1. Cover Plates may be removed and replaced in the following manner:

   A. COWL (Mask or Typebar Cover):
      (1) Remove two (2) Typebar Cover Hinge Binding Screws from each hinge (located behind Typebar Cover in rear of ribbon spool).
      (2) Raise the front edge of Cover upward, the rear of cover may be raised and the Typebar Cover Arms, right and left may be removed by spreading out through their slots in the Cover.

   B. REAR NAME PLATE:
      (1) Remove four (4) Rear Name Plate Binding Screws (2 on each end binding Name Plate and Base Mask to rear frame corners). Spread rear end of Base Mask on either side sufficiently to free Rear Name Plate from under turned end of Base Mask, sliding out Plate from opposite side as it is removed from machine.

   C. BASE MASK:
      (1) Remove 4 Base Mask Chrome Band Binding Screws. Remove Band.
      (2) Remove two (2) Touch Control Slide Retaining Screws and remove Slide top rail which is thereby freed.
      (3) Remove two (2) Base Mask Lower Binding Screws located just to the rear of the two front feet.
      (4) Move Ribbon Reverse Lever to right in position of open top slot in Mask.
      (5) Move Touch Control Lever to center in position of open top slot in Mask.
      (6) Move Ribbon Bichrome Lever to center in position of open top Slot in Mask.
      (7) Center Carriage and spread rear ends of Base Mask outward and draw upward as the mask is moved forward thereby maneuvering Mask Front Plate out of position behind top row of Keys as Mask Rear is spread to clear ends of centered Carriage and removed from Frame.

   D. ERASURE APRONS:
      (1) Remove Apron Binding Screw (the outer ends of this apron are provided with turned down piece acting as Fulcrum Wire Stop Screw). Remove Apron.

2. TO REPLACE: Reverse above procedure, replacing parts in the same position from which removed (See Drawings).
1. The Royal Carriage rides between two formed steel rails on two front and two rear ball bearings positioned in pinions which are enmesh in teeth perforations (constituting racks) in the Carriage Bedplate and in the front and rear Carriage Rails. With the Carriage centered on the frame (carriage rail ends even with ends of Bedplate rails) the center of the Ball Bearings should be positioned 21 teeth perforations in from each end of the Carriage Bedplate Rail, both front and rear. It is advisable to mark this position on both the front and rear rail (with scriber) to insure return of these bearings to correct position. In this position, with carriage moved to the extreme right or left, there will be six teeth perforations in the lower Bedplate rail from its end to the center of the Ball Bearings, either front or rear.

2. ADJUSTMENTS: Before attempting adjustments, with Drawband disconnected from under right end of Carriage and hooked on formed hook of Carriage Bedplate, determine that Carriage operates smoothly in its rails from end to end, while holding Carriage Release Lever forward (rack released from pinion). With the drawband disconnected any bind in the Mainspring Drum Pivot will not be reflected by the Carriage. Test Carriage for looseness (wobble) in its rails. Pits in the rails (caused by jolt in dropping or shipping) will be indicated by a bump which will be felt in moving the Carriage. Deformed pinions (which do not enter Carriage or Bedplate Rail perforations evenly and smoothly) will produce a grating or grinding feel. By applying pressure against the front and rear rails alternately from both ends of the Carriage, a deformed pinion may be located by friction or drag. Deformed pinions may be straightened and used if accurate, otherwise should be replaced. The Center Stop should be positioned so that it will not bind on the left or right Margin Stop (See Margin Stop and Line Lock for limiting Center Stop properly). It should be determined that the Bedplate Rail "V" is not bent nor deformed before attempting fitting adjustments. These rails must be formed true and parallel in their entire length otherwise a bind or looseness in spots will result.

A. Carriage Fitting Adjustments: The Carriage Bedplate (bottom) Rails are formed of one piece and adjustment is made by forming these rails for fitting adjustment to remove "wobble" or bind. The manufacturer provides a special Tool (E.S. 6, Bottom Rail Bender) which should be used for this purpose. Before attempting adjustments it should be determined that the Platen is parallel (by holding the Carriage forward toward the front rail) by making the Platen Parallel Test as indicated under "Ring and Cylinder". This test will indicate whether the front or rear Bedplate Rail requires adjusting.

(1) Loose Carriage: If there is looseness in Carriage in spot or spots, it would indicate that the Carriage Rail is not true nor parallel with other rail. Locate deformity, correct by use of Bottom Rail Bender.

Loose Carriage generally indicates rails need spreading apart. Spread rails by use of Bottom Rail Bender.

(2) Binding Carriage in spot or spots indicates rail is not true or not parallel with opposite rail. Locate deformity (at point of bind) and correct by use of Bottom Rail Bender.

Binding Carriage generally indicates rails need to be formed inwardly (towards each other). Use Bottom Rail Bender uniformly and cautiously until properly formed.

B. Pitted Rails: Care should be taken in hammering out or filing (or emerying) pits in the Carriage Rails to preserve a parallel surface between the rails. The "cut" either by emerying or filing must be uniform throughout the length of the rail to maintain this parallel.

3. DISASSEMBLE: (To remove Carriage)

A. Disconnect Drawband from under right end of Carriage and attach to Bedplate formed hook.

B. Remove Center Stop Fulcrum Rod Nut.

C. Remove or drive out Center Stop Fulcrum with punch.

D. Remove Center Stop.

E. Remove Carriage Ball Stop Screw from left end of upper rail.

F. Slide Carriage off Bedplate Rails (to right or left) being careful not to lose Ball Bearings and Pinions (two of each in front and rear rails).

4. ASSEMBLE: (To replace Carriage) The manufacturer provides a special tool "Carriage Ball Feeder P.S. 78" for positioning the Ball Bearings and Pinions in the Carriage Rails. Use of this tool will more expeditiously and accurately position the balls and pinions.

