

FOREWORD

From raw material to finished product, skilled craftsmen at Royal's Factory are producing the world's finest writing machine.

Precision machines, specially designed dies and tools, conceived by Royal's staff of engineers, are employed to manufacture assembly parts within the close standard permitted and in accordance with an arbitrary standard of tolerance limit, which must stand rigid inspection.

Since parts are made to conform to a set standard and are interchangeable, it is obvious that extensive bending and filing is not necessary to arrive at correct adjustments, and it is the purpose of these mechanical instructions to outline the proper procedure to be followed while making adjustments on the Royal Typewriter.

Conceded "The World's No. 1 Typewriter", Royal enjoys an enviable reputation in world wide markets. To aid in preserving this, and in the promotion of good will, it is our desire to keep every Royal user satisfied with the service he gets from his machine. Prompt and competent mechanical service will go far toward this end.

The final analysis of a writing machine is the work it produces. Perfect alignment, marginal adjustments, tabulation, line spacing, etc., are vital in the production of the perfect letter.

We have endeavored to explain with the aid of illustrations the proper method to follow, with particular emphasis on the effect that some adjustments have upon others.

Intelligent effort in determining the cause before applying the cure, will eliminate faulty adjustment and mutilation of parts by excessive bending, peening and filing.

ROYAL

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ROYAL TYPEWRITER OILING CHART

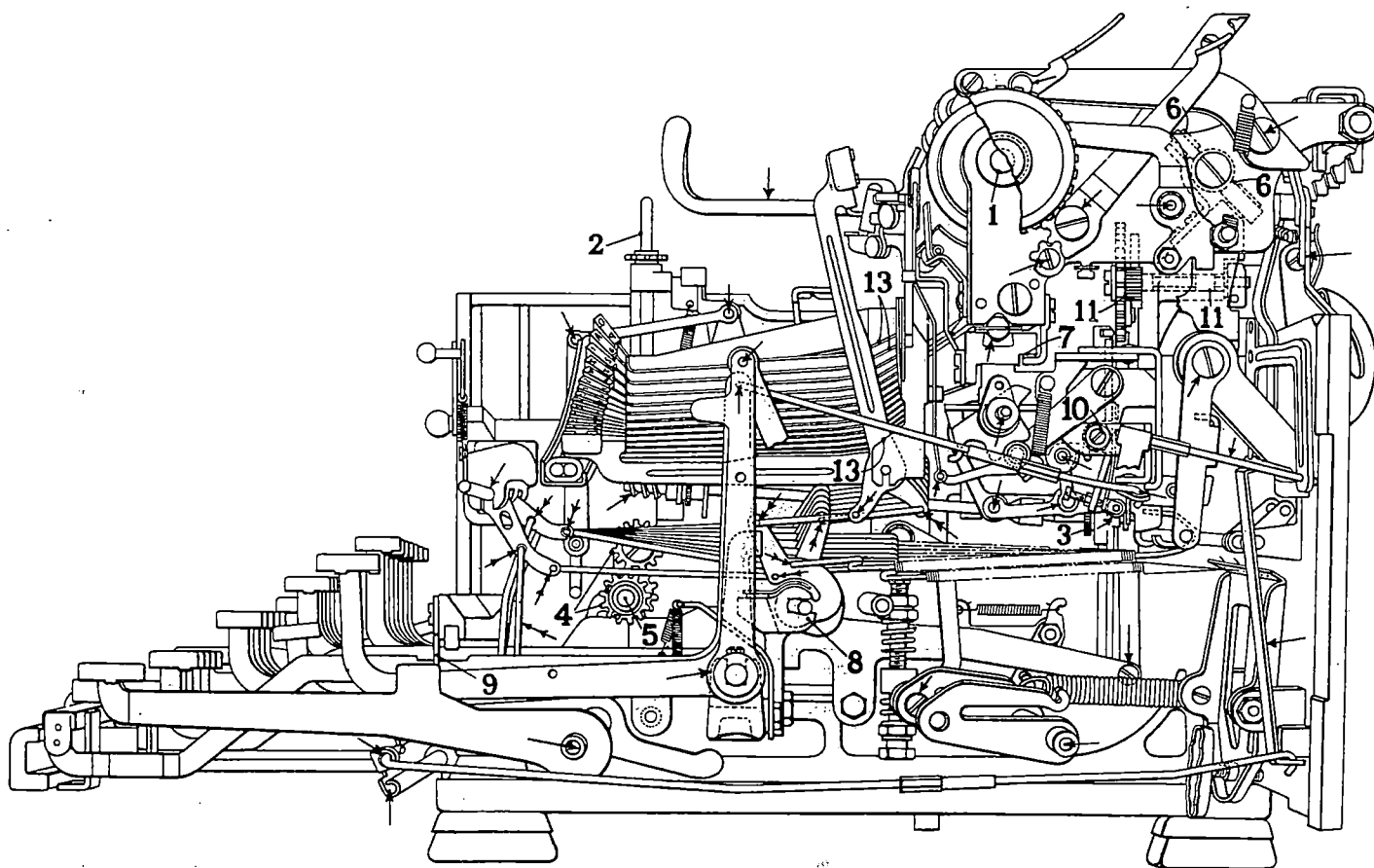
Royal Typewriter Oil is recommended. It is used on all typewriting machines manufactured by us. USE OIL VERY SPARINGLY at all points indicated by numerals and arrows.

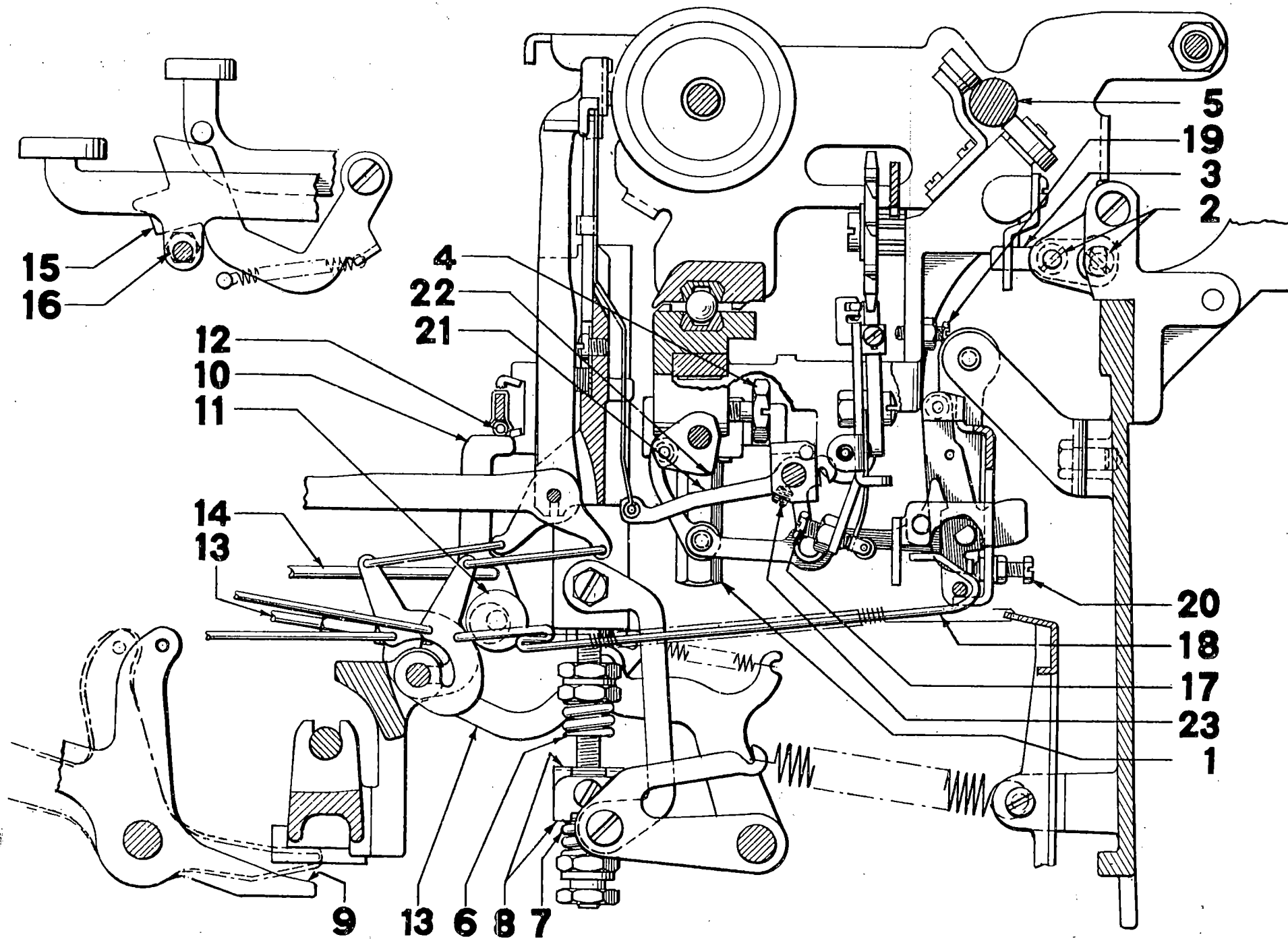
1. Cylinder Shaft Bearings at Carriage Ends.
2. Ribbon Spool Shafts.
3. Ribbon Pinion.
4. Ribbon Gears.
5. Ribbon Feed Shaft Bearings.
6. Large and Small Carriage Rolls.
7. All Carriage Clamps (on points where they slide on Bottom Rail only).
8. Type Bar Lever Guides in Type Bar Lever Bracket.
9. Key Lever Guides in Key Lever Guide Comb.
10. Escapement Plate Pivot Bearings.
11. Escapement Wheel Bearing and Wheel Teeth.
12. Main Spring Barrel Shaft (not shown).
13. Segment Slots (very little).

All points indicated by arrow.

All Type Bar and Key Lever Link Pivot Holes where indicated by double arrow.

All other Link Pivot Bearing Holes.





RING AND CYLINDER ADJUSTMENT

Instructions for adjusting ring and cylinder, upper and lower shift stops, trip, with their relation to back limit screw, bi-chrome ribbon, segment, and shift lock.

The effect that one adjustment has upon another, makes it necessary that the following procedure be employed in making and checking these adjustments:

RING AND CYLINDER
UPPER SHIFT STOP
LOWER SHIFT STOP
SEGMENT LOCK
UNIVERSAL TYPE BAR TRIP
BACK LIMIT SCREW
UNIVERSAL BAR RIBBON ADJUSTING SCREW

RING AND CYLINDER:

Loosen bottom rail binding screws (1) loosen screws (2) in carriage back rest (3), then turn ring and cylinder adjusting screws (4) right or left. Turn screws to the left to set the type face on the cylinder and to the right to set type bars on the ring, being careful to move the screws an equal distance, so that a true parallel of bottom rail will be maintained. When proper contact with ring and cylinder has been made by testing with type on the cylinder and type bar on the ring with a thin piece of paper, be sure to tighten bottom rail screws securely and secure carriage back rest (3). Before altering ring and cylinder adjustments, be sure to note that the cylinder is of the proper diameter and not over-size or undersize, and that it does not run eccentric. The diameter of a Standard cylinder is 1.486. If the carriage roll guide rod (5) is bent, ring and cylinder adjustment will appear to be off. Be sure to check this.

UPPER SHIFT STOPS:

The upper shift stops (6) are designed to arrest the downward movement of the segment so that when accurately positioned, the center line of the type face will coincide with the dead center line of the cylinder, thereby maintaining the curvature of the type face in proper relation to the cylinder radius. If upper shift stops are positioned too high or too low, the type impression will either show light on the bottom or top. Under no circumstances should upper shift stops be employed to correct faulty motion, as this will impair the relation of the type face to the cylinder.

LOWER SHIFT STOPS:

The lower shift stops (7) are identical in design with the upper shift stops (6) and are adapted to control the motion or vertical alignment of the upper and lower case characters. These stops (7) can be adjusted until perfect motion is attained. The distance between the lower edge of upper and lower case characters, or what is termed the motion, is on standard equipment .265 (two hundred and sixty five thousandths of an inch). The distance between the lower shift stops and lower shift stop cushions (8) should approximate this distance when the shift key is depressed. All four abutting surfaces of the shift stops should be tested with a thin piece of paper, to check that equal contact is being made with the shift stop cushions.

Shift frame extension (9) serves to limit the stroke of the shift key levers and should be adjusted to allow 1/16" additional depression of the shift key after the upper shift stops (6) have contacted the cushions (8).

(See dash-dotted lines in cut.) This provides motion for the release of the shift lock arm (15).

SHIFT LOCK (SEGMENT LOCK)

When position of lower shift stops has been changed, it is obvious that a readjustment of the shift lock (10) will be necessary. This is accomplished by turning the shift lock eccentric stud (11) and adjusting it so that the segment shift will release freely and that all excess play has been removed between the shift lock (10) and shift lock plate (12). When it is necessary to replace shift link (13) or shift lock link (14) first adjust shift link (13) so that shift lock arm (15) will hold segment firmly in capital locked position, yet so that it can be released with slight pressure. Shift key lever eccentric (16) is designed to provide close adjustment. Next adjust shift lock link (14) so that shift lock (10) will take sufficient purchase on shift lock plate (12) to insure a perfectly locked segment.

TYPE BAR TRIP:

The type bar trip should be set so that type bars will trip the escapement when type face is approximately $3/8$ " from the cylinder. It is recommended that they be tested by bringing the bar up to the tripping point with the finger as a more accurate setting can be obtained than by testing with key lever. Universal trip adjustment is provided by turning trip adjusting screw (17) clockwise to set the trip farther out from cylinder and counter clockwise to set trip closer to cylinder. Individual adjustment is provided by bending universal bar links (18) at point shown on cut. Be sure to tighten lock nut on trip adjusting screw (17).

BACK LIMIT SCREW:

It is important that escapement plate back limit screw (19) be checked to note that there is a little play between escapement plate and limit screw when type face is held against the cylinder. It is also important to remember that when tripping position has been changed, back limit screw setting usually has to be changed to conform. (See page 13 paragraph 3 for machines equipped with Front and Back limit plates.)

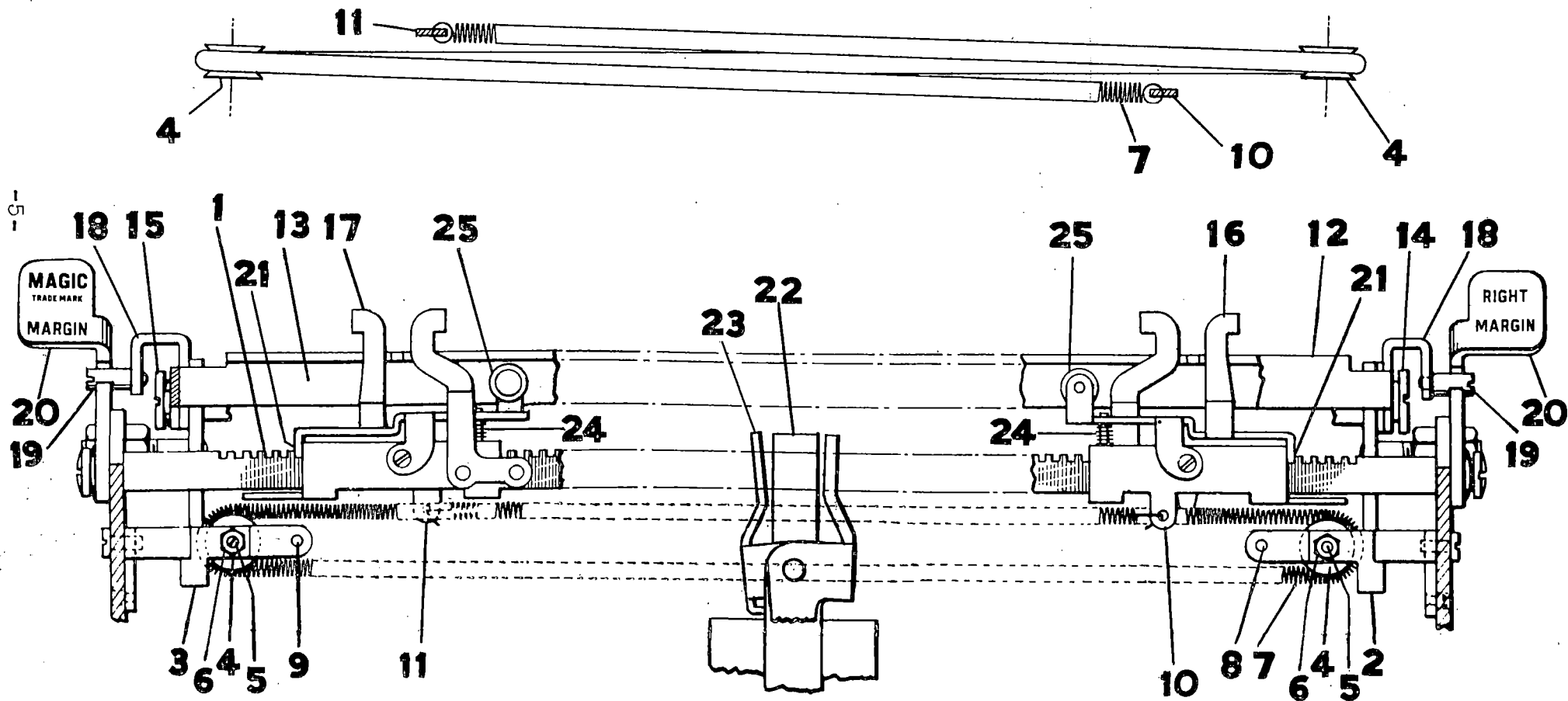
UNIVERSAL BAR RIBBON ADJUSTING SCREW:

When ring and cylinder adjustment has been altered, the relation of universal bar and escapement plate has been changed, which in turn affects the type bar trip and back limit screw, therefore it is important that the universal bar ribbon adjusting screw (20) be checked to note that vibrator arm (21) is contacting cam (22) when type face is held against the cylinder. Should the ribbon adjusting screw (20) be set up too far, vibrator arm (21) will contact cam (22) before type has contacted cylinder, thereby impairing the action of the machine and causing the type bars to "choke".

If with the trip properly set and type face held against cylinder, vibrator arm fails to contact cam solidly, it will indicate that ribbon adjusting screw will have to be reset, so that all play will be removed from ribbon vibrator when type face is held against the cylinder. Failure to make proper adjustment will prevent the ribbon from raising to its proper height, and will cause tops of characters to miss the ribbon.

RIBBON VIBRATOR ARM STOP:

Ribbon vibrator arm stop (23) is designed to control the set of the ribbon and in no way affects the ribbon throw, and should be set so that with ribbon vibrator at rest, the top of the ribbon will set at approximately $1/16$ of an inch below top of card scale.



MM MODEL MARGIN STOP ADJUSTMENTS

Margin Stops must be free of bind and run absolutely free on Margin Rod #1. Lack of, or excess lubrication, accumulations of dirt or other foreign matter may prevent the positive operation of the automatic Margin Stops, right and left.

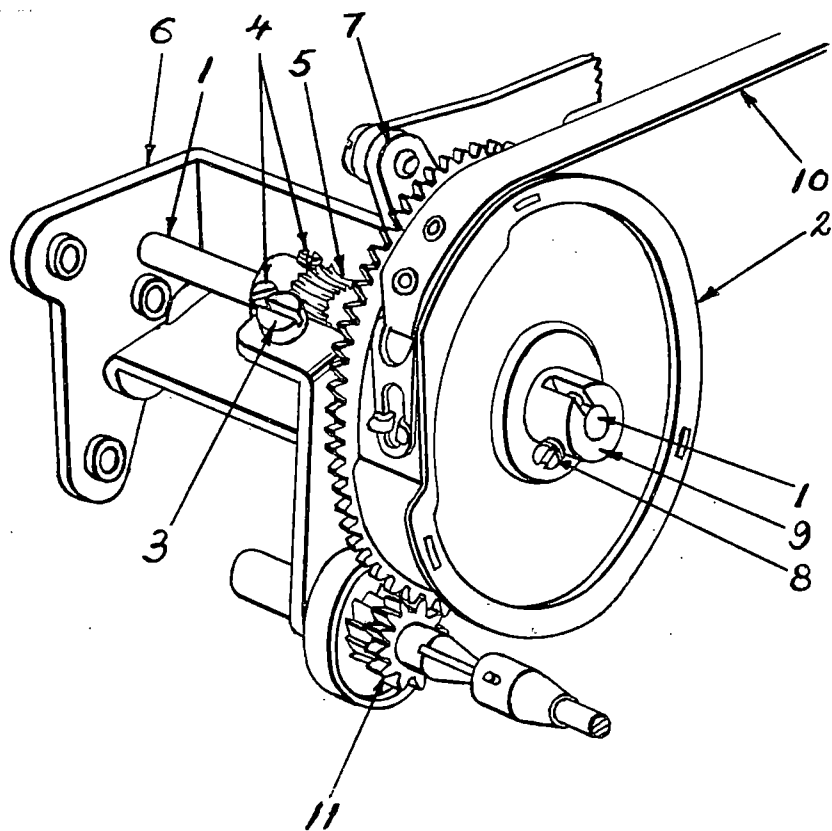
Margin Stop Spring Anchor (or pulley brackets) right #2 and left #3, located directly under Margin Stop Rod #1, must be securely fastened to carriage ends. Margin Stop Set Spring Roller, or Pulley, #4 are ball bearing and must be free from bind. Care must be exercised in adjusting Fulcrum Screw #5 and Nut #6 so that a bind or drag in roller does not occur.

When it is necessary to replace Margin Stop Set Spring #7, first disconnect Margin Stop Set Spring Guard by removing the two retaining screws Nos. 8 and 9 located at right and left of guard, after which spring can be disconnected from Margin Stops right and left. To replace spring, thread end of spring through Pulley #4 at left side of machine and attach end of spring to Spring Hanger #10 on right Margin Stop. Then thread the other end of Spring through Pulley #4 at right side of machine and attach other end of spring to Spring Hanger #11 on left side margin stop. In both cases thread the spring in from underneath and over top of pulley. Note carefully that loops on spring ends are closed properly to insure against possible disconnection.

It will be noted that Margin Release Bail Right #12 and Left #13 are pivoted on Fulcrum Screws right #14 and left #15, attached to Key Set Tabulator Rack and located directly behind Paper Holder Arms. Therefore, it is obvious that a slight tilt in Key Set Tabulator Rack in either direction will cause either one of the Margin Release Bails to drag against the Margin Stop Bail Handles Right #16 and Left #17. Since the space between bails in which the Margin Stop Handle operates is predetermined and no adjustment is provided for changing this distance, it is imperative that the Key Set Tabulator Rack be absolutely square with the carriage and the Margin Stop Rod #1 and Margin Release Bails Nos. 12 and 13 must be parallel. It is essential that Margin Release Bails be free of bind. Sufficient tolerance or play is provided at fulcrum points to insure absolute freedom in the Release Bails, provided they are not distorted or bent. A spring washer is inserted between the Bails on left side to remove excessive side play.

It will be noted that an adjustment for controlling the throw of the Margin Release Bails is provided on the end of right and left Bail. This adjustment #18 is located directly behind Paper Holder Arms and is the part to which the Margin Release Bail Screw #19 is attached. This part should be bent so that when the Margin Release Lever #20 is in forward position it will lift the Margin Stop Handle Tooth #21 approximately $1/64$ " to $1/32$ " from Margin Rod Tooth. When it is found necessary to bend either of these arms, be careful to bend them not more than is sufficient to raise Margin Stop Handle Tooth to within the prescribed limits. Care must be exercised not to bend the arms to the extent that they will force the Margin Stop Handle on top of the Margin Stop and prevent its free operation.

An Eccentric Washer located directly in front of the Key Set Tabulator Rack Nut, is provided for the proper rear set of the Margin Release Lever #20 right and left. Margin Release Lever should be adjusted so that Margin Release Bail Screw #19 is central in notch of Lever #20 and the adjustment is controlled by set of Eccentric Washer. Be sure to check Margin Release Lever when set in forward position to note that it does not interfere with Paper Holder Arm Left.



REMOVING SPRING BARREL

Remove Type Bars and Type Bar Links letters Q and A. This will permit free passage of Spring Barrel Shaft #1 under Bottom Rail.

To remove Spring Barrel #2, turn Main Spring Adjuster #3 until set screws Nos. 4 and 8 are visible. Loosen Set Screws Nos. 4 and 8 until Spring Barrel Shaft #1 can be drawn through Spring Barrel Shaft Worm Gear #5 and Spring Barrel Hub #9.

