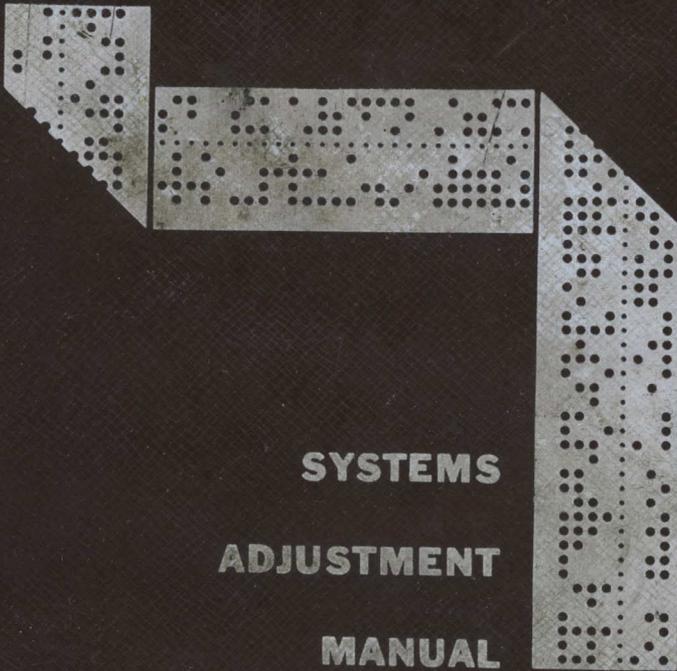




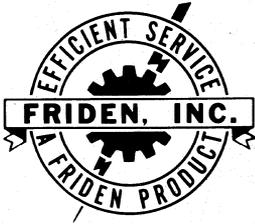
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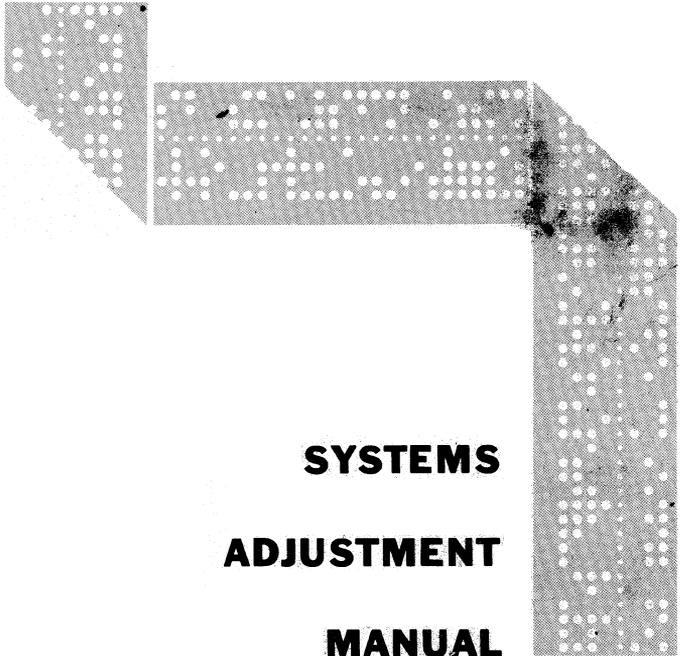
SYSTEMS

ADJUSTMENT

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SYSTEMS

ADJUSTMENT

MANUAL

FRIDEN, INC.

HOME OFFICE AND MAIN PLANT
SAN LEANDRO, CALIFORNIA
SALES AND SERVICE THROUGHOUT THE WORLD

FRIDEN SYSTEMS ADJUSTMENT

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FRIDEN SYSTEMS ADJUSTMENT

MOTOR & POWER DRIVE

WRITING MACHINE

MOTOR

Motor Mounting

1. Set the machine on its tilt posts.
2. Remove the perforated motor cover.
3. Check to see that the motor is placed correctly in its bracket. See that the mounting clamp screws are tight but not bending the clamps. Also see that the ventilating louvers are positioned so they will be on top when the machine is on its base to dissipate the heat readily.
4. Loosen the set screw on the left hand side of the motor shaft pulley and align the pulley with the drive shaft pulley and tighten the set screw.

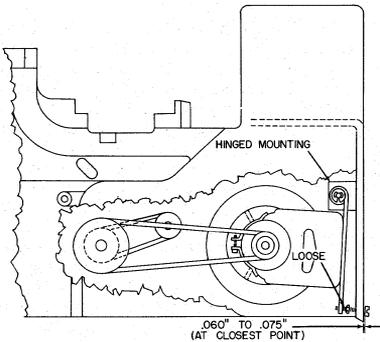


Figure 1

Belt Tension (Figure 1)

5. Loosen the locking nuts on the motor position adjusting screws and turn the screws out slightly.
6. Place the machine on its base.
7. With the power switch off, position the motor adjusting screws .060" to .075" from the rear base plate (1/16" plus .015" minus .000").
8. Return the machine to the upright position.
9. Tighten the locking nuts against the rear base plate, fixing the position of the motor.

Machine Speed

10. If it is necessary to change the speed of the machine, loosen the set screw on the right half of the motor shaft pulley and turn that part of the pulley, holding the other half stationary, to affect the change in speed. Tightening the right side of the pulley increases the effective diameter and increases the speed, and loosening the right side of the pulley decreases the speed of the power drive and the machine. Tighten the set screw.

Changing this adjustment will change the speed of all the units (Reader, Punch, Translator and Power Roll) on the machine. The speed should be 575 plus or minus 5 RPM measured on the end of the reader shaft.

The speed can be checked by placing the speed indicator T-18074 on the end of the reader shaft.

Varying the speed of the machine will affect the overall type impression but should not be attempted without considering the overall effect on the operation of the reader, punch and translator.

11. Replace the cover and set the machine on its base.

Note: Whenever the speed of the machine is adjusted the motor belt tension is changed and it must also be adjusted.

POWER DRIVE

In Sequence

The position of the power drive shaft in the machine is determined by its relation to the left bushing. The end play is determined by the distance between the drive shaft pulley and the rear gear, sprocket and hub assembly.

1. Remove the oil cap and felt wick (Figure 2).

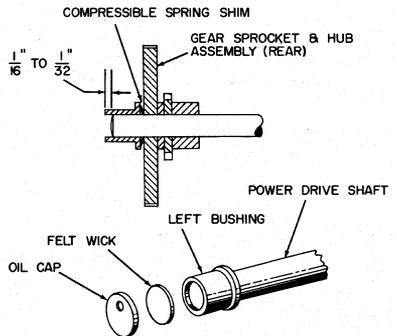


Figure 2

2. With all set screws for the power drive shaft loose, position the shaft so it is 1/16" to 1/32" in from the outside face of the left bushing. Position the drive shaft pulley against the right bushing and tighten the set screws against the flat sections on the power drive shaft. This determines the setting of the pulley on the shaft and also the

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 9

DATE: November 9, 1962

CHANGE: Page 1-1, Motor Mounting, Step 4

REASON: Adjustment Tolerance Change

EXPLANATION: More liberal tolerance than former adjustment.

4. Loosen the setscrew on the left hand side of the motor shaft pulley and align the pulley with the drive shaft pulley within $1/32$ inch. Tighten the setscrew.

DATE: November 9, 1962

CHANGE: Page 1-1, Belt Tension (Figure 1), Step 7

REASON: Adjustment Tolerance Change

EXPLANATION: The power drive will operate satisfactorily with the following belt tension adjustment.

7. With the power switch off, adjust the motor positioning screws to permit $1/4$ " to $1/2$ " deflection of the belt without any appreciable movement of the motor in its rubber mountings. Adjust the positioning screws equally to prevent cocking the motor.

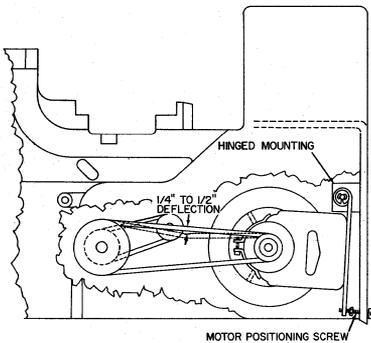


Figure 1

FRIDEN SYSTEMS ADJUSTMENT

KEY LEVER TRIP

position of the shaft relative to the bushings.

3. Insert a .003" feeler (thickness gauge T-18009) between the drive shaft pulley and the right bushing (Figure 3), press the rear gear, sprocket and hub assembly against the left bushing tightly (compressing the spring shim installed between the left bushing and the rear gear, sprocket and hub assembly) and tighten the set screws against the flat sections on the power drive shaft. Remove the .003" feeler. Grasp the shaft and try to move it laterally in the bushings. There should be a barely noticeable amount of end play, .001" to .005".

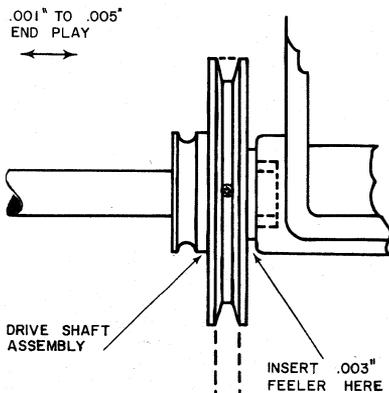


Figure 3

There will be no visible clearance between the pulley and the bushing because of the compressible spring shim.

4. Reinstall the oil cap and felt wick.

KEY LEVER

Key Lever Trip

Check all key levers to see that they do not bind against the sides of the slots in the front guide comb or against the translator seekers. Key lever binds in the guide comb can be removed by forming or straightening the key levers with two T benders.

See that the set screws for the key lever bearing rod do not contact it. The bearing rod should extend about equally from the ends of the bearing rod support, and there should be a slight clearance between the set screw and the bearing rod on each side of the machine.

Using the key lever trip gauge T-18222, check to see that the cams will trip later than .185" movement (depression) of the key lever, but before .230" movement (Figure 5).

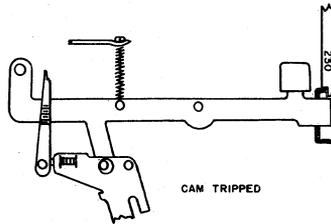


Figure 4

If a majority of the key levers across the keyboard trip their cams at .185" or sooner, loosen the mounting screws at the sides of the front guide comb (Figure 7) and pivot the front guide comb upward very slightly. Tighten the screws and check.

If a majority of the key levers trip their cams later than .230" loosen the mounting screws and lower the front guide comb. Tighten the screws and check. If several key levers on one side of the keyboard trip their cams too soon or too late, raise or lower that side of the front guide comb, being careful not to twist the front guide comb, because this can restrict the operation of the units mounted to it. Isolated key levers, especially when changing key levers, will not fall within the adjustment limits. Then it is necessary to adjust the key lever itself by forming. Support the key lever with a selector slide forming tool T-18121 ground off flat as indicated so the tool doesn't slip off the ridge on the power frame (Figure 5).

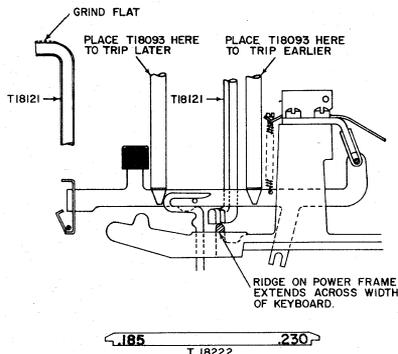


Figure 5

Place a T bender T-18093 on the key lever and tap it with a hammer to change the tripping point. Placing the T bender at the forward end of the key lever and tapping it will cause the key lever to trip later. Placing the T bender behind the selector slide forming tool and tapping it will cause the key lever to trip earlier.

FRIDEN SYSTEMS ADJUSTMENT

KEY LEVER TENSION & INTERLOCK

When the tripping point is changed, the clearance between the translator seeker and the stud on the key lever will be changed. Therefore the clearance should be checked and the seeker adjusted.

Note: Occasionally, when a key lever is adjusted close to the limits (.185" to .230"), the key lever will cause the cam release lever to hang up on the lug on the cam. When this is found, the key lever trip should be adjusted so it trips closer to the center of the adjustment range. Keep in mind that this is only one of the causes of cam failure.

CAUTION: The key lock bail should be pivoted so the forward end of the key lever doesn't bear against it while the adjustment is made. Also, be sure that no other key levers are down while adjusting because the interlock can be jammed or a roller broken.

Key Lever Tension (Figure 6)

Each cam operating key lever should trip the cam when a force of between 2 and 3 ounces is applied to the key button. The adjustment is obtained by changing the setting of the tension adjusting screw.

1. Place a 3 oz. weight (T-18245) on the key button of the key lever to be adjusted. Turn the adjusting screw so the weight depresses the key lever just far enough to reliably trip the cam.

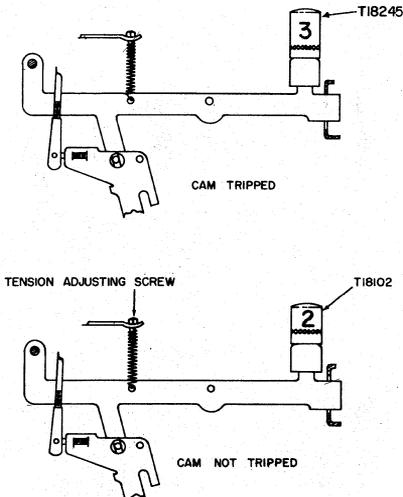


Figure 6

2. Place a 2 oz. weight (T-18102) on the key button. Turn the adjusting screw so that the key lever is not depressed far enough to trip the cam.

Using the weights as described, adjust each key lever (except the space & shift key levers) for the proper tension.

Space Bar Key Lever Tension

The space bar should trip the space cam at between 3 and 5 ounces. Place a 3 oz. weight in the center of the space bar. This weight should not trip the cam. Add a 2 oz. weight carefully and the cam should trip. Turn the tension adjusting screw to obtain the correct tension.

Shift Key Lever Tension

The shift key levers in the SFD, SFD President and the SPD should be adjusted so that the shift cams trip at 2 to 3 ounces. Since each shift cam can be operated by either of two key levers, the weights should be placed on the key button where the adjustment is provided. For lower case the weight should be placed on the right lower case key button. For upper case the weight should be placed on the left upper case key button.

KEY LEVER INTERLOCK (Figure 7)

End Stops (Figure 8)

Both end stops are adjustable and should be installed so the cut out corners are toward the right side of the machine.

Insert a .056" accumulated set of feelers (use thickness gauge T-18009, .020", .013", .010", .008", .003" and .002" feelers) in a center slot in the interlock and loosen the mounting screws for the end stops, position the end stops snug against the rollers and tighten the mounting screws securely. This leaves .056" movement of the rollers available in the interlock.

Interlock Position (Figure 7)

With a key lever in the interlock, the remaining key levers should be able to be depressed from .042" to .052" ($3/64" \pm .005"$) before they are restricted by the interlock rollers. The interlock should be located so the slots in the interlock are located centrally to the slots in the front guide comb. The interlock is positioned by loosening the three mounting screws that attach it to the front guide comb.

Depress a key lever (about ninth from one side) and check the key levers on the other side of the keyboard. See that there is .042" to .052" ($3/64" \pm .005"$) clearance between the top of the key lever and its slot in the front guide comb when the key lever is depressed until it is stopped by the interlock rollers (Figure 7).

Check both sides of the keyboard in this man-

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 34

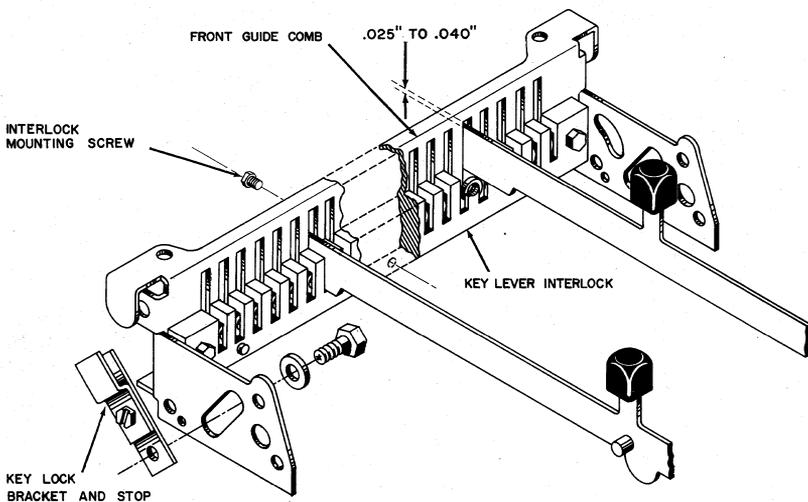


Figure 7

DATE: November 9, 1962

CHANGE: Page 1-3, Interlock Position (Figure 7)

REASON: Adjustment Tolerance Change

EXPLANATION: The interlock functions properly with the adjustment indicated in this change.

Loosen the three mounting screws that attach the interlock to the front guide comb and, by utilizing the play in its mounting holes, align the interlock slots with the guide comb slots. At the same time, move the interlock vertically to a position where, with a middle key lever in the interlock, the remaining key levers can be depressed from .025" to .040" before they are restricted by the interlock rollers. This range of movement should be equal at both sides as well as in the middle. Tighten the mounting screws.

FRIDEN SYSTEMS ADJUSTMENT

KEY LOCK

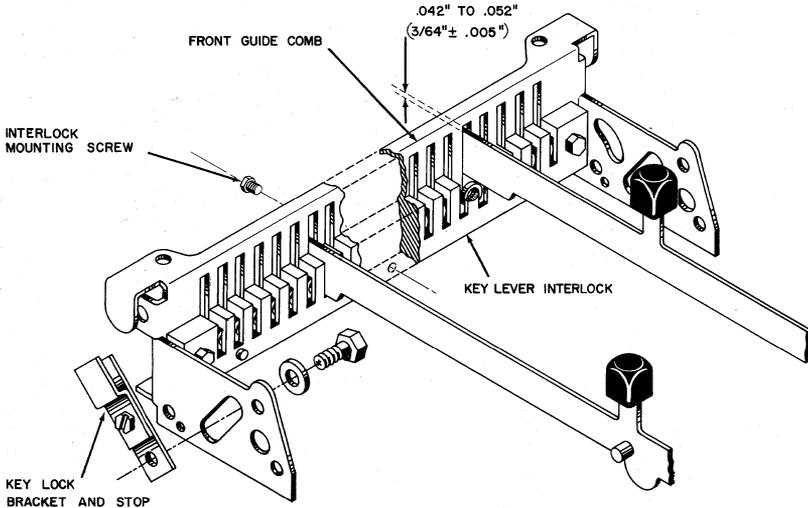


Figure 7

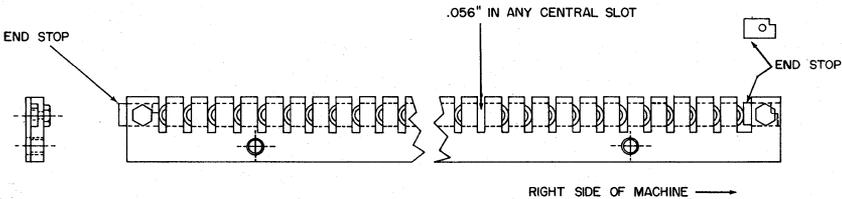


Figure 8

ner. If it is necessary to change the adjustment, loosen the three hex mounting screws slightly. Adjust the side of the interlock up or down to obtain the required adjustment. Tighten the mounting screws securely.

Use the checking procedure to check other key levers, holding down a center key lever, etc. Be sure that after adjusting the interlock for height, it is lined up with the slots in the front guide comb. If it is not, readjust.

KEY LEVER LOCK BAIL

In Sequence

1. The key lock magnet gap should be $.023$ ". This adjustment is obtained by forming lip (1). See that the magnet armature rests flat against the core when fully attracted.
2. With the adjustable link disconnected at the clevis end, adjust the wire spring anchor so that the spring holds the key lock bail against the front guide comb with the minimum amount of tension.

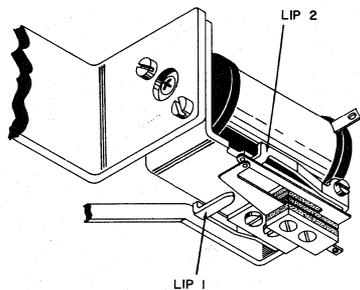


Figure 9

3. With the magnet de-energized, adjust the clevis of the adjustable link so that the stud it engages is at the top of the slot in the clevis and the key lock bail is not pivoted away from the front guide comb. This will give approximately $.050$ " to $.060$ " clearance between the longest key lever and the key lock bail when the magnet is fully energized.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 42

DATE: November 9, 1962

CHANGE: Page 1-4, KEY LEVER LOCK BAIL

REASON: Adjustment Tolerance Change

EXPLANATION: The following adjustments apply to all systems machines except Systems Verifiers.

In Sequence

1. Adjust the de-energized key lock magnet gap to $.023''$ plus or minus $.003''$ by forming Lip (1). With the key lock magnet energized the armature must be fully attracted to and lay flat against the core.

2. With the adjustable link disconnected at the clevis end adjust the wire spring anchor so that the spring holds the key lock bail against the front guide comb with a minimum amount of tension. Check the key lever lock bail for straightness and form if necessary so its edge rests as flat as possible (within $.015''$ over its entire length) against the guide comb.

Position the key lock brackets to adjust the height of the key lever lock bail for a clearance of $.010''$ to $.020''$ between the top of the key lever lock bail and the bottom of the key levers (Figure 9-1).

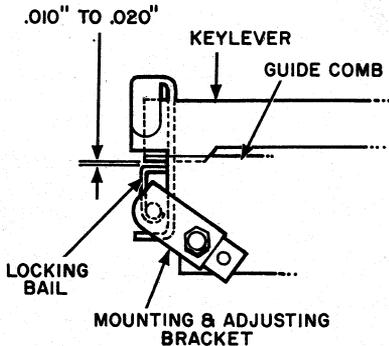


Figure 9-1

Form the key lock bail stop at the right side of the guide comb to obtain $.005''$ to $.015''$ end play of the lock bail (Figure 9-2).

3. With the magnet de-energized, adjust the clevis of the adjustable link so that the stud it engages is at the top of the elongated clevis slot with only as much play as is necessary to avoid pulling the key lock bail away from the guide comb. This will result in a clearance of approximately $.050''$ to $.060''$ between the key lock bail and the longest key levers when the magnet is fully energized.

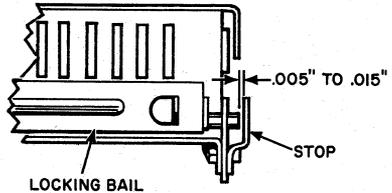


Figure 9-2

4. Form Lip (2) to cause the key lock magnet stationary contact to have a minimum of $.010''$ follow with the magnet fully energized. With the machine in a tape reading operation manually move the key lock armature toward the de-energized position as slowly as possible. The contacts are adjusted properly if the reader stops reading slightly before the key levers are restricted by the key lock bail.

DATE: April 5, 1963

ADDITION: Page 2-2-12, ADJUSTMENT (Figure 17)

REASON: System Verifier Flexowriter Adjustments

EXPLANATION: The Systems Flexowriter adjustments listed in the Systems Flexowriter Operation and Adjustment Manual are applicable to the Systems Verifier Flexowriter except as follows:

Key Lever Lock Bail and Key Lock Magnet Adjustments (Systems Verifier Flexowriter Only)

1. With the key lock magnet de-energized, the key lock bail, under spring tension against the bail stop screw, is to project $.040''$ to $.060''$ under the ends of the key levers (Figure 17-1 Inset B).

To obtain this, disconnect the adjustable linkage, loosen the bail stop screw locking nut and adjust the screw. Tighten the locking nut.

2. With the key lock magnet de-energized, the vertical position of the key lever lock bail is to be as low as possible without allowing any key lever to trip its cam when depressed. This vertical clearance between the bail and the bottom of the key levers must be as equal as possible over the entire length of the bail.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 42

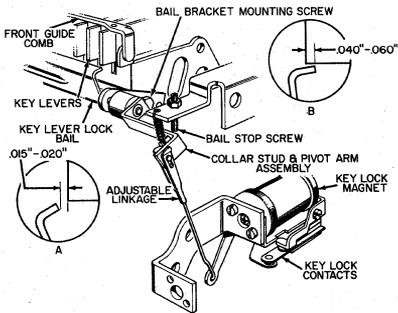


Figure 17-1

To obtain this, disconnect the adjustable linkage and loosen the mounting screw for each bail bracket. Operate key levers at each side of the keyboard and position the bail for the correct height. Tighten the bail bracket mounting screws. Check all key levers and readjust if necessary.

3. With the adjustable linkage connected and the key lock magnet energized, the clearance between the locking bail and the ends of the longest key levers is to be .015" to .020" (Figure 17-1 Inset A).

Adjust the linkage to obtain this.

4. When the key lock magnet de-energizes, its contacts must open just as the bail goes under the ends of the key levers. When the key lock magnet energizes, the contacts must close with a minimum follow of .010".

Form lip 2 (Figure 17) to obtain this.

5. When the key lock is operated, the adjustable link's clevis must float free and not bind on its connecting pin. When the magnet is de-energized, there is to be a slight clearance between the stud on the pivot arm and the upper end of the clevis slot.

To obtain this, readjust the linkage while maintaining the previous adjustment tolerances.

FRIDEN SYSTEMS ADJUSTMENT

CAMS AND TYPE BAR & TOGGLE

4. With the magnet fully energized, the key lock magnet stationary contact should have .010" to .015" follow. Form Lip (2). To check the operation of the contacts, operate the machine so it is reading from a tape and manually (very slowly) move the key lock magnet armature toward the de-energized position. The reader should stop reading before any of the key levers could be restricted by the key lock bail.

CAM ASSEMBLIES

Cam To Power Roll

1. Lift the machine upright (on its tilt posts) and lower the selector unit.
2. With the power on, and the type basket in lower case (upper position), adjust the cams to clear the power roll by .001" to .007", the basic consideration being that the repeat operation of the cam is reliable. Check both lobes of a double lobe cam. In extreme cases on a very small minority of cams (due to bell crank "G" dimension and cam link-angle angles and lengths), this .007" clearance may be exceeded to a maximum of .010".
3. Turn off the machine and remove the power roll if any cam assemblies require adjustment.
4. Adjust the cam assembly by disconnecting the adjustable link from the impression adjusting screw and turning the clevis. Turn the clevis in to bring the cam closer to the power roll and out to bring the cam farther away from the power roll. The cams can be marked before removing the power roll to identify the ones requiring adjustment. With all of the cams adjusted properly, the tails of the cam assemblies containing the selector slide operating studs will line up across the machine (assuming that the power roll is concentric and is of a uniform diameter).
5. Connect the clevis to the impression adjusting screw, install the power roll, turn the machine on and check the clearance, readjusting if necessary.

Note: If the proper adjustment can't be obtained to both lobes of a double lobe cam, replace the cam assembly.

6. The release and anti-repeat lugs on the cam release lever should engage the lugs on the cam lobes, without enough sideways movement to allow incorrect operation. Form if necessary.

Note: If the release lever doesn't engage the lugs on the cam properly, the key lever may cock the release lever and the anti-repeat lug can

catch on the edge of the cam lug. This causes enough pressure to keep the key lever down after the finger is removed. The condition can be corrected by forming the cam release lever sideways.

Impression Adjusting Screw

The impression adjusting screw increases or decreases the force transmitted by the cam assembly to the type bar, thereby increasing or decreasing the impression of the character. The adjustment can be changed by removing the clevis and turning the screw half turns; turning in to make the impression lighter, and out to make the impression heavier.

After changing the adjustment of the impression adjusting screw it is always necessary to check the cam to power roll clearance, since the clearance may have changed enough to require adjustment. Incorrect adjustment of the cam to the power roll can cause failure, especially in repetitive typing, with failures occurring more frequently if the cam is too close to the power roll.

The impression adjusting screws on the functional cam assemblies can be used to provide a fine adjustment of the cam to the power roll or eliminate choke off; otherwise they should be positioned halfway in their adjustment range.

BELL CRANKS

Any adjustment of the bell cranks, other than removing binds, is not desirable or ordinarily necessary. Except for the section shown (Figure 10), they are hardened and will break readily if forming is attempted.

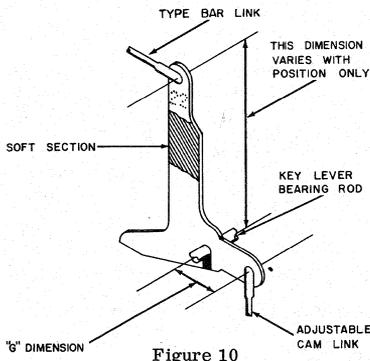


Figure 10

TYPE BAR AND TOGGLE ASSEMBLY

Toggle Assemblies (Figure 11)

Remove the top cover, lifting it from the rear, so as to not stretch the spring levers which

FRIDEN SYSTEMS ADJUSTMENT

TYPE BASKET & UNIVERSAL BAR

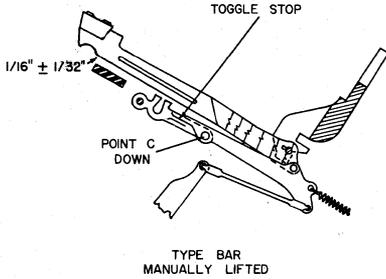


Figure 11

hold it. Lift a type bar manually and see whether it comes away from the rest $1/16'' \pm 1/32''$. If it can be lifted all of the way, the toggle isn't locked and is too long. If the type bar can't be lifted the toggle is locked too tight. If the type bar sits away from the type bar rest the toggle is much too long. Adjust the toggles so they all lock positively as the type bar is manually returned to the type bar rest. The toggle should lock just before the type bar reaches the rest. Poor locking may be due to the toggle adjustment or binds in the type bar and toggle assembly. To shorten a toggle, use a pair of long nose pliers and squeeze the bifurcation in the toggle link slightly. To lengthen a toggle, spread the bifurcation slightly with a screwdriver.

Note: If a majority of the toggles are out of adjustment refer to Type Basket for the overall adjustment.

TYPE BASKET

The adjustment of a type bar toggle can be checked by manually lifting the type bar from the type bar rest. It should lift about $1/16''$ before the type bar is stopped by the toggle locking. Check all the type bar toggles by this method. If a majority of them are of incorrect length, the shim - segment spacer adjustments should be changed. If only a few are out of adjustment, they should be adjusted individually.

Shim -Segment Spacer

Loosen the segment mounting screws and place or remove shims behind the segment, where it mounts to the basket, to change the toggle distance for each side of the basket. Adjust for the majority.

Adjust the bifurcation in the segment spacer to control the length of the center toggles so that the majority are correct. Use a screwdriver in the bifurcation as a pry to increase the distance and squeeze the bifurcation with a pair of long nose pliers to decrease the distance.

UNIVERSAL BAR ASSEMBLY

The universal bar should be positioned to rest as high in the slot as possible giving the maximum amount of movement. The curvature of the U bar may not correspond to the curvature of the slot but it is important that the U bar be centered so that the clearance to the slot is the same for both sides. The bar should be further adjusted to compensate for the spring mounting and the give in the assembly so that the same movement is afforded at the point where the escapement trip link is connected upon the operation of type bars from different positions in the type basket. Two methods are given.

Mounting

Loosen the two front mounting screws and position the U bar in the slot as described above. Have the rear mounting screw loose at this time so it doesn't influence the adjustment. Tighten the two front mounting screws and then tighten the rear mounting screw without shifting the rear spring.

Position

Method 1 - The U bar should rest a few thousandths away from the bottom of the slot on the left side to compensate for the spring mounting, thereby equalizing the movement caused by the type bars. When the adjustments are accessible or when replacement is required, place a wire marker under the left front carriage rail mounting screw (Figure 12). Move the number 42 type bar up to the ring and set the marker where the escapement trip link connects to the U bar. Operate the number 22 and the number 1 type bar and see if the same travel of the U bar is obtained. If it is not, it is necessary to change the position of the rear spring slightly.

Viewed from the front, raising the rear spring causes the center type bars to move the U bar less. Moving the rear spring down will move the U bar more but will have little effect, except to strain the U bar assembly, if the U bar is already against the bottom of the slot. Moving the rear spring to the right will cause the left type bars to move the U bar less, and moving the rear spring to the left will cause the right type bars to give less motion. Moving the rear spring too far can put pressure on the U bar and if the U bar is correctly positioned in the slot, only a very slight shifting of the rear spring will be necessary.

To do this, loosen the rear spring mounting screw slightly and shift the spring in the direction where there is less motion. Tighten the screw and check, using the 42, 22, and number 1 type bar. Remove the wire marker.

Method 2 (Figure 13) - When it is desired to adjust the U bar and set the escapement tripping point without disassembly, manually op-

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE & RAILS

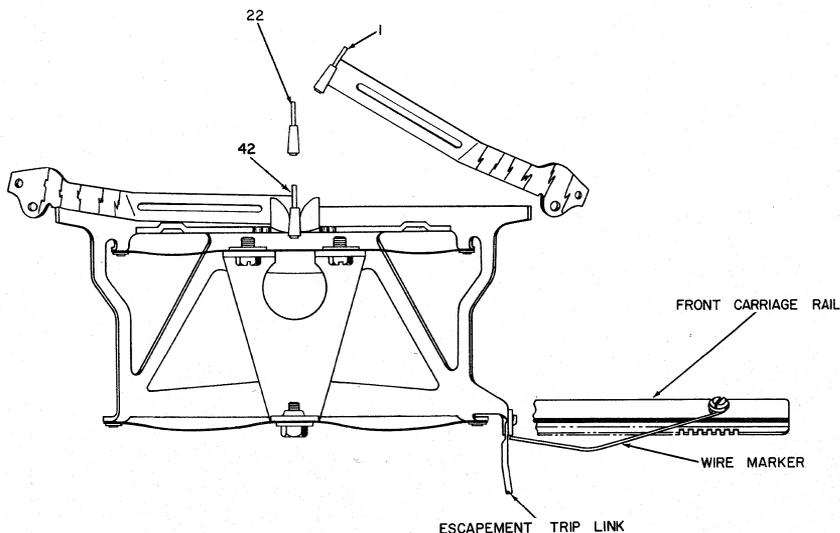


Figure 12

CARRIAGE & RAILS

Disconnect the tab governor preventing contact with the governor drive pinion; remove the screw holding the carriage tension tape (hook the tape to the right casting with a bent paper clip); remove the escapement rack; unhook the carriage return tape from the indexing mechanism hook (hook the CR tape to the left base casting with a bent paper clip); and remove the field control rack if there is one on the carriage. The carriage should move laterally without binding or any side play (clearance). By placing the carriage at the extreme left against the final stop (margin stop out of the way), the left end of the carriage can be checked for free play by attempting to move the carriage back and forth. In the same way, with the carriage at the extreme right (past the margin stop), the right end of the carriage can be checked for free play.

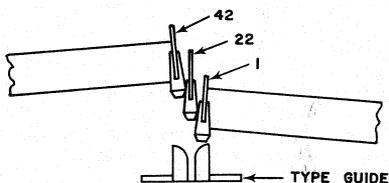


Figure 13

erate the number 1, 22 and 42 type bars, positioning them so they are jammed in the throat of the type guide in stepped positions. Set the number 1 type bar farthest into the guide with the number 22 type bar next to it but $1/8$ " behind it, and the number 42 type bar $1/8$ " behind the number 22 type bar. With the type bars in position, loosen the rear spring mounting screw and let the rear spring position itself. Tighten the mounting screw and restore the type bars.

Then by operating the type bars manually, note that they trip or "cock" the escapement as the type bar enters the guide. Try the number 1, 22 and 42 type bars and if the tripping point is not the same, readjust, using a different stepped distance ($1/4$ " instead of $1/8$ ", for instance). This method adjusts the U bar by positioning it against the type bars under the pressure of the escapement mechanism and the steps in type bar position compensate for the give of the U bar.

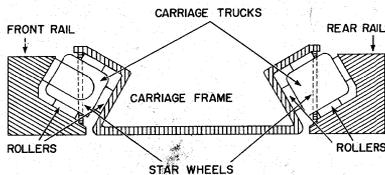


Figure 14

If there are any binds or free play the rails will have to be adjusted and the trucks, rollers, and star wheels checked for defects. Loosen the locking nuts and back the rear rail adjustable screws out until they are flush with

FRIDEN SYSTEMS ADJUSTMENT

MAIN SPRING & HOLDER

the boss in the casting. Loosen the rear rail mounting screws. Remove the two front mounting screws that mount the escapement mechanism to the front rail. Remove the screw and eccentric for the center rail brace from the front rail.

Move the rear rail back (removing the mounting screws) and remove the truck assemblies, walking them out past the gear teeth in the racks. Inspect the truck assemblies for cracked or busted rollers, broken star wheels, etc., and see that the rollers are not out-of-round by rolling them on a flat surface.

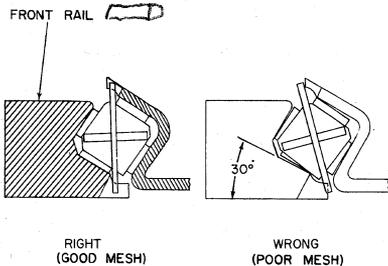


Figure 15

Install the rollers in the truck assemblies and install the trucks in the openings properly (star wheels vertical) and position them flush to 1/4" in from the end of the rails as previously described. Be sure that the star wheels engage the racks properly.

Install the two mounting screws for the escapement mechanism through the front rail and leave them loose. Install the two rear rail mounting screws and leave them loose. Install the eccentric and its screw on the front rail brace and leave them loose.

Center the front rail on its mounting screws and push it against the front rail seats and tighten the screws.

Move the carriage to the left until the left hand trucks are centered between the left hand rail mounting screws. Center the rail on the mounting screw, hold the rail tightly against the carriage by hand, and tighten the mounting screw.

Move the carriage to the right so that the right hand trucks are centered between the right hand mounting screws, press the rear rail forward tightly, and tighten the rear rail mounting screw.

Note: The adjustable screws should not be used to adjust the carriage, their purpose being to maintain the rear rail-carriage-front rail relationship. They do not allow the carriage to loosen.

Check the carriage for free movement laterally without binds. There should be no front to rear play. Turn the adjustable screws in snug against the rear rail without moving it, and tighten the locking nuts, being careful not to change the setting of the rear rail.

Adjust the rail brace eccentric to eliminate any rearward bow in the rear rail at that point. Tighten the mounting screw. The eccentric is there to eliminate a possible bow caused by the mounting of the cantilever assembly that holds the butterfly, tab levers, margin release lever, etc.

Note: The adjustment of the eccentric shouldn't cause a bind in the carriage's travel. Its only intended use is to eliminate a loose condition at the point in the rear rail where the brace is mounted.

Tighten the two screws for the escapement mechanism. Check the carriage again and if necessary, readjust. When the carriage is properly adjusted, install and adjust the escapement rack, the tab governor, and hook up the carriage tension and carriage return tapes. Install the field control rack if there is one.

Note: The escapement rack must be removed to adjust the carriage and rails. Latching up the tab to divorce the escapement pinion and ratchet wheel assembly from the rest of the escapement mechanism and free the carriage for travel will not allow the carriage and rails to be adjusted carefully enough.

MAIN SPRING AND HOLDER

With the carriage at the extreme right margin (to the left), hook a spring scale to the right end of the carriage. Pull the carriage to the right using the spring scale. The carriage should start to move when the scale indicates from 2-3/4 to 3-1/2 lbs. If the machine has a carbon ribbon mechanism, a 20" carriage, or is a PSM machine, the scale should indicate from 3-1/2 to 4 lbs. This adjustment is changed by moving the loop of the tape to another lug on the holder.

To do this safely, set the machine on its tilt posts and position the carriage so the looped end of the tension tape is exposed and in the upper half of the periphery of the holder. Grasp the holder, using a rag or cloth to protect the hands, and tighten the main spring, causing the carriage tension tape to relax. Hold the spring holder securely with one hand and move the tape to another lug, being sure that it is in position on the race lugs. Allow the spring to unwind by rotating the spring holder until the tape is taut and release the holder.

FRIDEN SYSTEMS ADJUSTMENT

ESCAPEMENT

Tightening the spring and placing the tape on the closest lug increases the tension on the carriage, and backing the spring off and placing the tape on the closest lug decreases the tension on the carriage.

ESCAPEMENT

The bushings of the escapement shaft should be adjusted so there is $.172''$ plus or minus $.002''$ ($11/64''$) clearance from the rear surface of the rear rail to the front surface of the carriage return ratchet (Figure 16). They should hold the parts on the escapement shaft with no clearance or side play, and the units should turn freely.

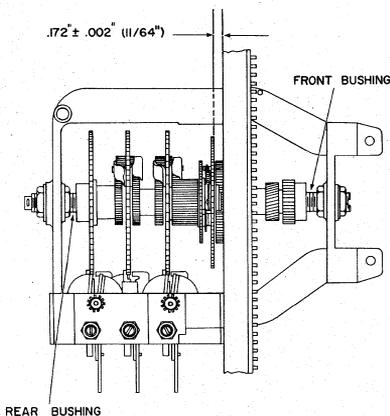


Figure 16

Adjust the cone screws so there is no perceptible free play and the pawl carrier assemblies operate freely. The lower cone screw should position point "E" the same height as the centerline through the escapement mechanism shaft and then the lower cone screw should be locked in position with the locking nut. Then the upper cone screw should be adjusted and tightened in position (Figure 17).

Note: This assembly adjustment, and the escapement pinion to escapement rack engagement effect the operation of the back space mechanism and must be as close as possible for good, reliable back space.

Adjust screw "A" so that the face of the escapement pawl is on the centerline through the escapement mechanism shaft. Do this by loosening the screw (at point "E") so screw "A" can move the limiting stops for the escapement pawl. This will loosen the pawl carrier operating lever. Once screw "A" is adjusted and its locking nut tightened, position the pawl carrier operating lever so edge

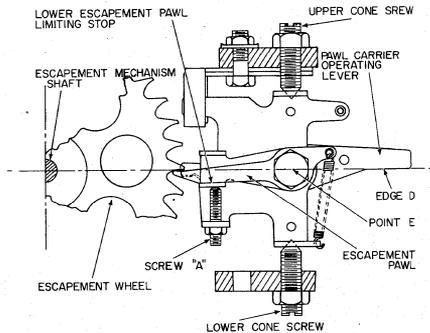


Figure 17

"D" is on the centerline of the escapement mechanism shaft and tighten screw (at point "E"). When tightening this screw, keep the lower escapement pawl limiting stops against the adjusting screw. This is true for mono-spacing mechanisms only. On PSM machines the pawl carrier operating levers are mounted so they operate freely (as stated previously).

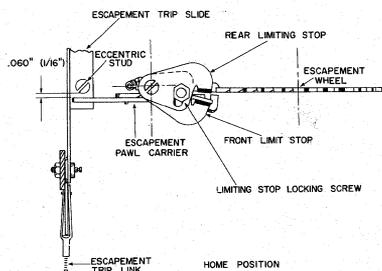


Figure 18 Home Position

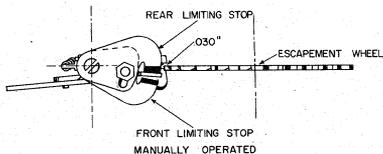


Figure 19 Manually Operated

Pawl Carrier Stops

Adjust the front pawl carrier stop so that, in normal position (at rest), the front surface of the escapement pawl is flush with the front surface of the escapement wheel (Figure 18).

Adjust the rear pawl carrier stop so that, with the pawl carrier fully operated, there is $.030''$ clearance between the front surface of the escapement pawl and the rear surface of the escapement wheel at the closest point (Figure 19).

Note: These adjustments must be made together since both stops are con-

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 39

DATE: November 9, 1962

CHANGE: Page 2-2-38, Pawl Carrier Stops
and Figure 19.

REASON: Adjustment Tolerance Change

EXPLANATION: Provide tolerance when adjusting rear pawl carrier stop.

Pawl Carrier Stops

Adjust the front pawl carrier stop so that, in home position (at rest), the front surface of the escapement pawl is flush with the front surface of the escapement wheel (Figure 18).

Adjust the rear pawl carrier stop so that, with the pawl carrier fully operated, there is .025" to .035" clearance between the front surface of the pawl carrier arm and the rear surface of the escapement wheel at the closest point (Figure 19).

Note: These adjustments must be made together since both stops are controlled by the same locking screw. Loosen the screw slightly, just enough so that each stop may be pushed into position without the other moving, and position the stops. Tighten the locking screw and recheck the adjustment.

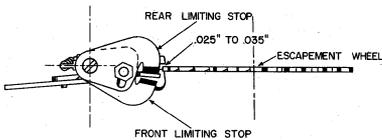


Figure 19 Manually Operated

FRIDEN SYSTEMS ADJUSTMENT

ESCAPEMENT RACK, MARGIN & TAB RACKS & PAPER SCALE

trolled by the same locking screw. Loosen the screw slightly, just enough so that each stop may be pushed into position without the other moving, and position the stops. Tighten the locking screw and re-check the adjustment.

Escapement Trip Link

With the eccentric studs at mid-position (high point toward the escapement), adjust the escapement trip link so there is approximately .060" (1/16") clearance between the studs and their respective pawl carrier operating levers (Figure 18). This is in the non-operated position of the escapement trip slide. In the proportional spacing escapement the pawl carriers will have to be manually operated to check the clearance.

Escapement Trip Slide (Figure 20)

Bring a type bar up manually and hold it against the ring. Adjust the eccentric studs to operate their associated pawl carriers so there is .010" to .020" clearance between the front face of the escapement pawl and the rear face of the escapement wheel. This will position the escapement pawl so there is .005" to .015" clearance between the pawl carrier and the rear pawl carrier stop.

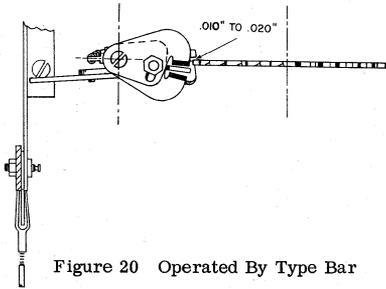


Figure 20 Operated By Type Bar

Escapement Magnets & Linkage

With the escapement magnets not energized, check that there is .028" air gap between the armature and the core. Use T-18122 to check. Adjust for this by loosening the locking nut and adjusting the top screw. Tighten the locking nut. Adjust the linkage so that when the escapement trip slide is operated manually, and the escapement magnets are not energized, the eccentric stud moves under the escapement pawl carrier operating lever with clearance of .060" (1/16").

ESCAPEMENT RACK

When properly adjusted the escapement rack should be parallel to the underside of the carriage and have .001" to .010" clearance or backlash in a mono-spacing machine, and .001" to .005" backlash in a proportional spacing machine.

Position the carriage so that the adjustment screw closest to the binding point or point of excessive clearance is directly over the escapement pinion. Back the mounting screw out slightly and loosen the locking nut on the adjustment screw. Back the adjustment screw out slightly and then turn it down carefully until it causes the escapement rack to touch the escapement pinion. From that point turn the screw out 1/4 to 1/2 turn and tighten the locking nut against the carriage frame. Tighten the mounting (inner) screw against the adjustment screw, bringing the escapement rack up against the adjustment screw.

When removing the escapement rack from the machine, remove the mounting screws and back the adjustment screws out until they are flush with the bed of the carriage. Another method is to latch up the tab, remove the mounting screws and slide the escapement rack out the end of the carriage. The tab governor should be disconnected and the tab mechanism latched and holding a tab stop with the power off (unlatch position).

To install the escapement rack and adjust it completely, mount it with all of the mounting screws loose and the locking nuts loose, and adjust each set by positioning it directly over the escapement pinion. Check the rack at both ends and between the screws for proper backlash and readjust as necessary.

MARGIN RACK, PAPER SCALE AND TAB RACK

In adjusting the racks they must not be bowed, and the carriage end frames must not be drawn in or out by the mounting - adjusting nuts. The center brace screws must be loosened, along with the brace screws at the right side of the carriage bed, when the racks are adjusted on longer carriages.

A good method is to have all nuts loose, adjust the inner nuts hand tight against the carriage end frames, and tighten the outer nuts. When the margin rack is adjusted it must not be cocked in the machine and the outer washers must be positioned all the way to the rear so they do not restrict the manual release levers.

In Sequence

All Units Except 10 & 12 Pitch

1. Adjust the margin rack roughly so that each end extends about equally beyond the end plates of the carriage. Position the margin stop approximately in the middle of the rack and place the carriage so that the margin stop engages the margin release lever (carriage at the left margin). Adjust the margin rack right or left to allow the escapement pinion ratchet to move out of its engaged position with the carriage re-

FRIDEN SYSTEMS ADJUSTMENT

MARGIN RACK, PAPER SCALE & TAB RACK

turn pawl .005" to .015" when the carriage is moved manually to the right as far as the margin stop will allow.

2. Set the paper scale to correspond to the margin rack, so that the paper scale reads the same number as that indicated on the margin rack when the carriage is against the margin stop. Loosen the positioning collar set screw, position the paper scale for the correct reading and tighten the set screw, being sure that the paper scale pivots freely and does not have side play. Be sure that the spring for the paper scale is in place.
3. The tab rack is to be positioned so that its scale and adjustment corresponds exactly to that of the margin rack. Set the tab rack roughly the same as the paper scale and manually latch up the tab. Place a tab stop in the same position as the paper scale position indicated and with the power off, slip the rubber tab governor belt from one of its pulleys (allowing the carriage to move to the left with the power off). Position the carriage at the unlatch position with the tab levers holding the tab stop. Disconnect the pawl release link, allowing the carriage return pawl to engage the escapement pinion ratchet.

In this position the engagement of the carriage return pawl to the tooth of the escapement pinion ratchet can be seen if the carriage return pawl is over the top of the ratchet. Adjust the tab rack right or left for the .010" to .015" the same as the margin rack.

Check the carriage return pawl to see that there are no binds as it is operated. See that the spring that tensions it, is in proper position and not stretched. Also see that the spring that mounts around the carriage release ratchet is in its position on the studs.

4. Adjust the center brace in the carriage bed so that the margin rack is straight, both up and down and front and rear, and tighten the center brace screws.
5. Adjust the tab rack center brace so there is no strain on the tab rack and tighten the screw.
6. Check the final tab stop to see that it causes a tab unlatch operation five units before the carriage hits the final stop. If it doesn't, move the final stop to the position on the tab rack that will give the proper unlatch point.

10 & 12 Pitch Machines (Figure 21)

1. On 10 pitch machines, the escapement pinion has a different number of teeth than the escapement pinion ratchet. Because of this, each escapement pinion tooth bears a different relationship to the closest escapement pinion ratchet

tooth. As a nearly uniform reference point for the field control plate and actuators, the rack to pinion engagement should be selected which gives the least clearance between the carriage return pawl and the latching surface of the escapement pinion ratchet when the carriage is pulled to the right against the final stop (past the margin stop).

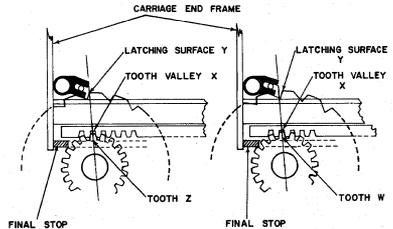


Figure 21

The figure illustrates the different clearances between the carriage return pawl and latching surface (Y) because of the different teeth (Z) and (W) engaging tooth valley (X). In both illustrations the carriage return pawl, carriage, escapement rack and final stop stay in a fixed position.

To obtain the minimum clearance described, move the carriage to the extreme left and disconnect the carriage return and carriage tension tapes. Remove the escapement rack mounting screws and slide the rack forward so it doesn't engage the escapement pinion. Holding the escapement pinion stationary, move the carriage and escapement rack to the left, align another tooth in the rack with the pinion and reengage the rack with the pinion. This change will increase or decrease the amount of travel of the escapement pinion ratchet away from the carriage return pawl. (Check the clearance and select the tooth engagement of rack to pinion which gives minimum disengagement.)

Note: This adjustment effects the back space mechanism and the back space should be checked following any change in the adjustment.

On 12 pitch machines, the pinion and ratchet have the same number of teeth and the clearance will be the same for all teeth. On these models, the front rail should be shifted on its mounting screws to provide minimum clearance between the carriage return pawl and the escapement pinion ratchet.

2. Be sure that the line gauge card holder is installed correctly and, with the car-

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 15

DATE: October 9, 1962

CHANGE: Page 1-11, Step 3.

REASON: Adjustment Tolerance Change

EXPLANATION: Reliable adjustment as indicated in this Manual Addendum.

3. The tab rack is to be positioned so that its scale and adjustment corresponds exactly to that of the margin rack. Set the tab rack roughly the same as the paper scale and manually latch up the tab. Place a tab stop in the same position as the paper scale position indicated and with the power off, slip the rubber tab governor belt from one of its pulleys (allowing the carriage to move to the left with the power off). Position the carriage at the unlatch position with the tab levers holding the tab stop. Disconnect the pawl release link, allowing the carriage return pawl to engage the escapement pinion ratchet.

In this position the engagement of the carriage return pawl to the tooth of the escapement pinion ratchet can be seen if the carriage return pawl is over the top of the ratchet. Adjust the tab rack left or right to cause the release pawl to be held out of its engaged position on the escapement pinion wheel .020" to .035".

Check the carriage return pawl to see that there are no binds as it is operated. See that the spring that tensions it is in proper position and not stretched. Also see that the spring that mounts around the carriage release ratchet is in its position on the studs.

FRIDEN SYSTEMS ADJUSTMENT

FIELD CONTROL

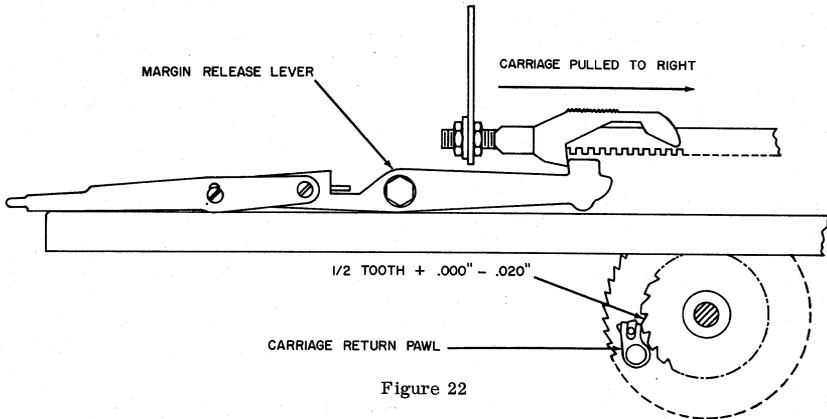


Figure 22

riage in its normal escapement held position next to the Final Stop, loosen the positioning collar set screw and position the paper scale so it reads zero. Tighten the set screw, being sure that the paper scale pivots freely and doesn't have side play. Be sure that the spring for the paper scale is in place.

3. Adjust the margin rack so that each end extends beyond the end plates of the carriage equally, and engages the carriage with the margin stop (with the margin stop located centrally between the frames).
4. At this time, when the carriage is manually pulled to the right as far as the margin stop will allow, the escapement pinion ratchet should have moved away from the carriage return pawl so the pawl is just coming on to the periphery of the escapement pinion ratchet (plus .000" minus .020") (Figure 22). To obtain this, a very slight shifting of the margin rack may be performed, but not so much that there is a large inequality in the extension of the margin rack beyond the end frames.

CAUTION: Never move the rack one complete space.

Note: In the event of removal of the escapement rack, the rack to pinion gear engagement method of obtaining the 1/2 tooth spacing should be followed to eliminate the need for readjustment of both tab and margin racks, field switches, etc.

5. Adjust the tab rack so that its scale corresponds to the scale on the margin rack. Adjust in the same manner as the tab rack adjustment for other models, but adjust to the 1/2 tooth spacing (plus .000", minus .020").
6. Adjust the center brace in the carriage

bed so that the margin rack is straight, both up and down and front and rear, and tighten the center brace screws.

7. Adjust the tab rack center brace so there is no strain on the tab rack and tighten the screw.
8. Check the adjustment of the final tab stop and change its setting if it doesn't cause a tab unlatch operation two teeth before the carriage hits the final stop.

FIELD CONTROL

Actuator Plate

The actuator plate should fit in the plate assemblies with minimum play, but it should be easy to remove and install. If there is excessive end play and the actuator plate can be shifted right or left the plate assemblies should be shimmed between the assemblies and the carriage end frames. The actuator plate should not be formed. Front to rear free play can be removed by forming the stop lugs on the release levers on the plate assemblies. They should not be formed so far as to hinder easy removal and installation.

With the actuator plate installed and several actuators in place, the tips of the actuators should not come within .060" (1/16") of

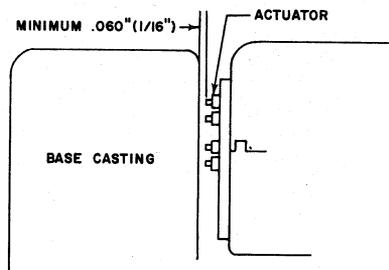


Figure 23

FRIDEN SYSTEMS ADJUSTMENT

FIELD CONTROL

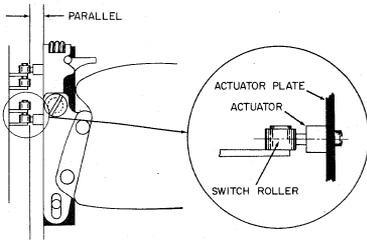


Figure 24

touching the relay cover or the vertical extensions of the base casting (Figure 23). If the clearance is less than that the plate assemblies may not be fully seated on the tab and margin racks. Loosen the inside tab and margin rack nuts and move the plate assemblies forward so they are fully seated. Tighten the inside mounting nuts, being careful not to disturb the adjustment of the tab and margin racks.

The actuator plate should be adjusted vertically so that the actuators are centered on the switch rollers and the actuator plate is parallel to the surface made by the switch rollers (Figure 24). Adjust the mounting of the field switch assembly by the placement or removal of shims under the front mounting screw so the switch rollers' surface is vertical and then loosen the screw in each plate assembly and align the plate with the rollers and adjust its height so the actuators are centered on the rollers. Tighten the screws and check. These surfaces should remain parallel and constant throughout the travel of the carriage. If they do not, readjustment of the plate assemblies is indicated.

Field Switch Assembly Mounting - Front To Rear (Figure 25)

Adjust the field switch assembly mounting so that the switch rollers have .032" to .042"

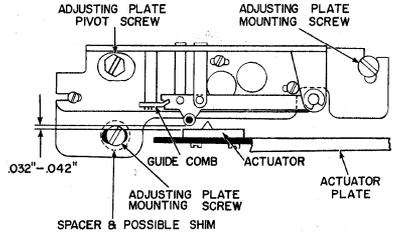


Figure 25

clearance to the low dwell of the actuators. Do this by loosening the two mounting screws and the pivot screw slightly and pivoting the entire assembly about the pivot screw until the clearance is obtained. Tighten the screws.

Field Switch Assembly - Lateral (Figure 26)

Place an actuator in position 12 on the actuator plate. Space the carriage to position 11 as indicated on the paper scale. At this point the actuator should not actuate the operating arm of the switch. Spacing the carriage to position 12 should cause the actuator to oper-

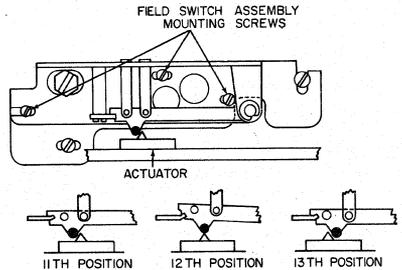


Figure 26

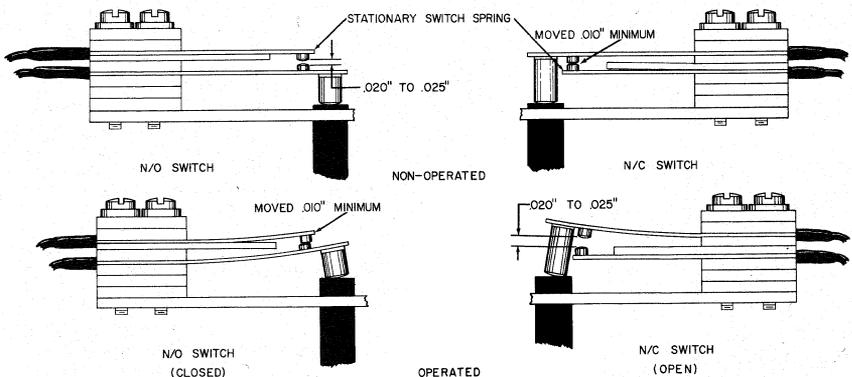


Figure 27 Field Control Switches

FRIDEN SYSTEMS ADJUSTMENT

SINGLE, DOUBLE DETENT & CARRIAGE RELEASE—MANUAL

ate the switch and position the switch actuator so that the switch roller on the switch operating arm is just past the high point of the actuator. To position the rollers, loosen the three screws that mount the field switch assembly to the mounting and shift the field switch assembly right or left as required. Tighten the screws and check the adjustments.

Field Control Switches (Figure 27)

The operate springs of the switches should be adjusted so they have sufficient tension to hold the switch operating arms against the guide comb.

Adjust the stationary switch springs on the normally open switches so there is .020" to .025" clearance to the operate spring with the switch non-operated. When operated, the operate spring should have moved the stationary spring a minimum of .010". If not, check the adjustments previously made.

Adjust the stationary switch spring on the normally closed switches so there is .020" to .025" clearance to the operate spring with the switch operated by an actuator on the actuator plate. When non-operated, the stationary switch spring should have been moved a minimum of .010". If not, check the actuators and previous adjustments.

DETENT PAWL ASSEMBLY - SINGLE & DOUBLE

Single Detent (Figure 28)

The single detent pawl is adjusted by loosening the mounting screws and moving the whole assembly right or left so that the pawl drops in behind all of the teeth on the carriage return ratchet with minimum clearance. The pawl should be as parallel as possible and resting on the surface of the receding tooth with normal pressure on the escapement pinion and the escapement mechanism in an unoperated position. Due to an accumulation of tolerances, the pawl will have a different clearance with various teeth of the carriage return ratchet. It is therefore necessary to adjust the pawl to the tooth that gives the least clearance so that the pawl drops in behind all of the teeth.

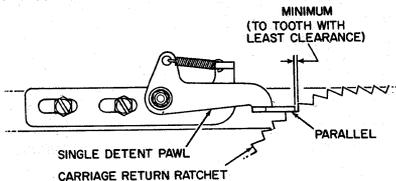


Figure 28

Double Detent

The double detent pawl assembly should be adjusted so that the lower pawl rides behind

the teeth of the carriage return ratchet the same as the single detent pawl, positively getting behind each tooth on the carriage return ratchet.

This adjustment is obtained by moving the mounting bracket as in the previous adjustment. In addition, the upper pawl is adjusted, by means of the eccentric, to get behind the majority of teeth encountered, so that the tolerances are decreased. Do not set the upper pawl so that it checks the tooth with the greatest clearance.

For example: If the lower pawl is set to check all of the teeth and the upper pawl is set to check the one with greatest clearance, the clearance for other teeth might be .006". If the lower pawl is set to check all of the teeth and the upper pawl is set to check the majority, the clearance for other teeth would be reduced (.003", for instance), giving more reliable operation.

Loosen the eccentric locking nut and adjust the eccentric after adjusting the lower pawl. Be sure that all nuts and screws are tight. When the assembly is adjusted correctly, the mounting bracket will be horizontal and parallel to the rear rail. It is possible to cock the mounting bracket so that the pawl(s) engages the next tooth to the left, but this setting is not desirable because the pawl(s) will not meet the forward face of the teeth as effectively.

CARRIAGE RELEASE - MANUAL

The washers on the margin rack must be positioned all the way to the rear (on the outside of the carriage end frames) so they do not restrict the full operation of the manual release levers. Loosen the margin rack nuts and position the washers, being careful not to change the adjustment of the margin rack.

Operation of either the right or left manual release lever should result in sufficient lifting action to disengage the carriage at either end of its travel. Form the ends of the release bail where they are contacted by the manual release levers. The lifting action obtained should be equal.

The release bail should be parallel to the carriage bed and without bows. It must not contact the vertical lug of the release pawl lever throughout the carriage's travel when the release levers are not operated. Check by moving the carriage back and forth with the power on and the tab latched (no tab stops in the tab rack). The bail should be close to

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE RELEASE—AUTOMATIC & LINE SPACE & RATCHETS

fully operated. It was used in early machines to limit the travel of the release pawl.

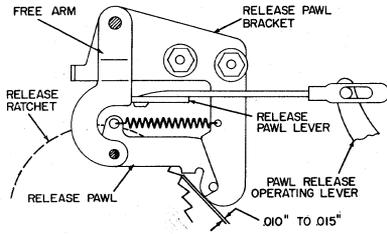


Figure 29 Non Operated

the upright lug of the release pawl lever (for good lifting action), but not come within .002" of it. If the clearance is excessive or the lug rubs on the bail, the vertical lug of the release pawl lever should be formed.

There should be no binds in the manual release levers and they should be centrally located in their slots in the carriage end covers. Form the levers.

Note: To obtain the adjustments, the release pawl bracket assembly should be in adjustment. Do not form the ends of the release bail forward to obtain good lifting action when the adjustment of the release pawl bracket assembly has not been checked and found to be correct. If the ends of the release bail are formed and then the release pawl bracket assembly is adjusted later on, the manual release levers will choke off and cause the vertical lug of the release pawl lever to be bent or the release bail to bow toward the front of the machine.

CARRIAGE RELEASE - AUTOMATIC

Loosen the release pawl bracket assembly mounting nuts slightly and position the bracket so that:

1. The release pawl is held non-operated, by the coil spring, in its seat on the bracket and is .010" to .015" away from any contact with the release ratchet as it rotates.
2. The release pawl, when operated, contacts a tooth of the release ratchet 1/2 the distance of the roughly horizontal face of the tooth.

The free arm of the release pawl bracket assembly may be inclined slightly to the right (looking from the rear of the machine) to accomplish this.

Note: The lug that would limit the travel of the free arm is bent out of the way so that the release pawl may be

Tighten the mounting nuts and check the operation several times. See that the release pawl is fully in line with the release ratchet so there is no chance that it will miss the teeth in the ratchet. The free arm may be formed to accomplish this.

LINE SPACE AND RATCHETS (Figure 30)

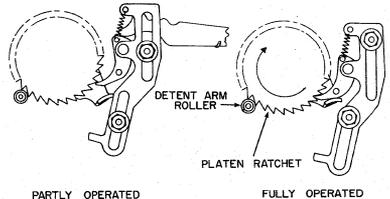


Figure 30 Index Pawl Carrier Movement

In Sequence

1. The platen detent arm should be adjusted by means of the eccentric it is mounted on so that the tooth of the index pawl enters the tooth of the ratchet 1/3 down the forward face of the tooth. The platen must be removed to make the adjustment. Loosen the mounting screw, adjust the eccentric, keeping the high point on top, and tighten the mounting screw. The line space lever should be in its forward position.
2. The lower index pawl stop must be adjusted, after any change in the detent adjustment, so that it stops the travel of the index pawl carrier at the same instant as the ratchet fully detents on the detent roller. There is no allowable clearance here. Adjust the lower index pawl stop with the platen installed by loosening the locking screw and pivoting the lower index pawl stop. Lock the screw and check the adjustment by moving the carriage to the extreme left and operating the indexing mechanism by hand. A sharp pull on the carriage return tape will actuate the index pawl and rotate the platen. Hold the pawl carrier down by pulling the tape and try to rotate the platen with the left hand knob. Any play that is felt should be removed by further adjustment of the lower index pawl stop.

Platen ratchets are supplied with various numbers of teeth to facilitate selection of suitable line spacing. The Flexwriters are normally equipped with a 33 tooth ratchet, permitting six lines per inch, and the Justo-

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 38

DATE: November 9, 1962

CHANGE: Page 1-15, CARRIAGE RELEASE-AUTOMATIC

REASON: Adjustment Tolerance Change

EXPLANATION: The release pawl functions properly with the adjustments indicated in this change.

ADJUSTMENT

Loosen the release pawl bracket assembly mounting nuts and position the bracket so that:

1. The release pawl is held non-operated by the coil spring in its seat on the bracket and is .010" to .020" away from any contact with the release ratchet as it rotates.
2. The release pawl, when operated, engages the lower most tooth possible at least 1/2 the distance of the roughly horizontal face of the tooth.
3. The release pawl bracket, when viewed from the side should be visually parallel to the release ratchet wheel. The "bite" or engagement of the release pawl to the release wheel should be at least full width plus .015" minus .000" and remain constant to the limit of the pawl travel.
4. All pivot points of the bracket and pawl assembly should be free of binds. The release pawl should be free floating at the stop pin location and not bear against the lower part of the bracket to cause a drag or bind. Excess play of the release pawl should not be more than that which would allow the stop pin to be flush with the outer surface of the lower portion of the bracket.

Slight bending or forming of the bracket may be done if necessary to obtain the above adjustments.

Tighten the mounting nuts and check the operation several times.

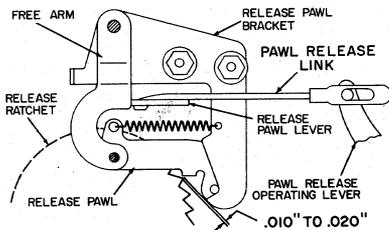


Figure 29 Non Operated

FRIDEN SYSTEMS ADJUSTMENT

LINE SPACE & RATCHETS

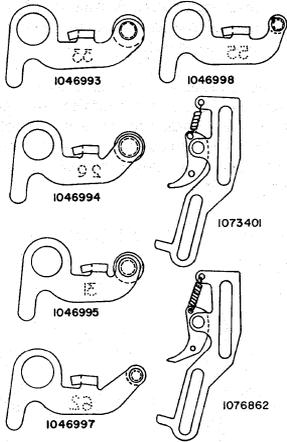


Figure 33

writers are equipped with a 55 tooth ratchet, permitting five lines per inch. The chart shows the ratchets used and the parts necessary for their proper operation. When a ratchet is changed, the upper index pawl stop, detent arm assembly, and the index pawl carrier should be checked against the chart and changed if necessary.

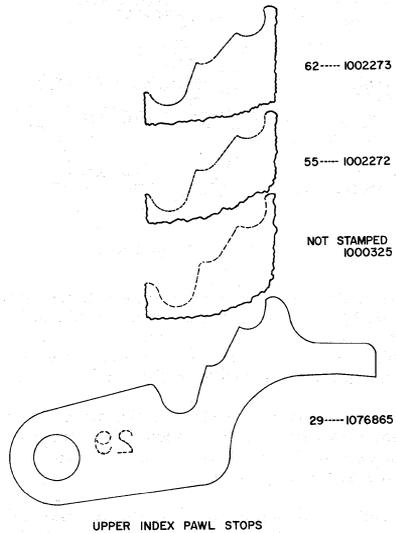


Figure 34 Upper Index Pawl Stops

Platen Ratchet	Number of Teeth	Lines per inch of Form from Ratchet Tooth Rotation					Upper Index Pawl Stop	Detent Arm Assembly	Index Pawl Carrier
		1 Tooth	2 Teeth	3 Teeth	4 Teeth	5 Teeth			
1042527	27	4.91	2.46	1.64			1076865	1046993	1073401
1042529	29	5.28	2.64	1.76			1000325	1046994	1073401
1042533	33	6.00	3.00	2.00			1000325	1046994	1073401
1042536	36	6.55	3.27	2.18			1000325	1046995	1073401
1042538	38	6.91	3.46	2.30			1000325	1046994	1073401
1042539	39	7.09	3.55	2.37			1000325	1046995	1073401
1042540	40	7.28	3.64	2.43			1000325	1046995	1073401
1042544	44		4.00	2.66	2.00		1000325	1046994	1073401
1042544	44	8.00	4.00	2.66			1002273	1046994	1073401
1042548	48		4.37	2.91		1.75	1076865	1046993	1073401
1042549	49		4.46	2.97		1.78	1000325	1046994	1073401
1042550	50		4.55	3.03	2.27		1002272	1046997	1076862
1042551	51		4.64	3.09	2.32		1002272	1046997	1076862
1042552	52		4.73	3.15	2.37		1002272	1046997	1076862
1042555	55		5.00	3.33	2.50		1002272	1046998	1076862
1042557	57		5.18	3.46	2.59		1002272	1046997	1076862
1042558	58		5.28	3.52	2.64		1002272	1046998	1076862
1042559	59		5.37	3.58	2.68		1002273	1046998	1076862
1042562	62		5.64	3.76	2.82		1002273	1046997	1076862
1042566	66		6.00	4.00	3.00		1002273	1046997	1076862

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 three 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.

Figure 31 Ratchets & Line Space Levers Chart

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 60

DATE: February 20, 1964

REFERENCE: Page 1-16, Figure 33.

REASON: To correct an error.

EXPLANATION: Figure 33 shows the index pawl carriers as being different in appearance than they are. Both are the same shape with the only distinguishing characteristic being a 62 stamped in the index pawl of the 1076862 carrier. If the index pawl does not have the 62 stamped in it, the index pawl carrier is part number 1073401.



FRIDEN SYSTEMS ADJUSTMENT

TAB GOVERNOR & CARRIAGE RETURN & TAB

TAB GOVERNOR (Figure 32)

The worm gear & governor pulley shaft (Figure 32) should have .002" - .005" end play. Position the governor bracket on the Power Frame to allow from .003" to .010" backlash between the governor's intermediate gear and the governor drive pinion.

The support screw should be just touching the Power Frame. At no time should there be a clearance between the support screw and the frame nor should the screw be adjusted to exert pressure against the casting.

CARRIAGE RETURN AND TAB

In Sequence

Perform the first three adjustments with a normal load on the carriage and the platen and field control rack etc., installed. If these three adjustments are not properly made (and in sequence), the carriage may not be indexed the proper number of times by repeat carriage returns.

1. Disconnect the carriage return tape by removing it from the clutch pulley. Pull the tape out until the screw is exposed, hold the pulley against rotation, and remove the screw. Tighten the clutch pulley until the spring is fully wound and from that position, using the screw hole as a guide, back the clutch pulley off 5 turns and mount the tape on the pulley again. Allow the tape to rewind on the clutch pulley and make sure that it's on the rollers and has no twists in it. If the tape is frayed it should be replaced.

Note: The clutch may be held rigidly for removal and installation of the screw by manually latching the carriage return toggle with the carriage away from the margin (power off). This cams the clutch pressure plate against the clutch disc, holding the clutch pulley against rotation.

2. With the tab governor installed and the machine running, adjust the main spring to have from 2-3/4 to 3-1/2 lbs. tension with the carriage at the extreme right margin (2-1/3 to 4 lbs. on carbon ribbon machines, P.S.M. & 20" carriage Machines). Twelve inch P.S.M. 1/32 and 1/36 escapement machines may be set as high as 4-1/2 lbs. Sixteen inch 1/36 escapement machines and all 1/40 and 1/48 escapement machines may be set as high as 5 lbs. if necessary for proper escapement.

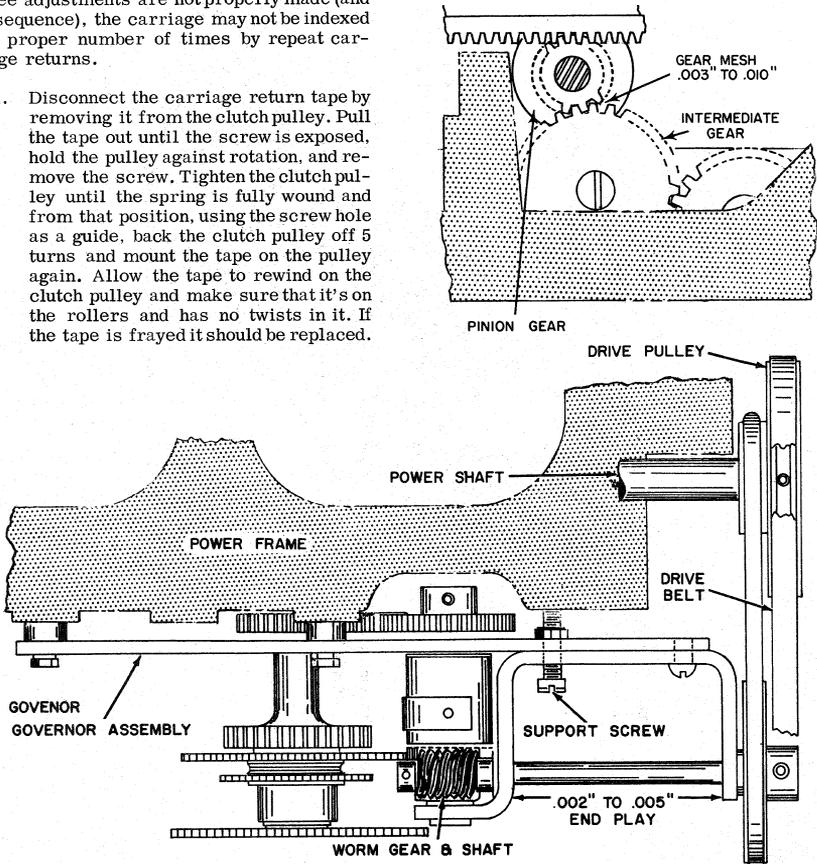


Figure 32

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE RETURN & TAB

3. Form the indexing hook lever spring to restore the index pawl carrier against the upper index pawl stop with the carriage at the extreme right margin (to the left) and the line space lever in the

3 line (last) position. Keep the index hook lever spring bracket parallel to the carriage bed (loosen mounting screws and position).