A. Place Carriage in Bedplate rails and move to the extreme right. Position Ball bearings and Pinions in Feeder Tool feeding into lower rail from the left until pin on handle contacts end of lower rail. Move Carriage slowly to the left applying a bit of pressure on tool to insure that pinion teeth enter rail teeth perforations. With carriage to extreme left feed Ball bearings and Pinions in Feeder Tool in from the right side until Ball Feeder Tool is up to die mark on handle, then move carriage to the right. Replace Carriage Ball Stop Screw. Replace Drawband to Carriage. Replace Center Stop mechanism.
1. The Mainspring, providing the tension for the movement of the Carriage to the left, is housed in the Mainspring Drum which bears on a formed bracket welded to the Carriage Bedplate, the drum being positioned between the Bedplate Rails on the left end of the Bedplate. It is accessible for adjusting by removing the Rear Name Cover Plate (See Cover Plates).

2. ADJUSTMENTS: The Carriage should be properly fitted in its rails without bind or looseness and must have sufficient Mainspring tension to draw it the length of the Carriage Rails and into Line Lock.

A. Mainspring Tension:
   1. To increase tension: Hold Backspace Key depressed which will permit entry of screwdriver under top frame at left hand rear corner of machine. Turn Tension Adjusting Screw clockwise.
   2. To decrease tension: With machine on its back, work adjusting lever in and out.

3. DISASSEMBLE: (Remove Rear Name Plate).

A. Mainspring Drum:
   1. Relax Mainspring Tension as indicated in Paragraph 2A(2) above.
   2. Holding the Mainspring Adjusting Ratchet stationary with the Adjusting Lever, turn Tension Adjusting Screw counter-clockwise.
   3. Remove Adjusting Ratchet.
   4. Spring Drum may be moved forward from Bracket and removed.

B. Mainspring:
   1. Pry the cover from the Spring Drum.
   2. The Mainspring may be removed, being careful to keep it under control.

C. Drawband: A new Drawband may be attached to Mainspring Drum without removal of the Drum from the machine. Remove the knotted end of the old Drawband located in Drawband Slot of Drum and held in position by the Spring. Insert new Drawband end in Drum slot.
1. The diameter of the Royal Portable Platen is 1.273".

2. ADJUSTMENTS: (See also Variable and Paper Feed).
   
   A. The Royal Portable Platen is constructed like the Standard Royal Platen, instructions contained in Volume 1, Typewriter Mechanical Training Manual, Standards, “Platen” applies.

   1. Fractional Cylinder End teeth should be in good condition and Cylinder End Springs should provide sufficient tension to properly operate the Variable.

3. DISASSEMBLE:

   A. Loosen left Cylinder Knob Set Screws. Loosen Right Platen Set Screws. Grasp the Right Hand Platen Knob with the right hand while holding the platen with the left hand, draw out the Platen Shaft from the right. Platen may be lifted out of carriage.

4. ASSEMBLE:

   A. Replace Platen in Carriage, fitting the Fractional Cylinder End into Ratchet Feed Platen Shaft through right Carriage End Bearing and through Platen. Replace right Platen Set Screws positioning Screws in embossed holes in Platen Shaft. Tighten Left Cylinder Knob Set Screws.

1. The Variable mechanism is provided in the Platen to disengage the Platen from the control of the Ratchet when the typist desires to relocate a line of writing or to write on ruled forms. The Platen is equipped with a Fractional Cylinder End built in the Platen Core with springs located in drilled holes in the wood core which are contacted by the Pins of the Fractional Cylinder End to provide the tension to hold the Fractional Cylinder End outward. This pressure forces the teeth of the Fractional Cylinder End into mesh with the inner teeth of the Ratchet holding the Platen to the movement of the Ratchet. When the Variable Knob is depressed the Line Space Release Rod end is moved into engagement with the Tongue Washer of the Fractional Cylinder End pushing the Cylinder End (to the right) out of engagement with the inner Ratchet Teeth, thereby permitting the Platen to rotate without transmitting this movement to the Ratchet. Release of the Variable Knob permits the Fractional Cylinder End teeth to reengage the inner teeth of the Ratchet locking the Platen to the movement of the Ratchet.

2. ADJUSTMENTS:

   A. Fractional Cylinder End must move in and out of Platen End without binding and with sufficient tension applied by the inbuilt springs to hold the Cylinder End outward for engagement in the Ratchet teeth. If the teeth of the Fractional Cylinder End or the inner Ratchet teeth are not in good condition proper mesh cannot be made and slipping will result. The tongue washer must be in position on the Fractional Cylinder End if the Release Rod of the Left Hand Knob is to operate properly. When the Fractional Cylinder End is worn or defective it is recommended that a new Cylinder (Platen) be installed.

   B. Ratchet: If inner Ratchet teeth are worn, Cylinder End teeth cannot mesh properly and Variable will not function to hold the Platen to the movement of the Ratchet. If worn, the Ratchet should be replaced.
1. The Royal Portable is of the Segment Shift mechanism. As the Shift Key is depressed the Shift Drop Lock Lever (which removes up-down movement from the Segment in non-shift position) is drawn forward out of lower case lock position as the turned-up rear arm of the R.H. Shift Lever, through the connecting link, draws the Shift Arm downward. The rear of the Shift Arms provide a pivot for the Segment Frame Arms and this downward movement of the Shift Arms is transmitted to the Segment which is moved downward placing the type in upper case position (top characters of type to print). The Shift Balance Springs provide the tension for return of the Segment to the lower case position.

The Segment Frame operates on Ball Bearings in the right and left hand Segment Ball Races. Movement of the Segment Frame is arrested by the Motion Adjusting Screws and the On-Feet Adjusting Screws, the Shift Stop Plate of the Segment Frame limiting between these screws, on both right and left ends of the Frame.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that:

- Shift Drop Lock Lever frees Shift Arm properly
- Shift Frame is free on its pivots
- Segment Plate has snug fit, without bind, on its bearings in Race
- Shift Levers are free in front Keylever Comb slots and are not limiting on Keylever up-stop.

Typebar Links are not binding on adjoining links.

A. ON-FEET ADJUSTMENT: On-Feet position is determined by use of the capital letter with Shift key depressed and locked. Adjustment is made with the "on-feet" adjusting Screw after loosening lock nut. These screws are available for adjusting without removing masks. They are located between rear of ribbon spool cups and front of front Bedplate Rail—the inside screws. Turn "On-Feet" Adjusting Screws clockwise to raise capitals; counter-clockwise to lower capitals. Adjustment should be made uniformly on both "On-Feet Adjusting Screws. Check for uniformity by inserting strip of thin paper between each "On-Feet Adjusting Screw and the Stop Plate determining by friction pull that the adjustments are uniform.

