

Supplement to  
Form 20732  
Machines 500 & 503  
(463)

# SERVICE MANUAL

# SINGER\*

## MACHINES OF CLASSES

# 500 and 503

Model description – Page 46  
Index – Page 45

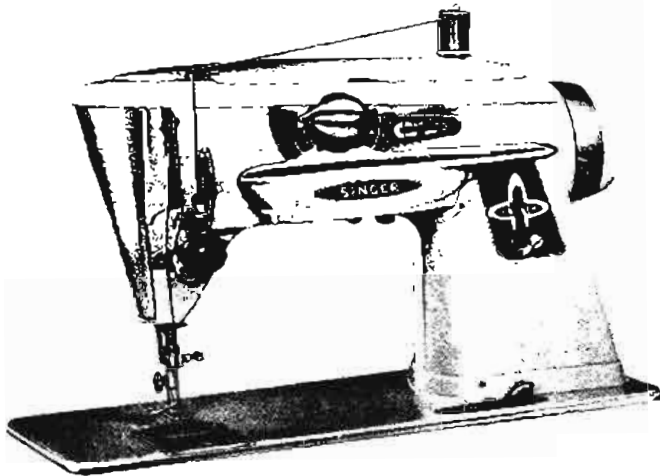


Fig. 1. Machine 500

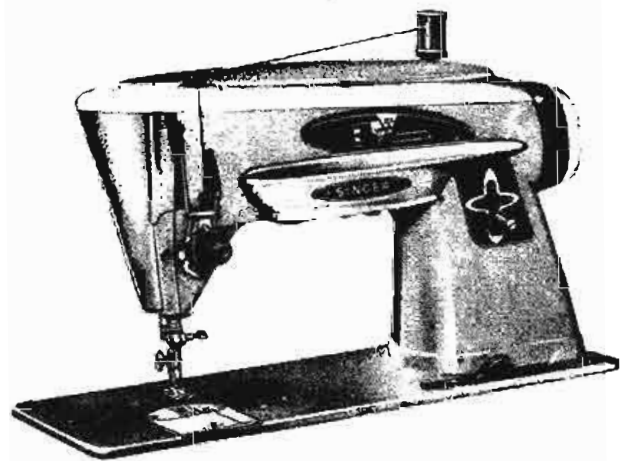


Fig. 2. Machine 503

The instructions contained in the front section of this binder (pages 1 to 79) generally apply to Machines of Classes 500 and 503.

Specific instructions which apply only to Machines of Classes 500 and 503 appear in this supplement (pages 1 to 44).

Instructions on pages 2 to 29 apply to both Classes of Machines.

Instructions on pages 30 to 36 apply only to Machine 500.

Instructions on pages 37 to 42 apply only to Machine 503.

For detailed instructions concerning operation, threading, choice of needles, etc., see regular instruction books supplied with the machine.

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## PREPARATION OF MACHINE FOR INSPECTION

Before any extensive inspection is undertaken to find causes of faulty operation, machine should be thoroughly cleaned and oiled.

Remove all lint, dust or other foreign particles from machine.

Remove motor, light and wiring harness, as described on pages 28 and 29 and dip machine in large container of Varsol. If grease or dirt has become

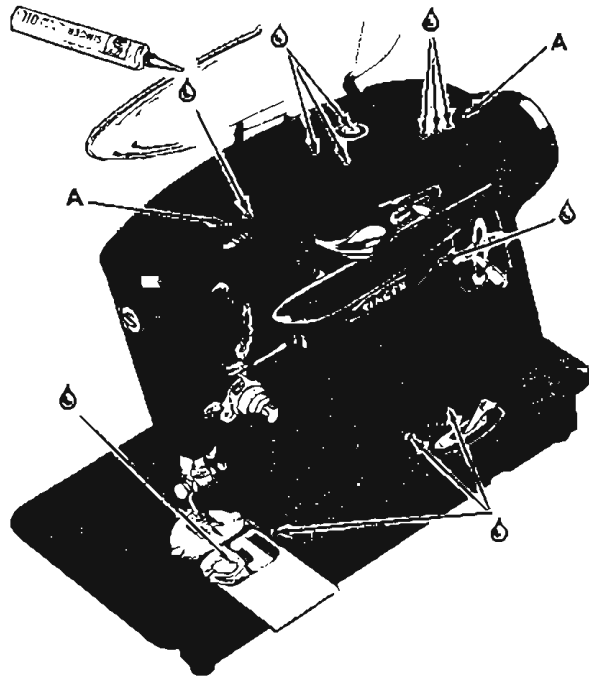
considerably hard and tacky it may be necessary to leave machine in Varsol for several hours.

Wipe machine clean and dry.

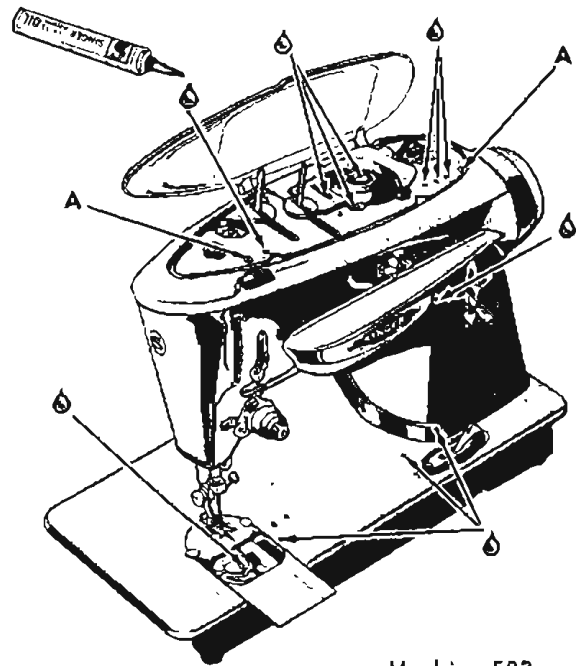
Oil the machine as instructed below and on page 3.

Wipe away all surplus oil.

## LUBRICATION



Machine 500



Machine 503

Fig. 3. Front View - Oiling Points

## LUBRICATION (Cont'd)

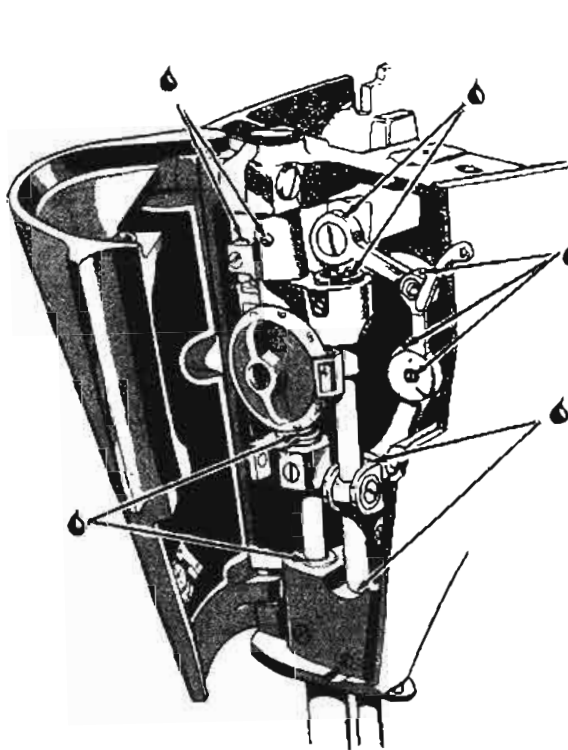


Fig. 4. End View - Oiling Points

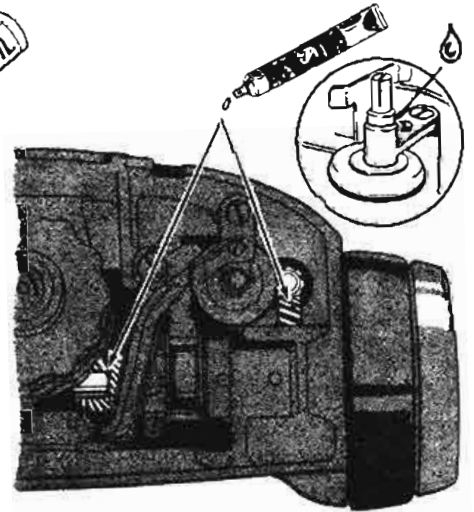


Fig. 5. Upper Gear Lubrication

Open face plate and oil the places indicated in Fig. 4.

Remove arm top cover by loosening screws A, Fig. 3. Apply SINGER\* Gear Lubricant to gears, as shown in Fig. 5.

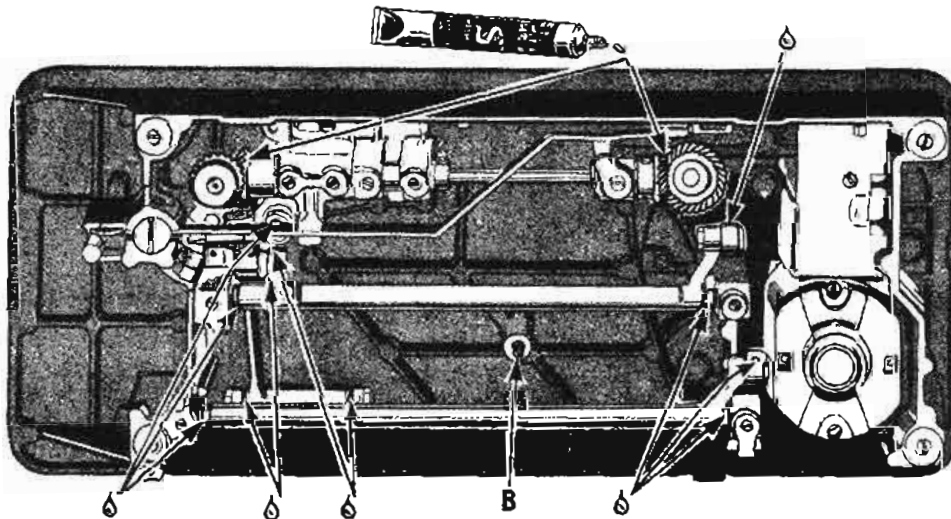


Fig. 6. Bottom View - Oiling and Gear Lubrication

Tilt machine back and remove thumb nut from screw B. Remove cover plate from underside of machine. Oil each of the places indicated in Fig. 6. Apply Gear Lubricant to the two sets of gears.

**THE MOTOR REQUIRES NO LUBRICATION**



## TO SET PRESSER FOOT AT CORRECT HEIGHT

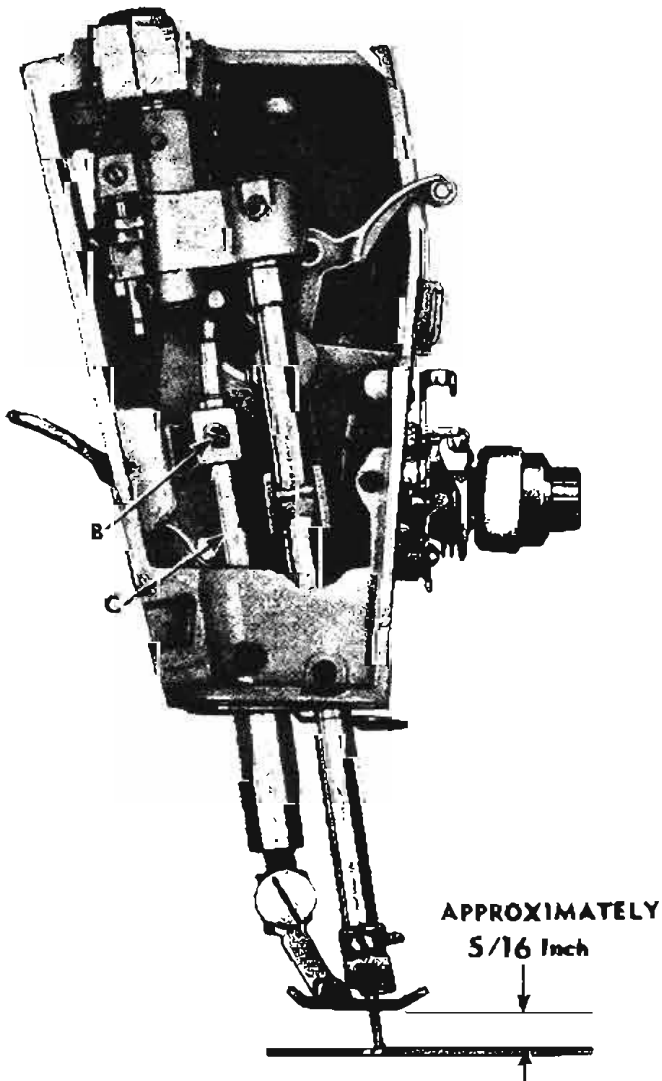


Fig. 7. Setting Presser Foot at Correct Height

**IMPORTANT:** Unless the presser foot is set at correct height, attachments for these machines may not function properly on presser bar.

**NOTE:** Throat plate must be down, flush with bed slide, while setting presser foot height.

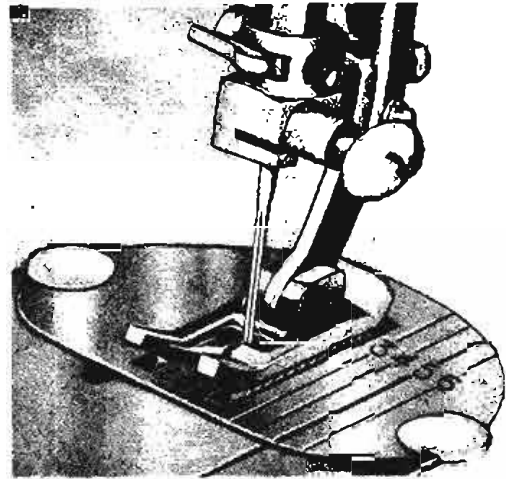


Fig. 8. Presser Foot in Alignment with Slots in Throat Plate and with Feed Dog

### CHECK:

Raise presser bar lifter, raising presser foot to highest position.

Bottom of presser foot should be approximately  $5/16$  inch above top of throat plate, as shown in Fig. 7.

Test alignment of presser foot to slots in throat plate and to feed. Fig. 8 shows presser foot in correct alignment. Height of presser foot and alignment with slots in throat plate must be set at same time.

### SETTING:

1. Remove pressure regulating dial bracket as instructed on page 25.
2. Loosen set screw B.
3. Raise or lower presser bar C as required making certain that needle clamp does not strike the presser foot when presser foot is in raised position.
4. Align presser foot with slots in throat plate and securely tighten screw B.
5. Replace pressure regulating dial bracket as instructed on page 25.

## TO SET FEED DOG AT CORRECT HEIGHT



Fig. 9. Stitch Length Regulator Set for 12 to 15 Stitches per Inch

### PREPARATION:

Remove bottom cover, motor hold-down plate and motor, as instructed on page 28.