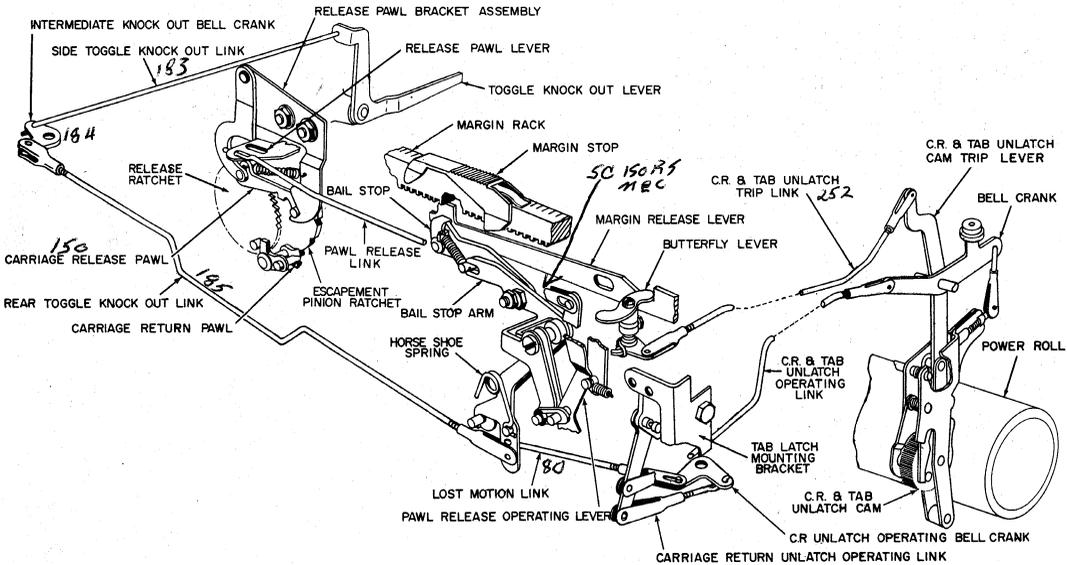


Figure 35 Carriage Return Latching

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE RETURN & TAB

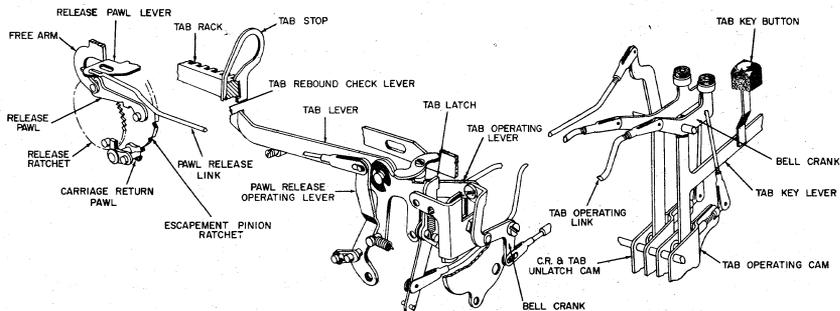


Figure 36 Tab Latching Operation

4. Disconnect the following links at their adjustable end: (Figure 35 & 36)

Pawl Release Link
 Rear Toggle Knock Out Link
 Lost Motion Link (Remove)
 CR & Tab Unlatch Operating Link
 Tab Operating Link
 CR & Tab Unlatch Trip Link

5. Adjust the release pawl bracket so the release pawl clears the release ratchet by .010" to .015" when the pawl is non-operated, and engages the roughly horizontal face of the tooth 1/2 its distance when the release pawl contacts the release ratchet to operate it, as described in "CARRIAGE RELEASE - AUTOMATIC," Page 1-15.
6. Loosen the mounting nut for the small eccentric stud on the left end of the tab lever and set it so the high point is midway in its vertical travel and toward the center of the machine (Figure 37). Tighten the nut without changing the setting. This is a preliminary setting to allow the full range of adjustment when the eccentric is finally set later on.
7. Loosen the mounting screws for the tab latch mounting bracket slightly, latch the tab operating lever under the tab latch, and adjust the height of the tab latch mounting bracket so the top of the tab operating lever is flush with the top of the slot in which it operates. Tighten the mounting nut securely.
8. Hook up and adjust the pawl release link so that with the tab latched, the carriage return pawl is .032" - .045" distance away from the escapement pinion ratchet (Figure 39). The pawl release link must have about .090" (3/32") additional movement before limiting. These clearances are necessary so that when the carriage is manually released the pawl release link will not restrict the releasing action between the release pawl lever and the

pawl release operating lever. If the setting can't be obtained, the release pawl bracket assembly is probably out of adjustment and should be readjusted (see "CARRIAGE RELEASE - MANUAL & AUTOMATIC", Pages 1-14 & 15.

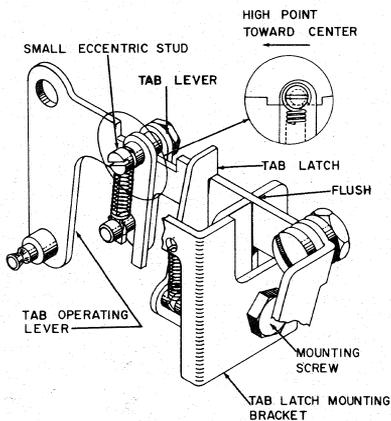


Figure 37

9. Adjust the carriage return cam to the power roll the same as the other cams. The impression screw on the carriage return cam assembly will effect the throw of the cam assembly to a minor degree and can be used to help adjust the cam to the power roll. Otherwise it should be halfway in its adjustment range.

Note: On the model 2 carriage return clutch toggle assembly the available movement of the toggle operating lever was increased from .250" to .265", because of the increased rigidity of the assembly, and to eliminate choke off of the carriage return cam against the power roll.

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE RETURN & TAB

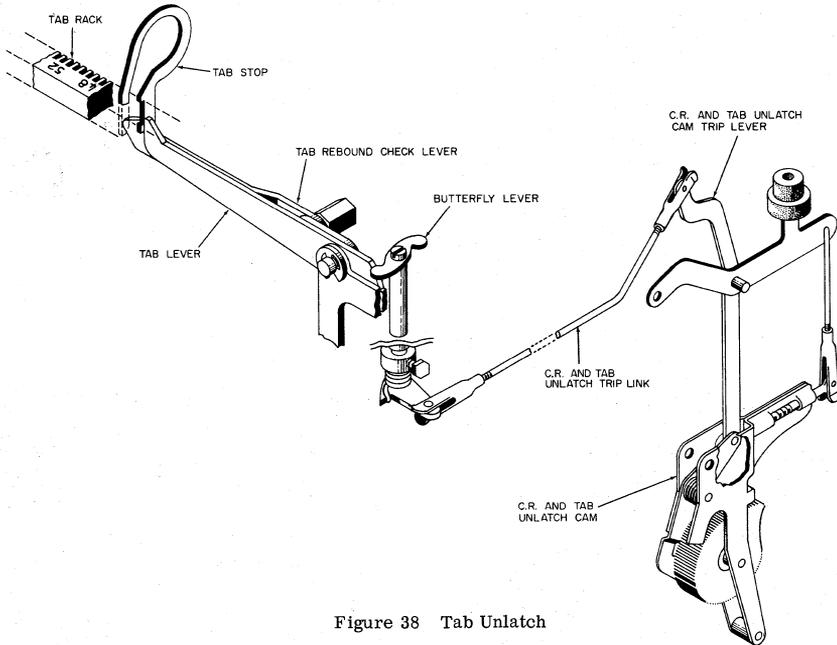


Figure 38 Tab Unlatch

10. Be sure that there are no binds in the clutch toggle assembly, the mounting screws are tight, and the toggle knock out lever is underneath the lug of the clutch toggle lever and centered. If it isn't centered, form the forward tail of the lever.

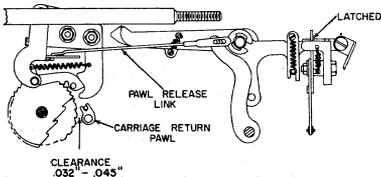


Figure 39

11. Loosen the locking nut and adjust the clutch toggle Bristol screw so there is from .003" to .007" clearance from the clutch pressure plate to the thrust bearing on the clutch operating lever part (B) (.005" plus or minus .002").

This clearance can be set by first placing a .003" feeler between the clutch pressure plate and the thrust bearing with the machine running. Loosen the locking nut and adjust the Bristol screw in until the carriage return tape starts to move, indicating

that the clutch disc is against the clutch pressure plate and the clutch pulley. Back the Bristol screw out from that point until the tape relaxes and tighten the locking nut without changing the setting.

Turn off the machine and with the .003" feeler still inserted pull the carriage return tape off of the clutch pulley and then allow it to rewind. It should rewind freely, indicating that the clearance is at least .003".

Note: This setting is not as critical as it was in the model 1 clutch but will give greater reliability of operation if kept to the indicated range.

12. Attach a spring scale to the left end of the carriage and apply enough pulling force to hold the carriage against the carriage return (with the machine running) and depress the carriage return key lever. Decrease the tension slowly until the carriage moves. Allow the carriage to move to a point about 1" from the extreme left margin (margin stop at the extreme left) and hold the carriage balanced against further movement by the spring scale. The scale should read from 4 to 6 lbs. tension. Allow the carriage to return fully.

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE RETURN & TAB

If the scale shows the adjustment is not within range, loosen the locking nut on the clutch operating lever part (B) and turn the slotted screw to change the adjustment (Figure 40). Turning the screw in will compress the compression spring, increasing the tension, and turning the screw out will decrease the tension of the compression spring and decrease the tension of the carriage return. Tighten the locking nut without changing the setting of the slotted screw and check the adjustment again. Re-adjust if necessary.

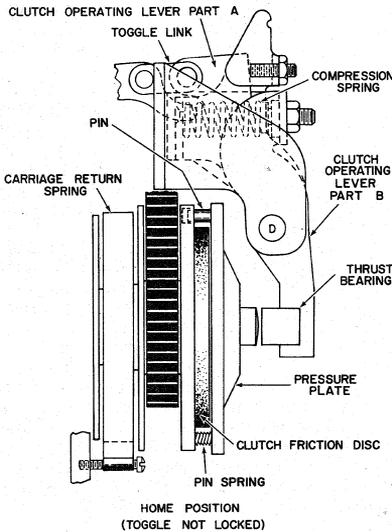


Figure 40

13. Adjust the tab cam to the power roll (.001" to .007") and see that it operates freely (pivoting away from the power roll). If it does not, check for binds in impression screw can be used for a fine adjustment of the tab cam to the power roll. Otherwise it should be adjusted halfway in its adjustment range in the cam assembly frame.
14. Hook up and adjust the tab operating link, by its rear clevis, so that under hand power the tab operating lever latches under the tab latch before the tab cam reaches the high point (Figure 41). At this point there should be two or three teeth visible on the lobe before the high point. Further rotation to the high point should give .003" over-latch. Under machine power this clearance will be greater. The tab lever must not touch the underside of the tab rack.

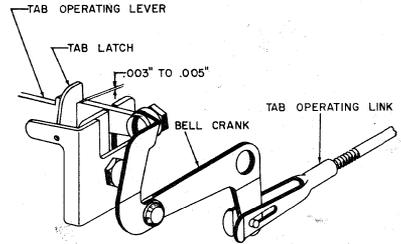


Figure 41

15. Adjust the carriage return and tab unlatch cam to the power roll. Be sure that the cam assembly pivots freely without binding.
16. Hook up and adjust the carriage return and tab unlatch operating link with the unlatch cam at the high point (Figure 42). Start with the link long and shorten it, by the front clevis, so that the tab latch is pivoted to the rear a minimum of .015" from the rear surface of the tab operating lever, with the tab operating lever pushed to the rear side of the slot in which it operates. Do not adjust the link so short that the tab latch chokes off on the spring bracket.

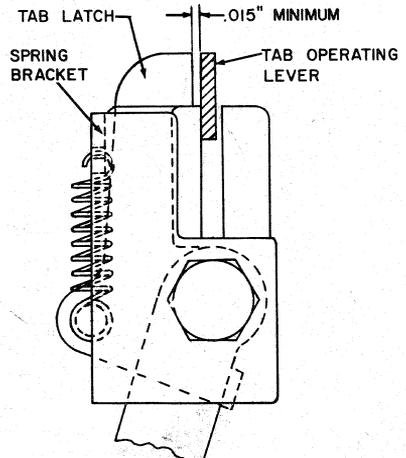


Figure 42

17. If necessary, adjust the length of the carriage return unlatch operating link so that the link pivots the carriage return unlatch operating bell crank past the pivot point of the bell crank. The bell crank should operate from rest to fully operated position about equal distances with respect to an imaginary line drawn horizontally or vertically through the bell crank's pivot point in the same plane in which the bell crank operates (Figure 43).

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 35 & 36

DATE: November 9, 1962

CHANGE: Page 1-21, Step 17 and Figure 43.

REASON: Adjustment Change

EXPLANATION: More positive C.R. unlatch operating bell crank adjustment.

17. With the tab lever latched and the latch release lever just touching the tip of the tab latch, the arms of the intermediate bell crank should be as near as possible to approximate 90° angles to the connecting C.R. unlatch operating link and the rear toggle knock out link (Figure 103). Adjust the link for length to obtain this.

This adjustment must be made as carefully as possible. It is necessary for reliable operation of the unlatch cam.

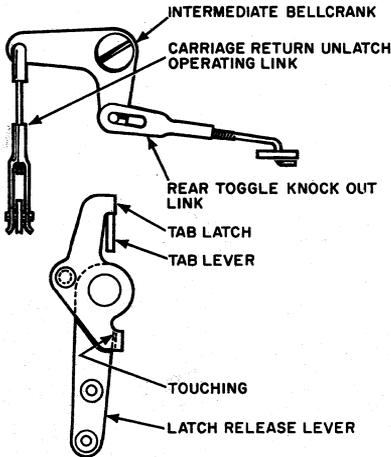
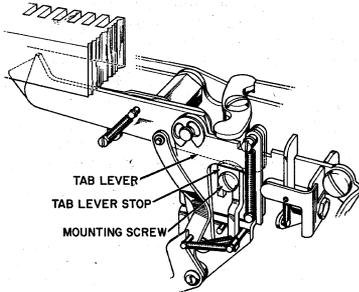


Figure 43



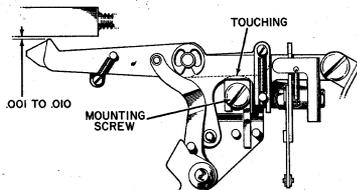
This stop, mounted to the lever & bracket assembly on the rear rail, prevents the tab lever from contacting the under side of the tab rack. The stipulation that "The tab lever must not touch the under side of the tab rack" is still true but this condition is obtained after the adjustment of the tab operating link. It can be disregarded during step 14 in equipment that has the new stop.

13. Adjust the tab cam to the power roll (.001" to .007") and see that it operates freely (pivoting away from the power roll). If it does not, check for binds in the bell cranks, etc., and correct.

The impression screw can be used for a fine adjustment of the tab cam to the power roll. Otherwise it should be adjusted halfway in its adjustment range in the cam assembly frame.

14. Tab Lever and Tab Lever Stop:

A. Hook up and adjust the tab operating link, by its rear clevis so that under hand power the tab operating lever latches under the tab latch before the tab cam reaches the high point (Figure 101). This should be checked with the carriage at the left, one or two spaces away from the margin stop. At this point there should be at least three teeth visible on the lobe before the high point. Further rotation to the high point should result in a minimum of .003" overlatch. Under machine power this clearance will be greater.



DATE: July 18, 1963

CHANGE: Page 1-21, Steps 13, 14 & 15.

REASON: Addition of Tab Lever Stop.

EXPLANATION: This reprint of M.A. 35 contains all of the information in M.A. 35 dated November 9, 1962 but adds the adjustment of the new tab lever stop recently added to the Flexowriter.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 35 & 36

B. Loosen its mounting screw (slightly) so the tab lever stop can be moved up or down. Manually depress the left end of the tab lever so the right end, at its highest point, has a clearance of from .001" to .010" to the under side of the tab rack. Position the tab lever stop so it touches the under side of the tab lever and tighten the mounting screw. Check the clearance the length of the rack, readjusting if necessary.

15. Adjust the carriage return and tab unlatch cam to clear the power roll by .001" to .007" and to pivot freely without binding.

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE RETURN & TAB

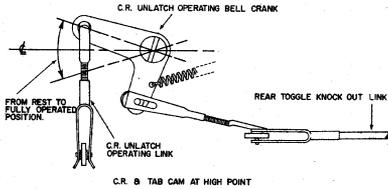


Figure 43

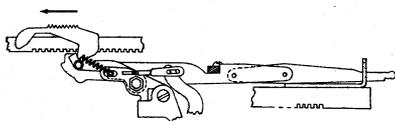
This adjustment is necessary so that tension is put on the unlash cam by the spring attached to the stud side of the bell crank, and from there, back through the carriage return unlash operating link and the carriage return and tab unlash operating link, providing more reliable operation of the unlash cam.

18. The carriage return and tab unlash cam trip link (Figure 38) should be adjusted carefully because it releases the CR & Tab unlash cam through the CR & Tab unlash cam trip lever, and therefore is a "finger on the key lever", although the mechanism is machine actuated.

Operate the CR & Tab unlash cam trip lever forward manually (power on), releasing the cam, and restore it to the rear. Holding it there, adjust the front clevis on the CR & Tab unlash cam trip link so that it is short enough to fit on the stud. From that point adjust the link by lengthening. Turn the clevis out a couple of half turns and put it in position on the stud on the CR & Tab unlash cam trip lever. Manually slide the margin release lever to the right (with the carriage away from the margin stop) and note the tripping point. If it doesn't trip the CR & Tab unlash cam the link is too short.

Lengthen the link until a point is reached where the cam trips .015" short of full travel of the margin release lever to the right (Figure 44).

By pushing the tab lever to the left, the pivoting of the butterfly is also accomplished (tripping the cam) and this point should be the same (.015" short of



CARRIAGE RETURN
AT UNLASH POINT

Figure 44

full travel). Lost motion between the two levers before they contact the butterfly is permissible as long as the .015" clearance adjustment is maintained. If there is a difference, the butterfly can be turned over and the operation checked. If the clearance is not corrected, the butterfly should be replaced.

- Note: The CR & Tab unlash cam is a repeat cam on mono-spacing machines and a standard (non-repeating) cam on PSM machines.

On mono-spacing machines of ten or twelve pitch, with the machine adjusted normally, the CR & Tab unlash cam will trip when the carriage is manually pulled to the right when it is against the margin stop. This is proper due to the 1/2 tooth movement allowed by the margin rack with respect to the carriage return pawl's engagement with the escapement pinion ratchet. On proportional escapement machines, again due to the adjustment of the tab and margin racks, the CR & Tab unlash cam will be in a tripped and cycled position and will be held by the anti-repeat lug of the cam assembly. If the adjustment of the margin rack is such that the cam can be cycled by pulling the carriage to the right (proportional spacing machines), either the margin rack is maladjusted or the unlash mechanism is not properly adjusted. If the margin or tab rack is maladjusted the carriage may not hold the left margin.

19. The adjusting collar on the butterfly lever and shaft assembly for the tension spring should be adjusted so that the butterfly will positively restore the margin release lever to the left as the carriage moves away from the margin stop, and positively restore the tab lever to the right as the tab mechanism restores. The tension must not be so great as to prevent movement of the butterfly by the tab lever on short tabs with the carriage near the extreme right margin. Increased tension can also cause failure to tab from the left margin because the carriage return pawl will not disengage from the escapement pinion ratchet.
20. Loosen the mounting nut for the small eccentric stud on the tab operating lever and adjust the eccentric stud so that the right end of the tab lever is positioned under the tab rack with .020" to .025" clearance from the tip of the tab lever to the underside of the tab rack with the power off and the tab manually latched (Figure 45). Tighten

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 25

DATE: November 9, 1962

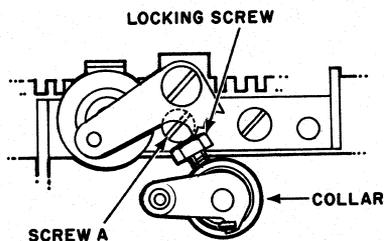
CHANGE: Page 1-22, Step 19.

REASON: Adjustment Change

EXPLANATION: More positive butterfly spring adjustment.

19. Loosen the spring tension adjusting collar on the butterfly lever and shaft assembly and check the shaft for freedom from binds.

Adjust for proper butterfly spring tension by turning the adjusting collar and tightening it so the head of its locking screw is visually in line with the head of screw "A" as shown. The tension must not be so great as to prevent movement of the butterfly by the tab lever on short tabs with the carriage near the extreme right margin. Increased tension can also cause failure to tab from the left margin because the carriage return pawl will not disengage from the escapement pinion ratchet.



DATE: December 28, 1962

CHANGE: Page 1-22, Step 20.

REASON: Change in clearance from tab lever to the under side of the tab rack.

EXPLANATION: The tab mechanism will operate reliably with the increased tolerance indicated in this Manual Addendum.

20. Loosen the mounting nut for the small eccentric stud on the tab operating lever and adjust the eccentric stud so that the right end of the tab lever is positioned under the tab rack with .020" to .030" clearance from the tip of the tab lever to the underside of the tab rack with the power off and the tab manually latched (Figure 45). Tighten the mounting nut without changing the setting of the eccentric stud.

Note: Be sure to check the clearance to the tab lever. The tab rebound check lever is adjusted later and should not enter into this adjustment.

FRIDEN SYSTEMS ADJUSTMENT

CARRIAGE RETURN & TAB

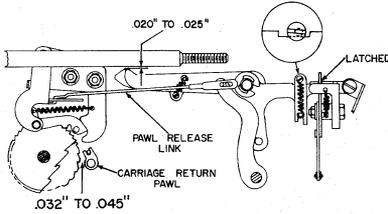


Figure 45

the mounting nut without changing the setting of the eccentric stud.

21. Hook up and adjust the rear toggle knock out link (toggle locked, power off and the carriage away from the margin stop) so that the carriage return pawl is .030" to .045" distance away from the escapement pinion ratchet, the same as in tab.
22. With the carriage in the same position (toggle locked, power off and the carriage away from the margin stop), loosen the locking nut and adjust the eccentric on the bail stop arm so that the bail stop does not contact the underside of the margin rack. The high point of the eccentric should be to the right. Tighten the mounting screw (Figure 46).

When properly adjusted, the carriage can be moved out from the margin stop one space, or one unit of escapement (P.S.M.), the carriage return operated, and the margin stop cams the bail stop out of the way as the carriage returns. If it doesn't, the bail stop is too low and to the left. If the bail stop is cammed out of the way and doesn't contact the underside of the margin stop, the bail stop is too high and to the right.

Hold the carriage rigidly to the right against the margin stop so the CR & Tab unlatch cam is tripped and cycled and depress the carriage return key lever (power on). The bail stop should contact the underside of the margin stop soon enough so that the toggle unlocks after the CR cam has passed the high point. Do this several times.

The bail stop or bail stop arm shouldn't contact the underside of the margin rack, the bail stop should be pivoted out of the way when the carriage return is initiated one space (or three units on P.S.M. machines) out from the margin, and the bail stop should reliably unlock the toggle after the CR cam has passed the high point by contact with the underside of the margin stop. If these three conditions are not met, re-

adjust the bail stop arm eccentric.

Note: With the bail stop positioned under the margin rack the clearance may have to be wide to accomplish the proper adjustment.

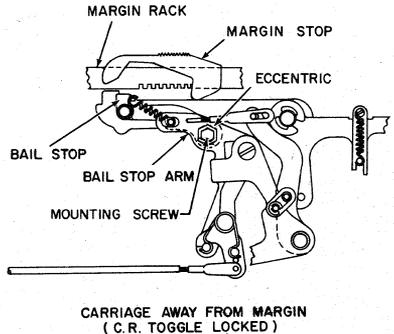


Figure 46

23. With the carriage return toggle unlocked, and the tab unlatched, cycle the CR & Tab unlatch cam to the high point with the power off. Hook up and adjust the lost motion link so that most of the lost motion is taken up, but the link is still free (Figure 47, CR toggle locked). This is the maximum movement of the carriage return unlatch operating bell crank without the lost motion link causing choke off, and this method will give positive unlocking of the carriage return clutch toggle, with the other carriage return adjustments properly made.

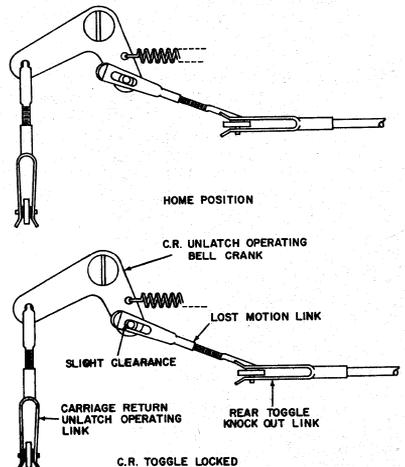


Figure 47

FRIDEN SYSTEMS ADJUSTMENT

SCRT, SPACE BAR & BACK SPACE

With the power off, and tab governor disconnected (by slipping the round rubber belt off of the governor pulley or removing the governor from connection with the governor drive pinion), manually latch up the tab and allow the carriage to escape and be held by a tab stop engaging the tab lever. Loosen the mounting screw, adjust the eccentric and tighten the mounting screw without changing the setting. Keep the high point of the eccentric up. Replace the tab governor belt on its pulleys.

turn key lever. When this condition is the cause of failure the spring should be changed.

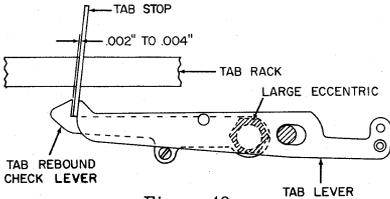


Figure 48

24. Loosen the mounting screw and adjust the large eccentric for the tab rebound check lever so that it holds a tab stop, with the tab stop against the tab lever (unlatch position), with .002" to .004" clearance (Figure 48).
25. Loosen the mounting nut and adjust the small eccentric on the bottom of the tab lever to regulate the height of the tab rebound check lever so it is flush to .005" above the height of the tip of the tab lever (.000" to .005"), with the tab mechanism latched. With the power off, latch up the tab with no tab stops in the way (the carriage will be held by the governor) and perform the adjustment. Tighten the mounting nut without disturbing the setting of the eccentric (Figure 49).

Note: If the horseshoe spring is weak, (creates the back pressure necessary to unlock the toggle when the carriage is at the left margin) and the unlatch cam is tripped and cycled (as in P.S.M. machines) the carriage return toggle can be locked by the operation of the carriage re-

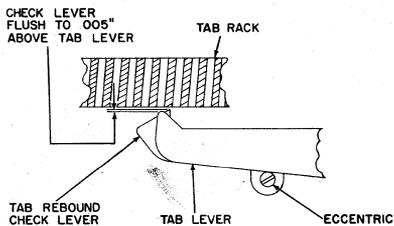


Figure 49

CARRIAGE RETURN AND TAB CONTACTS (Figure 50)

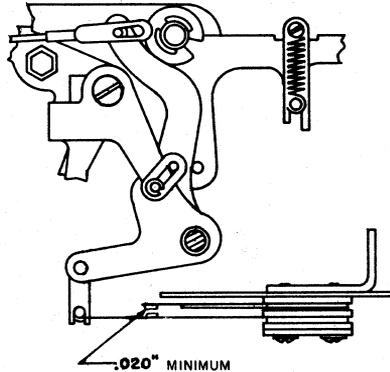


Figure 50

Adjust the contacts so they open at least .020". When non-operated, the stationary contacts should be an appreciable distance away from the contact stiffener. The nylon operator should not have any lost motion. Adjust the contacts and/or the contact bracket.

SPACE BAR

Form the bendable stops on the ends of the front guide comb so the space bar is located centrally in front of the front guide comb. Form the lug that goes through the space bar spring bracket so it doesn't bind on the bracket and is vertical. The bendable stops should have the same angle to the front guide comb and they should be formed so that the space bar has from .015" to .030" end play (Figure 51).

Form the space bar spring bracket up or down so the space bar rests .001" to .005" above the space key lever with both the key lever and the space bar non-operated.

BACK SPACE

1. Check the cam for correct power roll clearance and adjust if necessary.
2. Space the carriage until the carriage return pawl is at the bottom of the escapement pinion ratchet.
3. Operate the back space pawl by hand and hold the pawl against the lower stop. This is the full travel of the back

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 40 & 41

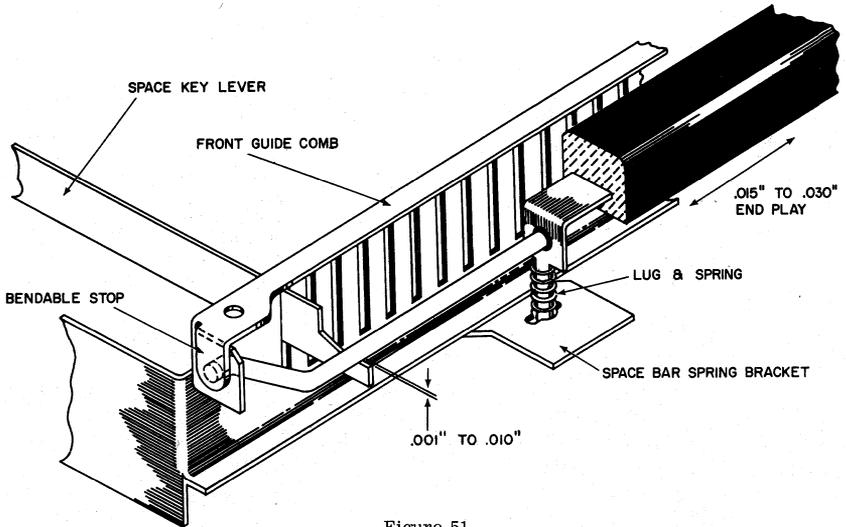


Figure 51

DATE: November 9, 1962

CHANGE: Page 1-24, SPACE BAR

REASON: Adjustment Tolerance Change

EXPLANATION: Space bar to space key lever clearance.

ADJUSTMENT

Form the bendable stops on the ends of the front guide comb so the space bar is located centrally in front of the front guide and the vertical lug centers in the hole of the space bar spring bracket. The bendable stops should have the same angle to the front guide comb and they should be formed so that the space bar has from .015" to .030" end play (Figure 51).

Form the space bar spring bracket up or down so the space bar rests .001" to .010" above the space key lever with both the key lever and the space bar unoperated.

DATE: November 9, 1962

CHANGE: Page 1-24, BACK SPACE

REASON: Adjustment Tolerance Change

EXPLANATION: Clarification of Back Space adjustments, putting them in sequence, and making the tolerance changes.

Adjustment (in sequence)

1. All machines.

A. Space the carriage until the carriage return pawl is at the bottom of the escapement pinion ratchet.

B. Loosen the back space pawl bracket mounting screws. Move the bracket vertically to a position which permits the operated back space pawl to engage an escapement ratchet tooth as close to the rear rail as the bracket mounting slots will allow.

C. Loosen the back space eccentric and set it in mid position with its high side toward the rear rail.

2. Mono-space machines.

Turn the eccentric left or right and move the back space pawl bracket as necessary to:

A. Position the unoperated back space pawl as close to the escapement ratchet as possible but not closer than .005" (Figure 52A).

B. Cause the manually operated back space pawl to engage the face of the escapement ratchet tooth as quickly as possible (Figure 52B) and advance the ratchet one full tooth past the carriage release pawl with as much overthrow as possible (Figure 52C).

3. Proportional spacing machines.

Turn the eccentric left or right and move the back space pawl bracket as necessary to:

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 40 & 41

E. Manually cycle the machine several times to check the operation.

Caution: Manually check Mono-spacing machines with the carriage to the right. The back space operation may not always be positive if manually checked with the carriage at the left because of increased carriage tension and, in 16" and 20" machines, may not operate at all. This condition is acceptable only if positive operation is obtained under power.

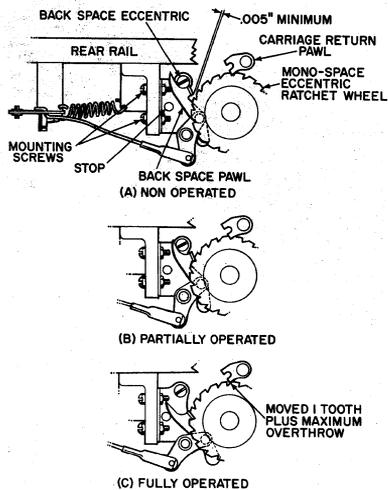


Figure 52

A. Position the unoperated back space pawl to clear the escapement ratchet (Figure 53A).

B. Cause the manually operated back space pawl to engage the escapement ratchet at approximately the mid-point between teeth (Figure 53B) and, at full travel, advance the escapement ratchet one full tooth past the carriage release pawl with an overthrow not to exceed 1/2 tooth (Figure 53C).

4. All machines.

A. Tighten the bracket mounting screws and lock the eccentric.

B. Check the back space operating link for freedom of movement and form it if necessary. Connect it to the rear back space bell crank hole closest to the pivot point and adjust its length to cause the angle formed between its other arm and the long back space link to be slightly less than 90° (Figure 54).

C. Check the back space cam for correct power roll clearance and adjust if necessary (see "CAM ASSEMBLIES," Page 1-5).

D. Adjust the long back space link so that when the back space cam is at its high point on the power roll the back space pawl has engaged the escapement ratchet and moved it at least one full tooth past the carriage return pawl. When the cam drops off its high dwell the carriage return pawl must engage the next escapement ratchet tooth.

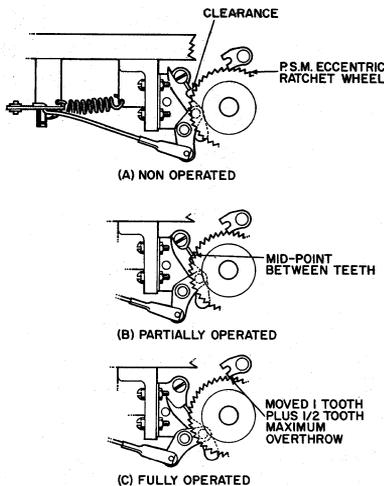


Figure 53

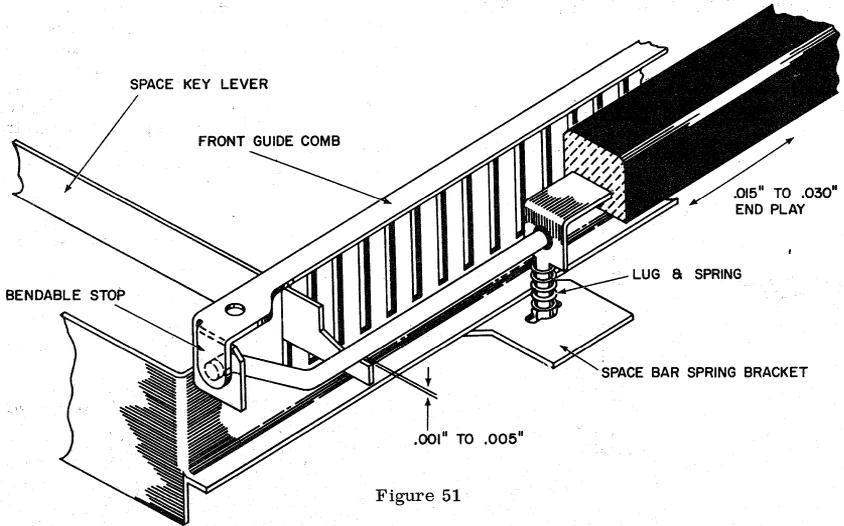


Figure 51

space pawl. Check to see that the escapement pinion ratchet has moved approximately 1-1/2 teeth away from the carriage return pawl. If it has not, loosen the two mounting screws for the back space pawl bracket and raise or lower it to obtain the tooth and a half travel. Tighten the mounting screws (Figure 52).

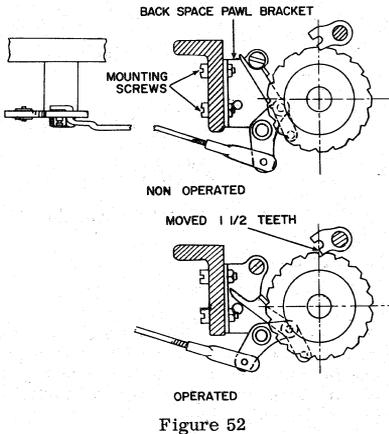


Figure 52

4. Adjust the back space operating link so that when the back space pawl is fully operated, the bell crank has operated across the pivot point about equally from rest to fully operated position. The link should be connected to the hole in the bell crank closest to the pivot point.

5. Adjust the long back space link so that when the back space cam is about 1/8" to 1/4" from the end of the cam's high point travel, the back space pawl will have completed its travel and be resting against the lower stop. Check by cycling the machine by hand and watching the back space operate. With the adjustments made properly, the carriage return pawl should be checked for the tooth and a half travel.
6. Adjust the upper eccentric stop so there is clearance from the back space pawl to the escapement pinion ratchet, and the back space pawl enters the escapement pinion ratchet at least 1/2 the distance down the vertical face of the tooth, but doesn't enter the ratchet and contact the horizontal face of the tooth to rotate the ratchet (Figure 53).

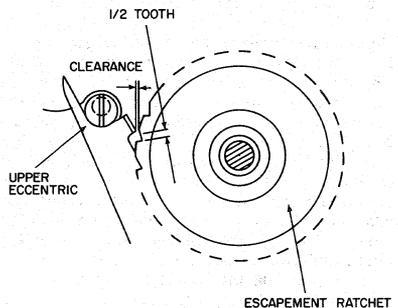


Figure 53

FRIDEN SYSTEMS ADJUSTMENT

SBS, SHIFT & WRITING LINE

BACK SPACE CONTACTS (Figure 54)

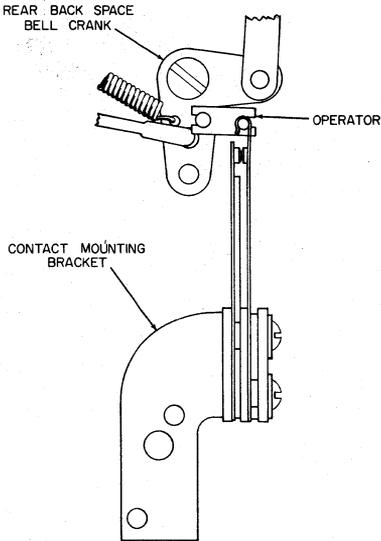


Figure 54 Back Space Contacts

Adjust the back space contacts to be normally closed with the movable contact leaf holding the stationary contact leaf an appreciable distance away from its stop strip. Check to see that the contacts open at least .020" by operation of the back space mechanism. The nylon operator should not have lost motion. Adjust the contacts and/or the contact bracket.

SHIFT

Equalizer Spring

Back the type basket limiting screws out so the leather washers do not contact the arms extending from the power frame. Back them out far enough so they won't hinder the type basket while performing the adjustments.

Remove the forward end of the toggle springs from the studs on the toggle spring levers. This allows the basket to move freely. Adjust the equalizer spring by turning the castellated hex collar to tighten the spring. Do this by placing a wrench on the castellated hex collar and moving the collar off of the screw on the rock shaft with a screwdriver. Turn the collar with the wrench to the next position and push the collar onto the screw with the screwdriver. Place the wrench on the collar again and repeat, being careful not to let the wrench slip off the collar during the procedure, because the spring will unwind rapidly.

Tighten the spring until the basket "floats" midway between upper and lower case. This

can be determined by typing a full height letter such as an "L" on a sheet of paper and seeing that an equal amount of the upper and lower case characters are printed. If the spring is too tight it will have to be loosened and this should be done in the same manner as described, because the point at which the basket starts to float is not far from the point at which the basket is all the way up.

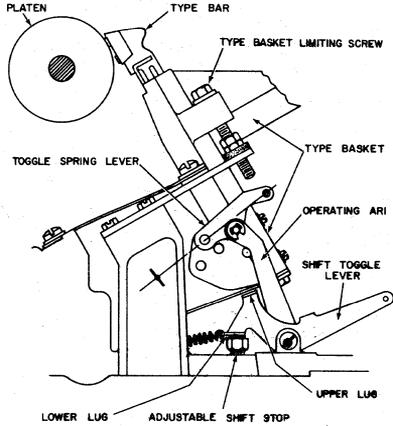


Figure 55

Writing Line (Figure 56)

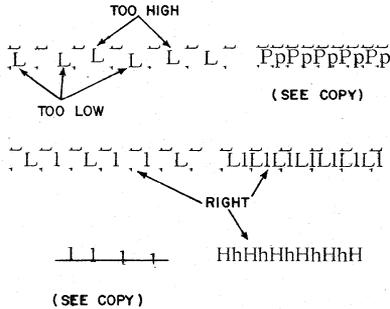


Figure 56

Type a series of full height letters with the basket floating. Hook up the toggle springs. Using the same characters, alternately type upper and lower case characters through the series of full height letters.

The upper and lower case characters typed the second time should be on the same line (the writing line) and this line should be such that the characters are centered vertically between the first series of characters typed.

L, H, D & B are full height letters. Letters such as P, Q, N, S, etc., either extend below

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 28

DATE: October 9, 1962

CHANGE: Page 1-26, BACK SPACE CONTACTS (Figure 54)

REASON: Adjustment Tolerance Change

EXPLANATION: Specific closed contacts adjustment.

Adjust the back space contacts to be normally closed with the movable contact leaf holding the stationary contact leaf a minimum of .010" away from its stop strip. Check to see that the contacts open a minimum of .020" by operation of the back space mechanism. The nylon operator should not have lost motion. Adjust the contacts and/or the contact bracket.

FRIDEN SYSTEMS ADJUSTMENT

TYPE BASKET LIMITING STOPS & SHIFT TOGGLES

the writing line or do not have (in lower case) the height of their corresponding capital letters (Figure 56).

When the letters are not on the proper writing line the density will not be equal. In Figure 56 it can be seen that the top of the character gets more dense and the bottom lightens and disappears as the writing line is moved downward from the proper point.

To adjust, loosen the locking nuts on the adjustable shift stops and back them out a couple of turns.

To lower the lower case characters, turn the left adjustable shift stop in (upward).

To raise the lower case characters, turn the left adjustable shift stop out (downward).

To lower the upper case characters, turn the right adjustable shift stop out (downward).

To raise the upper case characters, turn the right adjustable shift stop in (upward).

When either of the shift stops is adjusted, the shift cam is moved with respect to the power roll. If the shift stop is turned out, the cam will be moved closer to the power roll and may choke off. If the cam chokes off the adjustable cam link should be lengthened so the cam sits farther away from the power roll. Then the cam should be adjusted to the power roll after the shift stop setting is determined.

In any case, after the adjustable stops are set, the cam to power roll clearance should be checked and the cam assembly adjusted for proper operation.

Note: When the basket is in lower case and is shifted to upper case, the shift cam on the right side may move slightly closer to the power roll. This is due to the right operating arm striking the upper lug of the basket shift toggle lever and putting pressure on the lower lug against the rubber of the shift stop. In the same way, when the basket is shifted to lower case, the shift cam on the left side will move closer to the power roll, due to the left operating arm striking the upper lug of the basket shift toggle lever and applying pressure against the rubber of the shift stop on that side. This is normal due to the give of the rubber. For this reason the left shift cam (upper case) should be adjusted to the power roll with the basket in lower case (upper position), and the right shift cam should be adjusted to the power roll with the basket in upper case (lower position).

If the cam to power roll clearance is different for the upper and lower position, it indicates that the shift adjustments are not proper. That is, the writing line is high or low on the platen. If the type bar springs are weak this difference may be pronounced and cause failure of a key lever operation after a shift.

With the two adjustable stops set, the writing line in proper position with respect to the characters typed with the basket floating, and the shift cams adjusted to the power roll, the effort required to shift the basket should be equal. This can be checked by shifting the basket manually with the power off and the machine upright (on its tilt posts), manually pivoting the cam assemblies away from the power roll.

If there is a very noticeable difference in the effort required to shift the basket, broken leaf springs or binds in the toggle assemblies should be looked for. Also, the tension of the toggle springs should be checked to see that it is equal for both springs.

Type Basket Limiting Stops

The adjustable stops on the basket should be positioned so the leather washers are brought to bear against their respective arms with light pressure (so they can be turned with a finger). As stated, their purpose is to provide a stop for one side of the basket, so if they are adjusted too tightly, they will move the basket away from the setting determined by the adjustable rubber stop, moving the writing line, for that case, away from its proper position.

Field Adjustment - Shift Toggle Brackets

The purpose of the shift toggle bracket adjustment is to allow the basket to be shifted from position to position with an equal amount of force, and to allow the typing to be performed with precision in both cases.

1. Adjust the type basket limiting screws so they will not interfere with the motion or adjustment of the toggle brackets. Do not adjust the right type basket limiting screw down so far that it restricts the toggle spring lever.
2. Adjust the shift cams, by their adjustable cam links, so they are about 3/16" away from the power roll and can't interfere with the adjustments.
3. Adjust the shift toggle brackets so their front face is parallel to the type basket. The attitude of the toggle brackets can be seen from underneath the machine or by the use of the mirror T-18109. Do not tighten the screws more than necessary to hold the brackets snugly.
4. Remove the shift toggle springs and allow the basket to float. Type a series of "H's" and adjust the equalizer spring so that equal parts of the lower and upper case characters print.

FRIDEN SYSTEMS ADJUSTMENT

SCS & PLATENS

- Loosen the locking nuts and adjust the shift stops upward until the basket is held against movement up or down without the rubber in the shift stops being compressed unequally or excessively. "H's" typed now should be the same as with the basket floating.
- Now adjust the shift stops down an equal number of turns (3 to start with), hook up the toggle springs, and by manually shifting the basket at the shift cams, and typing upper and lower case "H's" alternately, obtain the correct writing line by turning the shift stops downward equally. It is important that the shift stops are adjusted equally at this time because the shift toggle brackets have not been finally adjusted.
- Adjust the shift toggle brackets further so that when the basket is unlocked on that side, the toggle spring extends across the pivot point of the toggle spring lever. This positions the spring dead center with respect to the toggle operation. Do not try to force the brackets sideways because generally they will locate themselves so they will not bind. Adjust the brackets by loosening one screw and tightening the other.

When both brackets are properly adjusted, remove the toggle springs and check to see that the basket moves without binding or looseness. Check to see that the studs which pass through the toggle brackets can be pushed back and forth without binding.

Ordinarily the toggle brackets will have the same angle to the type basket. If the toggles operate freely without binding and the other conditions of adjustment are met, a slight difference in the angle is permissible. A great difference in the angle can cause a twist in the basket and hard operation.

- It is necessary to readjust the shift stops to obtain the writing line. Use the procedure as outlined under "Writing Line," Page 1-26.
- Adjust the shift cams to the power roll, adjusting the upper case cam with the basket in the upper position (L.C.) and the lower case cam with the basket in the lower position (U.C.).
- Adjust the type basket limiting screws so that the leather washers touch the limiting stops but can be turned with a finger. They should not bear against the stops to the extent that they change the writing line.

With the adjustments carefully made, the force required to shift the basket should be almost equal. This can be checked by attaching a spring scale to the selector slide operating stud on

each shift cam, in turn, and pulling the cam assembly away from the power roll, noting the readings obtained by the use of the scale. The difference should be slight. This check should be made with the machine on its base and the selector and translator removed, so the scale can be pulled almost straight forward.

With the machine adjusted in this manner, it may be harder to raise the basket manually, by lifting it, than it is to lower it. This is due to the fact that with the basket in the lower position (U.C.), the right toggle spring lever is close to being vertical, and this is the direction the basket must move. With the basket in the upper position (L.C.), the left toggle spring lever is at an angle more horizontal and therefore the basket can be moved down with less hand pressure. Since the work is done through the shift cams, the force required should be equal at that point, regardless of the force required at the basket itself.

CASE SHIFT CONTACTS (Figure 57)

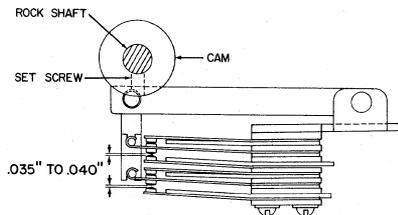


Figure 57 Lower Case (LTRS) Position

Set the contact operating cam on the rock shaft so the flat part of the cam rests fully against the edge of the contact operating arm with the basket in the upper position. With the basket in this position, adjust the open contacts. Move the basket to the lower position and adjust the other contacts, now open. Move the basket to each position and see that the contacts move with appreciable follow (.010" minimum). All break-before-make contacts should have an air gap of .035" to .040" when open and all make-before-break contacts a .020" to .025" air gap when open. Check that the nylon operators are seated properly in their positions and that the SCS-bracket is lined up so that the operating arm is perpendicular to the cam on the rock shaft.

PLATENS

The platen rests in two yokes which are ad-

FRIDEN SYSTEMS ADJUSTMENT

RING & CYLINDER & PAPER FEED & RELEASE

justable either forward or backward by eccentric screws located on each carriage end frame. The platen must be parallel to the travel of the carriage so that the type bars strike with equal force throughout the length of the platen. The type bars will emboss the copy if the platen is too far forward. The type bars will print light if the platen is too far back, because the type bars are stopped by the "ring" (the flat surface on the segment). The purpose of the ring is to minimize embossing and prevent over-printing. The platen can be called the "cylinder". The period or comma are good characters to use when checking the platen for being parallel.

RING AND CYLINDER

Fabric Ribbon

Manually bring a type bar up to the ring. Place a strip of bond paper (about 1/2" x 4") between the type bar and the ring. Put pressure on the type bar near the segment with the thumb and withdraw the slip of paper, noting the amount of drag.

Do the same thing, placing the slip of paper between the normal amount of paper (copy) on the platen and the fabric ribbon, applying the same pressure at the same point on the type bar with the thumb, withdrawing the slip of paper, and noting the drag. (Check in lower case). The drag on the cylinder will be equal in lower case.

Check at several points of the carriage's travel using several type bars. If the force required to remove the slip of paper is not equal for the ring and the cylinder and is not equal throughout the platen's length, loosen the carriage's eccentric screw mounting nuts and adjust them for the correct conditions. The use of several different type bars to check the adjustment will insure that it is not the type bar that is at fault.

Carbon Ribbon

Use the method given for Fabric Ribbon but set the cylinder (platen) farther back so there is less force required to extract the slip of paper. How far the platen should be set back is determined by the quality of the typing. The

platen should be set for good impression and uniform density.

PAPER FEED AND RELEASE

(Figure 58)

Feed Rollers

The feed rollers must turn freely without side play. They must be very free in their rotation because the paper is indexed very rapidly and for a short distance. Loosen the locking nuts and adjust the pivot screws to hold the feed rollers centered in the cutouts in the deflector without side play and tighten the locking nuts.

Paper Deflector

The paper deflector must feed the paper straight. This means the feed rollers must have equal pressure on the platen. Remove the paper deflector and platen and hold the deflector level with the platen in it and "twirl" the platen, noting whether it "walks" in either direction. If it does, twist the paper deflector to compensate and check again. Reinstall the deflector and platen.

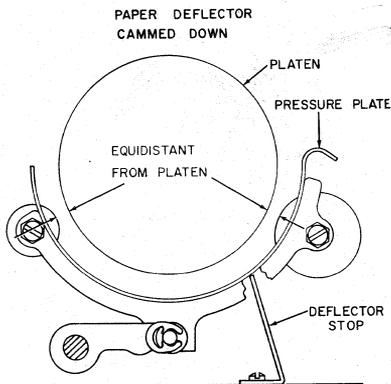


Figure 59

Note: On longer carriages, with two deflectors, their position should be noted when they are removed for other reasons than adjustment, and

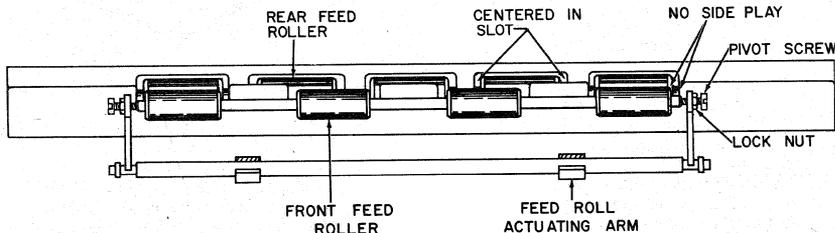


Figure 58

FRIDEN SYSTEMS ADJUSTMENT

LINE GAUGE CARD HOLDER & RIBBON FEED, REVERSE & LIFT

they should be returned to the same position so readjustment isn't necessary. If they are to be adjusted, each should be separately adjusted using the procedure outlined.

Deflector Stop (Figure 59)

The deflector stop in the carriage bed prevents the paper deflector from interfering with the release bail when the paper release lever is forward.

It should be adjusted by forming so that the feed rollers are equidistant from the platen when the paper release lever is forward.

Note: On carriages with pin feed platens the paper deflector may have deflector springs mounted on the pivot screws to keep the deflector down and away from the platen when the paper release lever is forward (Figure 60). This enables a pin feed platen, with the pins adjusted shorter, to feed the multiple forms with reliability.

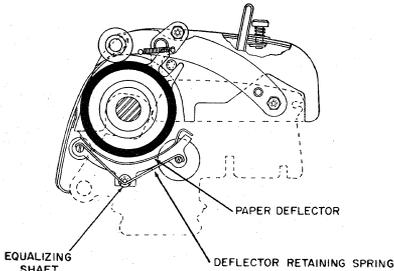


Figure 60

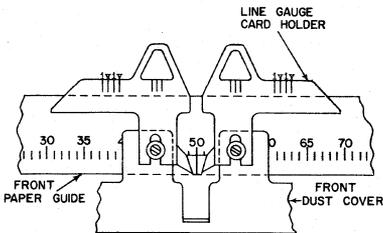


Figure 61

LINE GAUGE CARD HOLDER - STD. & PSM

Standard (Figure 61)

Strike up several characters and align the small vertical lines on the line gauge card holder to the center of the character as shown.

Loosen the two mounting screws and position

the holder and tighten the mounting screws. The card holder should be formed so that the clearance between the platen and the holder is .030" minimum.

PSM (Figure 62)

Type a series of "H's". Space the carriage twenty or thirty units and type another series of "H's". Move the carriage back and type two "H's". Back space the carriage 16 units and position the card holder so that the straight line or positioner is placed accurately between the two "H's", and the writing line is as shown. The clearance to the platen should be .030" (1/32") Minimum.

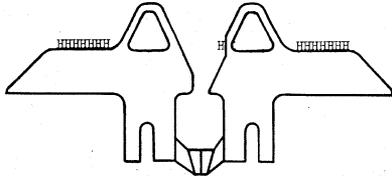


Figure 62

RIBBON FEED, REVERSE & LIFT

The ribbon lift bar should be adjusted so that it is operated equally by all bell cranks. It is adjusted by means of the eccentrics for the ribbon lift bar bearing rod. The operation of the ribbon lift bar effects the operation of the ribbon feed levers, the ribbon feed pawls, the ribbon lift and the ribbon reverse.

Ribbon Lift Bar Eccentric & Ribbon Feed Levers

In Sequence

The following adjustments can only be performed with the power frame out of the machine.

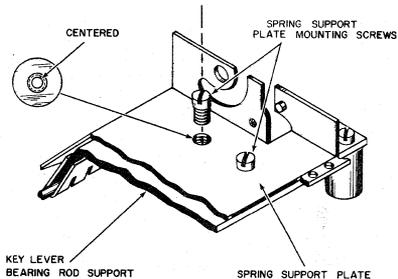


Figure 63

1. Set the spring support plate so the mounting screws are centrally located in their mounting holes (Figure 63). The plate carries the ribbon feed and check pawl assemblies, determining their position. Tighten the screws.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 59

DATE: October 24, 1963

CHANGE: Page 1-30, PSM (Figure 62).

REASON: Additional Adjustments.

EXPLANATION: The sideways adjustments of the line gauge card holder varies with the basic unit value of escapement of proportional spacing machines.

1. Type a series of H's (5 or 6). Space the carriage 20 or 30 units and type another series of H's. Move the carriage back and type two H's approximately in the center of the spaced portion of the line.
2.
 - a. For $1/32$ " escapement machines back-space the carriage 12 units of space.
 - b. For $1/36$ " escapement machines back-space the carriage 14 units of space.
 - c. For $1/40$ " escapement machines back-space the carriage 16 units of space.
 - d. For $1/48$ " escapement machines back-space the carriage 18 units of space.
3. Loosen the mounting screws. Position the line gauge card holder horizontally and vertically so the right hand vertical edge is exactly midway between the two H's and the writing line is as shown (Figure 62). Tighten the mounting screws.
4. Form the line gauge card holder so that its inner curved surface is approximately parallel to and at least .030" away from the curved surface of the platen. When forming the line gauge card holder, maintain sufficient clearance between it and the type guide to insure complete freedom of movement of the ribbon guide.

FRIDEN SYSTEMS ADJUSTMENT

RIBBON FEED, REVERSE & LIFT

2. Loosen the set screws for the ribbon lift bar bearing rod eccentrics and set the eccentrics so the high points are toward the key lever bearing rod (Figure 64). Note that the screwdriver slots cut through the high and low points. Do not tighten the set screws at this time.
3. Manually bring a center type bar up to the ring and note the amount of movement of the ribbon feed levers with reference to the hook of the ribbon reverse pawls. Only one can be checked at a time and the ribbon feed has to be reversed to check the other. Pivoting the ribbon reverse lever to the rear brings the hook of the ribbon reverse pawl up so the clearance can be readily seen. Do not move the ribbon reverse lever so far to the rear that the ribbon reverse pawl chokes off on the ribbon feed lever.

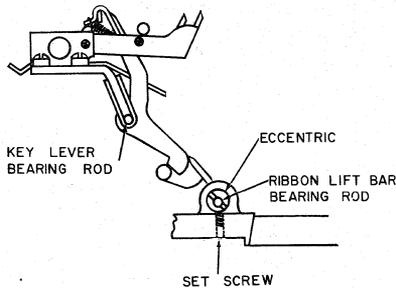


Figure 64

When the ribbon feed levers are fully operated by a type bar against the ring, they must not choke off against the ribbon reverse pawls (Figure 65). If they do choke off, the type bar will be restricted as the ribbon reverses, giving a light impression or failure to print.

4. If the throw is too long (choking off), or the ribbon feed levers do not feed equally, the ribbon feed levers should be formed. This should be done with two pair of pliers, increasing or decreasing the distance between the lugs as required (Figure 66).
5. Bring two end type bars halfway to the ring manually (use a right and left end type bar, matching in position from the ends of the basket counting all slots) and jog them back and forth so they alternately hold the ribbon lift bar partially operated and the ribbon feed levers set still. The jogging point should be the same for both type bars. Check the jogging point for several sets of matching type bars to take into account differences in the type bars, bell cranks and linkages, and adjust

the eccentrics to obtain the most nearly uniform throw of the ribbon feed levers.

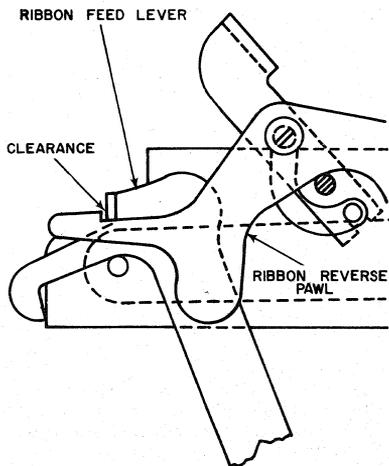


Figure 65

If the throw of the right ribbon feed lever is less, the right eccentric should be turned clockwise, moving the high point of the eccentric away from the key lever bearing rod. This moves the ribbon lift bar bearing rod toward the front of the machine, decreasing its distance from the pivot of the ribbon feed lever. The ribbon lift bar pivots upward because it is moved closer to the bell cranks and increases the throw of the ribbon feed levers. If the throw of the left ribbon feed lever is less, the left eccentric should be turned counter clockwise, moving the high point of the eccentric away from the key lever bearing rod in the same manner as the right eccentric's high point.

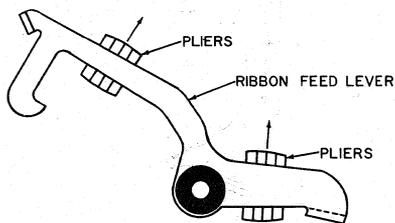


Figure 66

With both ribbon feed levers feeding equally on the operation of various type bars across the basket, tighten the eccentric's set screws. Replace the power frame in the machine.

Spring Support Plate

With the ribbon feed levers feeding evenly and the power frame in the machine, the

FRIDEN SYSTEMS ADJUSTMENT

RIBBON FEED, REVERSE & LIFT

spring support plate ordinarily should not have to be moved. However, with the adjustments that have previously been made correct, the engagement and operation of the ribbon feed and check pawls may be different with respect to the two ribbon spools. Then the spring support plate may be shifted slightly at either side to make the operation more uniform. Loosen the spring support plate mounting screws, shift the plate and tighten the screws. Keep in mind that the ribbons feed levers must not choke off on the ribbon reverse pawls and the movement of the ribbon feed levers should positively cause the ribbon to reverse.

Ribbon Feed & Check Pawls

With the ribbon feed levers feeding evenly, check the feed pawl operation. With the machine in home position the feed pawl should be holding the spool about 1/2 a tooth past the point where the check pawl would hold it. To check the operation, move a type bar to the ring by hand slowly, noting that the feed pawl is moved toward the front of the machine by the ribbon feed lever against the tension of the feed pawl spring. As the feed pawl starts to move forward it rotates the ribbon spool backwards until the tooth of the check pawl contacts the tooth of the spool, and the spool is held against backward rotation. The feed pawl continues to move forward and cams past the first and the second tooth of the ribbon spool and when the type bar is against the ring the feed pawl has moved more than two but less than three teeth with respect to the ribbon spool.

Allow the type bar to restore slowly to the rest and see that the feed pawl now cams the ribbon spool past the check pawl until it has fed the spool two teeth and comes to rest with the feed pawl holding the ribbon spool about half a tooth past the check pawl (home position).

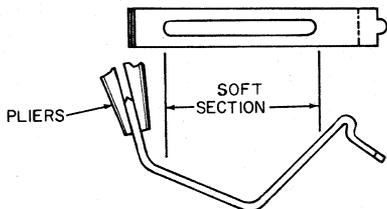


Figure 67

If the feed pawl does not positively feed the spool it is necessary to form the feed pawl. The feed pawl has a soft section and when the feed pawl is formed, this section will be changed (Figure 67). No forming of the check pawl should be attempted because it is hardened and consequently will break easily. The feed pawl should be formed by changing the curvature of the soft section, using a pair of pliers at the pawl end. The feed pawl and the

check pawl should operate freely without binds and when the ribbon reverse pawl is brought away from the center of the machine against the stud (B) (Figure 68), the ribbon feed and check pawl assembly must not bind against it when moved up and down several times. If this happens, remove the feed pawl and place a screwdriver in the check pawl and pry it away from the ribbon reverse pawl so that it doesn't bind against it. The feed pawl must not bind against the check pawl and must operate inside it freely. This freedom of movement can be obtained by forming the lug of the ribbon feed lever where it holds the ribbon feed pawl so that the feed pawl is centrally located in the check pawl (Figure 69). If the lug has to be formed, check to see that the ribbon feed lever operates freely throughout its travel and it rides against the ribbon feed and check pawl assembly bracket without binding against it.

With these adjustments properly made, the pawls will not contact the spool when they are pivoted out of engagement by the action of the ribbon reverse bar. If they contact the spool when the ribbon feed levers operate, readjustment is necessary.

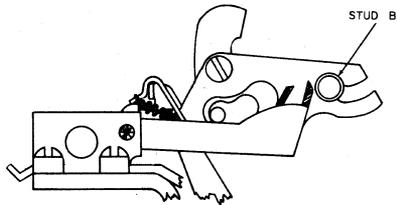


Figure 68

Ribbon Guides

The ribbon guides should be adjusted so that the ribbon goes through the guides freely and centered in the slot. Form them right or left to accomplish this. Adjust them from front to rear so they are roughly aligned with the ribbon lift. They may be inclined toward the front slightly so that the corner the ribbon turns is not quite so sharp. If the ribbon is cocked or bears against the sides of the slot, twisting of the ribbon through the guides may result.

Manual Positioning Stud

In Sequence

Loosen the toggle arm screw and the positioning lever screw.

1. Position the toggle arm so the toggle spring is in the center detent stop (Figure 70). Position the manual positioning stud so it is in the center of the slot in the right base casting and tighten the toggle arm screw.
2. Adjust the center detent stop so the force required to move the manual positioning stud from position to position

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 29

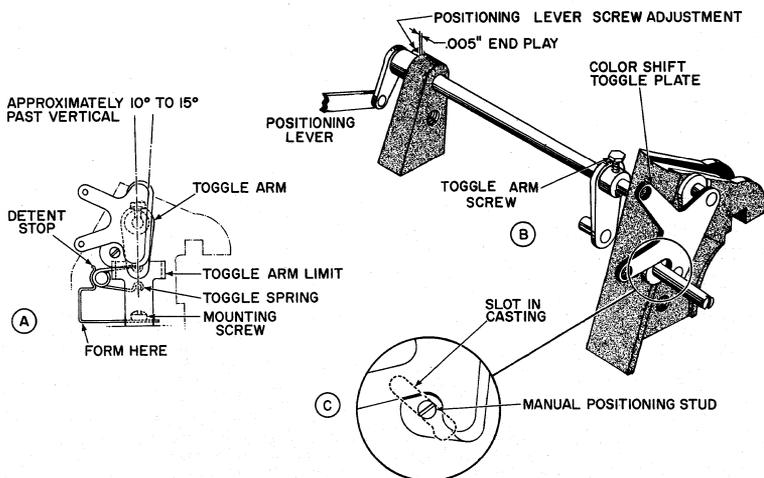


Figure 70

DATE: November 9, 1962

CHANGE: Page 1-32, Manual Positioning Stud

REASON: Adjustment Tolerance Change

EXPLANATION: Clarification of and additions to this adjustment.

In Sequence

Loosen the toggle arm screw and the positioning lever screw.

1. Set the manual positioning stud for stencil operation by placing it in the center of the slot in the right base casting (Figure 70C). Note that the color shift toggle plate is in an approximate 10 to 15 degrees past vertical position (Figure 70A). Position the toggle arm so its spring stud is vertically in line with the stud on the toggle arm limit bracket (Figure 70A). Tighten the toggle arm screw.
2. Form and position the detent stop to hold the spring firmly in its concave surface during stencil operation and to require minimum and equal pressure to move it out of stencil operation in either direction.
3. With the manual positioning stud in stencil position locate the positioning lever over the vertical slot in the ribbon lift control plate (Figure 71). Tighten the positioning lever screw for a maximum of .005" end play of the lateral shaft (Figure 70B).

4. Loosen the toggle arm limit mounting screw. Operate the manual positioning stud and position the toggle arm limit to cause the positioning lever to travel equal distances from the vertical slot in the ribbon lift control plate. Tighten the screw and recheck the detent stop adjustment.

FRIDEN SYSTEMS ADJUSTMENT

RIBBON FEED, REVERSE & LIFT

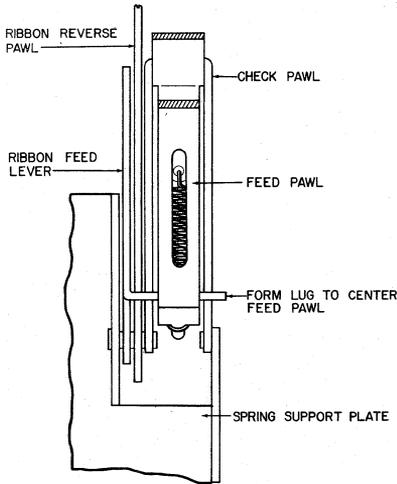


Figure 69

and to the center is equal. Do this by forming the detent stop back and forth.

3. Locate the positioning lever centrally over the vertical slot in the ribbon lift control plate with the toggle arm and the manual positioning stud located at the center detent position and tighten the positioning lever screw.

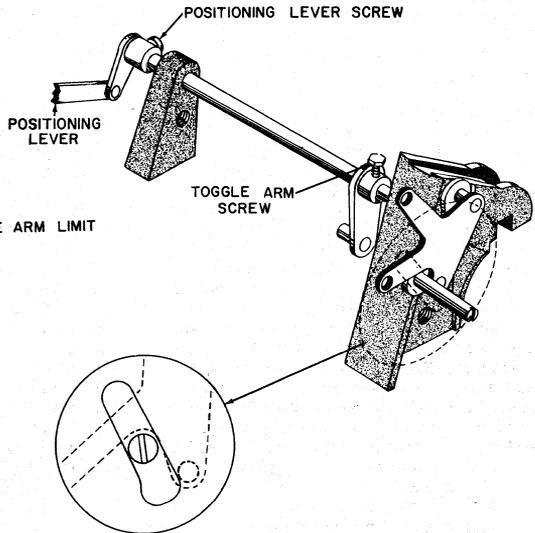
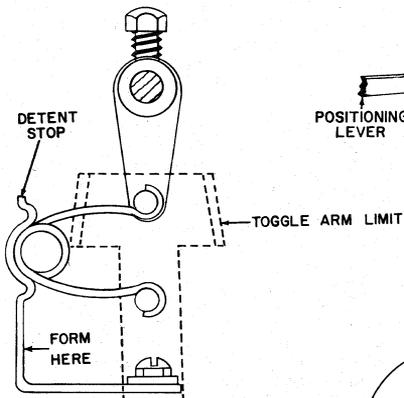


Figure 70

4. Loosen the mounting screw and adjust the toggle arm limit so that the positioning lever operates equal distances from the vertical slot in the ribbon lift control plate as the manual positioning lever is moved from position to position. Tighten the screw and check the detent stop.

Ribbon Lift (Figure 72)

Adjust the ribbon lift for height (when operated) so that a slash mark character is fully printed by the ribbon in both positions. This is ordinarily the tallest character in the type basket. The percent sign, parentheses, or number sign may also be used. The ribbon lift must be free from binds. To check for the freeness of operation, the clevis end of the ribbon lift can be removed from the ribbon lift lever spring stud and the ribbon lift lever moved back and forth to see that the travel is equal from front to back and side to side. If it is not, the tail of the ribbon lift can be formed. Because the lift lever describes an arc and the ribbon lift travels on the type guide in a straight line, the freeness of travel is important, and any binds can affect the impression and ribbon action.

Adjust the ribbon lift stop so that when the ribbon lifting height is changed by moving the manual positioning stud back and forth rapidly, the ribbon lift doesn't move or "bounce". If it does, it indicates that the positioning lever is not moving freely in the horizontal slot in the ribbon lift control plate.

FRIDEN SYSTEMS ADJUSTMENT

RIBBON FEED, REVERSE & LIFT

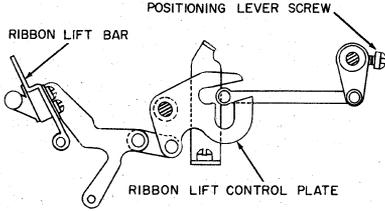


Figure 71

Form the ribbon lift stop to the rear of the machine to remove the bounce. If the ribbon lift stop is moved too far to the rear, the ribbon lift control plate can be pivoted, causing the ribbon lift bar to be moved to a partially operated position. This will also cause the ribbon lift to be partially operated upward into the path of the type bar. If there is doubt as to which direction to form, form the stop forward until the ribbon lift bounces, and then form the stop to the rear until the bounce is removed.

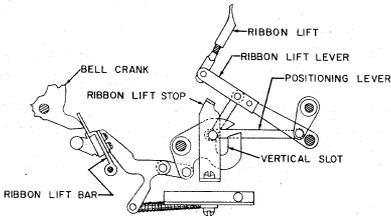


Figure 72

Ribbon Reverse

The tension of the reverse lever springs should be such that they retain the release levers in position over the ribbon spools but should be very light so that the reverse levers can be easily operated by the tension of the ribbon as it nears the end of the spool. The ribbon reverse levers must be free of binds and must clear the teeth of the spool so they do not restrict its rotation. Their position relative to the spool can be changed by forming the lug (A) toward the rear of the machine to move the reverse lever toward the rear of the machine (Figure 73). By operating the manual ribbon reverse lever on the ribbon reverse bar rapidly several times the ribbon reverse levers can be checked for bouncing caused by the reversing action. This is caused by the ribbon reverse pawl moving on the stud (B) as it is operated.

This bouncing can be removed by forming the lug (A) downward, thereby changing the position of the stud relative to the slot in the ribbon reverse pawl.

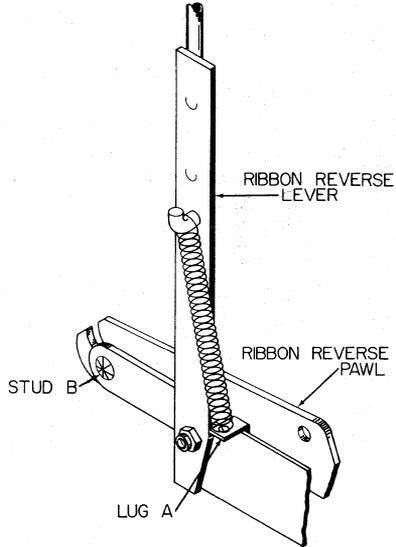


Figure 73

Note: Do not attempt to open the slot for this adjustment because the part is hardened and will break easily.

The ribbon reverse can be manually checked by operating a type bar slowly with the ribbon reverse lever pivoted to the rear and the feed and check pawls engaged. By watching the toggle spring it can be seen whether the reversing action is adequate and the reverse bar pivots far enough.

Spool Retaining Springs (Figure 74)

The spool retaining springs should be positioned so that the spools are parallel to the side of the machine. If they are cocked, erratic feeding of the ribbon may result. They should have sufficient tension to retain the spool on the hub and prevent the spool from overrunning, but not cause enough friction that the feed pawl springs won't be able to feed the ribbon spools properly. This can also cause ribbon reverse failure. Loosen the two screws that mount the spring and shift it, with the spool on the hub, so the spool lines up with the side of the machine. If it is necessary to change the tension of the spring, form the spring with the spool off or the spring removed from the machine. Tighten the screws.

Ribbon Reverse Bar

The ribbon reverse bar should have from .015" to .030" end play. It should be free from binds and shouldn't contact the spring support plate, the bell cranks as they operate, or the basket

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 30

DATE: October 9, 1962

CHANGE: Page 1-34. Ribbon Reverse Bar,
1st Paragraph.

REASON: Adjustment Tolerance Change

EXPLANATION: This change provides additional ribbon reverse bar end play tolerance.

The ribbon reverse bar should have from .005" to .030" end play. It should be free from binds and shouldn't contact the spring support plate, the bell cranks as they operate or the basket in the basket's lower position. Form the ribbon reverse bar.

The toggle spring should retain the bar in either operated position. It should not make the reversing action difficult. Sometimes when the ribbon has traveled from spool to spool several times the ribbon will become loosely wound on the spools. Then when the ribbon nears the end of the spool, the take up spool will wind up the slack and the ribbon will be stationary at the printing point. It is necessary to manually reverse the ribbon with the manual ribbon reverse lever (on the right side of the ribbon reverse bar). The adjustment of the spool retaining springs should be checked.

FRIDEN SYSTEMS ADJUSTMENT

TYPE SOLDERING & FRONT PANEL SWITCHES

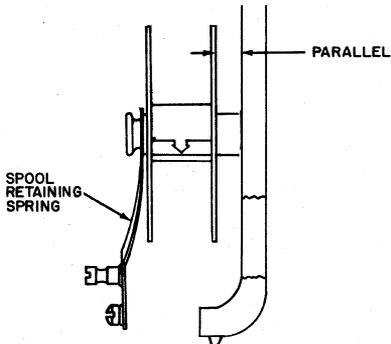


Figure 74

in the basket's lower position. Form the ribbon reverse bar.

The toggle spring should retain the bar in either operated position. It should not make the reversing action difficult. Sometimes when the ribbon has traveled from spool to spool several times the ribbon will become loosely wound on the spools. Then when the ribbon nears the end of the spool, the take up spool will wind up the slack and the ribbon will be stationary at the printing point. The type bars may cut through the ribbon at this point. It is necessary to manually reverse the ribbon with the manual ribbon reverse lever on the right side of the ribbon reverse bar. The adjustment of the spool retaining springs should be checked.

TYPE SOLDERING

Type soldering is not ordinarily necessary since the type slugs are welded to the type bars in manufacture. There are many methods and special tools used to accomplish the proper positioning of a type slug on the bar while it is soldered, but when the various fixtures are not available, the following method may be used.

1. Remove the type slug from the bar. Remove all the old solder. Tin the bar by heating it and applying acid core solder until a thin coating of bright solder is left after wiping with a rag. This insures that the surface will provide a good bond.

Remove the old solder from the slug by heating and shaking off excess solder. Try some new solder and see that the mating surface is clean and bright.

With a thin coating of new solder on both parts very little trouble should be encountered when the slug is soldered after being properly positioned.

CAUTION: Keep all solder away from the type face on the slug. If solder does get into the type face the slug can be heated and the solder removed by shaking the bar or wiping with a rag.

In using the above procedure, rags can be placed around the type bar. The type bar can be positioned about halfway to the type guide using a screwdriver or pair of pliers set behind it. The flame of the torch should be angled upward and not pointed to any part of the machine.

2. Put the slug on the bar. If it is loose, crimp the type slug so it will stay on the bar and still be able to be moved. If the slug won't go on the bar, it may be spread (slightly) so it will fit. The slug should be tight but be able to be shifted.
3. Make a strike up of N's and spaces (alternately) on a sheet of paper.
4. Position the carriage between the N's.
5. Manually operate the type bar to the ring and push the slug against the ribbon and paper. Restore the type bar without moving the slug on the bar and check the alignment of the character.
6. Reposition the slug until a good alignment is obtained and then the slug can be held on the bar and solder applied from the top (with the bar heated and rags in the basket to keep hot solder out of the machine). Excess solder can be removed while still hot (with care) but if the slug shifts the procedure will have to be repeated.
7. Check the ring and cylinder adjustment in both lower and upper case. If repositioning is indicated, the slug can be shifted with a screwdriver when the parts are heated carefully. (If too much heat is applied, the slug may shift too much and it will again require repositioning).

FRONT PANEL CONTACT ASSEMBLIES

Panel Buttons

The panel buttons should have .005" to .010" end play (collectively) and be free on the pivot shaft. The buttons may be shimmed for the end play indicated.

Break-Before-Make Contacts

1. The movable contact strap should have sufficient tension to keep the panel button fully non-operated. Adjust by forming.
2. There should be a .035" to .045" gap between the movable strap and the n/o make contacts with the switch non-operated, and the contacts should be moved a minimum of .015" with the switch fully operated.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 26

DATE: May 29, 1962

ADDITION: Page 1-35 preceding "TYPE
SOLDERING"

REASON: To outline new policies for usage of
certain features in Flexowriters.

EXPLANATION: Effective May 14, 1962, the
following policies are in effect with reference
to all Flexowriters. Flexowriters in the field
are to be maintained as they have been. These
policies will facilitate manufacturing and
eliminate aligning problems that can't be cor-
rected in the field.

A. Micro Gothic Condensed Type

1. The use of the double case alphabet is
discontinued. It will not be shown in the
Type catalog. Capital letters only, are
available and will be in the normal lower
case position.

2. The speed of the Micro Gothic Con-
densed machines is to be reduced from
575 RPM plus or minus 5 RPM to 525 RPM
plus or minus 5 RPM.

3. These Flexowriters cannot be used to
make direct Offset masters.

B. Inverted Type (Lower Case Characters on Top)

1. Not to be used for letter writing appli-
cations.

2. Not to be used to make direct Offset
masters.

C. Ribbon Mechanisms

1. Machines will be manufactured with
either Carbon ribbon or Fabric ribbon but
not both.

D. Solenoid-operated Basket Shift (RCA 501)

1. Aligning is secondary to proper opera-
tion.

2. Not to be used to make direct Offset
masters.

Service is effected to the extent that the speed
of the Micro Gothic Condensed machines
should be reduced (by changing the interme-
diate gears) and the improper usage of the
machines should be discontinued wherever
there are aligning problems due to said usage.

FRIDEN SYSTEMS ADJUSTMENT

CARBON RIBBON MECHANISM

3. As the switch is operated, the n/c break contacts should follow the movable contacts a minimum of .015" and have a gap of .020" minimum (to the movable strap) with the switch fully operated.

Make-Before-Break Contacts

1. The movable contact strap should have sufficient tension to keep the panel button fully non-operated. Adjust by forming.
2. There should be a .020" to .030" gap between the movable strap and the n/o make contacts with the switch non-operated, and the contacts should be moved a minimum of .015" with the switch fully operated.
3. As the switch is operated, the n/c break contacts should follow the movable contacts a minimum of .015" and have a gap of .020" to .030" (to the movable strap) with the switch fully operated.

Double Make Contacts

1. The movable contact strap should have sufficient tension to keep the panel button fully non-operated.
2. With the switch non-operated, there should be a .020" gap between the movable contact and the first make strap and a .020" gap between the first make

strap and the second make strap. When the switch has been fully operated, the second make strap should have been moved a minimum of .010".

Locking Contacts

Contact assemblies with locking type contact springs are to be adjusted according to their configuration, maintaining the minimum .020" gap to the make contacts. The end of the movable contact spring may be formed to insure positive locking.

CARBON RIBBON MECHANISM

The gears should mesh with minimum backlash and without binding. If they bind, use shims between the bracket and the base casting and move it vertically or horizontally (using the play in its mounting holes) to obtain the gear mesh.

The feed roll and gear shaft must have a slight bit of end play (maximum .005).

