet and rotates the pinwheel assembly one full tooth backwards. Thus, the last punched code is placed into the punching position. The pawl stop limits the movement of the pawl to prevent overtravel.

When the solenoid is in the de-energized condition, spring tension returns the arm assembly to its restored position.

ADJUSTMENTS (TAPE PUNCH)



1. Locate the solenoid bracket to its rearmost position and align the bottom edge of the bracket with the bottom edge of the inner casting.

   a. Loosen the mounting screws that retain the solenoid bracket.

   b. Position the solenoid bracket as required and tighten the mounting screws.

2. When the solenoid plunger is in the operated condition the pawl on the arm assembly must make a positive engagement with the feed ratchet for a feed of one tooth.

a. Loosen the nuts that retain the arm pivot.

b. Place the solenoid plunger in its operated condition and position the arm pivot so that the pawl makes positive engagement with the feed ratchet for a feed of one tooth of the ratchet. With the solenoid unoperated, the pinwheel must rotate freely in both directions with a clearance between the pawl and the feed ratchet. Tighten the retaining nuts.

3. With the solenoid plunger in the operated condition and the pinwheel in a detented position, the pawl stop must limit the movement of the pawl to prevent overtravel.

a. Loosen the pawl stop mounting screws.

b. With the solenoid plunger in the operated condition, position the pawl stop as required.

c. Tighten the two mounting screws.

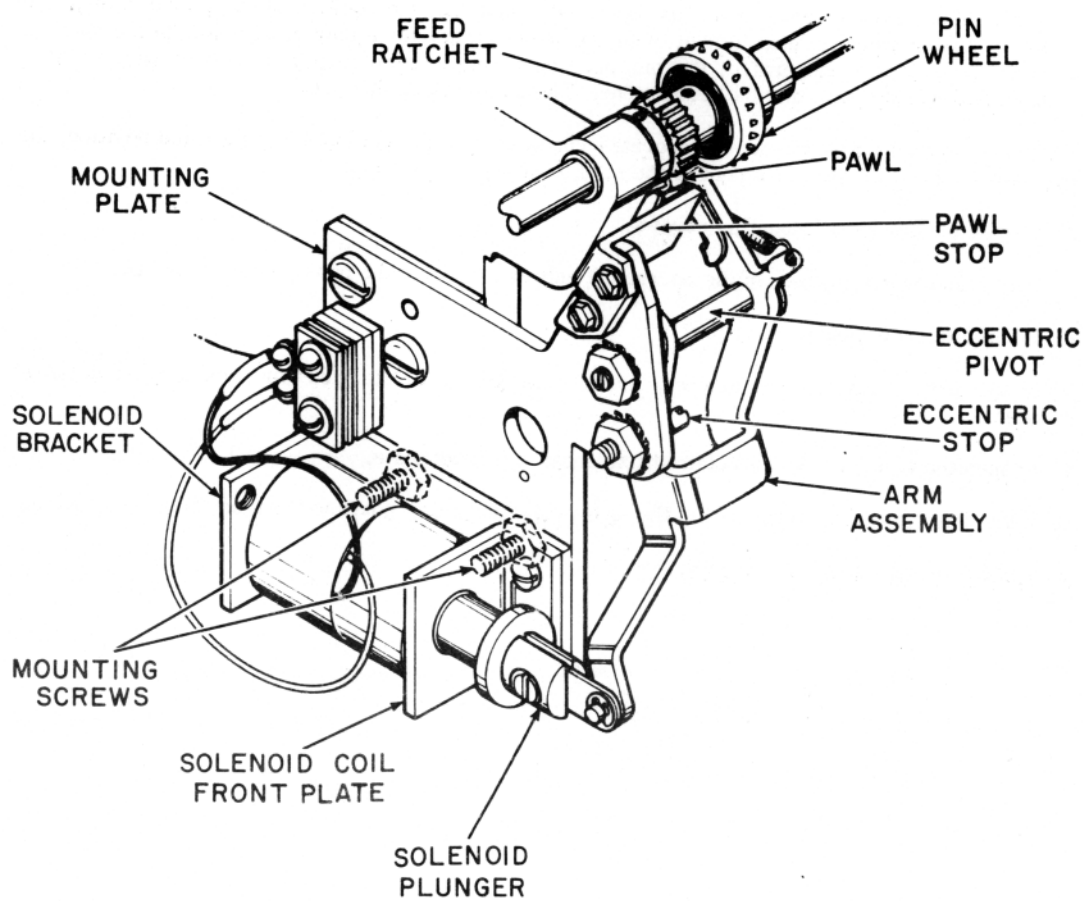
4. With the pawl engaging the ratchet, there must be a 3/32" to 5/32" movement of the solenoid plunger.

a. Loosen the two screws that retain the solenoid coil front plate.

b. With the solenoid plunger in the operated condition, position the front plate as required.

c. Tighten the two mounting screws.

ADJUSTMENTS (EDGE CARD PUNCH)



1. The eccentric stop must be positioned with the eccentric located to the front of the punch.

   a. Loosen the lock nut that retains the eccentric stop.

   b. Position the eccentric stop as required.

   c. Tighten the lock nut.

2. Position the solenoid bracket to its rearmost position and align the bottom edge of the bracket with the bottom edge of the mounting plate.

   a. Loosen the two mounting screws that retain the solenoid bracket.

   b. Position the solenoid bracket as required.

c. Tighten the mounting screws.

3. When the solenoid plunger is in the operated condition, the pawl on the arm assembly must make a positive engagement with the feed ratchet for a feed of one tooth.

   a. Loosen the lock nut on the arm assembly eccentric pivot and position the pivot with the eccentric up.

   b. Place the solenoid plunger in its operated condition and adjust the eccentric pivot screw so that the pawl makes positive engagement with the feed ratchet for a feed of one tooth of the ratchet. Place the solenoid plunger in its unoperated condition. The pinwheel must rotate in both directions with a clearance between the pawl and the feed ratchet. Tighten the lock nut on the pivot.

4. With the solenoid plunger in the operated condition and the pinwheel in a detented position, the pawl stop must limit the movement of the pawl to prevent overtravel.

   a. Loosen the pawl stop mounting screws.

   b. With the solenoid plunger in the operated condition, position the pawl stop as required.

   c. Tighten the two mounting screws.

5. With the pawl engaging the ratchet, there must be a 3/32" to 5/32" movement of the solenoid plunger.

   a. Loosen the two screws that retain the solenoid coil front plate.

   b. With the solenoid plunger in the operated condition, position the front plate as required.

   c. Tighten the two mounting screws.

SPECIAL FEATURES

LABEL HOLDER

2200/2300 SERIES FLEXOWRITER
Automatic Writing Machines

Purpose And Use

Physical Description

Adjustments

LABEL HOLDER

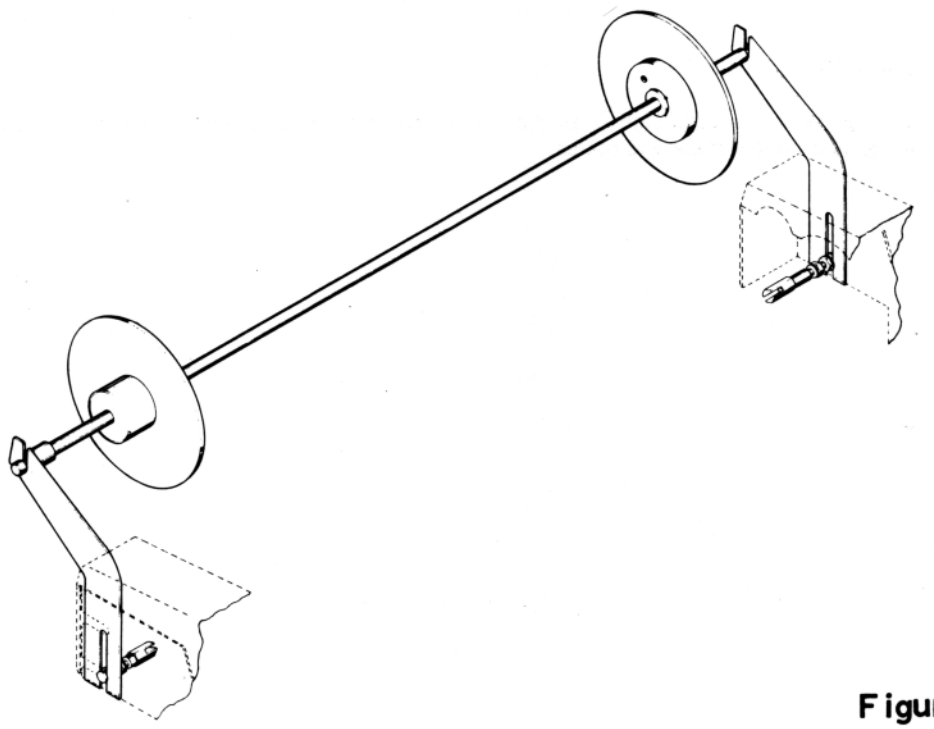


Figure 1

PURPOSE AND USE

The Label Holder (Figure 1) provides the means for installing a roll of labels on the carriage for continuous feeding of labels during automatic operation.

Installation of this feature on any of the 2200 or 2300 series FLEXOWRITER Automatic Writing Machines can be made in the field.

PHYSICAL DESCRIPTION

The roll of labels is installed between two plates which are adjustable to any position on a shaft. The shaft is set between two brackets which are attached to the carriage end plates.

A rubber brake on the shaft is positioned against the inner surface of the bracket at the left hand end end of the shaft. This brake prevents free turning of the shaft. The normal carriage return operation indexes the labels in the same manner as any hard copy would be indexed.

Installation of this feature requires the changing of existing upper and lower left hand and right hand end covers, installation of the special brackets, and new end cover screws. This feature can be ordered by using either one of two part numbers: 2024277 (for a 16-inch carriage) or 2024278

(for a 20-inch carriage).

ADJUSTMENTS

Only one adjustment is required; it is the initial mounting of the brackets and studs which hold the brackets against the carriage end plates.

INSTALLATION

Unpacking

1. Open the carton and remove the shipping envelope. Check to see that the envelope contains the following items:

   a. Operators Manual
   b. Unpacking Report and Aligning Form
   c. Two Schematics
   d. Two copies of the machine specifications
   e. Special instructions or requests from Quality Control. (Applies to certain units.)
   f. A cloth bag containing:
      (1) Actuators
      (2) Tab stops and back-up tabs
      (3) Actuator screws
      (4) Programming diodes (Applies to certain units.)
      (5) Jumper wires

2. Supplies consisting of:

   a. Cloth ribbon or a carbon ribbon
   b. Roll of paper tape
   c. Dust Cover
   d. Tape slug cleaning brush
   e. Edge punch cards (Applies to certain units.)

3. Remove the upper packing and lift the machine from the carton.

   CAUTION: Do not lift the machine without assistance

4. Remove the plastic bag from around the machine.

5. Remove the tapes which retain the covers to the machine.

6. Remove the four carriage stops from the ends of the carriage rails.

7. Remove the upper rear cover and remove the two split black rubber washers. These washers hold the segment support assembly in its mid-position. (Double case machines only.)

8. Remove the strips of paper tape from the guides on the Punch and the Reader.

9. Thread the end of the roll of paper tape through the Punch.

10. Remove the paper which is wrapped around the platen.

11. Install the ribbon. If a black and red cloth ribbon is used, the black part must be at the top.

12. Perform the applicable acceptance tests which follow in this section. After completing the acceptance tests use the customer's program, if possible, to further check the equipment.

Packing

Packing the machine is accomplished by reversing the order of the steps outlined under Unpacking. Use the same type of tape to retain the writing machine covers as was used when the machine was originally shipped. Any Flexowriter that is to be shipped from the Field, must be properly packed in a carton or a box.

ACCEPTANCE TESTS

The following series of tests were devised for checking the functions and the features on Model 2201 and Model 2301 Flexowriters. Tests for models other than the Model 2201 and Model 2301 are also included in this series of tests.

These tests also include every special feature available. The Customer Service Representative will devise the test pattern for the particular feature on the machine.

Repeat Character

Test Description:

The Repeat Character test consists of each character printed in groups of five, each group separated by a space. Both upper case and lower case characters, if applicable, must be tested.

Example:

aaaaa bbbbb ccccc ddddd eeeee fffff ggggg hhhhh iiiii jjjjj kkkkk lllll mmmmm nnnnn ooooo ppppp
AAAAA BBBBB CCCCC DDDDD EEEEE FFFFF GGGGG HHHHH IIIII JJJJJ KKKKK LLLLL MMMMM

Recommended Test Length:
Two complete cycles of test tape under automatic operation.

Back Space

Test Description:

Print a line of the letter n followed by a space across the entire width of a sheet of paper. (See Example 1.) Then back space to each of the spaces between the n's and print the letter i. (See Example 2.) Continue until an i is printed in each space. (See Example 3.) If applicable, this test must be done in upper case and lower case.

Example:

(1) n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n
(2) n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n n ninininininininininininininininininin
(3) nininininininininininininininininininininininininininininininininininininininininininininininininin

Recommended Test Length:
Three cycles of the test tape under automatic operation.

Carriage Return & Tab

Test Description:

Insert tab stops in a pattern of long tabs and short tabs across the entire length of the carriage. Using the letter X to indicate the printing position at the margin and each tab stop, prepare a tape so that X is at the margin followed by a tab operation and an X is printed at each tab stop. This test pattern will vary so that the operation will carriage return from various carriage positions and not just the extreme end of the carriage.

Example:

```
X     X     X     X
X     X     X
X     X
X     X     X     X
```

Recommended Test Length:
Run the tape at least five times.

Non Print & Print Restore

Test Description:

Prepare a tape consisting of the codes for the characters A through M, followed by the Non Print code, then the codes for the characters 1 through 9, a Print Restore code, the codes for the characters N through Z, and a Stop code.

Example:

Codes for the printing characters in the tape:

ABCDEFGHIJKLM 123456789 NOPQRSTUVWXYZ

The correct readout in Automatic Non Print must be:

ABCDEFGHIJKLMNOPQRSTUVWXYZ

The correct readout in Manual Non Print must be:

NOPQRSTUVWXYZ

Recommended Test Length:
Run the tape five times automatically, and five times in Manual Non Print.

Tape Skip & Skip Restore

Test Description:

Prepare a tape consisting of the codes representing all of the characters on the keyboard, then a Skip Restore code, and the codes representing all of the characters on the keyboard in reverse order.

Example:

Codes for the printing characters in the tape:

ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890-=½';/.,
,./;'½=-0987654321ZXYWVUTSRQPONMLKJIHGFEDCBA

The correct readout must be:

,./;'½=-0987654321ZYXWVUTSRQPONMLKJIHGFEDCBA

Recommended Test Length:
Run the test tape five times.

Shift Test

Test Description:

Prepare a tape consisting of codes representing the printing characters on the keyboard in alternate upper and lower case.

Example:

aAbBcCdDeEfFgGhHiIjJkKlLmMnNoOpPqQrRsStTuUvVwWxXyYzZ
2@3#4$5%6¢7&8*9(0)-_=+½¼'";:/?.,,

Recommended Test Length:
Run the test tape five times.

CP ON

Test Description:

With the CP Switch depressed, check for proper punching of all symbols. With the CP Switch off, check for non punching of the indicated symbols.

No example necessary.

Skip Tab

Test Description:

To test the Skip Tab, it will be required that the method of activating the Skip Tab is programmed as well as the actuator rack to disable the Skip Tab. Install two actuators on the rack so you will be able to initiate and disable two Skip Tabs per line. Prepare a tape with an X at the margin followed by a Tab, then an X, another Tab and X followed by a code to create a skip tab action. Then a Tab code followed by an X; another skip tab code, Tab and finally another X and Carriage Return.

Example:

Margin	Tab	Tab	Tab	(Actuator)	Tab	Tab	(Actuator)	Tab
X	X	X			X			X
X	X	X			X			X
X	X	X			X			X
X	X	X			X			X
X	X	X			X			X

Recommended Test Length:
A minimum of five Skip Tab operations.

Punch Control

Test Description:

In order to effectively test the ON-OFF operation of the Punch, a tape must be manufactured consisting of an ON 1 Code followed by the alphabet from A to M. This is followed by a Punch Off Code with the numerals 1 through 9. Then put an ON Code with the remaining letters of the alphabet N to Z, Off, and Stop.

Example:

Codes in the test tape:

ABCDEFGHIJKLMN 123456789 NOPQRSTUVWXYZ

The correct readout must be:

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Recommended Test Length:
Run the test tape five times.

Parity Check

Test Description:

Through the use of the Aux. Switch, create several parity codes in a tape, and read the tape in the Reader while in the non print condition.

Field Control

Test Description:

It will be necessary to wire the program panel as well as attach actuators to the actuator rack to test this operation properly. If ON 1 only is required, that is all that will have to be tested; if both ON 1 and ON 2 are to be tested, it must be done in manual and automatic operations.

Recommended Test Length:
Run any test tape developed five times.

Stop Operation

Test Description:

Check to see that the equipment stops upon manual depression of the Stop Read switch, and also when the Stop Code is read. Check the specification sheet to make sure there is no optional feature with regard to these stop operations. If there is, be sure to test it.

Recommended Test Length:
Manually five times; automatically five times.

Program Mod Switch

Test Description:

Check each program mod switch for proper operation and coding, if used in the customer's program.

Selector Relays

Test Description:

If selector relays are used in the customer's program, each must be checked by the program for pick and drop by code and/or field switches, as required.

Tight Tape

Test Description:

Check to see that a tight tape condition exists by manually holding the tape during a normal punching operation.

Tape Feed & Edge Card Feed

Test Description:

Check to see that the tape feed and card feed operations operate properly, and that registration is maintained.

Tape Run-Out & Edge Card Run-Out

Test Description:

Check to see that a length of tape will feed completely through the Punch during a Tape Feed Operation; or check to see, if applicable, that a last edge card feeds properly through the Punch.

INSPECTION CHART
(Things to check on an Inspection)

Power Drive
- Speed
- Motor
- Gears
- Power Roll

Power Frame
- Basket Stops
- Basket Shift
- Case Shift Contacts
- U Bar
- Ribbon Lift
- Ribbon Feed
- Ribbon Reverse

Keyboard
- Key Lever Trip
- Front Guide Comb
- Key Lever Interlock
- Key Lever Tension
- Key Lever Lock
- Key Lever Lock Contacts

Escapement & Back Space
- Escapement Pawl Carrier(s)
- Pawl Carrier Stops
- Back Space Eccentric
- Back Space Detent
- Back Space Contacts

Carriage & Rails
- Rails
- Margin Rack
- Paper Scale
- Tab Rack
- Line Gauge Card Holder
- Line Space
- End Covers
- Release Pawl Bracket
- Paper Deflector(s)
- Manual Release Levers
- Main Spring Tension

Carriage Return & Tab
- Links
- Clutch
- Tension
- Tab Governor
- Rebound Check Lever
- Links
- Contacts

Panel Switches
- Free Movement
- Contacts

Selector
- Transverse Bails
- Contact Shaft Assemblies
- Bail Play in Contact Shaft Assemblies
- Free Movement of Selector Slide
- Rollers
- Selector & Bridge Contacts

Punch
- Engagement with Power Drive
- Cam Shaft
- Pin Wheel(s)
- Registration
- Magnet Assembly
- Latch Levers & Armatures
- Bit Magnet Armature Knock Off
- Punch Levers
- Punch Lever & Frame Assembly
- Guide Comb
- Tape Stripper
- Tape Pressure Arm
- Feed
- Contacts

Punch Clutch
- Home Position
- Magnet Armature
- Armature Knock Off
- Overtravel Stop
- Sleeve End Play

Parity Check
- Position
- Contacts

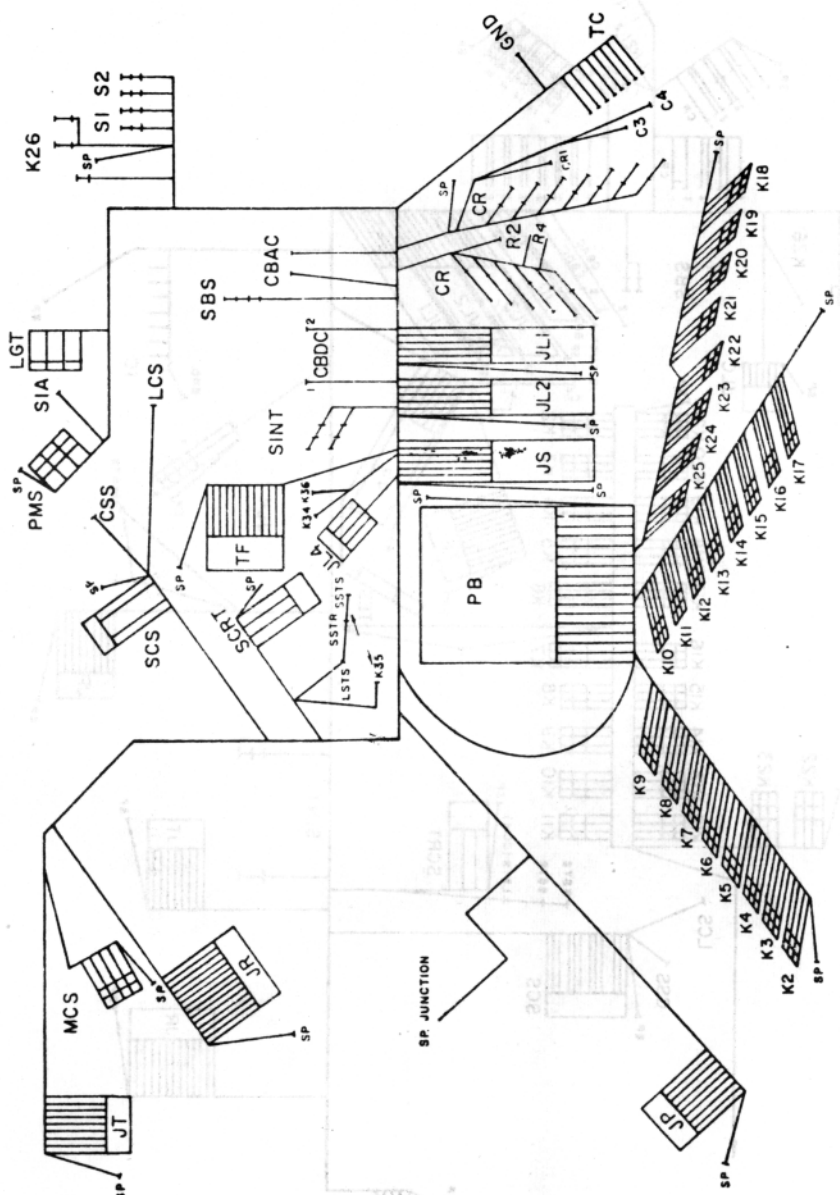
Translator
- Engagement with Power Drive
- Permutation Bars & Guides
- Spring Plunger Bracket
- Armature Heelpiece Clearance
- Armature Clearance to Permutation Bars
- Seeker Restoring Bail
- Seeker Operating Bail
- Projections to Seeker Alignment
- Permutation Bar Restoring Bail & Eccentric Stop
- Armature Knock Off
- Contacts

Translator Clutch
- Home Position
- Magnet Armature
- Overtravel Stop
- Sleeve End Play

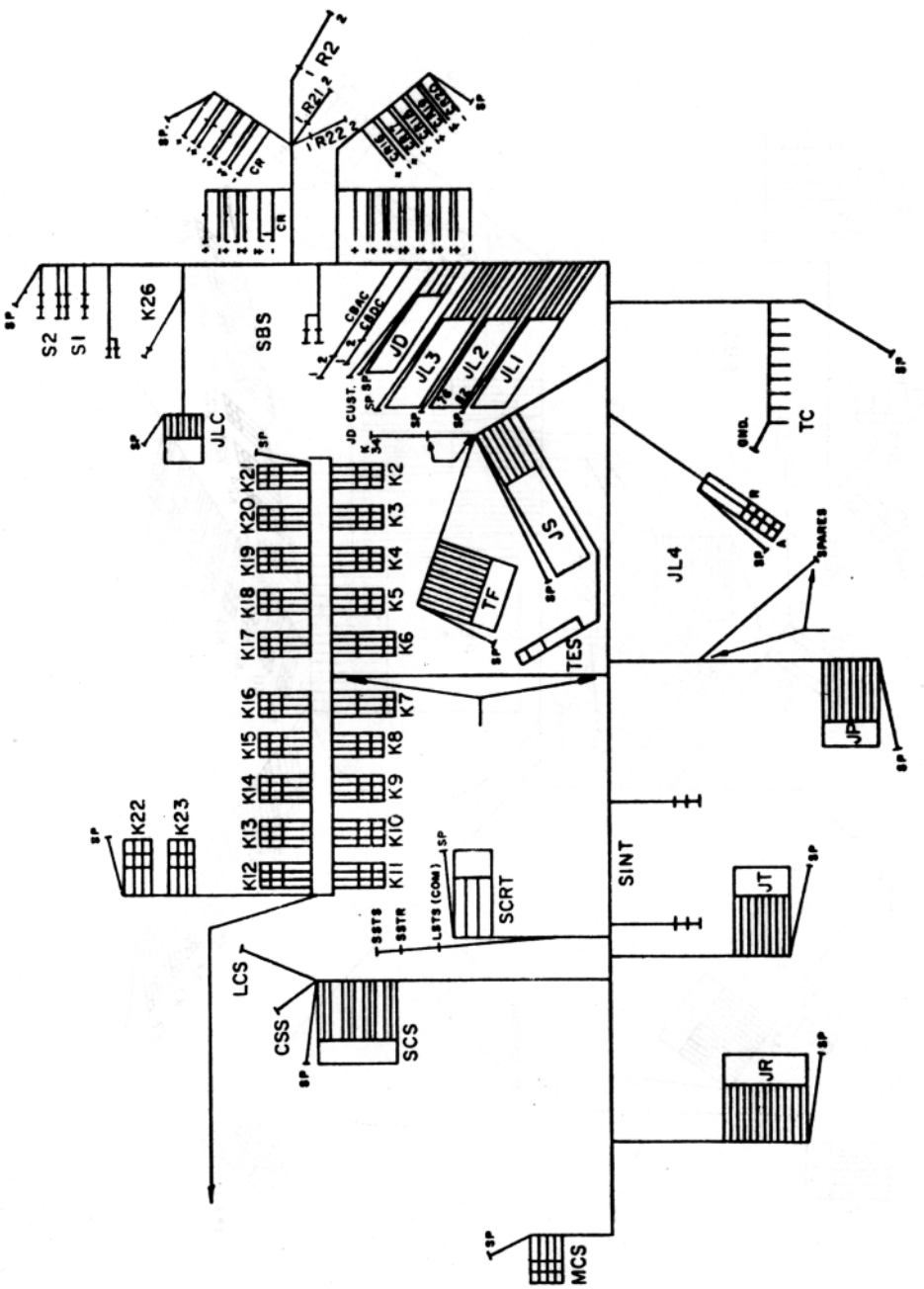
Reader
- Engagement with Power Drive
- Cam Shaft
- Pin Wheel (s)
- Interposer Guide & Springs
- Magnet Armature End Play
- Registration
- Feed
- Magnet Assembly
- Control Armature Assembly
- Control Arm
- Guide Block
- Contacts

Typing Operation
- Cam Clearance
- Alignment
- Impression

2200 SERIES SPARE WIRE LOCATION



2300 SERIES SPARE WIRE LOCATION



LUBRICATION

General Practice

Proper lubrication requires that the part receive just sufficient lubricant to prevent rust or excessive wear. Surfaces requiring oil are properly lubricated when they are covered by a film of oil. Assemblies requiring grease are properly lubricated when filled with just the amount of grease called for by the lubrication specifications. In every case, excess lubricant is to be wiped from the lubricated part.

Excess lubricant is defined as that amount of lubricant which does not adhere to the operating surface, sliding member, or pivot. Excess lubricant, because it is by definition outside the contact area, does nothing to prevent rust and excessive wear of the lubricated surfaces. It can, in fact, produce adverse effects and cause damage to the equipment.

Excess lubricant collects dust which, because it usually contains abrasive particles, can cause excessive wear of the affected parts.

Excess lubricant is especially detrimental to the efficient operation of electrical coils, contacts and connections. Excess lubricant has a tendency to rot insulation. It acts as an undesirable insulator between surfaces which must make electrical contact.

Excess lubricant can impede the operation of rapidly moving parts. For example, grease on the surface of the armature adjacent to the core of a coil can cause the armature to be held up when the coil is de-energized.

Use the #5 round brush (T18070) to apply oil to surfaces which require only a small amount of oil; for instance, roller pivots. Use the plastic valvespout oiler (T18185) to dispense oil to places such as oil holes and wicks where more than a drop of oil is needed.

Never apply so much lubricant that it drips or falls from the part being lubricated.

The lubrication points for the various components are indicated by the arrows in the figures beginning with Figure 2. The numbers in the circles refer to the classification of the lubricant according to the numbers given in Figure 1.

Our Number	Type Of Lubricant	Name	Approved Source
(2)	Oil	Mobil DTE 797	Mobile Oil Co.
(7)	Powder	Molylube 16	Bel-Ray Co.
(8)	Oil	Molub Alloy (To be purchased with an organic Carrier. A synthetic carrier must not be used.)	A.T. Supply Co.
(10)	Grease	Aero Lubriplate	Davis-Howland

Figure 1.

