MECHANICAL INSTRUCTIONS

for

REMINGTON PORTABLE TYPEWRITER

Maintenance Department

Remington Rand

BUSINESS SERVICE
BUFFALO, NEW YORK
May 13, 1931

PORTABLE MECHANICAL INSTRUCTION BOOKS

MAINTENANCE DEPARTMENT:

The enclosed Portable Instruction Book is to be carried in the Inspector's Mechanical Binder. The pages are already punched, and by removing the cover this booklet can be inserted as outlined above.

Additional copies can be secured through Maintenance Department Headquarters at Buffalo.

R. D. WOLFE
FOREWORD

This instruction book is intended primarily for mechanics, but it can be studied to very good advantage by salesmen. This book is not an operator's instruction book and should not be given to customers.

The drawings contained in this book should be studied in connection with the reading matter and are of great assistance in learning the functions and adjustments of the various mechanical units. For those in the Foreign field who do not read English, a careful study of the drawings will give helpful fundamental information.

Study one unit thoroughly before going on to another.

To obtain the best results, learn the adjustments pertaining to a unit from the book and then make them on the machine.
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MARGIN RELEASE AND LINE LOCK

Refer to Plates I and II. These two drawings show the Line Lock Release and Line Lock Mechanism from the under and upper sides of the machine. Plate II illustrates this mechanism from the underside. By using this drawing as a reference the movement of the Line Lock Mechanism takes place when the post on the right hand Margin Stop (2) engages the Line Lock Lever (4). This Lever (4) is carried to the left, with the movement of the carriage, fulcruming on the Fulcrum Screw (17) which causes the front end of the lever, through which runs the Line Lock Pull Wire Sleeve (6) to move to the right. At this point the Line Lock Lever (4) is pressing against the Line Lock Pull Wire Spring (5-s) and the pressure of this spring (5-s) against the Lock Nut (7) pulls the Line Lock Adjustable Connecting Wire (5) also to the right. The movement is then taken up by the Line Lock Bell Crank (8) which fulcrums on the Line Lock Bell Crank Stud (8-a). The end of the Line Lock Bell Crank (8), to which the Line Lock Pull Wire (9) is connected, now moves toward the rear of the machine, and this movement through the Line Lock Pull Wire (9) connection, is transmitted to the Line Lock Swing Bar (10) Plate I. As the Line Lock Swing Bar (10) swings to the rear of the machine on the Studs (10-s) the lip of the Line Lock Swing Bar, indicated by broken lines, engages the underside of the Line Lock Hook (18-a) on the Keylever (18) which prevents a full stroke operation of the key stopping the travel of the typebar about half way between the cylinder and the type rest. If it is necessary at this point to write further on the line it is possible to do so by pressing the Margin Release Key (17) Plate I. When this key is depressed the downward movement is carried to the Margin Release Shaft (13) through the Margin Release Lever Connecting Link (16) and the Margin Release Connection Arm (15). The Margin Release Shaft (13) has its bearing in the Side Frames of the machine, and with the downward movement of the arm (15) at the front, the Margin Release Arm (14) at the rear, moves upward pressing on the underside of the arm of the Carriage Stop Bracket (12). On this bracket (12) are mounted the Line Lock Lever (4) and the Bell Ringer Arm (3). This complete assembly is mounted on the Carriage Frame Support (19) by the Fulcrum Screws (17) and is held in an engaging position by the Carriage Stop Bracket Spring (11-s). With the upward pressure of the Margin Release Arm (14) Plate II on the arm of the Carriage Stop Frame (12) the rear of this assembly tips downward disengaging the Line Lock Lever (4) and the Carriage Stop (11) from the right hand Margin Stop (2). The Line Lock Bell Crank Spring (8-s) at this time pulls the Line Lock Mechanism back to normal position which will again permit the operation of the keys.

A final Carriage Stop and Line Lock is provided but is not indicated in the drawing. This stop is a stud on the underside of the Carriage Rack (21) at a point where the drawing (Plate II) of this part (21) is cut away to show the Carriage Roll Truck (30).
When moving the carriage to the extreme left this stud engages the Line Lock Lever (4) at a point just in front of the Limit Screw (20). The contact of these two members, and the movement of the carriage causes the final line lock.