Turn hand wheel over toward you until feed dog is at its highest position.

Make certain that throat plate is down, flush with bed slide and set stitch length regulator for 12 to 15 stitches per inch, as shown in Fig. 9.

### CHECK:

With feed dog at its highest position, approximately a full depth of feed dog teeth should project above top surface of throat plate, as shown in Fig. 11.

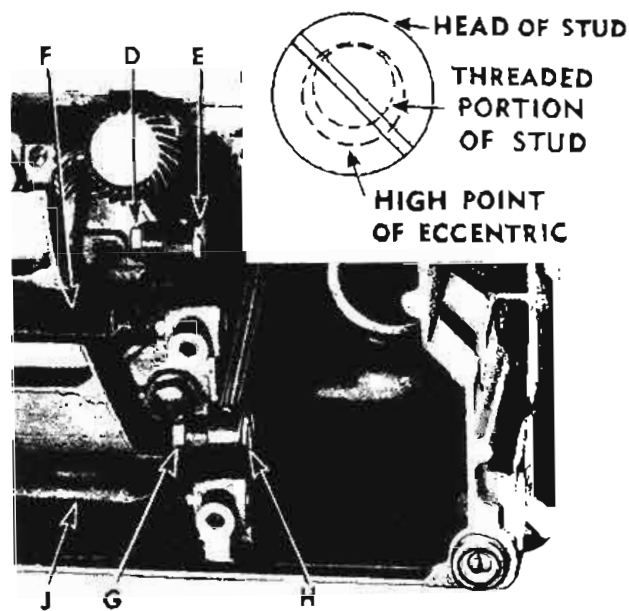


Fig. 10. Feed Dog Adjustments

### SETTING:

1. Loosen nut D, Fig. 10.
2. Turn eccentric stud E until high point of eccentric is toward rear of machine bed, as shown in Fig. 10 (inset), making distance between stud E and feed lifting rock shaft F as short as possible.
3. Then, turn eccentric stud E, as required, to bring feed dog to correct height.
4. Maintain this setting while securely tightening nut D.



Fig. 11. Feed Dog at Correct Height

## TO SET FEED DOG LENGTHWISE IN THROAT PLATE SLOTS

### PREPARATION:

Set feed dog at correct height, as instructed above.

Make certain that throat plate is down, flush with bed slide and set stitch length regulator for 12 to 15 stitches per inch, as shown in Fig. 9.

### CHECK:

While turning hand wheel over toward you, feed dog should come as close as possible to front of throat plate slots without striking throat plate.

### SETTING:

1. Loosen nut G, Fig. 10.
2. Turn eccentric stud H until high point of eccentric is toward rear of machine bed, as shown in Fig. 10 (inset), making distance between stud H and feed rock shaft J as short as possible.
3. Then, turn eccentric stud H, moving feed dog toward front or rear as required.
4. Securely tighten nut G.

TO SET FEED DOG SIDEWISE IN THROAT PLATE SLOTS  
AND TO ELIMINATE NOISE IN FEED MOVEMENT

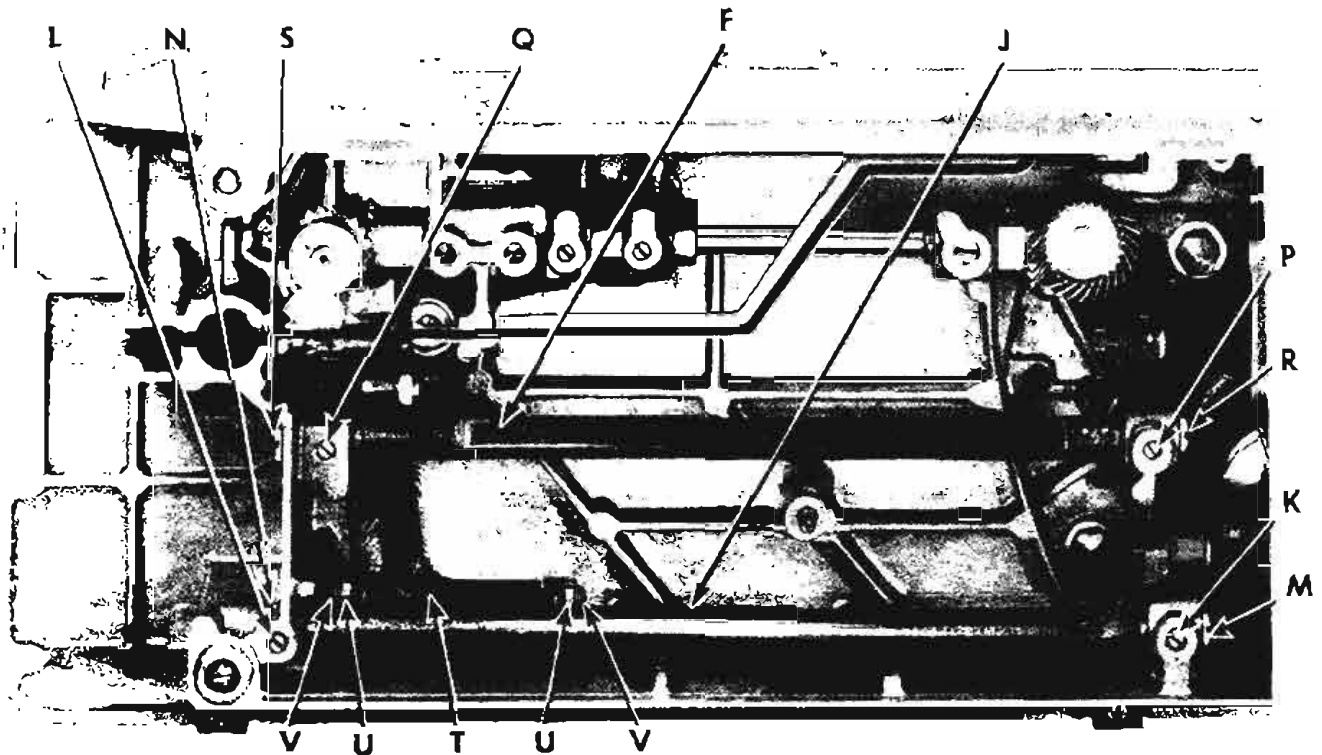


Fig. 12. Setting Feed Dog Sidewise

**PREPARATION:**

Set feed dog at correct height as instructed on page 5.

**CHECK:**

Feed dog should be located centrally (along the bed) in feed slots of throat plate.

**SETTING: (See Fig. 12)**

Loosen set screws K and L that hold screw centers M and N and feed rock shaft J in position.

Loosen set screws P and Q that hold screw centers R and S and feed lifting rock shaft F in position.

Loosen screw centers R and S slightly to permit movement of feed dog toward left or right.

To position feed dog toward left, loosen screw center N and tighten screw center M an equal amount, as required.

To position feed dog toward right, loosen screw center M and tighten screw center N an equal amount, as required.

When feed dog is centralized in throat plate, make certain screw centers M and N hold feed rock shaft J snugly (without end play or binding). Then securely tighten set screws K and L.

Tighten screw centers R and S equally upon feed lifting rock shaft F so that shaft F rides freely without end play or binding. Then securely tighten set screws P and Q.

**NOTE:** Check for end play or binding in feed bar T. To adjust, loosen nuts U and turn screw centers V as required. Recheck sidewise position of feed dog, and adjust if necessary, as instructed above. Tighten nuts U.

## TO ADJUST THREAD CLEARANCE

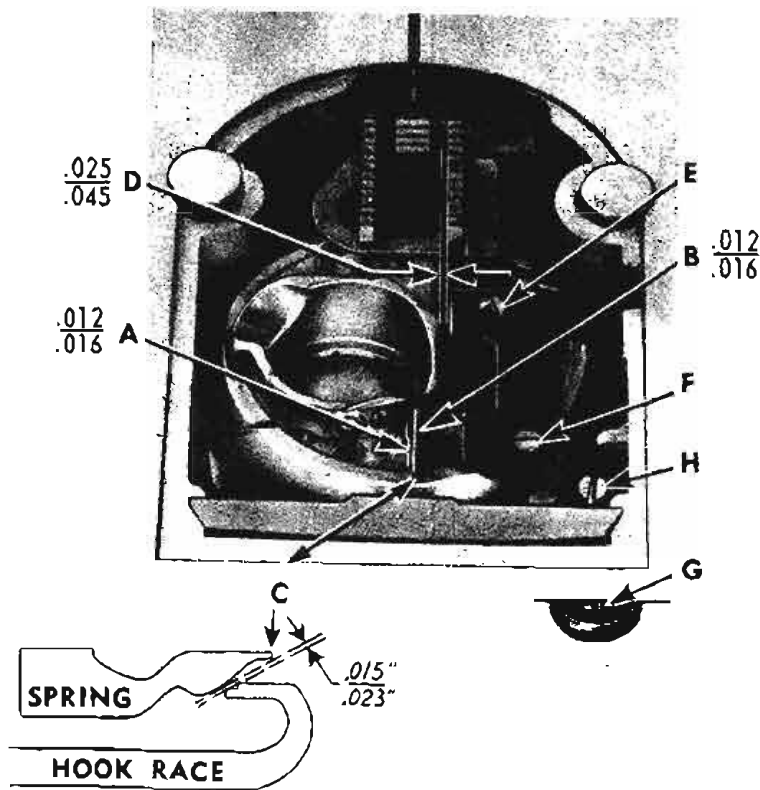


Fig. 13. Thread Clearances

### PREPARATION:

Remove needle, throat plate and bed slide.

### CHECK: (See Fig. 13)

Using a narrow Feeler Gauge, (Starrett 571), check the following thread clearances:

1. At A, between bobbin case cushion spring and heel of bobbin case - clearance should be .012 to .016 inch.
2. At B, on other side of spring, between spring and bracket - clearance should be .012 to .016 inch.
3. At C, between hook race and underside of spring - clearance should be .015 to .023 inch.
4. At D, between rear corner of bobbin case and top of spring - clearance should be .025 to .045 inch.

Check cushion spring and screws E and F for wear and possible need for replacement.

### SETTING:

To adjust clearances at B, C and D, loosen screws E and F and move cushion spring as required.

Move spring toward rear to increase clearance C, or toward front to decrease clearance C.

When all three clearances have been obtained, at same position of cushion spring, securely tighten screws E and F.

**NOTE:** Hole in cushion spring for screw E is elongated and hole for screw F is oversized to permit adjustment for correct clearances.

To adjust clearance at A, loosen set screw G and turn eccentric stud H, as required, to move spring and bracket toward or away from bobbin case heel.

Securely tighten screw G.

## TO SET THE TAKE-UP SPRING

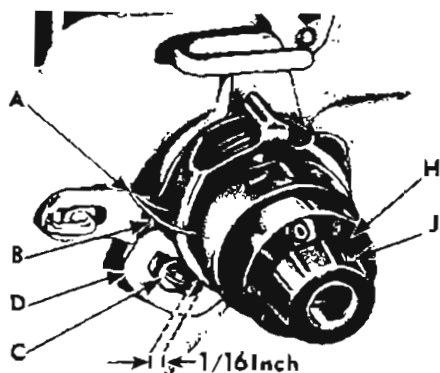


Fig. 14. Setting Stroke of Take-up Spring

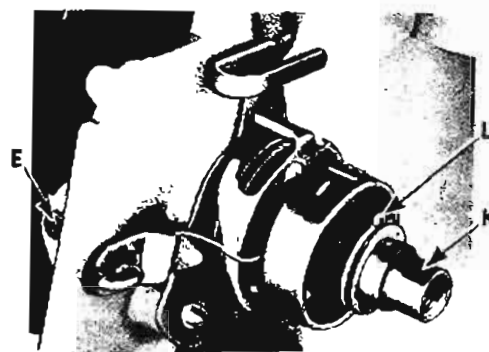


Fig. 15. Stud Set Screw and Tension Adaptor

### SETTING THE STROKE: (See Fig. 14)

Take-up spring A should complete its action and be at rest against stop B as point of needle enters fabric.

Loosen screw C and move slack thread regulator D up to the left to complete take-up spring action earlier (shorter stroke), or move regulator down to complete spring action later (longer stroke). Then tighten screw C.

**NOTE:** Fig. 14 shows normal setting with right end of regulator slot  $1/16$  to  $3/32$  inch to right of screw head C.

### SETTING THE TENSION:

Tension on take-up spring A, Fig. 14 should be just sufficient to take up slack of needle thread until point of needle reaches fabric.

Loosen stud set screw E, Fig. 15 and remove entire tension assembly. Turn numbered dial to "0", releasing all tension. Hold tension assembly so that component parts are in position shown by dotted line in Fig. 16. Place spring end F in groove

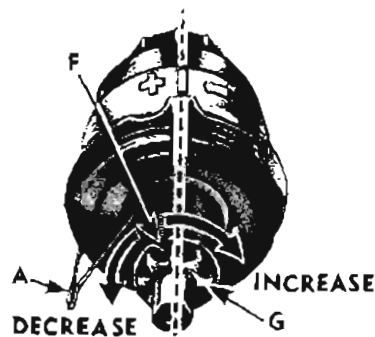


Fig. 16. Setting the Tension

of sprocket G so that take-up spring A hangs down in a vertical position. This is the normal setting.

To increase tension on take-up spring, move spring end F right to next groove in sprocket G. To decrease tension, move spring end left to next groove.

Replace tension assembly, draw spring A so that it rests on regulator stop B, Fig. 14 and recheck tension. Tighten stud set screw E, Fig. 15.

## TO ADJUST NEEDLE THREAD TENSION

### CHECK:

1. Use No. 50 Mercerized Thread.
2. Lower presser bar to engage tension.
3. Turn tension dial H, Fig. 14 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).

### ADJUSTMENT:

1. Loosen set screw J, Fig. 14 and remove tension dial H.

2. Place thread between tension discs and turn adaptor K, Fig. 15 as required, to obtain a slightly perceptible tension on needle thread (between 5 and 15 grams on Tensometer).
3. Replace tension dial H, Fig. 14 so that stop on inside of dial is to right of stop washer extension L, Fig. 15.
4. Tighten set screw J, Fig. 14.
5. Recheck tension on needle thread.

## TO ELIMINATE END PLAY OR BINDING OF FEED ROCK SHAFT AND FEED LIFTING ROCK SHAFT

### PREPARATION:

Remove bottom cover, motor hold-down plate and motor, as instructed on page 28.

### ADJUSTMENT: (See Fig. 17)

To eliminate end play or binding of feed rock shaft J, loosen set screw K at right end of shaft and adjust screw center M so that shaft J rides snugly but freely (without any left or right movement).

Securely tighten set screw K.

To eliminate end play or binding of feed lifting rock shaft F, loosen set screw P at right end of shaft and adjust screw center R, as required.

