

**Service
Manual**

SINGER*

500

series machines

518 538 514 513 533

Form K8865 (773)

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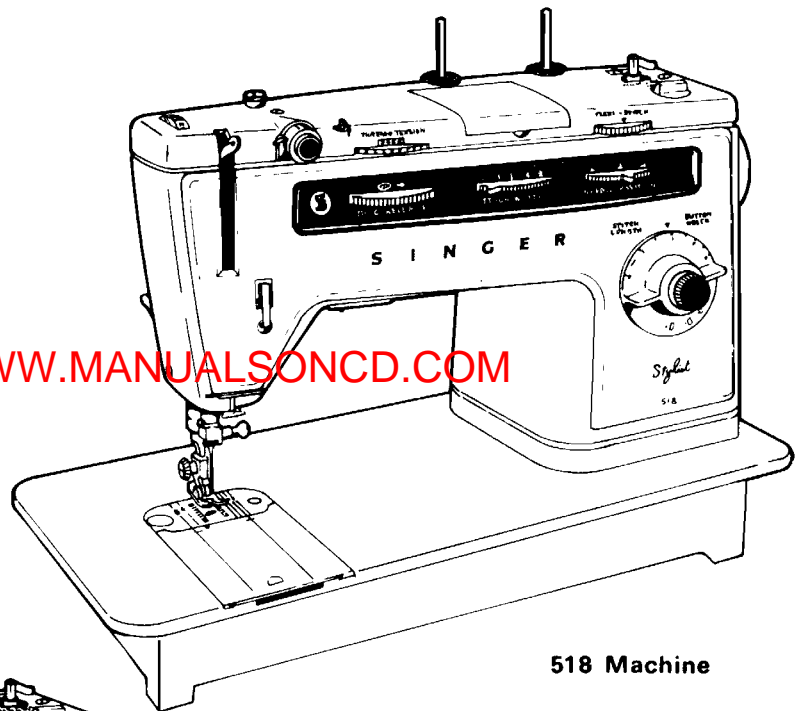
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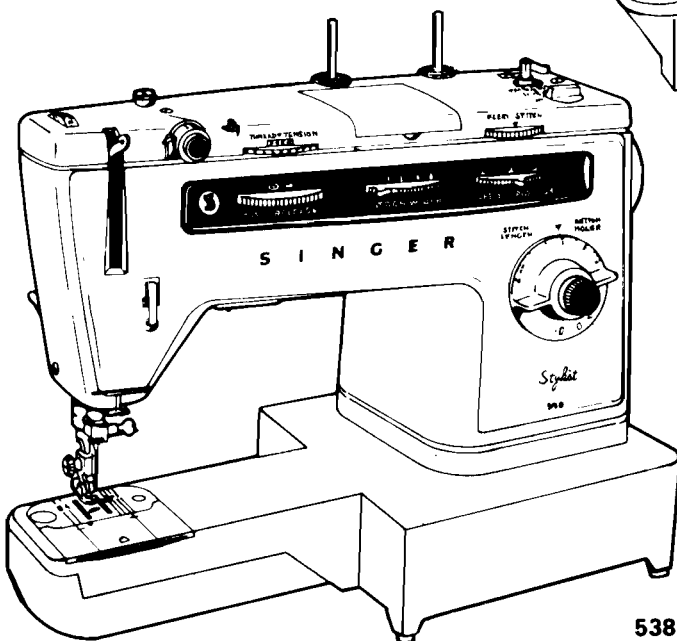
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Servicing Instructions for **SINGER** Machines Classes 518K & 538K

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


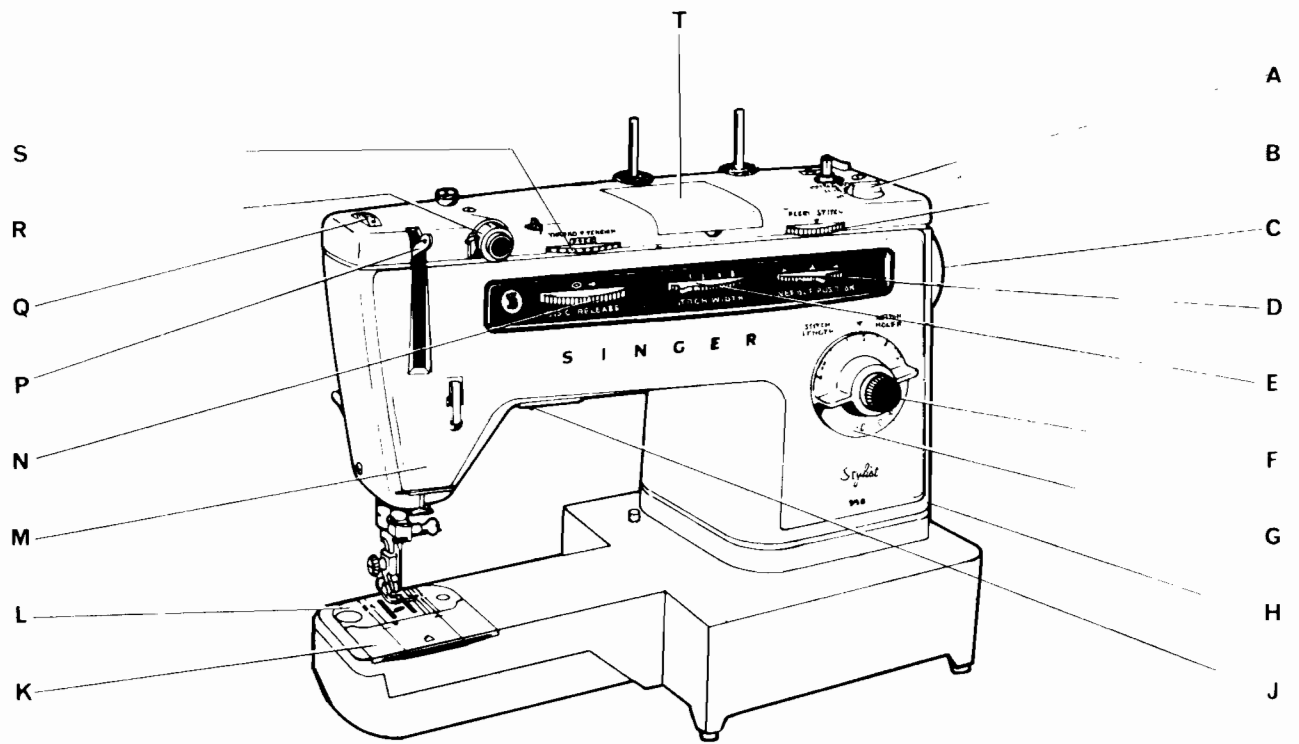
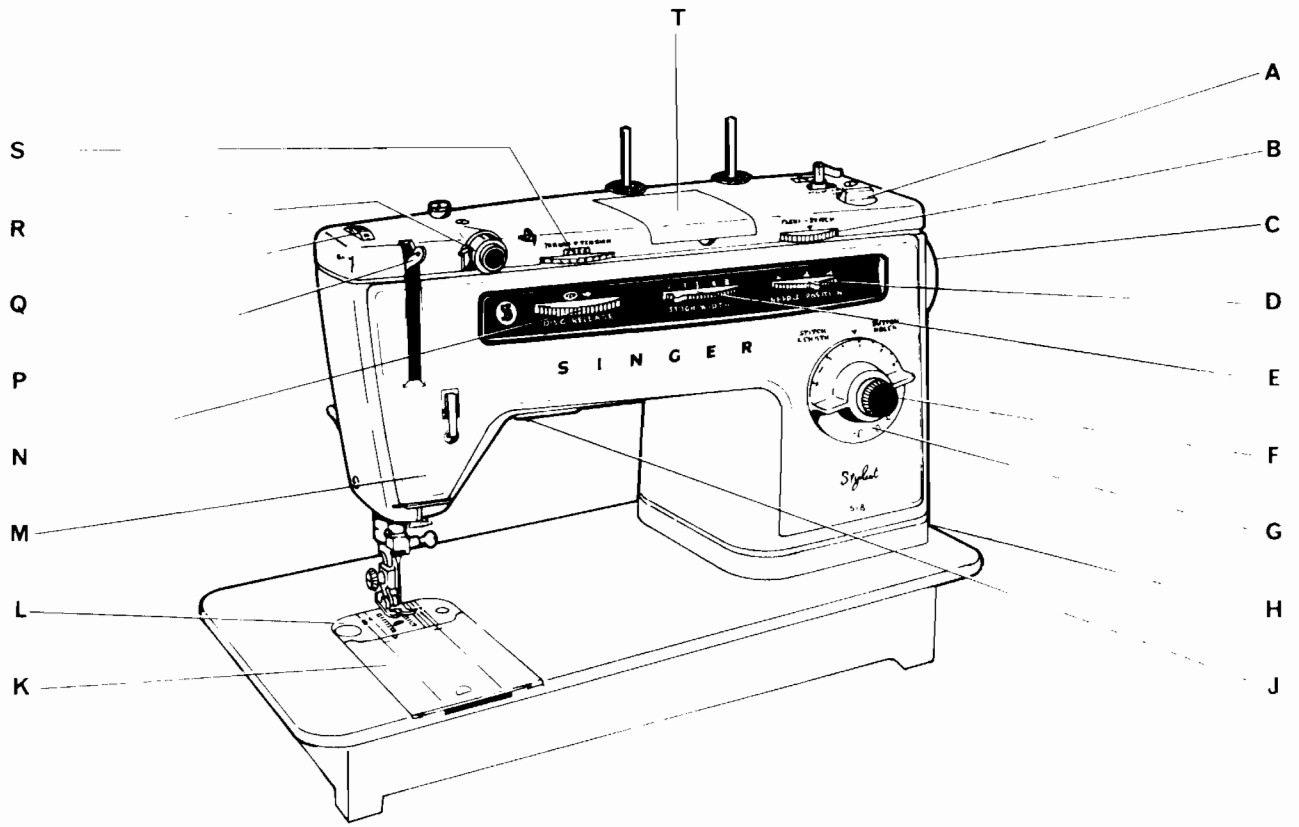
518 Machine



538 Machine

DESCRIPTION - 518K & 538K MACHINES

- For straight, zig-zag, stretch and ornamental stitching.
- 518K: Flat bed aluminium machine.
- 538K: Tubular bed aluminium machine.
- Electric power with built-in ENK8 motor, light J (hinged), rocker power and light switch H (located below arm end cover plate) and 'Touch and Wind' hand wheel C.
- Belt and gear driven horizontal rotating hook on a vertical axis with stationary bobbin case (Apollo Hook System). Rotating hook takes two revolutions for each stitch.
- Throat plate L held in position by a position pin and spring loaded clamp. Opening the bed slide K actuates the clamp and allows for easy removal of throat plate.
- Lock stitch, Alpha feed, link take-up.
- Self threading take-up lever P, slotted for easy threading.
- Bobbin winder mounted on top cover is actuated by means of a switch A protruding through the top cover.
- *Flexi-Stitch* balance control dial B engages or disengages the cam-controlled feed system. It also permits the operator to manually balance forward and reverse stitching to provide variation of *Flexi-Stitch* patterns.
- Disc release dial N operates a mechanism to release the disc for easy removal.
- Bight control dial E on front of arm in direct view of the operator. The dial controls the width of the zig-zag or ornamental stitch, up to a maximum of 5mm. When the machine is to be used for straight sewing in either left, centre or right needle position, this dial is set at the $\frac{1}{2}$ position.
- Needle position selector dial D on front of arm in direct view of the operator. The dial enables the needle to be set in left, centre or right position.
- Four step buttonhole mechanism built into machine. Square end buttonholes can be made by turning buttonholer and feed regulator control dial G in a sequence of four steps beginning at  1. Balancing device incorporated in mechanism to permit equalising forward and reverse stitch length which may vary when changing from one fabric to another. This balancing is achieved by turning the push button F located in centre of buttonholer and feed regulator control dial.
- Plastic control panel M (Cream Tint), control panel insert (copper), names 'SINGER' and 'Stylist' and machine class No. '518'/'538' (Brown) and indications and names for 'Disc Release', 'Stitch Width' and 'Needle Position' (White).
- Buttonholer and feed regulator control dial G (Cream Tint), 'BUTTONHOLE', buttonhole designs and numerals 1, 2, 3, 4, 'STITCH LENGTH', 'FINE' and numerals 0, 6, 7, 8, 10, 12, 15, 25 (Brown) and *Flexi-Stitch* indication (Bright Cherry Red).
- Hinged disc cover plate T at top of arm.
- Thread tension control dial S increases or decreases the thread tension. Tension settings are indicated on the dial in numerals.
- Thread tension device R, with central spacing disc for two needle threads.
- Control dial Q which projects from the arm top cover indicates the presser foot pressure. This dial is marked with settings NORM and MAX, indicating increasing pressure on the presser foot and DARN indicating the darning position with no pressure on the presser foot.
- Push button reverse feed F in direct view of operator, located in buttonholer and feed regulator control dial G. Button is held depressed for reverse stitching and released to continue forward stitching.
- 518K: Bed—16 $\frac{1}{2}$ inches (41.91cm) long—6 63/64 inches (17.78cm) wide.
- 538K: Tubular bed circumference—9 $\frac{5}{8}$ inches (24.45cm).
- Working space at right of needle—7 $\frac{1}{8}$ inches (18.1cm).
- Needle catalogue 2020 (15x1) threaded from front to back.
- Needle catalogue 2028 for twin-needle stitching.
- Needle catalogue 2045 for sewing synthetic materials.
- Maximum stitch length—6 per inch (4mm)
- Needle bar stroke—1 183 inches (30.05mm).
- Presser bar lift—.290 to .300 inches (7.37 - 7.62mm).
- Maximum width of zig-zag stitch (bight), approximately 3/16 inch (5mm).
- Speed—maximum speed at the rated voltage not less than 900 r.p.m. supplied with single pile foot controller.
- 32 varieties of *FASHION* discs are available. Those not furnished with machine can be supplied at an additional charge. Each disc produces a particular decorative stitch and is manually inserted into machine.
- 5 *Flexi-Stitch* discs are furnished with machine.



LUBRICATION

1. Disconnect machine from electricity supply.
2. Remove all lint, dust or foreign particles from machine.
3. Clean presser bar, needle bar and between tension discs.
4. Remove arm top cover and apply oil to the places indicated.
5. Remove face plate and apply oil to places indicated.
6. Open bed slide, remove throat plate and bobbin case and oil point indicated.
7. Remove bottom cover and oil points indicated. Avoid getting oil on any part of the motor.
8. Wipe away all surplus oil from machine.
9. Replace bottom cover, bobbin case, throat plate, face plate and arm top cover. Close bed slide.

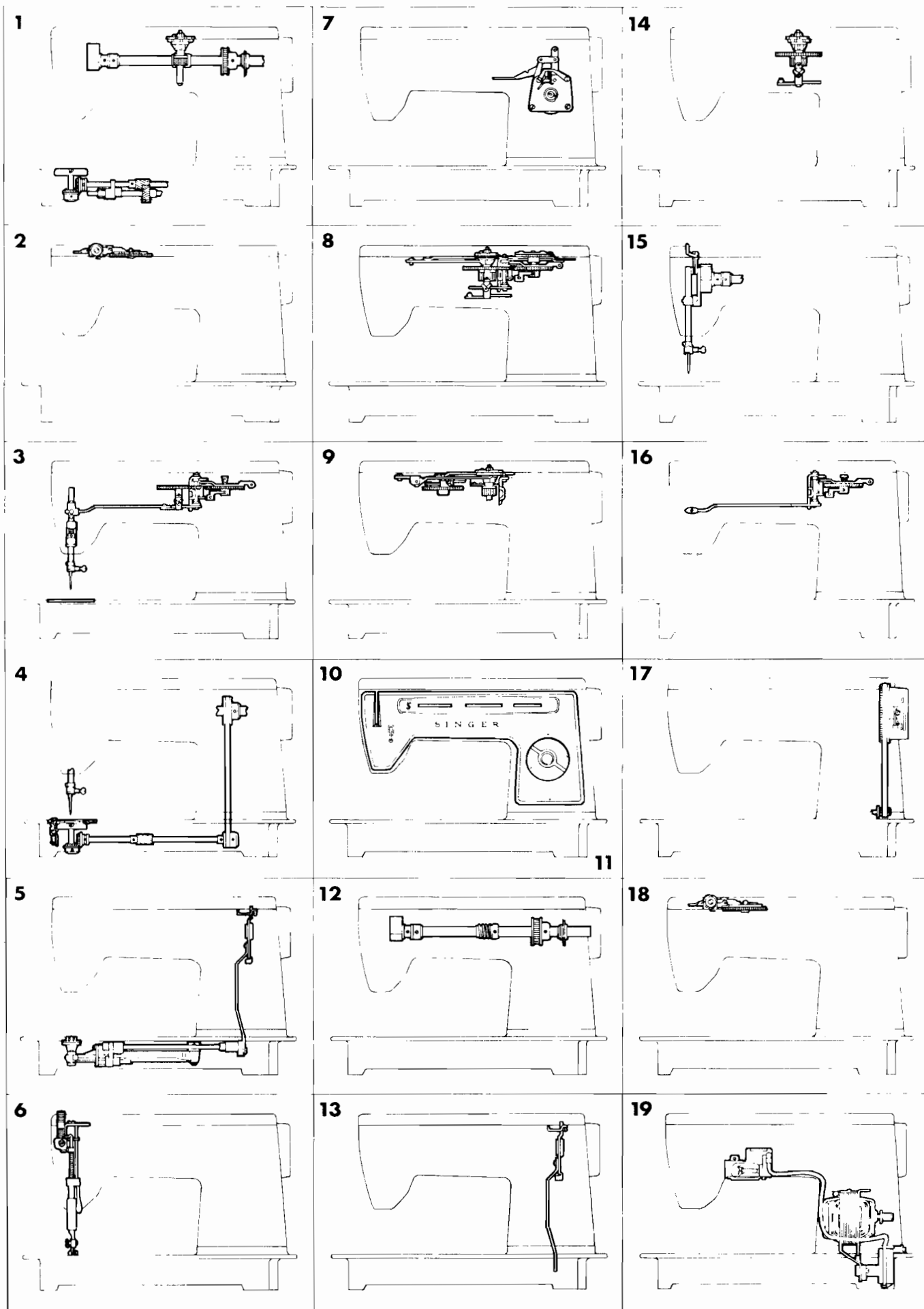
NOTE Under extreme conditions (if grease or dirt has become considerably hard or tacky), the machine should be cleaned with Varsol 2 (White Spirit 100). To do this, the following procedure must be observed:

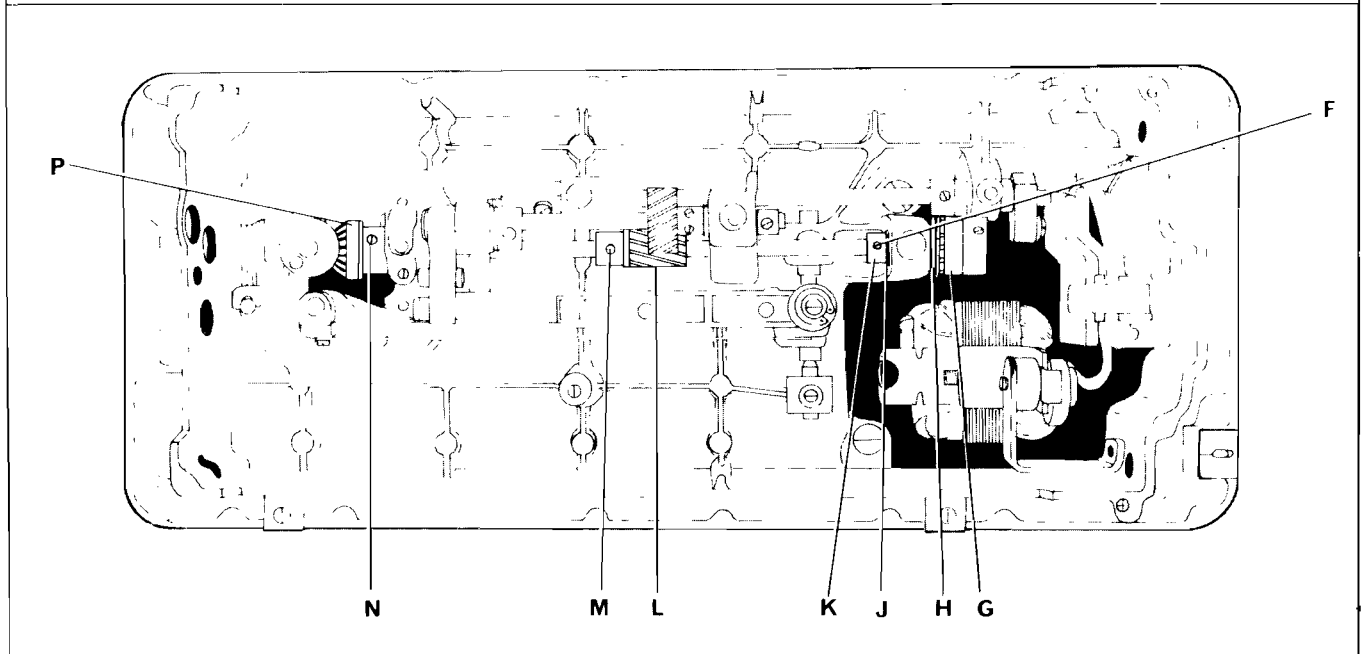
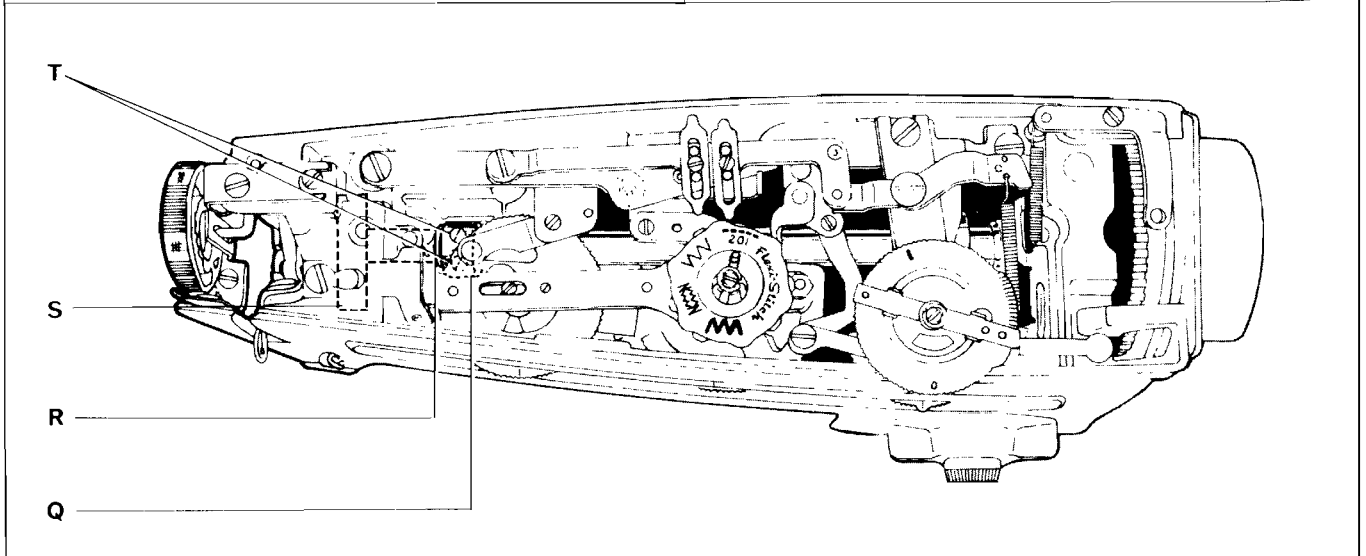
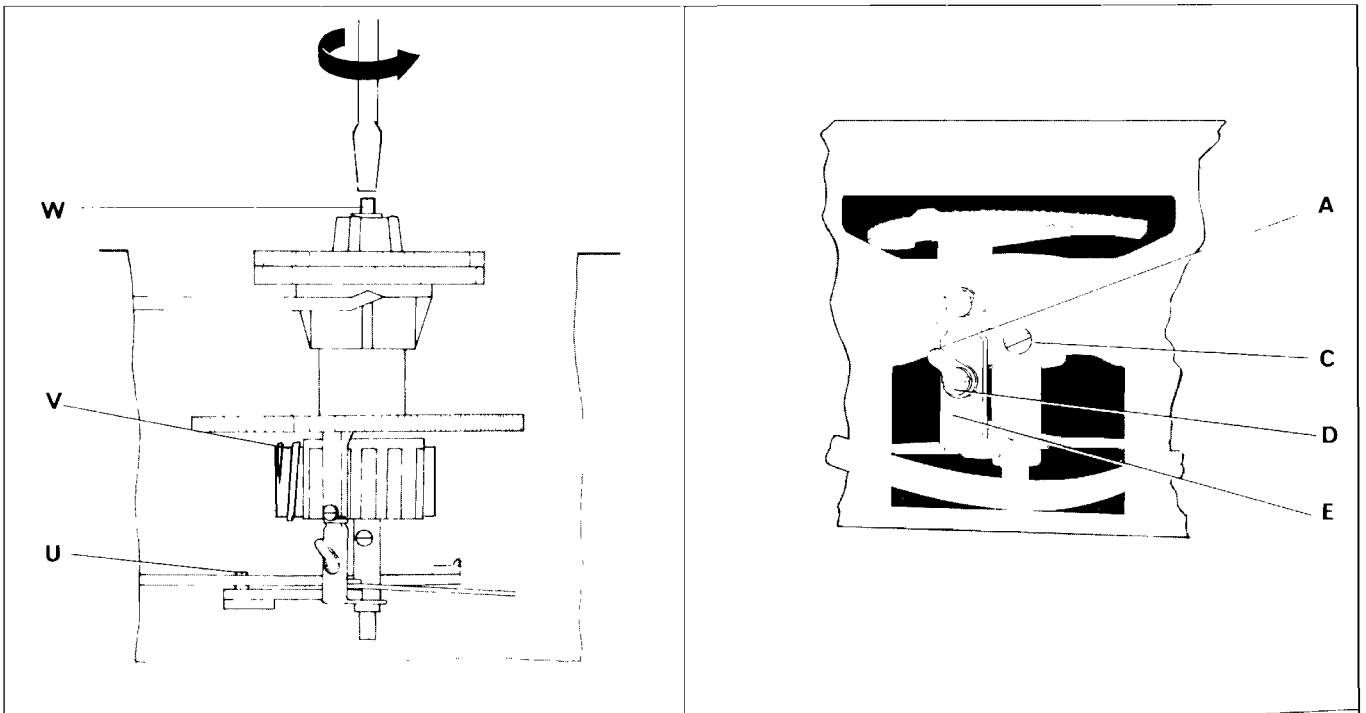
1. Remove arm top cover and face plate.
2. Remove bottom cover.
3. Remove bed slide, throat plate and bobbin case.
4. Remove motor, light and wiring harness as instructed on page 43.
5. Spray (or brush) top and bottom mechanisms with Varsol 2 (White Spirit 100), taking care to avoid over-spray to branded parts.
6. 'Blow-Off' excess solvent from mechanisms, or leave the machine until it is air dried.
7. Relubricate machine as instructed above.
8. Replace motor, light and wiring harness.
9. Replace bottom cover.
10. Replace bobbin case, bed slide and throat plate.
11. Replace arm top cover and face plate.

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- NOTE
- For a systematic check-out of the various components of the machine, carry out the checks in items 1 to 9.
 - Remove the arm top cover, face plate, arm end cover, control panel and bottom cover before starting on the first adjustment procedure.
 - Use a 'dummy' control panel when carrying out the sequential check.
 - When replacing arm top cover, hold tension releasing lever against arm top cover so that it does not get damaged.
 - A 3/32 inch A/F Allen key & a 9/32 inch A/F wrench are required to carry out the adjustments in this manual.

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1. SHAFTS



Eliminating end play or binding of horizontal arm shaft

CHECK: When horizontal arm shaft binds, first check to make certain that mesh between arm shaft worm gear and cam stack worm wheel is not too tight. Do this by setting the cam stack as instructed below.

If arm shaft still requires adjustment for end play or binding:

- SETTING:**
1. Loosen two set screws T in collar Q.
 2. Push needle bar crank S toward hand wheel end of machine while firmly pressing collar Q against plastic washer R.
 3. Tighten two set screws T.



Adjusting the cam stack

PREPARATION: Set needle position dial at centre position () and stitch width dial at straight-stitching position ().

CHECK: Check for excessive end play or binding between arm shaft worm gear and disc driving gear. Surging of machine speed is a clear indication of binding between worm and gear.

- SETTING:**
1. Loosen cam stack set screw C.
 2. Turn cam stack spindle W counter-clockwise to bring high point of eccentric toward arm shaft worm gear V and then back-off until there is no binding and a minimum amount of backlash (.003 to .010 inch (.08 - .25mm) at maximum disc radius).
 3. Tighten set screw C.

IMPORTANT Adjust stitch width dial for straight stitch and maximum width of zig-zag stitch as follows

1. Loosen screw D by half a turn.
2. Set stitch width dial at .
3. Set stop A against arm.
4. Tighten screw D, taking care not to disturb setting of stop A.
5. Set stitch width dial at  (maximum).
6. Loosen screw stud U.
7. Press needle bar driving arm toward you (away from arm shaft) and at same time tighten screw stud U.

Eliminating backlash in rotating hook bevel gears

- SETTING:**
1. Turn hand wheel over toward you and find closest meshing condition.
 2. Loosen screw N and move gear P to ensure no backlash at this position.
 3. Tighten screw N.

Eliminating end play in hook drive shaft

CHECK: Shaft should turn freely with no end play.


- SETTING:**
1. Loosen screw F.
 2. Hold collar K against face of bushing J and push pulley G firmly against opposing bushing face H.
 3. Tighten screw F.
 4. Reset hook and feed timing as instructed on pages 23 and 27

Eliminating backlash in feed shaft helical gears

- SETTING:**
1. Turn hand wheel over toward you and find closest meshing condition.
 2. Loosen screw M and move gear L along shaft as required, to ensure no backlash at this position.
 3. Tighten screw M.
 4. Check feed timing (see page 27).

2. THREAD CONTROL

Setting take-up spring

- CHECK:**
1. Set stitch width dial at \vdots , needle position dial at , stitch length dial at 12 and tension dial between 3 and 4.
 2. Place a piece of light-weight material (two ply) under presser foot.
 3. Turn hand wheel over toward you until eye of size 14 needle is about to enter fabric as shown at T.
 4. Spring V should be at rest against stop W.
- SETTING:**
1. Using an old needle, carefully remove decal U to reveal slot in screw X.
 2. Loosen screw X and rotate unit as required.
 3. Tighten screw X.
 4. Position decal U on screw X, aligning notches in decal with screw slot. Press decal firmly into position. (If decal is damaged or lacks adhesion, fit new decal.)

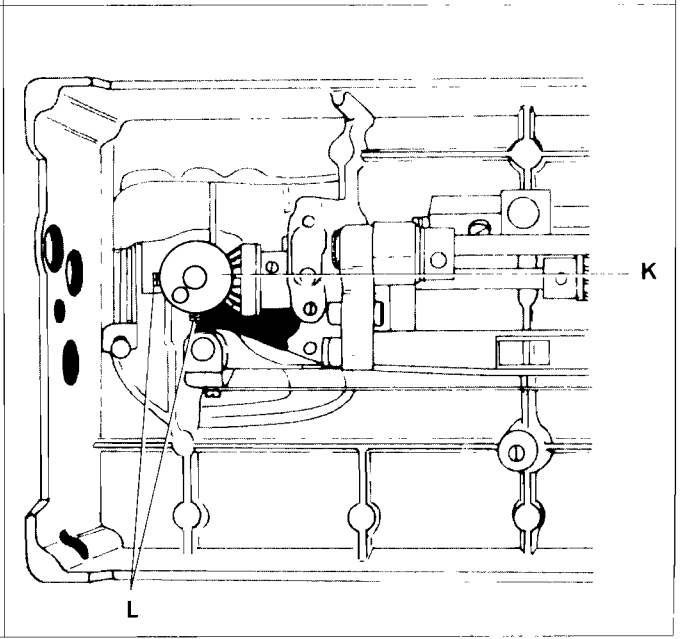
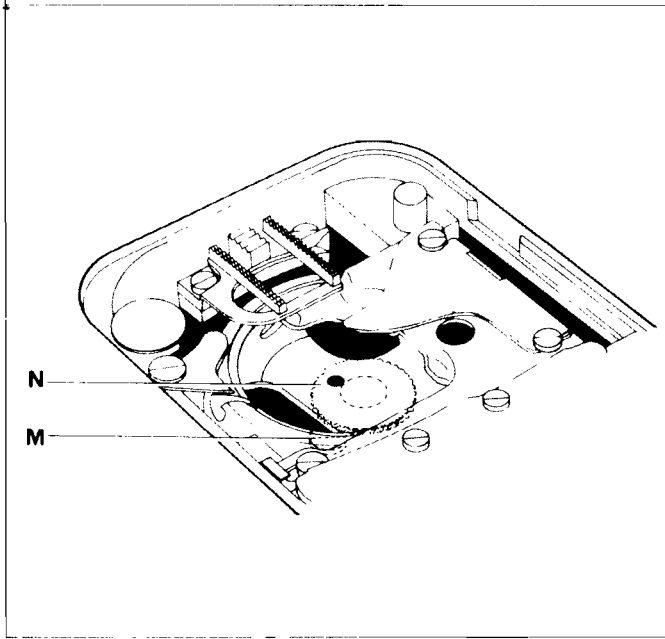
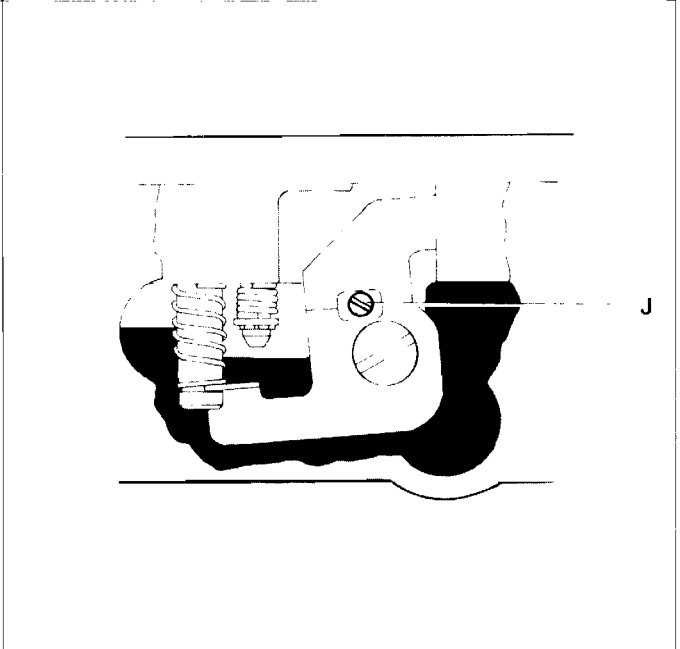
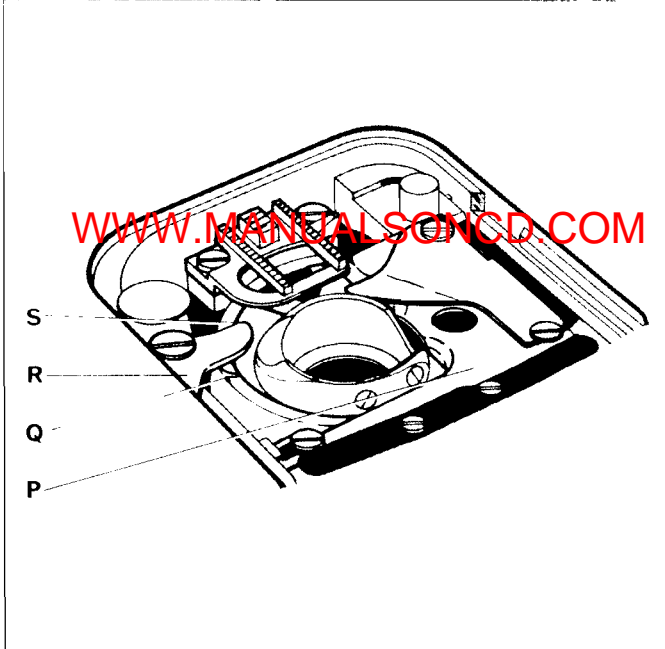
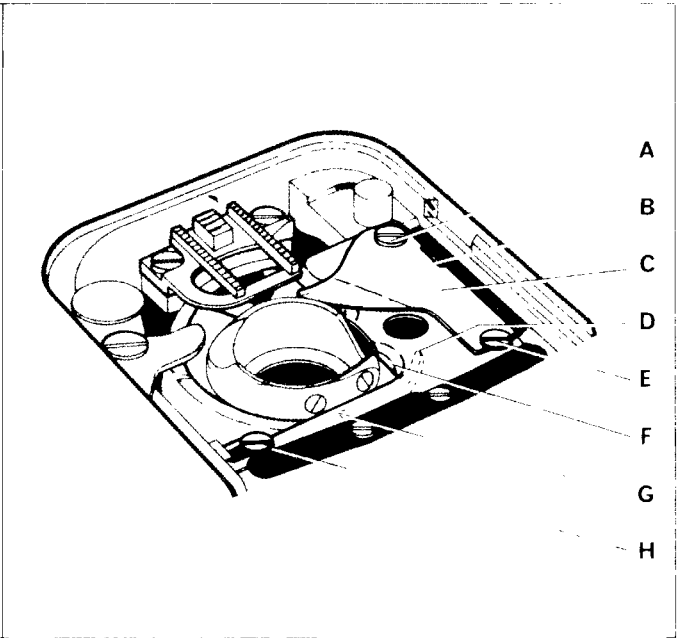
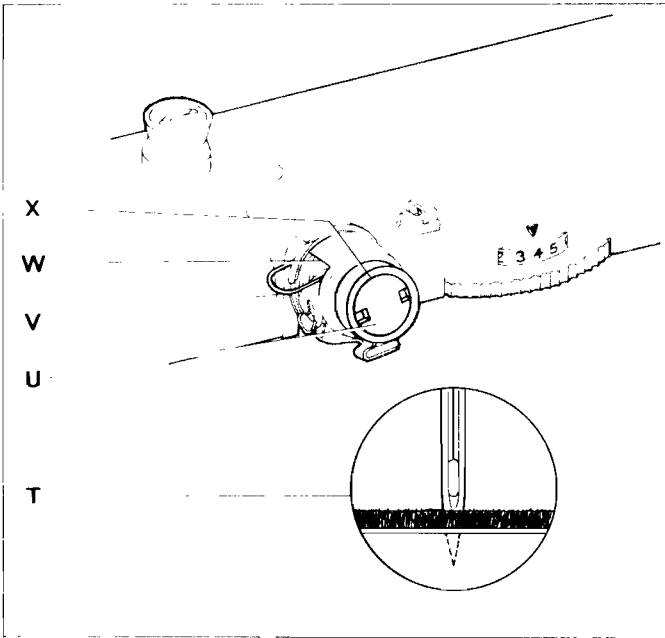
Setting thread clearances