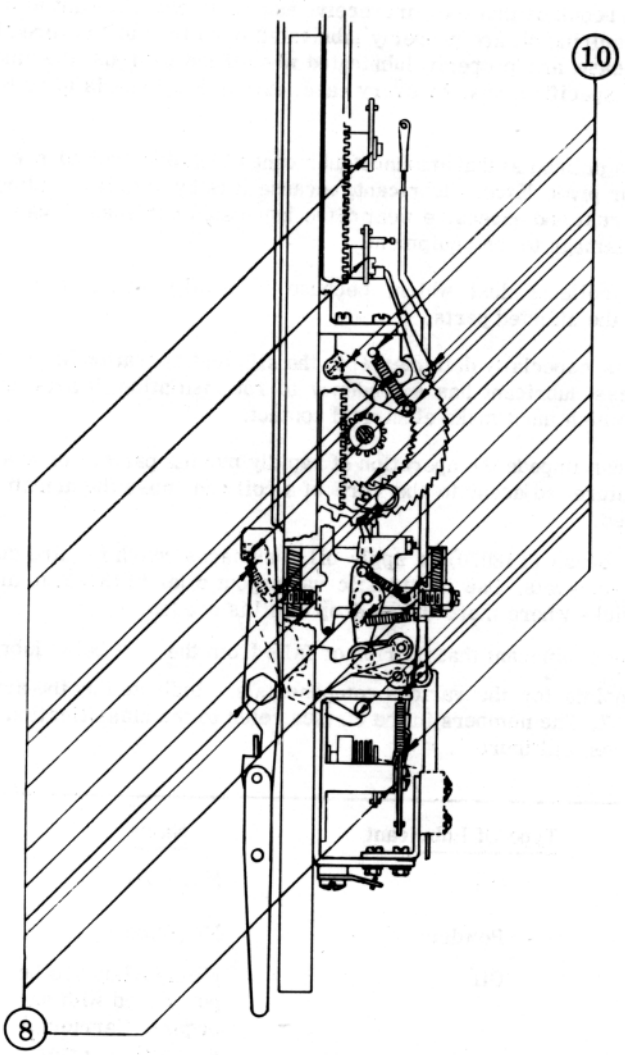


Figure 2. Carriage & Rails - Front View

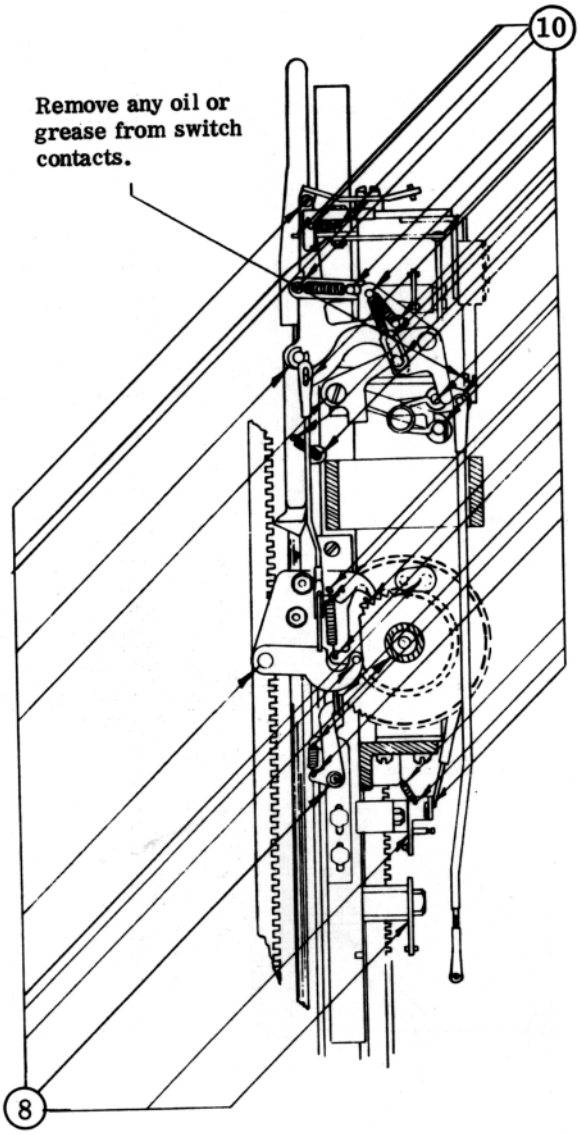


Figure 3. Carriage & Rails - Rear View

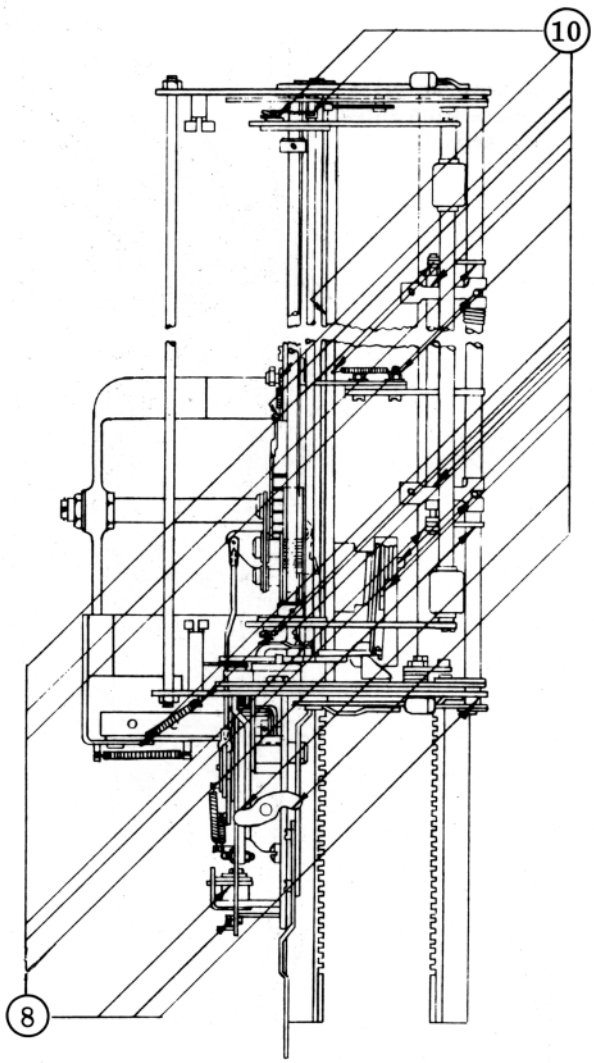


Figure 4. Carriage & Rails - Top View

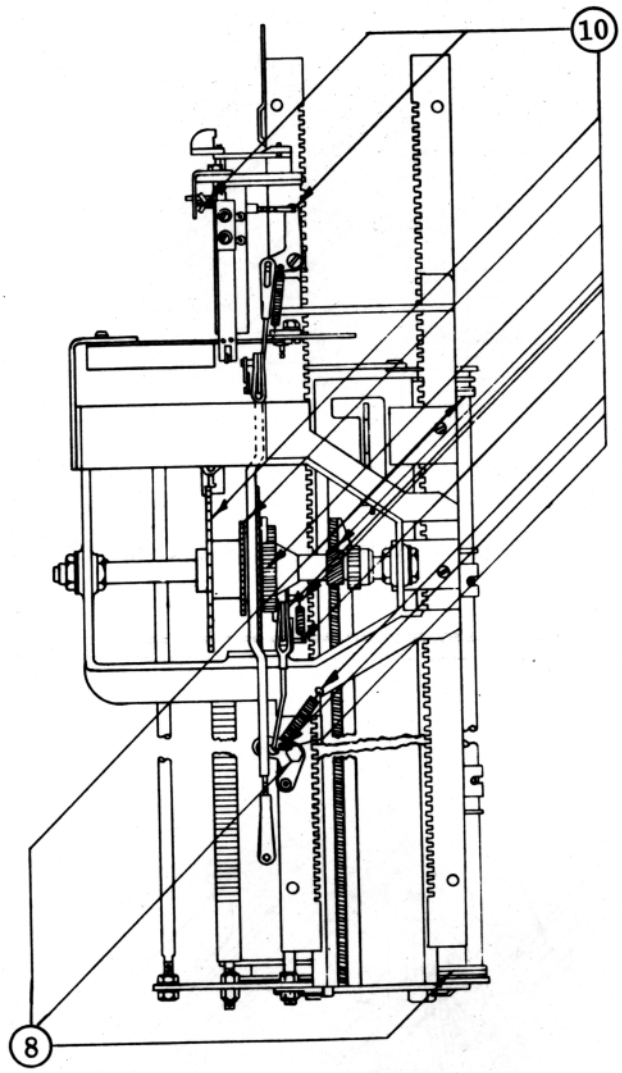


Figure 5. Carriage & Rails - Bottom View

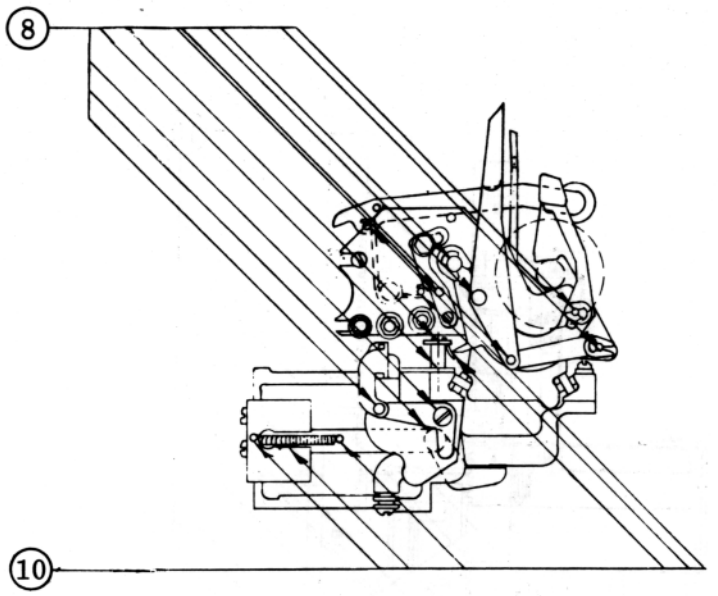


Figure 6. Carriage & Rails - Left Hand End, Outside View

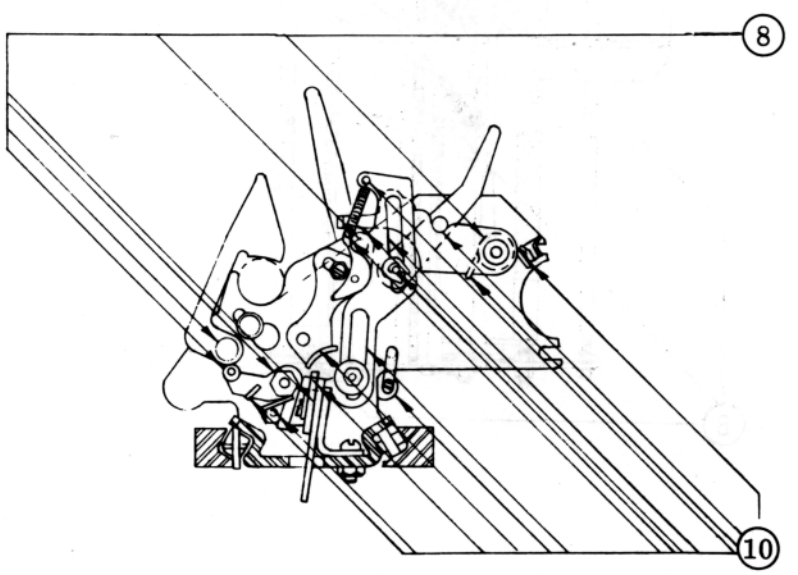


Figure 7. Carriage & Rails - Right Hand End, Inside View

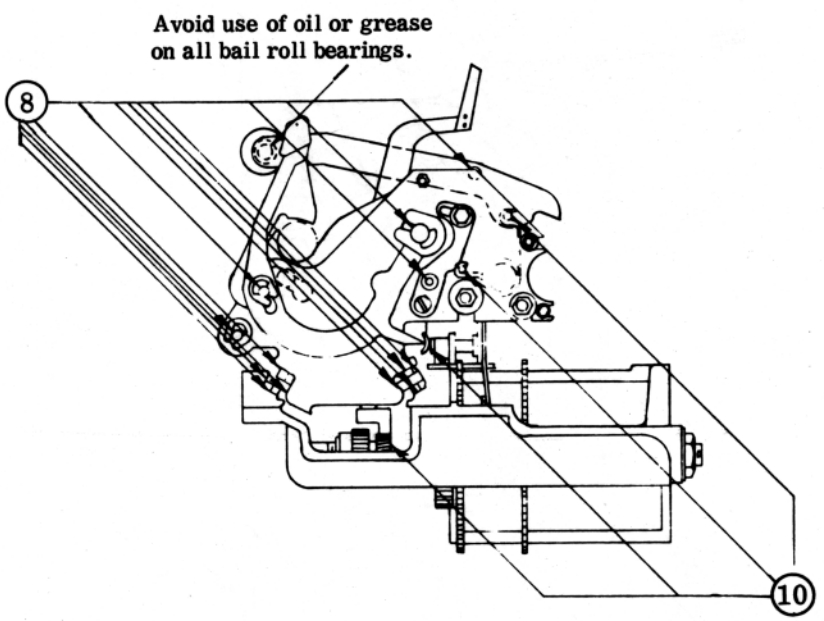


Figure 8. Carriage & Rails - Right Hand End, Outside View

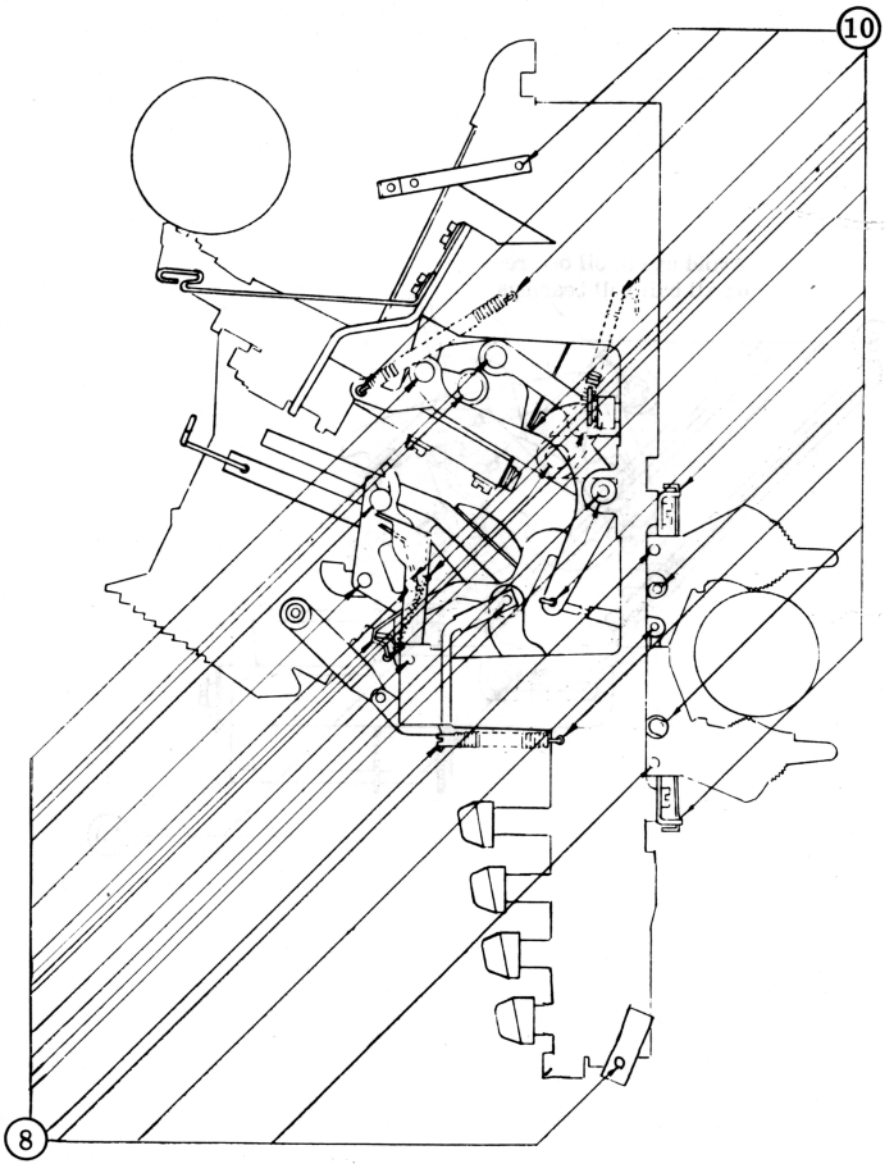


Figure 9. Power Frame - Right Hand Side

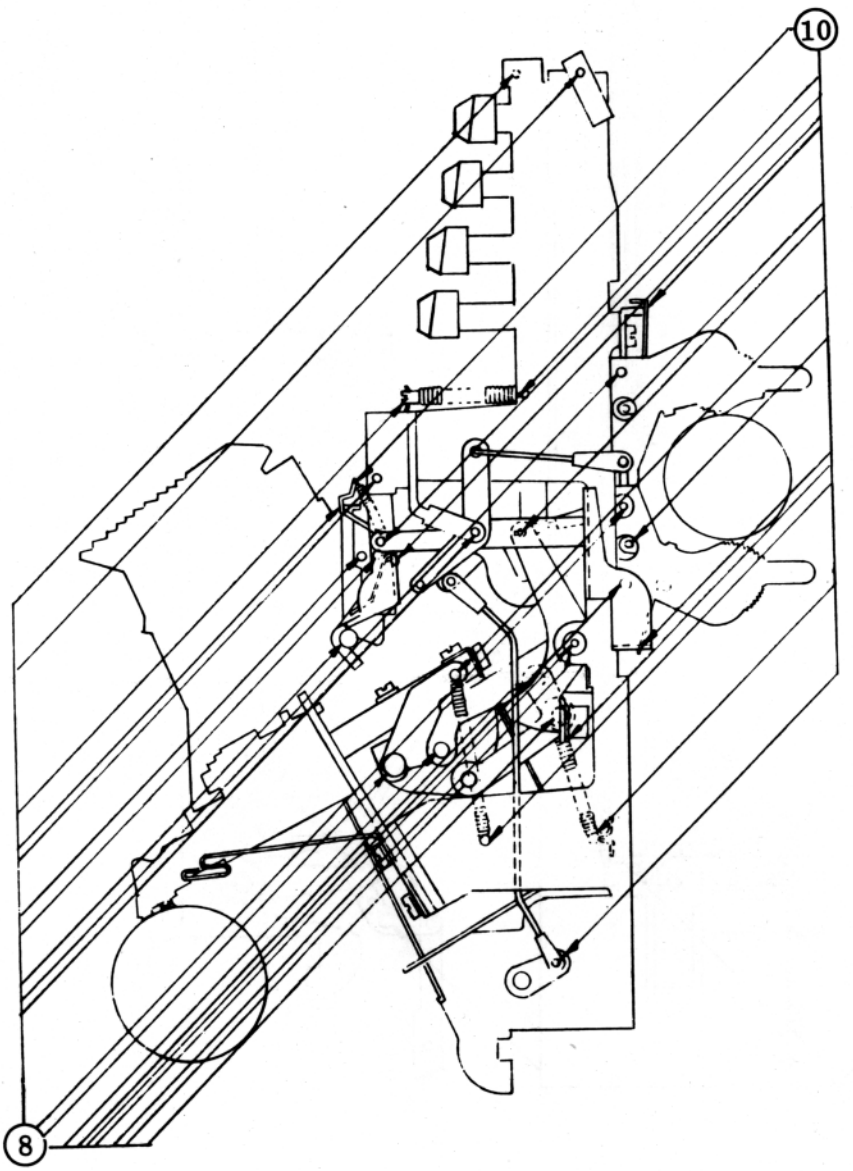


Figure 10. Power Frame - Left Hand Side

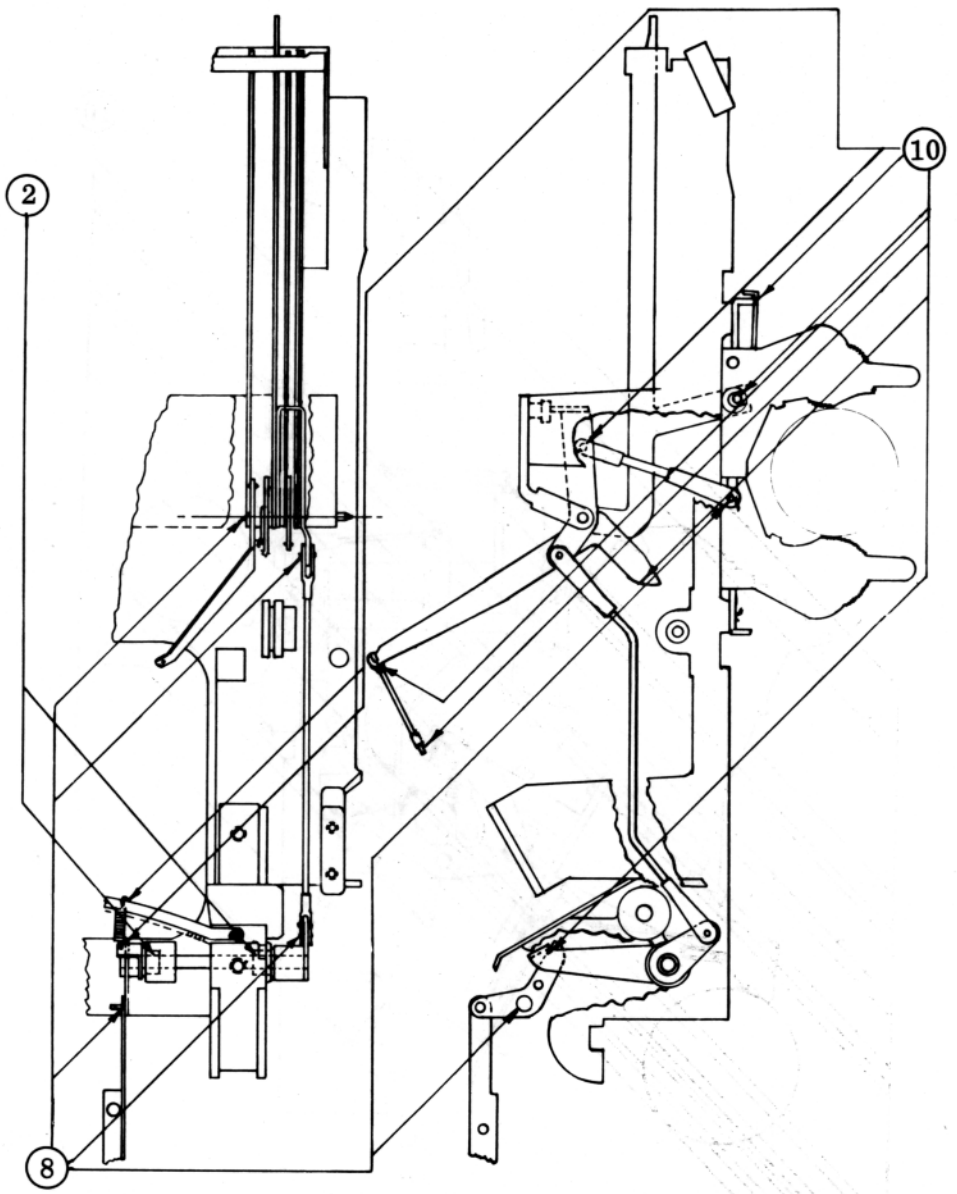


Figure 11. 44th Printing Character

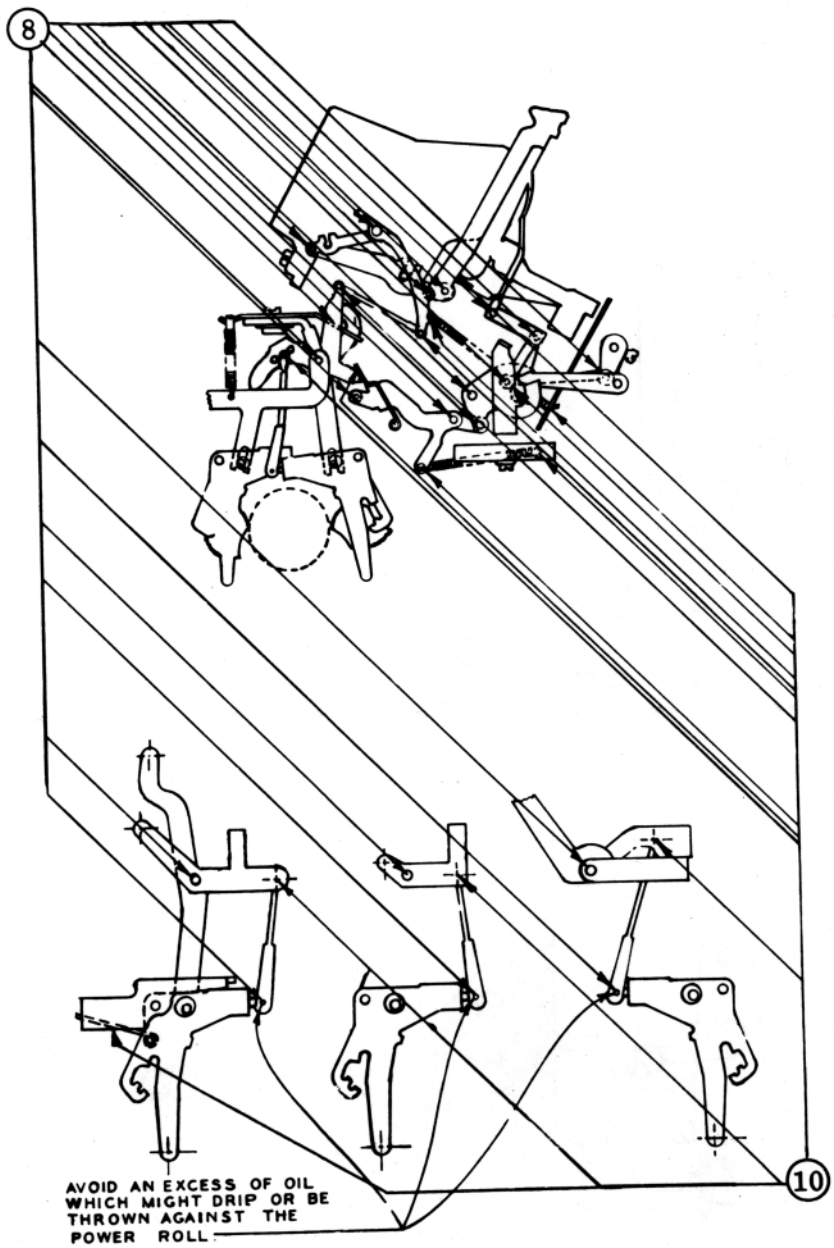


Figure 12. Power Frame

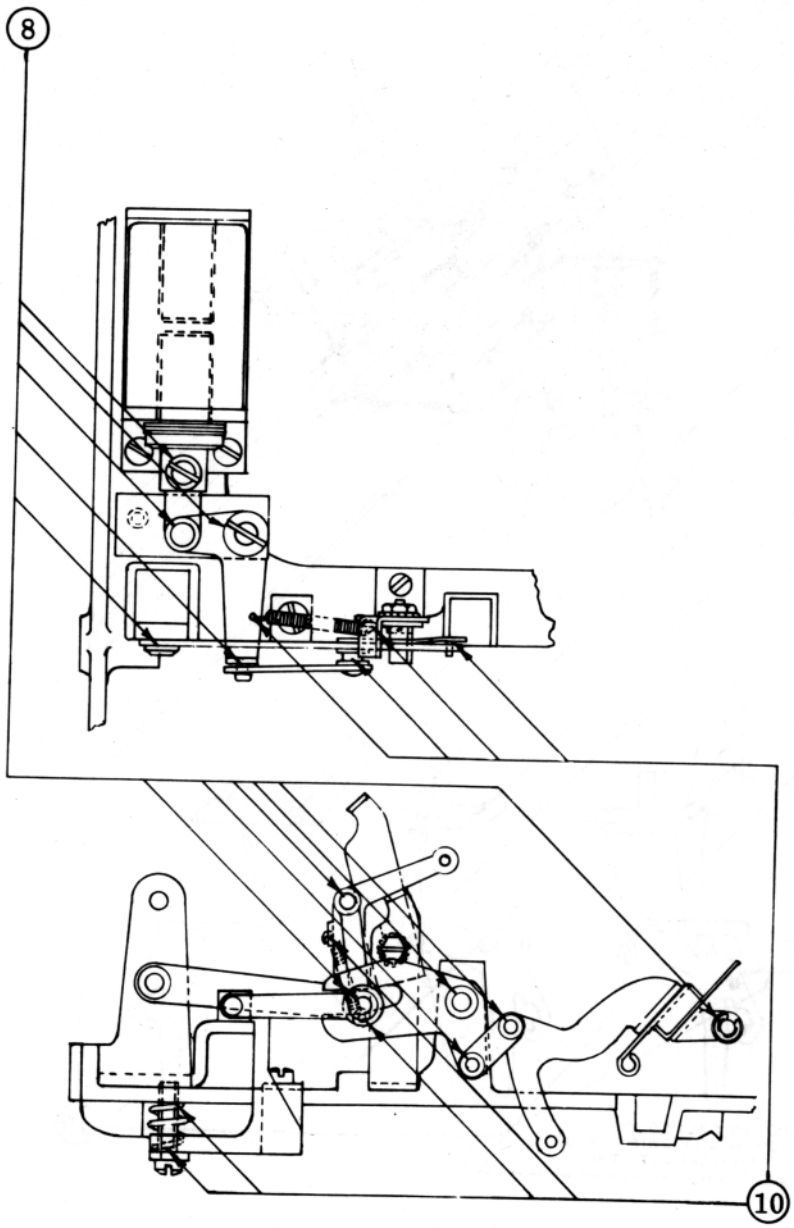


Figure 13. Automatic Ribbon Color Shifting Mechanism

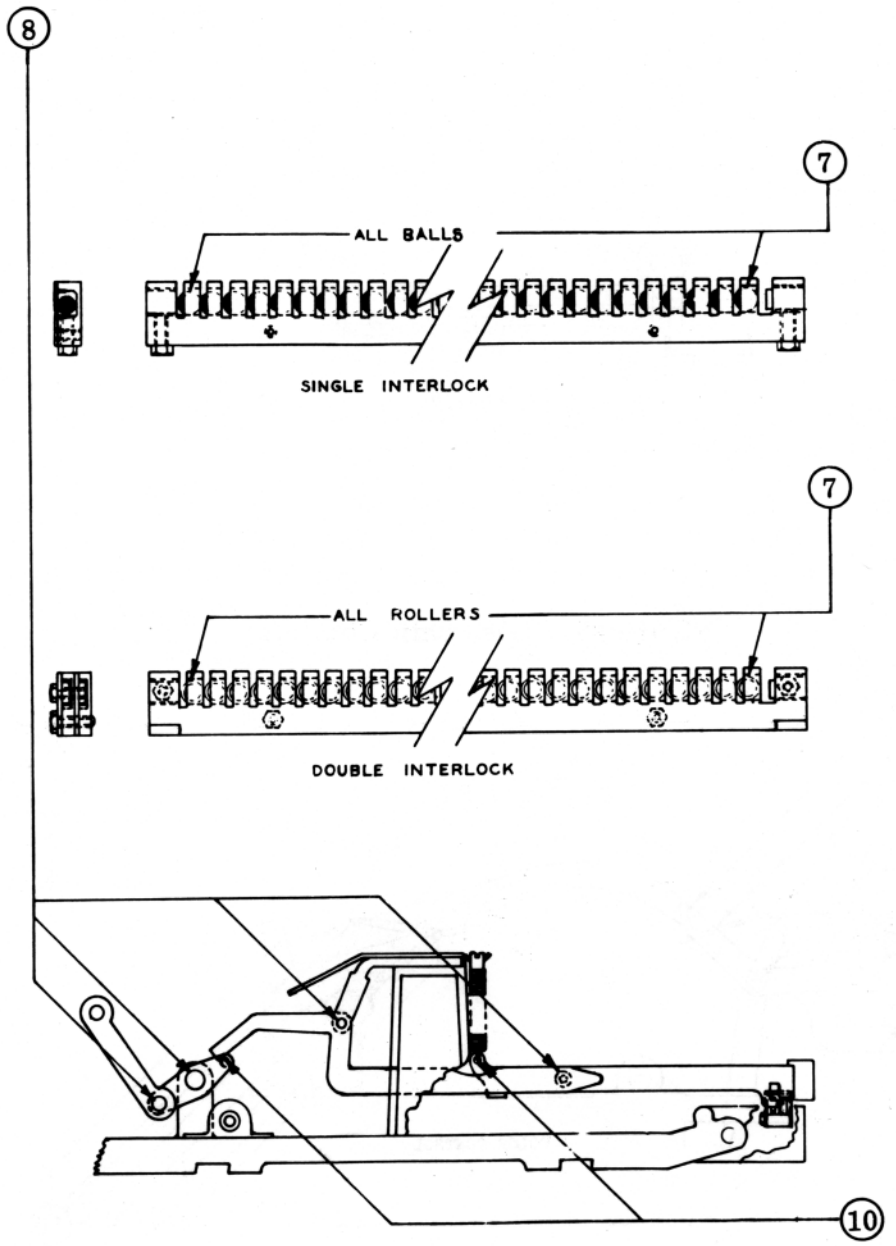


Figure 14. Interlock Mechanism

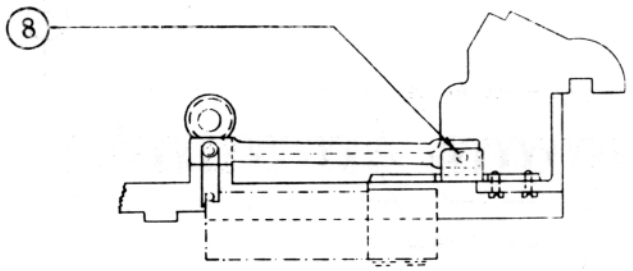


Figure 15. Case Shift Contacts

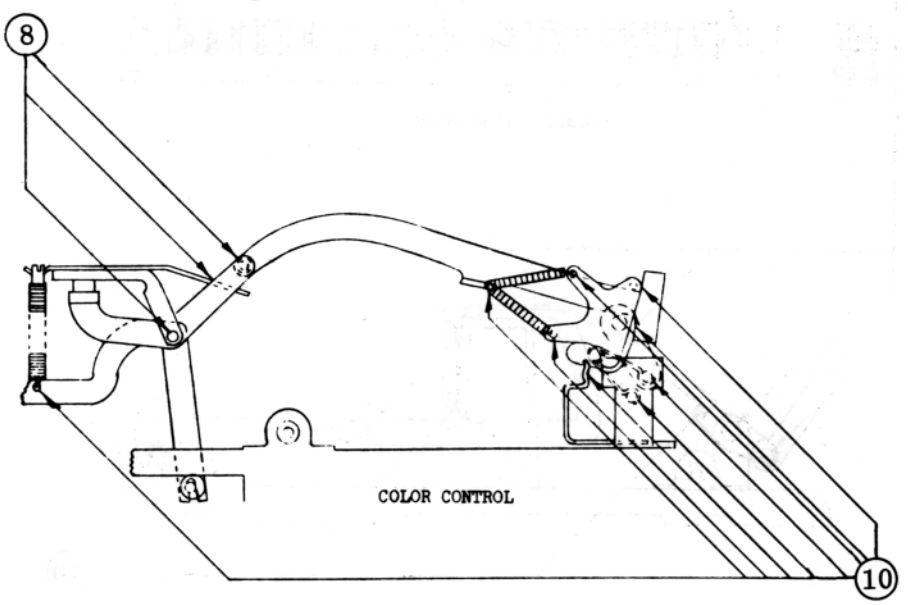


Figure 16. Color Control Mechanism

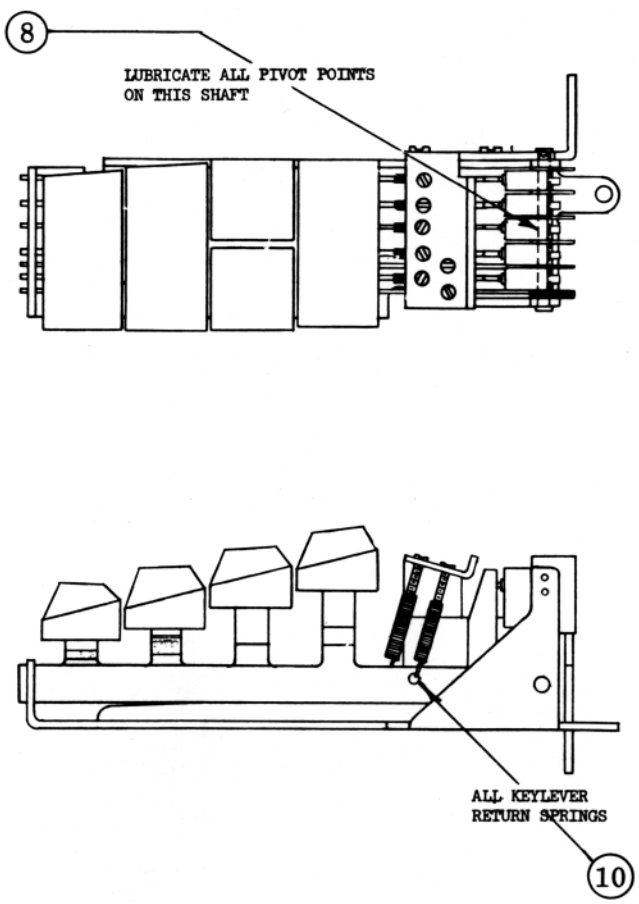


Figure 17. Keyboard Control Assembly

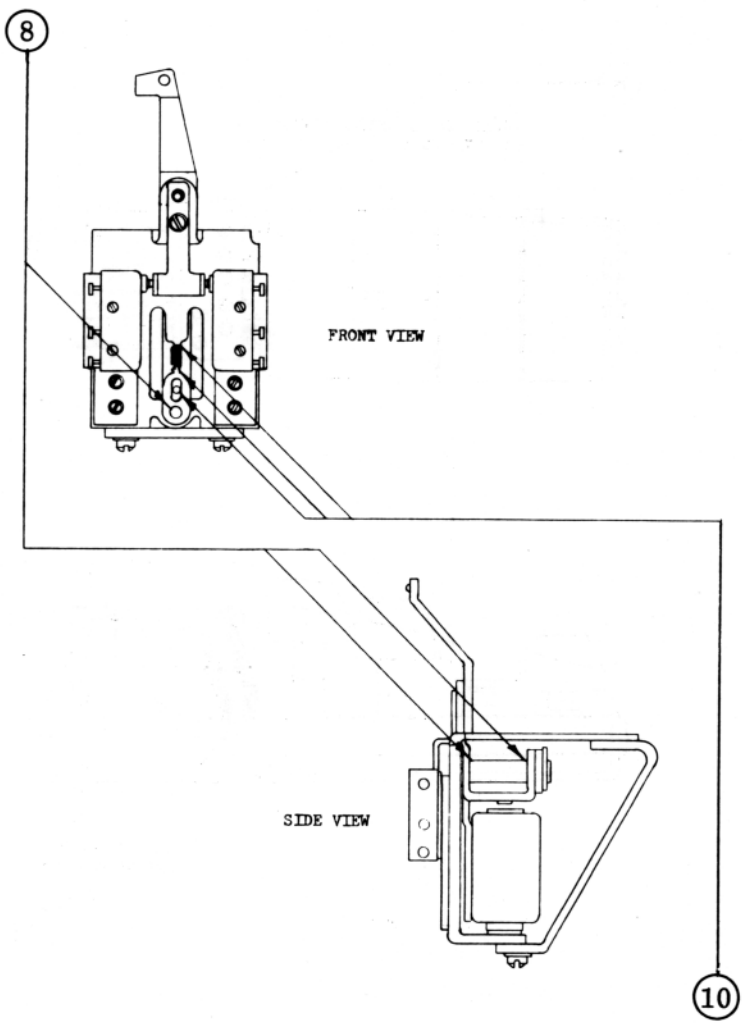


Figure 18. Disabling Assembly

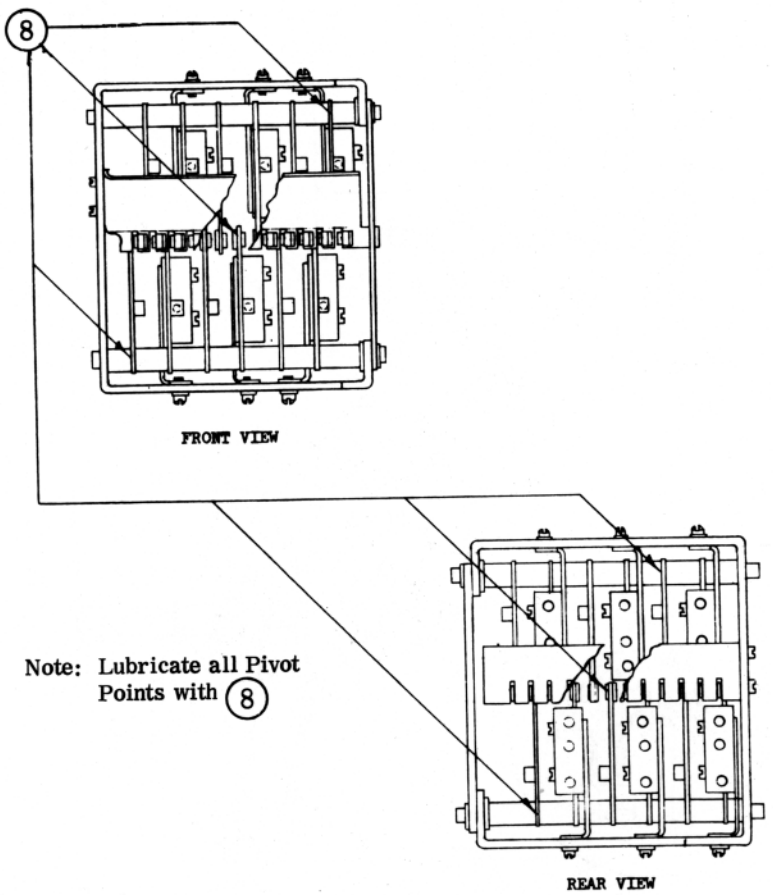


Figure 19. Field Switch Assembly

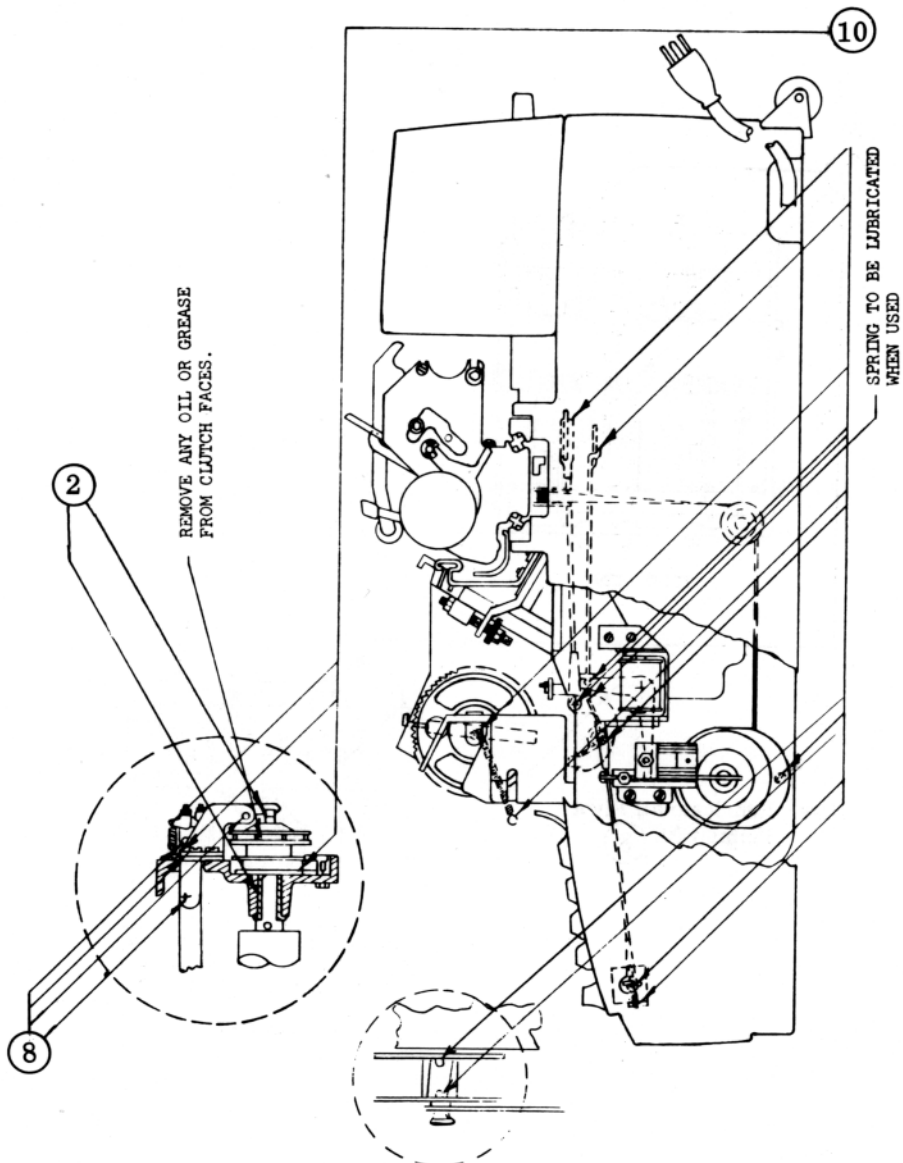


Figure 20. Final Assembly - Right Hand Side

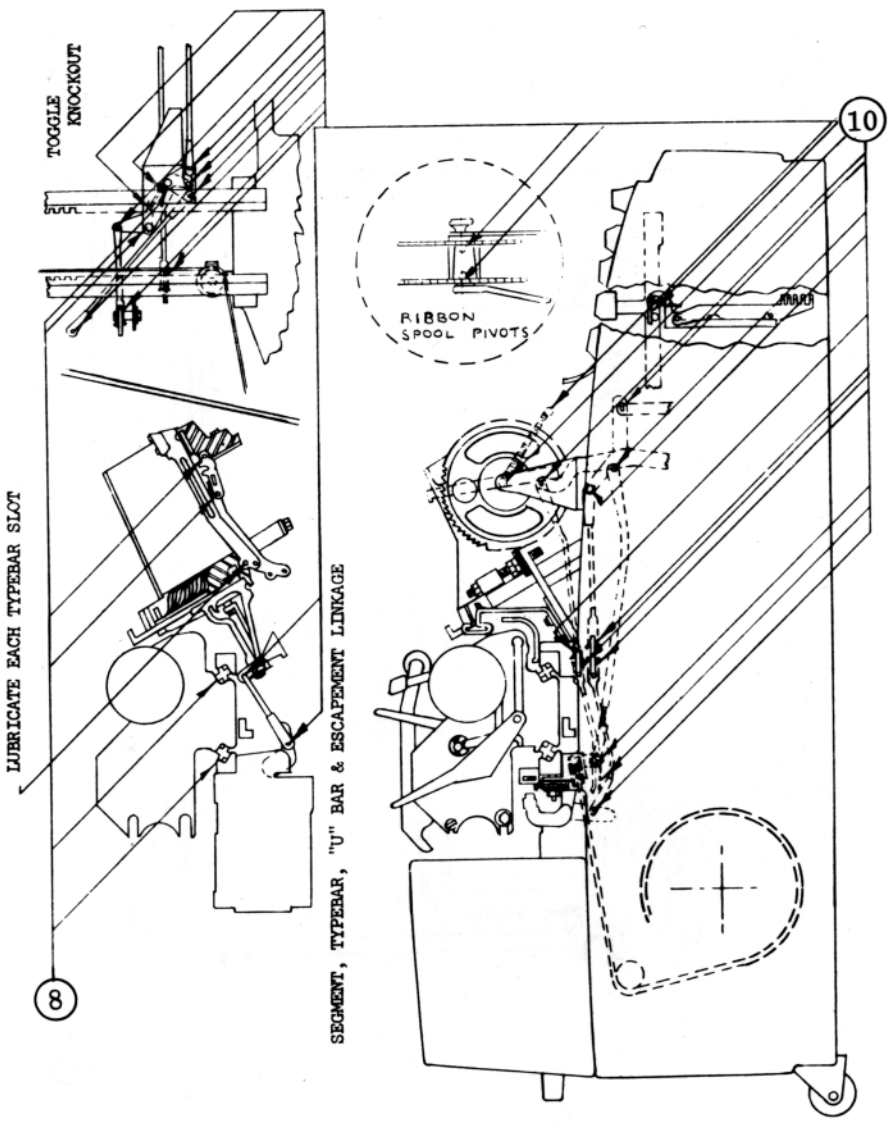


Figure 21. Final Assembly - Left Hand Side

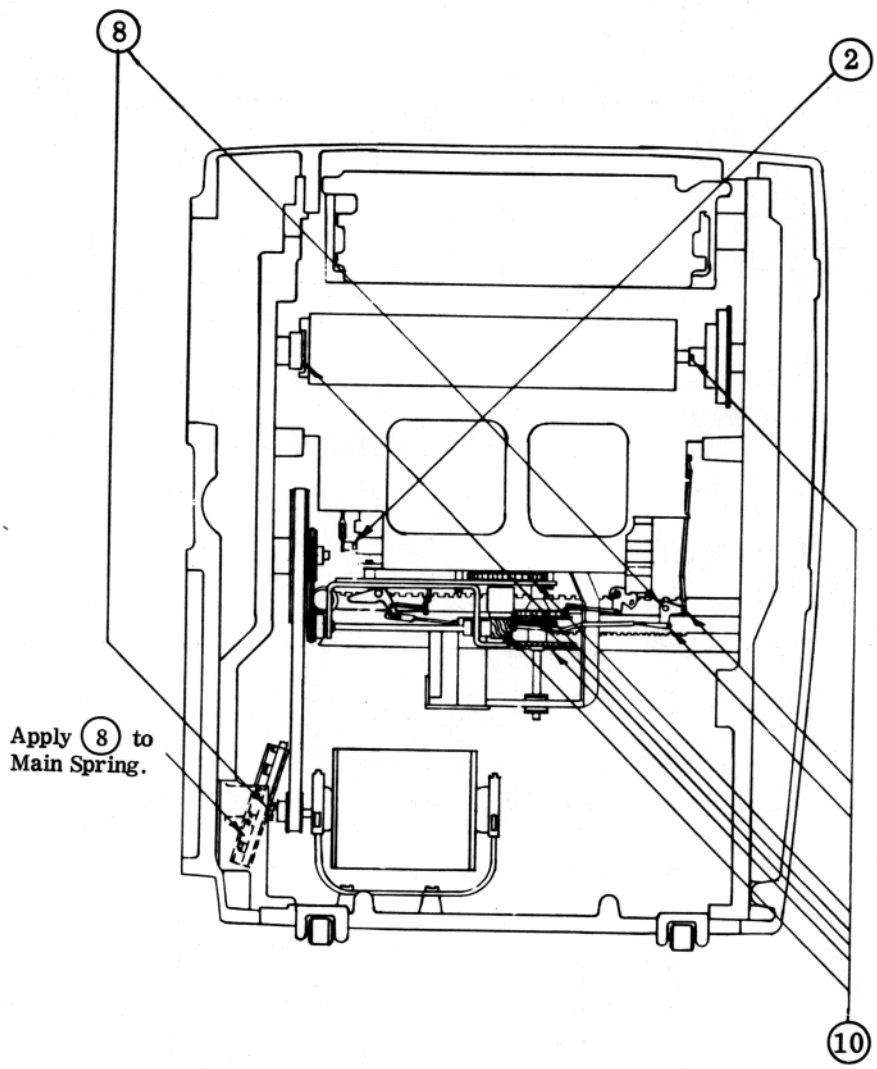


Figure 22. Carriage & Rails Mounted to Base Assembly

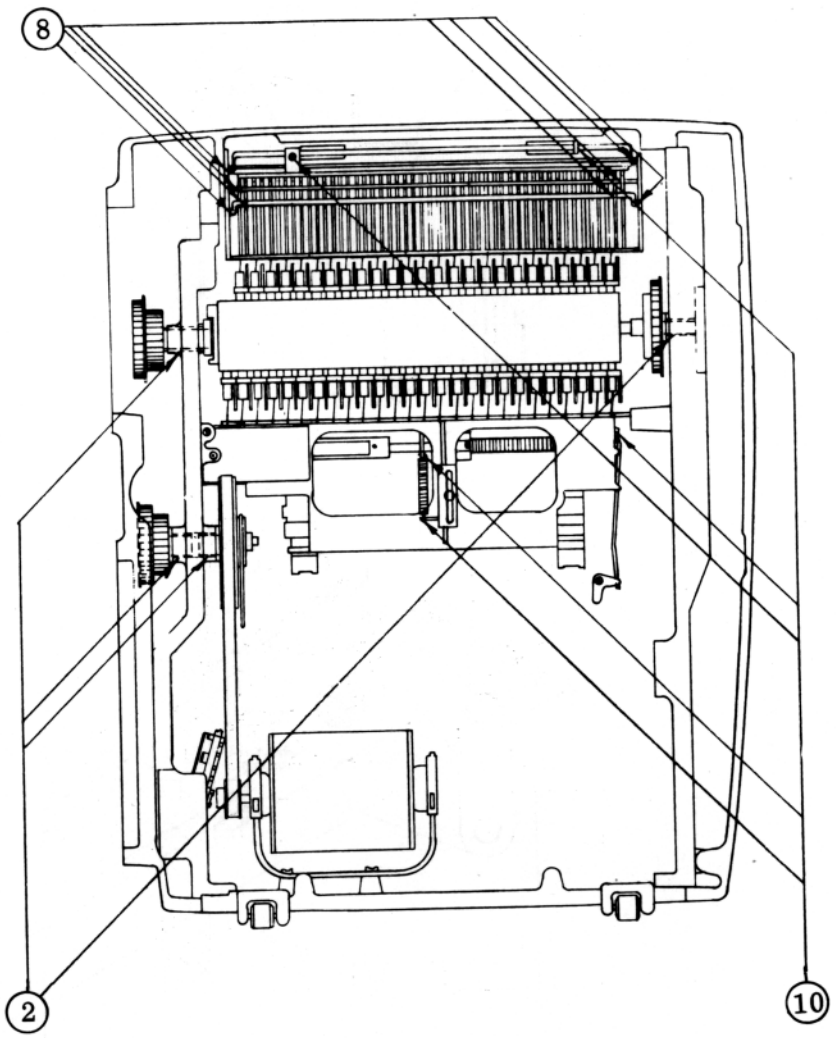


Figure 23. Power Frame Mounted To Base Assembly

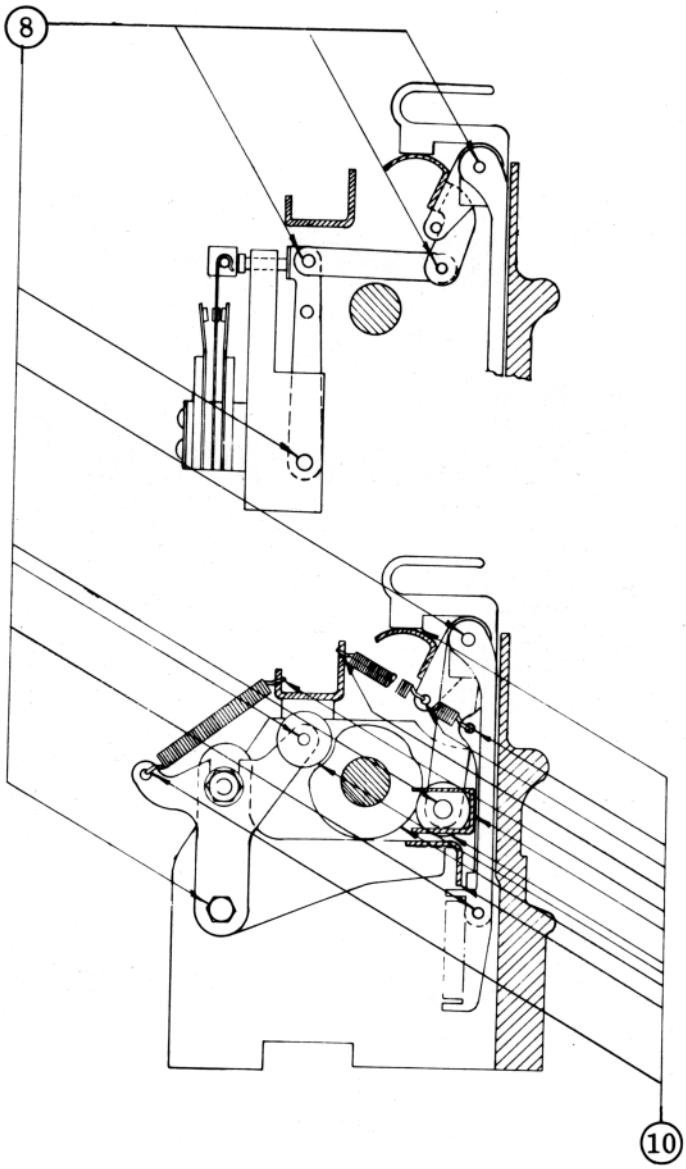


Figure 24. Translator - Right Hand End

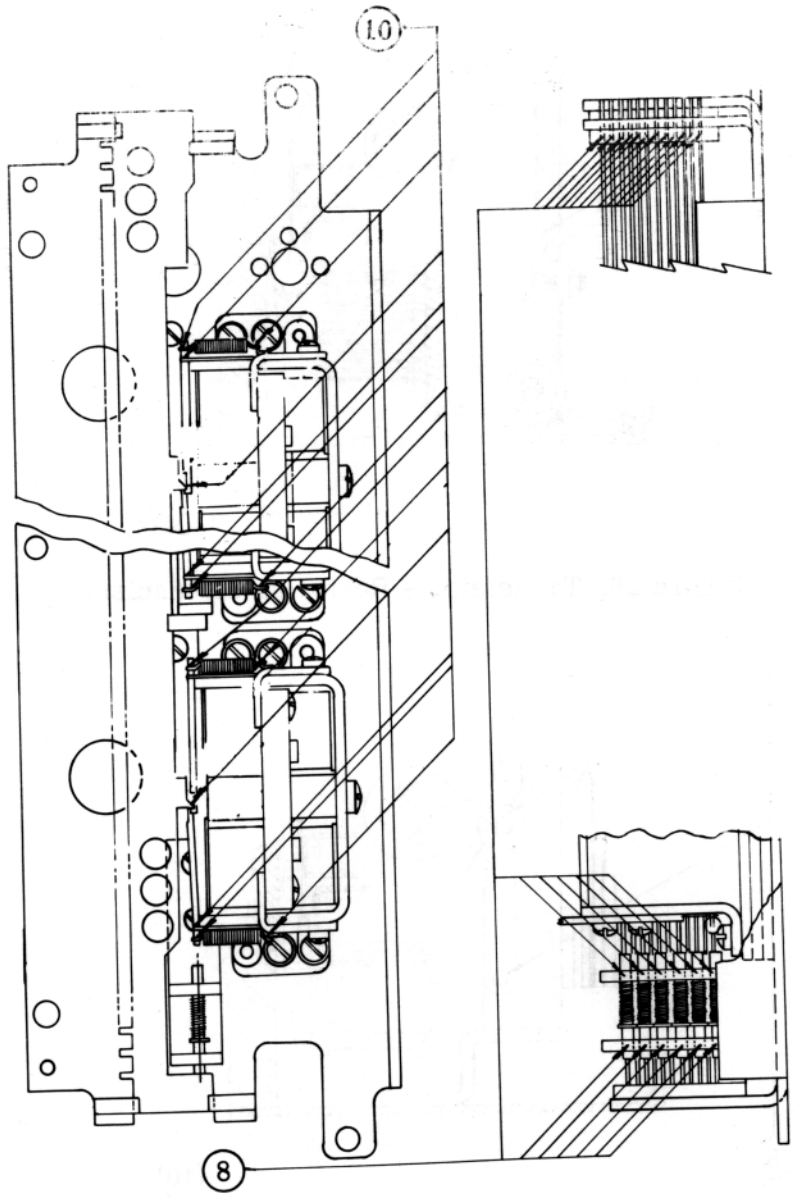


Figure 25. Translator - Bottom Side

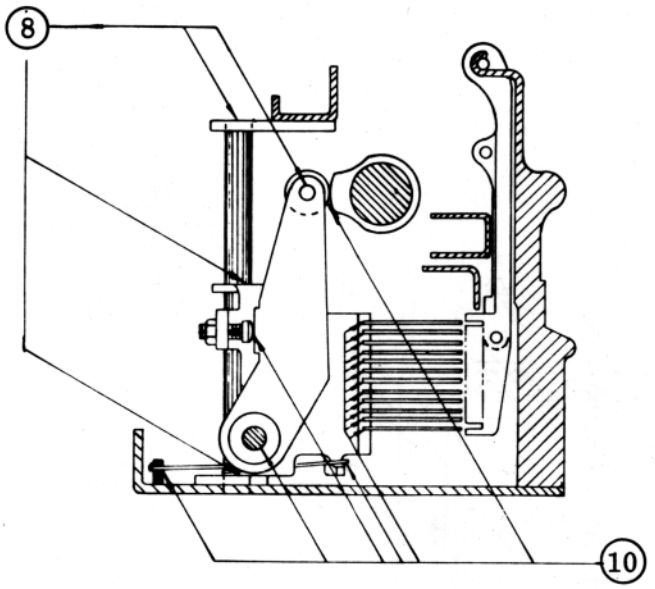


Figure 26. Translator - Restoring Mechanism

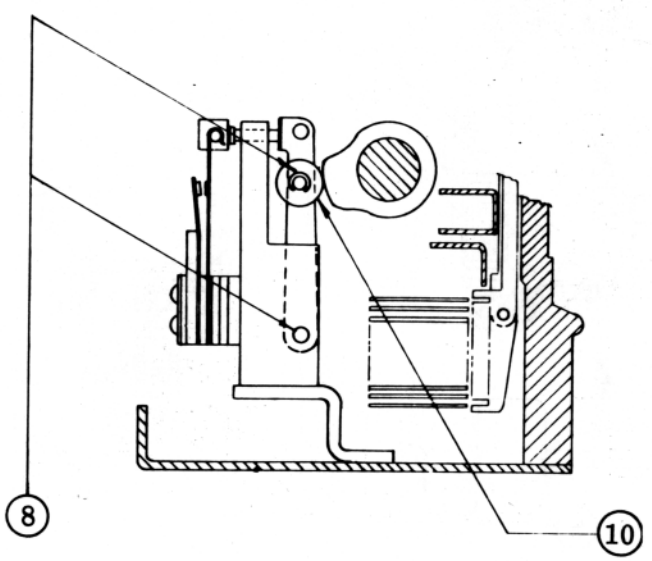


Figure 27. Translator - STC Mechanism

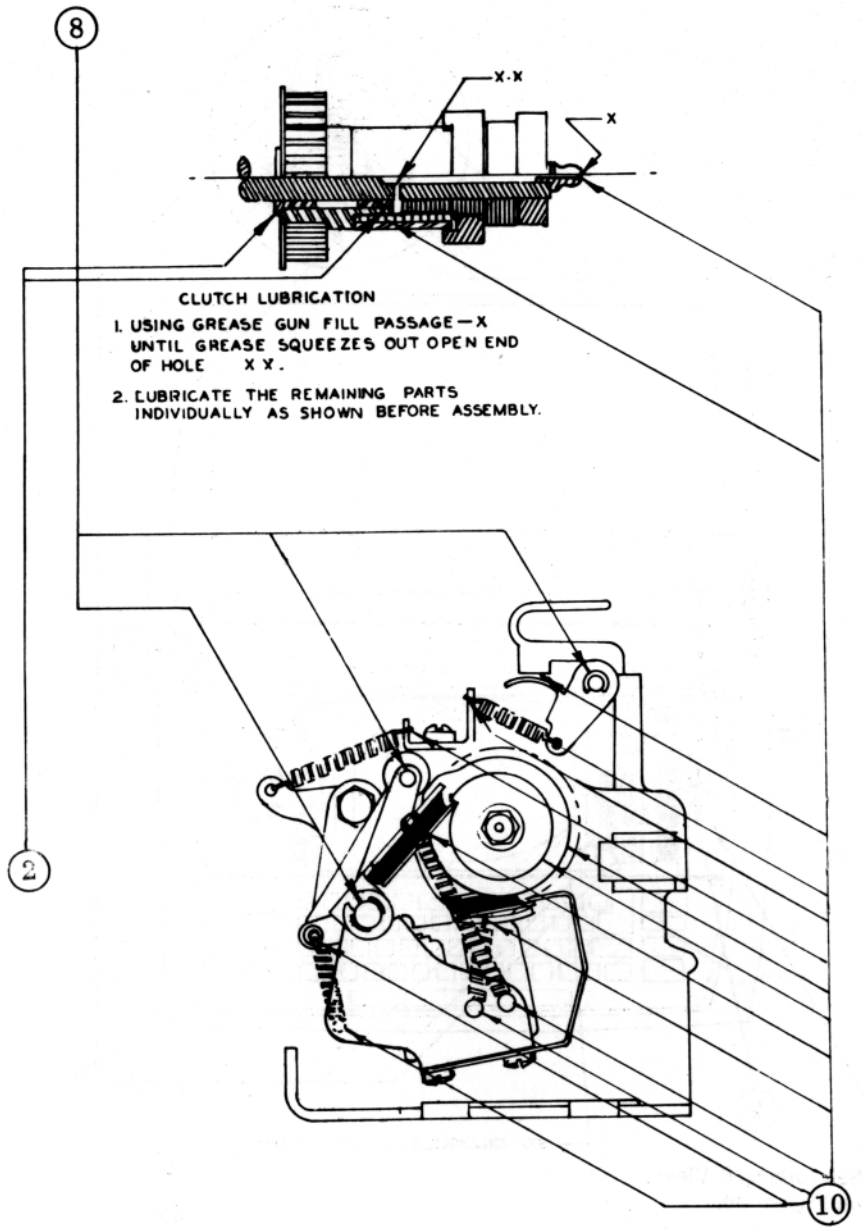


Figure 28. Translator - Clutch

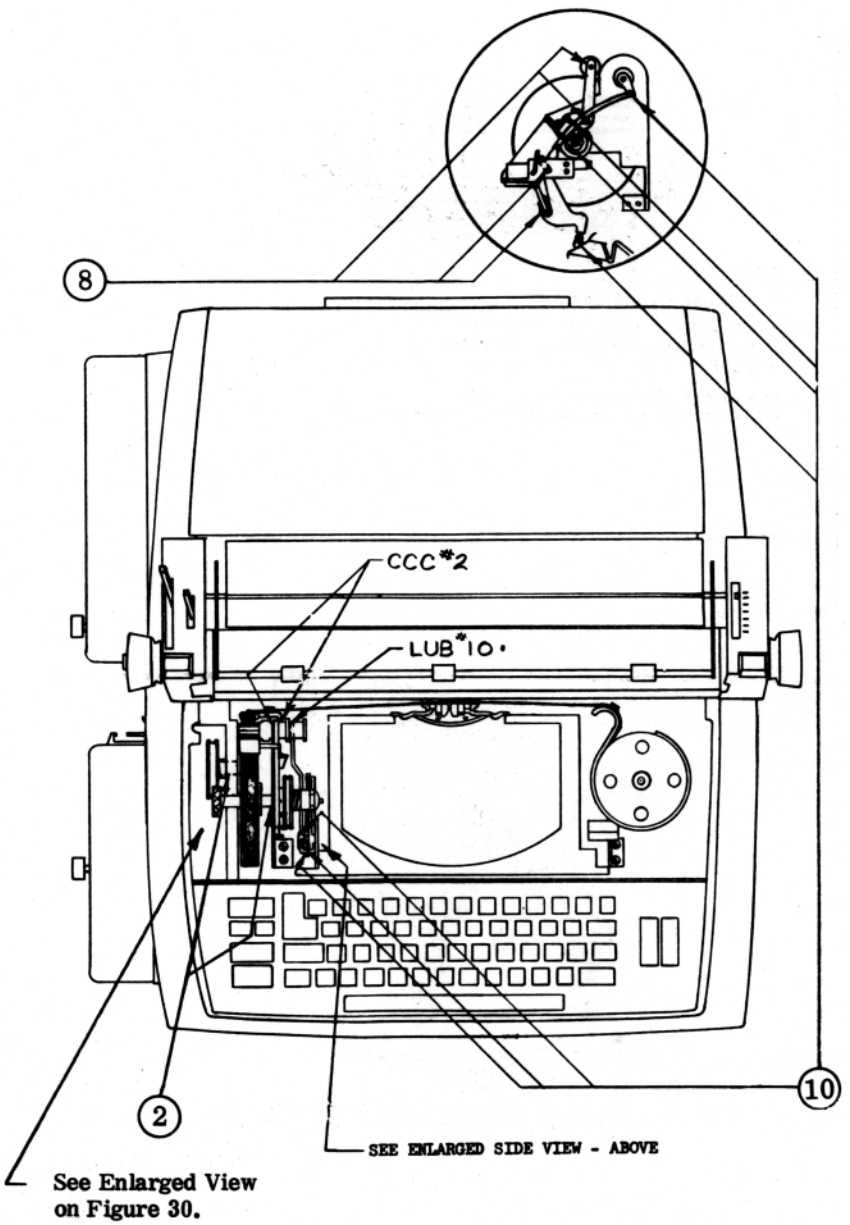


Figure 29. Carbon Ribbon Mechanism

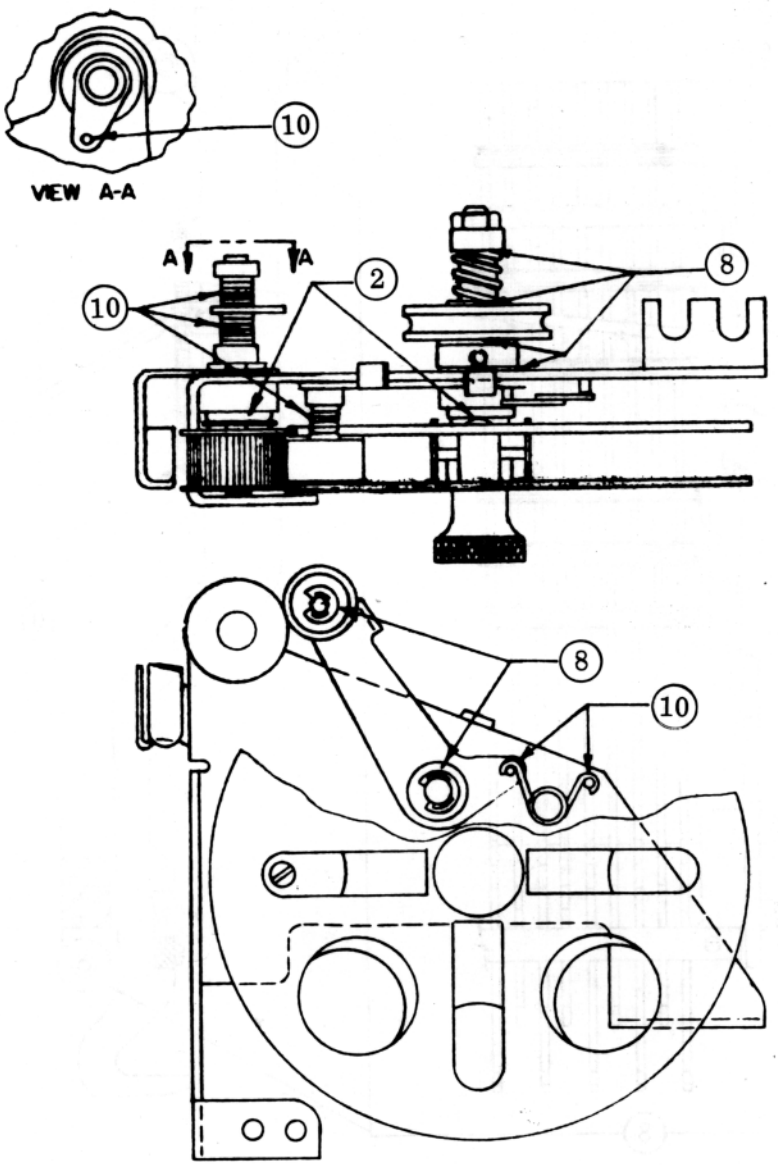


Figure 30. Carbon Ribbon Mechanism - Rewind

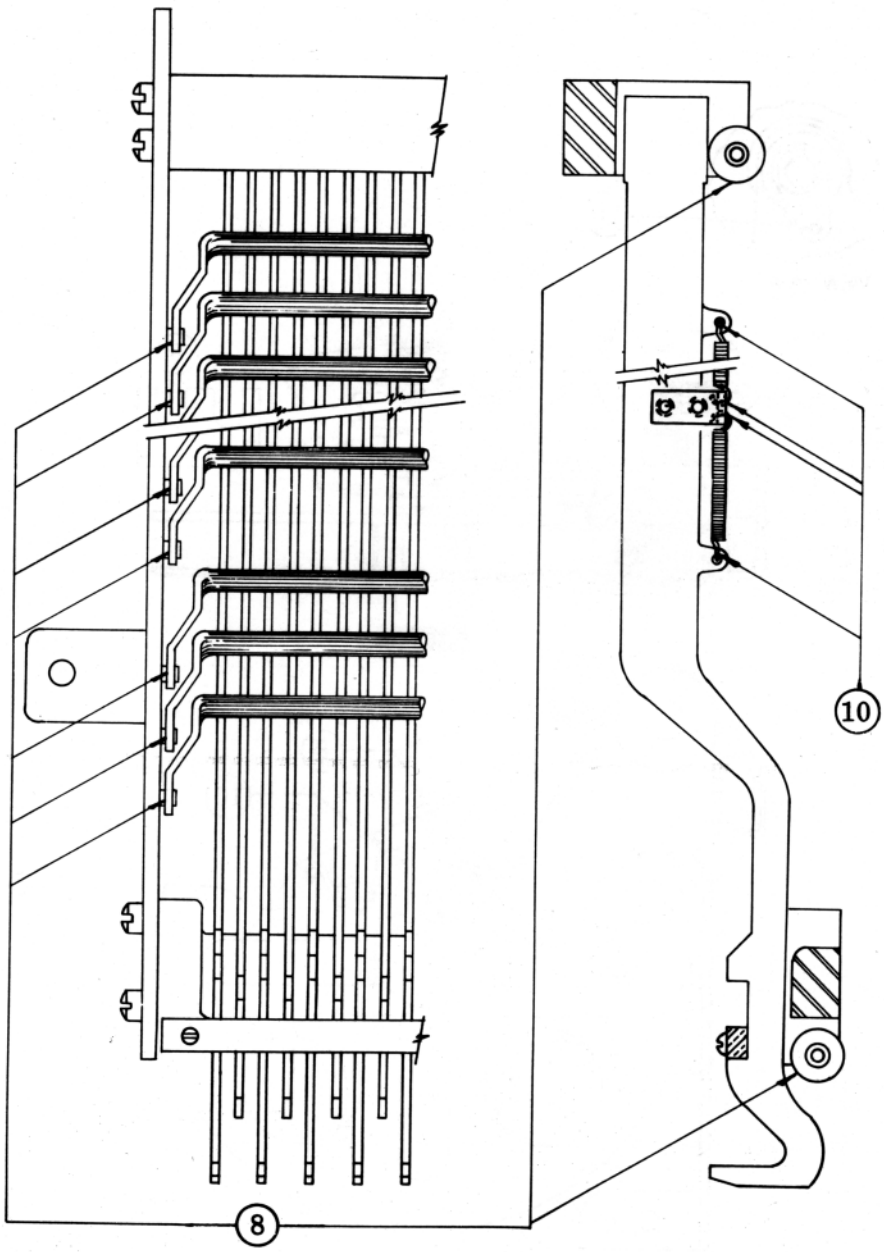


Figure 31. Selector Assembly

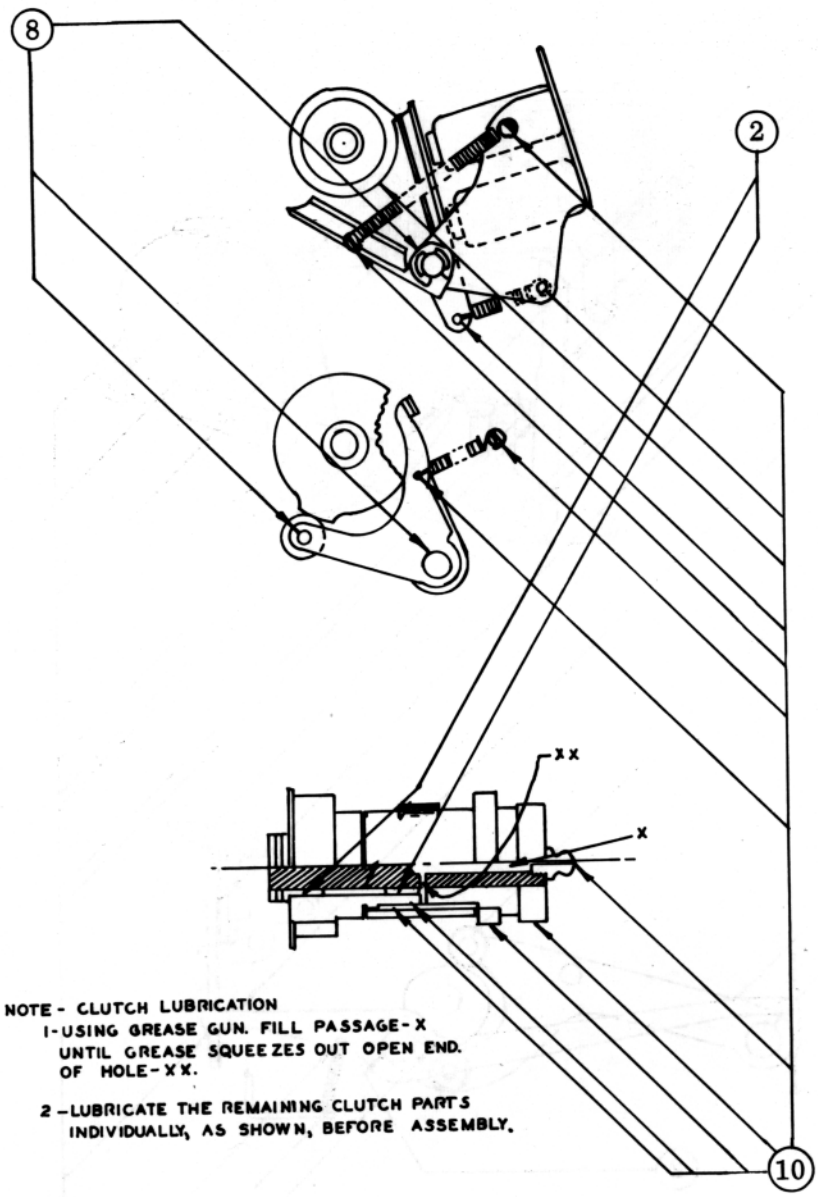


Figure 32. Punch - Clutch

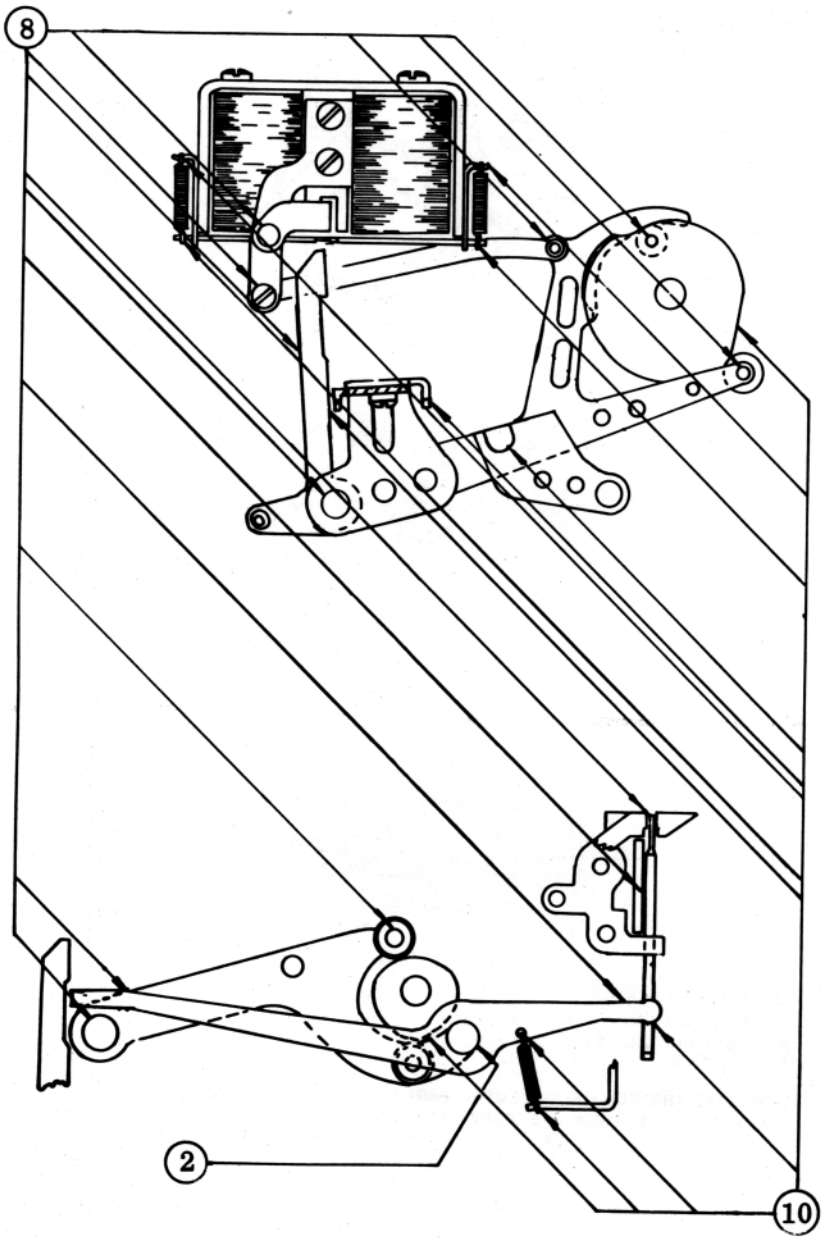


Figure 33. Punch - Side View

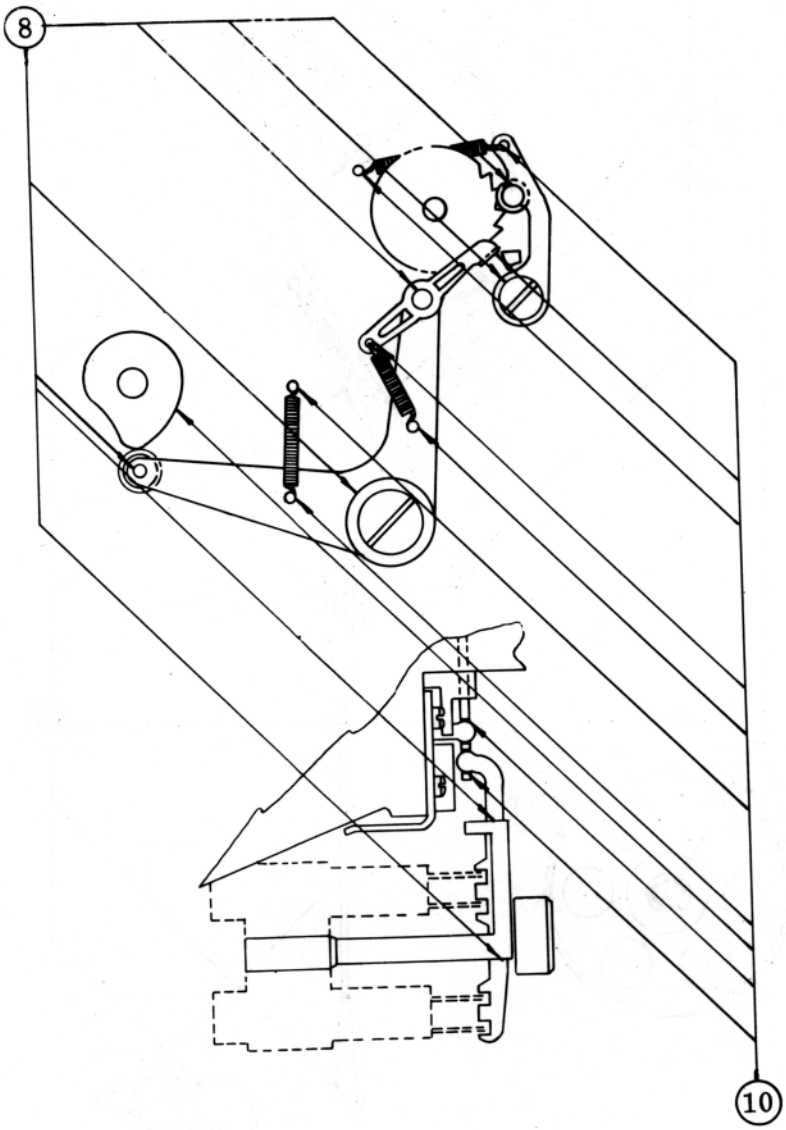


Figure 34. Punch - Feed Mechanism

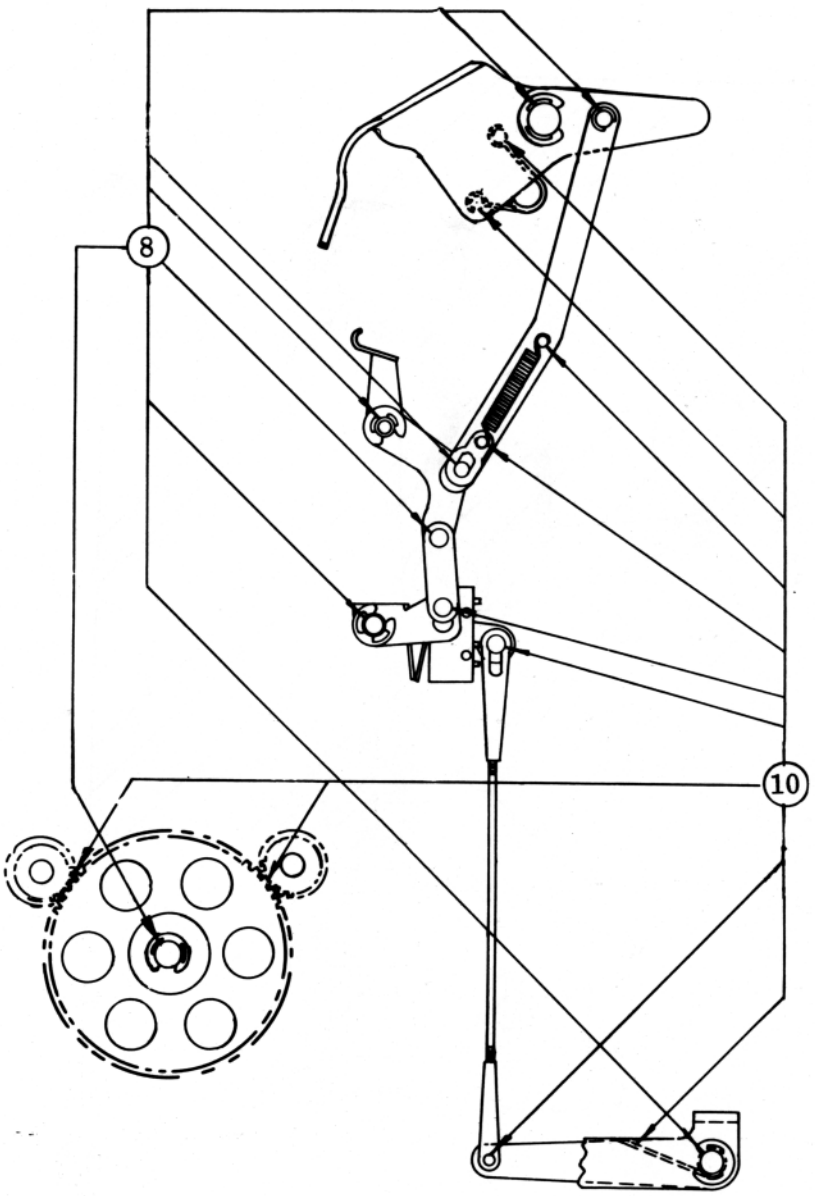


Figure 35. Punch - Tight Tape Mechanism

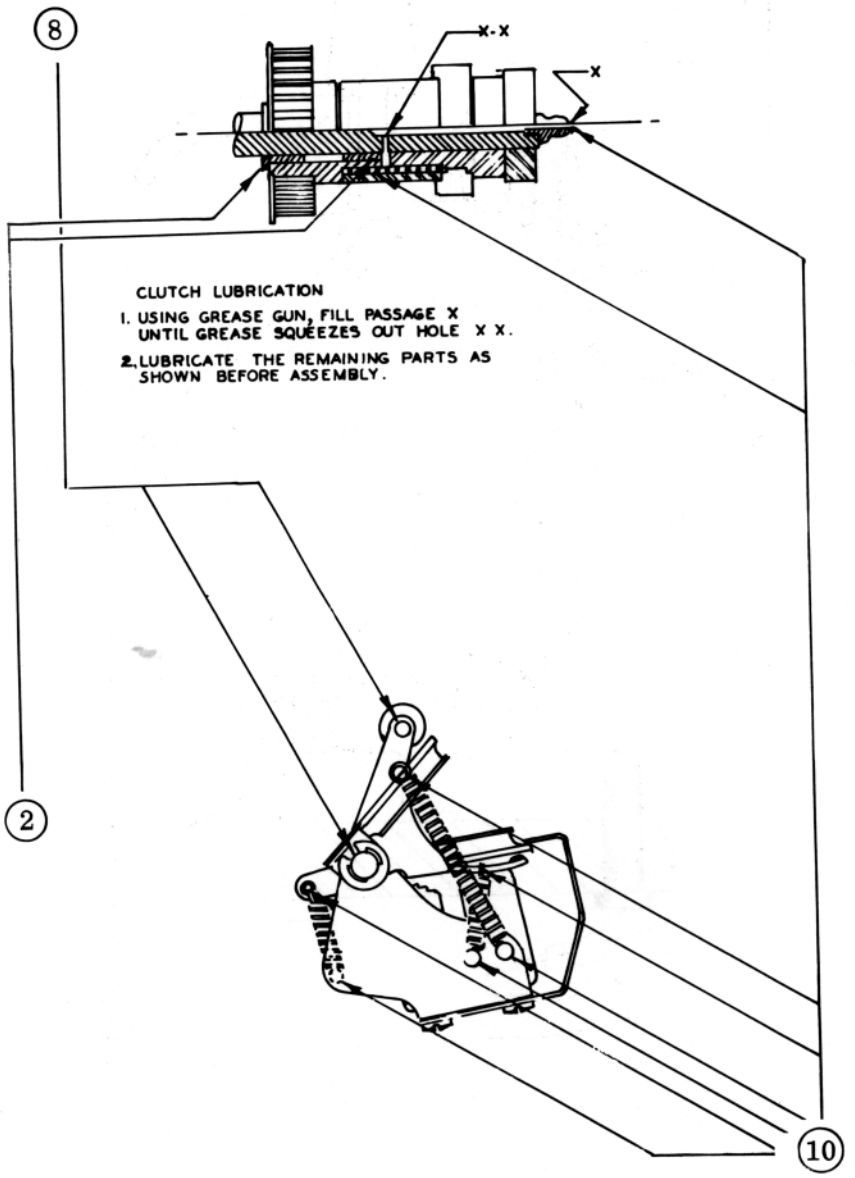


Figure 36. Reader - Clutch

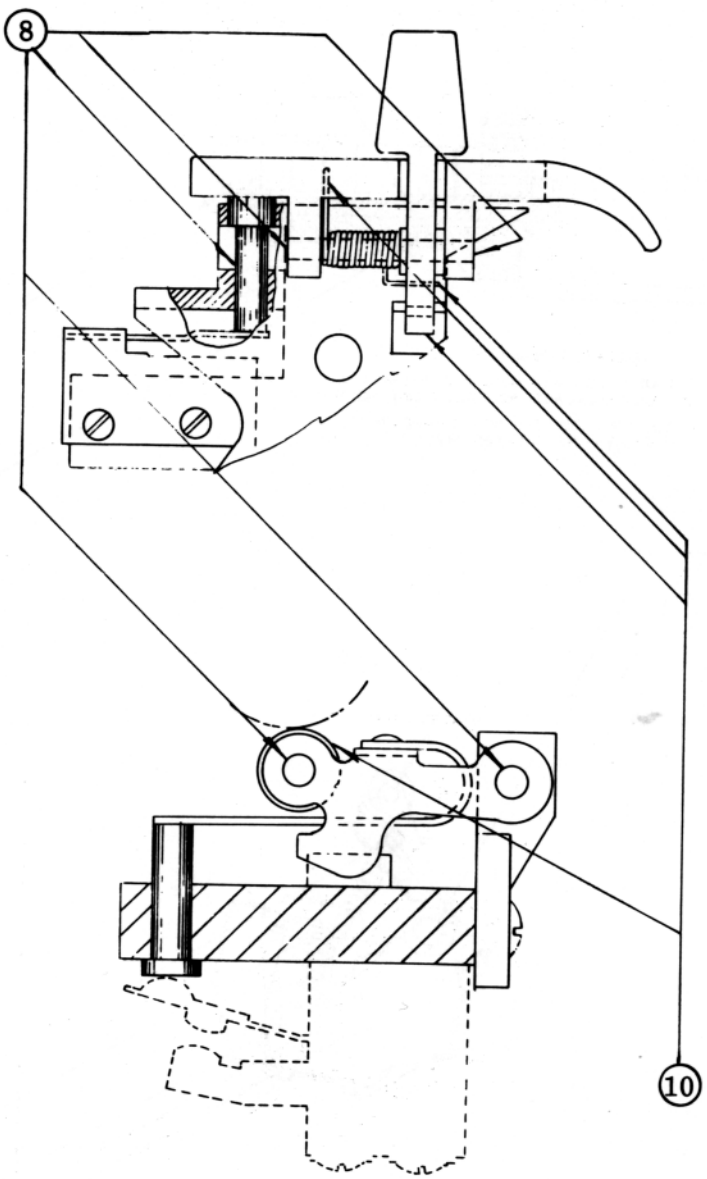


Figure 37. Reader - Tape Gate, Circuit Breaker Arm Assembly

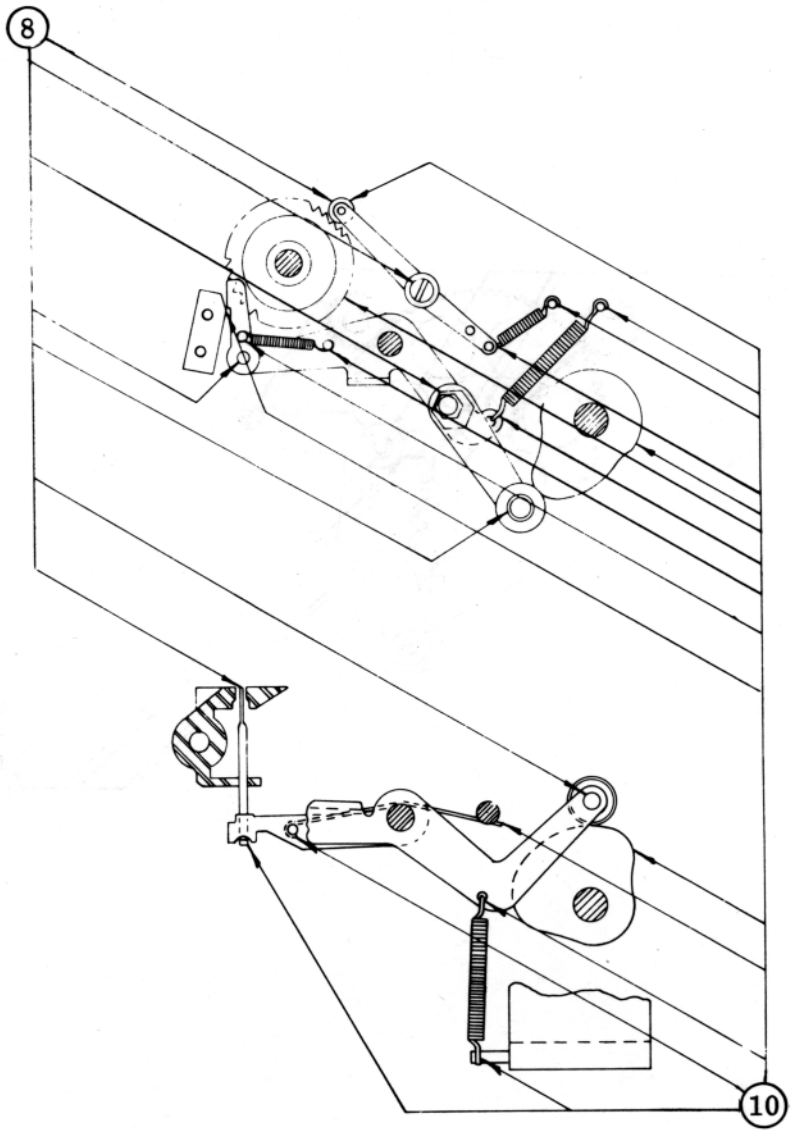


Figure 38. Reader - Feed Mechanism

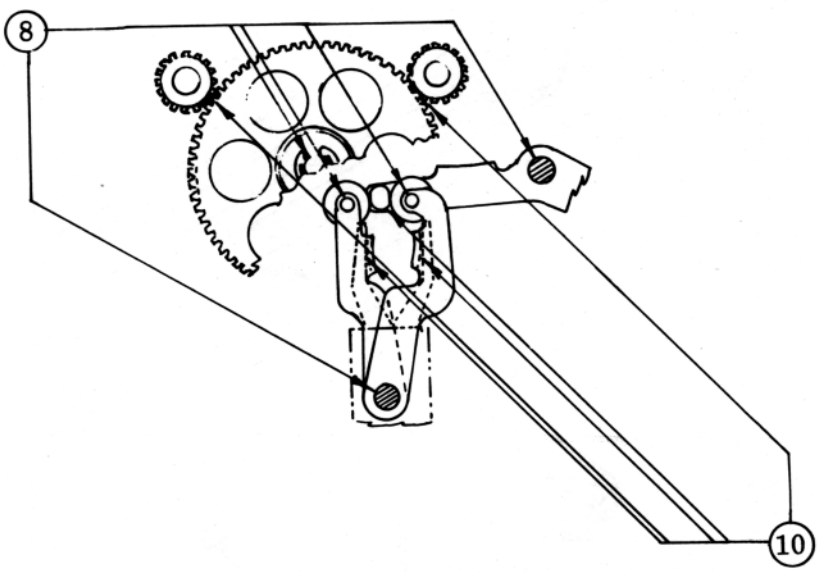


Figure 39. Reader - Interposer Mechanism

OTHER MODELS

MODEL 2210 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Model 2210 FLEXOWRITER Automatic Writing Machine offers speed, accuracy, and versatility in automatic printing at a rate of 145 words per minute. Automatic operation is from tape and/or edge cards. An attached ten key numeric keyboard facilitates the continuous entry of numbers. Depression of the Program Mode Switch changes the operating mode from Model 2210 to Model 2201 FLEXOWRITER Automatic Writing Machine.

PHYSICAL AND FUNCTIONAL DESCRIPTION

Except for the following features, all the functions in the Model 2210 are the same as those in the Model 2201:

In the Model 2210 mode of operation, manual operation causes typing and code punching from the main keyboard. The functional keylevers are coded in the Translator to respond to their respective function codes. While reading, the output of the functional keylevers is switched from the ten key numeric output to the standard Model 2201 functional output (the function codes do not reproduce).

The more important changes from the Model 2201 for the Model 2210 ten key numeric operation are:

1. The functional keylevers are not coded in the Selector.
2. The function keybuttons are replaced with numeric keybuttons which have a greater height than standard keybuttons.
3. For the ten key numeric operation, the functional Selector bridge contacts are connected through relay switching contacts and a diode matrix to the appropriate Translator section.
4. The Translator speed is changed to 1000 RPM to respond to a rapid consecutive rate encountered in manual numeric keyboard operation.
5. In the Model 2201 operating mode, the functional Selector bridge contacts are connected through the relay switching contacts and a second diode matrix to the punch code magnets for the function codes.
6. A checking circuit is added in the Selector for the detection of overlapping of the functional keyboard and the main keyboard to detect punching of erroneous codes.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION

Same as the Model 2301 Flexowriter. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

A program modification switch is provided for changing from the Model 2210 mode to the Model 2201 mode of operation. The programming functions, the punching function, and the reproduction functions are accomplished in a manner similar to the standard Model 2201, except the patch points and the circuit routing are different. The function codes are the same as the Model 2201.

To punch standard function codes from the auxiliary keyboard in the 2201 mode of operation, each code must be patched individually.

CODE	FUNCTION	PATCH	KEY	
1-2-4	Stop	J1-M9	Tab	(F1)
3-4-5	Non Print	J2-M10	0	(F2)
3-4-6	Print Restore	J3-M11	-	(F3)
3-4-7	ON 1	J4-M12	1	(F4)
2-3-4-6-7	ON 2	J5-M13	2	(F5)
1-2-3-4-6	Punch Off	J6-M14	3	(F6)
2-3-4-5-7	F.C. On	J7-M15	SP	(F7)
1-3-4	Skip Restore	J8-M16	4	(F8)
2-3-4	Control	J9-M17	5	(F9)
1-2-3-4-5	Data Select	J10-M18	6	(F10)
1-2-3-4-7	Form Feed	J11-M19	7	(F11)
1-3-4-5-7	Address Ident	J12-M20	8	(F12)
1-3-4-5-6	F13	J13-L20	9	(F13)

This patching may be altered to meet customer requirements.

MAINTENANCE

Refer to the Maintenance section in this volume.

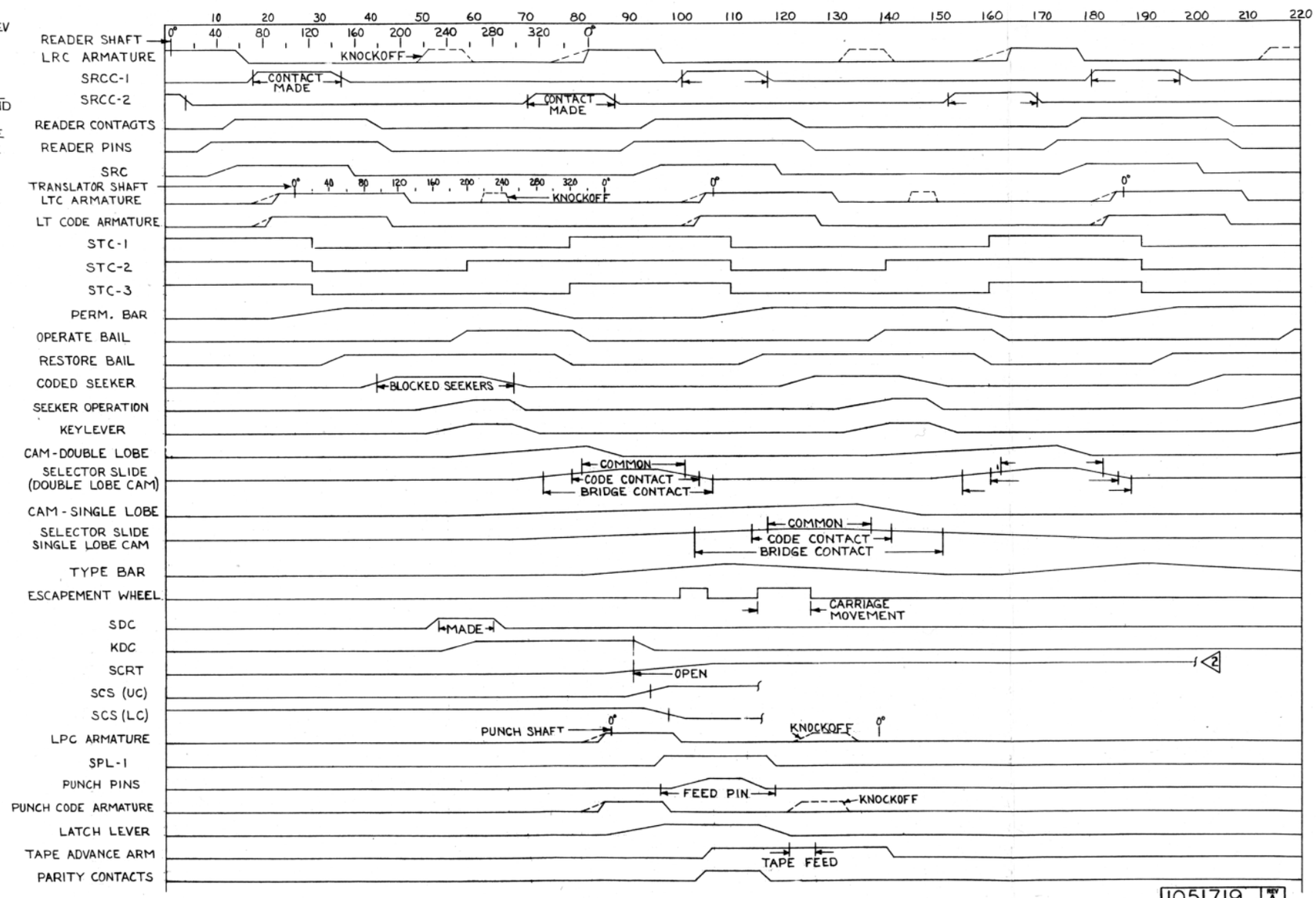
NOTES:

1.

	SPEED RPM	MS/REV
READER	731	82
TRANSLATOR	1000	60
PUNCH	1044	57.5

RPM X .006 = DEGREES / MILLISECOND

2 SCRT OPERATED TIME DEPENDS ON CARRIAGE TRAVEL TIME. SCRT OPER. TIME FOR SINGLE LINE SPACE 108 MS.



1051719 SHEET — REV A

MODEL 2210 TIMING CHART

OTHER MODELS

MODEL 2211 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Model 2211 FLEXOWRITER Automatic Writing Machine is basically a Model 2201 offering speed, accuracy and versatility in automatic printing at a rate of 145 words per minute. Automatic operation is from tape and/or edge cards. An attached ten key numeric keyboard facilitates the continous entry of numbers. Depression of the Program Modification Switch changes the operating mode from Model 2211 to Model 2201. This unit contains verifier wiring that enables it to be used with the Model 2321 Systems Verifier.

PHYSICAL AND FUNCTIONAL DESCRIPTION

Functions of the Model 2211 are the same as those of the Model 2201 except as follows:

Verification is controlled by the VERIFY ON switch on the Verifier Reader or by programming the Flexowriter to turn verification ON or OFF by reading control codes in either the Flexowriter Reader or the Verifier Reader, or by field switch control. When using the field switch control for verification, the VERIFY ON actuator should be immediately preceded by an OFF actuator and the VERIFY OFF actuator should be preceded by an ON actuator.

The most important changes from the Model 2201 are as follows:

1. The functional keylevers are not coded in the Selector.
2. The addition of a third (JL3) connector.
3. The functional keybuttons are replaced with numeric keybuttons having a greater height.
4. For ten key numeric operation, the functional Selector bridge contacts are connected through relay switching contacts and a diode matrix to the Translator section.
5. The Translator speed is changed to 1000 RPM to respond to the rapid consecutive rate encountered in manual keyboard operation.
6. In the Model 2201 operating mode, the functional Selector bridge contacts are connected through relay switching contacts and a second diode matrix to the punch code magnet to punch the function codes.
7. A checking circuit in the Selector to detect overlapping of the functions and main keyboard characters that could result in punching erroneous codes.
8. When equipped with the tape backspace feature, the Model 2211 may be patched to lock the keyboard whenever the tape is backspaced. Tape feed must be operated, deleting the non-valid code, in order to unlock the keyboard.

   NOTE: The backspace function must not be coded on machines equipped with the tape backspace feature.

Switches And Indicators

The following switches and indicators are different from those in the Model 2201.

CHECKER ERROR - Used for correcting operator errors when verifying.

VERIFY AND PUNCH ERROR - Indicates the type of error that occurs.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

Same as the Model 2201. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

The programming of functions and the punching and reproduction of function codes is accomplished in the same manner as the Model 2201, except patch points and circuit routing are different. The function codes are the same as for the standard Model 2201 and are associated with the same keylever positions.

To punch standard function codes from the auxiliary keyboard in the Model 2201 mode of operation, each code must be patched individually as follows:

CODE	FUNCTION	PATCH	KEY
1-2-4	Stop	J1-M9	Tab (F1)
3-4-5	Non Print	J2-M10	0 (F2)
3-4-6	Print Restore	J3-M11	- (F3)
3-4-7	ON 1	J4-M12	1 (F4)
2-3-4-6-7	ON 2	J5-M13	2 (F5)
1-2-3-4-6	Punch Off	J6-M14	3 (F6)
2-3-4-5-7	FC On	J7-M15	SP (F7)
1-3-4	Skip Restore	J8-M16	4 (F8)
2-3-4	Control	J9-M17	5 (F9)
1-2-3-4-5	Data Select	J10-M18	6 (F10)
1-2-3-4-7	Form Feed	J11-M19	7 (F11)
1-3-4-5-7	Address Ident	J12-M20	8 (F12)
1-3-4-5-6	F13	J13-L20	9 (F13)

MAINTENANCE

Refer to the Maintenance section in this volume.

OTHER MODELS

MODEL 2261 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Model 2261 FLEXOWRITER Automatic Writing Machine, designed for off-line document origination and tape preparation of USASCII coded information, duplicates the functions of the Model 2201 Flexowriter Automatic Writing Machine. It is limited to tape or edge card processing and can be used with a standard auxiliary reader and punch units.

PHYSICAL AND FUNCTIONAL DESCRIPTION

Refer to the General Description and the Theory of Operation sections in Volume I, and the Special Features section in Volume II.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

Same as the Model 2201. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

The programming of this machine is the same as the Model 2201.

MAINTENANCE

Refer to the Maintenance section in this volume.