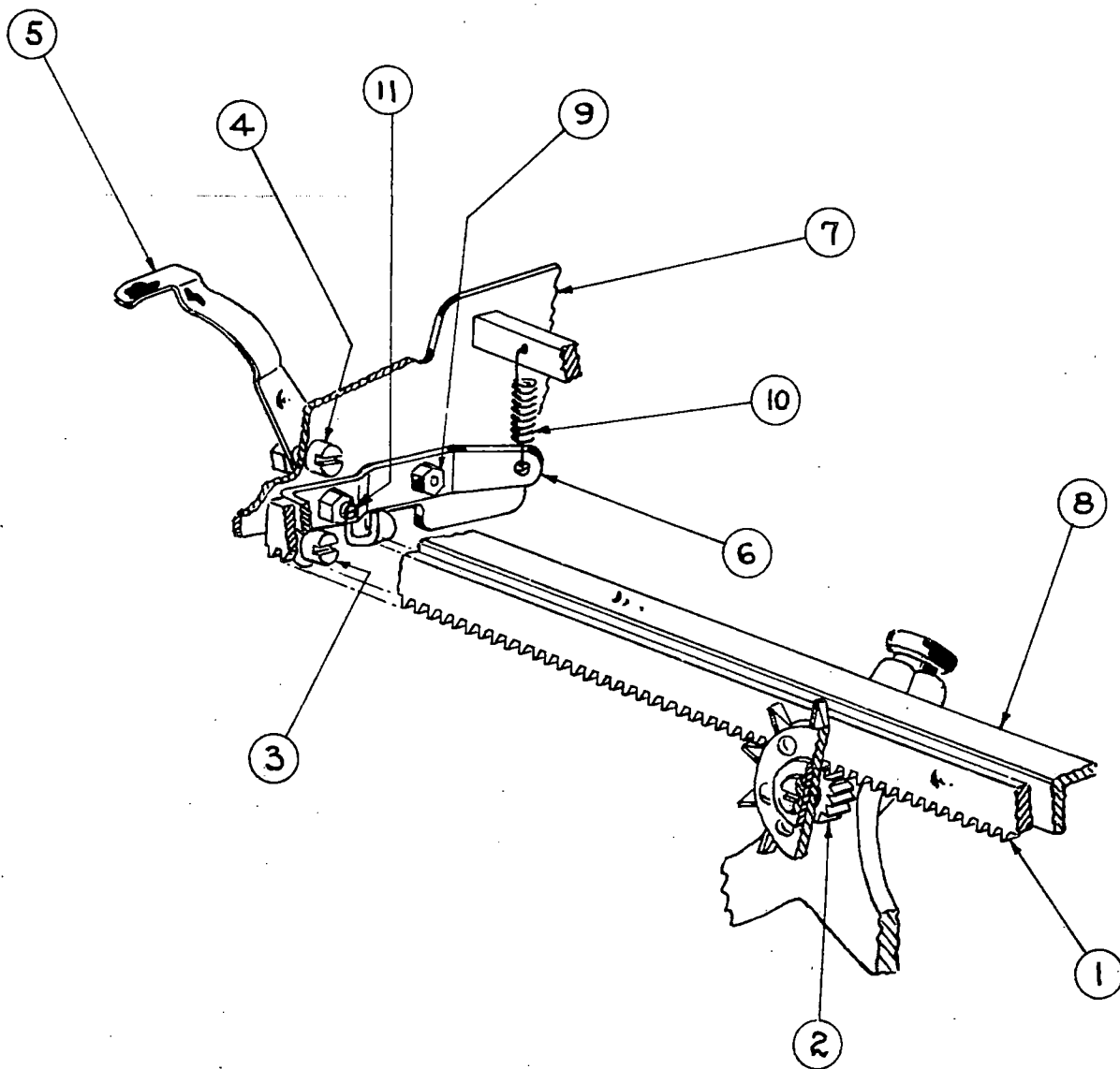
To replace, proceed in reverse order, being sure to assemble Worm Gear #5 to Spring Barrel Shaft #1 before it is inserted in its bearing in Spring Barrel Support #6.

Note whether excess play in Back Space Pawl Swinging Arm #7 has been removed; adjustment is provided for side play by set screw #8 in Spring Barrel Hub #9.

To adjust carriage tension, turn Main Spring Tension Adjuster #3 clockwise to increase tension, and anti-clockwise to reduce the tension.

Note whether Draw Band #10 is flat on Spring Barrel Rim so that interference with Ribbon Worm Shaft Pinion #11 will not occur, and any indication of a bulge at Draw Band End after it has been connected to Spring Barrel, should be flattened out. Care should be exercised to see that Draw Band is not twisted before connecting to extension on carriage end.

Main Spring tension should not be in excess of what is necessary to insure positive travel of carriage to extreme left with relation to Escape-ment, Tabulator and Line Lock.



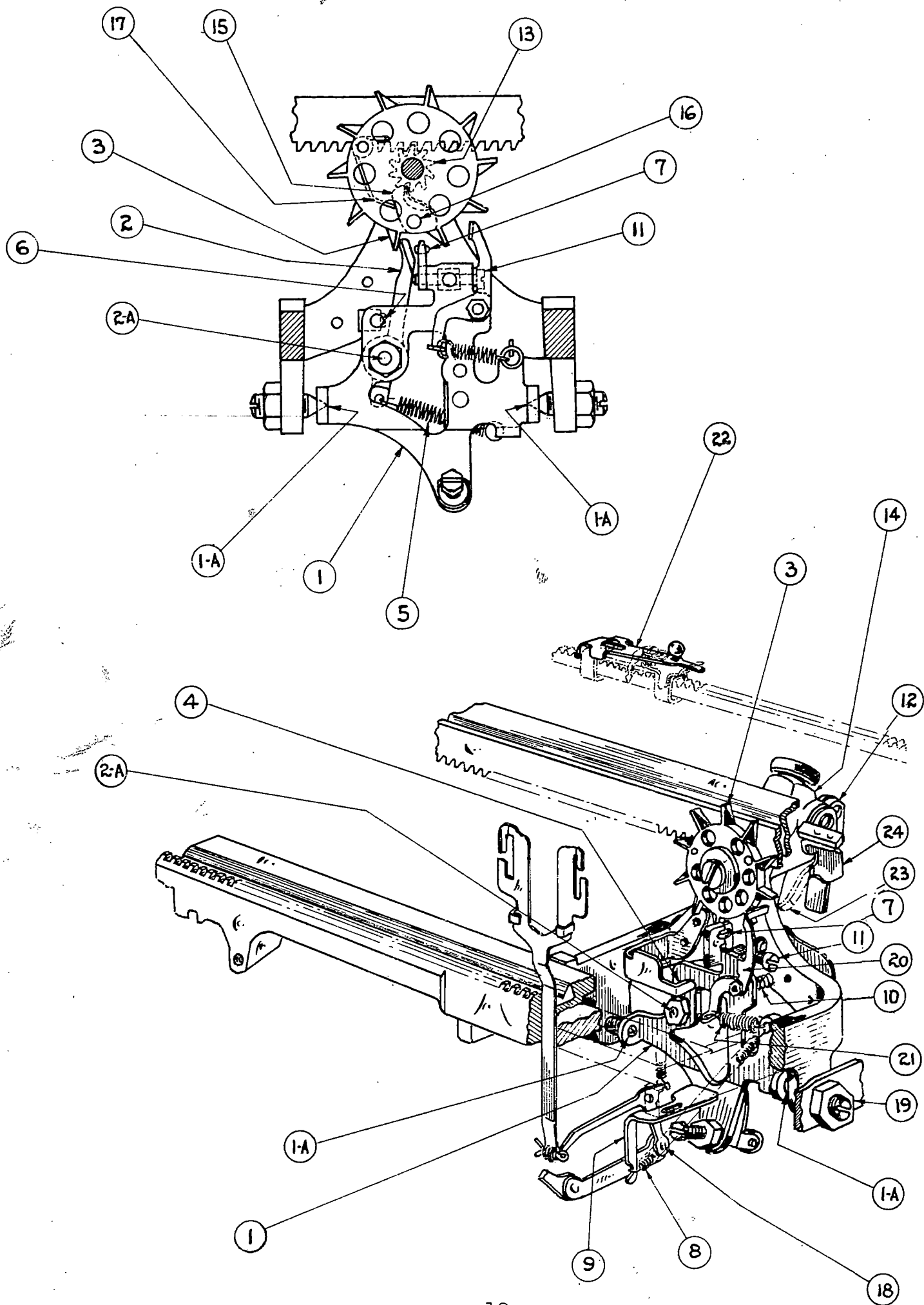
CARRIAGE RACK AND RACK BAIL

Carriage Rack #1 must be adjusted so that positive mesh with Ecapement Pinion #2 is maintained. Depth of Rack #1 in Pinion #2 is controlled by Rack Bail Eccentric Stop Screws #3 (Right and Left) and should be adjusted so that they will permit Carriage Rack #1 to engage teeth in Pinion deep enough to insure positive meshing. If rack teeth mesh too deeply, it will cause excessive wear and interfere with operation of carriage and will also cause a harsh noise when carriage is returned.

Eccentric Stop Screws Right and Left #4 are designed to control the height of the Carriage Rack #1 when released from Pinion #2 and should be set so that rack will clear pinion not exceeding 1/16". If position of Rack and Pinion has been changed, it will be necessary to check Rack Release Levers #5 to see that Rack Bail Eccentric Stop Screws #3 are not preventing Rack from setting proper depth in Pinion. Before attempting to lower Rack, turn Eccentric #3 to a lower point and readjust so that there is a little play between Rack Release Levers #5 and Eccentric Stop Screws #3. If Rack is set too deeply in Pinion, it will be necessary to set Eccentrics #3 to a higher position. After change has been made, be careful to note that there is a little play in Rack Release Levers #5.

Note that Rack Bail Ends #6 are parallel with Carriage Ends #7. It is very important that all side play be removed from Rack Bail #8. Note that Rack Bail Bearings #9 are adjusted so that Rack Bail will be free from bind and drops freely without the aid of Rack Bail Springs #10. Note that Springs #10 are properly connected and of sufficient tension to hold rack firmly in pinion.

Rack Bail adjusting Stud #11 is designed to provide close Rack Bail adjustment and will eliminate side play between Rack Bail Ends and Carriage Ends, provided Rail Bail Ends are parallel with Carriage Ends.



ESCAPEMENT

Escapement Plate #1 must be free on its Pivots #1-A and all side play must be removed.

Escapement Dog #2 must be free on its Fulcrum #2-A, but care must be exercised to note that there is not too much side play between Escapement Plate and Escapement Dog.

Escapement Dog #2 must be flush with face of Escapement Wheel Tooth #3 while in inactive position. Adjustment is controlled by Front Limit Plate #4. All late model machines are equipped with Front and Back Escapement Plate Stops replacing Front and Back Limit Screws.

Escapement Dog Spring #5 must have sufficient tension to insure return of Escapement Dog against Stop #6.

Escapement Roll #7 must be absolutely free on its bearing and predetermined distance of $1/64$ of an inch between Escapement Roll #7 and Escapement Dog #2 must be maintained. This adjustment is Factory Standard and it is not recommended that it be altered except in extreme cases where it is desired to decrease the distance between Roll and Escapement Dog, in which case a thinner Escapement Dog Washer (Part No. Z1911) be substituted. Attempting to decrease the distance between Escapement Dog and Escapement Roll by bending or any other method, is not satisfactory and should be discouraged.

Escapement Plate Spring #8 must have sufficient tension to actuate Escapement Plate. Tension adjustment is provided by adjustable Plate #9. Escapement Plates in late model machines are equipped with a kick back spring #10. On these machines Adjustable Plate #9 should be set at its lowest limit unless a heavy action is desired by the operator.

Escapement Plate Drop Screw #11 should be set so that when key is depressed, carriage will drop or move forward approximately $1/32$ of an inch. This is approximately Factory Standard and it is not recommended that this adjustment be disturbed.

Escapement Wheel #3 must run freely on its shaft, and Escapement Wheel Shaft Nut #12 must be set so that there is a little play between Escapement Pinion #13 and Escapement Frame #14.

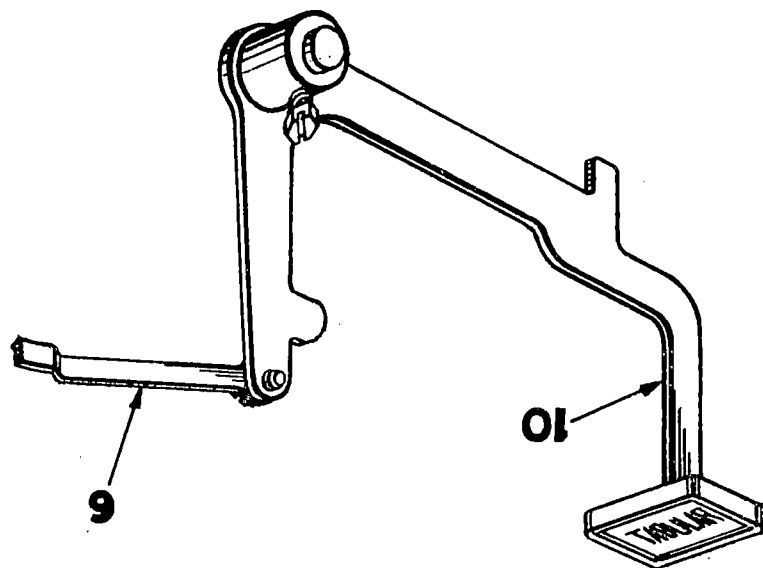
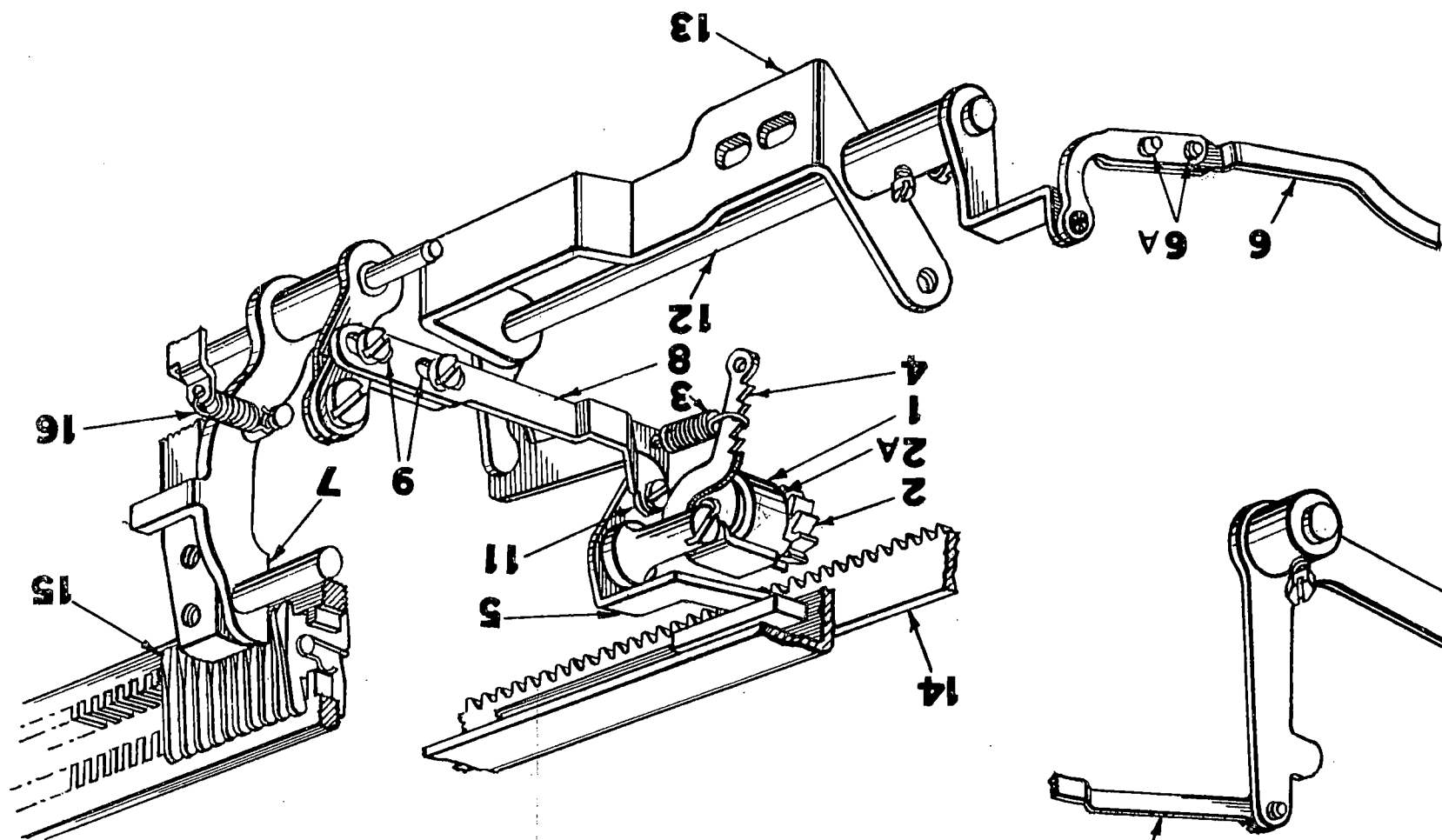
Escapement Pinion Pawl #15 must be free on its bearing #16 and Escapement Pinion Pawl Spring #17 must have the necessary tension to insure positive meshing of Pawl and Pinion. When replacing Escapement Pinion be sure to note that Pinion Teeth are facing in the right direction.

To remove Escapement Plate #1, remove Bichrome Ribbon Vibrator Link Screw #18; disconnect Escapement Plate Spring #8 from Adjusting Plate #9; loosen Right Escapement Pivot Screw Nut #19. Using tool S-197, withdraw Pivot #1-A Right until Escapement Plate #1 is clear of pivots - Escapement Plate can then be removed through bottom of the machine. To replace, proceed in reverse order.

Escapement Wheel Check Pawl #20 must be free on its bearing, and Check Pawl Spring #21 must have the necessary tension to return the Check Pawl to inactive position. Escapement Wheel Check Pawls are numbered to correspond with carriage spacing and are not interchangeable in all cases.

For 6, 12 and 14 pitch, Check Pawls are numbered 1. For 5 and 10 pitch, Check Pawls are numbered 2. For 9 and 16 pitch, Check Pawls are numbered 3. For 8 pitch, Check Pawls are numbered 4. It is imperative that the proper Check Pawl be installed. Escapement Wheel Check Pawls are not used on 20 pitch machines.

When it is desired to install Escapement Plate Assembly equipped with Check Pawl on a machine that was not previously equipped with this part, it is necessary to remove Left Margin Stop Handle #22 and substitute a Right Margin Stop Handle. It is also necessary to cut off Escapement Wheel Check Arm #23 on Tabulator Lift Lever #24, as Check Pawl replaces this arm.



TABULAR BRAKE

To eliminate carriage rebound and soften the impact while tabulating, a tabular brake is now provided on all KMM Models beginning with Serial Number 2,462,654.

This brake is exceedingly simple in construction and operation and consists of a Tabular Brake Friction Hub #1, a Tabular Brake Gear #2 and a Tabular Brake Spring #2A, the spring being contained within the friction hub and attached to the gear.

It will be noted that Gear #2 will make part of a revolution before engaging friction hub #1, which permits free movement of the carriage where tabular stops are used closely together. Each time the tabular key is released, the spring will return the gear to inactive position.

Brake #2 supplies the amount of brake friction desired and is controlled and adjusted by changing the position of the Tabular Brake Spring #3 to the desired notch in the Tabular Brake Friction Lever #4. The position of the notch and spring is governed by the width of the carriage. Care must be exercised not to apply brake friction in excess of what is necessary, because excessive brake friction will retard the normal operation of the carriage.

The Tabular Rack Lift Lever #5 MUST BE SYNCHRONIZED WITH BRAKE GEAR #2 and must be set so that the gear will mesh in Carriage Rack #14 and raise the rack high enough to disengage the escapement pinion, but care must be exercised to note that the brake gear does not mesh too deep in the carriage rack, as this will cause the assembly to be noisy and interfere with the free operation of the parts. It is not recommended that this adjustment be interfered with under normal conditions as the proper relation of the parts are determined and set at the factory.

It will be noted that there is a change in design of the tabular assembly and that convenient adjustment is now provided by the adoption of elongated holes in the Tabular Link #6. Adjustment can be obtained by loosening the Hexagon Head Screws #6-A and shortening or lengthening the tabular link as desired.

The Key Set Tabular Finger #7 is positioned as formerly and proper setting is obtained by changing the position of the Link #8. Elongated holes #9 in Link #8 have been maintained for adjustment of this part.

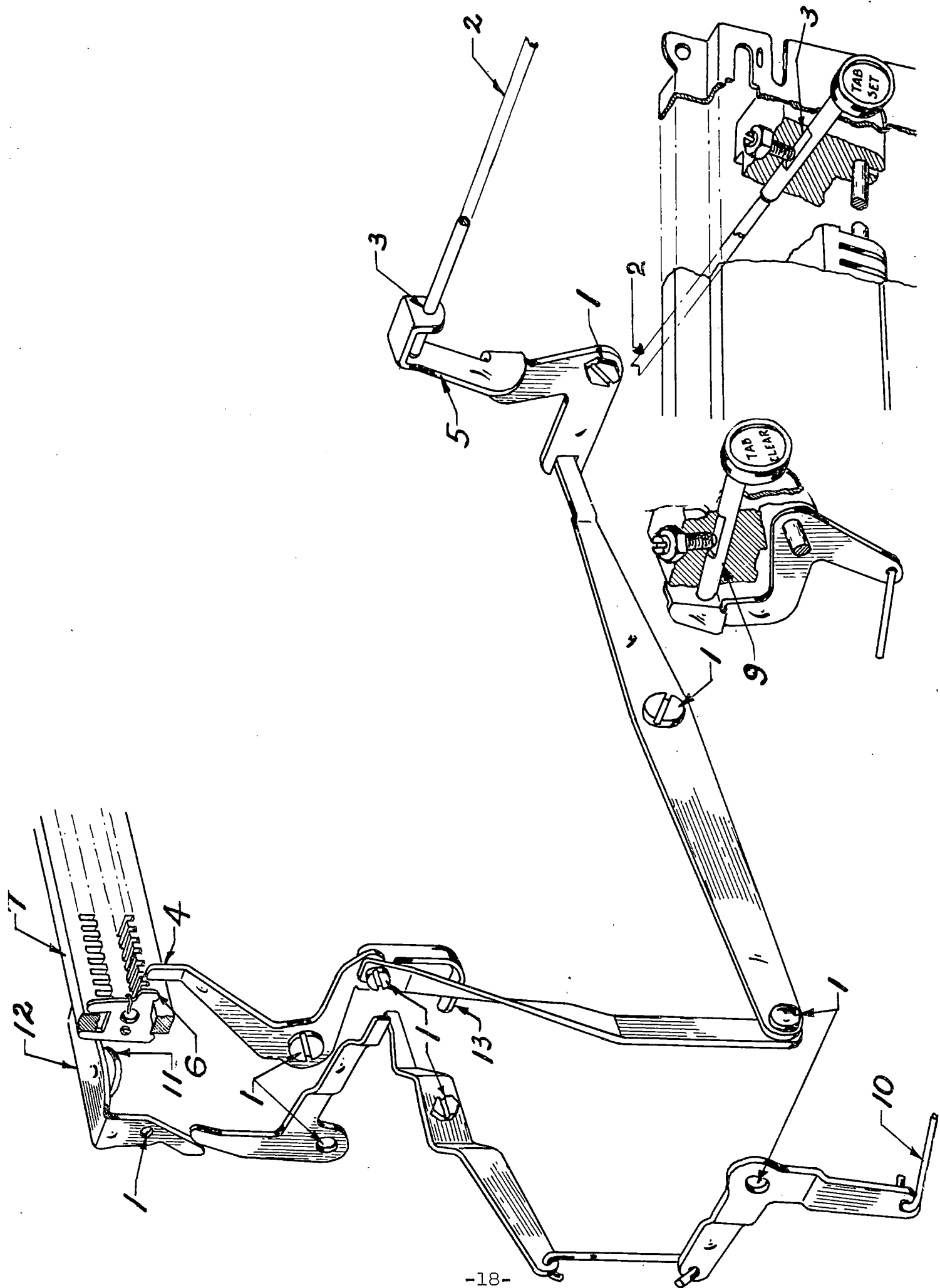
For accurate and dependable tabulation it is essential that all working parts are free from bind and that the proper relation of one adjustment to another is maintained. It is therefore suggested that the entire assembly be checked thoroughly after adjustments have been made to the tabulating assembly. To make this check, proceed as follows:

Note that the Tabular Key Lever #10 is free from bind and Tabular Link #8 is free on its Fulcrum #11. Also, see that the Tabular Lift Arm Rod #12 moves freely in the supporting Bracket #13.

See that the Tabular Lift Lever #5 is set so that it lifts the Carriage Rack #14 the proper distance from the escapement pinion with the tabular key depressed, being careful to observe that it does not lift the carriage rack too high. It is recommended that this adjustment be made from elongated holes in the Tabular Link #6.

See that the Key Set Tabular Finger #7 is set so that it clears unset Tabular Stops #15 when the tabular key is depressed. Also, that the finger comes forward far enough to insure sufficient purchase on the Tabular Stop #15 while tabulating.

See that Spring #16 is properly connected and has sufficient tension to return Assembly to inactive position.



TABULATOR SET KEY

Note that all parts are free from interference and working freely on all fulcrums #1. Note that Key Set Tabulator Set Key Stem #2 is not distorted and is working freely on bearings #3.

Adjustment is provided for proper throw of Key Set Tabulator Stop Set Arm #4 by bending Key Set Tabulator Set Key Stem Crank #5 toward the front of the machine, being careful not to bend Crank in excess of that necessary to push Tabulator Stop #6 into positive locked tabulating position. When Tabulator Set Key is depressed to its full limit, Tabulator Stop Set Arm should contact Tabulator Stop #6 lightly. Inactive position of Tabulator Stop Set Arm #4 is controlled by extension #13 on Set Arm. This extension rests against the Base Back and proper bending is determined at the Factory. With Extension #13 resting against Base Back and in inactive position, there should be clearance of approximately three-sixteenths of an inch between unset tabulator stops and Set Arm #4.