B. MOTION ADJUSTMENT: With the "On-Feet" Adjustment properly made as outlined above, the Motion (bringing the small letters into alignment with the capital letters) is made with the "Motion" Adjusting Screws after loosening lock nut. Turn "Motion" Adj. Screws clockwise to lower small letters; counter-clockwise to raise small letters.

C. SHIFT LOCK LATCH: After adjusting "On-Feet" and "Motion", the Shift Lock Latch should be adjusted. This new style Latch is not provided with an eccentric like the older machines. Adjustment is made by forming the Latch Plate.
Latch should be adjusted so that Segment is locked properly (when Shift Lock Key is depressed) and that in such position, capitals line up with capitals when the Shift Key is depressed. Latch should unlock with slight pressure on Shift Key.

D. SHIFT DROP LOCK: (Lower case lock). Test for lost motion (down movement) in the Segment with Shift Keys inactive. The Shift Drop Lock should position directly beneath (about .002" clearance) the Shift Arm Stop. Form Stop to adjust. Position of the Lock Lever is governed by its Stop on Shift Key lever, which may be formed to insure top of lever positioning under Shift Arm Limit.

E. SHIFT BALANCE SPRINGS: Tension of Shift Balance Springs should be uniform and touch of Shift Keys light and responsive. Form Shift Balance Spring Plates upward to increase tension, downward to decrease tension.

F. SHIFT BALL RACE: Shift Ball Race Binding Screws are positioned in adjustable slots in the Ball Race for adjustment purposes to remove end shake.

3. DISASSEMBLE:
A. To remove segment, see "Segment and Typebars".

1. The Carriage Bedplate is attached to the frame by two screws on either end (Ring and Cylinder Adjusting Plate Screws) which are positioned in slots for adjusting the position of the Bedplate. Size of the Royal Portable Platen is 1.273".

2. ADJUSTMENTS:
A. Ring and Cylinder Adjustments: Forward movement of the Platen (to contact a typebar held against the Segment Ring) may be made, after loosening Ring and Cylinder Adjusting Plate Screws, by movement of the Carriage Bedplate forward or rearward in order to bring into contact with a typebar held contacting the Abutment Ring. Tighten Screws when adjustment is made, testing Platen in its entire length to determine that it is parallel. After adjusting, it is necessary to check and readjust "On-Feet" and Motion (See Motion and Shift Mechanism) and Ribbon Vibrator (See Ribbon Bichrome Cover).

B. Platen Parallel: If the Bedplate Rails are bent or deformed they may prevent typebar from contacting platen. Before attempting adjustment it should be determined that Bedplate rails are true and parallel (See Main Carriage). Platen should be checked to determine that it is not eccentric but of uniform size throughout. Adjust Platen Parallel by movement of either end forward or rearward by loosening Ring and Cylinder Adjusting Plate Screws and moving Bedplate forward or rearward as may be necessary.
1. The Paper Feed mechanism of the Royal Portable is positioned beneath (not attached to) the Deflector Pan, which may be removed (after removal of the Platen) by removing two binding screws, one at each end of the Pan. The Rear Feed Roller is of one-piece construction bearing in the Large Feed Roll Arms of the Feed Roll Bracket. The lower ends of the Feed Roll Arms are positioned in Cam flats of the Feed Roll Release Rod as are the rear ends of the Small Feed Roll Arms (Front Feed Roll Bearing). Forward movement of the Paper Feed Release Lever rotates the Feed Roll Release Rod rearward, in which action, the Cam Flat of the Rod moves the lower ends of the Large Feed Roll Arms rearward and the rear ends of the Small Feed Roll Arms upwards, drawing the Feed Rollers out of engagement with the Platen.

2. ADJUSTMENTS: Before attempting adjustments, the bearing ends of the Feed Roller Shafts should be polished (with crokus cloth) and slightly oiled and the surface of the Feed Rollers should be cleansed with alcohol or with a cloth slightly moist with Venetian Lacquer Thinner. The center of the rear feed roller has a slightly larger diameter than the two outer ends compensating for any bend in the Feed Roller Shaft when pressure is applied to the ends of the Shaft, thereby permitting the full surface of the roller to contact the Platen evenly and uniformly. The same situation exists with the front feed rollers, for which reason the assemblies may not be straightened but should show light at the outer ends.

A. Feed Rollers: Feed Roller pressure against the Platen should be uniform on both ends of both front and rear rollers, slightly more tension in the center which is provided for by the slight increase in size of center of rollers.

(1) Rear Feed Roller Pressure: Pressure is supplied by the large Feed Roll Arm Spring attached to the Large Feed Roll Arms, right and left. Replace spring or springs if tension is not uniform.

(2) Front Feed Roller Pressure: Pressure is supplied by the Small Feed Roll Arm Spring attached to each of the Small Feed Roll Arms, right and left. Replace spring or springs if tension is not uniform.
B. **Paper Holder**: The Paper Holder Rolls must apply even tension to the paper and must operate freely on the Roll Rod. Tension is applied to the Roll Rod and Rolls by the Holder Spring and must be uniform and proper and the bearing on the right arm of the holder must roll freely and smoothly on the top of the right carriage end. Bail must operate freely on its fulcrum screws.

**MECHANIC'S NOTES:**
1. With the Platen locked to the movement of the Ratchet as outlined in chapter "Variable" movement of the Platen is controlled by the Line Space Lever or the Platen Knob. Line Space Adjuster position determines whether the spacing of the Platen by the Line Space Lever will be single or double. As the Line Space Lever is moved to the right, the Line Space Link draws the Line Space Pawl Arm rearward, the stud of the Line Space Pawl following the contour of the Adjuster Plate for either single or double spacing. At the extreme end of the "throw" the Line Space Pawl is limited by contact with the Line Space Pawl Eccentric Stop Screw as the Line Space Lever is limited by contact with the Line Space Eccentric Stop Screw. The Line Space Pawl tension spring provides the tension for maintaining the Pawl in tooth engaging position.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that Line Space Lever, Line Space Link, Line Space Pawl Arm and Line Space Pawl are free on their pivots without bind and that Line Space Pawl Spring is properly connected.