Adjustment

Refer to Plate II. The Line Lock (4), Bell Ringer (3) and Carriage Stop Mechanism (11) is mounted as an assembled unit on the Carriage Frame Support (19) by the Carriage Stop Bracket Fulcrum Screws (17) and is held in position to engage the Margin Stops by the Carriage Stop Bracket Spring (11-s). The height of this assembled unit should be such that the bottom of the post on the right hand Margin Stop (2) will be about 1/16 of an inch below the underside of the Line Lock Lever (4) when it engages that part. The Carriage Stop (11) should safely engage both the right and left hand Margin Stops. Adjustment for the height of the Stop Bracket is obtained by jacking (bending) the Release Arm of the Carriage Stop Bracket (12) up or down at a point to the rear of the Carriage Stop Bracket Stop Screw (22). If, after adjusting the Carriage Stop to the correct height, it is found that the Line Lock Lever (4) is either too high or too low, adjust by jacking the lever in the required direction at a point to the rear of the limit screw (20). The position of the Bell Ringer Arm (3) is adjusted in a like manner. Be sure that in making any of these adjustments no bind has been effected. The Arm (3) and the Lever (4) should move back and forth freely. See that the Line Lock Release Arm (14) is not touching the Arm (12) when adjusting the height of the Stop Bracket Assembly. Final Stop. The Lip (23) of the Line Lock Lever (4) should engage the stud (not indicated, see machine) on the underside of the Carriage Rack (21). This Lip should be adjusted deep enough to engage the stud mentioned when the carriage is released and not so deep that it will not clear the Carriage Rack (21) in all positions. Adjustment is made by bending the Lip (23).

After checking the above adjustments see that all connections are properly made and that all moving parts are operating freely. With the right hand Margin Stop (2), set at 50 on the Margin Stop Rack (1) make a test of the Bell Ringer and the Line Lock. By operating one of the keys space the carriage down until the bell rings. This should occur six spaces before the Line Lock locks the keylever. This means that after the Bell Ringer (3) has tripped off it should be possible to type six spaces and have the keyboard locked on the seventh. For the present assume that the Bell Ringer is properly adjusted, and instead of locking the keyboard, as specified above, the keys are locked one space too soon. This indicates that the adjustment of the Line Lock Adjustable Connecting Wire (5) is too short, or it may be that there is no locking of the keyboard after the sixth space, which is an opposite condition, the adjustment of the wire (5) being too long. Correct adjustment can be made by adjusting the location of the Line Lock Pull.
Wire Adjusting Sleeve (6) and the Lock Nut (7) on the Line Lock Adjustable Connecting Wire (5). If the Line Lock is too soon lengthen the wire by adjusting the Sleeve (6). If too late, or no lock, shorten. After adjustment see that the Nut (7) is locked.

Parallel of the Line Lock Swing Bar (10) Plate I. In testing the Line Lock, it may be found that on one side of the keyboard the keys will be locked, and on the other side there will be no lock. This is because the Line Lock Swing Bar (10) is not parallel with the Hooks (18-a) on the key levers (18). If, for example, the keys are locking properly on the right side, and not on the left, it will be necessary to jack the left arm of the Line Lock Swing Bar (10) toward the rear of the machine. To do this, hold the upper side of the arm firmly with a pair of pliers, and with a bending tool, below the angle of the arm, through which the Stud (10-s) extends, bend the lower side toward the rear of the machine.

Line Lock Release

Adjustment of the Line Lock Release is comparatively simple, the main points of adjustment being on the Margin Release Arm (14) Plate II. Note at the end of the Arm (12) that there is an angular bend of about twenty-five degrees. This is provided so that there will be the same movement of release in both upper and lower case. (Do not bend at this point.) This arm should not touch the Line Lock Release Arm (14) Plate II when in rest position. There should be clearance in both upper and lower cases. In testing out the Line Lock Release, make the test in upper and lower case at the time, watching the Carriage Stop Assembly (11) Plate II to determine whether there is any up and down movement of this unit. If there is any downward movement of the Carriage Stop (11) when shifting to the upper case, the tip end of the Release Arm (14) should be lowered. Be sure after adjusting that there is sufficient movement to effect a release, if not, bend upward on the Margin Release Lever (14).
RIBBON COVER

Movement

On Plate III (Fig. I) is shown the Ribbon Cover Mechanism, also a Key Lever Unit. The movement of the parts which make up this mechanism is as follows:

When the Key-Lever (18) is depressed the angular heel (26) on the lever comes in contact with the Universal Bar (24) and carries the front of the Universal Bar downward. With the pivoting action of the Universal Bar at (27) where the Universal Bar pivots in the Shift Frames (42-L & R). This downward movement changes to upward at the rear. At the right of the center of the Universal Bar (24) is mounted the Ribbon Cover Operating Arm (28). This Arm (28) moves upward with the rear of the Universal Bar and raises the Ribbon Color Shift Rod (33) (see Fig. II Plate III) which runs through the forked arms (29-a and 29-b) of the Ribbon Carrier Driving Lever (29). The Ribbon Carrier Driving Lever (29) is assembled to the Ribbon Driving Lever Bracket (32) by the Ribbon Driving Lever Fulcrum Pin (31) and fulcrums on this pin when being raised with the Ribbon Color Shift Rod (33). This fulcrum movement of the Ribbon Carrier Driving Lever (29) raises the Ribbon Carrier (35) through the Ribbon Carrier Link (34), the Ribbon Carrier being shaped so as to slide up and down the Type Guide.