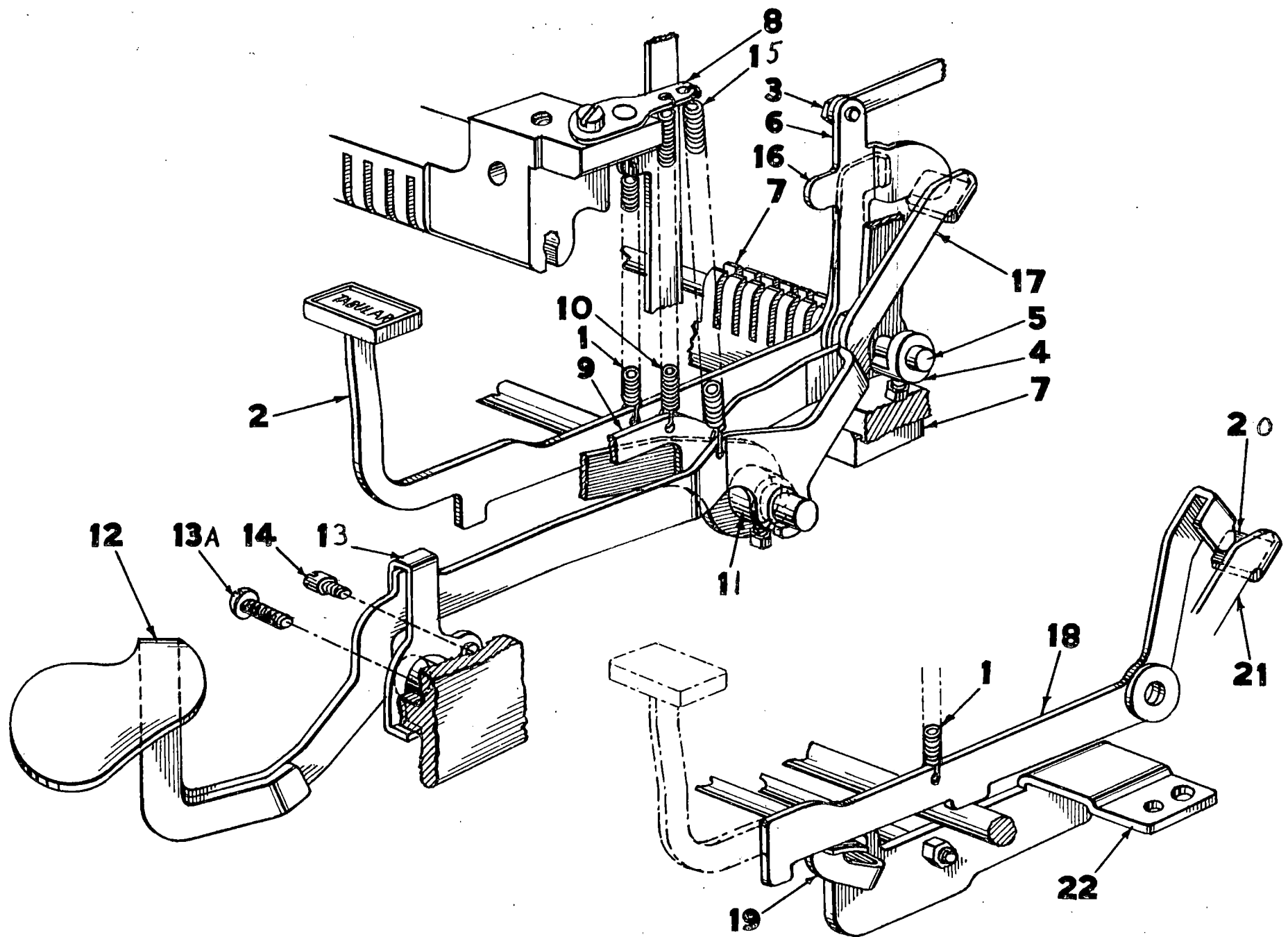
If it is found necessary to disturb Tabulator Rack #7 adjustment in order to establish accurate tabulating registration by moving Rack #7 to right or left, Tabulator Stop Set Arm #4 will have to be checked to note that it sets directly in front of Tabulator Stops #6 and not inclined to either side. If Set Arm #4 is not set properly, there is danger of the Arm becoming wedged between the stops and in some cases two stops will be set at one operation. Tabulator Stop Set Arm #4 can be bent to right or left as desired.

TABULATOR CLEAR KEY

Note that all parts work freely on Fulcrums #1 and that Tabulator Clear Key #9 works freely on its bearings.

Key Set Tabulator Stop Release Roll #11 should be set so that when Tabulator Clear Key is depressed, Roll #11 will contact Tabulator Stop #6 and push it forward into positive locked unset position. Shortening Tabulator Clear Key Link #10 will provide quicker contact with Tabulator Stops #6, but link should not be shortened in excess of what is necessary to push stops into positive unset position, and when Clear Key is fully depressed Tabulator Stop Release Roll #11 should rest lightly against unset Tabulator Stops.

A stop is provided on Key Set Tabulator Release Bracket #12 to limit the inactive set position of Tabulator Stop Release Roll #11.



INSTALLING PALM TABULATOR ON KMM MODELS WITH 5-6-10 KEY DECIMAL TABULATOR

Remove Top Cover (See instructions for removing Top Cover.)
Remove Base Panel Right.
Remove Front Plate.
Remove Bottom Plate.
Remove Key Lever Guide and Support.
Remove Margin Release Key Lever Collar #4.
Slip Margin Release Key Lever #9 over Fulcrum Rod #5. Do not remove from machine.
Remove Fulcrum Rod #5, retaining Screw (Screw not visible on drawing.)
Push Fulcrum Rod #5 to left until end of rod clears hole in Tabulator Lever #2.
Remove and discard Tabulator Key Lever #2, disconnecting Spring #1 from Lever only. Retain Washer (Not visible on cut).

Replace Tabulator Key Lever #2 with Key Lever Crank Arm #18, placing Washer to left of Crank Arm.
Push Fulcrum Rod #5 to the right, inserting it through holes in Washer and Crank Arm Extension #18. Center hole in fulcrum rod with tapped hole in Key Lever Bracket #7. Insert screw and secure.

Replace Margin Release Key Lever #9 on Fulcrum Rod #5.
Attach new Margin Release Key Lever Collar #4 and secure with set screw.

Attach Tabulator Key Lever Spring #1 to Key Lever Crank Arm #18.

Unhook Margin Release Key Lever Spring #10 from Spring Anchor Plate #8.
Attach Spring Anchor Plate supplied with Palm Tabulator Parts for replacement.
Attach Spring #10 to Plate #8. Attach Spring #1 to Plate #8 as shown on cut.

Remove Bottom Plate Side Right.
Remove and discard Shift Frame Retaining Collar #11 and substitute with shoulder collar supplied with Palm Tabulator Parts.

Insert Palm Tabulator Lever #12 through front of machine. Insert shoulder collar before attaching Palm Tabulator Lever to Shift Frame. Secure collar with set screw and check for close adjustment and freedom from bind.

Assemble Key Lever Guide #13 as shown on cut, using #13-A retaining screw. Note that Palm Tabulator Lever is free in Guide #13 before attaching Stop Screw #14.

Replace Bottom Plate Side Right.
Replace Key Lever Guide and Support.
Note that Crank #19 is centered with Key Lever Crank Arm #18.
Note that Key Lever Crank Arm #18 and Palm Tabulator Lever #12 are adjusted so that with Palm Tabulator in inactive position, there is a little play between the levers at point #20. Lever #12 can be bent at point #21, but should not be bent in excess of what is necessary to provide a very little play between the levers.
Note that Bracket #22 is positively secured to Base.
Replace Front Plate, Top Cover, Base Panel Right and Bottom Plate.

Note that all set screws are secure and all Tabulator Parts free from bind.

INSTALLING PALM TABULATOR ON KMM MODEL WITH TABULATOR BRAKE

Remove Top Cover (see instructions for removing Top Cover).

Remove Front Plate.

Remove Bottom Plate. Remove Right Base Panel.

Disconnect Tabulator Spring #1 from Tabulator Key Lever #2.

Disconnect and remove Key Lever Guide and Support.

Remove Tabular Key Lever Screw #3.

Remove Margin Release Key Lever Collar #4 and discard collar.

Slip Margin Release Key over Fulcrum Rod #5, but do not remove from machine.

Remove Fulcrum Rod Retaining Screw (not visible on drawing).

Push Fulcrum Rod to left until end of rod clears hole in Tabulator Lever #2 (use extra Fulcrum Rod as a follow-up rod).

Tabulator Key Lever can now be removed by working it out through front of machine.

Insert Tabulator Key Lever that is supplied for replacement, also Tabulator Key Lever Extension #6. Palm Tabulator Key Lever Extension #6 is placed to the right of Tabulator Key #2.

Push Fulcrum Rod #5 to the right, inserting it through holes in Tabulator Key Lever and Key Lever Extension, centering hole in fulcrum rod with screw hole in Key Lever Bracket #7. Insert set screw and secure.

Replace Margin Release Key Lever #9 on Fulcrum Rod.

Attach Margin Release Lever Collar (flat) #4 and secure with set screw.

Unhook Margin Release Key Lever Spring #10 from Spring Anchor Plate #8. Attach Spring Anchor Plate supplied with Palm Tabulator Parts for replacement.

Hook Margin Release Key Lever Spring #10 to Plate #8 as shown on cut. Attach Tabulator Key Lever Spring #1 to Tabulator Key Lever #2.

Remove Bottom Plate Side Right (see instructions for removing Bottom Plate Sides).

Remove and discard Shift Frame Retaining Collar #11 and substitute with shoulder collar supplied with Palm Tabulator parts.

Insert Palm Tabulator Lever #12 through front of machine, nest shoulder collar #11 in Palm Tabulator Lever #12 and assemble to Shift Frame. Secure collar with set screw and check for close adjustment and freedom from bind.

Assemble Key Lever Guide #13 as shown on cut, using #13-A retaining screw. See that Palm Tabulator Lever #12 is free in Guide before attaching Stop Screw #14.

Attach Spring #15 to Palm Tabulator Lever and Spring Anchor Plate #8 as shown in cut.

Replace Bottom Plate Side Right. Replace Fulcrum Screw #3.

Replace Key Lever Guide and Bracket.

See that Palm Tabulator Key Lever Extension #6 and Palm Tabulator Key Lever #12 are adjusted so that when Palm Tabulator Key is depressed, Key Lever Extension #6 will contact Ribbon Spool Bracket Right at point #16. With Palm Tabulator Key fully depressed and arrested by Stop Screw

#14 and Extension Lever #6 fails to make contact with Ribbon Spool Bracket, it will be necessary to bend Palm Tabulator Key Lever #12 at point #17, until contact is made, being careful not to bend this part in excess of that necessary to accomplish this adjustment.

Replace Top Cover. Attach Base Panel Right. Replace Bottom Plate. Note that all screws are secure and all parts free from bind. For further adjustments, see Instructions for Tabulator.

INSTALLING PALM TABULATOR ON KMM MODEL (WITHOUT TABULATOR BRAKE)

Remove Top Cover (See instructions for removing Top Cover).
Remove Front Plate.
Remove Base Side Panel Right. Remove Bottom Plate.
Disconnect Tabulator Link (not shown on cut) from Tabulator Key Lever Extension (This will be replaced with Palm Tabulator Key Lever Extension).
Remove Margin Key Lever Collar #4 and discard collar.
Disconnect and remove Key Lever Guide and Support.
Slip Margin Release Key Lever over Fulcrum Rod #5. Do not remove from machine.
Remove Fulcrum Rod Retaining Screw (not visible in cut).
Push Fulcrum Rod #5 to left until end of rod clears hole in Tabulator Lever Extension (use extra Fulcrum Rod as a follow-up rod).

It is not necessary to substitute Tabulator Key Levers on machines that are not equipped with Tabulator Brake.

Insert Palm Tabulator Key Lever Extension #6 (this replaces regular Tabulator Key Lever Extension and is not to be confused with Palm Tabulator Key Lever Extension Supplied for KMM Models equipped with Tabulator Brake).

Push Fulcrum Rod #5 to the right inserting it through hole in Key Lever Extension, centering hole in Fulcrum Rod with screw hole in Key Lever Bracket #7.

Insert set screw and secure.

Replace Margin Release Key Lever #9 on Fulcrum Rod #5 and attach New Margin Release Key Lever Collar #4 and secure with set screw. Check for bind.

Remove Bottom Plate Side Right (see instructions for removing Bottom Plate Side).

Remove and discard Shift Frame Collar and replace with Palm Tabulator Lever Shift Frame Collar #11.

Insert Palm Tabulator Lever #12 through front of machine, nest shoulder of Shift Frame Collar #11 in Lever #12 before assembling to Shift Frame. Secure Collar #11 with set screw and check for close adjustment and freedom from bind.

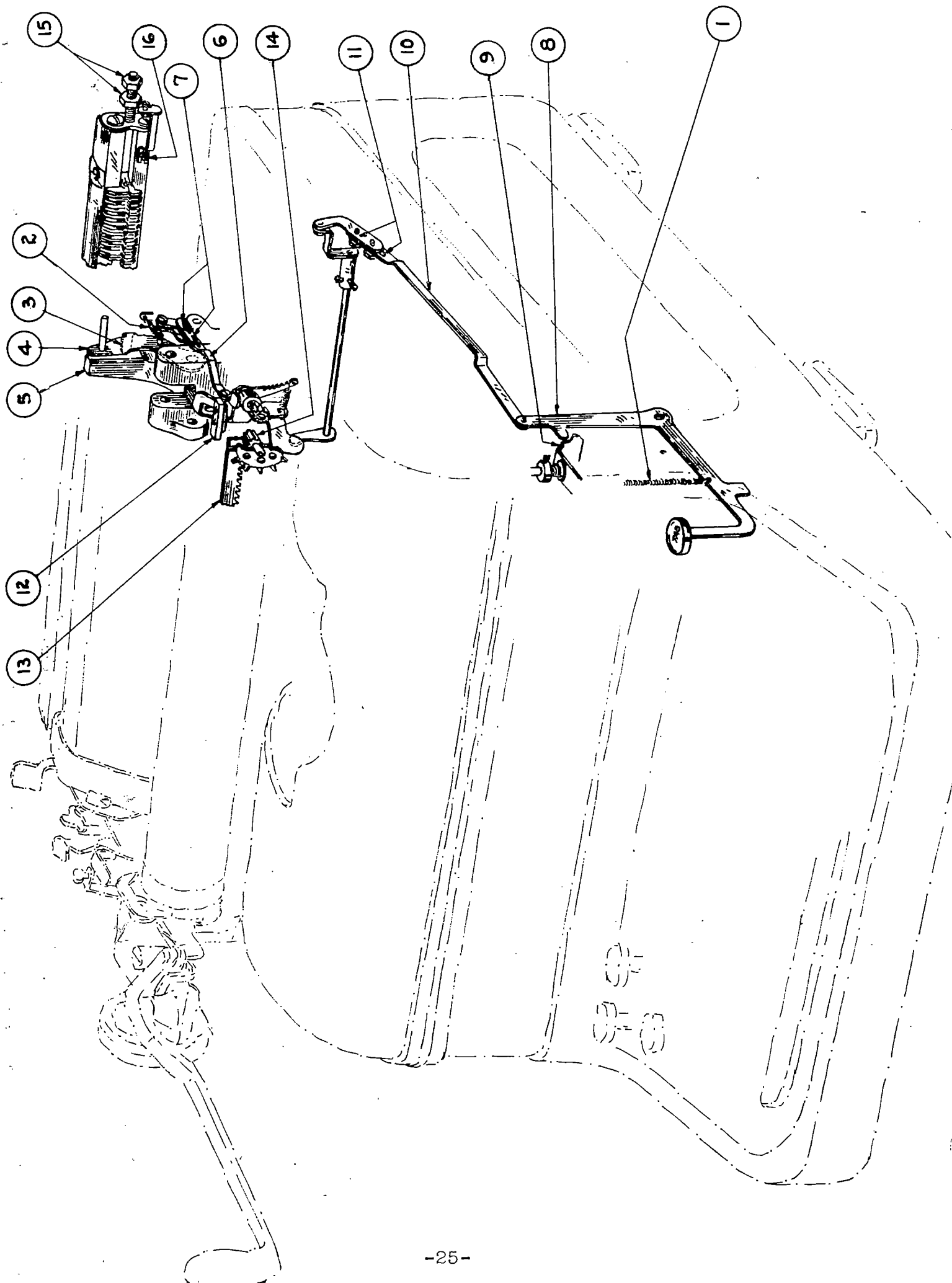
Assemble Key Lever Guide #13, using #13-A retaining screw. Note that Palm Tabulator Lever #12 is free from bind in Guide #13, before attaching Stop Screw #14.

Substitute Spring Anchor Plate #8 with plate supplied with Palm Tabulator Parts.

Attach Margin Release Spring #10 to Plate #8.

Attach Palm Tabulator Spring #15 to Palm Tabulator Lever #12 and to Plate #8.

Replace Bottom Plate Side Right.
Replace Key Lever Guide and Bracket.
Attach Tabulator Key Lever Link (not shown on cut) to Key Lever Extension #6. Follow instructions as outlined in instructions for adjusting Palm Tabulator KMM Model.
Replace parts as outlined in Instructions KMM Model with Tabulator Brake.



TABULATOR (EQUIPPED WITH TABULATOR BRAKE)

Note that all working parts are free from bind, that Tabulator Key Lever Spring #1 and Key Set Tabulator Finger Spring #2 are properly connected and of sufficient tension to return Tabulator Key Lever and Tabulator Finger to inactive position.

Extension #3 on Tabulator Finger #4 is designed to limit the throw of Tabulator Finger so that when Tabulator Key is depressed, interference with unset Tabulator Stops will not occur and should be checked so see that with Tabulator Key depressed there is clearance of approximately $1/32$ of an inch between Tabulator Finger and unset Tabulator stops. This can be tested by pushing Tabulator Finger Extension #3 against Center Stop Bracket #5 and noting clearance.

Key Set Tabulator Finger Link Lever #6 is designed with elongated holes #7 to provide accurate adjustment for Tabulator Finger and Tabulator Key Lever and should be adjusted so that with Tabulator Key Lever fully depressed and Tabulator Key Lever Extension #8 contacting Ribbon Spool Bracket at point #9, Extension #3 on Tabulator Finger should contact Center Stop Bracket #5.

Tabulator Link #10 is provided with elongated holes #11 to permit alteration of the length of this part. If Tabulator Link #10 is adjusted too short, it will arrest Tabulator Key Lever before it has reached the full limit of depression by causing Extension #3 on Tabulator Finger #4 to contact Center Stop Bracket too soon. If Tabulator Link is too long, it will prevent Tabulator Rack Lift Lever #12 from raising Carriage Rack #13 high enough to clear Escapement Pinion #14 when parts are in active tabulating position.

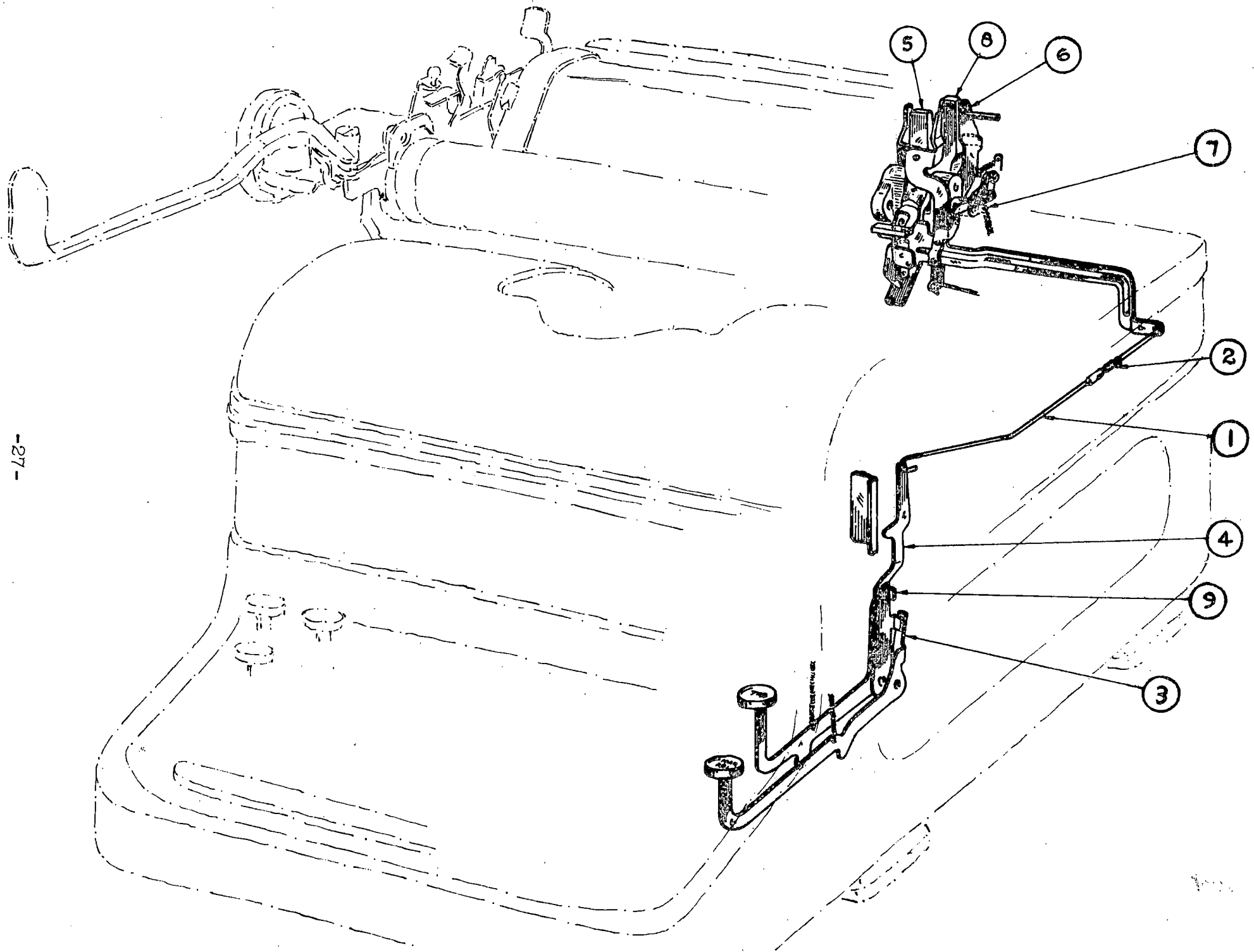
It is essential that adjustment of Tabulator Finger Extension and Center Stop Bracket #5, Tabulator Key Lever Extension and Ribbon Spool Bracket #9 and Tabulator Link #10 be synchronized as outlined above.

If registration is not accurate, it will be necessary to move Key Set Tabulator Rack Assembled to the right or left as desired, by loosening Tabulator Rack Nuts #15 and Carriage End Brace Screw Nuts #16 and adjusting Tabulator Rack so that while in inactive tabulating position Key Set Tabulator Finger #4 will set a little to the left of Set Tabulator Stops and not directly behind them. This can be tested by depressing Back Space Key and Tabulator Key consecutively and noting that Tabulator Finger #4 clears set Tabulator Stops a trifle to the left.

Tabulator Rack Assembled must be adjusted so that graduations are in unison with Margin Rack, Cylinder, Paper Holder Rod and Paper Table Scales.

Note that all screws and nuts are secure.

For further adjustments on Tabulator, see "Instructions for Tabulator Brake".



TABULATOR (NOT EQUIPPED WITH TABULATOR BRAKE)

Since Margin Release Mechanism works in conjunction with Tabulator mechanism on machines that are not equipped with Tabulator Brake, the method of adjustment varies a trifle.

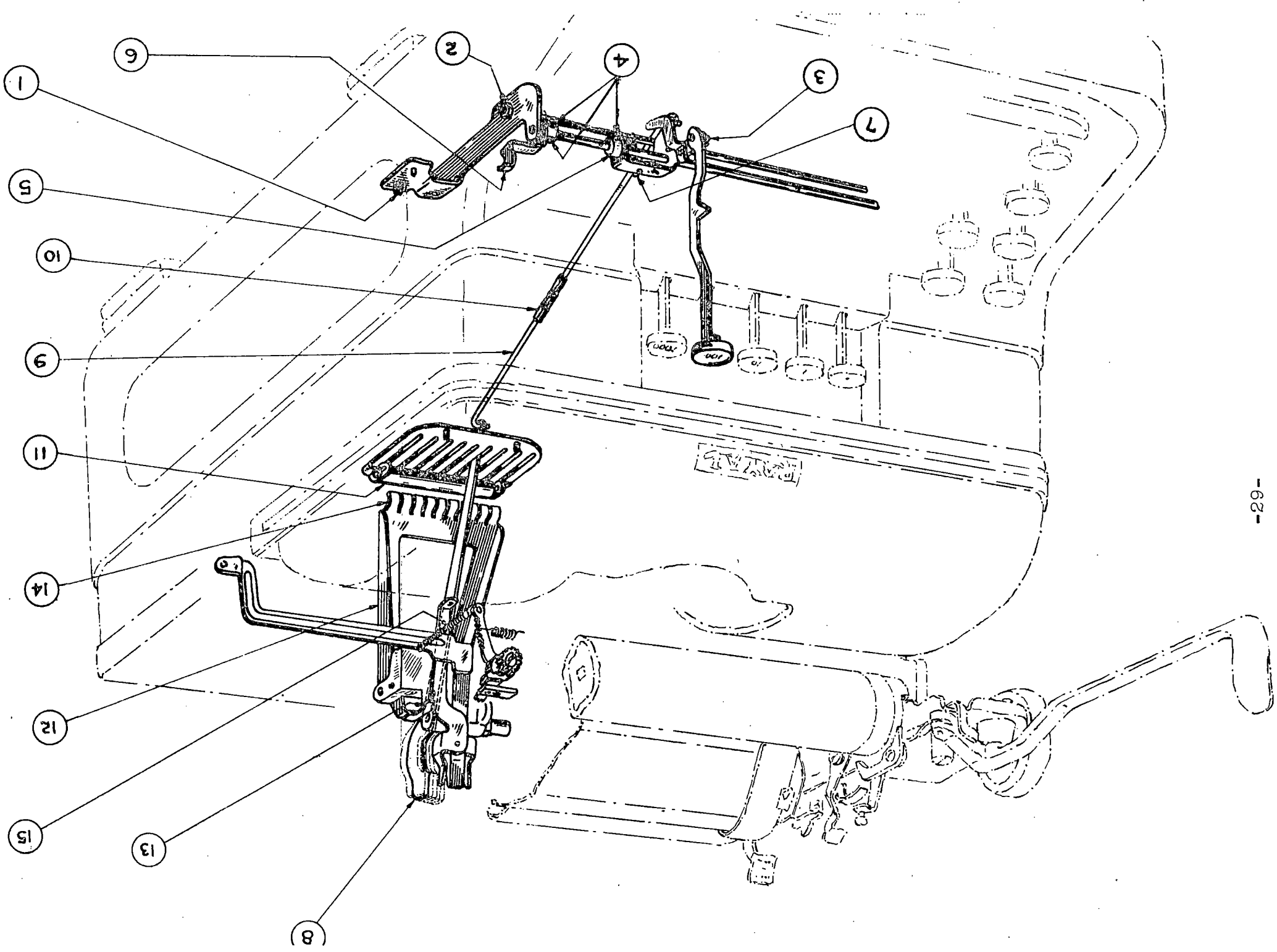
Margin Release Link #1 is employed to actuate both Margin Release and Tabulator and is provided with a Turnbuckle #2 for controlling the length of this part.

When adjustment is necessary, loosen Turnbuckle and shorten or lengthen link as desired, turning short end of link anti-clockwise to shorten and clockwise to lengthen.

Margin Release Link #1 should be adjusted so that when in inactive position, positive contact with Margin Stop Adjusting Screw will be maintained. (See instructions for adjusting Margin Stops.) Extension #3 on Margin Release Key Lever should rest against Tabulator Key Lever Extension #4. Check to see that when Margin Release Key is depressed, Margin Stops clear Center Stop #5 and that the free travel of the Carriage is not retarded while operating under normal conditions. Improper adjustment of Margin Release or excessive spring tension on Tabulator Finger #6 or Link Crank End #7 might cause a drag in Carriage when Margin Stops are passing Center Stop.