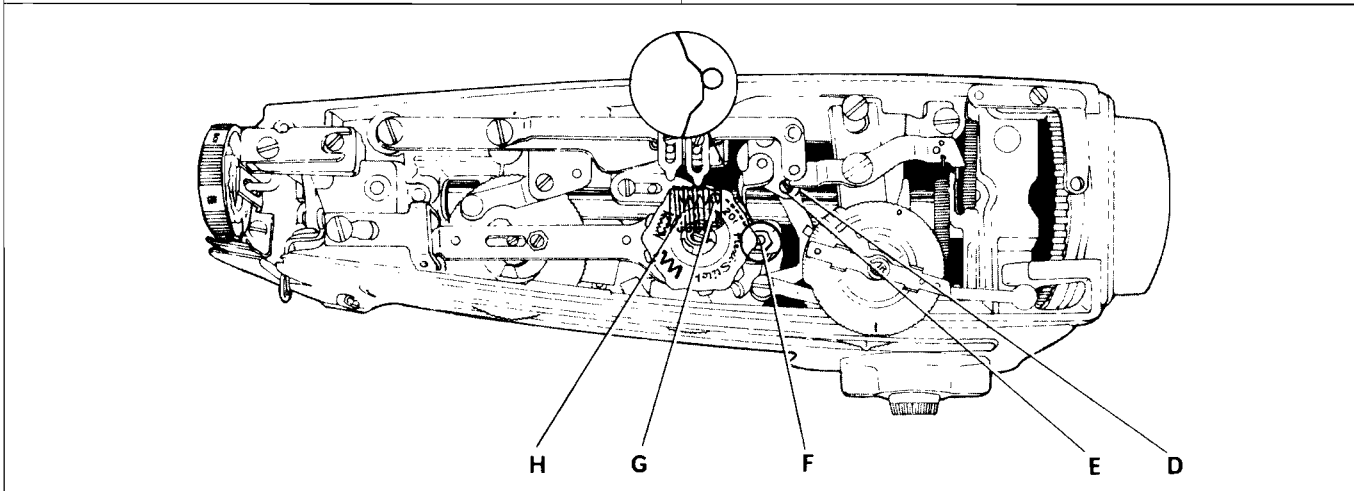
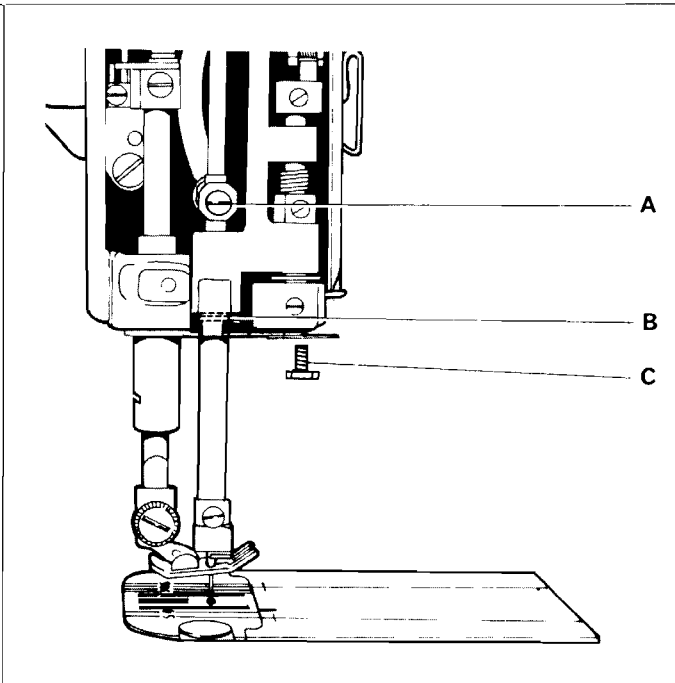
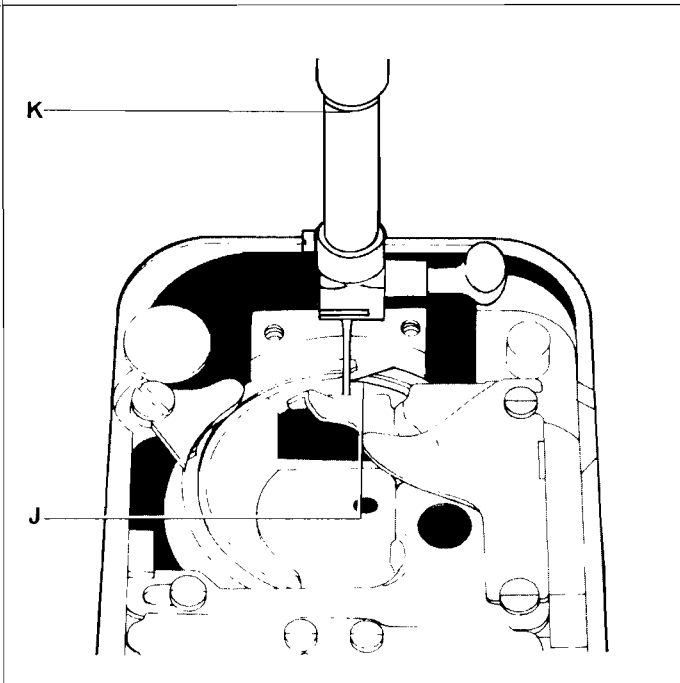
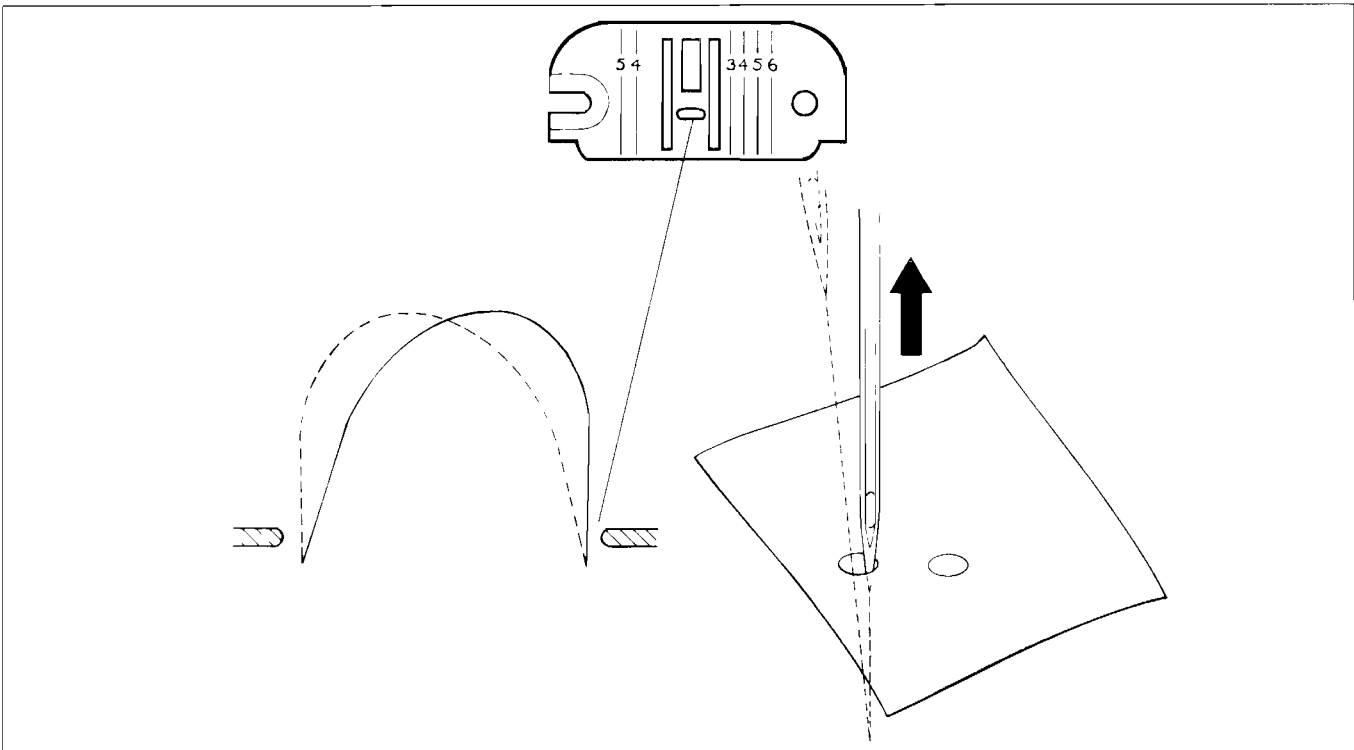
SETTING CLEARANCE UNDER BOBBIN CASE RETAINING PLATE

- CHECK:**
1. Open bed slide and remove throat plate.
 2. Turn hand wheel over toward you until hook point is in position shown at Q.
 3. Using a wire feeler gauge, check clearance under bobbin case retaining plate at point S. The clearance should be .010 to .014 inch (.25 - .36mm).
- SETTING:**
1. Remove bobbin.
 2. Turn hand wheel over toward you until hook point is in position shown at Q.
 3. Loosen set screw J.
 4. Loosen two Allen screws L (use 3/32 inch A/F Allen key) and turn jacking screw M (making sure that eccentric hook bushing N does not rotate) until clearance of .010 to .014 inch (.25 - .36mm) between bobbin case and bobbin case retaining plate R is obtained.
 5. Tighten set screw J.
 6. Check hook timing as instructed on page 23.
 7. Check distance between hook point and needle as instructed on page 16.

SETTING CLEARANCE BETWEEN BOBBIN CASE AND POSITION PLATE AND RESTRAINING PLATE











- CHECK:**
1. Open bed slide and remove throat plate.
 2. Turn hand wheel over toward you until hook point is in position shown at D.
 3. Using a wire feeler gauge, check point F. The clearance should be .010 to .014 inch (.25 - .36mm).
 4. Using a wire feeler gauge (.010 to .018 inch) (.25 - .46mm), check clearance under position plate at point G. Adjust in conjunction with clearances under bobbin case retaining plate.
- SETTING:**
1. Turn hand wheel over toward you until hook point is in position shown at D.
 2. Loosen screws A, E and H.
 3. Move position plate P to obtain a clearance of .010 to .014 inch (.25 - .36mm) between bobbin case and position plate at point F.
 4. Tighten screws E and H.
 5. Move restraining plate C to obtain a clearance of .012 to .018 inch (.30 - .46mm) between restraining plate and bobbin case at point B.
 6. Tighten screw A.








3. NEEDLE BAR



Adjusting needle position selector bracket assembly

- PREPARATION:**
1. Insert general purpose throat plate.
 2. Insert a size 9 needle up into needle clamp.
 3. Place Disc No. 201 (Ric-rac) on disc spindle.
- CHECK:**
- Place a sheet of paper under presser foot. Set stitch width dial at  (maximum) and needle position dial at . With needle in left position, lower and raise needle to make a slight perforation in the paper. Repeat this operation at settings of , ,  and  with needle remaining  left position.
- At correct adjustment of selector bracket D, the needle will always enter the same perforation in paper.
- SETTING:**
1. Place a sheet of paper under presser foot. Set stitch width dial at  (maximum)
 2. Turn hand wheel over toward you and, with needle coming down at left position, make one penetration in paper. Turn hand wheel away from you to bring needle immediately above hole in paper
 3. Set needle position dial at  and stitch width dial at 
 4. Loosen screw E and move selector bracket extension D until point of needle coincides with centre of needle hole in paper.
 5. Tighten screw E and repeat check.

Timing the pendulum movement of the needle bar



- PREPARATION:**
1. Insert general purpose throat plate.
 2. Place Disc No. 201 (Ric-rac) on disc spindle.
 3. Set needle position dial at  and stitch width dial at  (maximum).
- CHECK:**
1. Raise needle bar and remove presser foot.
 2. Place a small piece of paper on throat plate and hold it in place so that feed dog does not move it.
 3. Turn hand wheel.
 4. As needle is rising from left perforation, the point of the needle should be moving toward the right, lightly touching the edge of the paper without enlarging hole.
- SETTING:**
1. Centralise needle in needle hole of straight-stitching throat plate as instructed on pages 16 and 19.
 2. Loosen needle bar stop screw C.
 3. Set needle position dial at 
 4. Loosen two set screws G in worm gear H.
 5. Turn hand wheel over toward you until needle bar is at its lowest point in right position.
 6. Turn disc as required to locate follower F at second half of high point of Zig-zag Disc as shown.
 7. Tighten one of set screws G. If set screws G cannot be reached, turn worm gear H until a set screw becomes accessible.
 8. Re-check pendulum movement. If satisfactory, tighten other set screw G.
 9. Set needle bar stop as instructed on page 19.

Setting needle bar at correct height

- PREPARATION:**
1. Set needle position dial at  and stitch width dial at 
 2. Insert a needle up into needle clamp.
- CHECK:**
1. Turn hand wheel over toward you until needle bar is at its lowest point. At this position, the upper timing mark B on needle bar should be aligned with lower end of needle bar frame, as shown.
 2. Turn hand wheel over toward you until lower timing mark K on needle bar is aligned with lower end of needle bar frame. At this setting, hook point is behind needle. If needle bar is correctly turned, hook point will be positioned behind needle and in the centre of the needle blade as shown at J.
- SETTING:**
1. With needle bar at its lowest point, loosen screw A and raise or lower needle bar as required.
 2. While maintaining correct needle height, make certain needle bar is correctly turned, then tighten screw A.

Checking the position of the needle in relation to straight-stitching throat plate

PREPARATION :

1. Install straight-stitching throat plate.
2. Set needle position dial at  and stitch width dial at .

CHECK :

When needle enters needle hole D in straight-stitching throat plate, the short groove E (flat shank) side of the needle should face slightly to right of rear, as shown. The gib located in the needle bar ensures that the needle cannot be inserted incorrectly.

Although the size of the needle may be changed to suit sewing requirements, the position of the flat shank G side of the needle remains constant in relation to the needle hole D in the throat plate.

Observe that the centre of a size 14 needle should be at the approximate centre of the needle hole D in the throat plate and that the centre of each larger size needle advances toward the front of the needle hole as shown.

This position is necessary to permit an increase in the diameter of the needle blade F toward the front without disturbing the proper relationship between the needle and the sewing hook. This position of the needle will also maintain sufficient clearance for the needle thread.

At no time should the needle touch the edge of the needle hole. The needle should never strike the presser foot.

If the needle is incorrectly located in the throat plate hole :



1. Needle bar setting may be incorrect from front to back or from right to left (see below)
2. Needle or needle bar may be bent. (Replace.)
3. Needle seat in needle bar may be clogged with dirt or may be damaged.
4. Throat plate may be incorrectly seated.

If the needle strikes the presser foot, any of the above conditions may be at fault, or :

1. Presser bar may be bent, damaged or turned out of position (see page 28). (Indicated by misalignment of presser foot.)
2. Presser foot may be incorrectly seated on presser bar.
3. Presser foot may be bent. (Replace.)

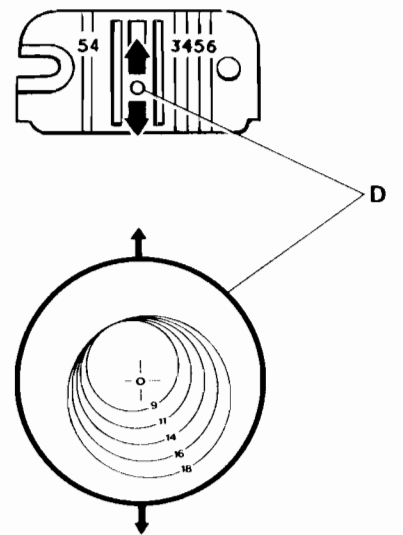
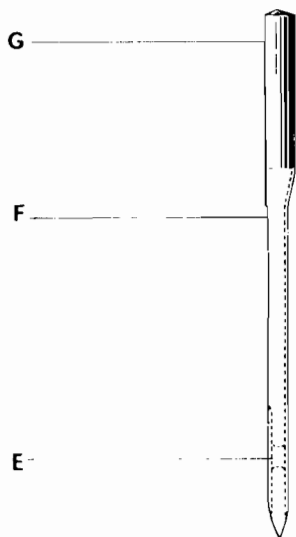
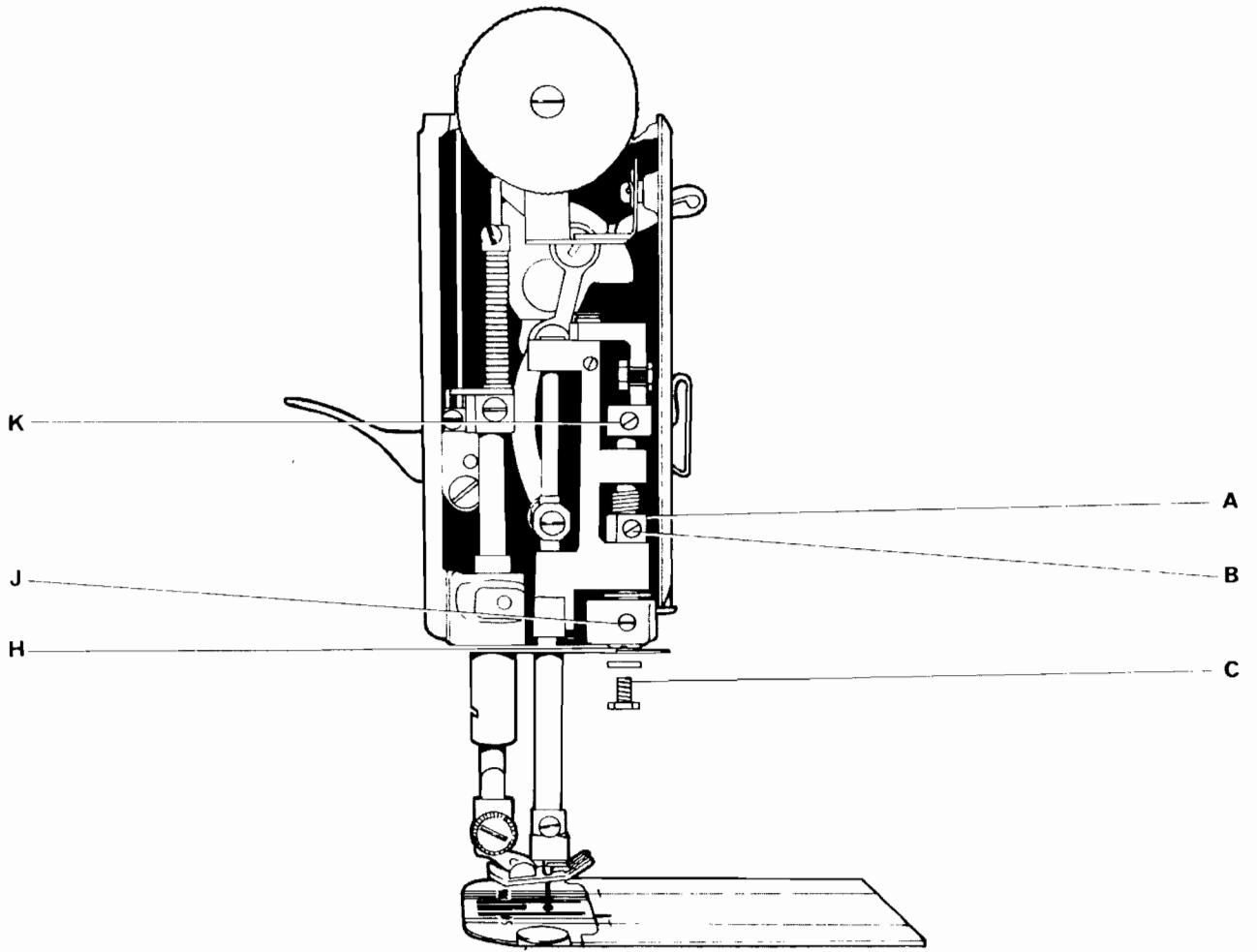
Setting needle - back to front - in needle hole in straight-stitching throat plate

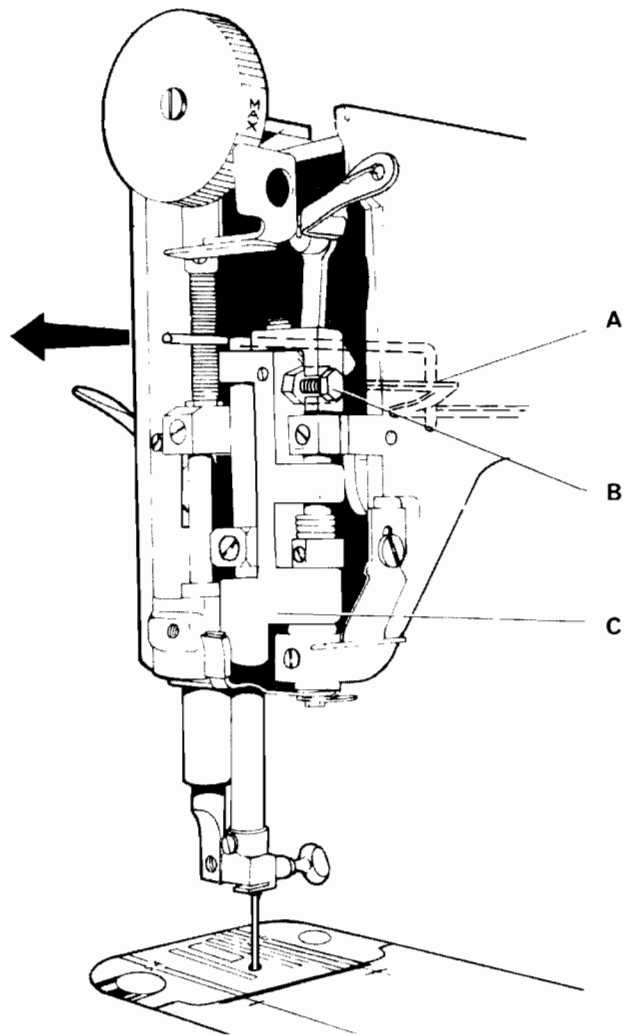
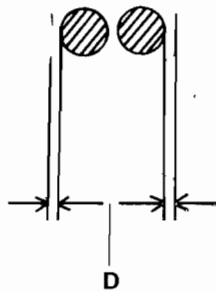
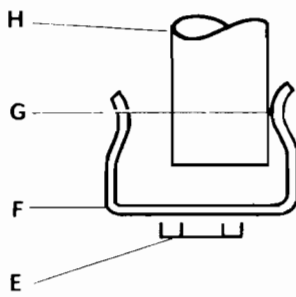
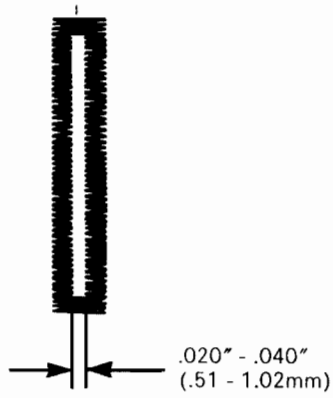
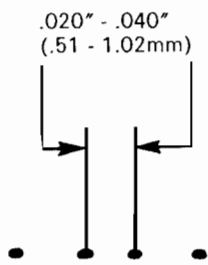
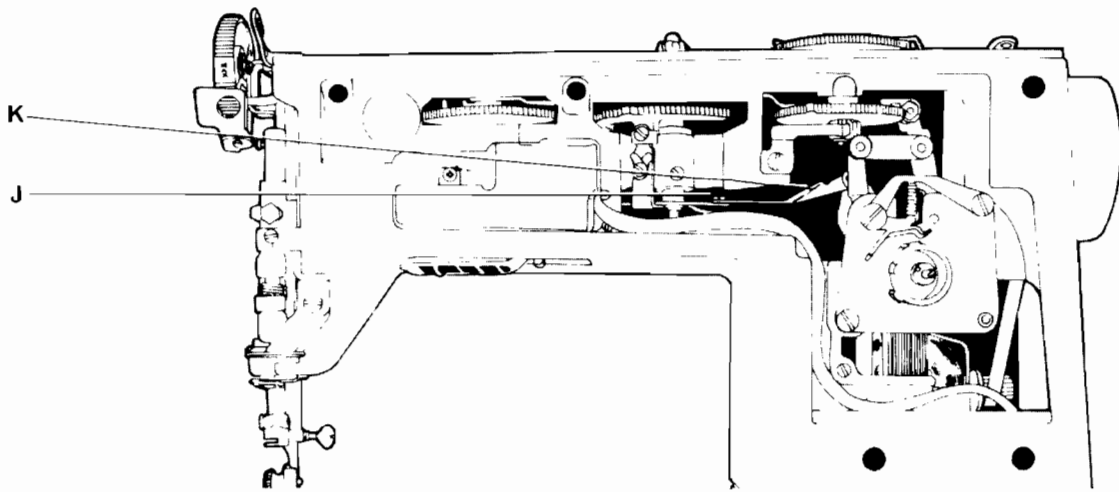
PREPARATION :

1. Set needle bar height as instructed on page 15.
2. Remove presser foot.
3. Install straight-stitching throat plate.
4. Insert a size 14 needle into needle clamp.
5. Set needle position dial at  and stitch width dial at .



SETTING :

1. Loosen screw C.
2. Loosen set screw B in collar A.
3. Loosen set screws J and K.
4. Using a thin wrench, turn eccentric stud H to left or right to bring needle to centre of needle hole.
5. When correct setting is obtained, tighten screws J and K.
6. Turn collar A counter-clockwise until sufficient spring tension is obtained (16 ozs on needle bar) and then tighten collar set screw B. (This loading is obtained when screw B is aligned with screw J.)
7. Set needle bar stop as instructed on page 19.
8. Check distance between hook point and needle as instructed on page 20.












Setting needle - left to right - in needle hole in straight-stitching throat plate

- PREPARATION:**
1. Remove presser foot.
 2. Install straight-stitching throat plate.
 3. Insert a size 14 needle up into needle clamp.
 4. Set needle position dial at  and stitch width dial at .
- CHECK:** Turn hand wheel over toward you until point of needle enters hole of throat plate. Point of needle (size 14) should be located in centre of needle hole.
- CAUTION:** Needle position dial must be set as instructed on page 39 (item 3 under removal of needle position selector) before carrying out this adjustment.
- SETTING:**
1. Loosen hexagon screw B. (Use 9/32 inch A/F wrench.)
 2. Using a hook shaped rod, pull driving arm A firmly toward face plate end of machine and, at same time, press needle bar rocker assembly C, as required, until point of needle is located directly at centre of throat plate needle hole.
 3. When correct needle position is obtained, securely tighten hexagon screw B.

Setting buttonhole cutting space

- PREPARATION:**
1. Set stitch width dial at  (maximum) and needle position dial at .
 2. Set *Flexi-Stitch* dial at 0. Loosen screw J
 3. Set stitch regulator dial at No. 1 buttonhole position. This will bring link K into correct position.
 4. Set stitch width dial at    and tighten screw J
 5. Place a sheet of paper under presser foot.
 6. Make two stitches (two penetrations of needle in paper).
 7. Set stitch regulator dial at No. 3 buttonhole position and make two stitches.
 8. Measure distance between inner two of the four holes in paper. This should measure .020 to .040 inch (.51 - 1.02mm).
- SETTING:**
1. *To increase or create space*, loosen screw J and turn stitch width dial to left
To reduce space, loosen screw J and turn stitch width dial to right
 2. While holding the setting obtained from above, tighten screw J

Setting needle bar stop

- SETTING:**
1. Slacken back screw E allowing stop F to move freely.
 2. Check needle for alignment back to front and left to right as instructed above.
 3. Place Disc No. 201 (Ric-rac) on disc spindle.
 4. Set stitch width dial at  (maximum) and needle position dial at .
 5. Turn hand wheel over toward you until needle is at its lowest point in right hand needle position.
 6. Move stop F to make leg G of stop touch needle bar frame H and back off slightly.
 7. Hold in this position and tighten screw E.
 8. Bring needle to its lowest point in left hand position.
 9. Bend left hand leg G of stop until it just touches needle bar frame.
- CHECK:** Needle bar must be clear of elongated hole in stop when in both left and right positions as shown at D
10. Replace face plate.

Needle bar rocker bracket assembly



- REMOVING:**
1. Remove needle.
 2. Remove screw P and washer G.
 3. Raise presser bar lifter and remove presser foot and thumb screw.
 4. Loosen screw R and allow needle bar to rest on throat plate.
 5. Ease needle bar stop down over presser bar bushing and off presser bar to hang loose on needle bar clamp.
 6. Loosen set screw S and remove hinge pin A.
 7. Loosen set screws B and E.
 8. Loosen set screw C in collar D and remove eccentric stud F.
 9. Remove needle bar frame T together with needle bar.
 10. Remove needle bar from needle bar frame T.
- REPLACING:**
1. Replace needle bar frame in reverse order of its removal taking care that spacing washer Q is in place as shown before replacing eccentric stud F.
 2. Set needle bar at correct height as instructed on page 15 and adjust needle to or from hook point as instructed on page 16.
 3. Set needle bar stop as instructed on page 19.
 4. Replace needle.

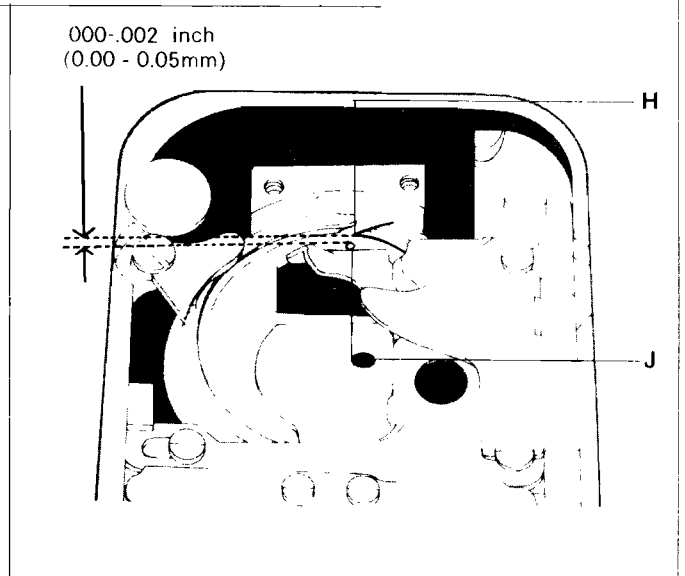
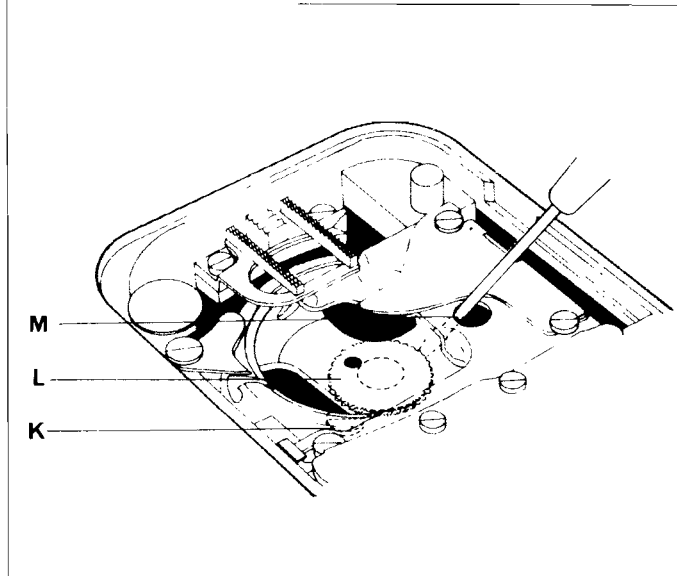
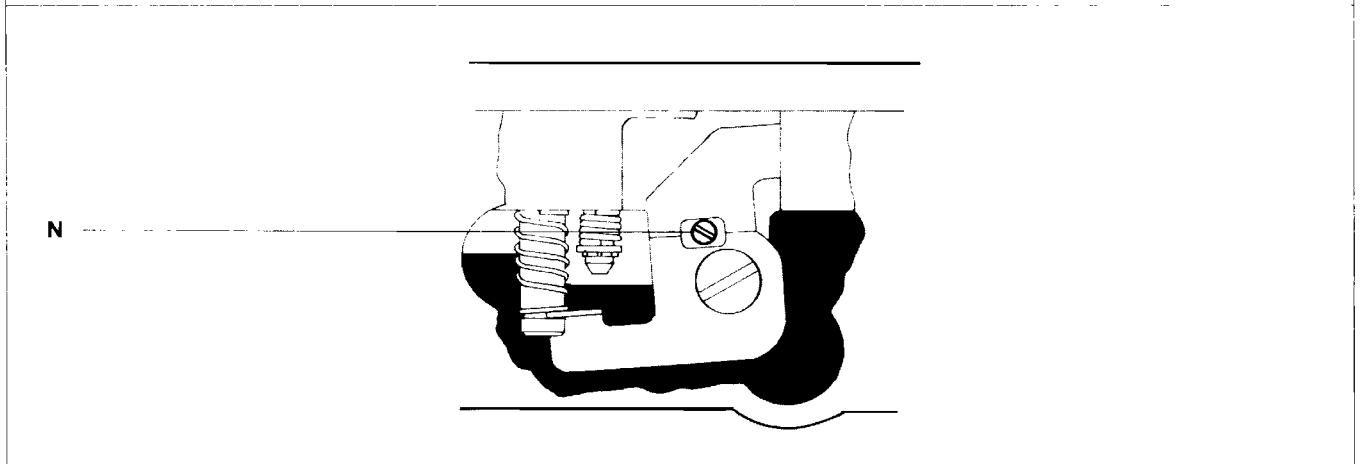
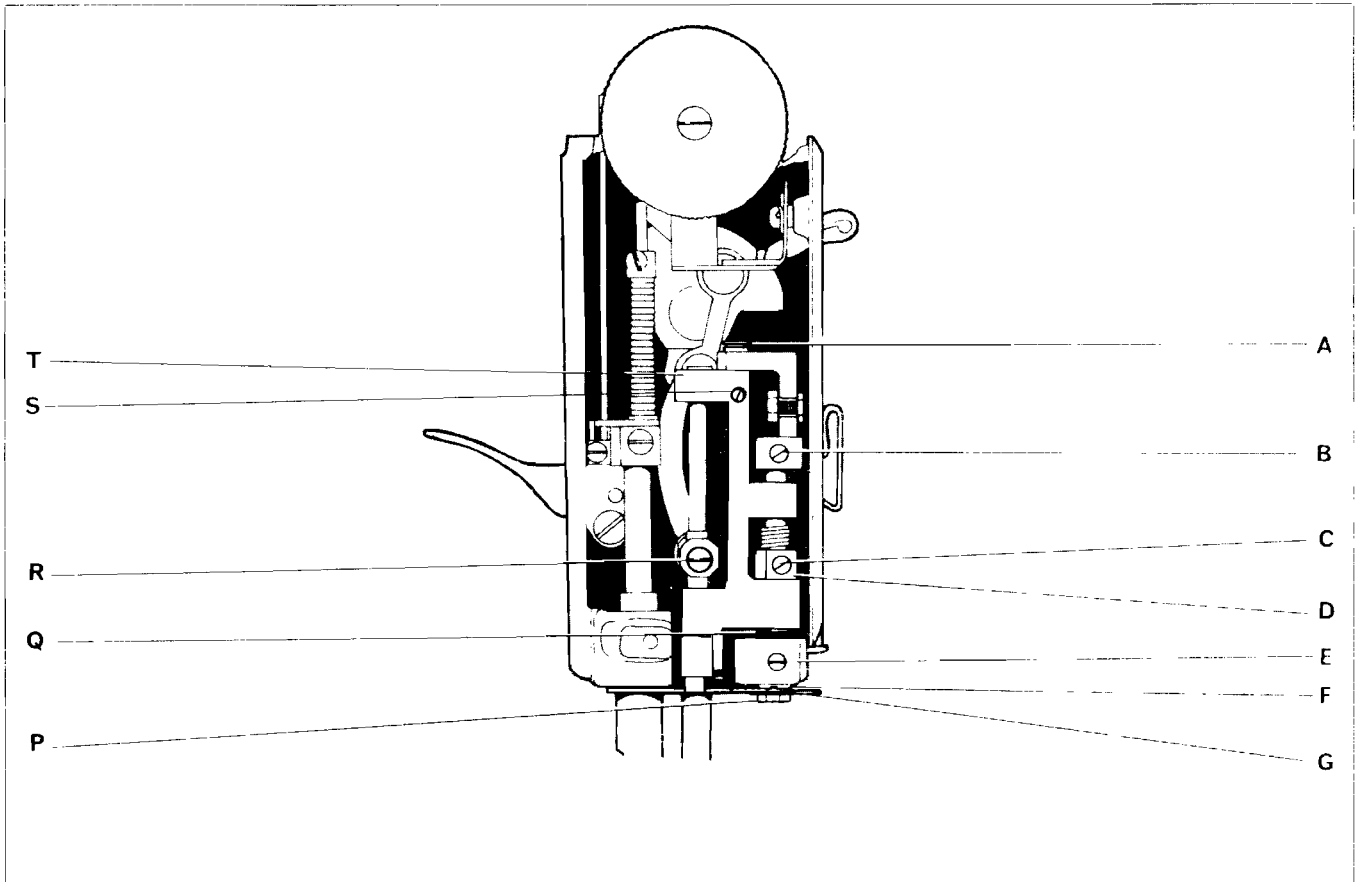
Needle bar

- REMOVING:**
1. Remove needle clamp and needle bar gib.
 2. Remove pressure regulator bracket as instructed on page 28.
 3. Loosen screw R and lift needle bar out of machine.
- REPLACING:**
1. Insert needle bar down through needle bar frame.
 2. Adjust needle bar height as instructed on page 15.
 3. Securely tighten screw R.
 4. Replace pressure regulator assembly.
 5. Replace needle bar gib and needle clamp.