OTHER MODELS

MODEL 2302 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Model 2302 FLEXOWRITER Automatic Writing Machine provides a fast, accurate, and versatile preparation of routine business paperwork and repetitive writing applications. The unit will prepare documents automatically from tape and/or edge cards at a rate of 145 words per minute. This double case machine includes selective punch control, manual non print, and field switch function control.

PHYSICAL AND FUNCTIONAL DESCRIPTION

Refer to the General Description and the Theory of Operation sections in Volume I, and the Special Features section in Volume II.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

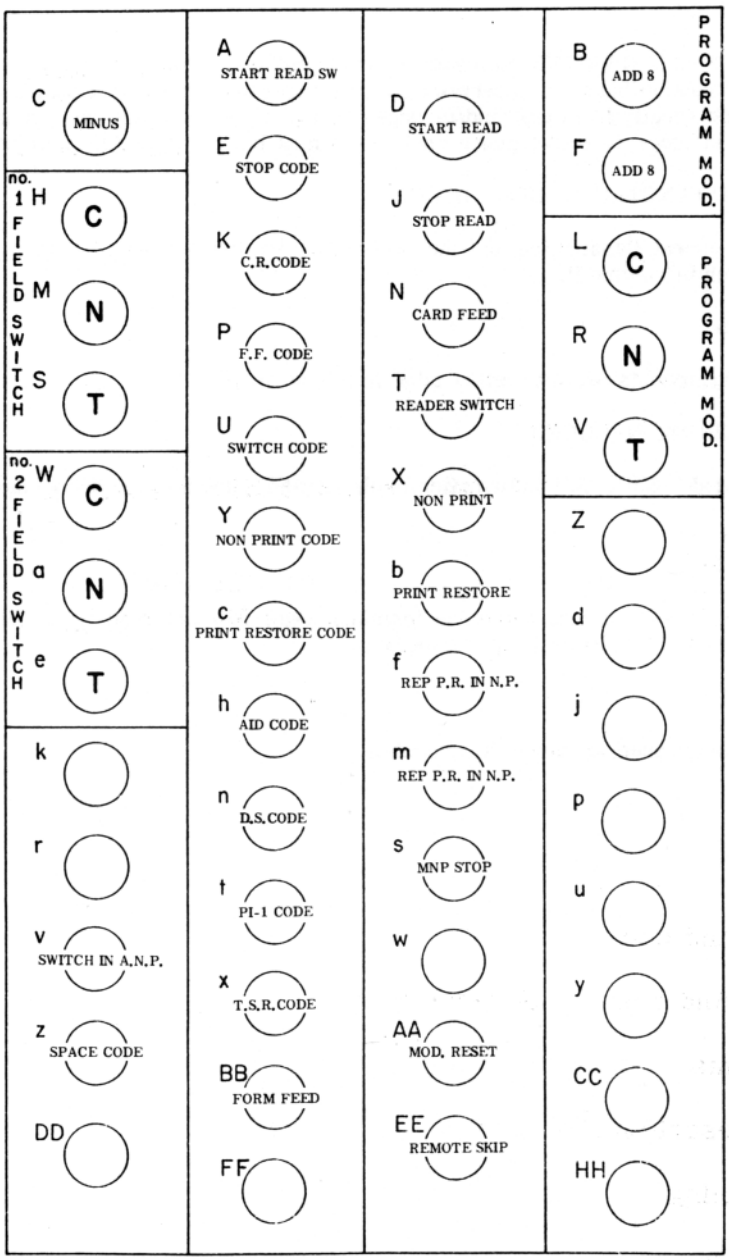
Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

As in the Model 2301, a programmable terminal connector and a removable field switch/tab rack provides flexibility. See Figure 1 for hub location.

MAINTENANCE

Refer to the Maintenance section in this volume.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SWITCH IN A.N.P.
z
SPACE CODE
DD
A
START READ SW
E
STOP CODE
K
C.R.CODE
P
F.F. CODE
U
SWITCH CODE
Y
NON PRINT CODE
c
PRINT RESTORE CODE
h
AID CODE
n
D.S.CODE
t
PI-1 CODE
x
T.S.R.CODE
BB
FORM FEED
FF
D
START READ
J
STOP READ
N
CARD FEED
T
READER SWITCH
X
NON PRINT
b
PRINT RESTORE
f
REP P.R. IN N.P.
m
REP P.R. IN N.P.
s
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F
ADD 8
PROGRAM MOD.
L
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Figure 1.

OTHER MODELS

MODELS 2303 and 2304 FLEXOWRITER
Automatic Writing Machines

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

Friden 2200/2300 SERIES MACHINES

PURPOSE AND USE

Model 2303. This unit consists of a heavy-duty writing machine with a conventional electric typewriter keyboard, a Tape Punch, and a Tape Reader. It is intended for routine repetitive writing functions common to every business activity.

Model 2304. This machine is identical to the Model 2303 except that proportional spaced type styles are used. It is used for executive letter writing applications and offset master preparation as well as for all normal repetitive writing functions.

PHYSICAL AND FUNCTIONAL DESCRIPTION

All the general specifications for the Model 2300 series Flexowriters apply to the Model 2303 and 2304 machines. Some of the features on the Models 2303 and 2304 are:

1. Tape Reader or a Tape/Edge Card Reader
2. Tape Punch or a Tape/Edge Card Punch
3. Keyboards as follows:
   a. A fully-expanded keyboard with 45 printing keylevers is standard. In addition, six format control keylevers are provided and coded for automatic operation.
   b. The Model 2303 has elite type style as a standard but other mono-spacing type styles are available.
   c. The Model 2304 keyboard has an additional THREE UNIT keylever with modern type style as standard. Other type styles are available.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

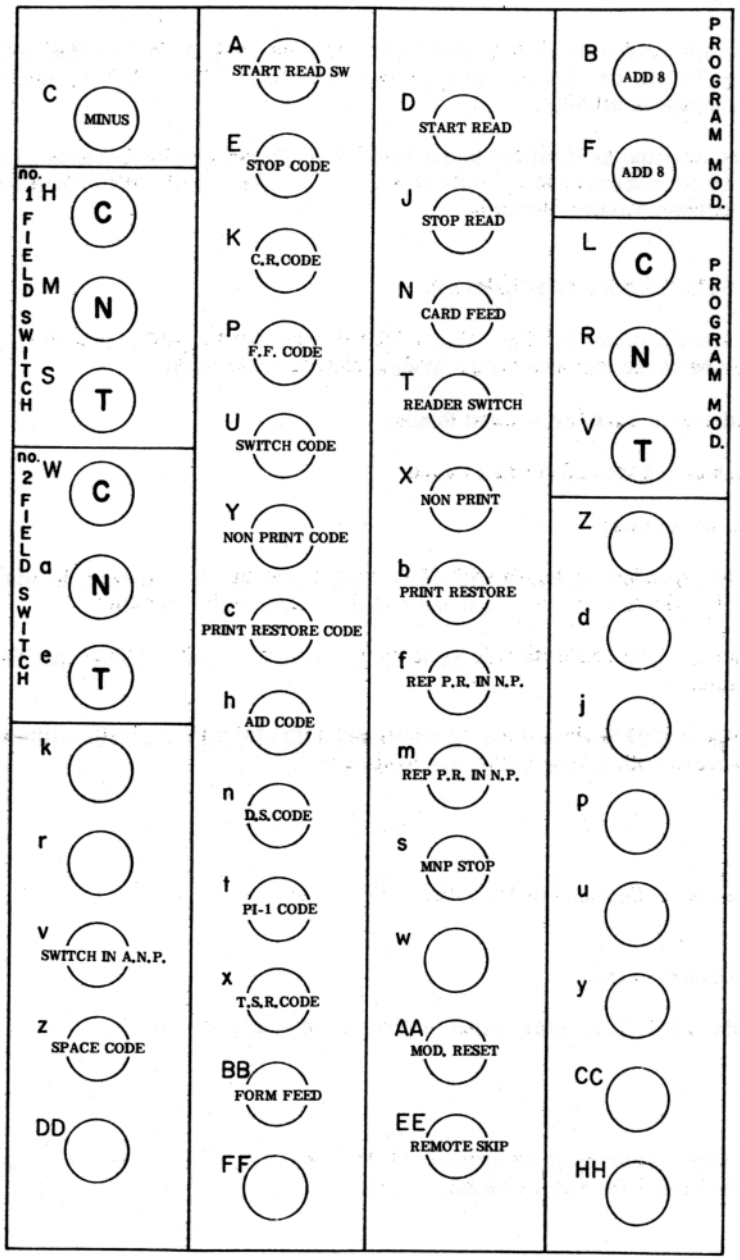
Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

Programming is identical to the programming of the Model 2301 Flexowriter Automatic Writing Machine. See Figures 1 and 2 for hub locations.

MAINTENANCE

Refer to the Maintenance section in this volume..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SPACE CODE
DD
A
START READ SW
E
STOP CODE
K
C.R.CODE
P
F.F. CODE
U
SWITCH CODE
Y
NON PRINT CODE
c
PRINT RESTORE CODE
h
AID CODE
n
D.S.CODE
t
PI-1 CODE
x
T.S.R.CODE
BB
FORM FEED
FF
D
START READ
J
STOP READ
N
CARD FEED
T
READER SWITCH
X
NON PRINT
b
PRINT RESTORE
f
REP P.R. IN N.P.
m
REP P.R. IN N.P.
s
MNP STOP
w
AA
MOD. RESET
EE
REMOTE SKIP
B
ADD 8
F
ADD 8
PROGRAM MOD.
L
C
R
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V
T
PROGRAM MOD.
Z
d
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Figure 1.

MODEL 2304

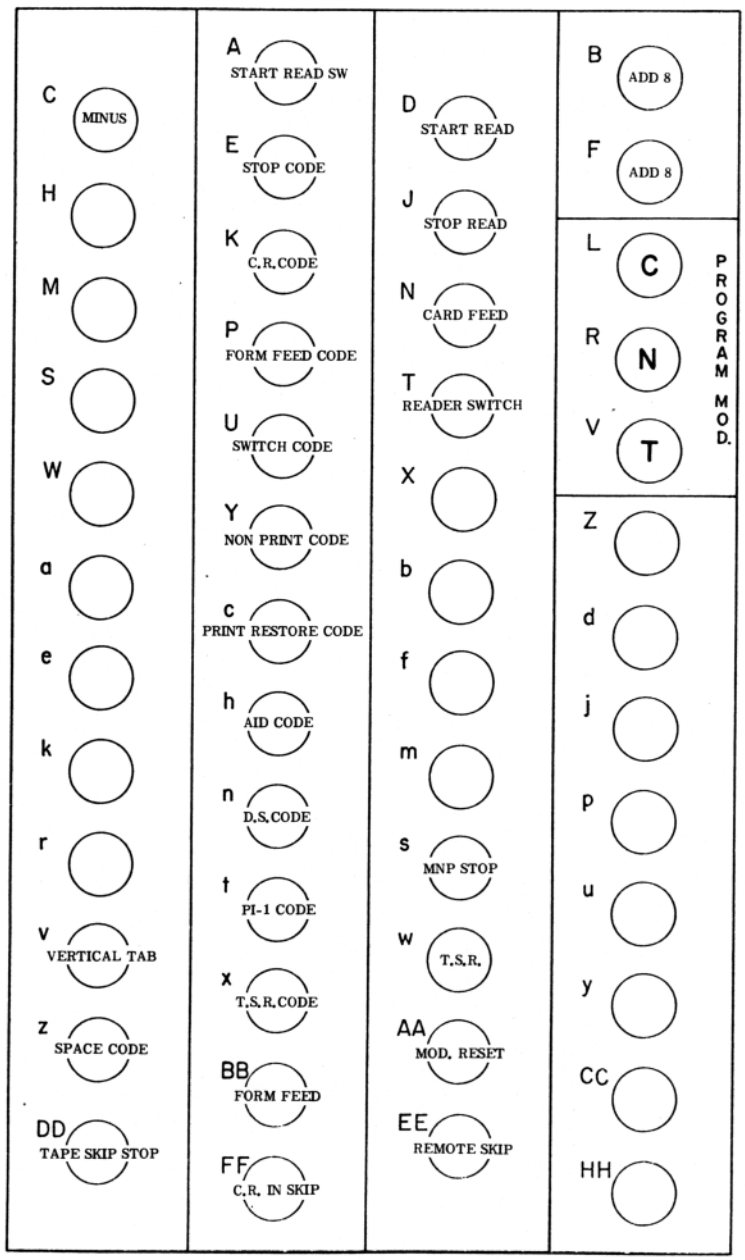


Figure 2.

OTHER MODELS

MODELS 2336 AND 2337 FLEXOWRITER
Automatic Writing Machines

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Models 2336 and 2337 FLEXOWRITER Automatic Writing Machines are cable-connected to standard 2200 or 2300 series Flexowriters to produce printed documents from master machines during manual typing, normal reading, or while in a non-print operation.

PHYSICAL AND FUNCTIONAL DESCRIPTION

The functions and controls of the Models 2336 and 2337 are the same as those of the Model 2301 Flexowriter.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

Programming is the same as the Model 2301.

MAINTENANCE

Refer to the Maintenance section in this volume.

OTHER MODELS

MODELS 2340 and 2341 FLEXOWRITER
Document Revision Machines

Physical And Functional Description

Programming

Adjustments

Circuit Descriptions

PHYSICAL AND FUNCTIONAL DESCRIPTION

The Models 2340 and 2341 Flexowriter Document Revision Machines are similar to the Model 2303 Flexowriter Automatic Writing Machine. These units are designed primarily for letter writing applications with special features to assist in the revision of documents.

Neither model will accept an auxiliary output unit and only the Model 2341 will accept an auxiliary input unit.

The Models 2340 and 2341 Flexowriters are equipped with the following features which provide special document revision capabilities:

Live Carriage Zone: An area near the right hand margin of the document is designated as the "Live Zone". When the carriage assembly is within this zone, automatic hyphen printing and/or automatic carriage return may occur. A different "Live Zone" may be selected from one of two panel switches.

LONG LINE Panel Switch: The zone nearest the extreme right hand margin is activated thus providing the longest writing line.

SHORT LINE Panel Switch: The zone in the area of the center of the document is activated.

The actual position of the "Live Zone" is determined by the placement of the actuators on the actuator rack. An indicator lamp glows to indicate to the operator that the carriage assembly has entered the "Live Zone".

Hidden Hyphen: All Models 2340 and 2341 Flexowriters are equipped with a hidden hyphen keylever. When this keylever is operated, manually or by the translator, it will cause punching of a hidden hyphen code in the by-product tape but will not cause a hyphen to be printed on the document unless the power switch is in the "On Print Hyphen" position or the carriage assembly is in the "Live Zone".

Print Hyphen: When operated, the Print Hyphen keylever causes a hyphen to be printed on the document. This keylever may be operated manually, during a reading operation when a print hyphen code is read, or automatically as a result of the operation of a Hidden Hyphen keylever with the carriage in the "Live Zone" or with the power switch in the "On Print Hyphen" position. The print hyphen code will not reproduce during an automatic operation.

Automatic Print Hyphen: A hyphen will be printed automatically on the document as a result of a hidden hyphen keylever operation (manual or reading) when the carriage assembly is in the "Live Zone" or the power switch is in the "On Print Hyphen" position. The carriage return operation occurs only when it is in the "Live Zone". Only the hidden hyphen code will reproduce.

Automatic Print Hyphen Followed By An Automatic Carriage Return: With the carriage assembly in the "Live Zone", a hidden hyphen keylever operation will initiate a function that causes the printing of a hyphen followed by the carriage return operation. Only the hidden hyphen code will reproduce.

Automatic Carriage Return Initiated By A Space Bar Operation: With the carriage assembly in the "Live Zone", operation of the space bar will result in an automatic carriage return. Only the space code will reproduce.

Automatic Carriage Return Initiated By A Print Hyphen Keylever Operation: Operation of the print hyphen keylever when the carriage assembly is in the "Live Zone" results in an automatic carriage return operation after the hyphen has printed. Only the print hyphen code will reproduce.

There are several conditions under which a reading operation can be terminated:

Stop Code (1-2-4): Will always terminate a normal reading operation.

Sentence Code (1-2-3-4-7): Will terminate a normal reading operation when the Sentence Panel Switch is operated.

Carriage Return Code (8): Terminates a reading operation when the Sentence Panel Switch is operated.

Space Code (5): Stops the normal reading operation when the Word Panel Switch is operated. A Space Code appears after each word.

Characters: Terminates the reading operation if the Character Panel Switch is operated.

After the reading operation has stopped as a result of one of the above conditions, the START READ switch must be operated to resume reading.

The various methods of terminating a reading operation makes it possible for the operator to locate an area on a document where a correction is to be made without the risk of passing over the area.

The Secretary Shift Mechanism is a standard feature on the Models 2340 and 2341 Flexowriter Document Revision Machines.

Special features that may be ordered are:

Carbon Ribbon Mechanism: Models 2340 and 2341 Flexowriter Document Revision Machines may be ordered with the carbon ribbon mechanism. If a run-out micro switch is desired, it must be ordered special.

Intermediate Margin Control Mechanism: This feature provides two possible left hand margin positions. This is determined by the position of the Intermediate Margin Panel Switch. With the Intermediate Margin Panel Switch in the restored position, the margin position is determined by the setting of the left hand margin stop. In the operated position, the margin position is determined by the right hand margin stop.

PANEL SWITCHES

INTER MARGIN (Program Modification) S-8: A locking type switch which completes a circuit to KDM on units equipped with the intermediate margin control mechanism feature. KDM is connected mechanically to the intermediate margin assembly. With KDM energized, the intermed-

iate margin control mechanism is positioned to contact the intermediate margin stop. The circuit to KDM is made through program board patching.

LONG LINE (S-9): The purpose of this switch is to provide a means of selecting one of two zones to control the right hand margin. A locking type switch, when operated, qualifies a circuit through SF3 to KZC.

SHORT LINE (S-10): This switch consists of two locking type of micro switches that are operated by a common actuator. One micro switch applies negative potential to the open side of SF-4. When SF-4 is closed, a circuit is completed to pick KZC. The purpose of this micro switch is to provide a means of selecting one of two zones to control the right hand margin. The other micro switch connects the punching circuit to terminal B of the program board. This is the ADD 8 exit. The "Short Line Switch" may serve as a "Punch Address" switch. All codes that are punched with this switch operated will include the 8th bit.

SENTENCE (S-11): A locking type switch that conditions the Flexowriter to stop a reading operation upon completion of a sentence or a line. A sentence or carriage return code when sensed in the reader during a normal reading operation will terminate the reading operation if the SENTENCE Panel Switch is operated. The sentence code will appear on the tape between each sentence after the space code.

WORD (S-12): When operated, this switch stops a reading operation upon completion of a word. A space code when sensed in the reader will terminate the reading operation if the WORD Panel Switch is operated. The space code will appear on the tape between each word.

CHARACTER (S-13): A locking type switch which conditions the Flexowriter to stop the reading operation upon reading one code.

FIELD SWITCHES

SF-1: Field switch available for optional programming.

SF-2: Field switch available for optional programming.

SF-3: Switch is assigned to the "Long Line" function and is wired in series with the LONG LINE panel switch.

SF-4: Switch is assigned to the "Short Line" function and is wired in series with the SHORT LINE panel switch.

SF-5: Assigned to the "Delay in Zone" function.

KKL CIRCUITS

There are four basic circuits to KKL (Figure 1). Circuit number 3 is divided into two sections midway in the circuit and is labeled 3A and 3B.

2340/2341, KKL CIRCUIT

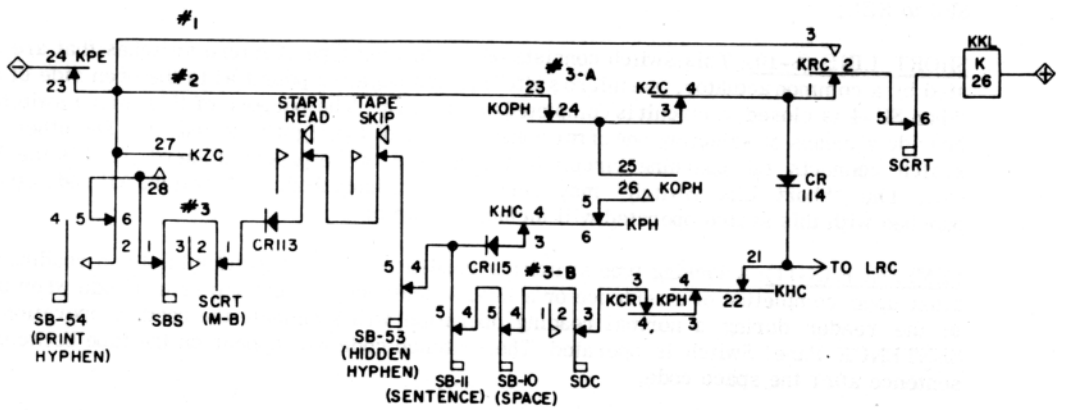


Figure 1.

KKL Circuit Number 1 is the only one of the four that is in effect during a reading operation. This is the simplest of the circuits since it has only three sets of contacts: KPE (N/C), KRC (N/O), and SCRT (N/C). While the Flexowriter is reading, the only operations that can cause the keyboard to lock are Carriage Return, Tab and a punching error. The timing is not critical for locking the keyboard during a reading operation because it is not likely that the operator will operate manually the keyboard during some of the automatic functions (Print Hyphen, Automatic Carriage Return, etc.)

Circuits number 2, 3A and 3B are in effect only when the Flexowriter is not reading. These circuits are necessary to assure the earliest possible locking of the keyboard as one of the automatic functions (Print Hyphen or Carriage Return) is initiated during a manual typing operation.

Circuit number 2 is the primary circuit to KKL as long as the Flexowriter is not conditioned to perform either of the automatic functions (Print Hyphen or Carriage Return). This circuit is qualified through KOPH (N/C) and KZC (N/C). It will be broken when the power switch is set in the "On Print Hyphen" position or when the carriage moves into the "Live Zone". The timing is not critical in the locking of the keyboard during a manual typing operation as long as KOPH and KZC remain down because no automatic function will occur.

Circuit number 3A is in effect as long as the carriage is out of the "Live Zone". This circuit can be understood best as a bypass of circuit 3B. It is important to bypass SB-11 (Sentence) and SB-10 (Space) so that operation of these keys will not cause the keyboard to lock. There is no need for the keyboard to lock since these keylevers do not initiate an automatic operation when the carriage assembly is not in the "Live Zone".

As the carriage moves into the "Live Zone", circuit 3A is broken, leaving only circuit 3B to KKL. This is part of the circuit to LRC and all of the contacts are not necessary for the KKL circuit. The circuit is designed in this manner so that some of the contacts that are necessary for both circuits can serve two purposes thus saving several sets of contacts. The earliest possible break will occur in the KKL circuit when:

1. The Automatic Print Hyphen followed by carriage return is initiated by a manual operation of the hidden hyphen keylever.
2. An Automatic Carriage Return is initiated by manual operation of the Space Bar.
3. An Automatic Carriage Return is initiated by manual operation of the sentence keylever.
4. An Automatic Carriage Return is initiated by manual operation of the Print Hyphen keylever.

The initial break in the KKL circuits in operations one, two and three will occur as a result of the opening of selector bridge contacts that correspond to the keylever that is manually operated. The break is extended by the pick of KPH, KHC, and KCR and further extended by the opening of SCRT (N/C). At the end of the resulting Carriage Return operation, all the contacts are restored with SCRT the last to restore to complete the KKL circuit. After this, the operator can resume typing.

Operation number four is similar to the first three operations except in the initial break of the KKL circuit. With the carriage in the "Live Zone", a set of KZC (N/O) contacts bypasses SB-54 (Print Hyphen). The initial break will occur as a result of the pick of KCR.

INFORMATION PERTAINING TO THE KEYBOARD

The following keylevers will not be blocked by the keylock bail:

Print Hyphen
Sentence
Space
Back Space
Hidden Hyphen
Carriage Return

The print hyphen keylever and the carriage return keylever do not engage the roller interlocks. This is necessary to assure that the roller interlocks will not block the operation of these keylevers in the event that the operator fails to restore the keylever that initiated the automatic function.

PROGRAMMING

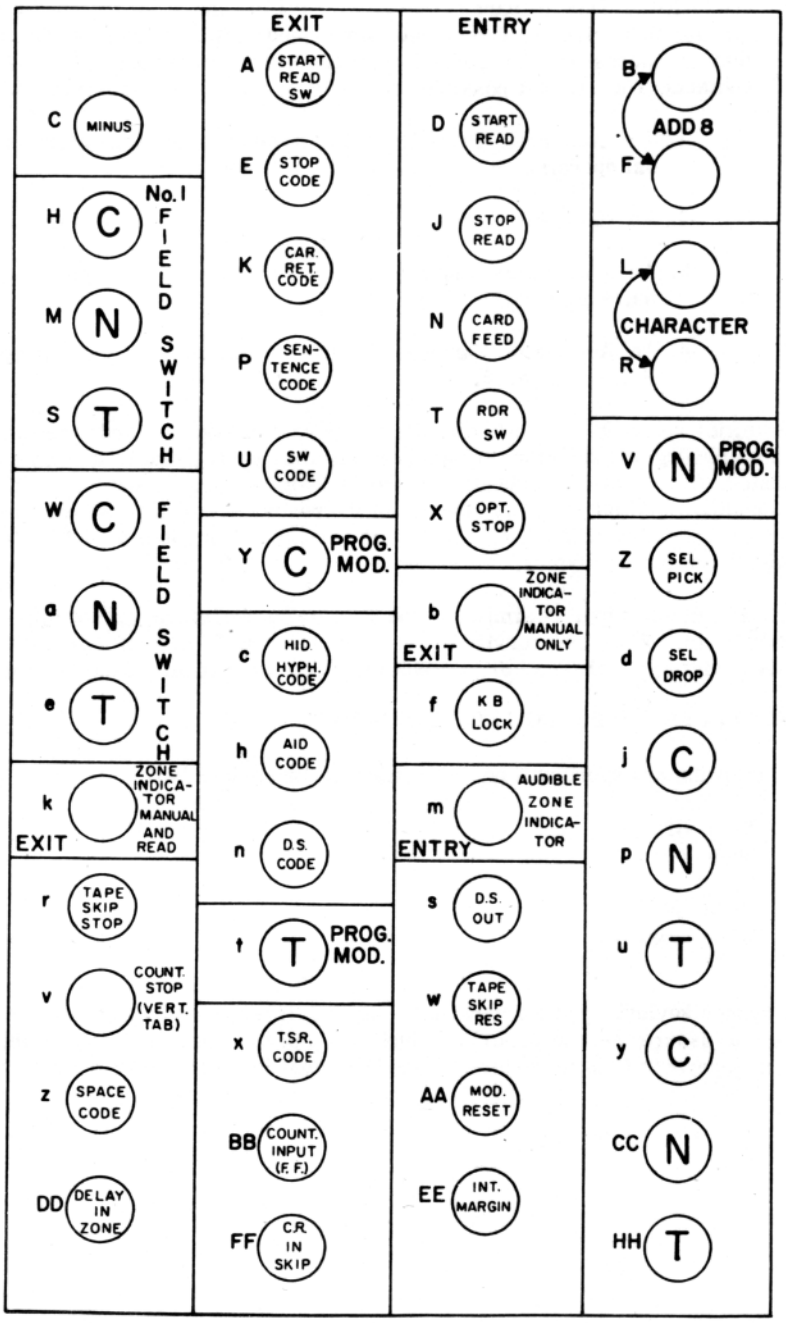


Figure 2.

Most programming of the Models 2340 and 2341 Flexowriter Document Revision Machines is the same as that of any of the 2300 series Flexowriters. Programming is accomplished by patch wires in the program board and by the placement of actuators on the actuator rack. The following describes the function of each of the terminals on the program board of the Models 2340/2341.

A (Start Read Switch). Upon depression of the Start Read Switch, negative potential will appear at this terminal and remain until the switch is released. This terminal normally is jumpered to terminal D (Start Read).

B-F (Add 8). With terminals B and F jumpered together and the short line panel switch operated, an eight bit will be punched in the by-product tape along with the normal code for every operation except Tape Feed. Restoring of the short line panel switch will disable the Add 8 feature.

C (Minus). This terminal provides a source of unqualified minus potential to be used for programming purposes.

D (Start Read). A negative pulse directed into this terminal will initiate a normal reading operation. This terminal normally is jumpered to terminal A.

E (Stop Code). A negative pulse will appear at this terminal whenever a Stop Code (1-2-4) is sensed during a normal reading operation or tape skip. This terminal normally is jumpered to terminal J.

F (Add 8). See terminal B.

H (Number 1 Field Switch, Common). This terminal is wired directly to the operate contacts of the number one field switch. This switch is available for optional programming.

J (Stop Read). A negative pulse directed to this terminal will terminate a normal reading operation. This terminal normally is jumpered to terminal E.

K (Carriage Return Code). A negative pulse will appear at this terminal whenever a Carriage Return code (8) is sensed during a normal reading operation or a tape skip operation.

L-R (Character). These terminals must be jumpered together to qualify the Character panel switch.

M (Number 1 Field Switch, Normal). This terminal is wired directly to the normally closed contacts of the number one field switch. This switch is available for optional programming.

N (Card Feed). A negative pulse directed to this terminal will initiate a card feed operation in the Edge Card Punch, if the Flexowriter is so equipped.

P (Sentence Code). A negative pulse will appear at this terminal whenever a sentence code (1-2-3-4-7) is sensed during a normal reading operation or a tape skip operation.

R - See terminal L.

S (Number 1 Field Switch, Transfer). This terminal is wired directly to the normally open contacts of the number one field switch. This switch is available for optional programming.

T (Reader Switch). A negative pulse directed to this terminal will cause reading control to switch from one unit to the other (Flexowriter to auxiliary reader or auxiliary reader to Flexowriter). This

terminal normally is jumpered to terminal U.

U (Switch Code). A negative pulse will appear at this terminal whenever a Switch Code (2-3-4) is sensed during a normal reading operation or tape skip. This terminal is normally wired to terminal T.

V (Program Modification, Normal). This terminal is wired directly to the normally closed contacts of the program modification switch (intermediate margin). This switch is available for optional programming.

W (Number 2 Field Switch, Common). This terminal is wired directly to the operate contacts of the number two field switch. This switch is available for optional programming.

X (Optional Stop). A negative pulse directed to this terminal will cause the termination of a normal reading operation or a tape skip operation.

Y (Program Modification, Common). This terminal is wired directly to the operate contacts of the program modification switch (intermediate margin). This switch is available for optional programming.

Z (Selector Pick). A negative pulse directed to this terminal will cause the selector relay to pick.

a (Number 2 Field Switch, Normal). This terminal is wired directly to the normally closed contacts of the number 2 field switch. This switch is available for optional programming.

b (Zone Indicator, Manual Only). With the audible zone indicator feature incorporated, a negative pulse will appear at this terminal each time a character is typed manually when the carriage assembly is in the "Live Zone". This pulse may be directed through a jumper wire to terminal M to pulse the bell solenoid and ring the bell.

c (Hidden Hyphen Code). A negative pulse will appear at this terminal whenever a Hidden Hyphen code (3-4-6) is sensed during a normal reading operation or a tape skip operation.

d (Selector Drop). A negative pulse directed to this terminal will cause the selector relay to drop.

e (Number 2 Field Switch, Transfer). This terminal is wired directly to the normally open contacts of the number two field switch. This switch is available for optional programming.

f (Keyboard Lock). A negative pulse directed to this terminal will cause the punch error relay to pick and hold, thus locking the keyboard by dropping KKL.

h (AID Code). A negative pulse will appear at this terminal whenever an AID code (1-3-4-5-7) is sensed during a normal reading operation or a tape skip operation.

j (Selector Relay, Common). This terminal is wired directly to the operate contacts of one set of the selector relay contacts.

k (Zone Indicator, Manual and Read). With the audible zone indicator incorporated, a negative pulse will appear at this terminal each time a character is typed (manually or normal reading) when the carriage assembly is in the "Live Zone". This pulse may be directed through a jumper wire to terminal M to pulse the bell solenoid and ring the bell.

m (Audible Zone Indicator). A negative pulse directed to this terminal will energize the bell solenoid and ring the bell, if the Flexowriter is so equipped.

n (Data Select Code). A negative pulse will appear at this terminal whenever the Data Select code (1-2-3-4-5) is sensed during a normal reading operation or a tape skip operation.

p (Selector Relay, Normal). This terminal is wired directly to the normally closed contacts of one set of the selector relay contacts.

r (Tape Skip Stop). A negative pulse directed to this terminal will terminate a tape skip operation. Normal reading will not resume.

s (Data Select Out). A negative pulse directed to this terminal will initiate a readout operation in a Data Selector that is connected to the Flexowriter.

t (Program Modification Transfer). This terminal is wired directly to the normally open contacts of the program modification switch. This switch is available for optional programming.

u (Selector Relay, Transfer). This terminal is wired directly to the normally open contacts of one set of the selector relay contacts.

v (Counter Stop)(Vertical Tab). This terminal is used as an exit from the predetermined counter or as an entry for the Automatic Vertical Spacer. When using the predetermined counter, a negative pulse will appear at this terminal when the counter steps to the specified point. This pulse will be directed to terminal J (Stop Read) by a jumper wire, to drop the read control relay. When using the Automatic Vertical Spacer, a negative pulse directed to this terminal will initiate a vertical tab function.

w (Tape Skip Restore). A negative pulse directed to this terminal will terminate a tape skip operation. Normal reading will resume.

x (Tape Skip Restore Code). A negative pulse will appear at this terminal whenever a Tape Skip Restore code (1-3-4) is sensed during a normal reading operation or a tape skip operation.

y (Selector Relay, Common). This terminal is wired directly to the operate contacts of one set of the selector relay contacts.

z (Space Code). A negative pulse will appear at this terminal whenever a Space Code (5) is sensed during a normal reading operation or a tape skip operation.

AA (Modifier Reset). A negative pulse directed to this terminal will cause to drop those code storage relays in a Selectadata Reader that are patched to the Program Modifier Release terminal board.

BB (Counter Input)(Form Feed). This terminal is used as an entry for either the predetermined counter or the Automatic Vertical Spacer. When using the predetermined counter, this terminal will be jumpered directly to terminal C (minus). When using the Automatic Vertical Spacer, a negative pulse directed to this terminal will initiate a form feed function.

CC (Selector Relay, Normal). This terminal is wired directly to the normally closed contacts of one set of the selector relay contacts.

DD (Delay in Zone). A negative pulse directed to this terminal will pick KDC if the carriage assembly is in the "Live Zone".

EE (Intermediate Margin). Negative potential directed to this terminal will pick the intermediate margin relay (KDM). Potential must remain at this terminal for KDM to remain up.

FF (Carriage Return in Skip). A negative pulse directed to this terminal during a tape skip operation will energize LTC and LT-8. This will result in a Translator cycle to operate the carriage return key thus initiating a carriage return operation. If it is necessary to recognize carriage return codes during a tape skip operation, terminal FF will be jumpered to terminal K.