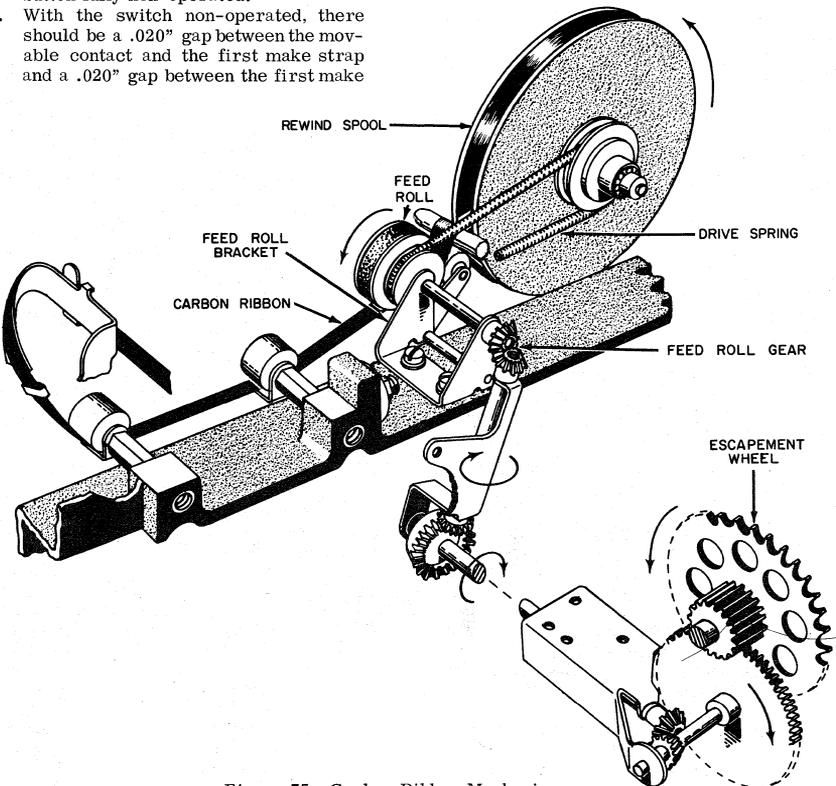


Figure 75 Carbon Ribbon Mechanism

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 20 & 31

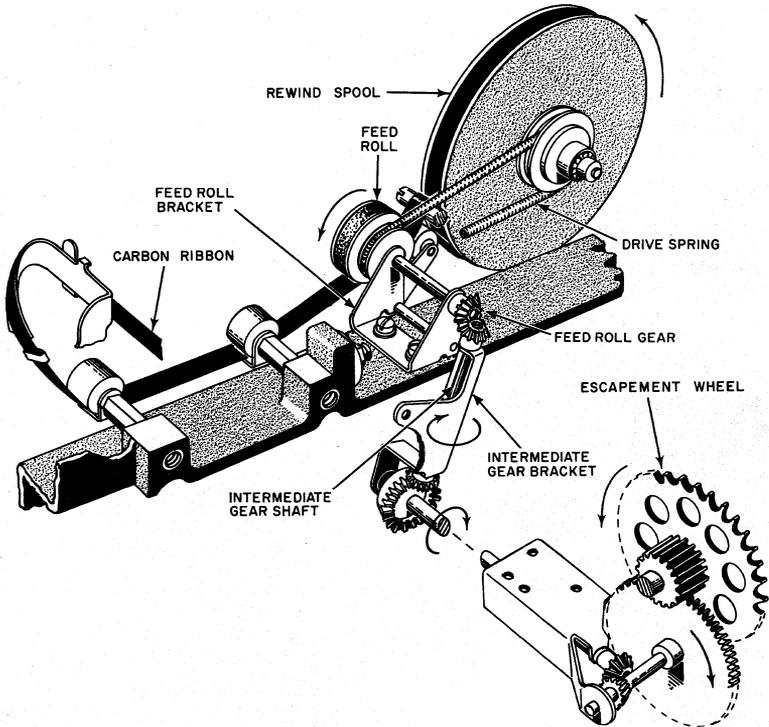


Figure 75 Carbon Ribbon Mechanism

DATE: October 9, 1962

ADDITION: Page 1-36, Front Panel Contact Assemblies

REASON: Contact Adjustments

EXPLANATION: Provides adjustments for contacts not previously included in the Flexo-writer manual.

Form A-B Contacts

1. The movable contact strap should have sufficient tension to keep the panel button fully non-operated.
2. With the switch restored, the Form A (make) contact should have an air gap of .035" to .045".
3. When the switch is operated, the Form B (break) contact should open before the Form A (make) contact closes and with the switch fully operated, the Form B break contacts should have at least .020" air gap. There should be at least .015" follow on both make and break stationary straps.

Form A Locking Contacts

1. In a restored position the contacts should have a minimum air gap of .020".
2. When the switch is operated the button should positively lock and the stationary contact spring should be moved at least .015".

DATE: November 9, 1962

ADDITION: 1-36

REASON: Carbon Ribbon Adjustments

EXPLANATION: Tolerance & adjustments as described in this Manual Addendum.

ADJUSTMENT

The gears should mesh with minimum backlash and without binding. If they bind, use shims between the bracket and the base casting and move it vertically or horizontally (using the play in its mounting holes) to obtain the gear mesh.

The feed roll and gear shaft must have a slight bit of end play (maximum .005).

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 20 & 31

Loosen the intermediate gear bracket mounting screws and, with the tabular mechanism latched, pivot the bracket in its mounting holes for a minimum clearance of $1/16''$ between the intermediate gear shaft and the bell crank link. This adjustment is necessary to prevent choke off of the tab mechanism.

The position of the bracket must also be such that the head of its upper mounting screw does not touch the tape guide pulley.

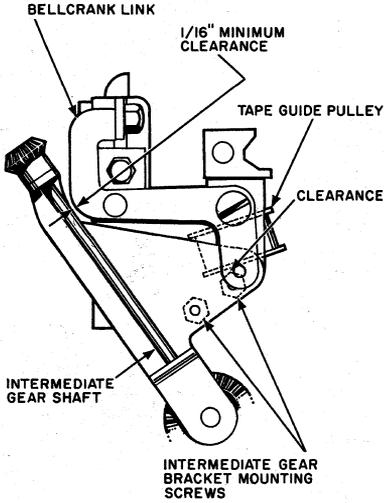


Figure 75A

SELECTOR

Selector Slides (Figure 1)

Form each selector slide so there is a minimum of .005" clearance between the selector slide operating stud and the operating extension of the selector slide in the non-operate position. On the cam assemblies with the small diameter selector slide operating stud the selector slide operating extension should be adjusted so it would have a minimum of .005" clearance if the selector slide operating stud were the large diameter.

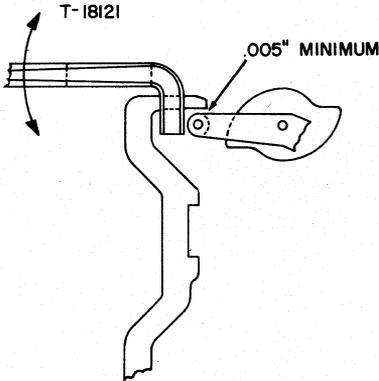


Figure 1

Note: If the selector slide operating extensions were adjusted close to .005" clearance to the smaller diameter studs the contact would be closed much too early and stay operated much too long, energizing the punch error relay (KPE) and locking the keyboard.

Manually move each type bar to the platen and check to see that the selector slides have additional movement available before they are limited by the retaining strip on the top of the front space bar. Also, for functional cam assemblies such as the carriage return, tab, back space, etc., place each cam on its high lobe and check to see that the selector slide has additional movement available (Figure 2).

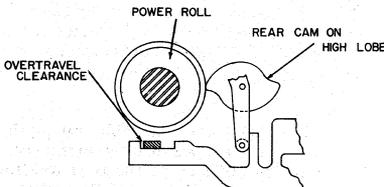


Figure 2

Form the selector slide operating extensions with the selector slide forming tool T-18121 for the previous two conditions. The selector slides must operate without binds. When using the selector slide forming tool be careful not to put a twist in the operating extension.

Selector Slide Cams (Figure 3)

The selector slide cams are not adjustable, but there are two different cams used. One has a curvature designed to operate the selector contacts a "standard" amount of time and the other, identified by three vertical lines stamped on its side, has a curvature designed to operate the selector contacts a different amount of time. The plain cams ("standard" cams) are used in any position on a selector slide. The cams with the three vertical lines are used as common cams only.

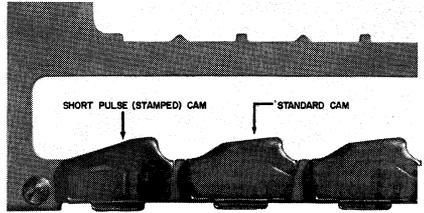


Figure 3

Each type is used in specified positions as follows:

Plain (unstamped) common cam:

1. Upper and Lower Case
2. Space Bar
3. Any position where a dummy type bar is used.
4. Position W when used for any other purpose than back space.

Short pulse (stamped) common cam:

1. Any position using a large single lobed cam.
 - a. Back Space
 - b. Tab Operate
 - c. Carriage Return
2. All positions which have a printing type bar.

Most of the common cams are the short pulse (stamped) type. These cams are necessary for use when a TCPC is connected to an SPS or SPD because the pick-up and drop-out time of code conversion relays is a factor. The cam reduces the pulse length to output units. The use of either cam does not change the selector common contacts adjustment.

FRIDEN SYSTEMS ADJUSTMENT

BAILS, ROLLERS & SC MOUNTING BRACKETS

Selector Coding Chart, SFD & SFD President

Selector Position	Front or Rear Slide	Keyboard Layout Chart Position	Selector Slide Cams		Standard Tape Coding	Escapement L.C. U.C.	Character or Function
			SFD	SFD-President			
1	F	R	C-3-4-5-9-10	C-3-4-5-9-10	3-4-5-6-7	- -	Upper Case
2	R	S	C-2-3-4-5-9	C-2-3-4-5-9	2-3-4-5-6	- -	Tab
3	F	T	C-5	C-5-6-11	5	2 2	Space
4	R	-	-	-	-	- -	-
5	F	U	1-2-3-4-7-9	1-2-3-4-9	1-2-3-4-6	- -	Punch Off
6	R	1	C-4-5-10	C-4-5-7-8-10-12	4-5-7	3 4	q
7	F	2	C-1-9-10	C-1-7-8-9-10-12	1-6-7	3 4	a
8	R	3	C-2	C-2-7-8-12	2	3 4	@
9	F	4	C-1-4-9	C-1-4-7-8-9-12	1-4-6	3 4	Z
10	R	5	C-2-3-9	C-2-3-7-9-11-12	2-3-6	4 5	w
11	F	6	C-2-5-9	C-2-5-7-9-12	2-5-6	3 3	s
12	R	7	C-1-2-5	C-1-2-5-7-12	1-2-5	3 3	#
13	F	8	C-1-2-3-5-9	C-1-2-3-5-7-8-9-12	1-2-3-5-6	3 4	x
14	R	9	C-1-3-5-9-10	C-1-3-5-7-8-9-10-12	1-3-5-6-7	3 4	e
15	F	10	C-3-9-10	C-3-7-8-9-10-12	3-6-7	3 4	d
16	R	11	C-3	C-3-7-12	3	3 3	4
17	F	12	C-1-2-5-9-10	C-1-2-5-7-8-9-10-12	1-2-5-6-7	3 4	c
18	R	13	C-1-4-10	C-1-4-7-8-10-12	1-4-7	3 4	r
19	F	14	C-2-3-5-9-10	C-2-3-5-6-8-9-10-12	2-3-5-6-7	2 4	f
20	R	15	C-1-3-5	C-1-3-5-7-8-12	1-3-5	3 4	5
21	F	16	C-1-3-9	C-1-3-7-8-9-12	1-3-6	3 4	v
22	R	17	C-1-2-9	C-1-2-6-8-9-12	1-2-6	2 4	t
23	F	18	C-1-2-3-9-10	C-1-2-3-7-8-9-10-12	1-2-3-6-7	3 4	g
24	R	19	C-2-3-5	C-2-3-5-7-11	2-3-5	3 2	6
25	F	20	C-2-9-10	C-2-7-8-9-10-12	2-6-7	3 4	b
26	R	21	C-4-5-9	C-4-5-7-8-9-12	4-5-6	3 4	y
27	F	22	C-4-9-10	C-4-7-8-9-10-12	4-6-7	3 4	h
28	R	23	C-1-2-3	C-1-2-3-7-8-12	1-2-3	3 4	7
29	F	24	C-1-3-10	C-1-3-7-8-10-12	1-3-7	3 4	n
30	R	25	C-3-5-6	C-3-5-7-8-9-12	3-5-6	3 4	u
31	F	26	C-1-5-10	C-1-5-6-10-12	1-5-7	2 3	j
32	R	27	C-4	C-4-7-12	4	3 3	8
33	F	28	C-3-5-10	C-3-5-6-7-10-11-12	3-5-7	5 5	m
34	R	29	C-1-4-5-9-10	C-1-4-5-6-9-10-11	1-4-5-6-7	2 2	l
35	F	30	C-2-5-10	C-2-5-7-8-10-12	2-5-7	3 4	k
36	R	31	C-1-4-5	C-1-4-5-7-11	1-4-5	3 2	9
37	F	32	C-1-2-4-5-9	C-1-2-4-5-6-9-11	1-2-4-5-6	2 2	,
38	R	33	C-2-3-10	C-2-3-7-8-10-12	2-3-7	3 4	o
39	F	34	C-1-2-10	C-1-2-6-8-10-12	1-2-7	2 4	l
40	R	35	C-9	C-7-9-11	6	3 2	0
41	F	36	C-1-2-4-9-10	C-1-2-4-6-9-10-11	1-2-4-6-7	2 2	,
42	R	37	C-1-2-3-5-10	C-1-2-3-5-7-8-10-12	1-2-3-5-7	3 4	p
43	F	38	C-5-9-10	C-5-6-9-10-11	5-6-7	2 2	:
44	R	39	C-1	C-1-7-12	1	3 3	1
45	F	40	C-1-5-9	C-1-5-7-9-12	1-5-6	3 3	/
46	R	41	3-4-6-7-10	3-4-10	3-4-7	- -	Punch On
47	F	42	C-10	C-7-10-12	7	3 3	''
48	R	43	2-3-4-7	2-3-4	2-3-4	- -	Control
49	F	V	C-8-11	C-8	8	- -	Carriage Return
50	R	W	C-2-4-9	C-2-4-9	2-4-6	- -	Back Space
51	F	Z	C-2-4-5-9-10	C-2-4-5-9-10	2-4-5-6-7	- -	Lower Case

Note: Underlined Common Cams - Use the short pulse cam (3 stamped lines)

Figure 4

Transverse Bails

The transverse bails should be straight and free from binds. The bails' weight should allow them to restore to home position. They should have from .010" to .030" end play. The end pivots may be formed to obtain the adjustment. The right pivots should have no more than .015" rotational play in the forked ends of the contact shaft assemblies (Figure 6).

With the play in the transverse bail taken up to the left and the play in the contact shaft assembly taken up to the right, the end of the fork on the contact shaft assembly should maintain at least a half width engagement with the transverse bail. Form the fork if necessary.

The tines of the forked ends may be formed to take up excessive clearances. The tine should be formed which maintains or restores the vertical attitude of the contact operator.

Selector Slide Rollers

The selector slide rollers should be free to rotate on the bearing rods and should rotate in the slots in the space bars without binds.

Selector Contact Mounting Brackets (Figure 7)

With the machine on its feet and the code selector in operating position, adjust each selector contact's mounting bracket. Loosen the mounting screws and position the bracket so that the movable contact springs are against the contact operator. When the operator is pivoted toward the rear of the machine the springs should follow the operator no more than .010" (maximum). Tighten the mounting screws.

Individually adjust each movable spring that is not touching its operator by forming the movable spring stiffener to the rear to allow the movable spring to be against its operator, keeping in mind that the movable spring should not follow the operator more than .010".

FRIDEN SYSTEMS ADJUSTMENT

SELECTOR CONTACTS

Selector Coding Chart, SPS & SPD

Selector Position	Front or Rear Slide	Keyboard Layout Chart Position	SPS			SPD					
			Selector Cams	Slide	Standard Tape Coding	Character or Function	Selector Cams	Slide	Standard Tape Coding	Character or Function	L,C.
1	F	R	3-4-7-10	3-4-7	On 1	C-3-4-5-9-10	3-4-5-6-7	Upper Case			
2	R	S	C-2-3-4-5-6-9	2-3-4-5-6	Tab	C-2-3-4-5-6-9	2-3-4-5-6	Tab			
3	F	T	C-5-6	5	Space	C-5-6	5	Space			
4	R	-	-	-	-	-	-	-			
5	F	U	1-2-3-4-7-9	1-2-3-4-6	Punch Off	1-2-3-4-7-9	1-2-3-4-6	Punch Off			
6	R	1	C-4-5-10	4-5-7	Q	C-4-5-10	4-5-7	q	Q		
7	F	2	C-1-9-10	1-6-7	A	C-1-9-10	1-6-7	a	A		
8	R	3	C-2-6	2	@	2-6-8	2	@	Z		
9	F	4	C-1-4-9	1-4-6	Z	C-1-4-9	1-4-6	z	Z		
10	R	5	C-2-3-9	2-3-6	W	C-2-3-9	2-3-6	w	W		
11	F	6	C-2-5-9	2-5-6	S	C-2-5-9	2-5-6	s	S		
12	R	7	C-1-2-5-6	1-2-5	3	1-2-5-6-8	1-2-5	3	#		
13	F	8	C-1-2-3-5-9	1-2-3-5-6	X	C-1-2-3-5-9	1-2-3-5-6	x	X		
14	R	9	C-1-3-5-9-10	1-3-5-6-7	E	C-1-3-5-9-10	1-3-5-6-7	e	E		
15	F	10	C-3-9-10	3-6-7	D	C-3-9-10	3-6-7	d	D		
16	R	11	C-3-6	3	4	3-6-8	3	4	\$		
17	F	12	C-1-2-5-9-10	1-2-5-6-7	C	C-1-2-5-9-10	1-2-5-6-7	c	C		
18	R	13	C-1-4-10	1-4-7	R	C-1-4-10	1-4-7	r	R		
19	F	14	C-2-3-5-9-10	2-3-5-6-7	F	C-2-3-5-9-10	2-3-5-6-7	f	F		
20	R	15	C-1-3-5-6	1-3-5	5	1-3-5-6-8	1-3-5	5	=		
21	F	16	C-1-3-9	1-3-6	V	C-1-3-9	1-3-6	v	V		
22	R	17	C-1-2-9	1-2-6	T	C-1-2-9	1-2-6	t	T		
23	F	18	C-1-2-3-9-10	1-2-3-6-7	G	C-1-2-3-9-10	1-2-3-6-7	g	G		
24	R	19	C-2-3-5-6	2-3-5	6	2-3-5-6-8	2-3-5	6	¢		
25	F	20	C-2-9-10	2-6-7	B	C-2-9-10	2-6-7	b	B		
26	R	21	C-4-5-9	4-5-6	Y	C-4-5-9	4-5-6	y	Y		
27	F	22	C-4-9-10	4-6-7	H	C-4-9-10	4-6-7	h	H		
28	R	23	C-1-2-3-6	1-2-3	7	1-2-3-6-8	1-2-3	7	?		
29	F	24	C-1-3-10	1-3-7	N	C-1-3-10	1-3-7	n	N		
30	R	25	C-3-5-9	3-5-6	U	C-3-5-9	3-5-6	u	U		
31	F	26	C-1-5-10	1-5-7	J	C-1-5-10	1-5-7	j	J		
32	R	27	C-4-6	4	8	4-6-8	4	8	*		
33	F	28	C-3-5-10	3-5-7	M	C-3-5-10	3-5-7	m	M		
34	R	29	C-1-4-5-9-10	1-4-5-6-7	I	C-1-4-5-9-10	1-4-5-6-7	i	I		
35	F	30	C-2-5-10	2-5-7	K	C-2-5-10	2-5-7	k	K		
36	R	31	C-1-4-5-6	1-4-5	9	1-4-5-6-8	1-4-5	9	(
37	F	32	C-1-2-4-5-9	1-2-4-5-6	,	C-1-2-4-5-9	1-2-4-5-6	,	,		
38	R	33	C-2-3-10	2-3-7	O	C-2-3-10	2-3-7	o	O		
39	F	34	C-1-2-10	1-2-7	L	C-1-2-10	1-2-7	l	L		
40	R	35	C-6-9	6	0 Zero	6-8-9	6	0)		
41	F	36	C-1-2-4-9-10	1-2-4-6-7	P	C-1-2-4-9-10	1-2-4-6-7	p	P		
42	R	37	C-1-2-3-5-10	1-2-3-5-7	.	C-1-2-3-5-10	1-2-3-5-7	.	.		
43	F	38	C-5-9-10	5-6-7	&	5-8-9-10	5-6-7	&	&		
44	R	39	C-1-6	1	1	1-6-8	1	1	;		
45	F	40	C-1-5-9	1-5-6	/	1-5-8-9	1-5-6	/	/		
46	R	41	C-6-10	7	-	6-8-10	7	-	;		
47	F	42	C-1-2-4-5-10	1-2-4-5-7	%	1-2-4-5-8-10	1-2-4-5-7	%	%		
48	R	43	2-3-4-5-7-10	2-3-4-5-7	FC On	2-3-4-5-7-10	2-3-4-5-7	FC On	FC On		
49	F	V	C-6	8	CR	C-6	8	CR	CR		
50	R	W	-----	-----	BS	3-4-7-10	3-4-7	On 1	On 2		
51	F	Z	2-3-4-7-9-10	2-3-4-6-7	On 2	C-2-4-5-9-10	2-4-5-6-7	Lower Case			

Note: Underlined Common Cams - Use the short pulse cam (3 stamped lines)

Figure 5

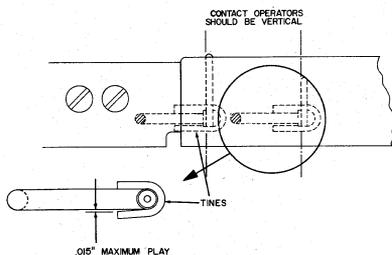


Figure 6

Selector Contacts

Any selector contact, when used to energize punch magnet or output unit coils, is to be adjusted to a gap of .020" to .024". Any selector contact, when used to energize escapement magnets in a PSM machine, is to be adjusted to a gap of .016" to .020". The specified gap is obtained by forming the stationary contact stiffener. The selector should be in position and the machine should be down on its base when checking. Both contacts on each bifurcated set of contacts should touch as nearly simultaneously as possible and meet with no more than .015" misalignment.

FRIDEN SYSTEMS ADJUSTMENT

SCC & SB CONTACTS

Selector Common Contacts

On an SFD, SC6 is a transfer contact, is a break before make contact and should be adjusted so the gap between the center operate contacts and the forward contacts is .020" to .024" and, as the operate contacts are operated, the rear contacts follow the center contacts no more than .010".

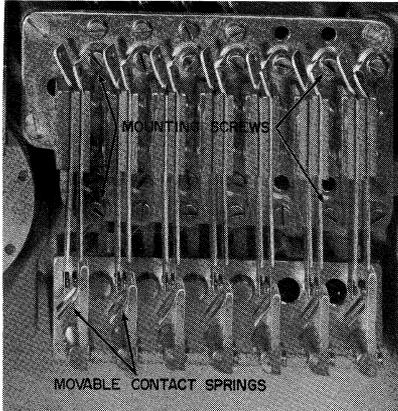


Figure 7

Selector common contacts, when used to energize the punch clutch or output unit clutch, must close after the contacts used to energize code magnets close.

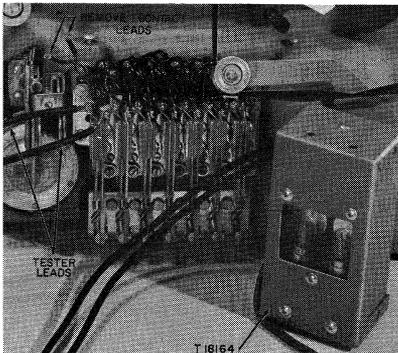


Figure 8

The gap should be .040" plus .006" or minus .003". Form the stationary contact stiffeners for a starting gap of .040". Disconnect the leads of the contact and connect the tester T-18164 in their place. Operate the keyboard, trying all of the keys.

If a majority of the keys light both lights on the tester, the pulse length is too long and the switch gap should be increased toward the

.046" clearance. If a majority of the keys light neither light, the pulse length is too short and the switch gap should be decreased toward the .037" limit. The minority of selector slides that are not within the desired range should be adjusted by forming the operating extension. Keep in mind the .005" minimum clearance to the cam assembly and be sure there is additional movement when the type bar is at the ring or the cam lobe at the high point (CR, Tab, Back Space, etc.).

Note: When checking, allow a few seconds between key depressions to allow the potential in the tester to delay, insuring accurate readings.

A minimum of .010" follow on the SCC is to be maintained by the operation of all type bars.

These adjustments will give the desired pulse length with a minimum amount of individual slides requiring adjustment. With as much follow as possible, and with the setting correct as observed using the contact tester, the majority of the selector slides will give a pulse length near the 36 millisecond limit of the tester, which is desirable.

Note: At least .010" movement of the stationary contact should be obtained by the operation of all selector slides.

Selector Bridge Contacts (Figure 9)

Adjust all selector bridge contacts except those on SPS-C and SPD-C Flexowriters to a .020" to .030" air gap by forming the stationary contact springs. This includes the punch off contacts.

On SPS-C and SPD-C machines, adjust all selector bridge contacts except contacts 7 & 8 on the carriage return contact in position V to an air gap of .030" plus or minus .003". This includes the punch off contacts. Adjust contacts 7 & 8 for an air gap of .050" plus or minus .003". These are the top two springs in the stack up.

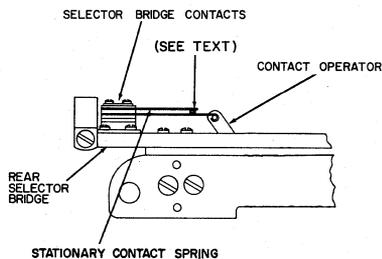


Figure 9

FRIDEN SYSTEMS ADJUSTMENT

OPERATIONAL CHECK

CODE SELECTOR OPERATIONAL CHECK AND ADJUSTMENT

All stationary contact springs should be moved .010" minimum by the operation of the selector slide.

All selector contacts should close before the selector common contacts close and open after the common contacts open, including selector bridge contacts.

If any slide fails to punch and the contact adjustments are proper, the operating extension of the selector slide should be formed closer to the cam assembly (but not within .005"). If the operation still fails the common contact gap may be decreased, but not below

the .037" limit.

If the proper amount of escapement is not obtained (in PSM machines), check the setting of the escapement magnet contacts, decreasing their clearance toward the .016" minimum setting.

Selector slides that cause the punch error relay to energize (locking the keyboard) should be adjusted away from the cam assembly by forming the operating extension.

If a selector common contact is set near its minimum gap and slides tend to operate the punch error relay, the common contact gap may be opened toward its maximum setting.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 32

DATE: October 9, 1962

CHANGE: Page 2-5, CODE SELECTOR OPERATIONAL CHECK AND ADJUSTMENT.

REASON: Adjustment Tolerance Changes.

EXPLANATION: Adjustment of selector slides.

All stationary contact springs should be moved a minimum of .010" by the operation of a selector slide.

All selector contacts should close before the selector common contacts close and open after the common contacts open, including selector bridge contacts.

If any slide fails to punch and the contact adjustments are proper, the operating extension of the selector slide should be formed closer to the cam assembly but not limit or choke off the full operation of the cam. If the operation still fails the common contact gap may be decreased, but not below the .037" limit.

If the proper amount of escapement is not obtained (in PSM machines) check the setting of the escapement magnet contacts, decreasing their clearance toward the .016" minimum setting.

Selector slides that cause the punch error relay to energize (locking the keyboard) should be adjusted away from the cam assembly by forming the operating extension.

If a selector common contact is set near its minimum gap and the slides tend to operate the punch error relay, the common contact gap may be operated toward its maximum setting.

FRIDEN SYSTEMS ADJUSTMENT

PUNCH ARMATURES

PUNCH

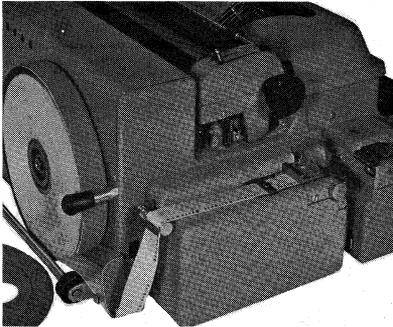
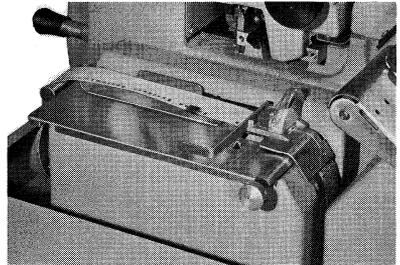


Figure 1 Installing The Tape



Tape in Tape/Edge Card Punch

PUNCH ARMATURES (Figure 2)

The magnet armatures pivot on the armature spring & pivot plates. Long-tipped armatures are used on the odd-numbered magnets (1-3-5-7) and short-tipped armatures are used on the even-numbered magnets.

Note: In the translator, short-tipped armatures are used on odd-numbered magnets and long-tipped armatures on even-numbered magnets. The reason for the difference in the use of the armatures in the two assemblies is that the direction of latching is different. With the armatures used as they are, the latch is always on the long tip of the armature or the body of the armature and never on the short tip of the armature.

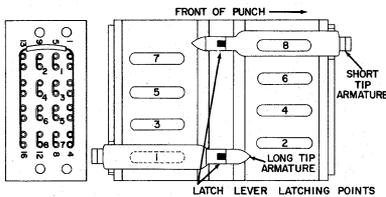
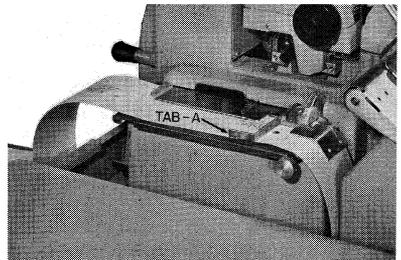


Figure 2

Punch Magnets

1. With the armatures of the punch magnet assembly in the attracted position, a clearance of from .002" to .007" should be obtained between the heel piece and the armature (Figure 4). Loosen the screws holding the armature spring & pivot plate and move the plate up or down as required. Be sure that the plate gives the same clearance at both sides of the magnet assembly and adjust both armature spring & pivot plates.



Edge Card in Tape/Edge Card Punch

Figure 3

2. The magnet assembly is mounted to the punch casting by two screws. It should be shimmed to provide .003" to .007" clearance between the tips of the latch levers and the undersides of the armatures with the armatures attracted (Figure 5).
3. Adjust the magnet assembly, front to rear on the casting, to give .015" to .025" clearance between the front edge of the latches and the rear end of the punch levers with the latch levers en-

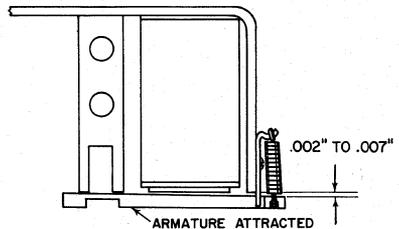


Figure 4

4. Adjust the armature knock off ball so it will contact all of the punch magnet armatures, to move them simultaneously, by loosening the knock off brackets (inner and outer) and positioning them so the knock off ball is parallel to gaged with their armatures (Figure 6).

FRIDEN SYSTEMS FLEXOWRITER

MANUAL ADDENDUM 21A

DATE: April 15, 1965

CHANGE: Page 3-1, Step 3 and Page 3-2
Figure 6

REASON: Adjustment Tolerance Change

EXPLANATION: This adjustment tolerance change eliminates grinding the ends of the latch levers during production. Grinding was necessary to obtain the previous clearance.

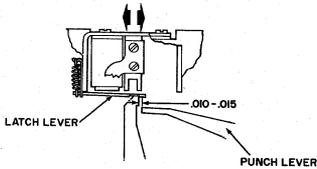


Figure 6A

3. Adjust the magnet assembly, front to rear on the casting, to give .010" to .025" clearance between the front edge of the latches and the rear end of the punch levers with the latch levers engaged with their armatures (Figure 6A).

FRIDEN SYSTEMS ADJUSTMENT

CAM SHAFT, PUNCH LEVERS & PIN WHEEL

the magnet armatures and no closer than $.002''$ to the yoke's surface where the armatures touch when attracted (Figure 7).

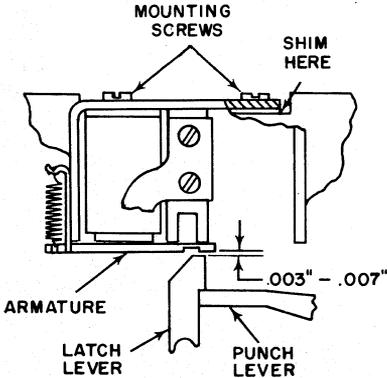


Figure 5

5. The latch restoring bail (Figure 9) should have from $.003''$ to $.015''$ side play on its shaft. Measure the clearance between the outer surface of the bail and the inside edge of the outer casting. The clearance is obtained by the use of shims.

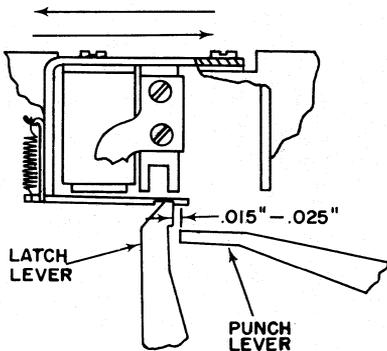


Figure 6

Form the latch restoring arm so it moves the latch lever $.015''$ to $.031''$ from the latching point on the armatures when the bail is fully operated by the roller on the cam assembly (Figure 8).

6. Loosen the locking nut and adjust the armature knock off bail eccentric so there is $.001''$ to $.003''$ clearance between the tips of the latch levers and the armatures when the latch restoring bail is fully operated by the roller on the cam assembly. Tighten the locking

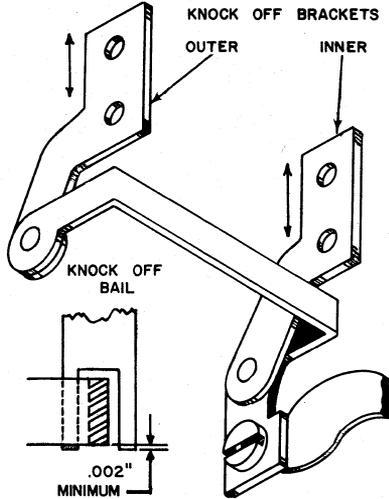


Figure 7

nut and check the latch restore and armature knock off adjustments, readjusting if necessary.

Cam Shaft

The cam shaft must have no more than $.005''$ end play between the bearings and turn freely. Shim the shaft as necessary.

Punch Levers (Figure 10)

1. Both the inner and outer punch lever drive arms must be parallel and operated equally by the punch cams. Check by rotating the drive shaft until the inner and outer rollers are at the high dwell of the punch cams. If the rollers do not contact the cams and turn equally, loosen nut (A), hold both of the rollers against the cams, tighten the nut and check.
2. When the punch pins are withdrawn below the guide block surface, the rear ends of the punch levers should not be able to be moved up far enough to prevent latching by the latch levers. There should be a perceptible ($.001''$) clearance between the rear end of the punch levers and the top of the pivot shaft when the punch pins are down in home position. Loosen the guide comb mounting screws, position the guide comb to meet the requirements and tighten the screws.

Pin Wheel

Shim the pin wheel and ratchet assembly between the bearings so it has a maximum of $.001''$ end play and turns freely without binding. Locate the shims so that the pins on the

FRIDEN SYSTEMS ADJUSTMENT

PIN WHEEL

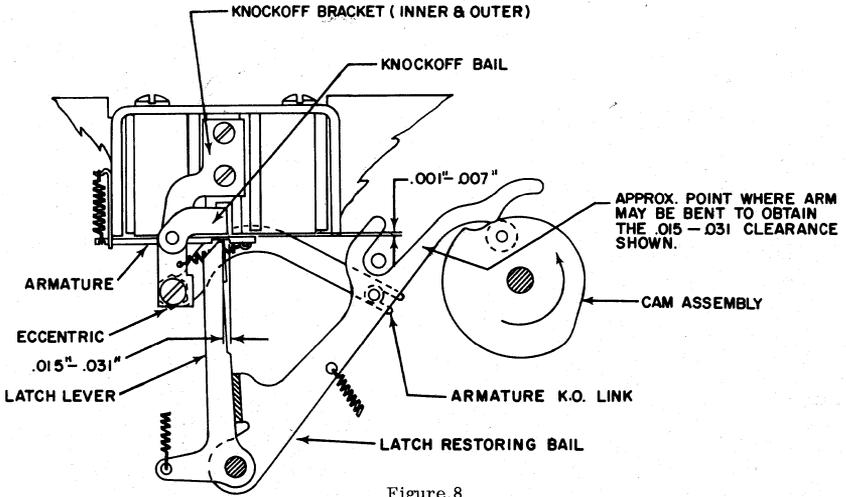


Figure 8

pin wheel are aligned with the feed hole punch pin in the guide block (Figure 11).

To check, remove the plastic chad cover and the two mounting screws for the die block. Remove the die block by turning the chad cover screw into the tapped hole between the mounting screw holes.

CAUTION: Do not pry it up with a screw-driver.

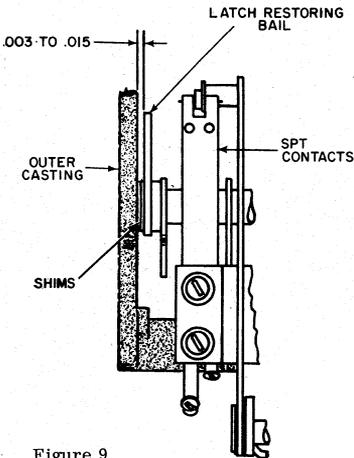


Figure 9

Cycle the punch until the feed hole punch pin operates and place the pin to pin wheel gauge T-18150 on the punch pin and the pin wheel. The gauge should be parallel to the inside casting.

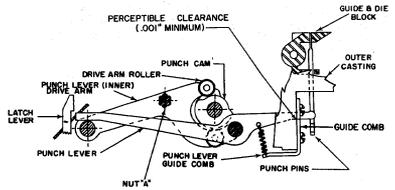


Figure 10

In the tape/edge card punch the rear pin wheel must also be shimmed. First, the card guide assembly must be removed. Remove the two screws mounting the card guide assembly to the inside casting and loosen the screw underneath the table on the outside casting. Note that there are two washers under the card guide at the front inside casting mounting screw and one washer at the rear inside casting mounting screw. The rear pin wheel can then be shimmed to no more than .001" end play, maintaining the alignment to the pin to pin wheel gauge.

If the gauge is on the operated feed pin and it doesn't fit on the front pin wheel pins longitudinally, adjust the detent eccentric so it does. If the rear pin wheel doesn't fit the gauge longitudinally, loosen the idler gear mounting screws, releasing the rear pin wheel.

Once the two pin wheels are shimmed, the rear pin wheel must be matched to the front pin wheel so it has exactly the same attitude to an edge card. Loosen the pinion on the rear pin wheel shaft and adjust the idler gear so it meshes with the pinions with a minimum of backlash (Figure 12). If backlash is necessary

FRIDEN SYSTEMS ADJUSTMENT

TAPE STRIPPER

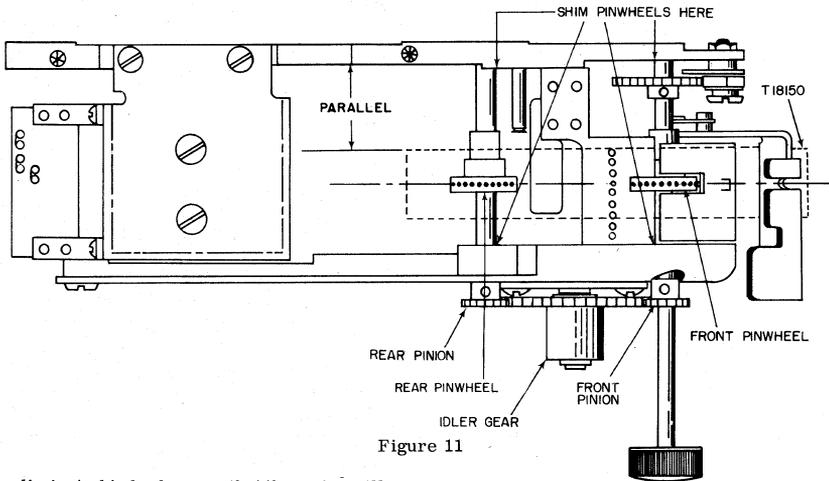


Figure 11

to eliminate binds, be sure that the pinion will allow the pin wheel to move to the rear. Place the pin to pin wheel gauge on both pin wheels, turning the rear pin wheel shaft until the pins fit the gauge. Be sure that the pinions engage the idler wheel fully, and tighten the rear pinion.

Check the alignment and smoothness of movement by placing an edge card on the pin wheels and being sure that the pin wheels carry the card through the punch without causing any distortion of the feed holes. By lifting the detent roller away from the ratchet on the pin wheel shaft assembly and turn-

ing the feed knob, the smoothness and correctness of the adjustment can be noted.

Tape Stripper

Shim the tape stripper, where it mounts to the inner casting, so the groove for the pinwheel is centered on the pin wheel. Its top surface should be flush or very slightly below the top surface of the guide block (Figure 13). The tape stripper must not touch the pin wheel. Adjust by shifting the stripper under the mounting screws and/or forming; but form only if necessary, being careful not to mar the surface of the stripper.

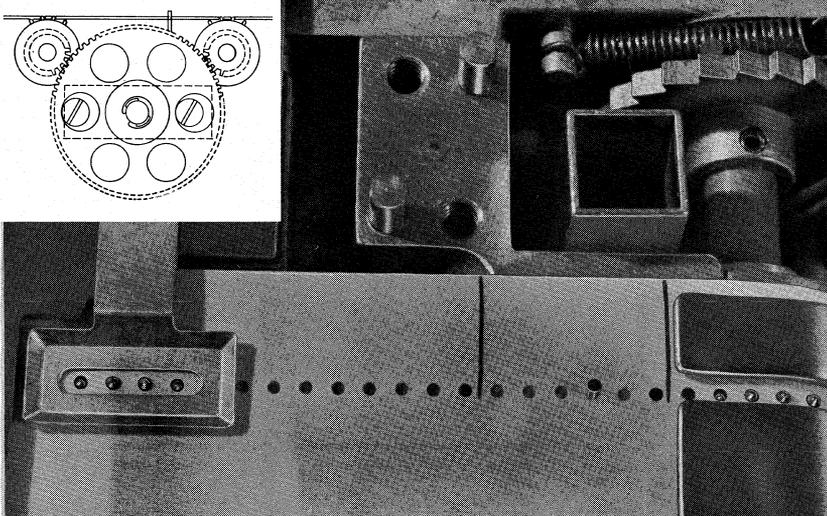


Figure 12

FRIDEN SYSTEMS ADJUSTMENT

TAPE PRESSURE ARM & REGISTRATION

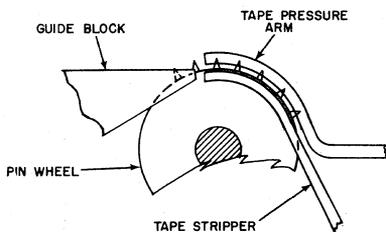


Figure 13

The tape stripper should also be formed so its curved surface is as concentric to the curvature of the base of the pins on the pin wheel as possible. Then the pins will have the ability to engage the card or tape as fully as possible.

Tape Pressure Arm

Tape Punch: The inside surface of the tape pressure arm should be concentric to the curved surface of the tape stripper and it should be slightly above (maximum .010") the top surface of the guide block to allow tape clearance between the tape stripper and the tape pressure arm. Form if necessary, being careful not to mar the surface of the pressure arm.

Tape/Edge Card Punch: Adjust the tape pressure arm to provide clearance (maximum .010") between the tape stripper and the tape pressure arm. Insert a card in the punch and be sure that both sides of the tape pressure arm bear equally against the card. The main point of pressure should be on the card at the top three pins of the pin wheel. Form if necessary, being careful not to mar the surface of the pressure arm.

Registration - Lateral

Tape Punch: Adjust the tape guide on the tape runout arm so that there is .394" plus .000", minus .004" from the center line of the feed hole to the right edge of the tape. To check, feed a length of tape and check it with gauge T-18118.

Tape/Edge Card Punch: By the use of shims and the spacers (two spacers under the front mounting screw and one spacer under the rear mounting screw), adjust the card guide assembly, on the inner casting so it is flush to .005" below the surface of the die block.

Remove the card hold down spring to adjust the card guide assembly. Loosen the mounting screws and locate the card guide assembly so the rectangular opening is located (front to rear) centrally over the rear pin wheel. Further locate the card guide assembly sideways so that with a card on the pin wheels, there is .005" to .010" clearance between the edge of the card and the guide edge of the table. Lift the card over the pins and to the right

until it touches the guide edge of the table and then move it back on to the pins. This movement should be .005" to .010". Tighten the two mounting screws on the top of the card guide assembly and tighten the screw underneath the table, forming the slotted mounting close to the outside casting if necessary. The table should not be forced down farther than the outside casting (above the rear pin wheel pinion) will allow. Mount the card hold down spring, forming it if necessary, so it just touches the periphery of the pin wheel and keeps a card on the pin wheel.

Adjust the tape guide on the card guide assembly so there is .394" plus .000", minus .004" from the centerline of the feed hole to the right edge of the tape. To check, feed a length of tape and check it with gauge T-18118.

Install the die block and adjust the outside card guide for the width of the card plus a slight clearance to allow for normal expansion.

Note: An edge card with pre-punched feed holes is placed under the outside card guide, and an edge card without feed holes is placed over the tab, to guide the card through the punch. Locate the outside card guide vertically so it allows a card to feed under it with a slight clearance. This clearance should be minimum because the guide keeps the card against the card table Microswitch.

Registration - Longitudinal

The registration of the tape, that is, the spacing of the feed holes, must be .100" \pm .001" from center to center or 60 codes in 6.000" \pm .015" overall. To check, place a length of tape on the registration gauge T-18118 and note the alignment.

If the registration is incorrect, loosen the locking nut and turn the detent eccentric slightly (Figure 15), tighten the locking nut, feed a length of tape and check the registration with gauge T-18118.

The proper setting gives a distance of .600" from the centerline of pin (A) to the centerline of the feed hole punch pin (Figure 14). Since there are five positions (or feed holes) between these points, the distance between each of the feed holes is .100".

Regardless of the fact that the pin wheel is designed to carry tape with the feed holes spaced .100" from centerline to centerline, setting the detent so that the distance between the centerline of the feed hole punch pin and the centerline of pin (A) is not .600" will cause each set of seven feed holes to have an incorrect dimension even though the pin wheel rotates the same number of degrees each time the punch cycles. It is important to note that

FRIDEN SYSTEMS ADJUSTMENT

FEED & SPT CONTACTS

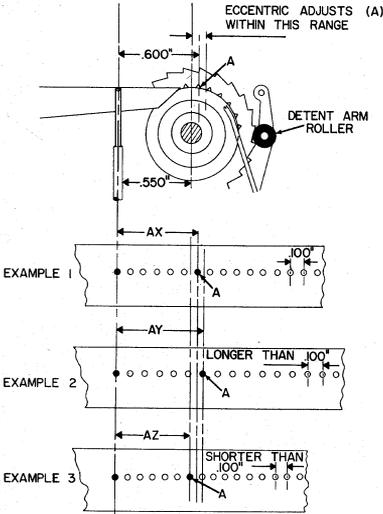


Figure 14

at any point in the rotation of the pin wheel a pin is at pin position (A) when the feed hole is punched.

In example 1, AX is .600" and the distance between the feed hole centerlines is .100" (AX/6). In example 2, AY is greater than AX and the distance between the feed hole centerlines is greater than .100" (AY/6). In the same manner (example 3), AZ is smaller than AX and the distance between the feed hole centerlines is less than .100" (AZ/6). Any detent setting that changes the dimension from AX (.600") toward AY or AZ will cause a different spacing between the centerlines of adjacent feed holes.

From the point where the tape engages the pin wheel at pin position (A), the error in the registration is not corrected by the spacing of the pins on the pin wheel because each pin bears the same incorrect relationship to the feed hole punch pin.

Note: If the registration can't be set, adjust the eccentric stud for the feed pawl lever so the eccentric's high point is down and the feed lever is up and readjust.

Feed (Figure 15)

1. With the registration adjustments properly made, loosen the locking nut and adjust the feed pawl lever eccentric screw so that the feed pawl moves the ratchet on the pin wheel shaft assembly to within .010" of fully detented position. The travel should never be past the fully detented position. The travel

can be checked by lifting the detent roller away from the ratchet, and cycling the punch so the feed pawl is at the limit of its travel from rest position. By allowing the roller to just touch the ratchet, the location of the ratchet can be seen with respect to the detent roller. If the feed pawl stop interferes with the movement of the feed pawl, adjust it so it is fully out of the way.

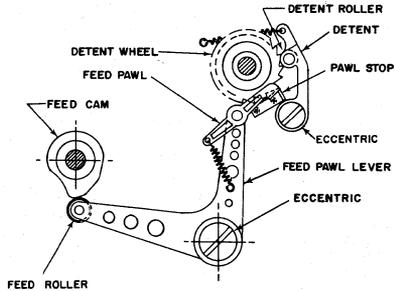


Figure 15

2. Manually operate the feed pawl lever so the feed pawl is against the ratchet 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, and tighten the mounting screws without changing the eccentric's setting. Move the feed pawl back and forth to be sure that the feed pawl is not binding between the ratchet and the feed pawl stop. There should be no visible clearance.

Uniform feed is essential to uniform registration; Therefore, the better the feed adjustments, the more uniform the registration.

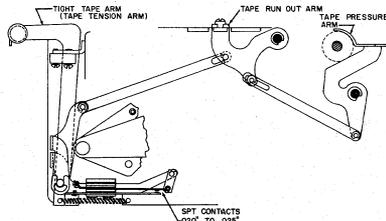


Figure 16

Contacts

SPT: The SPT contacts should be adjusted to .020" to .025" air gap with the Tight Tape Arm and Tape Pressure Arm in the normal position. Either the removal of the tape from the punch, forward movement of the Tape Tension

FRIDEN SYSTEMS ADJUSTMENT

SPL, SCF CONTACTS & PUNCH CLUTCH

Arm or operation of the Tape Pressure Arm should close the contacts with a minimum of .002" follow on the stationary strip (Figure 16).

SPL: When the SPL contacts operate, the normally closed stationary contacts should follow the movable contacts .005" to .010". Form the stationary contact stiffeners. With the SPL contacts at rest there should be a .040" gap between the movable contacts and the n/o contacts. Form the contact stiffeners. This adjustment gives a break-before-make operation of the SPL contacts (Figure 17).

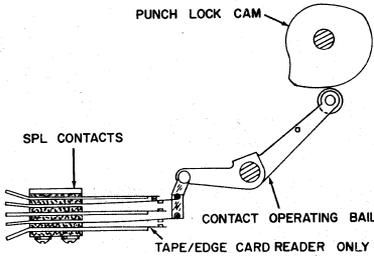


Figure 17

Note: Whenever there is a KPE in the circuit, SPL should never be adjusted to be make-before-break.

The Tape/Edge Card punch contains a set of normally open contacts used in the Card Feed circuit. These contacts should be adjusted to a .030" gap when non-operated. There should be an appreciable amount of follow when the contacts make (Figure 17).

Microswitch - Tape/Edge Card Punch (Figure 18)

The Microswitch should be adjusted using standard fan fold cards with the last row of holes in the first card at the punching station.

Adjust the Microswitch by means of the switch mounting plate so that when the roller has started to be moved, by the ratchet, toward the next detented position, the apex of the switch arm will come up into the 1/4" hole in the card. This should cause the switch to oper-

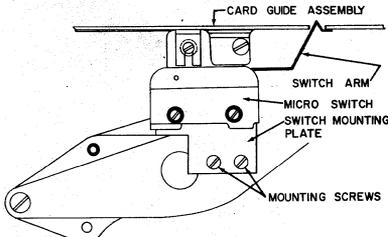


Figure 18

ate before the roller has become fully detented.

Then when the roller has started toward the next detent position, the card must again operate the switch before the roller has become fully detented.

At this point the card should be holding the switch arm down and the punch must have stopped cycling, positioning the card so the second feed hole in the card is at the punching station.

This position is the proper point to start punching information in an edge card. Then the card can be trimmed in the "Card Cutter" and subsequently inserted in an edge card reader so that the first code containing information can be easily positioned at the reading station.

Punch Clutch

1. Position the collar on the clutch armature shaft to allow the clutch armature .005" to .015" end play on the shaft (Figure 19). Push the shaft all the way toward the casting so the clutch detent, armature knock off arm and washer are against the magnet yoke assembly. Push the clutch armature away from the casting so it touches the armature knock off arm and locate the collar .005" to .015" from the clutch armature and tighten the set screw.

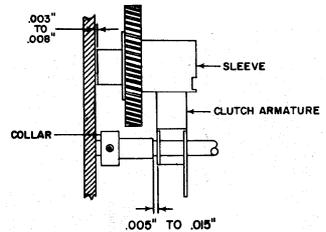


Figure 19

Always have the shoulder on the collar inboard toward the casting so it can't contact the punch gear.

2. There should be a visible to .012" clearance between the armature and the lower clutch coil when the armature is fully attracted to the upper clutch coil (Figure 20). If this clearance is not obtained, change one or both magnet coils. Change the armature itself if it is worn where it contacts the upper clutch magnet coil.
3. Cycle the punch shaft until the clutch sleeve touches the armature and the clutch detent is short of latching. Loosen the two mounting screws and position the clutch magnet yoke so there

FRIDEN SYSTEMS ADJUSTMENT

PUNCH CLUTCH

is .003" to .006" clearance between the tip of the clutch sleeve and the tip of the clutch armature with the armature fully attracted (Figure 20).

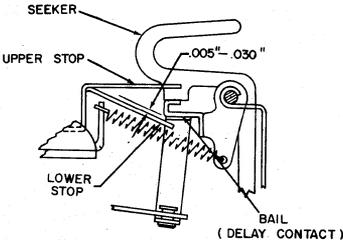


Figure 20

4. Cycle the punch about halfway and form the armature stop so there is .001" to .008" clearance between the clutch armature and the low surface of the clutch sleeve (Figure 21).

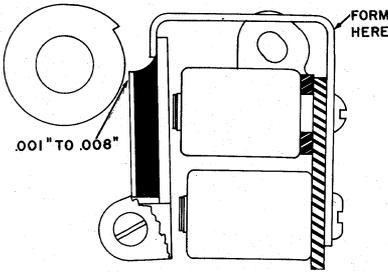


Figure 21

5. Cycle the punch until the feed has occurred and the feed lever roller just comes on to the low dwell of the feed cam. Locate the detent cam on the shaft so there is .003" to .008" clearance between the punch gear and the bearing at the punch casting (Figure 19). Be sure that all of the clutch parts and the punch gear are tight against the detent cam when obtaining the setting. Further

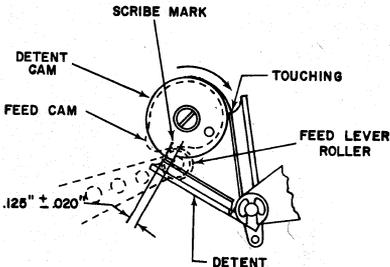


Figure 22

locate the cam rotationally so it is .125" (plus or minus .020") short of latching on the clutch detent (Figure 22). There is a scribe mark on the cam at this point and it should be aligned with the latching end of the clutch detent.

On punches that do not have the scribed detent, put the timing dial T-18088 on the end of the punch shaft and locate the cam so the clutch detents 15° past the start of the low dwell of the feed cam (plus or minus 3°) (Figure 23).

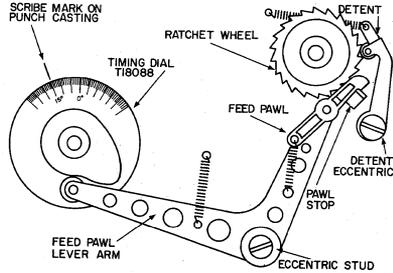


Figure 23

6. Cycle the punch shaft so the detent cam is about halfway around in the shaft's rotation and manually turn the clutch sleeve backward to be sure that the square stud on the inside of the sleeve is against the non-expanded clutch spring. Maintaining this condition, continue to cycle the punch until the detent cam is .005" to .062" short of latching (Figure 24). At this position, turn the clutch collar (set screws loose) toward the armature latching surface until it touches. This results in the clutch spring being properly positioned to expand as the clutch detents. Tighten the clutch collar set screws with the clutch collar tight against the clutch detent cam.
7. Cycle the punch shaft until the armature knock off roller is on the high dwell of the knock off cam (Figure 25). Form the armature knock off arm so there is

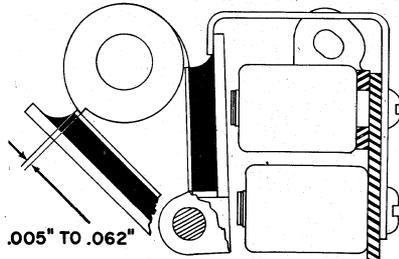


Figure 24

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 33

DATE: May 15, 1963

CHANGE: Page 3-8, Step 7.

REASON: Adjustment Tolerance Change

EXPLANATION: The present .005" to .010" clearance at armature knock off is difficult to obtain due to play in the parts and the fact that it is an adjustment obtained by forming. It is hereby changed to .003" to .010" to facilitate the adjusting of the part (by forming).

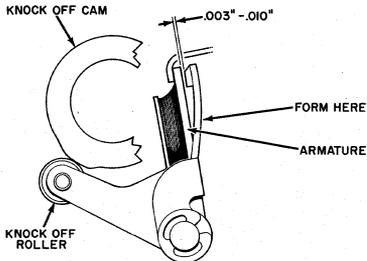


Figure 25

7. Cycle the punch shaft until the armature knock off roller is on the high dwell of the knock off cam (Figure 25). Form the armature knock off arm so there is .003" to .010" clearance between the armature knock off arm and the clutch armature. The armature knock off occurs between 215° and 225°. If it occurs during the first part of the cycle the armature knock off cam is installed incorrectly and it must be removed and reinstalled so the high point is on top with the clutch detented.

FRIDEN SYSTEMS ADJUSTMENT

PUNCH CLUTCH

.005" to .010" clearance between the armature knock off arm and the clutch armature. The armature knock off occurs between 215° and 225°. If it occurs during the first part of the cycle the armature knock off cam is installed incorrectly and should be removed and

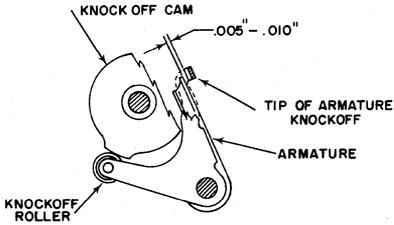


Figure 25

reinstalled so the high point is on top with the clutch detented.

- Loosen the set screws on the knock off cam and locate it so the clutch can overtravel from $\frac{1}{64}$ " to $\frac{1}{32}$ " before the cam contacts the clutch sleeve (Figure 26).

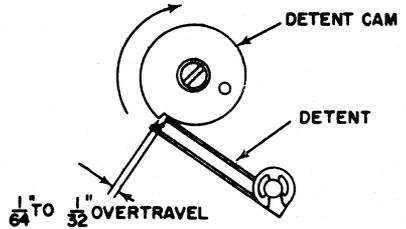


Figure 26

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 33

DATE: October 9, 1962

ADDITION: Page 3-9

REASON: Tolerance Adjustment

EXPLANATION: Provides Punch to Flexowriter gear mesh for minimum of noise.

Mounting the Punch to the Flexowriter

With the Flexowriter upright, position the punch on the base casting to provide a gear mesh which will result in a minimum of noise. Backlash between gears should be held to .003 to .010 inch. Tighten the mounting screws.

FRIDEN SYSTEMS ADJUSTMENT

PUNCH TIMING CHART

MODEL 2 PUNCH TIMING CHART
(AVERAGE VALUES)

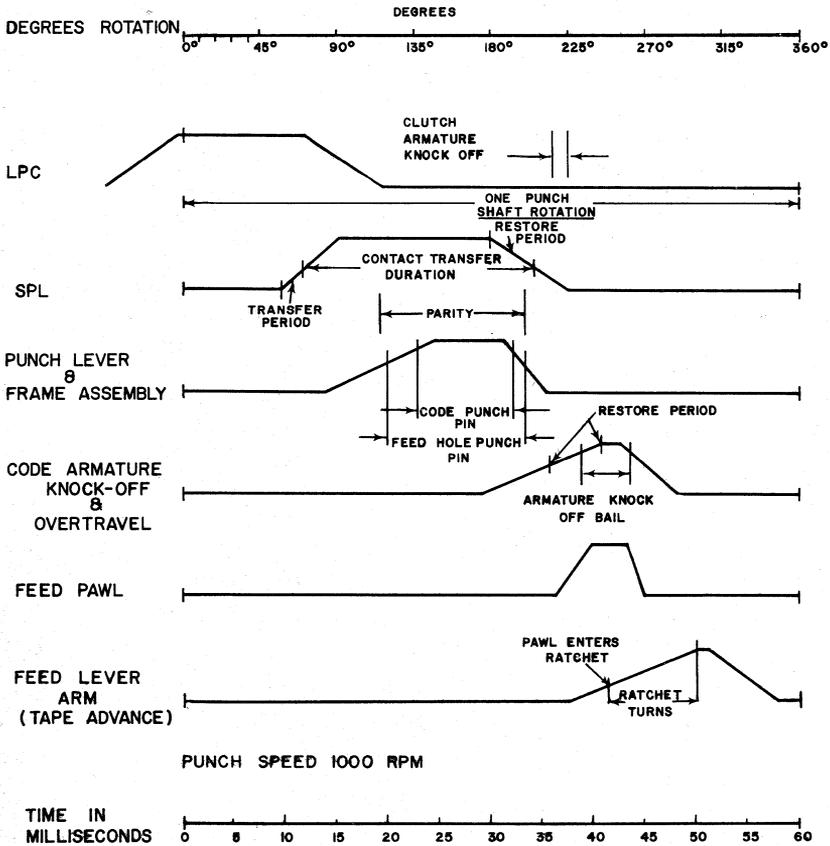


Figure 27

FRIDEN SYSTEMS ADJUSTMENT

CAM SHAFT & CONTROL ARMATURE ASSEMBLY

READER

All Readers

The reader cam shaft speed should be from 570 to 580 RPM, measured on the end of the reader shaft, with the motor operating on rated voltage. The speed the machine was aligned to is given on the envelope containing the specifications and schematic wiring diagrams. The speed is changed by adjusting the split pulley on the motor shaft and it should be kept in mind that changing the split pulley adjustment will change the speed of the power roll, translator and punch.

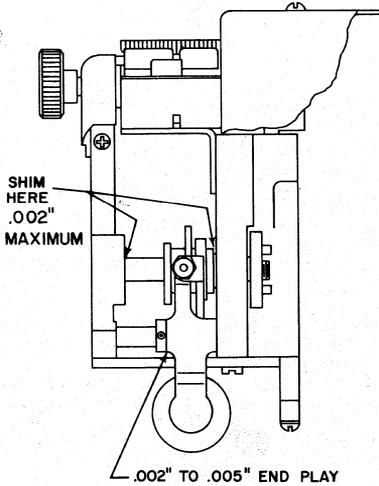


Figure 1

The maximum allowable end play on the reader cam shaft is .002". The reader shaft should be shimmed to obtain the adjustment (Figure 1).

Control Armature Assembly

In Sequence

1. The end play of the armature control assembly on the pivot shaft should be from .002" to .005". Loosen the collar set screw and position the collar to obtain the adjustment. Tighten the collar and be sure that the control armature and control arm pivot freely.
2. Adjust the control armature to lie flat against the magnet core with the roller at the low dwell of the armature knock off cam. Form at point (A) (Figure 2).
3. With the control armature assembly roller on the high dwell of the armature knock off cam, form the armature stop arm for .000" to .003" clearance to the residual pin (Figure 3). At this time there should be .025" to .030" clearance between the control armature and

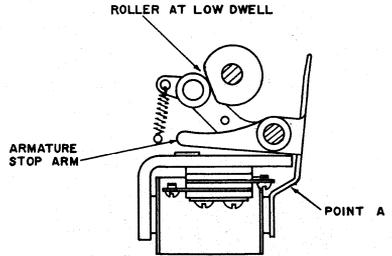


Figure 2

the magnet core at the center point of the core (the armature will have a slight angle to the core because of its pivot mounting). If the clearance (.025" to .030") isn't obtained, form the armature at point (A) to achieve the adjustment and recheck the other adjustments. The roller will ride off of the low dwell of the knock off cam.

4. The control arm should be straight except for the 11°15' bend near the top. Form at point (B) to straighten. On a tab card reader, form both arms but only if necessary.
5. With the control armature fully attracted to the core (roller on low dwell) loosen the locking nut and adjust the set screw on the control arm so that, as the interposer bail comes down past the latching surface of the control arm, the control arm clears the latching point on the bail by .002" to .005" (Figure 4). The clearance will very likely be changed by tightening the locking nut, so the screw should be turned and the nut tightened before checking the clearance. In a tab card reader, adjust both control arms.

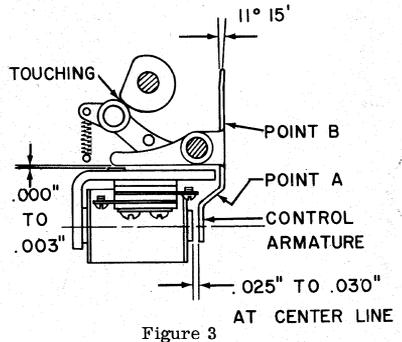


Figure 3

Note: With the roller on the high dwell of the knock off cam and the armature away from the magnet core, the interposer bail arm should overlap

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 23

DATE: January 30, 1964

ADDITION: After "All Readers", Page 4-1.

REASON: Changes in the adjustments for the single cycle reader clutch.

EXPLANATION: All Systems Flexowriters contain this new device. As of October 11, 1963 all Flexowriters shipped are adjusted to the new tolerances.

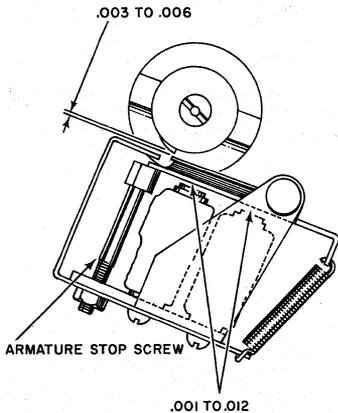


Figure 1

MAGNET YOKE ASSEMBLY

1. Loosen the locking nut and set the armature stop screw so there is .001" to .012" clearance between the armature (manually attracted) and each coil core (Figure 1.)

2. Slightly loosen the screws which mount the magnet yoke. Position the magnet yoke so the armature manually attracted has .003" to .006" clearance to the tip of the clutch sleeve and the latching surface of the clutch sleeve is parallel to the end of the armature. Tighten the mounting screws.

3. Form the armature stop arm so the armature has .001" to .008" clearance to the low surface of the clutch sleeve when the armature is not attracted to the clutch magnet coils (Figure 2).

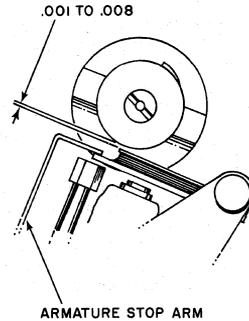


Figure 2

CLUTCH COMPONENTS

The following procedure is for completely adjusting the clutch. Steps 1, 2, 3 & 4 are necessary to obtain the correct relationship of the clutch shaft sleeve and the clutch collar. If the clutch shaft sleeve is butted against the interposer/feed cam cluster and the cluster is against the needle bearing and there is .005" to .015" clearance between the clutch collar and the outer casting (Figure 3) steps 1, 2, 3 & 4 need not be performed. (Simply loosen the setscrews for the interposer/feed cam cluster, detent cam, overtravel stop and end collar.)

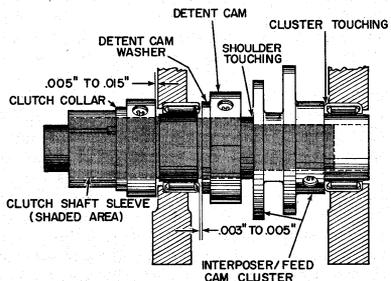


Figure 3

1. Loosen the setscrews on the end collar and remove it. Disengage the end of the clutch spring from the square stud inside the clutch sleeve and carefully remove the clutch sleeve.

Note: If the reader is not mounted in the machine, the clutch shaft can be removed by sliding it to the right after the end collar setscrews are loosened.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 23

2. Remove the plastic clip which retains the armature pivot shaft and remove the shaft and parts mounted on it. Loosen the setscrews on the overtravel stop and remove it. Loosen the setscrews for the interposer/feed cam cluster, detent cam, overtravel stop and clutch collar.

3. Push the clutch shaft sleeve to the right so the interposer/feed cam cluster is against the needle bearing in the inner casting and the shoulder on the clutch shaft sleeve is against the interposer/feed cam cluster and tighten one of the cluster's setscrews.

4. Maintaining the clutch shaft sleeve to the right, position the clutch collar .005" to .015" from the outer casting and tighten both of its setscrews securely.

5. Reinstall the overtravel stop & clutch sleeve. Set the end of the clutch spring against the square stud on the inside of the clutch sleeve and turn the clutch sleeve clockwise until the spring is fully expanded and install the end collar. Leave the setscrews on the overtravel stop loose but temporarily tighten the setscrews on the end collar, leaving a slight clearance between it and the clutch sleeve. (Install the clutch shaft if it has been removed.) Reinstall the clutch armature and the parts previously removed from the clutch magnet yoke.

6. Advance the clutch by means of the reader coupling until the sleeve stops against the armature. Set the detent cam washer against the detent cam, position the detent cam so there is clearance to the needle bearing, .003" to .005" and set the detent cam .032" (maximum) short of latching. Tighten the setscrews. Latch up the clutch and either turn on the machine or rapidly advance the reader coupling. If the detent cam moves away from the detent arm, increase the amount of underlatch slightly but not in excess of .032". No minimum underlatch is specified as long as the detent cam does not move away from the detent arm when the clutch is latched and the clutch shaft turns freely when the clutch mechanism is fully adjusted. Be sure that the clutch shaft sleeve has the .003" to .005" end play that should be obtained by this adjustment.

*Manually attract the clutch armature with the clutch latched and the power off. The clutch sleeve must move so it can no longer be caught by the armature. If it doesn't, check the adjustments and the clutch spring.

7. Position the overtravel stop to the right tight against the clutch collar and set it to allow the clutch cam to overtravel .015" to .031" past the detent arm. Tighten the setscrews securely.

8. With the clutch shaft and the clutch shaft sleeve to the left as far as the parts will allow (Figure 4), and the clutch sleeve against the clutch collar, loosen the setscrews on the end collar, set it .003" to .008" from the clutch sleeve (tight against the clutch collar) and tighten the setscrews.

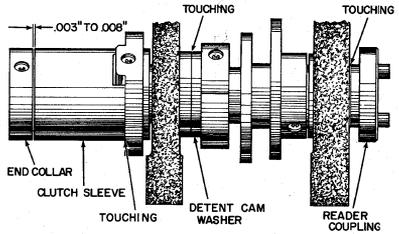


Figure 4

Check the clutch sleeve for .003" to .008" end play and check the clutch shaft to see that it turns freely when the clutch is latched.

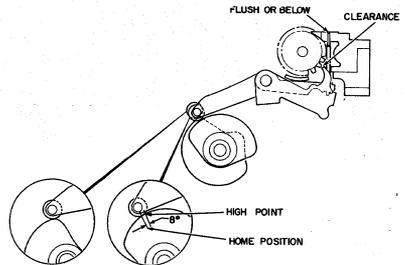


Figure 5

9. Loosen the setscrews on the interposer/feed cam cluster and, with the clutch latched, set the cluster so the feed cam roller is just onto the high dwell and the interposer cam roller is started down the very slight intermediate high dwell (Figure 5) and tighten the setscrews.

Check and make sure the reader pins are flush or below the top surface of the guide block and the feed pawl is down away from any possibility of contact with the ratchet as it is rotated manually. The cams must have at least a 75% bite on the cam rollers. When checked with a timing dial, the reader common contacts must close 68 degrees plus or minus two degrees after zero.

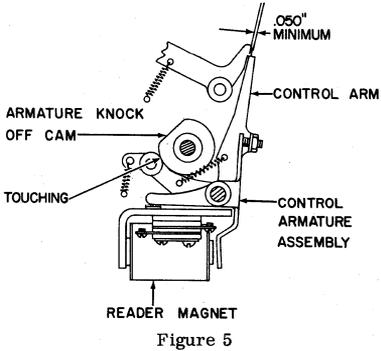
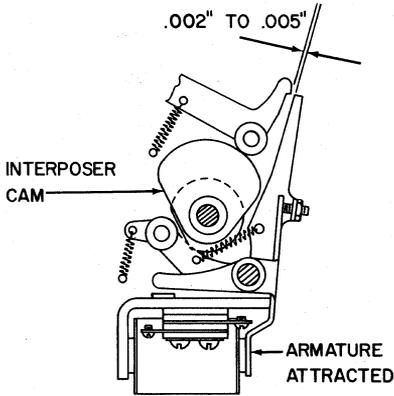
10. Loosen the setscrew for the collar and set it so the detent arm has .005" to .015" side play. Tighten the setscrew.

Periodically check the ends of the setscrews to see if they are flattened out. Replace the defective ones. Make sure all of the setscrews are securely tightened.

FRIDEN SYSTEMS ADJUSTMENT

FEED & INTERPOSER GUIDE

the control arm by a minimum of .050", insuring that the interposer bail will not operate when the reader magnet is energized at other times than the start of the cycle. Recheck the adjustments if the .050" minimum isn't obtained (Figure 5).



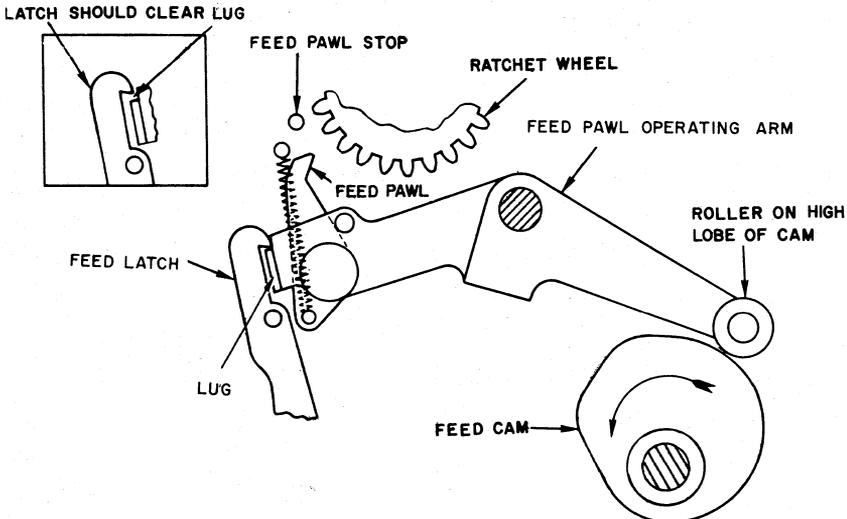
2. With the front contact lever bail in home position (pins down), the hook of the feed latch should have a full bite on the lug of the feed pawl operating arm with the stop pin of the auxiliary latch arm engaging the edge of the feed latch (Figure 7). At this time the upper curved end of the auxiliary latch arm should be just touching the front contact lever bail. Form the curved end to obtain the adjustment.

Feed Control

1. With the feed pawl operating arm roller on the high dwell of the feed cam, the feed latch should move freely over the lug of the feed pawl operating arm. Form the feed pawl operating arm to meet the above requirement (Figure 6). The clearance is necessary to insure unlatching.

Interposer Guide (Figure 8)

The interposer guide should be centered over the interposers so that the reader pins and interposers operate with no drag on the guide. Loosen the mounting screws and position. If the interposer guide is too far to the right, the interposer can bind the feeler pins. Tighten the screws.



FRIDEN SYSTEMS ADJUSTMENT

TAPE REGISTRATION

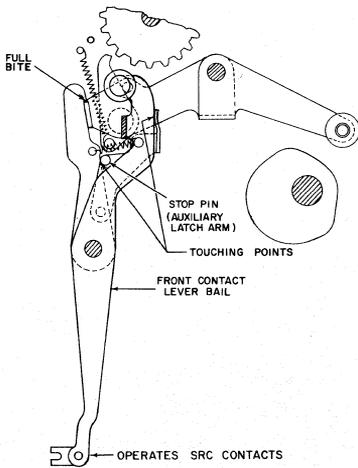


Figure 7

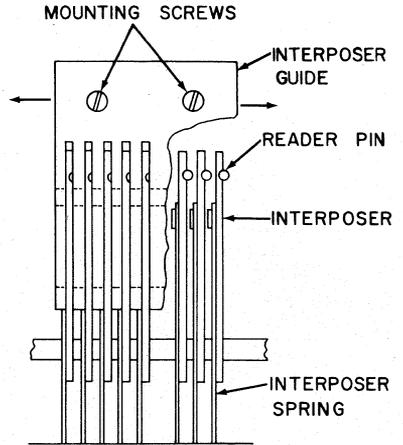


Figure 8

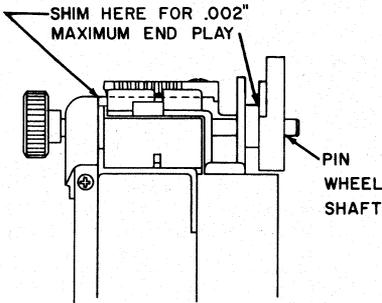


Figure 9

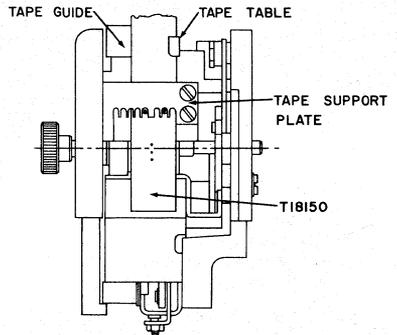


Figure 10

Tape Reader Registration - Lateral In Sequence

1. The front pin wheel shaft assembly should have no more than .002" end play between the bearings (Figure 9). Shim the assembly, locating the pin wheel so that a tape in the reader has its code holes centered over the feeler pins.
2. Using the pin to pin wheel gauge, T-18150, loosen the tape support plate mounting screws and locate the tape support plate so the guide edge on its under surface touches the right edge of the gauge. Be sure that the tape support plate is straight on the reader. Tighten the mounting screws (Figure 10).
3. Adjust the tape table and the tape table guide under the mounting screw so they just touch the edge of the tape and keep the tape feeding straight into the reader.

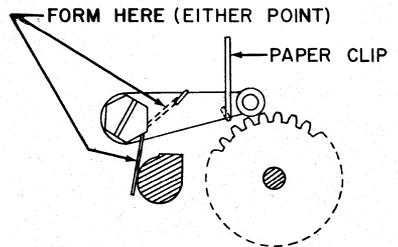


Figure 11

Registration - Longitudinal

1. Loosen the detent eccentric's locking nut, turn the eccentric so that the code holes are concentric with the feeler pins (tape in reader) and tighten the locking nut (Figure 13).