A. Ratchet Detent: With the Line Space Lever held in its furthest position (to the right), Line Space Pawl limiting on Line Space Pawl Eccentric Stop Screw, there should be a minimum additional movement of the Platen (when turned with fingers) before the Ratchet Detent is positioned solidly between two teeth of the Ratchet. Adjustment is made after loosening Line Space Pawl Eccentric Stop Screw Nut (left hand Carriage End Cover Plate must be removed first) by turning Eccentric Screw until this condition exists. Tighten Eccentric Screw Lock nut when adjustment is made.

B. Line Space Lever should just contact its limit Eccentric when Line Space Pawl limits on its stop. Adjust, after loosening Line Space Eccentric Stop Screw Nut, by turning Eccentric Stop Screw. Tighten Lock Nut when adjustment is made.

Line Space Lever Spring should be properly connected and provide sufficient tension to return Line Space Lever to inactive position and Line Space Pawl out of Ratchet tooth engaging position.

3. DISASSEMBLE: (With Platen removed)

   (1) Line Space Lever may be disassembled by removing Line Space Pivot Screw Lock Nut and backing out Pivot Screw; removing Line Space Link Screw and disconnecting Line Space Lever Spring.

   (2) Line Space Pawl Arm may be removed by removing Screw binding it to the Line Space Link and removing Line Space Pawl Arm Bushing.
2. ADJUSTMENTS:

A. Rack: The Rack must be true in its entire length and Rack teeth must engage Pinion as deep as possible without bottoming and without causing a rasping noise as the Carriage is moved to the right. Adjustment of Rack teeth engagement in Pinion is made by forming Rack Limit Lug, left end of Carriage under Carriage End Cover Plate, downward withdraws the Rack teeth from mesh with Pinion; upward enters Rack teeth deeper into Pinion. Rack Spring must be connected and provide proper tension to maintain Rack uniformly in Pinion.

B. Pinion: The Pinion should be correctly installed on the Starwheel pivot, operate freely and be controlled by the Pinion Pawl (of the Starwheel) with Pinion Pawl Spring retaining the Pawl in contact with the Pinion teeth.

C. Starwheel (Escapement Wheel): The Starwheel operates on its Pivot on the Escapement Frame. The Pinion Pawl, pivoting on the Starwheel and held engaged to the Pinion Teeth by pressure of the Pinion Pawl Spring, holds the Pinion to the movement of the Starwheel in typing (carriage moving to the left). Starwheel should be free on its pivot and perfectly true.

3. DISASSEMBLE:

A. Rack: The Rack is held to the Rack Bail by two screws entering the Rack at each end. Remove these four Rack Binding Screws. Rack may be removed from either end of machine.

B. Starwheel & Pinion: Remove Carriage (See Main Carriage). Remove Starwheel Pivot Screw Lock Nut. Facing machine from beneath, remove Starwheel Pivot Screw. The Starwheel-Pinion Assembly may be maneuvered free of Back Space and Universal Bar mechanism and removed.

4. ASSEMBLE: Reverse above disassembly instructions.
1. L. H. Margin Stop: The principle of spring motivated L. H. Margin Stop is employed in the Royal Portable similar to the mechanism of the standard Royal. It relies upon the tension of the Margin Stop Set Spring to move the L. H. Margin Stop to the right when the "Magic Margin" Lever is drawn forward. Movement to the right is limited to engagement of the Margin Stop with the Center Post (position of the Carriage as indicated by the type guide). Return movement (to the left) is performed manually either by depressing the Margin Stop Lever and moving the stop to the left or by holding the "Magic Margin" Key forward while moving the Carriage to the right. The L. H. Margin Stop is locked into the Margin Rack by the pressure of the Margin Stop Lock Spring on the Margin Stop Release Lever holding the lever upward so that its lock will enter between teeth of the Margin Rack. The Margin Stop Lock Roll is an extension of the Stop Lock and the Margin Release Lever. The Roll rides on the flat underside of the half round Margin Stop Release Rod. When the Magic Margin Lever is drawn forward, rotation of the Margin Stop Release Rod presses downward on the Stop Lock Roll which in turn moves the Stop Lock downward freeing it from the Margin Stop Rack Teeth. Tension of the Margin Stop Set Spring causes the L. H. Margin Stop to move to the right to the position of the Center Stop (position of the Carriage as indicated by the Type Guide).

R. H. Margin Stop and Line Lock: When the Right Hand Margin Bell Trip contacts the end of the Bell Hammer, the Hammer is cocked and as the Trip moves off the end of the Hammer, the Bell Hammer Spring causes the Bell Hammer to ring the bell. When the Right Hand Margin Stop contacts the Line Lock Lever on the Center Post, the lower end of the Lever, through the connecting Link, draws the Line Lock Stop Lever into Universal Bar Arm engaging position, arresting the escapement tripping action of the Universal Bar and thereby locking the Carriage and the Keylevens.

Margin Release: When the Margin Release Key is depressed, the lower Arm of the Center Post is drawn forward while the top of the Center Post with the Line Lock Lever is pivoted rearward out of Margin Stop engaging position. The Line Lock parts are thereby freed from the pressure of the Margin Stop on the Line Lock Lever, returning to their inactive position freeing the Carriage for continued movement to the left.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that Margin Stops are free on the Margin Stop Rack; that the Margin Stops do not bind on the center post (See "Line Lock" and "Margin Release" instructions for positioning Center Post); and that the Margin Stop Lever Springs are properly connected and provide just sufficient tension to maintain the Margin Stop Lock engaged in the Margin Rack.

A. MAGIC MARGIN (L. H. Margin Stop): It should be determined that all parts are free but snug before attempting adjustments:

(1) Margin Stop Release Rod must be true and parallel with Margin Rack in its entire length and the Margin Stop Lock Roll must be positioned to ride the flat of the Release Rod. When the Magic Margin Lever is moved forward, the Rod must depress the Margin Stop Lock Roll by .0937". It is essential that this tolerance be held accurately. That portion of the Margin Stop providing bearing for the Roll may be formed to provide these positions. Roll must be free on its bearing.