Setting of Tabulator Finger with its relation to Center Stop Bracket #8, Tabulator Key Lever Extension #4, and contact with Ribbon Spool Bracket Right are the same as in instructions for the adjustment of machines equipped with Tabulator Brake. Extension on Tabulator Key Lever #9 should rest against Tabulator Key Lever Extension #4 with mechanism in inactive position.

For further instructions, see "Tabulator equipped with Tabulator Brake".



5 - 6 - 10 KEY (KEY SET DECIMAL TABULATOR)

Check Binding Screws #1 on Decimal Tabulator Link Crank Bracket Right and Left, and note that they are secure. Check Nuts #2 on Key Tension Spring Anchor Rod.

Check Key Stem Fulcrum Screws #3 and Set Screws #4 in Collars #5 and Tabular Key Lever Crank #6. Note that all Decimal Tabulator Link Crank Springs #7 are properly connected.

Decimal Tabulator Fingers #8 should be adjusted so that while in inactive position they will be in parallel alignment and clear Tabulator Stops set in tabulating position by approximately $1/16$ of an inch. This is accomplished by shortening or lengthening Decimal Tabular Links #9 until these adjustments are obtained. Decimal Tabulator Links #9 are adjusted by loosening Turnbuckle #10 and turning link end to the right or left as desired until proper position of Decimal Tabulator Finger is attained.

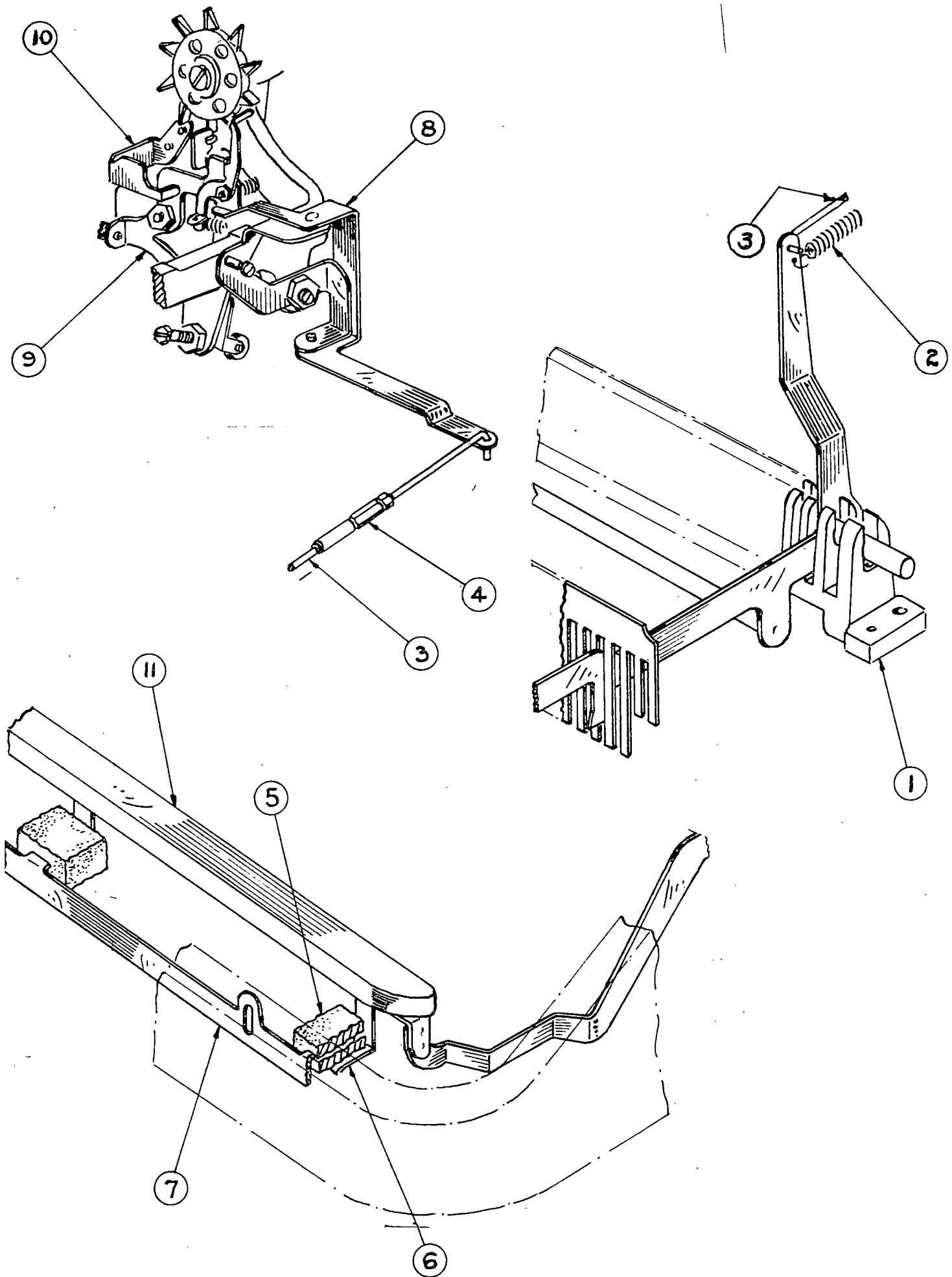
Decimal Tabulator Finger Buffer #11 should be adjusted so that with Decimal Tabulator Keys depressed, Decimal Tabular Fingers #8 will clear Tabulator Stops while set in neutral or inoperative position by approximately $1/32$ of an inch. It is important to note that Decimal Tabulator Finger Buffer #11 is positively secured after adjustment has been made.

Decimal Tabulator Universal Bar #12 can be bent at point #13 to regulate the clearance between Carriage Rack and Escapement Pinion when Decimal Tabulator Keys are depressed. This distance should not exceed, nor be less than approximately $3/64$ of an inch.

Decimal Tabulator Universal Bar #12 is designed to provide individual adjustment of Decimal Tabulator Fingers #8 at point #14 and if it is found that any individual Decimal Tabulator Key fails to lift Carriage Rack the required distance when fully depressed, it will be necessary to bend point #14 on Decimal Tabulator Universal Bar #12 directly in front of connecting Decimal Tabulator Finger.

Note that Spring #15 connected to Tabulator Brake Gear and Center Stop Arm is properly secured and of sufficient tension to return Tabulator Brake Gear to inactive position.

Instructions for adjusting Non-Key Set Decimal Tabulator are substantially the same.



SPACE BAR

Space Bar #11 must operate freely in Key Lever Bracket #1. Space Bar Spring #2 must have sufficient tension to return Space Bar to inactive position.

Space Bar Link #3 can be adjusted by disconnecting Link from Space Bar Frame and loosening Space Bar Link Nut #4. Turning Link end clockwise will shorten Link and anti-clockwise will lengthen it.

Space Bar Link #3 must be adjusted so that after carriage escapes there will be at least one-eighth of an inch downward travel of the Space Bar before it makes contact with Space Bar Buffers #5. Secure Nut #4.

Extensions #6 on Space Bar Frame are designed to limit position of Space Bar while in inactive position and when set surface of Space Bar should be approximately 1/4 of an inch below lower bank key top.

Space Bar Buffer Support #7 is provided with elongated holes to permit up and down adjustment of Space Bar Buffers #5. It is important to note that when adjustment of Space Bar Link #3 is disturbed, Space Bar Buffers #5 will have to be readjusted so that not less nor more than an eighth of an inch downward travel of the Space Bar will occur after the Carriage escapes.

If Space Bar Link #3 adjustment has been disturbed, check Space Bar Trip Arm Support #8 to see that Space Bar Trip Arm is not resting against Escapement Plate #9. There should be a little space between Trip Arm and Escapement Plate when machine is in inactive position. This is important - IF TRIP ARM IS RESTING AGAINST ESCAPEMENT PLATE IT WILL PREVENT IT FROM CONTACTING FRONT LIMIT PLATE #10 AND IMPAIR ESTABLISHED RELATION OF ESCAPEMENT DOG AND ESCAPEMENT WHEEL TOOTH.



AUTOMATIC RIBBON REVERSE

Automatic Reverse Arms #1 must be absolutely free from bind and Automatic Reverse Arm Springs #2 should be checked to see that they are properly connected and of correct tension. Tension of Springs #2 should not be in excess of that necessary to return Automatic Reverse Rolls #3 to inactive position. Inactive position of Reverse Rolls should have clearance of approximately $1/64$ of an inch from Cam #4. A slight bend at point #1 in either direction will provide further adjustment for throw of Ribbon Reverse Rolls #3.

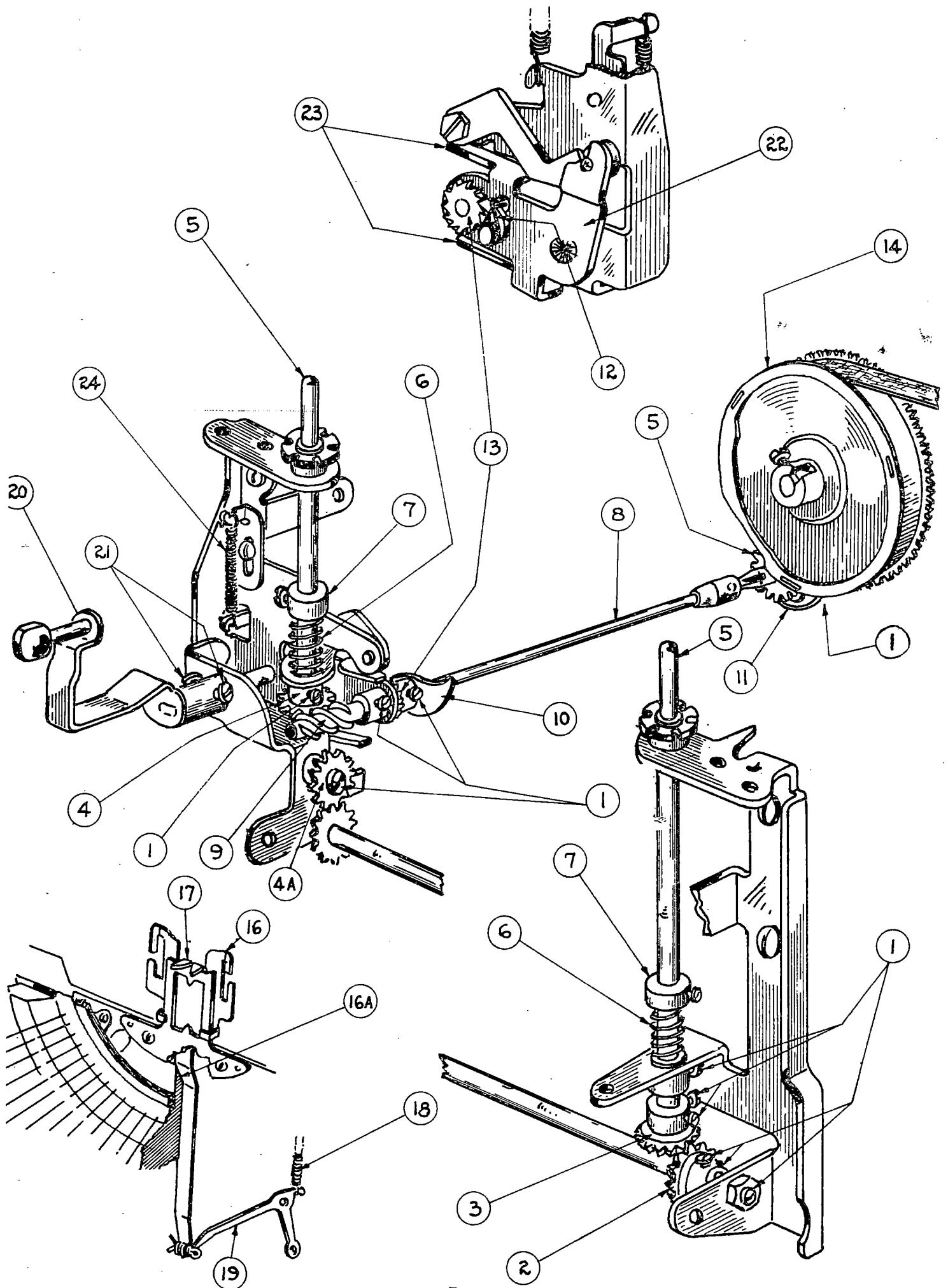
Inactive position of Reverse Rolls #3 are governed by fixed stops #5 and on right side only by Set Screw #6. Actuating limits are governed by extensions on Automatic Reverse Arms #7.

See that Automatic Reverse Arms #1 clear Ribbon Spool Cups and that Ribbon Spools are perfect and run freely. It is recommended that Ribbon Spools manufactured by the Royal Typewriter Company, Inc., be used exclusively.

Check Automatic Ribbon Spool Trip #8 and note that it releases and drops when ribbon is completely unwound from spool. Check Trip Return Spring #9 and note that it has sufficient tension to insure positive drop of Automatic Ribbon Spool Trip #8.

See that Ribbon Spool Flange #10 is not bent or distorted.

If Automatic Reverse Roll Right #3 is set too high, there is some danger that when extreme point of Cam #4 is in contact with Reverse Roll #3, spiral of Ribbon Reverse Worm #11 will be forced against tooth of Ribbon Spur Gear #12. This would only occur when tooth of Spur Gear #12 happened to be set directly above spiral of worm when Automatic Ribbon was in process of reversing and would have a tendency to lock the ribbon movement and possibly disconnect Carriage Draw Band. When this occurs, bend Automatic Reverse Roll down a trifle to provide more clearance.



RIBBON FEED

See that all Set Screws #1 shown on cut are secure and that Ribbon Beveled Gears Nos. 2 and 3 are properly meshed, that Idler Gear #4-A and Spur Gear #4 are in proper mesh, and that Ribbon Spool Shaft Spur Gear Left #4 and Ribbon Spool Shaft Beveled Gear #3 are set so that they do not bind against bottom of Ribbon Spool Bracket and interfere with the free movement of Ribbon Spool Shafts #5. Adjustment of Ribbon Spool Tension Springs #6 is controlled by adjusting Tension Spring Collar #7. Care should be exercised not to put too much tension on Ribbon Spool Shafts #5 as this will retard the free travel of the ribbon feed. Sufficient tension to provide a slight drag on the ribbon to prevent a back lash in the Ribbon Spools is all that is necessary.

To remove Ribbon Worm Shaft #8, loosen Set Screws #1 in Ribbon Reverse Worm #9 and in Cam #10. Loosen Set Screw #1 in Pinion Case #11. Ribbon Worm Shaft #8 can then be drawn upward through Ribbon Reverse Worm and Ribbon Reverse Cam. When replacing, be sure all set screws are over flat surfaces of shaft before securing.

Note that Ribbon Worm Ratchet Spring #12 has sufficient tension to check Ribbon Reverse Worm Ratchet #13. Be sure to see that pawl is in alignment with ratchet.

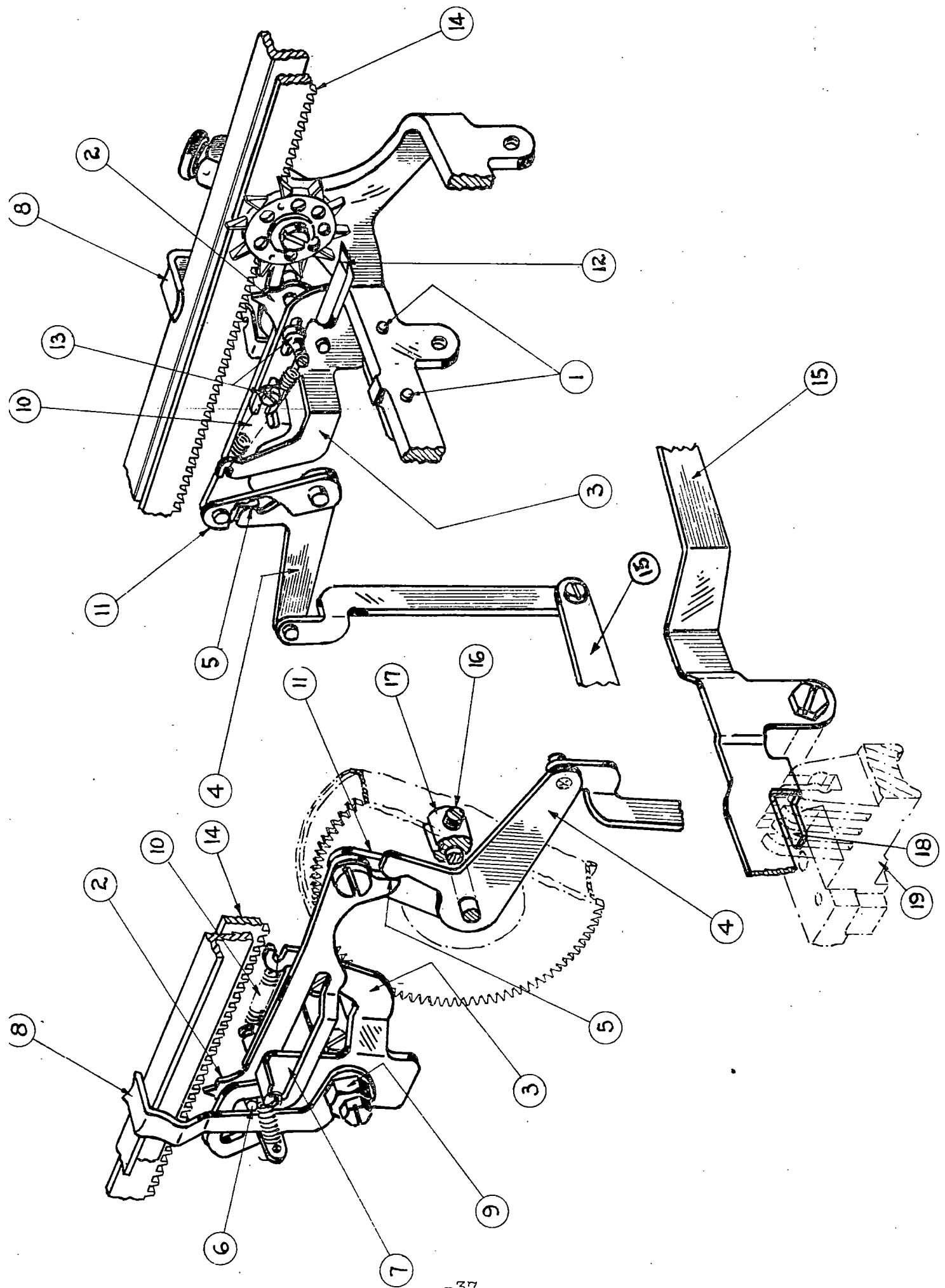
Note that Spring Barrel #14 is free of bind and Spring Barrel Gear making proper contact and mesh with Ribbon Worm Shaft Pinion. Note that all set screws in Spring Barrel Assembly are secure.

It is important that Top Cover Stops are properly adjusted so that Top Cover will not rest on Ribbon Spools and cause them to bind. (See instructions on Top Cover.)

Note that Ribbon Vibrator #16 is properly formed and that sufficient clearance is provided at point #16-A. It is also necessary to see that the Ribbon Vibrator #16 does not hug Type Bar Guide #17 too tightly as this will cause the Ribbon Vibrator to stick. The Ribbon Vibrator should be adjusted so that it is flat against the back of the Type Bar Guide #17 without springing or binding against it. Note that Ribbon Vibrator Arm Spring #18 is properly connected and of sufficient tension to return vibrator to normal position. If Ribbon is lifting too high or not lifting high enough, bend the end of the Ribbon Vibrator Arm #19 up or down, using Benders #S-39.

Ribbon Reverse Handle #20 must be adjusted so that Ribbon Feed Release when operated to the left, will hold Reverse Handle #20 in neutral position, disengaging ribbon feed. Reverse Handle #20 is adjusted by set screws #21. Limits for Ribbon Reverse Arm #22 are indicated by Extensions #23 and must be adjusted so that Ribbon Reverse Worm #9 will engage Spur and Idler Gears Nos. 4 and 4-A at the proper depth. The Extensions #23 can be bent to provide proper adjustment. Worm #9 should not engage gears to a depth in excess of that necessary to insure accurate ribbon drive, and meshing worm too deep will interfere with free movement of Ribbon Feed.

Ribbon Reverse Arm Spring #24 must have sufficient tension to hold Worm #9 securely in ribbon gears. Should this spring be too strong, Automatic Ribbon Reverse will be affected.



BACK SPACE

Check Back Space Guide Binding Screws #1 and note whether they are secure. See that Back Space Pawl #2 engages correct tooth on Carriage Rack #14. Should Back Space Guide #3 be distorted or bent, it will be necessary to bend it to the right or left as desired. Working from the back of the machine, bend Guide to the left if overspacing occurs, and to the right for underspacing.

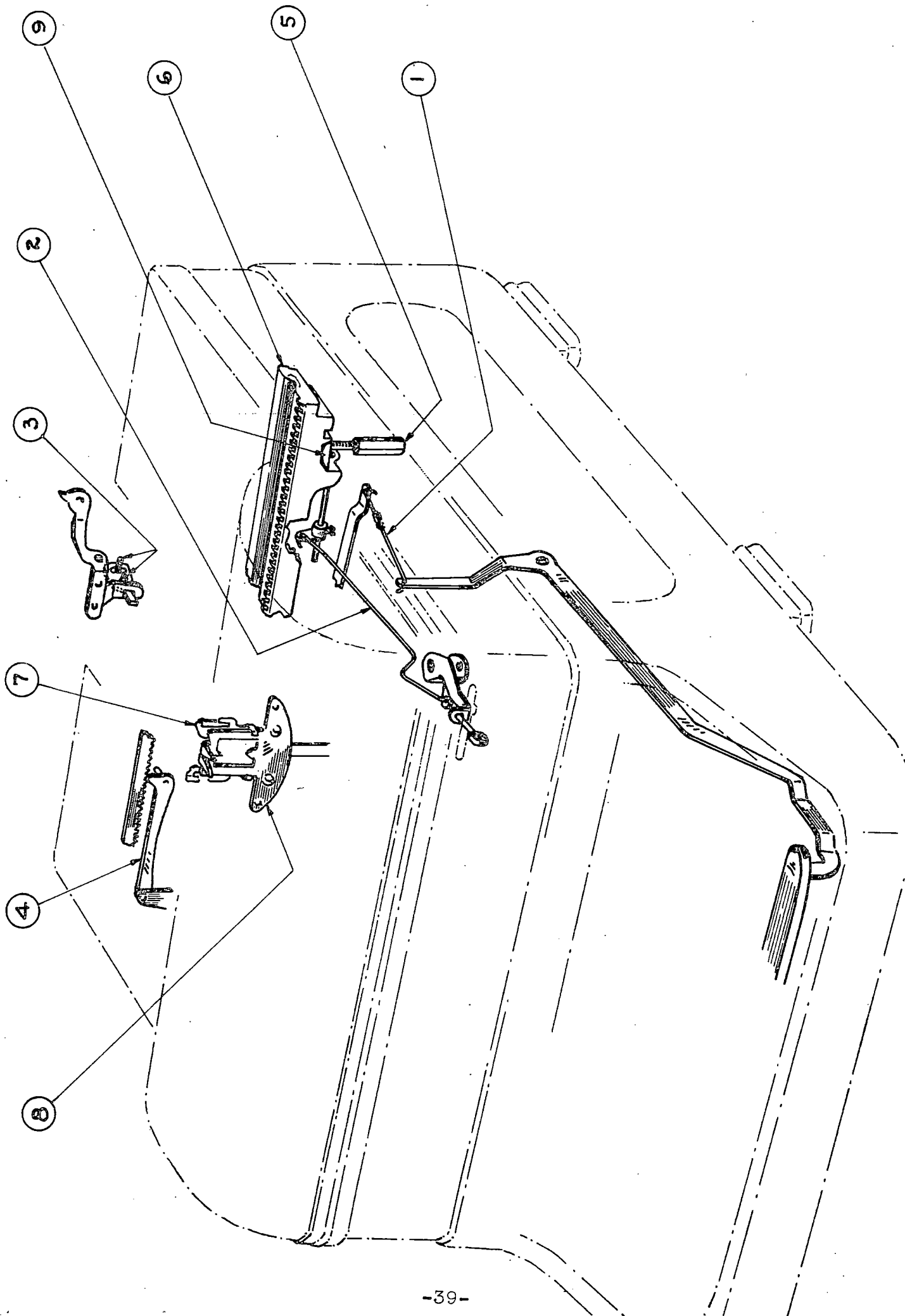
While in inactive position, Back Space Pawl #2 should rest against Back Space Pawl Lift Lever #4 at point #5. Back Space Pawl Lift Lever #4 must be set so that it will not hold Back Space Pawl #2 out of position. Adjustment is provided by bending Back Space Key Lever #15. Bending Lever down toward back of machine will provide adjustment if Back Space Pawl #2 is being held out of position and bending Lever up toward front of machine will provide adjustment for making contact with Back Space Pawl, if when in inactive position there is clearance between these two parts. With Back Space Pawl #2 and Back Space Pawl Lift Lever #4 resting in inactive position and properly adjusted at point 5, Back Space Pawl Guide Post #6 must rest in extreme lower left corner of opening in Back Space Guide #3. Check Back Space Pawl #2 and Back Space Guide Plate #3 at point #7 and note that there is sufficient operating clearance. Use Tool #S-62 for bending Back Space Key Lever #15.

Back Space Escapement Wheel Stop #12 must be set so that with Back Space Key depressed there will be approximately, but not in excess of, 1/32" play between Escapement Wheel Tooth and Stop #12. Adjustment is provided by Set Screws #13, and holes in Stop #12 are elongated to arrive at accurate adjustment.

Back Space Rack Lock #8 should be adjusted with Back Space Rack Lock Eccentric #9 and should be set so that with Back Space Key depressed, Carriage Rack #14 will be locked securely in position. Machine should back space with slight finger pressure and Eccentric #9 should be adjusted so that Back Spacer will not overthrow and will function without excessive finger pressure effort.

Note that Back Space Pawl Spring #10 is properly connected and of sufficient tension to return Back Space Pawl #2 to inactive position, and that Back Space Pawl Swinging Arm #11 is free of bind and excessive side play is removed between Swinging Arm #11 and Spring Barrel. Adjustment is provided by loosening Set Screw #16 in Spring Barrel Hub #17 and moving Spring Barrel to the rear until lost motion has been removed, being careful to avoid any bind in this part.