FRIDEN SYSTEMS ADJUSTMENT

TAPE/EDGE CARD REGISTRATION

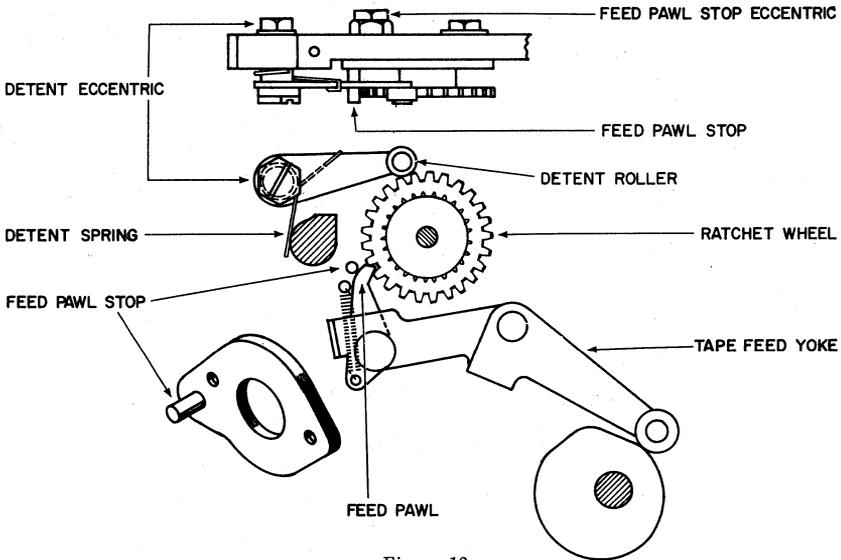


Figure 12

2. Adjust the detent spring to have from 3/4 to 1 lb. tension at the roller (Figure 11). Form the spring end to change the tension. To check, hook a bent paper clip under the detent arm near the roller. Hook the spring scale T-18123 to the end of the paper clip, pull the scale until the detent roller leaves the ratchet wheel, and note the reading obtained.

Feed

The feed pawl should rotate the ratchet wheel to the next fully detented position, maintaining accurate registration in a properly punched tape. Adjust the eccentric for the feed pawl stop so the feed pawl is stopped just as the detent arm roller is fully seated between two teeth of the ratchet wheel (Figure 12). Do not change the setting of the detent arm eccentric if the feed pawl stop eccentric will not give enough adjustment. This condition indicates that the feed pawl stop is to the rear in its mounting hole. Loosen the mounting screw and the eccentric locking screw and move the feed pawl stop forward, restoring the eccentric back to the proper adjustment range.

Note: The uniform registration and feed of the tape can be checked by cycling correctly punched tape through the reader and watching the pin wheel. Any change in the position of the pins on the pin wheel when they stop momentarily indicates that the feed pawl stop eccentric adjustment is incorrect and it should be readjusted.

Tape/Edge Card Reader Registration - Lateral In Sequence

1. The front pin wheel shaft assembly should have no more than .002" end play between the bearings. Shim the assembly, locating the pin wheel so that a tape in the reader has its code holes centered over the feeler pins (Figure 13).

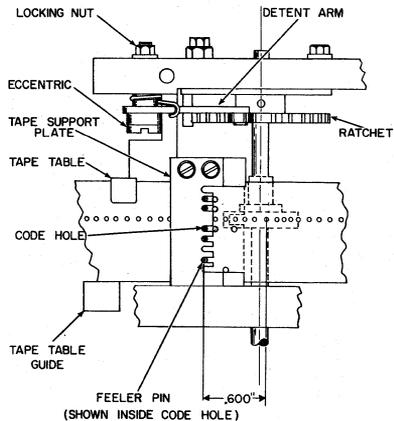


Figure 13

2. In the same manner (.002" maximum) shim the rear pin wheel shaft so that it lines up with the front

FRIDEN SYSTEMS ADJUSTMENT

TAPE/EDGE CARD REGISTRATION & TABLE

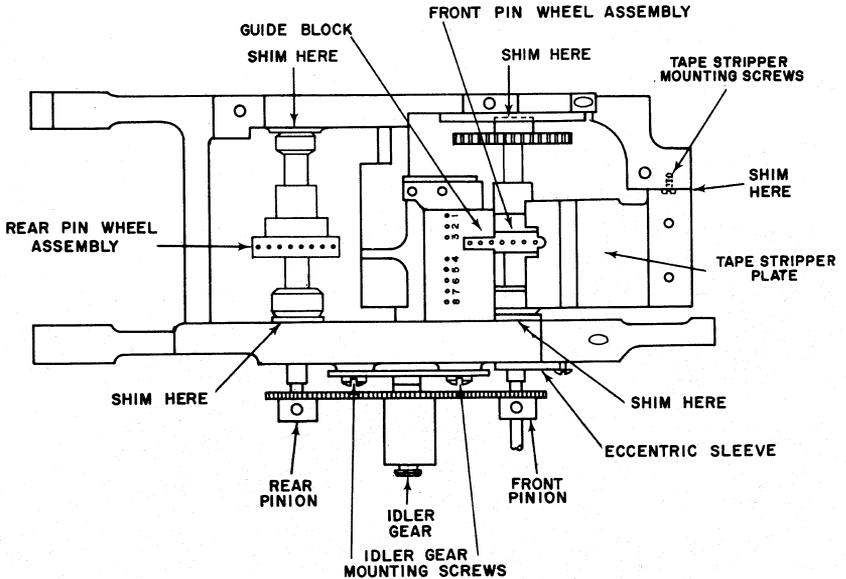


Figure 14

pin wheel. The two pin wheels should be on a line perpendicular to a line drawn through the center of the code holes.

Registration - Longitudinal In Sequence

1. Loosen the set screws for the pinions on the rear pin wheel shaft and loosen the mounting screws for the idler gear.
2. Adjust the ratchet wheel detent eccentric to position a tape in the reader so that the code holes are centered on the feeler pins. At this time they should be perfectly concentric.
3. Locate the pinions on the pin wheel shafts so they are aligned with the idler wheel and tighten the set screws on the front pinion. Adjust the idler gear under its mounting screws for minimum backlash without binds at any point. Place the pin to pin wheel gauge (T-18150) in the reader. Hold the feed knob (so the front pin wheel, pinion, idler gear and rear pinion will not turn) and rotate the rear pin wheel so that it has exactly the same relationship to the holes in the gauge as the front pin wheel. Tighten the set screws on the rear pinion. To check for proper registration, place a tape or edge card in the reader, disengage the ratchet wheel detent roller, and turn the feed knob. The pin wheels should enter the tape or edge card exactly the same so they do not elongate the feed holes or bow the card and al-

low misregistration. Be sure that the code holes are concentric with the feeler pins.

Feed

1. Adjust the feed pawl stop to stop the feed pawl just as the detent roller is fully seated between two teeth of the ratchet wheel (same adjustment and considerations as in the tape reader).
2. Adjust the detent spring to have from 1 to 1-1/4 lb. tension at the roller. Form the spring end to change the tension. To check, hook a bent paper clip under the detent arm near the roller. Hook the spring scale T-18123 to the end of the paper clip, pull the scale until the detent roller leaves the ratchet wheel, and note the reading obtained (Figure 11).
3. Shim the tape stripper plate so that its groove is centered on the pins of the front pin wheel. Adjust it under the mounting screws so it's as close to the pin wheel as possible without touching (Figure 14).

Tape/Edge Card Table

1. Shim the lower card table so that the rectangular opening is centered laterally over the rear pin wheel (Figure 15).
2. Adjust the eccentric shaft that mounts the rear end of the lower card table so the rectangular opening is centered longitudinally over the rear pin wheel and there is .007" to .010" clearance

FRIDEN SYSTEMS ADJUSTMENT

READER CONTACTS

between the wheel of the rear pin wheel and the under surface of the upper card table. This adjustment is to be made with the card table down (Figure 16).

3. The card table rests on the eccentric sleeve in the outer casting (around the pin wheel shaft). Loosen the locking screw and rotate the eccentric sleeve so there is .007" to .010" clearance between the periphery of the pin wheel (not counting the pins) and the under surface of the upper card table. Tighten the locking screw.

Note: Check the clearance of the rear pin wheel to the under surface of the upper card table and readjust if necessary so both clearances are correct.

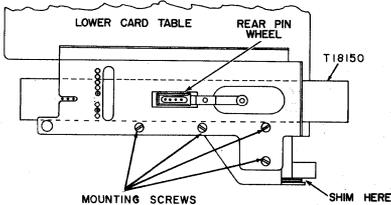


Figure 15

4. Loosen the four upper card table mounting screws, place an edge card in the reader and lower the card table so the card is on the pins. Position the upper card table so its guiding edge just touches the card and tighten the four mounting screws (Figure 15).
5. Adjust the upper card table spring so the rear button holds an edge card against the lower table with a minimum of drag. The front end of the spring is to have sufficient tension so as to just touch the rear pin wheel when the card table is down and allow a tape or edge card to be inserted in the reader with the card table up.
6. Form the card stop, if necessary, so that it is parallel to the lower card table surface (Figure 17). Be careful

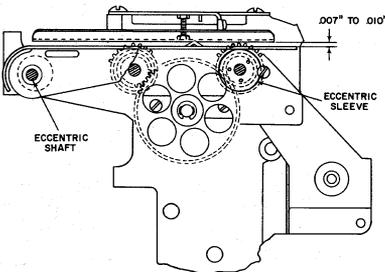


Figure 16

in forming to not mar the surfaces. Adjust the card stop adjusting screw (with the mounting screws tight) to allow removal of a partially read card with a minimum of drag. With the card table up loosen the mounting screws and position the card so that when the card table is lowered, the feed holes engage the pins of the pin wheels without movement of the card. Proper adjustment will insure longer life of the feed holes in the card.

Note: A properly cut edge card must be used for this adjustment. The first reading station must be over the feeler pins with the code holes concentric with the feeler pins.

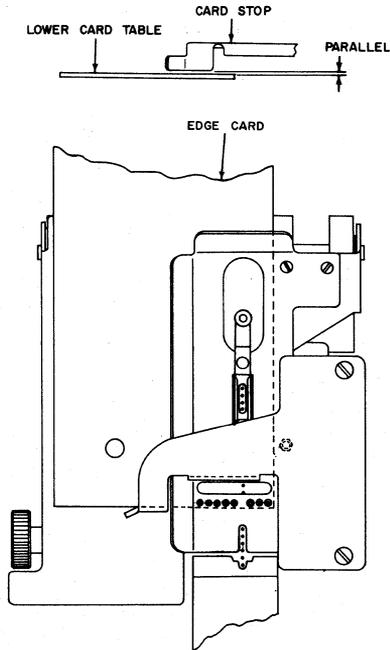


Figure 17

TAPE - TAPE/EDGE CARD READER CONTACTS

Check the reader to see that all of the contact springs and stiffeners are in proper sideways registration in each contact stack. Check to see that all stationary contact springs have tension against their stiffeners. The movable contact springs should all have sufficient tension to follow the contact levers to their extreme inward position without lost motion in the nylon operators. All stationary contacts, when made with their movable contacts, should have been moved a minimum of .010".

FRIDEN SYSTEMS ADJUSTMENT

READER CONTACTS

The two contacts on each spring must touch their mating contacts as nearly simultaneously as possible. Contacts with the same specified clearance in various stackups should make or break at the same point in the rotation of the reader shaft. Mating contact points should be no more than .015" out of alignment when they meet.

Note: Be sure that all contact operator shafts are fully seated in their contact springs. None of the contact operators should touch any of the stationary contact springs as the contacts operate.

A contact clearance chart is given for each reader according to its reader model number (Figure 19). "R" stands for tape reader and "CR" stands for tape/edge card reader. Be sure that the correct chart is used for the reader involved.

The reader contact stacks are numbered as indicated in Figure 18. The contact springs are numbered from the contact lever outward. The gap dimensions between the contact springs are expressed in thousandths of an inch measured in the position indicated. All normally open (N/O) contacts are adjusted with a blank tape in the reader and the interposer bail roller on the low dwell of the cam

so the pins are up against the underside of the punching media. All normally closed (N/C) contacts are adjusted without a tape in the reader and the interposer bail roller on the low dwell of the cam so the pins are fully operated up through the guide block.

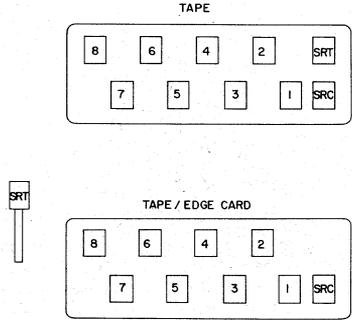


Figure 18 Bottom View

1. Lift the machine on to its tilt posts, loosen the three reader cover mounting screws and remove the reader cover. (The reader may be removed entirely for easy accessibility to the adjustments.)

R57, R60, CR68 & CR75 READERS

Tape in Reader												
Contacts	Normally Open Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8	20-25		15-20		15-20							
SR7	20-25		20-25		20-25							
SR6	20-25		15-20									
SR5	20-25		15-20		15-20		20-25					
SR4	20-25		20-25									
SR3	20-25		20-25		15-20							
SR2	20-25		15-20				20-25					
SR1	20-25		15-20				20-25					

No Tape in Reader												
Contacts	Normally Closed Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8								20-25				
SR7							20-25		20-25			
SR6					20-25		20-25					
SR5									20-25			
SR4						15-20		20-25				
SR3							20-25					
SR2					15-20			20-25				
SR1					15-20			20-25				

Figure 19

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 1

Readers R69, R78, R84 and CR77*

Tape in Reader

Contacts	Normally Open Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8	20-25		15-20		15-20							
SR7	20-25		20-25		20-25							
SR6	20-25		15-20									
SR5	20-25		15-20		15-20		20-25					
SR4	20-25		20-25									
SR3	20-25		20-25		15-20							
SR2	20-25		15-20				20-25					
SR1	20-25		15-20				20-25					

No Tape in Reader

Contacts	Normally Closed Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8								20-25				
SR7							20-25		20-25			
SR6				20-25		20-25						
SR5									20-25			
SR4					15-20		20-25					
SR3						20-25						
SR2				15-20			20-25					
SR1				15-20			20-25					

*Note that the reader contact clearances are unchanged from the R57, R60, CR68 & CR75 Readers

DATE: November 4, 1963

This adjustment gives make-before-break operation of contacts 3, 4 and 5.

ADDITION: To Page 4-7.

SRT: With the tape hold down arm against the pinwheel, adjust all N/O contacts to a gap of .020" to .025".

REASON: New Reader Designations - SRCC Obsolete.

With the tape hold down arm away from the pinwheel, adjust all N/C contacts to a gap of .020" to .025".

EXPLANATION: The change in the reader control element from reader magnet to reader clutch made the SRCC contacts no longer necessary; consequently, they have been removed. The modification necessitates a change in reader designations and outdates instructions for adjusting readers equipped with the SRCC contacts.

SRC: With the interposer bail roller on the high dwell of its cam, adjust SRC contacts 1 & 2 to a gap of .042" to .047". Adjust SRC contacts 3 & 4 to a gap of .015" to .020".

With blank tape in the reader and the interposer bail roller on the low dwell of the cam, adjust SRC contacts 4 & 5 to a gap of .015" to .020".

FRIDEN SYSTEMS ADJUSTMENT

SRC & SRCC CONTACTS

2. Place an unperforated tape in the reader to block all of the feeler pins. Manually cycle the reader until the interposer bail arm roller is at the low dwell of the interposer cam, and adjust all of the normally open contacts according to the proper reader chart by forming the stationary spring stiffeners with a spring hook or screwdriver. "T" bender T-18093 can be used where the stiffeners are accessible. Check the gaps with the wire gauges.

Note: When a contact gap is narrower than specified, forming the stationary contact stiffener to widen the gap and then forming it back to the specified gap will provide a longer lasting adjustment than just forming the stiffener to the specified gap because of the direction of stress put in the metal by the last bend. If the gap is widened by the last bend, the gap will widen more rapidly than if the gap is narrowed.

3. In the same manner, manually cycle the reader so the interposer bail arm roller is at the low dwell of the cam but without any tape in the reader, allowing all pins to operate fully and adjust all of the normally closed contacts (now open) according to the proper reader chart by forming the stationary contact stiffeners. Check the gaps using the wire gauges.

READER COMMON CONTACTS (SRC)

Tape & Tape/Edge Card Readers R57, R60, CR52, CR68 & CR75:

1. With the interposer bail arm roller on the high dwell of its cam, form the contact stiffener on spring 3 for a .015" to .020" gap between springs 3 & 4.
2. With blank tape in the reader and the interposer bail arm roller at the low dwell of the cam, form the contact stiffener on spring 5 for a .015" to .020" gap between springs 4 & 5.

Note: This gives make-before-break operation of contacts 3, 4 & 5.

3. With the interposer bail arm roller on the high dwell of the interposer cam, form spring 1 so there is a .042" to .047" gap between springs 1 & 2.

READER CAM COMMON CONTACTS (SRCC) & TIMING CAM

1. Shim the contact operating arm so it has from .002" to .005" side play on the mounting shaft.

2. Loosen the set screws and locate the timing cam as follows:
 - a. Locate it sideways so it is situated centrally under the contact operating arm roller.
 - b. Locate it rotationally so that when the interposer bail arm roller is on the high lobe of its cam, the contact operating arm roller is at the low point of the timing cam. The timing cam may have to be shifted (slightly) later on (step 5).

Tighten the set screws.

3. Cycle the reader so that the interposer bail arm roller is on the high point of its cam and the contact operating arm roller is at the low dwell of the timing cam. Form the stationary contact stiffener on spring 4 so there is a gap of .010" to .015" between contacts 3 & 4. (3 & 4 are normally open.)
4. Cycle the reader so that the interposer bail arm roller is at the low dwell of the interposer cam and the timing cam is at the high point and form the stationary contact stiffener on spring 1 so there is a gap of .030" to .035" between contacts 1 & 2 (normally closed).
5. Check the rotational location of the timing cam. Cycle the reader shaft with no tape in the reader and check to see that the normally open contacts 3 & 4 close just after the normally closed reader contact springs 7 & 8 on SR8 open. Springs 3 & 4 should open just before the described reader contact springs close when restoring. If contacts 3 & 4 do not operate in this manner, loosen the timing cam set screws and shift it rotationally to satisfy the

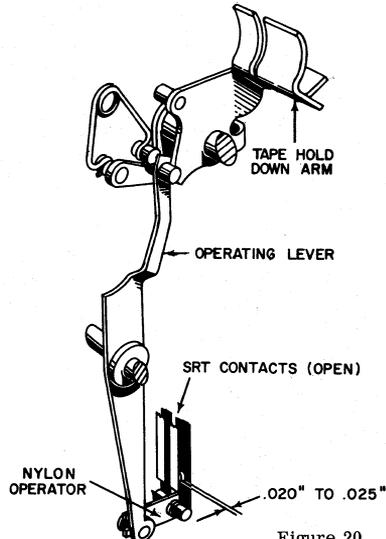


Figure 20

FRIDEN SYSTEMS ADJUSTMENT

SRT & TCR CARD LOADING

requirements of the operation. Tighten the cam's set screws and check the operation.

Reader Tape Contacts (SRT)

1. In the tape reader, the tape hold down arm operates the reader tape contacts (SRT) (Figure 20). When the arm is opened, the circuit to the reader control relay is broken so the arm must be closed for reading to take place. Adjust the contacts to a gap of .020" to .025" with the arm open and see that there is an appreciable amount of follow with the arm closed. There should be no lost motion in the nylon operator.

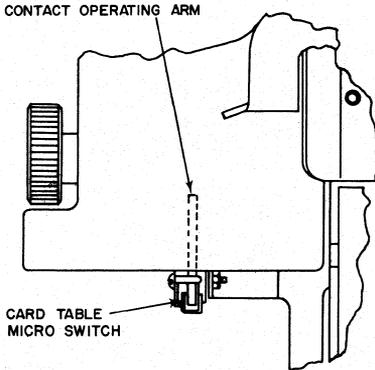


Figure 21

2. In the edge card reader, the same function is provided by the card table Microswitch (also SRT) which should operate before the table reaches its limit of travel in either direction. Form the contact operating arm to obtain this adjustment (Figure 21).

Tab Card Reader

Card Loading In Sequence

1. Tighten the card release lever set screw against the flat section of the card release shaft so the lever is flush with the end of the shaft (Figure 22).

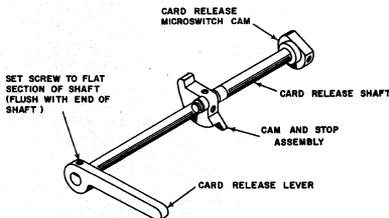


Figure 22

2. Lift the card table on its pivot shaft by loosening screw (A), removing screw (B) and unhooking the upper feed roll bail springs (Figure 23).

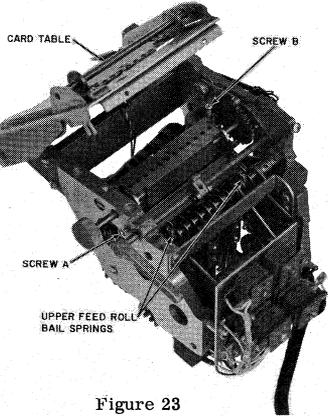


Figure 23

3. Loosen the two set screws on the cam and stop assembly so it can be shifted. Lower the card table and tighten screw (A). Position the cam and stop assembly so its rear stop is against the upper feed roll bail and the end of the card release lever is in line with the surface of the card table. Tighten the front set screw with the card release lever down using allen wrench T-18038 (Figure 24). Further locate the cam and stop assembly right or left to equalize the movement of the pressure rollers away from the feed rollers as the card release lever is raised. Position the assembly so it won't contact any of the interposers because they will restrict it. Raise the card table and tighten both set screws securely.

Note: If the cam and stop assembly has to be moved very far from the center point between the springs, the tension of the springs is unequal. The springs should be changed because they maintain the pressure rollers against the top of the card, thereby insuring equal feed (by their equal tension).

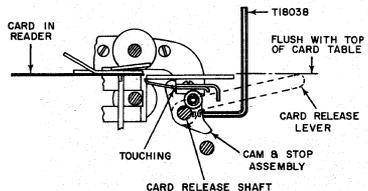
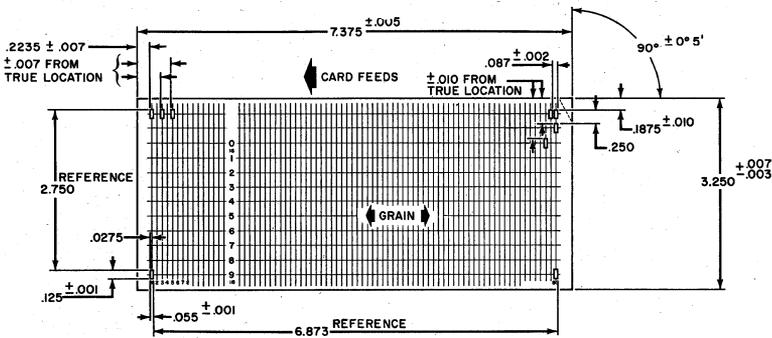


Figure 24

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 46



DATE: August 29, 1963

ADDITION: Page 4-9.

REASON: To outline specifications for tab cards to be read in Friden equipment.

EXPLANATION: This manual addendum specifies what a tab card should be in order to be read in Friden equipment. The equipment is designed and adjusted to read tab cards within the specifications.

TAB CARD SPECIFICATIONS

The physical measurements should be made after the cards to be checked have been stored in a 73° Fahrenheit, plus or minus 3.5°, temperature environment with a Relative Humidity of 50%, plus or minus 2%, overnight (or approximately sixteen hours).

The paper stock is to be .007" ± .0004" in thickness (regular tab card stock). The "grain" of the stock is to run lengthwise of the card. All edges of each card are to be straight within plus or minus .003".

The opposite sides of the cards are to be parallel within plus or minus .003".

The card may be die cut at the rear upper corner.

Punching in the card is to consist of rectangular holes .125" ± .001" in height and .055" ± .001" in width. A maximum of 80 codes can be punched in the card. The code holes in column one of the card are to be located .2235" ± .007" from the leading edge of the card. The code holes in the 80 columns may not vary more than ± .007" from true location from the leading edge of the card.

Holes in adjacent code columns are to be .087" ± .002" from each other. The topmost code hole (its top edge) is to be .1875" ± .010" from the top of the card. Each code hole in the code column is to be .250" from its adjacent hole. Each code hole can vary a maximum of ± .010" from true location from the top edge of the card.

Note: All measurements of code holes are from one edge of one to the same edge of the other. Practically, then, two code holes can be .230" apart, edge to same edge, and still be within the specification as long as each is ± .010" from true location from the top of the card.

In applications where tab cards with the same information can be punched on different machines, the specifications may be difficult to satisfy because of individual machine variances. It is recommended that such tab cards be gang punched on equipment known to satisfy the specification.

FRIDEN SYSTEMS ADJUSTMENT

TCR CARD TABLE

- Lower the card table, tighten screw (A), and put the card release lever down. The card release Microswitch must be non-operated and the operating arm of the switch on the low dwell of the cam (Figure 25). Loosen the cam's set screw and locate the cam flush with the end of the shaft. Position the operating arm on the cam's low dwell and tighten the set screw. The switch should operate, as the card release lever is raised, just before the operating arm is moved to the high dwell. Form the operating arm to obtain the adjustment. Be sure that the switch operating arm doesn't choke off between the cam and the contact button when the card release lever is up. There should also be freedom of movement when the operating arm is on the low dwell so the contact button is not partially operated.

Card Table

- The upper feed roll ball should be shimmed so that it floats in the card table slot (Figure 26). Loosen the set screws on the pivot shaft and slide the shaft to the left until shims can be installed or removed to obtain the adjustment. Reassemble and tighten the set screws.
- Secure the card table, hook up the upper feed roll ball springs and raise the card release lever. Loosen the screws and position the pressure roller retaining plate so it's down as far as possible and tighten the screws securely.

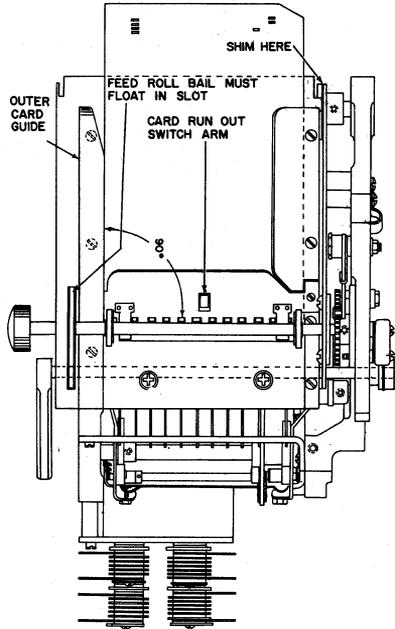


Figure 26

Note: In the event that the other adjustments are correct but the card gets out of registration, the card stops may be readjusted slightly forward or rearward to compensate for the misregistration.

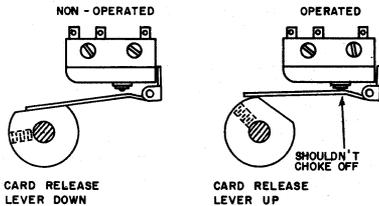


Figure 25

- Insert a card, lower the card release lever and adjust the card stops so they are flush to .010" (maximum) below the surface of the card table (Figure 27). To obtain the adjustment, raise the card table and form the stops until the adjustment is correct, lowering the card table, hooking up the upper feed roll ball springs and tightening the screws each time.
- Slightly loosen the card stop position adjusting screws (Figure 28) and adjust the card stop plate so that the card stops position the tab card with the first column in the card centered front to rear over the feeler pins and tighten the screws.

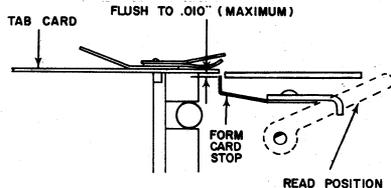


Figure 27

- Adjust the card stiffener springs (Figure 29) so they are moved slightly by the card stops as the card release lever is raised. The card stiffener springs should not touch the card. Reform if necessary. Adjust the stops above the springs to allow the springs to move upward for easy removal of the tab card with the card release lever up.
- Adjust the card run out switch so it operates when the card leaves the 80th Column. Check to see that the contact operating arm doesn't choke off before going below the top of the table. Slight adjustment can be obtained by shifting

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 45

DATE: August 22, 1963

CHANGE: Page 4-10, 4-11, Step 4, 7 & 8.

REASON: Issuance of T18278 Tab Card Reader Gauge.

EXPLANATION: The gauge permits a standard and uniform method of adjusting the card reader to achieve the proper clearances. No longer does the proper setting depend on paper tab cards.

4. Slightly loosen the card stop position adjusting screws (Figure 28) and move the stops forward. They will be adjusted later.

7. Slightly loosen all of the mounting screws that mount the inner and outer card guides. Insert the gauge in the tab card reader so the second column of code holes are positioned over the reader pins and manually cycle the reader until the reader pins come up through the gauge. Move the gauge forward against the pins and center it on the reader pins as shown in Figure 28. Carefully maintaining the gauge in position, bring the card guides up against it and tighten their mounting screws. Cycle the reader to home position.

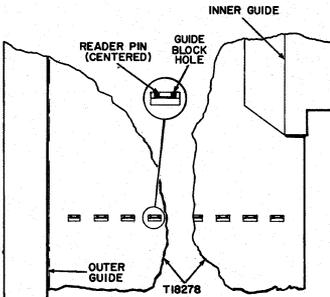


Figure 28

Note: The gauge is 3.265" wide. The maximum width of the tab card is 3.257".

8. Move the gauge so the front column of code holes is over the reader pins, manually cycle the reader so the pins are up and position the gauge as shown in Figure 30, centered front to rear on the pins. Raise the card release lever so the card stops are up, position them so they touch the front edge of the gauge and tighten the adjustment screws. Cycle the reader to home position and remove the gauge.

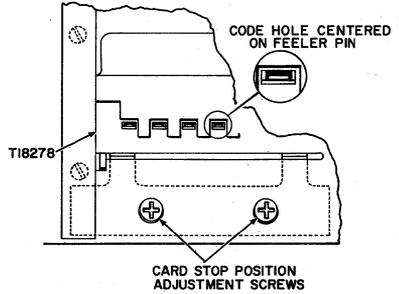


Figure 30

Note: In the event the card gets out of registration and these adjustments are correct, check the feed adjustments readjusting as necessary. (Refer to Manual Addendum 43) Do not use the gauge to check the feeding of the card. The two sets of holes are not in registration; the first is for registering the card on column one and the second is for setting the guides only.

FRIDEN SYSTEMS ADJUSTMENT

TCR FEED

the switch on the mounting bracket and forming the operating arm gives more adjustment.

Note: If the switch operates late, the end of the card will be read as a space by the Flexowriter, which is incorrect.

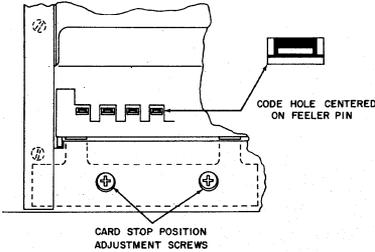


Figure 28

- Adjust the outer card guide (Figure 30) so it is 90° to the leading edge of the pin openings in the guide block and the inner edges of the card code holes are flush with the inner edges of the pin openings in the guide block. Raise the card table and loosen the three mounting screws to position. A tab card with multiple punches in column one should be used so the registration can be seen at different pin openings.

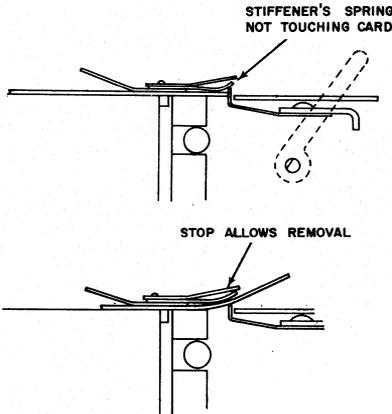


Figure 29

- Adjust the inner card guide so it is parallel to the outer card guide and the outer edges of the pin openings in the guide block. This can be done by loosening the five screws holding the inner card guide to the card table and inserting a card in the reader holding it to the right against the inner card guide. Then

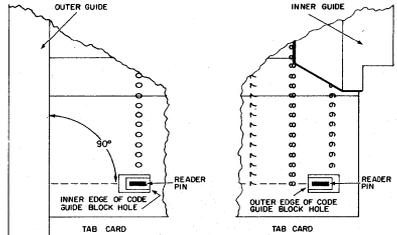


Figure 30

the guide can be positioned so the left edge of the card is parallel to the outer card guide and the card code holes line up properly.

With the above two adjustments properly made, sufficient clearance is allowed for normal expansion of the tab card without chance for misreading.

Note: Any lost motion evident in the card release lever before it starts to lift the upper feed roll bail indicates that the left side of the card table is not down far enough on screw (A). Loosen screw (A) and position the left side of the card table so that the card table is the same height with respect to the guide block across the reader.

Feed

- Manually cycle the reader until the feeler pins have read and are moved down flush or very slightly below the guide block. Loosen the detent arm eccentric (Figure 31) and adjust it, keeping the high point up, so that the ratchet wheel is moved to a position just short of touching the partially operated feed pawl and tighten the locking nut. Pivot the feed pawl back and forth to be sure that it doesn't touch the ratchet wheel. This adjustment provides the start of the feed just as soon as the feeler pins are out of the way of the tab card.

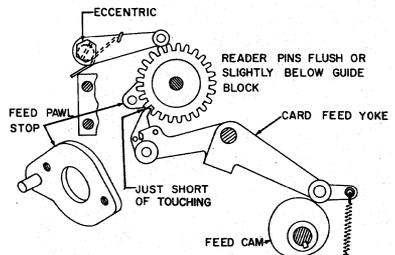


Figure 31

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 43

DATE: November 30, 1962

CHANGE: Page 4-11, Feed

REASON: To provide a more practical adjustment.

EXPLANATION: The previous adjustments provided no assurance that the reader would read properly. A procedure has been found which works much better.

Feed In Sequence

1. With a tab card in the reader and the card release lever down, unhook the feed spring and the spring for the detent eccentric. Pivot the detent arm out of the way so it can't contact the ratchet wheel.

2. Operate the feed pawl fully against the feed pawl stop, restore it, and feed it again, checking to see that the feed pawl clears the next tooth and the card feed yoke roller clears the low dwell of the feed cam by .003" minimum. To readjust, loosen the feed pawl stop mounting screws, adjust the eccentric so the feed pawl stop is moved downward, and tighten the mounting screws.

Note: If the proper adjustment can't be obtained, the feed pawl stop may be too far to the rear. Loosen the mounting screws, turn the eccentric so the feed pawl stop is all the way forward and try the adjustment again.

3. With the feed pawl fully operated and against the feed pawl stop, hook up the detent spring, loosen the detent eccentric mounting screw and adjust the detent eccentric so the detent roller is fully seated in the ratchet. Tighten the mounting screw. Move the feed pawl back and forth, checking for movement of the ratchet wheel. There shouldn't be any. Check at several points on the ratchet wheel, further adjusting the detent eccentric to remove any movement of the ratchet wheel. Reinstall the card feed yoke spring.

4. Adjust the detent spring to have from 1/2 to 3/4 lbs. tension at the roller. Form the spring end to change the spring's tension. To check, hook a bent paper clip under the detent arm near the roller and hook the spring scale T18123 to the end of the paper clip. Pull the scale until the detent roller leaves the ratchet wheel and note the reading obtained.

5. Check the feed adjustments by reading tab cards under power. Registration should be the same at both column 1 and column 80. Slight over or under feeding may be compensated for by changing the tension of the detent spring (within its range).

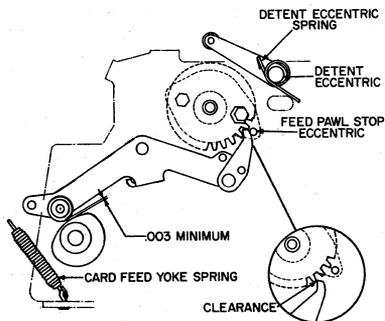


Figure 31

FRIDEN SYSTEMS ADJUSTMENT

TCR READER CONTACTS

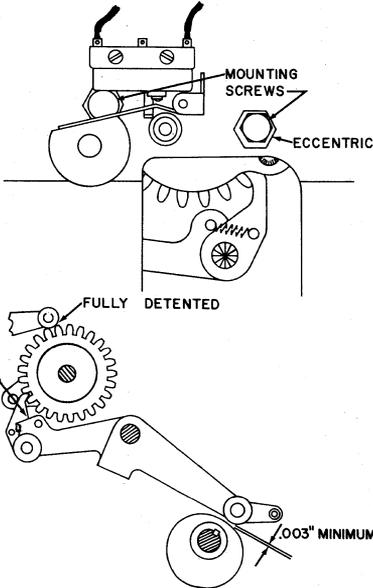


Figure 32

2. Cycle the reader farther so the feed pawl has fully operated and the card feed yoke roller is at the low dwell of the feed cam (Figure 32). Remove the feed yoke springs, loosen the locking screw and adjust the feed pawl stop eccentric so that the ratchet wheel is fully detented under the detent roller. Turning the eccentric will move the ratchet wheel with respect to the detent roller. Keep finger pressure on the card feed yoke and be sure that there is a minimum of .003" between the roller and the low dwell. If there isn't, recheck the adjustments.

Note: If the proper adjustment can't be obtained, the feed pawl stop may be too far to the rear in its mounting hole. Loosen the mounting screw, loosen the eccentric's locking screw and position the feed pawl stop assembly all the way to the front and tighten the mounting screw. This brings the feed pawl stop closer to the ratchet wheel, bringing the eccentric setting back into the adjustment range.

3. Adjust the detent spring to have from 1/2 to 3/4 lbs. tension at the roller. Form the spring end to change the spring's tension. To check, hook a bent paper clip under the detent arm near the roller and hook the spring scale T-18123 to the end of the paper clip,

pull the scale until the detent roller leaves the ratchet wheel and note the reading obtained. If the tension of the detent spring is greater than the tolerance, overfeeding can result.

4. Insert and read tab cards, checking the registration. The card stops may be adjusted, using the positioning screws, to compensate slightly for over or under feeding. Changing the upper feed roll ball spring will assist in keeping the registration correct.

TAB CARD READER CONTACTS

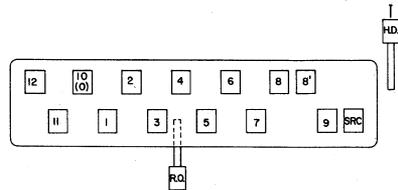


Figure 33 Bottom View

Check the reader to see that all of the contact springs and stiffeners are in proper side wise registration in each contact stack. Check to see that all stationary contact springs have tension against their stiffeners. The movable contact springs should all have sufficient tension to follow the contact levers to their extreme inward position without lost motion in the nylon operators. All stationary contacts when made with their movable contacts should have been moved a minimum of .010" from the stiffeners.

Care should be taken to see that the two contact points on each spring engage their mating contact points as nearly simultaneously as possible. It is also important that there be a minimum of difference in the point at which the contacts with the same specified clearance in various stackups make or break during rotation of the reader shaft. Mating contact points should be no more than .015" out of alignment. The reader contact stacks are numbered as indicated from the contact lever outward (Figure 33). A contact clearance chart is given for the tab card reader (Figure 34). The gap dimensions between the contact springs are expressed in thousandths of an inch measured in the position indicated. All normally open (N/O) contacts are adjusted with a blank card in the reader and the interposer bail roller on the low dwell of the cam (pins up). All normally closed (N/C) contacts are adjusted with no card in the reader and the interposer bail roller on the low dwell of the cam (pins up).

1. Lift the machine on to its tilt posts and loosen three screws and remove the reader cover. The reader can be re-

FRIDEN SYSTEMS ADJUSTMENT

TCR READER CONTACTS

- moved entirely for easy accessibility to the adjustments.
2. Place an unperforated tape in the reader to block all of the feeler pins. Manually cycle the reader until the interposer bail arm roller is at the low dwell of the interposer cam, and adjust all of the normally open contacts according to the chart by forming the stationary spring stiffeners with a spring hook or screwdriver. "T" bender T-18093 can be used where the stiffeners are accessible. Check the gaps with the wire gauges.

Note: When a contact gap is narrower than specified, forming the stationary contact stiffener to widen the gap and then forming it back to the specified gap will provide a longer lasting adjustment than just forming the stiffener to the specified gap because of the direction of stress put in the metal by the last bend. If the gap is widened by the last bend, the gap will widen more rapidly than if the gap is narrowed.

TCR05 Reader

Tab Card in Reader

Contacts	Normally Open Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR12	20-25		15-20									
SR11	20-25		15-20		20-25			20-25				
SR10(0)	20-25		20-25		15-20							
SR1	20-25		20-25									
SR2	20-25		20-25									
SR3	20-25											
SR4	20-25		20-25		20-25							
SR5	20-25		20-25		15-20							
SR6	20-25		20-25									
SR7	20-25		20-25		20-25		20-25					
SR8	20-25			20-25								
SR8	20-25		20-25									
SR9	20-25		20-25									

No Tab Card in Reader

Contacts	Normally Closed Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR12					20-25							
SR11						20-25			20-25			
SR10(0)						20-25		20-25		20-25		
SR1					20-25							
SR2					20-25							
SR3			15-20		20-25							
SR4							20-25		20-25			
SR5						20-25		15-20				
SR6												
SR7								20-25		20-25		
SR8		20-25			20-25		20-25					
SR8												
SR9				20-25								

Figure 34

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 2

TCR06 Reader*

Tab Card in Reader

Contacts	Normally Open Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR12	20-25		15-20									
SR11	20-25		15-20		20-25			20-25				
SR10(0)	20-25		20-25		15-20							
SR1	20-25		20-25									
SR2	20-25		20-25									
SR3	20-25											
SR4	20-25		20-25		20-25							
SR5	20-25		20-25		15-20							
SR6	20-25		20-25									
SR7	20-25		20-25		20-25		20-25					
SR8	20-25			20-25								
SR8	20-25		20-25									
SR9	20-25		20-25									

No Tab Card in Reader

Contacts	Normally Closed Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR12					20-25							
SR11						20-25			20-25			
SR10(0)						20-25		20-25		20-25		
SR1					20-25							
SR2					20-25							
SR3			15-20		20-25							
SR4							20-25		20-25			
SR5						20-25		15-20				
SR6												
SR7								20-25		20-25		
SR8		20-25			20-25		20-25					
SR8												
SR9				20-25								

Figure 34

*Note that the reader contact clearances are unchanged from the TCR05 Reader

DATE: November 4, 1963

ADDITION: Page 4-13. Manual Addendum 2.

REASON: Reader Designation Changed.

EXPLANATION: The removal of SRCC contacts from reader TCR05 has necessitated a change in designation to TCR06.

FRIDEN SYSTEMS ADJUSTMENT

TCR, SRC & SRCC CONTACTS

3. In the same manner, manually cycle the reader so the interposer bail arm roller is at the low dwell of the cam, but without any tape in the reader, allowing all pins to operate fully, and adjust all of the normally closed contacts (now open) according to the chart by forming the stationary spring stiffeners. Check the gaps using the wire gauges.

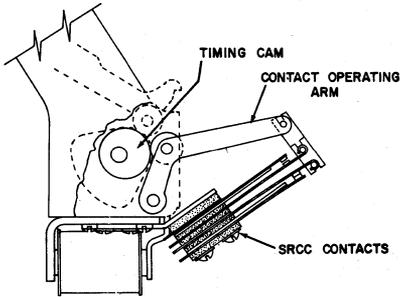


Figure 35

5. Adjust SRC contact spring 6 so that 6 & 7 have the same gap as the contact springs 1 & 2 on the reader contacts operated by the contact lever bail touching the interposer bail studs. (If the front contact lever bail rollers are touching the interposer bail studs, common contact springs 6 & 7 are to be adjusted to the same gap as the reader contact springs 1 & 2 on the rear reader contacts. In the same way, if the rear contact lever bail rollers are touching the interposer bail studs, common contact springs 6 & 7 are to be adjusted to the same gap as reader contact springs 1 & 2 on the front reader contacts.)

If there is doubt as to which contact lever bail will touch and be moved first, rotate the reader shaft back and forth and note which group of reader contacts, front or rear, operate first.

READER CAM COMMON CONTACTS (SRCC) & TIMING CAM (Figure 36)

1. Loosen the set screws and position the collar on the mounting shaft so the contact operating arm has from .002" to .005" side play. Tighten the set screws.
2. Loosen the set screws and locate the timing cam:

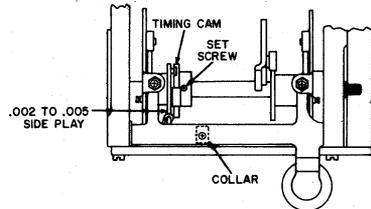


Figure 36

- a. Locate it sideways so it is situated centrally under the contact operating arm roller.
- b. Locate it rotationally so that when the interposer bail arm roller is on the high lobe of its cam, the contact operating arm roller is at the low point of the timing cam. The timing cam may have to be shifted (slightly) later on.

Tighten the set screws.

3. Cycle the reader so that the interposer bail arm roller is on the high lobe of its cam and the contact operating arm roller is at the low point of the timing cam. Form the stationary contact stiffener on spring 4 so there is a gap of .010" to .015" between contacts 3 & 4. (3 & 4 are normally open.)

READER COMMON CONTACTS (SRC)

1. With the interposer bail arm roller on the high dwell of its cam, form the contact stiffener on spring 3 for a .015" to .020" gap between springs 3 & 4.
2. With blank tape in the reader and the interposer bail arm roller at the low dwell of the cam, form the contact stiffener on spring 5 for a .015" to .020" gap between springs 4 & 5.

Note: This gives make-before-break operation of contacts 3, 4 & 5.

3. With the interposer bail arm roller on the high dwell of the interposer cam, form spring 1 so there is a .042" to .047" gap between springs 1 & 2.
4. With blank tape in the reader and the reader contacts adjusted properly, rotate the reader shaft so the feeler pins operate and the interposer bail arm roller starts back to the high dwell. Stop the reader shaft at the point where the studs on the interposer bail first contact either of the contact lever bail rollers.

Note: Ideally, the interposer bail studs contact both contact lever bails at the same point and start to move them at the same time. Due to manufacturing tolerances, this condition is not always present. Either the front contact lever bail or the rear contact lever bail may start to move its contact lever first. This is the point at which the common contacts are to be adjusted.

FRIDEN SYSTEMS ADJUSTMENT

RECTIFIER LOCATIONS

4. Cycle the reader so that the interposer bail arm roller is at the low dwell of the interposer cam and the timing cam is at the high point and form the stationary contact stiffener on spring 2 so there is a gap of .030" to .035" between contacts 1 & 2 (normally closed.)
5. Check the rotational location of the timing cam. Cycle the reader shaft with no tape in the reader and check to see

that the normally open contacts 3 & 4 close just after the normally closed reader contact springs 5 & 6 on SRI2 open. Springs 3 & 4 should open just before the reader contact springs close when restoring. If contacts 3 & 4 do not operate in this manner, loosen the timing cam set screws and shift it rotationally to satisfy the requirements of the operation. Tighten the cam's set screws and check the operation.

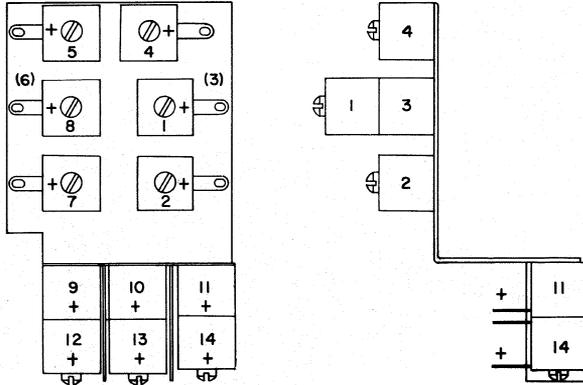


Figure 37 Rectifier Locations

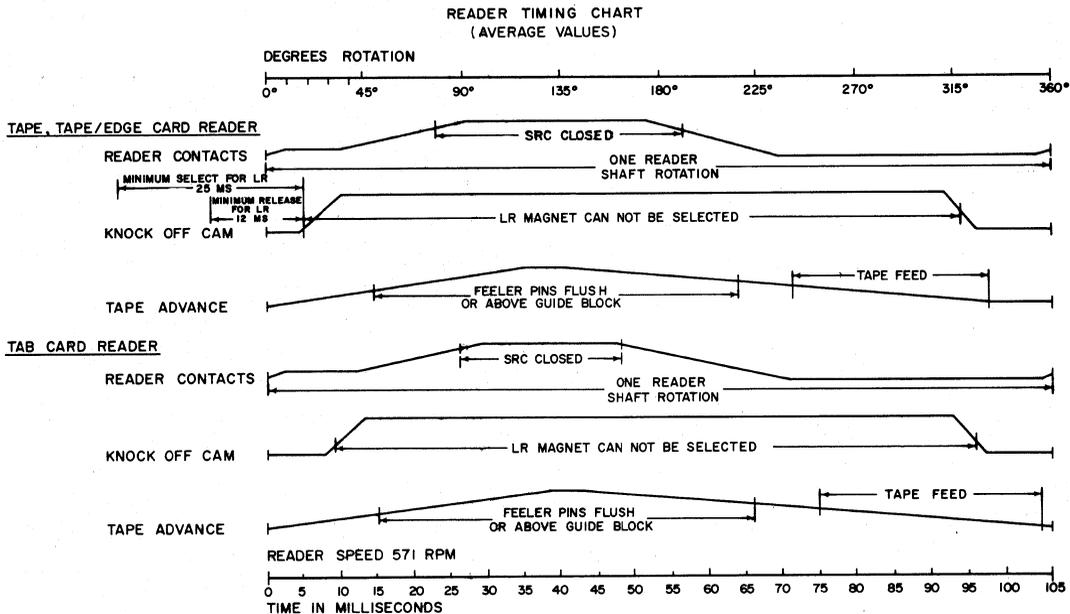


Figure 38

FRIDEN SYSTEMS ADJUSTMENT

FRAME ASSEMBLY

TRANSLATOR

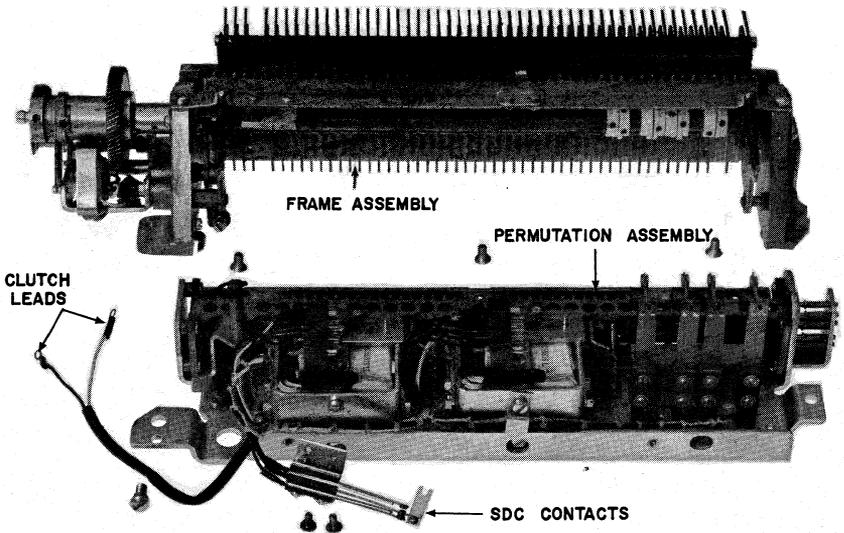


Figure 1

The adjustments should be followed in sequence if the translator is to be completely adjusted. In this way, an adjustment, once made, will not be affected by those following it. It is also true that if an adjustment is changed in a translator, all of those adjustments following it should be checked.

The translator should be disassembled into the two major sub-assemblies, the frame assembly and the permutation assembly, to accomplish some of the following adjustments. To disassemble, remove the three counter-sunk screws on the rear of the translator, and the slotted screw at the right side of the translator bed. Disconnect the two leads to the translator clutch and remove the two screws mounting the SDC contacts to the seeker spring support.

Separate the two assemblies (Figure 1). The nylon operators for the STC and SDC contacts, and the restorer bail shaft will come free and should be retained for reassembly.

Frame Assembly

There are two adjustments which affect the seeker operating bail. Its pivot point can be changed by rotating the eccentric pivot stud with the mounting screw loose (Figure 2). This moves the bail back and forth. The bail's eccentric adjustment near the cam roller is used to control the height of the bail.

1. Cycle the translator so the seeker restoring bail allows the seekers to move

to their extreme operated position. Loosen the screws holding the eccentric pivot studs so they can be turned and, keeping the high (marked) lobes of the eccentrics up, turn the studs so that the seeker operating bail overlaps the seeker shoulders by at least two thirds its operating surface. Tighten the screws without disturbing the adjustment.

2. Adjust the eccentrics between the cam follower arms and the operating bail arms so that the operating surface of the operating bail is .001" to .010" above the seeker shoulders just as the seekers reach their extreme forward position (Figure 3). Keep the high lobes of the eccentric studs up and be sure that the clearance is equal across the translator.

With the two adjustments made, unhook the seeker operating bail springs and see if the bail operates freely on the pivot studs. Also be sure that the bail is straight. If there are binds or the bail isn't straight, form the bail and make the adjustments again and recheck.

Note: The seeker operating bail should not come within .005" of seekers blocked by their permutation bar projections. This clearance is hard to see when the translator is assembled and only the end-seeker clearance

FRIDEN SYSTEMS ADJUSTMENT

PERMUTATION ASSEMBLY & COMBINED ADJUSTMENTS

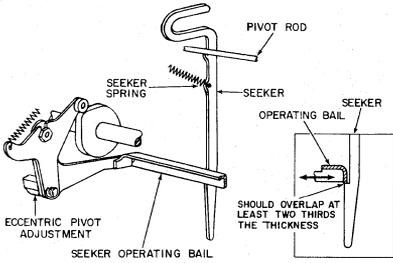


Figure 2

can be seen. The closer the bail is kept to the "two thirds its own thickness adjustment", the better the .005" minimum clearance will be.

Permutation Assembly

The spring plunger bracket assembly must be adjusted after the restoring bail eccentric stop is set, but the bracket should be straight in the machine and aligned with the permutation bars so it will not interfere with the adjustments.

1. Be sure that the permutation bars are straight, free in the guides, and installed in the correct slots. Loosen the rear guide mounting screws and adjust the guides so the permutation bars operate freely and have no more than .003" play front-to-rear (Figure 4).

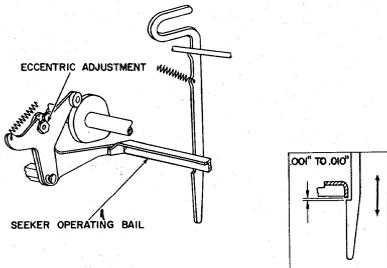


Figure 3

2. Adjust both magnet yoke assemblies in the same manner and to the same armature to heelpiece clearance.

Loosen the mounting screws of the armature spring & pivot plate (Figure 5) and with the armatures attracted manually, position the plate for a clearance of .002" to .007" between the heelpiece of the magnet yoke and the underside of the magnet armature. Both top and bottom armature clearances should be the same.

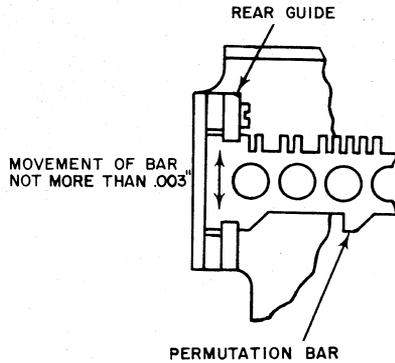


Figure 4

Tighten the mounting screws.

3. Loosen the two hex head screws on each side of each magnet yoke and pivot the yokes around the studs so that all armatures have the same clearance (within .003") to the permutation bar projections vertically (Figure 6). The variation should be measured between the top and bottom armature in each case. Tighten the hex head screws.

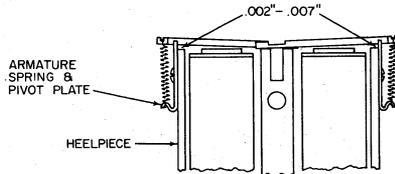


Figure 5

Reassemble the two sections of the translator to perform the rest of the adjustments, installing the operators, etc. that came free in disassembly.

4. Loosen the screws (slightly) that mount the magnet yoke assemblies to the bed of the translator and position the yokes so they are parallel to the permutation bars and there is .005" to .010" clearance between manually attracted armatures and the latching surfaces of the permutation bars (Figure 7). Note that the right hand armatures will be .004" closer to the permutation bars at the heelpiece due to the difference in the air gaps. The yoke assembly itself should be parallel.

At the same time, locate the magnet yokes right or left so that the odd-numbered permutation bar projections

FRIDEN SYSTEMS ADJUSTMENT

COMBINED ADJUSTMENTS

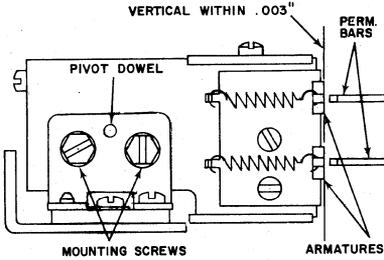


Figure 6

are centered on their respective seekers with the armatures latched. With the two conditions satisfied, tighten the mounting screws securely. The magnet yokes may be removed without disturbing their adjustment by removing the screws mounting the magnet yokes to the magnet yoke mounting and adjusting plates.

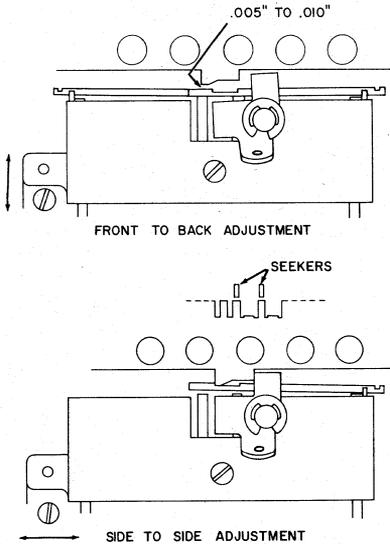


Figure 7

5. Loosen the screw that mounts the armature knock off bail plates to each magnet yoke and position the plates so there is a minimum of .002" clearance between the bail and a manually attracted armature (Figure 8). The clearance should be the same for the top and bottom armature in each magnet yoke. The clearance should be held as close to the .002" minimum as possible for maximum knock off action but the bails must not come within .005" clearance to the permutation bars so that they

bind against the bars as they operate. The bails must also not be so far forward that they bind the armatures as they operate.

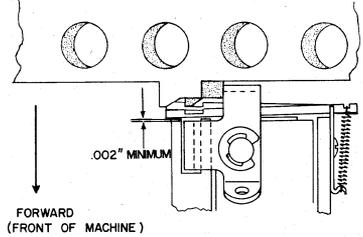


Figure 8

6. Loosen the mounting screws and position the upper pivot bearing block for the restoring bail shaft so the restoring bail is vertical (Figure 9). This can be done by pivoting the restoring bail manually and seeing that it touches all of the latched permutation bar restoring projections at the same time. Tighten the mounting screws.

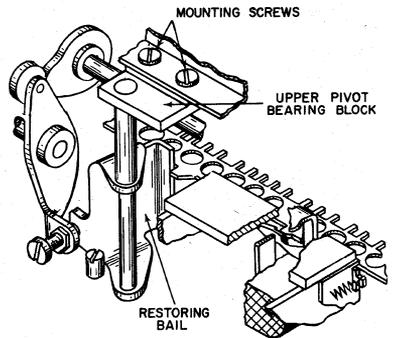


Figure 9

7. Cycle the translator so that the bail lever is at the high point of the restore cam and the restore bail is fully pivoted. Loosen the locking nut and adjust the restoring bail operating screw so that the permutation bars are moved .015"

FRIDEN SYSTEMS ADJUSTMENT

CLUTCH

to .030" past the latching point (Figure 10). At the same time, there should be .001" to .010" movement available for the armatures between the permutation bars and the knock off bails. The .001" lower limit insures that the armatures are not choked off and the .010" upper limit insures that the knock off is adequate. The knock off should be as equal as possible for both bails. The bails may be repositioned.

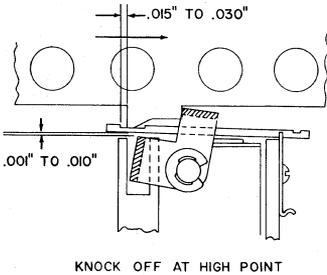


Figure 10

- Release all of the permutation bars with the permutation bar restoring bail lever at the low dwell of the restore cam (Figure 11). Loosen the locking nut and adjust the eccentric stop for the restoring bail so the permutation bars are located with the even numbered projections centered in front of their respective seekers. This may allow lost motion of the restoring bail lever, which is permissible. Once the clutch is adjusted, this lost motion will not be evident at home position.

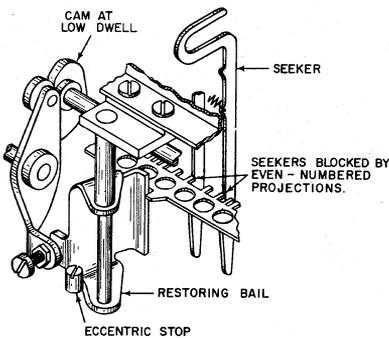


Figure 11

- Loosen the mounting screws and adjust the spring plunger bracket so there is .005" minimum clearance between the surface of the bracket and the shoulders on the plungers (Figure 12) when the permutation bars are released and against the restoring bail and the bail, in

turn, is against the eccentric stop. Keep the bracket straight so the clearance is as equal as possible for all the plungers and tighten the mounting screws.

Clutch

- Manually pivot the clutch armature to the fully attracted position and see that there is a visible clearance to the lower magnet coil, not exceeding .012" (Figure 13). If the clearance is incorrect, change the coils or the armature, whichever is at fault.

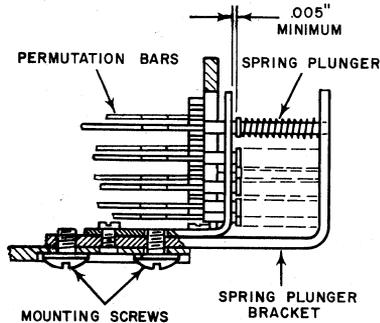


Figure 12

- Locate the clutch magnet yoke on the translator casting, by loosening the two mounting screws, so that the tip of the armature, fully attracted, clears the clutch sleeve projection by .003" to .006".
- Trip off a permutation bar with the translator cycled to a point where the restoring bail has caused the armature knock off and is pivoting back toward the eccentric stop. Have the clutch detent cam and the clutch collar set screws loose and position the clutch detent so there is .003" to .008" clearance between the translator gear and the spacer with the clutch parts tight against the detent (Figure 14).

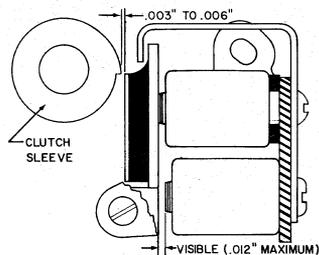


Figure 13

FRIDEN SYSTEMS ADJUSTMENT

CLUTCH & SDC CONTACTS

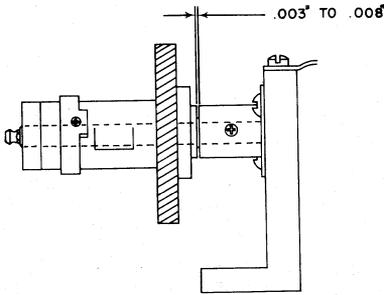


Figure 14

Preserving this clearance, cycle the translator until the permutation bar just stops moving to the left, indicating that the restoring bail is against the eccentric stop (Figure 15). Turn the clutch detent cam until it engages the detent arm and tighten the set screws, being sure that the .003" to .008" clearance is still evident between the translator gear and the spacer. This is the home position of the translator.

4. Cycle the translator shaft so the clutch detent cam is about halfway from home position and manually turn the clutch sleeve backward to be sure that the square stud on the inside of the sleeve is against the non-expanded clutch spring.

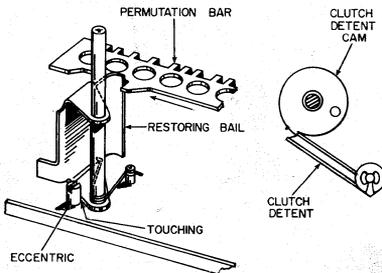


Figure 15

Maintaining this condition, continue to cycle the translator until the clutch detent cam is .005" to .046" short of the latching surface on the end of the detent arm (Figure 16). At this position, turn the clutch collar (set screws loose) toward the armature latching surface until it touches. This results in the clutch spring being properly positioned to expand as the clutch detents. Tighten the clutch collar set screws with the clutch collar tight against the clutch detent cam.

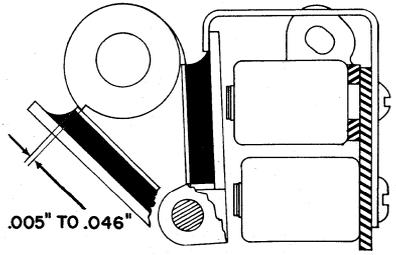


Figure 16

5. The armature stop should be formed to permit the armature to be as close to the low surface of the clutch sleeve as possible without touching it (.001" to .008") (Figure 17).

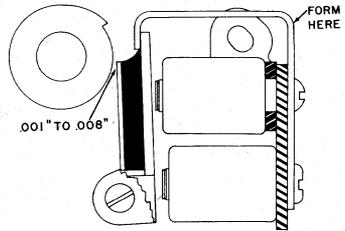


Figure 17

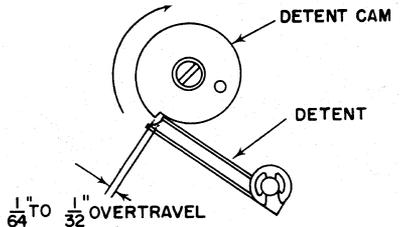


Figure 18

6. Loosen the set screws on the overtravel stop and locate it so the clutch can overtravel $1/64$ " to $1/32$ " before the stop contacts the clutch sleeve (Figure 18).

Contacts SDC

1. Adjust the normally open contacts for a gap of .015" plus or minus .002" to the movable contacts by forming the contact stiffeners. Depress the SDC bail slowly and see that the normally closed contacts follow the movable contacts .010" minimum. Form the contact stiffeners.

FRIDEN SYSTEMS ADJUSTMENT

STC CAMS & CONTACTS

This gives break before make operation of the SDC contacts. When the SDC contacts are operated by a carriage return, tab or back space translator operation, the movable contacts should operate far enough to move the make (n/o) contacts .010" (minimum).

If there is no follow on the make contacts, loosen the two screws that mount the SDC contacts to the seeker spring support and shift the contact bracket counterclockwise (viewed from the top) so that the movable contacts have more tension. This will make it necessary to readjust the contacts.

Conversely, if the break (n/c) contacts follow the movable contacts too far, the SDC contact mounting bracket should be shifted clockwise (viewed from the top). This will also make it necessary to adjust the contacts.

Note: The seeker springs above the SDC contacts can be removed so the contact clearance and operation can be seen.

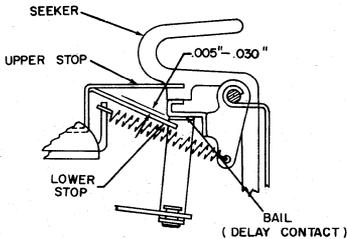


Figure 19

- Form the SDC bail stop for .005" to .030" clearance to the SDC bail when a bail operating seeker is fully operated, operating the bail. This allows for operation under power without the probability of the nylon operator coming off of the bail or contacts (Figure 19).
- Cycle the translator to the point where a slight upwards movement of all seekers is noted. The delay bail should not follow the seekers up during this slight movement. Turn the shaft back and forth and form the upper stop to hold the bail at the lowest point caused by the seeker movement.

STC Cams & Contacts (Figure 20)

- The cams should be located on the shaft so that the cams fully engage the rollers without chance for mis-alignment.
- All normally closed contacts should have a .020" to .025" air gap when operated (high dwell of the cam). On the

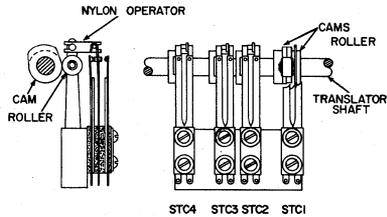


Figure 20

low dwell of the cam, the stationary contacts should have been moved a minimum of .010".

- All normally open contacts should have a .020" to .025" air gap when at rest (high dwell) and when they are operated (low dwell) the stationary contacts should be moved a minimum of .010".
- Transfer contacts are to be adjusted to make and break at the specified degree settings with no regard for maximum clearances as long as a minimum air gap of .015" and .010" minimum follow on stationary contacts is maintained.

Note: On contact stack-ups where only two springs are wired, they are to be treated as n/o or n/c contacts, adjusted as such, and the unwired spring formed out of contact with the wired springs.

- All bifurcated contacts should touch simultaneously with their mating contact points and the contacts should be in alignment sideways.
- Adjust the cams to operate the contacts at the degrees of translator shaft rotation as indicated on the schematics for the machine (plus or minus 2°). The following method is suggested (Figure 21).

Connect the VOM T-18082 across the switch contacts to be adjusted with the meter set to indicate continuity. Mount the timing dial T-18088 on the end of the translator shaft, put a mark on the detent arm pivot shaft, loosen the set screws on the timing dial and set the timing dial to zero at the scribe mark. The timing dial screw T-18152 replaces the screw or grease fitting in the end of the translator shaft while the dial is being used.

Cycle the translator shaft to the degrees rotation indicated and set the cams on the translator shaft to cause the contacts to make or break as the case may be. Set one part of the cam for the start of the contact dwell and the other for the end of the contact dwell. Do not tighten the set screws

FRIDEN SYSTEMS ADJUSTMENT

TRANSLATOR MOUNTING

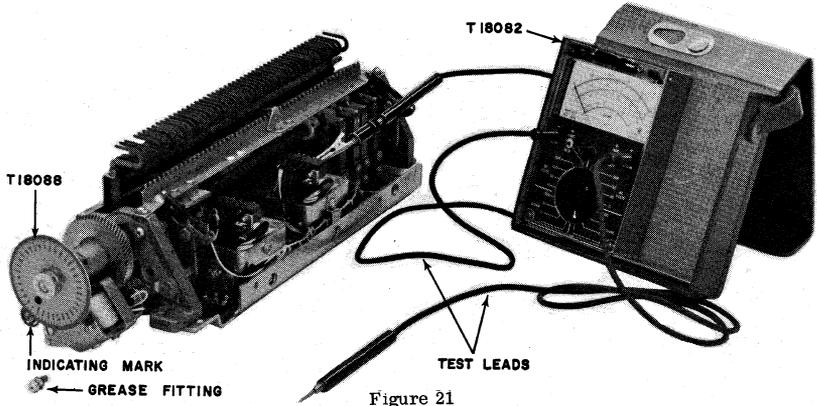
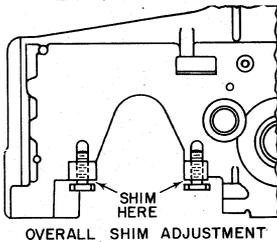
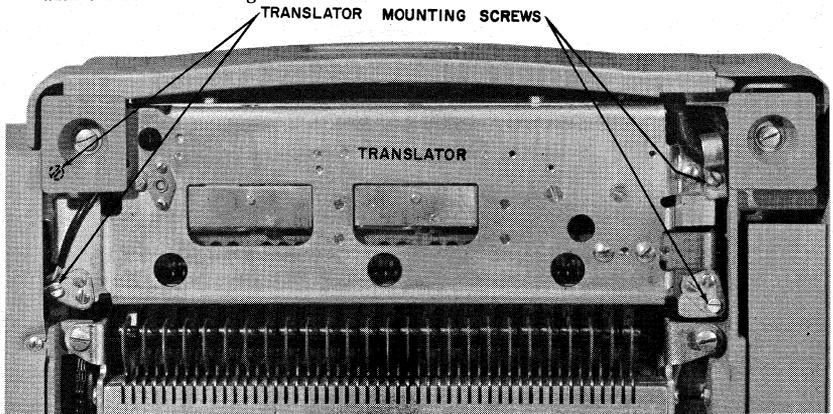


Figure 21

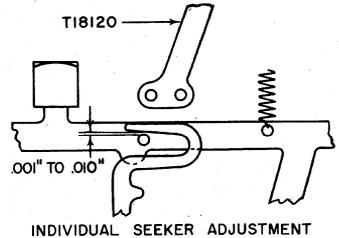
excessively as this will cause the material to stretch.
Translator Mounting (Figure 22)
 These adjustments are normally necessary only on initial installation of a translator in a machine.

1. When the translator is in the machine the seekers should clear the tops of the key lever studs by .001" to .010". Washers may be placed between the base and the adjustable translator mounting foot studs for an overall adjustment. Individual seekers are adjusted by forming with the seeker forming tool T-18120.

2. The two lower, or rear, mounting positions have adjustable plates which may be loosened in order to align the translator to the machine. The translator should be positioned right or left so that the seekers have minimum clearance to the key levers, but do not bind on the sides of the key levers. It should be positioned front and rear for a slight amount of backlash between the intermediate gear, outer, and the translator gear. The two front mounting screw holes are large enough to allow adjustment.



OVERALL SHIM ADJUSTMENT



INDIVIDUAL SEEKER ADJUSTMENT

Figure 22

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 37

DATE: November 9, 1962

CHANGE: Page 5-7, Translator Mounting
(Figure 22)

REASON: Adjustment Tolerance Change

EXPLANATION: Provides a specific mesh tolerance between the intermediate gear outer and the translator gear.

2. The two lower, or rear, mounting positions have adjustable plates which may be loosened in order to align the translator to the machine. The translator should be positioned right or left so that the seekers have minimum clearance to the key levers, but do not bind on the sides of the key levers. It should be positioned front and rear for a backlash between the intermediate gear, outer, and the translator gear of .003" to .010" and for minimum noise. The two front mounting screw holes are large enough to allow adjustment.

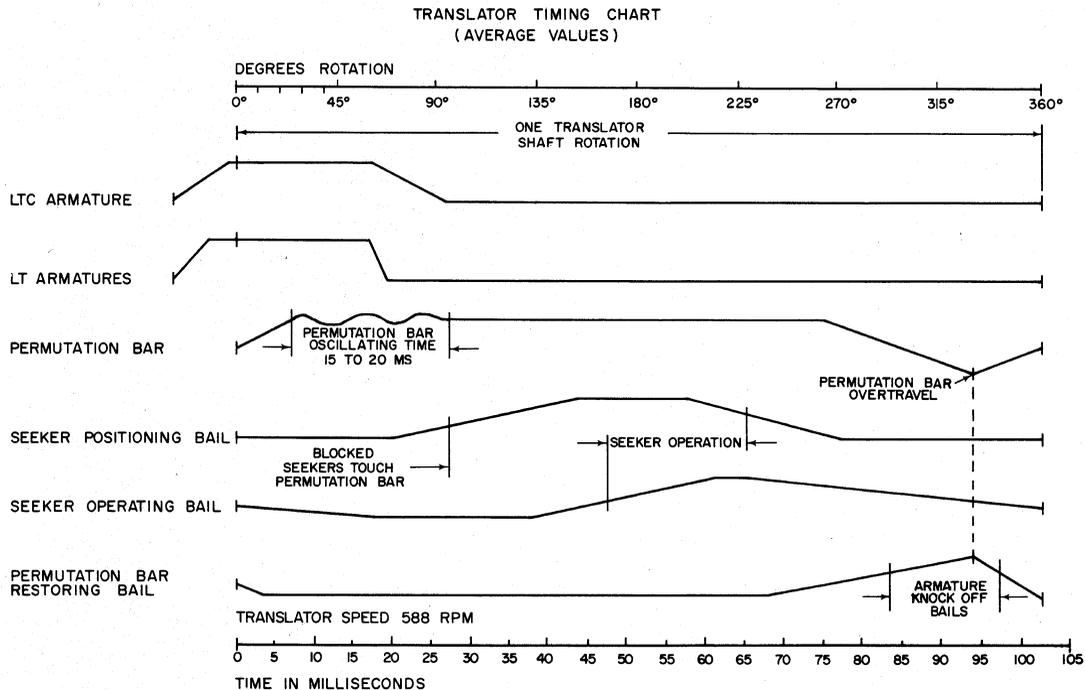


Figure 23

FRIDEN SYSTEMS ADJUSTMENT

READERS, PUNCHES & EXTENDED CARD GUIDE

CUSTOM KITS & OPTIONAL FEATURES

Units in the field must be returned to the point of manufacture for addition of any of the Special Features because of the complexity and amount of work involved.

Special Features are identified as such, otherwise the device is a Custom Kit. Accessories are also identified.

READERS

Either a tape/edge card or tab card reader may be substituted for a tape reader in any Systems Flexowriter. The reader plug wiring is compatible and the mounting is the same except that the dowel screw must be removed from the Flexowriter casting when a tape reader is dismantled. This allows the tape/edge card or tab card reader to be mounted using two screws instead of one because of the reader's larger size and weight. The reader cable should be routed to the reader plug socket in the same manner as the one removed. The reader cables should always be run inboard the selector pivot shaft so as to protect the cable. The screws that extend from the plug and socket align the pins and prevent a plug being inserted the wrong way.

Note: The same type plugs are used for the reader, punch & selector. The different positions of the male and female screws on the plugs and sockets in addition to the two different size plugs and sockets used prevent their incorrect installation.

Caution should be used to be sure that the cable does not touch any moving parts.

PUNCHES

A tape/edge card punch can be installed in place of the tape punch on any Systems Flexowriter unless it is equipped with a 20" carriage. Keep in mind the considerations for routing the cable and plug insertion.

The card feed (KCF-K11) relay must be installed in the Flexowriter to obtain the automatic card feed without Tape Feed punching unless the relay is already in the machine.

EXTENDED CARD GUIDE

The extended card guide mounts on a tape/edge card reader or punch to guide cards up to 5" in width. The kit consists of an adjustable card guide, two mounting screws, a screw plate, and a shaft, collar, and four set screws.

In the tape/edge card punch, the adjustable guide is mounted under the card table through a slot on the overturned edge. The screw plate is positioned underneath and the mounting screws threaded from the top into the screw plate. Once installed, it is only necessary to loosen the mounting screws, adjust the guide to the card, and tighten the screws.

In the tape/edge card reader the same procedure and parts are used, but the guide already in the reader must be removed.

The shaft collar and set screws provide a means of extending the pin wheel shaft beyond the five inches. The tape feed knob is removed, the collar set screwed to the pin wheel shaft with the flat end toward the casting but not touching it, the shaft is inserted in the collar and set screwed, and then the tape feed knob is installed on the end of the shaft.