(2) Margin Stop Set Spring must be properly connected to Margin Stop and to Left Carriage End Hanger and Pulley on right Carriage end must be free on its fulcrum.

(3) Banking and Overthrow:

(a) Margin Stop Locater should be positioned on Center Stop Post so that when the Magic Margin Lever releases the Margin Stop and the Margin Stop contacts the locater, the Margin Stop Lock will engage the Rack between the proper teeth. Adjust by forming lower end of locater. Locater Spring should be connected and provide proper tension.

(b) Margin Stop Adjusting Screw may be adjusted to correct Banking by turning clockwise. To correct overthrow (coming-in) turn counter-clockwise.

B. LINE LOCK (R. H. Margin Stop): Determine that all Line Lock parts are free on their pivots before attempting adjustment.

(1) Bell Ringer: R. H. Margin Stop Bell Trip must be free on its pivot and must contact the Bell Hammer end centrally. It may be formed to provide this contact. Bell Hammer Spring must be connected and provide proper tension.

(2) Line Lock Lever: R. H. Margin Stop Adjusting Screw head must contact the Line Lock Lever centrally and Line Lock Lever must be free on its pivot with spring properly connected and providing proper tension. When the Line Lock Lever is contacted by the Margin Stop, the tail of the Lever must draw the Line Lock Stop Lever into blocking position with the Universal Bar Rocker Arm. The Link connecting the tail of the Lever to the Line Lock Stop Lever may be formed to provide this position.

(3) Center Post Position: The Center Post (with the L. H. Margin Locater and Line Lock Lever) must be positioned to contact Margin Stop Adjusting Screw heads centrally without binding on the Margin Stops. Adjustment is made by forming Center Post Bracket so that Center Post Limit will hold post in clear position.

C. MARGIN RELEASE: Determine that Margin Release Keylever is free on its pivot and that link connecting rear of Release Keylever to tail of Center Post clears Ribbon Spool Shaft and Reverse Arm Bracket without binding in any position. Link may be formed to provide this clearance, but should not limit Center Post nor change relationship of Center Post to Margin Stop Adjusting Screws. Center Post Spring must be properly connected and provide sufficient tension to return mechanism to inactive position.
MECHANIC'S NOTES:
1. When the Space Bar is depressed the left Arm of the Frame is drawn forward pulling the Space Bar Link forward. The Link moves the left arm of the Trip Lever forward so that the face of the Trip Lever contacts the Escapement Plate Trip Arm thereby tripping the Escapement Rocker in the same manner employed by the Universal Bar.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that:

   Front frame is not limiting Stops in such a manner as to hold Escapement Rocker off its Limits, preventing trip.

   Space Bar Frame is free on its pivots.

   Space Bar Spring connected and provides proper tension.

   Space Bar Link is not binding on Sub-Frame or on Space Arm or Trip Lever connections.

A. Space Trip should be adjusted so that trip takes place just prior to Space Bar stops contacting front frame Down-Stop. Adjust by lengthening or shortening Space Bar Link (by forming).
1. It is the function of the Universal Bar to transmit the movement of the typebars to the escape- ment Rocker in such a manner as to cause the Loose Dog of the rocker to move off the starwheel tooth permitting one-tooth rotation (movement of Carriage one space).

The Universal Bar Blade is positioned in the groove in the rear of the Segment, is guided by the U-Bar Guide of the Segment Plate and the rear arms of the U-Bar are attached to the U-Bar Rocker Arms. Rearward movement of the Universal Bar Blade (when contacted and pushed rearward by engagement of the cam shape of the typebar heel) is thereby transmitted to the Universal Bar Rocker Arms, which, in its rearward movement, causes the U-Bar Escapement Plate Trip Arm Operating Arm to actuate the Escapement Rocker.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that the Escapement Rocker Spring is connected and provides proper tension to maintain the U-Bar Blade in position in rear Segment groove; that the Universal Bar Rocker Arm Pivot Screws are tight in the Bracket; and that the Escapement Plate Trip Arm is free on its fulcrum without lost motion between the Escapement Rocker Frame and the Universal Bar Blade engagement limiting in Segment groove.

A. Universal Bar Rocker Arms are responsible for positioning the Universal Bar Blade flush and parallel with Segment in U-Bar Blade groove in the Segment. If trip is not uniform, when testing a bar from both ends and center of Keyboard, the Rocker Arms may be formed to position the U-Bar Blade parallel with Segment to provide such uniform trip.

1. The escapement Action in the Royal Portable is actuated by an Upper Universal Bar as it is contacted and moved rearward by the cam shape of the Typebar heel as the Typehead nears the platen. As the Keylever is depressed, the Keylever Link draws the Sub-lever forward arm downward while the main arm is moved forward drawing the Typebar Link and the lower end of the Typebar forward, in which action the Type head of the Typebar is pivoted toward the Platen. In this action the cam shape of the typebar heel is moved into contact with the blade of the Universal Bar which is moved rearward. As the blade of the U-Bar is moved rearward the Rocker Arm Escapement Plate Trip Arm Operating Arm is pivoted rearward moving the Trip Arm Plate rearward as the Trip Arm in its movement to the right pushes the lower extension of the Escapement Rocker in this direction, pivoting action of the Rocker moving the Loose Dog off the Starwheel tooth as the Stationery Dog moves into tooth engaging position. When the Keylever is released, the Loose Dog (which has stepped slightly toward the on-coming starwheel tooth) contacts and holds the Starwheel, thereby completing the Escapement cycle.

The Trip Arm Plate of the Trip Arm is held in contact with the Universal Bar Escapement Plate Trip Arm Operating Arm by Tension of the Escapement Rocker Spring applied by the Rockers lower extension to the Trip Arm resulting in no lost motion between the U-Bar and the Escapement Rocker. In this manner all parts including the Universal Bar receive their tension from the Escapement Rocker Spring.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that the Keylevers, Sub-levers, Links, Typebars and Universal Bar are free on their pivots or fulcrums; that the Universal Bar Blade is flush and parallel with Segment Groove; that Escapement Rocker Spring is connected and supplies proper tension; Pinion and Starwheel are free on their pivot with Pivot Screw tight and lock nut tight and that the Escapement (Loose) Dog Spring Arm spring is properly connected and provides sufficient tension.