Securely tighten set screw P.

Check and, if necessary, adjust feed bar for end play or binding and for sidewise position of feed dog, as instructed on page 3.

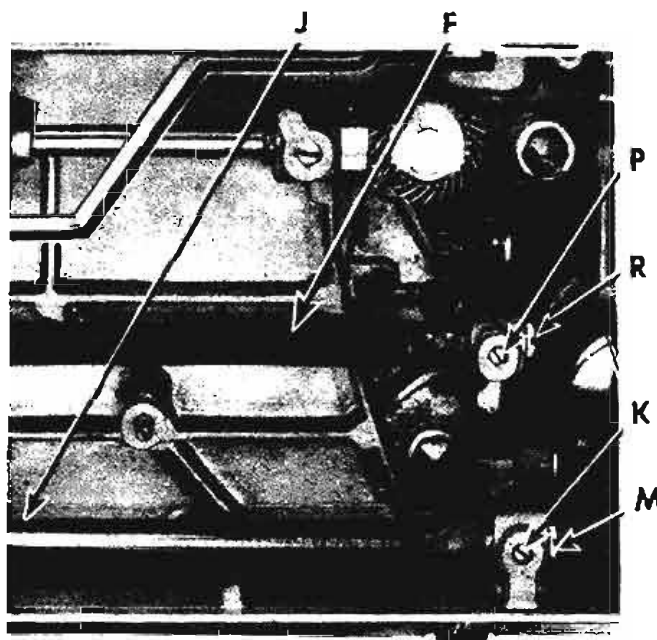


Fig. 17. Eliminating End Play or Binding of Feed Shafts

## TO ELIMINATE END PLAY OR BINDING OF HOOK DRIVING SHAFT

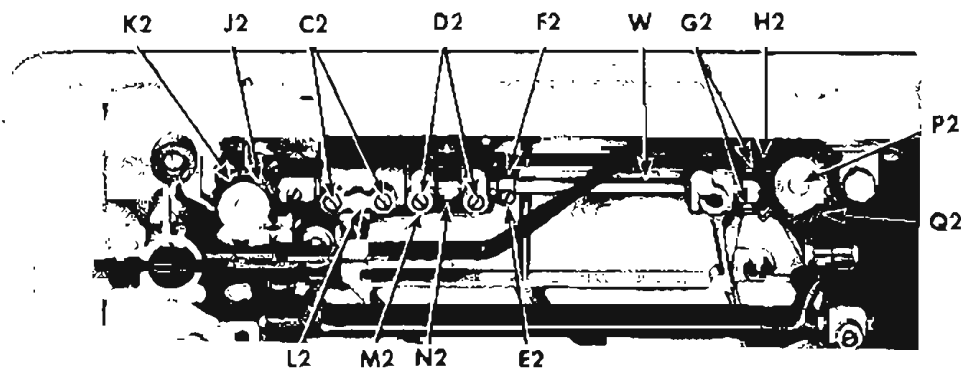


Fig. 18. Eliminating End Play or Binding of Hook Driving Shaft

**NOTE: KEEP ALL GEARS IN MESH (See CAUTION on page 23.)**

### PREPARATION:

Remove bottom cover.

### ADJUSTMENT: (See Fig. 18)

To eliminate end play or binding of hook driving shaft W, loosen two set screws C2 and two set screws D2. Then loosen set screw E2 in collar F2 and two set screws G2 in bevel gear H2 at right end of hook driving shaft W.

Check for end play on rotating hook shaft. To eliminate end play, loosen set screw J2, press gear K2 up against its bearing and retighten set screw J2.

Hold hook bracket L2 against lug M2 and push bushing N2 toward left against bevel gear at left end of shaft W so that there will be no looseness or binding. Securely tighten two set screws C2. Then press the collar F2 firmly against the bushing N2 and tighten collar set screw E2. Adjust gear mesh at right end of shaft W so that there is neither backlash nor binding. While maintaining this adjustment, tighten the two set screws G2 in gear H2.

Check timing of hook as instructed on page 15.

Adjust position of hook in relation to needle as instructed on page 16.

## TO ELIMINATE END PLAY OR BINDING OF UPRIGHT ARM SHAFT

### PREPARATION:

Remove arm top cover.

### ADJUSTMENT:

To eliminate end play or binding of upright arm shaft P2, Fig. 18, loosen set screw in lower bevel gear Q2. (See CAUTION on page 23.)

While pressing downward upon shaft P2 from top of machine, set gear Q2 firmly against bearing on casting and tighten its set screw.

Adjust hook driving shaft for end play or binding, as instructed on page 9.

Adjust horizontal arm shaft for end play or binding as instructed below.

## TO ELIMINATE END PLAY OR BINDING OF HORIZONTAL ARM SHAFT

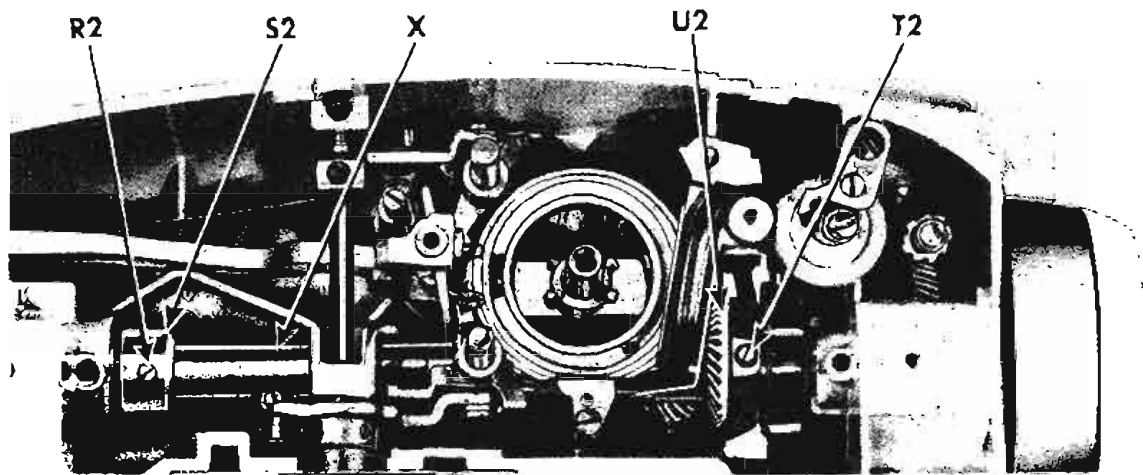


Fig. 19. Adjustment for End Play or Binding of Arm Shaft

To eliminate end play or binding of horizontal arm shaft X, Fig. 19:—

1. On Machine 500, first check to make certain that mesh between the arm shaft worm and the cam stack worm wheel (shown in Fig. 68, page 36) is not too tight. Do this by removing cam stack as instructed on page 35. If binding is thus released, the eccentric shaft X5, Fig. 68, requires adjustment, as instructed on page 36.
2. On Machine 503, first check to make certain that mesh between the arm shaft worm and the worm wheel of bight amplitude and pattern selector (shown in Fig. 68, page 36) is not too tight. Do this by removing pattern selector as instructed on page 42. If binding is thus released, then eccentric shaft X5, Fig. 68, requires adjustment as instructed on page 36.

If arm shaft still requires adjustment for end play or binding, loosen set screw R2 in collar S2,

Fig. 19. Turn hand wheel until timing screw T2 appears in hole of connecting rod cap as shown above. Loosen screw T2.

While keeping timing screw T2 in groove provided for it in arm shaft, push needle bar crank toward hand wheel end of machine and press bevel gear U2 into mesh with bevel gear at top of upright arm shaft, without backlash or binding. (See CAUTION on page 23.)

Then tighten timing screw T2 and check for free running.

Press collar S2 firmly against bushing in head of machine and tighten set screw R2 firmly against flat provided for it on arm shaft.

Check timing of hook as instructed on page 15.

NOTE: If there is considerable play between hand wheel and hand wheel gear, remove and disassemble hand wheel assembly as instructed on page 18 and check seating of spring

## TO ELIMINATE SIDE-SHAKE OR BINDING OF NEEDLE BAR

Side-shake or binding of needle bar is usually the result of an incorrectly adjusted ball bushing at A2, Fig. 20 or X2, Fig. 22.

### ADJUSTMENT:

To adjust lower ball bushing, first remove presser foot, then loosen screw Z2, Fig. 21, and lower presser bar bushing A3 and thread guide B3.

Loosen set screw C3 and loosen or tighten adjusting screw A2, Fig. 20, as required. (Use 1/2 inch spanner wrench.)

Upper ball bushing may be adjusted with 1/2 inch spanner wrench at X2, after loosening set screw D3, Fig. 22.

**CAUTION:** Tighten set screws C3, Fig. 21, and D3, Fig. 22 only enough to hold adjusting screws A2 and X2 in position. Over tightening of the screws will tend to "shift" adjusting screws, which will cause them to bind.

To check for binding, adjust machine for straight stitching in right needle position (AK5 on Machine 500). Then press vibrating bracket E3, Fig. 22 toward hand wheel end of machine and release. Upon release, bracket should return smoothly to original (right needle) position.

Replace thread guide B3 in groove of presser bar bushing A3, as shown in Fig. 20.

Raise presser bar bushing with guide to its original position. Be sure guide B3 is flat against bottom of casting, as shown in Fig. 21, then tighten set screw Z2.

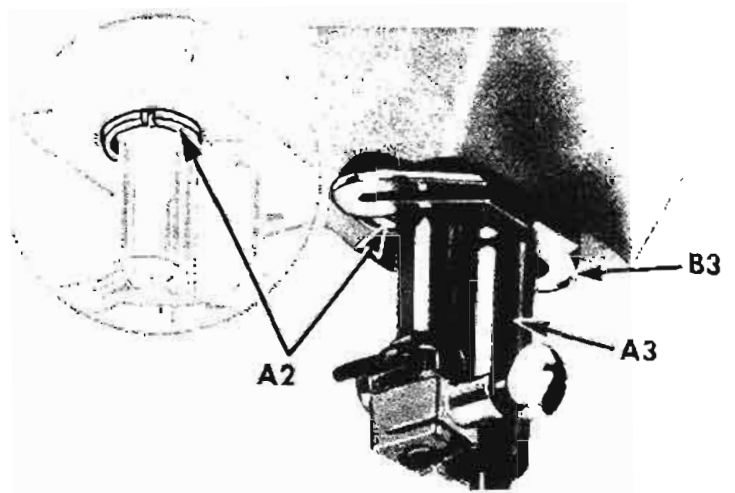


Fig. 20. Lower Ball Bushing

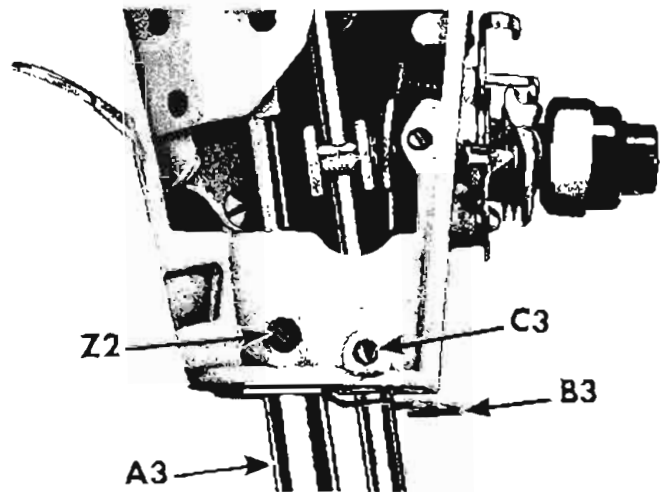


Fig. 21. Bushing Set Screws

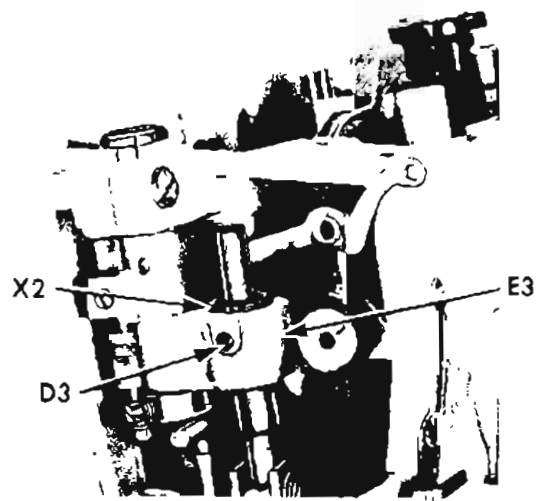


Fig. 22. Upper Ball Bushing



## TO CENTRALIZE NEEDLE IN NEEDLE HOLE IN STRAIGHT-STITCHING THROAT PLATE

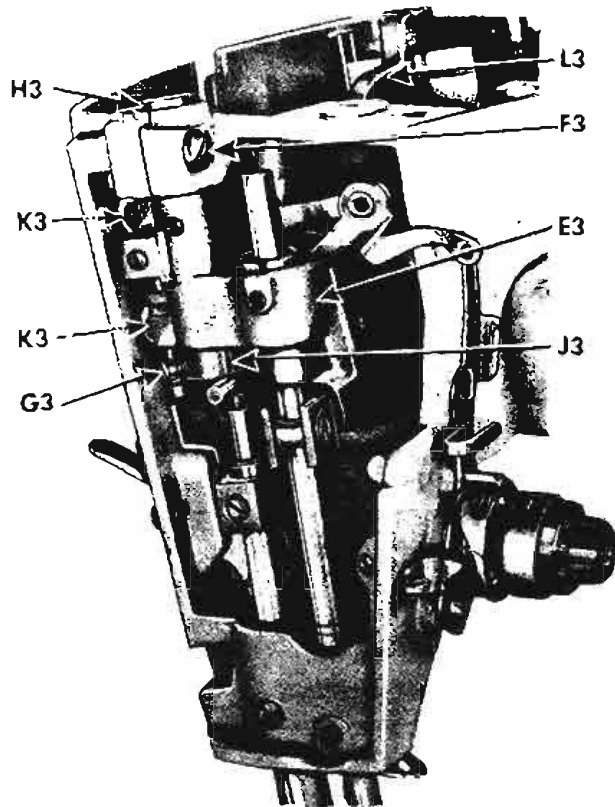


Fig. 23. Centralizing Needle in Needle Hole  
in Straight-Stitching Throat Plate

### PREPARATION:

Adjust machine for straight stitching in center needle position. (AK3 on Machine 500.)

Remove arm top cover and face plate.

Install straight-stitching throat plate.

Remove pressure regulating dial assembly as instructed on page 25.

Insert a Size 11 needle up into needle clamp.

### SETTING (Front to Rear Position): (See Fig. 23)

Loosen clamping screw F3 and set screw G3.

Turn hand wheel until needle is in needle hole in throat plate.