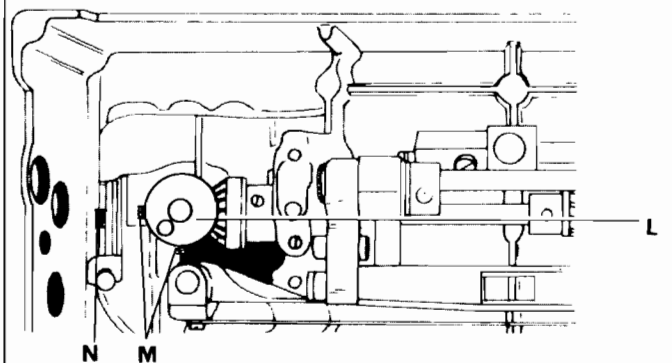
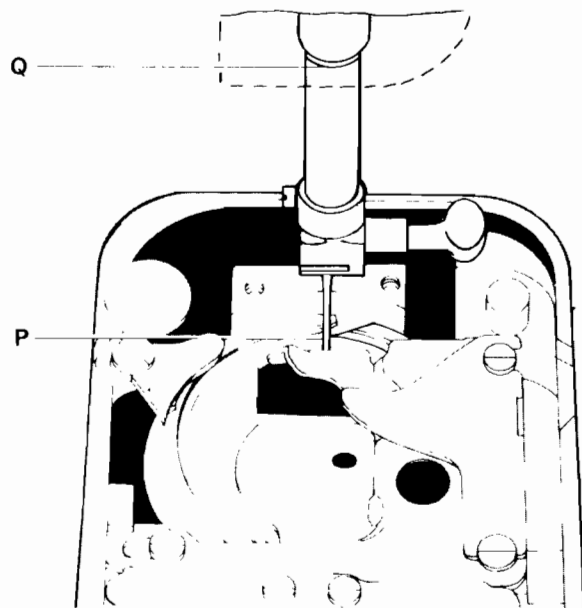
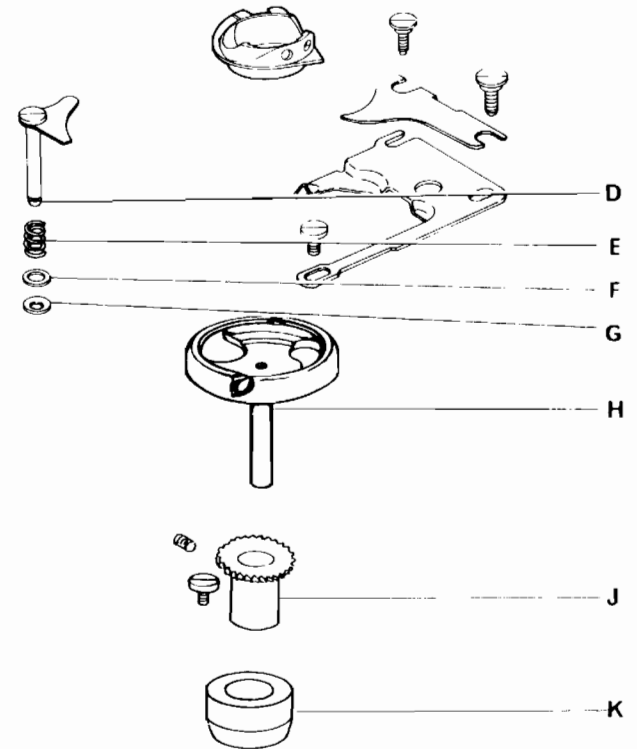
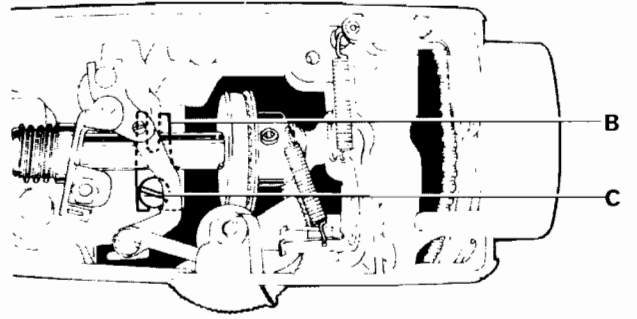
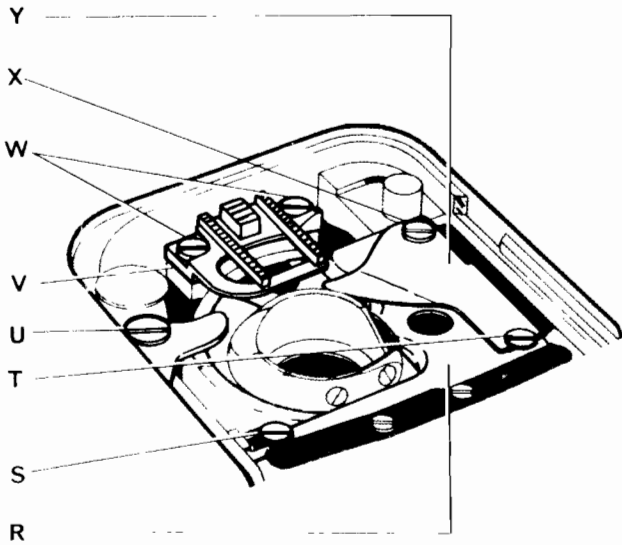
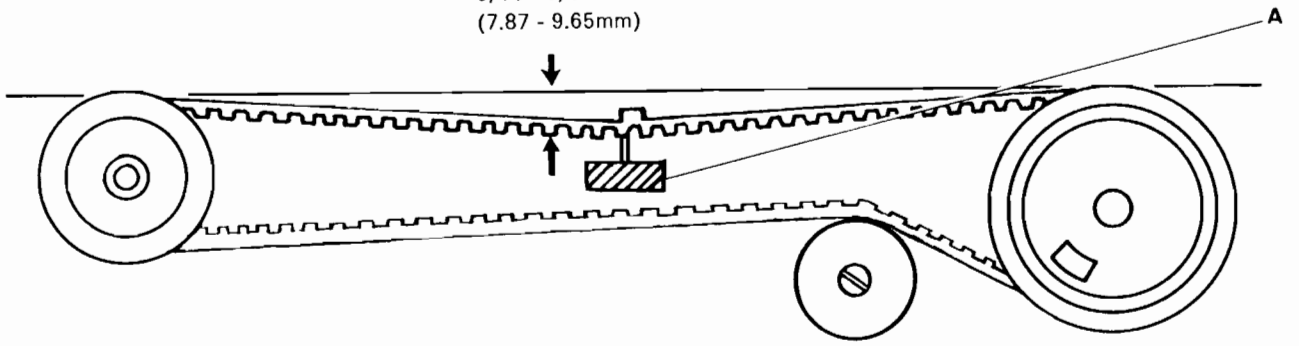
4. ROTATING HOOK

Setting hook point to or from needle



- CHECK:**
1. Open bed slide and remove throat plate.
 2. Set needle position dial at  and stitch width dial at .
 3. Turn hand wheel over toward you until point of hook H is directly behind needle J (size 18). Distance between hook point and needle should be between .000 and .002 inch (.00 - .05mm).
- SETTING:**
1. Remove bobbin case.
 2. Make sure that jacking screw K is up against bushing L and loosen set screw N.
 3. While making sure that jacking screw K does not turn, insert screwdriver through hole M in position plate and turn eccentric hook bushing L **clockwise** to bring hook point H to its farthest position from the needle. Continue turning hook bushing **clockwise** until hook point is between .002 and .000 inch (.05 - .00mm) from needle. Take care not to damage bevel gear while making this adjustment.
 4. While pressing down rotating hook, tighten set screw N.
 5. Replace bobbin case and throat plate.
 6. Check thread clearances as instructed on page 12.



5/16 - 3/8 inch
(7.87 - 9.65mm)



Timing the rotating hook

- PREPARATION:**
1. Set needle bar at correct height as instructed on page 15.
 2. Time needle bar vibrating mechanism as instructed on page 15.
 3. Insert a size 18 needle up into needle clamp.
 4. Remove presser foot, throat plate and bobbin case. (Feed dog is removed in illustration to show point of hook, but it need not be removed to time the hook.)
 5. Set needle position dial at  and stitch width dial at .
- CHECK:** Turn hand wheel over toward you until lower timing mark Q is aligned with lower edge of needle bar frame on upward stroke of needle bar. At this position of needle bar, point of hook should be at centre of needle, as shown at P.
- SETTING:**
1. Loosen two Allen screws M in gear L (use 3/32 inch A/F Allen key).
 2. While maintaining correct position of needle bar (lower timing mark Q aligned with lower edge of needle bar frame), turn hook until point is located directly behind centre of needle, as shown at P.
 3. Without disturbing position of hook, press gear L firmly against plastic collar and at same time press down on hook from top of machine. Tighten two screws M in gear L. Ensure minimum end play without binding.
CHECK: When gears are meshed at closest point there should be no backlash.
 4. Replace bobbin case, throat plate and presser foot.
 5. Check thread clearances as instructed on page 12.

Adjusting belt tension

- PREPARATION:** Lay machine on its back and support it so that the top side of the belt lies horizontally.
- CHECK:** Belt tension should be such that a load of 5 ounces A centrally located between pulleys deflects the belt 5/16 inch to 3/8 inch (7.87 - 9.65mm), as shown.
- SETTING:**
1. Slacken screw C and adjust bracket B, as required.
 2. Tighten screw C.

Rotating hook assembly

- REMOVING:**
1. Remove presser foot and needle.
 2. Remove throat plate and bed slide.
 3. Remove two screws W and feed dog V.
 4. Remove bobbin case.
 5. Remove screws S and T.
 6. Loosen screw X and remove position plate R and restraining plate Y.
 7. Remove throat plate release mechanism as instructed on page 24.
 8. Remove circlip G (a light hammer blow on bottom of stud D will release the circlip), washer F and spring E.
 9. Remove bobbin case retaining plate U.
 10. Loosen two screws M with Allen key and remove bevel gear L and collar K.
 11. Remove rotating hook H.
 12. Loosen set screw N and remove eccentric bushing J.
- REPLACING:**
1. Replace eccentric bushing J and rotating hook H.
 2. Replace bobbin case retaining plate U.
 3. Replace spring E, washer F and circlip G. (Use a new circlip.)
NOTE: To replace circlip G, press down on bobbin case retaining plate U and, using a hollow drift, apply pressure to circlip until it snaps into place. A scrap, hollow presser bar is a convenient tool for this operation providing you protect the palm of your hand with padding.
 4. Replace throat plate release mechanism as instructed on page 24.
 5. Replace collar K and bevel gear L and reset hook timing as instructed above.
 6. Set hook point to needle as instructed on page 20.
 7. Replace position plate R, restraining plate Y and screws S and T. (Do not tighten screws.)
 8. Replace bobbin case.
 9. Set thread clearances as instructed on page 12.
 10. Replace feed dog V and two screws W. Make sure that feed dog is located centrally in throat plate slots.
 11. Set feed timing as instructed on page 27.
 12. Eliminate backlash in bevel gears as instructed on page 11.
 13. Replace throat plate, bed slide and presser foot.

Throat plate release mechanism

- REMOVING:**
1. Open bed slide and remove throat plate.
 2. Remove screw H with its washer G and withdraw actuating lever E, and spring D.
 3. Remove clamping pin B.

- REPLACING:**
1. Replace clamping pin B.
 2. Replace throat plate.
 3. Replace clamping pin spring D and assemble the actuating lever E, making sure that its slot F is engaged in the groove C in the clamping pin.
 4. Replace screw H with its washer G, but do not tighten screw H.
 5. Fully open bed slide.
 6. To raise the clamping pin to its correct height, push up the actuating lever at point A.

NOTE When the clamping pin is raised, the underside of the pin head should, at minimum setting, be level with the surface of the throat plate.

7. While maintaining this setting, tighten screw H

5. FEED SYSTEM

Setting feed dog sidewise in throat plate slots

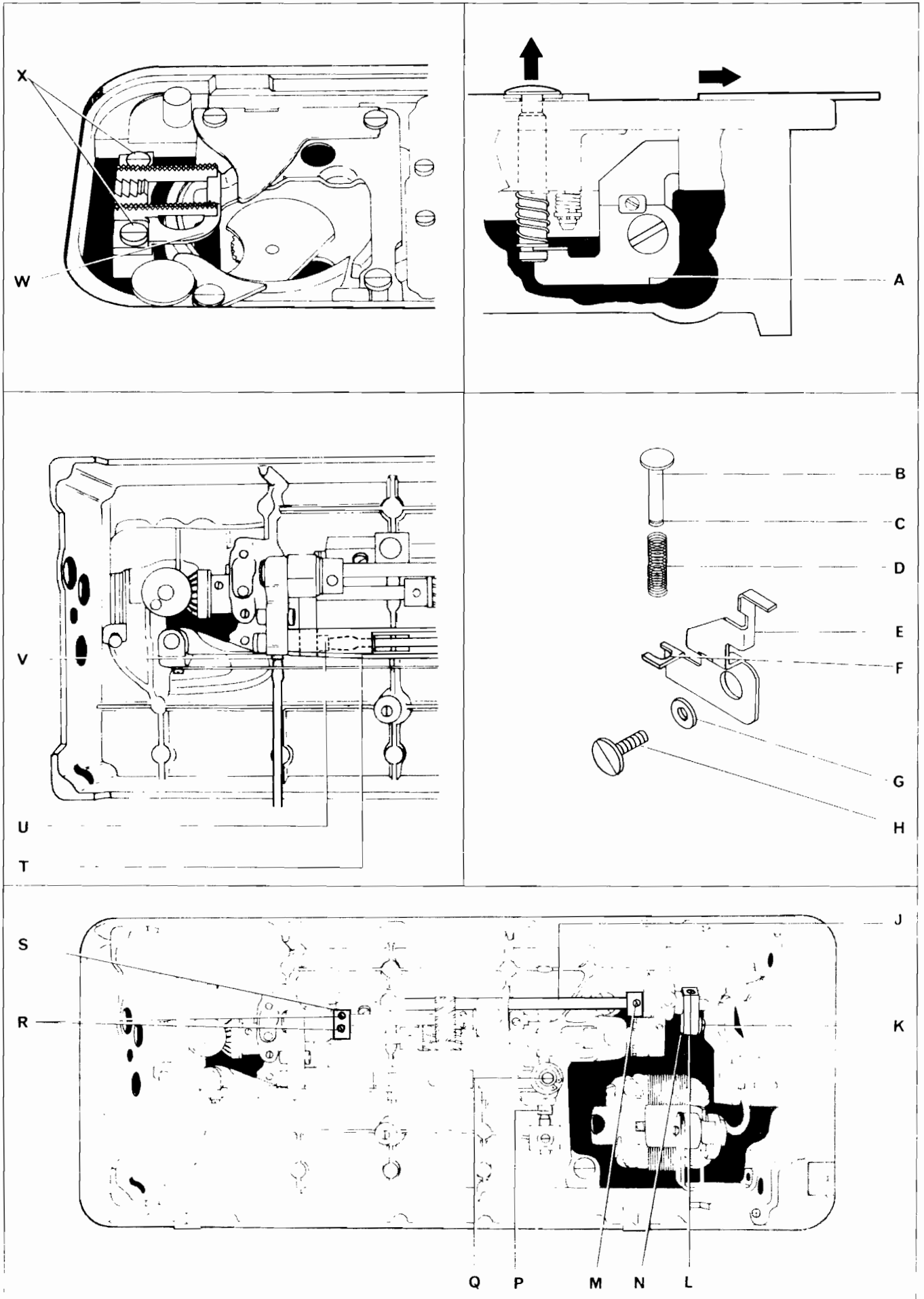
CHECK: Feed dog should be located centrally in throat plate slots (*i.e.* parallel)

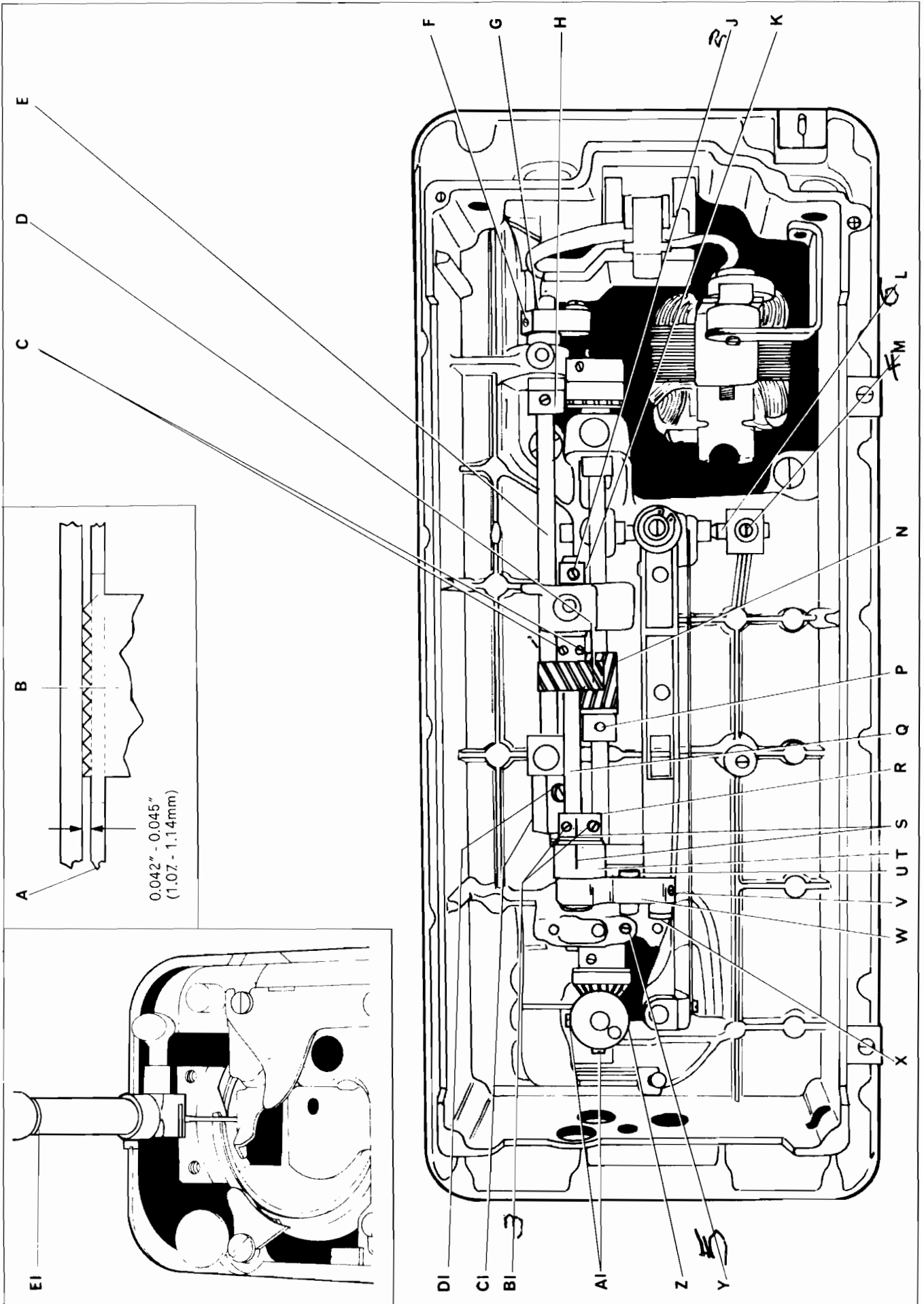
- SETTING:**
1. Remove throat plate.
 2. Loosen two screws X and move feed dog W as required.
 3. Tighten screws X.
 4. If there is insufficient adjustment, loosen screws R and Q, turn eccentric pin P as required and then tighten screw Q.
 5. While turning hand wheel over toward you, move eccentric S along shaft to give free running of machine and tighten screws R.
 6. Reset feed timing as instructed on page 27
 7. Check for free movement of feed regulator shaft J. While turning hand wheel over toward you, move lever N through its total movement.
If feed regulator shaft J binds, loosen screws L and M and move shaft J as required.
 8. Tighten screws L and M.
 9. Check and reset feed dog height as instructed on page 27
 10. Replace throat plate.

Setting feed dog lengthwise in throat plate slots

CHECK: Feed dog should not touch ends of throat plate slots (front or back) at any stitch length setting.

- SETTING:**
1. Remove throat plate.
 2. Loosen screw V, rotate eccentric U through opening in feed bar T as required and then tighten screw V.
 3. Repeat check.
 4. Replace throat plate.





Setting height of feed dog

- CHECK:** With feed dog B at its highest position, and stitch regulator control dial set at 12, slightly more than a full depth of tooth should project above throat plate A (.042 to .045 inch) (1.07 - 1.14mm) as shown.
- SETTING:**
1. Set stitch regulator control dial at 12.
 2. Turn hand wheel over toward you until feed dog is at its highest position.
 3. Loosen screw V.
 4. Turn eccentric X, as required.
 5. Tighten screw V

Feed timing

- CHECK:** Timing lines S on eccentric R and feed regulator slide block drive connection T must coincide when needle is at loop lift position.
- SETTING:**
1. Turn hand wheel over toward you until the lower timing mark E1 on the needle bar is aligned with the lower end of needle bar frame (with needle moving upward) as shown.
 2. Loosen two screws C in large helical gear D.
 3. Rotate eccentric R until timing line on eccentric coincides exactly with timing line on feed regulator slide block drive connection T.
 4. Tighten screws C, ensuring that gear D is meshed until no backlash at high point is evident.

Alpha feed mechanism

- REMOVING:**
1. Remove throat plate.
 2. Remove feed dog.
 3. Loosen screws C, J and B1
 4. Withdraw feed drive shaft Q.
 5. Loosen screws M and Y
 6. Remove centre L.
 7. Loosen screw V and remove eccentric stud X.
 8. Withdraw fork W with stud U.
 9. Loosen screws F and D1.
 10. Partly withdraw shaft E.
 11. Move feed bar toward hook, as far as possible, and resting connection T against hook drive shaft, remove regulator C1
 12. Remove feed bar assembly.
- REPLACING:**
1. Replace feed bar in machine.
 2. Replace feed regulator C1, engaging slide block.
 3. Replace centre L ensuring free rotation of feed bar and no side play at centres.
 4. Replace feed drive shaft Q together with collar K and helical gear D.
 5. Align end of shaft with front bushing, bring collar K against face of rear bushing and tighten screw J.
 6. Hold large helical gear D against face of rear bushing and tighten screws C. Ensure shaft is free running with no end play.
 7. Hold feed cam and eccentric R clear of bush and tighten two screws B1. Ensure one of the screws B1 engages on flat on shaft.
 8. Replace feed fork W and stud assembly.
 9. Replace eccentric stud X and nip screw V.
 10. Move feed regulator shaft to bring feed collar H against rear bush and tighten screw F on lever G. Ensure screw F engages with flat on shaft and that shaft is free to turn with no end play.
 11. Turn feed regulator control dial to 0.
 12. Turn hand wheel and rotate feed regulator C1 until there is no feeding of feed dog holder. Tighten screw D1.
 13. Replace feed dog and set for sidewise and lengthwise clearance with throat plate slots as instructed on page 24.
 14. Eliminate backlash in helical gears by loosening screw P and moving small helical gear N along shaft as required.
 15. Tighten screw P.
 16. Set feed timing as instructed above.
 17. Set feed dog height as instructed above.
 18. Replace throat plate.

6. PRESSER BAR

Setting presser foot at correct height

- IMPORTANT:** Unless presser foot is set at correct height, attachments for these machines may not function properly on presser bar.
- CAUTION:** Throat plate must be flush with bed slide while setting presser foot height.
- CHECK:** Raise presser bar lifter, raising presser foot to highest position. Bottom of presser foot should be .290 to .300 inch (7.37 - 7.62mm) above top of throat plate. Test alignment of presser foot to feed slots in throat plate as shown. Height and alignment of presser foot must be set at the same time.
- SETTING:**
1. Loosen set screw N.
 2. Raise or lower presser bar, as required.
 3. Align presser foot and securely tighten set screw N.

Presser bar

- REMOVING:**
1. Remove presser foot and presser foot thumb screw.
 2. Lower presser bar lifter and turn dial to DARN
 3. Remove screw G and control panel retainer J
 4. Remove regulating bracket assembly, guide pin and spring from machine, taking care that pin H is not bent or damaged.
 5. Loosen screw N and remove presser bar from machine.
- REPLACING:**
1. Replace presser bar assembly in the reverse order of removal. Ensure pressure release pin M is located in hole F.
 2. Replace presser foot on presser bar.
 3. Adjust presser foot for correct height and align foot with slots for feed dog in throat plate, as instructed above.
 4. Tighten screw N.
 5. Loosen screw L and adjust collar K to give a presser foot pressure of 5.5 - 8 lbs at maximum pressure dial setting.

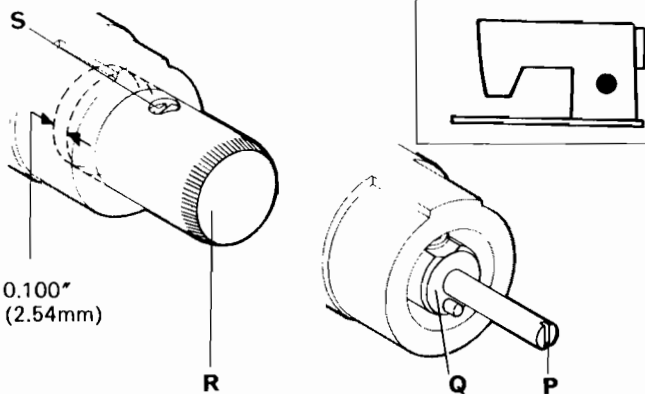
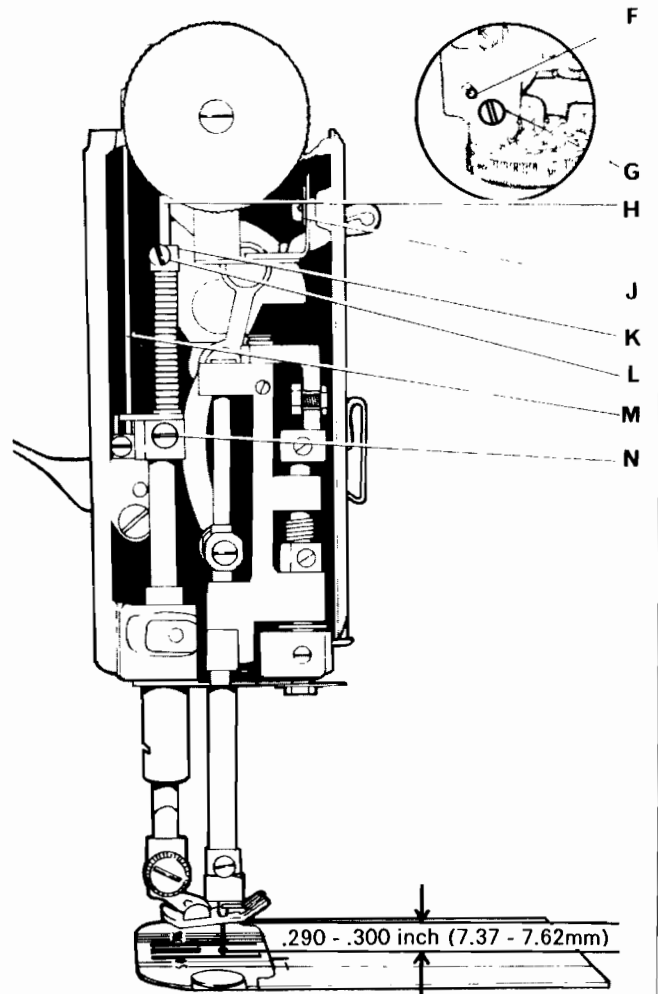
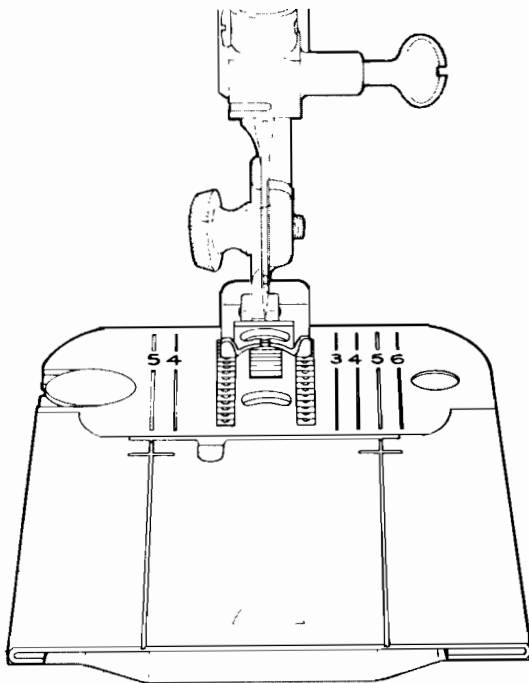
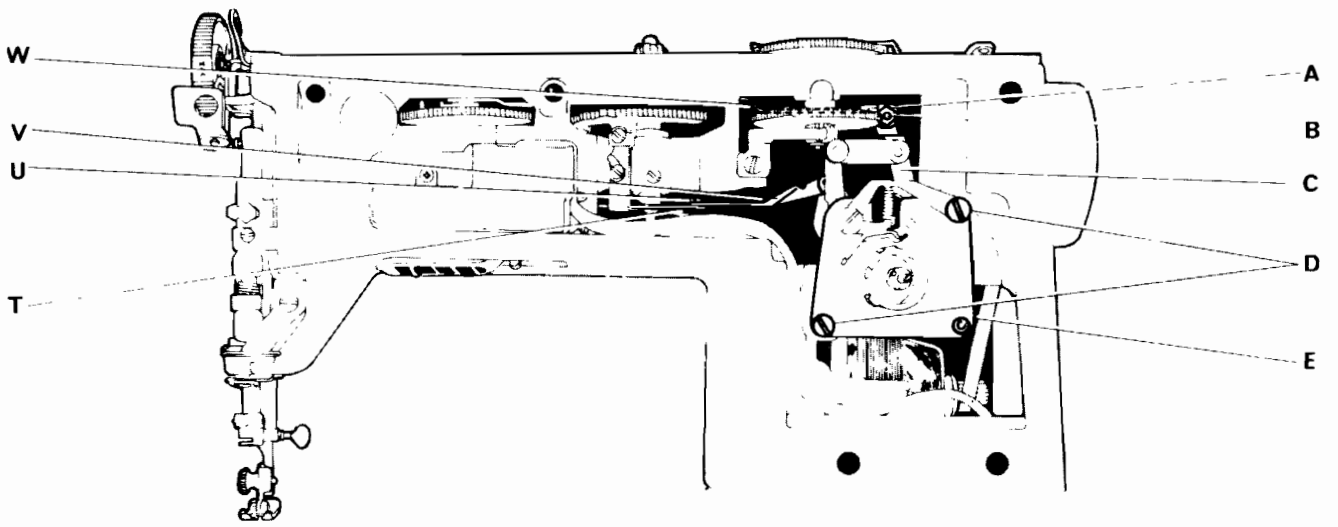
7. BUTTONHOLE MECHANISM

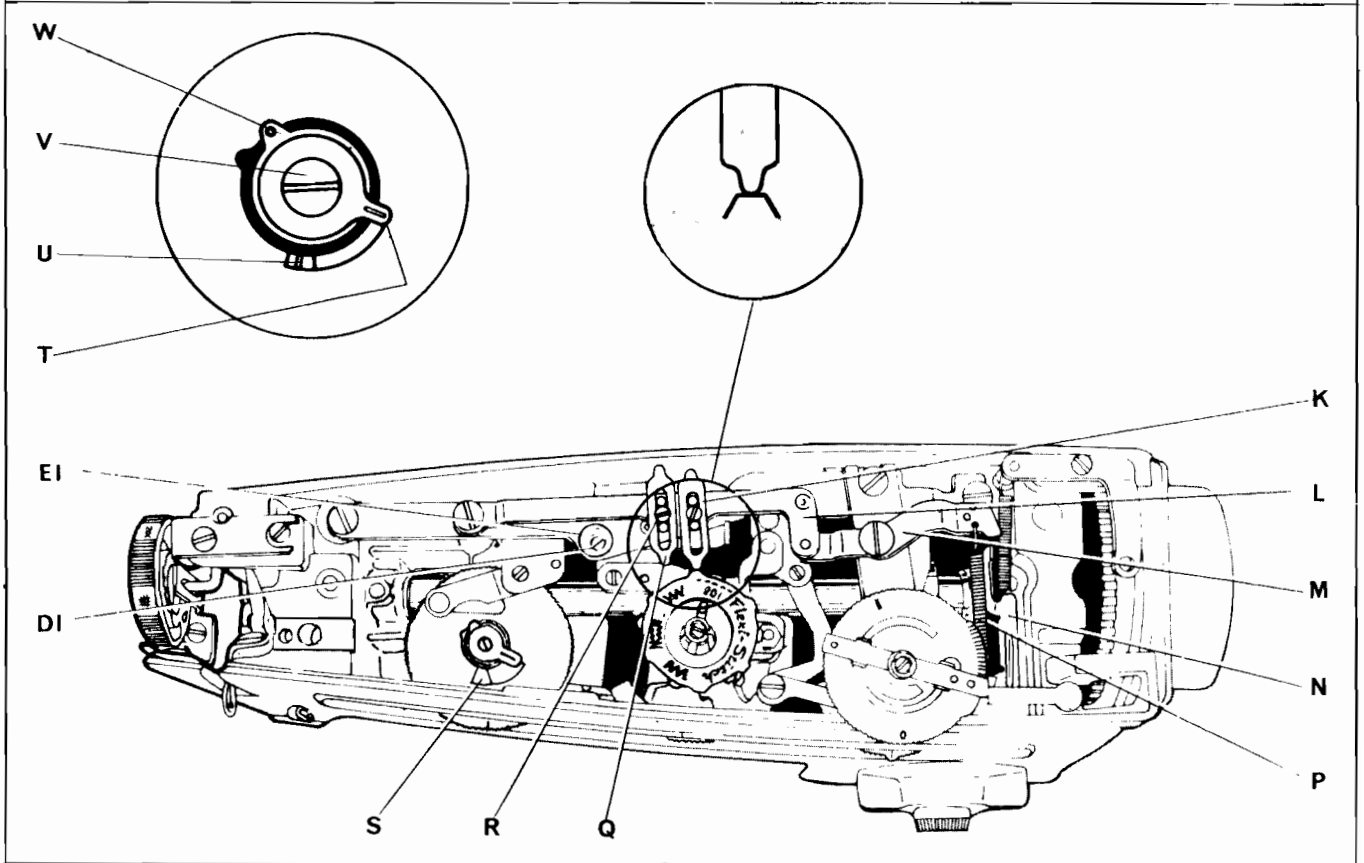
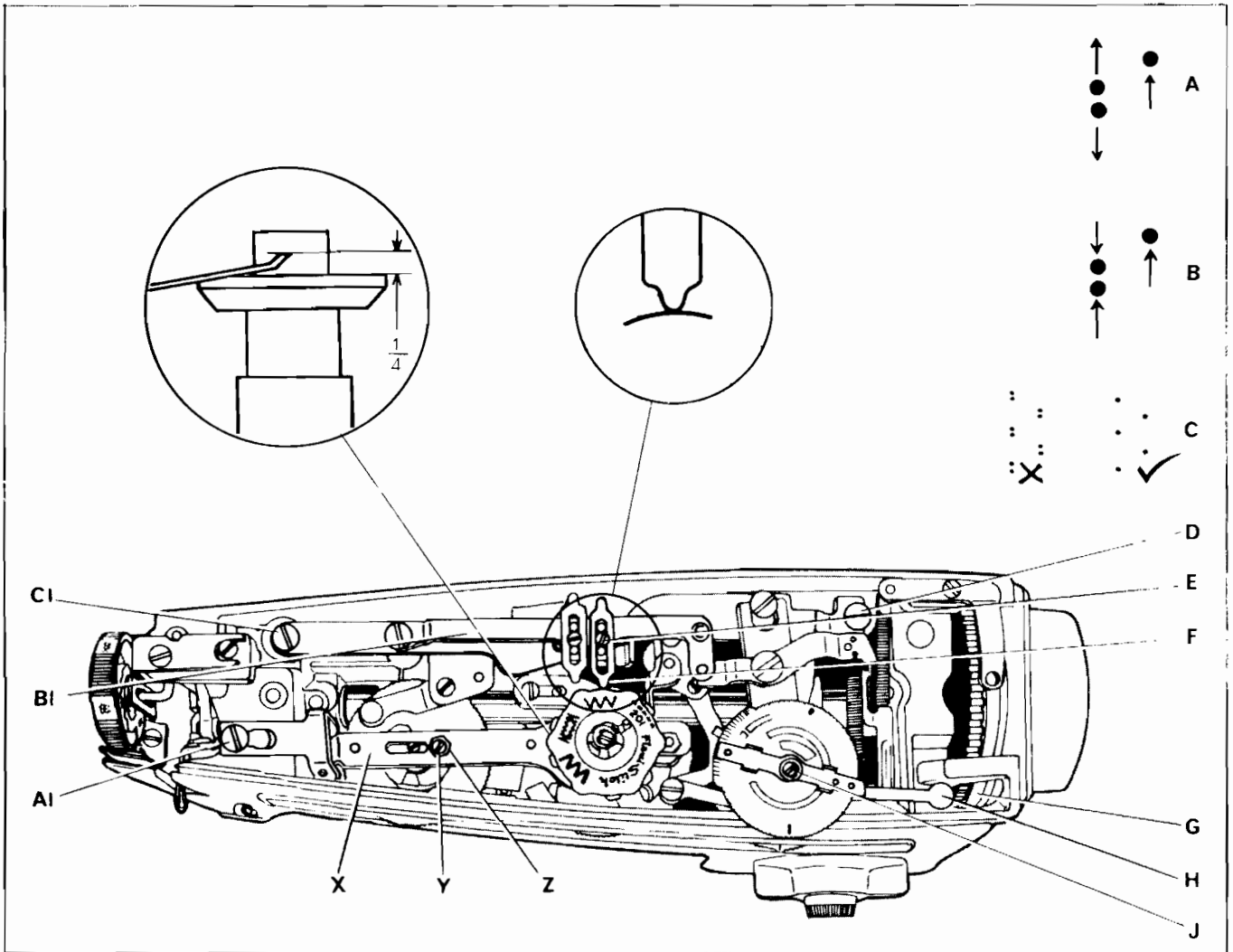
Setting for zero feed

- CAUTION:** Needle position dial must be set as instructed on page 39 (item 3 under removal of needle position selector) before carrying out this adjustment.
- SETTING:**
1. Place a sheet of paper under presser foot.
 2. Remove needle.
 3. Set control dial between No. 4 buttonhole position and 0 stitch position.
 4. Remove control dial as instructed on page 32.
 5. Loosen screw S and remove reverse button R.
 6. Run machine at normal speed and observe any feeding of paper. (a) If paper feeds forward, turn screw P clockwise till all feeding is eliminated. (b) If paper feeds in reverse, turn screw P counter-clockwise till all feeding is eliminated.
 7. Replace reverse button with indicating line in line with arrowhead (▼) on front panel and spaced .100 inch (2.54mm) from face of pin carrier Q.
 8. Replace control dial as instructed on page 32.
- NOTE:** This setting automatically sets all other stitch lengths correctly.
9. Set cam controlled feed cam follower and stop as instructed on page 31.