The amount of travel of the Ribbon Carrier is determined by the lateral position of the Ribbon Color Shift Rod (33) and the position of this rod is governed by the Ribbon Color Shift Lever (37). In the drawing (Fig. I) this lever is shown as set in black position (to write on the upper half of the ribbon). By shifting the lever (37) to red position the lower end will pull the Ribbon Shift Pull Wire (36) forward and the Ribbon Color Shift Bell Crank (39) will move the Shift Rod (33) to the right. There is an offset in this rod (33) at a point between the arms of the Ribbon Carrier Driving Lever (29), and with the Shift Lever (37) in red position, the Ribbon Cover Operating Arm (28) will be operating on the offset to the rear of the machine. This is at a point out toward the end of the arm (28) at which point there is more movement which must necessarily raise the ribbon higher.

Adjustment

The adjustments necessary to obtain the correct amount of movement when the Color Shift Lever (37) is in black or red position is explained in the following paragraphs.

The correct amount of "Lead" must first be established in the Key Levers (18) before the movement of the Universal Bar (24) is started. Test the machine by locking the carriage in the upward case and slowly depressing the keys in the lower bank. While going through this operation watch the Ribbon Carrier (35) and determine how far the type bar has raised off the rest before
The carrier (35) starts to move. The amount of raise of the bar before the carrier starts to move is called "Lead" and this lead should be about one inch. Use the lower bank of keys in making the test as the lead on each bank varies and increases with each succeeding bank, the upper bank having the greatest amount. Adjustment to establish the correct amount of lead is provided in the Universal Bar Stop Lugs (41-L & R) located on the Shift Frames (42-L & R) under the rear arms of the Universal Bar (24). If there is too much lead lower the Stop Lugs, if too little raise them. This adjustment is made with the bending tools S.T. 899. Be sure that the Universal Bar is touching both lugs (41-L & 41-R) when at rest position.

After checking the lead of the machine the next step is to adjust the height of the Ribbon Carrier (35). The height of the carrier is correct when the upper edge of the ribbon is about 1/32 of an inch below a line of underscores. Adjust the height of the carrier by jacking the Operating Arm (28) up or down at a point (28-a) as close as possible to the Universal Bar Frame. If the carrier is too low raise the arm at this point, if too high lower. Do this adjusting with the carriage locked in the upper case. Be sure the Ribbon Carrier Driving Lever (29) is not resting on the segment which may give a false impression as to the height of the carrier. Now try the mechanism for "flicker", by shifting the lever (37) from black to red position. Notice the Ribbon Carrier (35) at the time. If the carrier drops when shifting to black, or raises when shifting to red, it indicates that there is more pressure of the Operating Arm (28) on the Ribbon Color Shift Rod (33) in red position than in black. By jacking downward on the Operating Arm (28) at point (28-b), the flicker can be removed. It may be that the opposite movement of the carrier (35) is noted. That is, the carrier drops when shifting to red or raises when shifting to black. In this case jack upward on the Operating Arm (28-b).

It is possible after removing the flicker in the Carrier that the height of the Carrier (35) has been changed. To correct this condition bend the heel of the Ribbon Carrier Driving Lever at point 29-a. Bending the lever to the rear raises the Carrier and bending it to the front lowers it. After making this adjustment again try for flicker. If flicker is again noticed in the Carrier (35), bend the Operating Arm (28) as previously instructed. When the upper part of the ribbon (black) is set to cover, move the lever (37) up into red position and try for cover, using such characters as the underscore and diagonal. If it is found that the lower portion of the ribbon (red) is not properly set, bend the extreme end of the Operating Lever (28-b) upward to raise the ribbon and downward to lower it. While making this bending operation hold the Operating Lever at point 28-b with a bending tool. This will prevent Operating Lever (28) from being bent out of black position. After the ribbon has been set to cover on both cases, set the black and red stops (28-a and b). Do not lower these stops so far that it will cause a "bumper" feeling in the key action. Set the lever (37) in black position and strike off all regular characters and note if they all cover correctly. If it is found that the ribbon is throwing too high or not high enough on an individual character, jack the Universal Bar Lug (25) upward to raise the ribbon and bend it downward to lower it.
See that the Ribbon Color Shift Rod (33) moves freely in the fork of the Bell Crank (29). See that the forked arm (29-b) of the Driving Lever (29) does not strike the keylever when operating the ribbon. Do not bend the Ribbon Color Shift Rod (33). Bend the Operating Arm (28) only at the points designated. Test the adjustments in the order given.

Type Action Plate III

The Keylever (1), when depressed, fulcrums on the Keylever fulcrum wire (7) through the Connecting Wire (2) pulls down on the Operating Arm (3). This arm fulcrums on the wire (4) and acts as a driver for the movement of the typebar (5), the connection being a geared tooth construction at the end of the Operating Arm (3), which meshes with a like gear on the Typebar (5). Tension for the type action is supplied by the Operating Arm Spring (8).

There are several items in connection with this action which are worth noting, first of which is freedom of movement. Under this heading, see that the keylever is free in the comb, is not twisted or bowed. If the keylever is to be replaced see that it corresponds to the one removed as the keylever connection hole is punched in a different position on each keylever. There are several shapes used in the connection links (2). See that these links have the proper angle of bend and are entered into the keylever from the proper side. Make special note of these when removing. Typebars and operating arms are numbered. When replacing either check the number on the bar or arm against the one removed.