FRIDEN SYSTEMS ADJUSTMENT

PARITY CHECK

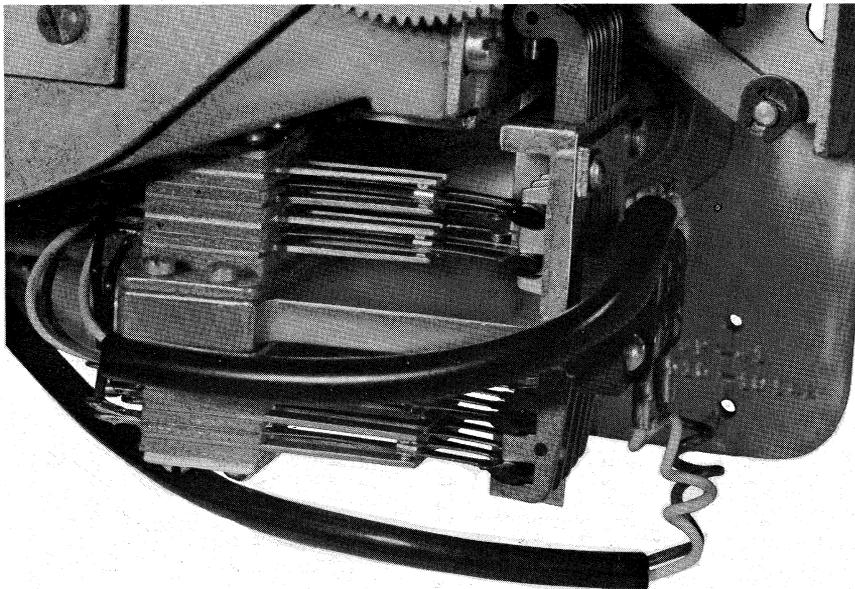


Figure 1

The punching accuracy check can be added to any tape or tape/edge card punch that is not a back spacing unit. The parity check assembly is mounted in the punch so that its operators engage the punch pins (Figure 1). As the pins move up to punch a code, the corresponding contacts transfer, either completing or not completing a circuit to the parity relay. If a circuit is completed, the parity relay energizes, breaking the circuit to the punch and causing the Flexwriter keyboard to lock.

The parity check can be for either "odd code parity" or "even code parity". In all equipment using the Systems code the parity check is odd code parity because the Systems code is composed of odd codes. A feed hole alone is considered an even code and will lock parity.

Therefore, whenever the punch punches an odd code, there is no circuit to the parity relay and the code is assumed to be the correct one.

If, however, the code punched contains an even number of bits, the parity relay energizes, breaks the punching circuit, locks the keyboard, and the operator can delete the code and punch the correct one.

Note: If two code bits are added or dropped the code is still odd and is not recognized as an incorrect code. The chances of this happening are extremely remote.

The parity (KP-K33) relay and the punch address (KPA-K15) relay must be installed in the Flexwriter to complete the necessary circuits unless they are already in the machine.

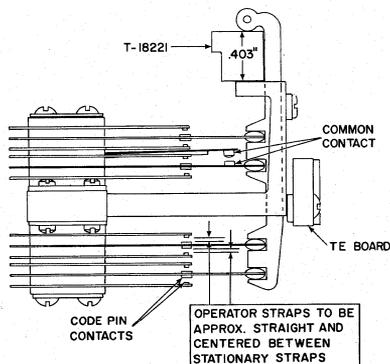


Figure 2

ADJUSTMENT

Parity Check Assembly - Not Installed

1. Using the parity check gauge T-18221 with the .403" side of the gauge inserted as shown (Figure 2), the movable straps of the contacts should be

FRIDEN SYSTEMS ADJUSTMENT

PARITY CHECK

approximately straight and the center contacts centered between the normally open and normally closed contacts.

2. With the .438" side of the gauge inserted (Figure 3), all open contacts except the commons should be formed for .008" to .014" clearance to the center movable contacts.
3. With the .368" side of the gauge inserted (Figure 3), the open contacts should be formed for an .008" to .014" gap.

Parity Check Assembly - Installed

1. Position the assembly on the inner punch casting so that the scribe mark on the outer (channel 8) operator arm is aligned with the top surface of the parity contact casting when the punch pins are down. Be sure that the contact operators have a full engagement with the punch pins and tighten the screws.
2. With the punch pins down, there should be an .008" to .014" gap between the operate contacts and the normally open contacts. Form the stationary contact springs.
3. With the punch cycled manually so all of the punch pins are fully operated (armatures tripped manually), there should be an .008" to .014" gap between the operate contacts and the normally closed (now open) contacts. Form the stationary contact springs.

Parity Common Contacts

The parity common contacts operate from the

feed hole punch pin. The parity check assembly supplied for all Systems machines is the normally open contact type. Adjust the common contact to close just after the code pin contacts close during the upward movement of the punch lever & frame assembly. With the adjustment made properly, the common contact will open before the code pin contacts open during the downward movement of the punch lever & frame assembly.

Note: On normally closed contact parity contact assemblies, the common contact is adjusted to open just after the code pin contacts open during the upward movement of the punch lever & frame assembly and close before the code pin contacts close during the downward movement of the punch lever & frame assembly.

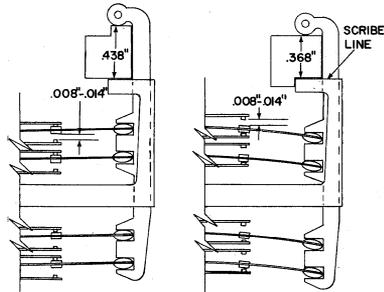


Figure 3

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ADDING MACHINE SELECTOR BRIDGE

BRIDGE ASSEMBLY (Adding Machine)

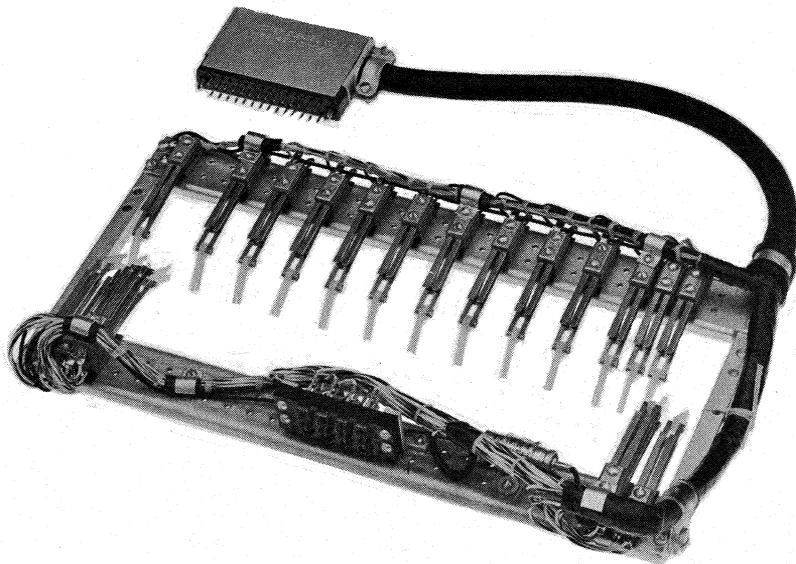


Figure 1

A Friden Solenoid Input Adding Machine can be cable connected to an SPS or SPD Flexowriter if the Flexowriter is equipped with the necessary selector assembly (Figure 1). Various plug changes must be made in the Flexowriter and then the adding machine will operate as an auxiliary output unit.

With the units properly hooked up, a number key depressed in the Flexowriter will select the proper digit in the adding machine. After a series of digits have been typed on the Flexowriter and entered into the adding machine, a signal originated in the Flexowriter

will cause the adding machine to cycle. The signal can be any one of several (Space, Carriage Return, Tab, Plus or Minus).

Normally, the signals are sent from an SPD with the basket in lower case. However, there is a pluggable option whereby the signals can be sent to the adding machine with the basket in upper case.

Space bar operation in the Flexowriter will select a zero in the adding machine. This is also pluggable and the zero can be suppressed by changing the taper pin connection.

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PIN FEED PLATENS

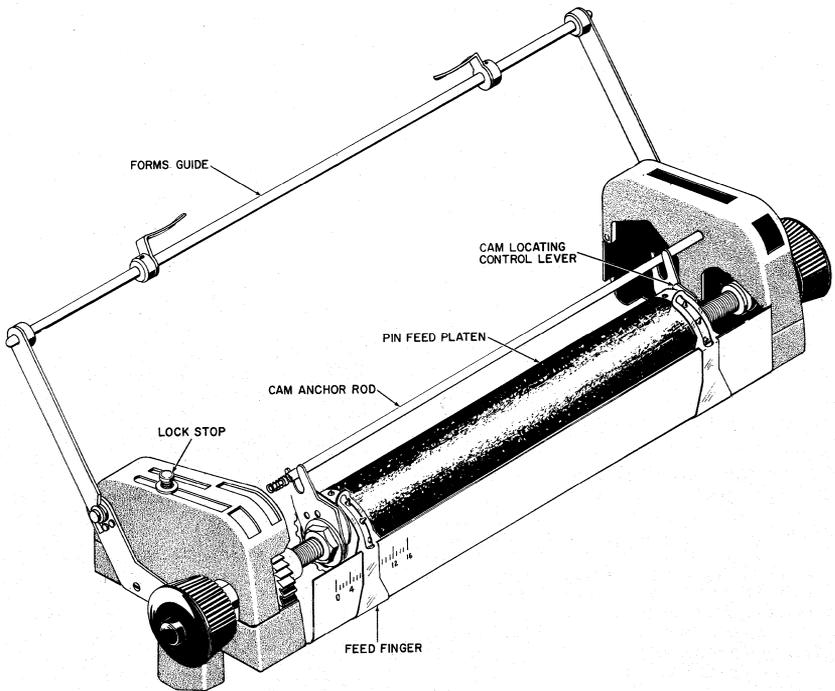


Figure 1

Pin feed platens are used in many Systems applications to obtain automatic transport and registration of forms. The forms used are (1) continuous fan-fold, (2) perforated for easy separation and (3) punched with regularly spaced holes at each side. They contain carbons in one form or another. When these forms are installed in a Flexewriter equipped with a pin feed platen, many forms and their multiple copies can be written with a minimum amount of attention from the operator with regards to form insertion and registration.

Cammed pins near the ends of the platen feed the forms instead of using the pressure between the feed rollers and platen as in a normal Flexewriter. Feed fingers (Figure 1) keep the forms on the pins and the paper release lever is in its forward position so that the paper deflector is out of engagement with the platen. A spring loaded stop, the "lock stop" (Figure 1), is provided to keep the paper release lever forward. The deflector retaining springs hold the paper deflector away from the platen so that the deflector cannot interfere with the proper feeding of the forms.

It is not necessary to remove the pin feed platen when unpunched forms are to be used. Move the lock stop to the rear, position the

paper release lever to the rear, pivot the bail roll shaft and move the bail stops out of the way of the cam anchor rod, and position the pins to the rear by disengaging the cam locating control levers and turning the control plates until the levers pivot into the other slots. The platen will now feed unpunched forms the same as a regular platen except that the typing line will be restricted to the shorter length of the rubber surface.

When the forms are installed, the second form's first line should be turned to the writing line using the platen variable. The first form should be left blank and is used to position the forms on the pins only. Always leave one typed form in the platen, to insure good pin engagement, or else index the platen through one blank form when removing the last typed form.

A form guide is supplied which mounts on the carriage to keep the forms feeding straight into the machine. Another guide covers the relay bank and tape supply drum on the Flexewriter.

The "Packholder and Refold Assembly" may also be used. This device is a stand that holds a pack of forms, guides them to the Flexo-

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PIN FEED PLATEN

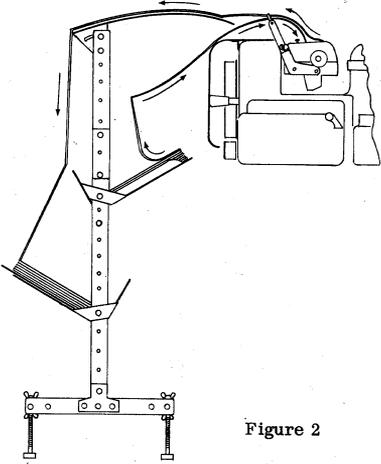


Figure 2

writer, and accepts the typed ones, allowing them to restack themselves (Figure 2).

The platen is composed of two halves or "sectors" instead of being one piece. These sectors are cut as a unit when the platen is manufactured. The seams do not influence the typing impression or density as long as they are assembled correctly. Each sector and the pin wheel assembly is marked to allow the sectors to be correctly matched when the platen is reassembled.

A second margin stop acts as a right hand margin to prevent the carriage escaping past the end of the rubber surface of the platen, thereby preventing damage to the type faces caused by typing on the pin wheel assembly or feed fingers.

ADJUSTMENT

1. With the cam locating arm lever in slot (A) (Figure 3), loosen screw (C) and

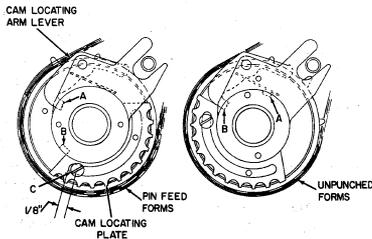


Figure 3

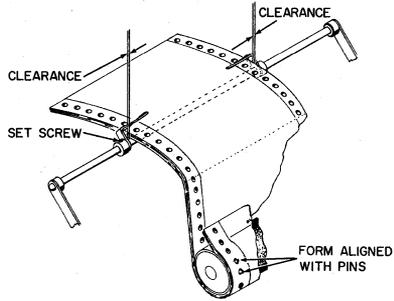


Figure 4

shift the cam locating plate so there is $1/8$ " between the center of the screw head and the end of the slot. Adjust both cam locating plates and be sure to tighten the screws. This adjustment positions the pins so they will engage the forms properly.

Note: The platen can feed unpunched forms by positioning the cam locating arm levers in slot (B), thereby positioning the extended pins toward the rear.

2. Loosen the set screws on the form guides (Figure 4) and position them laterally so they keep the forms feeding straight with a slight amount of side play. Position the guides rotationally in line with the arms and tighten the set screws.
3. Adjust the bail stops (Figure 5) by means of their eccentrics so there is clearance between the bail rollers and forms installed in the machine. Be sure that the bail rollers rest on the platen when the bail stops are not positioned on the cam anchor rod.

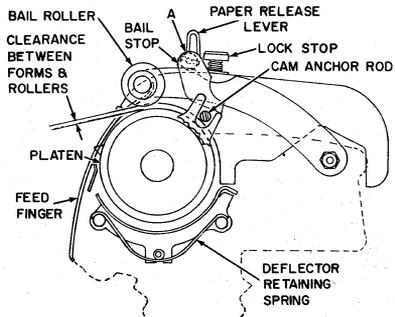


Figure 5

ELECTRIC LINE FINDER

When continuous forms are used in a Flexowriter with a pin feed platen, it is usually necessary to index the platen more than once to get from the last line of the completed form to the first line of the next form. There are various methods of accomplishing this indexing operation in one step. The Electric Line Finder does the work entirely automatically, being activated from the Flexowriter either by keyboard action or by a "Form Feed" code being read in the tape. The Electric Line Finder has no provision for manually indexing the platen other than using the platen variable mechanism in the special pin feed platen. The platen variable is used to align the printed form to the writing line. Since the operation is automatic, the pin feed platen does not have the right end platen knob and the platen assembly ends at the right carriage end frame. The indexing hook lever in the Flexowriter operates but does not control the platen of the line finder.

The platen is indexed by a motor mounted in the mechanism itself. This motor is constructed so it can be turned on but "stalled" (held so it can't rotate) for indefinite periods of time without damage. The motor is on and stalled whenever the Flexowriter is on. The motor is kept from rotating by its engagement with the "Program Disc" in the gear train. The program disc is held in turn, by the "Program Disc Stop Pawl".

Two rotary solenoids are used in the line finder. The first is called the "Line Feed" solenoid. Its action pivots the program disc stop pawl out of the program disc momentarily, allowing the program disc to turn and index the platen (also connected to the gear train).

The program disc is manufactured according to the design of the form to be used. It contains a number of teeth matching the lines of the form. The disc can be changed to provide the proper program for each different form. The program disc is machined so that when the last typing line has been reached and the line feed solenoid is energized, the program disc stop pawl comes out of the program disc momentarily, as before, but there are no teeth on the program disc so the motor indexes the platen to the first line of the next form.

The second rotary solenoid, termed the "Form Feed" solenoid allows the operator to index the platen (and the form) from any point in the form to the next form without the necessity of more than one operation. This operation is termed "Form Feed".

To accomplish a form feed, the line feed and form feed solenoids are both energized at the same time, the program disc stop pawl comes out of the program disc, and the stop pawl is

latched so that it stays out of the program disc through the balance of the form.

On the Flexowriter, depression of the carriage return key lever closes contacts (Selector Bridge Contacts in an SPD and Selector Contacts in an SPS) and completes a circuit to the line feed solenoid, causing line feed as the carriage returns.

Form feed is manually initiated by depressing the "Punch Adres" panel switch and operating the carriage return key lever.

Form Feed is automatically initiated by reading the form feed (12347) code in the reader. The reader is stopped during the form feed function.

SEQUENCE OF OPERATION

Line Feed

Before End of Form: When the carriage return key lever is depressed a circuit is completed to the line feed solenoid. The line feed solenoid rotates counterclockwise viewed from the left and causes the tripping pawl to pivot the program disc stop pawl out of the tooth of the program disc (Figure 1). The line feed solenoid restores when the selector contacts open and the program disc stop pawl pivots back into the program disc and stops the program disc at the next tooth.

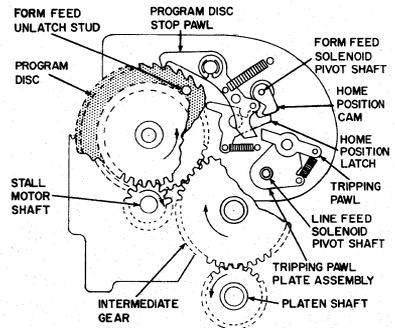


Figure 1

When the program disc is released, the stall motor gear, turning clockwise, turns the program disc counterclockwise because of its engagement with the gear on the left side of the program disc (Figure 1). As the program disc turns, the platen is indexed through the intermediate gear (Figure 2), the platen turns clockwise and indexes the form one line.

At End of Form: When the carriage return key lever is depressed at the last line of a form,

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ELECTRIC LINE FINDER

the same line feed function occurs as described for a line feed. The program disc doesn't have any teeth at the point where the program disc stop pawl pivots back to the program disc so the stop pawl simply rides the periphery of the disc and the stall motor indexes the platen to the first line of the next form. At this point the program disc stop pawl engages the first tooth of the program disc. An apparent form feed has been obtained from a line feed because of the programming of the program disc.

Form Feed

Manual: With the "Punch Adres" panel switch operated, depression of the carriage return key lever energizes both the line feed and form feed solenoids.

The form feed solenoid rotates and pivots the home position latch to also pivot counterclockwise. (When the signal to the form feed solenoid ends it tries to restore but can't because of the operated position of the home position latch.)

The line feed solenoid rotates, pivots the tripping pawl, and the tripping pawl pivots the program disc stop pawl out of the program disc and the stall motor indexes the platen.

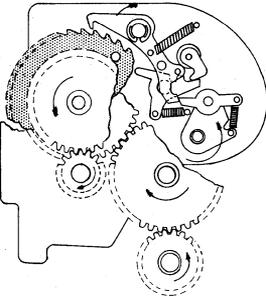


Figure 2 Line Feed (Start of Indexing)

Due to the form feed solenoid having been energized, the home position latch latches the program disc stop pawl so that it stays out of the program disc (Figure 3).

At this time the platen is indexing (feeding through the balance of the form) and the program disc stop pawl is latched so it can't return to engage the program disc.

As the program disc nears the home position (first line of the next form), the form feed unlatch stud contacts the tail of the home position latch and pivots the latch clockwise (Figure 4), allowing the home position cam and the form feed solenoid to restore. Also, as the home position latch restores, the program disc stop pawl is unlatched and it pivots

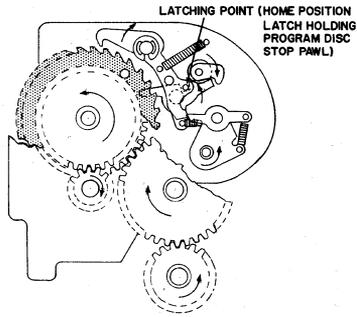


Figure 3 Form Feed (Latching Point)

back to the program disc and stops the disc at the first tooth (home position).

Stall Motor Operation

The stall motor always turns clockwise and it has a spring attached to it (the "Motor Tension Spring") which tries to turn it counterclockwise. The spring should always be fully seated on its mounting studs. It works constantly to tension the motor through the use of the "Constant Torque Switch" and cam.

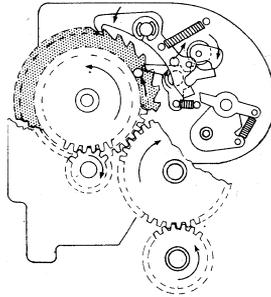


Figure 4 Form Feed (Unlatch Point)

Constant Torque Switch (Figure 5)

The constant torque switch is connected in series with the motor and it opens whenever the motor develops too much torque (on a long form feed, for example). The switch is normally closed and its roller rides on the low dwell of the cam mounted between the stall motor mounting frame and the stall motor itself. When the device line spaces, the motor should develop sufficient torque to rotate the cam so the cam's high dwell is adjacent to the switch roller without causing the roller to even partially operate the switch. On a form feed then, the motor may develop enough torque to cause the cam to operate the switch. This opens the circuit to the motor and allows the motor tension spring to turn the motor backward a short distance. When the motor turns backward the switch closes and restores

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ELECTRIC LINE FINDER

the circuit to the motor. Therefore, the motor tension spring is always working against the motor, even during a line feed or form feed operation.

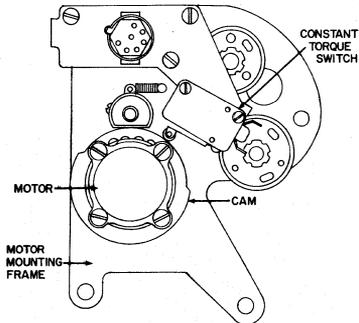


Figure 5

Program Disc Housing Cover Switch (Figure 6)

The program disc housing cover switch is also connected in series with the stall motor and it opens whenever the cover is opened, opening the circuit to the motor so that the program disc can be removed without danger of the motor turning.

Reader Delay (Limit) Switch

The limit switch is connected in series with the SCRT contacts in the Flexowriter to keep the reader stopped during the line feed or form feed operation. The limit switch is actuated by the program disc stop pawl being pivoted out of the program disc (Figure 6) by stud (A).

Program Disc Removal & Installation

1. Manually position the carriage to the extreme left and move the margin stop to the right so that the carriage can carriage return only two or three inches. Turn the Flexowriter on and depress the carriage return key, thereby causing a line feed operation & carriage return.
2. Open the program disc housing cover breaking the circuit to the stall motor.
3. Depress the Punch Adres panel switch and operate the carriage return key. This operation will pivot the program disc stop pawl out of the program disc and latch it on the home position latch.
4. Turn the Flexowriter off.
5. Press the pivot shaft latch and pull the pivot shaft out of the assembly.

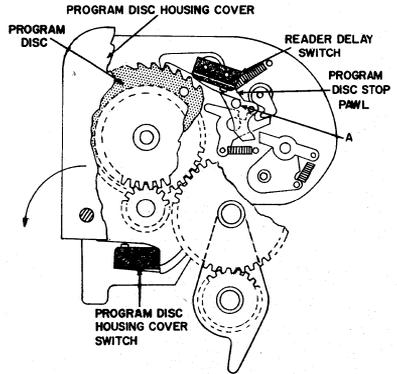


Figure 6

6. Remove the program disc through the back of the assembly.
7. Install the program disc through the back of the assembly. Be sure the small hub on the disc is towards the center of the carriage.
8. Align the program disc with the pivot shaft hole and insert the pivot shaft, moving it in until the pivot shaft engages the program disc. Do not push it all the way in yet.
9. To insure proper meshing of the intermediate gear, the platen gear, and the program disc, position the tie link by means of the tie link knob so that the gears are meshed and a hole in the tie link is aligned with a hole in the auxiliary frame. Then push the pivot shaft all the way in until the pivot shaft latch engages the groove in the pivot shaft.

Note: The projection (downward) on the intermediate gear support plate can be moved in conjunction with the tie link knob to facilitate meshing the gears (Figure 6).

10. Close the program disc housing cover and manually rotate the stall motor to recheck the gear mesh.
11. Turn the Flexowriter on and the program disc will advance (form feed) to a home position because the program disc stop pawl is latched out of the program disc and the program disc housing cover is closed, allowing the stall motor to run.

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REVERSIBLE ELECTRIC LINE FINDER

REVERSIBLE ELECTRIC LINE FINDER

The reversible electric line finder operates in almost the same manner as the regular electric line finder except that the forms can be fed in the reverse direction from a point near the bottom of the form. This device is used in conjunction with the "Double Margin Control" special feature to provide sequential typing of two columns of information on a form, either automatically or manually.

The device is the same as the electric line finder with the following differences:

The Program Disc is not interchangeable because of the very specialized application. The program disc can be removed and installed but the reverse stop pawl must be raised to accomplish this.

The Stall Motor is rigidly mounted to the motor mounting frame and a friction clutch (Figure 1) allows the motor to slip when the program disc is stopped suddenly on a forward form feed. The amount of torque developed by the motor is adjusted by means of a variable resistor (Figure 2) connected in series with the motor. The torque developed by the motor should be the minimum consistent with reliable form feed in both directions. The torque is reduced by increasing the resistance of the variable resistor.

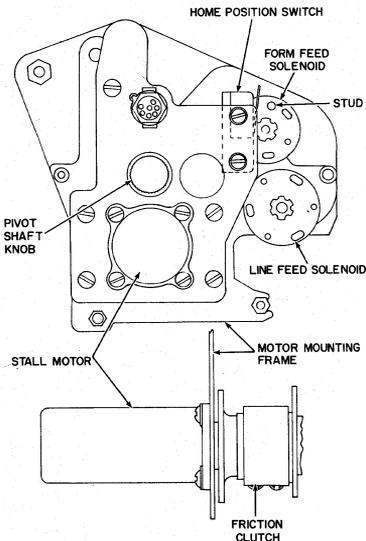


Figure 1

The reversing action is accomplished by reversing the polarity of the current through the motor, causing the motor to turn in the opposite direction.

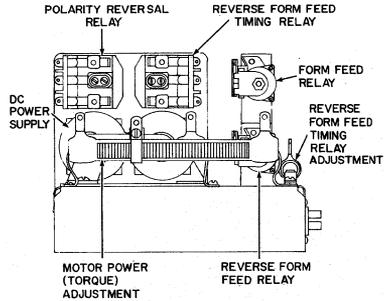


Figure 2 Control Box

OPERATION

Form Feed

Form feed occurs in the same manner as in an electric line finder, either automatically or manually with the differences noted with respect to the stall motor's operation. The Form Feed relay is used (Figure 2).

Reverse Form Feed

When the Reverse Form Feed panel switch is depressed or the reverse form feed (12345) code is read, the reverse form feed relay is energized, completing the pick circuit to the reverse form feed timing relay. The timing relay energizes and picks the polarity reversal relay. The polarity reversal relay's contacts transfer and reverse the current through the stall motor. All of the relays are in the control box.

The stall motor feeds the forms backward, ratcheting the program disc stop pawl. The reverse form feed is electrically timed in the following manner.

The polarity reversal relay is held through the timing relay's contacts and the timing relay is held through a capacitor and variable resistor. The proper drop out time is obtained by adjusting the variable resistor. Increasing the resistance decreases the holding time (or the length of the reverse form feed). Decreasing the resistance increases the holding time (or the length of the reverse form feed).

The timing of the relays should be such that the forms are reverse fed 1/12 of an inch above the intended line as established by the reverse stop stud on the program disc. Timing must be such that reverse feed is held until a positive stop is assured. The reverse stop pawl will stop the program disc during the reversing operation. When the polarity reversal relay de-energizes, the original polarity of the current through the stall motor is restored and the stall motor rotates the platen so that the program disc again engages the

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REVERSIBLE ELECTRIC LINE FINDER

program disc stop pawl, jogging the forms to the reverse form feed home position.

Reader Delay

In the same manner as in an electric line finder, a reader delay switch is used to keep the reader stopped while the device is feeding the forms forward. However, the switch (the "Home Position" switch, (Figure 1) is mounted on the motor mounting frame. The switch is operated by a stud on the form feed solenoid.

When the device reverse form feeds, a set of contacts on the reverse form feed timing relay open, breaking the circuit to the reader and keeping it broken during the reverse form feed.

Therefore, either the operation of the reader delay switch or the energization of the reverse form feed timing relay will break the circuit to the reader since they are connected in series with the SCRT contacts in the Flexo-writer.

DOUBLE MARGIN CONTROL

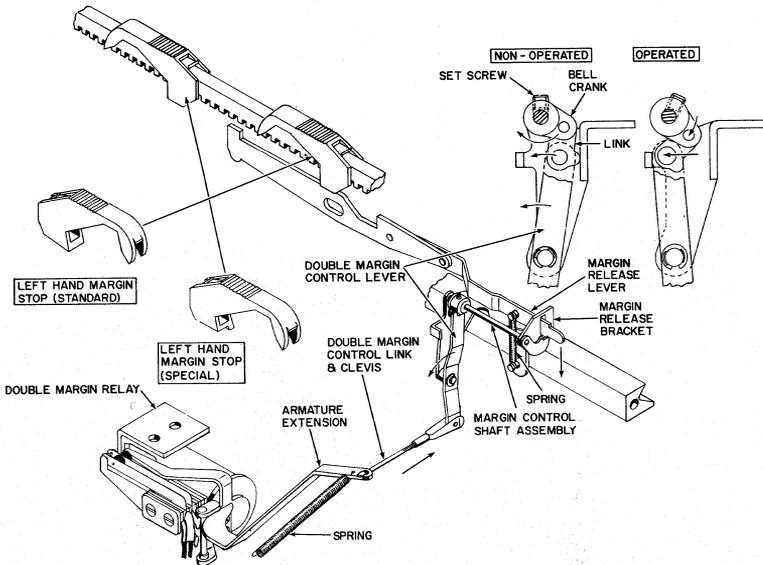


Figure 1

On machines (Mono-Spacing only) equipped with the double margin control feature (Figure 1) the carriage returns to the standard margin stop. But, in addition, the carriage returns to a second margin stop when the double margin relay is energized. The second margin stop is always placed on the margin rack to the right of the standard margin stop. It is designed to miss the margin release lever when the relay is not energized. The left end of the margin release lever can be raised to allow the carriage to be moved past the left hand (standard) margin stop the same as in a normal machine.

The double margin relay is mounted to the underside of the escapement mechanism. The armature extension connects to the double margin control link which, in turn, connects to the double margin control lever. The lever connects to a short link, the link connects to a bell crank, and the bell crank is setscrewed to the margin control shaft. The margin control arm (on the left end of the margin control shaft assembly) positions the left end of the margin release lever so that it is lifted about halfway in its slot in the margin release bracket. When the double margin relay is energized, the margin control arm is pivoted down and the left end of the margin release lever drops, raising the right end into the path of the special left hand margin stop.

Therefore, whenever the double margin relay is energized, the carriage will return to the special left hand margin stop, provided that the carriage return is initiated when the special left hand margin stop is to the left of the margin release lever.

The linkage which accomplishes the positioning of the margin release lever moves according to the arrows in Figure 1.

ADJUSTMENT

In Sequence

1. There should be .040" plus or minus .005" clearance between the armature and core of the double margin relay when the relay is not energized (Figure 2). The clearance is measured at the center line of the core. Adjust by forming the bendable stop on the relay.
2. With the relay not energized, adjust the double margin control link so that the double margin control lever link rests against the margin release bracket (Figure 1). Operate the relay manually and be sure that there are no binds or lost motion. Have the set screw on the bell crank tightened in a position where the bell crank doesn't interfere with the adjustment.

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DOUBLE MARGIN CONTROL

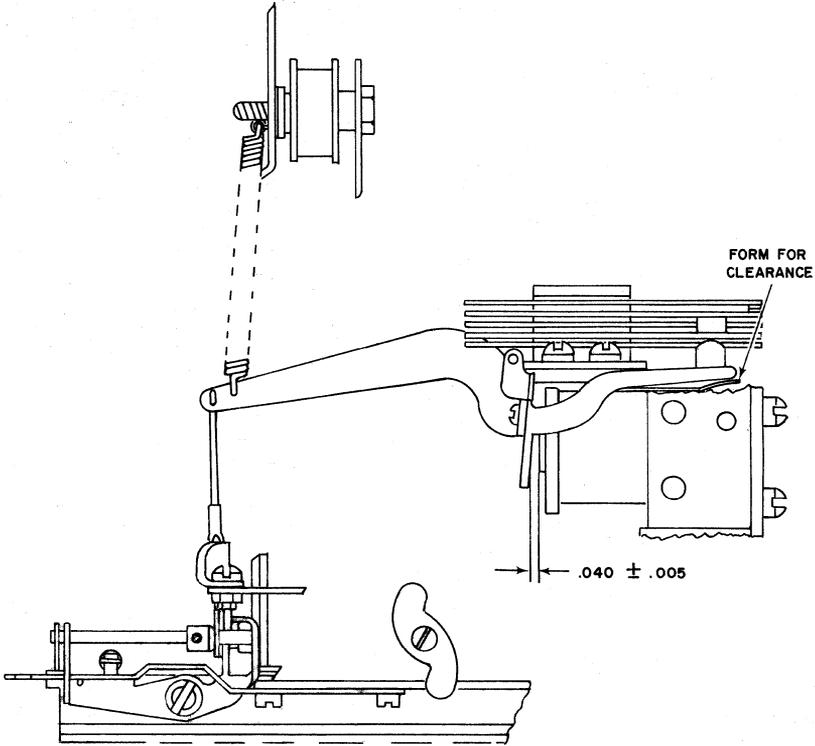


Figure 2 Relay Not Energized

3. Position the left hand margin stop over the margin release lever as shown in Figure 3 and loosen the margin release lever screws slightly. Lift the left end of the lever to the top of the slot in the margin release bracket, position the right end of the lever so there is .004"
4. Position the special left hand margin stop over the margin release lever as shown in Figure 4. Loosen the set screw on the bell crank slightly.

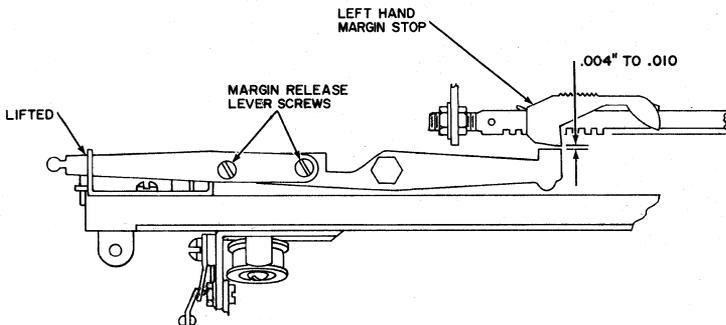


Figure 3 Manually Lifted

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 63

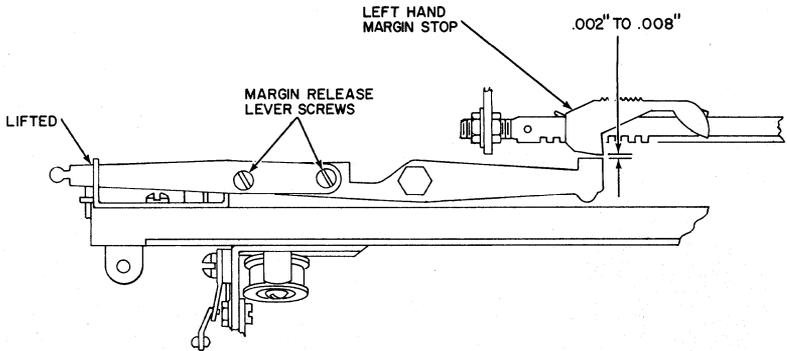


Figure 3 Manually Lifted

DATE: April 14, 1965

CHANGE: Page 6-16, Step 3 and Figure 3.

REASON: More positive bite on margin stop.

EXPLANATION: This change decreases the clearance obtained between the left hand margin stop and the margin release lever.

3. Position the left hand margin stop over the margin release lever as shown in Figure 3 and loosen the margin release lever screws slightly. Lift the left end of the lever to the top of the slot in the margin release bracket, position the right end of the lever so there is .002" to .008" clearance between the lever and the stop and tighten the screws.

FRIDEN SYSTEMS ADJUSTMENT

DOUBLE MARGIN CONTROL

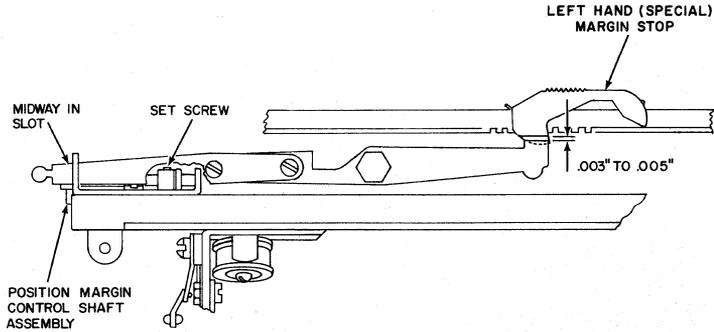


Figure 4 Home Position

With the relay de-energized and the double margin control lever link resting against the margin release bracket, adjust the margin control shaft assembly. Rotate it so the margin control arm positions the right end of the margin release lever .003" to .005" below the margin stop and tighten the set screw.

Manually energize the relay with both margin stops out of the path of the margin release lever and check the clearance between the margin release lever and the margin rack (Figure 5). It should be .015". If not, check the adjustments and readjust as necessary.

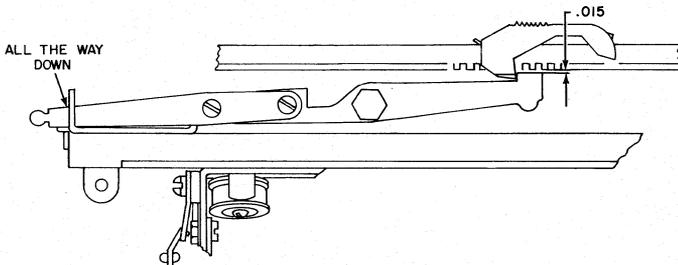


Figure 5 Relay Energized

FRIDEN SYSTEMS ADJUSTMENT

FLEXIBLE FORMALINER

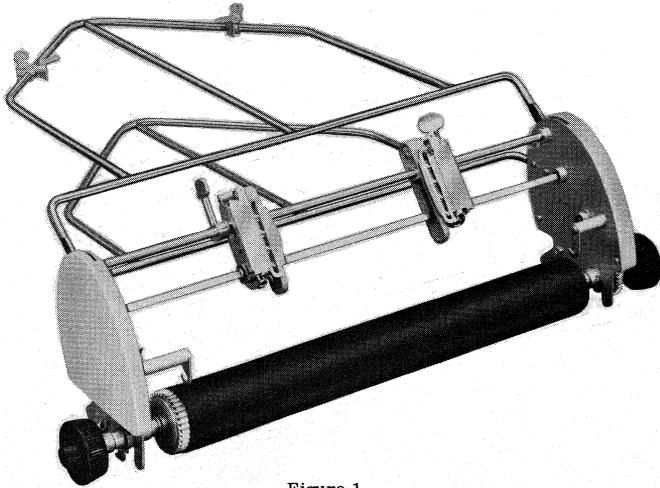


Figure 1

The Friden Flexible Formaliner, when installed on a Flexowriter carriage, provides automatic transport and registration of forms. The forms used are (1) continuous fan-fold, (2) perforated for easy separation and (3) punched with regularly spaced holes at each side. The forms used can be the full width of the platen because the normal platen is used.

The Flexible Formaliner is attached to the carriage by means of platen extensions and a spring-tensioned mounting which enables the Flexible Formaliner to be installed and removed with little effort. The Flexible Formaliner is hooked onto supports mounted in place of the rear carriage end cover screws.

The forms are fed through gears meshed with the platen (Figure 2). When the platen rotates,

the tractor pins feed the forms. The paper release lever must be kept forward while the Flexible Formaliner is in use because the forms are fed by the tractor pins. A lock stop is mounted on the left frame to keep the paper release lever forward. It can be pivoted up out of the way to allow the paper release lever to be moved to the rear (Figure 3).

With the paper release lever forward, feed the forms over the top of lower "V" guide, around the platen, and onto the tractor pins. The pressure plates can be opened to position the forms on the pins. Enough forms should be fed through the device so that the forms move onto the upper "V" guide.

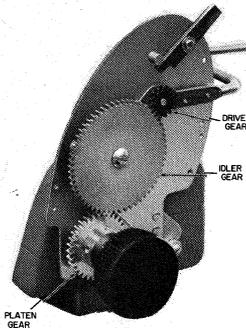


Figure 2

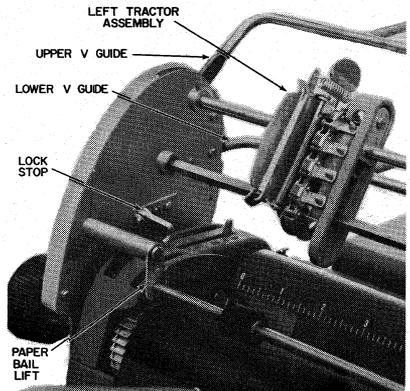


Figure 3

FRIDEN SYSTEMS ADJUSTMENT

FLEXIBLE FORMALINER

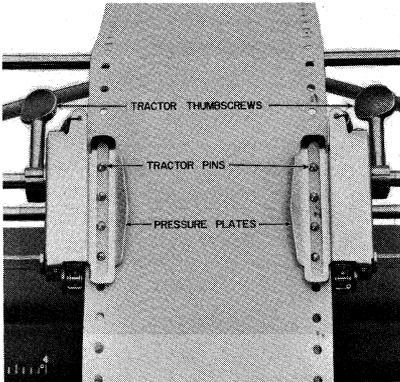


Figure 4

To put the Flexible Formaliner on the carriage, position the Flexible Formaliner as shown in Figure 5 making sure the lock dogs are open and press it down at the forward end until it snaps into position as shown in Figure 6.

The tractors can be moved sideways to accommodate forms of variable widths by loosening the thumb screws and sliding the tractors on the shafts (Figure 4). The forms should be positioned so they are centered in the carriage.

When narrow forms are used the small forms guides should be put on the upper and lower V guides and adjusted to the forms so the forms are centered on the apex of the V. Be sure the tractors are positioned so the forms are also centered on the platen. (Figure 7).

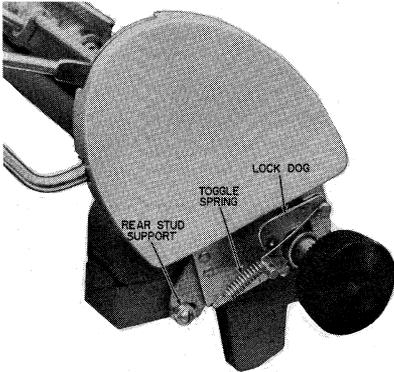


Figure 5

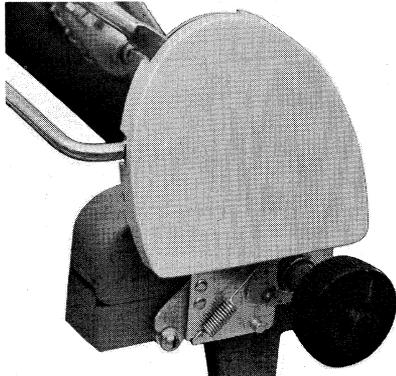


Figure 6

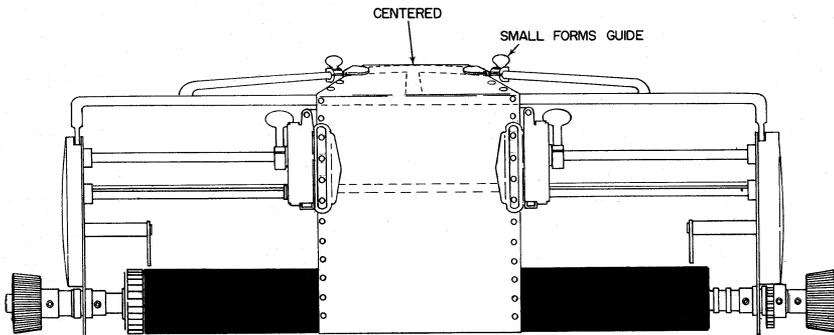


Figure 7

FRIDEN SYSTEMS ADJUSTMENT

FLEXIBLE FORMALINER

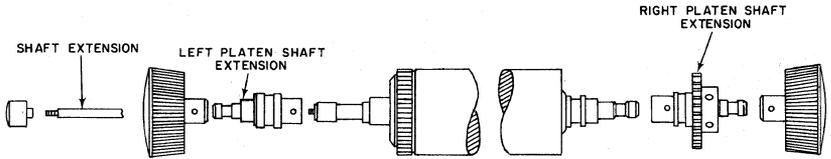


Figure 8

Paper Bail Lifts

The paper bail rollers should be lifted off of the forms by the paper bail lifts as shown in Figure 3.

Platen Extensions

1. Remove the platen variable button (using T-18075) and platen knobs (Figure 8). Leave the collars on the platen shaft in place. Install the platen shaft extensions and reinstall the platen knobs. Tighten the set screws and be sure that the collars on the platen shaft rotate freely.
2. Install the platen variable button on the threaded end of the platen variable button shaft extension and reinstall the platen variable button using T-18075.

Mounting the Flexible Formaliner

Remove the rear carriage end cover screw from the left and right carriage end covers and install the rear stud supports with their mounting screws. The Flexible Formaliner can now be installed as shown in Figures 5 & 6.

Removing the Flexible Formaliner

When enough pressure is exerted upward on the front of the Flexible Formaliner, the lock dogs will open and the Flexible Formaliner can be lifted off of the carriage. The platen shaft extensions and rear stud supports do not interfere with normal machine operation and should be left on the machine. The line gauge card holder does not interfere with the operation of the Flexible Formaliner. It should be left on the machine.

Small Forms Guides

The paper guides should be installed on both the upper and lower V guides when forms less than eight inches in width are used. They should be adjusted to the forms, leaving about 1/8 inch clearance. The forms should be centered on the V guides.

Idler Gear Adjustment

When first installed, the large idler gear may not mesh correctly with the gear on the right platen shaft extension. Remove the right Flexible Formaliner end cover and loosen the

idler gear's mounting screw (holding the nut with a wrench). Install the Flexible Formaliner, position the idler gear (in the slot) for free rotation with minimum backlash and tighten the mounting screw against the nut.

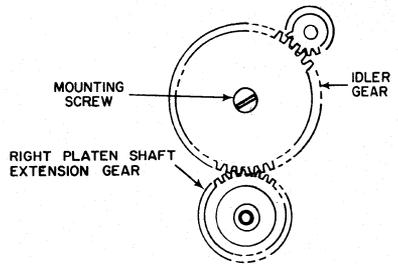


Figure 9

Tractor Pin Alignment

Loosen both tractor chain sprocket set screws, (Figure 10) install forms on the tractors and align the forms to the writing line. Align the tractors to each other so the form is parallel to the writing line. Remove the forms without disturbing the tractors and tighten the set screws.

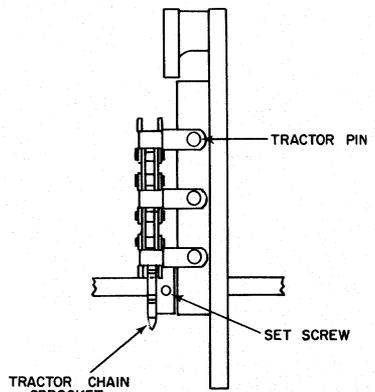


Figure 10

FRIDEN SYSTEMS ADJUSTMENT

FRIDEN SYSTEMS ADJUSTMENT

FLEXIBLE FORMALINER STAND

FLEXIBLE FORMALINER STAND

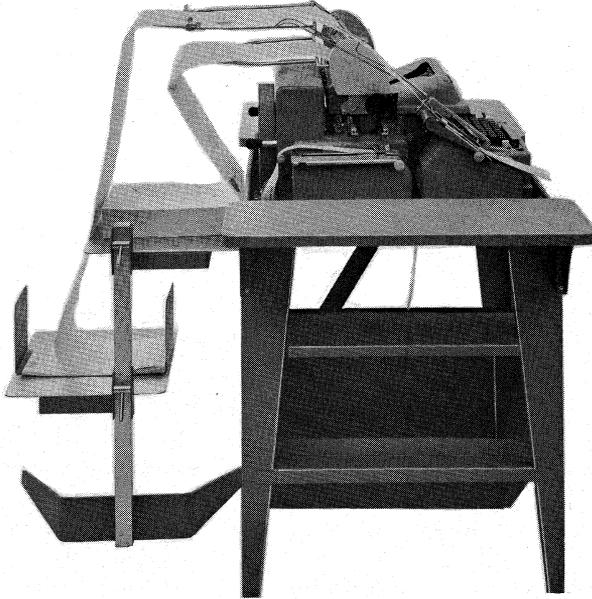


Figure 1

The Friden Flexible Formaliner Stand is used in conjunction with the Friden Flexible Formaliner to supply unused forms and stack them as they are used. The stand is positioned behind the Flexowriter stand with the upper (supply) shelf touching the back of the stand. The stand is shown with the upright on the left side in Figure 1. By switching the shelf positions (putting the bottom one on top) and turning the stand around, the upright is on the right side. This procedure allows the stand to be set up for easy access to the Stand's shelves.

The upper shelf is the supply shelf and should contain the unused forms. They should sit in the center of the shelf and the stand itself should be centered behind the Flexowriter. This allows the V guides to perform their function properly, that being to lessen the drag on the carriage by allowing the forms to bend naturally as the carriage moves.

The lower shelf catches the forms and, if the stand and Flexible Formaliner is properly set up, allows them to restack themselves. It has two shelf racks which aid in folding the forms.

Installation & Adjustment

1. Using the slotted screws and flat wash-

ers, mount the aluminum upright to the base and tighten the screws securely (Figure 2).

2. Install the shelves on the upright so they extend over the base and lock each shelf in position by pushing down on the clamp handle (Figure 3). The upper shelf is to hold the unused forms and it should always extend toward the Flexowriter and touch the back of the Flexowriter stand. The lower shelf accepts the typed forms and it should extend toward the rear away from the Flexowriter.

Note: If the forms are to be torn off as they are used, the lower shelf need not be used.

3. If the operator cannot gain easy access to the forms because the upright is in the way, switch the shelves and turn the stand around. The upright will then be on the opposite side and the shelves will be in their proper positions.
4. Install the shelf racks on the lower shelf, using the square-shouldered screws and wing nuts (Figure 4).

FRIDEN SYSTEMS ADJUSTMENT

FLEXIBLE FORMALINER STAND

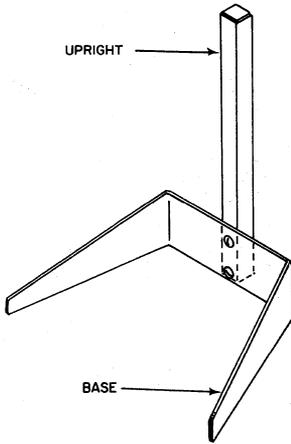


Figure 2

Face the backs of the guides inward if the forms used are less than 10 inches in height. Face them outward if the forms are 10 inches or more in height. Keep the backs of the guides parallel to the front and rear edges of the shelf so that the square shouldered screws are fully seated. The re-fold guides should be positioned in their slots equally.

Then with the Flexible Formaliner stand touching the Flexowriter stand, the forms are centered front-to-rear as they come off of the upper "V" guide. This allows the rear edge of the top shelf to center the forms during re-folding.

5. Position the stand so it is centered behind the Flexowriter. This positioning equalizes forms sway as the Flexowriter carriage moves sideways.
6. Position the blank forms as the center of the top shelf, feed them into the Flexowriter and adjust the height of the shelves, best satisfying the following conditions:

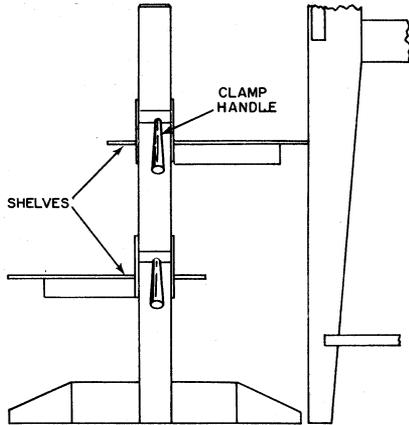


Figure 3

- a. The lighter the forms, the lower the shelves.
- b. The less form fastening (stapling, pasting, crimping, etc.), the higher the shelves.
- c. The lower the shelves, the better the control of forms sway.

How far apart the shelves should be from each other is determined by the height of the forms. Long forms require greater shelf separation than short forms.

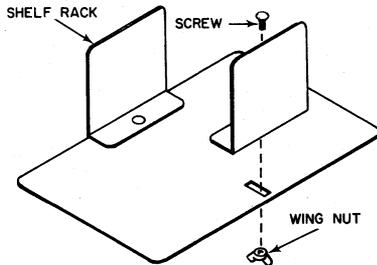


Figure 4

44TH PRINTING CHARACTER

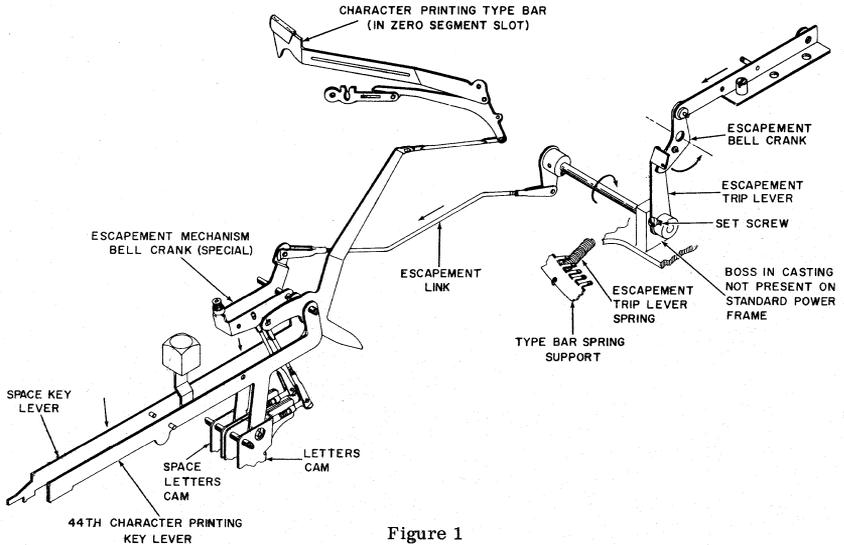


Figure 1

A Special Feature

A character printing type bar can be installed at the factory in the segment in the "zero" slot normally occupied by the space dummy type bar. The character printing operation is initiated from the key lever in position "U", utilizing the proper bell crank and a type bar designed to be operated from the zero segment slot. The type bar, bell crank and cam are to be adjusted the same as any of the other character printing type bars, bell cranks or cams.

Carriage escapement (spacing) is achieved from the operation of the space bar in a different manner. Instead of the adjustable link from the space cam pivoting a dummy bell crank, etc., the adjustable link pivots a special escapement mechanism bell crank. The bell crank pulls the escapement link forward which in turn pivots the shaft and the escapement trip lever assembly. The escapement trip lever operates the escapement bell crank, etc., and the carriage escapes as the mechanism restores.

ADJUSTMENT

In Sequence

1. Adjust the length of the escapement link so that the threads on the link just extend into the yoke of the clevis. This adjustment is made now to insure the full range of adjustment later on.
2. Manually position the space letters cam on its high point with the power off. Loosen the escapement trip lever set screw and turn the lever until it fully operates the escapement trip slide without choking off. Further position the lever on the end of the shaft so the shaft has .005" to .010" end play. Tighten the set screw and check both adjustments.
3. Readjust the escapement link so there is .015" to .020" clearance between the escapement pawl and the rear face of the escapement wheel when the space cam is at its high point.

FRIDEN SYSTEMS ADJUSTMENT

FRIDEN SYSTEMS ADJUSTMENT

LABEL HOLDER

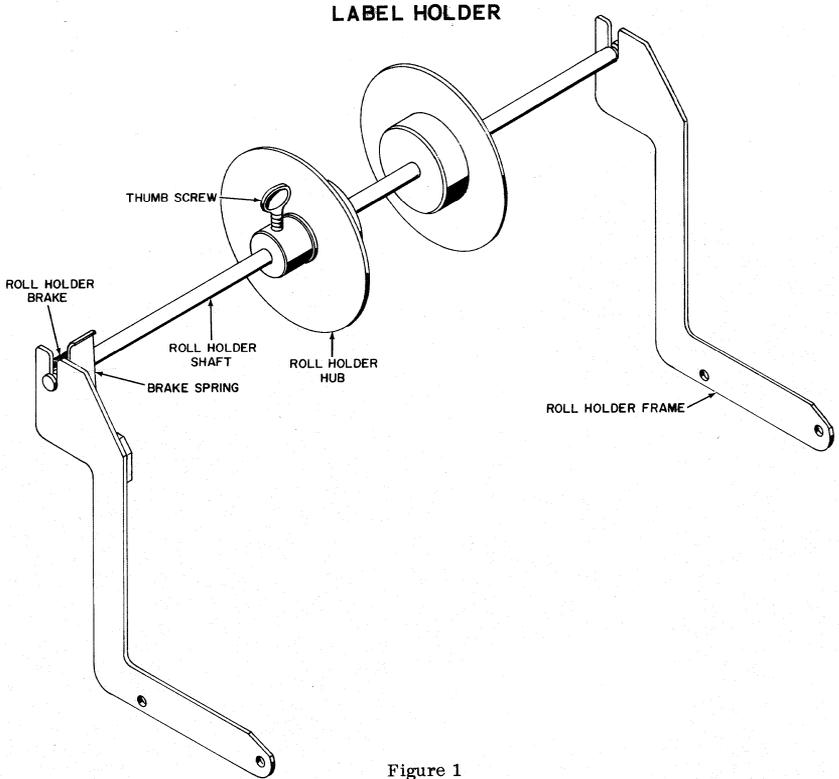


Figure 1

An Accessory

The label holder is used on a Flexowriter to hold a roll of coated paper containing unperforated adhesive labels to be typed. These labels can then be attached to the edge cards usually punched during the operation. The label holder attaches to the carriage end covers, by means of the carriage end cover screws, in the same manner as a forms guide for the Pin Feed Platen. Since the label holder moves with the carriage, the roll of labels are fed around the platen without chance of cocking the labels.

To install a roll of labels, lift the label holder shaft out of the roll holder frames, loosen its

thumb screw & slide one of the roll holder hubs off of the shaft, install the roll holder hub so it prevents the roll from turning and tighten the thumb screw. Install the label holder shaft in the roll holder frames with the roll holder brake to the left.

In normal operation the roll holder shaft should turn as the platen indexes and be held against free rotation by the brake spring rubbing against the roll holder brake.

The roll holder hubs should be located on the shaft consistent with the setting of the margin stop and the width of the roll.

FRIDEN SYSTEMS ADJUSTMENT

FRIDEN SYSTEMS ADJUSTMENT

FLEXOWRITER CARD CUTTER

FLEXOWRITER CARD CUTTER

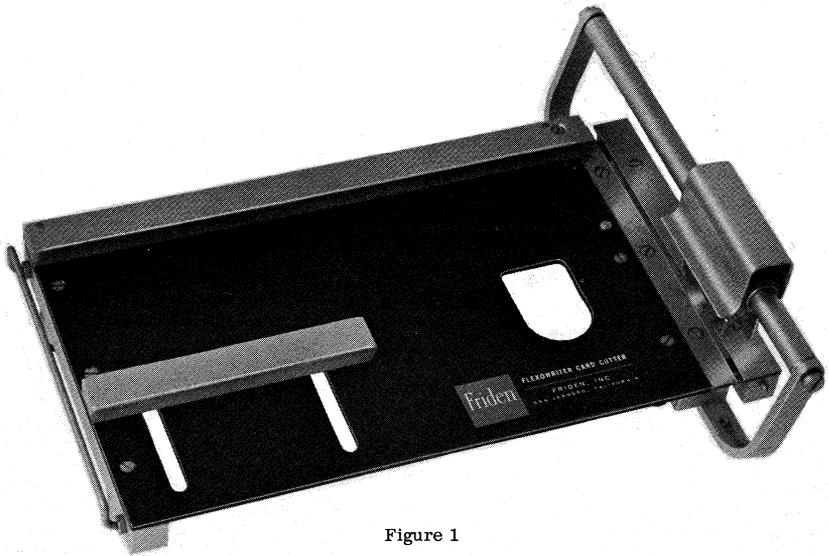


Figure 1

An Accessory

The Flexowriter card cutter (Figure 1) trims the forward edge of a punched edge card to enable the card to be properly positioned when inserted in a tape/edge card reader. If the edge card is not properly trimmed or positioned, several feed holes will be ruptured or

distorted when the card table is lowered. Feed hole distortion will cause incorrect reading.

With an edge card properly in position on the card positioning and feed hole pins on the card cutter plate, drawing the cutter blade, carriage & handle assembly through the card

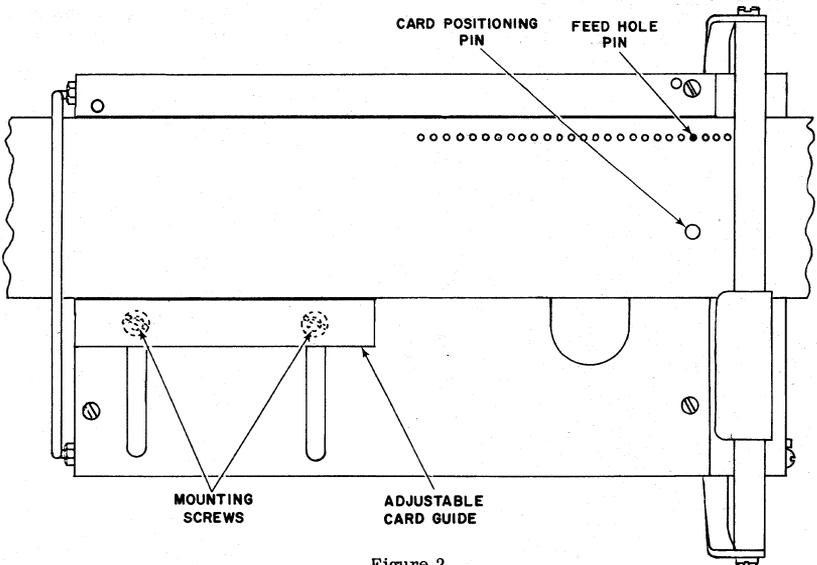


Figure 2

FRIDEN SYSTEMS ADJUSTMENT

FLEXOWRITER CARD CUTTER

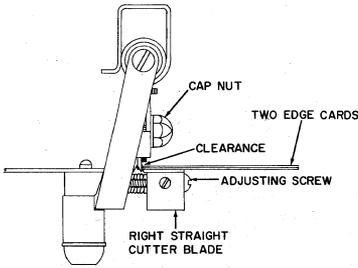


Figure 3

removes 1/16" of the card. The circular cutter blade rides between two straight cutter blades and is gear-connected so it rotates whenever the assembly is moved. When an edge card is trimmed, the distance from the center line of the first code punched to the trimmed edge of the card is .0875".

ADJUSTMENT

1. Place two continuous edge cards in the card cutter so they are under the wire guide and positioned on the card positioning and feed hole pins. Loosen the mounting screws slightly and position the adjustable guide so it touches the cards. Tighten the mounting screws (Figure 2).
2. Loosen the cap nut on the circular cutter blade mounting screw and shift the circular cutter blade up or down so that two edge cards can be inserted between the circular cutter blade gear

teeth and the right straight cutter blade (Figure 3).

3. Loosen the set screws and turn the adjusting screws (moving the right straight cutter blade) so that the circular cutter blade has a smooth cutting action, has minimum or no side play, and doesn't bind at any point.

Note: As long as the straight cutter blades are straight and true and the circular cutter blade is of uniform thickness, the proper adjustment will be easy to achieve. But when the straight cutter blades are worn and the circular cutter blades is no longer a uniform thickness, it may be very difficult to achieve a smooth, without binding adjustment. This is especially true if the cutter blade, carriage & handle assembly has been removed or replaced.

To obtain a good adjustment under these conditions, move the cutter blade, carriage & handle assembly to the binding point. Loosen the cap nut holding the cutter blade in the assembly (Figure 3) so the cutter blade gear misses the small intermediate gear and move the assembly to a loose point without rotating the cutter blade. Engage the cutter blade and tighten the cap nut. Perform the adjustment.

This procedure may have to be repeated several times until the thickness of the circular cutter blade matches the wear of the straight cutter blades.

FRIDEN SYSTEMS ADJUSTMENT

44TH PRINTING CHARACTER

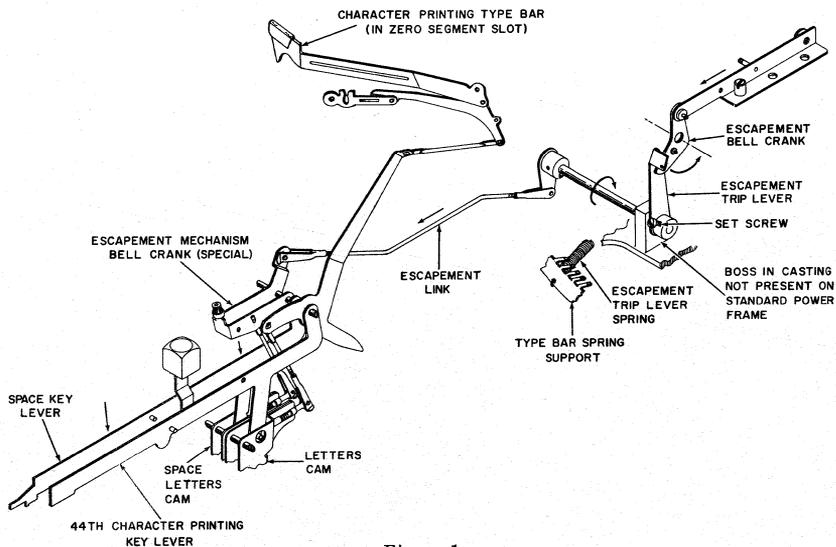


Figure 1

A Special Feature

A character printing type bar can be installed at the factory in the segment in the "zero" slot normally occupied by the space dummy type bar. The character printing operation is initiated from the key lever in position "U", utilizing the proper bell crank and a type bar designed to be operated from the zero segment slot. The type bar, bell crank and cam are to be adjusted the same as any of the other character printing type bars, bell cranks or cams.

Carriage escapement (spacing) is achieved from the operation of the space bar in a different manner. Instead of the adjustable link from the space cam pivoting a dummy bell crank, etc., the adjustable link pivots a special escapement mechanism bell crank. The bell crank pulls the escapement link forward which in turn pivots the shaft and the escapement trip lever assembly. The escapement trip lever operates the escapement bell crank, etc., and the carriage escapes as the mechanism restores.

ADJUSTMENT

In Sequence

1. Adjust the length of the escapement link so that the threads on the link just extend into the yoke of the clevis. This adjustment is made now to insure the full range of adjustment later on.

2. Manually position the space letters cam on its high point with the power off. Loosen the escapement trip lever set screw and turn the lever until it fully operates the escapement trip slide without choking off. Further position the lever on the end of the shaft so the shaft has .005" to .010" end play. Tighten the set screw and check both adjustments.

3. Readjust the escapement link so there is .015" to .020" clearance between the escapement pawl and the rear face of the escapement wheel when the space cam is at its high point.

A Special Feature

An automatic color shift mechanism (Figure 2) can be installed in a Flexewriter to provide color shifting at designated points in the program. Example: When reading, the machine types Red. When being manually operated, the machine types Black. Normally, a two color ribbon, Black & Red, is used.

Note: Ordinarily, the Black half of the ribbon should be on top.

The automatic color shift mechanism replaces the manual ribbon shift mechanism, occupying its space in the power frame. The power frame itself is not standard, having cut outs and holes for the automatic mech-

FRIDEN SYSTEMS ADJUSTMENT

AUTOMATIC COLOR SHIFT

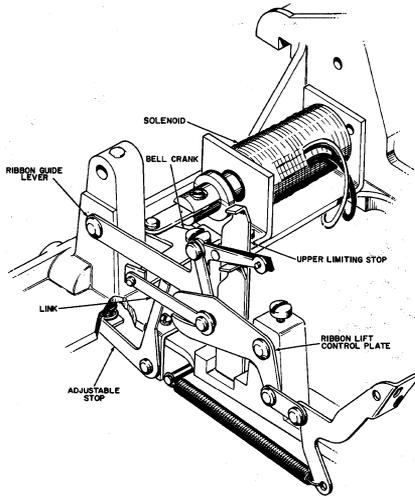


Figure 2

anism. A special ribbon lift control plate is used which doesn't have the vertical slot used for stencil preparation. The ribbon stop has an upper limiting stop attached to it. The ribbon guide lever is a special one, and a solenoid, bell crank, and adjustable stop are all added to provide automatic operation.

When the solenoid coil is energized, the plunger operates the bell crank, which pulls the link to the rear, positioning the roller to the rear of the slot in the special ribbon lift control plate. As long as the coil is energized, the lower (red) half of the ribbon is lifted into the path of the type bar. When the coil de-energizes, the mechanism restores, positioning the roller in the special ribbon lift control plate forward, so that the upper (black) half of the ribbon is lifted into the path of the type bar.

ADJUSTMENT

In Sequence

1. With the solenoid not energized and no type bars operated, the roller in the ribbon

lift control plate should be free in the slot. Form the ribbon (lower) stop back or forth to obtain the adjustment. When the roller is moved back and forth in the slot, it should not move the ribbon lift bar off of the tails of the bell cranks. Readjust if necessary.

2. Adjust the clevis of the ribbon guide so that the lower surface of the retaining ears of the ribbon guide are from $1/32$ " to $3/32$ " above the bottom surface of the segment guide plate with the ribbon guide lever resting on the lower stop (Figure 3).

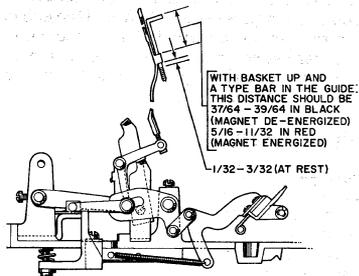


Figure 3

FRIDEN SYSTEMS ADJUSTMENT

3. Typing in Black: With the solenoid not energized, manually operate a type bar fully to the platen and set the adjustable stop so there is from $37/64"$ to $39/64"$ distance from the top surface of the ribbon guide retaining ears to the top surface of the type guide.

Note: On double case machines, the basket should be in lower case (the upper position) when performing this adjustment.

Turning the adjusting screw for the spring loaded stop inward results in less upward travel and turning it out results in more upward travel.

4. Typing in Red: With the solenoid manually energized and a type bar fully operated to the platen, the ribbon should be lifted so there is a $5/16"$ to $11/32"$ distance between the top surface of the ribbon guide retaining ears and the top surface of the type guide. If the upper adjustable ribbon stop interferes with the movement of the ribbon guide lever, loosen its mounting & adjusting screw and move it up out of the way.

If the proper ribbon lift is not obtained, loosen the solenoid bracket mounting screws and move the solenoid bracket right or left. Move the solenoid to the right toward the outside of the power frame casting to increase the ribbon lift height. Move the solenoid to the left toward the center of the machine for less ribbon lift. Once the adjustment is obtained, check the ribbon height in black.

5. Once the adjustments are obtained, set the upper ribbon stop to allow no more than $3/64"$ additional upward movement of the ribbon guide lever without choking off. Check to see if there is any appreciable movement of the ribbon lift control plate when the solenoid plunger is operated manually, causing the ribbon lift bar to raise off of the bell cranks. If there is, readjust as necessary.

All linkages, pivots and levers should be free of binds.

FRIDEN SYSTEMS ADJUSTMENT

ELECTRIC CARBON RIBBON FEED MECHANISM

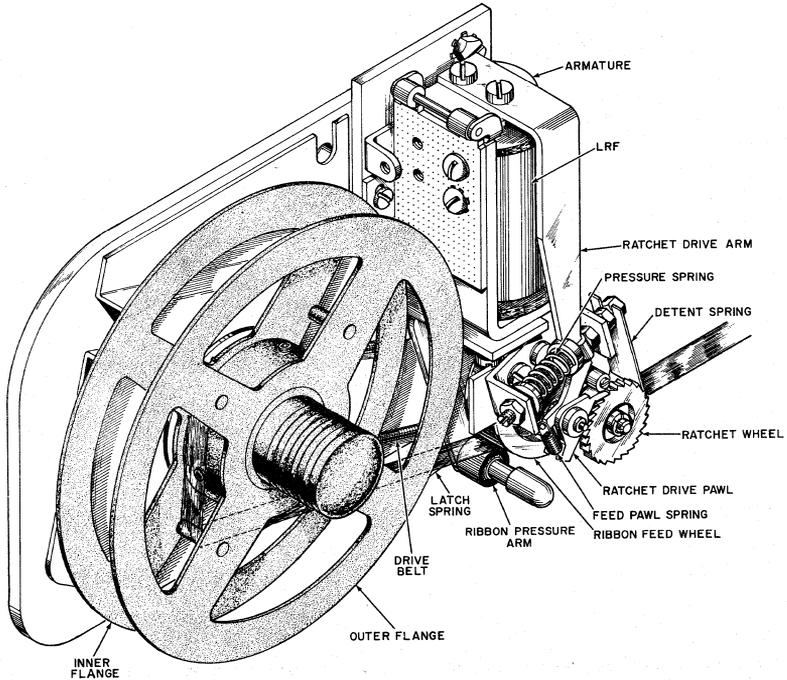


Figure 1

* A Special Feature

The Electric Carbon Ribbon Feed Mechanism feeds a uniform amount of carbon ribbon past the printing point of a writing machine following each operation of a printing key lever. To eliminate overlapping ribbon spaces and to insure clear, sharp composition, each ribbon space is large enough to accommodate the widest characters.

In the drive mechanism (Figure 1), the spacing of the ratchet wheel teeth determines the amount of ribbon feed or size of the ribbon spaces. To keep ribbon waste to a minimum, the number of teeth contained in the ratchet wheel varies with the carriage escapement

mechanism employed by the writing machine. Increasing the number of teeth decreases the spacing between the teeth and the amount of feed.

OPERATION

Cocking the Mechanism

When a character printing key lever is operated, its type bar moves toward the platen and a bell crank pivots the Ribbon Lift Bar (Figure 2). The Ribbon Lift Control Plate Lever is attached to and moves with the Ribbon Lift Bar. The roller on the tail of the lever strikes and closes the Ribbon Feed Contact (SRF) to complete a circuit to energize the Ribbon Feed Magnet (LRF).

FRIDEN SYSTEMS ADJUSTMENT

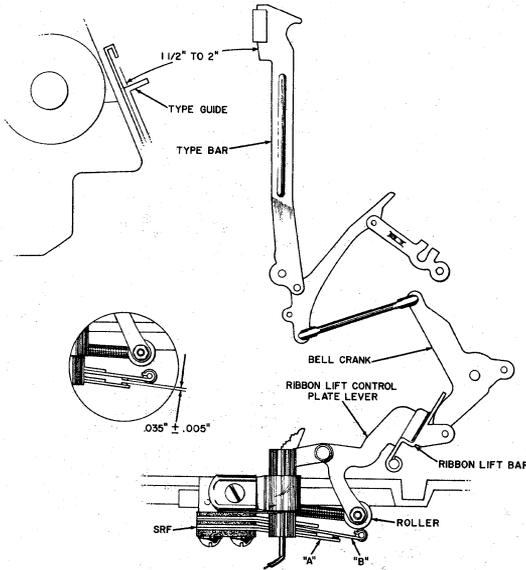


Figure 2

LRF, a part of the feed mechanism, attracts its armature to the magnet core (Figure 1). The Ratchet Drive Assembly (consisting of the Ratchet Drive Arm and, pivoting on its lower end, the Ratchet Drive Pawl) is attached to the armature, moves with it and compresses the Pressure Spring.

The Ratchet Drive Pawl moves in the direction of the Ribbon Winding Spool by an amount slightly greater than the width of a Ratchet Wheel tooth. The Feed Pawl Spring, connected between the extensions on the drive arm and the pawl, pivots the driving edge of the pawl into the valley behind the ratchet tooth and cocks the mechanism. During the cocking operation, the Detent Spring is engaged with another tooth to prevent backward rotation of the Ratchet Wheel.

Feeding The Ribbon

Ribbon feed occurs when the typing mechanism and SRF restore to their at rest condition. As LRF de-energizes, the Pressure Spring forces the armature away from the magnet core and the Ratchet Drive Assembly rotates the Ratchet Wheel a distance equivalent

to one tooth space. The Drive Pulley Assembly (consisting of the Drive Pulley and the Ribbon Feed Wheel) and the Ratchet Wheel are mounted on a common sleeve and rotate as a unit on a shaft. The carbon ribbon is threaded between the Ribbon Feed Wheel and the roller on the Ribbon Pressure Arm. The Latch Spring supplies a force to press the ribbon firmly against the Ribbon Feed Wheel and, as the wheel turns, the ribbon feeds in the direction of the Ribbon Winding Spool.

Winding The Ribbon

The spring Drive Belt, connected between the Drive Pulley and a pulley on the Inner Hub Assembly, causes the Inner Hub Assembly to rotate on a ball bearing shaft (Figure 4). The Outer Hub & Flange Assembly, on which the ribbon is wound, is mounted on the Inner Hub Assembly and rotated by the friction drive resulting from three ball bearings that protrude from the outer hub under spring tension and exert pressure in a groove on the inner hub. This allows the inner hub to rotate an amount determined by the drive belt arrangement while the outer hub rotates only the amount required to take up the slack in the ribbon.

FRIDEN SYSTEMS ADJUSTMENT

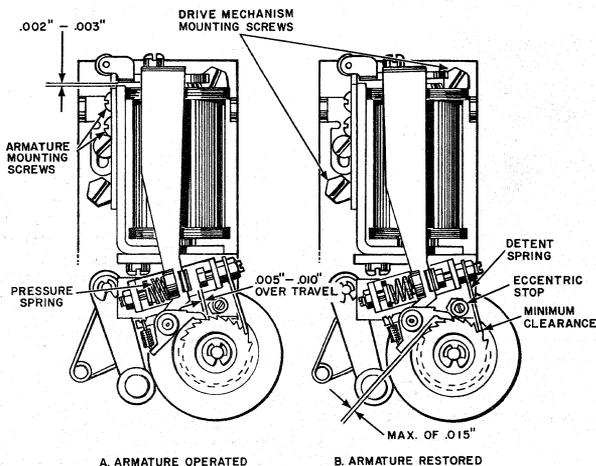


Figure 3

ADJUSTMENT

SRF Contact

1. With a printing type bar held 1 1/2" to 2" away from the type guide (Figure 2), form contact "A" so it just touches contact "B".
2. With the type bar restored to its non-operated position, form contact "B" so there is a clearance of .035" plus or minus .005" between it and contact "A" (Inset, Figure 2).

Drive Mechanism

1. Loosen the armature mounting screws (Figure 3A). Hold the armature against the magnet core and position it so it clears the heel piece by .002" to .003". Tighten the mounting screws.
2. Loosen the drive mechanism mounting screws (Figure 3B) and position the mechanism horizontally so it is approximately in line with the right hand edge of its mounting plate. Maintain this condition and, with the armature non-operated, position the drive mechanism vertically so the driving edge of the Ratchet Drive Pawl is fully into a valley behind a ratchet tooth and there is a clearance not greater than .015" between the ratchet wheel and the main body of the pawl.

3. Loosen the mounting nut and remove the Detent Spring. Loosen the locking nut and turn the Eccentric Stop so there is a maximum clearance between it and the Ratchet Drive Pawl. Rotate the Ratchet Wheel so a tooth just engages the Ratchet Drive Pawl. With the Ratchet Wheel held in this position and the armature fully operated, the Ratchet Drive Pawl should travel a distance equal to one tooth space plus .005" to .010" overtravel (Figure 3A). If this is not obtained, release the armature and loosen the Drive Arm Stop Screw locking nut. Turn the screw in to decrease the overtravel or out to increase it. Repeat as necessary to obtain the required overtravel and tighten the Drive Arm Stop Screw locking nut.