Buttonhole mechanism

- REMOVING:**
1. Loosen screw S and remove reverse button R
 2. Remove screw A and nut B.
 3. Remove screw U.
 4. Hold mechanism plate E firmly against arm and remove two screws D with lock washers.
 5. Remove buttonhole mechanism by tilting lower edge forward and withdrawing with a slight swivelling movement.
- REPLACING:**
1. Replace buttonhole mechanism ensuring that lever V rests on lever T, and lever W is behind lever C.
 2. Replace two screws D with lock washers.
 3. Replace screw U
 4. Replace screw A and nut B but do not tighten nut B.
 5. Set needle position dial at 1 and buttonholer dial at 2 and tighten nut B on screw A.
 6. Set buttonhole cutting space as instructed on page 19.
 7. Set for zero stitch as instructed above.
 8. Set cam controlled feed cam follower and stop as instructed on page 31





8. CAM CONTROLLED FEED MECHANISM

Setting cam controlled feed mechanism

- CHECK :**
1. Place Disc No. 201 (Ric-rac) on cam stack.
 2. Set stitch width dial at ∞ (maximum), buttonholer dial at red bar and *Flexi-Stitch* dial at red bar.
 3. Place a sheet of paper under presser foot and, while turning hand wheel over toward you, observe penetrations in paper. The reverse penetration must coincide with the forward penetrations *i.e.* there must be no double penetrations (see illustration C).
- SETTING :**
1. Set machine for *Flexi-Stitch* sewing, as per items 1 and 2 above.
 2. Set *Flexi-Stitch* dial to one notch to the right of the red bar central position.
 3. Loosen screw D1.
 4. Place a sheet of paper under presser foot.
 5. Turn hand wheel over toward you to make two forward stitches.
 6. While turning hand wheel over toward you, observe penetration of reverse stitch and, if necessary, adjust as follows.
 - (a) If penetration occurs forward of previous penetration, as shown at B, firmly hold lever B1, loosen screw E and move follower F toward cam. Tighten screw E.
 - (b) If penetration occurs behind previous penetration, as shown at A, firmly hold lever B1, loosen screw E and move follower F away from cam. Tighten screw E.
 7. Turn hand wheel over toward you to bring follower F to low point of cam.
 8. Turn eccentric stop E1 to obtain 0.003in (0.08mm) clearance between follower F and cam. While maintaining this setting, tighten screw D1.

Setting cam controlled feed lever stop

- CHECK :**
1. Check that full stitch length (6 stitches per inch) is achieved when stitch length selector is set at 6.
 2. Check cam controlled feed mechanism setting as instructed above.
- SETTING**
1. Turn hand wheel over toward you to bring follower K to high point of disc.
 2. Set *Flexi-Stitch* dial at 0 position.
 3. Loosen screw R and adjust stop Q to achieve .010in (.03mm) (about the thickness of one sheet of paper) clearance with the high point of the cam as shown. Tighten screw R.
- NOTE: When adjusting stop Q, spring P should be disengaged from lever M and finger pressure should be applied to driving arm at L.

Cam controlled feed mechanism

- REMOVING**
1. Remove spring P from driving arm M.
 2. Remove two screws D and C1.
 3. While supporting the cam controlled feed unit, unscrew stud J and withdraw the unit from the machine.
- REPLACING**
1. Replace cam controlled feed unit.
 2. Engage end of spring H in casting pocket G.
 3. Replace screws D and C1 and tighten stud J.
 4. Reconnect end of spring P in back hole in driving arm M.
 5. Set cam controlled feed follower and stop as instructed above.
 6. Check settings of cam controlled feed follower and stitch width disc follower kick-out mechanisms as instructed on page 32.

9. DISC RELEASE AND KICK-OUT MECHANISM

Setting disc release mechanism

- CHECK**
- Set needle position dial at \downarrow , stitch width dial at \uparrow and *Flexi-Stitch* dial at 0. When disc release dial is operated, the disc should be lifted free of the disc driving gear and lever X should stay raised. If lever X drops, adjust as follows:
1. Remove screw A1 and lever assembly X.
 2. Turn dial counter-clockwise as far as it will go and hold it in that position. Loosen screw V and locate detent T in groove U in dial. Turn plate W to give just sufficient spring tension to allow dial to return. Ensure edge of plate W does not touch sides of cam by pushing plate away from cam.
 3. Tighten screw V.
 4. Replace lever assembly X and screw A1 and adjust as instructed below.
- SETTING**
1. Loosen screw A1 and align screw Y with centre of releasing dial cam track S.
 2. Tighten screw A1.
 3. Loosen nut Z and turn releasing dial counter-clockwise as far as it will go.
 4. Adjust screw Y to give 1/4in (6.35mm) fork lift above disc driving gear.
 5. Hold screw Y and tighten nut Z.

Setting cam controlled feed follower kick-out

- CHECK:**
1. Set *Flexi-Stitch* dial at red bar and stitch length dial at red bar.
 2. Turn hand wheel over toward you to bring follower L to high point of disc.
 3. When operating disc release dial, follower L should move away from disc to allow its release.
- PREPARATION:**
1. Place Disc No. 201 (Ric-rac) on cam stack.
 2. Set stitch width dial at \ddagger .
 3. Set *Flexi-Stitch* dial at 0.
- CAUTION:** Before carrying out this setting, make sure that cam controlled feed cam follower and stop are correctly set (see page 31).
- SETTING:**
1. Loosen screw Q.
 2. Turn releasing dial counter-clockwise as far as it will go and move bracket R to bring finger J as close as possible to but not touching lever H. Tighten screw Q.

Setting stitch width disc follower kick-out

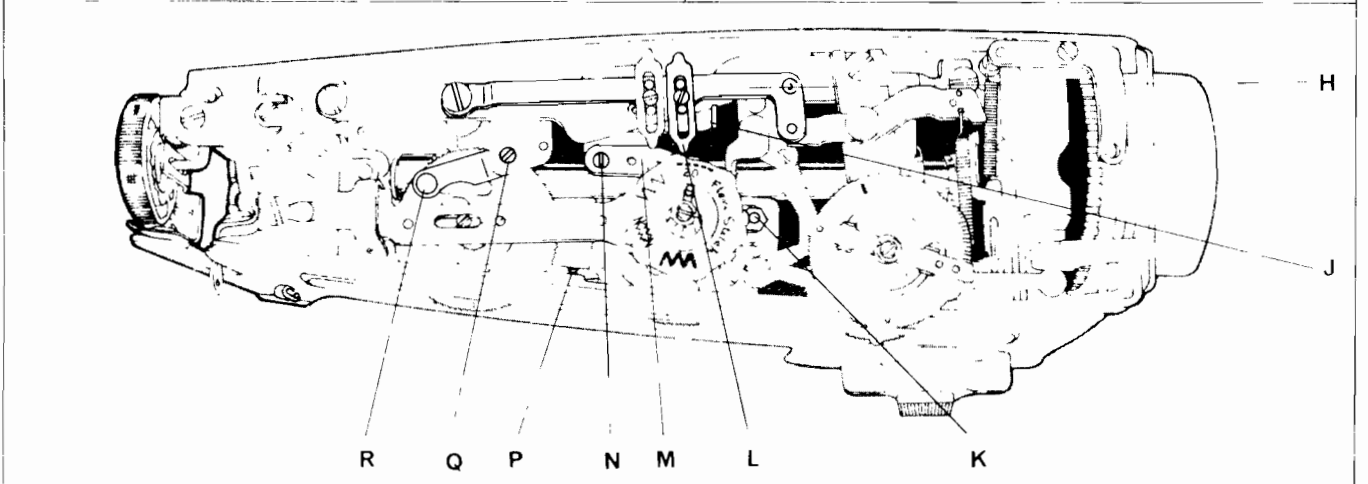
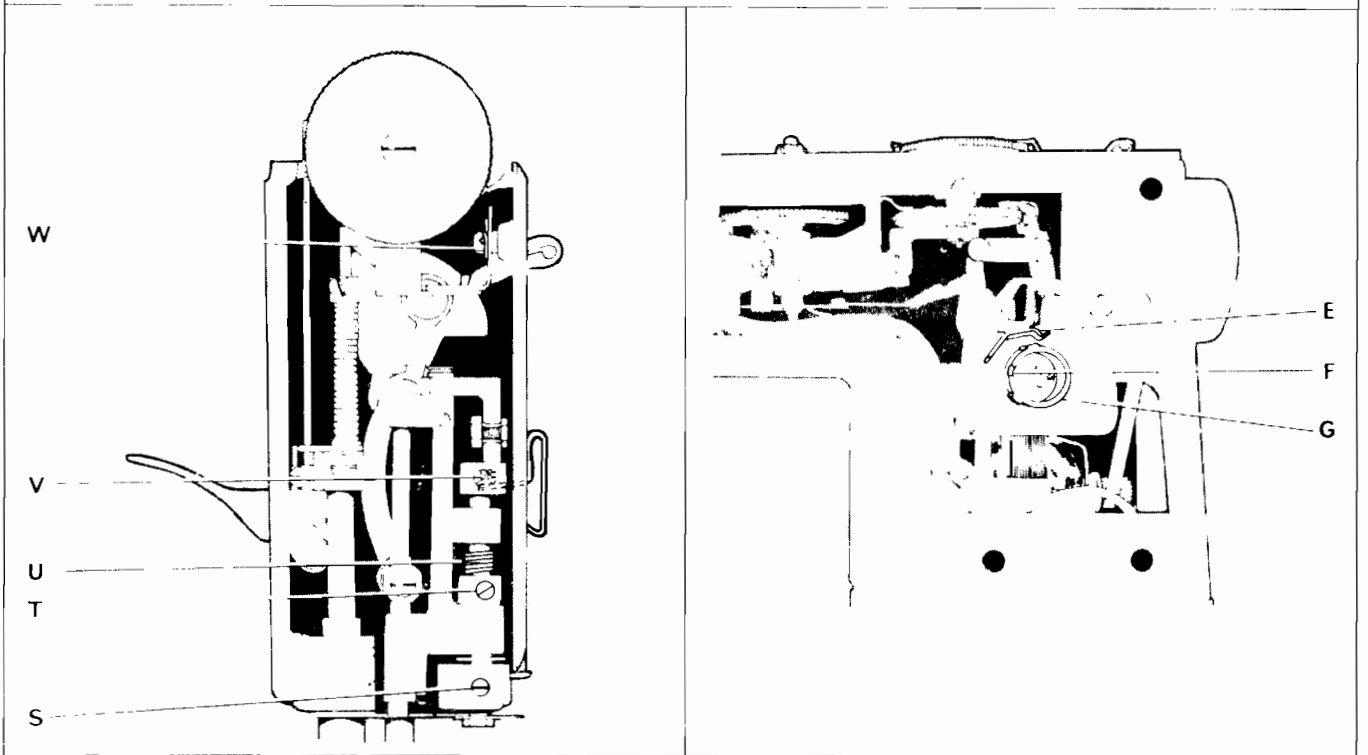
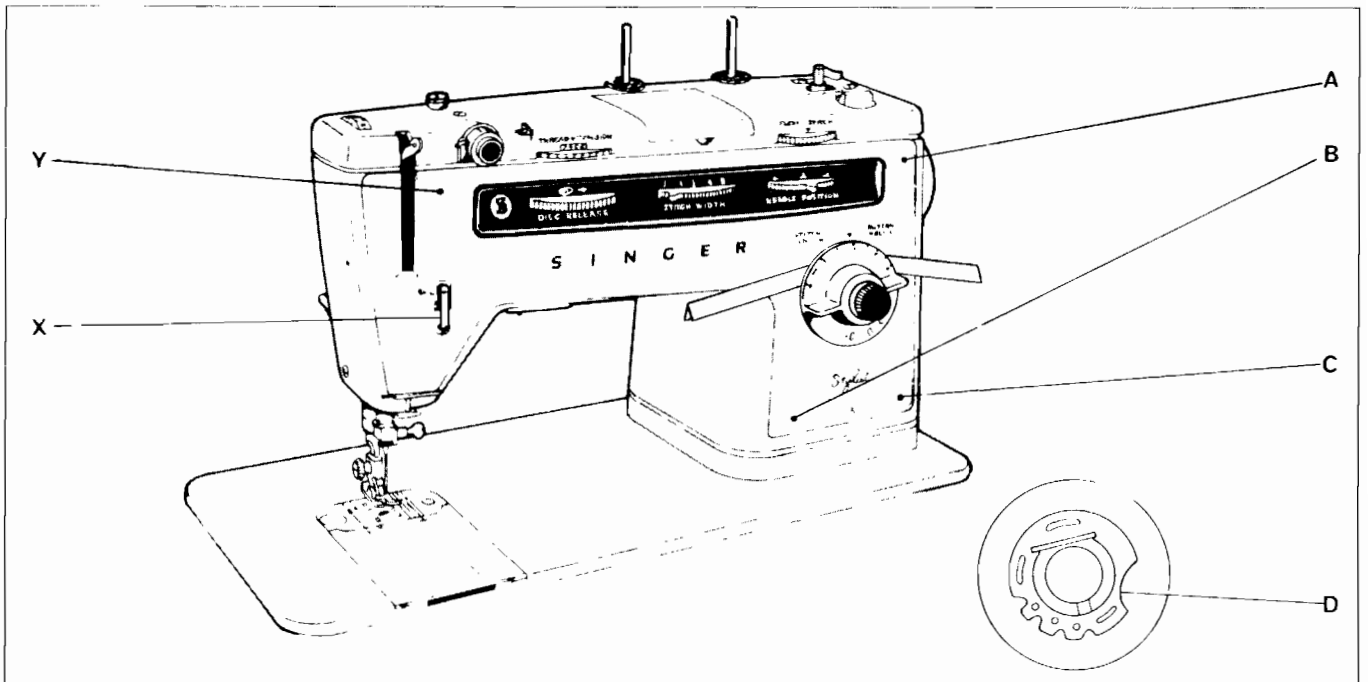
- PREPARATION:**
1. Place Disc No. 201 (Ric-rac) on cam stack.
 2. Set needle position dial at \downarrow , stitch width dial at \ddagger and *Flexi-Stitch* dial at 0.
- CHECK:** When operating disc release dial, with stitch width dial at \mathbb{W} (maximum), follower K should move away from disc to allow its release.
- CAUTION:** Before carrying out this setting, make sure that the tension on the needle bar rocker return spring U is set to give 16 ozs load on needle bar (this loading is obtained when screw T is aligned with screw S) and that the cam controlled feed follower kick-out is set correctly.
- SETTING:**
1. Loosen screw N.
 2. Turn hand wheel over toward you to bring follower K to high point of disc.
 3. Turn disc release dial counter-clockwise as far as it will go and move lever M to the right until follower K moves away from disc. The gap should be .010 inch (.03mm)—about the thickness of one sheet of paper.
 4. Tighten screw N.

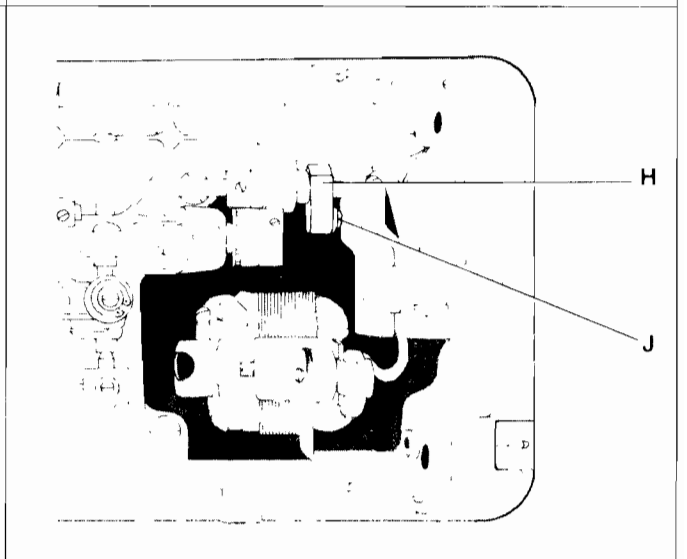
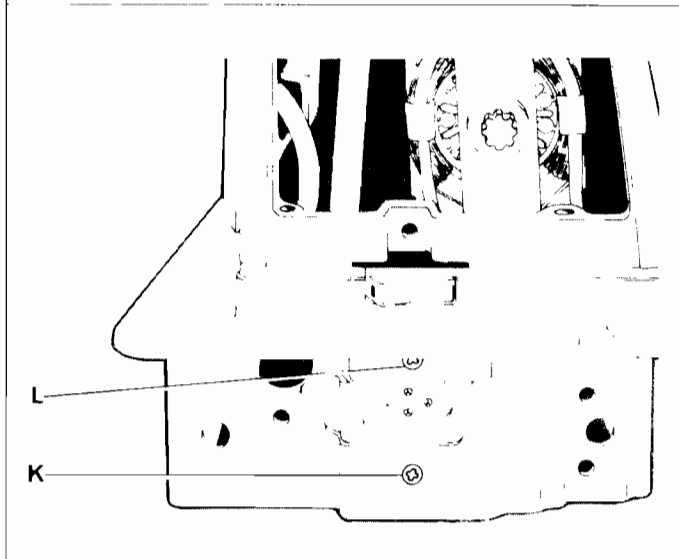
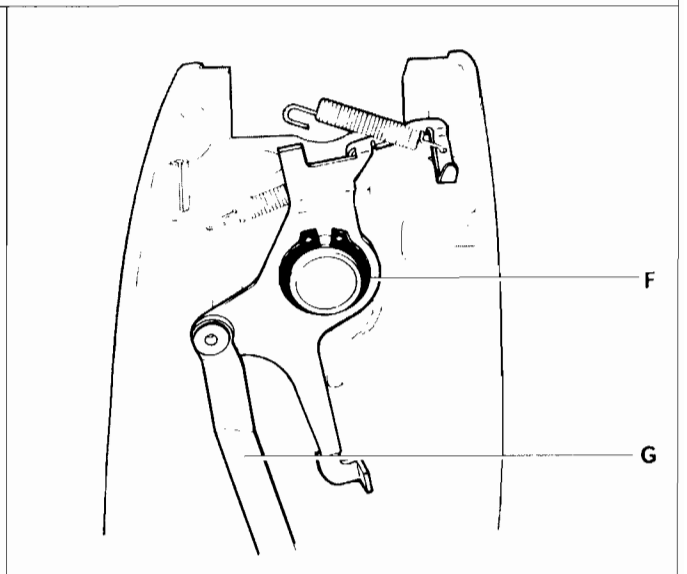
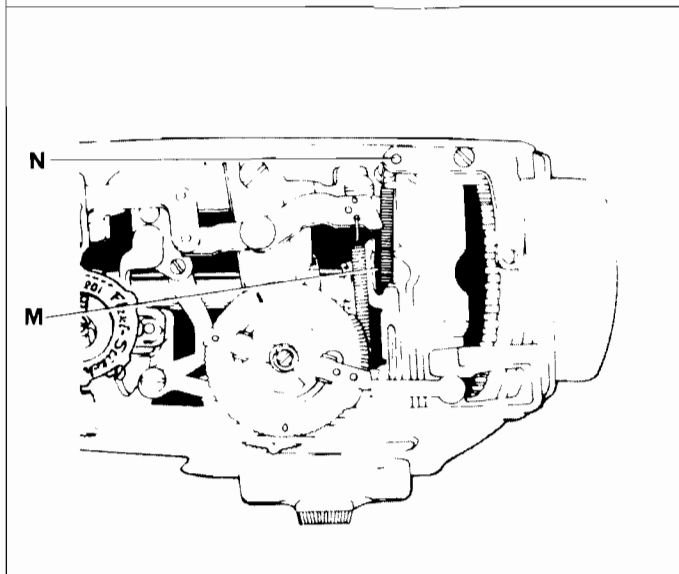
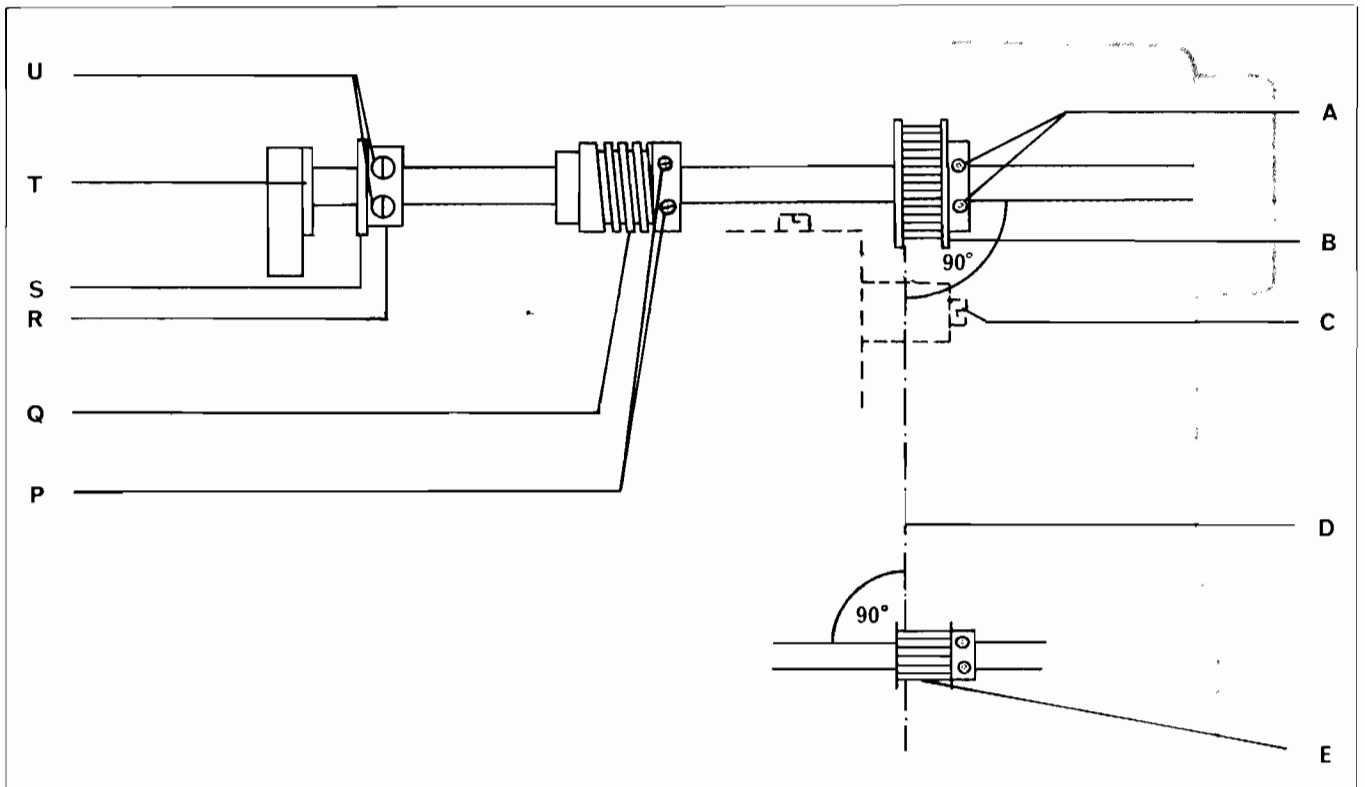
10. CONTROL DIAL

- REMOVING:**
1. Turn dial to area between zero and No. 4 buttonhole marks.
 2. Insert two-ply material behind dial and pull away from panel.
- REPLACING:**
1. Ensure that slot F in cam G is at 10 o'clock position, as shown, allowing depression D in dial to clear pawl E.
 2. Replace dial.

11. CONTROL PANEL

- REMOVING:**
1. Remove arm top cover and face plate.
 2. Remove control dial as instructed above.
 3. Loosen set screw V and remove thread guide X.
 4. Remove control panel fasteners P and W by closing small tags and easing fasteners over bosses of panel. The remaining fasteners will pull off with the control panel.
- REPLACING:**
1. Replace control panel and fastener P.
 2. Push panel at points A, B, C and Y to locate the fasteners at these points.
 3. Replace fastener W.
 4. Replace thread guide X and tighten set screw V.
 5. Replace control dial.
 6. Replace arm top cover and face plate.





12. HORIZONTAL ARM SHAFT

- REMOVING :**
1. Remove presser bar as instructed on page 28.
 2. Remove needle bar rocker bracket assembly as instructed on page 20.
 3. Remove needle thread take-up as instructed on page 36.
 4. Remove hand wheel assembly as instructed on page 40.
 5. Remove cam controlled feed unit as instructed on page 31.
 6. Loosen screw C and slacken belt.
 7. Loosen two screws U in collar R.
 8. Loosen two screws A in pulley B.
 9. Loosen two screws P in arm shaft worm gear Q.
 10. Remove arm shaft out of face plate end of machine. Make sure that plastic washer T remains on arm shaft.
- REPLACING :**
1. From face plate end of machine insert new arm shaft with washer T into machine arm, through washer S, collar R, worm gear Q and pulley B, ensuring belt is looped on to shaft.
 2. While pressing firmly on needle bar crank and holding collar R against plastic washer S, tighten set screws U.
 3. Align pulley B with small pulley E and assemble belt D (over small pulley first).
 4. Replace hand wheel assembly as instructed on page 40.
 5. Replace needle thread take-up as instructed on page 36.
 6. Replace needle bar rocker bracket assembly as instructed on page 20.
 7. Replace presser bar as instructed on page 28.
 8. Time hook to needle as instructed on page 23.
 9. Adjust belt tension as instructed on page 23.
 10. Replace cam controlled feed unit as instructed on page 31.
 11. Check feed timing as instructed on page 27.
 12. Time needle bar vibrating mechanism as instructed on page 15.
 13. Set presser bar as instructed on page 28.

13. FEED REGULATOR DRIVING BRACKET

- REMOVING :**
1. Remove arm top cover, bottom cover and arm end cover.
 2. Unhook spring M from roll pin N.
 3. Remove cam controlled feed unit as instructed on page 31
 4. Partly withdraw arm shaft (see above)
 5. Remove driving bracket retaining ring F
 6. Remove switch module mounting screws K and L.
 7. Push switch module down to obtain access to screw J
 8. Remove screw J to release feed connection G.
 9. Slide driving bracket off arm shaft bushing and withdraw the assembly from machine.
- REPLACING :**
1. Replace driving bracket assembly.
 2. Align bottom end of feed connection with feed regulator shaft crank H and replace screw J.
 3. Replace switch module and mounting screws K and L.
 4. Replace retaining ring F
 5. Replace arm shaft as instructed above.
 6. Replace cam controlled feed unit.
 7. Reconnect spring M to roll pin N
 8. Set *Flexi-Stitch* dial at 0 and check that driving bracket returns freely after reverse-stitch button has been depressed. It should return freely with hand wheel turned to any position. If it does not, adjust feed regulator shaft crank as instructed on page 27 (item 10 under replacement of Alpha feed mechanism)
 9. Set cam controlled feed follower and stop as instructed on page 31
 10. Replace arm end cover, bottom cover and arm top cover

14. CAM STACK AND STITCH WIDTH DIAL ASSEMBLY

REMOVING :

1. Remove arm top cover.
2. Remove control panel as instructed on page 32.
3. Remove screw J.
4. Remove screw F, washer G and dial assembly E.
5. Loosen screw M, allowing screw and washer N to remain in hole in arm immediately below gear shaft.
6. Loosen set screw H.
7. Lift entire cam stack assembly from machine arm.
8. Slide bracket assembly P from fork of driving arm R and remove bracket assembly from machine arm.

REPLACING :

1. Replace cam stack assembly in machine arm and adjust as instructed on page 11.
2. Insert assembly P into cut-out in front of arm and fit stud Y in fork of driving arm, ensuring that lever K rests on lever L.
3. Place assembly P on screw M with its washer N and assemble to shaft from underside of machine arm.
4. Replace screw J.
5. Replace dial E, washer G and screw F.
6. Loosen screw S.
7. Hold support T against bearing U and tighten screw S.
8. Adjust stitch width dial for straight stitch and maximum width of zig-zag stitch as instructed on page 11.
9. Replace control panel as instructed on page 32.
10. Set bight dial halfway along its travel and, with machine running, turn screw M until dial starts to move.
11. Tighten screw M by half a turn.
12. Time pendulum movement of needle bar as instructed on page 15.
13. Set for maximum bight width as instructed on page 11.
14. Set cutting space for buttonhole as instructed on page 19.
15. Set cam controlled feed follower and stop as instructed on page 31.
16. Replace arm top cover.

15. NEEDLE THREAD TAKE-UP

REMOVING :

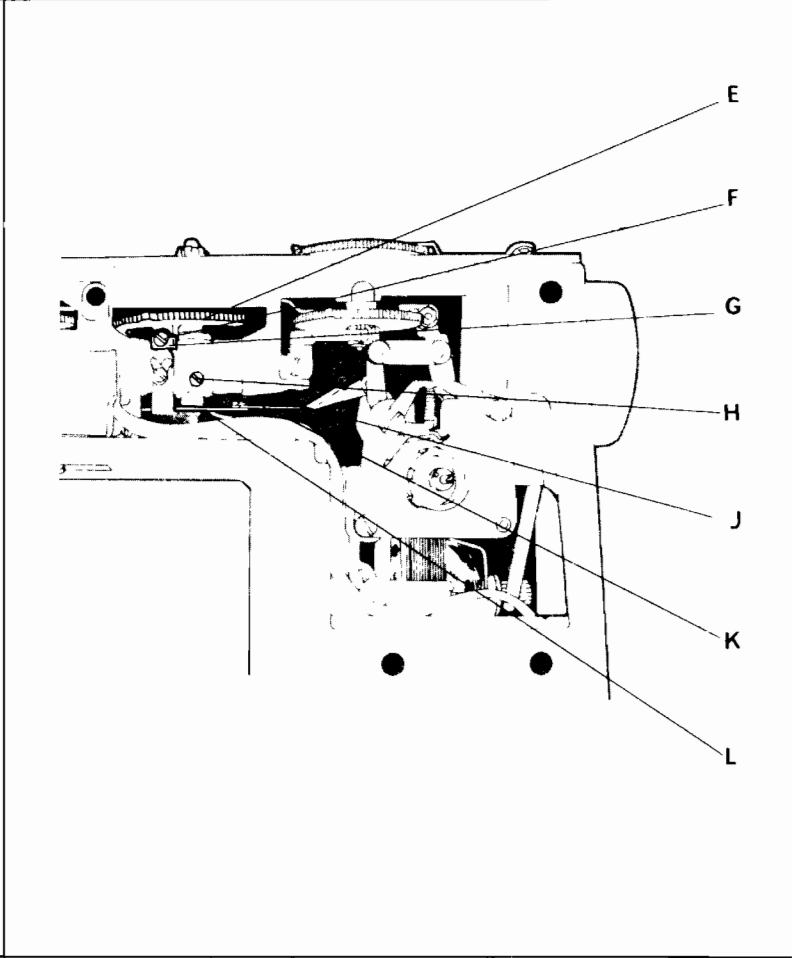
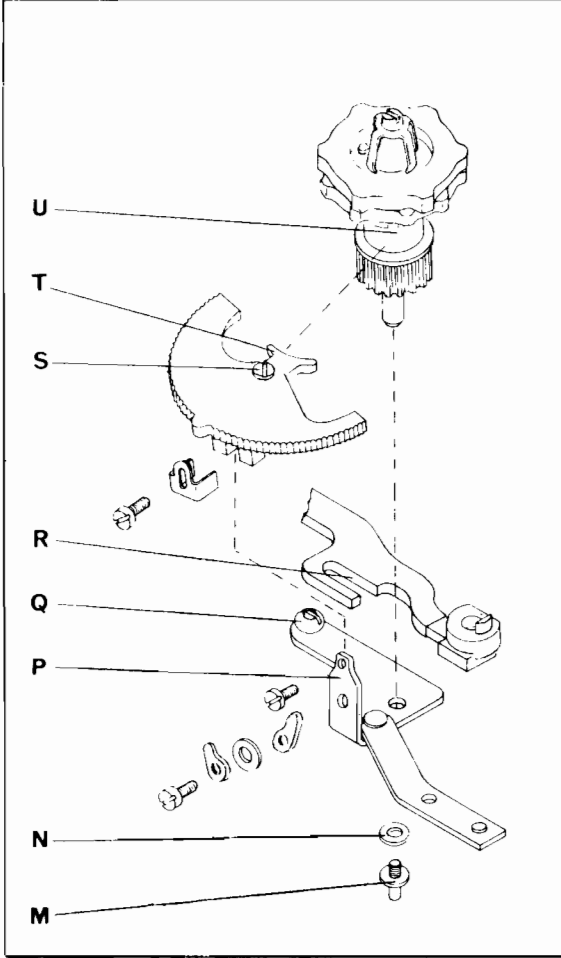
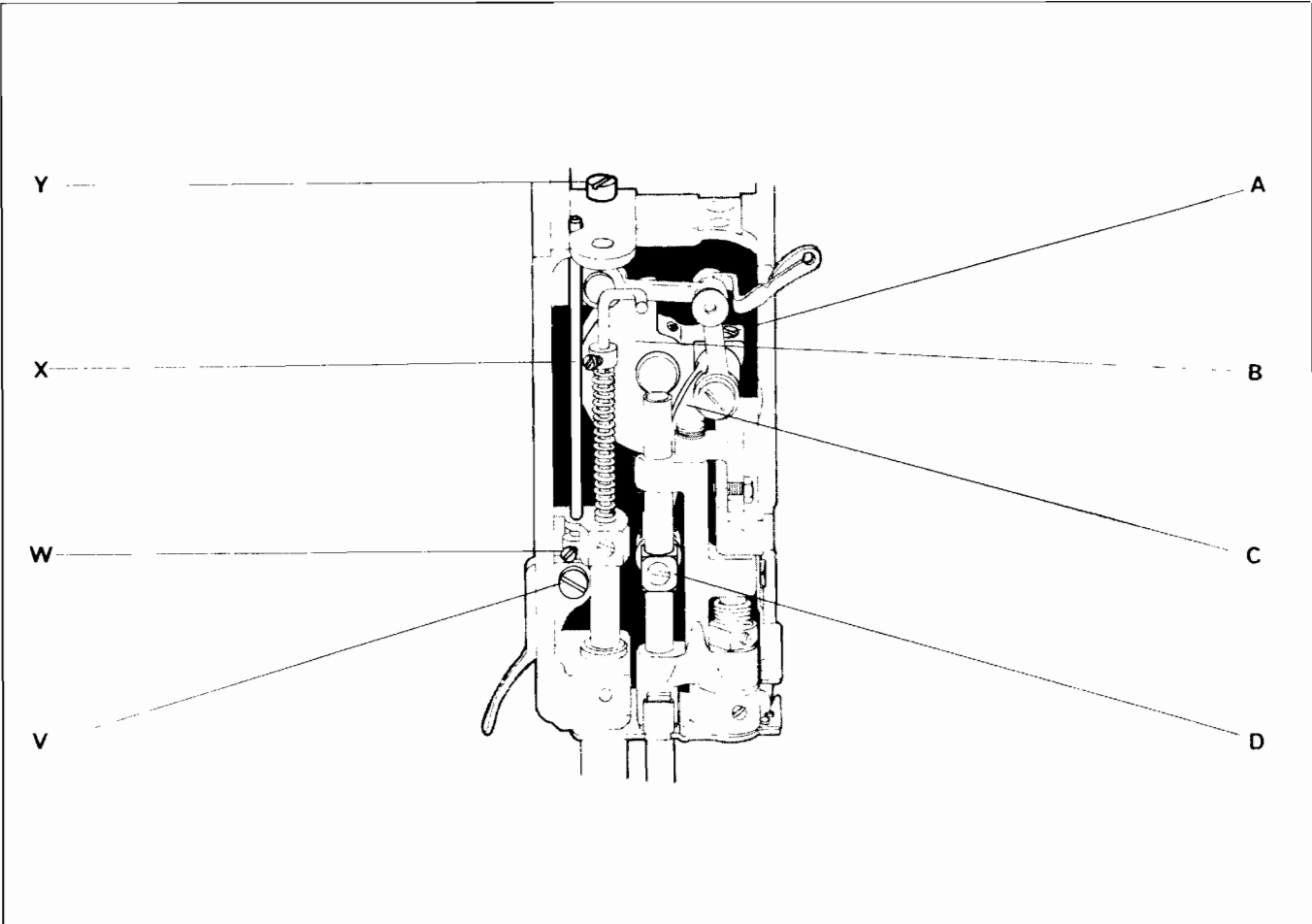
1. Remove arm top cover and face plate.
2. Remove needle bar and presser bar regulating bracket as instructed on pages 20 and 28.
3. Loosen screw W and remove collar V and pin X.
4. Loosen screw Y.
5. Through hole in top of casting, loosen set screw A in needle bar crank B.
6. Withdraw needle thread take-up with link C and hinge stud D from machine.

