

## **INTERPRETER**

### **DESCRIPTION**

The interpreter is a machine for printing numerals on the top of the tabulating card corresponding to the holes punched in the card. That is, if a five hole is punched in any particular column, a five will be printed directly above that column or above any column desired according to the plugging.

By an arrangement of plugging, it is possible to print either zero (0) or ten (10) for a hole punched in the zero position of card.

The plugboard on this machine is located in the front and right and left in the following instructions means right or left facing the plugboard. The feeding mechanism is located at the left and the start and stop key just to the right of the feeding mechanism. The main switch is to the left of the plugboard and must be turned "ON" before the machine is operated. The stacker is located at the right hand end of the machine. The fuses are located in the rear of the plugboard to the left.

The feeding magazine has a capacity of approximately 900 cards. The stacker will hold approximately 800 cards, however, it is not advisable to allow more cards to accumulate in the stacker than can be conveniently removed with one hand.

Cards are placed in the feeding mechanism face down, top edge first.

### **GENERAL**

**Card**—The Interpreter is furnished to accommodate cards of the following capacities:

For cards 5-5/8"—5/32" (34 column) spacing.

For cards 7-3/8"—5/32" (45 column) spacing.

For cards 7-3/8"—3/32" (80 column) spacing.

**Speed**—This machine operates at a speed of approximately 75 cards per minute.

**Current Requirements**—The Interpreter operates on direct current 110 or 220 volts, and consumes 5.0 amperes for starting and 2.5 amperes for running loads at 110 volts.

**Dimensions**—Length—37". Width—22". Height—47".

**Weight**—Packed for shipment 590 lbs., unpacked 468 lbs.

### **OPERATION**

The arrangement of plugging is as follows: The two upper rows of plug hubs represent the printing columns and should be wired to the next two lower rows of plug hubs which represent the columns of the card. This makes the machine flexible so that it is possible to print the figures punched in any column on the card in any position desired across the top of the card.

Directly below the hubs just described are located two rows of hubs and one set of special fibre plugs which should be inserted in all column positions of one row of hubs or the other as the machine will not function correctly if removed entirely. This plugging makes possible the printing of zeros (0) or tens (10) for the holes punched zeros. When inserted in the bottom row of hubs, zeros will be printed and when inserted in the next row above, tens will be printed.

### **PRINTING SET UP FOR ZEROS**

This machine is equipped with a printing mechanism of a solid bank of type and the printing fields must be separated according to the fields on the card so that the zeros will only be printed in columns to the right of figures where desired.

If these printing fields are not separated zeros will be printed in all columns to the right of figures, either where no numerals appear or for columns not plugged.

Located between the third and fourth rubber feed rolls are two long upright locking levers, (one at the front and one at the rear of the machine). These lock the zero lever set up and must be depressed toward the stacker during the time the zero lever set up is being made.

The printing column index and zero levers are located between the second and third rubber feed rolls. All these levers should be in their right hand position

toward the stacker with the exception of the levers for the first column of each field and they should be to the left toward the feeding mechanism.

To make zero lever set up proceed as follows: Move the locking levers located between the third and fourth feed rolls toward the stacker and move the individual zero lever for the first column of each field to the left or toward the feeding mechanism. That is, if one field occupies column 15 to 20, move column 15 zero lever toward the feeding mechanism which would prevent the preceding field carrying zeros into the field occupied by columns 15 to 20. After set up has been completed release the locking levers making sure they return to their extreme left hand position to lock the zero levers.

It is not possible to suppress the printing of zeros in single column fields where a number of single column fields are adjacent.

After the set up has been completed place the cards in the feeding mechanism and depress the start key. The information punched in the fields of the card will then be printed directly above that field or above another field if desired and then placed into the stacker face down.

### **CYCLE OF OPERATION**

Two card feed knives oscillate by means of an internal cam driven from the worm gear housing. These feed knives pick a card from the bottom of the pack in the magazine and carry it to the two sets of feed rolls which serve to carry the card thru a contact roll feed. As the card passes thru the contact roll feed, contact is made thru the punched holes. This forms a means of completing the circuit thru the print magnets.