Back Space Key Lever Extension #18 serves to limit the stroke of the Back Space Key #15 and should contact Key Lever Bracket #19 when Key Lever is depressed. This adjustment should be tested with a thin piece of paper. It is not usually necessary to disturb this adjustment or that of Back Space Key Lever as these adjustments seldom change from original setting.



REMOVING BOTTOM RAIL

Remove Carriage (see instructions for removing carriage).

Remove Space Bar Link #1.

Remove Bichrome Link #2.

Loosen Screws in Carriage Back Rest #3.

Remove Back Space Pawl #4.

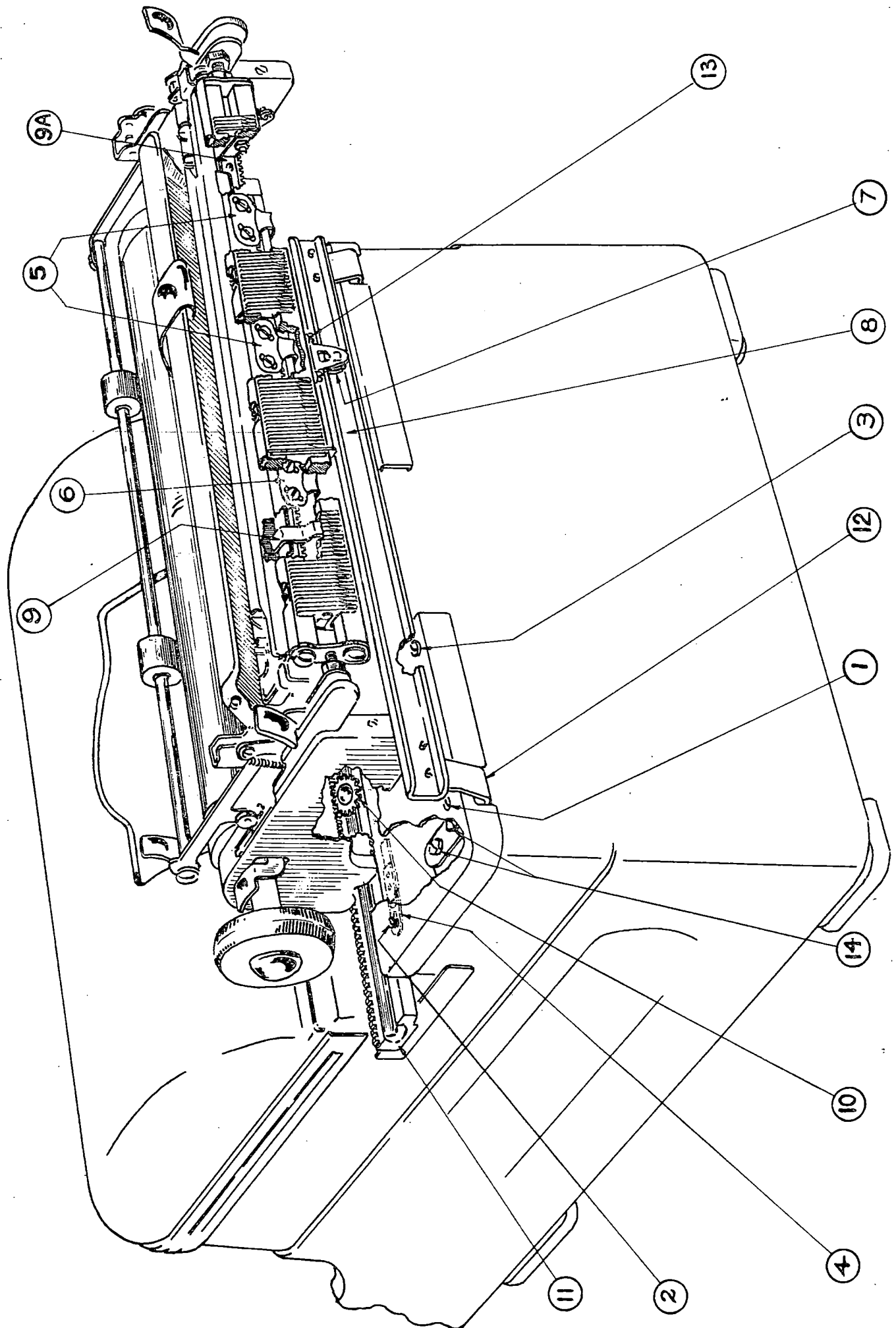
Remove Bottom Rail Binding Screws #5.

Bottom Rail #6 with complete escapement frame assembly can now be lifted from machine.

To replace, proceed in reverse order, being careful to guide Ribbon Vibrator #7 over Type Bar Guide #8. See that Bottom Rail Seats Right and Left #9 are properly positioned and seated.

Bottom Rail Binding Screws Right and Left #5 should be set down from right to left a little at a time, so that Bottom Rail will rest evenly on Bottom Rail Seats #9.

Check Ring and Cylinder, Trip, Motion, Back Limit and Ribbon adjustments.



REMOVING CARRIAGE ASSEMBLY

Working from rear of machine:

Remove Back Cover Screws #1 and Draw Band Anchor Screw #2. Loosen Screw #3, replace Draw Band Anchor Screw #2. Disconnect Draw Band #4 and attach to Anchor Screw #2.

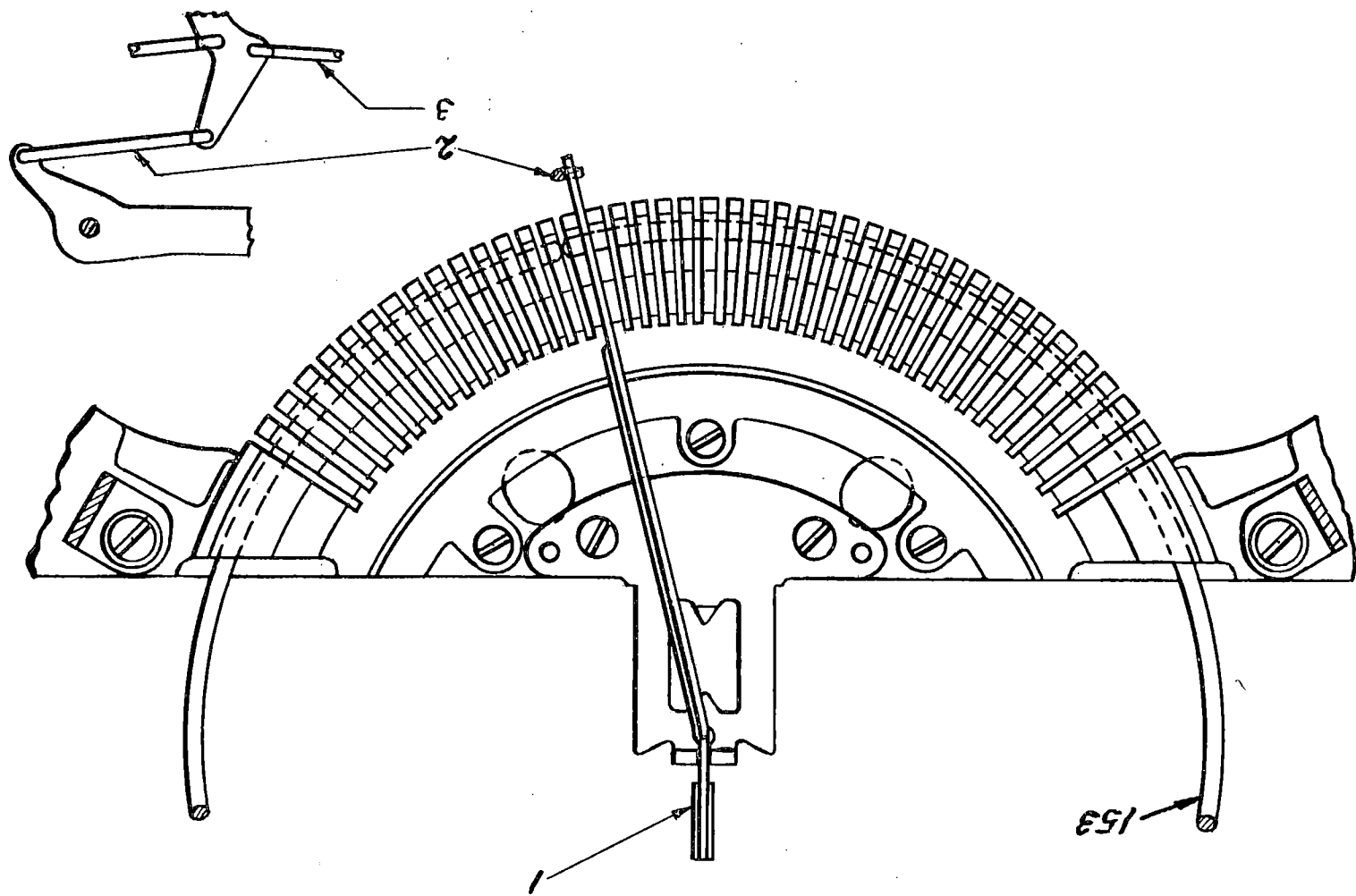
Remove entirely Carriage Clamps #5, loosen Center Carriage Clamp #6. Move carriage to within one inch of extreme left, tilt carriage back to disengage Tabular Rack Roll #7 from Carriage Support Rail #8. Move carriage to extreme left, tilt carriage upward to an angle of approximately 45 degrees, slip Back Space Rack Lock Arm #9 through opening #9A between Carriage End and Rack Bail. Carriage can then be lifted from machine.

To replace, proceed in reverse order, being careful to note that Bottom Rail Balls and Bottom Rail Ball Pinions #10 are properly positioned. With Carriage at extreme ends of writing line, Bottom Rail Ball Pinion should be positioned three teeth in from the edge of Bottom Rail #11. If Ball Bearings and Pinions are set out too far, they will be likely to become disconnected from rails and render machine inoperative. Balls and Pinions must be positioned before Carriage Clamps are adjusted, and indicators are provided on Bottom Rail for locating these parts. If, when setting Carriage back on Rails, Ball and Pinion position is disturbed, they can be relocated with a thin screwdriver or similar instrument before Carriage Clamps are adjusted.

Carriage Clamps #5 must be adjusted so that a snug fit, free from bind, is obtained.

Adjustment is provided by elongated holes in Carriage Support Bracket #12 for accurate adjustment of Carriage Support Rail #8. Note that Tabular Rack Roll #7 is free from bind and that Tabular Rack Roll Set Screws #13 are secure. Note that Carriage Support Bracket Screws #14 are secure.

It is not recommended that this method of removing Carriage Assembly be employed for carriage widths in excess of 14 inch. When it is necessary to remove carriage from machines in excess of 14 inch, it is recommended that Base Carriage Support Rod be disconnected from Base and all Carriage Clamps, except two end clamps, be loosened. From 12" to 32" inclusive, Small Carriage Rolls will have to be removed.



REMOVING TYPE BARS

It is necessary to remove the entire Top Cover Assembly for the removal of one or more Type Bars #1.

An additional or follow-up Segment Wire Part #153 must be used to push the Segment Wire with which the machine is equipped, around to the point where the Type Bar to be removed is located. Careful observance while follow-up wire is being pushed through, will disclose point to stop at and will be indicated by a slight drop in the Type Bar to be removed. By moving one segment wire a trifle to the left and the other a trifle to the right, Type Bar will become disconnected from the Segment. Unhook Type Bar Link #2.

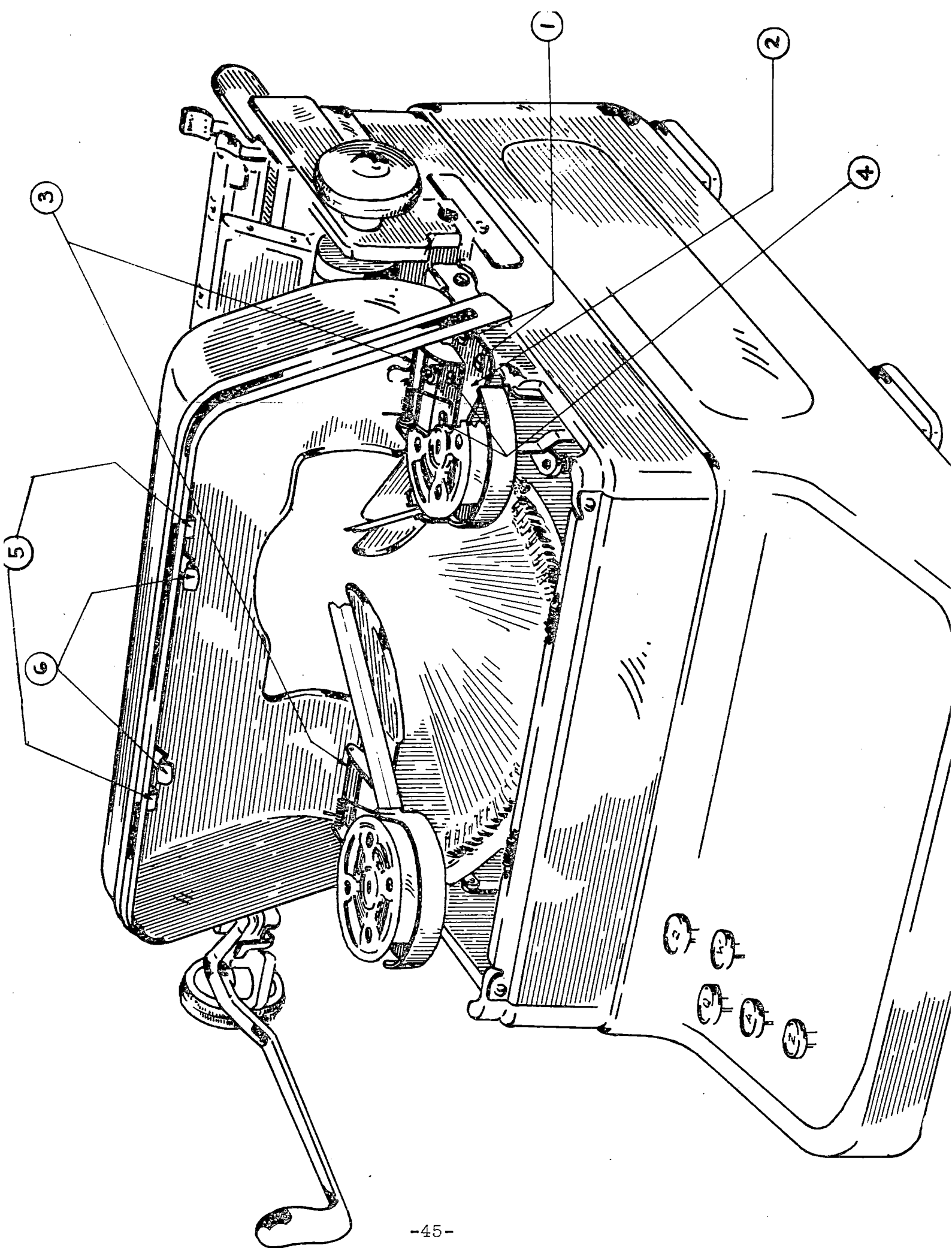
To replace, proceed in reverse order, and if more than one Type Bar has been removed, be careful to note that Type Bar Links #2 are replaced as removed. These Links are not usually interchangeable and are numbered one to forty-two.

Note whether Type Bar Lever Links #3 (Link Nos. 8 and 9) are transposed, for they must be replaced in the same order as removed from the machine.

When it is necessary to remove the entire set of Type Bar Links, a board containing 42 holes with each hole marked from one to forty-two inclusive, should be used so that confusion will be avoided when they are replaced.

It will be noted that Type Bar Links #2 (one to eleven inclusive) are hooked into the Type Bars with hook of link toward the right. From twelve to thirty-one inclusive, they are staggered, alternating from left to right, and from thirty-two to forty-two inclusive, links are hooked into Type Bars with hook of link toward the left.

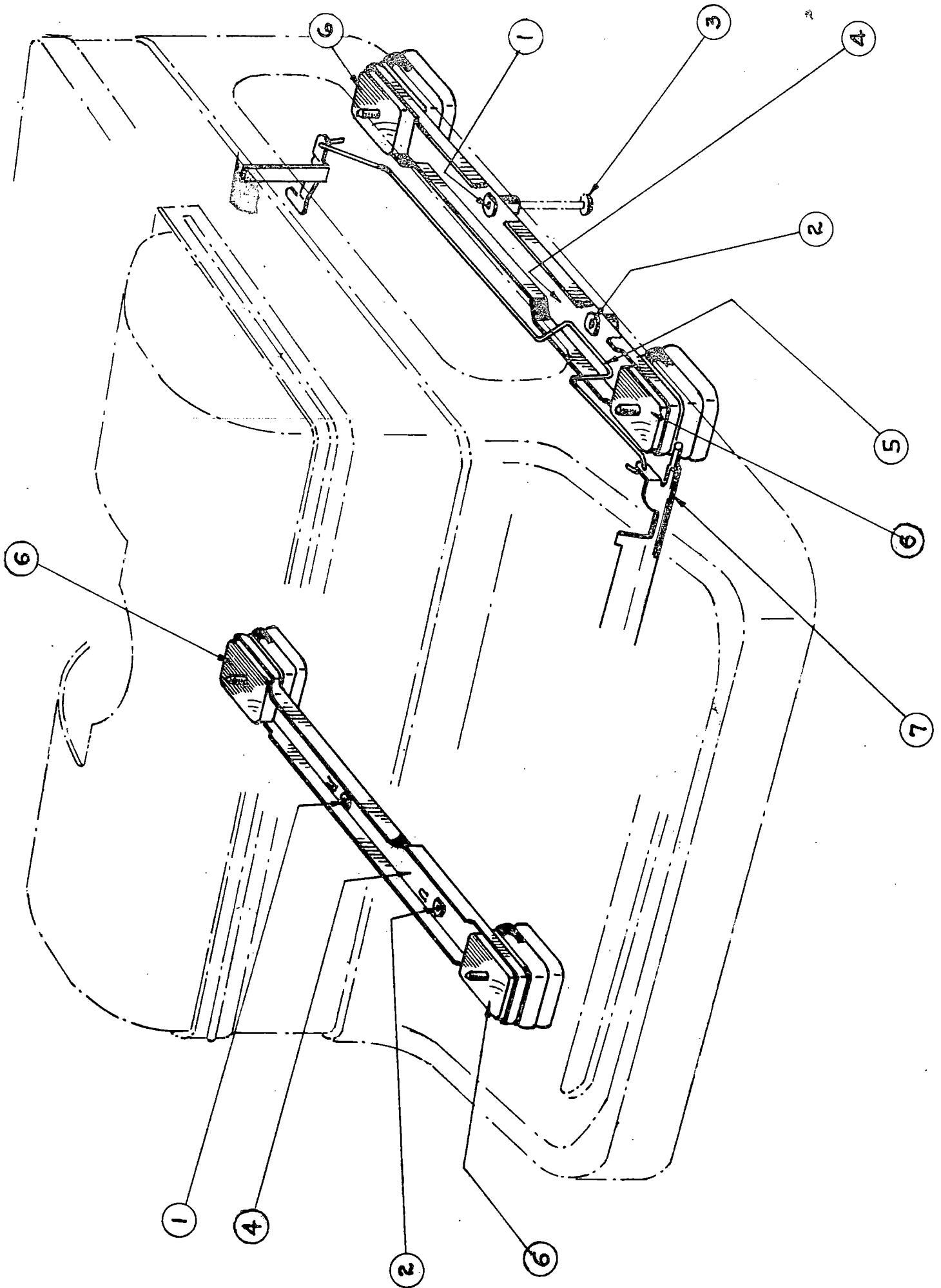
When substituting or replacing original Type Bars, it is found that the fit in the Segment Slot is too tight, it is recommended that segment bearing surfaces of Type Bars be rubbed on emery cloth and laid on a flat surface until free fit in segment slot is obtained.



REMOVAL AND REPLACEMENT TOP COVER ASSEMBLY

Remove retaining screws positioned parallel with base sides #1. Hold top cover slightly tilted forward in vertical position and raise Right Top Cover Hinge Support #2 to clear ribbon cup. Repeat operation on left side, after which Top Cover Assembly with Segment Covers attached can be readily lifted from machine. It will be necessary to spring Top Cover Hinge Supports #2 backward a little in order to clear ribbon cups. This procedure is recommended unless Top Cover has to be replaced, in which case straighten out ends of Top Cover Fulcrum Pins #3 and withdraw them from hinges. This will eliminate removal of Top Cover Hinge Screws #4 as holes in hinges are elongated to provide perfect fit around sides of base and front plate. Removal of Top Cover Fulcrum #3 will not disturb this adjustment.

After replacing Top Cover, check stops #5 located inside cover and to the front and see that they are set so that inside of Top Cover will not rest on ribbon spools. These stops can be bent down until positive clearance is assured. See that Top Cover latches #6 are adjusted so that Top Cover is held securely, yet releases with a minimum of effort.



BOTTOM PLATE SIDE RIGHT AND LEFT

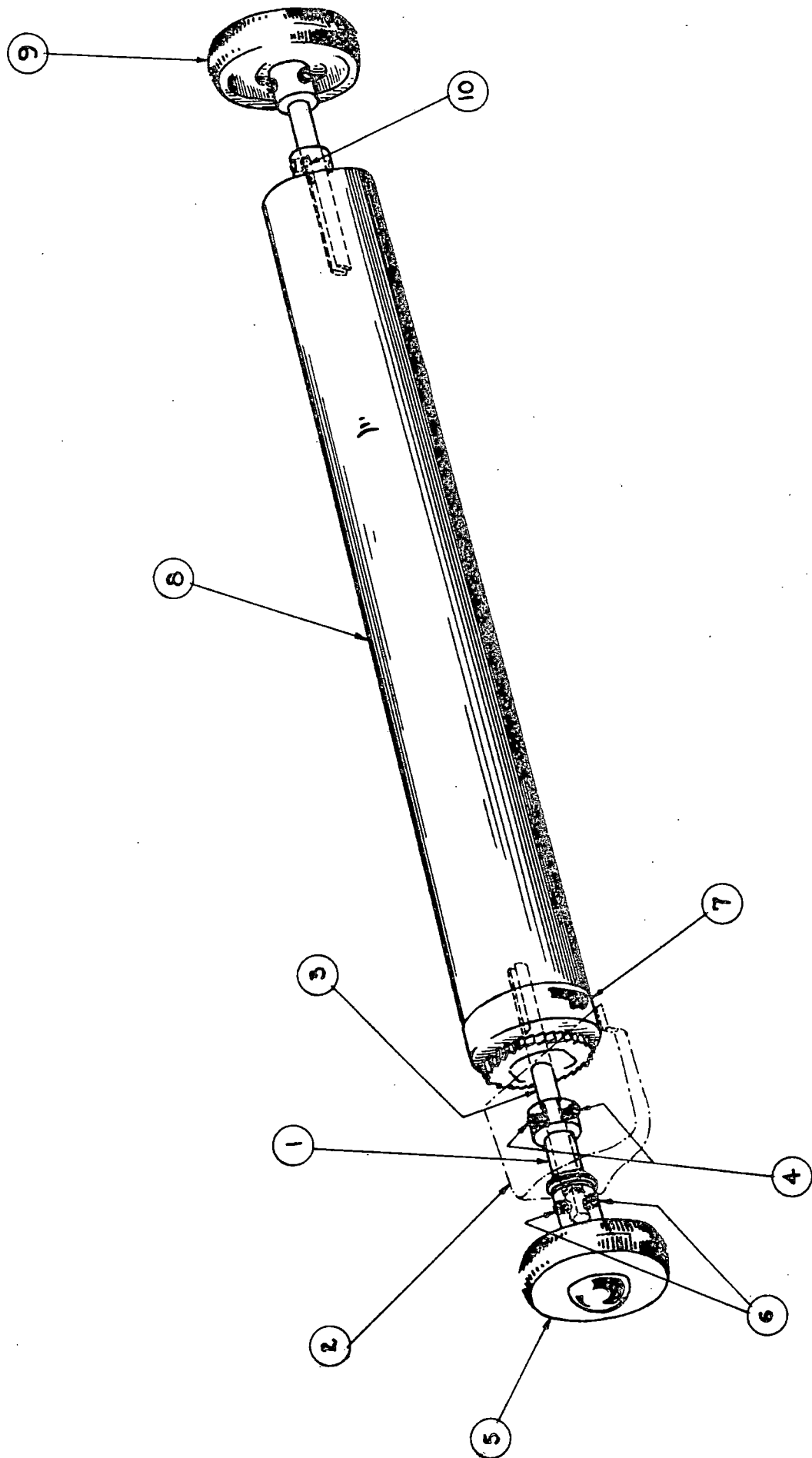
In addition to Screw Holes #2 for fastening Royal Typewriters to desks, extra holes #1 have been provided to accommodate desks that have been previously drilled for Underwood Typewriters. Care must be exercised to see that Fastening Screws #3 are not too long and do not extend beyond inside level of Bottom Plate Sides #4.

If Fastening Screws #3 are too long, they will interfere with the Line Lock Link #5 and will render the machine inoperative.

Bottom Plate Cushions #6 must be set in position so that they will nest securely inside the Bottom Plate Sides #4. If they are not nested properly and extend over edges of Bottom Plate Sides #4, interference with Line Lock #7 will occur.

Fastening Screws should not be drawn down too tightly as this will have a tendency to compress the Rubber Feet and to some extent will impair the noise reducing features that have been built into the typewriter.

All those who have occasion to fasten machines to desks should observe these instructions carefully.



REMOVABLE CYLINDER

Remove standard cylinder (See instructions for removing cylinder).