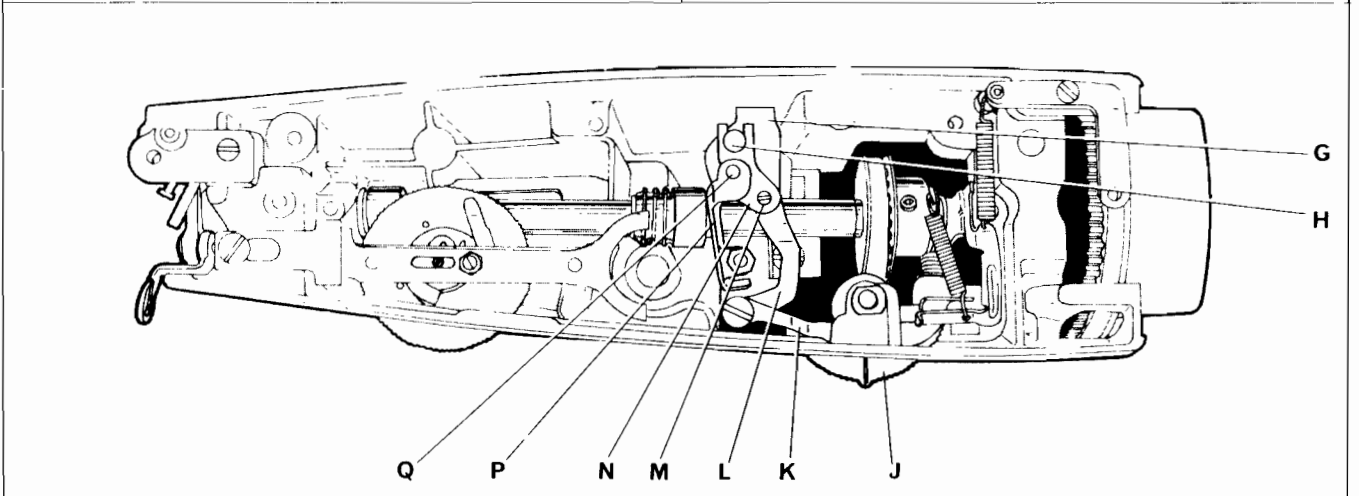
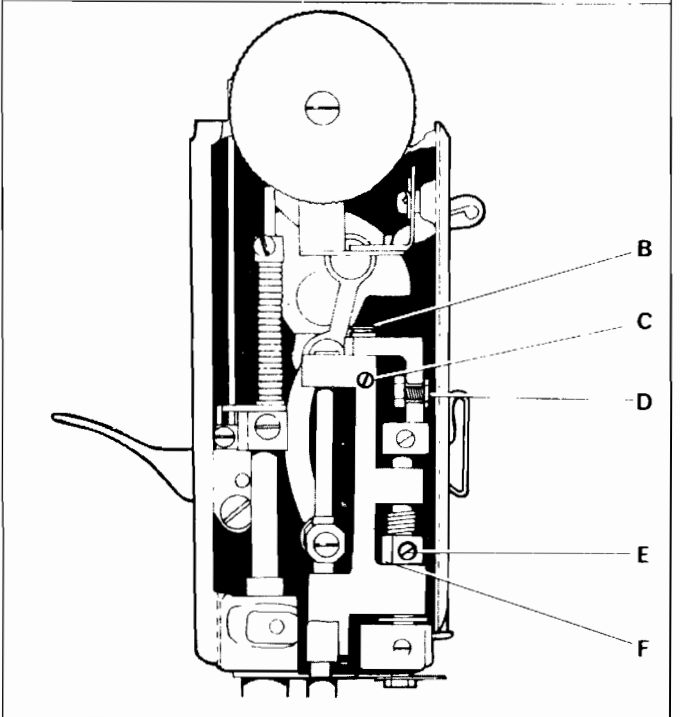
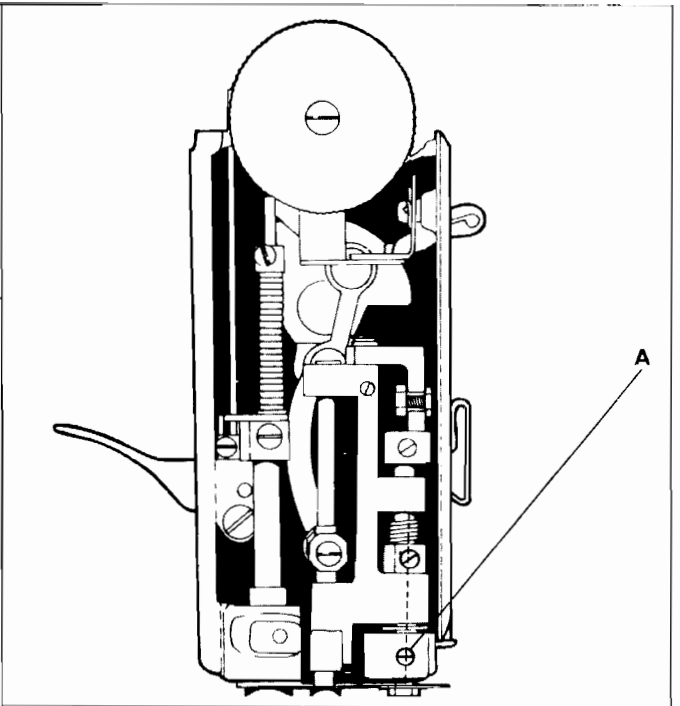
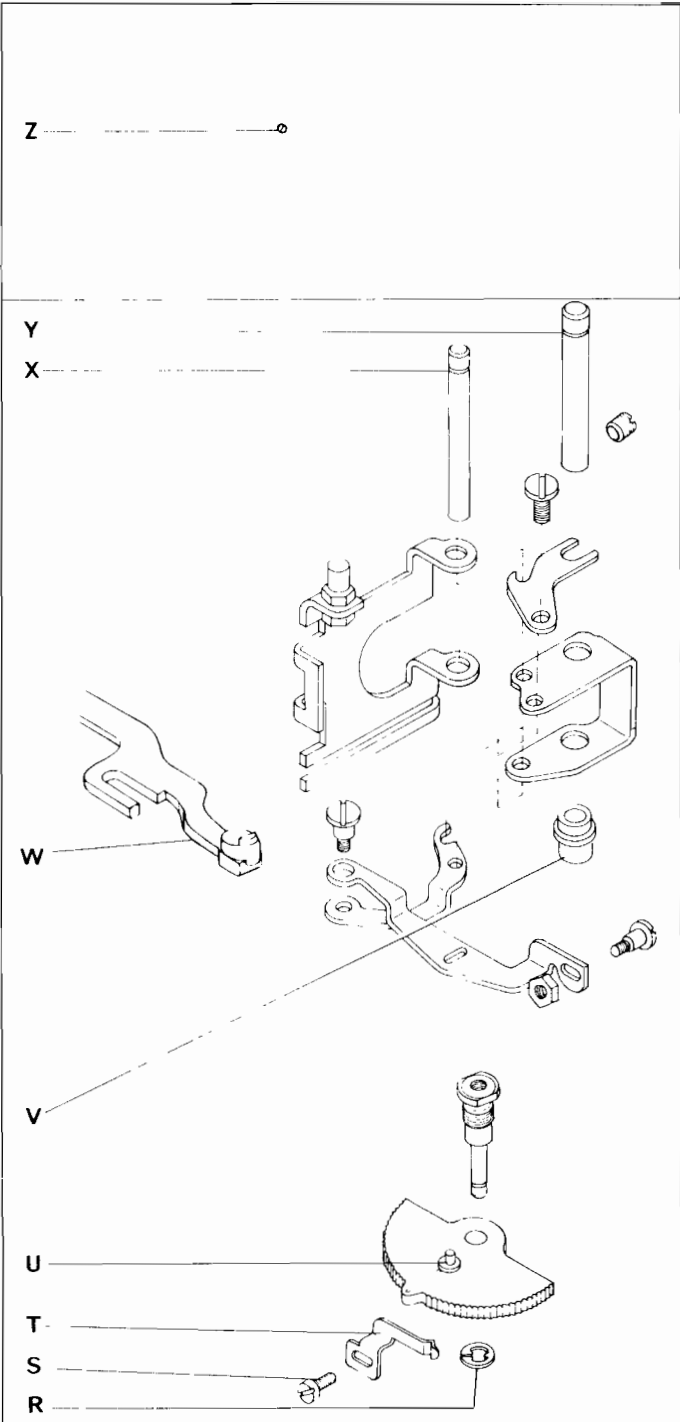
REPLACING :

1. Replace needle thread take-up in reverse order of its removal.
2. Set needle bar height as instructed on page 15.
3. Set tension releasing pin X at correct height by ensuring that it acts on releasing lever when presser bar is lifted.
4. Replace arm top cover and face plate.

IMPORTANT :

When replacing take-up assembly, make certain that set screw A is tightened firmly against flat on take-up hinge stud and then, while turning hand wheel over toward you, slowly tighten set screw Y. Check that machine turns freely.





16. NEEDLE POSITION SELECTOR AND NEEDLE BAR DRIVING ARM

NOTE:

To remove needle position dial only.

1. Remove screw S and detent spring T.
2. Remove circlip R and slip dial J off shaft and out through casting.

To replace dial:

1. Replace dial J and circlip R, making sure that stud U on dial engages in slot of lever K.
2. Replace detent spring T and screw S.
3. Loosen screw S and move spring T and dial J to align dial with control panel graphics.
4. Set needle—left to right—in needle hole in straight-stitching throat plate as instructed on page 19.
5. Set needle position dial as instructed on page 28 (item 5 under replacement of buttonhole mechanism).

REMOVING:

1. Remove arm top cover
2. Remove face plate.
3. Remove control panel as instructed on page 32
4. Remove cam controlled feed unit as instructed on page 31.
5. Remove cam stack and stitch width dial assemblies as instructed on page 36.
6. Remove screw M.
7. Slide retainer N to the right and then out of machine.
8. Loosen screw E.
9. Lift out hinge pin Q, disengaging bracket P and lever L from pin.
10. Loosen set screw C and remove hinge pin B. It is not necessary to remove hexagon head screw D from driving arm.
11. Move amplitude bracket P and driving arm W, until driving arm becomes disengaged from long slot of amplitude bracket.
12. Slide driving arm toward left and out of face plate end of machine.
13. Remove amplitude bracket from machine.
14. Loosen set screw Z at back of arm and remove pin H, bracket G and spacer V from machine by turning bracket G to clear arm shaft.

REPLACING:

1. Replace spacer V, bracket G and pin H, taking care to align holes as pin H is assembled.
2. Replace amplitude bracket P.
3. Insert driving arm W from face plate end of machine and fit right end of arm in long slot of amplitude bracket.
4. Insert pin O through holes in brackets P and G and lever L.
5. Replace retainer N, engaging vertical slot in groove Y and angled slot in groove X. Press down pin H and tighten screw Z.
6. Replace screw M
7. Replace pin B and tighten set screw C.
8. Turn collar F counter-clockwise until sufficient spring tension is obtained (16 ozs on needle bar) and tighten set screw E. (This loading should be obtained when screw E is aligned with edge of bracket A.)
9. Replace cam stack and stitch width dial assemblies as instructed on page 36.
10. Replace control panel as instructed on page 32.
11. Set pendulum movement of needle bar as instructed on page 15.
12. Set for maximum bight as instructed on page 11
13. Set buttonhole cutting space as instructed on page 19.
14. Replace cam controlled feed unit as instructed on page 31.
15. Set kick-out mechanisms as instructed on page 31
16. Replace arm top cover and face plate.

17. HAND WHEEL AND MOTOR BELT

- REMOVING:**
1. Remove arm top cover.
 2. Turn hand wheel until screw C is accessible through aperture P.
 3. Remove screw C.
 4. While holding belt M, remove hand wheel.
 5. Remove belt M.
- DISASSEMBLING:**
1. Remove circlip E and withdraw clutch mechanism H.
 2. Remove plate with decal G.
- REASSEMBLING:**
1. Replace plate with decal, aligning pin in plate with hole F in clutch mechanism.
 2. Insert clutch mechanism into hand wheel.
 3. Replace circlip E.
- REPLACING:**
1. Turn arm shaft until hole N is accessible through aperture P.
 2. Loop belt on to hand wheel and slide hand wheel on to arm shaft.
 3. Loop belt on to motor pulley L.
 4. Turn hand wheel until large hole D is in line with hole N.
 5. Replace screw C.
 6. Replace arm end cover and arm top cover
- NOTE:** To adjust belt tension, loosen screw K and turn eccentric bushing J. Tighten screw K.

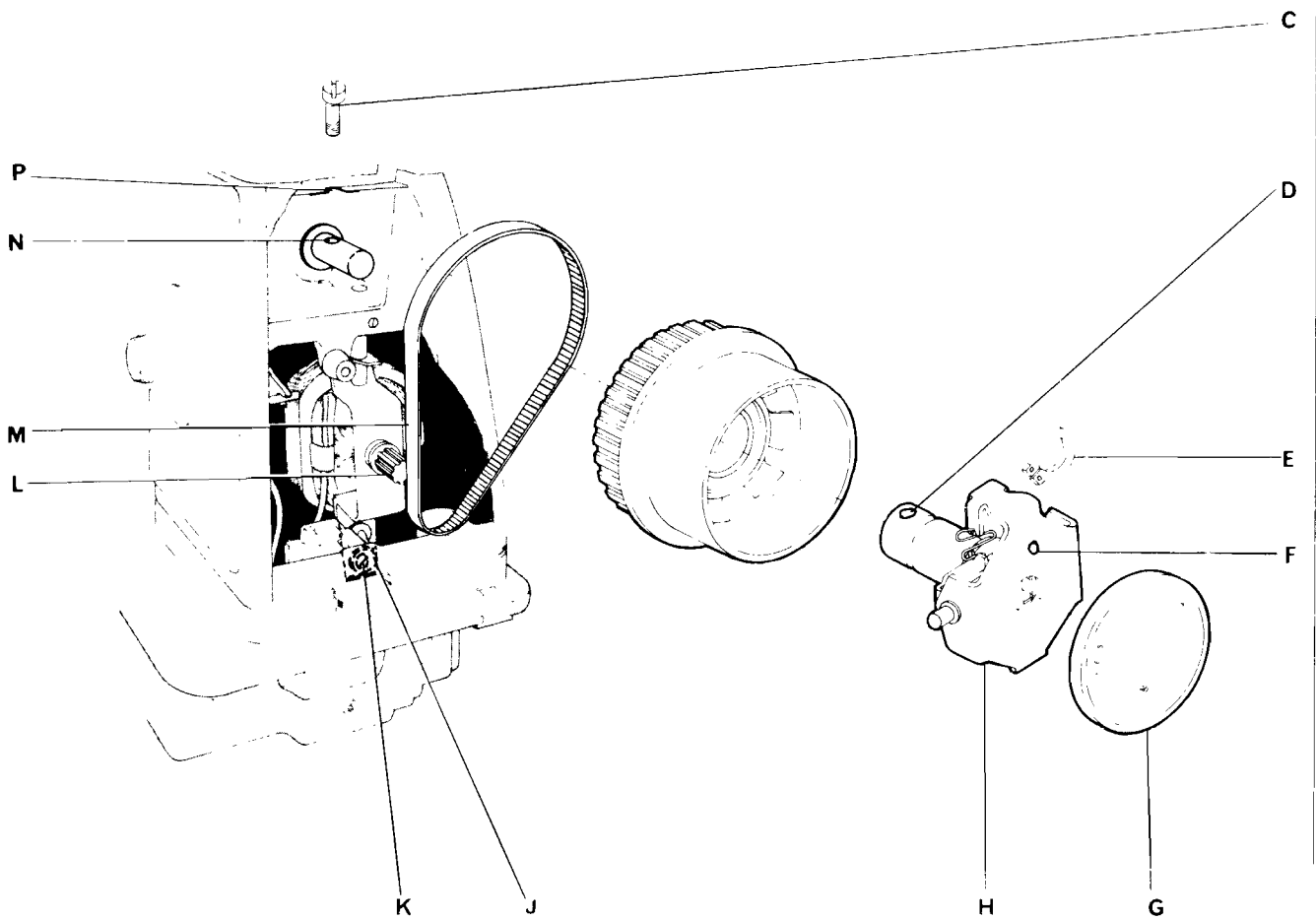
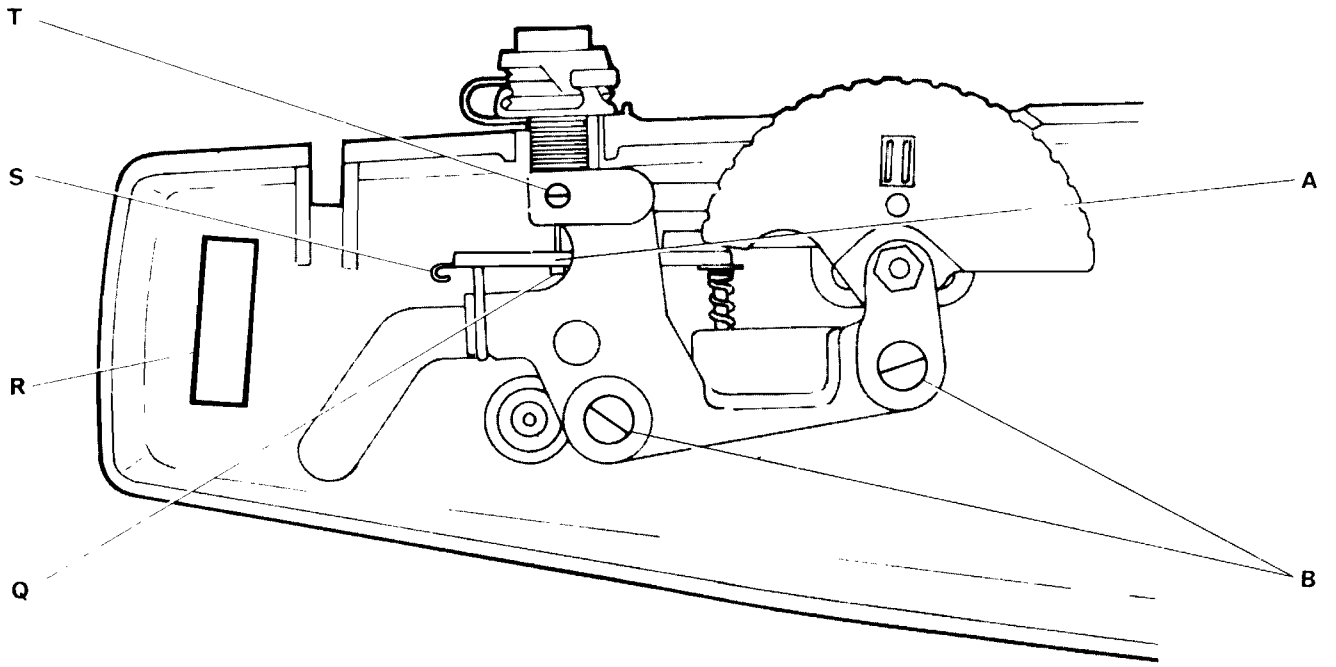
18. NEEDLE THREAD TENSION

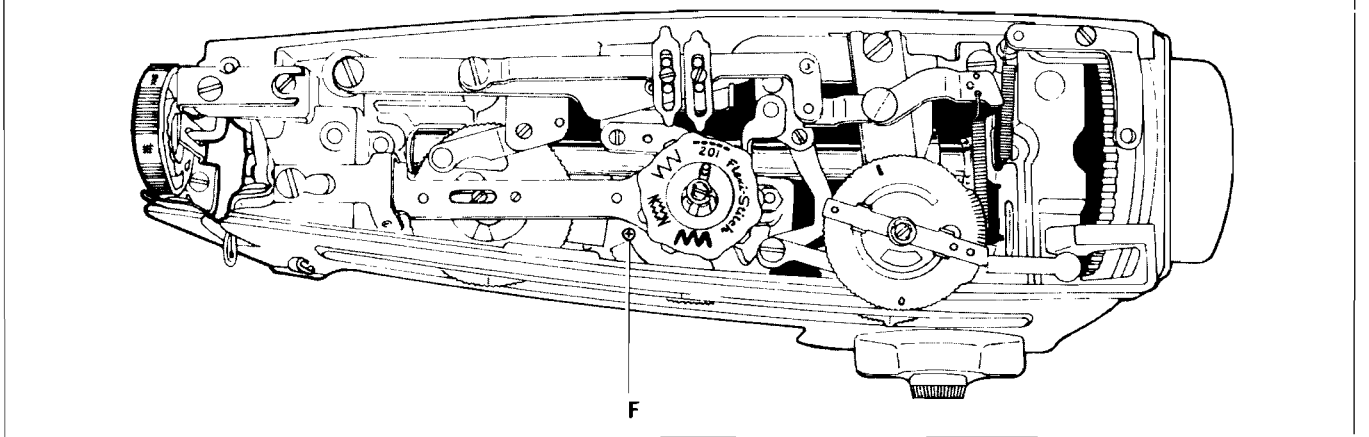
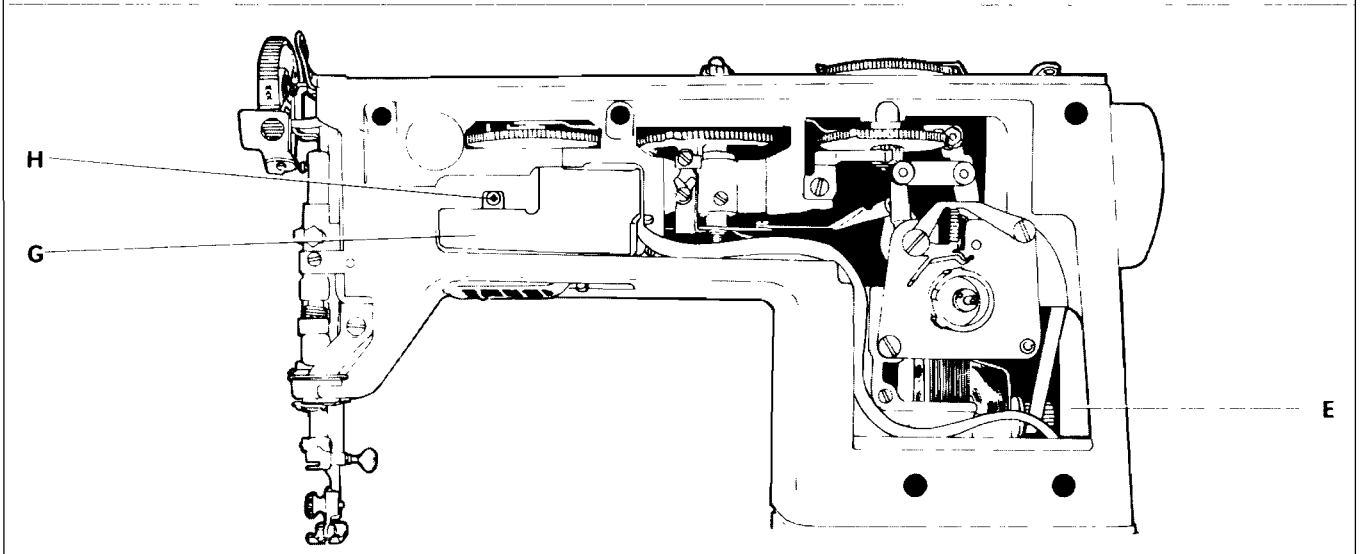
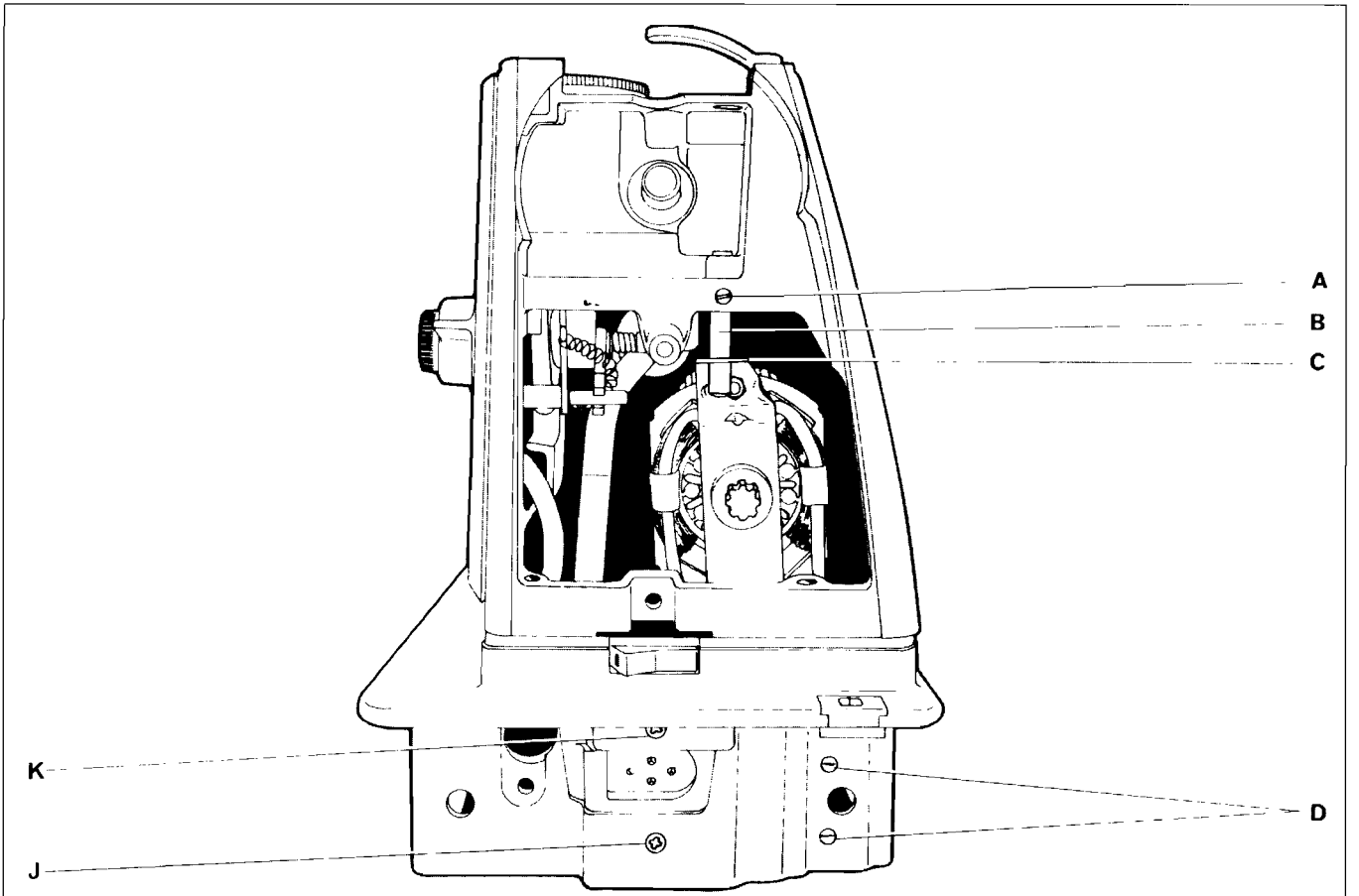
Needle thread tension assembly

- REMOVING:**
1. Remove arm top cover.
 2. Remove two screws B and complete tension assembly.
- REPLACING:**
1. Lower presser foot.
 2. Replace tension assembly and screws B, but do not tighten screws B.
 3. While pressing tension assembly toward back of arm top cover, tighten screws B.
 4. Replace arm top cover.
- CHECK:** When presser bar lifter is raised, pressure between tension discs should be released.

Needle thread tension disc unit

- REMOVING:**
1. Remove arm top cover
 2. Move spring S toward pressure regulating dial slot R.
 3. Loosen screw T and withdraw tension disc unit.
- REPLACING:**
1. Replace tension disc unit. Make sure that pin Q is located in keyhole slot in slide channel A.
 2. Push spring S toward dial as far as it will go.
 3. Tighten screw T and set take-up spring as instructed on page 12.

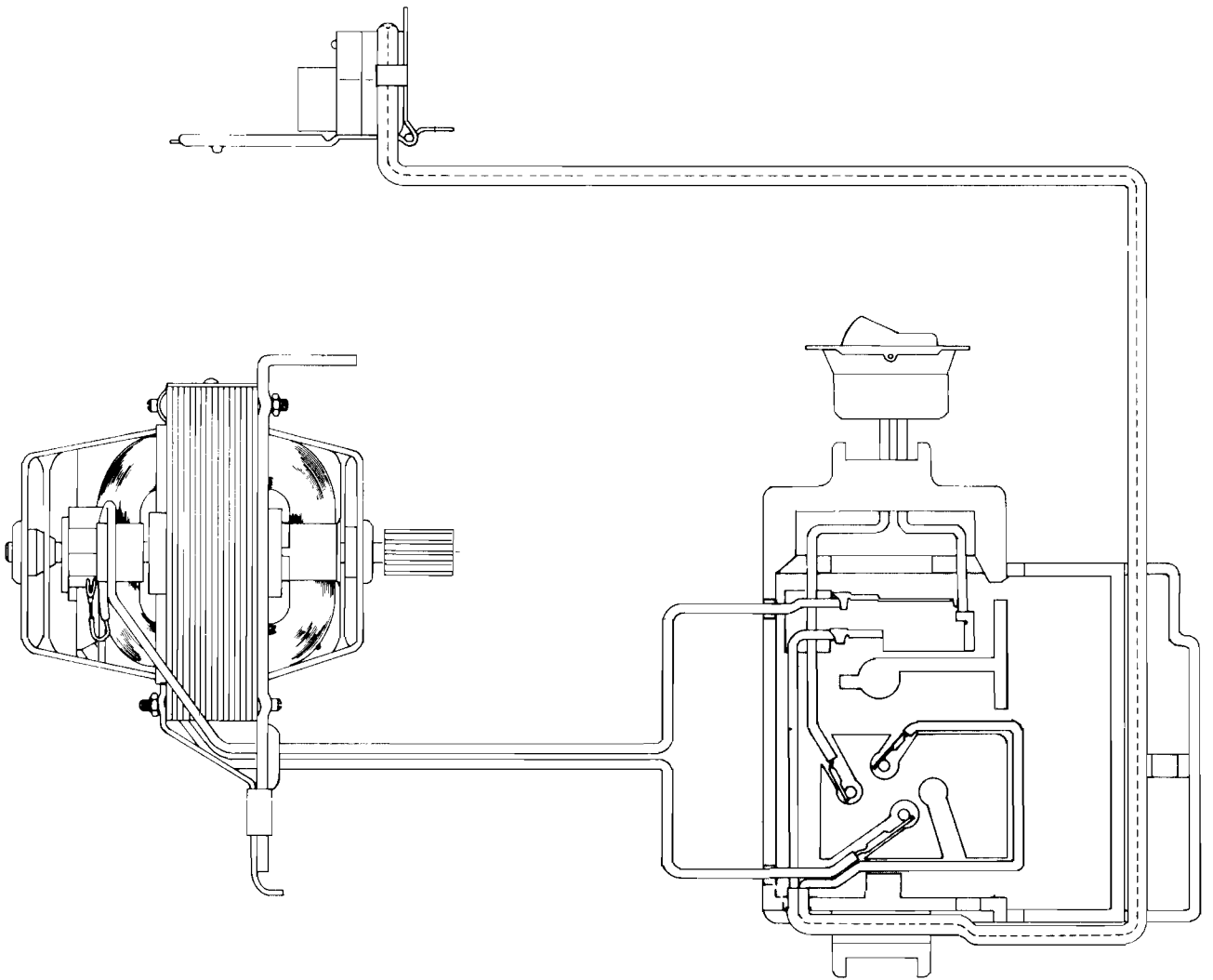
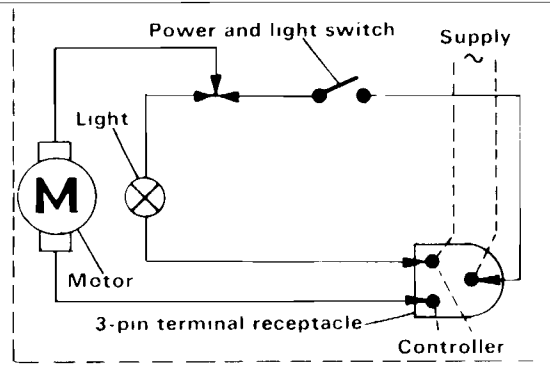




19. ELECTRICAL COMPONENTS

- CAUTION:** Remove plug from electrical outlet before removing any electrical part of the machine.
- REMOVING:**
1. Remove arm top cover and arm end cover.
 2. Remove control dial and control panel as instructed on page 32.
 3. Remove hand wheel and motor belt as instructed on page 40.
 4. Remove screw H and light shield G.
 5. Remove screw F and withdraw light fixture from arm.
 6. Remove screws J and K. (In 538 machine, screw J holds the bed end cover plate.)
 7. Loosen screw A and raise post pin B until it clears upper motor bracket C.
 8. While holding motor in position, remove screws D.
 9. Withdraw motor, switch module and light fixture from machine.
- REPLACING:**
1. Feed light fixture through aperture E in arm casting.
 2. Install switch module and motor in machine.
 3. Lower bracket post pin B through motor bracket C and tighten screw A.
 4. Replace screws D.
 5. Replace screws J and K (and the bed end cover plate in 538 machine).
 6. Replace light fixture and screw F.
 7. Replace light shield G and screw H.
 8. Replace hand wheel and motor belt as instructed on page 40.
 9. Replace control panel and control dial as instructed on page 32.
 10. Replace arm end cover and arm top cover.
- NOTE:** By removing the switch module cover and disconnecting the appropriate terminals, the motor, switch module and light fixture can be removed as separate units. (See wiring diagram on page 44.)

Wiring diagram



FAULT ANALYSIS CHART - MECHANICAL

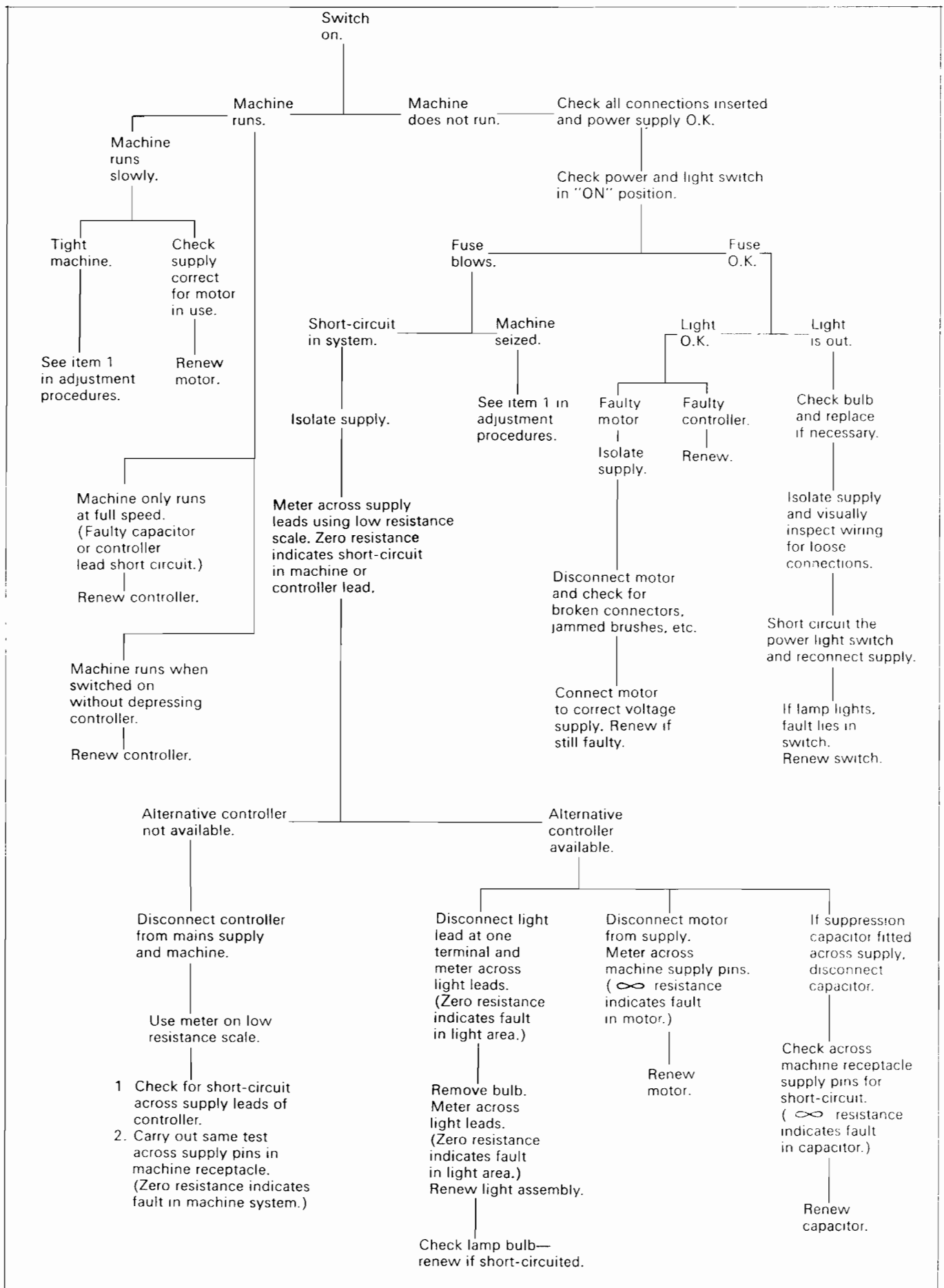
FEATURE	FAULT	POSSIBLE CAUSE	CURE	MANUAL PAGE REF.
Presser bar	1. Presser bar lifter inoperative.	(a) Tension releasing pin or lever damaged.	Replace pin or lever	28
		(b) Pressure regulating bracket twisted or loose.	Replace or relocate bracket.	28
		(c) Pressure regulating pin damaged.	Replace pin.	28
	2. Pressure regulating dial inoperative.	(a) Regulating bracket damaged.	Replace bracket.	28
	3. Pressure regulating dial stiff.	(a) Presser bar raised.	Lower presser bar lifter	—
		(b) Dial fouling on top cover.	Loosen top cover screws and adjust top cover to give clearance between knob and slot.	—
		(c) Pressure spring adjusting collar not set.	Reset collar	28
Bight mechanism.	1. Bight too narrow.	(a) Mechanism binding.	Check clearance on needle bar rocker bracket hinge pin, needle bar rocker eccentric pin and bight amplitude hinge pin. Increase tension on needle bar rocker tension spring.	20 & 71
		(b) Needle bar connection hinge stud pin disengaged.	Relocate pin.	20 & 71
		(c) Needle bar driving arm touches driving gear shaft at maximum bight.	Adjust driving arm positioning screw stud.	11
		(d) Driving arm fouling on buttonholer bight lever.	Align buttonholer bight levers.	28
	2. Bight dial/lever not zeroing.	(a) Needle position selector bracket incorrectly set.	Reset for round hole throat plate.	15 & 68
		(b) Needle bar driving arm follower misaligned.	Reassemble follower ensuring flat is held rigidly against end of driving arm when tightening binding screw.	39
		(c) Driving arm damaged.	Replace driving arm.	39
		(d) Buttonholer bight levers damaged.	Replace stitch width or buttonholer bight lever assembly.	28 & 36
		(e) Bight dial bracket stop not set.	Reset stop.	11
	3. Bight dial/lever stiff or moving at zig-zag.	(a) Cup washer under bight dial bracket/lever incorrectly tensioned.	Adjust tension.	36 & 75
		(b) Buttonholer bight levers incorrectly set or damaged.	Reset or replace stitch width and/or buttonholer bight lever assembly.	28 & 36
	4. Excessive noise at maximum bight.	(a) Excessive backlash in disc driving gear.	Reset with minimum clearance in gears.	11
		(b) Needle bar rocker tension spring heavy.	Reset spring.	16
		(c) Needle bar fouling needle bar stop.	Reset stop.	19
		(d) Excessive end play in arm shaft.	Adjust arm shaft collar.	11