A. Escapement Trip:

(1) Master Trip Adjustment: Moving a typebar from either end and center of typebasket to the Platen with the fingers (not the keylever) trip should take place when type face of typebar is approximately 3/8” from platen. The Rocker Arm Escapement Plate Trip Arm operating Arm may be formed to provide Trip Adjustment. Forming Arm forward (toward front of machine) will cause trip to take place when typebar is closer to the platen; rearward will cause trip to take place when typebar is farther from Platen.

(2) Individual Trip Adjustment: (See Universal Bar, Par. 2A).

B. Escapement Rocker:

(1) Loose Dog: The Loose Dog, pivoting on the Rocker Frame, is positioned for 9 o’clock position on Starwheel tooth (flush face to face) by Rocker Frame Pivots and is positioned flush (edge to edge) with bottom of Starwheel tooth by the Loose Dog Position Limit which may be formed to provide this flush position. Its tension, providing for step (when released) is provided by Escapement Dog Spring Arm spring. The Upper Rocker Limit Screw (located on top of Escapement Frame—beneath carriage) should be adjusted to provide a minimum of additional movement when keylever or space bar is held fully depressed. Loose Dog must be free on its fulcrum with “wobble” eliminated.

(2) Rocker Pivots: The Escapement (Rocker) Plate must fit snug but free on its Pivots and the position of the Plate must be adjusted by its Pivot (fulcrum) screws to permit of flush position of the Loose Dog on the Starwheel Tooth.

(3) Rocker Spring: The Escapement (Rocker) Spring must be connected and provide proper tension.

3. DISASSEMBLE:

A. Escapement Plate: Facing machine from beneath, remove Trip Arm Fulcrum Screw (after releasing lock nut). Remove Trip Arm Support Screws.

(2) Loosen Lock Nut on Rear Rocker Pivot Screw and loosen Pivot Screw sufficiently to remove Rocker. To replace, reverse instructions.

B. Escapement Bracket Assembly may be removed (after removing Carriage) by removing two Escapement Bracket Binding Screws on each end of Bracket binding the Bracket to the Carriage Bedplate.
MECHANIC'S NOTES:
1. The rear ends of the Keylevers are positioned under the Ribbon Universal Bar Rear Shaft. When a Keylever is depressed the Ribbon U-Bar Rear shaft is raised, while the Ribbon Feed Pawl pivoting on the U-Bar Pivot Shaft is moved forward, the tooth of the Feed Pawl (engaged in the Ribbon Feed Ratchet) rotating the wheel and Feed Shaft together with the Ribbon Reverse Shaft Gears affixed to the left and right ends of the Reverse Shaft). One of these gears will be in mesh with the Spool Shaft Gear on the feeding spool side. As the Ribbon Reverse Shaft is not actuated by the Space Bar, Carriage or Tabulator mechanism the ribbon does not feed during movement of either.

Ribbon Reverse: When the eyelet in the end of the ribbon on the empty spool side is drawn into engagement with Ribbon Reverse Arm on the Ribbon Spool Bracket the Ribbon Reverse Arm is drawn outward from the Spool Cup. The cam shape of the bottom of the Reverse Arm applies pressure to the Reverse Dog Lever which is transmitted to the Reverse Dog causing the diagonal tooth end of the Dog to engage in the teeth of the Spiral cut Reverse Worm Shaft drawing the spiral cut Reverse Worm against the diagonal tooth of the Reverse Dog causing the Reverse Shaft to be moved in the opposite direction engaging the Reverse Shaft Gear on the empty spool side into mesh with the Ribbon Spool Shaft on that side, thereby reversing the direction of the ribbon feed.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that:

Proper ribbon spool, correct length of ribbon (10 yards) equipped with eyelet in each end and properly threaded.

Ribbon Spool Shafts turn freely.

Spool Shaft Gears mesh properly in Reverse Shaft Gears when Reverse Shaft is moved to either side. Gear binding screws tight.

Ribbon Reversing Arms operate freely, Reverse Dog Lever Springs connected and provide proper tension.

Ribbon Feed Pawl and Check Pawl springs connected and both Pawls engage Ratchet wheel properly.

Check Pawl free but snug on Keylever Fulcrum Rod.

Feed Ratchet Wheel not binding on Reverse Yoke Guides and that there is a clearance between the guides and the Ratchet wheel in either position.

Ribbon Reverse handle operates freely without bind when moving to opposite position.

A. PAWLS:

1) Feed Pawl must be free on its bracket—tooth edge in good condition and spring connected and providing sufficient tension to hold tooth edge of Pawl engaged in Feed Ratchet but permitting it to ride over Ratchet teeth easily when Keylever is released. Tooth edge of Pawl must engage Ratchet safely in either position of the Reverse Shaft. Depression of Keylever should move the Feed Ratchet one tooth position as indicated by the Check Pawl. Adjustment is made by forming Ribbon U-Bar Stop upward to reduce downward to increase movement of the Feed Pawl.

2) Check Pawl must fit snug but free on Keylever Fulcrum Rod and spring must provide proper tension to maintain Check Pawl engaged in Ratchet Wheel. The formed bearing of the Check Pawl may be formed to provide proper fit after removing it from the Keylever Fulcrum (See Keylevers).

B. GEARS:

1) Spool Shaft and Reverse Shaft Gears must mesh properly without bottoming and gears must be tight on their shafts. It should be determined that gear teeth are in good condition.

3. DISASSEMBLE:

A. Reverse Shaft:

1) Loosen Reverse Shaft Gear Set Screws. Remove Shaft Gears.

2) Loosen Reverse Worm Set Screws. Remove Reverse Worms.

3) Loosen Reverse Index Set Screw.

4) Loosen Feed Ratchet Set Screw.

5) Reverse Shaft may be drawn outward (either side) and removed as the Reverse Index and Feed Ratchet move off the Rod as it is drawn out.

B. Spool Shaft:

1) Loosen Spool Shaft Gear Set Screw. Spool Shaft may be drawn upwards out of Ribbon Spool Cup.