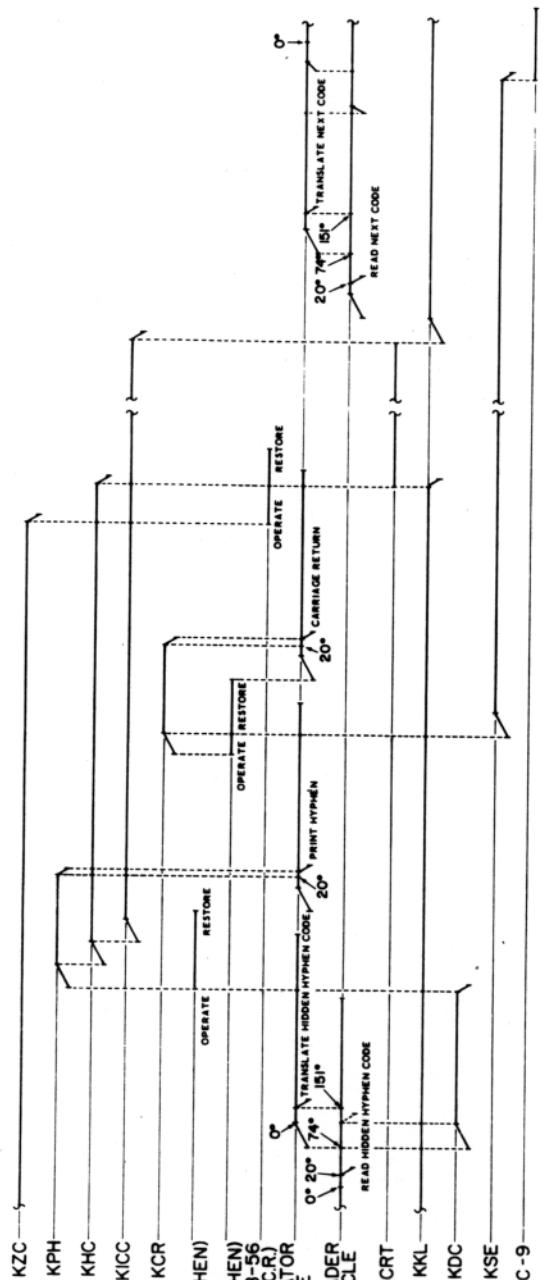
HH (Selector Relay, Transfer). This terminal is wired directly to the normally open contacts of one set of the selector relay contacts.

ADJUSTMENTS

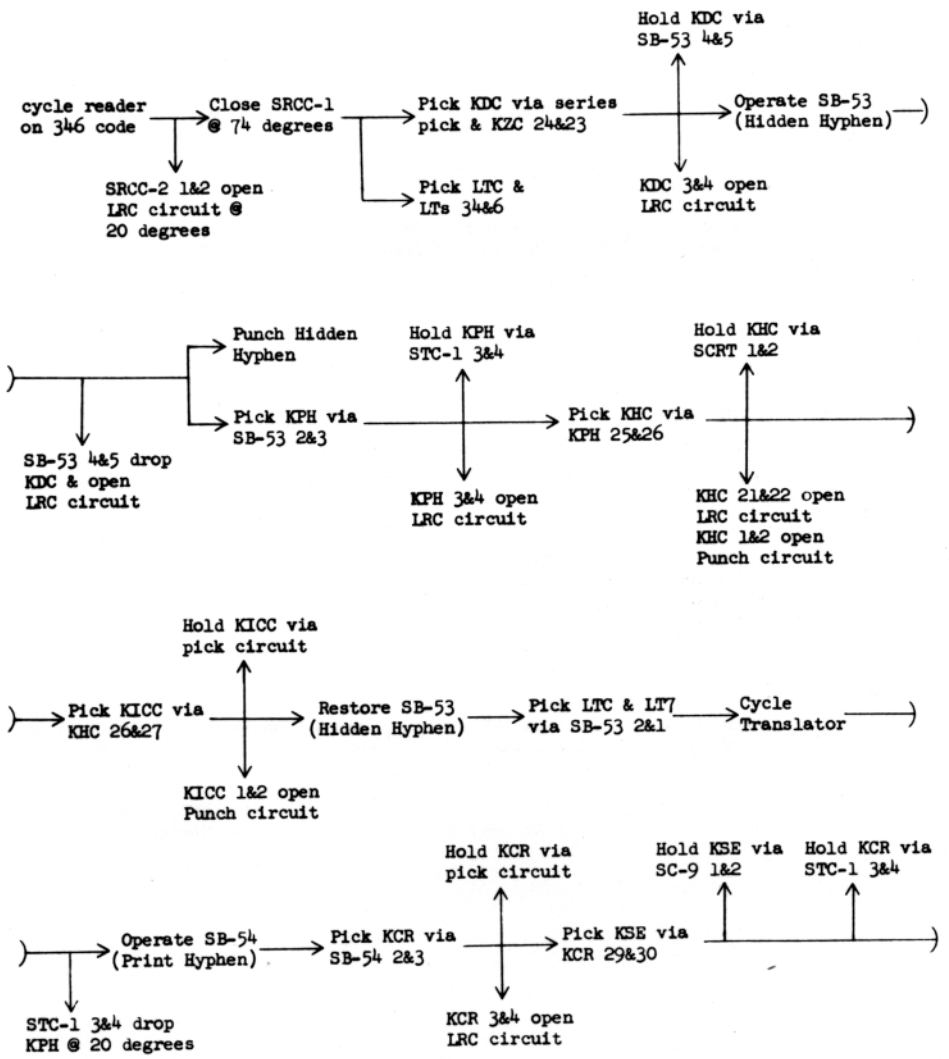
(Refer to the Adjustments Section (yellow tabs) in this volume.)

CIRCUIT DESCRIPTIONS

Read a Hidden Hyphen code while in the Live Zone, the Punch is On, KKL, KZC and KRC are energized.

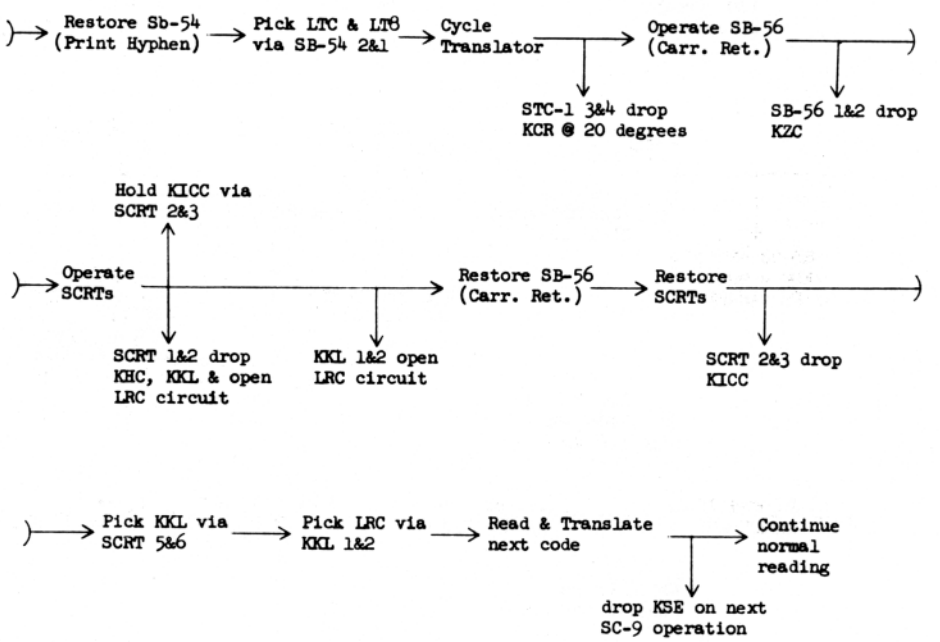


Read a Hidden Hyphen code while in the Live Zone, the Punch is On, KKL, KZC and KRC are energized.

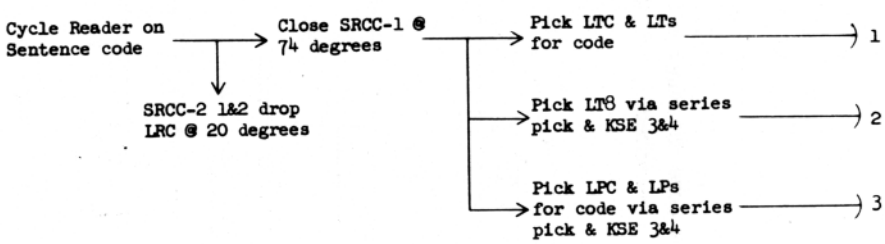


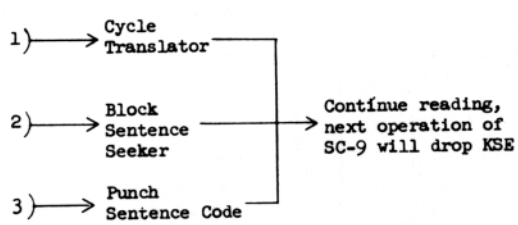
(Continued on next page.)

Read a Hidden Hyphen code while in the Live Zone, the Punch is On, KKL, KZC and KRC are energized.

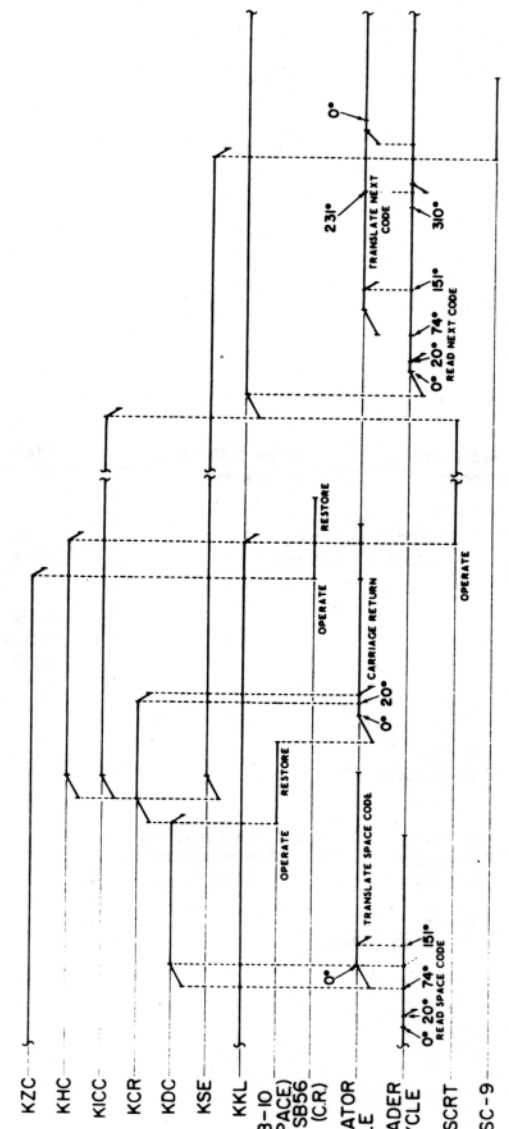


Read a Sentence code following an automatic Carriage Return, Punch is On, KKL, KRC and KSE are energized.

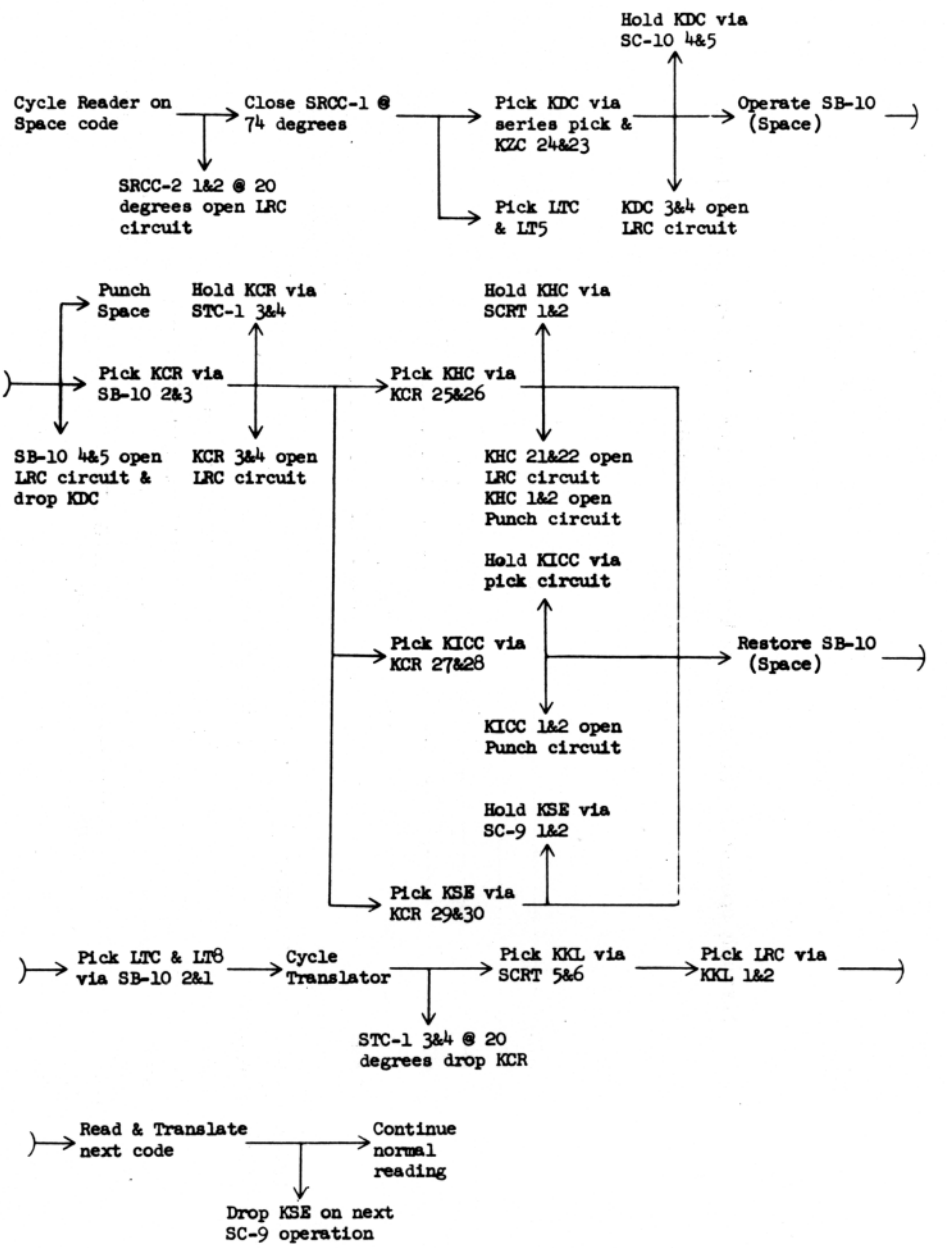




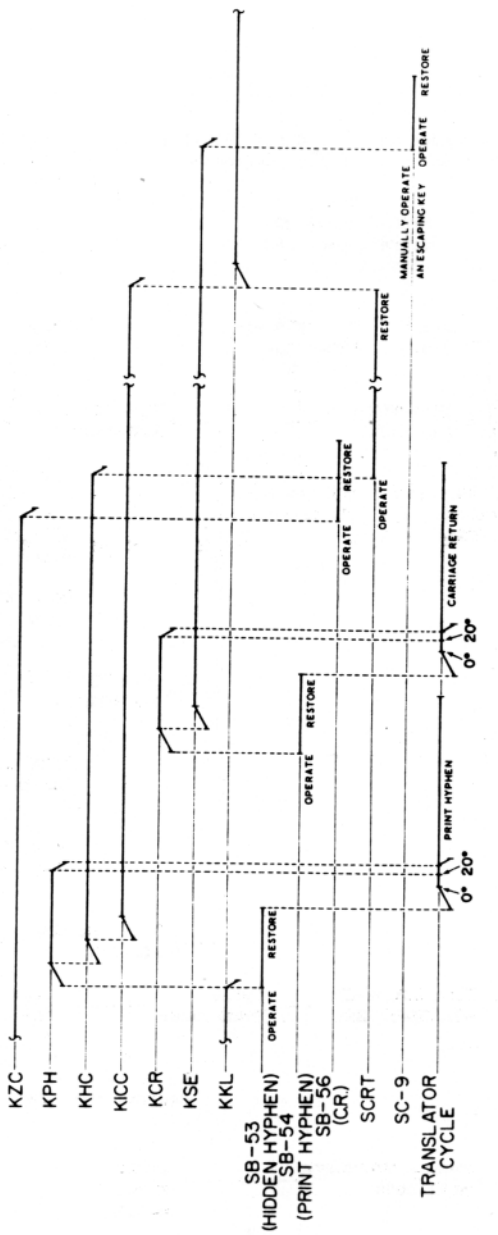
Read a Space code while in the Live Zone, the Punch is On, KKL, KZC and KRC are energized.



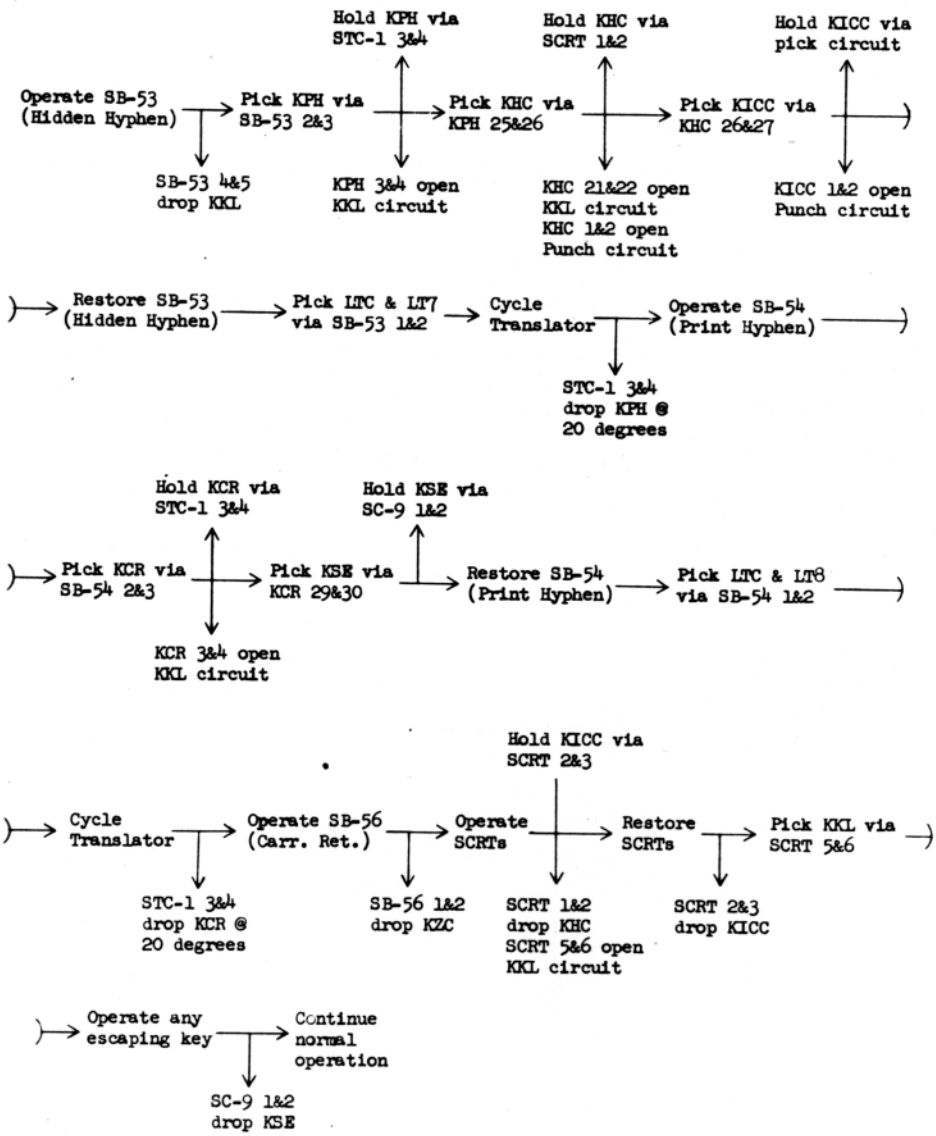
Read a Space code while in the Live Zone, the Punch is On, KKL, KZC and KRC are energized.



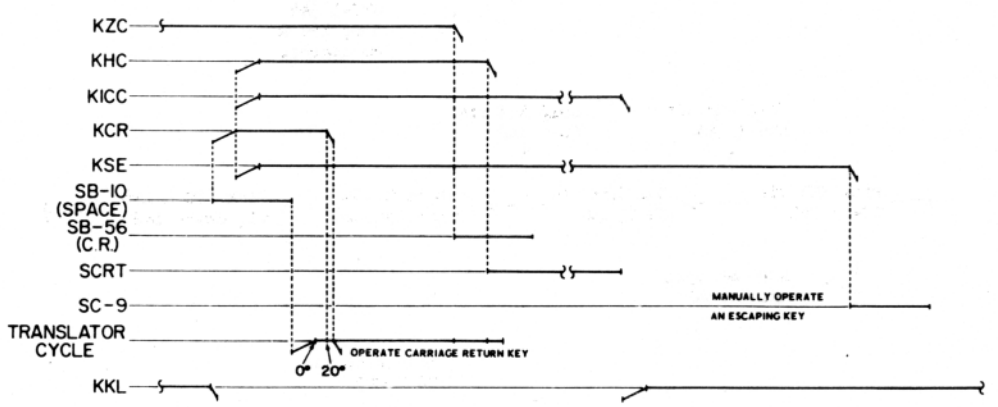
Manually operate the Hidden Hyphen keylever while in the Live Zone, the Punch is On, KKL and KZC are energized.



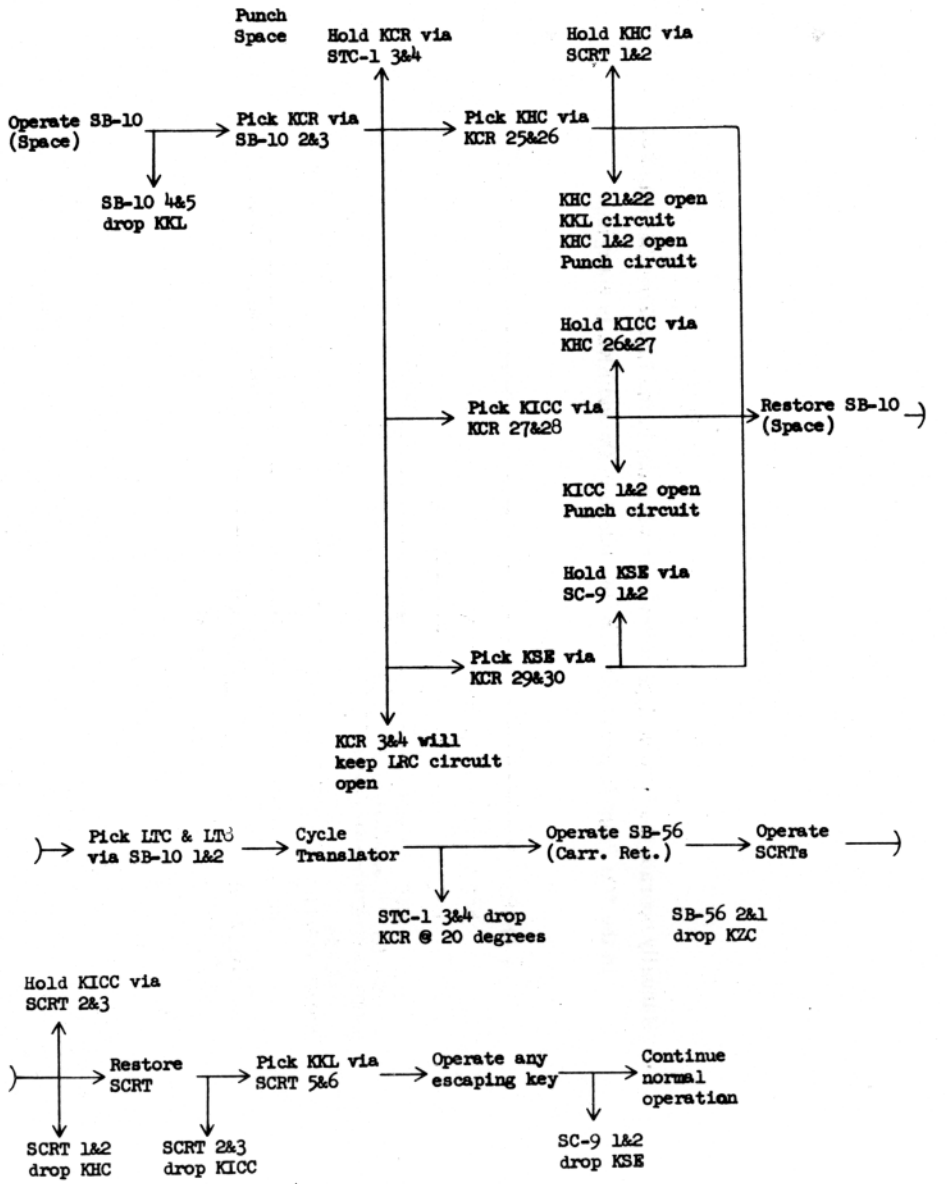
Manually operate the Hidden Hyphen keylever while in the Live Zone, the Punch is On, KKL and KZC are energized.



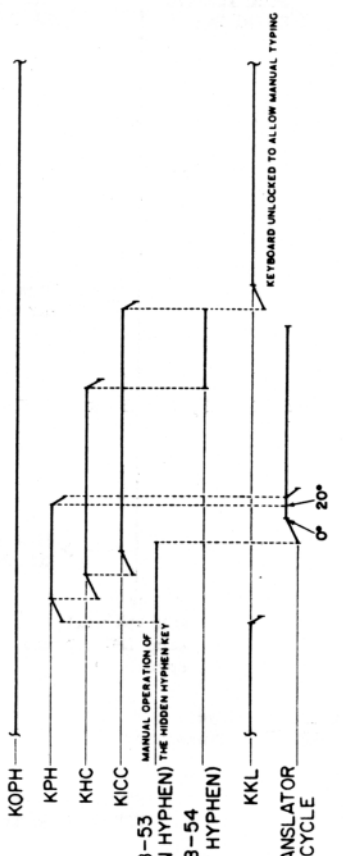
Manually Space while in the Live Zone, the Punch is On, KKL and KZC are energized.



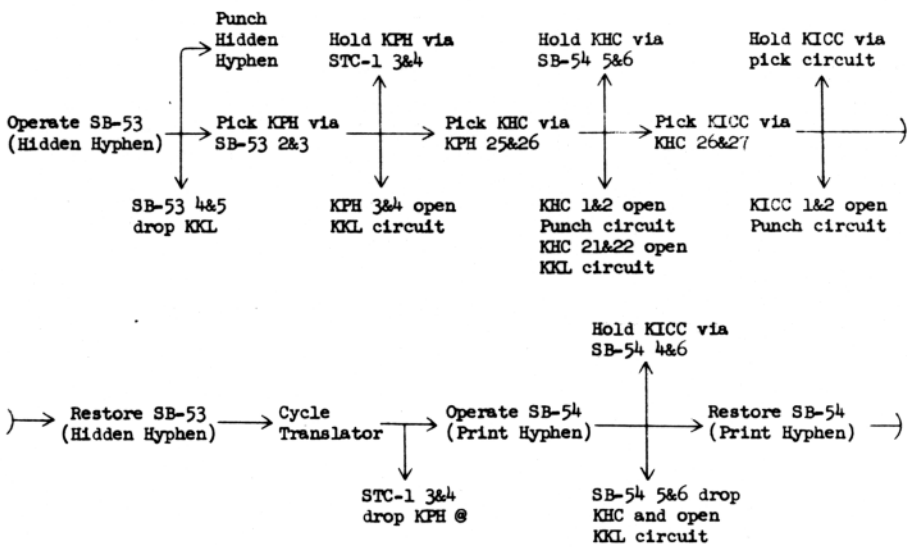
Manually Space while in the Live Zone, the Punch is On, KKL and KZC are energized.



Manually operate the Hidden Hyphen keylever when not in the Live Zone but with S-1 in the "On Print Hyphen" position, the Punch is On and KKL is energized.



Manually operate the Hidden Hyphen keylever when <u>not</u> in the Live Zone but with S-1 in the "On Print Hyphen" position, the Punch is On and KKL is energized.



OTHER MODELS

FLEXOWRITER VERIFIER SYSTEM

MODEL 2331 FLEXOWRITER VERIFIER SYSTEM AUTOMATIC WRITING MACHINE

MODEL 2321 AUXILIARY VERIFIER READER

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description

FLEXOWRITER VERIFIER SYSTEM

PURPOSE AND USE

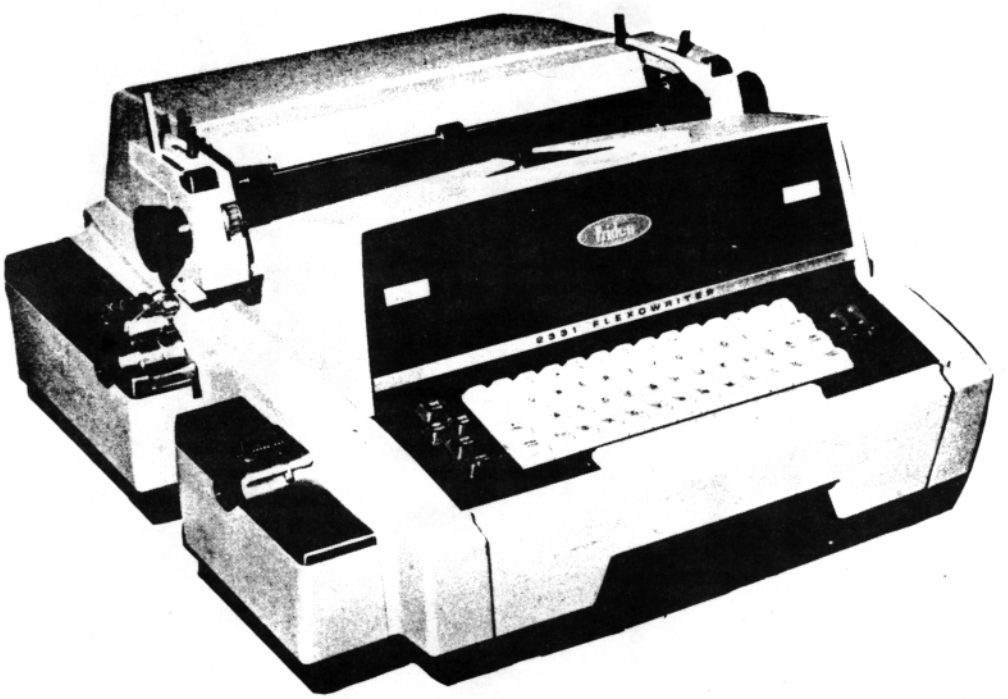


Figure 1.

The Model 2331 Flexowriter Verifier System Automatic Writing Machine (Figure 1) with the Model 2321 Auxiliary Verifier Reader (Figure 2) will perform selective keyboard/tape verification, limited comparison/tape verification for position checks in non-printing mode, and it can also perform as a standard duplex reader.

Figure 2.

The Model 2331 Flexowriter can perform the same as a standard Model 2301 Flexowriter since it incorporates the same keyboard layout, coding, and other specifications, but has additional verification components. The codes to be verified are received at the Model 2321 Verifier from the Flexowriter keyboard, or panel switches.

Indicator Lights

PUNCH FAULT- Glows to indicate a malfunction in the output area of the system, such as: tight tape, tape out, parity error or input signal overlap. At the same time, the Flexowriter keyboard becomes locked.

VERIFY ERROR- Glows to indicate a non-compare error in which the code in the auxiliary Verifier Reader does not match the verification input code. The Flexowriter keyboard becomes locked.

Control Switches

CHECKER ERROR- A momentary panel switch that unlocks the Flexowriter keyboard and extinguishes the VERIFY ERROR Indicator following a keyboard error on the part of the operator.

START READ- Starts the Flexowriter Reader.

START READ 1- Located on the Verifier. When in operation causes the Flexowriter Reader to operate.

START READ 2- Located on the Verifier. When in operation causes the Verifier Reader to operate.

ADD CODE SWITCH- Operated when the error condition is due to one or more missing codes from the tape that is being verified. Operation of this switch unlocks the Flexowriter keyboard.

CHANGE CODE SWITCH- Operated when an incorrect code is present in the tape that is being verified. Operation of this switch unlocks the Flexowriter keyboard and permits one keystroke to occur without verification. The tape in the Verifier Reader advances to the next code.

BY PASS SWITCH- Operated when the tape being verified contains one or more extemporaneous codes. Operation of this switch unlocks the Flexowriter keyboard and advances the Reader to the next code.

DUPLEX SWITCH- When operated, verification is completely disabled. The code designated as a Switch Code and read in either Reader will stop the Reader in which it is sensed and immediately switch to the other Reader.

MACHINE SPECIFICATIONS'

Operating Speed

140 Words Per Minute
720 Codes Per Minute

Accuracy Check

Parity contacts in the Flexowriter Punch

Power Supply

110 VAC

Motor

A 35 millihorsepower single phase induction motor.

Dimensions (Model 2331)

Width- 22 - 3/4 inches
Height- 10 inches
Depth- 22 - 1/2 inches

Dimensions (Model 2321)

Width- 16 - 3/4 inches
Height- 26 - 1/2 inches
Depth- 17 - 1/2 inches

Standing Weight (Model 2331)

105 pounds

Standing Weight (Model 2321)

85 pounds

Shipping Weight (Model 2331)

140 pounds

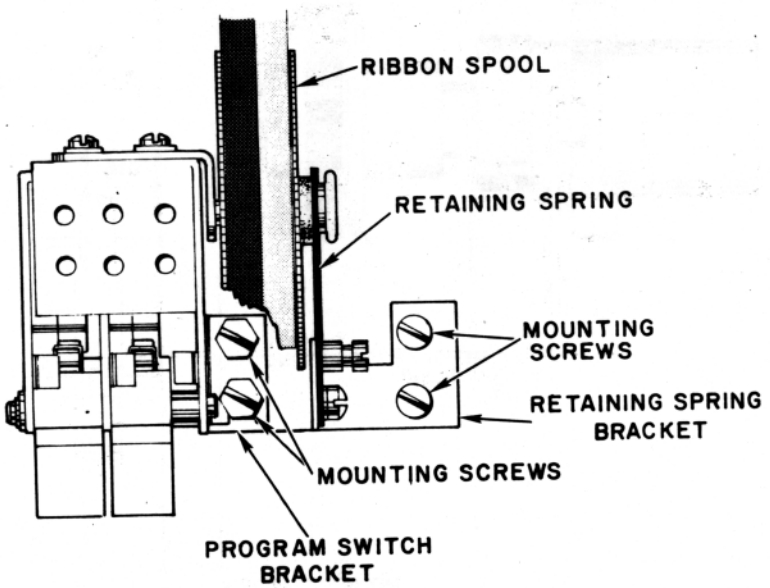
Shipping Weight (Model 2321)

94 pounds

ADJUSTMENTS (MODEL 2331)

(Except for the following adjustment, refer to the Writing Machine Adjustments Section (yellow tabs) in this volume.)