Change of Type - Alignment

Use the type soldering fixture when changing type. In order to gauge the position of the type to be changed adjust the fixture to the angle and position of a bar next to the one to be changed. Before soldering on the new type see that the end of the bar is well tinned and clean. Apply soldering flux to the end of the typebar and in the slot of the type. Do not apply solder until the bar and type are hot enough to melt the solder. By using care in the above it is possible to change a type and have it show fair alignment.

It requires practice more than theory to become expert in aligning. Some of the following suggestions may be of assistance. Before attempting to align a machine it is necessary that the carriage, motion and parallel be adjusted, explanation of this is covered in the text of Shift Mechanism Group. Use this as a reference.

Next see that the type guide (6) is central. Strike alternately the small letters "q" and "p", and some of the other characters on each side of the keyboard. Printing should be in alignment. But should the characters printed from the right side of the segment be high, and those on the left be low, it indicates that the type guide is not central. In the case mentioned the guide (6) is set too far to the right. If the characters on the left side of the segment are high, and those
on the right low, the guide (6) is set too far to the left. Type guides are properly set and pinned at the factory. It is only in cases where the guide is changed that the above condition arises. If characters on the right side of the segment are high in alignment, and those on the left low, drift the guide to the left. If the opposite case exists drift the guide (6) to the right.

To align individual characters for up or down position use the nine prong pliers made for slotted segment type bars. The amount of adjustment obtained is limited, and in case the type is too far above, or too far below the line, it is advisable to resolder the type.

If the individual characters are out of line side spacing, use the type offsetting pliers to offset the type, either to the right or to the left, whichever necessary. See that all bars enter the type guide freely. Those on the right side of the segment should favor the right side of the guide, and those on the left side should favor the left.

In case some of the characters are off feet (print light on one side and heavy on the other), use the type twisting wrenches to correct this condition. With one wrench forked over the type-bar just below the type, with the type faced down toward the platen, use the other wrench on the type twisting it downward on the side which is printing light.
SHIFT MECHANISM AND MOTION

Movement

Refer to Plate IV and to machine. This drawing shows the Shift Mechanism at rest in normal or lower case position. When either of the shift keys (1-L or 1-R) is depressed a contact is made by the shift key lever with the roll (6) on the arm of the Center Shift Rock Shaft (5) forcing that arm downward. The Center Shift Rock Shaft (5) pivots in the side frames at the points (5-a) and through the Link (7) connection at point (7-a) of the Ribbon Carrier Driving Lever Bracket (8) which is mounted on the underside of the Carriage Support Frame (9). The carriage moves upward and to the rear at an angle of 25 degrees until the lugs on the Shift Frames (10-L & 10-R) limit on the upper case Motion Stops (13). When the shift key (1-L or 1-R) is released the entire mechanism returns to normal (lower case) through the weight of the carriage.

Adjustment

The carriage and Shift Frame are assembled as a unit before being mounted in the machine and as the drawing (Plate IV) does not show the detail of this it will be necessary to refer to the machine. With the machine in position to show the underside attention is called to the Shift Rock Shaft, which runs across the underside of the Carriage Support Frame (9) and is mounted to the Carriage Support Frame (9) by pins through the arm of the Shift Rock Shaft. This assembled unit is allowed to fulcrum in the frame of the machine on the tapered shouldered screws at each end of the Shift Rock Shaft. These screws are adjustable, being used to insure a free operating shift and to eliminate end play in the Carriage Support Frame. Adjustment is made by running the tapered shouldered screws in to take out end play and by backing them out to eliminate bind. The set screws in the rear of the ends of the Rock Shaft are to lock the tapered shouldered screws in position after the correct adjustment has been made. Notice another cross member in line with the Shift Rock Shaft. This is the Frame Spacing Shaft and its purpose is to provide support to the frame and clearance for the Shift Rock Shaft between the frame sides of the machine. Adjustment is provided for by the Adjusting Nut at the left end of the Spacing Shaft.

The Shift Frame is also supported on each side, at the front, by links which are mounted on the side frames of the machine. The upper end of these fit over the Pivot Studs (11) on the Shift Frame (10-L & 10-R), as shown in Plate IV. These together with the Shift Balance Shaft form the four-point support of parallel motion for the shift mechanism.

Motion Adjustments

It is first necessary to establish the normal or lower case position of the carriage. With the carriage in lower case operate some of the keys, particularly those long characters like h, g, j, k, l, / and the numerals. Notice whether or not the printing is even. It may be light on the bottom, in this case it will
be necessary to lower the carriage or have it come to rest closer to the front of the machine. To do this loosen the lower case Motion Stop (12) Mounting Screws (15 & 15-a) so that they are about friction tight and with a wrench turn the eccentrics (14) so that the high point moves the stop (12) towards the front of the machine. Do this on both sides of the Shift Frame, making sure that the stops are adjusted so as to touch both lugs evenly. After adjustment make another test again printing the long characters. It may be that the printing now shows light on top. If so, reverse the adjustment just described and turn the eccentric (14) so that the high point moves the stop (12) toward the rear of the machine. This will raise, or move, the carriage towards the rear, which is necessary when the printing is light on top. After the correct normal position of the carriage is obtained, check the adjustment of the Motion Stops (12) to determine whether or not the lugs on the Shift Frame (10-L & 10-R) are at rest on both stops. If not adjust the stop that is not touching.