4. With the armature non-operated, turn the Eccentric Stop so it is as close as possible to the Ratchet Drive Pawl without binding it. Tighten the Eccentric Stop locking nut.

5. With the armature non-operated and the Detent Wheel held so a tooth just engages the Ratchet Drive Pawl, install and secure the Detent Spring so it has a minimum clearance with the Ratchet Wheel tooth most closely in line with it (Figure 3B). Do not form the Detent Spring except when necessary to secure a positive tooth engagement.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 62

DATE: March 12, 1964

CHANGE: Page 6-37, Drive Mechanism, Step 3.

REASON: Additional adjustment.

EXPLANATION: Step 3, as originally written, is correct for all Electric Carbon Ribbon Feed Mechanisms except those used with writing machines having 14 point Commercial type and 1/32" proportional spacing escapement. This addendum provides for the exception.

3. Loosen the mounting nut and remove the detent spring. Loosen the locking nut and turn the eccentric stop so there is maximum clearance between it and the ratchet drive pawl. Rotate the ratchet wheel so a tooth just engages the ratchet drive pawl.

While holding the ratchet wheel in this position, operate the armature so it is in its fully attracted position against the magnet core. On writing machines that have 14 point Commercial type and a 1/32" proportional spacing escapement mechanism, the ratchet drive pawl should travel a distance equal to two teeth plus .005" to .010" overtravel (Figure 3A). (On all other writing machines, the ratchet drive pawl should travel a distance equal to one tooth plus .005" to .010" overtravel.)

To obtain the specified amount of travel, release the armature and loosen the drive arm stop screw locking nut. Turn the screw in to decrease, or out to increase, the amount of ratchet drive pawl travel. Check the travel as described above and if necessary, repeat the adjustment. Tighten the drive arm stop screw locking nut.

FRIDEN SYSTEMS ADJUSTMENT

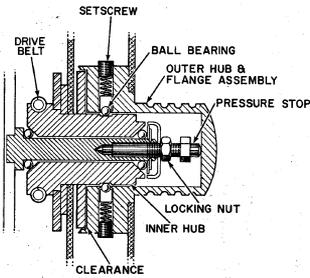


Figure 4

6. With the carbon ribbon installed, loosen the locking nut and turn the Pressure Spring adjustment screw out so the spring pressure is minimum. Apply power to the writing machine and, while typing a series of upper case M's or W's, turn the screw in until the appearance of the characters indicates that there are no overlapping ribbon spaces. Tighten the locking nut.

Winding Spool

1. Remove the Outer Hub & Flange Assembly and loosen the Pressure Stud locking nut (Figure 4). Adjust and secure the stud so that,

when the Outer Hub & Flange Assembly is replaced, there is a slight clearance between the flat surfaces of the inner and outer hubs and the three ball bearings are in the groove on the inner hub. The relationship between the inner and outer hubs cannot be directly measured and must be felt rather than observed.

2. With the Outer Hub & Flange Assembly mounted on the Inner Hub, loosen the three setscrews so the friction between the parts is minimum. Apply power to the writing machine. Turn each setscrew inward a small and equal amount until the Outer Hub & Flange Assembly, when held by hand, falls just short of stopping the rotation of the Inner Hub Assembly when a printing key lever is continuously operated.

Overall Check

With the carbon ribbon installed and power applied to the writing machine, operate the upper case M or W key lever for at least one complete revolution of the ratchet wheel and check the overall operation of the feed mechanism. Re-adjust as necessary.

FRIDEN SYSTEMS ADJUSTMENT

**BASE ASSEMBLY &
AUXILIARY CLUTCH DETENT**

AUXILIARY READERS

Model Identification Chart

	Auxiliary		Selectadata ³			
Duplex	ATR ¹ ATCR ¹ ACR ¹	Manual Data Selector	STR	Manual Data Selector	Automatic Selection & Search	
		ATR-D ¹ ATCR-D ¹ ACR-D ¹		STR-D	STR-A	
	STR-AD					
Synchro- Duplex	ATR-SD ²	Manual Data Selector	STR-SD	Manual Data Selector	Automatic Selection & Search	
		ATR-D-SD ²		STR-D-SD	STR-A-SD	
		STR-AD-SD				

(1) Feed Knob & 575 RPM

(2) No Feed Knob & 1000 RPM (Homing RPM)

(3) No Feed Knob & 1334 RPM (Searching RPM)

Figure 1

**BASE ASSEMBLY (ALL UNITS)
In Sequence (Figure 3)**

1. With all set screws for the drive shaft loose, insert a .010" feeler between the reader (mounted) and the rubber reader coupling on the drive shaft. Push the drive shaft forward, locate the front positioning collar tight against the front drive shaft bearing and tighten the set screw. This determines the limit of travel of the drive shaft toward the reader. Remove the feeler. This leaves .010" clearance between the reader and coupling.
2. With the front positioning collar tight against the front drive shaft bearing, insert a .003" feeler between the rear positioning collar and the pulley and hub assembly (or pulley & hub assembly and the rear drive shaft bearing). Locate the rear positioning collar tight against the shim (or pulley & hub assembly) and tighten the set screw. Remove the

feeler, leaving .003" end play for the drive shaft. (.003" is the maximum allowance.)

3. Loosen the set screws for the motor pulley on the motor shaft, position the pulley so both pulleys are aligned with the motor belt and tighten the set screws (Figure 4).
4. Loosen the bolts that mount the motor cradle and position the motor right or left to allow from 1/4" to 3/8" belt deflection without any appreciable sideways movement of the motor. The motor belt tension should be sufficient to reliably drive the mechanism under load.

Clutch Detent (Home Position)

ATR & ATR-D: Check the adjustment of reader contact springs 1 & 2 on SR8 with the blank tape in the reader and be sure that the clearance is from .020" to .025" as indicated in the reader contact adjustment chart (Figure 20).

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 47, 48, 49 & 50

Model Identification Chart

		Auxiliary	Selectadata ³		
Duplex	ATR ¹	Manual Data Selector	STR	Manual Data Selector	Automatic Selection & Search
	ATCR ¹	ATR-D ¹		STR-D	STR-A
	ACR ¹	ATCR-D ¹		STR-AD	
Synchro- Duplex	ATR-SD ² ATR-ASD ²	Manual Data Selector	STR-SD STR-ASD	Manual Data Selector	Automatic Selection & Search
		ATR-D-SD ² ATR-D-ASD ²		STR-D-SD STR-D-ASD	STR-A-SD STR-A-ASD
		STR-AD-SD STR-AD-ASD			

(1) Feed Knob & 575 RPM

(2) No Feed Knob & 1000 RPM (Homing RPM)

(3) No Feed Knob & 1334 RPM (Searching RPM)

Figure 2

DATE: November 4, 1963

CHANGE: Page 7-1, "Model Identification Chart".

REASON: New Reader Models.

EXPLANATION: Making Automatic Synchro-Duplex operation available on all standard Synchro-Duplex readers has resulted in six additional motorized readers.

Note: MANUAL ADDENDUMS 47, 48 & 49, dated 11-4-63 contain much the same information but they pertain to the Flexowriter manual only and the information is not repeated here.

FRIDEN SYSTEMS ADJUSTMENT

CLUTCH DETENT

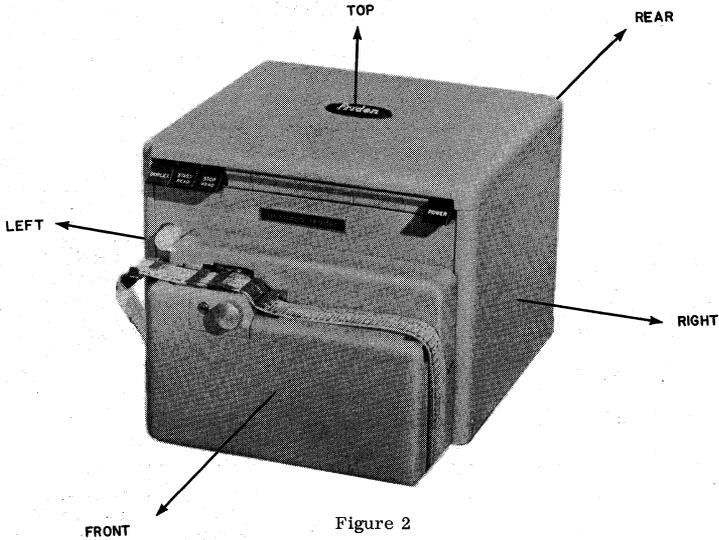


Figure 2

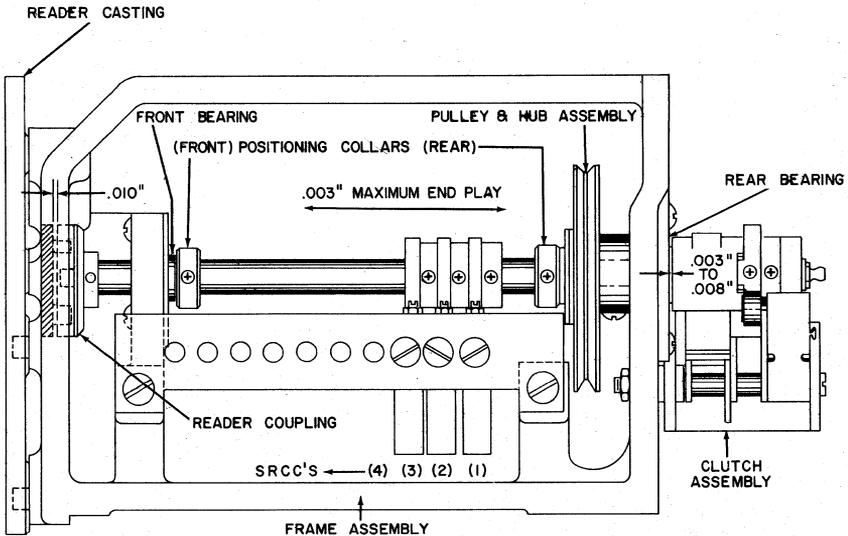


Figure 3

Connect the meter T-18082 across springs 1 & 2 on SR8 with no tape in the reader and set it to indicate continuity. Insert the timing dial screw T-18149 in the threaded end of the reader shaft and mount the timing dial T-18088 on the screw.

With all of the clutch parts loose, cycle the reader until contacts 1 & 2 on SR8 just make

as indicated by the meter. Hold the reader shaft at that point, set the timing dial so that the 50° indication (in Red) is in line with the scribed mark on the outside casting and tighten its set screws.

Cycle the drive shaft until the timing dial indicates zero and set the clutch detent on the end of the drive shaft so there is .003" to .008"

FRIDEN SYSTEMS ADJUSTMENT

CLUTCH DETENT & CLUTCH MECHANISM

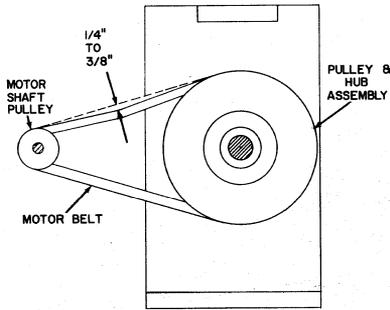


Figure 4

clearance between the clutch sleeve and the casting (all set screws loose). Preserving this clearance, locate the clutch detent rotationally so it engages the clutch detent arm and tighten the set screws.

Note: This position corresponds to the point where the feed lever roller has come to the low dwell of the feed cam (Figure 5).

Check the setting of the clutch (home position). The reader contacts should close 50° (plus or minus 2°) after 0° . Readjust if they do not.

ATCR & ATCR-D: Use exactly the same procedure as outlined for an ATR & ATR-D except set the clutch detent so the reader contacts make at 52° (plus or minus 2°) after 0° .

ACR & ACR-D: In the same manner, set the clutch detent so the reader contacts make at 48° (plus or minus 2°) after 0° .

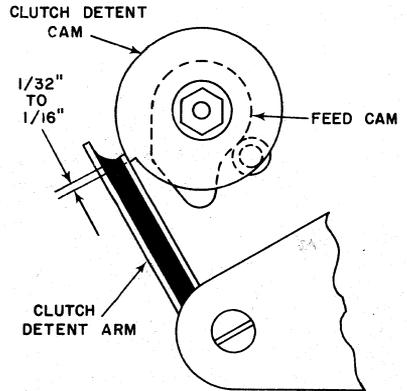
Note: These positions correspond to the point where the feed lever roller has come on to the high dwell of the feed cam (Figure 6).

In all of the Auxiliary Duplex readers, the home position is after the feed has occurred. The feed pawl has just stopped moving away from the ratchet.

Note: Any time the clutch is removed or the setting of the clutch detent is changed, the adjustment of the timing cams on the drive shaft may be changed and they must be checked. Conversely, if the adjustment of the timing cams is off, the setting of the clutch detent should be checked.

Clutch Mechanism (All Units)

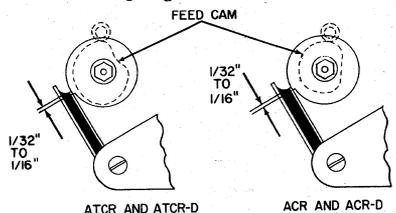
1. Loosen the locking nut for the top clutch magnet coil, adjust the upper coil so its core is visually flat to the manually attracted armature, and tighten the locking nut (Figure 7).



ATR AND ATR-D

Figure 5

2. Loosen the locking nut for the lower clutch magnet coil, adjust the lower coil so there is a $.002''$ to $.004''$ clearance between the core and the fully (manually) attracted armature, and tighten the locking nut.
3. Cycle the drive shaft until the clutch sleeve touches the armature. Loosen the mounting screw and position the clutch magnet yoke so there is $.003''$ to $.006''$ clearance between the tip of the clutch sleeve and the tip of the armature with the armature fully attracted.
4. The clutch armature, armature knock off arm and clutch detent should pivot freely without binding. The armature should have $.005''$ to $.015''$ end play.
5. Cycle the drive shaft about half way and form the armature stop so there is $.001''$ to $.008''$ clearance between the clutch armature and the low surface of the sleeve.
6. Cycle the drive shaft so the detent cam is halfway around and manually turn the clutch sleeve backward to be sure that the square stud on the inside of the sleeve is against the non-expanded clutch spring.



ATCR AND ATCR-D

ACR AND ACR-D

Figure 6

FRIDEN SYSTEMS ADJUSTMENT

CLUTCH MECHANISM & CIRCUIT BREAKERS

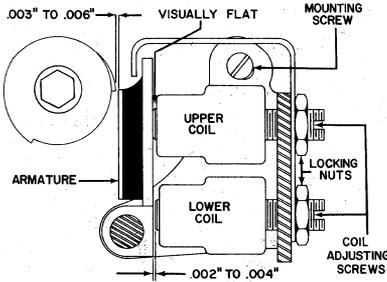


Figure 7

Maintaining this condition, continue to cycle the drive shaft until the detent cam is short of latching the proper specified distance according to model, speed and number of circuit breakers as follows:

A. $.005''$ to $.046''$ (on units with speeds of 800 RPM or less or with two or more cam operated circuit breakers). Examples:

Models	RPM
ATR, ATR-D	575
ATCR, ATCR-D	575
ACR, ACR-D	575

B. $.005''$ to $.062''$ (on units with speeds in excess of 800 RPM and one cam operated circuit breaker). Examples:

Models	RPM
STR, STR-A, STR-AD, STR-D	1334
STR-A-SD, STR-D-SD, STR-SD	1334
ATR-SD	1000

Note: If these units have two or more cam operated circuit breakers the detent cam is to be adjusted $.005''$ to $.046''$ short of latching as in (A) above.

At this position, turn the clutch collar (set screws loose) toward the armature latching surface until it touches. This results in the clutch spring being properly positioned to expand as the clutch detents. Tighten the clutch

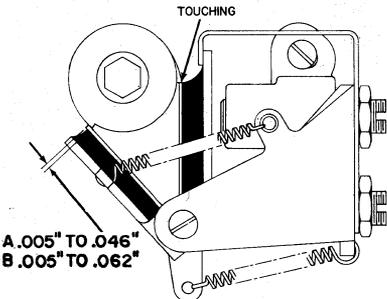


Figure 8

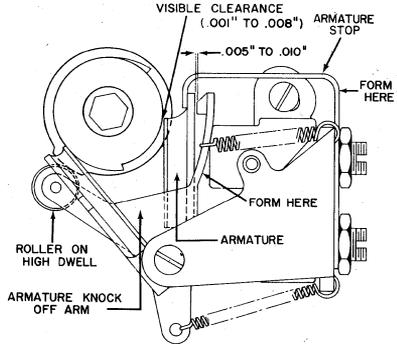


Figure 9

collar set screws with the collar tight against the detent cams.

7. Cycle the drive shaft until the armature knock off roller is on the high dwell of the knock off & overtravel cam (Figure 9). Form the armature knock off arm so there is $.005''$ to $.010''$ clearance between the armature knock off arm and the clutch armature.

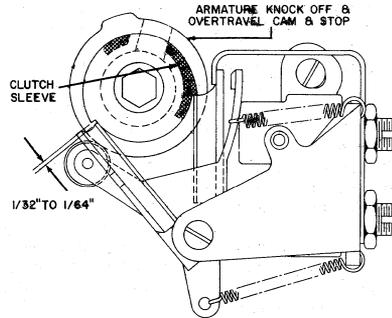


Figure 10

8. Loosen the set screws on the knock off & overtravel cam and set it so the clutch can overtravel $1/64''$ before the cam contacts the clutch sleeve (Figure 10).

Check the clutch sleeve to be sure that it has $.003''$ to $.008''$ free play. If it does not, readjustment is necessary.

Circuit Breakers (Figure 11)

1. Set the timing dial on the end of the reader shaft so the 0° setting is lined up with the scribed mark on the outside reader casting.
2. Connect the VOM T-18082 across the cam operated contacts and set it to indicate continuity. Cycle the drive shaft

FRIDEN SYSTEMS ADJUSTMENT

CIRCUIT BREAKERS & PANEL SWITCHES

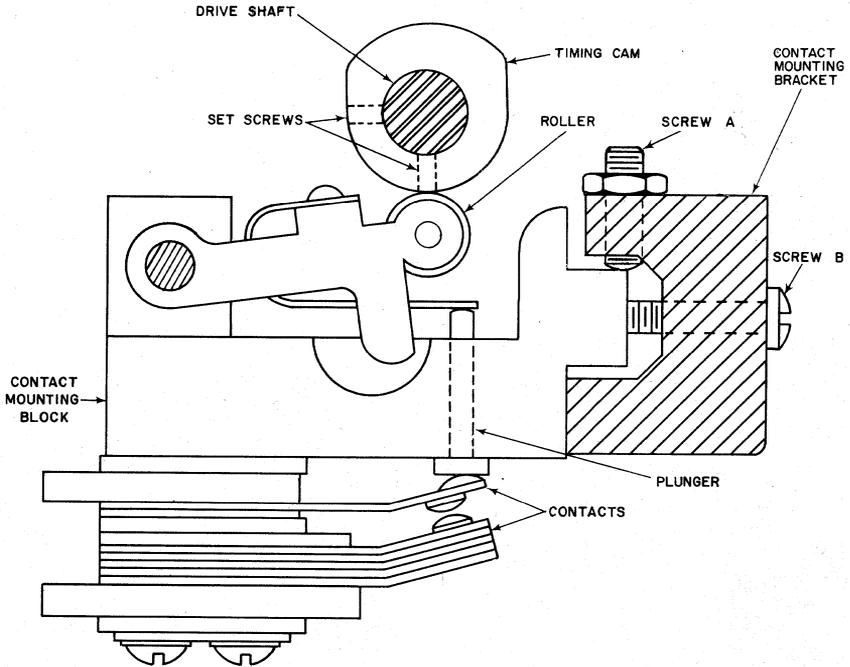


Figure 11

slowly and note the duration of contact operation. If it is not correct according to the information on the unit's schematic, loosen the locking nut, screw (B), and adjust screw (A) up or down to change the contact operation duration. Be sure to retighten screw (B) and the locking nut.

- Loosen the cam set screws, locate the cam so the contacts operate as specified on the schematic, and tighten the set screws. The allowable range is plus or minus 2 degrees at the make or break setting.

Example: SRCC1 in an ATR. (Normally closed breaks at 20° and makes at 225°).

The contacts - open duration should be 205° (225° minus 20°). Adjust screw (A) for this condition.

Locate the timing cam so that the contacts break at 20°, plus or minus 2°.

Note: With the plus or minus 2° range on make or break settings, it is possible to be 4° off on the total contact duration.

Panel Switches (Figures 12 & 13)

All panel switches must satisfy three basic conditions:

- There must be sufficient tension in the operate strap to keep the panel switch fully non-operated.
- The contacts must meet with no more than .010" mis-alignment top to bottom or sideways.
- The two contacts on bifurcated straps must meet their mating contacts within .005" of each other (as nearly simultaneously as possible).

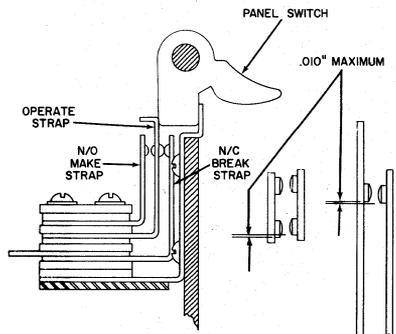


Figure 12

FRIDEN SYSTEMS ADJUSTMENT

PANEL SWITCHES & INTERPOSER BAIL

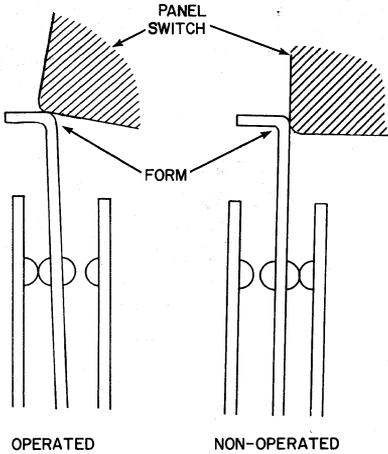


Figure 13

Break-Before-Make Contacts: With the switch in the non-operated position, form the normally open (make) contacts so there is a clearance of .035" to .045" to the center contacts. With the switch operated, form the normally closed (break) contacts so there is a clearance of .020" (Minimum) to the center contacts. Both make and break contacts should have .015" minimum follow as the switch operates and restores.

Make-Before-Break Contacts: Adjust these contacts in the same manner as the break-before-make contacts but with .020" to .030" clearance to the make contacts, and .020" to .030" clearance to the break contacts.

Maintain .015" minimum follow in both positions.

Locking Contacts: Locking panel switches must be adjusted according to their configuration and the bent end of the center strap must be formed so the panel button locks sufficiently in its operated position.

Microswitches Operated from Panel Switches (Figure 14)

The Microswitch operator spring should have sufficient tension to keep the panel switch fully non-operated. The switch should operate before the mid-point of its travel. Locking type switches should lock sufficiently when operated. Any forming of the Microswitch operator spring is not advisable because of its composition. The Microswitch may be shifted slightly on its mounting to obtain the proper adjustment. If this doesn't work, the switch should be changed.

Switching Relays (Figure 15)

The armature latching arms are to be in

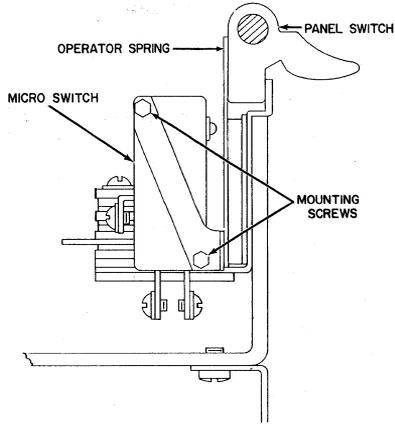


Figure 14

alignment and engage each other by .050" (plus or minus .010"). There should be a clearance of .001" to .002" between the end of the unlatched armature latching arm and the latched arm when the latched armature is fully depressed against its core. The adjustments can be obtained by loosening the latching arm mounting screws and repositioning the arms on the armatures. Check in both positions.

.001" TO .002" CLEARANCE AT THIS POINT WHEN LATCHED RELAY ARMATURE IS HELD AGAINST ITS CORE.

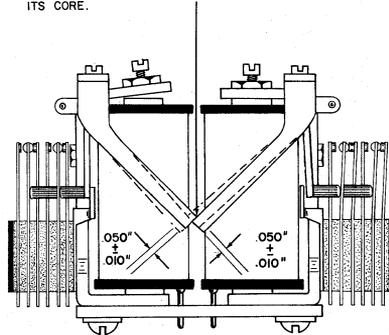


Figure 15

AUXILIARY DUPLEX READERS

The adjustments for these readers are the same as those for a Flexowriter reader with the following exceptions in the tape - only reader:

Interposer Bail

With the interposer bail arm roller on the high dwell of the interposer cam, loosen the locking screw and adjust the eccentric so that the feeler pins are flush or no more than .010"

FRIDEN SYSTEMS ADJUSTMENT

below the surface of the guide block. Tighten the locking screw without disturbing the adjustment (Figure 16).

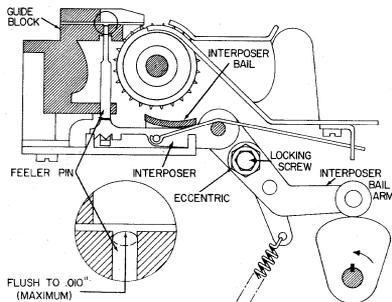


Figure 16

Feed Bell Crank (Figure 17)

With the feed bell crank roller at the high point of the feed cam, loosen the locking screw and adjust the eccentric so that the feed pawl has moved the pin wheel ratchet to fully detented position (desirable), or within $.010''$ of fully detented position. The extent of feed pawl travel should never be beyond the fully detented position.

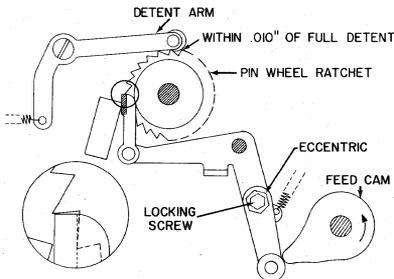


Figure 17

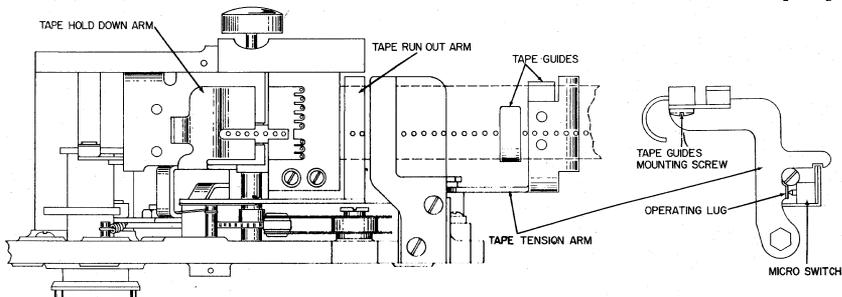


Figure 19

FEED, TAPE RUN OUT & TAPE TENSION ARM

Feed Pawl Stop (Figure 18)

Loosen the mounting screws slightly and, with the feed roller at the high point of the feed cam and lifted away from it $.005''$ to $.010''$, adjust the eccentric so the feed pawl stop touches the feed pawl which is, in turn, against the ratchet. This allows a slight clearance between the feed pawl and the feed pawl stop at the extent of the feed pawl's travel.

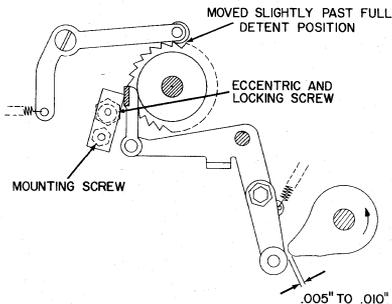


Figure 18

Tape Run Out And Tape Tension Arm (Figure 19)

The Tape reader used in the Auxiliary Input readers has a tape run out arm and tape tension arm similar in principle to those in a Flexowriter punch.

The tape run out arm must operate freely without binding. It may be formed so it is located centrally between the tape support plate and the guide. It should positively operate the SPT contacts in the same manner as the tape hold down arm.

The tape tension arm is to reliably actuate the Microswitch before it reaches the limit of its travel. The operating lug on the tape tension arm may be formed to obtain the adjustment.

The tape guides, inner and outer, on the tape tension arm should be adjusted to keep a tape

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 44

DATE: April 5, 1963

CHANGE: Page 7-7

REASON: Adjustment Change

EXPLANATION: A slight over feeding adjustment results in more reliable operation.

sureing that the pin wheel shaft will rotate the required distance for reliable operation. Check each tooth of the ratchet and adjust for the highest tooth (or teeth).

With the pin wheel ratchet detenting backwards a very short distance, the ratchet starts the feed pawl back to it unoperated position.

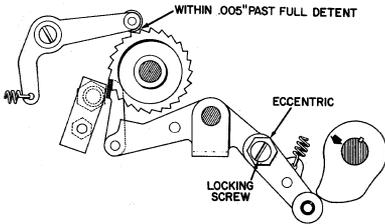


Figure 17

Feed Bell Crank

With the feed bell crank roller at the high point of the feed cam, loosen the locking screw and adjust the eccentric so the feed pawl has moved the pin wheel ratchet one full tooth to .005" more than one full tooth. The feed must never be less than one full tooth.

Feed Pawl Stop

With the feed bell crank roller at the high point of the feed cam, loosen the mounting screws and adjust the feed pawl stop eccentric so the feed pawl stop is touching the feed pawl which is, in turn, against the ratchet. Check by trying to manually turn the pin wheel shaft. It should not move, thereby in-

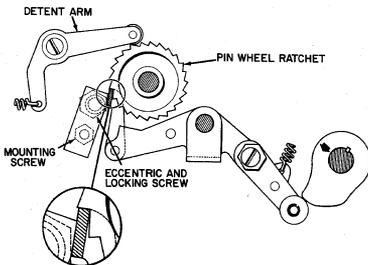


Figure 18

FRIDEN SYSTEMS ADJUSTMENT

SR, SRC CONTACTS & SUMMARY

feeding straight into the reader with minimum clearance between the inner and outer guides. Loosen the mounting screw to shift the guides.

Reader Contacts ATR, ATR-D, APCR, APCR-D, HR40, CR87, ACR, ACR-D & TCR88

The reader contacts are to be adjusted in the same manner and to the same basic considerations as any reader. That is, sideways alignment, minimum follow on stationary contacts, simultaneous meeting of mating contacts, and so forth.

The reader contacts are individually adjusted to specified clearances as outlined in the charts for the unit (Figures 20 & 21). Each set of contacts is afforded an operate and non-operated adjustment in that part of the cycle where the reading occurs. The gap dimensions between the contact springs are expressed in thousandths of an inch measured in the position indicated.

1. Remove the reader cover. With a blank tape or tab card inserted in the reader (to block all of the reader pins) cycle the reader manually until the interposer bail arm roller is on the low dwell of the interposer cam. Adjust all of the normally open contacts for the specified clearances by forming the stationary spring stiffeners. Check the gap with the wire gauges.
2. In the same manner, but with no tape or tab card in the reader (allowing the reader pins to operate fully), manually cycle the reader until the interposer bail arm roller is at the low dwell of the interposer cam and adjust all of the normally closed contacts (now open) for the specified clearances by forming the stationary spring stiffeners. Check the gaps with the wire gauges.
3. (ATR, ATR-D, APCR, APCR-D, HR40 & CR87 only). With the SR contacts adjusted as per Figure 20 and with no tape or tab card in the reader, manually cycle the reader and check to see that the closing of springs 1 & 2 of SR6 and springs 1 & 2 of SR7 occurs before the opening of springs 6 & 7 of SR3 and springs 7 & 8 of SR4. Readjust if necessary.

(ACR, ACR-D & TCR88 only). With the SR contacts adjusted as per Figure 21 and with no tape or tab card in the reader, manually cycle the reader and check to see that the closing of springs 3 & 4 of SR11 and springs 3 & 4 of SR12 occurs before the opening of springs 7 & 8 of SR8, springs 3 & 4 of SR3 and springs 5 & 6 of SR3. Readjust if necessary.

Reader Common Contacts (SRC)

1. With the interposer bail arm roller on the high dwell of the interposer cam, adjust the contact spring stiffeners on contact spring 1 as there is a gap of .042" to .047" between contacts 1 & 2. Adjust the contact spring stiffeners on contact spring 3 so there is a gap of .015" to .020" between contacts 3 & 4.
2. With blank tape in the reader and the interposer bail arm roller at the low dwell of the interposer cam, adjust the contact spring stiffeners on contact spring 5 so there is a gap of .015" to .020" between contacts 4 & 5. The above adjustments result in make-before-break operation of springs 3, 4 & 5.
3. (ACR, ACR-D, TCR88 only). Adjust the contact spring stiffeners on contact spring 6 so that contacts 6 & 7 make at the same time or slightly after all of contacts 1 & 2 of SR1 through SR12 make.

Summary

With the exception of the different home positions of the units with respect to the closure of the reader contacts and the different gaps for the reader contacts, all of the other adjustments for each type of reader unit are the same as the adjustments for its corresponding Flexowriter reader. That is, the adjustments for an Auxiliary Input Tape reader are the same as the adjustments for the Flexowriter Tape Reader, the adjustments for an Auxiliary Input Tape/Edge Card reader are the same as the adjustments for the Flexowriter Tape/Edge Card reader and the adjustments for an Auxiliary Input Tab Card reader are the same as the adjustments for the Flexowriter Tab Card reader.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 51

DATE: November 4, 1963

CHANGE: Page 7-8. Issue Revision 1 of
Page 7-8.

REASON: Reader Designations Changed.

EXPLANATION: Changing the reader control element from reader magnet to reader clutch necessitates the changing of reader designations. Because the control adjustments do not change, readers in the field may bear either the old or new designation.

FRIDEN SYSTEMS ADJUSTMENT

READER CONTACT CHART

ATR, ATR-D, ATCR & ATCR-D

*HR40, HR93, CR87, CR91

Blank Tape/Edge Card in Reader

Contacts	Normally Open Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8	20-25		15-20		15-20								
SR7	20-25		20-25		20-25								
SR6	20-25		15-20										
SR5	20-25		15-20		15-20		20-25						
SR4	20-25		20-25										
SR3	20-25		20-25		15-20								
SR2	20-25		15-20			20-25							
SR1	20-25		15-20			20-25							

No Tape/Edge Card in Reader

Contacts	Normally Closed Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8							20-25						
SR7						20-25		20-25					
SR6				20-25		20-25							
SR5								20-25					
SR4					15-20		20-25						
SR3						20-25							
SR2				15-20			20-25						
SR1				15-20			20-25						

Figure 20

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 52

DATE: November 9, 1963

CHANGE: Page 7-9. Issue Revision 1 of
Page 7-9.

REASON: Reader Designations Changed.

EXPLANATION: The changing of the reader control element from reader magnet to reader clutch necessitates changing reader designations. Because the contact adjustments do not change, readers in the field may bear either the old or the new designation.

FRIDEN SYSTEMS ADJUSTMENT

READER CONTACT CHART

ACR & ACR-D
*TCR88 & TCR 93

Blank Tab Card in Reader

Contacts	Normally Open Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR12	20-25		15-20										
SR11	20-25		15-20		20-25			20-25					
SR10 (0)	20-25		20-25		15-20								
SR1	20-25		20-25										
SR2	20-25		20-25										
SR3	20-25												
SR4	20-25		20-25		20-25								
SR5	20-25		20-25		15-20								
SR6	20-25		20-25										
SR7	20-25		20-25		20-25		20-25						
SR8	20-25			20-25									
SR8 ¹	20-25		20-25										
SR9	20-25		20-25										

No Tab Card in Reader

Contacts	Normally Closed Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR12					20-25								
SR11						20-25			20-25				
SR10 (0)						20-25		20-25		20-25			
SR1					20-25								
SR2					20-25								
SR3			15-20		20-25								
SR4							20-25		20-25				
SR5						20-25		15-20					
SR6													
SR7								20-25		20-25			
SR8		20-25			20-25		20-25						
SR8 ¹													
SR9				20-25									

Figure 21

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 53

DATE: November 4, 1963

CHANGE: Page 7-10. Issue Revision 1 of
Page 7-10.

REASON: Reader Designation Changed.

EXPLANATION: Changing the reader control element from reader magnet to reader clutch necessitates a change in reader designation. Because the contact adjustments do not change, readers in the field may bear either the old or the new designation.

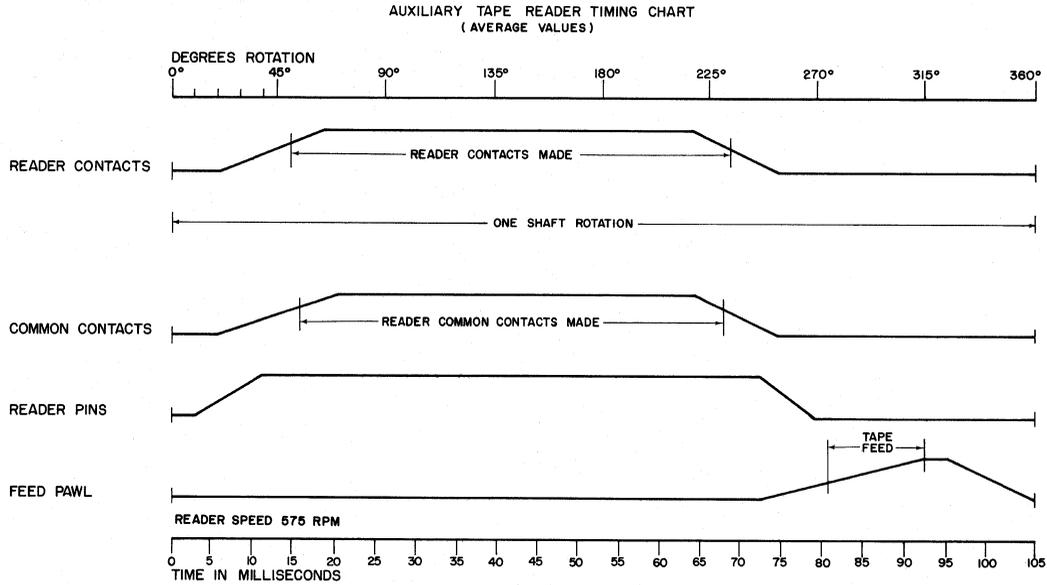


Figure 22

FRIDEN SYSTEMS ADJUSTMENT

FRIDEN SYSTEMS ADJUSTMENT

SELECTADATA CLUTCH DETENT SR, SRC CONTACTS & SUMMARY

SELECTADATA READERS

Clutch Detent (Home Position)

STR, STR-D, STR-A & STR-AD: Use the same procedure in setting the clutch detent as outlined in Auxiliary Readers. "Clutch Detent (Home Position)", page 7-1, but set the timing dial to read 81°.

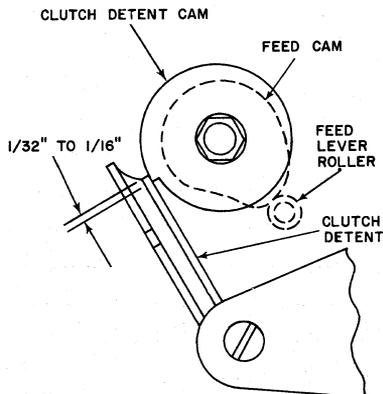


Figure 1

Note: This home position is where the feed lever roller is at the high point of the feed cam (Figure 3). In all Selectadata readers the home position is where the feed has occurred but the feed pawl is still engaging the ratchet. (For this reason they do not have a Tape Feed knob.)

Check the setting of the clutch (home position). The reader contacts should close 81° (plus or minus 2°) after zero. Readjust if necessary.

*Reader Contacts STR, STR-D, STR-A, STR-AD (HR-41 & HR76)

The reader contacts are to be adjusted in the same manner and to the same basic considerations as any reader. That is, sideways alignment, minimum follow on stationary contacts, simultaneous meeting of mating contacts and so forth. The reader contacts are individually adjusted to specified clearances as outlined in the chart for the units (Figure 2).

1. Remove the reader cover and cycle the reader manually with blank tape inserted (to block all of the reader pins) until the interposer bail arm roller is on the low dwell of the interposer cam. Adjust all of the normally open contacts for the specified clearances by forming the stationary spring stiffeners. Check the gaps with the wire gauges.

2. In the same manner, but with no tape in the reader so the pins operate fully, manually cycle the reader so the interposer bail arm roller is on the low dwell of the interposer cam and adjust all of the normally closed contacts (now open) for the specified clearances by forming the stationary spring stiffeners. Check the gaps with the wire gauges.

3. With the SR contacts adjusted as per Figure 4 and with no tape in the reader, manually cycle the reader and check to see that the closing of springs 1 & 2 of SR6 and springs 1 & 2 of SR7 occurs before the opening of springs 6 & 7 of SR3 and springs 10 & 11 of SR4. Readjust if necessary.

Reader Common Contacts (SRC)

1. With the interposer bail arm roller on the high dwell of the interposer cam, adjust the contact spring stiffeners on contact spring 1 so there is a gap of .042" between contacts 1 & 2. Adjust the contact spring stiffeners on contact 3 so there is a gap of .015" to .020" between contacts 3 & 4. Adjust the contact spring stiffeners on contact 6 so there is a gap of .015" to .020" between contacts 6 & 7.

2. With blank tape inserted in the reader and the interposer bail arm roller at the low dwell of the interposer cam, adjust the contact spring stiffeners on contact 5 so there is a gap of .015" to .020" between contacts 4 & 5. Adjust the contact spring stiffeners on contact 8 so there is a gap of .015" to .020" between contacts 7 & 8.

This provides make-before-break operation of the two sets of transfer contacts 3-4-5 & 6-7-8.

Summary

With the exception of the different home positions of the units with respect to the closure of the reader contacts, the feed pawl being at the ratchet, and the different gaps for the reader contacts, the adjustments for each type of reader unit are the same as the adjustments for its corresponding Flexowriter reader (Tape, Tape/Edge Card or Tab Card).

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 54

DATE: November 4, 1963

CHANGE: Page 7-13. Issue Revision 1 of
Page 7-13.

REASON: Reader Designation Changed.

EXPLANATION: Changing the reader control element from reader magnet to reader clutch necessitated a change in reader designation. Because the contact adjustments do not change, readers in the field may bear either the old or the new designation.

FRIDEN SYSTEMS ADJUSTMENT

READER CONTACT CHART

STR, STR-D, STR-A & STR-AD
*HR41 & HR76

Blank Tape in Reader

Contacts	Normally Open Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8	20-25		15-20		15-20								
SR7	20-25		20-25		20-25			20-25					
SR6	20-25		15-20			20-25							
SR5	20-25		15-20		15-20		20-25			20-25			
SR4	20-25		20-25		20-25								
SR3	20-25		20-25		15-20			20-25					
SR2	20-25		15-20			20-25			20-25				
SR1	20-25		15-20			20-25			20-25				

No Tape in Reader

Contacts	Normally Closed Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8							20-25		20-25				
SR7						20-25			20-25		20-25		
SR6				20-25			20-25		20-25				
SR5								20-25			20-25		
SR4						20-25		15-20		20-25			
SR3						20-25			20-25				
SR2				15-20			20-25			20-25			
SR1				15-20			20-25			20-25			

Figure 2

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 55

DATE: November 4, 1963

CHANGE: Page 7-14. Issue Revision 1 of
Page 7-14.

REASON: Reader Designation Changed.

EXPLANATION: Changing the reader control element from reader magnet to reader clutch has necessitated a change in reader designation. Because the contact adjustments do not change, readers in the field may bear either the old or the new designation.

STR-AD-SD READER TIMING CHART (AVERAGE VALUES)

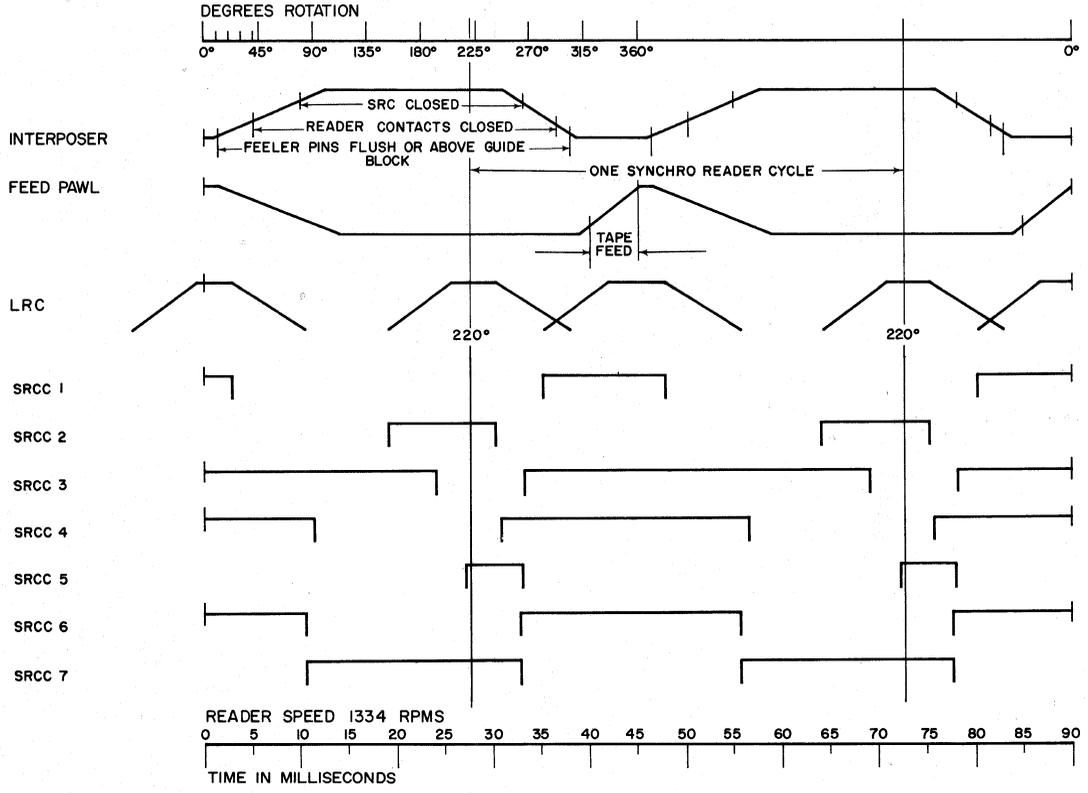


Figure 3

FRIDEN SYSTEMS ADJUSTMENT

FRIDEN SYSTEMS ADJUSTMENT

S-D CLUTCH DETENT, SR CHART & S-D SR, SRC & SRT CONTACTS

SYNCHRO-DUPLEX READERS

Clutch Detent (Home Position)
ATR-SD, ATR-D-SD, STR-SD, STR-D-SD,
STR-A-SD & STR-AD-SD: Use the same pro-

cedure as outlined in Auxiliary Readers, page 7-1, "Clutch Detent (Home Position)" but set the timing dial to read 81°.

ATR-SD & ATR-D-SD (HR43)

Contacts	Normally Open Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8	20-25		15-20		15-20								
SR7	20-25		20-25		20-25								
SR6	20-25		15-20										
SR5	20-25		15-20		20-25								
SR4	20-25		20-25										
SR3	20-25		20-25		15-20								
SR2	20-25		15-20			20-25							
SR1	20-25		15-20			20-25							

Contacts	Normally Closed Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8							20-25		20-25				
SR7							20-25		20-25				
SR6				20-25		20-25		20-25					
SR5						20-25		20-25					
SR4					15-20		20-25						
SR3						20-25		20-25					
SR2				15-20			20-25						
SR1				15-20			20-25						

SYNCHRO-DUPLEX SR, SRC & SRT CONTACTS

Figure 1

Note: The home position for all Synchro-Duplex readers is where the feed lever roller is at the high point of the feed cam (Figure 2). The feed has occurred but the feed pawl is still engaging the ratchet. (For this reason they do not have a Tape Feed knob.)

Check the home position setting of the clutch. The reader contacts should close at 81° (plus or minus 2°) after zero. Readjust if necessary. Be sure that the clutch has been set at 0° by cycling the reader and seeing that the clutch again detents at 220°.

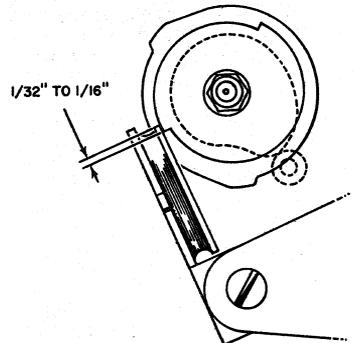


Figure 2*

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 56

DATE: November 4, 1963

CHANGE: Page 7-17. Issue Revision 1 of
Page 7-17.

REASON: Numerical Designation of Reader
Changed.

EXPLANATION: The substitution of a clutch for the reader magnet as a means of controlling reader operation necessitated a change in the numerical designation of all readers which were so modified. Because the contact adjustments do not change, readers in the field may bear either the old or the new designation.

FRIDEN SYSTEMS ADJUSTMENT

SYNCHRO-DUPLEX SR, SRC & SRT CONTACTS

Reader Contacts ATR-SD, ATR-D-SD (HR43 & HR78) & STR-SD, STR-A-SD, STR-D-SD, STR-AD-SD (HR42 & HR77)

1. Remove the reader cover. With blank tape inserted in the reader (to prevent full reader pin movement), cycle the reader manually until the interposer bail arm roller is at the low dwell of the interposer cam. Adjust each pair of normally open contacts to its specified clearance (Figure 1 or 3) by forming the stationary spring stiffeners and checking the clearances with the wire gauges. When the adjustments are completed, manually cycle the reader to home position and remove the tape.
2. Without inserting tape in the reader (to allow full pin movement), cycle the reader manually until the interposer bail arm roller is again at the low dwell of the interposer cam. In the same manner as above adjust each pair of normally closed contacts (now open) to its specified clearance. When adjustments are completed, manually cycle the reader to its home position.
3. Unless otherwise specified, a minimum of .010" follow-through movement of all stationary contacts must be maintained in all contact adjustments.

Reader Common Contacts (SRC)

1. With the interposer bail arm roller on the high dwell of the interposer cam, adjust the contact spring stiffeners on contact spring 1 so there is a gap of .042" to .047" between contacts 1 & 2. At the same time, adjust the contact spring stiffeners on contact spring 3 so there is a gap of .015" to .020" between contacts 3 & 4 and also adjust the contact spring stiffeners on contact spring 6 so there is a gap of .015" to .020" between contacts 6 & 7.
2. With blank tape inserted in the reader and the interposer bail arm roller at the low dwell of the interposer cam, adjust the contact spring stiffeners on contact spring 5 so there is a gap of .015" to .020" between contacts 4 & 5 and adjust the contact spring stiffeners on contact spring 8 so there is a gap of .015" to .020" between contacts 7 & 8.

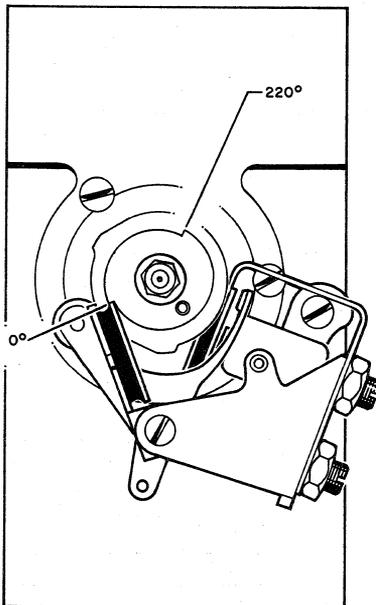


Figure 3 Synchro-Duplex Clutch*

The above adjustments provide make-before-break operation of the two sets of transfer contacts 3-4-5 & 6-7-8.

Reader Tape Contacts (SRT)

1. In normal position with the tape in the reader (the run out arm held down by the tape) and the tape hold down arm against the pin wheel, adjust all normally open contacts to a gap of .020" - .025".
2. With the tape hold down arm away from the pin wheel, adjust all normally closed contacts to a gap of .020" - .025". Return the hold down arm to its normal position against the pin wheel.
3. Remove tape from the reader. At this time the tape run out arm will be up. Check to see that the normally closed contacts have again opened to a gap of .020" to .025". Readjust if necessary.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 58

DATE: November 4, 1963

ADDITION: Page 7-18A, 7-18B and 7-18C.
Issue Revision 1 of Page 7-18.

REASON: New Reader Mechanisms.

EXPLANATION: The Synchro-Duplex readers which are equipped for Automatic Synchro-Duplex operation require new reader mechanisms, HR94 and HR95. The reader contact adjustment charts are on the next two pages.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 58

ATR-ASD and ATR-D-ASD
(HR95)

Contacts	Normally Open Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8	20-25		15-20		15-20							
SR7	20-25		20-25		20-25							
SR6	20-25		15-20									
SR5	20-25		15-20		20-25							
SR4	20-25		20-25									
SR3	20-25		20-25		15-20			20-25				
SR2	20-25		20-25		15-20			20-25				
SR1	20-25		15-20			20-25						

Contacts	Normally Closed Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8								20-25		20-25		
SR7							20-25		20-25			
SR6				20-25		20-25		20-25				
SR5						20-25		20-25				
SR4					15-20		20-25					
SR3						20-25			20-25		20-25	
SR2						20-25			20-25			
SR1				20-25			20-25					

Figure 1

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 58

STR-ASD, STR-A-ASD, STR-D-ASD, STR-AD-ASD
(HR94)

Contacts	Normally Open Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8	20-25		15-20		15-20							
SR7	20-25		20-25		20-25			20-25				
SR6	20-25		15-20			20-25						
SR5	20-25		15-20		20-25			20-25			20-25	
SR4	20-25		20-25		20-25							
SR3	20-25		20-25		15-20			20-25			20-25	
SR2	20-25		20-25		15-20			20-25			20-25	
SR1	20-25		15-20			20-25			20-25			

Contacts	Normally Closed Contact Springs											
	1	2	3	4	5	6	7	8	9	10	11	12
SR8							20-25		20-25			
SR7						20-25			20-25		20-25	
SR6				20-25			20-25		20-25		20-25	
SR5						20-25			20-25			20-25
SR4						20-25		15-20		20-25		
SR3						20-25			20-25			20-25
SR2						15-20			20-25			20-25
SR1				20-25			20-25			20-25		

Figure 2

FRIDEN SYSTEMS ADJUSTMENT

READER CONTACT CHART

STR-SD, STR-A-SD, STR-D-SD & STR-AD-SD

*(HR42 & HR77)

Contacts	Normally Open Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8	20-25		15-20		15-20								
SR7	20-25		20-25		20-25			20-25					
SR6	20-25		15-20			20-25							
SR5	20-25		15-20		20-25			20-25			20-25		
SR4	20-25		20-25		20-25								
SR3	20-25		20-25		15-20			20-25					
SR2	20-25		15-20			20-25			20-25				
SR1	20-25		15-20			20-25			20-25				

Contacts	Normally Closed Contact Springs												
	1	2	3	4	5	6	7	8	9	10	11	12	13
SR8							20-25		20-25				
SR7						20-25			20-25		20-25		
SR6				20-25		20-25		20-25		20-25			
SR5						20-25			20-25			20-25	
SR4						20-25		15-20		20-25			
SR3						20-25			20-25				
SR2				15-20			20-25			20-25			
SR1				15-20			20-25			20-25			

Figure 3

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 57

DATE: November 4, 1963

CHANGE: Page 7-19. Issue Revision 1 of
Page 7-19.

REASON: Numerical Designation of Reader
Changed.

EXPLANATION: The substitution of a clutch for the reader magnet as a means of controlling reader operation necessitated a change in the numerical designation of all readers which were so modified. Because contact adjustments do not change, readers in the field may bear either the old or the new designation.

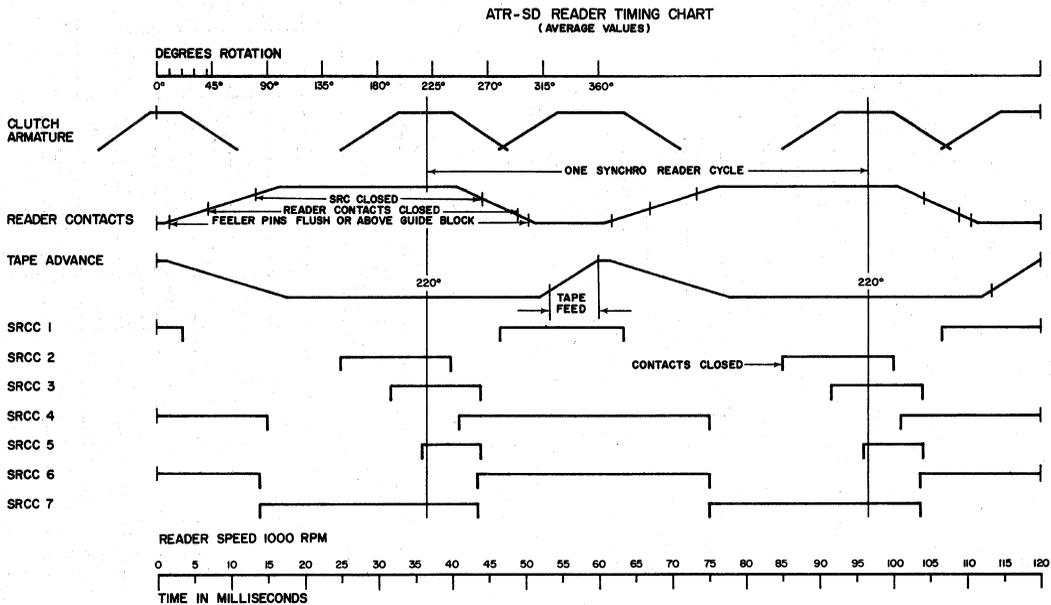


Figure 4

FRIDEN SYSTEMS ADJUSTMENT

MANUAL DATA SELECTOR

MANUAL DATA SELECTION

L-SSDS STEP SWITCH

Armature & Pawl

1. The requirements of: (1) the pawl not binding as it is lifted away from the ratchet and (2) the armature stopping teeth having clearance as described in the checking procedure, can be obtained by the placement of shims between the armature heelpiece and the armature pivot block. The thinnest suitable shims should be used to avoid interference between the armature stopping teeth and the outer surface of the ratchet wheel teeth as the armature restores.

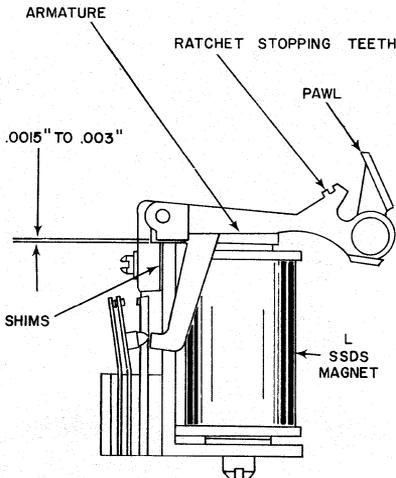


Figure 1

2. With the step switch stepping in a read-out, a .003" feeler placed between the armature and the heelpiece should feel tight when the armature is attracted to the core. In the same situation, there should be no drag on a .0015" feeler. To adjust the "airline", loosen the armature mounting screws, place a .002" feeler in the airline gap, manually operate the armature and tighten the

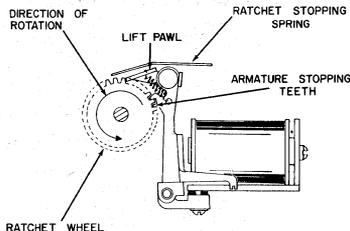


Figure 2

mounting screws. Check the adjustment.

Ratchet Stopping Spring

1. Tie a loop of string around the ratchet stopping spring, hook the string to a scale, and measure the pull necessary to move the tip of the spring away from the ratchet. It should be from 75 to 125 grams (2.6 to 4.4 ounces).

At the same time, the ratchet stopping spring should have at least $1/32"$ clearance to the pawl and the armature. Form the spring if necessary.

2. Manually turn the ratchet backward taking up any play between the ratchet and the pawl. Loosen the ratchet stopping spring mounting screws and locate it so there is a perceptible to .004" (Maximum) clearance to the ratchet tooth. Tighten the mounting screws and check.

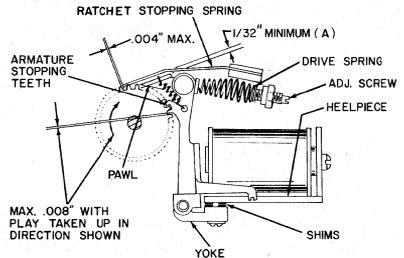


Figure 3

Interrupter Contacts

While the interrupter contacts are not used in the MDS, the contact operator should rest about $1/8"$ from the armature arm. Form the stationary contact.

Armature Drive Spring

Loosen the locking nut on the set screw and turn the set screw in the direction that decreases the spring tension. Manually operate the armature and allow it to restore slowly, decreasing the spring tension until the armature fails to fully restore. When a failure has occurred, increase the spring tension until no failures occur. At that point, turn the set screw another half turn in the tension-increasing direction and tighten the locking nut.

Note: In allowing the armature to slowly restore, pay particular attention to the point where the contact wipers contact and come onto, the contact points.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL DATA SELECTOR

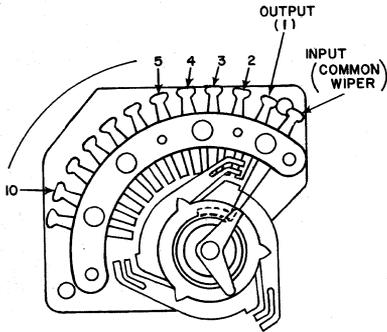


Figure 4

Contact Wipers & Contact Points

1. Contact wipers may be formed to satisfy the operating requirements but this must be done very carefully without scratching or burring the surfaces. Scratches or burrs will greatly increase the chances for abnormal breakage.
2. Contact points should be aligned with each other from step to step. If one is off, it may be formed to align it with the others. Great care should be used in forming in order not to break a contact point. They are not individually replaceable.

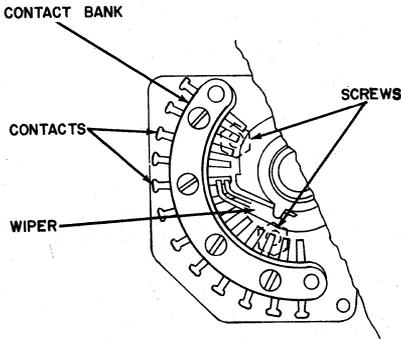


Figure 5

Contact Banks

The contact bank may be properly positioned

by loosening the two hex mounting screws and shifting the contact bank on the step switch base. Tighten the screws.

SSDS Contacts In Sequence

1. With the stepping switch at home position, loosen the mounting screws and adjust the contact mounting bracket sideways so the "V" form on contact 2 is on the center line of the actuating lobe of the cam. Move the bracket back and forth so there is a .020" to .025" air gap between contacts 1 & 2 (Contact 1 should be straight). Tighten the mounting screws. Manually step the switch to points 1 & 10 and be sure that the "V" form on contact 2 is .020" minimum from the low surface of the cam and .010" minimum from the actuating lobe.
2. With the stepping switch away from home position the second contact operator (on contact 4) should rest against contact 1. If necessary, form by wiping so there is no lost motion as the contacts operate. Form contact 5 so it positions contact 6 with .010" to .015" clearance to contact 4.
3. Contact 3 is not used. But, with the stepping switch in home position it should be formed to provide a .010" to .015" air gap between contacts 5 & 6, insuring that contacts 4, 5 & 6 "make-before-break". This forming of contact 3 must not change the .020" to .025" clearance between contacts 1 & 2.

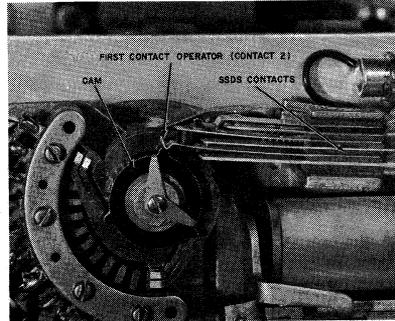


Figure 6

FRIDEN SYSTEMS ADJUSTMENT

AUXILIARY PUNCHES

AUXILIARY PUNCHES

The adjustments of the auxiliary punches are the same as for other units. That is, the adjustments of the base assembly, drive shaft, motor, motor belt, panel switches, etc., are the same as for the auxiliary readers. The

clutch adjustments are the same as for an Auxiliary Duplex reader clutch, except that the home position of the clutch is different. The adjustments for the punch mechanism are the same as for the punches used on the Flexowriters.

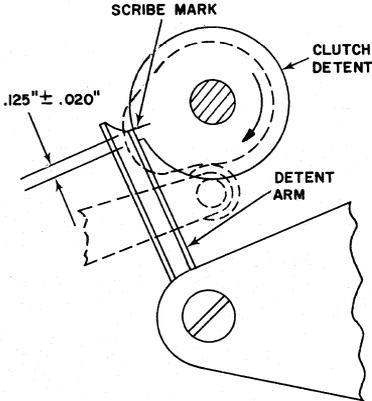


Figure 1

Clutch Detent (Home Position)

Set the clutch detent on the end of the drive shaft so there is $.003"$ to $.008"$ movement available for the clutch sleeve with all set screws loose. Locate the detent rotationally so the scribe mark on the cam is aligned with the end of the detent arm (plus or minus $.020"$) when the feed lever roller first comes to the low dwell of the feed cam. Tighten the set screws. The home position of the unit is where the clutch detent is engaging the detent arm (Figure 1).

Note: This setting corresponds to 15° , plus or minus 3° , past the point where the feed lever roller first comes to the low dwell of the feed cam. On units without the scribed detent, the timing dial and scribe mark on the outside casting must be used to find the 15° setting.

FRIDEN SYSTEMS ADJUSTMENT

SYSTEMS RECEIVERS

The adjustments of the Systems Receivers are the same as for the Flexowriters except for the translator home position because of the higher operating speed.

The cams on the drive shaft of a high speed translator have different curvatures than the cams in a standard translator. The high speed cam assemblies have an "H" stamped on the side and the restoring bail cam has a 17° dwell just past the high point. The home position of the translator is when the cam follower is within 6° (3° plus or minus 3°) of the end of the dwell. The 3° point (before the end of the dwell) is 26° past the high point of the armature knock off.

Translator Clutch Detent (Home Position)

With the timing dial on the end of the translator shaft cycle the translator to the high point of the armature knock off and note the reading on the dial. Continue to cycle the translator slowly and note that the permutation bars move to the left and then stop. This movement is 12°. Cycle the translator another 14°. Locate the detent cam so it engages the detent arm, set it on the shaft so that the clutch assembly (including the translator gear) has .003" to .008" clearance to the spacer with all of the clutch parts against the detent cam and tighten the set screws. This position is 3° before the end of the dwell and the tolerance at this point is plus or minus 3°.

Clutch

1. Manually pivot the clutch armature to the fully attracted position and see that there is a visible clearance to the lower magnet coil, not exceeding .012". If the clearance is more than .012", change the coils or the armature, whichever is at fault.
2. Loosen the mounting screws and locate

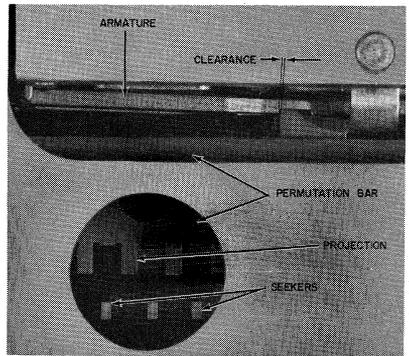


Figure 1

3. the clutch magnet yoke on the casting so that the tip of the armature, fully attracted, clears the clutch sleeve projection by .003" to .006".
3. Cycle the translator shaft so the clutch detent cam is about halfway from home position and manually turn the clutch sleeve backward to be sure that the square stud on the inside of the sleeve is against the non-expanded clutch spring. Maintaining this condition, continue to cycle the translator until the clutch detent cam is .005" to .046" short of the latch surface on the end of the detent arm. At this position, turn the clutch collar (set screws loose) toward the armature latching surface until it touches. Tighten the clutch collar set screws with the clutch collar tight against the clutch detent cam.
4. Loosen the set screws on the overtravel stop and locate it so the clutch can overtravel 1/32" to 1/64" before the stop contacts the clutch sleeve.

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TAB CARD PUNCH CONTROL

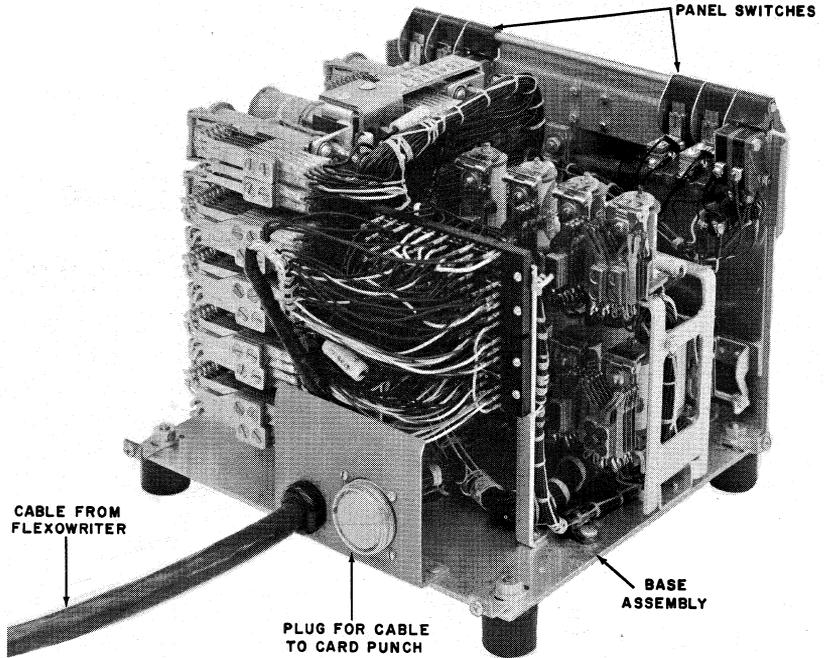


Figure 1

The TCPC unit (Figure 1) allows an IBM type 24 or 26 (024 or 026) Card Punch to be used as an auxiliary output unit to an SPS or SPD Flexewriter when the units are connected together by the detachable cables. The units can be disconnected and changed unit for unit: That is, an SPS can be directly replaced by an SPD and an 024 can be replaced by an 026. The card punch to be connected to the system must have the necessary additions to it (the cable connector and wiring).

The Flexewriter and the card punch can be independently operated even while they are cable connected by having the Cp On panel switch on the TCPC unit in the non-operated (up) position. The Cp Keybd panel switch must be in the operated (down) position to completely restore the channel 11 punching circuit to the card punch. (If the switch is in the non-operated position the 11 channel cannot be punched by operating the card punch keyboard).

Using the TCPC, tab cards as well as tape or edge cards can be obtained as Flexewriter

output. The information to be entered in the tab card is selective in nature because the card punch can be conditioned "On" and "Off" the same as any output unit. Ordinarily, the tab card will not contain punctuation marks so that all eighty tab card columns can impart useful intelligence.

CARD PUNCH

The primary purpose of the card punch is to prepare tab cards by punching alphabetic and numeric information in the tab cards using the Hollerith code. The definitions of terms and functions of the card punch, along with the various differences are as follows:

1. The 026 card punch (Figure 2) has a printing unit which prints the punched character on the tab card at the top of the card column. The printing and punching operations occur simultaneously. The 024 card punch does not contain the printing unit and cannot

FRIDEN SYSTEMS ADJUSTMENT

TCPC

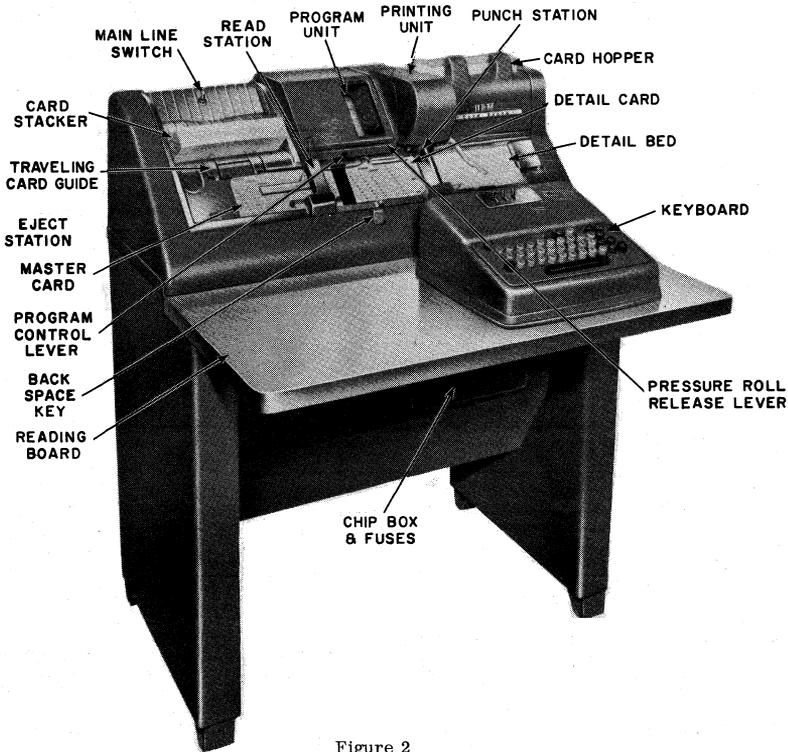


Figure 2

print the punched character on the tab card.

Note: The 024 card punch punches 20 characters per second (1200 RPM) when duplicating. The 026 card punch punches and prints 18 characters per second (1080 RPM) when duplicating.

2. Each tab card used in the card punch passes through several steps during its preparation. Assume that there are no tab cards in the card punch and that the various switches are in their proper position.
 - a. Blank tab cards are placed in the Card Hopper with the front of the card forward and the 9 bit edge at the bottom of the card. From there, the first one is pushed down and to the left to position two (Figure 3) when the first feed occurs. The card hopper will hold about 500 cards.
 - b. During the first part of the second feed cycle, the tab card is pushed

to position three, aligned, and pushed to position four, the "Punch Station". The tab card is now the "Detail" card. It is registered in the punching station at column zero.

Note: In the card punch, the tab card is advanced (fed) and then punched. This is the reverse of the sequence in a Friden punch, wherein the tape is punched and then advanced.

Also during the second feed cycle, another tab card is pushed down from the card hopper and pushed to position two as in (a) above.

There are now two tab cards in the card punch; the tab card registered at column zero in the punching station, and the tab card in the "Detail Bed". Punching can now be performed.

Note: Both of these tab cards are said to be "in the punching station", although the second one is not registered.

- c. Assuming that some of the columns in the detail card have been punch-

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TCPC

Step 1 - Turn the clamping strip handle to the left with respect to the clamping strip. The clamping strip remains stationary. Small sets of teeth hold the tab card against the clamping strip.

Step 2 - Insert the column 80 end of the program card under the clamping strip, make sure it is fully seated to the right and down against the bottom flange, and turn the clamping strip handle so it is over the center post hole, locking the column 80 end of the card. The alignment check holes will indicate whether or not the program card is fully seated.

Step 3 - Wrap the program card around the drum and position the column 1 end of the card under the clamping strip. Make sure that the card is (1) tight against the drum and (2) down against the bottom flange and turn the clamping strip handle fully to the right. Both ends of the program card are now locked.

4. The "Release" function is the releasing of the master and detail cards from the reading and punching stations, respectively. If the Auto Feed switch is in the On position, the master card is released or "ejected" from the reading station and stacked, the detail card is released from the punching station and registered at column one in the reading station, the tab card in the detail bed at position two is registered at column zero in the punching station, and a tab card is brought down from the card hopper and pushed to position two.

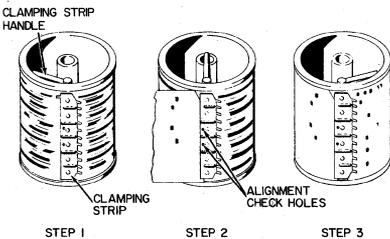


Figure 4

There are two intermediate positions. They are (A) a position between the punching and reading stations and (B) a position just ahead of the eject station (Figure 3). When the Auto Feed switch is in the Off position and the release function takes place, the detail card is "released" from the punching station and fed to the intermediate station between the punching and reading stations. The master card is "released" from the reading station and fed to the position just ahead of the eject station. With the tab cards in these positions it is possible to check the detail card for content and correctness. Part of the master card is covered by the reading unit.

The release function will also cause the card punch to restore program control to the normal program if the card punch is equipped with the alternate program feature and the card punch is under control of the alternate program.

5. Automatic release & feed takes place after the 80th column is punched if the Auto Feed switch is in the On position. All of the tab cards advance to their next station, a tab card is brought down from the card hopper, and the master card is stacked in the card stacker.

Note: The tab card in the detail bed is registered in the punching station in one-quarter the total automatic release & feed time so that punching can start sooner (in 1/4 of a second).

The cards release at a rate of 80 card columns a second. Every time the release function occurs, the program drum revolves and carries the program card to column one in a simultaneous movement with the tab card advancing from the punching station to the reading station.

6. The "Duplication" (Dup) function is the process of reading the master card in the reading station and punching the information in the detail card. This function occurs at the punching speed, 1200 RPM in an 024 or 1080 RPM in an 026.

The master card is read at the reading station, the code is transferred to the punch, the card advances the program card, master card & detail card one card column, and the code is then punched in the detail card.

Dup will continue until a 12 channel punch is not read by the star wheels if the star wheels are down on the program card. If the star wheels are up off of the program card, the dup function must be maintained by keeping the "Dup" key button on the card punch keyboard depressed. If the dup function takes place and the tab cards feed from column 80 with the Auto Feed switch in the On position, an automatic release & feed occurs.

7. The "Skip" function is the process of spacing or "tabbing" the program card, master card & detail card more than one card column at a time. The skip function takes place at the release speed, 80 card columns per second. Neither the reading nor the punching function takes place. The skip function continues until a 12 channel punch is not read by the star wheels. The star wheels must be down. If they are up, the tab cards will be advanced one card column only. If the star wheels are down and



Figure 5

there are 12 channel punches to and including column 80, a skip function into column 80 will cause an automatic release & feed if the Auto Feed switch is on.

Note: If the Auto Feed switch is in the Off position and either the dup or skip takes place to column 80, an automatic release to the intermediate positions will occur. No tab cards will be fed from the card hopper or to the card stacker.

8. Switches & Keys on the card punch that cannot be controlled by the Flexowriter are:
 - a. Main Line Switch - Turns on the card punch motor, etc., so the card punch can be operated.
 - b. Program Control Lever - Turns clockwise (to the right) to raise the star wheels so the program drum can be removed. Turns counterclockwise (to the left) to lower

the star wheels onto the program card and lock the program drum in place.

- c. Pressure Roll Release Lever - Releases the pressure roll so tab cards can be removed from the card punch.
- d. Back Space Key - Back spaces the program drum & card, the master card, and the detail card one card column at a time.

Note: If the detail card has been spaced or punched past column 78, the detail card not yet registered must be removed to permit back spacing because the cards are no longer overlapped and may jam.