C. Feed Pawl:

1) Remove Feed Pawl Pivot Screw. Disconnect Feed Pawl Spring. Remove Feed Pawl.
1. The Ribbon (Bichrome) Cover mechanism of the typewriter governs the positioning of the Ribbon Vibrator (Guide) and the Ribbon at the printing point synchronized with the arrival of the typebar type. The Ribbon Cover in the Royal Portable is actuated by the Ribbon Universal Bar. When a Keylever is depressed (as in Ribbon Feed) the Ribbon U-Bar rear shaft is raised by contact of the rear end of the Keylever with the shaft. The Bichrome Link is attached to the Ribbon U-Bar Shaft Lever and forward rocking motion of the Lever (in this action) is transmitted to the Bichrome Ribbon Lift Lever through the attached link.

If the Bichrome Handle is positioned in Black position (see drawing) forward movement of the Lift Lever contacts the Vibrator Link at a point just below the extruded top end. The Bichrome Cam is positioned to allow the Vibrator Arm to raise the Vibrator for top half of ribbon printing.

Movement of Bichrome Handle to Red position (see drawing) positions the top extruded end of Vibrator Link in contact position (closer to Lift Lever) while the Bichrome Cam is positioned to allow the Vibrator Arm to raise the Vibrator (and ribbon) for lower half of ribbon printing.

When the Bichrome Handle is set in Stencil (white) position, the Vibrator Link end is moved upward out of engaging position with the Lift Lever in which position there is no movement of the Link or Vibrator Arm.

The Card Guide Scale Bracket (on the Carriage Bedplate) provides a finger to serve as a position rest for the Vibrator Arm, which, in turn, positions the Vibrator Top and the ribbon in relation to the Card Guide Scale (top of Vibrator approximately 1/32" above top of Guide Scale).

Pick up of the Bichrome Mechanism begins shortly after contact of rear ends of Keylevers with Ribbon U-Bar rear Shaft and is completed when Vibrator Arm is limited by contact with the Bichrome Cam (when set in Red or Black position). Any excess play of the Ribbon Vibrator on the Cotter would thereby contribute to extending the limits provided by the Bichrome Cam.

2. ADJUSTMENTS:

A. Ribbon Position: Before attempting adjustments, depress a Keylever to determine that the typebar moves freely to contact with the Platen and that its movement is not choked as it nears the platen. Such choking (preventing the typebar from movement to contact with the Platen) is referred to as "bumper bars" indicating that some mechanism is preventing this contact.

(1) The top of the Ribbon Vibrator (inside standards) should position approximately 1/32 inch above the Card Guide Scale while the outer edges of the Vibrator (because of the diagonal forming of the Vibrator Top) will be just below the Top of Scale. This position may be adjusted by forming the Card Guide Scale Bracket Finger. In this position, with Bichrome Handle set in stencil position, shift key depressed, the underline — should not print.

B. Ribbon Throw: With Bichrome Handle set in Red or Black position, keylevers fully depressed, there should not be any choking of typebar nor should there be any additional movement "upward" of Vibrator when lifted by the fingers. The Bichrome Link may be shortened or lengthened (by forming) to remove or provide necessary movement.

When properly adjusted, with Bichrome Handle set in Black position and Shift Key depressed, depression of a Keylever should cause the ribbon to raise just a fraction (.005" to .008") above top of the typebar. Adjustment is made by forming Vibrator Arm upward to raise, downward to lower. Adjustment should be made with Ribbon Vibrator Arm Benders, Tool P. S. 22.

C. Ribbon Vibrator: The Vibrator must move freely up and down behind the Segment Type Guide with Guide Lugs fitted properly to Type Guide and all mechanism clean. A bind of the Vibrator may be caused by Vibrator Arm not lined up with Vibrator (adjust by forming); Guide Lugs binding on Guide (adjust by forming) or accumulation of dirt or ink on Vibrator (necessitating cleaning). It should also be determined that Vibrator Link Spring is connected and that there is no bind of Vibrator Arm on its Pivot. Loose fitting of Vibrator on its Cotter should be eliminated by replacement of Cotter; closing up of Vibrator Cotter bearing or replacement of Vibrator.

Vibrator may be removed by straightening end of cotter and removing cotter. This may be made accessible by removing Carriage or by loosening Segment Binding Screws pulling Segment outward slightly and removing Platen.

D. Bichrome Handle: The Bichrome Handle Link and the Margin Release Link both are positioned over the top of the right end of Sub-Frame between the Ribbon Spool Shaft and the Spool Cup Bracket. These Links should be formed, if necessary, to eliminate bind when either is operated. Bichrome Handle Spring should be properly connected and Handle should move freely and remain in set position.
ROYAL RIBBON BICHROME

BLACK POSITION

CARD GUIDE SCALE BRACKET FINGER

STENCIL POSITION

MECHANIC'S NOTES:
1. Depression of the Tabulator Key causes the rear end of the Tabulator Lever to pivot forward drawing the Keylever Link and lower arm of Tabular Crank forward. In this action the top arm of Tabulator Crank draws the Tabulator Rack Lift Arm Link to the right. The Tabulator Rack Lift Arm Link is attached to the lower arm of the Tabulator Rack Lift Arm and as it moves to the right the Lift Arm raises to contact the Tabulator Bar which is raised upward. The Tabulator Bar and Rack form a complete assembly and when the Tabulator Bar is raised the Rack is drawn out of mesh with the Pinion Wheel. In this action the Escapement Wheel Stop Arm moves its Stop Arm Tooth into engaging position with the Starwheel. The Carriage is free to move under Mainspring tension until the Tabular Rack Lift Arm Extension turned-up tooth contacts a Tabulator Stop on the Tabulator Stop Bar. As the Tabulator Key is released the rack meshes into the Pinion Wheel just prior to release of the starwheel tooth by the Escapement Wheel Stop Arm Tooth.

2. ADJUSTMENTS: Before attempting adjustments determine that:

- Rack is free on its Pivots with Rack spring connected.
- Tabulator Key is free on its fulcrum and in front comb slot.
- Keylever Link is not binding on Sub-frame or machine side frame.
- Tabular Crank is not binding on its fulcrum.
- Tabular Rack Lift Arm Link is not binding on its connection to Lift Arm or Tabular Crank.