Parallel

It is possible in making the above test that it will be found the printing may be even on one side of the carriage and off feet on the other. In such a case it is necessary to parallel the carriage. For example, say that the printing is correct on the left and is light on the bottom on the right hand side of the carriage. On machines manufactured since 1929 adjustment for correcting this condition has been provided for. This is done with the eccentric adjusting screw on the Carriage Heads. (See machine). This screw is located in the underside of the carriage between the Carriage Head Mounting Screws. To correct the above fault loosen the Mounting Screws in the right carriage head and turn the eccentric so that the carriage head moves forward toward the front of the machine. Tighten the Mounting Screws and test the printing. If the printing now appears light on top reverse the adjustment. It is possible to adjust the parallel on either side of the carriage. There are adjusting eccentrics in both carriage heads.

In some cases it is necessary to adjust the Shift Frame (10-L & 10-R). This is done by loosening the Shift Frame Mounting Screws (16 & 17) and setting the carriage forward or backward, as required. Light on the bottom, move forward. Light on the top, move to the rear. This adjustment is seldom required, unless the screws (16 & 17) have been disturbed, as this assembly was originally set to gauge at the factory.

After the lower case position and parallel adjustments of the carriage have been made or checked, the motion of the machine is ready to be adjusted. Alternately strike the upper and lower case NnNn several times. If the capital "N" is above the line of the small "n", it is an indication that there is not enough backward movement to the carriage. To adjust, loosen the Mounting Screw (friction tight), for the upper case motion stops (13) and turn the eccentrics (14) so that the high point moves the stop (13) to the rear. If the capital "N" is below the line of
the small "n", turn the eccentrics (14) so that the high point moves the stop (13) toward the front of the machine. When the correct distance has been set, see that both motion stops (13) are touching the lugs on the Shift Frame in the upper case. Tighten the Mounting Screws (15 & 15-a).

Shift Lock

After the motion has been correctly set try the Shift Lock (2). Alternately strike the capital and small "n" by locking and releasing the Shift Lock Key (2). If the capital letter is above the line of the small letter, lower the Shift Lock Plate (4) until both are in line. If the operation of the lock is too stiff, raise the Shift Lock Plate (4).

After making any of the above adjustments see that all screws effected are made tight.
RIBBON FEED MECHANISM

Movement

Refer to Plate V. With the downward movement of the Universal Bar under pressure of the keylever (1), the Ribbon Feed Driving Arm (3) moves upward. Forked over the pin on the Ribbon Driving Arm (3) is the Ribbon Feeding Ratchet (4) on which is mounted the Ribbon Driving Pawl (5), this Pawl engages and turns the Driving Ratchet (6) the mounting of which is held fast on the Ribbon Feed Shaft (2) by the Screw (8). Mounted on the Shaft (2) are the Ribbon Feed Gears (9-L & 9-R). The drawing shows the Ribbon Feed Gear (9-R) in mesh with the Ribbon Spool Gear (10-R). This position is fixed by the detent (12) shown in Fig. 3. Through this gearing the ribbon is wound on the right hand ribbon spool. When the keylever (1) is released the ribbon driving mechanism returns to rest position, but the Ribbon Feed Ratchet (6) is held in position by the Ratchet Retaining Pawl (7) which prevents the ribbon from winding in the reverse direction. With continued operation of the machine, the ribbon winds on the right hand spool until the reversing pin on the Ribbon Reverse Bracket (15-L) engages the Ribbon Reverse Cam (16-L) and causes the Ribbon Feed Shaft (2) to shift to the left, and the Ribbon Feed Gear (9-L) to engage with the Ribbon Spool Gear (10-L) thereby reversing the ribbon feed and causing it to wind on the left hand spool.

Adjustment

The right and left shift positions of the Ribbon Feed Shaft (2) are controlled by the detent (12) and Spring (13), shown in Fig. 3. The only adjustment required on this detent is to see that it is complete and has the proper tension on the Spring (13) to insure positive action. The location of the Ribbon Driving Ratchet (6) on the Ribbon Feed Shaft (2) can be obtained by shifting the Shaft from right to left to make sure that the Ratchet is safely under the Ratchet Retaining Pawl (7) in both positions. If too far one way or another, loosen the Screw (8) and shift the Ratchet Mounting in the required direction. There is a flat on the Ribbon Feed Shaft (2) at this point. Make sure that the Set Screw (8) is seated in it.