As the card starts under the brushes, the printing crosshead starts forward. The printing crosshead is operated by a second internal cam and timed so that the type bar stop pawls overlap the type bar teeth  $1/32$ " when contact is made thru the corresponding punched holes in the card.

The type bar stop pawls are unlatched to stop the travel of the type bar by the print magnet armatures. The print magnet armatures are attracted by the print magnets when they are energized by the circuits thru the punched hole in the card.

As the card leaves the second set of feed rolls, it is advanced by two large feed rolls, operating against two small idler feed rolls. The large feed rolls are operated by an intermittent gear. The card advances until the top of the printing position is directly under the center of the platen roll and then stops. The crosshead is at this time at its extreme forward position and at rest. This external cam is also operating on the same shaft as the crosshead internal cam. This external cam is for tripping the printing hammers. It is so timed that the hammers trip when the crosshead and the card are at rest, or immediately after the intermittent feed rolls stop. The hammer trip cam is also designed so that it positively pulls the hammers away from the type tails. Immediately after the hammers have been tripped, the Intermittent gear again operates to drive the large feed rolls and causes the card to go forward to the rubber feed rolls which carry it into the stacker.

### **DRIVE**

The machine is driven by a  $1/4$  h.p. motor. The motor is connected to the drive shaft by a "V" belt. The drive shaft is provided with a clutch which prevents the machine from being turned backward.

The main drive shaft is connected to the feed roll worm by helical gears. The feed rolls are similar and driven in much the same manner as the feed rolls on the horizontal sorter.

The worm housing is the main link in the drive mechanism. It contains two worms, two worm gears and intermittent gears. Attached to the one worm gear is a shaft on which is located three cams, viz. internal cam for operating the crosshead, external cam for tripping the printing hammers, and the external cam for operating the knockoff. The two contact cams are also located on this shaft. The other worm gear operates the internal cam for the card feed knives. The intermittent gears operate the large feed rolls which interrupt the travel of the card during the time the hammers are tripped.

### **INDEX**

The outside perimeter of the internal cam for driving the card feed knives

has scribed on it marks which make a very effective index. The markings are as follows:

12 and CC which coincide, 11, 10, 1, 2, 3, 4, 5, 6, 7, 8, 9, KC, KF and HC.

The numbers are for the different positions on the card. CC is for the timing of the Crosshead cam. The hole in the crosshead cam should be away from the feed and in a horizontal plane with the center of the cam shaft when the pointer is at CC on the index.

KC is for timing the knockoff cam. The hole in the knockoff cam should be away from the feed and in a horizontal plane with the center of the knockoff cam shaft when the pointer is at KC on the index.

IF is for the intermittent feed timing. The intermittent feed roll should stop when the pointer is on the IF position of the index.

HC is for the timing of the hammer cam. The top of the hammer trip cam should be toward the stacker and in a horizontal plane with the center of the shaft when the pointer is at HC on the index.

### FEEDING MECHANISM

The feed of this machine is very similar to the feed of the Horizontal Sorter, namely, two card feed knives oscillate by means of a crank shaft to pick a card from the bottom of the stack and carry it forward to the feed rolls. The card feed knives should be timed so that there is 2-23/32" from the card feed knife to the edge of the first feed roll at "2" on the index. Obviously the knives are on their forward stroke and the back lash is removed.

The throat knife and throat block should be adjusted so that an .008 and not a .010 thickness gauge will pass through the opening three ways. To obtain this adjustment proceed as follows: Raise the throat knife slightly and move the throat block until its point is directly in line with the outside surface of the throat knife, then tighten the throat block adjusting screw. Next move the throat knife down until the .008 and not the .010 thickness gauge will go through the opening horizontally. Then set the throat knife adjusting screws. If the throat block and throat knife has been properly set, the .008 and not the .010 thickness gauge will pass through the opening (1) horizontally, (2) at an angle of about 30 degrees, and (3) should follow through when held down on the radius of the throat block.