While holding eccentric hinge pin H3 down against casting, and holding vibrating bracket E3 up against shoulder of eccentric H3, turn eccentric H3 (with spanner wrench) until needle is located centrally from front to rear in needle hole in throat plate.

Press down upon eccentric H3 and tighten clamping screw F3.

Press collar J3 up against bracket E3 and tighten screw G3.

### SETTING (Left to Right Position): (See Fig. 23)

Loosen two clamping screws K3.

Turn hand wheel until needle is in needle hole in throat plate.

While holding needle bar driving arm L3 (to keep it from moving) move vibrating bracket E3 as required to bring needle in center (left to right) of needle hole in throat plate.

Maintain this setting of bracket E3 and tighten two clamping screws K3.

Check front to rear position of hook as instructed on page 16.

Check timing of hook as instructed on page 15.

## TO SET NEEDLE BAR AT CORRECT HEIGHT

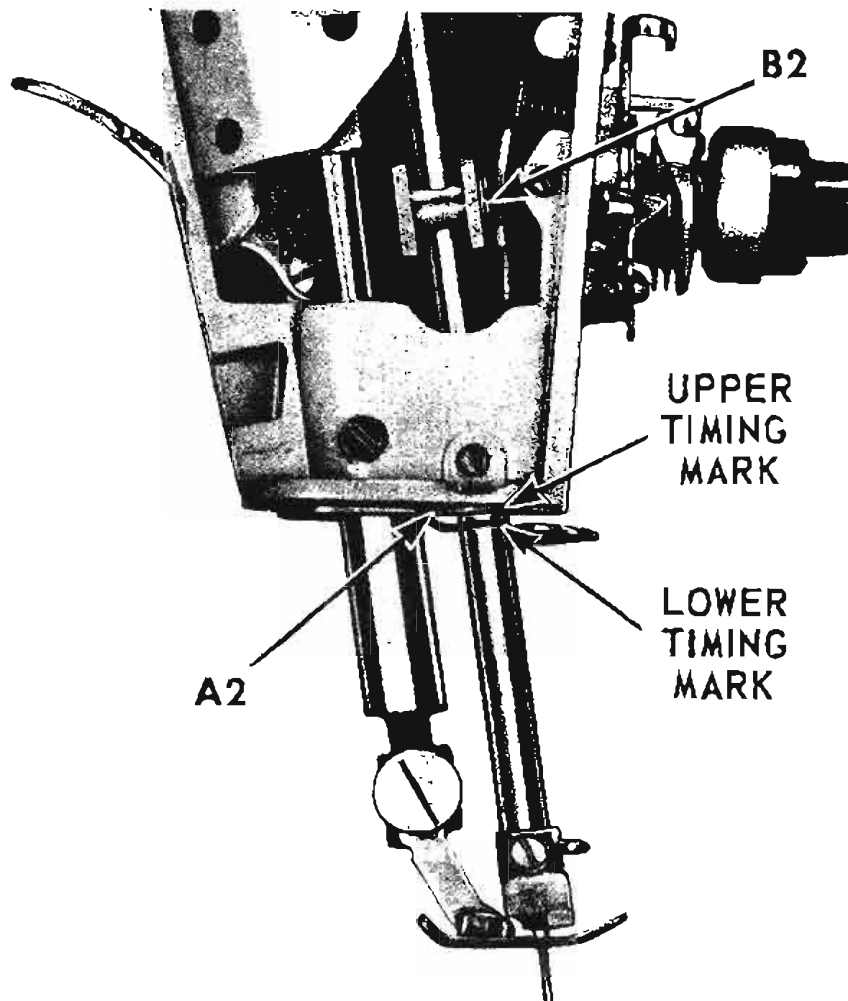


Fig. 24. Timing Marks on Needle Bar

### PREPARATION:

Open slide plate and remove throat plate.

Adjust machine for straight stitching in center needle position (AK3 on Machine 500).

Insert two needles (same size) up into needle clamp.

Then turn hand wheel over toward you until hook point is behind needles. If needle bar is correctly turned, both needles will be an equal distance in front of hook point.

### CHECK:

Turn hand wheel over toward you until needle bar is at its lowest point. At this position, the upper timing mark on needle bar should be aligned with lower end of needle bar ball bushing A2, Fig. 24.

### SETTING:

With needle bar at its lowest point, loosen screw B2 and raise or lower needle bar, as required.

While maintaining correct needle bar height, make certain needle bar is correctly turned, then tighten screw B2.

## TO CHECK THE POSITION OF THE NEEDLE IN RELATION TO STRAIGHT-STITCHING THROAT PLATE

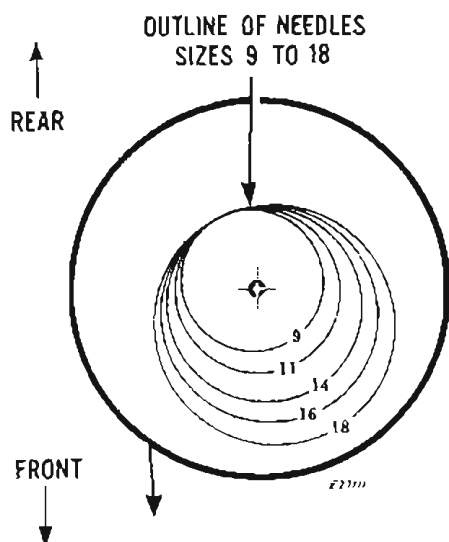


Fig. 25. Needle Hole in Straight-Stitching Throat Plate

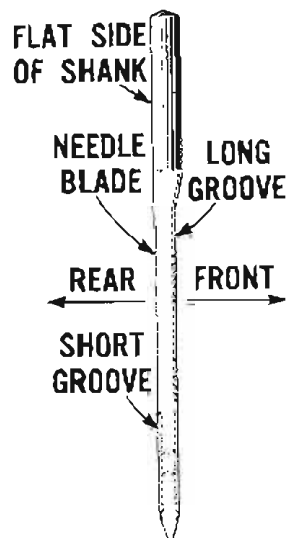


Fig. 26. Needle Catalog 2020 (15x1)

### PREPARATION:

Install straight-stitching throat plate and remove presser foot. Adjust machine for straight stitching in center needle position (AK3 on Machine 500).

### CHECK:

When the needle enters the needle hole in straight-stitching throat plate, the short-groove (flat shank) side of the needle should face slightly to the left of rear, as shown in Fig. 25.

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

Observe that the center of a Size 11 needle should be at the approximate center of the needle hole in the throat plate and that the center of each larger size needle advances toward the front of the needle hole.

This position is necessary to permit an increase in the diameter of the needle blade 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: -

- Needle bar setting may be incorrect from front to back or from right to left (see page 12).
- Needle bar shakes in ball bushings (see page 11).
- Needle or needle bar may be bent. (Replace.)
- Needle seat in needle bar may be clogged with dirt or may be damaged.
- Throat plate may be incorrectly seated.

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

- Presser bar may be bent, damaged or turned out of position (see page 4).
- Presser foot may be incorrectly seated on the presser bar.
- Presser foot may be bent. (Replace.)

## TO TIME THE ROTATING HOOK

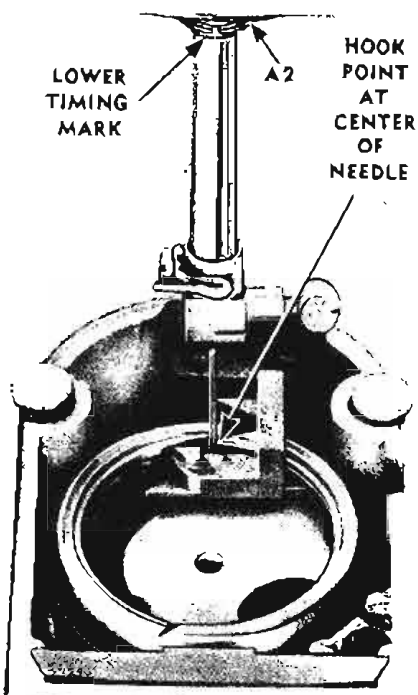


Fig. 27. Hook Correctly Timed

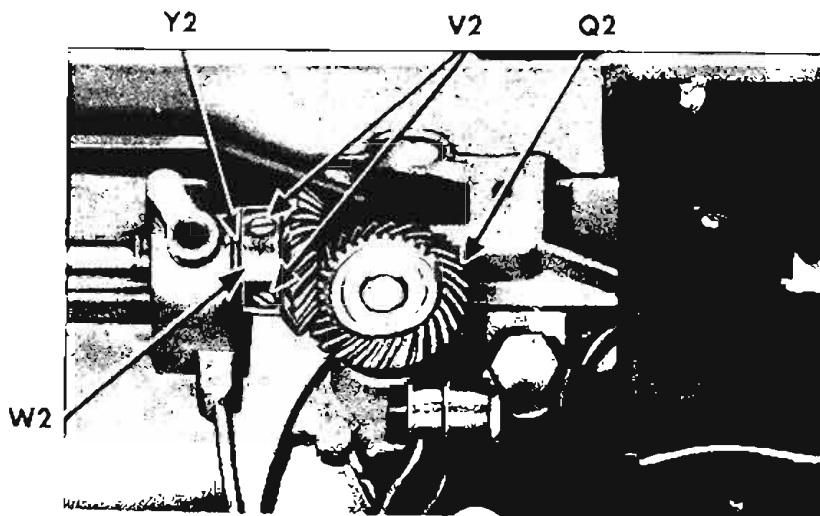


Fig. 28. Adjustment for Hook Timing

### PREPARATION:

Set needle bar at correct height as instructed on page 13.

Time the needle bar vibrating mechanism as instructed on pages 31 to 34, and pages 38 to 40.

Insert a Size 18 needle up into needle clamp.

Remove throat plate, bed slide and bobbin case.

Remove bottom cover plate. (Feed dog is removed in Fig. 27 to show point of hook, but it need not be removed to time the hook.)

Adjust machine for straight stitching in center needle position.

### CHECK:

Turn hand wheel over toward you until lower timing mark, Fig. 27, is aligned with lower edge of needle bar bushing A2 on upward stroke of needle bar.

At this position of needle bar, point of rotating hook should be at center of needle, as shown in Fig. 27.

### SETTING:

Loosen two set screws V2, Fig. 28 in gear W2.

While maintaining position of needle bar (lower timing mark aligned with lower end of bushing A2, Fig. 27), turn gear K2, Fig. 30, page 16, clockwise until hook point is located in position shown in Fig. 27.

Securely tighten two set screws V2, Fig. 28, making certain that gears W2 and Q2 are correctly meshed without binding or backlash.

**NOTE:** Hub of gear W2 should not bear against face of bushing at Y2.

Replace bottom cover, bobbin case, slide plate and throat plate.

## TO SET THE POSITION OF THE HOOK POINT TO OR FROM THE NEEDLE

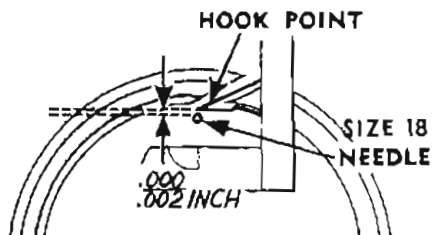


Fig. 29. Correct Position of Hook  
(Viewed from Above)

### PREPARATION:

Set needle bar at correct height as instructed on page 13.

Adjust machine for straight stitching in center needle position.

Insert a Size 18 needle up into needle clamp.

### CHECK:

Turn hand wheel over toward you until point of hook is directly behind the needle.

Clearance between needle and hook point should be .000 to .002 inch, as shown in Fig. 29.

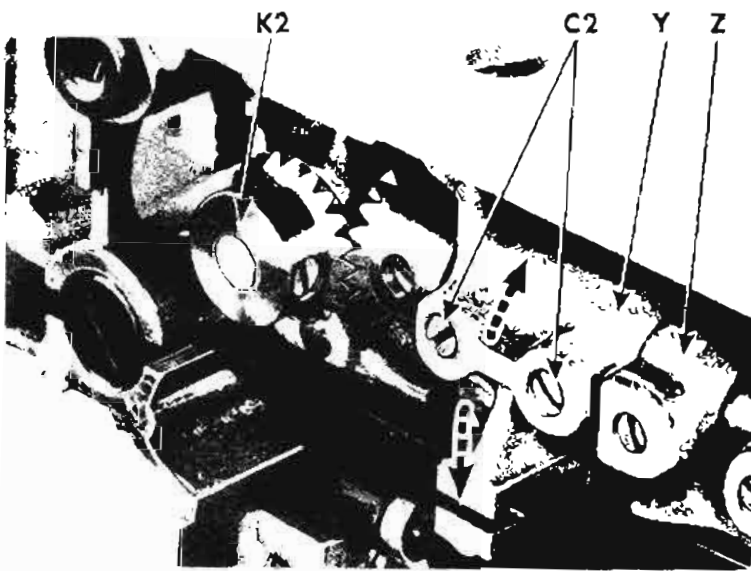


Fig. 30. Setting the Hook

### SETTING:

Loosen two set screws C2, Fig. 30.

Move entire hook bracket assembly Y in direction shown by upper dotted arrow, Fig. 30, thereby moving hook point away from needle.

Place feeler gauge (.002 inch) between needle and hook point.

Move entire hook bracket assembly Y in direction shown by lower dotted arrow until correct setting is obtained (.000 to .002 inch between needle and hook point).

Make certain that hook bracket Y is snug against lug Z, then tighten two screws C2.

Check timing of hook as instructed on page 15.

## REMOVALS AND REPLACEMENTS

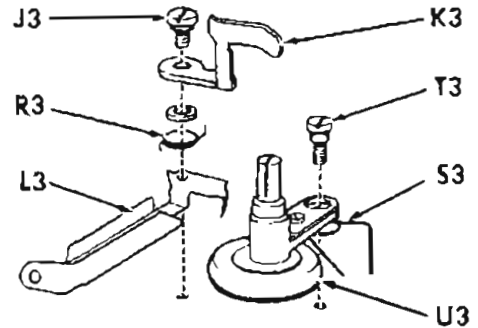
### BOBBIN WINDER

#### REMOVAL:

1. Remove arm top cover.
2. Remove screw J3 and remove engaging lever assembly K3 and oil shield L3 in the order shown in Fig. 31.

NOTE: Check seating of springs R3 and S3 before removing entire bobbin winder assembly.

3. Remove screw T3 and remove bobbin winder spindle and friction ring assembly U3 in the order shown in Fig. 31.



#### REPLACEMENT:

Replace bobbin winder assembly in the reverse order of its removal.

Fig. 31. Bobbin Winder Assembly

### STITCH LENGTH REGULATOR

#### REMOVAL:

1. Remove hand wheel assembly, as a unit, as instructed on page 18.
2. Remove two screws V3 which fasten stitch length indicator plate to machine arm.
3. Move feed regulator W3 to lowest position.
4. Remove large hinge screw X3, Fig. 34, page 18, with its spring and washer from arm casting.
5. Pull entire regulator, with indicator plate, out of machine arm.