See that the Ribbon Feed Gears (9-L & 9-R) mesh properly with the Ribbon Spool Gears (10-L & 10-R) by shifting the Shaft right and left. When set correctly both spools can be turned by hand when holding Ribbon Driving Shaft on center of Detent Cam. A flat in the Ribbon Feed Shaft (2) is provided at these points also. See that the Set Screw is seated on the flat. The action of the Ribbon Reversing Levers (15-L & 15-R) is that of a follow-up lever. These levers under a light spring tension are in contact with the ribbon on the spool, and as the ribbon travels from one spool to the other, the lever pivots on the upright Shaft (17) carrying the reverse pin (18) closer to the Ribbon Feed Shaft (2). When there is about six inches of ribbon left on either spool the Ribbon Reversing Pin (18) of that spool should be close enough to the Ribbon Feed Shaft (2) to engage the Reversing Cam (16-L or 16-R) and effect a shift in the Ribbon Feed Shaft (2).
It is possible to adjust the Ribbon Reverse Brackets without a ribbon on the machine. Shift the Ribbon Feed Shaft (2) to the right and make note of the location of the Reversing Pin (18) to the Ribbon Feed Shaft (2) and the Ribbon Reverse Cam (16-R). Swing the Follow Lever (15) away from the Spool Shaft (11) and notice whether or not the Reversing Pin (18) swings clear of the high point on the Reverse Cam (16-R). If the Pin does not clear this point it is necessary to move the Ribbon Reverse Bracket (14-R) away from it. Do this by loosening the Bracket Mounting Screws and moving the Bracket in towards the center of the machine. Do not move the Bracket too far as this will effect the reverse, enough to clear the high point of the Cam (16-R) is sufficient.

Now allow the Follow Lever (15-R) to swing back to the Ribbon Spool Shaft (11). The Follow Lever should be touching the Shaft (11) and the point of the Reverse Pin (18) should be about 1/64 of an inch from the Ribbon Feed Shaft (2). If the Reverse Pin is touching the Ribbon Feed Shaft (2) bend the Follow Lever (15-R) toward the rear of the machine until the proper distance between the Reverse Pin and the Ribbon Feed Shaft is established. If the Reverse Pin (18) is too far from the Feed Shaft bend the Follow Lever (15-R) toward the front of the machine. These adjustments apply to both right and left Reverse Brackets. Make sure after adjusting the location of the Bracket that the Ribbon Shaft lines up and shifts freely from right to left. The adjustments described will give a very good basis to work on. With a ribbon on the machine, it may be necessary to bend the Follow Levers (15-L or 15-R) for a more close adjustment. If the reverse is not soon enough, bend the Lever (15-L or 15-R) toward the front of the machine. If too soon bend them toward the rear.

To change the Ribbon Spool Gears (10-L or 10-R) Fig. 4, unscrew the ribbon Spool Shaft (11) and remove the gear.
The drawings on Plate VI illustrate the parts of the Escapement Group. In describing the movements of the parts which effect the escapement of the machine, start by depressing the Keylever (18). After a short lead, the heel (28) on the Keylever (18) forces the front of the Universal Bar (24) downward. The Universal Bar (24) pivots at the points (27) in the Shift Frames (42-L & R), causing the Universal Bar Operating Arm (43), which is mounted on the Universal Bar, to move upward, and the Adjusting Screw (49) in the Universal Bar Operating Arm (48), to engage with the lip of the escapement Operating Arm (46). The Escapement Operating Arm (46) now moves upward. This Operating Arm, which is a part of the Dog Rocker assembly, is held in position in the Escapement Bracket (43) by the Escapement Bearing Screws (44-L & R), and through a pivoting action on the screws (44-L & R), the movement of the Escapement body is downward at the rear.

Before this movement takes place, the Stepping Dog (not shown in the drawing, see machine) is engaging a tooth of the Carriage Rack (52), and with the downward movement of the Escapement body, the Stepping Dog passes through the teeth of the Carriage Rack (52) and steps ahead to engage the incoming tooth of the rack, at which time the Escapement Fixed Dog (45) engages the outgoing tooth. The downward movement of the Escapement body is now complete. When the Keylever is released the Escapement body returns to normal position under pressure of the spring (47). The Fixed Dog (45) at this time disengages the outgoing tooth of the Carriage Rack (52) and the Stepping Dog engaging the incoming tooth completes the escapement allowing the carriage to move one space to the left.

**Adjustment**

First check the adjustment of the Carriage Rack (52). This Rack should be parallel. In order to determine whether or not it is parallel try the escapement at both ends of the carriage. With the carriage at the left hand margin carry one of the type bars to the platen by hand, and notice at what point the escapement trip occurs. For example, say that the trip occurs when the type bar is about one inch from the platen. Now move the carriage toward the right hand margin and make another test of the escapement position by carrying the SAME type bar to the platen. At this point the trip occurs when the type bar is about an inch and a quarter from the platen. This indicates that the Carriage Rack (52) is not parallel. Notice in Fig. 2, which shows the rear of the carriage, the Carriage Rack Mounting Screw (55), and the block to which the Carriage Rack is mounted. See large drawing Fig. 3. By loosening the Screw (55) it is possible to raise or lower the Carriage Rack on the left hand margin side creating the level from this point. To correct the above fault, which is an indication that the Carriage Rack is high on the left hand side, loosen the Screw (55) and lower the Rack (52) until the escapement position is the same at both sides of the carriage. Adjustment can only be made on the left hand
margin end of the Carriage Rack so in case the escapement is farther away on this side it will be necessary to raise the Carriage Rack at that point.