The card feed knives are adjustable and should be set evenly on each side for the projection of .004 to .0045. A gauge is provided with two notches in it at opposite ends, one notch is marked "Go" and is cut .0045 deep and the opposite end is marked "No Go" and cut .004 deep. When adjusting the card feed knives it is necessary to first remove the card magazine guides and then loosen the clamping screws that hold the knife in place and turn in or out on the adjusting screw as the case may be to raise or lower the feed knife. If the knife is properly adjusted the "Go" end of the gauge will pass over the feed knife on either side and the "No Go" end will not pass over the projection. The knife must project evenly all the way across and it is obvious that both knives must be adjusted alike.

**Installing New Set of Brushes**—Install each brush for 1/8" projection from the heel of the brush to the face of the brush plate. Move the brush holder up or down until the brushes line up with the scribed line on the brush plate. The brushes should remain in alignment with the scribed line on the brush plate at all times, the card is then timed to the brushes.

**Timing Card to the Brushes**—Loosen the card feed knives connecting link lock nuts and adjust the connecting link until the card knives feed the card so that the brushes make contact 1/32" before the scribed line on the index. Check the timing of the brushes with a card punched "1" in all columns and make sure lock nuts are tightened after the correct timing has been obtained.

**NOTE:** Place one lead of the test set on the impulse distributor the other lead to be connected to a brush plughub. Turn the machine until the test set lights and check each brush position at this point. All brush circuits must be completed at 1/32" before the scribed line on the index. Check the breaking point on the distributor and see that all brush circuits are still complete after the distributor brushes have passed the corresponding segment.

### **CARD GUIDE SLIDE ADJUSTMENTS**

The lower guide slide or brush plate should be adjusted up or down until the brush plate is in the proper relation to the center of the feed rolls as follows. Loosen the two screws which hold the adjustable brackets and move in elongated holes until the brush plate lines up perfectly with the center of the upper and lower feed rolls.

The upper card guide slide or contact roll is not adjustable up or down but the previous adjustment of lower card guide slide should be checked with the .012" and .020" thickness gauges. The .012" thickness gauge should pass between both the card guides and contact roll with medium tension and the .020" gauge should not pass between the contact roll and the lower card guide plate.

The lower card guide slide (brush plate) should be adjusted laterally so that the brushes line up with the punched holes in the card as follows:

Located one on either side of the feed castings are two headless set screws which turn against the adjustable card guide brackets, and moves the lower card guide laterally to the front or rear. Adjust by loosening one and tightening the other until the brushes are in alignment with the punched holes in the cards. Before making this adjustment make sure that the punched holes on the card are in correct registration with the card gauge.

### **INTERMITTENT FEED ROLLS**

Adjust the tension of the upper feed rolls or idler rolls which operate against the large intermittent rolls to have a medium and even tension so that the cards will feed straight.

### **RUBBER FEED ROLLS**

Adjust the rubber feed roll tracks by loosening the holding screws and adjusting the stop screws until the cards feed straight and are not marked by the tracks. These should be adjusted very carefully and accurately.

### **STACKER**

Adjust the stacker so the top of the cards will remain approximately 1-1/2" below the card line at all times.

### **PLATEN**

The platen is of the cylindrical form and loose to revolve with the card so that each impression will be in a different position. Check to see that the platen is free from any binds.

### **RIBBON FEED MECHANISM**

The ribbon feed mechanism is standard except that the feed pawl is now advanced by an eccentric attached to a worm gear. The worm gear is the same as the feed roll worm gear and operates from the same shaft. In this way the ribbon is positively advanced each cycle. The ribbon feed drive gear should be timed so the ribbon is at rest when the hammers trip.