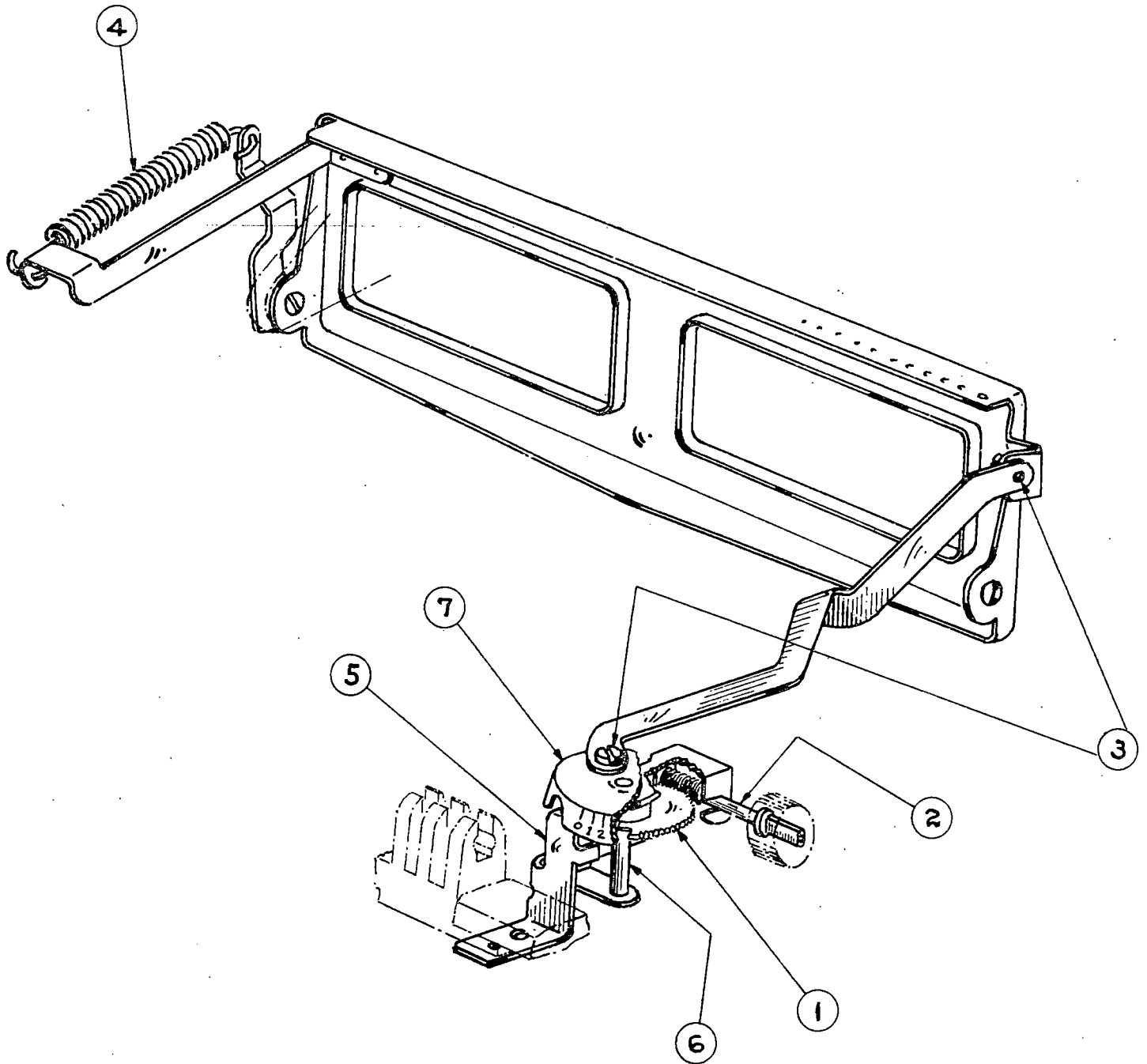
Insert Sleeve #1 with shoulder facing to the left between Carriage End and Carriage End Extension #2, inserting sleeve shoulder in hole formerly used for Left Cylinder Knob #5. Insert Shaft #3 through Sleeve #1. Place Line Space Ratchet #7 in position and insert Shaft #3 through Line Space Ratchet #7 and secure with set Screws #4, being sure to note that set screws are positioned on flats on shaft. Note that Sleeve Shoulder #1 is not binding against Carriage End Extension #2.

Attach Left Cylinder Knob #5 and secure with Set Screws #6. Note that Cylinder Knob #5 is not binding against Carriage End Extension #2.

Insert Removable Cylinder #8.

Insert Right Cylinder Knob #9, noting that Plunger #10 falls into position in either hole in Right Cylinder End. Note that Right Cylinder Knob is not binding against Carriage End.

Before installing Removable Cylinder, check all parts and note that they are free of bind.



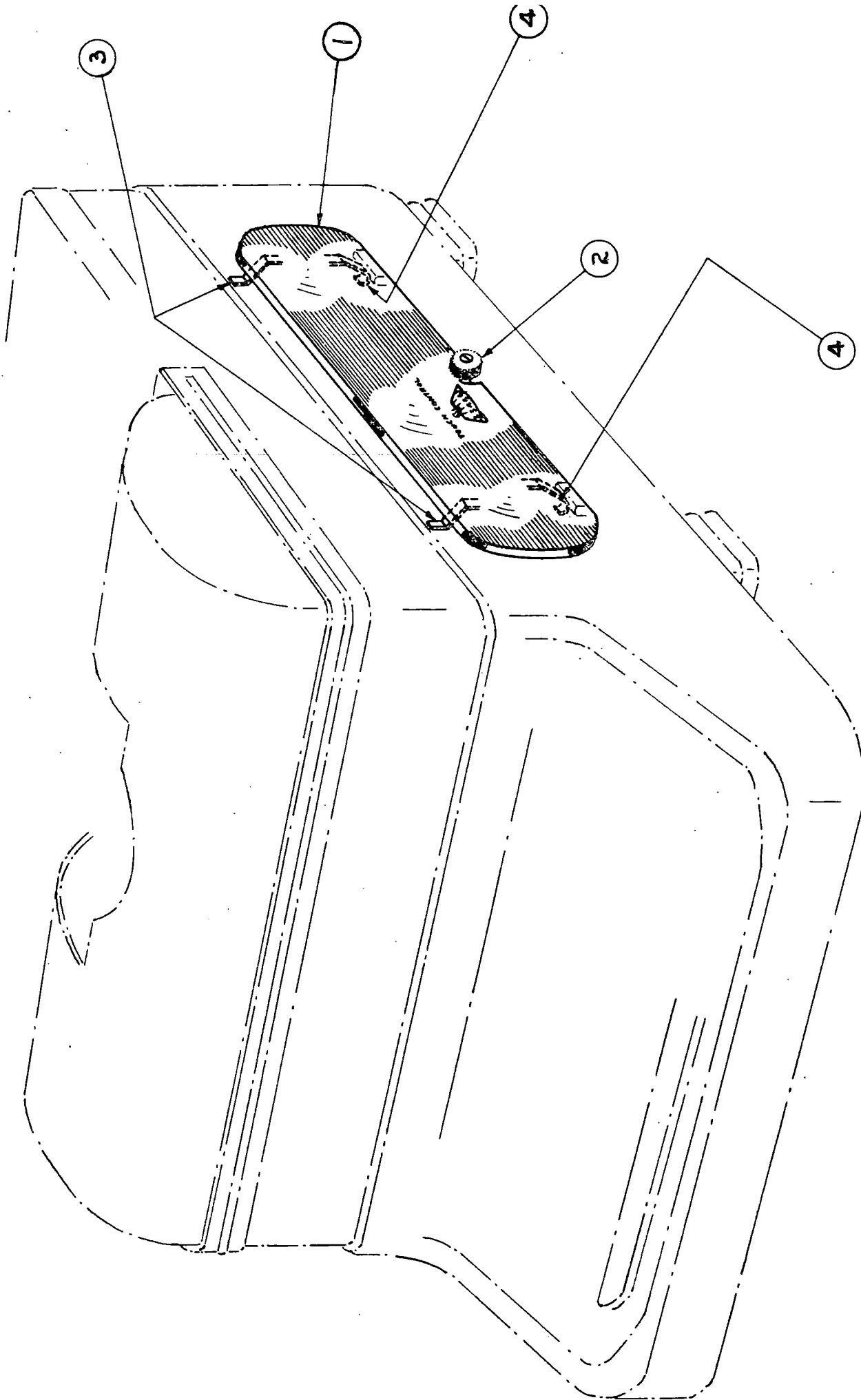
TOUCH CONTROL

It is essential that parts be free from bind and that there is positive meshing between Touch Control Gear #1 and Touch Control Worm #2.

Note that Touch Control Arm Fulcrum Screws #3 are free of bind and secure, and that Touch Control Balance Spring #4 is securely connected.

Note that Touch Control Bracket #5 is not bent or distorted and that Touch Control Shaft #6 is not eccentric.

Touch Control Dial #7 should be set at point #4 on dial for ordinary operation and should be set at that point before delivery.



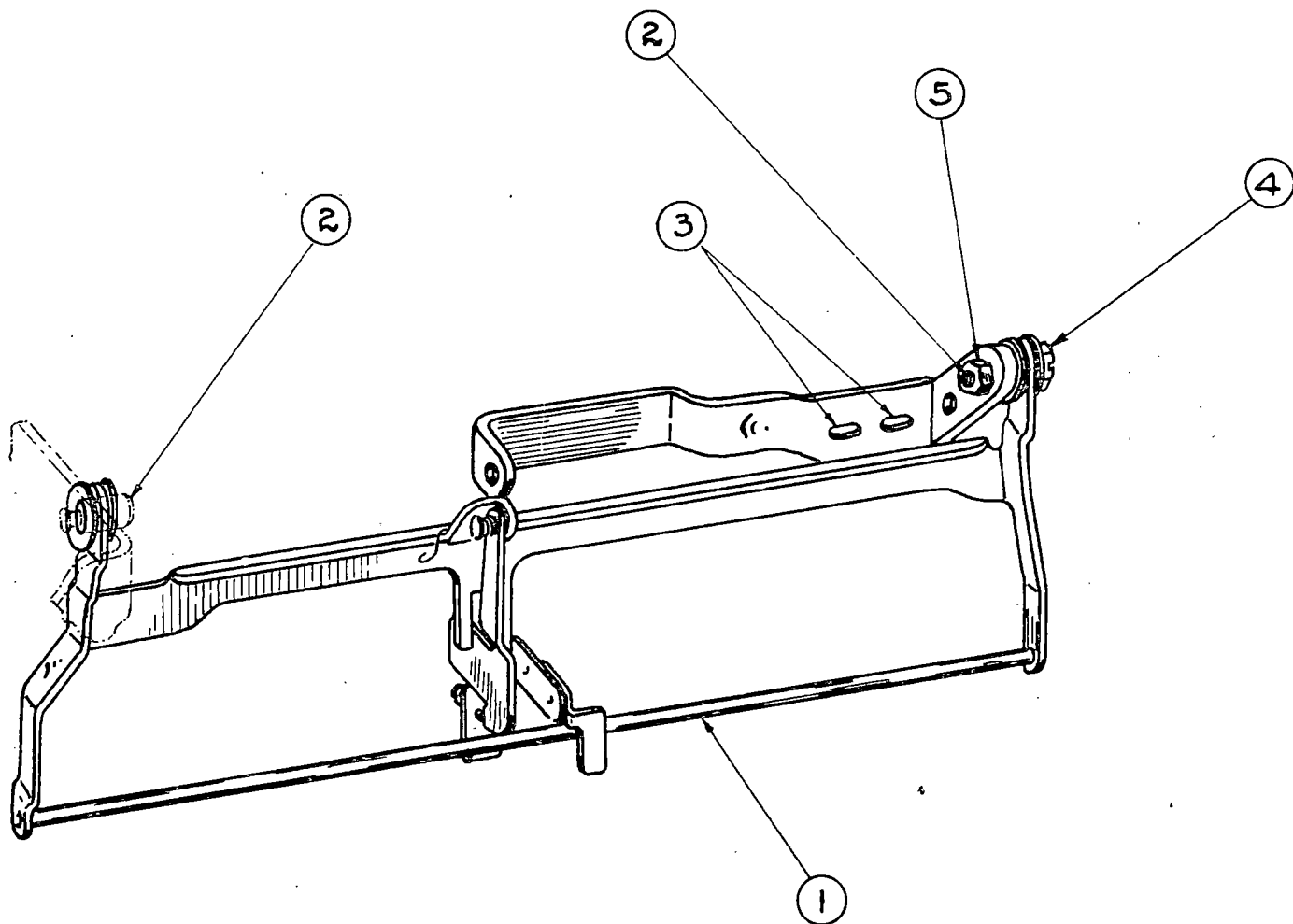
REMOVAL AND REPLACEMENT OF BASE PANELS

Base Panel Left can be removed by pushing panel outward.

Before Base Panel Right #1 can be removed, it is necessary to disconnect Touch Control Knob #2. Panel can then be removed by pushing outward.

To replace, insert upper clamps #3 under base side and spring lower clamps #4 into position by pushing clamps with a screwdriver or similar instrument.

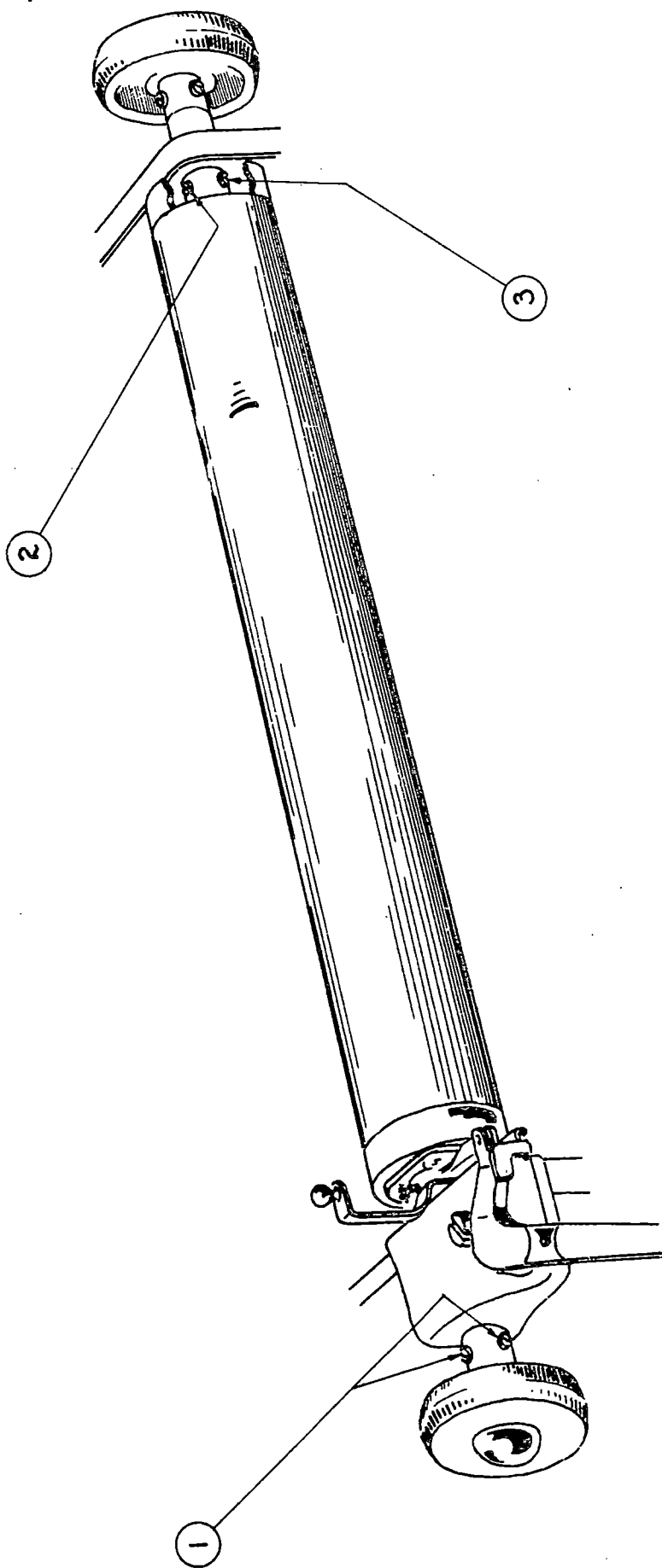
When replacing Touch Control Knob #2, be sure to note that countersunk side is to the outside so that retaining screw will not protrude from the knob.



UNIVERSAL BAR

Universal Bar #1 must be free on its fulcrums #2 and should swing back freely into inactive position. Springs are not employed to return the Universal Bar, therefore it is important that this part be free from bind. Adjustment for side play is provided in elongated holes in Universal Bar Bracket #3.

See that Fulcrum Screw #4 is not binding Universal Bar and that it is properly secured with Nut #5.



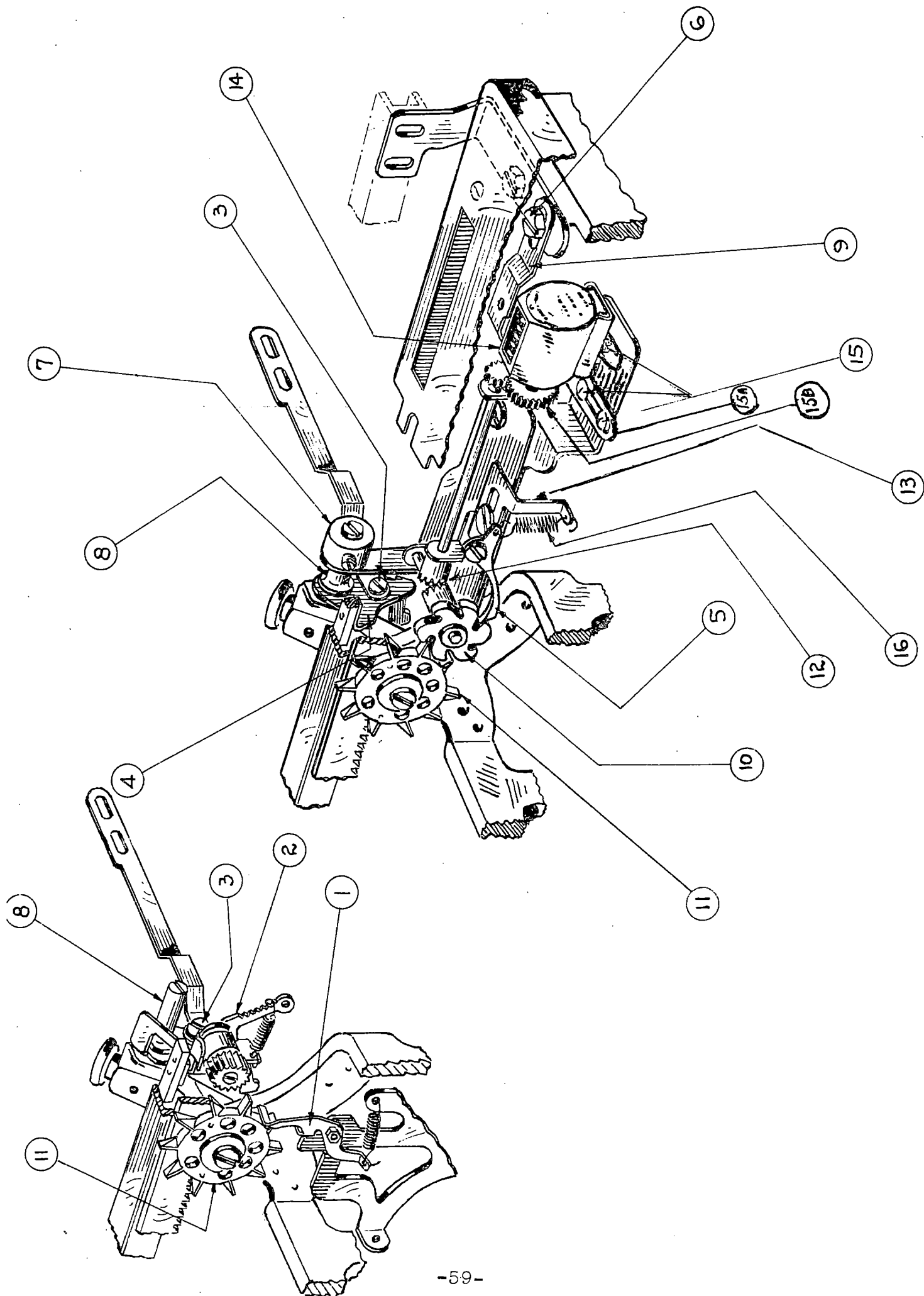
REMOVING AND REPLACING CYLINDER

Remove Left Cylinder Knob by loosening Set Screws #1.

Loosen Set Screw #2 and remove Fractional Line Space Aligning Screw #3 from right Cylinder End.

Draw out Cylinder Shaft from left to right - cylinder can now be lifted from machine.

To replace, proceed in reverse order, being sure to note that all set screws are secure.



INSTALLING STROKE COUNTER

Before Stroke Counter #14 can be installed, it will be necessary to remove Escapement Wheel Check Pawl and Spring #1. After Check Pawl has been removed, replace Fulcrum Nut, Screw and Escapement Plate Kick Spring.

Disconnect Tabulator Brake Assembled #2 by removing Fulcrum Screws Nos. 3 and 8. Remove entire assembly from machine and replace with Tabulator Lift Lever supplied with Counter, attaching same with Fulcrum Screws Nos. 3 and 8.

Stroke Counter is equipped with Wheel Check Pawl #5 to replace Escapement Wheel Check Pawl #1.

To install, remove Cylinder, Paper Pan and Feed Rolls.

Remove Carriage Rail Support Screw #6.

Insert bushing on counter over Tabulator Lift Lever Fulcrum Screw #8.

Insert Carriage Rail Support Screw #6 through elongated hole in counter Bracket #9.

Mesh Counter Drive Wheel #10 into Escapement Wheel #11, allowing sufficient play between the teeth of the wheels to insure free movement.

Secure Stroke Counter Bracket with Carriage Rail Support Screw #6 and secure set screw in Counter Bracket Bushing #7.

Before installing Stroke Counter, test and see that all parts are working freely and that Gears #12 are meshing properly. Adjustable Plate #15-A is provided for alignment of Gears #15-B.

Lateral adjustment of register is provided by Set Screws #15.

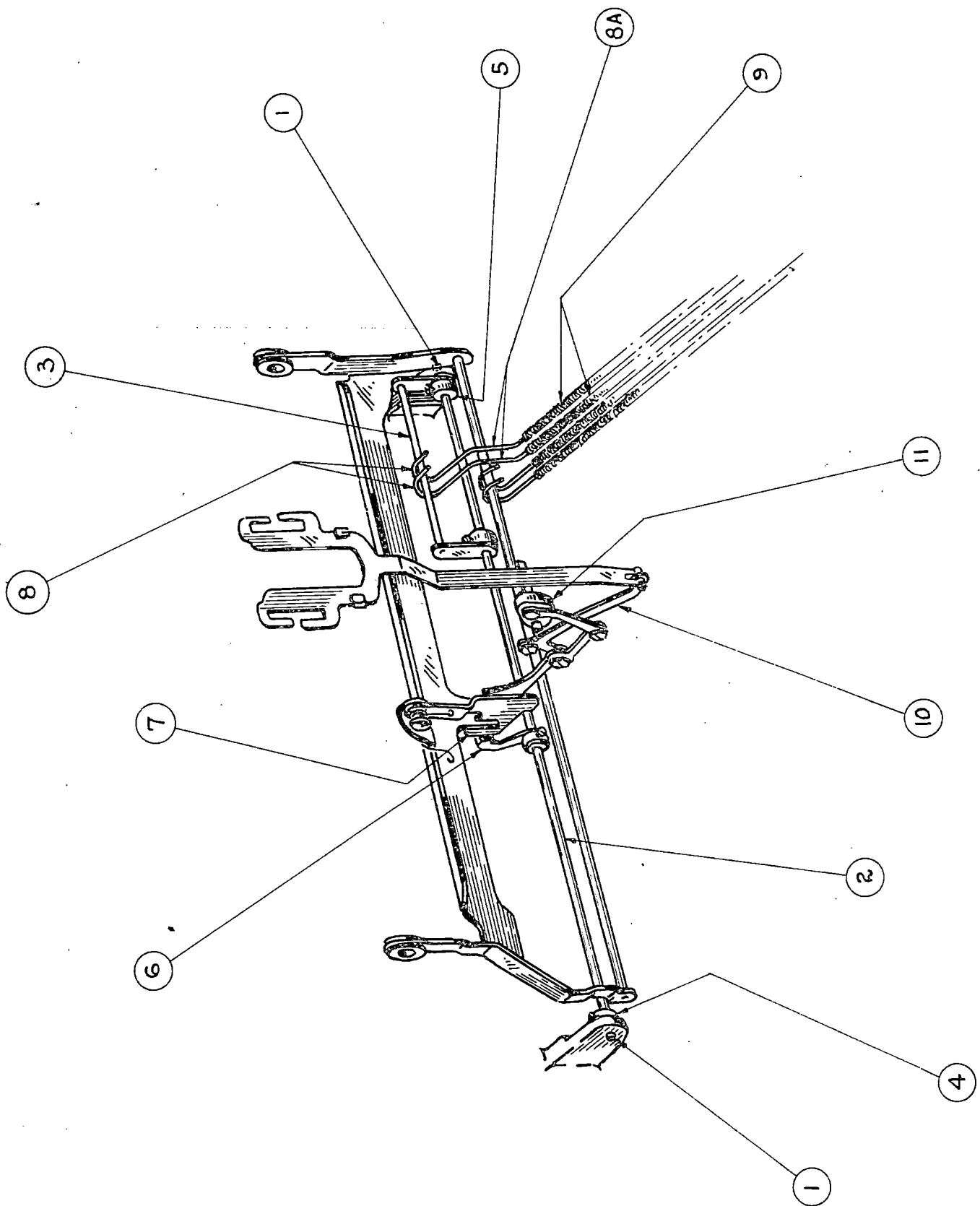
Note whether Spring #16 is properly connected to Check Pawl.

Special Back Cover Right is provided with Counter.

On wide carriage machines, Counter Bracket is fastened through elongated hole on Back Cover Plate, replacing Carriage Rail Support Screw #6 on Standard machines.

Before ordering or attaching Stroke Counter, determine ratio and pitch desired; also, whether for Decimal Tabulator or Standard Key Set Tabular.

Furnished in 10 or 12 pitch, ratios of 180 or 240 points to each stroke of the Type Bar or Space Bar. Ratios of 180 or 240 are standard - other ratios are special.



INSTALLING SILENT KEY

Remove Universal Bar Links #8A and Springs #9 that are to be replaced.