#### REPLACEMENT:

1. Install regulator in arm, making certain that slide of regulator fits on slide block of feed forked connection. (See inset.)
2. Replace large hinge screw X3, Fig. 34 with its washer and spring, through arm casting and into regulator.
3. Position indicator plate and fasten with screws V3.
4. Replace hand wheel assembly as instructed on page 18.

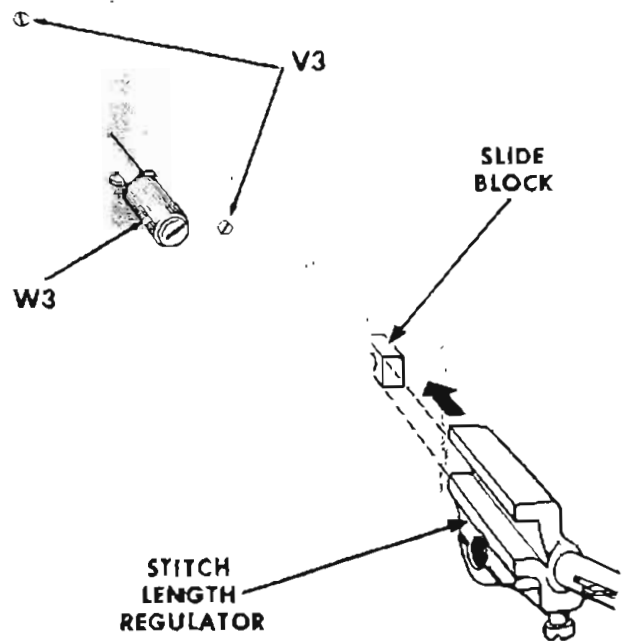


Fig. 32. Stitch Length Regulator

## REMOVALS AND REPLACEMENTS HAND WHEEL AND COUNTERBALANCE

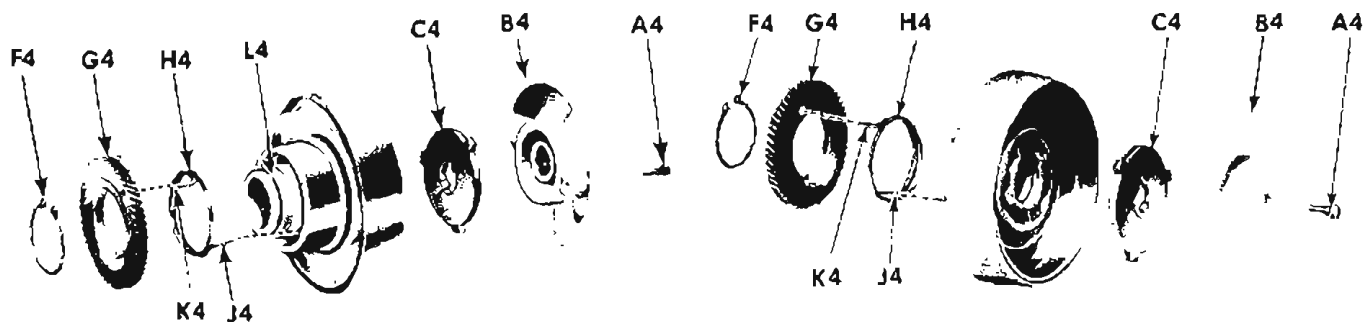


Fig. 33. Exploded View - Hand Wheel Assembly

### REMOVAL AND DISASSEMBLY:

1. Remove screw A4 from stop motion nut B4, Fig. 33.
2. Remove nut B4 and clamp washer C4 from arm shaft.
3. Remove hand wheel assembly from arm shaft.
4. Remove screw D4 and counterbalance E4, Fig. 34 from arm shaft.
5. Using extension pliers, remove snap ring F4, Fig. 33 from hand wheel assembly.
6. Slip gear G4 from hand wheel.
7. Remove gear spring H4 from recess in hand wheel.

### ASSEMBLY AND REPLACEMENT:

1. Place gear spring H4 into recess of hand wheel so that spring extension J4 fits into hole provided in hand wheel recess.
2. Place gear G4 on hand wheel, fitting other end K4 of spring H4 in hole provided for it in gear G4. (See Fig. 33.)
3. Replace snap ring F4 on hand wheel, setting ring F4 in groove L4 on hand wheel sleeve.
4. Replace counterbalance E4, Fig. 34.
5. Insert screw D4 through counterbalance E4, and into hole provided for it on arm shaft, as shown in Fig. 34.
6. Replace hand wheel assembly on arm shaft.
7. Replace clamp washer C4, Fig. 33 on arm shaft.
8. Replace and tighten stop motion nut B4 and replace screw A4 in hole of stop motion nut B4.

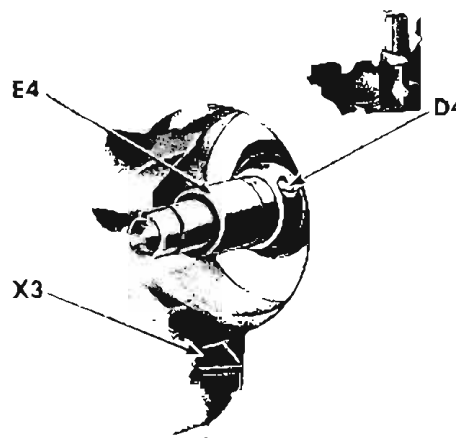


Fig. 34. Arm Shaft Counterbalance

**NOTE:** If three extensions of clamp washer C4 interfere with screw A4 when stop motion nut B4 is loosened to release hand wheel, remove screw A4 and nut B4. Remove clamp washer C4, rotate it 180° and replace it on arm shaft. Replace nut B4 and screw A4.

## REMOVALS AND REPLACEMENTS NEEDLE THREAD TENSION

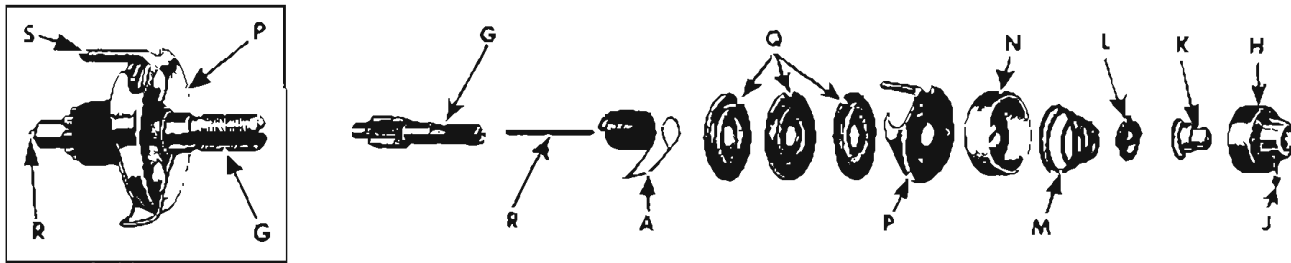


Fig. 35. Exploded View - Needle Thread Tension

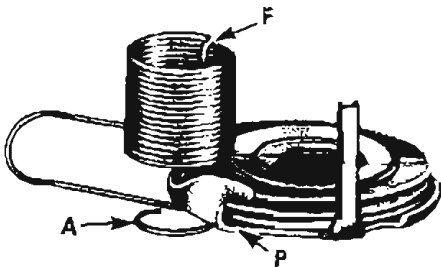


Fig. 36. Tension Disc Assembly

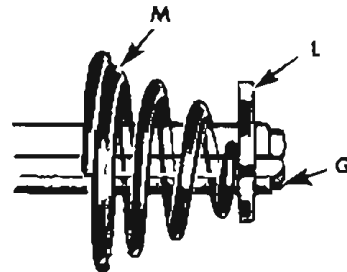


Fig. 37. Stop Washer and Tension Spring

### REMOVAL: (See Fig. 35)

1. Loosen set screw J and remove dial H.
2. Turn adaptor K to left (counterclockwise) and remove it from stud G.
3. Remove stop washer L, spring M, and indicator N from stud G.
4. Remove, as a unit, take-up spring A, thread guard P and tension discs Q.
5. Remove tension releasing pin R.

**NOTE:** It is not necessary to remove tension stud G from machine. It is shown removed in Fig. 35 to illustrate the complete assembly. See page 8 for instructions on removal of tension assembly as a unit.

### REPLACEMENT:

1. Make certain that tension releasing pin R is in place as shown in inset, Fig. 35.
2. Place tension discs Q on thread guard P as shown in Fig. 36.

3. Pass eyelet of take-up spring A under thread guard P with coils of spring above tension discs, as shown in Fig. 36.
4. Align coils of spring with holes in discs and place this assembly on stud G, as shown in inset, Fig. 35. Extension S of thread guard P enters hole provided for it in machine head.

**NOTE:** Tail F of take-up spring enters one of the grooves in rear of stud G (see instructions "SETTING THE TENSION" on page 8).

5. Replace indicator N, Fig. 35 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 M and stop washer L on stud G, as shown in Fig. 37.
7. Turn adaptor K (clockwise) on stud G until it rests against stop washer L.
8. Replace dial as instructed on page 8 under "TO ADJUST NEEDLE THREAD TENSION", steps 2 to 5.



## REMOVALS AND REPLACEMENTS THROAT PLATE POSITION BRACKET

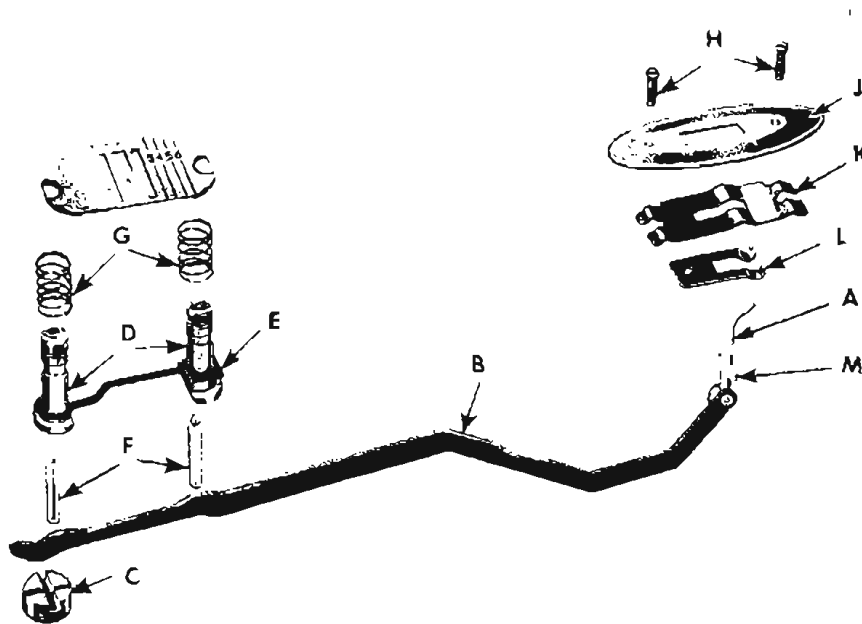


Fig. 38. Exploded View - Throat Plate Position Bracket Assembly

### REMOVAL:

1. Remove throat plate and bottom cover plate.
2. Move throat plate position lever A to right (sewing) position.
3. While pressing left end of bracket B toward underside of machine bed, remove adjusting screw C.
4. Swing end of bracket B away from machine bed and remove two throat plate clamps D, with bracket E, pins F and springs G.
5. Remove two screws H from indicator plate J.
6. Lift indicator plate J, stop plate K and spring L from bed of machine
7. Remove bracket B with lever A from underside of machine bed.

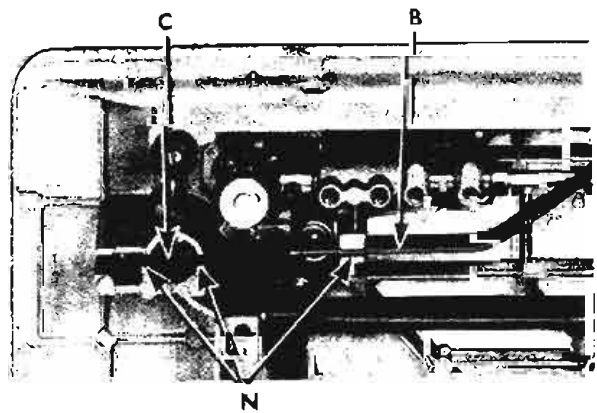


Fig. 39. Throat Plate Position Bracket Assembled

### REPLACEMENT:

Replace throat plate position bracket in reverse order of its removal.

Observe the following: -

Spring L should be replaced with its curved portions under cross piece M of lever A. (Remainder of spring should extend toward left.)

Bracket B should be inserted in grooves N under machine bed, as shown in Fig. 39.

Adjusting screw C should be turned in flush with bottom of casting while pressing left end of bracket B toward underside of machine

## REMOVALS AND REPLACEMENTS FEED LIFTING ROCK SHAFT

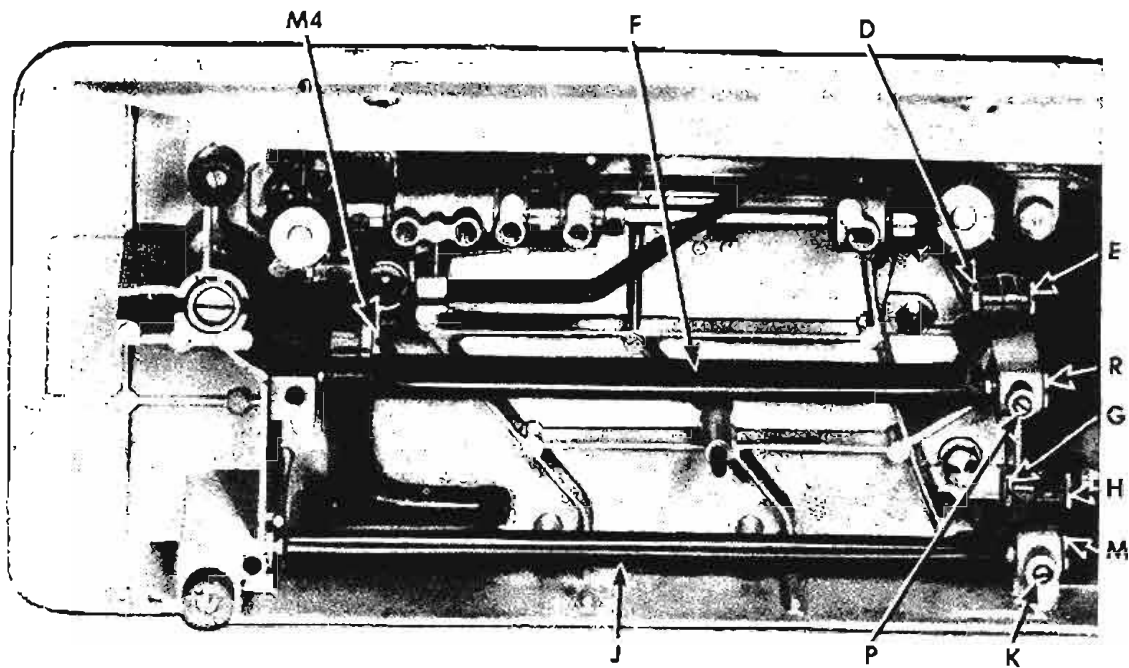


Fig. 40. Feed Lifting Rock Shaft and Feed Rock Shaft Assembly

### REMOVAL:

1. Remove bottom cover plate.
2. Remove motor hold-down plate and motor as instructed on page 28.
3. Remove nut D and eccentric E, disengaging feed lifting rock shaft F from upright connecting rod.
4. Loosen set screw P and remove screw center R.
5. Remove screw stud M4, disengaging feed bar.
6. Remove feed lifting rock shaft F.