### **PRINT MAGNET UNIT**

This unit is arranged with 45 stop pawls in one solid bank. The stop pawls and latches are positively returned to their latching position by a mechanical relatch and knockoff bar at the end of the printing cycle. The adjustments are as follows:

1. Adjust the turn buckles so that there will be .010" to .015" preferably .010" clearance between the stop pawls and latches when the armatures are attracted and back lash taken out of the pull rod.
2. Adjust by bending the armature tips until the stop pawls overlap its latch .020" to .025" preferably .020" when the stop pawls are latched.
3. The knockoff and relatch bars should be adjusted in relation to each other as follows: Adjust the eccentric studs (one on each side, two adjusting screws for each bushing) by loosening one screw and tightening the other so that when operated the relatch bar drives the stop pawls past their latching points 1/32" and at this time the knockoff bar should have 1/64" clearance to the latches. Both bars should strike stop pawls and latches evenly all the way across.
4. Adjust the knockoff bar backstop screw so that when released in its normal position there will be a clearance of 1/16" between the knockoff bar and the stop pawl latches.

### PRINT UNIT

This unit oscillates each card cycle by means of a cam and levers. The unit is guided and held rigid by bearings sliding over stationary guide bars.

The type bars are driven in one direction by the type bar carrying pawl and springs until stopped by the stop pawls. When the type bars are stopped the carrying pawls are moved out of position and the carrying pawl slides over the type bar. Type bars are positively returned by the crosshead returning to its normal position.

The type bars are equipped with 13 type and one blank as follows: 12, 11, 10, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, blank.

It will be readily seen that ten will be printed for a hole punched zero if a circuit is completed through the print magnet which is determined by the plugs being inserted in the second row of hubs from the bottom. If this circuit is opened at the zero position by the plugs being in the bottom of the plug hubs then zeros will be printed mechanically by the zero pawls.

### ADJUSTMENTS OF PRINTING LAP

**Note:** These adjustments must be made in the following procedure or one adjustment will affect the adjustments previously made.

1. Remove the platen roll and bearings. Adjust the type to strike the center of the platen roll by tilting the magnet unit with four adjustable bushings located at the bottom. Lower the two left hand bushings and raise the two right hand bushings or vice versa the same number of turns each so that the type bars are stopped with the center of type to be printed  $\frac{3}{8}$ " from the edge of casting that supports the bearings for the platen roll. Use straight edge and measure to center of type at both the front and rear of the printing unit.

2. Move the magnet unit up or down for a clearance of .010" to .015" between the type bar teeth and the stop pawls even all the way across when they are latched. This is obtained by turning all four bushings in the same direction with a like number of turns.

**Note:** This adjustment must be made very carefully so that it will not disturb #1 adjustment, . . . . .

3. With the adjustable bushings on the front side plate of the magnet unit, move the magnet unit to the front or rear so that the stop pawls line up with the type bars when looking down from the top.

**NOTE:** After making adjustments 1, 2, and 3 loosen the magnet unit holding screws and check to see that when tightened the bushings are adjusted evenly so as not to twist or bind the magnet unit.

4. Move the zero stop pawls in elongated holes by loosening the two screws in each end of the assembly until the zeros are printed in alignment with the numerals. Test by punching a card alternating eights and zeros all the way across.

**NOTE:** The locking levers (one at the front and one at the rear) which lock the zero pawls set up should be adjusted by loosening the two holding screws in each lever and move in elongated holes until the locking bars rest evenly against the zero pawl levers all the way across and at both ends. Check to see that the locking levers do not touch feed rolls.

5. The printing crosshead is driven by two links in which are eccentric bushings determining the overlap of the stop pawls and type bar teeth at the numerical line on the index. These eccentric bushings should be adjusted as follows:

A. Loosen the large pivot screw set screw on the under side of the reciprocating bearings so that the pivot screw may be loosened.

B. Loosen the large pivot screw until the eccentric bushings are accessible. (Do Not Remove Entirely).

C. Loosen the two eccentric bushing locking screws so that the eccentric bushings may be adjusted.

D. Turn the machine to "5" on the index.

E. Adjust the eccentric bushings so that the stop pawls overlap the #5 tooth on the type bar  $\frac{1}{32}$ " with the high side of both eccentrics together.