Tabular Rack Lift Arm is free on its Pivot, with spring connected.

Escapement Wheel Stop Arm free on its pivot with spring connected.

A. Tabular Rack Lift Arm: When the Tabulator Key is depressed, the Tabular Rack Lift Arm must move the Carriage Rack out of engagement with the Pinion wheel with a clearance of approximately .060". Adjustment is made by forming Tabular Rack Lift Arm Link (kinking to shorten—straightening to lengthen). To shorten Link causes Rack to move further from Pinion, to lengthen causes Rack to move in toward Pinion.

(1) Tabular Rack Lift Arm Extension functions to transmit the raising motion of the Lift Arm to the Tabular Rack and its tooth end functions to contact the Tabulator Stop and arrest movement of the Carriage. The tooth end of the Lift Arm Extension may be adjusted to overcome any inaccuracy of the carriage in stopping by loosening set screw and spreading or shortening Extension.

B. Escapement Wheel Stop Arm functions to arrest movement of the Escapement (Star) wheel while tabulating and to insure that the wheel remains stationary when the Rack is returning to engagement with the Pinion. The Rack returns to mesh with the Pinion Wheel just prior to release of the Starwheel tooth by the Stop Arm. The Stop Arm should be cautiously formed, if necessary, to provide this arresting action as there is only a minimum of clearance between the Stop Arm and the Back Space Dog. Malforming of the Stop Arm could bind escapement mechanism.

MECHANIC’S NOTES:
1. As the Back Space Key is depressed the rear end of the Back Space Key lever moves forward drawing the Link forward. The Back Space Crank lower arm is drawn forward in this action pivoting the upper arm fork positioned over the Slide Screw-head to the right pushing the Slide in this direction. The Back Space Pawl pivots on the slide and in this movement the Pawl Tooth contacts the Starwheel tooth moving it clockwise (the Loose Dog acting as a Pawl permits the Starwheel tooth it contacts to pass). As the Pawl moves to the right with the Starwheel tooth just as the Loose Dog releases the Starwheel tooth the right end of the Back Space Pawl which has previously contacted the tail end of the Back Space Pinion Lock moves the head of the lock into locked engagement with the Pinion preventing overthrow in Back Spacing.

When the Back Space Key is released the Back Space Slide and Back Space Crank top moves to the left under tension of the Back Space Spring releasing the Starwheel and Pinion Lock.

2. ADJUSTMENTS: Before attempting adjustments it should be determined that:

- Back Space Pawl pivots free on Slide with its spring providing proper tension.
- Slide is free in its Guide Slots.
- Crank is free on its fulcrum.
- Back Space Key lever is free in front comb slot and on its pivot, with Key lever Spring connected and providing proper tension.

Note that Escapement (Loose Dog) Stop has not been distorted through damage caused by accident or by closing case with Carriage not properly centered. Forcing side of case against right cylinder knob will bind the stop, changing position of the Escapement Wheel.

A. Back Space Slide: The Stop Screw on right end of Slide must limit on Stop Plate when Back Space Key is inactive (See drawing “Back Space Key Released”). When Back Space Key depressed the Slide Stop must limit on Stop Plate (see drawing). Adjust by forming Link (lengthen or shorten) to provide these limits.

B. Back Space Pawl: Right end of Back Space Pawl must press against Back Space Pinion Lock Tail so that just as the Starwheel tooth passes the Loose Dog the tooth end of Pinion Lock enters securely and locks the Pinion. Adjust by forming Pinion Lock Tail. The Back Space Pawl Spring must be attached and provide sufficient tension to hold tooth end of Dog towards front of machine in position to engage Starwheel Tooth.
ROYAL

BACK SPACER

BACK SPACE KEY RELEASED

BACK SPACE KEY DEPRESSED

BACK SPACE KEY SPRING

BACK SPACE CRANK

LINK

CRANE SHAFT

BACK SPACE SLIDE

PAWL PIVOT SCREW
1. The Typebars of the Royal Portable are motivated by the Key levers through the connecting Link, Sub-lever and Link. The Typebars bear embossed numbers from No. 1 to No. 42 (left to right).

2. ADJUSTMENTS:

A. Typebars should be adjusted (by forming) to enter Type Guide centrally without rubbing or binding on either side of the Guide slot and should be formed to contact the Segment Abutment Ring at the time the type face (of the typebar) contacts the Platen with 1 sheet of paper inserted (see Ring & Cylinder). Types should be aligned properly.

B. Sub-Levers should be aligned to draw the Typebars (through connecting Links) forward without binding Typebar and without collision with adjoining Sub-Levers or Links. This type of aligning is performed with T-slot Bender.

C. Key levers: The Keycup of the Key levers should be level for each bank (row) of Keys. Adjustment is made with Peening Pliers, peening the lower edge of the Key lever, raises the Keycup; peening the top edge of Key lever, lowers the Keycup. It should be determined that Key lever Springs provide proper tension to hold Key lever in "up" position and that nothing is preventing the Key lever from reaching this "up" position before peening.

3. DISASSEMBLE:

A. Typebars or Bars: Remove Erasure Aprons (see cover plates). Insert Follow-Up Typebar Fulcrum Wire in Fulcrum Wire Slot of Segment until Bar to be removed is reached by joining of the two fulc rums. Spread fulc rms slightly to free Typebar. Depress Key lever as Bar is drawn forward. Move adjoining typebars (several) up toward type guide to permit unhooking Typebar from Link or Link from Sub-lever. Links on Typebars No. 1 to No. 21 hook faces the left on Typebars right on Sub-levers. On Typebars No. 22 to No. 42 hook faces the right on Typebars, left on Sub-levers.

B. Sub-Lever (with typebar removed): Remove Sub-lever Fulcrum Stop screws, right and left. Position Ribbon Reverse Lever in left position so that L. H. Fulcrum Stop Screw can clear lower edge of lever. Chase Sub-lever Fulcrum Wire out with Follow-up Wire until Sub-lever to be removed is positioned at the union of the two fulc rms. Spread the fulc rms slightly, sufficient to free the sub-lever. The Sub-lever may be disconnected from Sub-Lever Link, by maneuvering, and removed.