### REPLACEMENT:

1. Install feed lifting rock shaft F in reverse order of its removal.
2. Adjust feed dog as instructed on pages 5, 6 and 9.
3. Replace motor as instructed on page 28.

## FEED ROCK SHAFT ASSEMBLY

### REMOVAL:

1. Remove bottom cover plate.
2. Remove motor hold-down plate and motor as instructed on page 28.
3. Remove feed lifting rock shaft F as instructed above.
4. Remove nut G and eccentric H, disengaging feed rock shaft J from feed forked connection.
5. Loosen set screw K and remove screw center M.
6. Remove feed rock shaft J with feed bar and feed dog.

### REPLACEMENT:

1. Install feed rock shaft J with feed bar and feed dog in reverse order of its removal.
2. Install feed lifting rock shaft F as instructed above.
3. Adjust feed dog as instructed on pages 5, 6 and 9.
4. Replace motor as instructed on page 28.

## REMOVALS AND REPLACEMENTS HOOK DRIVING SHAFT

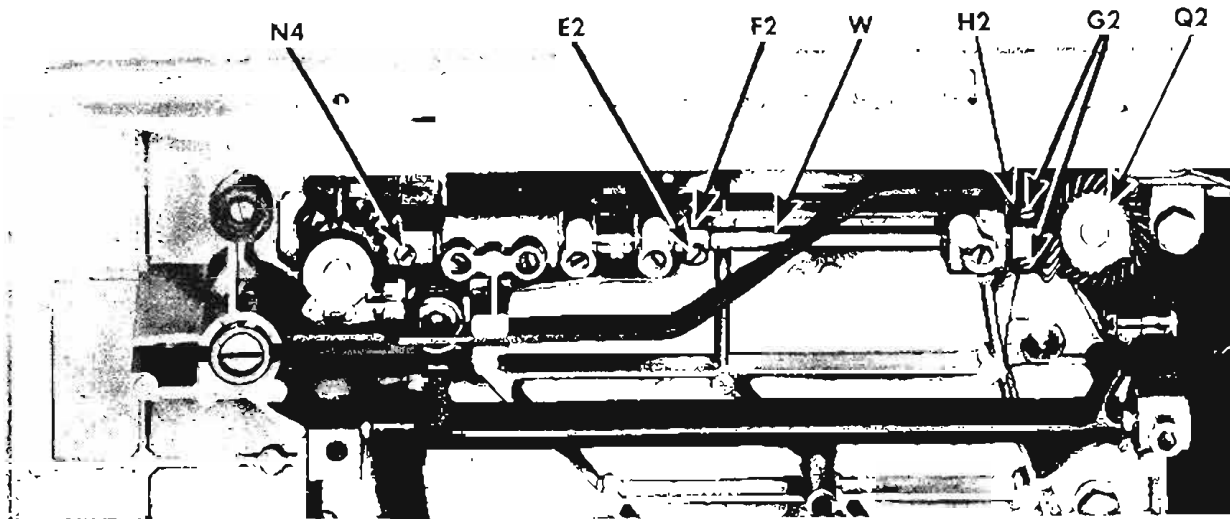


Fig. 41. Hook Driving Shaft

### REMOVAL: (See Fig. 41)

1. Remove motor as instructed on page 28.
2. Remove rotating hook as instructed on page 23.
3. Loosen set screw E2 in collar F2.
4. Loosen two set screws G2 in bevel gear H2.

NOTE: Mark the two bevel gears H2 and Q2. This may be done by scratching a line across one tooth of one gear and the corresponding space for that tooth of the other gear. This will insure proper mesh when replacing gear H2.

5. Loosen set screw N4 and remove gear from left end of hook driving shaft W.

6. Slide shaft W toward right and out of machine through hole in bed of machine.

### REPLACEMENT:

1. Replace hook driving shaft in reverse order of its removal.

NOTE: Flat on shaft W must be toward left end of machine (hook bracket end), so that set screw N4 may be fastened upon it.

2. Replace hook as instructed on page 23.
3. Adjust and time hook assembly as instructed on pages 9, 15 and 16.

## REMOVALS AND REPLACEMENTS ROTATING HOOK AND POSITION FINGER

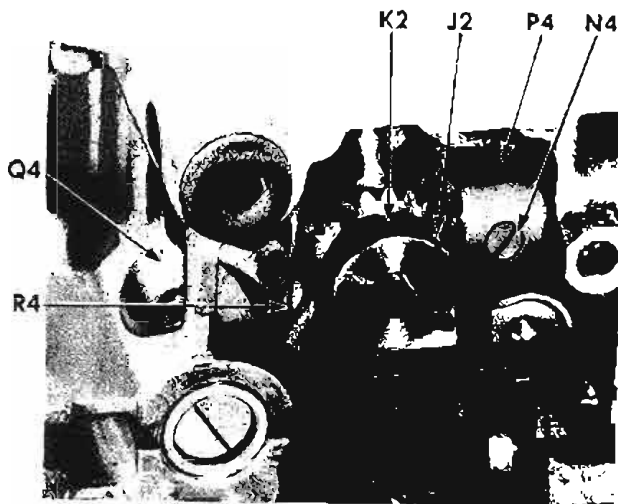


Fig. 42. Hook Shaft Bevel Gears

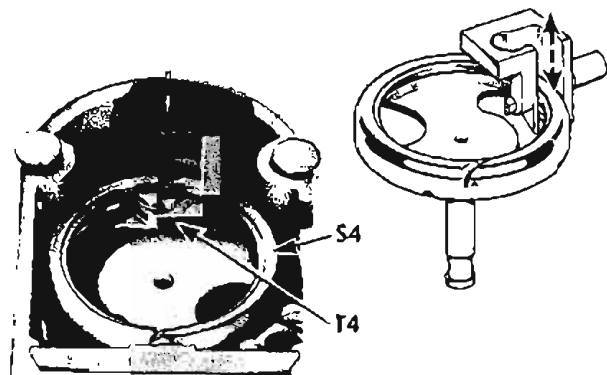


Fig. 43. Rotating Hook and Position Finger

**CAUTION:** Hook shaft gear K2 and hand wheel gear G4, Fig. 33, page 18, may be removed to facilitate adjustments. **DO NOT DISTURB THE MESH OF ANY OTHER GEAR IN THIS MACHINE.** All other gears are mated and correctly timed.

### REMOVAL:

1. Remove needle, presser foot, throat plate, bed slide, bobbin case and feed dog.
2. Remove cushion spring bracket by lifting cushion spring and pulling it toward left and out of machine.
3. Remove bottom cover plate.
4. Mark the two bevel gears K2 and P4. This may be done by scratching a line across one tooth of one gear and the corresponding space for that tooth of the other gear. This will insure proper mesh when replacing gear.
5. Loosen set screw J2 and remove bevel gear K2 from hook shaft.
6. Insert screwdriver through hole Q4 and loosen screw R4.
7. Remove rotating hook assembly S4, Fig. 43.
8. Remove position finger T4 from hook, as shown in inset, Fig. 43.

**NOTE:** Keep position finger **AWAY FROM** hook point.

### REPLACEMENT:

1. Install position finger T4 on hook, as shown in Fig. 43. Slide position finger down and around ring on hook at point shown in inset of Fig. 43, keeping it away from hook point.
2. Install rotating hook assembly S4 with position finger T4, as shown in Fig. 43.
3. Press down upon finger T4 and tighten set screw R4, Fig. 42.
4. Replace bevel gear K2 on hook shaft. Using guide marks previously made at removal, mesh the two bevel gears K2 and P4.
5. Turn hook shaft until flat is under set screw J2 in gear K2 and tighten screw J2.

**NOTE:** The two set screws J2 and N4 on the two bevel gears should be in line when hook shaft and hook driving shaft are correctly installed.

6. Adjust and time hook assembly as instructed on pages 9, 15 and 16.
7. Replace bottom cover plate.
8. Replace cushion spring bracket, feed dog, bobbin case, bed slide, and presser foot.

## REMOVALS AND REPLACEMENTS FEED LIFTING ROCK SHAFT CONNECTING ROD

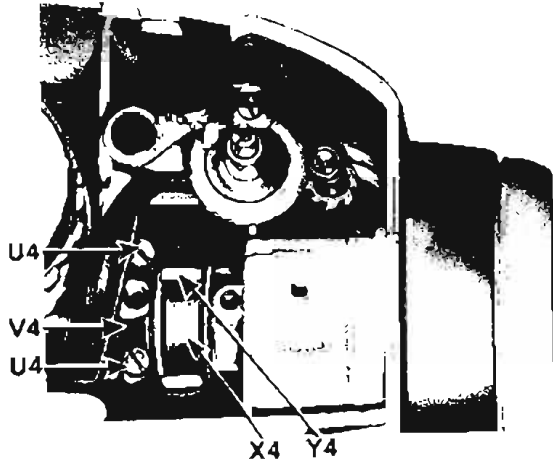


Fig. 44. Feed Lifting Rock Shaft Connecting Rod and Feed Forked Connection on Arm Shaft

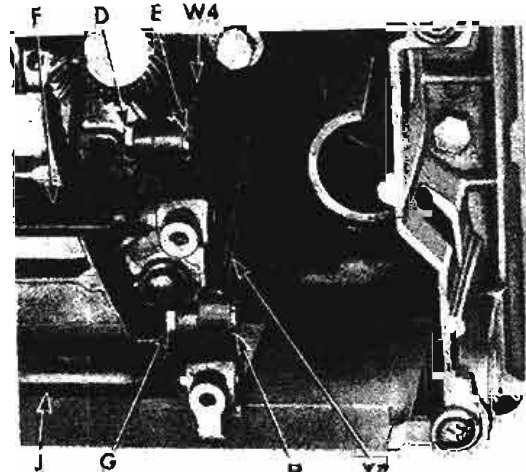


Fig. 45. Connections beneath Machine Bed

### REMOVAL:

1. Remove arm top cover and bottom cover plate.
2. Remove motor as instructed on page 28.
3. Remove two cap screws U4, Fig. 44 and remove connecting rod V4.
4. Remove nut D, Fig. 45 and eccentric stud E, disengaging connecting rod W4 from feed lifting rock shaft F.
5. Remove connecting rod W4 from bottom of machine.

### REPLACEMENT:

1. Insert connecting rod W4 into upright arm through bottom of machine so that it fits around bottom half of gear hub on eccentric X4, Fig. 44.
2. Replace cap V4 over top half of gear hub and fasten cap to connecting rod with two screws U4.
3. Replace stud E, Fig. 45, and nut D, engaging connecting rod W4 to shaft F.
4. Adjust feed dog height as instructed on page 5.
5. Replace motor as instructed on page 28.
6. Replace bottom cover plate and arm top cover

## FEED FORKED CONNECTION

### REMOVAL:

1. Remove stitch length regulator as instructed on page 17.
2. Remove motor as instructed on page 28.
3. Remove nut G and eccentric stud H, disengaging feed forked connection Y4 from feed rock shaft J.
4. Remove feed forked connection Y4 from bottom of machine.

### REPLACEMENT:

1. Insert feed forked connection Y4 into upright arm through bottom of machine so that its fork fits around eccentric X4, as shown in Fig. 44.
2. Engage feed forked connection Y4 with feed rock shaft J by means of eccentric stud H and nut G.
3. Replace stitch length regulator as instructed on page 17.
4. Adjust feed dog lengthwise in throat plate slots as instructed on page 5.
5. Replace motor as instructed on page 28.

## REMOVALS AND REPLACEMENTS NEEDLE BAR

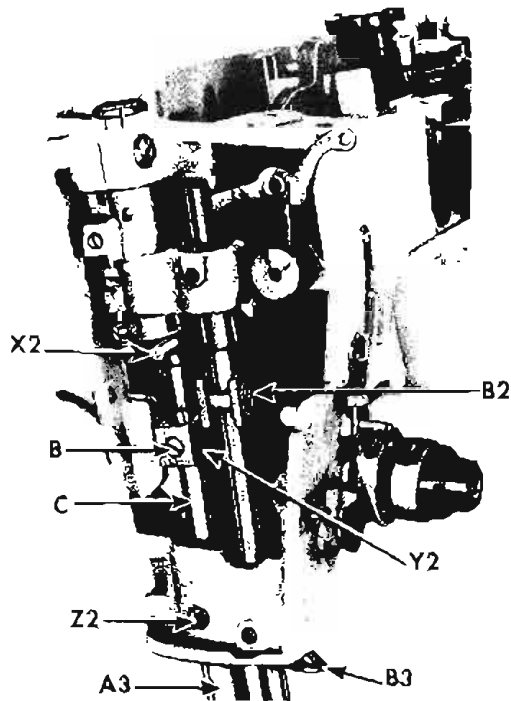


Fig. 46. Needle Bar and Presser Bar Assemblies

### REMOVAL:

1. Remove needle clamp assembly.
2. Remove arm top cover and face plate.
3. Loosen screw B2, Fig. 46 and lift needle bar up through bushings and out of machine.

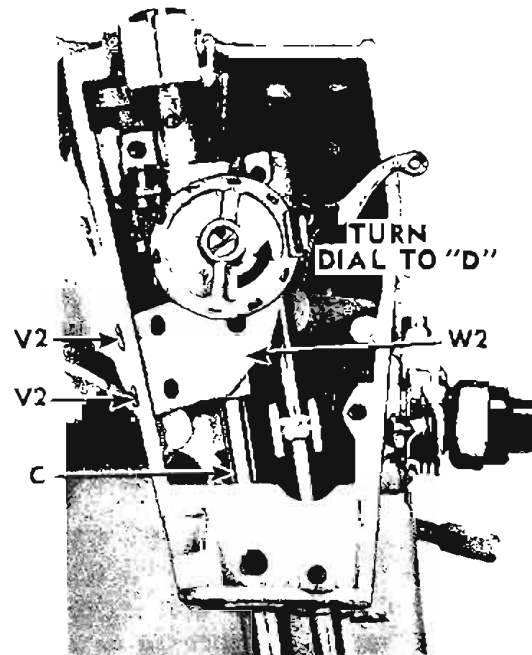


Fig. 47. Removing Pressure Regulating Dial

### REPLACEMENT:

1. Insert needle bar through bushings, as shown in Fig. 46.
2. Replace needle clamp assembly.
3. Adjust needle bar height as instructed on page 13.
4. Replace face plate and arm top cover.