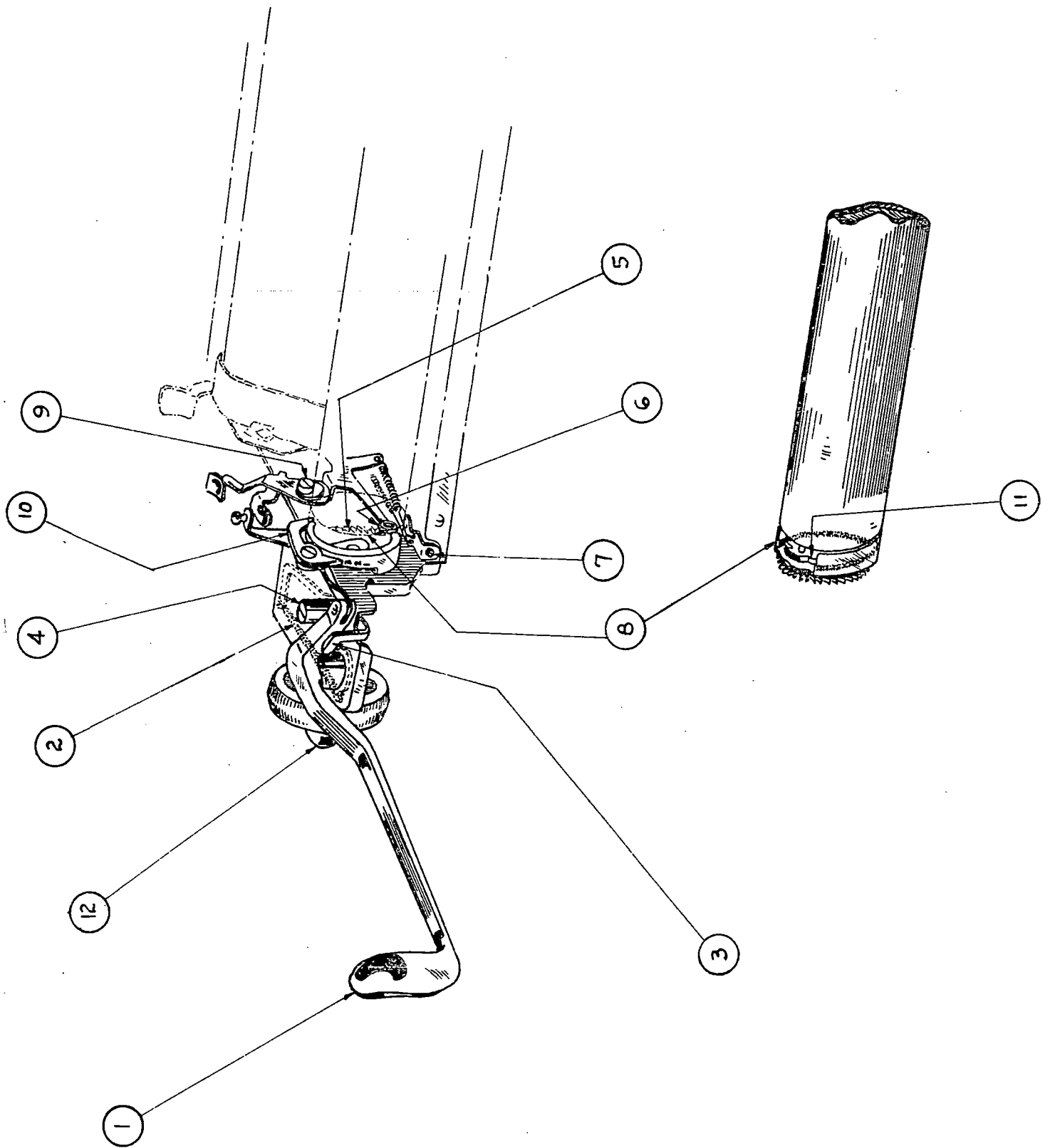
Check holes in Base Back Extensions #1 and note that Pivot Rod #2 will pivot freely. It may be necessary to ream or clean out these holes before Pivot Rod will work freely.

Insert Silent Key Frame Assembled #3 by inserting ends of Pivot Rod #2 in Base Back Extensions #1 and adjust Pivot Rod for side play with Pivot Rod Collar #4 and Silent Key Frame Bushing #5. Assembly must be free from bind.

Adjust Silent Key Ribbon Vibrating Lever #6 so that it will contact Bichrome Ribbon Lift Lever #7, noting that it is properly centered.

Insert and connect Silent Key Link #8-A and Silent Key Link Spring #9.

Set and adjust Silent Key Ribbon Vibrating Lever #6 so that Ribbon Vibrator Arm #10 will make contact with Bichrome Cam #11 when Silent Key is depressed. Final adjustment is accomplished by shortening or lengthening Silent Key Link #8-A, bending the link at point #8. If Silent Key Link is too short, Ribbon Vibrator Arm #10 will contact Bichrome Cam #11 before type face has contacted cylinder, causing a resistance in the type bar action. If Silent Key Link is too long, type face will contact cylinder before Ribbon Vibrator Arm #10 has contacted Bichrome Cam #11, in which case the ribbon will fail to rise to its proper height, thereby missing all or part of ribbon impression. It is essential that Vibrating Lever #6, Ribbon Vibrator Arm #10, Bichrome Cam #11 and Silent Key Link #8-A be synchronized.



LINE SPACE LEVER - FRACTIONAL LINE SPACE - LINE SPACE DETENT AND RELEASE

Line Space Lever #1 must be free from bind and Line Space Lever Spring #2 must have sufficient tension to return lever against Line Space Lever Stop #3.

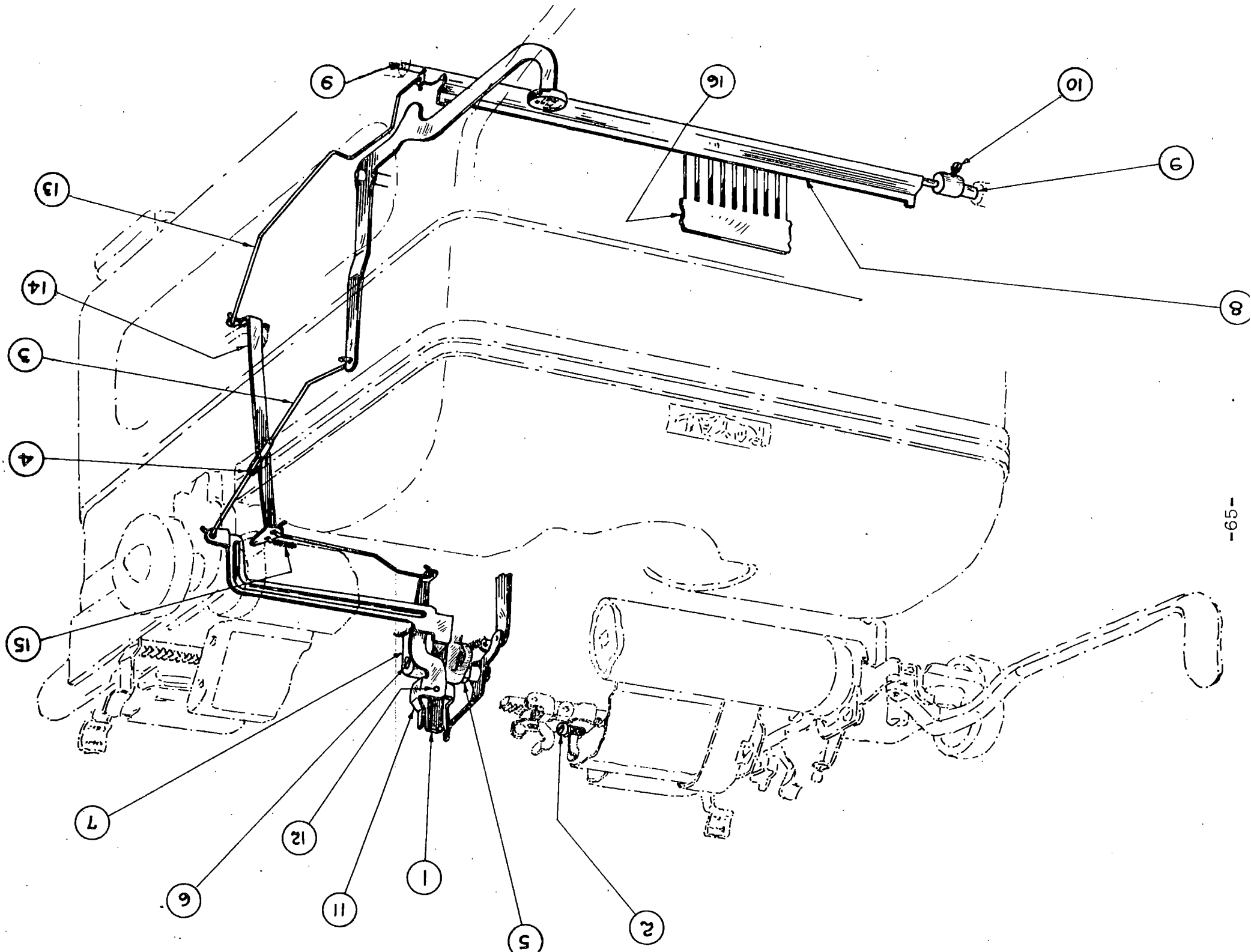
When Line Space Lever #1 contacts Line Space Lever Eccentric Stop Screw #4, Line Space Ratchet Tooth #5 should set securely in Line Space Detent Roll #6. If Eccentric Screw #4 is set so that it arrests Line Space Lever before Ratchet Tooth rests securely in Detent Roll #6, the cylinder will creep forward until ratchet tooth finds its normal position. This should not occur, and Eccentric Screw #4 should be set so that Line Space Ratchet Tooth #5 finds its set position in Line Space Detent Roll #6 at the instant Line Space Lever #1 contacts Line Space Lever Eccentric Stop Screw #4.

Should Line Space Lever Eccentric Stop Screw #4 be set so that the Ratchet Tooth #5 overthrows Line Space Detent Roll #6, difficulty with Line Spacing can be anticipated, therefore it is imperative that the proper relation of Line Space Lever, Line Space Ratchet and Line Space Lever Eccentric Stop be maintained.

Turning Line Space Detent Adjuster Screw #7 anti-clockwise will increase tension of Line Space Detent; turning screw clockwise will decrease the tension. Too much tension on Line Space Detent will cause cylinder to rotate stiffly, but sufficient tension must be maintained to insure positive detention of Line Space Ratchet #8 while Cylinder is in inactive position.

Line Space Pawl Eccentric Screw #9 must be set so that with Line Space Lever #1 held against Line Space Lever Eccentric Stop Screw #4 there will be a little play between Line Space Pawl #10 and Line Space Pawl Eccentric #9. This test is made by working cylinder knob back and forth by hand with Line Space Pawl held against eccentric.

Fractional Cylinder End #11 should be tested to see that it returns to locked position without bind or interference. Check teeth on Fractional Cylinder End to see that they are not distorted or bruised as this would present positive mesh with teeth in Line Space Ratchet. See that Fractional Line Space Release #12 is not distorted and that it is free of bind.



CENTER STOP - MARGIN RELEASE - LINE LOCK

Center Stop #1 must be adjusted so that in set position the Margin Stop Adjusting Screws #2 will make positive contact with Center Stop.

Adjustment is arrived at by shortening or lengthening Margin Release Link #3 until Center Stop #1 takes purchase of not less than $3/32$ of an inch on Margin Stop Adjusting Screw Head. Shortening Margin Release Link #3 will decrease, and lengthening Link will increase the amount of purchase Margin Stop Adjusting Screws will take on Center Stop. Margin Release Link #3 is adjusted by loosening Nut #4 and turning link end clockwise to shorten and anti-clockwise to lengthen.

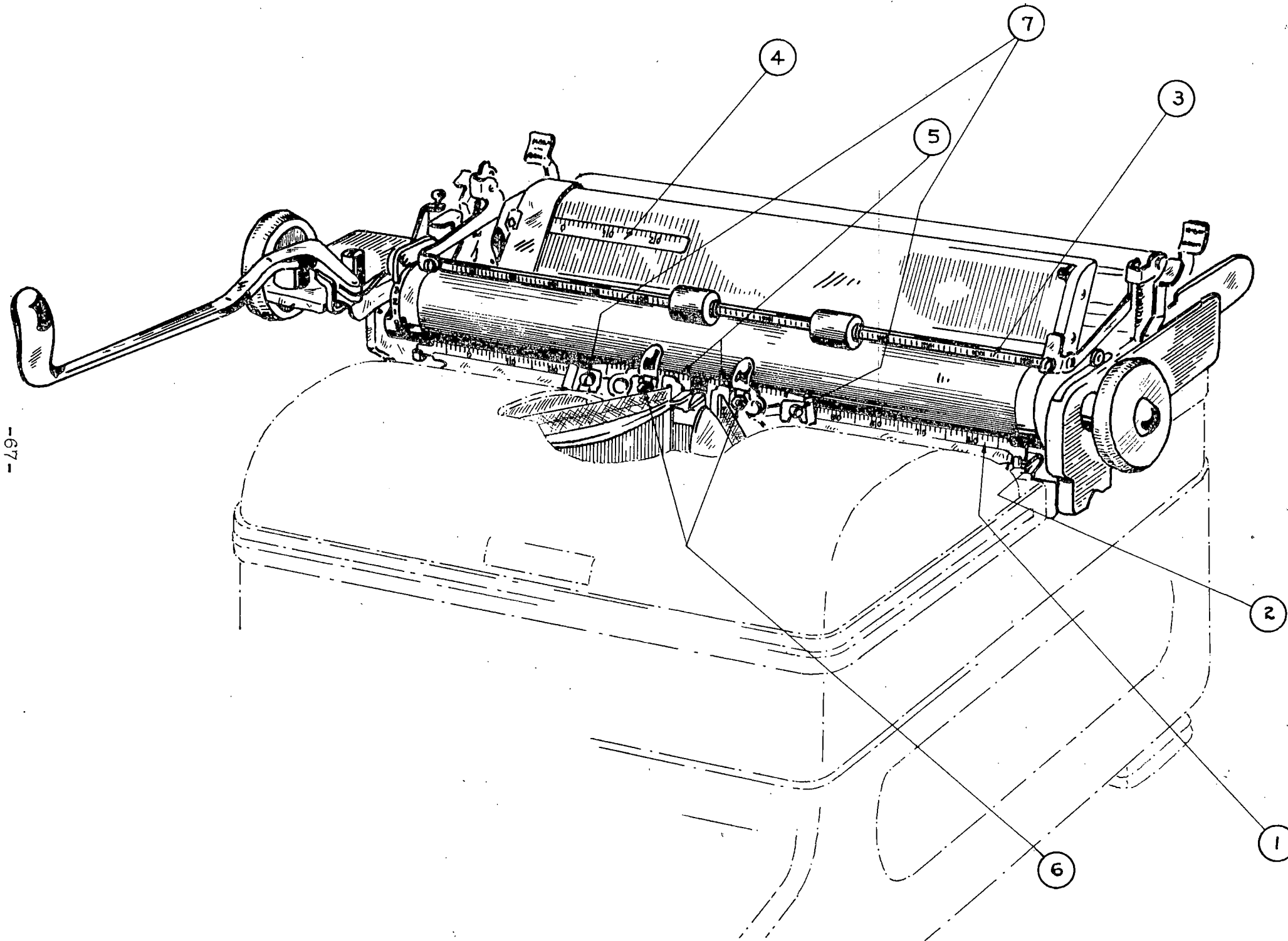
It is important to see that there is not excessive side play in Center Stop, and if this occurs it will be necessary to loosen Tabulator Stop Set Arm Bearing #5 and draw up Fulcrum Screw #6 until proper fit of Center Stop #1 and Center Stop Bracket #7 is obtained. When adjustment has been made, be sure to tighten Bearing #5.

Margin Release Key is connected to Margin Release Link #3 which is the same link that controls position of Center Stop #1. With Center Stop positioned as outlined in preceding paragraph, Margin Release should function. Should a little adjustment be found necessary, it can be obtained by adjusting Link.

Line Lock #8 is adjusted by first seeing that it is free in its bearings #9 and that excessive side play has been removed. Note that Line Lock Bearing Set Screw #10 is secure.

Line Lock Lever #11 must be free on Line Lock Fulcrum Pin #12 and Line Lock Link #13 must be free of interference with Bottom Plate Side Right. Line Lock Crank #14 must be free of bind and Line Lock Spring #15 must be properly connected and of sufficient tension to return Line Lock to inactive position.

Shortening or lengthening Line Lock Link #13 will determine proper set of Line Lock #8. When Margin Stop Adjusting Screw Head contacts Line Lock Lever #11, Line Lock should be resting lightly against Key Lever Guide #16. Bending Line Lock Lever #11 away from Center Stop #1 at point indicated by Arrow #11 will provide further throw of Line Lock #8. It is important to note that Line Lock Lever #11 lays flat against Center Stop when contacted by Margin Stop Adjusting Screw #2.



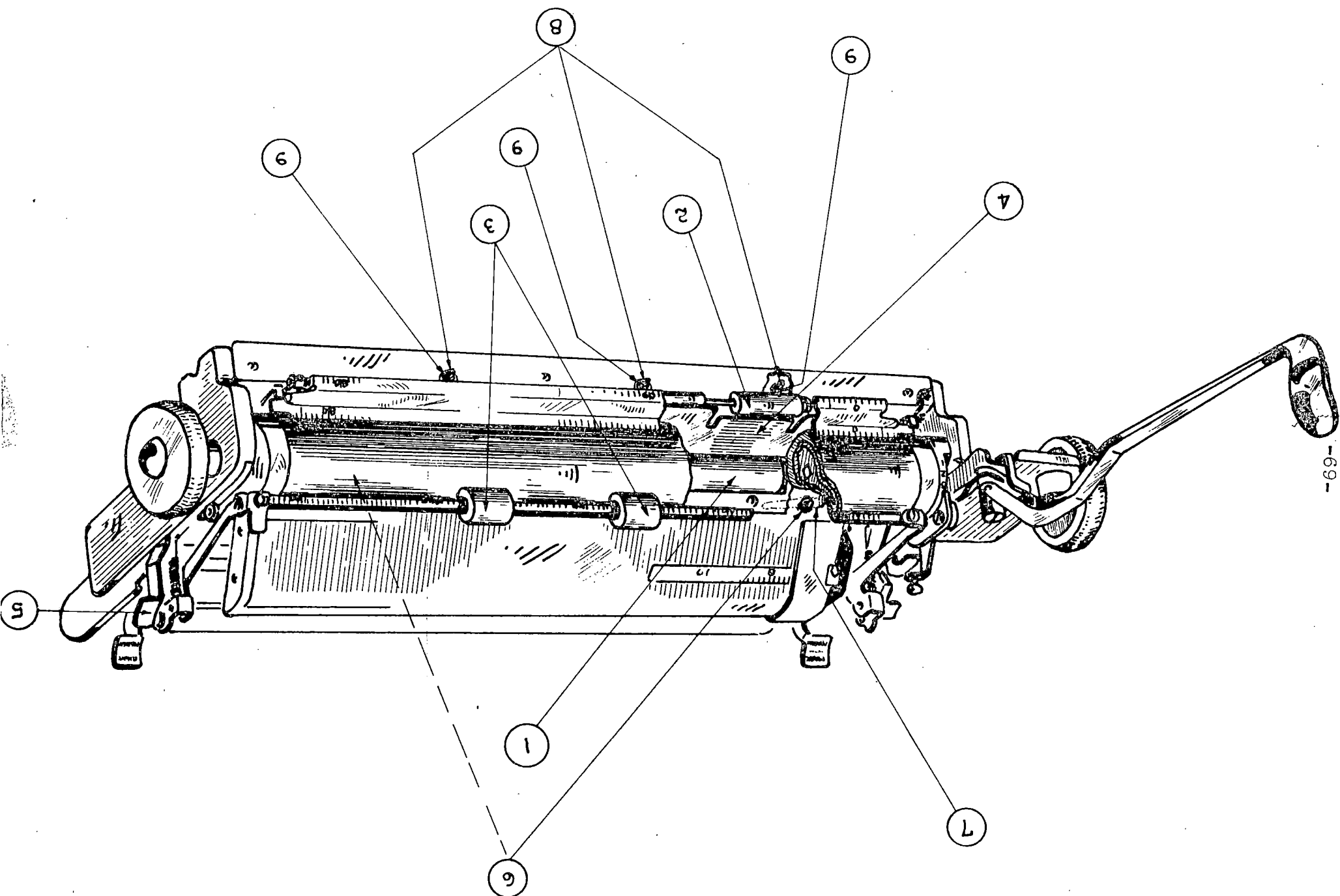
CYLINDER SCALE - CARD GUIDE SCALES - PAPER HOLDER ROLL ROD SCALE

Cylinder Scale #1 is adjustable at points #2 for accurate positioning. It must lay flat and parallel with cylinder and when properly set, graduations of scale will center with type. Test by rotating cylinder one space rearward and note that scale is set evenly with line of writing.

Cylinder scale graduations must correspond with graduations on Paper Holder Roll Rod #3 and Paper Table Scale #4, and must correspond with setting of Margin and Tabulator Racks.

Card Guide Scales Right and Left #5 must be adjusted so that there is approximately $1/32$ of an inch clearance between scales and cylinder.

Lateral and vertical adjustment of Card Guide Scales is accomplished by loosening Nuts #6 and Screws #7 and setting scales so that they are positioned even with bottom line of writing and that graduation of scales are set to center of type impressions.



PAPER FEED

Back Feed Roll #1 and Front Feed Rolls #2 must run freely on Feed Roll Rods and all residue must be removed by thoroughly cleaning the rods and cores of feed rolls. Front Feed Roll Cores can be efficiently and thoroughly cleaned by employing the use of regular pipe cleaners. Rubber should be thoroughly cleaned with wood or denatured alcohol to remove all trace of ink, dirt, etc. Paper Holder Rolls #3 and Bushings should be treated in the same manner and all semblance of glaze removed from rubber surfaces. Oil is unnecessary with new oil-less bearings on Paper Holder Rolls, Back Feed Rolls and Front Feed Rolls. The application of excessive oil to these parts is to be discouraged.

Front and back feed roll tension must be equalized on both sides of machine, and should be tested by using a small strip of paper. This is important if irregular line spacing is to be avoided. Back Feed Rolls should have a little more pressure than that of front feed rolls.

It is essential that the cylinder be concentric, free on its bearings and all traces of dirt and glaze removed by the application of a cleaning cloth saturated with alcohol. Badly pitted cylinders should be replaced and should not be dressed down to a smooth surface as this will result in an undersized part that will impair the alignment of the type and general appearance of type impressions.

Paper Pan #4 must be adjusted and conform to the cylinder. When properly adjusted, at least four sheets of standard writing paper should pass through feed rolls and cylinder without friction with Feed Roll Release Lever #5 released.

Increasing or decreasing back feed roll tension is accomplished by turning Nut #6 which compresses or releases Back Feed Roll Spring #7. Turning Nut #6 clockwise will increase tension, anti-clockwise will decrease it.

When a number of carbon copies are made, the paper pan should be lowered accordingly. Should carbon copies lag behind the original, it indicates that either the paper pan is set too close to the cylinder or one or more of the feed rolls is binding on the feed roll shaft.

Tension on Front Feed Rolls is controlled by Small Feed Roll Adjuster Screw #8. Turning screw clockwise will increase tension, and anti-clockwise will decrease it. Be sure to secure Lock Nuts #9 after adjustment has been made. Tension on all front feed rolls must be equalized.

MULTILITH PLATES

Equip the machine with a #3 cylinder.

Set the carriage back the distance equivalent to the thickness of the metal plate.

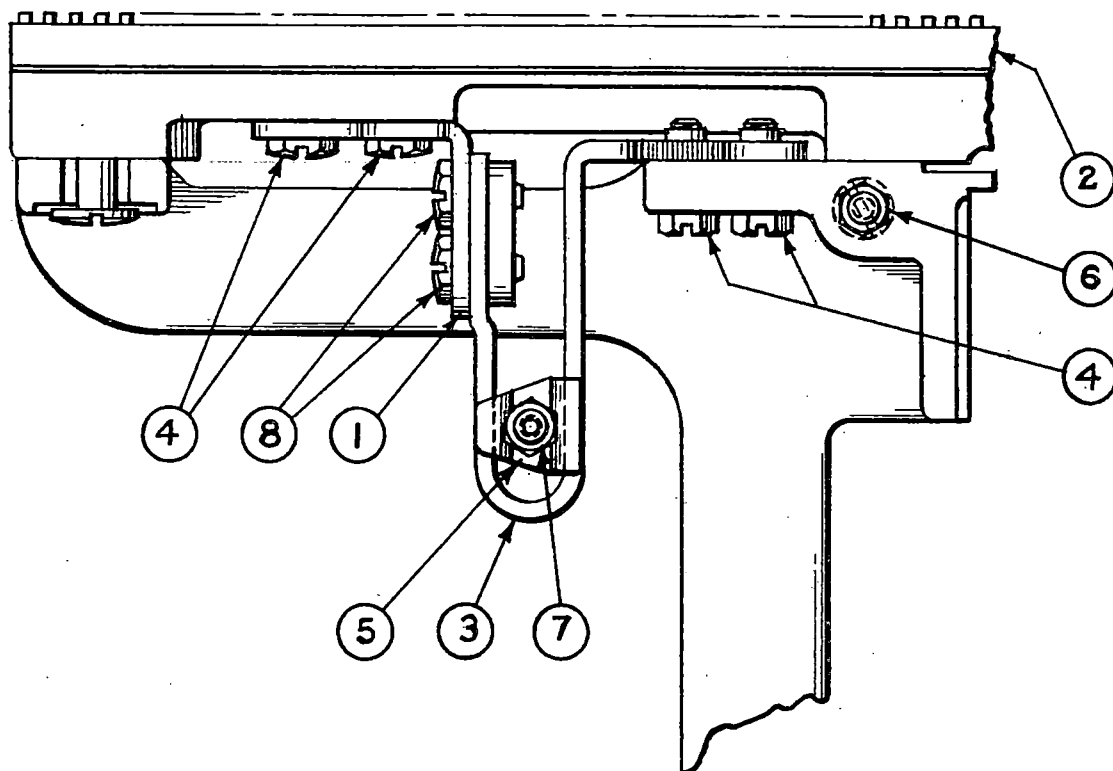
Be sure to see that all the type bars are adjusted to the ring and cylinder, all bars alike. Test each one separately, holding the bar lightly against the cylinder with your finger. Use a thin piece of paper between the type face and cylinder. When drawing it out, there should be slight resistance. Repeat operation between type bar and segment ring. Any bars too heavy on ring or cylinder should be adjusted until all are alike. Period, comma, semi-colon, etc. should be set heavy on ring so that they will not emboss the plate.