The depth of mesh of the teeth of the Carriage Rack (52) with the Escapement Dog should be the same on both sides. Adjustment for obtaining the same depth at both ends is provided for in the Adjusting Lugs (56-L & R). The Escapement Stepping Dog should engage the tooth of the Rack for about two thirds of its depth. If the mesh is not sufficient, bend these Lugs (56-L & R) to the rear. If too deep, bend forward. If the mesh on one side of the Rack (52) is correct and the other side shallow, bend the Lug on the shallow side to the rear. If too deep on one side bend the Lug on that side forward. If the bending of the lugs does not set the Rack as mentioned above, spring the Rack to the rear on the side that is too deep and to the front on the side that is not deep enough. This will parallel the Rack. After making this adjustment, see that both stops (56-L & R) are set.

The accuracy of the left hand margin is dependent on the lateral position of the Escapement body and Dogs. The Margin Stop Rack (1) and the Carriage Rack (52) are not adjustable endwise so, in order to obtain a correct margin adjustment, it is necessary to adjust the position of the Escapement Body. If there is too much play at the left hand margin, that is, the carriage sometimes goes beyond the margin set for, it will be necessary to move the Escapement Body to the right. If, in the opposite case, instead of going beyond the stop set for, the carriage does not come up to the stop, adjustment is made by moving the Dog Rocker or Escapement Body to the left. After making proper adjustments see that the Pivot Screw (44-L & R) Lock Nuts are tight.

After the above adjustments have been made, check the Escapement of the Type Bars. The point of escapement, or trip, should be about three quarters of an inch to one inch from the platen when the type bars are moved to the platen by hand. The Universal adjustment for this is with the Screw (49). If the escapement trip is too close to the platen turn in on this Screw (49). If too far away back out on the Screw. After adjustment see that the Locking Nut is set. Try the escapement on all of the type bars when making the above test. It may be found that some escape farther away than others. Individual adjustment can be made by raising or lowering the Lugs (25) on the Universal Bar. If the escapement is farther away on a few individual keys, lower the Lugs (25) under the respective key-levers. If too close, raise the Lugs. The trip on the Space Bar is adjusted by jacking the Space Bar Operating Arm (51). The trip should occur just before the Space Bar touches the Space Bar Down Stops. If there is no escapement, jack upward on the Space Bar Operating Arm (51). If the trip is too high, or too soon, jack downward on the Arm.

Some of the causes for piling are: Escapement trip too far away, escapement body stop set too high and lack of freedom in the movement of the parts. If the Carriage Rack is not set deep enough the machine is liable to skip.
PORTABLE CARRIAGE

Refer to Plate VII. Paper Feed Group - Fig. 1

The Hinge Plates (1-L & 1-R), which are mounted on the Carriage Frame by three screws in each Plate, serve to support the Feed Roll Frame Front (4) and the Feed Roll Frame Rear (5) by means of shafts on which the Feed Roll Frames (4 & 5) hinge. Tension on the Feed Rolls (2 & 3), front and rear, is supplied by the Feed Roll Pressure Spring in the Container (7). This Container Block is mounted to the Carriage Frame by screws through the underside of that member. The tension supplied may be considered as fixed when the Container (7) is securely mounted to the Carriage Frame. The Rear Feed Roll Brackets are mounted on the Feed Roll Frame (5) so as to provide a balanced pressure of the Rolls (3). By bending the ears of the bracket, through which the Feed Roll Shaft runs, it is possible to effect an even pressure of the rolls as well as the proper alignment of the Feed Roll on the platen. If the rolls are not in line when they are pressing against the Platen it is an indication of uneven pressure, the low side having more pressure than the higher. Test the pressure with a narrow strip of paper. If the pressure on the roll which is low is excessive, release it by bending the ears (6), supporting the shaft on that side, to the rear. If correct, increase the pressure on the high side by bending the ears (6), on that side, toward the front of the machine.

Pressure adjustment on the Front Feed Rolls (2) is also accomplished by bending the ears of the support brackets through which the Feed Roll Shaft (12) runs. There is no balancing action to the Front Feed Roll Frame (4).

In the paper feed mechanism it is important that the Pressure Rolls (2 & 3) revolve freely on the Feed Roll Shaft. See that this condition exists, and that the bearings are oiled, and the rolls are clean.

The amount of release movement of the feed rolls when released with lever (8) is controlled through the setting of Container Block (7). The holes in the Carriage Frame are elongated, which allows a backward and forward adjustable movement of the Container Block. If the feed rolls do not open far enough, loosen the two screws that are located on the underside of the Carriage Frame and move the Container Block (7) to the rear. Tighten screws securely after making this setting.