9. The "Function Control Switches" on the card punch keyboard cannot be controlled by the Flexowriter and they are (Figure 5):
 - a. Auto Feed - Causes a tab card to be fed from the card hopper to position

FRIDEN SYSTEMS ADJUSTMENT

TCPC

- two when a release occurs and the switch is on. The tab card at position two is registered at column zero at the punching station and it becomes the detail card. The detail card is fed and registered at column one in the reading station and it becomes the master card. The master card is ejected and stacked in the card stacker. When the switch is off, the detail and master card are fed to the intermediate stations. No tab card is brought from the card hopper or stacked. This switch should be in the On position normally.
- b. Auto Skip, Auto Dup - Causes an automatic skip or dup function when programmed in the program card. This switch should always be in the Off position when the card punch is used in a Friden Systems application.
 - c. Print (026 only) - Causes printing when in the On position. May be positioned On or Off at the customer's option.
10. The various keys on the keyboard have the following names and functions:
- a. Character Printing Keys (A, 1/U, X, 7/M, etc.) - These keys have the same basic function as in a Flexowriter. That is, to punch codes (and print in an 026 although the printing is incidental to the punching operation).
 - b. Alpha & Num Keys - Certain alphabetic characters are combined with numeric characters on the keyboard. When the star wheels are down, the codes punched from these dual character key buttons will be the numeric character. It is necessary to hold down the Alpha key to obtain the alphabetic character code. When the star wheels are up, the code punched will be the alphabetic character and it is necessary to hold down the Num key to punch the numeric character.
 - c. Space Bar - Spaces the tab cards and the program drum & card one column each time it is depressed.
 - d. Skip Key - Initiates the skip function.
 - e. Dup Key - Initiates the dup function.
 - f. Rel Key - Initiates the release function.
 - g. Mult Punch Key - Held depressed to prevent advancing the tab cards so that overpunching can be done in order to manufacture codes not represented by characters on the keyboard.
 - h. Dash Skip (with three lines) - Causes 11 channel punching when in Numeric Shift. When in Alphabetic Shift, the 11 channel is punched and the Skip function is initiated.
 - i. Feed - Causes a tab card to be fed from the card hopper to position two, unless a tab card is already there, when the Auto Feed switch is in the Off position.
 - j. Reg - Causes the tab card in position two to be registered in the punching station when the Auto Feed switch is off. Also, when a tab card is manually inserted in the punching station through the manual insertion slot, the Reg key is used to register the tab card (with the Auto Feed switch Off).
 - k. Alt Prog - Causes the card punch to switch control by the program drum card to the alternate program if the machine is so equipped and programmed. A subsequent release function will switch the program control back to the normal program.
 - m. Aux Dup - Causes the dup function according to the alternate program if the card punch is so equipped.

OUR HARNESS WON'T WORK WITH THIS

The Punching and Reading Operation

The card punch utilizes friction between the tab card and feed & pressure rollers to advance the tab cards across the card bed.

The tab cards are guided in the card bed by the upper rail which is stationary and a fixed reference. The lower rails are under spring tension and they maintain the tab cards against the upper rail. The two rails for the reading station have lighter spring tension than the rails at the punching station to lessen chances for misregistration.

A tab card is registered at column zero in the punching station by being pushed to that position, so it can be said that tab cards are registered in the card punch at the column 80 or trailing end of the card. As a result, any punching misregistration will be greatest at the column one or leading end.

Misreading is greatly reduced by the use of dual-sensing reader pins. These pins operate independently and in unison. They are spaced apart so they will read a greatly misregistered tab card and read it correctly.

Chad disposal in the punch is positive through the use of a tube and twisted blade which is motor driven. The chad is carried from the punch to the chad box under the reading board. The punches themselves are ground at an angle so they punch cleanly. The chad jams in the die so that it won't fall back to cause a card jam.

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The Printing Operation (026 only)

Printing is incidental to the punching operation and is performed by print wires striking the tab card through a cloth ribbon. The print wires are contained in the printing unit and their operation or non-operation is determined by the code plate which is mechanically positioned before a character is printed. The code plate is moved by mechanical linkages (print interposer) operated from the punch extensions in the punch. The code plate's position determines which of 35 print wires will operate to print the character. Close scrutiny of a printed character on a tab card will reveal the dotted appearance of the character. As the

punches operate, the code plate is positioned and then pushed against the print wires. The print wires necessary to print the character are operated. The print wires have individual springs which restore them to their non-operated position as the code plate restores. Printing can be suppressed by programming the program drum card. The printing operation occurs in a relatively short time compared to the total punching operation.

The ribbon has an automatic ribbon reverse mechanism. The ribbon requires periodic changing the same as in a typewriter.

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INSTALLATION

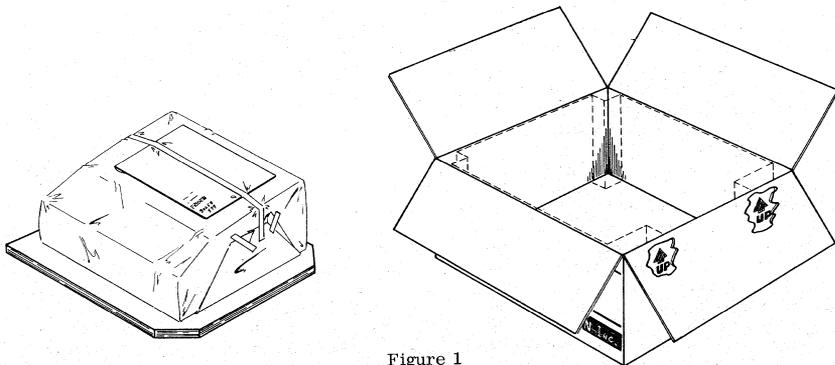


Figure 1

Systems Flexowriters are shipped to the customer in packaging designed to provide most adequate protection and yet the unit is simple to unpack and set up. The following procedure is recommended.

Unpacking Procedure

1. Open the carton, remove the envelope & package(s) and inspect them for content.

The envelope contains the operator's "Manual of Instructions", three copies (blue, white & pink) of the "Flexowriter-Justewriter Receiving Inspection Report", the schematic for the machine, and a copy of the machine's specifications.

The bag contains the rubber feet, washers and screws, a ribbon, an adapter plug, the dust cover and a type cleaning brush.

If the Flexowriter is equipped with a tape/edge card punch and reader, there is a second bag containing Edge Cards with an edge card guide taped to the outside of the bag.

2. Remove the carton liner and lift the pallet containing the Flexowriter out of the carton.
3. Stand the wrapped Flexowriter on its tilt posts at the edge of a table, positioning it so the pallet is off the edge of the table (Figure 2).
4. Remove the four nuts & dished washers; remove the pallet, and move the Flexowriter back from the edge of the table.
5. Remove the wrapping paper.
6. Remove the four washers and the shock mounts from the Flexowriter feet mounting holes.
7. Mount the front Flexowriter feet, using the locating dimples on the base foot caps to properly position the feet. Mount the rear feet, positioning them

- the same way.
8. Remove the selector mounting screws and lower the selector to its stop. Cycle the power drive shaft by hand until any cams that may have been tripped in shipment fully restore. Restore the selector, installing the right selector screw first. Note that it is knurled and has a shoulder to position the selector properly (laterally on the selector pivot shaft). Care should be exercised to be sure that selector slides that operate contacts on the power frame do not deflect the contact operator as the selector is raised.

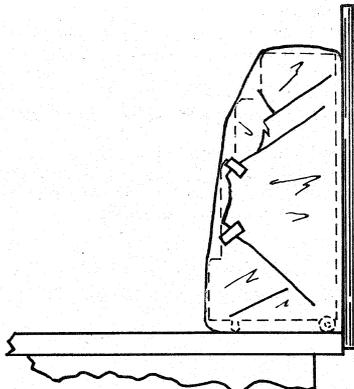


Figure 2

9. Remove all of the tape holding the various covers, etc.
10. Remove the two card strips in the punching & reading stations.
11. Install the tape (located on the tape supply drum) in the punch.
12. Remove the paper wrapped around the platen.

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UNPACKING, PACKING & MOVING

13. Remove the manual release lever plugs.
14. Remove the carriage end plugs.
15. Remove the top cover and remove the two split rubber washers holding the type basket at its mid-position (double case machines only). If the right side of the type basket is pushed down slightly, the right split rubber washer can be removed first, using a thumb and finger.
16. Install the ribbon, placing the full spool on the right. If a two color ribbon is used, put the black half on top (or the color most used).
17. Plug the power cord in, using the adapter plug if necessary, and turn the machine on.
18. Check the speed of the machine. It should be the same as the speed indicated on the envelope containing the specifications, etc. This is the speed the machine was final-aligned to. If the speed is not the same (within 5 RPM), change the motor pulley adjustment and bring the speed to the specified RPM.

Note: Use the average of at least three readings taken with the speed indicator on the end of the reader shaft. The speed should not be outside the 570-580 RPM range.

Write the speed (the aligned speed) on the sticker on the cover plate over the panel switch contacts. If the speed is subsequently changed for good reason, note the new speed on the sticker.

The machine should be checked out using the customer's program if at all possible. Check all operations, manual and automatic, whether used in the customer's application or not.

If the machine does not operate properly in any manner, locate and correct the trouble. The outline describing the points to check on an inspection is a good guide to use. Fill out the receiving inspection reports and send the white & blue copies to Rochester.

Packing Procedure

Pack the machine by accomplishing the unpacking steps in reverse order. Use the same

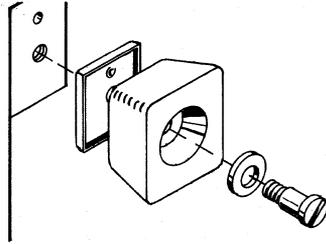


Figure 3

type of tape to secure the covers as was used in the original shipment. Flexowriters presently shipped all use the same basic size carton. If an old carton is used, be sure that a small one is not used for a Flexewriter equipped with a tape/edge card punch & reader. Other cartons are used. Whenever a Flexewriter equipped with an Electric Line Finder is shipped, a carton two inches deeper is used. Flexowriters shipped to other countries may have a wooden pallet and Flexowriters shipped across the country may be shipped in wooden boxes. Any machine being prepared for commercial shipment must be properly packed in a carton or box. Be sure that all of the feet, schematics, dust cover, etc. are sent with the machine.

Local Moving

Machines being moved locally should be mounted on a shipping pallet with the rubber shock mounts. The carriage and plugs and manual release lever plugs must be installed. The machine should be covered with its dust cover. All feet, screws etc. should be put in a bag and attached to the machine, along with the schematics etc. If the machine is to be subjected to jarring, etc., the split rubber washers should be installed to hold the type basket in its mid-position. If the Flexewriter is a Computyper model, be sure to remove the Flexewriter foot extension before installing the rubber shock mounts. Use two men to lift the machine because it is heavy and extensive damage can result if it is dropped. Also, never leave the Flexewriter up on its tilt posts because the center of gravity is high and the machine may fall if jarred.

INSPECTIONS

GENERAL

To perform a good inspection, it is necessary to check all of the points where (1) misadjustment can develop, (2) wear occurs, and (3) incorrect operation is taking place or has taken place (according to the user).

Lubrication should be performed, adding or replacing lubricant wherever necessary.

The machine should have a good appearance when the inspection is finished. The work area should be restored to good condition with papers, rags, etc. cleaned up and any spills, dirt, etc. taken care of.

Any supplemental devices should be put back the way they were found or as the customer wants them. If they are being used improperly this should be pointed out tactfully.

If there is a question of proper machine operation as opposed to improper machine operation, it should be pointed out that improper operation may result in a shorter service life or abnormal breakdown.

The following material includes general information which will aid in servicing and inspecting the machine.

Check to see that all links, pawls, etc., have further movement or travel available at either of their positions (operated or non-operated) except where the part is resting against a stop.

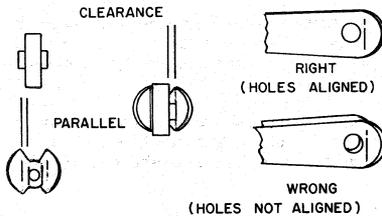


Figure 1

Clevises should be aligned with their links, the studs holes should line up with one another, and the clevis should be free on the stud but not spread enough so either stud can come out of its stud hole (Figure 1).

A link should extend into its clevis so that at least 75% of the tapped portion of the clevis is on the threaded end of the link (Figure 2).

The headed ends of the links must not bind in their attachment holes. If the links and parts

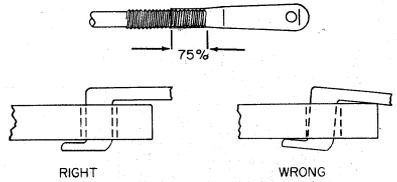


Figure 2

are properly aligned they will not bind (Figure 2).

All levers, etc., that are operated by other levers, pawls, etc., should be centered, if possible, or have a 100% bite unless otherwise specified.

Levers that have free play or side motion should not be able to be manually moved so they can miss their meeting member.

One failure to operate by a device, mechanism, etc., indicates that the device is not properly adjusted or lubricated somewhere or there is excess wear.

Contact operators must line up perpendicular to their contact straps to operate most reliably.

Springs

There are basically five types of springs used in Systems equipment; extension, compression, flat & straight, flat wound (spiral), and especially formed springs.

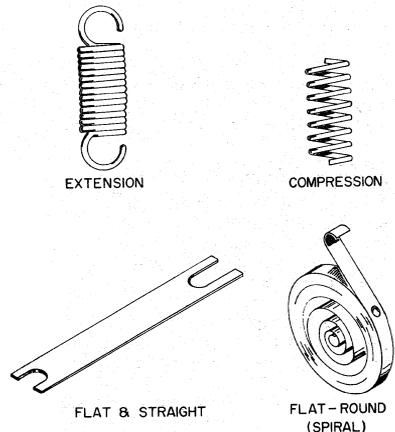


Figure 3

FRIDEN SYSTEMS ADJUSTMENT

INSPECTIONS

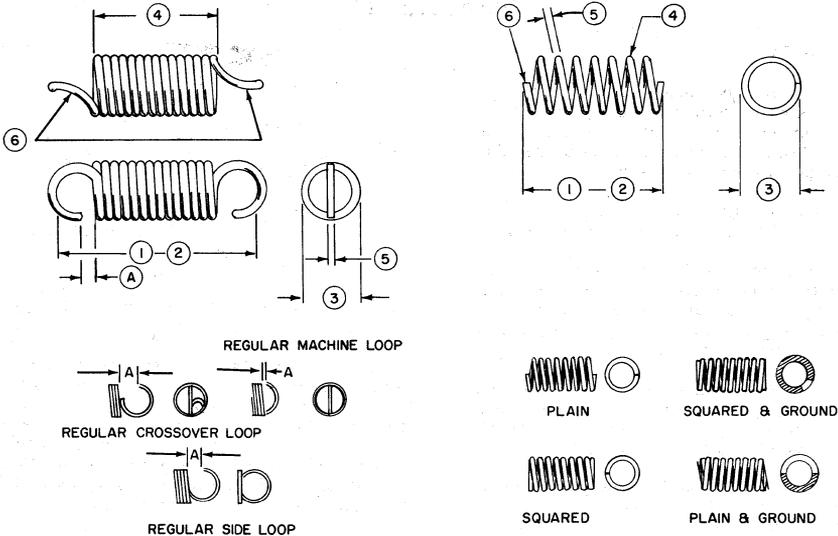


Figure 4

Extension springs have (specified):

1. An overall length.
2. An overall length it may be extended to.
3. An outside diameter.
4. The number of coils.

- (a) closed or open.
- (b) right or left hand wound.

5. The wire diameter & material.
6. The angular relationship of the hooks.
7. The type of end (hook):

- (a) a crossover loop.
- (b) a machine hook (full loop).
- (c) a side loop.

8. Open (specified clearance A) or closed loop.
9. Any special details (double loop, etc.).

Compression springs have (specified):

1. An overall length.
2. A loaded (compressed) length.
3. An outside diameter.
4. The number of coils.
5. The wire diameter & material.
6. The type of end.

- (a) Plain (snipped off).
- (b) Squared (snipped off & formed flat).
- (c) Plain & Ground (ground at the coil angle).
- (d) Squared & Ground (ground off square).
- (e) Any special details.

Flat & straight springs have (specified):

1. Shape & dimensions.

2. Material & thickness.
3. Formed shape.
4. Any special details (twists, etc.).

Flat & wound springs have (specified):

1. Material thickness & width.
2. Type of material used.
3. Length.
4. Shape & dimensions of spring ends.

Other springs are used and have a construction fitting them to their use.

Springs that have been extended past the point where they will resume their correct overall length can be referred to as being "stretched" (Figure 5).

Springs where coils have been cut off or an improvised hook made of the last coil can be referred to as having been "shortened" (Figure 5).

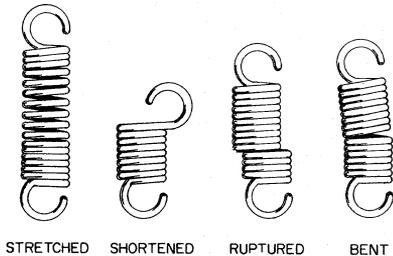


Figure 5

Springs that have adjacent coils not in line with each other can be referred to as being "ruptured" (Figure 5).

Springs where adjacent coils have been formed open on one side only can be referred to as being "bent" (Figure 5).

Flat & straight springs that have sharp bends in them can be referred to as being "kinked" (Figure 6).

There are many ways to put spring-ends on their studs or in their holes, etc., and experience is the best teacher. There are specific techniques used by people who install springs, however, and these techniques can be used to good advantage.

Note: Wherever there is room enough, crossover or machine hook loops are used. Where there are space limitations or possible interference with adjacent parts, side loops are used (Figure 7).

Any procedure that distorts the hook end of the spring should not be used. In example 1 (Figure 8), pulling the hook over the stud distorts the hook and will increase the overall length of the spring. A better method is to work the end of the spring onto the end of the stud (example 2) and move it into place. A third method is to place the body of the spring at the stud and turn the spring, twisting the hook onto the stud (example 3, Figure 8 and Figure 9).

Springs with closed loops should not be snipped to make an open loop. The closed loop is designed to insure that the spring will not come off during machine operation.

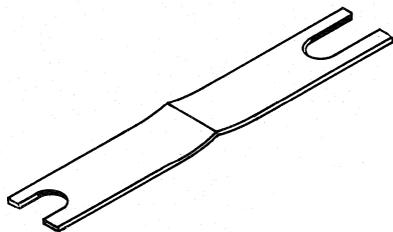


Figure 6

Compression springs, when they no longer return to their correct overall length after being compressed, should be replaced. The springs should not be manually extended to restore the overall length, because this will not correct the worn condition of the spring.

Flat & straight springs should be replaced if they are kinked because this is a good point for abnormal breakage to occur. Also, the spring must rest flat where it is mounted (or

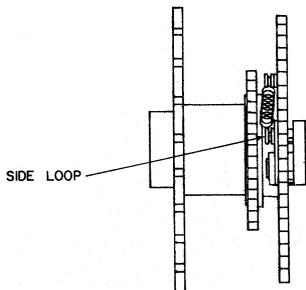


Figure 7

abnormal breakage may occur). Any fracture necessitates immediate spring replacement.

Flat wound (spiral) springs should be replaced when they become weak. They must be replaced whenever their ends break off. Forming a new hook on the end of a spiral spring after the original one breaks is not recommended.

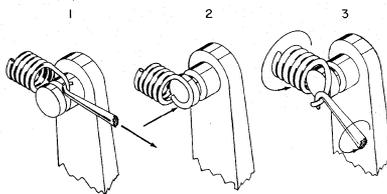


Figure 8

Especially formed springs should be compared with a new one if there is doubt as to their usefulness. In many instances the spring's tension is adjustable (by forming the spring end).

In some instances, armatures are prevented from actually touching the cores by stops in one form or another. It is important to maintain this air gap so that the residual magnetism build up is minimized. In other cases, the armature is adjusted to the core so it will touch one end of the core only, again the reason being to minimize the residual magnetism build up. In a few instances, the armature rests flat against the core when energized. In these cases a mechanical knock off is provided.

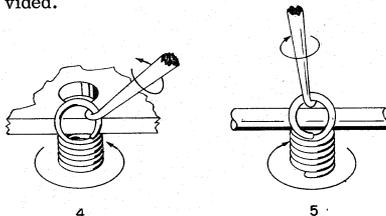


Figure 9

FRIDEN SYSTEMS ADJUSTMENT

FRIDEN SYSTEMS ADJUSTMENT

INSPECTIONS

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

FRIDEN SYSTEMS ADJUSTMENT

INSPECTIONS

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

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

LUBRICATION

<u>Our Number</u>	<u>Type & Use</u>	<u>Approved Source</u>	<u>Name</u>
2	Oil - Porous Metal Bearings	Socony-Vacuum	Gargoyle DTE 797
3	Oil - Flexowriter Cams	Esso	Teresso 85
5	Grease - Specified Applications only	Lehigh Chem Co. Chestertown, Md.	Anderol L-372
7	Powder - Specified Applications only	Bel-Ray Co.	Molyube 16
8	Oil - Light Mechanisms & Gears	A.T. Supply Co.	Molub Alloy SM Oil #0 (To be purchased with an organic carrier. A syn- thetic carrier must not be used.)
10	Grease - Specified Applications	Shell Oil Co.	Alvania #2
11	Oil - Stepping Switch Wipers	Texaco	#1692 Low Temp Oil MIL-L 7870 A

Figure 1 Lubricants

The lubricants, with their numbers, descriptions, and commercial types are outlined in Figure One. The actual points to be lubricated (and with which lubricant) are illustrated in the Figures numbered from Two on. The following information outlines the lubrication procedure in a general way.

An excess of oil, grease, or graphite may be defined as that amount of lubricant that does not adhere to the operating surface, sliding member, or pivot. The excess lubricant gets pushed out of the way during the operation except in the case of pivots. Lubricating with oil, the saturation point is reached the instant oil starts to overflow or runs out the other side. Even this amount is excessive in a lot of instances. The film of oil that actually lubricates is extremely thin and any oil outside of the contact area does nothing, generally, for the lubrication. In fact, excess oil can collect dust, possibly containing abrasive particles, which can cause a more rapid wearing of the parts involved. Although the difference in the wear rate may be very small, the overall difference between two machines, one lubricated properly and the other lubricated improperly, can sometimes be very apparent with respect to the appearance, sound, and operation of the machines.

With respect to lubrication with grease, light grease is used where necessary, as in clutches. Here again, an excess of grease can gather dust and dirt and affect machine operation and useful life.

Excess grease and oil should be wiped away, leaving all non-operating surfaces clean and

free of lubricants.

Graphite is used in the key lever interlock to allow very free and rapid movement of the interlock rollers as the key levers are operated. The amount of graphite that will stay in the interlock after it is dusted and shaken (with the mechanism out of the machine) is sufficient. Any excess will fall onto the translator and can cause improper operation.

Good lubrication entails making sure that the surfaces to be lubricated are covered with a film of oil, the assemblies that call for it are filled with the proper amount of grease, and graphite, where used, is applied correctly and in the proper amount. As stated previously, all excess lubrication should be wiped off of the parts involved.

Note: Keep oil, grease, and graphite away from all electrical coils, contacts, connections, etc., and any place where fast, rapid motion is essential. An example of the latter is the surface of an armature adjacent to the core of a coil. If there is grease on the armature and core, the armature can be held up when the coil is de-energized.

The #5 round brush T-18070 should be used to apply oil to surfaces where a small amount is sufficient, such as roller pivots. The plastic valvespout oiler T-18185 should be used to dispense oil to oil holes, wicks, etc. where more oil than a drop is needed. In no instance should oil be applied to the point where it drips off of the parts being lubricated.

FRIDEN SYSTEMS ADJUSTMENT

MANUAL ADDENDUM 61

Our Number	Type & Use	Approved Source	Name
2*	Oil-Porous Metal Bearings	Mobil Oil Co.	Mobil DTE 797
7	Powder-Specified Applications Only	Bel-Ray Co.	Molyube 16
8	Oil-Light Mechanisms & Gears	A. T. Supply, Inc.	Molub Alloy SM Oil No. 10 (To be supplied with an organic carrier. A synthetic carrier must not be used.)
10	Grease-Specified Applications	Davis Holland	Aero Lubriplate

* No. 2 lubricant is to be used to lubricate the Flexowriter cam bearing hubs.

Figure 1 Approved Lubricants

DATE: March 12, 1964

CHANGE: Page 9-9, Figure 1.

REASON: To reduce the number of lubricants used.

EXPLANATION: Changes have occurred in the lubrication specifications. While they do not change the lubrication illustrations, they do change Figure 1, page 9-9.

For further information refer to Flexowriter-Justowriter Service Letter 147, first issued June 27, 1963.

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

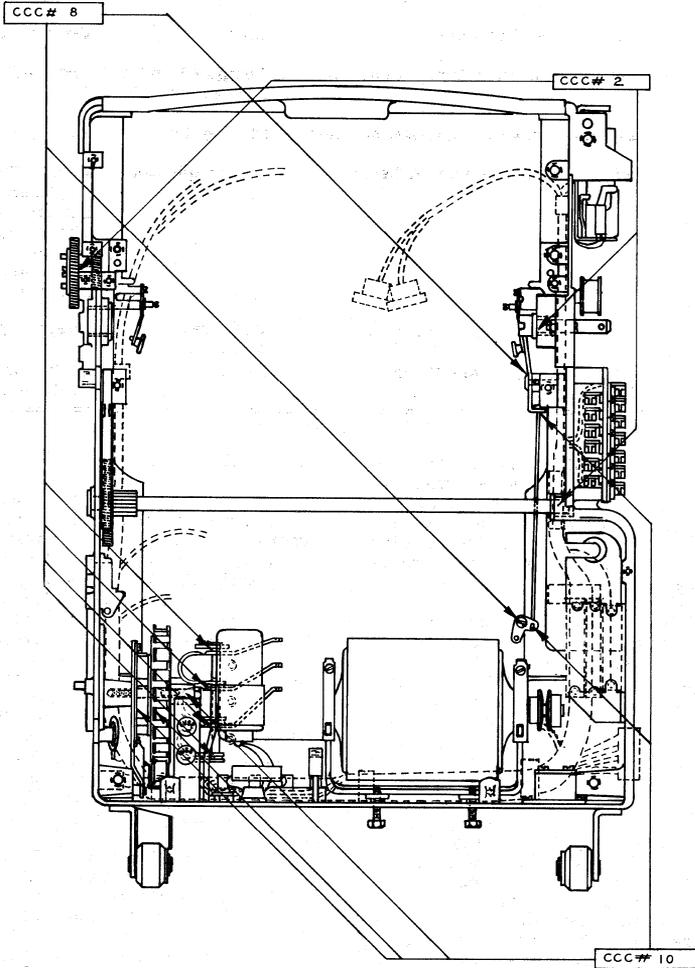


Figure 2 Base Assembly

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

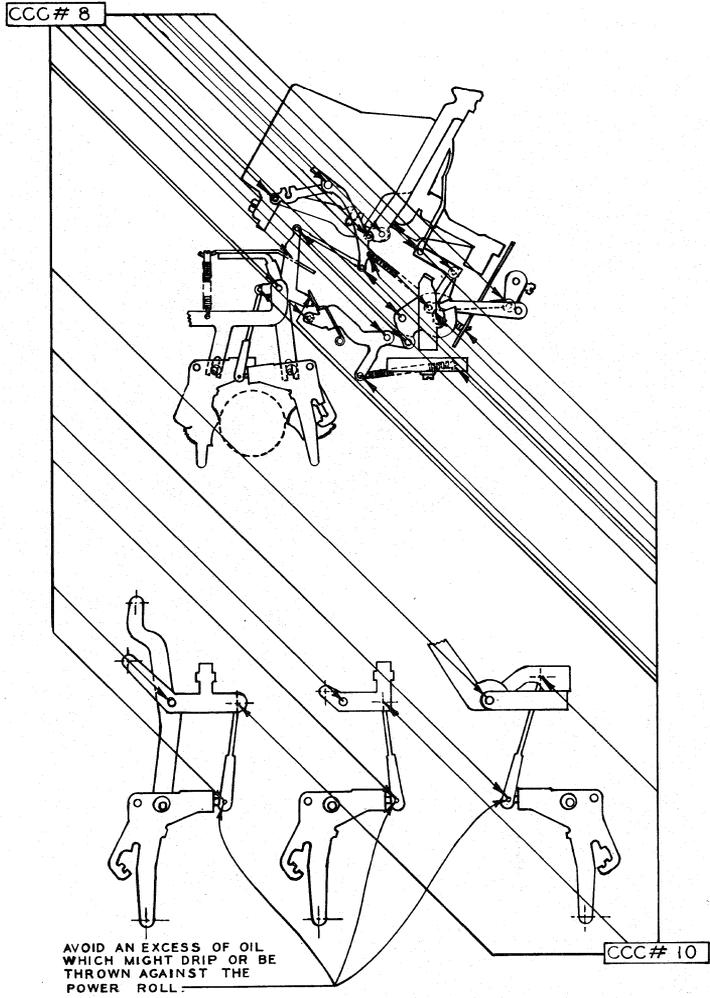


Figure 3 Power Frame

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

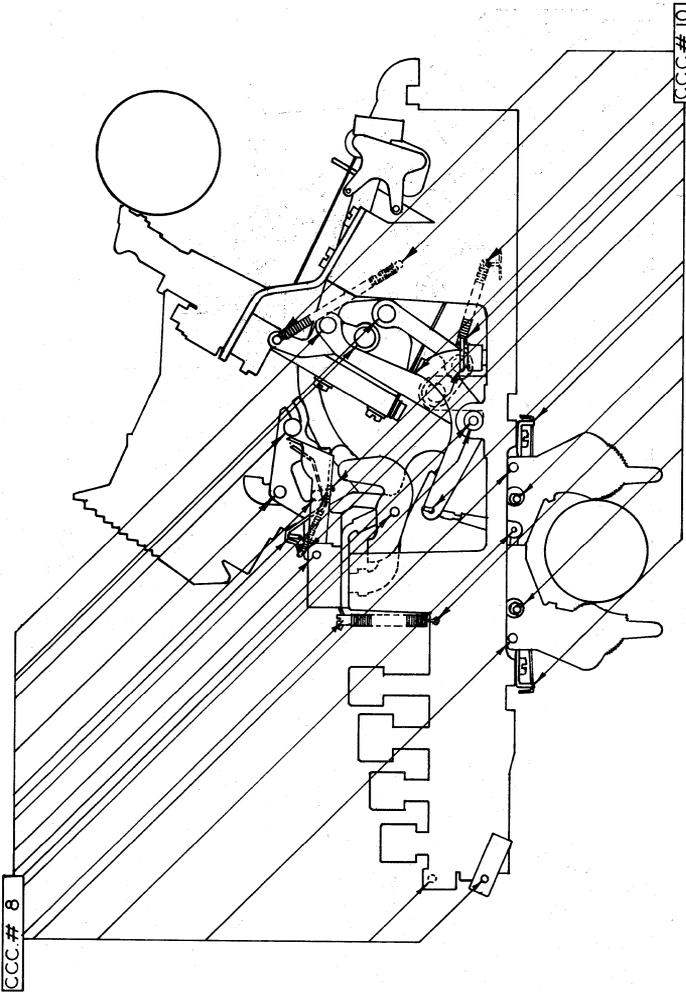


Figure 4 Power Frame-Right Side

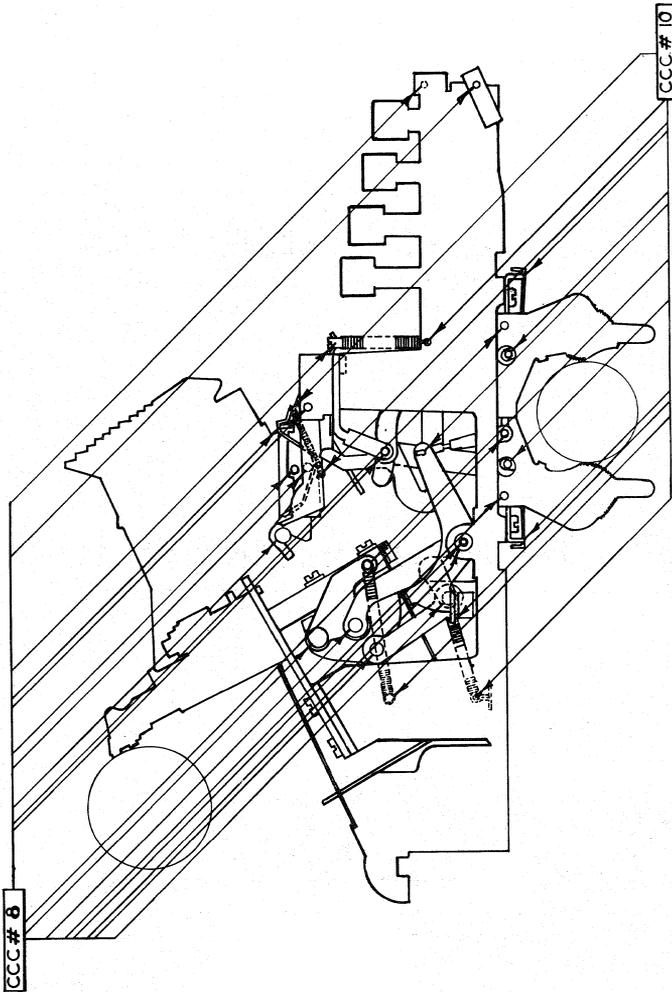


Figure 5 Power Frame-Left Side

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

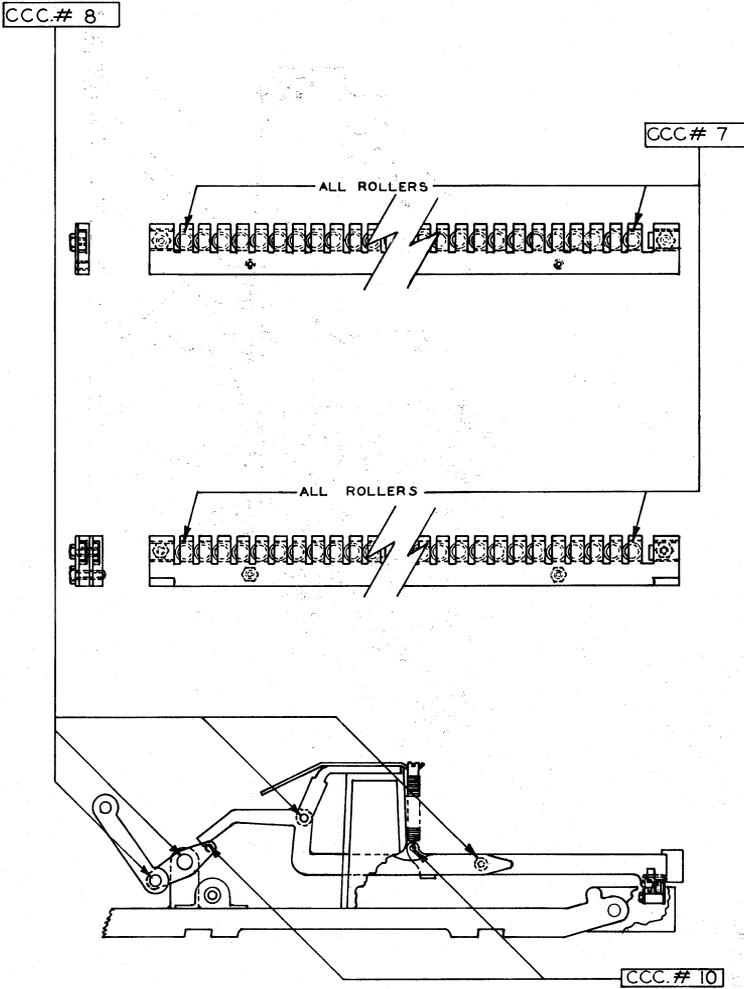


Figure 6 Interlocks

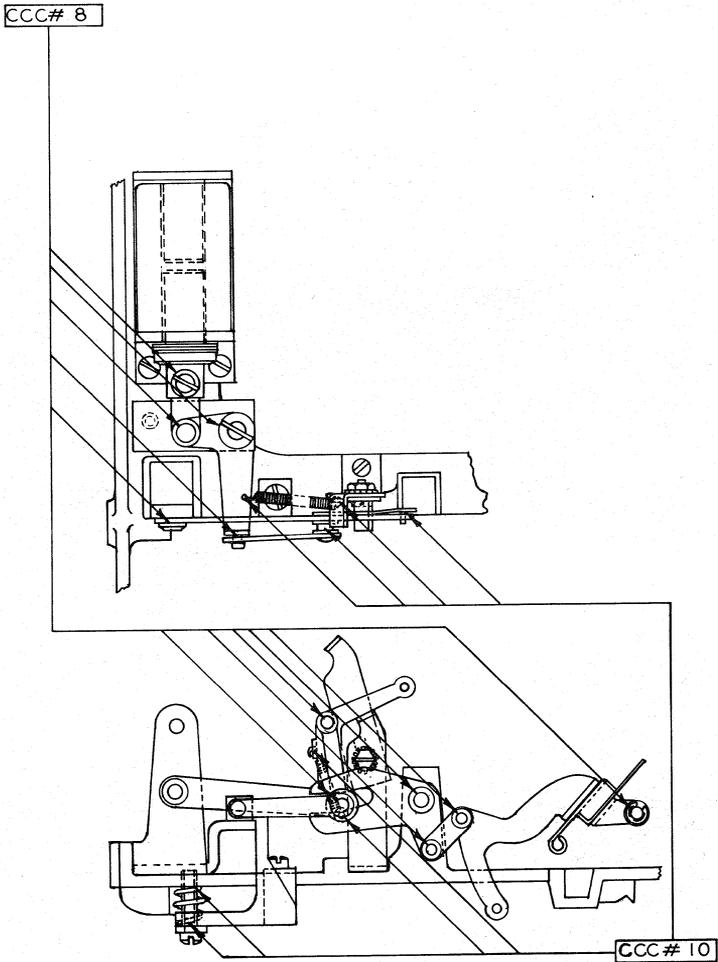


Figure 7 Automatic Color Shift

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

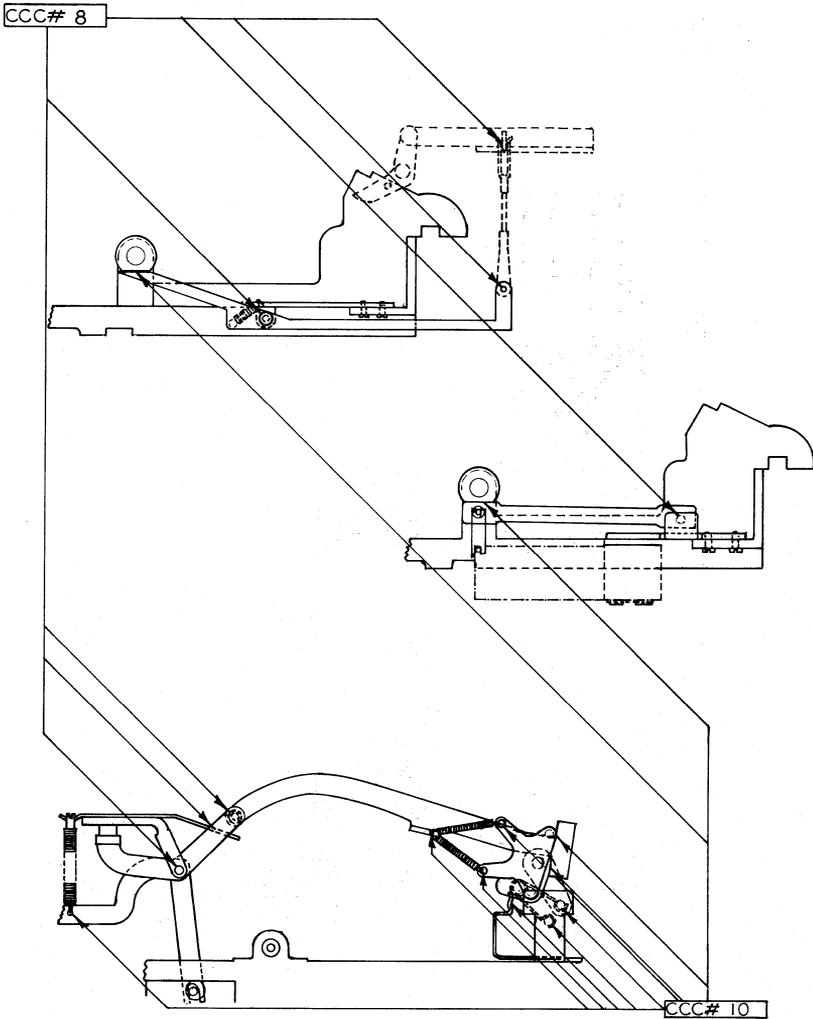


Figure 8 Mechanical Non Print, Case Shift Contacts & Color Shift

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

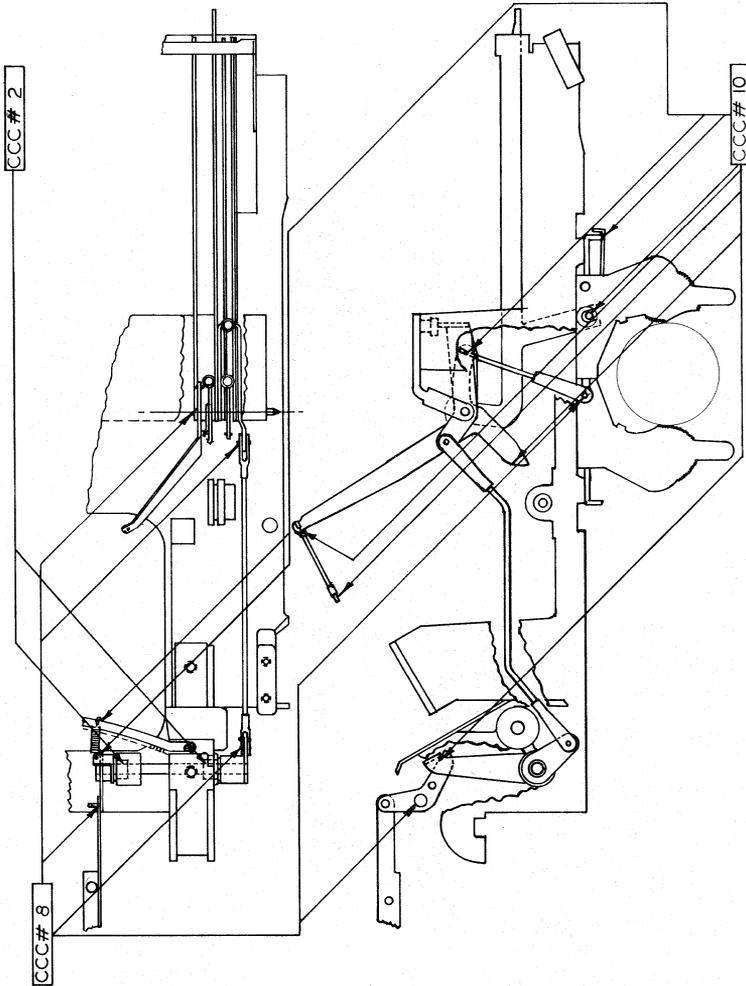


Figure 9 44th Printing Character

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

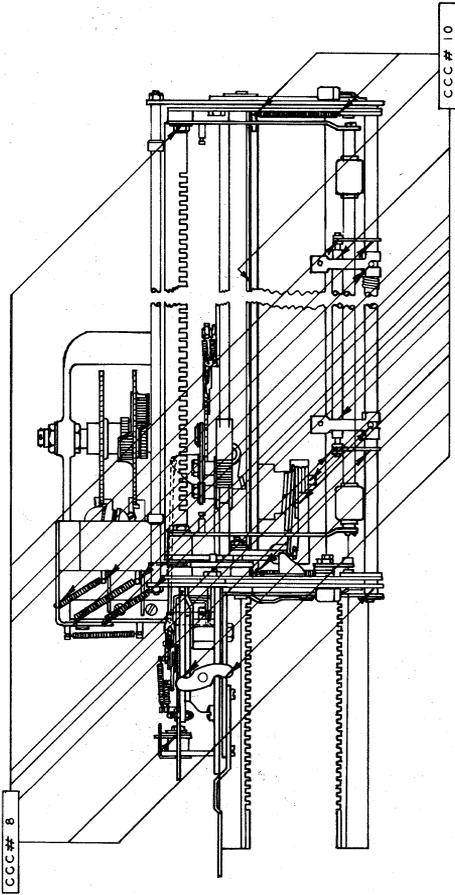


Figure 10 Carriage & Rails-Top View

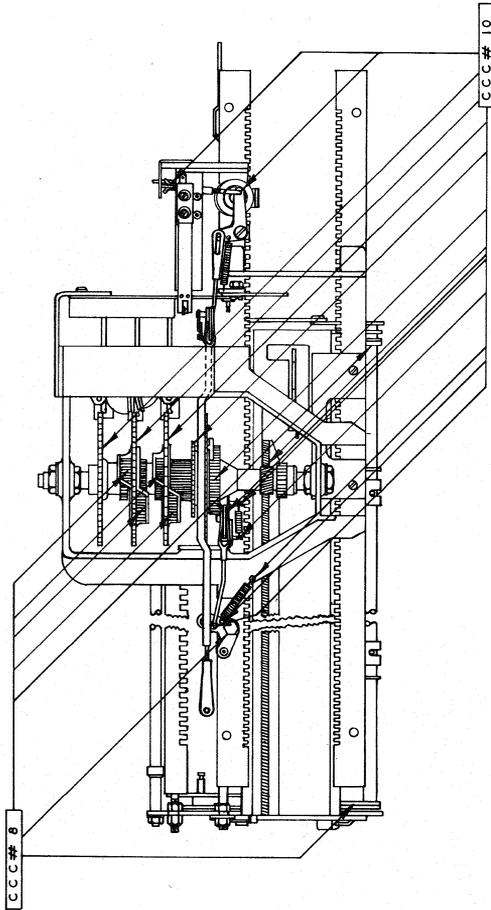


Figure 11 Carriage & Rails-Bottom View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

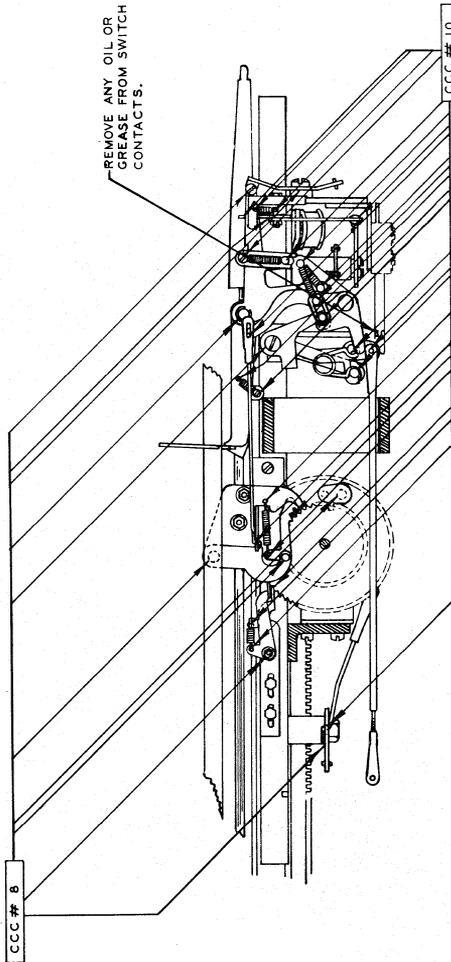


Figure 13 Carriage & Rails-Rear View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

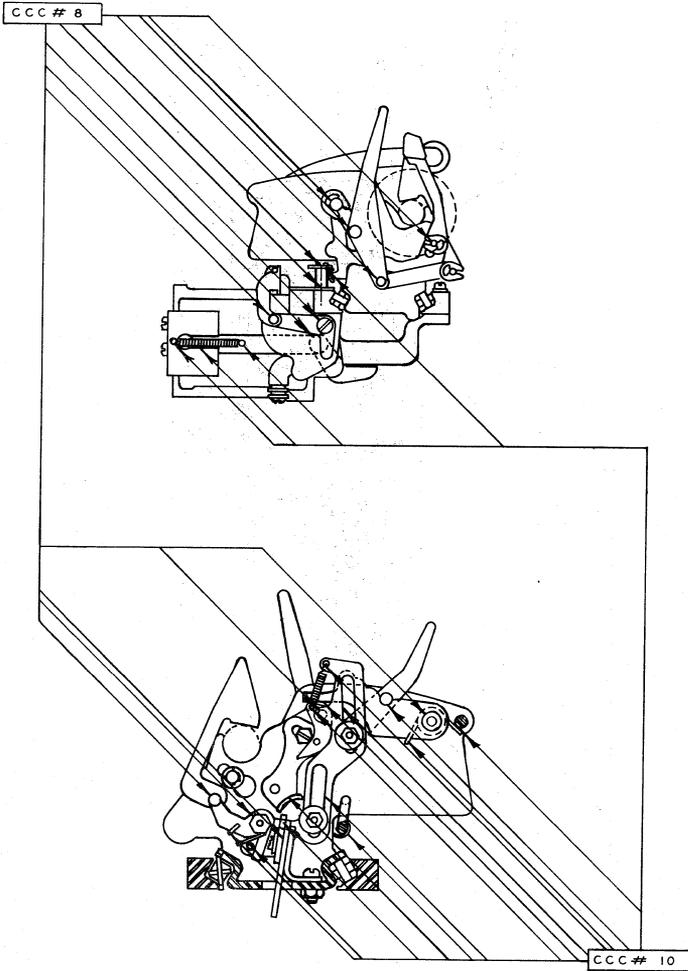


Figure 14 Carriage & Rails-Left & Right View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

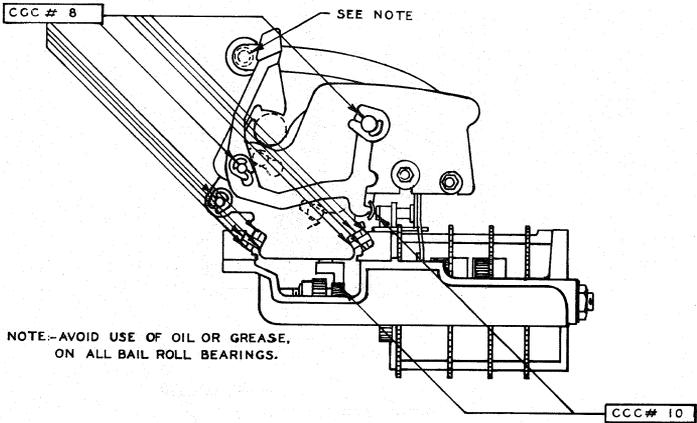


Figure 15 Carriage & Rails-Right Hand View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

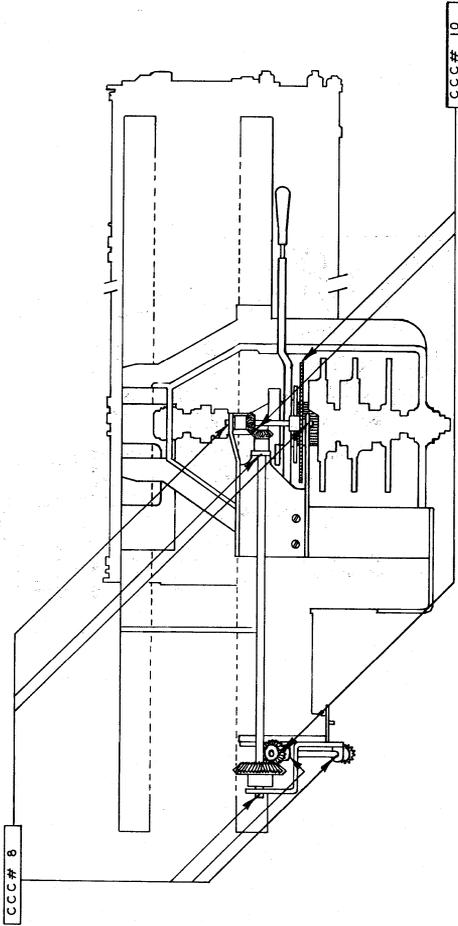


Figure 16 Carriage & Rails-Bottom View with Carbon Ribbon

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

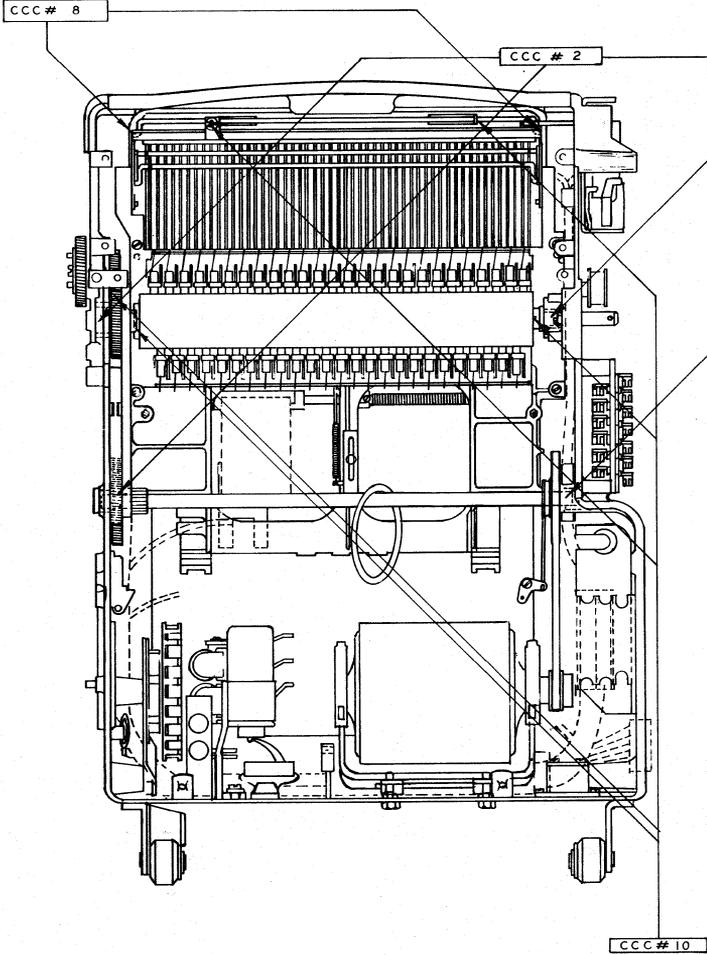


Figure 17 Power Frame in Base

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

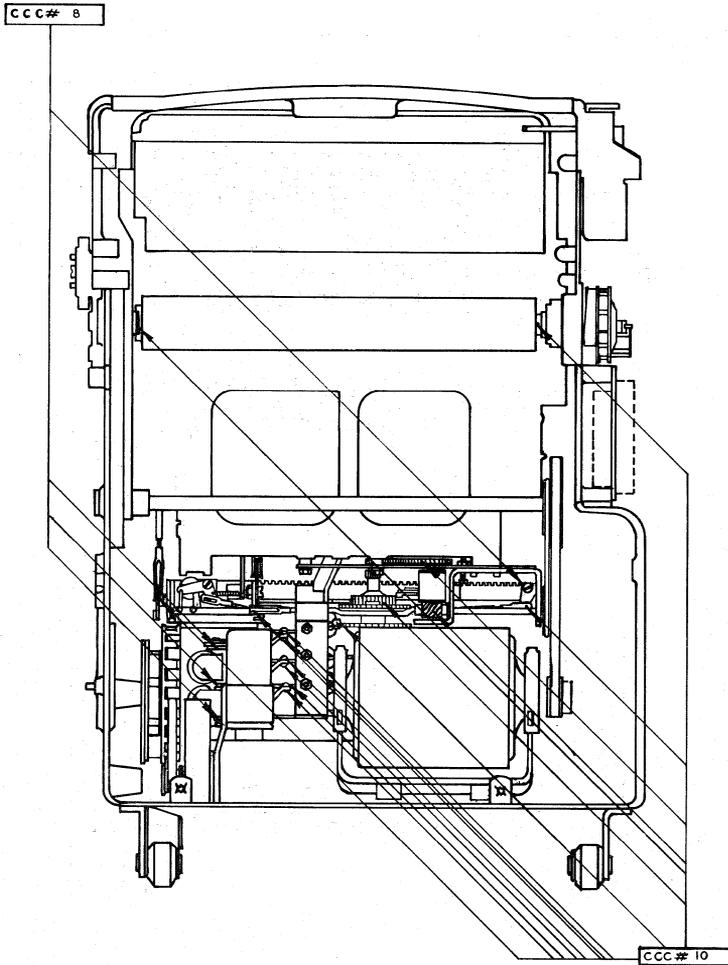


Figure 18 Carriage & Rails in Base

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

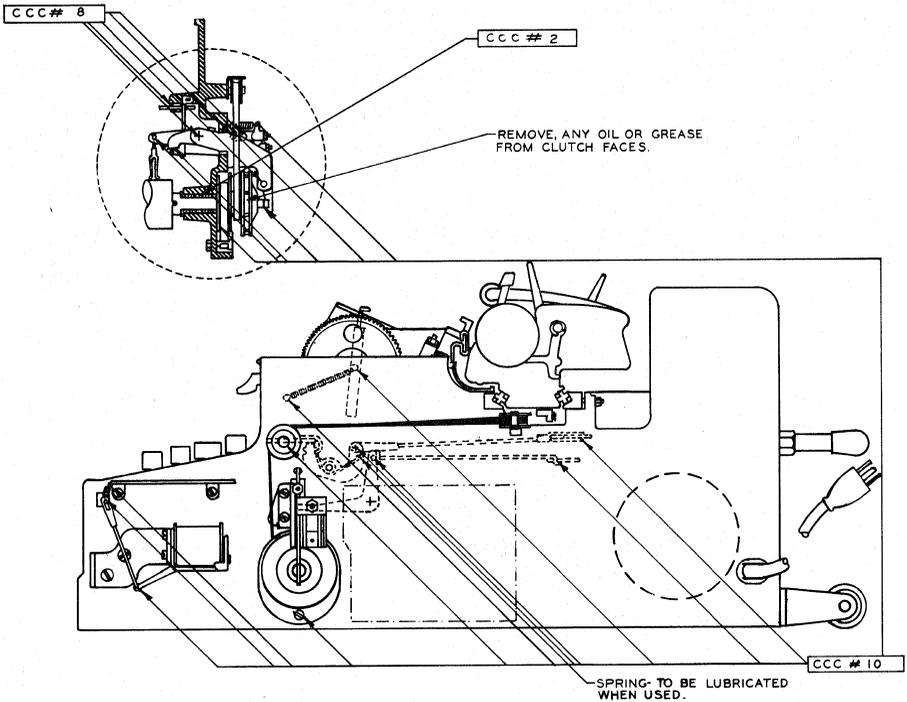


Figure 19 Final Assembly-Right View

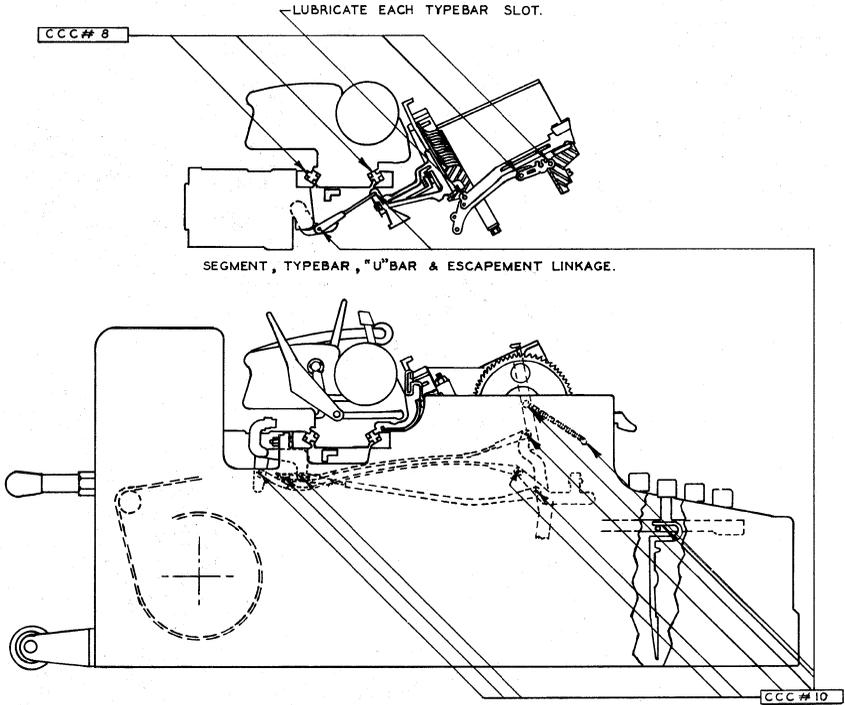


Figure 20 Final Assembly-Left View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

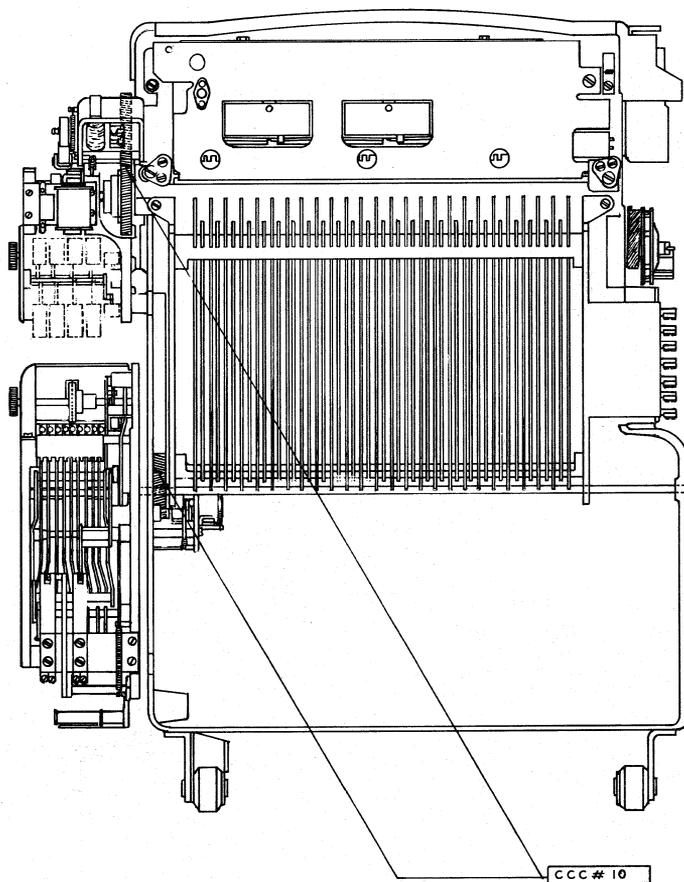


Figure 21 Final Assembly-Bottom View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

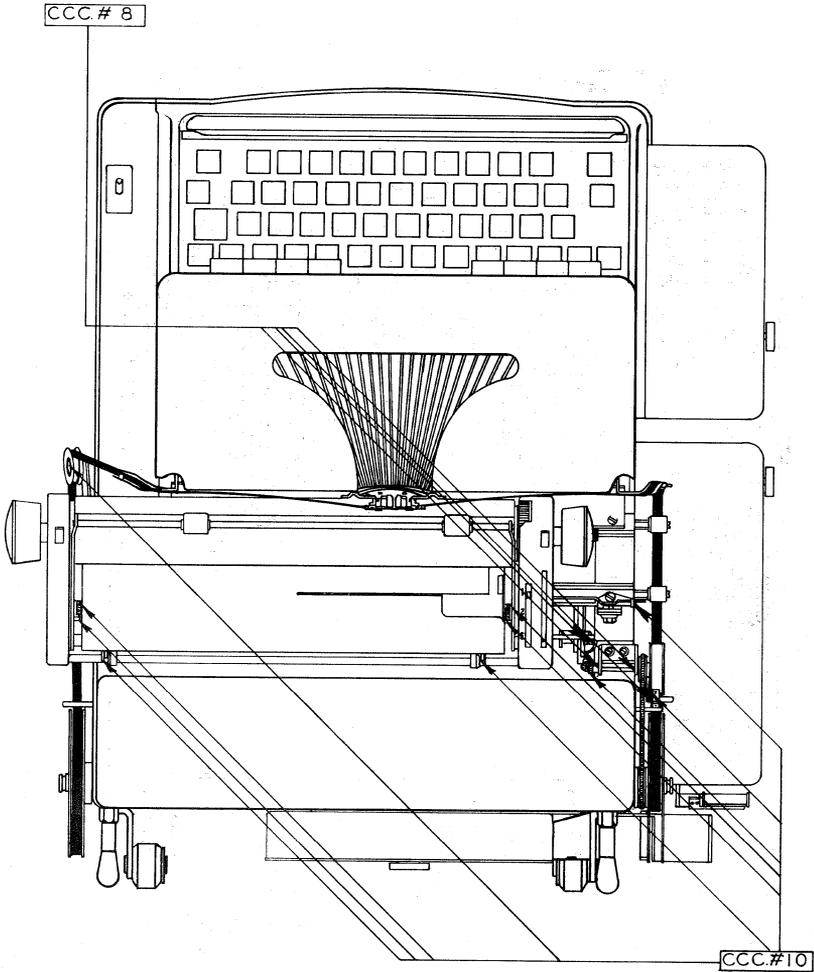


Figure 22 Final Assembly-Top View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

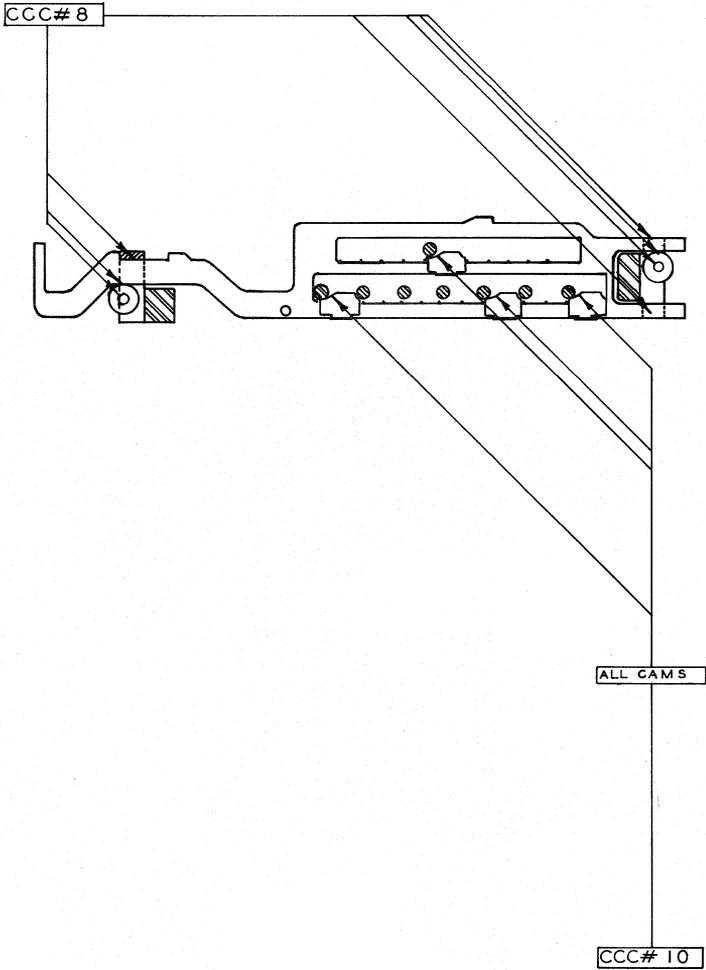


Figure 23 Selector-Side View (Section)

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

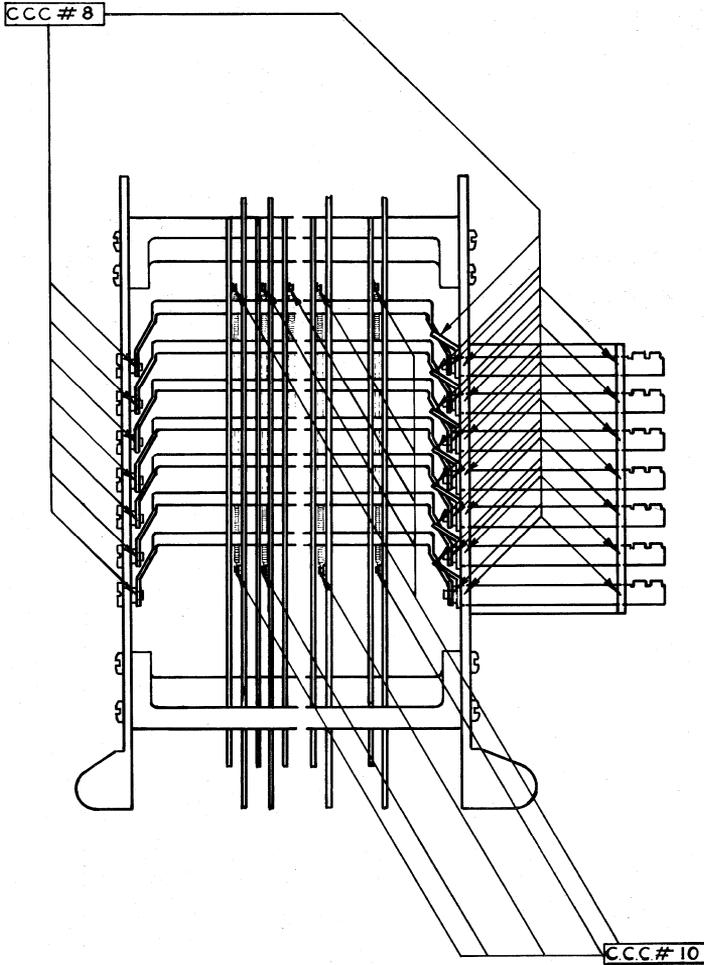


Figure 24 Selector-Top View

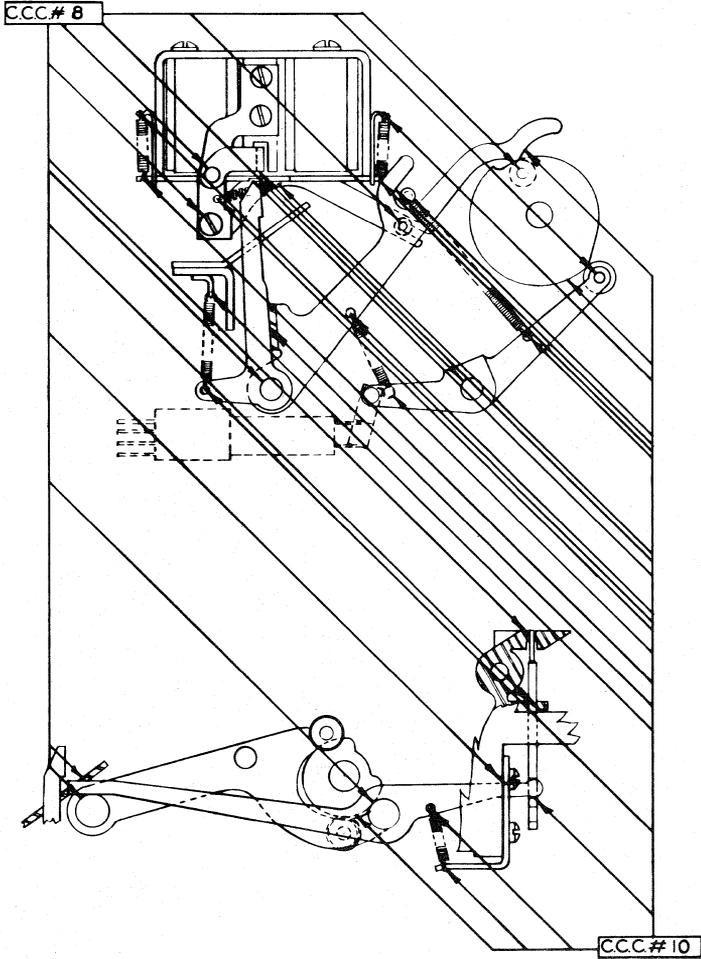


Figure 25 Tape Punch-Side View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