Increase tension on paper lock springs so that the metal plate will be held firmly against the cylinder.

Test segment ring to see that the laminations are not too loose. If they are, remove ring and tighten clamps - this can be done by laying the ring on a flat surface and using a center or pin punch to tighten the clamps.

Go over alignment very carefully to see that the type are all on feet and produce perfect impressions. This is very important. Use a very lightly inked ribbon and a light touch for this test.

As most of the Multilith plates sold are from five to seven thousandths of an inch thick, undersized cylinders are no longer recommended.



INSTRUCTIONS FOR ADJUSTING SHOCK ABSORBING RAIL

20" 26" 32" CARRIAGE.

Machines equipped with Shock Absorbing Rail, will be shipped from the Factory, with Shock Absorber Adjuster Lock Assembly #5 loose in looped bottom of Base Shock Absorber #3. Raising Shock Absorber Adjuster #5 towards Bottom Rail #2 reduces Shock Absorber tension and permits adjustment to suit different types of desks.

Check Bottom Rail Shock Absorbers Right and Left #1 and Base Shock Absorbers Right and Left #3 and note that all Binding Screws #4 are positively secure. This is important.

When proper position of Shock Absorber Lock Assembly #5 is determined, note that it is secured with Lock Nut #7.

Base Shock Absorbers #3 are stationary and permanently secured to Base with Binding Screws #4. Bottom Rail Shock Absorbers #1 are permanently secured to Bottom Rail #2 with Binding Screws #4, and Ring and Cylinder adjustment is provided through elongated holes in Base Shock Absorber #3 and Bottom Rail Shock Absorber #1 and the adjustment is secured with Binding Screws #8.

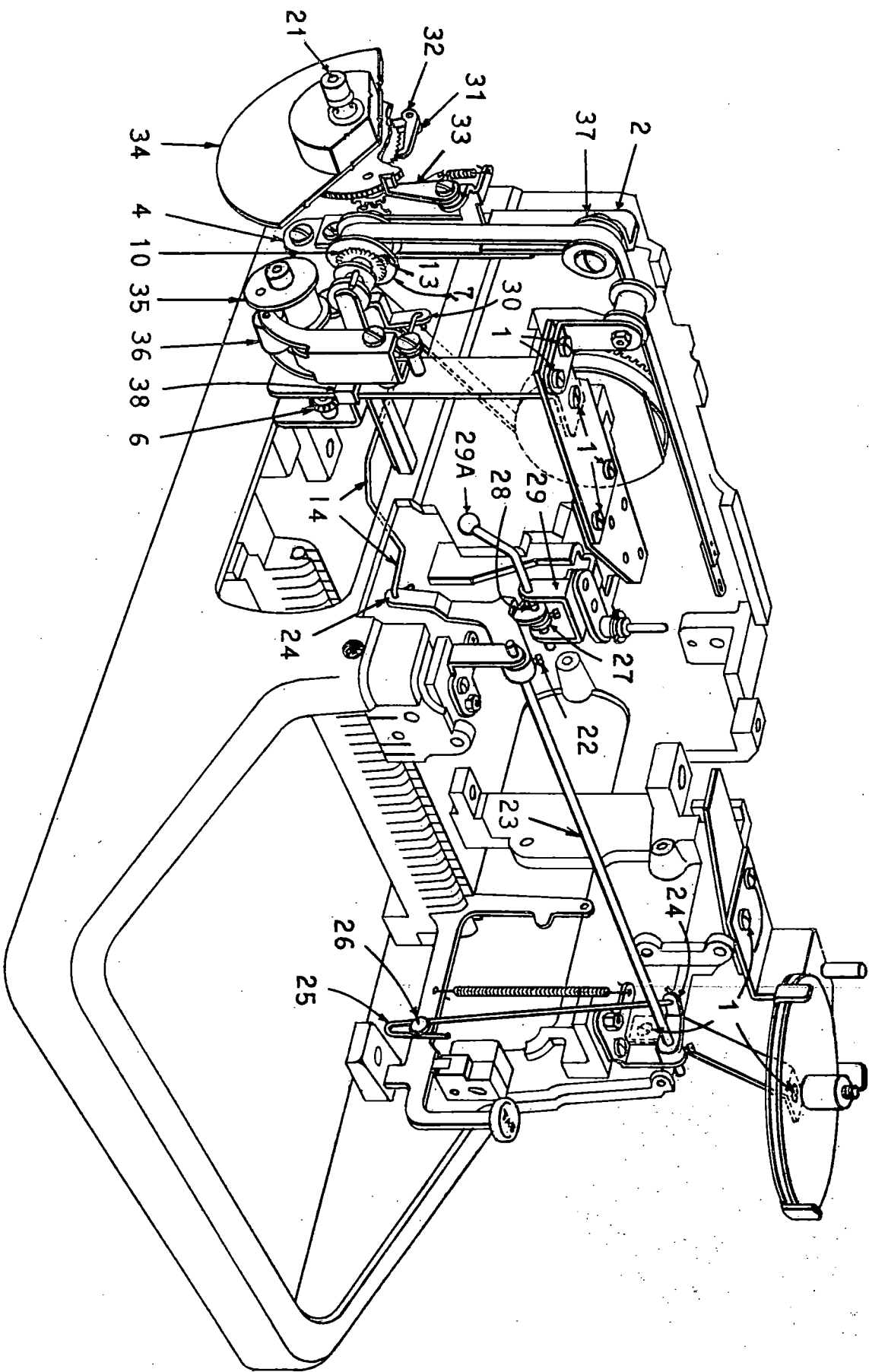
Should Ring and Cylinder adjustment on machines equipped with Shock Absorbing Rail be found necessary, proceed as follows:

Loosen Carriage Back Rest Binding Screws (See No. 2 on Page 2 of Adjustment Manual.)

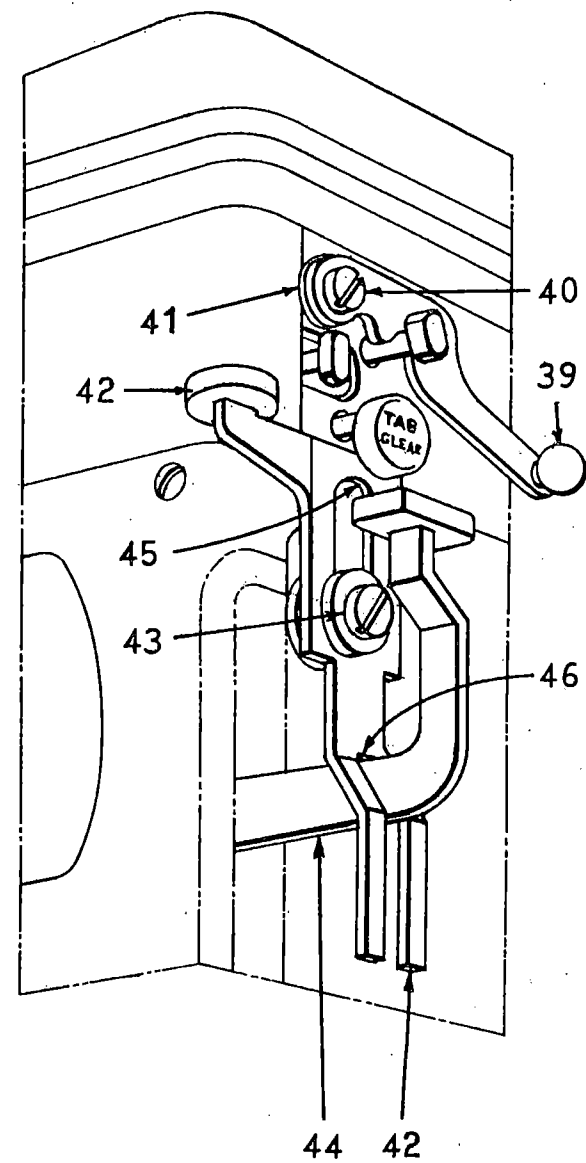
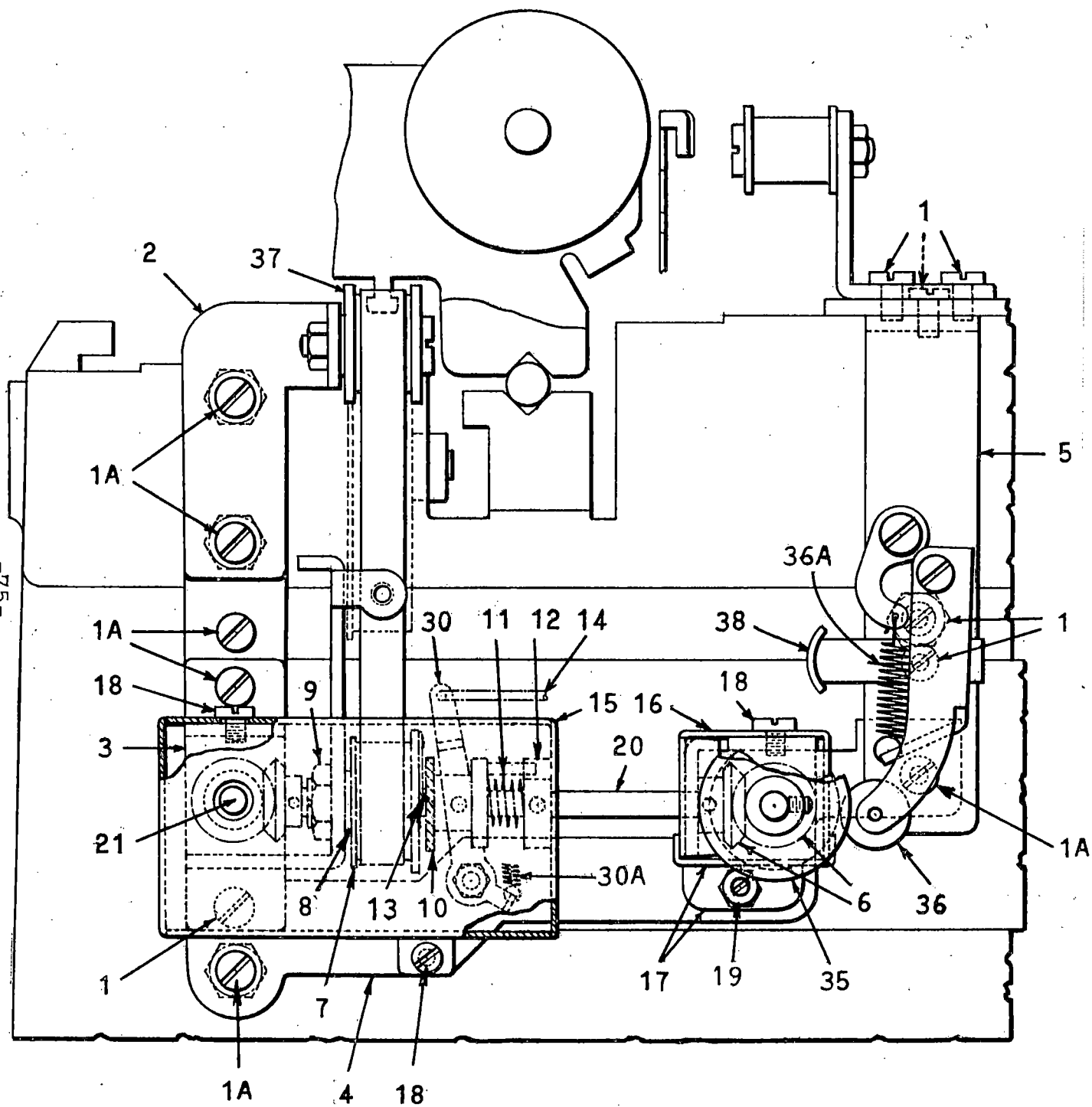
Loosen Binding Screws #8 to permit rear or forward setting of Carriage, through elongated holes in Bottom Rail and Base Shock Absorbers #1 and #3. Loosen Lock Nut #6 and facing machine, turn adjusting screw clockwise to set carriage back and anti-clockwise to bring carriage forward.

After adjustment for Ring and Cylinder has been made, be sure to note that Carriage Rest Binding Screws (No. 2 on Page 2 of Adjustment Manual) - Lock Nuts #6 and Binding Screws #8 are positively secure.

Follow instructions on Page 3 of Adjustment Manual for Typebar Trip-Escape Plate limits and Bi-chrome Ribbon Adjustments, as changing relation of Ring to Cylinder, upsets original adjustment of these parts.



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INSTRUCTIONS FOR ADJUSTING ROYAL PHOTO OFFSET TYPEWRITER

Examine Screws Nos. 1 and 1-A and note that all brackets are securely fastened to Base. Note that Draw Band Idler Bracket #2, Ribbon Winding Spool Bracket #3, Ribbon Feed Bracket #4, and Ribbon Tension Roll Frame Support #5 are not bent or distorted. Note that Ribbon Winding Spool #34, Carbon Ribbon Spool Covers, etc., are not bent from handling or other causes, as this would prevent Carbon Ribbon from functioning and render the device inoperative.

Note that Bevel Gears #6 are in positive mesh, secure to shafts, and free from bind. Adjustment collars are provided on Gear Shafts for positioning Gears and retention of Shafts in Ribbon Feed Bracket #4.

Note that Ribbon Feed Drive Pulley #7 is free on Drive Pulley Bearing #8. A slot is provided in bearing to accommodate a screwdriver to prevent bearing from turning while Lock Nut #9 is being secured. Ribbon Feed Drive Pulley and Bearing is an assembled compound part.

Ribbon Feed Ratchet #10 is held against Pulley #7 by Spring #11 and Ribbon Feed Ratchet Slotted Collar #12 and should be set so that a distance of approximately 1/4" will be maintained between Slotted Collar #12 and Feed Ratchet #10 while machine is set in Carbon Writing position. Spring #11 automatically holds Ribbon Feed Ratchet #10 against Feed Pawl #13, part of and attached to Pulley #7, and Spring should be of sufficient tension to insure that Feed Ratchet #10 will positively engage Spring Pawl #13.

Should it be necessary to remove the Carbon Ribbon Feed Assembly as a unit, first disconnect and remove the Draw Band, then remove Screws #1-A and disconnect Carbon Ribbon Feed Release Link #14. The Assembly is then disconnected from the Base, Draw Band Idler Bracket #2, and Ribbon Tension Roll Frame Support #5.

On carriage widths above 14", a special hole is drilled in Bottom Rail Bracket Left to accommodate Carbon Ribbon Feed Drive Shaft #20, so this assembly cannot be disconnected as a unit as in the 11", 12" and 14" carriages. To disconnect this assembly on Carriage widths above 14", first remove Bevel Gear from right end of Ribbon Feed Drive Shaft #20, loosen set screw in Slotted Collar #12, loosen collars on Ribbon Feed Shaft #21 and remove collars. Remove Bevel Gear on end of Feed Shaft #21 and draw Drive Shaft #20 from right to left. It will be necessary to detach Ribbon Winding Spool Bracket #3 from Ribbon Feed Shaft Bracket #4, after which Ribbon Feed Shaft Bracket #4 can be worked through between the Base Side and Bottom Rail Bracket Left. Aside from the procedure in assembling the Carbon Ribbon, parts are identical for all widths of carriages.

To remove Winding Spool Bracket Cover #15, remove Screws #18.

To remove Ribbon Feed Shaft Cover Top #16, remove Screws #18.

To remove Ribbon Feed Shaft Cover Bottom #17, loosen Lock Nut #19 and withdraw screw. This screw is designed to hold Base Panel in place and should be set firmly against Panel and securely locked with Nut #19 after adjustments have been completed.

It is important that Tabulator Lift Lever with its relation to Carriage Rack, Tabulator Finger, etc., be in standard adjustment before any

adjustments are attempted on Photo Offset Carbon Ribbon Feed. (See Instructions for adjusting Tabulator, Pages 25 and 26 of Adjustment Manual.)

With Tabulator properly adjusted, note that Set Screws #22 are set on flattened surfaces of Shaft #23 and that Tabulator Release Arms Right and Left #24 are adjusted so that Shaft #23 is free from bind and that side play is eliminated. Note that Link #25 works freely on Stud #26. Note that Set Screws are secure on notched Detent Collar #27 and that Spring #28 has sufficient tension to retain Collar #27 in notched part of Ribbon Neutralizer Bracket #29.

Link #14 should be adjusted so that with Carbon Ribbon Neutralizer Handle #29-A set in Carbon Ribbon writing position, sufficient clearance will be maintained between Ribbon Feed Release Arm #30 and Ribbon Feed Drive Pulley #7. This distance should approximate not less than 1/64". Adjustment is provided by shortening or lengthening Link #14. Note that Ribbon Feed Release Arm Spring #30-A is properly secured.

Note that Winding Spool Carrier Arm #31 is set so that there will be approximately, but not less than 1/32" clearance between Check Pawl #33 and side of Ribbon Winding Spool #34. A set screw, not shown, is provided in Arm #31 to control this adjustment. Note that Pawl #32 is free on its fulcrum and that Pawl Spring tension is not in excess of that necessary to drive Winding Spool Driving Ratchet and take up the slack in Carbon Ribbon. Excessive tension of spring, or any indication of a bind in this mechanism, would tend to retard the free travel of the carriage. This pawl and ratchet are designed to wind up the carbon ribbon and pawl will slip over ratchet after slack in ribbon has been taken up. This mechanism should not be confused with Carbon Ribbon Feed mechanism.

Note that Ribbon Feed Roll #35 is properly secured to shaft and free from bind and that Ribbon Tension Roll #36 is accurately centered with Feed Roll #35; also, that Ribbon Tension Roll Spring #36-A is properly secured. Winding Spool Ribbon Guide #38 can be bent in either direction, toward front or back, to centralize Carbon Ribbon on Ribbon Feed Roll #35.

To replace Draw Band, remove Winding Spool Cover and Winding Spool #34, loosen Nut #19 and withdraw screw so that Base Side Panel can be removed. Wind Spring Barrel by hand three full turns and attach Draw Band, permitting it to wind around Spring Barrel, retaining enough of the band to drop to the right of Spring Barrel. Retrieve end of band by employing a wire hook and pull it through under Tabulator Clear Link and around Drive Pulley #7 and Draw Band Idler Roll #37, then attach to Right Carriage End in the usual manner. Replace Winding Spool Cover and Base Panel. Adjust Spring Barrel Tension.

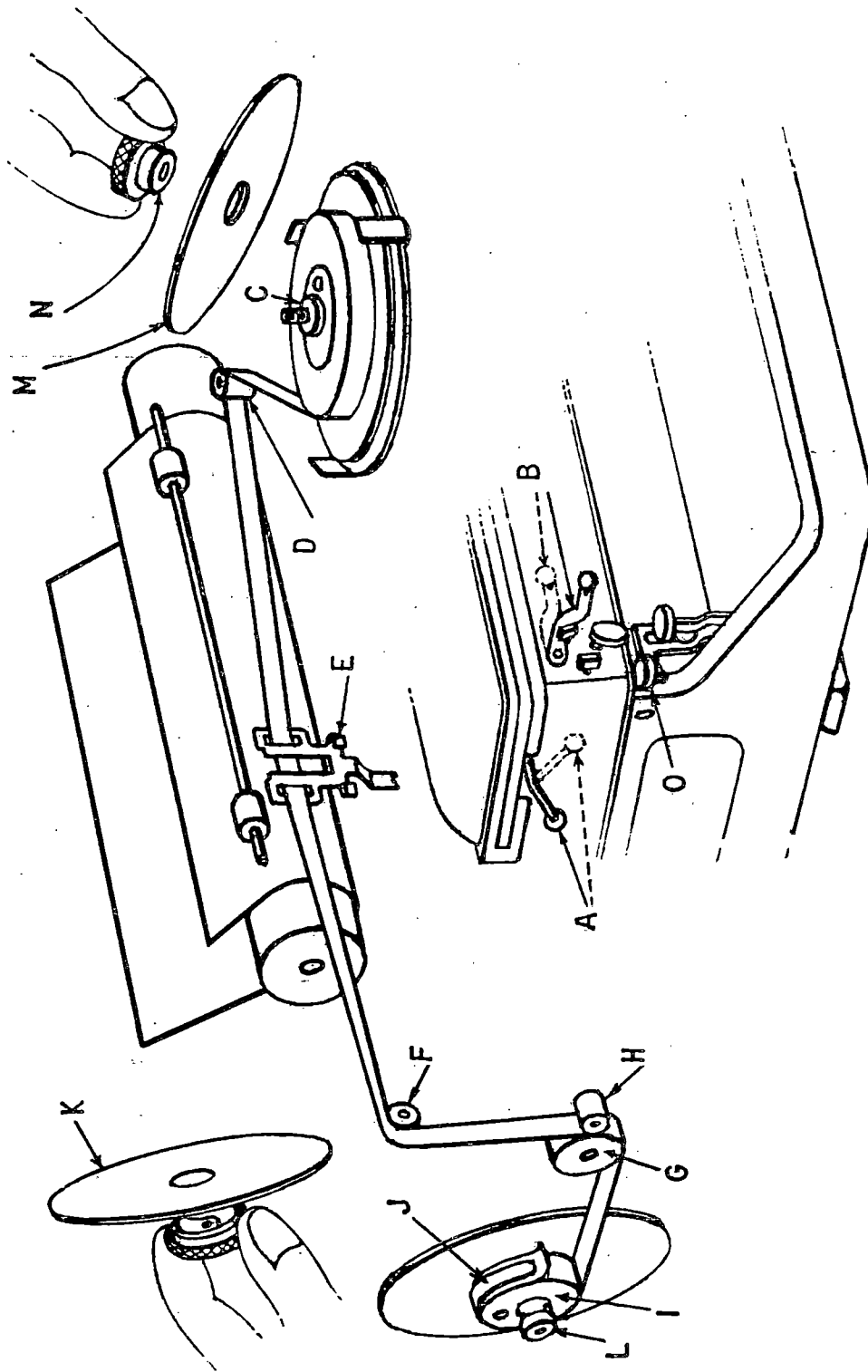
Draw Band Lengths:

For 11"-12"-14" Carriage widths use 26" Draw Band #14800
" 18"-20" " " " 32" " " #25640
" 26" " " " Special 43" Long.
" 32" " " " Special 49" Long.

Fabric Ribbon Neutralizer Lock #39 is attached to Front Plate by Screw #40 and a Friction Washer #41 is placed between Neutralizer Lock and Front Plate to prevent Lock from working loose from locked position. Aside from bending Friction Washer a trifle to provide sufficient friction on lock, there is no other adjustment necessary.

Half Back Spacer Key #42 must be free from bind on its Fulcrum #43. If Half Back Spacer is not depressing Back Space Key Lever #44 far enough, it will be necessary to file Half Back Space Key at point #45 until proper adjustment is obtained. If Half Back Space Key depresses Back Space Key Lever too far, it will be necessary to file Half Back Space Key at point #46 until proper adjustment has been obtained. Test by imprinting a character, preferably the capital "O", then test by noting that Half Back Space imprint is centralized with regular spacing. When Half Back Space Key is released, carriage should travel one and one-half spaces, or back to regular pitch.

It is important for efficient operation of Photo Offset Typewriter, that the carriage be absolutely free running for its entire length. A bind in carriage travel from any cause will have a definite bearing on the operation of the carbon ribbon feed.



ROYAL KMM PHOTO OFFSET TYPEWRITER.
Description and operating directions.

The new model Photo Offset Royal is a two-purpose machine, using Carbon Paper ribbon for offset work or a Fabric ribbon for correspondence or general office work.

The machine is equipped with a neutralizing lever 'A' to silence the carbon ribbon feed when it is desired to use the fabric ribbon, and there is an additional lever 'B' for silencing the fabric ribbon when the carbon ribbon is used. The lever 'A' also silences the carbon ribbon feed when the carriage is moved in making paper adjustments.

The machine has automatic means for silencing the feed of the carbon paper ribbon when the tab key is operated.

The carbon ribbon is moved a uniform space to present a new type imprint position regardless of the pitch of the machine or the quantity of ribbon on the spool hub, insuring clear uniform type impressions.

When the machine is to be used for photo offset typing with a carbon ribbon, the lever 'A' should be turned rearwardly as shown in full line in the drawing, and the lever B should be placed in the down position shown in full line.

When the machine is to be used for correspondence work with a fabric ribbon, the lever 'A' should be placed in the forward or dotted line position, and the lever B in the up position as shown in dotted line.

When using carbon ribbon for photo offset work, place full roll on stud C on base side extension. Thread ribbon back of guide D and through ribbon vibrator E and then over roll F and between the feeding roll G and the idler-pressure roll H. Attach the free end of the ribbon to wood core 'I' with spring clip J as illustrated. Place cover K on hub L - (This cover has a snap spring retainer)

When carbon ribbon has been unwound from the right hand spool to the left, the spool is then reversed or removed from the left hand winding hub L to the right hand stud C. This operation automatically reverses the zone of the ribbon, bringing the unused portion uppermost as it is threaded through the ribbon vibrator.

The ribbon cover M is placed over the hub C and is retained loosely in place by a knurled thumb nut N.

NOTE-Always have bichrome lever set in central or black position.

When machine is used for correspondence or other office work, remove the carbon ribbon and equip machine with a fabric ribbon as usual.

Two zones of writing can be obtained from the ribbon by reversing the position of the spools.

The Half Back Spacer - standard equipment on this machine - is valuable where the user wishes to justify the right margin on copy. By means of this key it is possible to move the carriage back successively half spaces, thereby crowding the space between words and thus typing more words in a given line than would be possible when using

regular spacing. The half back spacer key '0' is located on the front plate, directly above and working in conjunction with the regular back space key, and is operable by a down thrust finger action.

DIRECTIONS FOR USING HALF BACK SPACE KEY

1. Write first word in usual way.
2. Operate space bar once.
3. Half back space each letter in second word - DO NOT use space bar before beginning third word.
4. Write third word in usual way.
5. Operate space bar.
6. Half back space each letter in fourth word and repeat as directed above to shorten a line as many characters as is needed.

NOTE - DO NOT USE SPACE BAR AFTER A HALF BACK SPACED WORD.

When using the half back space key be sure to hold it down when typing a character.

Usually it is unnecessary to write a complete line of half back spaced words as the justification required can in most cases be accomplished with a small number of half back spaced words.