FEATURE	FAULT	POSSIBLE CAUSE	CURE	MANUAL PAGE REF.
Feed regulator and buttonholer mechanism.	1. Feeding occurs at No. 2 or No. 4 buttonhole positions.	(a) Feed incorrectly set.	Set for zero feed.	28
		(b) Feed regulator cam damaged.	Replace cam.	28
		(c) <i>Flexi-Stitch</i> dial engaged.	Set dial at 0.	—
	2. Cutting space cannot be achieved.	(a) Buttonholer bight adjusting screw loose.	Set cutting space and tighten screw.	19
		(b) Buttonholer bight cam follower out of track or loose.	Replace buttonholer bight lever assembly, also cam if damaged.	28
	3. Buttonhole incomplete or open.	(a) Buttonholer needle position adjusting screw loose.	Reset for round hole throat plate and secure screw.	28
		(b) Buttonholer bight adjusting screw loose.	Set cutting space and tighten screw.	19
		(c) Buttonholer needle position lever or cam follower damaged.	Replace lever assembly follower and/or cam if damaged.	28
	4. Buttonholer and feed regulator control dial inoperative.	(a) Feed regulator cam damaged.	Replace cam.	28
		(b) Feed regulator pin disengaged from driving bracket.	Relocate pin.	35
		(c) Feed regulator driving bracket retainer loose.	Relocate retainer	35
		(d) Control dial pawl damaged.	Replace pawl.	28
		(e) Reverse feed cam follower loose.	Reinsert follower.	28
	5. Feed regulator and buttonholer control dial does not engage at Nos. 1, 2, 3 and 4 positions.	(a) Pawl spring broken.	Replace spring.	28
		(b) Pawl hinge screw loose.	Tighten screw.	28
	6. Not feeding properly at buttonholing.	(a) Feed dog height incorrect.	Reset height.	27
		(b) Feed dog teeth damaged.	Replace feed dog.	23
		(c) <i>Flexi-Stitch</i> dial engaged.	Set dial at 0.	—
	7. Not feeding straight at buttonholing.	(a) Buttonholer foot damaged.	Replace foot.	—
	8. Stitch spacing on buttonhole sides cannot be balanced.	(a) Zero feed incorrectly set.	Readjust for zero feeding.	28
(b) Reverse push button binding screw loose.		Readjust for zero feeding and replace push button, ensuring screw is tight.	28	

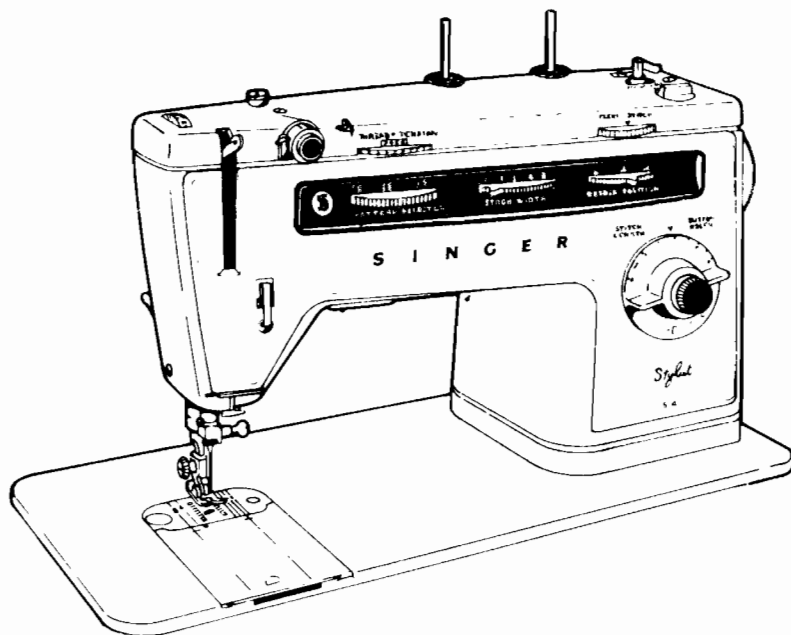
FEATURE	FAULT	POSSIBLE CAUSE	CURE	MANUAL PAGE REF.	
Feed system.	1. Feed system noisy.	(a) Feed bar centres slack.	Adjust centres.	27	
		2. Reverse feed push button does not retract.	(a) Feed regulator shaft bushing out of position.	Relocate bushing.	—
	(b) Feed regulator shaft overadjusted.		Readjust shaft to turn freely.	27	
	(c) Feed regulator connection twisted.		Replace connection.	35	
	(d) Feed regulator driving bracket return spring disconnected or broken.		Reconnect or replace spring.	31	
	(e) Cam controlled feed lever stop loose.		Reset stop	31	
	3. Feed dog fouls throat plate slots.	(a) Feed dog incorrectly positioned.	Reset feed dog.	24 & 27	
		(b) Feed bar centre (eccentric) pin incorrectly turned.	Reset pin.	24	
		(c) Lengthwise eccentric incorrectly adjusted.	Readjust using eccentric stud.	24	
	4. Stitch length does not correspond to dial indications.	(a) Feed incorrectly set.	Reset for zero feed.	28 & 71	
	Drive mechanism.	1. Machine runs slow.	(a) Motor belt over tightened.	Adjust belt tension.	40
			(b) Hook drive shaft belt over-tightened.	Adjust belt tension.	23
(c) Cam stack gear overadjusted.			Adjust cam stack mesh.	11	
(d) Hook gears too tightly meshed.			Adjust mesh of hook gears.	11	
(e) Feed regulator shaft overadjusted.			Adjust shaft to turn freely.	27	
(f) Feed fork hinge overadjusted.			Reposition hinge.	—	
(g) Feed lifting cam misaligned.			Adjust eccentric cam clear of front bush.	—	
(h) Feed gears too tightly meshed.			Adjust mesh.	11	
Stitch mechanism.	1. Needle thread looping.	(a) Needle and bobbin thread tensions out of balance.	Check tensions.	12 & 68	
		(b) Feed out of time.	Reset feed timing.	27	
		(c) Thread clearances too close.	Check thread clearance.	12	
		(d) Hook drive shaft belt jumped tooth (too slack).	Reset feed and hook timing. Adjust belt tension.	23 & 27	
Hand wheel.	1. Hand wheel noisy when winding bobbins.	(a) Belt damaged.	Replace belt.	40 & 76	
		(b) Clamp stop motion/disengaging clutch bushing requires lubrication.	Lubricate with 'SINGER' grease.	—	

FEATURE	FAULT	POSSIBLE CAUSE	CURE	MANUAL PAGE REF.
Cam controlled feed mechanism.	1. Not feeding.	(a) Return spring disconnected or broken.	Reconnect or replace spring.	31
		(b) Disc follower damaged or loose.	Replace follower and reset clearance.	31
		(c) Control dial disengaged.	Set at red bar.	—
		(d) Stop incorrectly set.	Reset stop.	31
		(e) <i>Flexi-Stitch</i> kick-out lever overadjusted.	Reset.	32
	2. <i>Flexi-Stitch</i> patterns unbalanced.	(a) Disc follower damaged or loose.	Replace follower and reset clearance.	31
		(b) Feed regulator shaft over-adjusted.	Adjust.	27
		(c) Control dial disengaged.	Set at red bar.	—
		(d) Stop incorrectly set.	Reset stop.	31
		(e) <i>Flexi-Stitch</i> kick-out lever overadjusted.	Reset.	32
	3. Noisy when sewing.	(a) Feed unbalanced.	Set.	—
		(b) Control dial disengaged.	Set at red bar.	—
		(c) Stop incorrectly set.	Reset stop.	31
		(d) Feed regulator shaft over-adjusted.	Adjust.	27
		(e) <i>Flexi-Stitch</i> kick-out lever overadjusted.	Reset.	32
Disc release mechanism (518/538)	1. Not releasing disc.	(a) Follower incorrectly set.	Reset.	31
	2. <i>Flexi-Stitch</i> kick-out not functioning.	(a) Incorrectly set.	Reset.	32
	3. Bight kick-out not functioning.	(a) Incorrectly set.	Reset.	32
	4. Disc release lever does not remain in its 'up' position.	(a) Detent spring not locating in groove.	Set.	31
	5. Dial not returning.	(a) Return spring not set.	Set.	31
	6. Dial heavy to operate.	(a) <i>Flexi-Stitch</i> or bight kick-out overset. (b) Return spring overset.	Reset. Reset.	32 31
Pattern selector (514).	1. Stitch patterns incorrect.	(a) Cam follower engaging on two discs.	Reset follower height.	59
	2. Dial heavy to operate.	(a) Disengaging lever incorrectly set.	Reset.	59
	3. Dial indication not aligning with panel graphics.	(a) Detent spring incorrectly set.	Reset spring.	59
Pattern selector (513/533).	1. Dial will not operate.	(a) Disc follower forced against cam.	Set bight lever at \ddagger .	75
	2. Dial operating but indicated stitch not achieved.	(a) Engaging pin on dial damaged.	Replace dial.	75
		(b) Disc binding screw loose.	Tighten screw.	75
(c) Disc follower damaged.		Replace disc follower.	75	

FAULT ANALYSIS CHART - ELECTRICAL



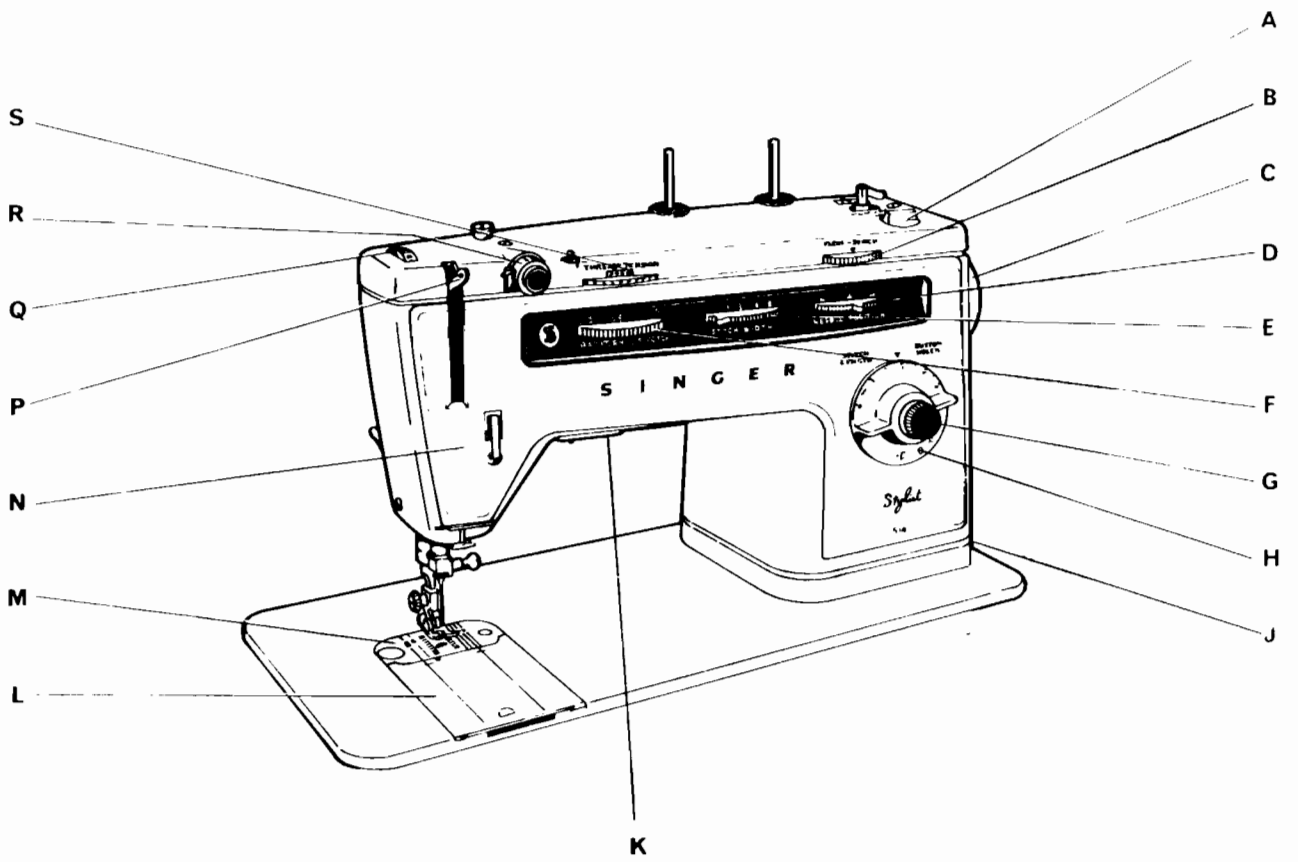
Servicing Instructions for **SINGER** Machines Class 514K



Servicing instructions for 518K Machines apply to the 514K with the exception of the special instructions on pages 52 to 61.

DESCRIPTION - 514K MACHINE

- For straight, zig-zag, stretch and ornamental stitching.
- Flat bed aluminium machine.
- Electrical power with built-in ENK8 motor, light K (hinged), rocker power and light switch J (located below arm end cover plate) and 'Touch and Wind' hand wheel C.
- Belt and gear driven horizontal rotating hook on a vertical axis, with stationary bobbin case (Apollo Hook System). Rotating hook makes two revolutions for each stitch.
- Throat plate M held in position by a position pin and spring loaded clamp for easy removal. Opening the bed slide L actuates the clamp and allows for easy removal of throat plate.
- Lock stitch, Alpha feed, link take-up P.
- Self-threading take-up, slotted for easy threading P.
- Bobbin winder mounted on top cover is activated by means of a switch A protruding through the top cover.
- *Flexi-Stitch* balance control dial B engages or disengages the cam controlled feed system. It also permits the operator to manually balance forward and reverse stitching to provide variations of *Flexi-Stitch* patterns.
- Pattern selector dial F located on front of arm. When *Flexi-Stitch* dial is OFF, dial moves easily to the left for zig-zag stitching, to the centre for blindstitching and to the right for multi-stitch zig-zag stitching. When *Flexi-Stitch* dial is ON, pattern selector dial moves easily to the left for ric-rac stitching, to the centre for slant overedge stitching and to the right for faggoting.
- Bight control dial E on front of arm in direct view of the operator. The dial controls the width of the zig-zag or ornamental stitch, up to a maximum of 5mm. When the machine is to be used for straight sewing in either left, centre or right needle position, this dial is set at the  position.
- Needle position selector dial D on front of arm in direct view of the operator. The dial enables the needle to be set in left, centre or right position.
- Four step buttonhole mechanism built into machine. Square end buttonholes can be made by turning buttonholer and feed regulator control dial H in a sequence of four steps beginning at  1. Balancing device incorporated in mechanism to permit equalising forward and reverse stitch length which may vary when changing from one fabric to another. This balancing is achieved by turning the push button G located in centre of buttonholer and feed regulator control dial.
- Plastic control panel N (Cream Tint), control panel insert (Architectural Bronze), names 'SINGER' and 'Stylist' and machine class No. '514' (Brown), indications and names for 'Pattern Selector', 'Stitch Width' and 'Needle Position' (White) and *Flexi-Stitch* indications (Bright Cherry Red).
- Buttonholer and feed regulator control dial H (Cream Tint), 'BUTTONHOLE', buttonhole designs and numerals 1, 2, 3, 4, 'STITCH LENGTH', 'FINE' and numerals 0, 6, 7, 8, 10, 12, 15, 25 (Brown) and *Flexi-Stitch* indication (Bright Cherry Red)
- Thread tension control dial S increases or decreases the thread tension. Tension settings are indicated in numerals.
- Thread tension device R with central spacing disc for two needle thread.
- Control dial Q which projects from the arm top cover indicates the presser foot pressure. This dial is marked with setting NORM and MAX, indicating increasing pressure on the presser foot, and DARN which indicates the darning position with no pressure on the presser foot.
- Push button reverse feed G in direct view of the operator located in buttonholer and feed regulator control dial H. Button is held depressed for reverse stitching and released to continue forward stitching.
- Bed—16½ inches (41.91cm) long—6 63/64 inches (17.78cm) wide.
- Working space at right of needle 7⅛ inches (18.1cm)
- Needle catalogue 2020 (15x1)—thread from front to back.
- Needle catalogue 2028 for twin-needle stitching.
- Needle catalogue 2045 for sewing synthetic materials.
- Maximum stitch length—6 per inch (4mm).
- Needle bar stroke—1 183 inches (30.05mm).
- Presser bar lift .290 to .300 inches (7.37 - 7.62mm).
- Maximum width of zig-zag stitch (bight) approximately 3/16 inch (5mm).
- Speed—maximum speed at the rated voltage not less than 900 r.p.m. supplied with single pile foot controller.



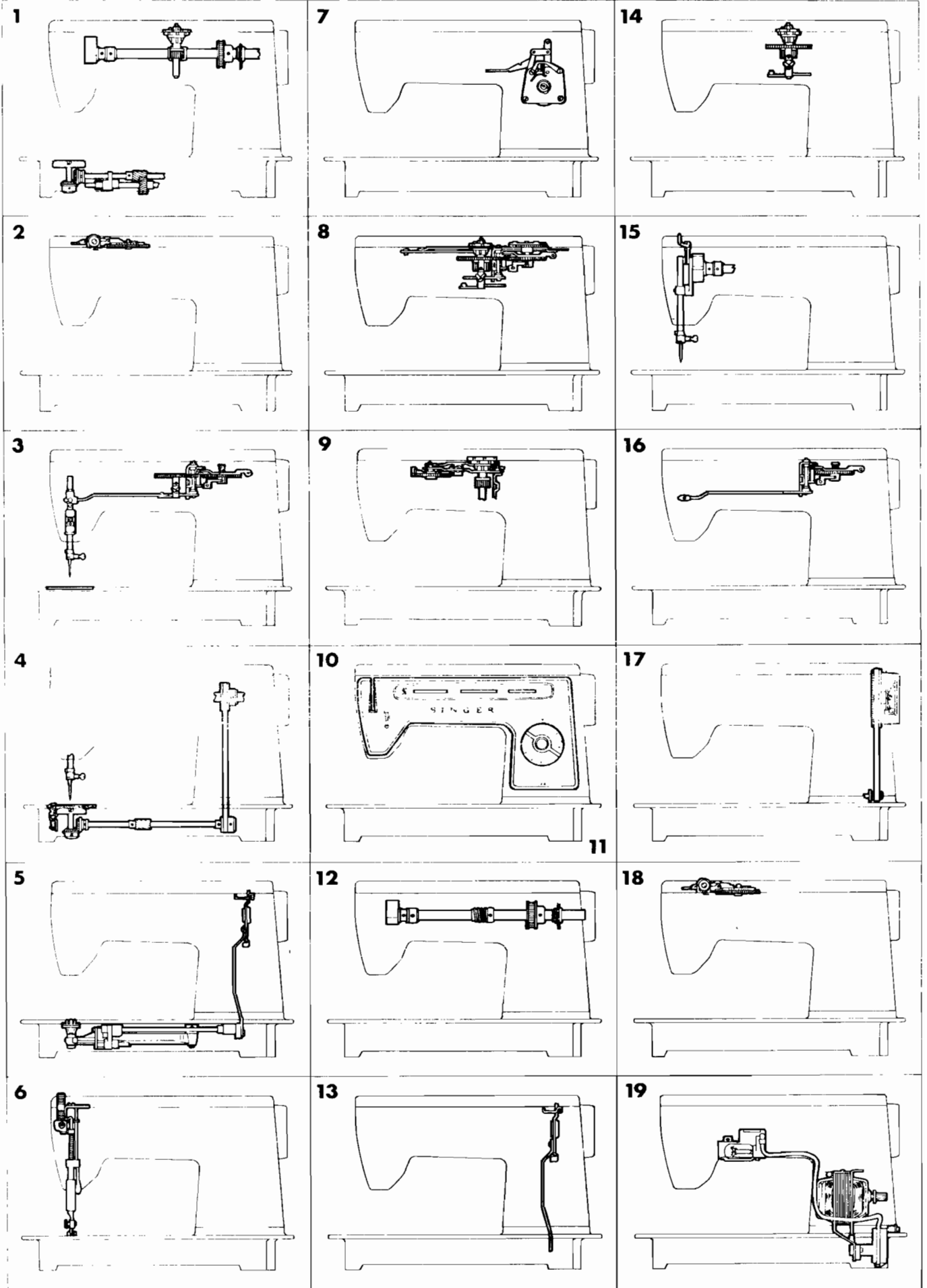











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- NOTE
- For a systematic check-out of the various components of the sewing machine, carry out the checks in items 1 to 9.
 - Remove the arm top cover, face plate, arm end cover, control panel and bottom cover before starting on the first adjustment procedure.
 - Use a 'dummy' control panel when carrying out the sequential check.
 - When replacing arm top cover, hold tension releasing lever against arm top cover so that it does not get damaged.




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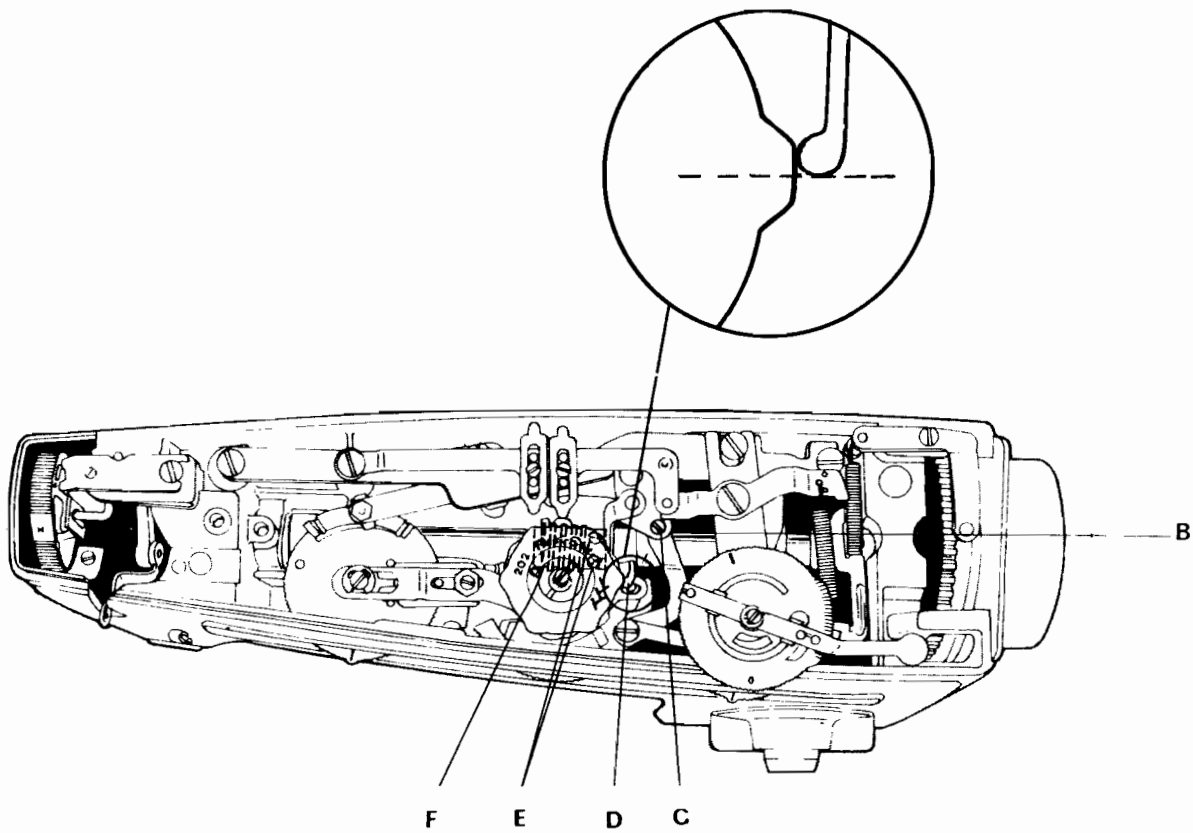
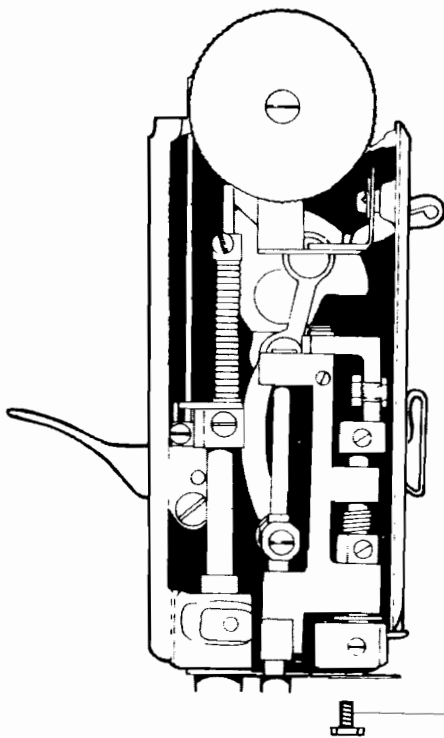
3. NEEDLE BAR

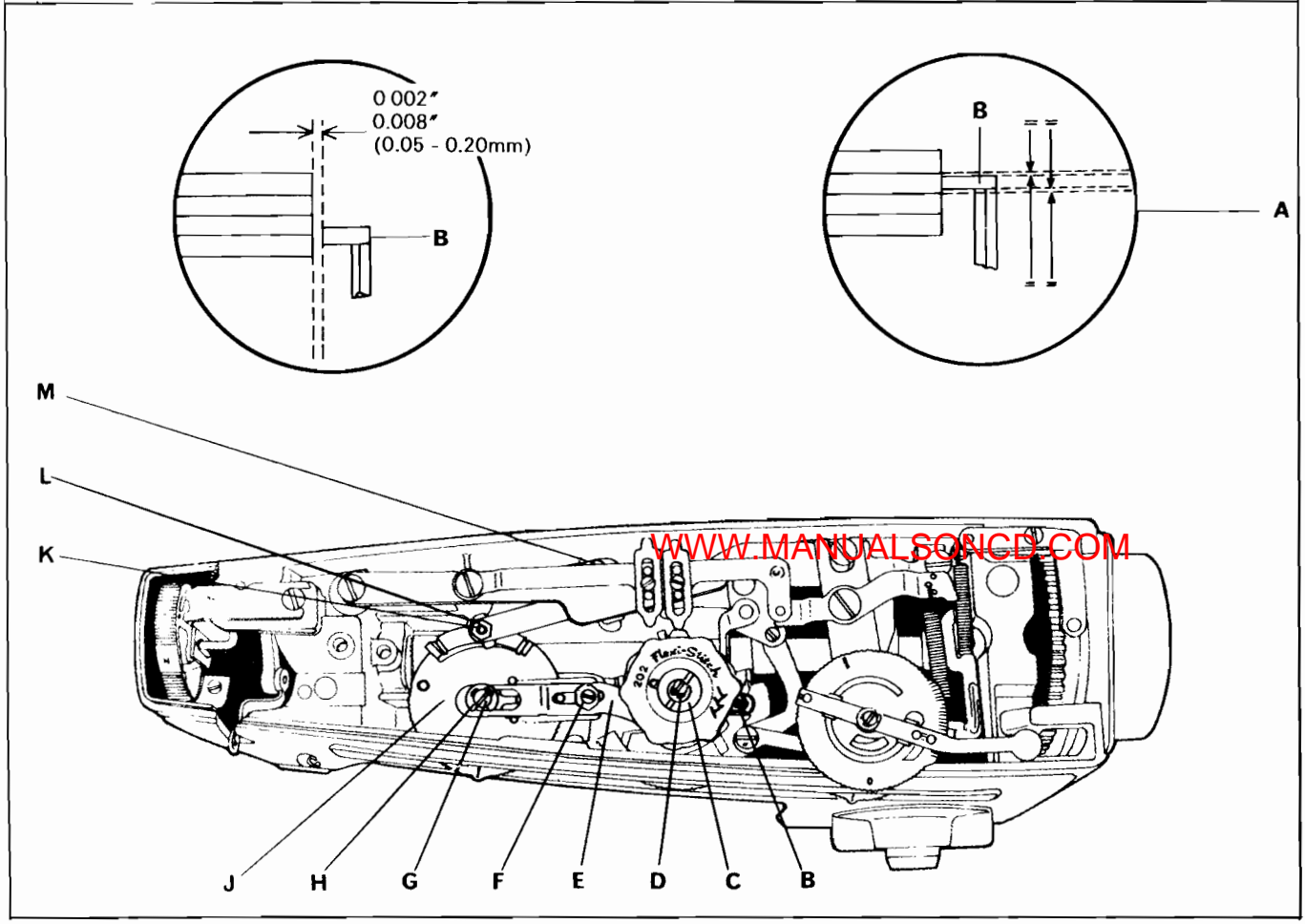
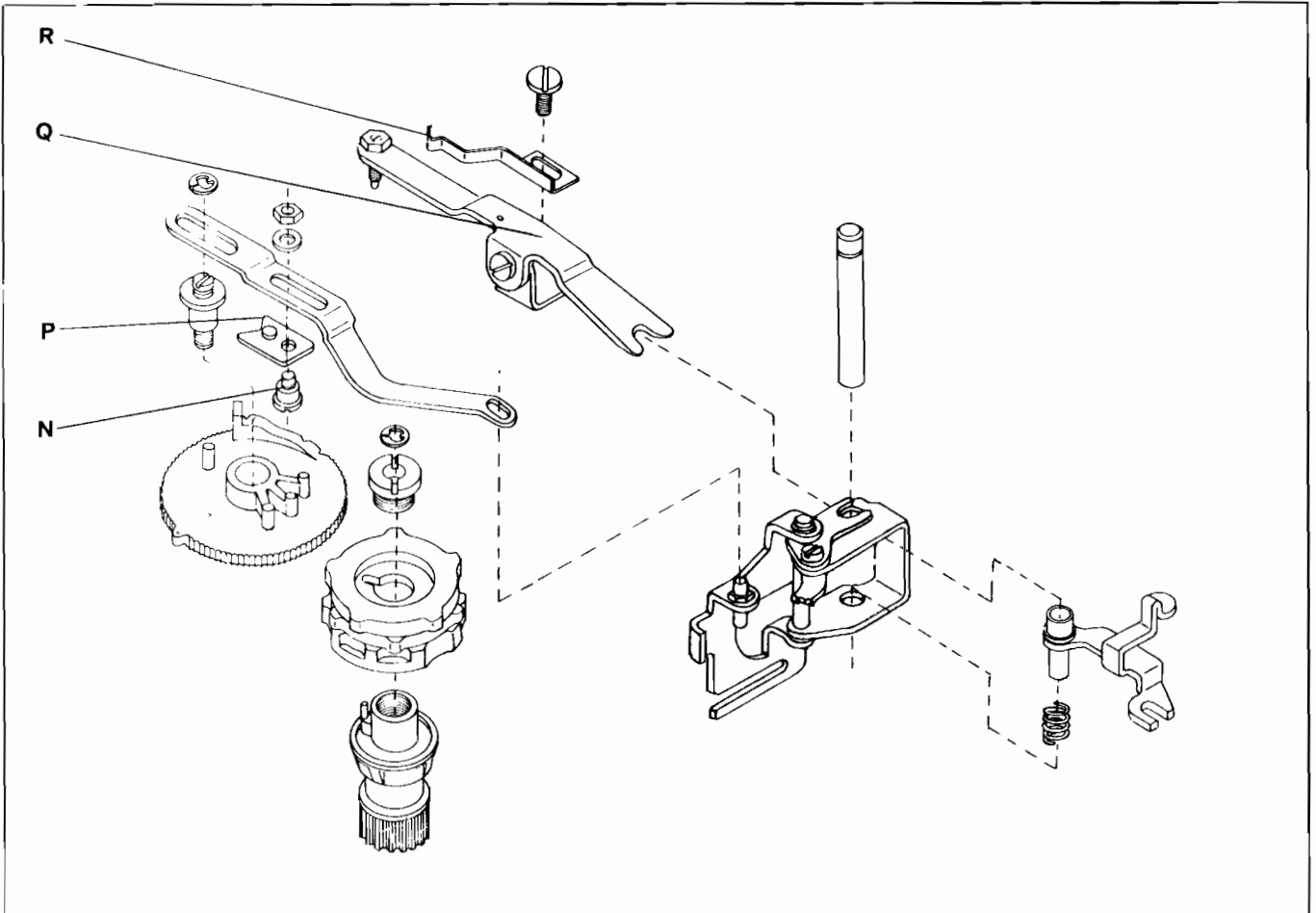
Adjusting needle position selector bracket assembly

- PREPARATION:**
1. Insert general purpose throat plate.
 2. Insert a size 9 needle up into needle clamp.
 3. Set pattern selector dial at zig-zag.
- CHECK:**
- Place a sheet of paper under presser foot. Set stitch width dial at  (maximum) and needle position dial at . With needle in left position, lower and raise needle to make a slight perforation in the paper. Repeat this operation at settings of , ,  and  with needle remaining in left position.
- At correct adjustment of selector bracket B, the needle will always enter the same perforation in paper.
- SETTING:**
1. Place a sheet of paper under presser foot. Set stitch width dial at  (maximum).
 2. Turn hand wheel over toward you and, with needle coming down at left position, make one penetration in paper. Turn hand wheel away from you to bring needle immediately above hole in paper.
 3. Set needle position dial at  and stitch width dial at .
 4. Loosen screw C and move selector bracket extension B until point of needle coincides with centre of hole in paper.
 5. Tighten screw C and repeat check.

Timing the pendulum movement of the needle bar



- PREPARATION:**
1. Insert general purpose throat plate.
 2. Set pattern selector dial at zig-zag.
 3. Set needle position dial at  and stitch width dial at  (maximum).
- CHECK:**
1. Raise needle bar and remove presser foot.
 2. Place a small piece of paper on throat plate and hold it in place so that feed dog does not move it.
 3. Turn hand wheel.
 4. As needle is rising from left perforation, the point of the needle should be moving toward the right, lightly touching the edge of the paper without enlarging hole.
- SETTING:**
1. Centralise needle in needle hole of straight stitching throat plate as instructed on pages 16 and 19.
 2. Loosen needle bar stop screw A.
 3. Set needle position dial at .
 4. Loosen two screws E in worm gear F.
 5. Turn hand wheel over toward you until needle bar is at its lowest point in right position.
 6. Turn disc as required to locate follower D at second half of high point of zig-zag disc as shown.
 7. Tighten one of set screws E. If set screws E cannot be reached, turn worm gear F until a set screw becomes accessible.
 8. Re-check pendulum movement. If satisfactory, tighten other set screw E.
 9. Set needle bar stop as instructed on page 19.








9. PATTERN SELECTOR MECHANISM




Adjusting pattern selector dial

- SETTING:**
1. Loosen screw M.
 2. Set pattern selector dial at centre position ( ).
 3. Locate follower K in centre of flat on dial J and position spring R in notch with slight tension on spring.
 4. Tighten screw M.
 5. Check cam follower height and clearance as instructed below.



Setting cam follower height

- SETTING:**
1. Set pattern selector dial at  . stitch width dial at  and needle position dial at  .
 2. Loosen nut L.
 3. Move cam follower B to touch against top pattern cam (Inset A).
 4. Turn screw K to position follower at centre of disc.
 5. Tighten nut L.

Setting cam follower for clearance with discs

- CHECK:** When selector dial is operated, follower B should move away from discs to allow free rise and fall of follower.
- SETTING:**
1. Turn hand wheel over toward you until follower B comes against top of lobes on discs.
 2. Set pattern selector dial at centre position ( ).
 3. Set stitch width dial at  (maximum).
 4. Loosen nut F and move screw N and follower P to give approximately .010 inch (.25mm) movement of disengaging lever E.
 5. Repeat check.
- CAUTION:** Follower B must bottom on lowest point of disc without touching lever E.

Pattern selector mechanism

- REMOVING:**
1. Remove screw M and detent spring R.
 2. Slide lever assembly Q to the left and remove it from machine.
 3. Remove circlip D and screw C.
 4. Remove discs from cam stack.
 5. Remove circlip H.
 6. Remove lever E, screw G and dial J.
- REPLACING:**
1. Replace dial J and screw G.
 2. Replace lever E and circlip H.
 3. Replace discs on cam stack.
 4. Replace screw C and circlip D
 5. Set pattern selector dial at  and stitch width dial at  .
 6. Press follower B down and replace lever assembly Q. Make sure that fork of lever Q fits over top of follower B.
 7. Replace detent spring R and screw M.
 8. Set pattern selector dial as instructed above.
 9. Set cam follower height and clearance as instructed above.

16. NEEDLE POSITION SELECTOR AND NEEDLE BAR DRIVING ARM

NOTE:

To remove needle position dial only:

1. Remove screw S and detent spring T.
2. Remove circlip R and slip dial J off shaft and out through casting.

To replace dial:

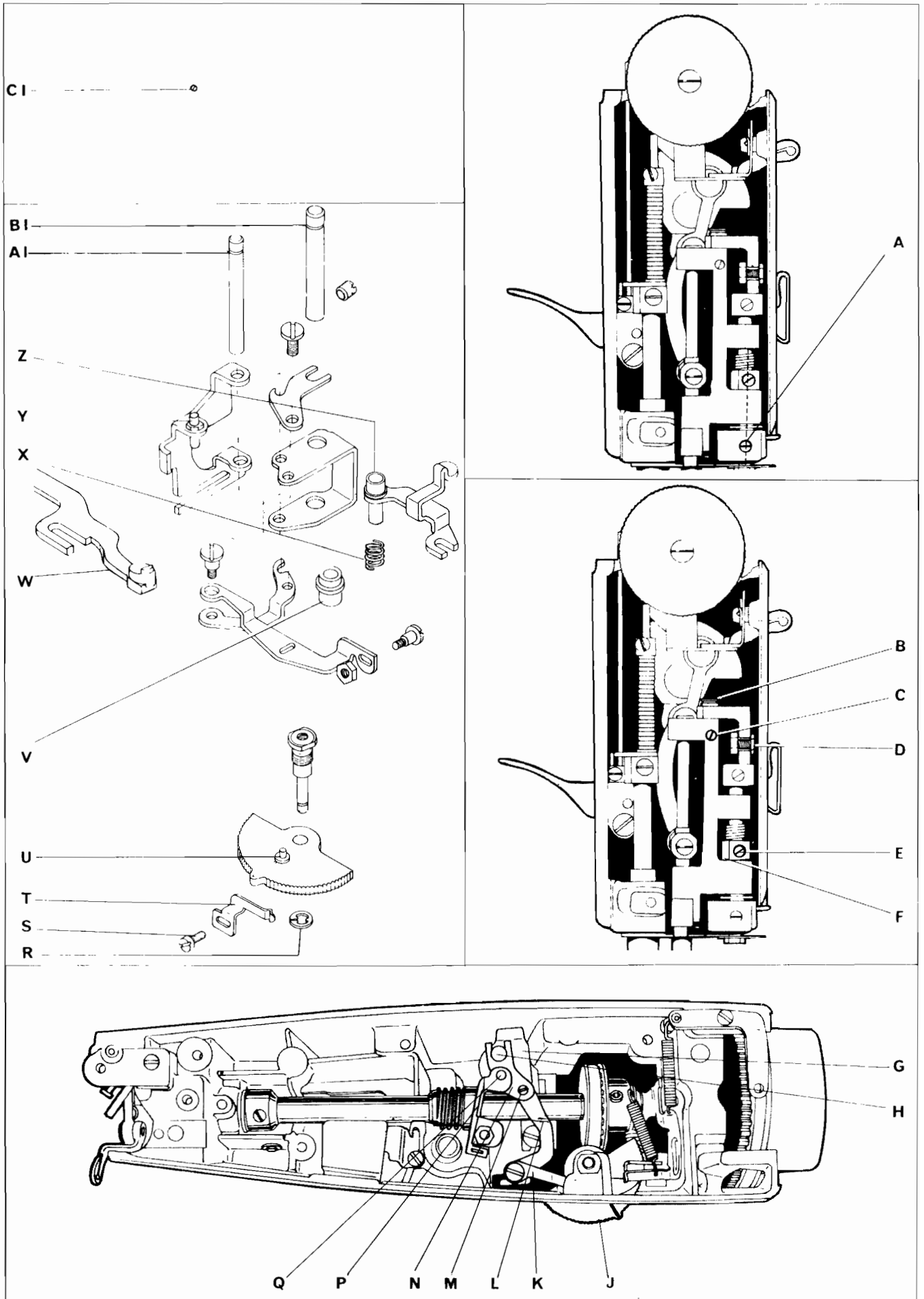
1. Replace dial J and circlip R, making sure that stud U on dial engages in slot of lever K.
2. Replace detent spring T and screw S.
3. Loosen screw S and move spring T and dial J to align dial with control panel graphics.
4. Set needle—left to right—in needle hole in straight-stitching throat plate as instructed on page 19.
5. Set needle position dial as instructed on page 28 (item 5 under replacement of buttonhole mechanism).