The Deflector (9) is supported, and hinges on the Feed Roll Frame Shafts. The shafts run through the arms (9-a) on the underside of the Deflector (9). Tension is supplied by the Flat Spring (11). The square shaped hooks (10) which hook over the Front Feed Roll Shafts (12) form a connection which lowers the front of the Deflector when the feed rolls are released. Cases are rare where it is necessary to increase or decrease the release of the Deflector. If the case does arise adjustment can be made by shaping the hooks (10).
Line Space

Adjustment of the line spacing mechanism is quite simple. First see that the detent (16) is operating on the Cylinder Ratchet (13). Bring the Line Space Lever (14) forward until the Line Space Pawl (15) limits the movement by coming in contact with the Left Carriage End at point (18). By holding the lever (14) forward keep the Pawl (15) in this position. Notice now whether or not the Cylinder Detent Roll (16) is seated between the teeth of the Cylinder Ratchet (13). If not, loosen the Mounting Screws (16-a) and raise or lower the detent (16) to a point where it properly seats itself. Then set the screws (16-a). Other than this the line space mechanism is purely a replacement and assembling job.

No adjustment is required on the Cylinder (19) other than the adjustment of the Carriage Ends. This adjustment has been explained in the text covering the Shift Mechanism. See "Parallel".

Carriage Scale

The Carriage Scale (20), Paper Fingers (23) and Rail are mounted on the carriage by the Pivot Screws (22), and are held against the cylinder under tension by a coil spring over the pivot (22) at the right end of the carriage. The Paper Fingers should conform to the curve of the cylinder and can be made to do so by shaping with a pair of pliers.

The horizontal position of the Carriage Scale (20) should be adjusted so as to parallel the underside of a line of writing two spaces below the writing line. The lateral position should check with the setting of the margin stop. That is, when the left hand margin stop is set, say at 10, the pointer should indicate 10 on the carriage scale when the carriage is at the left margin. It is also necessary that the graduation marks on the scale (20) be directly under the center of each letter.

It is possible to shift the scale (20) to the correct position by loosening the two screws (21). First set the lateral position, then line the scale horizontally with the underside of a line of small "n's" at each end of the cylinder, turn the cylinder back two spaces from the writing line when making this adjustment. After adjustment is made tighten the screws (21).
The Back Spacer Key (3) when depressed fulcrums on the Keylever fulcrum wire and the movement is carried through to the Back Space Keylever Bell Crank (5) by the connection (4). Through the cranking motion of the Crank (5), and the Connecting Wire (6), the Bell Crank (7), pivoting on the Mounting Screw (8), draws the Back Spacer Pawl Connecting Wire (9) to the right of the machine. At the beginning of this movement the Back Spacer Pawl (11) is raised and engages a tooth in the Rack (10), and with the continued movement the Pawl (11) moves the carriage to the right until the tooth of the Carriage Rack passes over the Escapement Dog, at which time the Escapement Dog engages the succeeding tooth. This completes one back space movement of the carriage.

Adjustment

First assume that margin adjustment has been properly made and that the lateral position of the Escapement Rocker is correct. The next step is to check the entry of the Back Spacer Pawl (11) into the Rack (10). The Back Spacer Pawl (11) should enter the Rack (10) about midway between the two teeth above it. The location of this Pawl can be accomplished by shifting the bracket (12) to the right or left as required. This bracket (12) has its mounting on the underside of the Carriage Support Frame (13), and it is possible to shift the bracket after the Mounting Screws have been loosened. When the Back Space Keylever (3) is in normal position the Back Spacer Pawl (11) should be disengaged and clear the rack (10). If not, it is possible or quite likely, that the Back Space Pawl Connecting Wire is too short. Disconnect this wire and see that the Pawl drops clear of the Rack. If it does not, it is apparent that the Pawl (11) is set too high or there is a bind in the movement of the Pawl. If the Pawl is set too high, bend downward on the Back Space Operating Arm at the point marked (14) on the illustration. When properly set, the Pawl should be about 1/32" below the Escapement Rack (10). After making this adjustment see that Pawl (11) is free in its bearings and drops of its own weight. If Pawl (11) is too low, bend upward on the Operating Arm at the point (14). After the Pawl has been set to proper height adjust the Connection Wire (9) so that it does not raise the Pawl (11) when it is hooked up to its bell crank (7). It may be after this adjustment that the Back Space is not positive, that it will space sometimes and sometimes it will fail. This is an indication that the wire is too long.

If on a quick stroke of the Back Space Key the mechanism fails to back space the carriage, look at the location of the back space pawl (11). It is probably striking on top of a tooth of the rack (10) and skidding over. Adjust as previously explained.
Another cause of back space failure is that the Back Space Keylever Stop may be set too high. This stop is mounted in back of the comb to the right of the back space key and can be adjusted by loosening the mounting screws and setting the stop. Adjustment of this Stop is made after all other back space adjustments are correct.