**NOTE:** Check to see that both of the eccentrics are adjusted evenly and together so that the printing crosshead will not bind on the guide rods.

F. Check the stop pawls for  $\frac{1}{32}$ " overlap on the type bar teeth at both "11" and "8" the same as at "5" on the index.

### **ADJUSTMENT OF ARMATURE KNOCKOFF LEVER**

Adjust the pivot points of the knockoff lever up or down in the elongated holes so that the relatch bar will have sufficient travel on the high point of its cam to drive the stop pawls  $1/32$ " past their latching points. At this same time check knockoff bar to see that it has  $1/64$ " clearance to stop pawl latches and does not bind.

### **HAMMER BAIL AND SPRINGS**

The hammer bail trip is not adjustable for timing and needs never to be changed. The hammer bail springs are provided with links with four holes for adjusting. Set the links over the studs in one of these four holes until a good impression is obtained. Make sure both sides are adjusted to have the same tension.

### **ADJUSTMENT OF RELAYS**

**Card Lever Relay**—This relay has standard adjustments, Namely:  $.012$ " clearance between armature and cores when attracted and  $.012$ " air gap between contact points when de-energized with medium tension on the armature spring.

**Motor Relay**—This relay is adjusted to have  $.012$ " clearance between the armature and cores when attracted and  $1/16$ " air gap between the contact points when de-energized with heavy tension on the armature return spring.

### **TIMING OF IMPULSE DISTRIBUTORS**

The two impulse distributors are used for completing the circuits through the holes in the card. They are timed to complete the circuit just after the card brush makes contact through the hole in the card and to break the circuit just before the card brush leaves the hole in the card. The card brushes are timed  $1/32$ " before line on index and impulse distributors at line on index. The brushes of impulse distributors are connected in series and must be timed with a test light so that the arc will be equally distributed between the four brushes when the machine is in operation.

The impulse distributors are driven so that they make two revolutions each cycle, one revolution on the cards and one between the cards. The card lever contact keeps the circuit open for one revolution of the impulse distributors.

### **PURPOSE AND TIMING OF CAMS AND CONTACTS**

The purpose of the motor cam contact is to overlap the break in the card lever contact and is timed to break at "5" on the index. Standard adjustments.

The purpose of the zero cam contact is to open the print magnet circuit during the time the card is under the brushes at the zero position to eliminate the printing of tens, elevens and twelves when not desired. Time so that contact will open approximately  $1/4$  point before "12" on the index and close  $3/4$  point after "10".

### **WIRING DIAGRAM**

Figure 102179 is a complete wiring diagram of the Interpreter. There are two relays in the machine, the motor series relay and the card lever relay. The motor series relay prevents starting the machine by any other method than the start key. The card lever relay contacts overlap the break in the cam contacts and keeps the motor running as long as the cards are feeding.

The printing circuit is very simple. It is as follows:

From one side of the line, card lever contact, impulse distributor, common contact roll, brushes, plugwires, resistance, print magnet and then through one of the two parallel circuits, depending on whether the machine is plugged to print zeros or tens. In one of these parallel circuits is a cam contact which opens the circuit  $3/16$ " before zero on the card or 10 on index and closes it  $3/16$ " before "2" on index. When the machine is plugged to eliminate printing tens, the brush making contact through the zero hole will not complete its circuit as the cam contact is open, therefore the type bar will not stop at the 10 position and zero will be printed mechanically.

In the other parallel circuit, a circuit is completed through the zero hole in the card and ten is printed.