REMOVING:

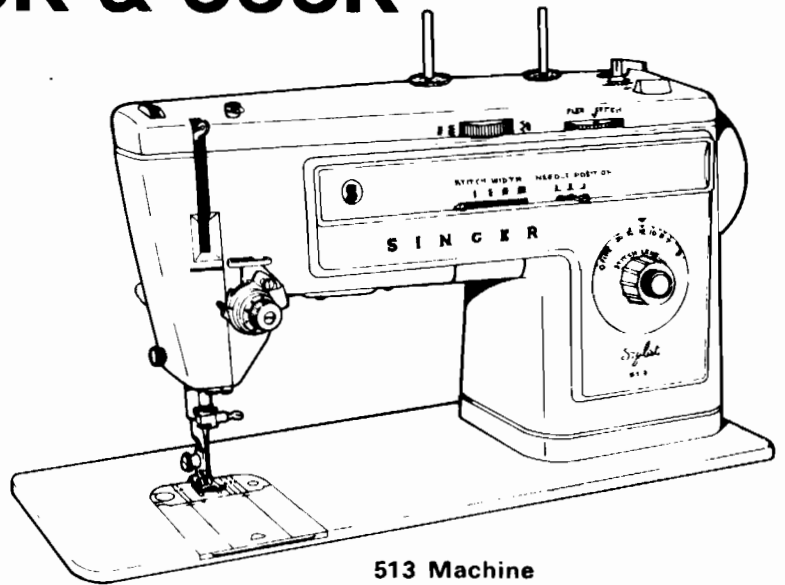
1. Remove arm top cover.
2. Remove face plate.
3. Remove control panel as instructed on page 32.
4. Remove cam controlled feed unit as instructed on page 31.
5. Remove cam stack and stitch width dial assemblies as instructed on page 36.
6. Remove screw M.
7. Slide retainer N to the right and then out of machine.
8. Loosen screw E.
9. Lift out hinge pin O, disengaging bracket P and lever L from pin.
10. Loosen set screw C and remove hinge pin B. It is not necessary to remove hexagon head screw D from driving arm.
11. Move amplitude bracket P and driving arm W, until driving arm becomes disengaged from long slot of amplitude bracket.
12. Slide driving arm toward left and out of face plate end of machine.
13. Remove amplitude bracket from machine.
14. Loosen set screw C1 at back of arm and remove pin H, bracket G, follower Z, spring X and spacer V from machine by turning bracket G to clear arm shaft.

REPLACING:

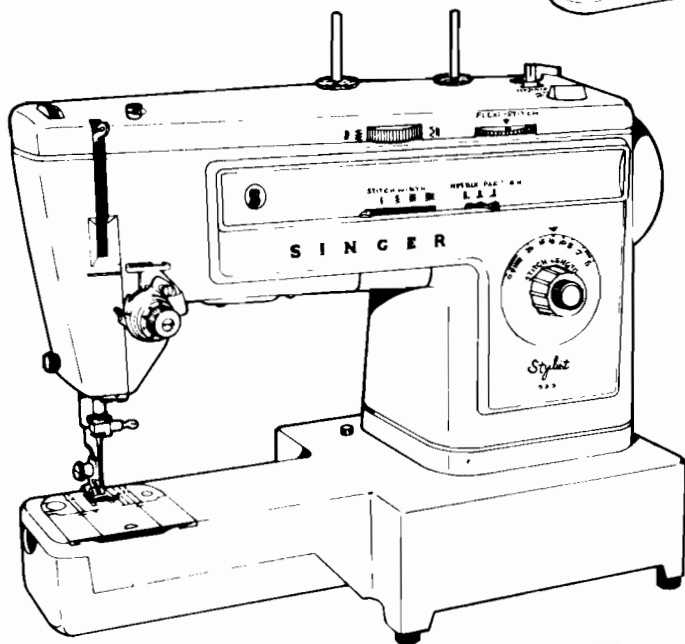
1. Replace spacer V. Assemble spring X on follower Z and replace them with bracket G. Make sure holes are aligned and replace pin H.
2. Replace amplitude bracket P and engage stud Y in fork of follower Z.
3. Insert driving arm W from face plate end of machine and fit right end of arm in long slot of amplitude bracket.
4. Insert pin O through holes in brackets P and G and lever L.
5. Replace retainer N, engaging vertical slot in groove B1 and angled slot in groove A1. Press down pin H and tighten screw C1.
6. Replace screw M.
7. Replace pin B and tighten set screw C.
8. Turn collar F counter-clockwise until sufficient spring tension is obtained (16 ozs on needle bar) and tighten set screw E. (This loading should be obtained when screw E is aligned with edge of bracket A.)
9. Replace cam stack and stitch width dial assemblies as instructed on page 36.
10. Replace control panel as instructed on page 32.
11. Set cam follower height and clearance as instructed on page 59.
12. Set pendulum movement of needle bar as instructed on page 56.
13. Set for maximum bight as instructed on page 11.
14. Set buttonhole cutting space as instructed on page 19.
15. Replace cam controlled feed unit as instructed on page 31.
16. Replace arm top cover and face plate.



Servicing Instructions for **SINGER** Machines Classes 513K & 533K



513 Machine

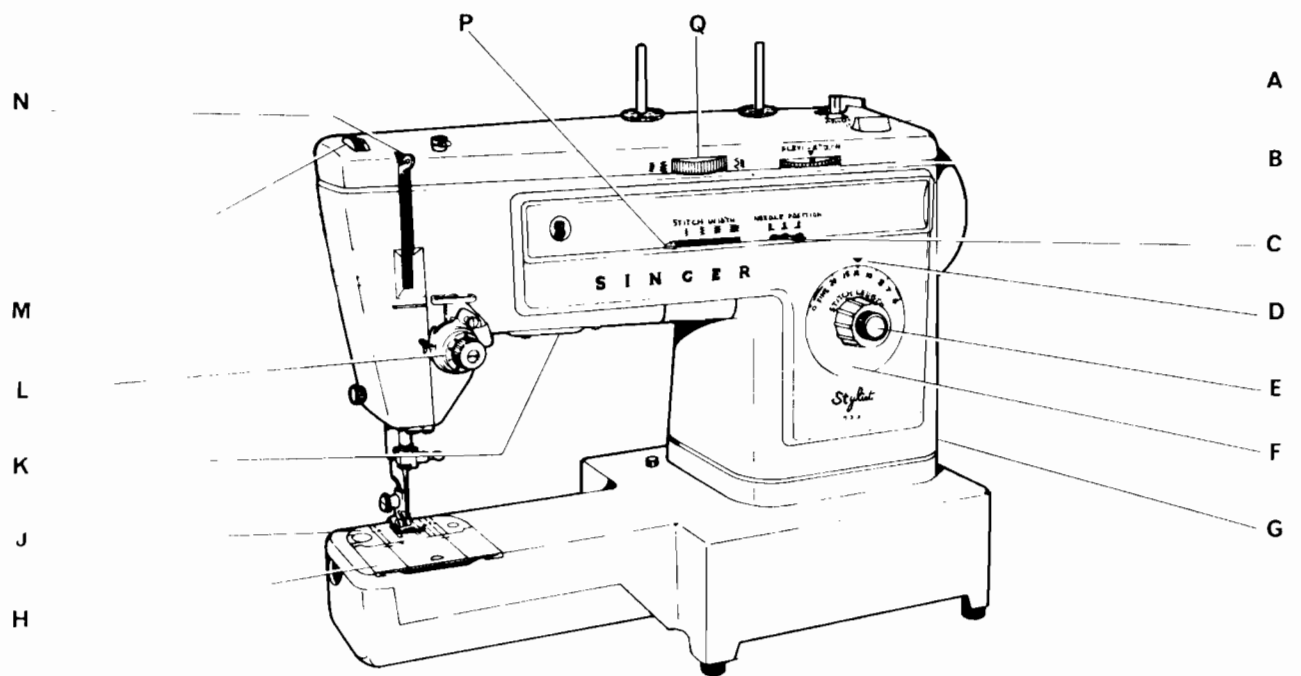
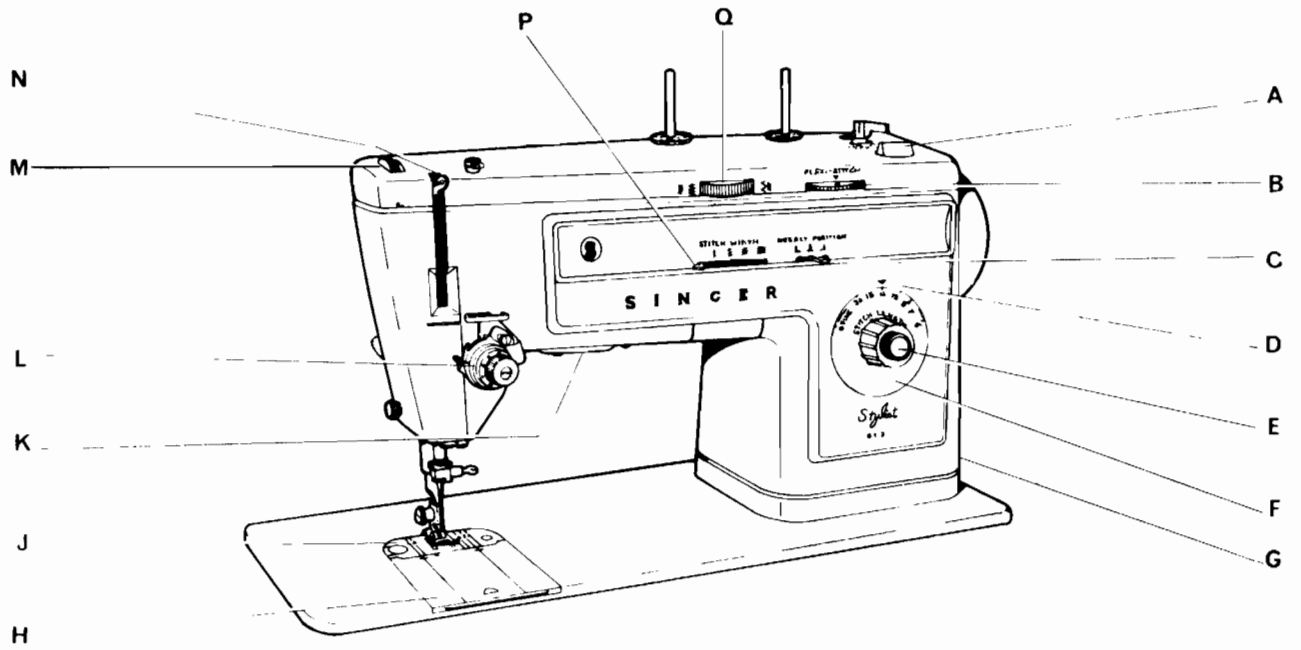


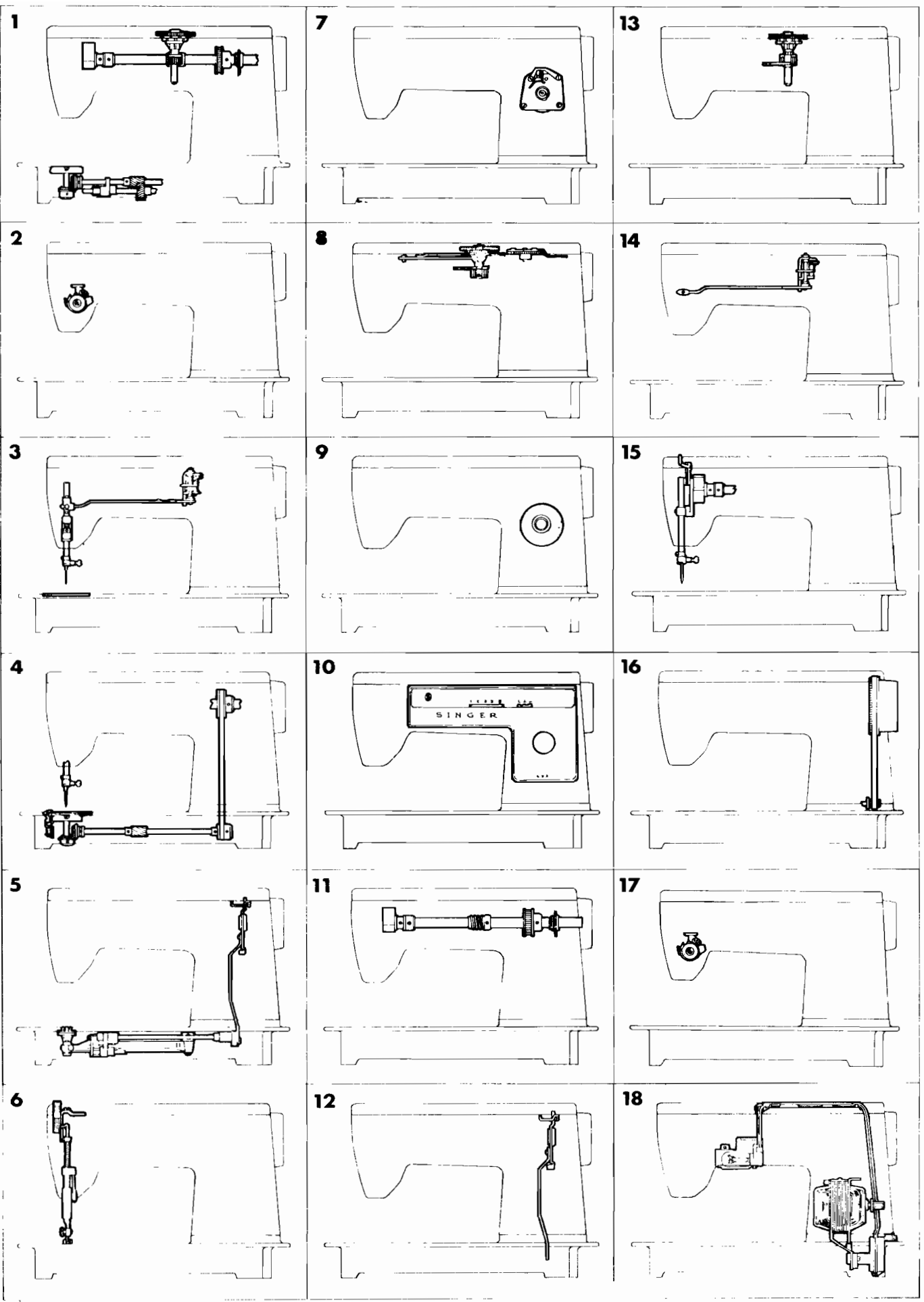
533 Machine

Servicing instructions for 518 & 538 Machines apply to the 513 & 533 Machines with the exception of the special instructions on pages 64 to 79.

DESCRIPTION - 513K & 533K MACHINES

- For straight, zig-zag and stretch stitching.
- 513K Flat bed aluminium machine.
- 533K Tubular bed aluminium machine.
- Electric power with built-in ENK8 motor, light K (hinged) and rocker power and light switch G (located below arm end cover plate).
- Belt and gear driven horizontal rotating hook on a vertical axis with stationary bobbin case (Apollo Hook System). Rotating hook takes two revolutions for each stitch.
- Throat plate J held in position by a position pin and spring loaded clamp. Opening the bed slide H actuates the clamp and allows for easy removal of throat plate.
- Lock stitch, Alpha feed, link take-up.
- Self threading take-up N, slotted for easy threading.
- Bobbin winder A mounted on top cover is actuated by means of a switch protruding through the top cover.
- *Flexi-Stitch* balance control dial B engages or disengages the cam controlled feed system. It also permits the operator to manually balance forward and reverse stitching to provide variations of *Flexi-Stitch* patterns.
- Bight control lever P on front of arm in direct view of the operator. The lever controls the width of the zig-zag or ornamental stitch up to a maximum of 5mm. When the machine is to be used for straight sewing in either left, centre or right needle position, this lever is placed in the \downarrow position.
- Needle position selector lever C on front of arm in direct view of the operator. The lever enables the needle to be set in left, centre or right position.
- Feed regulator control dial F (Cream Tint), 'STITCH LENGTH', 'FINE' and numerals 0, 6, 7, 8, 10, 12, 15, 25 (Coachman's Beige) and *Flexi-Stitch* indication (Bright Cherry Red)
- Push button reverse feed E in direct view of the operator, located in the feed regulator control dial F. Button is held depressed for reverse stitching and released to continue forward stitching.
- Plastic control panel D (Cream Tint), control panel insert (Coachman's Beige Metallic) names 'SINGER' and 'Stylist' and machine class No. '513'/'533' (Coachman's Beige) and indications and names for 'Stitch Width' and 'Needle Position' (White).
- Pattern selector dial Q located on front of arm top cover. When *Flexi-Stitch* dial is OFF, dial turns easily to the left for zig-zag stitching and to the right for blindstitching. When *Flexi-Stitch* dial is ON, dial turns easily to the left for ric-rac stitching and to the right for slant overedge stitching.
- Numerically graduated thread tension device L with central spacing disc for two needle threads.
- Control dial M which projects from the arm top cover indicates the presser foot pressure. This dial is marked with numerals 1 to 8, indicating increasing pressure on the presser foot, and the letter D which indicates the darning position with no pressure on the presser foot.
- 513K Bed— $16\frac{1}{2}$ inches (41.91cm) long— $6\frac{3}{64}$ inches (17.78cm) wide.
- 533K Tubular bed circumference— $9\frac{5}{8}$ inches (24.45cm).
- Working space at right of needle— $7\frac{1}{8}$ inches (18.1cm).
- Needle catalogue 2020 (15x1) threaded from front to back.
- Needle catalogue 2028 for twin-needle stitching.
- Needle catalogue 2045 for sewing synthetic materials.
- Maximum stitch length—6 per inch (4mm).
- Needle bar stroke—1.183 inches (30.05mm).
- Presser bar lift—.290 to .300 inch (7.37 - 7.62mm).
- Maximum width of zig-zag stitch (bight) approximately $\frac{3}{16}$ inch (5mm).
- Speed—maximum speed at the rated voltage not less than 900 r.p.m. supplied with single pile foot controller.





2. THREAD CONTROL

Setting take-up spring

SETTING THE STROKE

CHECK: The take-up spring P should complete the action and be at rest against stop N as eye of needle enters fabric.

SETTING:

1. Loosen screw Q and move slack regulator R down (to the right) to complete take-up spring action earlier (shorter stroke); move regulator R up (to the left) to complete take-up spring action later (longer stroke).
2. Tighten screw Q.

SETTING THE TENSION

CHECK: Tension on take-up spring should be just sufficient to take up slack of needle thread until eye of needle reaches fabric.

SETTING:

1. Turn hand wheel over toward you until set screw L is accessible to screwdriver, loosen set screw L and remove entire tension assembly.
2. Turn numbered dial to 0 releasing all tension. Hold tension assembly so that component parts are in position shown by dotted line D. Place spring end E in groove of sprocket F so that take-up spring G hangs down in a vertical position. This is the normal setting.
3. To increase tension on take-up spring, move spring end E right to next groove of sprocket H, to decrease tension, move spring end left to next groove.
4. Replace assembly, draw take-up spring so that it rests on regulator stop N and recheck tension. Tighten stud set screw.

Setting needle thread tension

CHECK:

1. Use white 'A' (or '60') silk.
2. Lower presser bar to engage tension.
3. Turn thumb nut C, together with flange A, over toward left as far as it will go. At this setting there should be a slightly perceptible tension on needle thread (between 5 and 15 grams on Tensometer).



SETTING:







1. Loosen set screw B and remove thumb nut C.
2. Remove flange A.
3. Place thread between tension discs and turn adaptor K, as required, to obtain a slightly perceptible tension (between 5 and 15 grams on Tensometer).
4. Replace flange A, so that stop on inside of flange is to right of stop washer extension M.
5. Hold flange A against tension assembly and tighten nut C (bevelled side out) against flange.
6. Tighten set screw B.
7. Recheck tension on needle thread.

3. NEEDLE BAR






Adjusting needle position selector bracket assembly

PREPARATION:

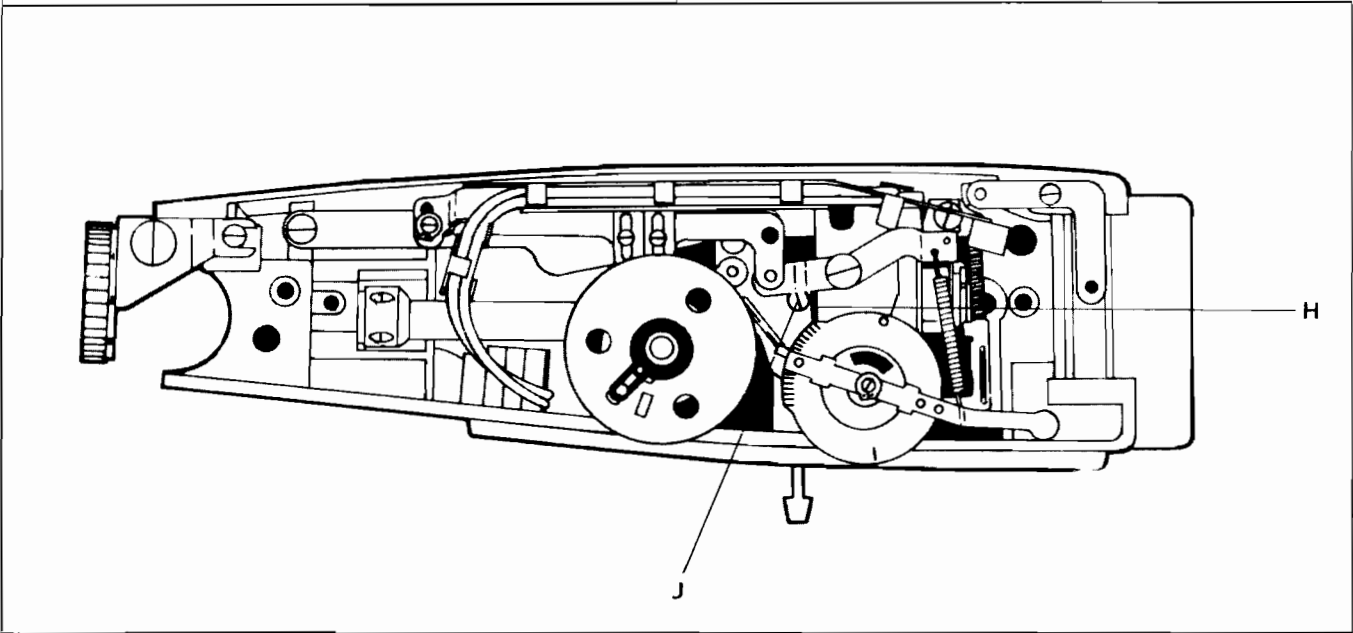
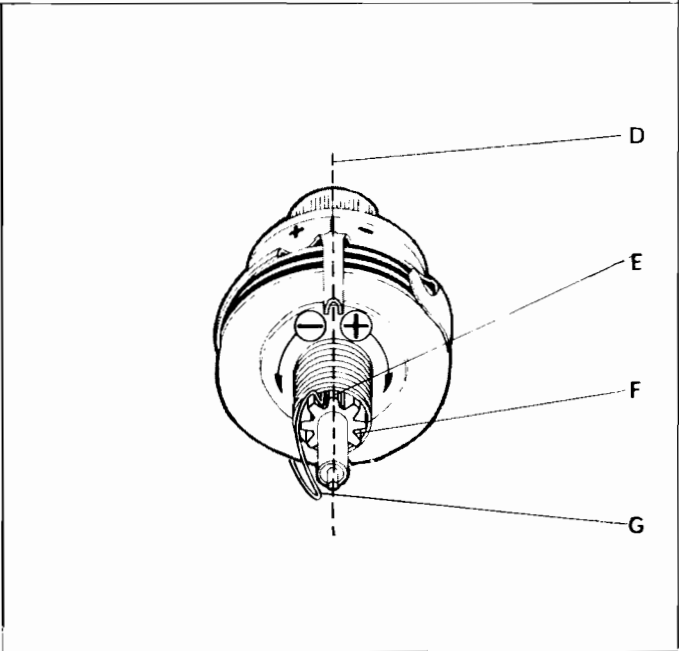
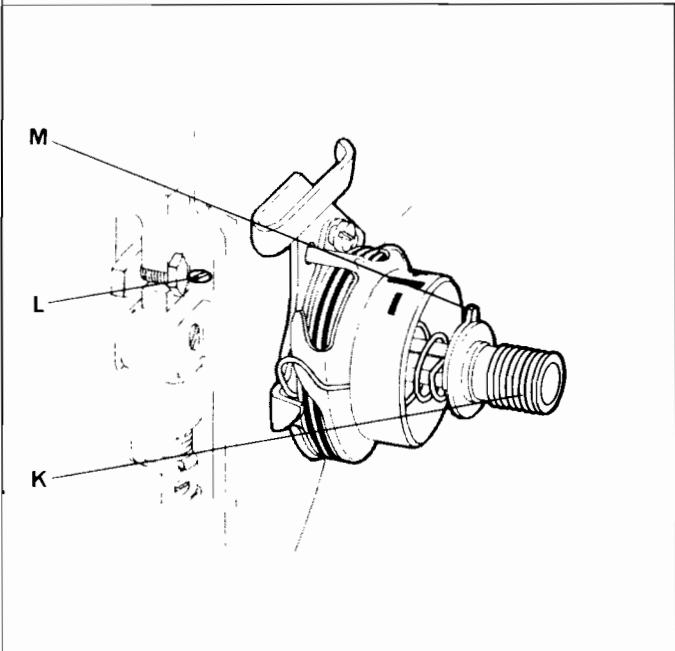
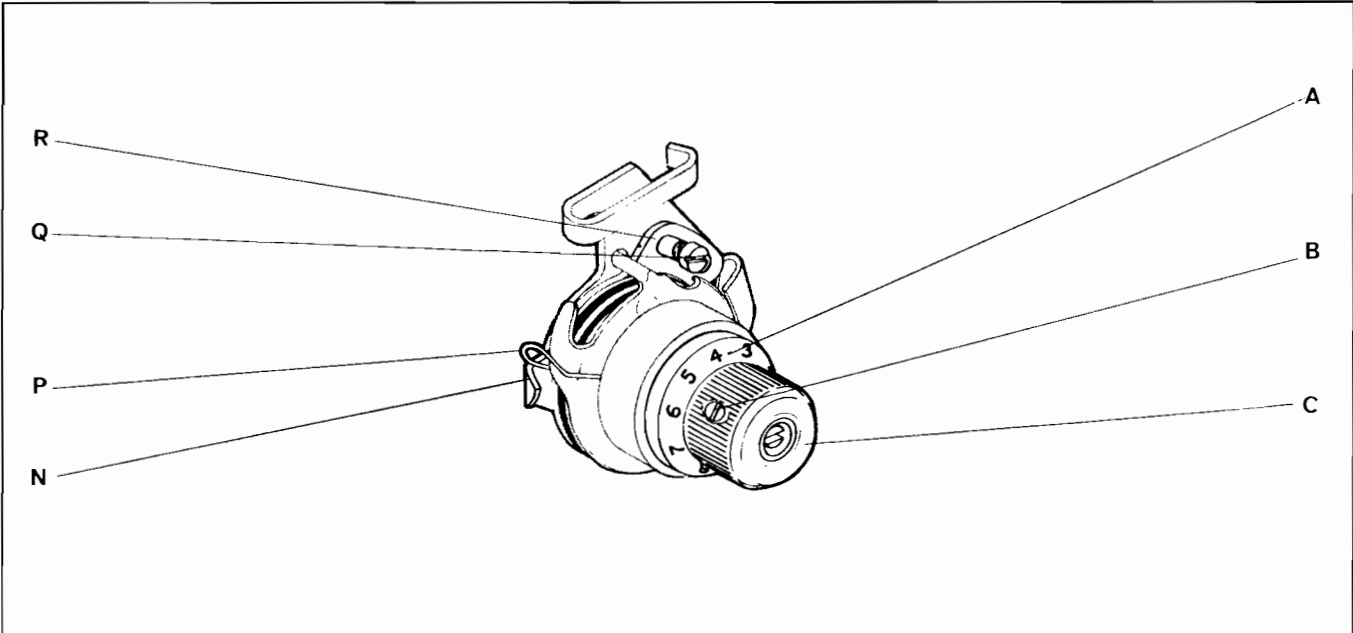
1. Insert general purpose throat plate.
2. Insert a size 9 needle up into needle clamp.
3. Set needle position selector at  and stitch width lever at .
4. Set pattern selector for zig-zag stitching.

CHECK: Place a sheet of paper under presser foot. Set stitch width lever at  (maximum) and needle position selector at . With needle in left position, lower and raise needle to make a slight perforation in the paper. Repeat this operation at settings of , ,  and  with needle remaining in left position. At correct adjustment of selector bracket H, the needle will always enter the same perforation in paper.

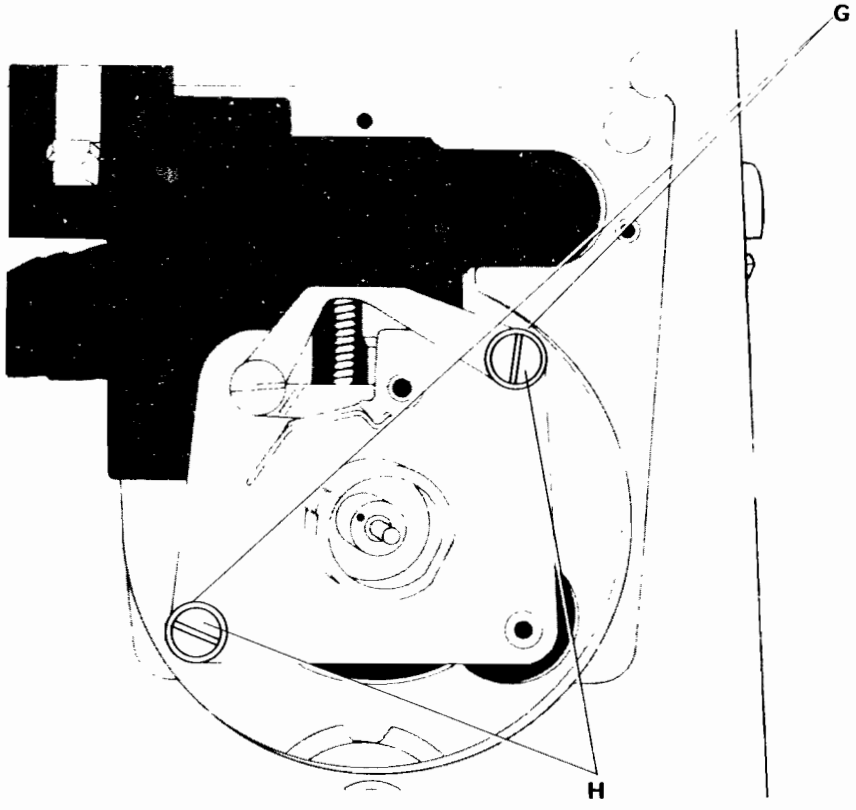
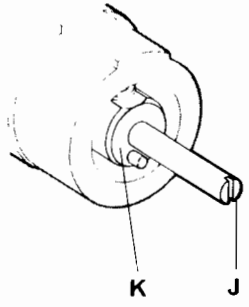
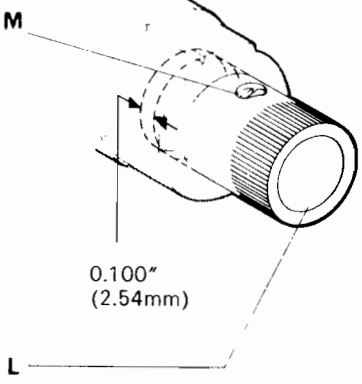
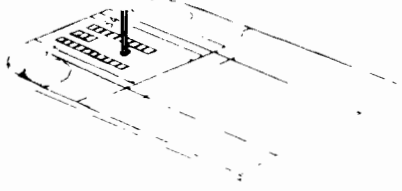
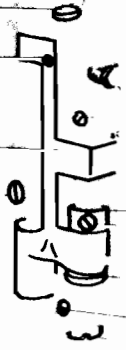
SETTING:

1. Set stitch width lever at  (maximum).
2. Loosen bracket screw J.
3. Turn hand wheel over toward you until needle bar is at its lowest point in left position.
4. Move stitch width lever slowly from  to  (maximum) and, at same time, move selector bracket extension H toward left or right as required, until there is minimum movement in needle bar.
5. Tighten bracket screw J.
6. Set stitch width lever at  (maximum).
7. Turn hand wheel over toward you until needle bar is at its lowest point in left position.
8. Set needle position selector at .



CHECK: Move stitch width lever from left to right. While doing so there should be a minimum movement in needle bar.



R
Q
P
N



Setting needle - back to front - in needle hole in straight-stitching throat plate

- PREPARATION:**
1. Set needle bar at correct height as instructed on page 15.
 2. Set needle position lever at  and stitch width lever at .
 3. Remove presser foot.
 4. Insert a size 14 needle into needle clamp.
- SETTING:**
1. Loosen set screw C in collar B.
 2. Loosen set screws A and E.
 3. Using offset screwdriver, turn eccentric stud F, left or right, to bring needle to centre of needle hole.
 4. When correct setting is obtained, tighten screws A and E.
 5. Turn collar B counter-clockwise until sufficient spring tension is obtained and then tighten collar set screw C.
 6. Check distance between hook point and needle as instructed on page 20.

Needle bar rocker bracket assembly

- REMOVING:**
1. Remove needle.
 2. Loosen set screw C in collar B.
 3. Loosen set screw Q and remove hinge pin R.
 4. Loosen set screws A and E.
 5. Remove eccentric stud F.
 6. Remove needle bar frame P with needle bar.
 7. Loosen clamping screw N and remove needle bar from needle bar frame P.
- REPLACING:**
1. Replace needle bar frame in reverse order of its removal.
Before replacing eccentric stud F, make certain that spacing washer D is in place as shown.
 2. Set needle bar height as instructed on page 15 and adjust needle as instructed on page 16.

7. STITCH LENGTH SELECTOR MECHANISM

Setting for zero feed

- SETTING:**
1. Place a sheet of paper under presser foot.
 2. Remove needle.
 3. Set stitch length dial at 0.
 4. Remove stitch length dial as instructed on page 72.
 5. Loosen screw M and remove reverse button L.
 6. Run machine at normal speed and observe any feeding of paper. (a) If paper feeds forward, turn screw J clockwise till all feeding is eliminated. (b) If paper feeds in reverse, turn screw J counter-clockwise till all feeding is eliminated.
 7. Replace reverse button with indicating line in line with arrowhead (▼) on front panel and spaced .100 inch (2.54mm) from face of pin carrier K.
 8. Replace stitch length dial as instructed on page 72.
 9. Check feed timing as instructed on page 27.
 10. Set cam controlled feed as instructed on page 31.
- NOTE:** This setting automatically sets all other stitch lengths correctly.

Stitch length selector mechanism

- REMOVING:**
1. Remove screws H and washers G and withdraw stitch length selector mechanism from machine.
- REPLACING:**
1. Replace stitch length selector mechanism, washers G and screws H.
 2. Set for zero feed as instructed above.
 3. Set feed dog height as instructed on page 27.
 4. Set cam controlled feed as instructed on page 31.