## PRESSER BAR

### REMOVAL:

1. Remove needle bar as instructed above.
2. Remove presser foot and thumb screw.
3. Lower presser bar C and turn pressure dial to "D" setting.
4. Remove two screws V2, Fig. 47 at left end of bracket W2 and remove pressure dial assembly.
5. Remove extension pin X2, Fig. 46, with its spring.
6. Loosen set screw B and remove presser bar guide bracket Y2.
7. Loosen screw Z2 and remove presser bar bushing A3, thread guide B3 and presser bar C.

### REPLACEMENT:

1. Replace presser bar assembly in reverse order of its removal.
2. Replace thread guide B3 as instructed on page 11.
3. With pressure dial set at "D", replace dial making certain that extension X2 is seated against outside cam surface of dial. Then fasten bracket W2 with two screws V2, Fig. 47.
4. Adjust presser foot height as instructed on page 4.
5. Replace needle bar as instructed above.

## REMOVALS AND REPLACEMENTS NEEDLE BAR VIBRATING BRACKET

### REMOVAL:

1. Remove arm top cover and face plate.
2. Remove pressure regulating dial as instructed on page 25. (It is not necessary to remove the presser bar.)
3. Mark edge of eccentric hinge pin H3, as shown in Fig. 48, so that its position in relation to casting may be readily regained.
4. Unhook spring Y3 from hinge pin Z3.
5. Loosen screw A5 and remove pin Z3.
6. Loosen screw G3 and remove collar J3.
7. Loosen clamping screw F3 and remove large eccentric hinge pin H3.
8. Remove needle bar vibrating bracket E3 from machine head.

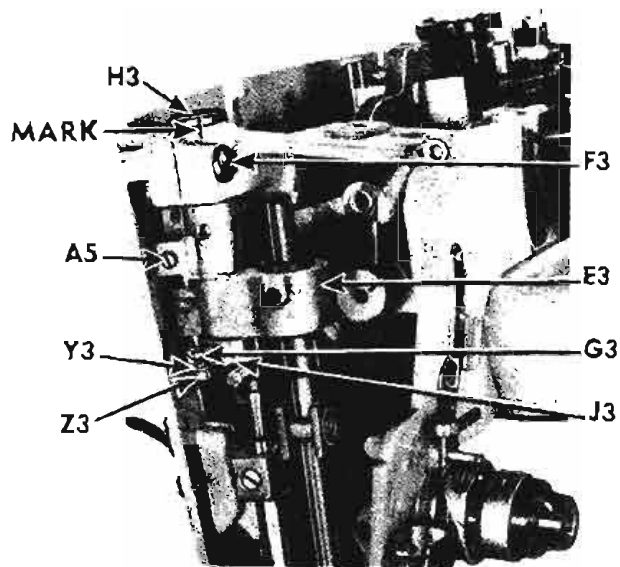


Fig. 48. Needle Bar Vibrating Bracket

### REPLACEMENT:

Install needle bar vibrating bracket E3 in the reverse order of its removal. Observe the following:

Spring Y3 must be hooked around hinge pin Z3, as shown in Fig. 53, and hooked on arm A6, (as shown in Fig. 59, page 33).

Make certain that when screw G3 is tightened, bracket E3 moves without looseness or binding.

Turn hinge pin H3 until marks made in Step 3 of "REMOVAL" are in line with each other. Then securely tight clamping screw F3.

## NEEDLE THREAD TAKE-UP

### REMOVAL:

1. Remove arm top cover and face plate.
2. Remove needle bar vibrating bracket as instructed above.
3. Loosen set screw B5.
4. Through hole in top of casting, loosen set screw C5 in needle bar crank D5.
5. Withdraw needle thread take-up E5 with link F5, hinge stud G5, stud H5 and thread control finger J5.

**NOTE:** Thread control finger J5 may be removed from connecting link K5 by removing the screw located at back of link K5 which fastens the control finger to the connecting link.

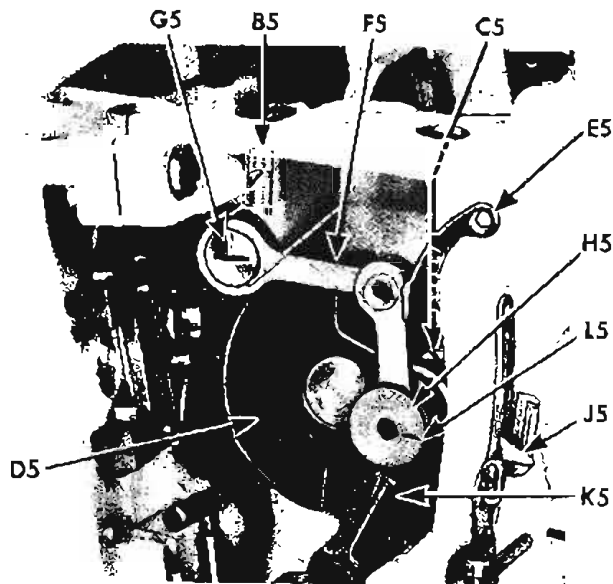


Fig. 49. Needle Thread Take-up

### REPLACEMENT:

1. Replace needle thread take-up in reverse order of its removal.
2. When inserting stud H5 into corresponding hole in crank D5, position mark L5 parallel to head of screw C5, as shown in Fig. 49. Press firmly on stud H5 and tighten set screw C5.
3. Turn hand wheel while setting hinge stud G5 to make certain there is no end play or binding, then tighten set screw B5.
4. Replace needle bar vibrating bracket as instructed above.
5. Replace face plate and arm top cover.

## REMOVALS AND REPLACEMENTS UPRIGHT ARM SHAFT

**CAUTION: DO NOT REMOVE** the upright arm shaft, from this machine. If this becomes necessary, the machine should be returned to the factory.

Both sets of bevel gears at the ends of the upright arm shaft have been lapped together at the factory and should be kept in mesh throughout all other removals and replacements.

### HORIZONTAL ARM SHAFT

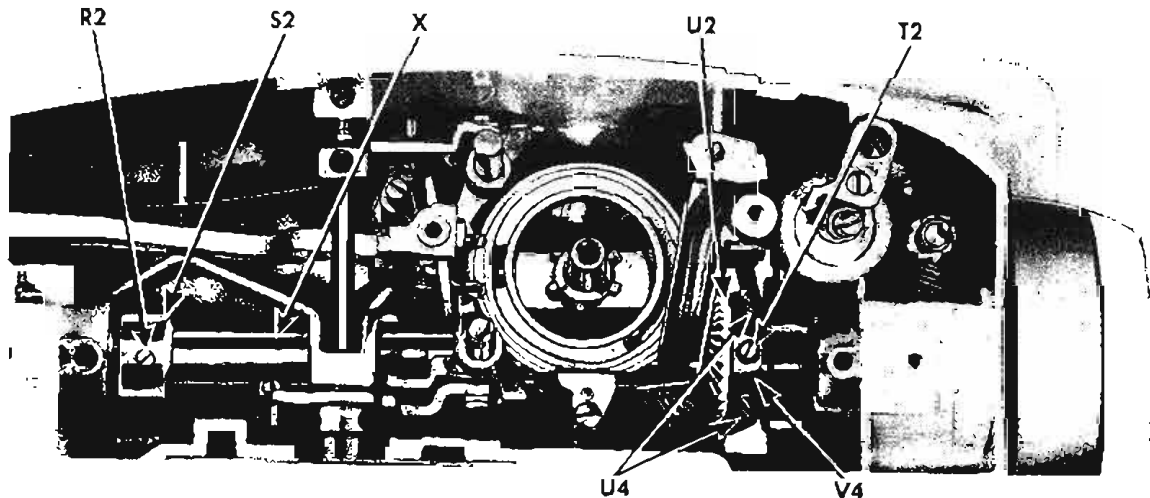


Fig. 50. Horizontal Arm Shaft

#### REMOVAL:

1. Remove arm top cover and face plate.
2. Remove needle bar vibrating bracket as instructed on page 26.
3. Remove needle thread take-up as instructed on page 26.
4. Remove cam stack as instructed on page 35. † Remove disc follower and needle position lever assembly as instructed on page 41. ‡
5. Remove hand wheel and counterbalance as instructed on page 18.
6. Loosen set screw R2 in collar S2.
7. Remove two screws U4 and remove connecting rod cap V4.
8. Loosen feed timing screw T2 so that gear U2 is free on arm shaft X.

**NOTE:** Keep gears in mesh at all times.

9. Using a 1/2 inch drift pin (or another arm shaft), drive arm shaft X out of face-plate-end of machine. Hold Gear U2 in mesh with gear on upright arm shaft.

#### REPLACEMENT:

1. From face-plate-end of machine, insert new arm shaft into machine arm, through collar S2, bevel gear U2 and feed forked connection Y4.
2. Make certain that flat on arm shaft is under set screw R2; then, while pressing firmly on needle bar crank and holding collar S2 against casting, tighten set screw R2.
3. Set gear U2 into mesh with bevel gear at top of upright arm shaft and tighten feed timing screw T2 into groove provided for it on arm shaft.
4. Replace connecting rod cap V4 and fasten with two screws U4.
5. Replace counterbalance and hand wheel as instructed on page 18.
6. Replace cam stack as instructed on page 35. † Replace disc follower and needle position lever assembly as instructed on page 41. ‡
7. Replace needle thread take-up as instructed on page 26.
8. Replace needle bar vibrating bracket assembly as instructed on page 26.
9. Adjust arm shaft for end play or binding, if necessary, as instructed on page 10.
10. Replace face plate and arm top cover.

† Applies only to Machine 500.

‡ Applies only to Machine 503.



## REMOVALS AND REPLACEMENTS THE MOTOR

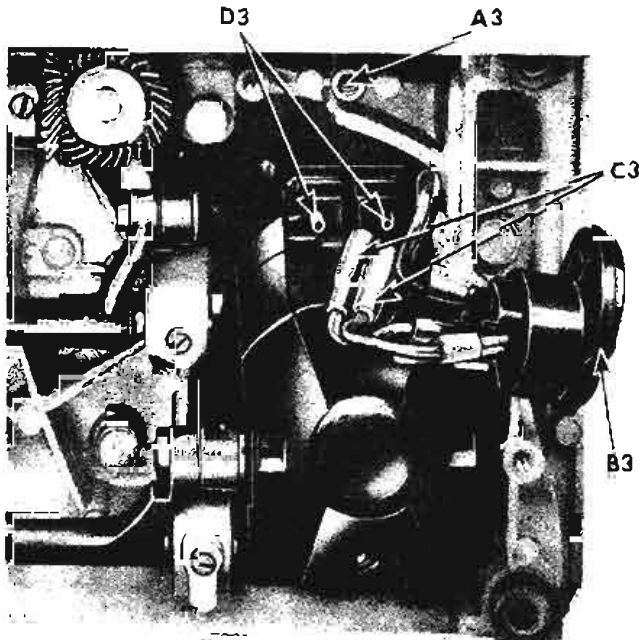


Fig. 51. Removing Motor

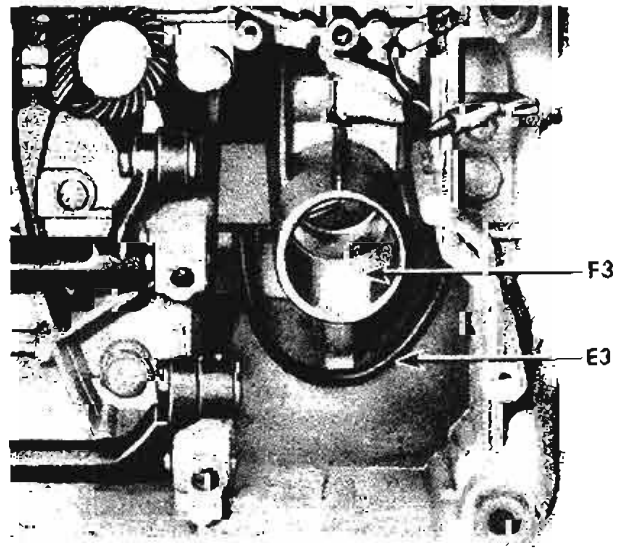


Fig. 52. Location of Wires around Motor

### CAUTION:

Remove plug from electric outlet before removing any electrical part from machine.

### REMOVAL:

1. Tilt machine back.
2. Remove bottom cover plate.
3. Remove motor hold-down plate by removing screw from hole A3, Fig. 51.
4. Displace male half of terminal connection B3, as shown in Fig. 51.
5. Remove two electrical sleeve connections C3 from motor terminals D3.
6. Slide motor out toward you, rocking it from side to side to facilitate removal.

**NOTE:** Remove grit or hardened grease from worm gear on motor shaft before replacing motor.

### REPLACEMENT:

1. Make certain that light lead E3 is correctly located around cylindrical tube F3, as shown in Fig. 52.
2. Slide motor into position, turning hand wheel slightly to facilitate gear mesh.
3. Fit electrical sleeve connections C3, Fig. 51 to motor terminals D3.
4. Return male half of terminal B3 to its correct position and replace motor hold-down plate.
5. Replace bottom cover plate.