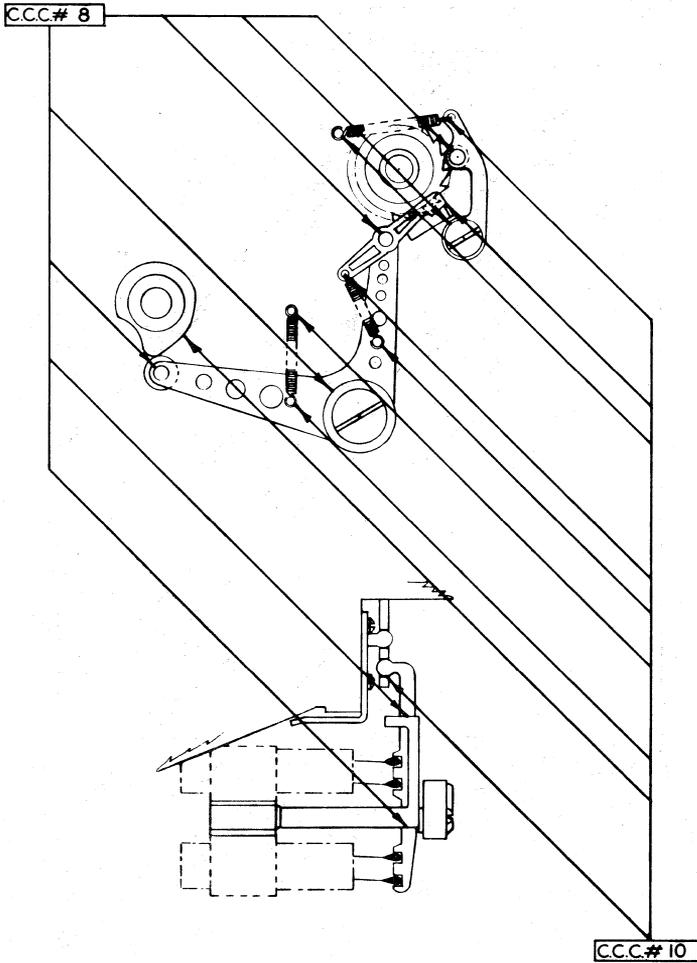


Figure 26 Tape Punch-Feed & Parity Check

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

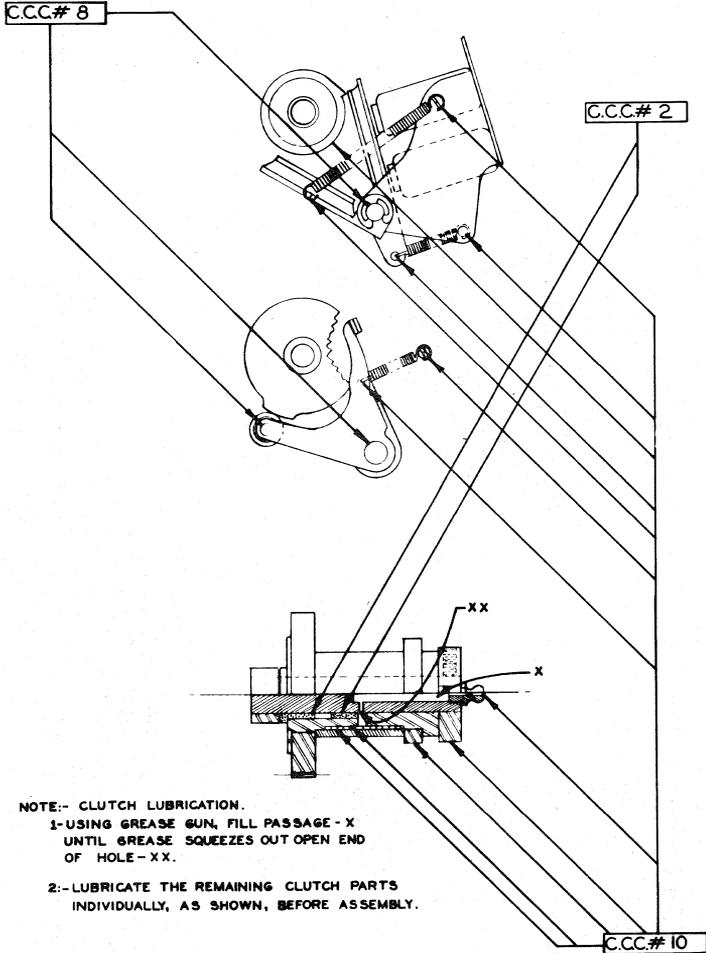


Figure 27 Punch Clutch

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

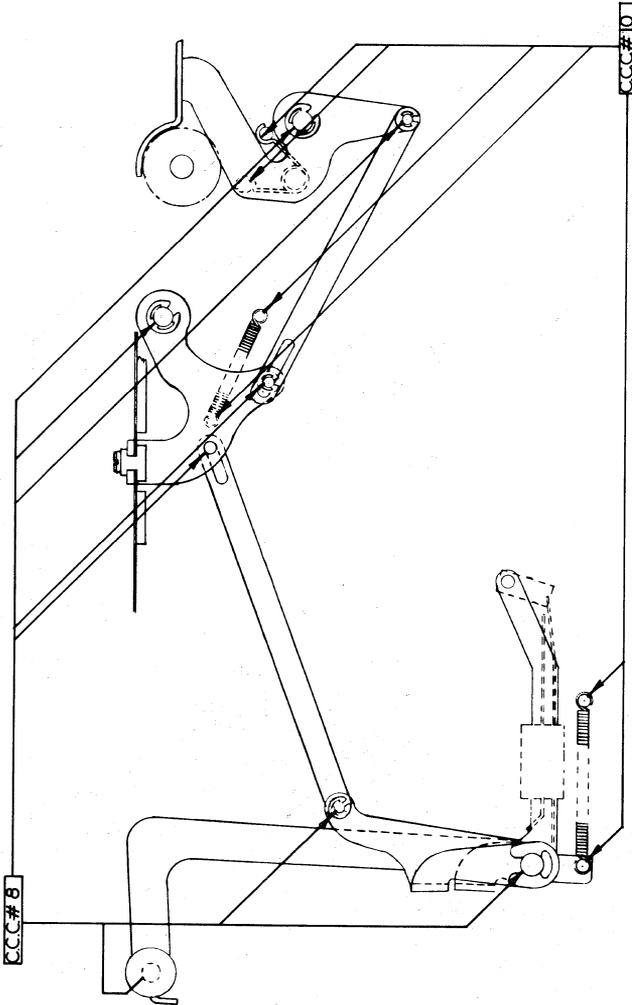


Figure 28 Tape Punch-SPT Mechanism

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

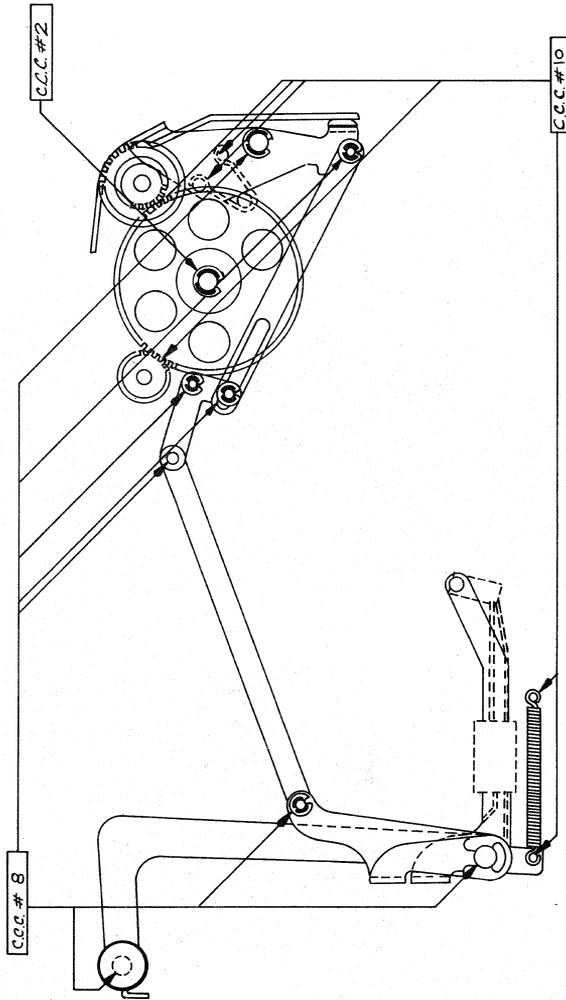


Figure 29-Tape/Edge Card Punch-SPT Mechanism

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

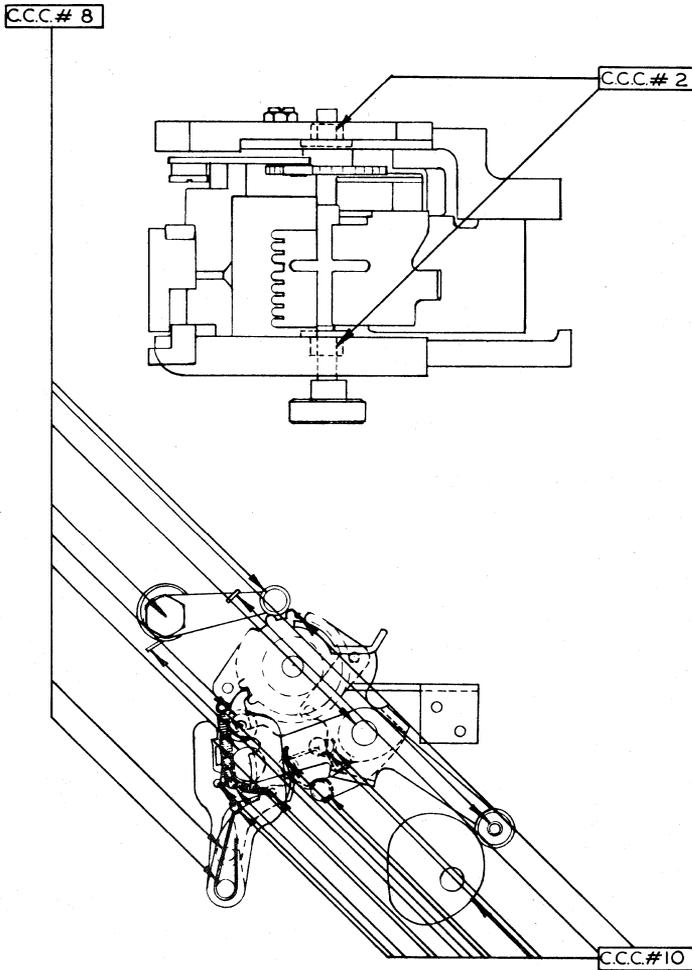


Figure 30 Tape Reader-Feed Mechanism

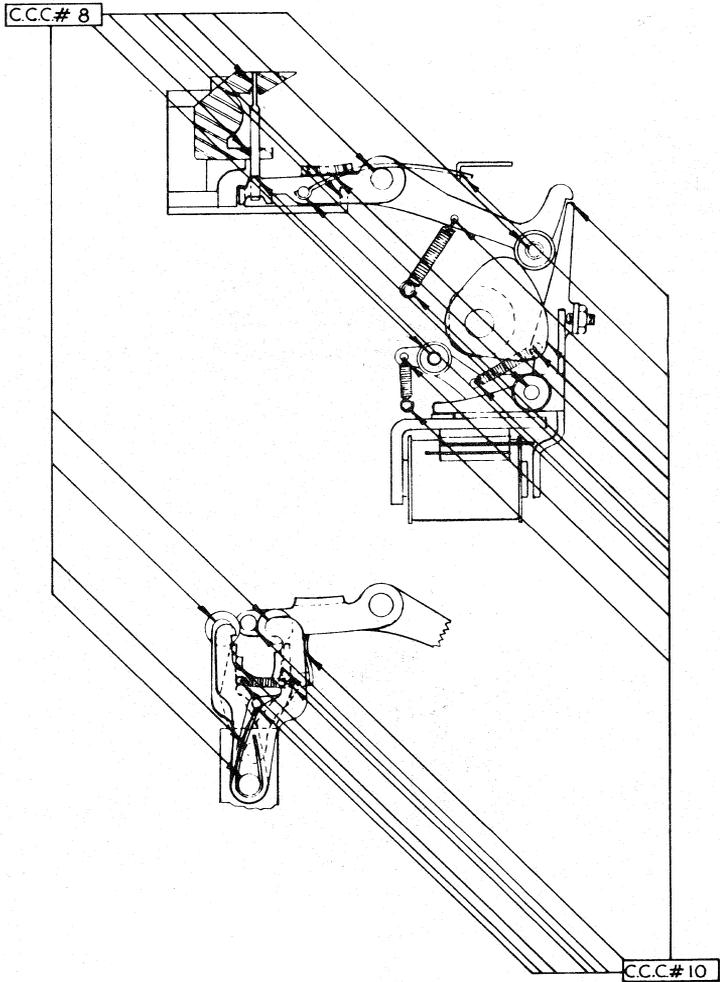


Figure 31 Tape Reader-Interposer Mechanism

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

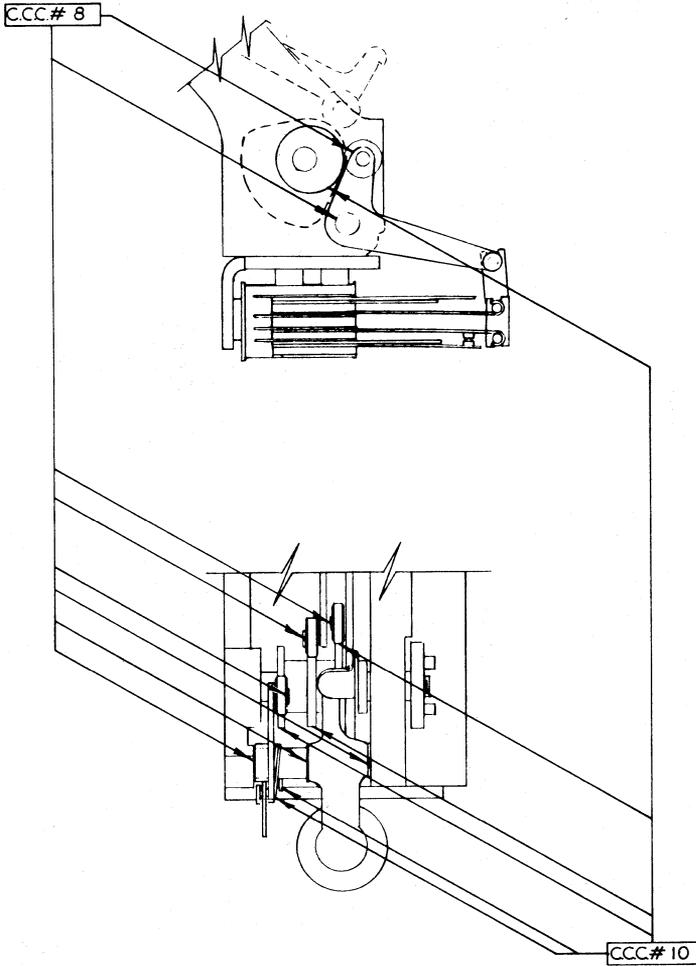


Figure 32 Tape Reader-SRCC Mechanism

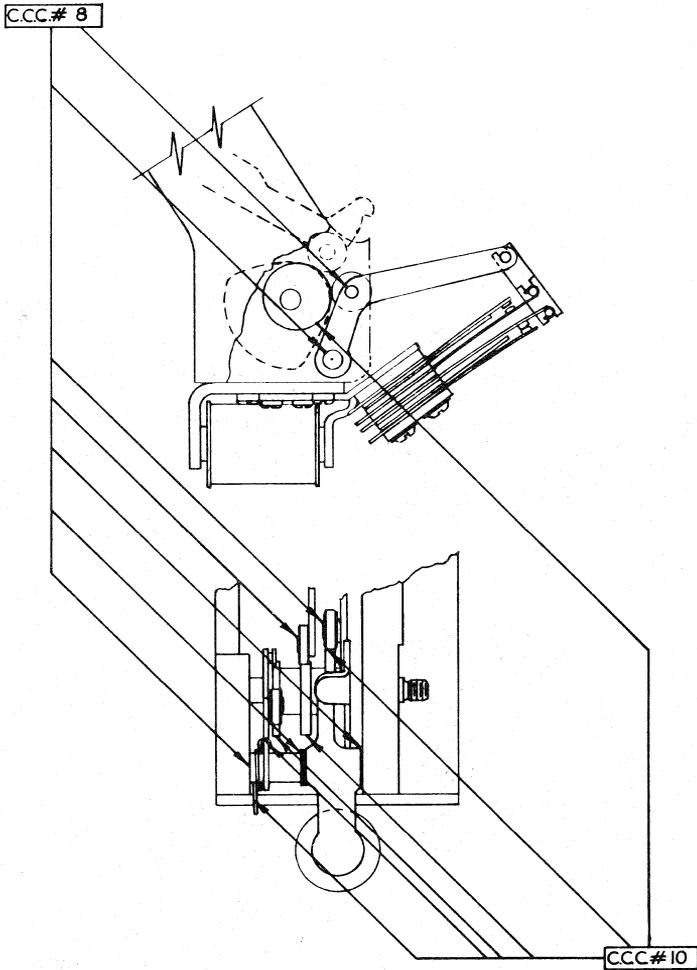


Figure 33 Tape/Edge Card Reader-SRCC Mechanism

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

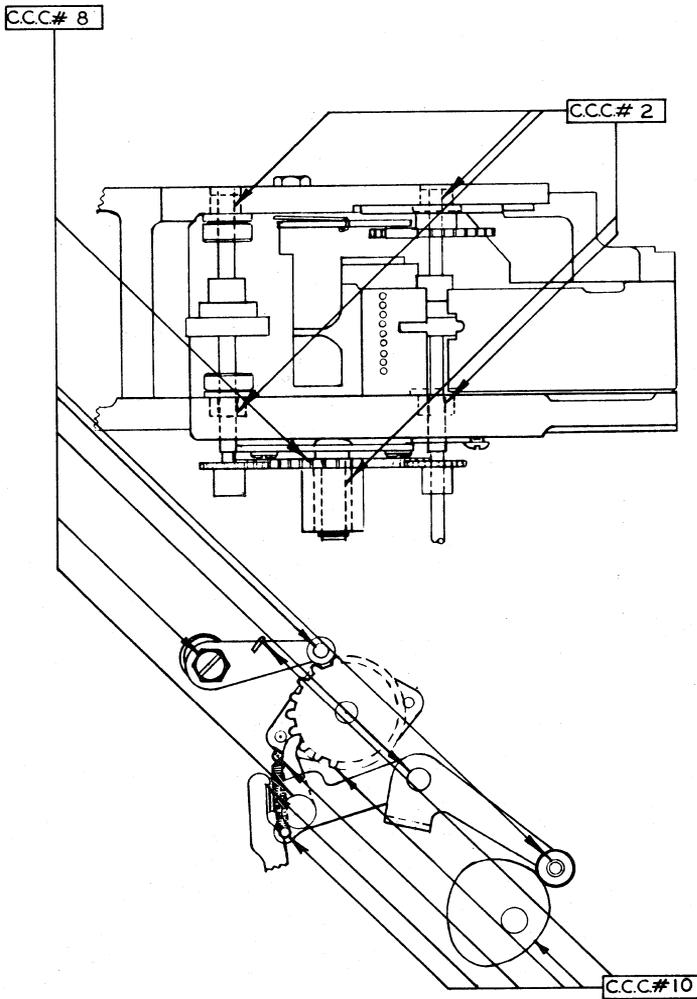


Figure 34 Tape/Edge Card Reader-Feed Mechanism

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

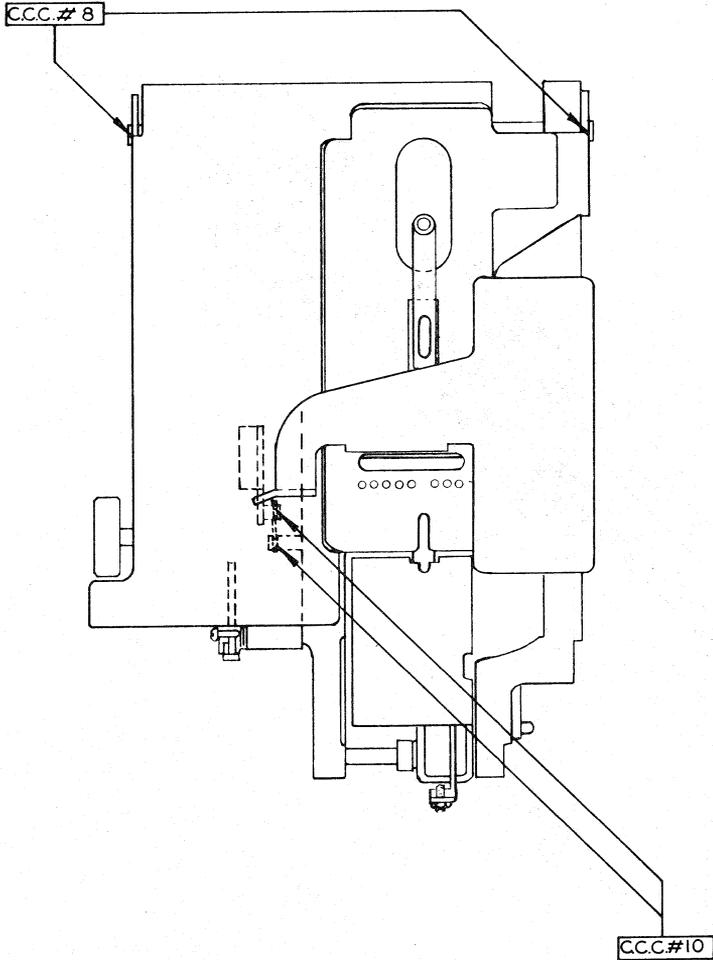


Figure 35 Tape/Edge Card Reader-Top View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

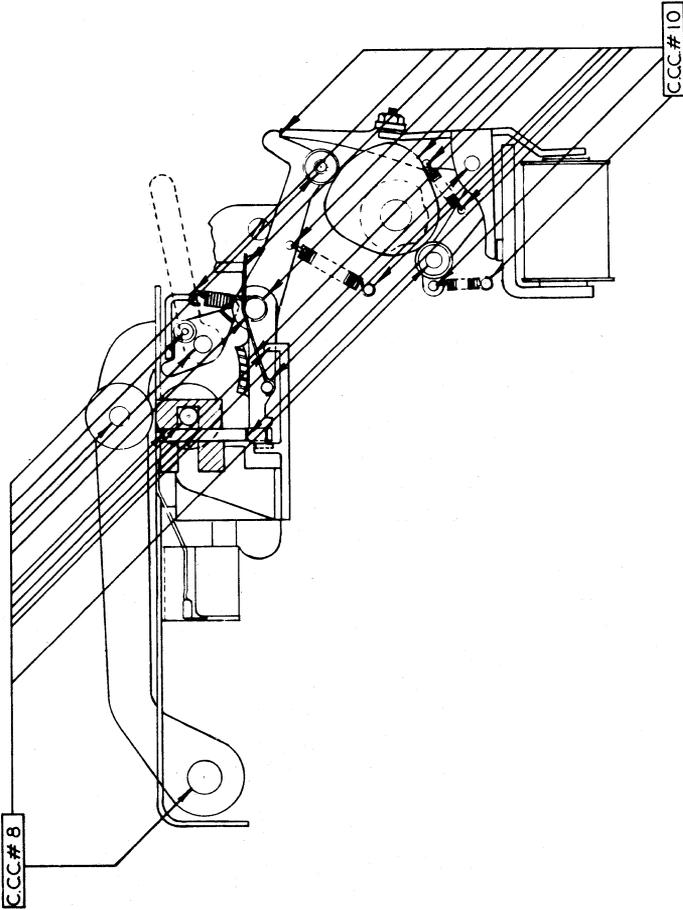


Figure 36 Tape/Edge Card Reader-Side View (Section 1)

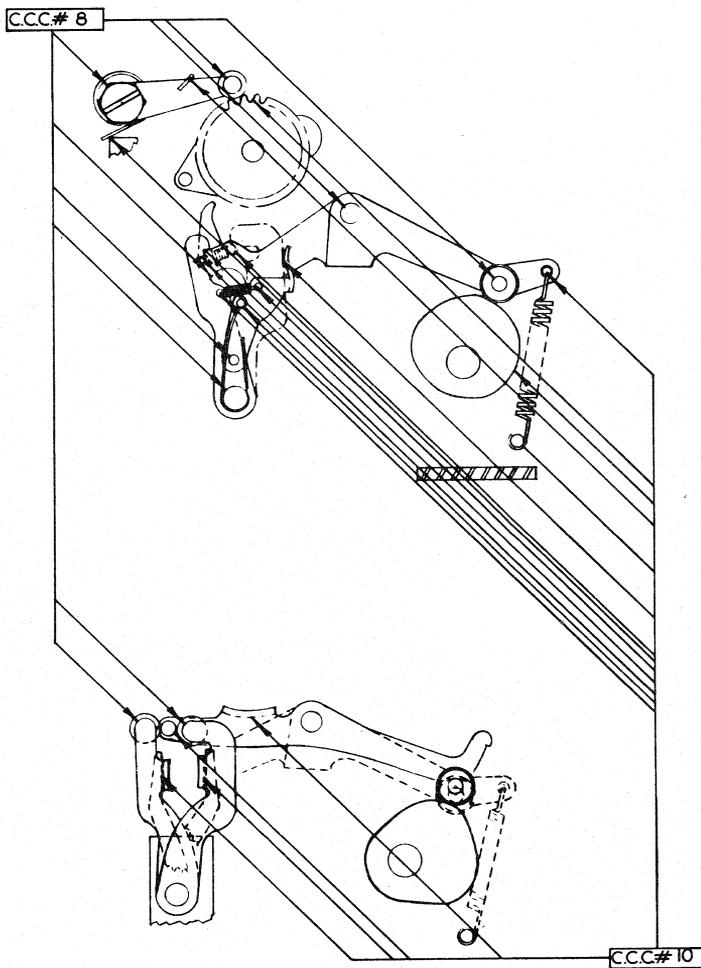


Figure 37 Tape/Edge Card Reader-Side View (Section 2)

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

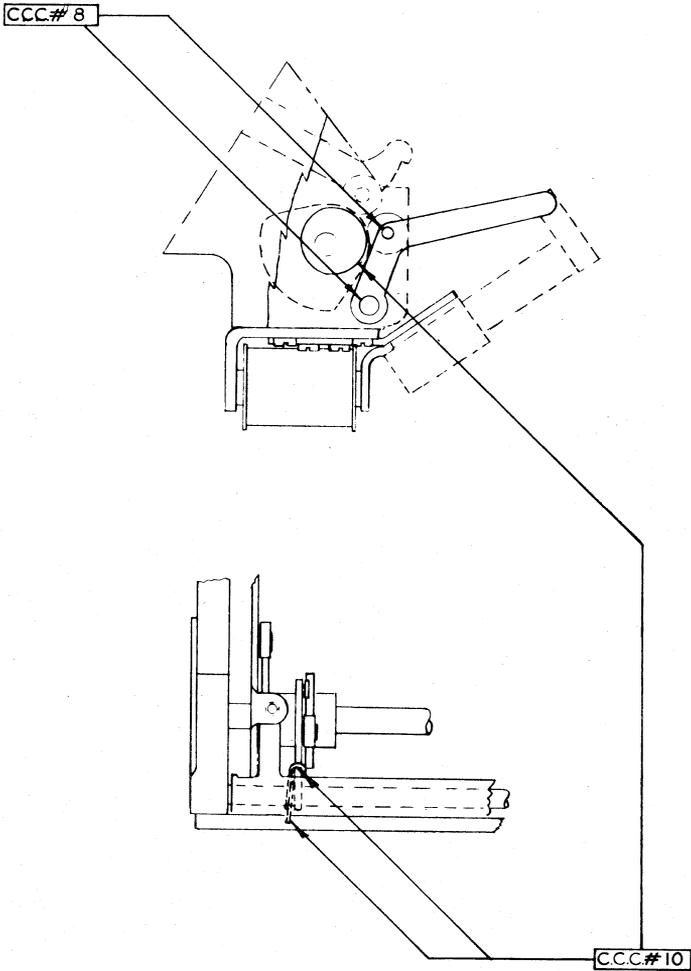


Figure 38 Tab Card Reader-SRCC Mechanism

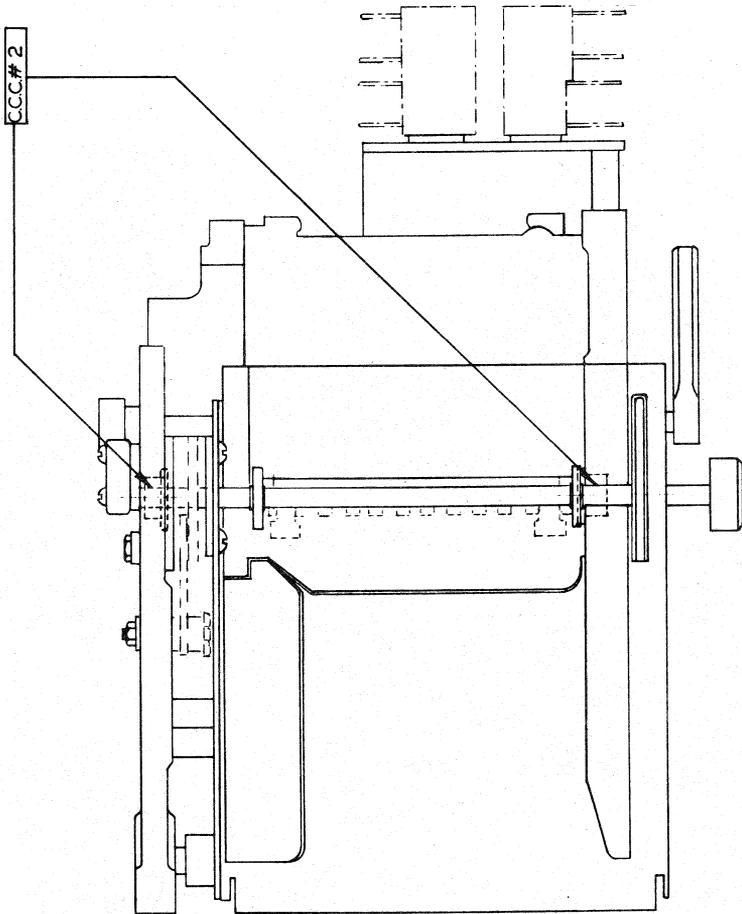


Figure 39 Tab Card Reader-Top View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

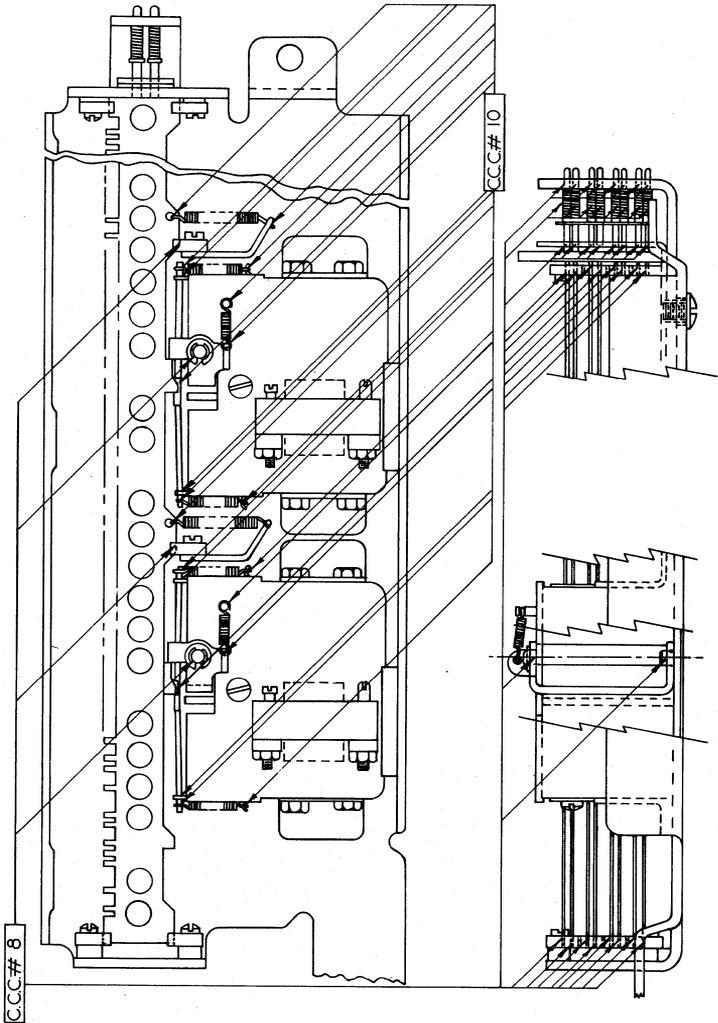


Figure 40 Translator-Permutation Assembly

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

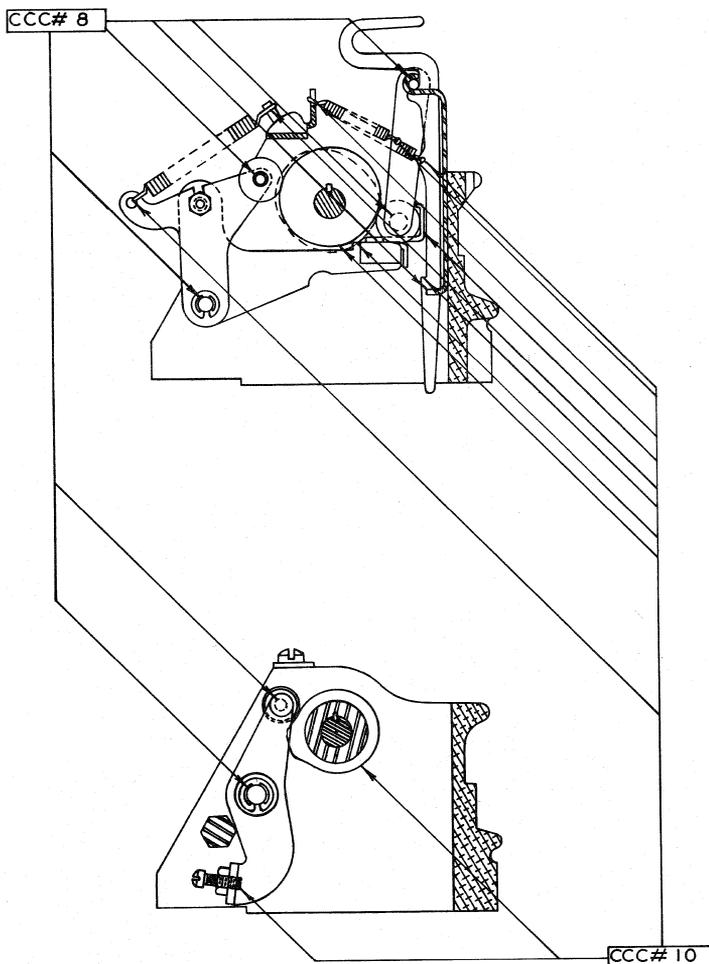


Figure 41 Translator-Side View (Section 1)

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

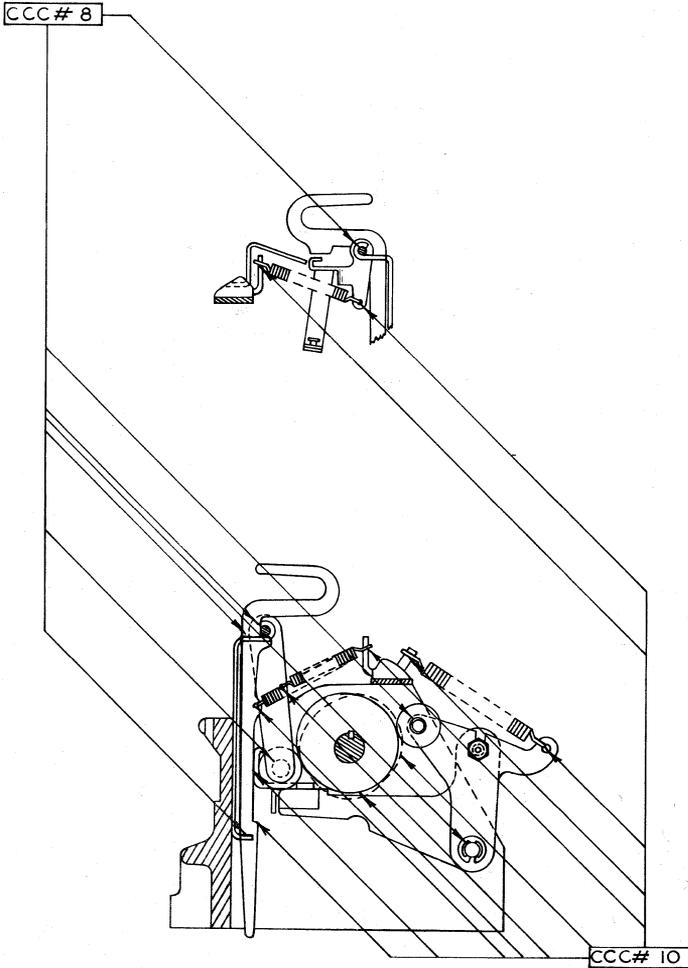


Figure 42 Translator-Side View (Section 2)

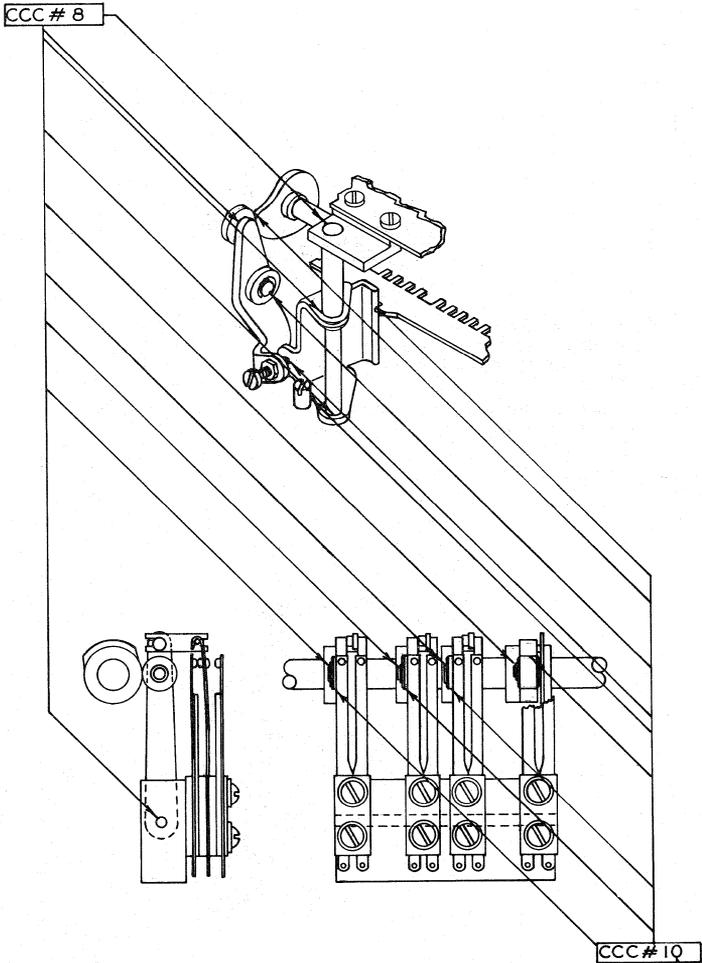
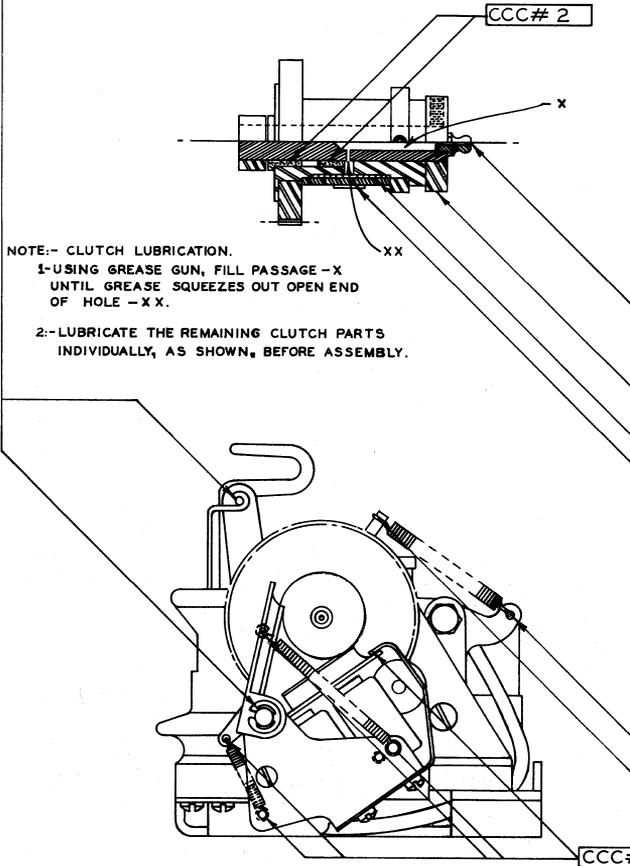


Figure 43 Translator-Permutation Bar Restore & STC Mechanism

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

CCC# 8



NOTE:- CLUTCH LUBRICATION.

1:- USING GREASE GUN, FILL PASSAGE - X
UNTIL GREASE SQUEEZES OUT OPEN END
OF HOLE - XX.

2:- LUBRICATE THE REMAINING CLUTCH PARTS
INDIVIDUALLY, AS SHOWN, BEFORE ASSEMBLY.

Figure 44 Translator Clutch

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

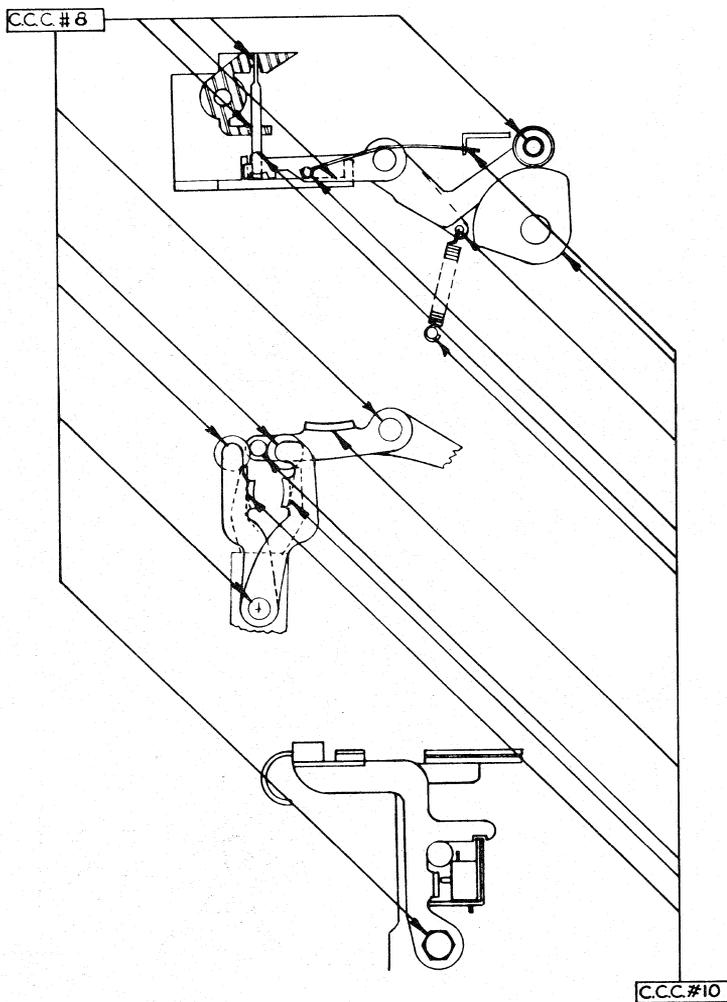


Figure 45 Auxilliary Tape Reader-Side View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

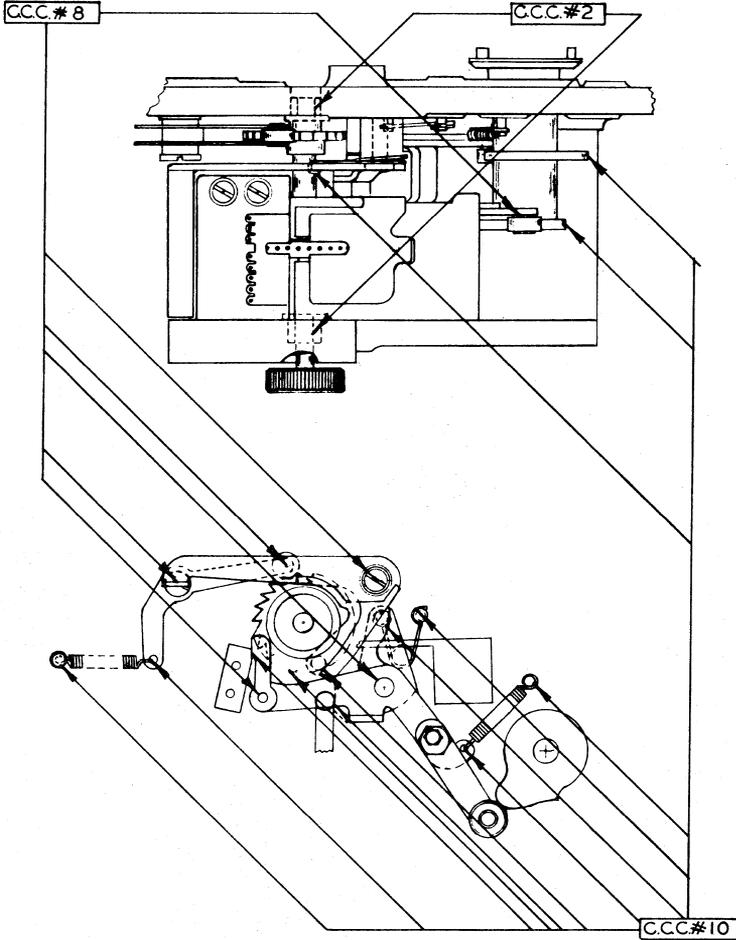


Figure 46 Auxiliary Tape Reader-Top & Side View

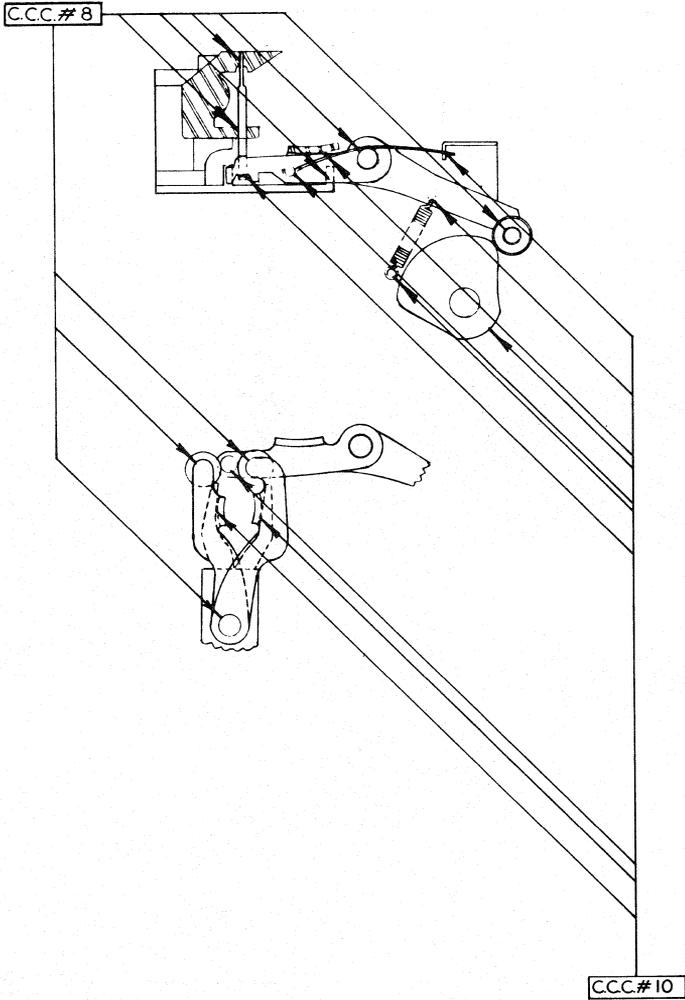


Figure 47 Auxiliary Tape/Edge Card Reader-Side View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

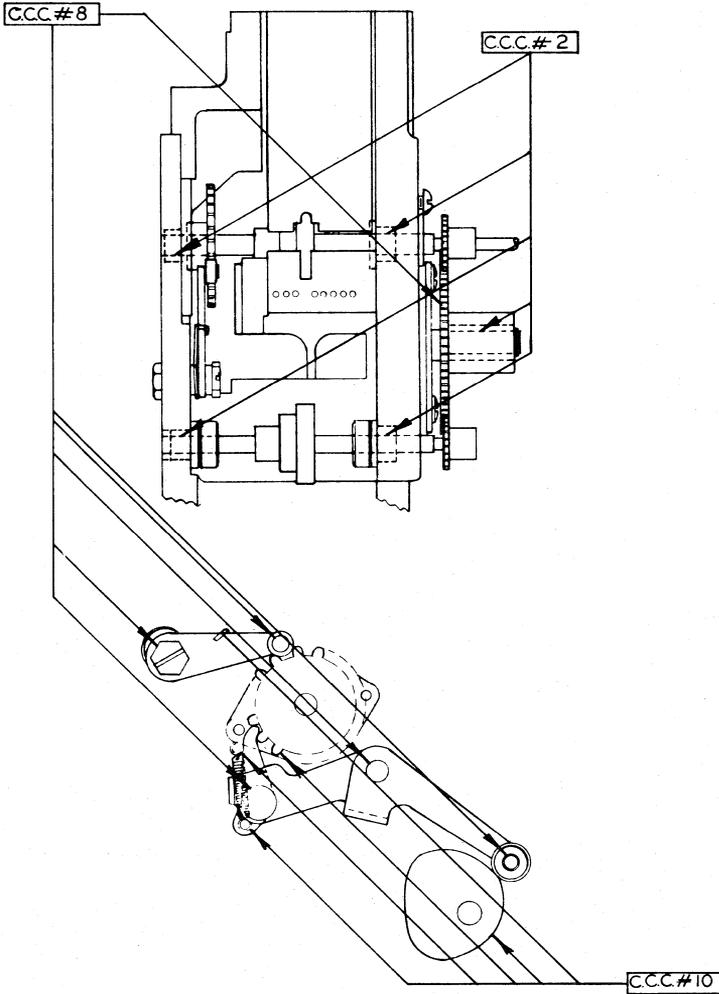


Figure 48 Auxiliary Tape/Edge Card Reader-Top & Side View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

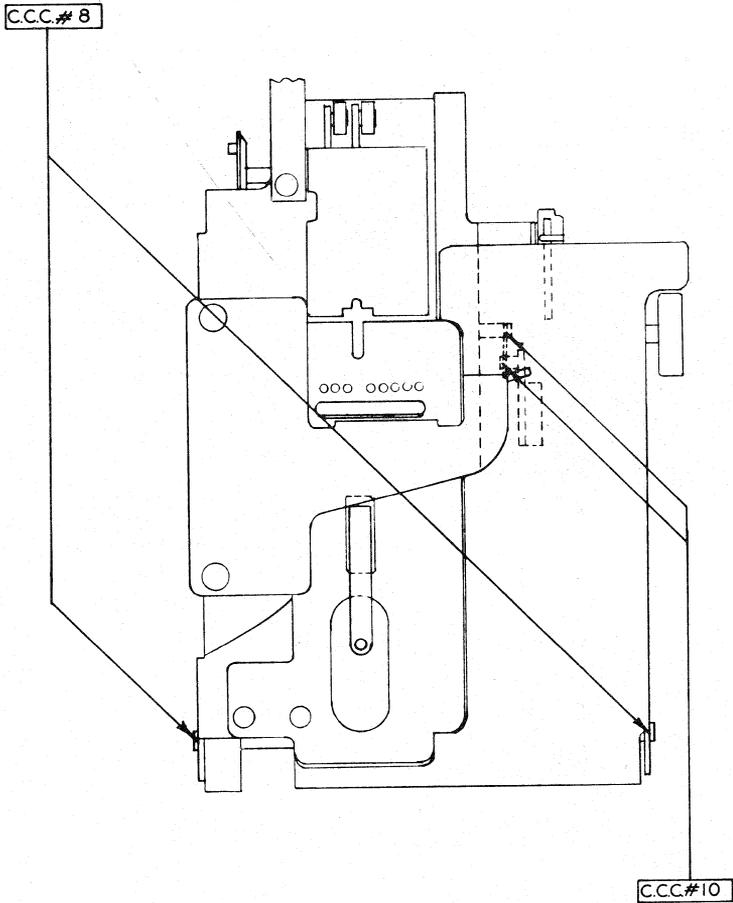


Figure 49 Auxiliary Tape/Edge Card Reader-Top View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

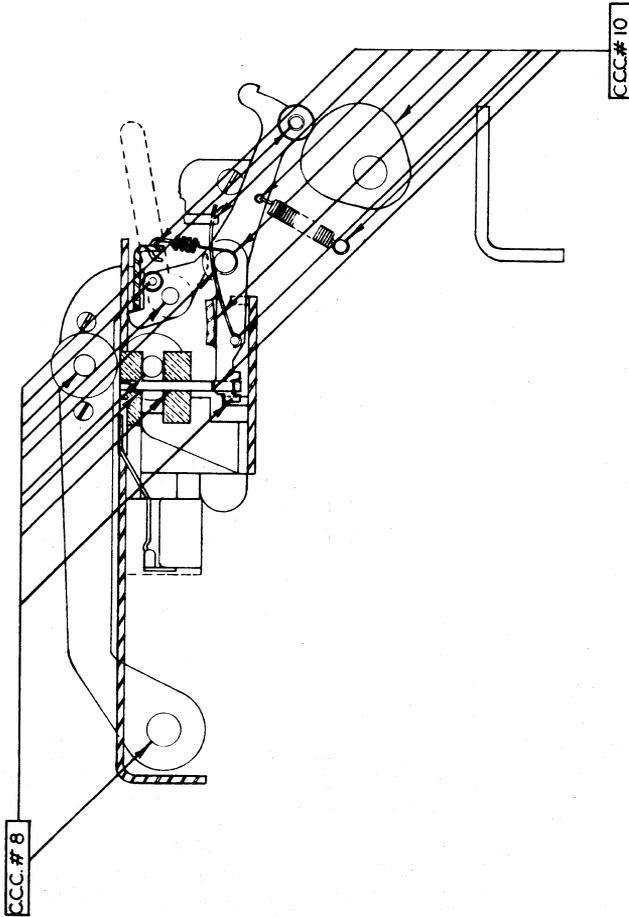


Figure 50 Auxiliary Tab Card Reader-Side View 1

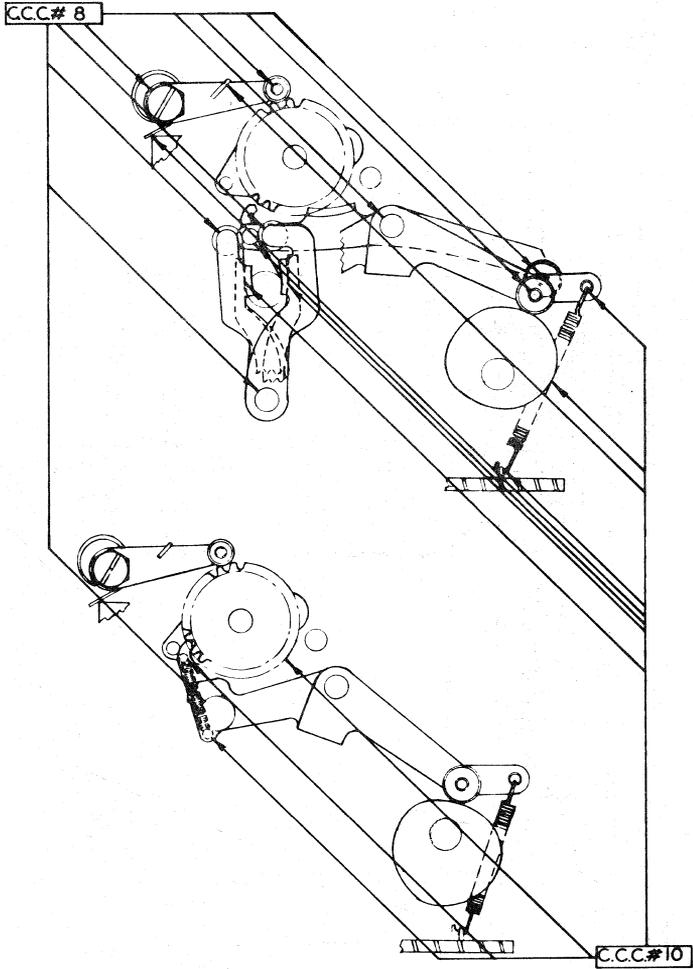


Figure 51 Auxiliary Tab Card Reader-Side View 2

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

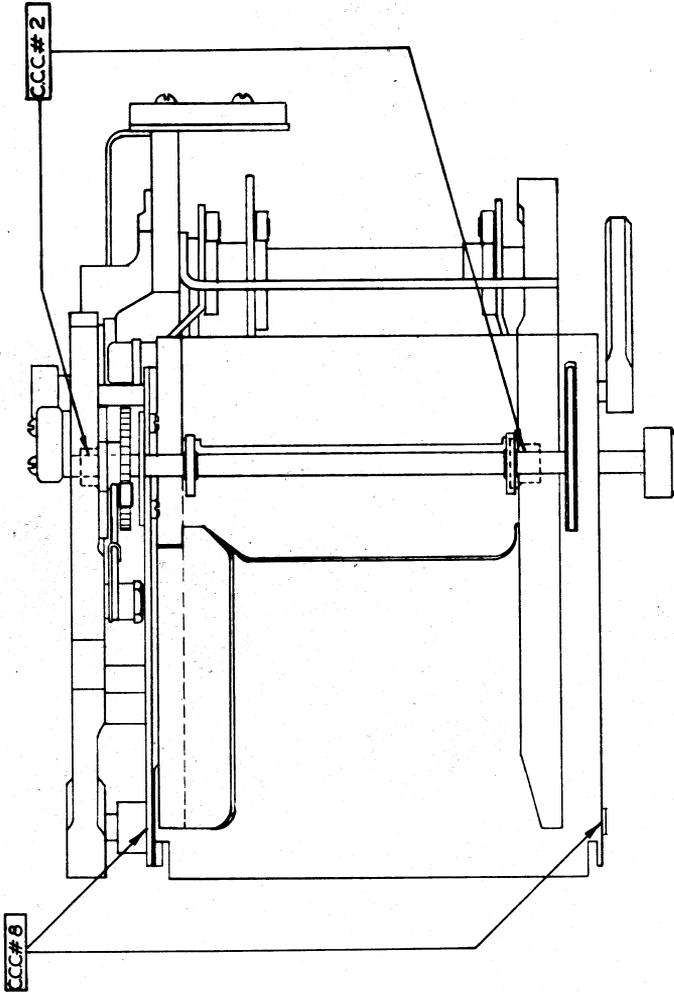


Figure 52 Auxiliary Tab Card Reader-Top View

FRIDEN SYSTEMS ADJUSTMENT

LUBRICATION

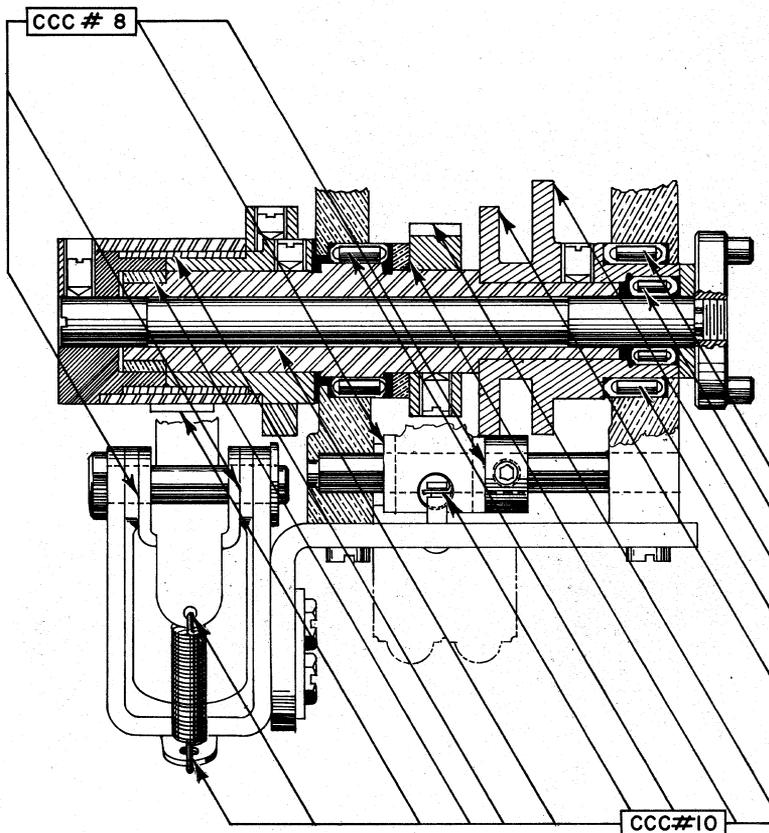


Figure 53 Single Cycle Reader Clutch Mechanism

FRIDEN SYSTEMS ADJUSTMENT

SFD FLEXOWRITER—VIEW 1

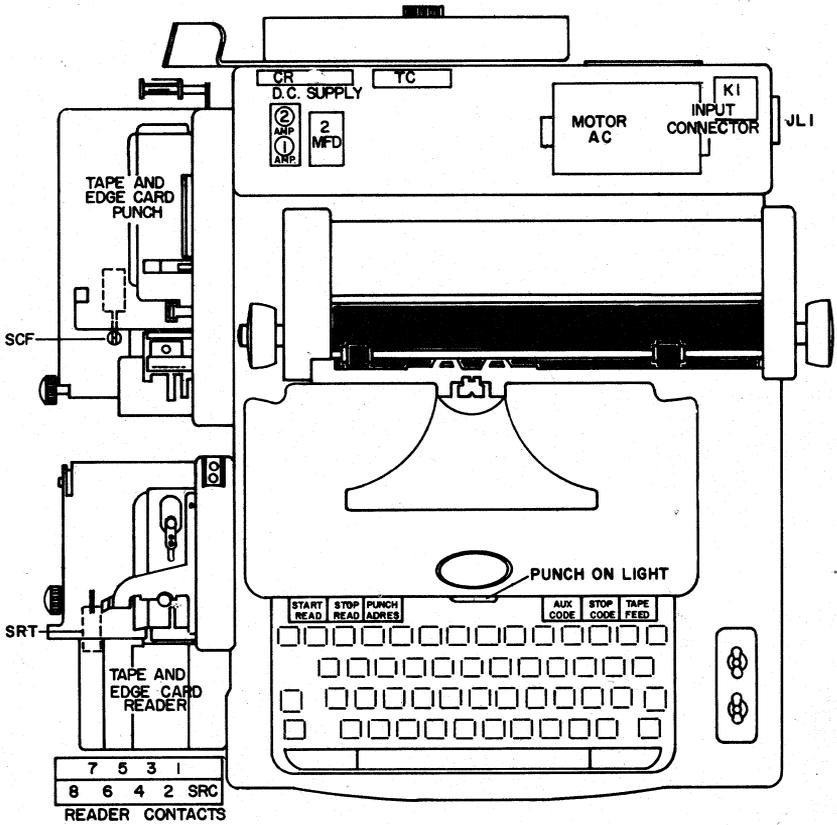


Figure 1 SFD Flexowriter - View 1

FRIDEN SYSTEMS ADJUSTMENT

SFD FLEXOWRITER—VIEW 2

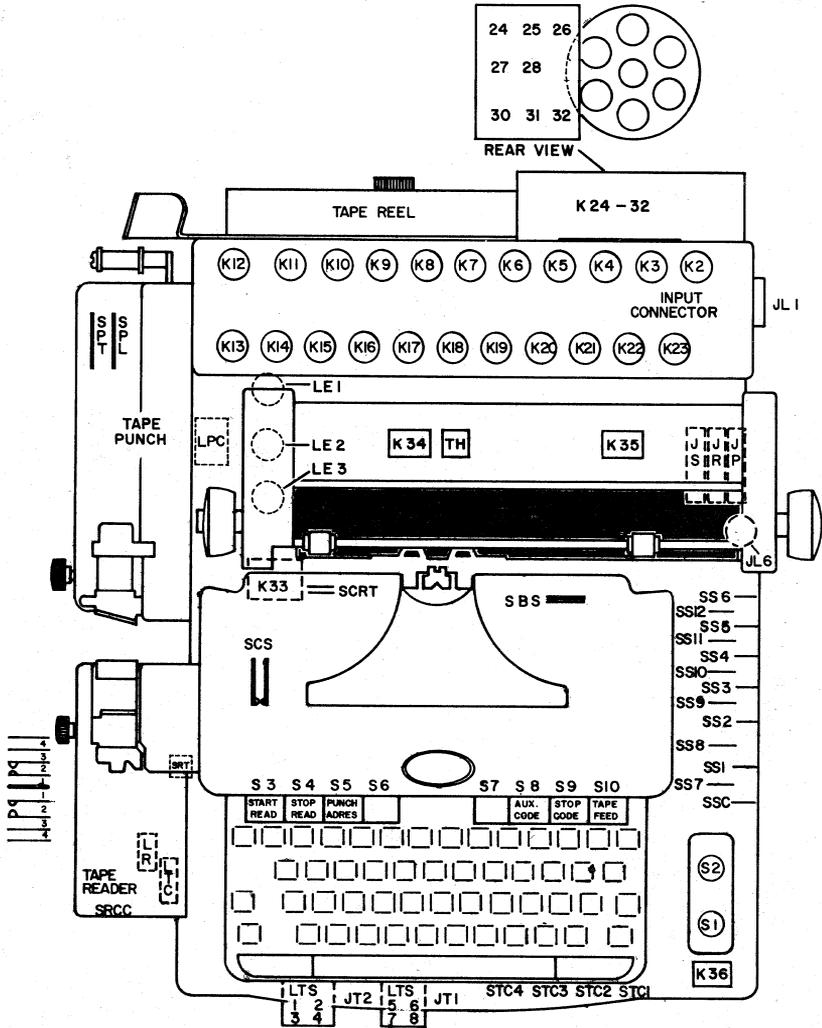


Figure 2 SFD Flexowriter - View 2

FRIDEN SYSTEMS ADJUSTMENT

SPS FLEXOWRITER

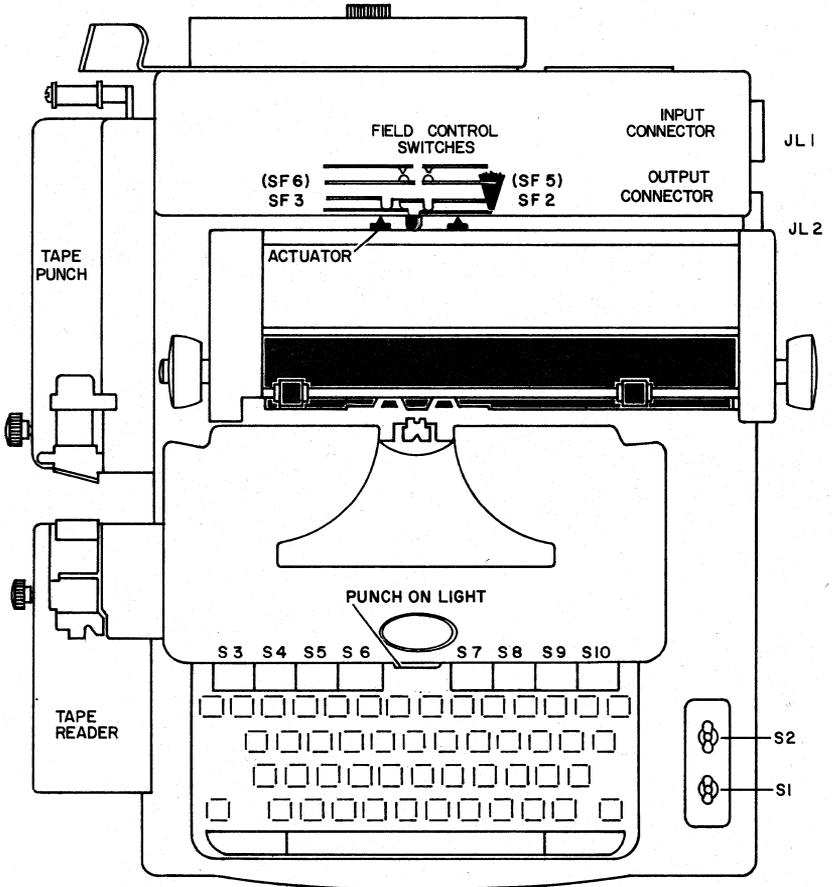
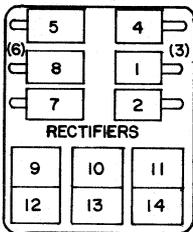
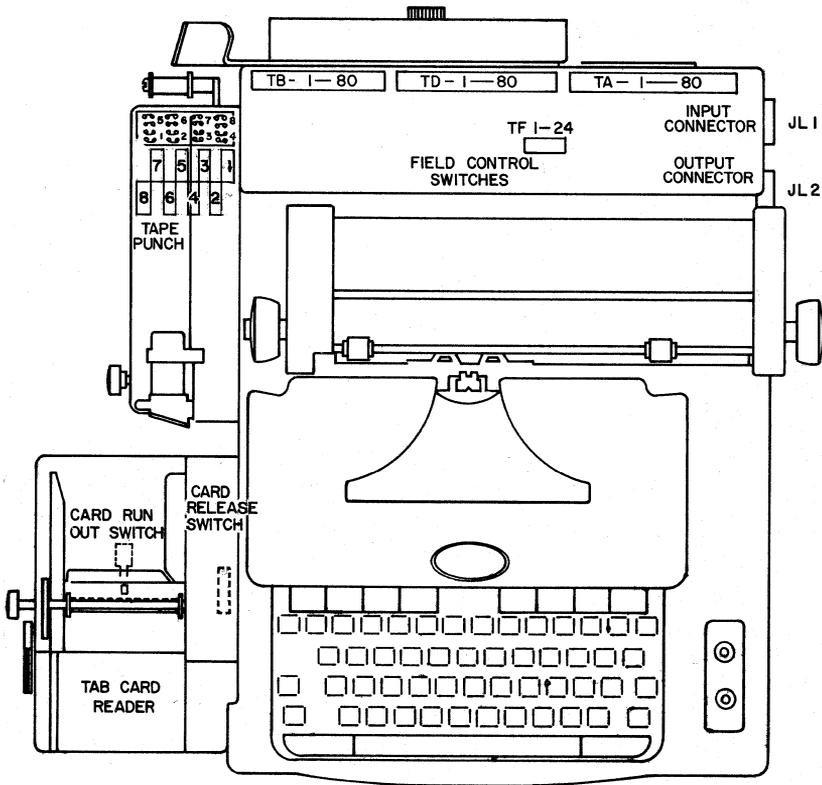


Figure 3 SPS Flexowriter

FRIDEN SYSTEMS ADJUSTMENT

SPD FLEXOWRITER



NUMBERS IN PARENTHESIS INDICATE REAR RECTIFIERS.

Figure 4 SPD Flexowriter

FRIDEN SYSTEMS ADJUSTMENT

ATR, ATR-D, ATCR & ATCR-D,
(LOWER SECTION) & MDS

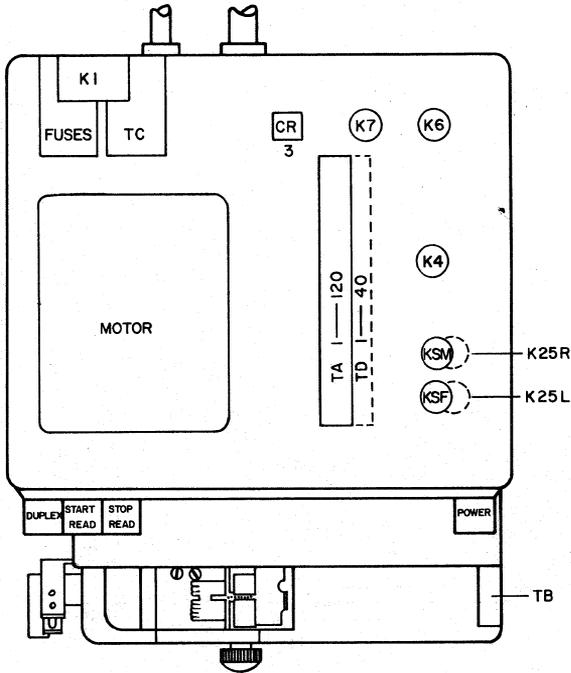


Figure 5 ATR, ATR-D, ATCR & ATCR-D (Lower Section)

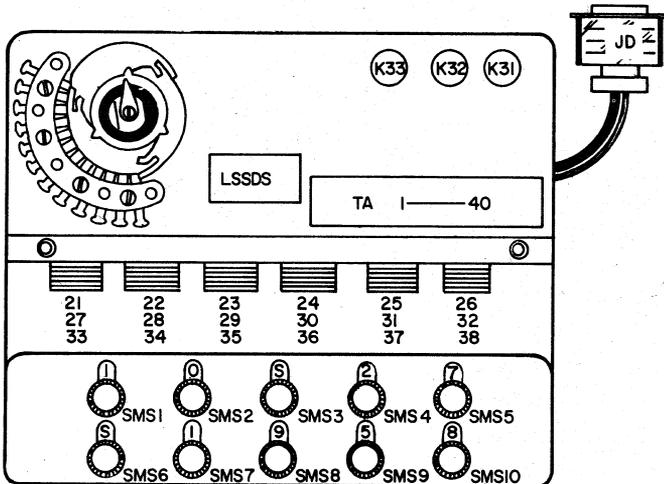


Figure 6 Manual Data Selector

FRIDEN SYSTEMS ADJUSTMENT

ACR & ACR-D,
ATR-SD & ATR-D-SD

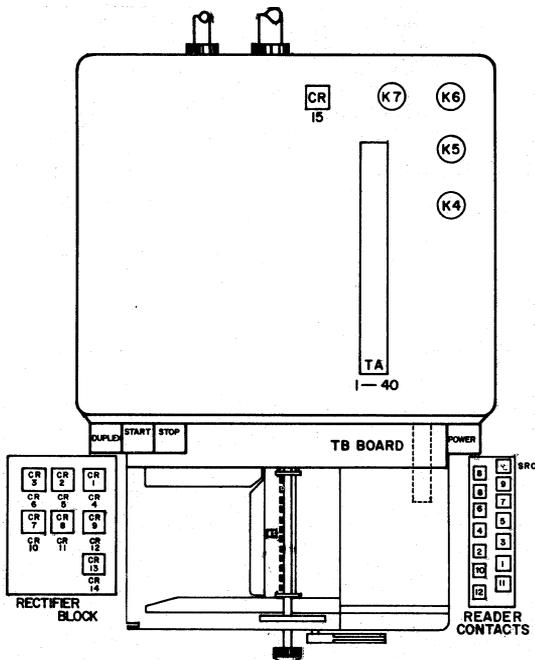


Figure 7 ACR & ACR-D

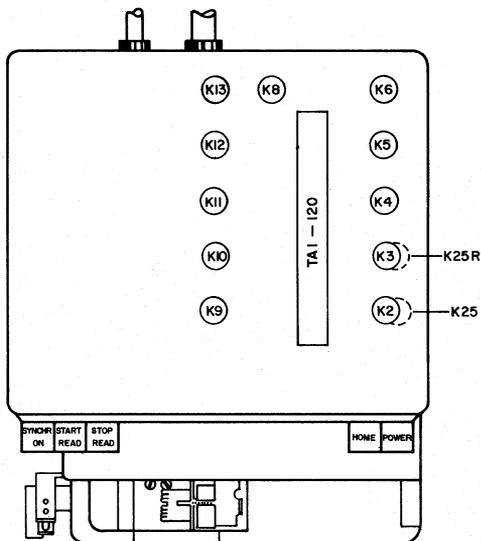


Figure 8 ATR-SD & ATR-D-SD

FRIDEN SYSTEMS ADJUSTMENT

STR & STR-D

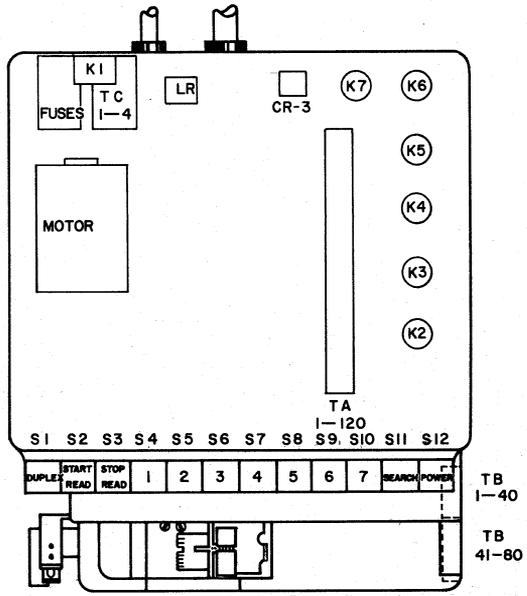


Figure 9. STR

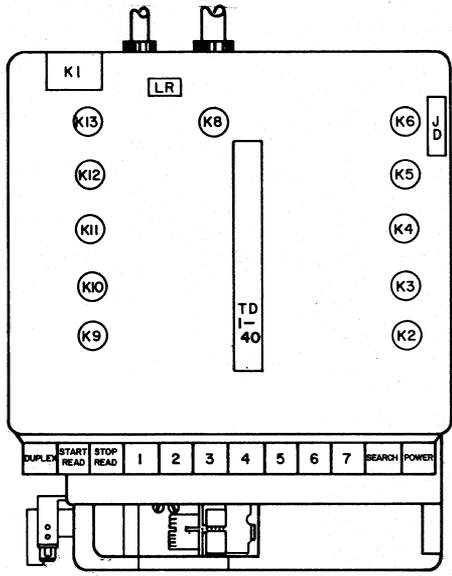


Figure 10 STR-D

FRIDEN SYSTEMS ADJUSTMENT

STR-AD,
STR-D-SD & STR-AD-SD

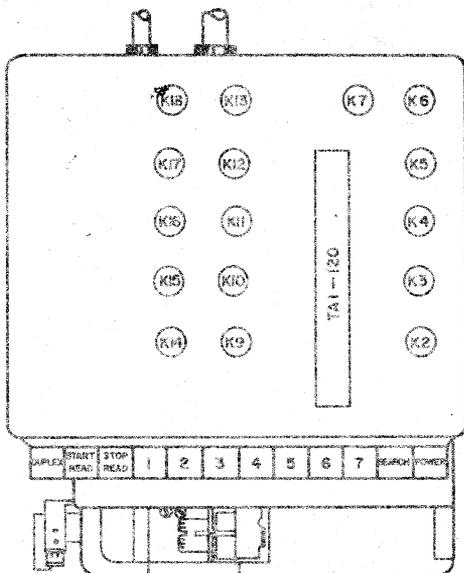


Figure 11 STR-AD

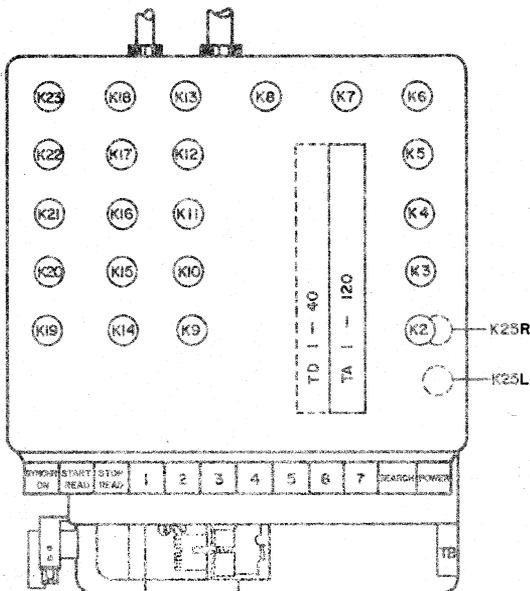


Figure 12 STR-D-SD & STR-AD-SD

FRIDEN SYSTEMS ADJUSTMENT

ATP & ATP-S

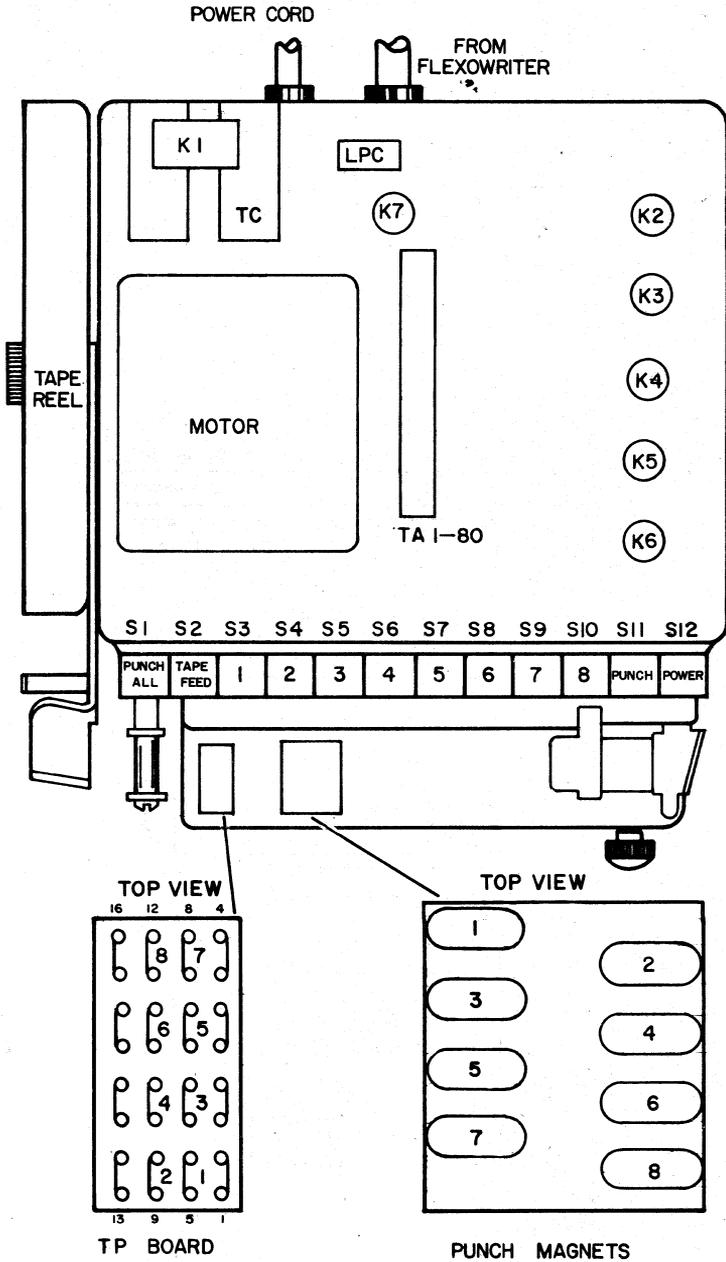


Figure 13 ATP & ATP-S

FRIDEN SYSTEMS ADJUSTMENT

ATCP & ATCP-S,
SOLENOID-INPUT ADDING MACHINE

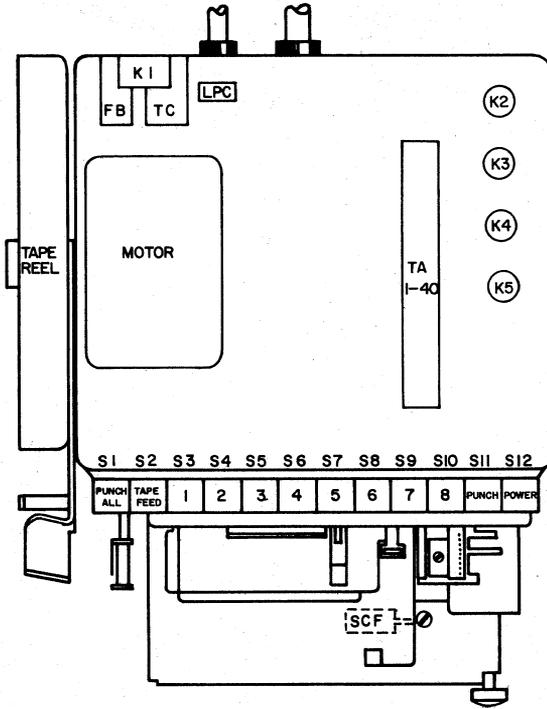


Figure 14 ATCP & ATCP-S

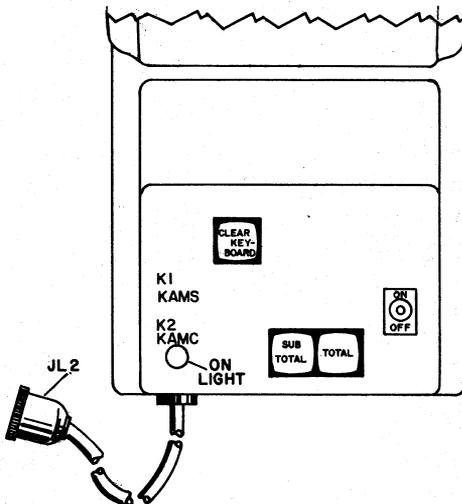


Figure 15 Solenoid - Input Adding Machine

FRIDEN SYSTEMS ADJUSTMENT

TCPC

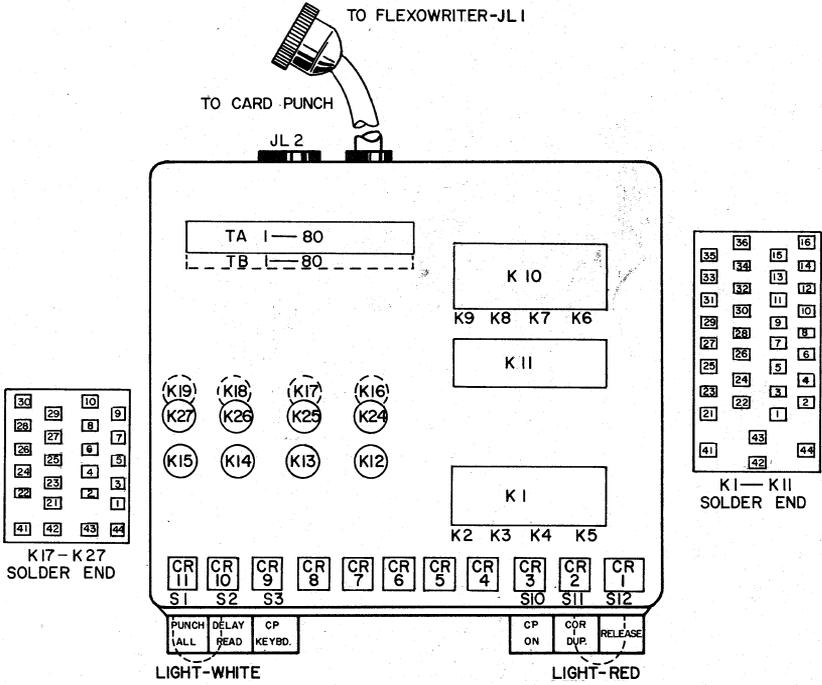


Figure 16 TCPC