9. CONTROL DIAL

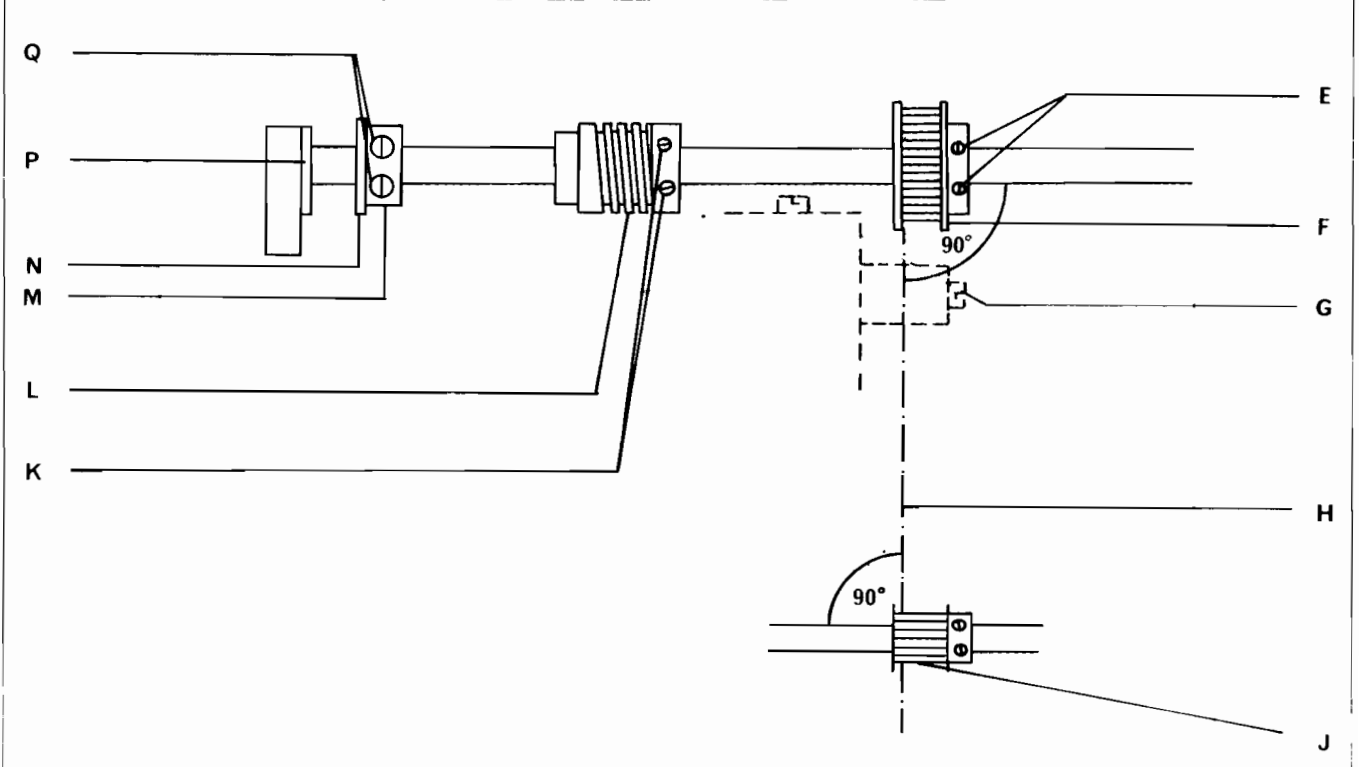
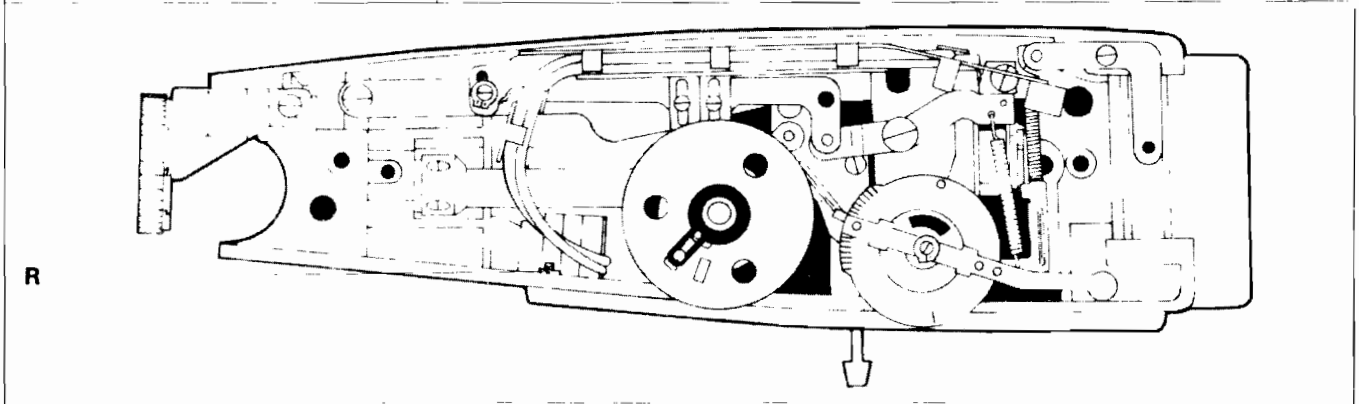
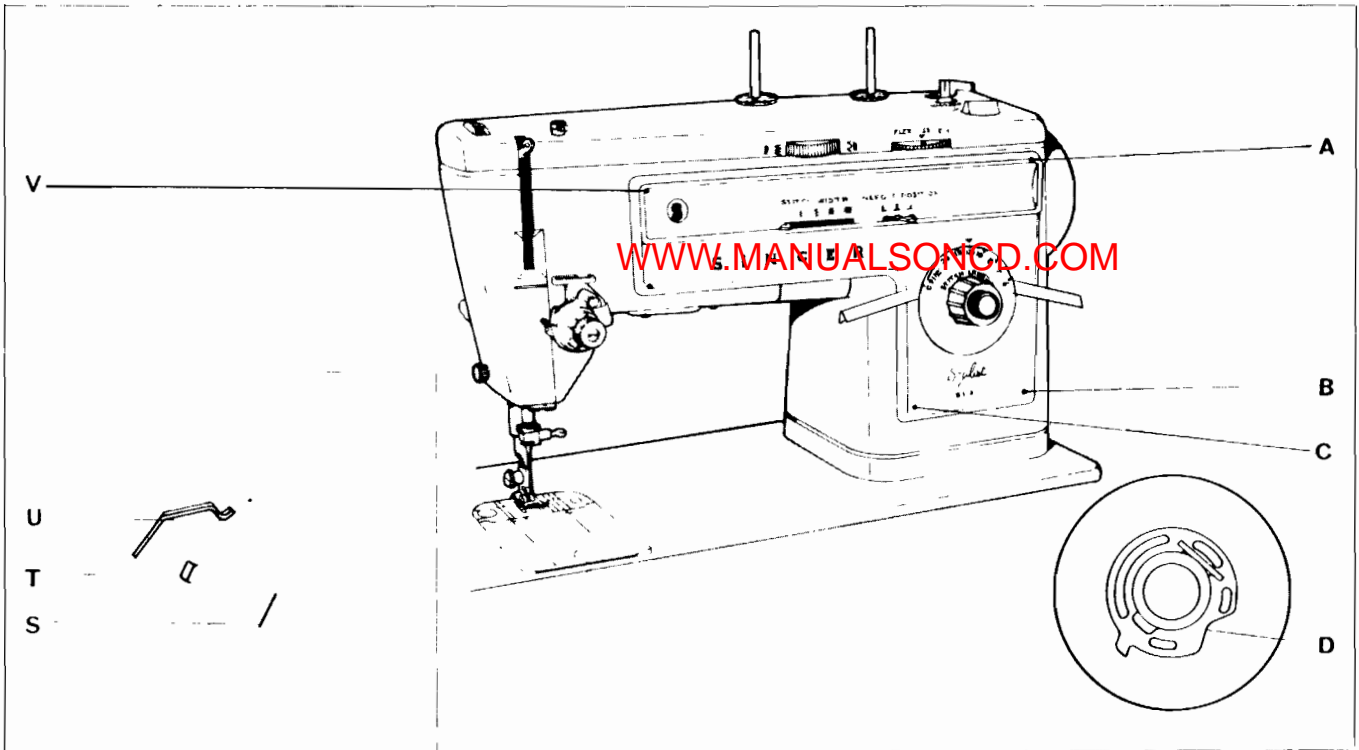
- REMOVING:**
- 1 Turn dial to 0.
 - 2 Insert two-ply material behind dial and pull away from panel.
- REPLACING:**
- 1 Ensure that slot T in cam S is at 10 o'clock position, as shown, allowing depression D in dial to clear pawl U.
 - 2 Replace dial.

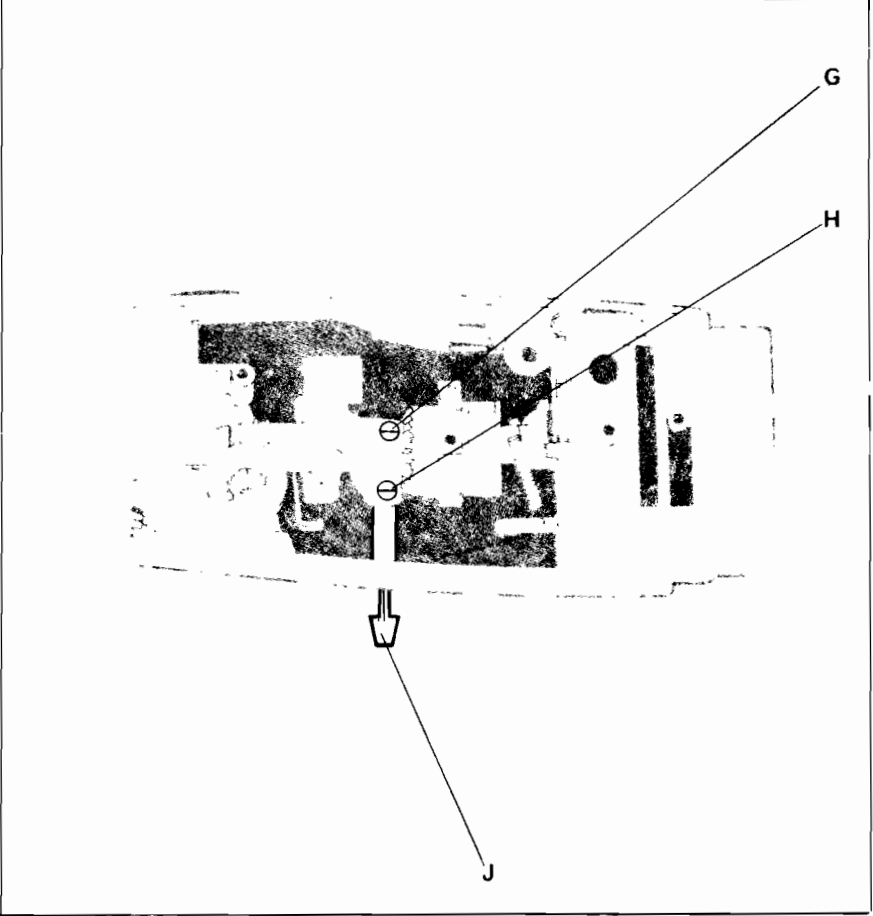
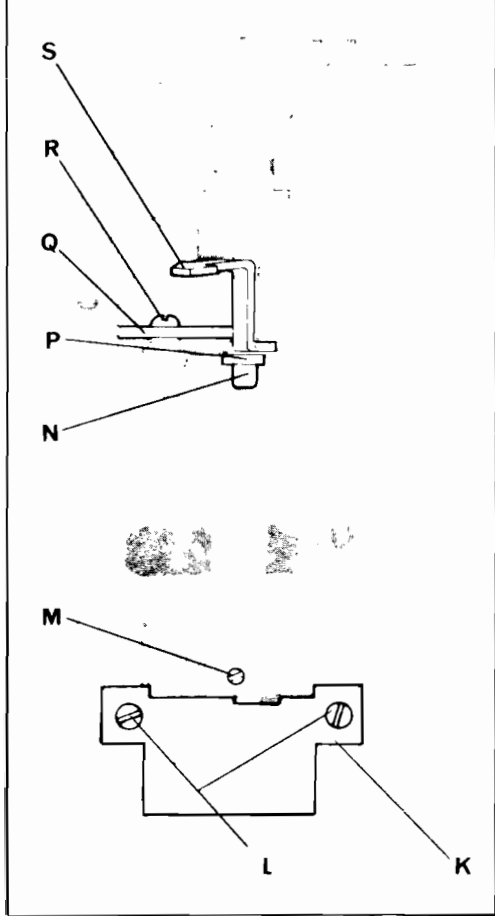
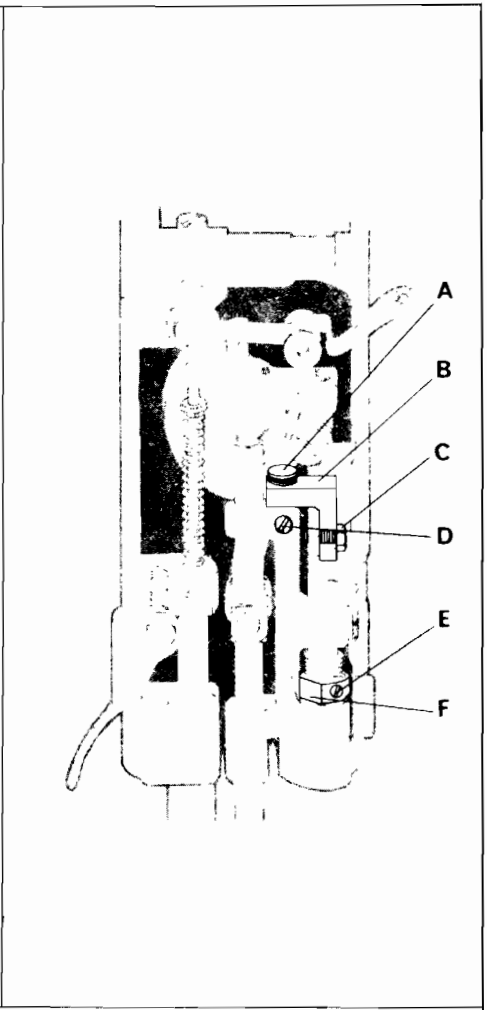
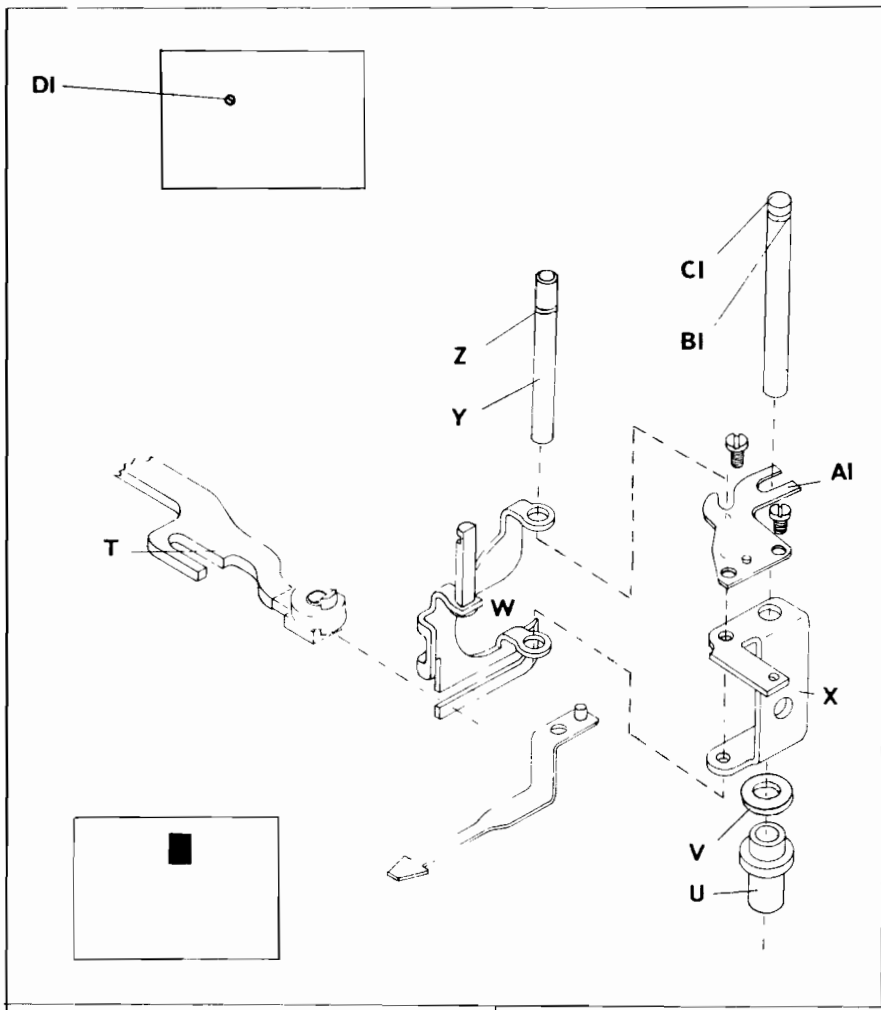
10. CONTROL PANEL

- REMOVING:**
- 1 Remove arm top cover
 - 2 Remove control dial as instructed above.
 - 3 Remove control panel fastener R by closing the small tags and easing fastener over boss of panel.
 - 4 Remove control panel by pulling it at points A, B, C and V.
- REPLACING:**
- 1 Replace control panel by locating boss R in hole in arm and pushing panel at points A, B, C and V
 - 2 Replace fastener R.
 - 3 Replace control dial as instructed above.
 - 4 Replace arm top cover.

11. HORIZONTAL ARM SHAFT

- REMOVING:**
- 1 Remove presser bar bracket as instructed on page 28.
 - 2 Remove needle bar rocker bracket assembly as instructed on page 71.
 - 3 Remove needle thread take-up as instructed on page 76.
 - 4 Remove hand wheel and flanged bushing as instructed on page 76.
 - 5 Loosen screw G and slacken belt.
 - 6 Loosen two screws Q in collar M.
 - 7 Loosen two screws E in pulley F.
 - 8 Loosen two screws K in arm shaft worm gear L.
 - 9 Remove arm shaft out of face plate end of machine. Make sure that plastic washer P remains on arm shaft.
- REPLACING:**
- 1 From face plate end of machine insert new arm shaft with washer P into machine arm, through washer N, collar M, worm gear L and pulley F, ensuring belt is looped on to shaft.
 - 2 While pressing firmly on needle bar crank and holding collar M against plastic washer N, tighten set screws Q.
 - 3 Align pulley F with small pulley J and assemble belt H (over small pulley first).
 - 4 Replace flanged bushing and hand wheel as instructed on page 76.
 - 5 Replace needle thread take-up as instructed on page 76.
 - 6 Replace needle bar rocker bracket assembly as instructed on page 71.
 - 7 Replace presser bar bracket as instructed on page 28.
 - 8 Turn hand wheel over toward you to bring needle into hook timing position.
 - 9 Adjust belt tension as instructed on page 23.
 - 10 Time hook to needle as instructed on page 23.
 - 11 Check feed timing as instructed on page 27.
 - 12 Time needle bar vibrating mechanism as instructed on pages 15, 16 and 19.
 - 13 Set presser bar as instructed on page 28.
 - 14 Check cam controlled feed as instructed on page 31.





13. CAM STACK AND STITCH WIDTH LEVER ASSEMBLY

- REMOVING:**
1. Remove arm top cover.
 2. Remove control panel as instructed on page 72.
 3. Remove two screws L and arm side cover K.
 4. Loosen screw N, allowing screw and washer P to remain in hole in arm immediately below gear shaft.
 5. Loosen set screw M.
 6. Lift entire cam stack assembly from machine arm.
 7. Slide stitch width lever assembly S from fork of driving arm Q and remove lever assembly from machine arm.
- REPLACING:**
1. Replace cam stack assembly in machine arm and adjust as instructed on page 11.
 2. Insert stitch width lever assembly into cut-out in front of arm and fit stud R in fork of driving arm.
 3. Place lever S on screw N with its washer P and assemble to shaft from underside of machine arm.
 4. Replace arm side cover K and two screws L.
 5. Replace control panel as instructed on page 72.
 6. Set bight lever halfway along its travel and, with machine running, turn screw N until lever starts to move.
 7. Tighten screw N by half a turn.
 8. Time pendulum movement of needle bar as instructed on page 56.
 9. Set for maximum bight as instructed on page 11.
 10. Replace arm top cover.

14. NEEDLE POSITION SELECTOR AND NEEDLE BAR DRIVING ARM

- REMOVING:**
1. Remove arm top cover.
 2. Remove face plate.
 3. Remove control panel as instructed on page 72.
 4. Remove arm side cover
 5. Remove cam controlled feed unit as instructed on page 31.
 6. Remove cam stack and stitch width lever assemblies as instructed above.
 7. Loosen screw E.
 8. Remove screw H and lever J.
 9. Remove screw G.
 10. Push bracket X counter-clockwise and slide needle position spring A1 toward right and then out of machine.
 11. Lift out hinge pin Y, disengaging bracket W from pin.
 12. Loosen set screw D and remove hinge pin A. It is not necessary to remove hexagon head screw C from driving arm.
 13. Move amplitude bracket assembly W and driving arm T until the driving arm becomes disengaged from long slot of amplitude bracket assembly.
 14. Slide driving arm toward left and out of machine from face plate end.
 15. Remove amplitude bracket assembly from machine.
 16. Loosen set screw D1 at back of arm and remove pin C1, bracket X, washer V and spacing collar U from machine by turning bracket assembly counter-clockwise to clear arm shaft.
- REPLACING:**
1. Replace collar U, washer V, bracket X and pin C1, taking care to align holes as pin C1 is assembled.
 2. Replace amplitude bracket W.
 3. Insert pin Y through holes in brackets W and X.
 4. Replace needle position selector spring A1 engaging vertical slot in groove B1 and angled slot in groove Z. Replace screw G. Press down pin C1 and tighten screw D1.
 5. Insert driving arm T from face plate end into machine arm and fit right end of arm on fork of amplitude assembly.
 6. Replace selector lever J and screw H.
 7. Turn collar F counter-clockwise until sufficient spring tension is obtained and tighten screw E.
 8. Replace cam stack, stitch width lever and arm side cover as instructed above.
 9. Replace control panel as instructed on page 72.
 10. Set pendulum movement of needle bar as instructed on page 56.
 11. Set for maximum bight as instructed on page 11.
 12. Replace cam controlled feed unit as instructed on page 31.
 13. Replace arm top cover and face plate.

15. NEEDLE THREAD TAKE-UP

- REMOVING:**
1. Remove arm top cover and face plate.
 2. Remove needle bar and presser bar as instructed on pages 20 and 28.
 3. Loosen set screw A (located behind regulator screw).
 4. Through hole in top of casting, loosen set screw B in needle bar crank D.
 5. Withdraw needle thread take-up with link C and hinge stud E from machine.
- REPLACING:**
1. Replace needle thread take-up in reverse order of its removal. (Except item 1.)
 2. Set needle bar height as instructed on page 15.
 3. Replace arm top cover and face plate.

IMPORTANT: When replacing take-up assembly, make certain that set screw B is tightened firmly against flat on take-up hinge stud and then, while turning hand wheel over toward you, slowly tighten set screw A. Check that machine turns freely.

16. HAND WHEEL AND FLANGED BUSHING

- REMOVING:**
1. Remove arm end cover.
 2. Remove screw C1 from stop motion screw B1.
 3. Remove screw B1, washer D1 and hand wheel from arm shaft.
 4. Remove screw F1 and flanged bushing E1 from arm shaft.
- REPLACING:**
1. Replace flanged bushing E1 and insert screw F1 through flanged bushing as shown.
 2. Replace hand wheel with motor belt in groove of motor hand wheel.
 3. Place motor belt around motor pulley.
 4. Replace washer D1.
 5. Replace and tighten screw B1 and replace screw C1.
 6. Replace arm end cover.

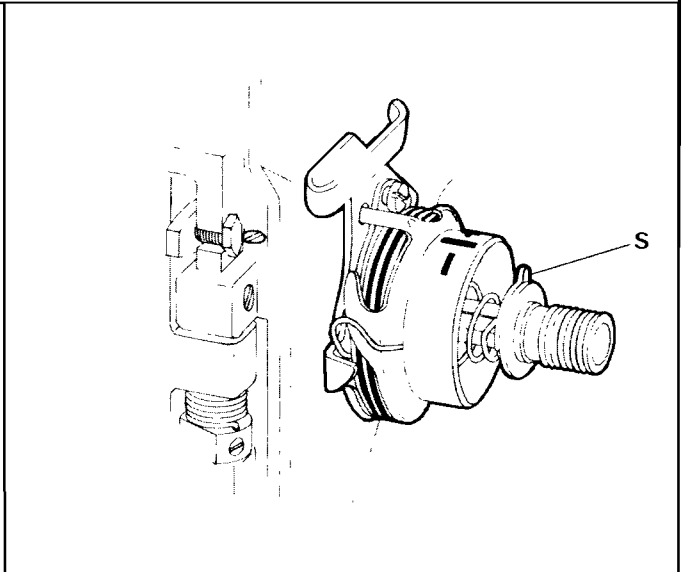
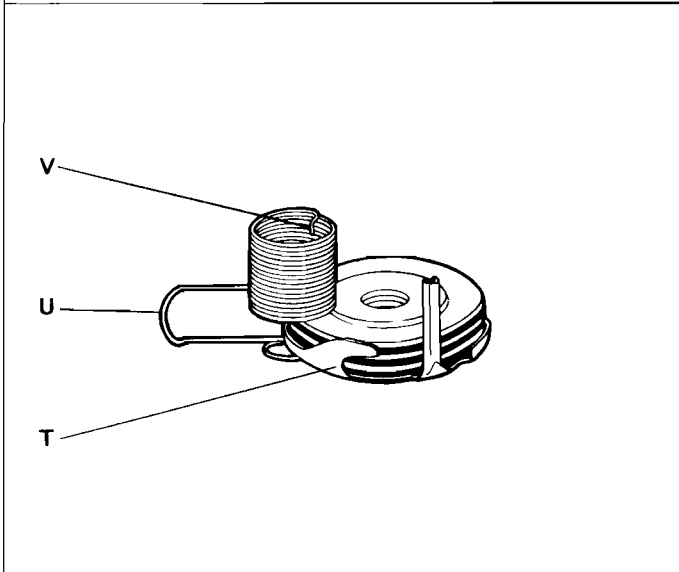
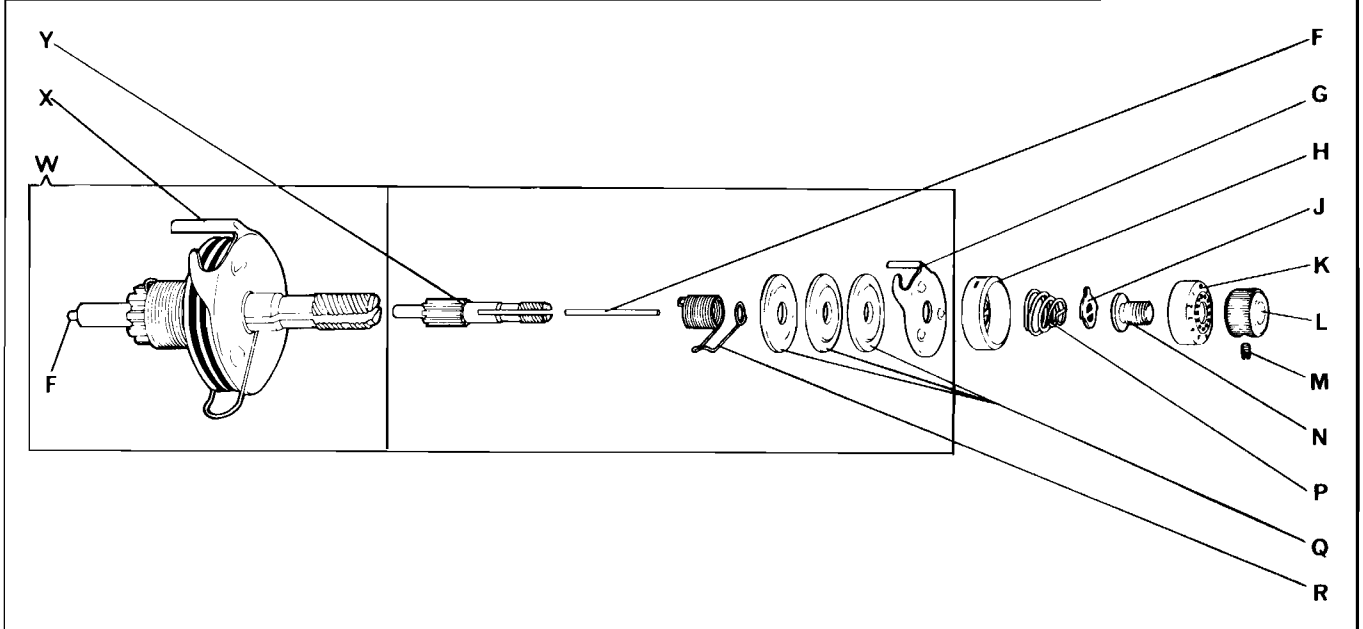
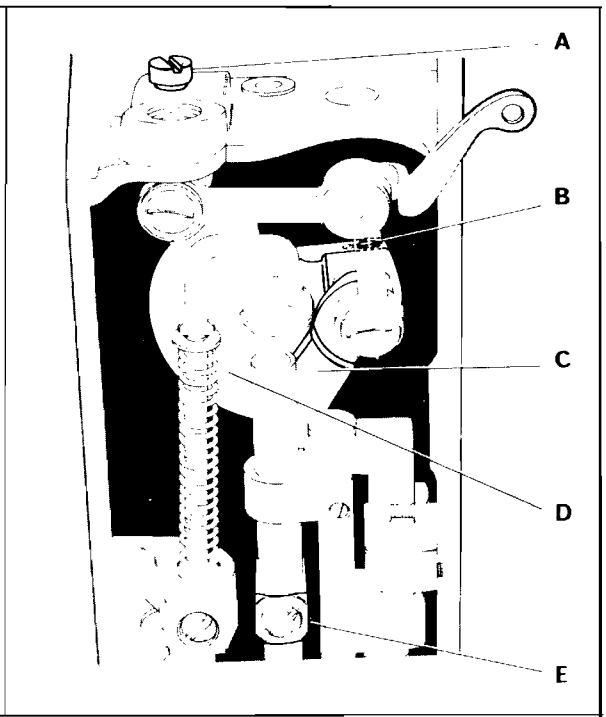
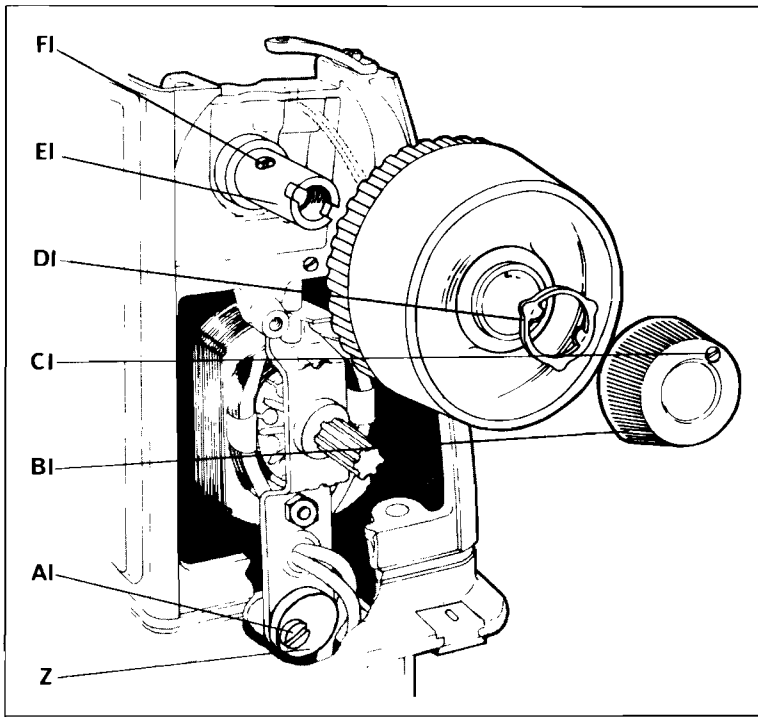
NOTE: To adjust belt tension, loosen screw A1 and turn eccentric bushing Z. Tighten screw A1. If stitching mechanism is not released when stop motion screw B1 is loosened, remove screws C1 and B1. Remove washer D1, rotate it 180° and replace it on arm shaft. Replace screws B1 and C1

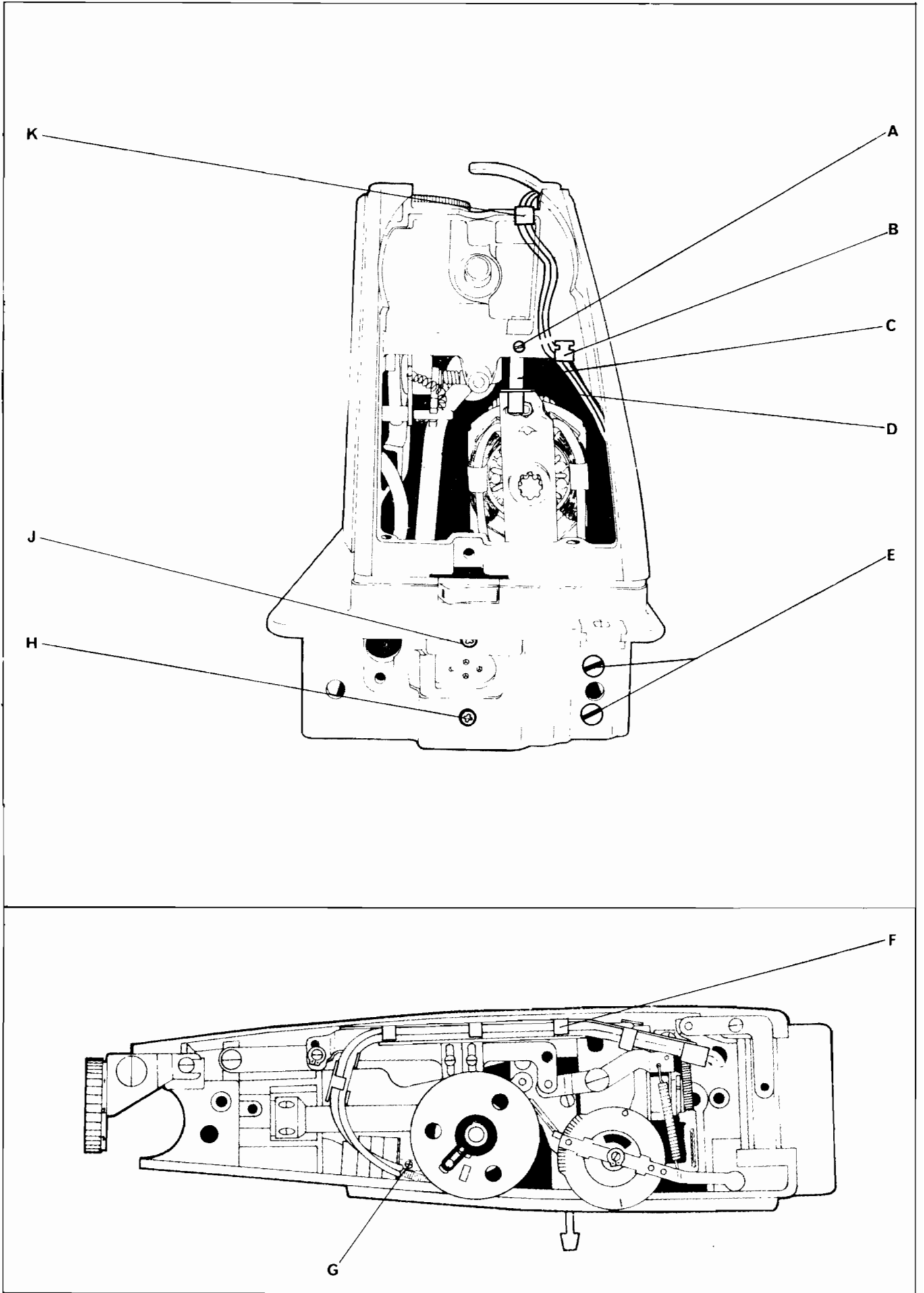
17. NEEDLE THREAD TENSION

- REMOVING:**
1. Loosen set screw M
 2. Turn thumb nut L to left (counter-clockwise) to remove.
 3. Remove tension flange K.
 4. Turn adaptor N to left (counter-clockwise) to remove it from tension stud.
 5. Remove stop washer J, spring P and tension indicator H from tension stud.
 6. Then, as a unit, remove tension disc assembly (thread guard G, tension discs O and take-up spring R).
 7. Remove tension releasing pin F

NOTE: It is not necessary to remove tension stud Y from machine. It is shown removed to illustrate complete assembly. See page 68 for instructions on removal of tension assembly as a unit.

- REPLACING:**
1. Make certain that tension releasing pin F is in place, as shown at W.
 2. Place tension discs on thread guard T, as shown.
 3. Pass take-up spring eyelet U under thread guard with coils of spring above tension discs, as shown.
 4. Align coils of spring with holes in discs and place this assembly on tension stud, as shown at W. Extension X of thread guard G enters hole provided in machine head. Tail V enters one of the grooves in rear of tension stud (see instructions on page 68)
 5. Replace indicator H with open side facing out and with plus (+) and minus (—) signs at top.
 6. Hold these assembled parts against shoulder of stud and place tension spring P on tension stud.
 7. Place stop washer J on stud so that its extension S is above tension stud as shown.
 8. Replace adaptor N on tension stud.
 9. Place thread between tension discs and turn adaptor N, as required, to obtain a slightly perceptible tension on thread (between 5 and 15 grams on Tensometer)
 10. Replace flange K so that stop on inside of flange is to right of stop washer extension S.
 11. Hold flange K against tension assembly and tighten nut L (bevelled side out) against flange.
 12. Tighten set screw M.





18. ELECTRICAL COMPONENTS

CAUTION: Remove plug from electrical outlet before removing any electrical part of the machine.

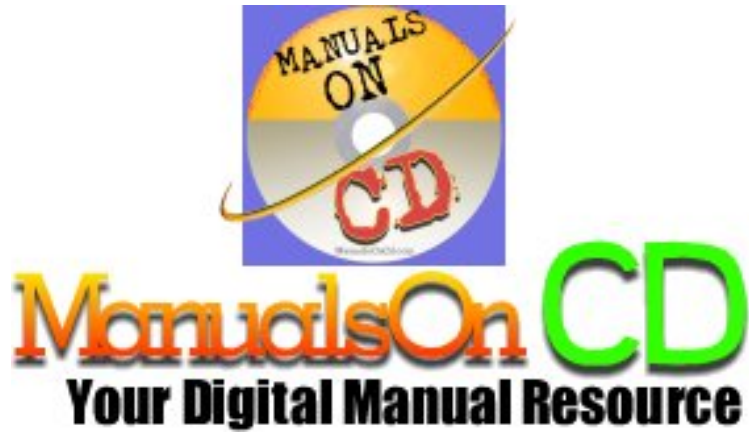
- REMOVING:**
1. Remove arm top cover and arm end cover.
 2. Remove hand wheel and motor belt as instructed on page 76.
 3. Remove fixing screw G, lower light assembly and draw it to the left to allow light bracket and spring to clear casting. Lift light assembly out of machine arm.
 4. Withdraw light lead from lead guide F.
 5. Withdraw grommet K and light lead from hole in casting.
 6. Withdraw light lead from clip B.
 7. Remove screws H and J. (In 533 machine, screw H holds the bed end cover plate.)
 8. Loosen screw A and raise post pin C until it clears upper motor bracket D.
 9. While holding motor in position, remove screws E.
 10. Withdraw motor, switch module and light fixture from machine.

- REPLACING:**
1. Install switch module and motor in machine.
 2. Lower bracket post pin C through motor bracket D and tighten screw A.
 3. Replace screws E.
 4. Replace screws H and J (and bed end cover plate in 533 machine).
 5. Secure light lead in clip B.
 6. Replace light lead and grommet K in hole in casting.
 7. Assemble light fixture to machine with fixing screw G.
 8. Replace lead in lead guide F.
 9. Replace hand wheel and motor belt as instructed on page 76.
 10. Replace arm end cover and arm top cover.

NOTE: By removing the switch module cover and disconnecting the appropriate terminals, the motor, switch module and light fixture can be removed as separate units. (See wiring diagram on page 44.)

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