LEFT HAND RIBBON SPOOL



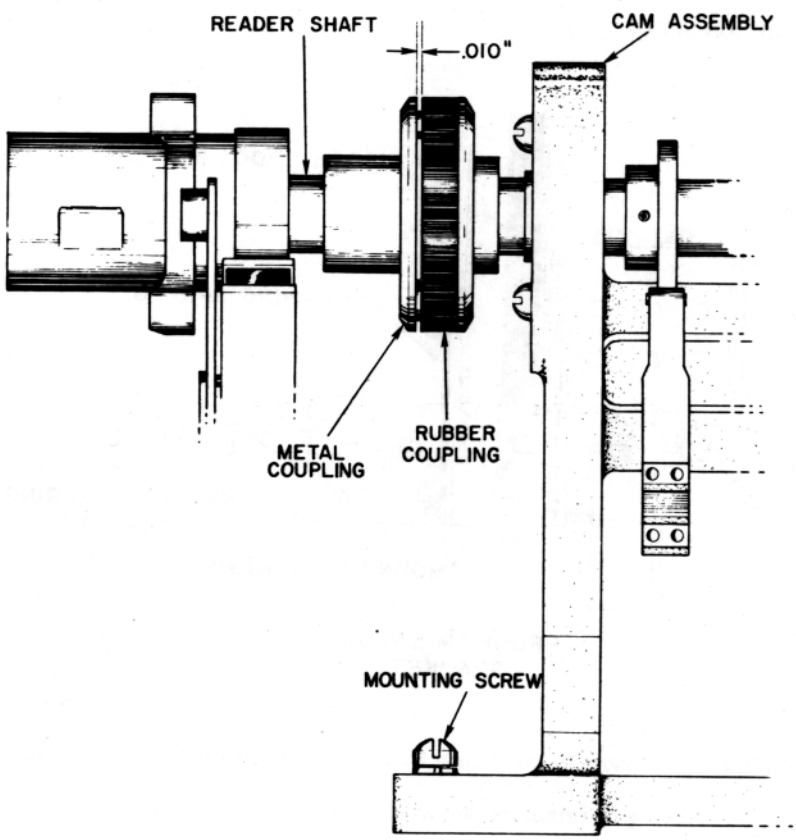
The left hand ribbon spool must be positioned horizontally to the switch bracket assembly.

1. Loosen the two screws that retain the left hand base plate.
2. Loosen the two mounting screws on the end of the spring support plate.
3. Position the switch bracket assembly so that the left hand ribbon spool is aligned horizontally to the bracket.
4. Tighten the screws.

ADJUSTMENTS (MODEL 2321)

(Except for the following adjustments, refer to the Auxiliary Tape Reader Adjustments Section (yellow tabs) in this volume.)

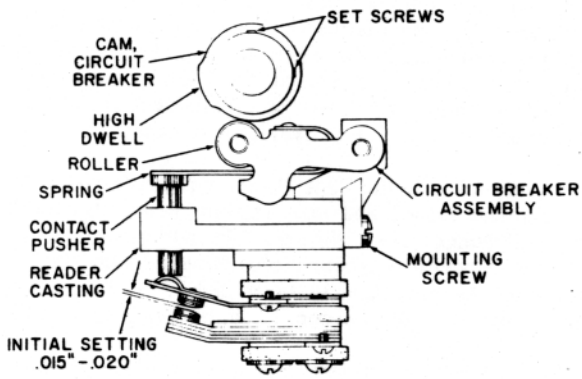
CAM ASSEMBLY



There must be a .010" clearance between the metal and the rubber coupling. Perform the adjustment in the following sequence:

1. Loosen the four mounting screws that retain the cam assembly.
2. Position the cam assembly for a .010" clearance between the metal and the rubber coupling. Simultaneously, the cam assembly must be aligned to the center of the Reader shaft.
3. Tighten the mounting screws and verify the adjustment.

CIRCUIT BREAKER ASSEMBLY TIMING (SRCC)



SRCC	MAKE	BREAK	DURATION OF CLOSURE
1	90°	200°	110°
2	260°	10°	110°
3	80°	188°	108°
4	165°	290°	125°
5	160°	270°	110°
6	195°	85°	230°
7	80°	200°	120°
8	190°	280°	90°

1. Duration - Raising or lowering the circuit breaker assembly by loosening the mounting screws determines the contact clearance with the roller on the low dwell of the cam and therefore the duration or length of time the contacts are made on the high dwell of the cam. Begin with the circuit breaker assembly adjusted to give an initial setting of .015" to .020" clearance between the contacts with the roller on the low dwell of the cam. With a timing dial (T-18088) attached to the reader shaft, determine the number of degrees the contacts remain closed when operated by the high dwell of the cam as the drive shaft is cycled. Raise the circuit breaker assembly to increase the duration of contact closure and lower to decrease until the correct duration of contact closure is obtained as outlined in the timing chart.

   NOTE: Distortion or weakening of the spring which operates the contact pusher may make it impossible to obtain the correct contact duration. If necessary, replace the circuit breaker assembly.

2. Timing - Once the correct duration of contact closure has been obtained, set the SRCC timing cams to make and break according to the specifications called for in the timing chart.

CIRCUIT DESCRIPTION

The qualifications to begin verification are that the VERIFY ON switch must be in the operated position or verification must be activated by a code assigned to the VERIFY ON function, and the DUPLEX switch must be in the non-operated position.

When the system is in operation, the code in the Auxiliary Reader is compared to the code received from the Flexowriter. If all code channels match for all eight code bits, the compared code is transmitted to the Flexowriter Punch and the Auxiliary Verifier Reader is advanced to the next code. In the case of unequal result in code comparison, the Flexowriter keyboard becomes locked against further operation; reading, if in progress, will be terminated. In addition, the Auxiliary Reader will not advance and the Tape Punch will not be activated by the verification circuitry.

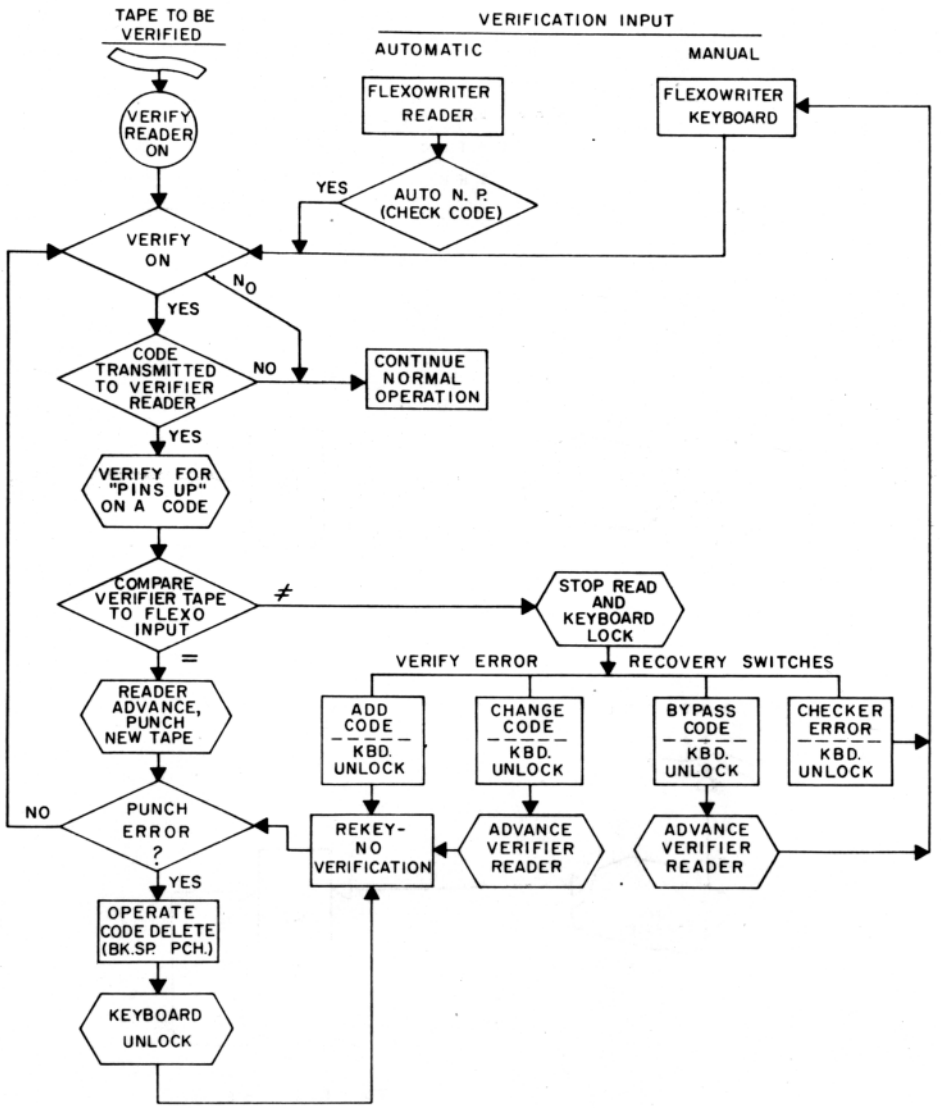
If the correct code is transmitted to the Tape Punch, but non-parity punching operation results, the Flexowriter keyboard becomes locked and tape reading will be terminated. Operation of the CODE DELETE panel switch will punch bits 1 through 7 in the tape without actuation of verification circuitry. This permits the Flexowriter keyboard to become unlocked and enables the Reader to be restarted manually. Following the operation of the CODE DELETE switch, on additional cycle of the Punch, either from the keyboard or the Reader, is permitted in order to enter a delete code.

When a single tape is being keyboard verified, and the VERIFY ON condition is in effect, a code assigned to the VERIFY OFF function must be in the READ position before the Auxiliary Reader can commence normal reading operation. Reading is initiated by operation of any START READ switch corresponding to the VERIFY OFF code. Reading will continue to be in effect (without verification) and may be stopped and restarted by any START READ switch operation. When a VERIFY ON code is sensed, it will return the system to keyboard verification operation.

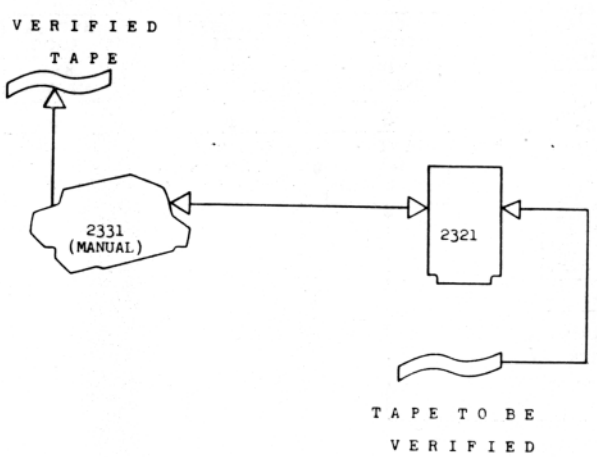
In dual tape operation, if programmed VERIFY OFF and STOP codes are sensed in the Flexowriter Reader to halt the system, operation of the Auxiliary Reader START READ 2 switch corresponding to the VERIFY OFF code in the Auxiliary Reader, starts this Reader into normal reading operation. A subsequent VERIFY ON code in the Auxiliary Reader causes the Reader to halt in condition to verify the next code. In VERIFY ON condition, operation of the Flexowriter START READ switch, or START READ 1 on the Auxiliary Reader, will cause the Flexowriter Reader to commence operation. This is intended for the purpose of turning verification off by code control, to sense program codes (such as punch control) or to transmit an in-step check code (in automatic NON PRINT condition) to the Auxiliary Reader for verification of the position of the program tape against the position of the tape in the Auxiliary Reader.

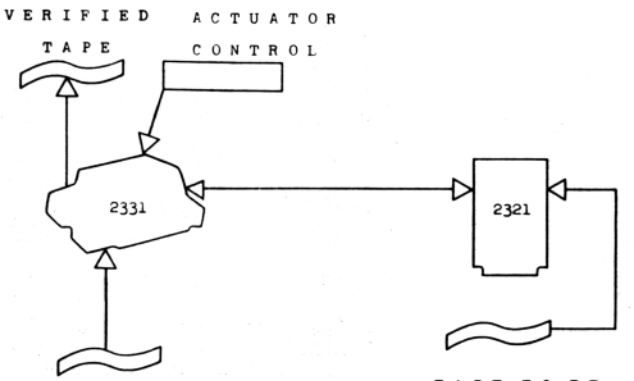
During verification, an automatic NON PRINT operation can be initiated by the sensing of a code (wired in the Flexowriter program panel to initiate automatic NON PRINT) in the Flexowriter Reader. An initial NON PRINT code read in the Flexowriter Reader will not be subject to verification because the code does not normally reproduce nor transmit to the Verifier Reader. It does place the Flexowriter in non print condition, and the code selected is then transmitted to the Auxiliary Reader where it must verify with a matching code. The Print Restore code sensed in the Flexowriter Reader must verify if it is wired in the Flexowriter program panel to reproduce.

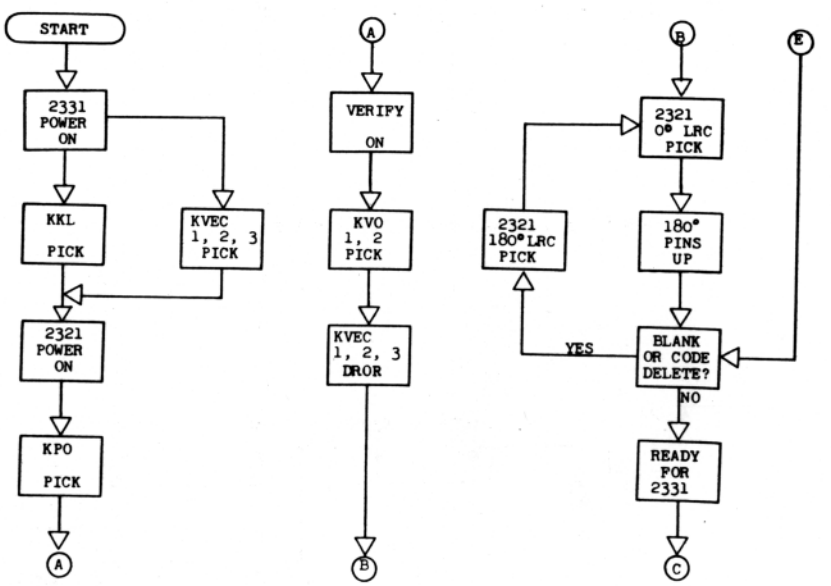
FLOW CHART


TAPE TO BE VERIFIED
VERIFICATION INPUT
AUTOMATIC
MANUAL
FLEXOWRITER READER
FLEXOWRITER KEYBOARD
VERIFY READER ON
YES
AUTO N. P. (CHECK CODE)
VERIFY ON
NO
YES
CODE TRANSMITTED TO VERIFIER READER
NO
CONTINUE NORMAL OPERATION
YES
VERIFY FOR "PINS UP" ON A CODE
COMPARE VERIFIER TAPE TO FLEXO INPUT
≠
STOP READ AND KEYBOARD LOCK
=
VERIFY ERROR
RECOVERY SWITCHES
READER ADVANCE, PUNCH NEW TAPE
ADD CODE KBD. UNLOCK
CHANGE CODE KBD. UNLOCK
BYPASS CODE KBD. UNLOCK
CHECKER ERROR KBD. UNLOCK
NO
PUNCH ERROR ?
REKEY-NO VERIFICATION
ADVANCE VERIFIER READER
ADVANCE VERIFIER READER
YES
OPERATE CODE DELETE (BK.SP. PCH.)
KEYBOARD UNLOCK

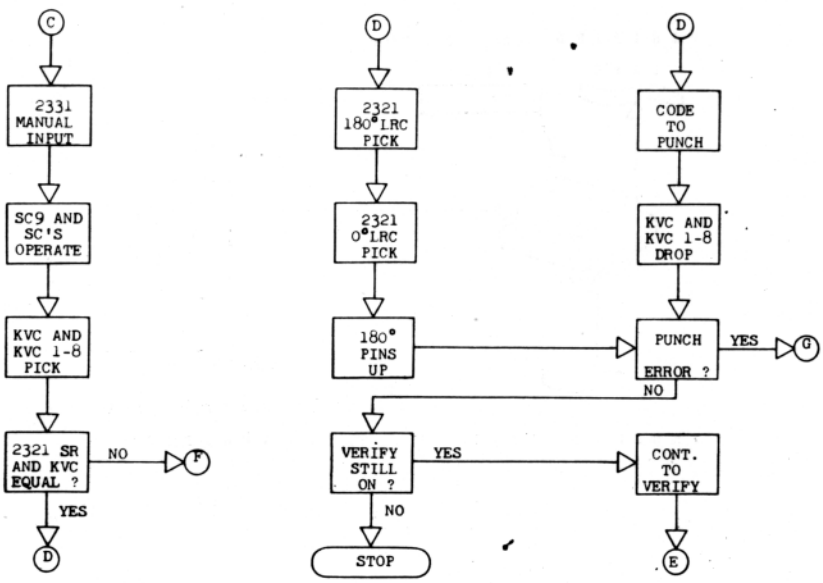
VERIFICATION
USING
THE





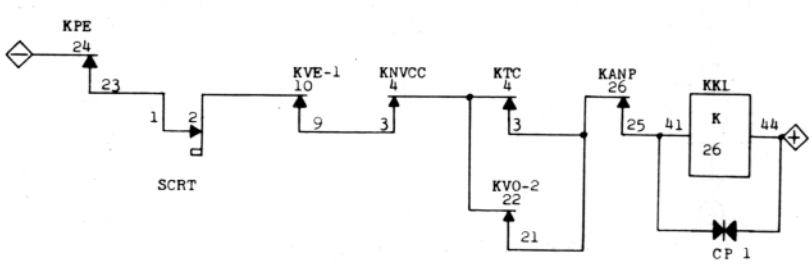


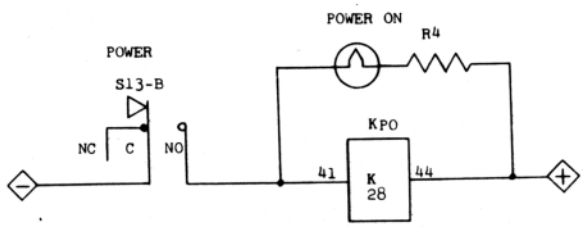
2331 AND 2321 FLOW CHART



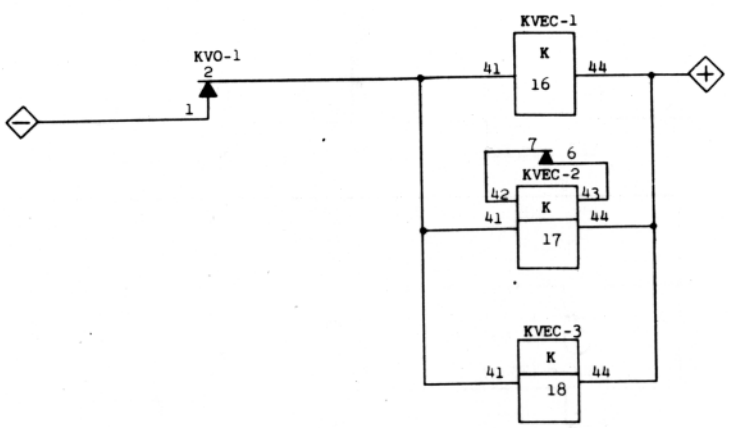
2331 AND 2321 FLOW CHART

KKL ENERGIZE CIRCUIT

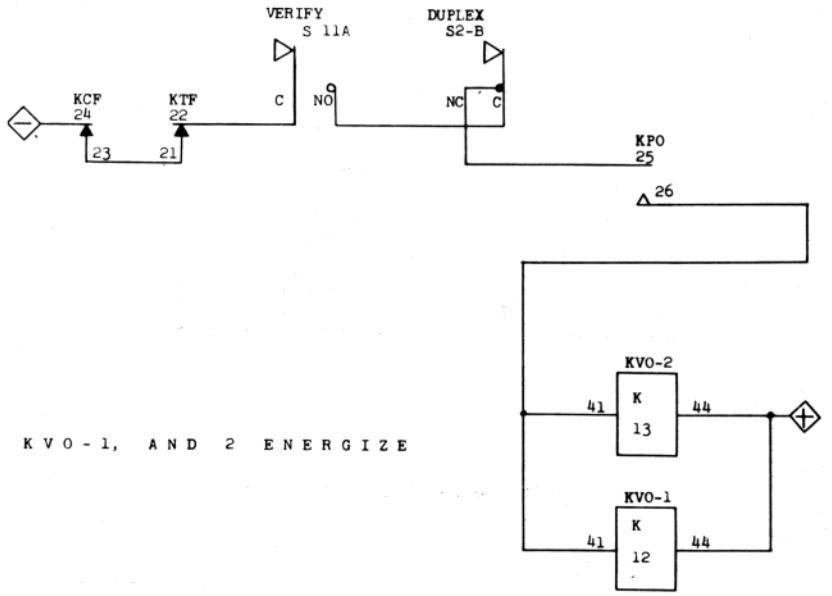




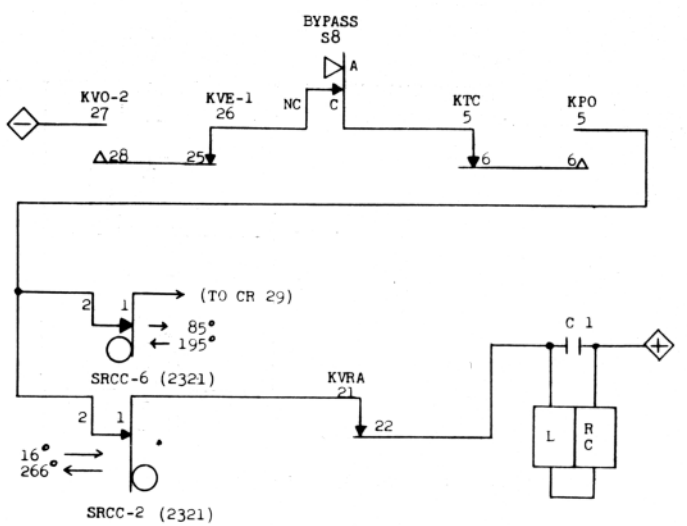
2321 POWER ON CIRCUIT



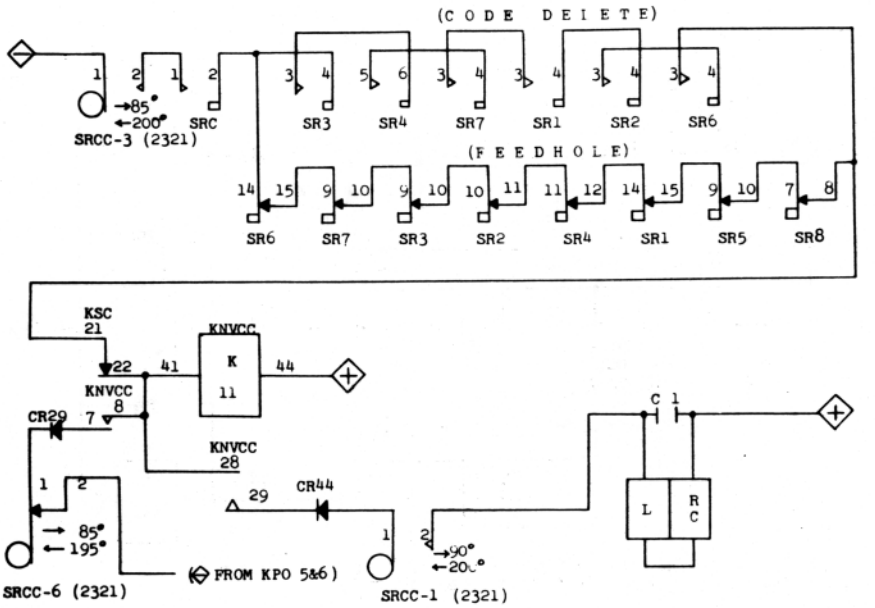
KVEC-1, 2, AND 3 ENERGIZE



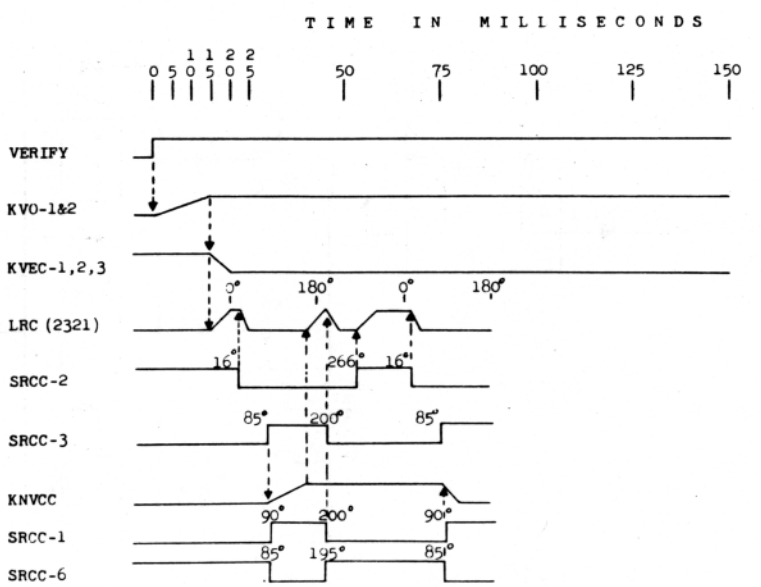
K V O - 1, A N D 2 E N E R G I Z E



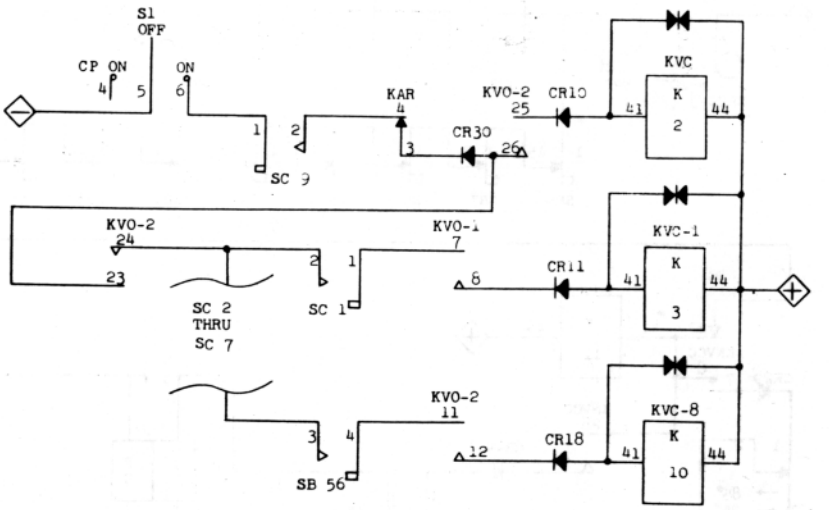
0° L R C E N E R G I Z E (S T O P A T 180° P I N S U P)



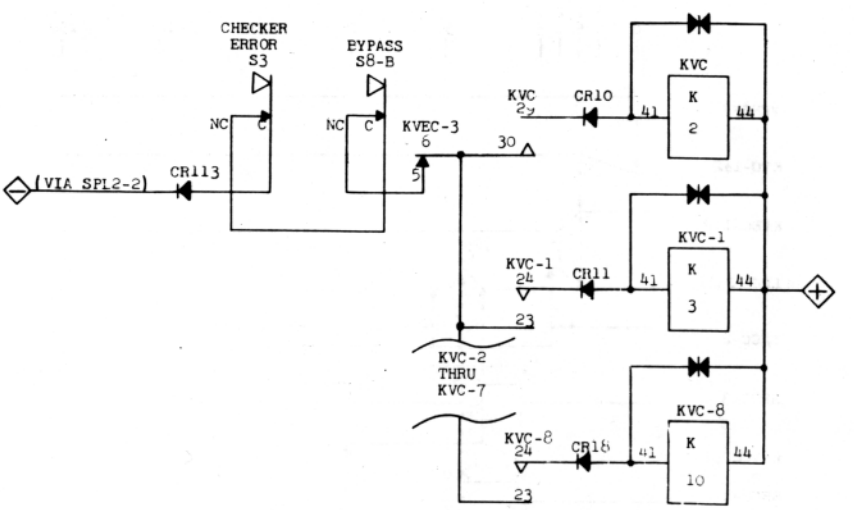
180° LRC ENERGIZE (CODE DELETE OR FEEDHOLE)



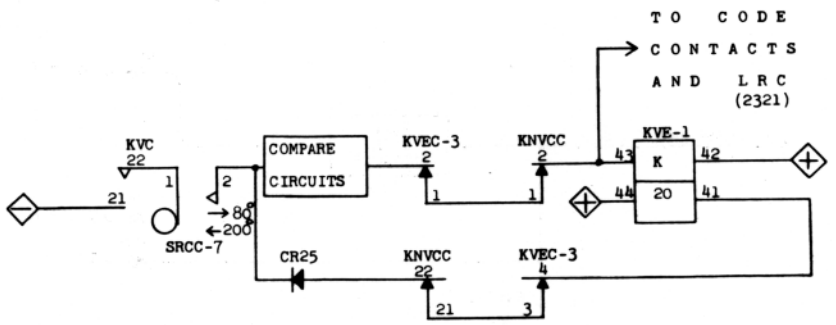
CODE DELETE OR FEEDHOLE



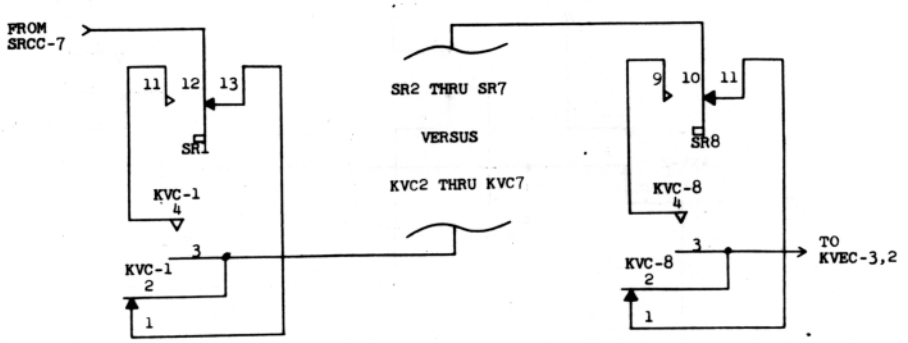
KVC AND KVC-1 ENERGIZE
(USING DIGIT 1)



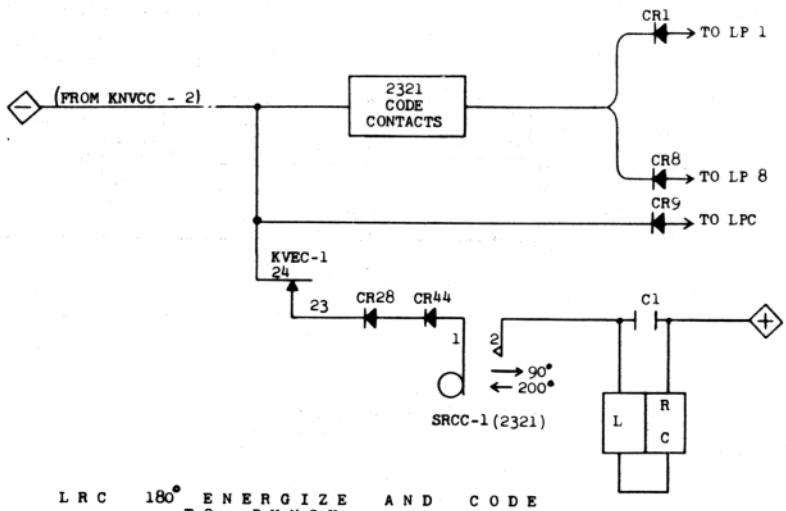
KVC AND KVC-1 HOLD CIRCUITS
(AFTER TYPING DIGIT 1)



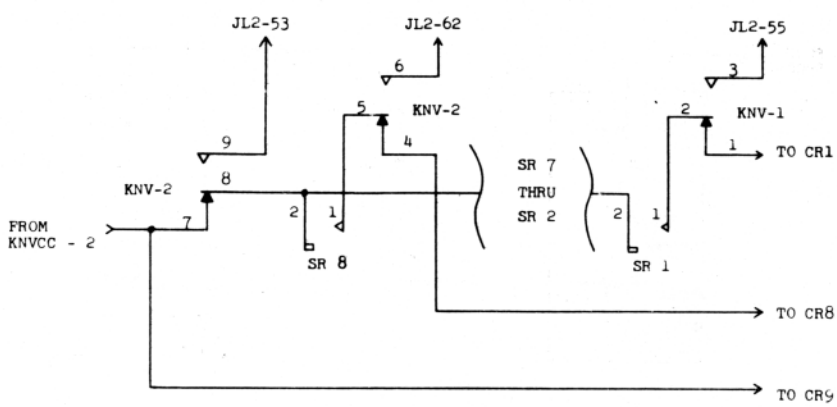
KVE-1 CONTROL



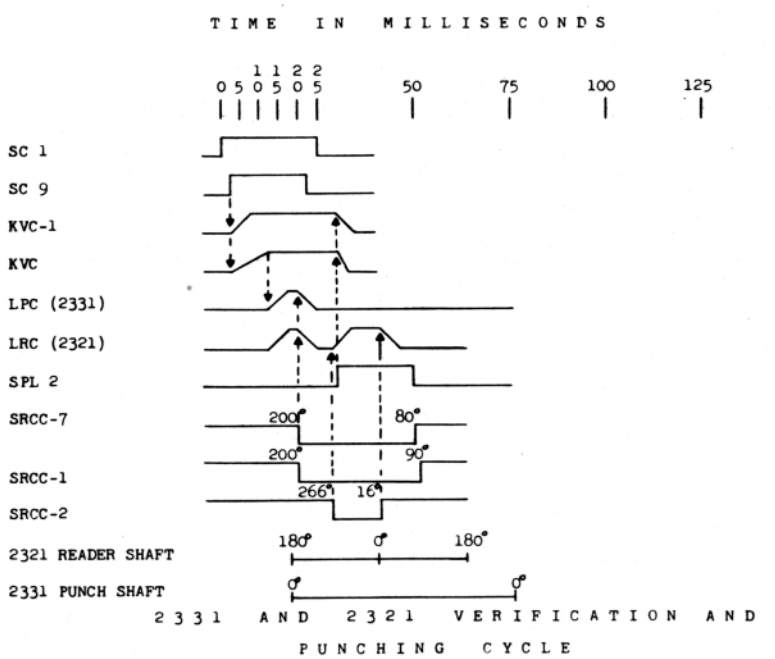
2321 COMPARE CIRCUITS



L R C 180° ENERGIZE AND CODE TO PUNCH



2321 CODE CONTACTS



2331 AND 2321 VERIFICATION AND PUNCHING CYCLE

OTHER MODELS

MODEL 2360 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Special Features

Accessories

Adjustments

Circuit Description

Programming

Maintenance

PURPOSE AND USE

The Model 2360 FLEXOWRITER Automatic Writing Machine was designed to replace the Model I FG-40 Flexowriter. The Model 2360 produces perforated paper tape for use in Addressograph-Multigraph (graphotype) machines. The Model 2360 is a single case machine and does not have programmatic features.