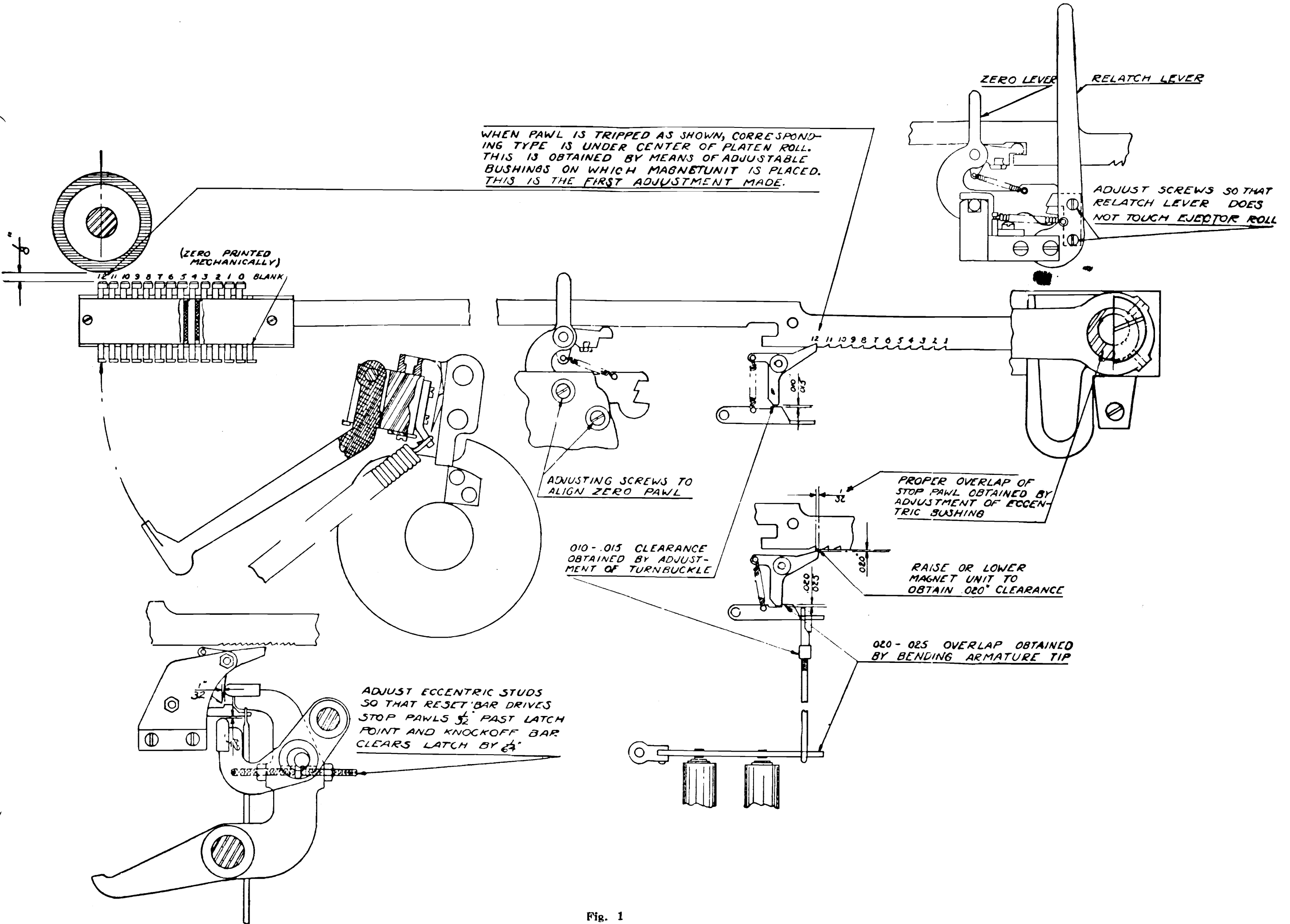


Fig. 1

OILING INSTRUCTIONS

1. Crosshead bearings are provided with oil wells and wicks. Keep oil wells filled with bearing oil at all times.

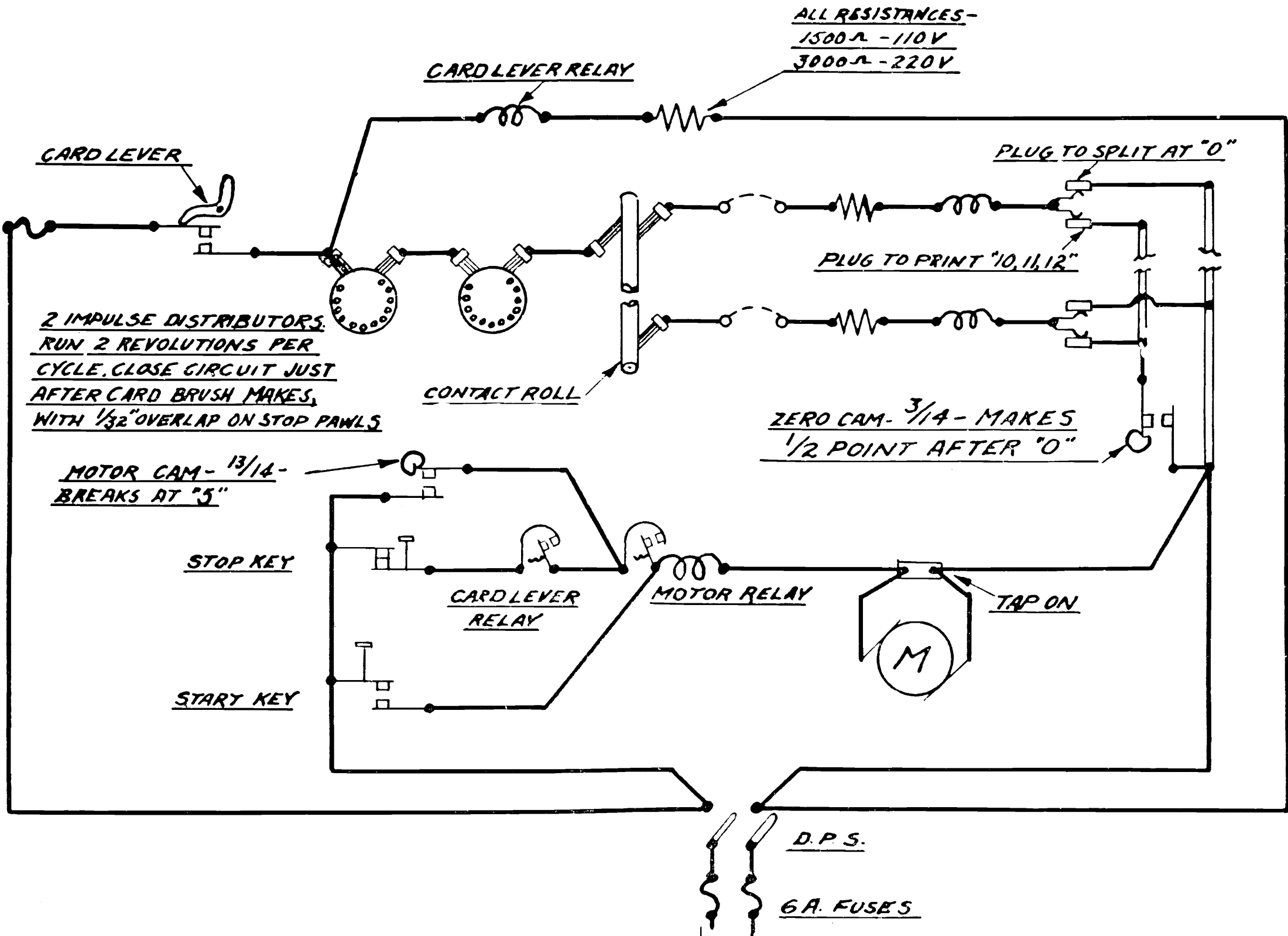


Fig 102179



2. The feed rolls should be oiled at least once each month.
3. Connecting rods for crossheads should be oiled at least once each month.
4. Motor should be oiled at least once each month.
5. Oil all cam rollers once each month.
6. Oil crosshead rocker arms once each month.
7. Oil worm shaft once each month.
8. Apply graphite to helical gears and worm gears once each month.
9. Keep worm housing filled up to bottom edge of worm gears with heavy motor oil or 600-W.
10. Lubricate gears in housing at the right hand end of horizontal shaft with motor bearing grease.