PHYSICAL AND FUNCTIONAL DESCRIPTION

The functions of the Model 2360 are similar to those of the Model 2301 FLEXOWRITER Automatic Writing Machine. The Model 2360 consists of the same basic units as the Model 2301.

MACHINE SPECIFICATIONS

Punch Operating Speed

1044 Codes Per Minute

Reader Operating Speed

12.2 Characters Per Second

Tape

6 - Channel Tape

Printing Characters

43

Paper

14 3/16 Inches Wide

Writing Line

135 characters long at 10 characters per inch.

Vertical Spacing

Six lines per inch.

Carriage

16 inch carriage assembly (20 inch carriage optional.)

Type Face

Pica Gothic

Case Shift

Single Case (Upper case)

Repeat Space Key

Repeats the space code when the space bar is held depressed.

Dimensions

Width - 20 1/2 inches
Height - 10 inches
Depth - 22 inches

Weight

Approximately 110 pounds

SPECIAL FEATURES

Tape/Edge Card Reader
Tape/Edge Card Punch

ACCESSORIES

Pinfeed Platen
Flexofeed Platen

ADJUSTMENTS

(Refer to the Adjustments Section (yellow tabs) in this volume.)

CIRCUIT DESCRIPTION

Same as Model 2301 Flexowriter. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

Programming is the same as the Model 2301 Flexowriter.

MAINTENANCE

Maintenance is the same as the Model 2301 FLEXOWRITER. See Volume II, Model 2200/2300 Flexowriter Adjustment Manual, TP700RD, including Special Features Section.

OTHER MODELS

MODEL 2351 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Model 2351 FLEXOWRITER Automatic Writing Machine, 5-channel, 4-bank, does not have permanent wiring for the function codes. This unit is intended for use with communication systems.

PHYSICAL AND FUNCTIONAL DESCRIPTION

The basic units, functions, and specifications of the Model 2351 are the same as those of the Model 2301 Flexowriter.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

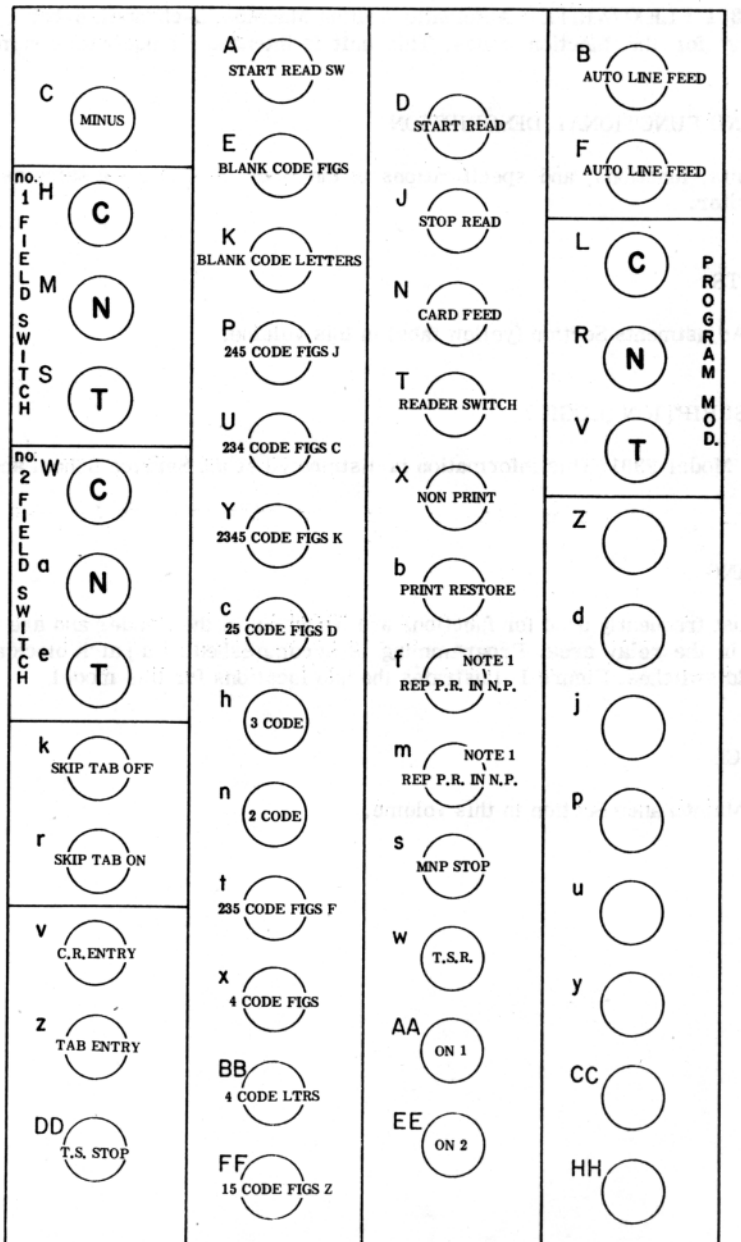
Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

The codes most frequently used for functions are wired out of the Reader and are pluggable at the JD option block in the relay area. Programming is accomplished by a patch block and an actuator/tab rack with field switches. Figure 1 illustrates the hub locations for this model.

MAINTENANCE

Refer to the Maintenance Section in this volume.



NOTE 1. IF CODE OTHER THAN 2345 IS USED FOR P.R., THE JUMPER JDF-JDM MUST BE USED. ANY OTHER CODE FOR P.R. WILL THEN BE REPRODUCING IN A.N.P.

Figure 1.

OTHER MODELS

MODEL 2352 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Use

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Model 2352 FLEXOWRITER Automatic Writing Machine, a three-bank keyboard, is used in conjunction with 5-channel communication systems. This unit has a 50-point removable program panel for rapid program changes.

PHYSICAL AND FUNCTIONAL DESCRIPTION

The basic units, functions, and specifications of the Model 2352 are the same as those of the Model 2301 Flexowriter.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

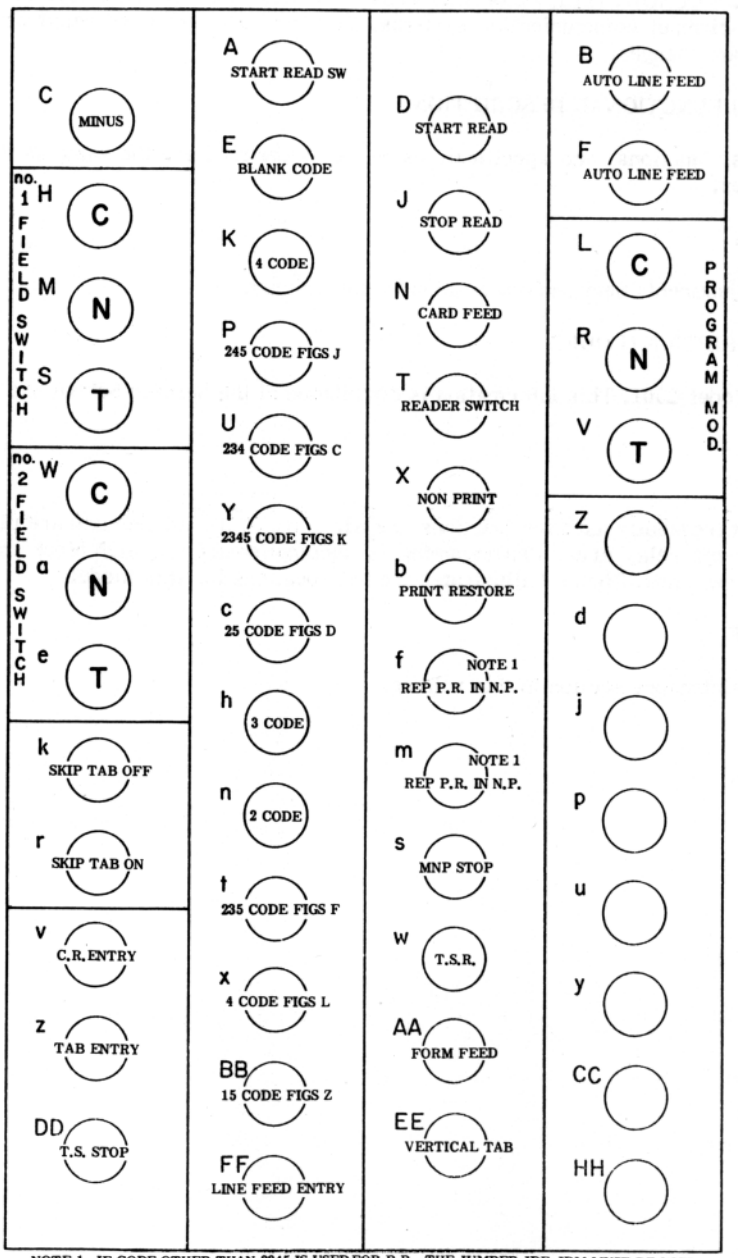
Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

The codes most frequently used for functions are wired out of the Reader and are pluggable at the JD option block in the relay area. Programming is accomplished by a patch block and an actuator/tab rack with field switches. Figure 1 illustrates the hub locations for this model.

MAINTENANCE

Refer to the Maintenance section in this volume.



NOTE 1. IF CODE OTHER THAN 2345 IS USED FOR P.R., THE JUMPER JDF-JDM MUST BE USED. ANY OTHER CODE FOR P.R. WILL THEN BE REPRODUCING IN A.N.P.

Figure 1.

OTHER MODELS

MODELS 2353 and 2354 FLEXOWRITER
Automatic Writing Machines

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description

Programming

Maintenance

PURPOSE AND USE

The Model 2353 FLEXOWRITER Automatic Writing Machine has a four-bank keyboard; the Model 2354 has a three-bank keyboard. These machines are non-programatic and are intended for use in five-channel communication systems. The units produce printed copy directly from a tape taken from the communications system, create printed documents, and generate five-channel tapes.

PHYSICAL AND FUNCTIONAL DESCRIPTION

Functions and controls are the same as those of the Model 2301 Flexowriter.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION

Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

This machine is programmed in the same manner as the Model 2301. For hub locations, see Figure 1.

MAINTENANCE

Refer to the Maintenance Section in this volume.

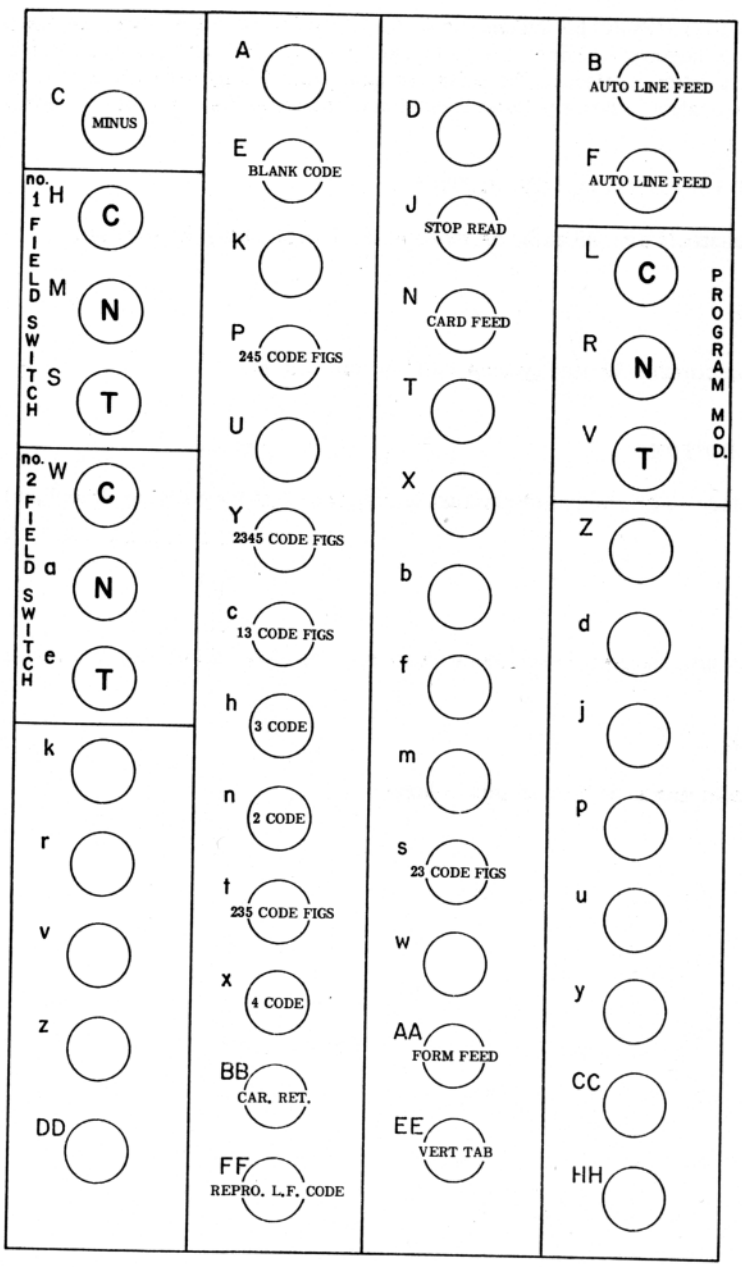

C
MINUS
no. 1 FIELD SWITCH
H
C
M
N
S
T
no. 2 FIELD SWITCH
W
C
a
N
e
T
k
r
v
z
DD
A
E
BLANK CODE
K
P
245 CODE FIGS
U
Y
2345 CODE FIGS
c
13 CODE FIGS
h
3 CODE
n
2 CODE
t
235 CODE FIGS
x
4 CODE
BB
CAR. RET.
FF
REPRO. L.F. CODE
D
J
STOP READ
N
CARD FEED
T
X
b
f
m
s
23 CODE FIGS
w
AA
FORM FEED
EE
VERT TAB
B
AUTO LINE FEED
F
AUTO LINE FEED
L
C
R
N
V
T
PROGRAM MOD.
Z
d
j
p
u
y
CC
HH

Figure 1.

OTHER MODELS

MODEL 2361 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Special Features

Accessories

Adjustments

Circuit Description

Programming

Maintenance

PURPOSE AND USE

The Model 2361 FLEXOWRITER Automatic Writing Machine was designed to replace the Model FG-68 Flexowriter. These machines use 8-channel tapes for preparation of input tapes on Addressograph-Multigraph Graphotype 6800 machines. The Model 2361 is a double case, non-programatic machine.

PHYSICAL AND FUNCTIONAL DESCRIPTION

The basic units and functions of the Model 2361 are the same as the Model 2301 Flexowriter. See Figure 1 for the keyboard layout.

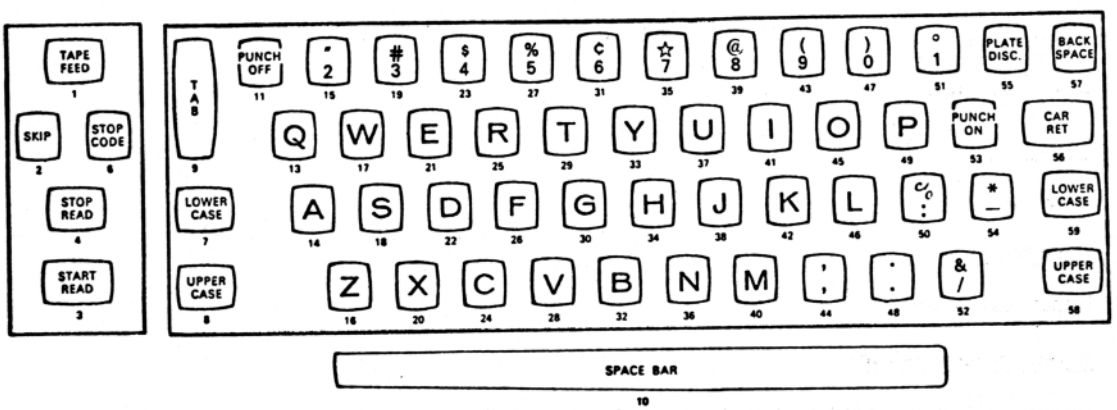


Figure 1.

MACHINE SPECIFICATIONS

Punch Operating Speed

1044 codes per minute

Reader Operating Speed

12.2 characters per second

Coding

Standard BCD 8-channel

Tape

8-channel tape

Printing Characters

82

Paper

14 3/16 inches wide

Carriage

16 inch carriage assembly

Writing Line

135 characters long at 10 characters per inch

Vertical Spacing

6 lines per inch

Type Face

Pica Gothic

Case Shift

Upper and lower

Repeat Space Keylever

Repeats the space code for as long as the space bar is depressed.

Dimensions

Width - 20 1/2 inches
Height - 10 inches
Depth - 22 inches

Weight

Approximately 110 pounds

SPECIAL FEATURES

Tape/Edge Card Punch
Tape/Edge Card Reader
20 inch Carriage Assembly

ACCESSORIES

Pinfeed Platen
Flexofeed Platen

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION

Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

Programming is the same as the Model 2301 FLEXOWRITER Automatic Writing Machine.

MAINTENANCE

Refer to the Maintenance Section in this volume.

OTHER MODELS

MODEL 2363 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Special Features

Accessories

Adjustments

Circuit Description (Logic)

Programming

Maintenance

Friden 2200/2300 SERIES MACHINES

PURPOSE AND USE

The Model 2363 FLEXOWRITER Automatic Writing Machine is designed to replace the Model FG-80 Flexowriter. This unit is used to manufacture six-channel tapes that are used on Addressograph-Multigraph Graphotype 6800 machines.

PHYSICAL AND FUNCTIONAL DESCRIPTION

The basic units and functions of the Model 2363 are the same as those of the Model 2301 Flexowriter. Figure 1 illustrates the keyboard layout.

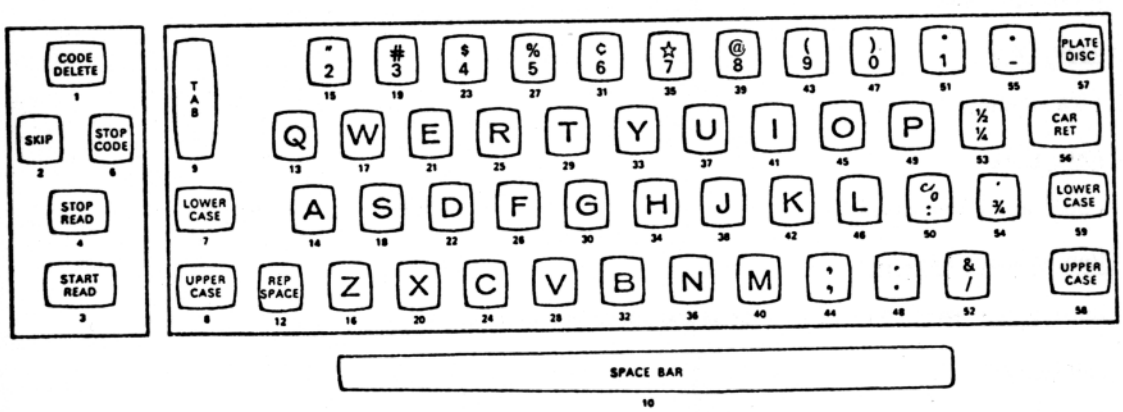


Figure 1.

MACHINE SPECIFICATIONS

Punch Operating Speed

1044 codes per minute

Reader Operating Speed

12.2 characters per second

Coding

6-channel

Printing Characters

80

Paper

14 3/16 inches wide

Carriage

16 inch carriage assembly

Writing Line

135 characters at 10 characters per inch

Vertical Spacing

6 lines per inch

Type Face

Pica Gothic

Case Shift

Upper and lower cases

Repeat Space Keylever

Repeats the space code for as long as the space bar is depressed.

Dimensions

Width-20 1/2 inches
Height-10 inches
Depth-22 inches

Weight

Approximately 110 pounds

Special Features

Tape/Edge Card Punch
Tape/Edge Card Reader
20 Inch Carriage Assembly
Electric Line Finder Wiring
Skip Tab

Accessories

Pinfeed Platen
Flexofeed Platen
Electric Line Finder

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

Programming is the same as the Model 2301. Figure 1 illustrates the hub locations for this model.

MAINTENANCE

Refer to the Maintenance section in this volume.

OTHER MODELS

MODEL 2371 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Special Features

Accessories

Adjustments

Circuit Description (Logic)

Maintenance

PURPOSE AND USE

The Model 2371 FLEXOWRITER Automatic Writing Machine is basically a Model 2301 with single case alpha keys and double case numerals and symbols. It is an off-line machine for tape and punched card preparation which is associated with data origination equipment.

PHYSICAL AND FUNTIONAL DESCRIPTION

The basic units and the functions of the Model 2371 are the same as those of the Model 2301 except for the following:

1. The Model 2371 is compatible with the USASCII code (a 7-channel code generating 128 maximum characters with an eighth channel for even parity).

2. Each keylever on the main keyboard must produce two (or sometimes three) different basic codes according to the position of the type basket, or in conjunction with the operation of the ADD 5-7 or the Switch 5-7 Program Modification Switches. Upper and Lower case code outputs are shown in Figure 1.

LOWER CASE		UPPER CASE		
CHARACTER	CODE	DATA ORIG. SYMBOL	CODE	FUNCTION
A	1-7	SOH	1-8	
B	2-7	STX	2-8	
C	1-2-7-8	ETX	1-2	
D	3-7	EOT	3-8	
E	1-3-7-8	ENQ	1-3	
F	2-3-7-8	ACK	2-3	
G	1-2-3-7	BEL	1-2-3-8	
H	4-7			
I	1-4-7-8			
J	2-4-7-8			
K	1-2-4-7	VT	1-2-4-8	
L	3-4-7-8	FORM FEED	3-4	
M	1-3-4-7	CR	1-3-4-8	
N	2-3-4-7	SO	2-3-4-8	NON PRINT
O	1-2-3-4-7-8	SI	1-2-3-4	PRINT RES.
P	5-7	DLE	5-8	
Q	1-5-7-8	DC-1	1-5	ON 1
R	2-5-7-8	DC-2	2-5	SW
S	1-2-5-7	DC-3	1-2-5-8	OFF
T	3-5-7-8	FS	3-4-5-8	MDS
U	1-3-5-7	GS	1-3-4-5	FC ON
V	2-3-5-7	RS	2-3-4-5	TSR
W	1-2-3-5-7-8	US	1-2-3-4-5-8	ON 2
X	4-5-7-8	CAN	4-5	
Y	1-4-5-7	EM	1-4-5-8	
Z	2-4-5-7	SUB	2-4-5-8	

LOWER CASE		UPPER CASE		
NUMERAL OR SYMBOL	CODE	SYMBOL	CODE	FUNCTION
1	1-5-6-8	!	1-6	
2	2-5-6-8	"	2-6	
3	1-2-5-6	=	1-2-6-8	
4	3-5-6-8	$	3-6	
5	1-3-5-6	%	1-3-6-8	
6	2-3-5-6	&	2-3-6-8	
7	1-2-3-5-6-8		1-2-3-6	
8	4-5-6-8	(	4-6	
9	1-4-5-6	)	1-4-6-8	
0	5-6			
:	2-4-5-6	*	2-4-6-8	
-	1-3-4-5-6-8	-	1-3-4-6	
>	2-3-4-5-6-8	.	2-3-4-6	
;	1-2-4-5-6-8	+	1-2-4-6	
<	3-4-5-6	,	3-4-6-8	
,	3-4-6-8	<	3-4-5-6	
.	2-3-4-6	>	2-3-4-5-6-8	
?	1-2-3-4-5-6	/	1-2-3-4-6-8	
TAB	1-4	TAB	1-4	
SPACE	6-8	SPACE	6-8	
CODE DEL.	1-2-3-4-5-6-7-8	CODE DEL.	1-2-3-4-5-6-7-8	
NEW LINE	2-4	NEW LINE	2-4	
BACK SP.	4-8	BACK SP.	4-8	
U.C. SHIFT	UNCODED	L.C. SHIFT	UNCODED	

Figure 1.

3. Alpha keylevers that have red-filled engraved symbols over the alpha symbols (Figure 2) will punch the control code for that symbol in a tape under the following conditions:

   a. DC-1, US, DC-3, and GS will punch in the upper case shift position provided the punch control switch is on ALL.

b. SCH, SU3, CAN, ENQ, EOT, ETX, ACK, FS, BEL, STX, EM, CR, VT, FF, and DLE will punch in the upper case shift position if the punch is ON.

4. DC-2 (SW), RS (Tape Skip Restore), S1 (RR), and SO (NP) are teletype command codes. In addition, the codes are used as Flexowriter function codes; therefore, they will punch in the upper case shift position only when the machine is not in the reading code.

5. The ON 1, ON 2, OFF, and FC-ON codes punch only with the punch control switch in the ALL position. The letters H, J, I, and the numeral 0 print and punch only when the writing machine is in the lower case shift mode. The upper case control codes for Non-Print, Print Restore, Skip Restore, and Switch will not reproduce when the tape is being read. They can be punched manually only.

6. Two blank keybuttons are used to translate and type the period and comma form codes read in the reader. The keylever positions showing the period and the comma are not coded in the translator.

7. The upper and lower case shift keylevers are uncoded in the translator and the selector. During tape read, automatic shift takes place as follows:

   a. The 7 code, or both the 5 and 6 codes will cause shifting to lower case.

   b. The 7 and 5 codes, or the 7 and 6 codes will cause shifting to upper case.

8. Standard manual and automatic non-print, tape skip and pluggable options are included in the machine.

9. The standard 8-channel punch is wired to accept even parity.

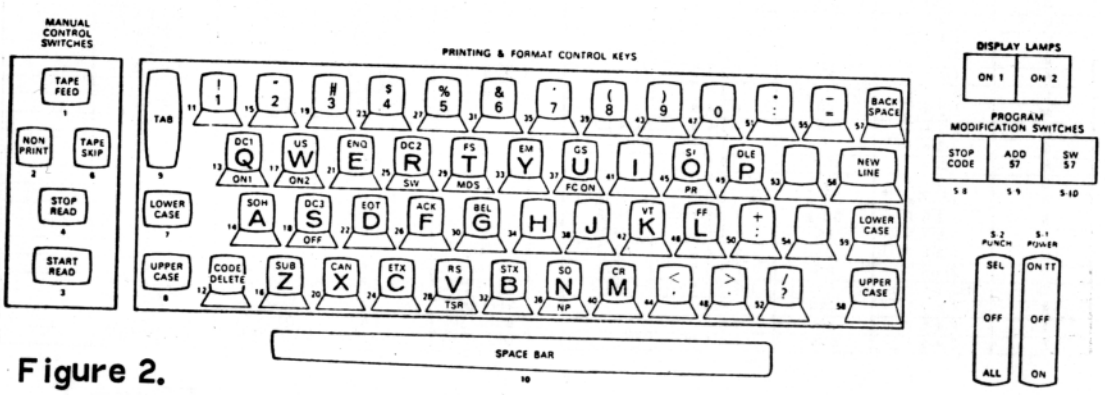


Figure 2.

SPECIAL FEATURES

Automatic Line Finder initiated by the L keylever in the upper case.
Tape Reader
Tape Punch
20 Inch Carriage Assembly

ACCESSORIES

Special USASCII coded Auxiliary Duplex Reader
Standard Model 2315 Auxiliary Reader

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING (Figure 3)

Additional versatility is possible through the use of a programmable terminal connector and a removable field switch/tab rack. Programming is the same as on the Model 2301 with special provision made in the selector to permit optional control panel wiring for dual form control output codes from the NEW LINE keylever. The Automatic Line Feed feature causes an automatic punching of the carriage return code following the Line Feed code. If the carriage is not at the left hand margin, the carriage return operation and the line feed function are coded to operate from the lower case code of the letter M when automatic line feed is wired in the control panel. When not wired into the control panel, the carriage return operation and the line feed function will operate from the lower case and upper case codes.

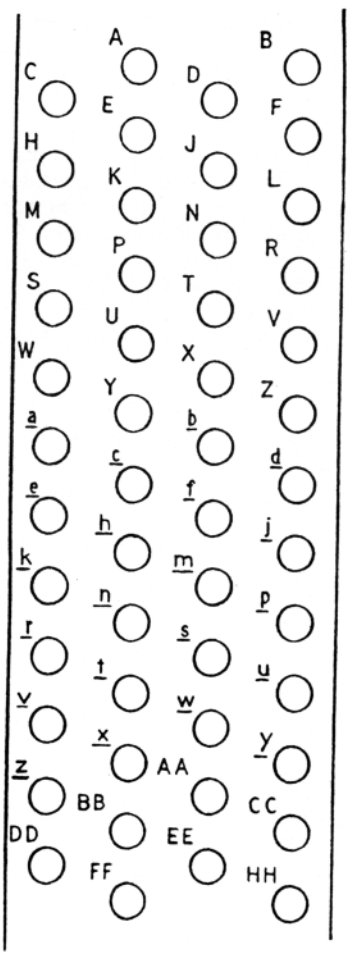

A
B
C
D
E
F
H
J
K
L
M
N
P
R
S
T
U
V
W
X
Y
Z
a
b
c
d
e
f
h
j
k
m
n
p
r
s
t
u
v
w
x
y
z
AA
BB
CC
DD
EE
FF
HH

Figure 3.

HUB DESIGNATIONS

A	Start Read Switch
B	Program Modification
C	Minus (-)
D	Start Read
E	Stop Code
F	
H	No.1 Field Switch (N)
J	Stop Read
K	Carriage Return
L	Program Modification (C)
M	No.1 Field Switch (N)
N	Card Feed
P	Form Feed Code
R	Program Modification (N)
S	No.1 Field Switch (C)
T	Reader Switch
U	Switch Code
V	Program Modification (T)
W	No.2 Field Switch (C)
X	Non Print
Y	Non Print Code
Z	Selector Pick
a	No.2 Field Switch (N)
b	Print Restore
c	Print Restore Code
d	Selector Drop
e	No.2 Field Switch (T)
f	Rep. Print Rest. in Non Print
h	Vertical Tab Code
j	(C)
k	Tape Skip Off
m	Rep. Print Rest. in Non Print
n	D S Code
p	(N)
r	Tape Skip On
s	Manual Non Print Stop
t	Line Feed Code
u	(T)
v	Switch in Auto Non Print
w	Tape Skip Restore
x	Tape Skip Restore Code
y	(C)
z	Space Code
AA	Line Feed Ext.
BB	F.C. on Code
CC	(N)
DD	F.C. On
EE	Line Feed Entry
FF	Vertical Tab
HH	(T)

NOTE: The following are additional customizing hubs:

CR in Skip
Form Feed
Tape Skip Stop

MAINTENANCE

Refer to the Maintenance section in this volume.

OTHER MODELS

MODEL 2373 FLEXOWRITER
Automatic Writing Machine

Purpose And Use

Physical And Functional Description

Adjustments

Circuit Description (Logic)

Programming

Maintenance

PURPOSE AND USE

The Model 2373 FLEXOWRITER Automatic Writing Machine is a modified Model 2301 that is designed for USASCII coded tape preparation and reading where a keyboard punch control is not required. All characters are in the upper case. This unit is non-programmatic.

PHYSICAL AND FUNCTIONAL DESCRIPTION

The basic units and functions of the Model 2373 are the same as those of the Model 2301.

ADJUSTMENTS

Refer to the Adjustments Section (yellow tabs) in this volume.

CIRCUIT DESCRIPTION (LOGIC)

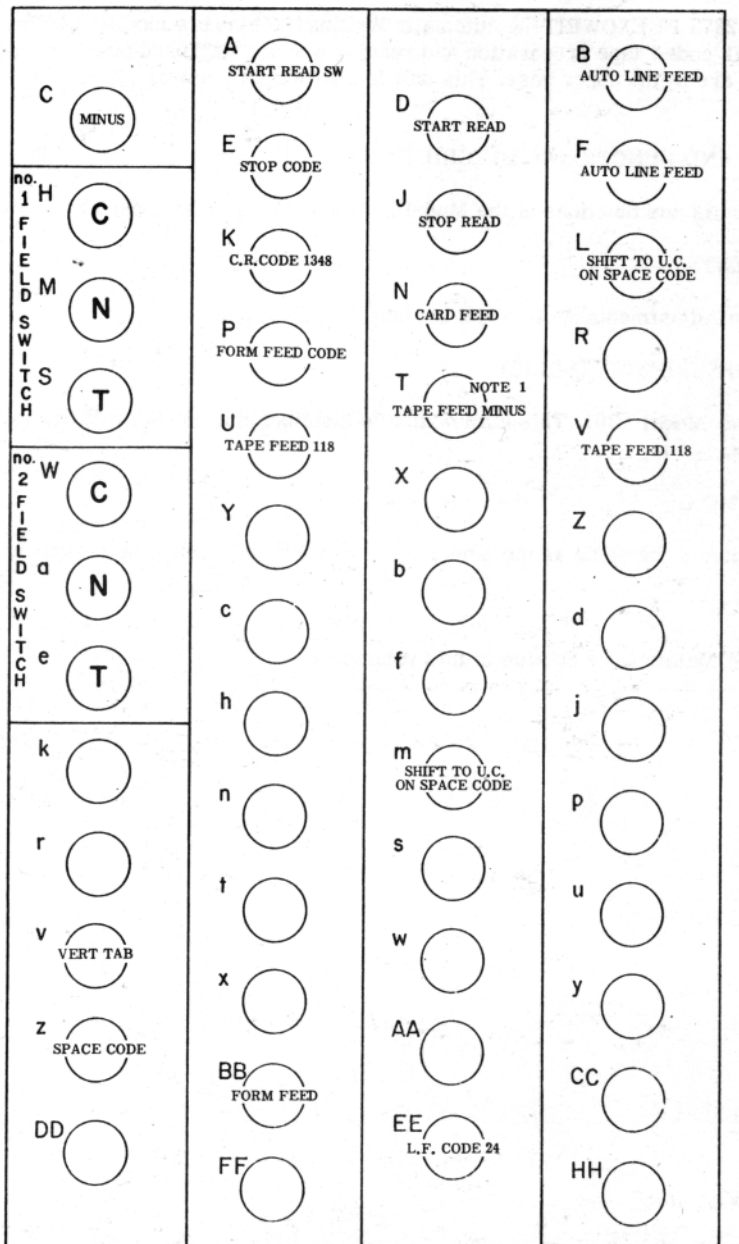
Same as the Model 2301. This information is distributed at the Service School and is not included in this manual.

PROGRAMMING

Programming is the same as the Model 2301. For hub locations, see Figure 1.

MAINTENANCE

Refer to the Maintenance Section in this volume.



NOTE 1. IF CODE OTHER THAN 2345 IS USED FOR P.R., THE JUMPER JDF-JDM MUST BE USED. ANY OTHER CODE FOR P.R. WILL THEN BE REPRODUCING IN A.N.P.

Figure 1.