**NOTE:** See Wiring Diagram on page 43.

## REMOVALS AND REPLACEMENTS LIGHT FIXTURE

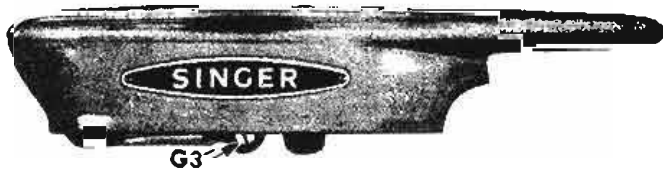


Fig. 53. Lamp Shade

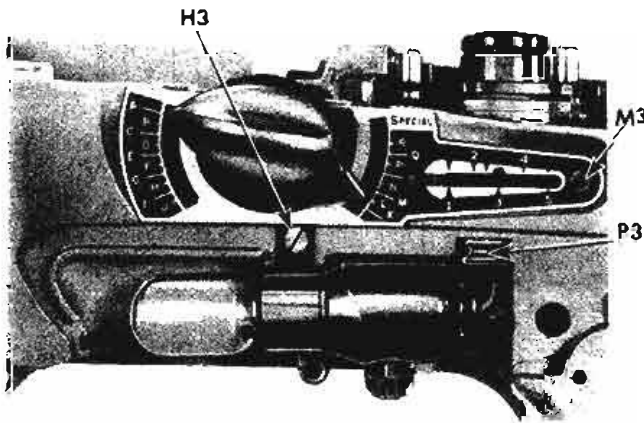


Fig. 54. Light Fixture

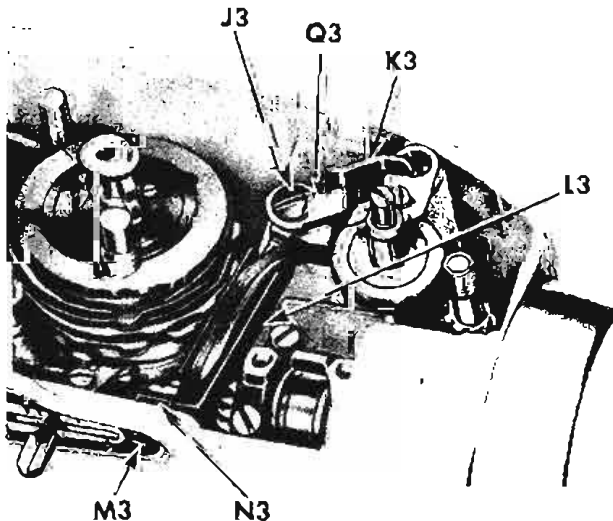


Fig. 55. Wiring at Top of Arm

### REMOVAL:

1. Remove screw G3, Fig. 53 which fastens lamp shade to machine arm and remove lamp shade.
2. Remove screw H3, Fig. 54, allowing socket to hang free from arm.
3. Remove arm top cover and bottom cover plate.
4. Remove two light lead terminals from terminal connection B3, Fig. 51. (See WIRING DIAGRAM on page 43.)
5. Remove screw J3, Fig. 55, and remove bobbin winder engaging lever assembly K3 with oil shield L3.
6. Remove screw M3 and light lead clip N3.
7. Remove light fixture, with its lead, from machine arm.

### REPLACEMENT:

1. Insert light lead through rubber grommet P3, Fig. 54 and up into arm of casting. Guide light lead down through cavity Q3, Fig. 55.

NOTE: Motor must be removed for this operation (see page 28) and light lead E3 must be correctly located around cylindrical tube F3, as shown in Fig. 52.

2. Connect two light lead terminals to terminal connection B3, Fig. 51. (See WIRING DIAGRAM on page 43.)
3. Replace light lead clip N3, Fig. 55 and fasten with screw M3.
4. Replace oil shield L3 and bobbin winder engaging lever K3 in the order illustrated on page 17.
5. Replace light socket and fasten with screw H3, Fig. 54.
6. Replace motor as instructed on page 28.
7. Replace lamp shade, arm top cover, motor hold-down plate and bottom cover plate.

**THE FOLLOWING PAGES**  
**(pages 31 to 36)**  
**APPLY ONLY TO**  
**MACHINE 500**

## TO SET INDEX PINS AT CORRECT HEIGHT

### PREPARATION:

Remove arm top cover and Special Disc.  
Remove lamp shade. Unfasten sewing light from arm of machine as instructed on page 29.

### CHECK:

Set selector knobs at "J" and "R".  
At this setting, top surface of followers Y and Z should be approximately 1/64 inch below top surface of cam stack M5, as shown in Fig. 56.

NOTE: Position of followers Y and Z is determined by height of index pins N5 and P5, respectively.

### SETTING:

Loosen set screw Q5, Fig. 56 (inset).  
Raise or lower rear index pin N5, as required, to bring top surface of follower Y 1/64 inch below top surface of cam stack M5. Then securely tighten set screw Q5.

Loosen screw R5 at front of machine arm.  
Raise or lower front index pin P5, as required, then securely tighten screw R5.

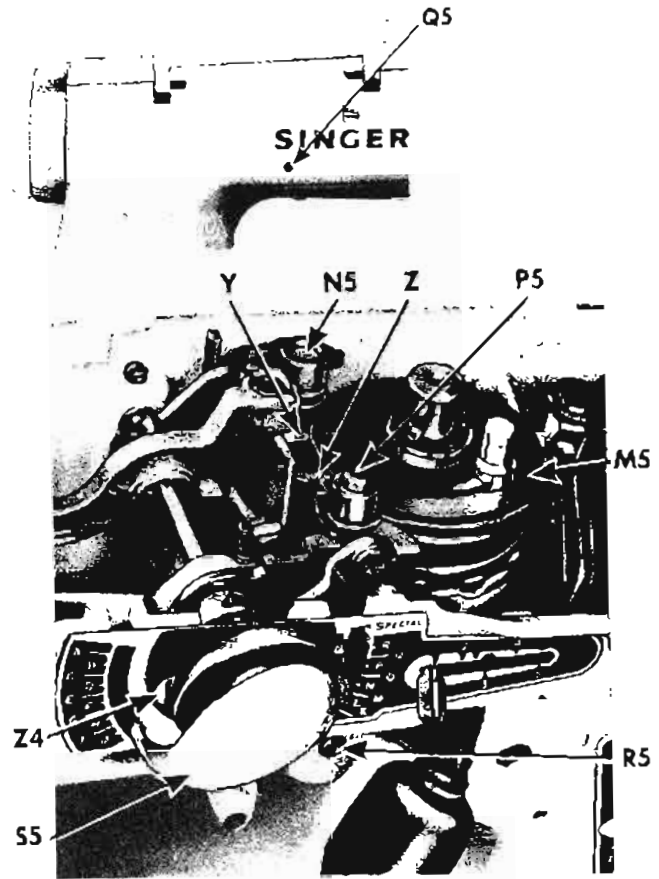


Fig. 56. Setting Height of Index Pins

## TO TIME THE CAM STACK

### PREPARATION:

Remove arm top cover and Special Disc.  
Using front selector knob S5, Fig. 56, bring rear follower Y in contact with edge of top cam of cam stack M5.

Turn hand wheel over toward you until timing mark T5 is at point of contact with rear follower Y, as shown in Fig. 57.

### CHECK:

At this setting, the needle bar should be at its lowest position.

### SETTING:

Remove stud and spring U5, Fig. 57.  
Turn hand wheel over toward you until needle bar is at its lowest position.  
Loosen each of the three clamping screws V5 one complete turn.

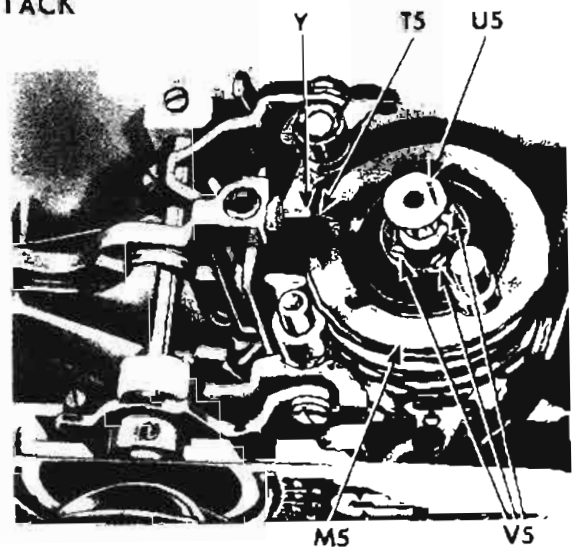


Fig. 57. Timing the Cam Stack

While holding needle bar at its lowest position, manually rotate entire cam stack clockwise until timing mark T5 reaches point of contact with rear follower Y, as shown in Fig. 57.

Tighten the three clamping screws V5.  
Replace stud and spring U5. Tighten stud.  
Replace Special Disc and arm top cover.

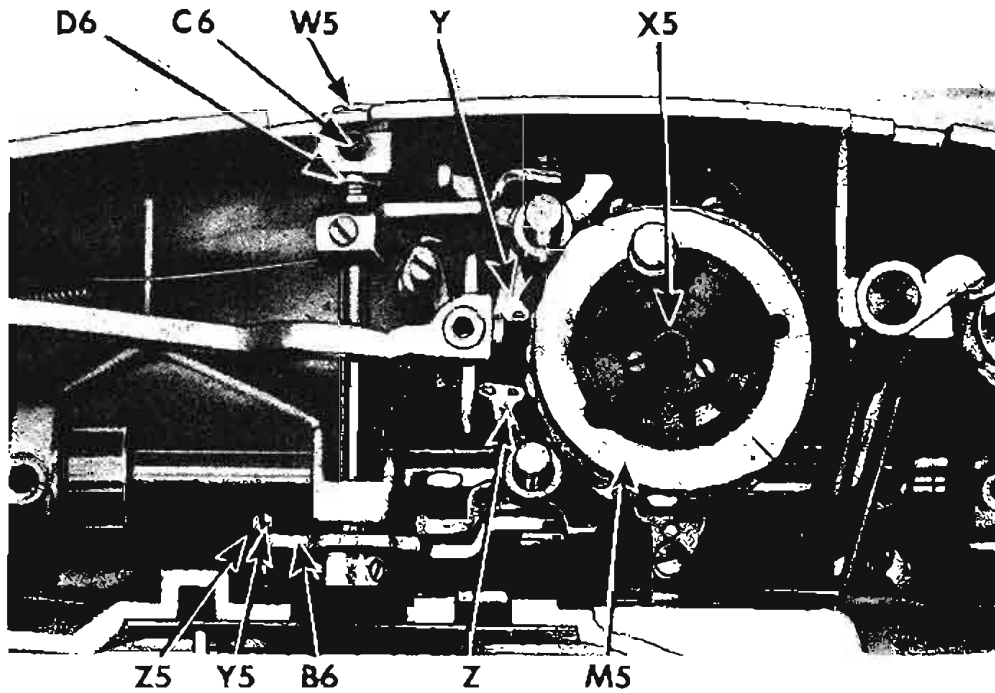


Fig. 58. Setting Cam Selector Arm Stops

#### PREPARATION:

Remove arm top cover.

Check adjustment of worm wheel shaft X5, Fig. 58, (see instructions on page 36).

Make certain that screws Z4, Fig. 56 and W5, Fig. 58 are securely tightened.

Set selector at "D" and "L".

Turn hand wheel over toward you until followers Y and Z, Fig. 58 rest upon high points of bottom (zigzag) cam of cam stack M5.

#### CHECK: (Use Feeler Gauge)

At this setting, when rear selector knob is drawn out as far as possible, clearance between front follower Z and high point of bottom cam should be .010 to .012 inch. When front selector knob is pressed in as far as possible, clearance between rear follower Y and high point of bottom cam should also be .010 to .012 inch.

#### SETTING:

Loosen set screw Y5, Fig. 58.

Set rear selector knob at "L".

Move stop Z5 toward front until its front surface contacts rear face of selector arm B6, as shown in Fig. 58.

Tighten set screw Y5.

Recheck clearance between front follower Z and bottom cam of cam stack M5.

Loosen set screw C6.

Set front selector knob at "D".

Press stop bushing D6 toward the rear until it contacts inside head of screw W5.

Tighten screw C6.

Recheck clearance between rear follower Y and bottom cam of cam stack M5.

## TO SET BIGHT AMPLITUDE STOP PLATES

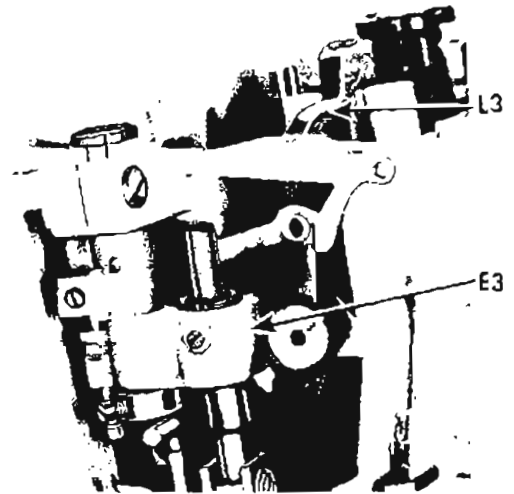
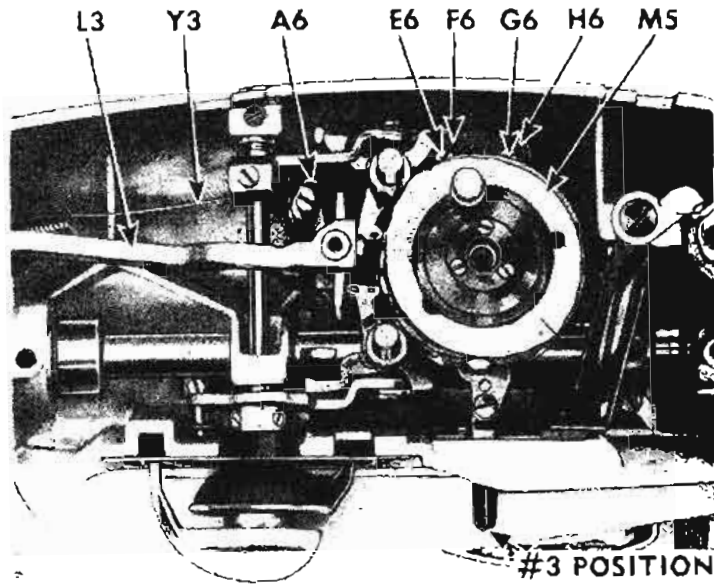


Fig. 59. Setting Bight Amplitude Stop Plates

### PREPARATION:

Remove arm top cover.

Set index pins at correct height and time the cam stack as instructed on page 31.

### CHECK: (At No. 1 Position)

With stitch controls set at "A - L - 3", operate machine at slow speed and, at same time, move stitch width (bight) lever to No. 1 position. (See Fig. 60.) Movement of driving arm L3, Fig. 59 and vibrating bracket E3 should stop at same time that movement of bight lever stops at No. 1 position.



Fig. 60. Setting "A - L - 1"

### CHECK: (At No. 5 Position)

With stitch controls set at "D - K - 3", operate machine at slow speed and, at same time, move stitch width (bight) lever to No. 5 position. (See Fig. 61.) Movement of driving arm L3, Fig. 59, and vibrating bracket E3 should stop at same time that movement of bight lever stops at No. 5 position.



Fig. 61. Setting "D - K - 5"

### SETTING:

Loosen clamping screw E6, Fig. 59.

Move bight lever to No. 3 position.

Run machine at moderate speed and move bight lever toward left to point where there is no movement of bracket E3 or driving arm L3. **DO NOT PASS THIS POINT.**

Maintain this position of bight lever and move left stop plate F6 forward (toward operator) against bight amplitude bracket beneath cam stack M5.

Hold stop plate F6 at this setting and securely tighten screw E6.

### SETTING:

Loosen clamping screw G6.

Move bight lever to No. 3 position.

Run machine at moderate speed and move bight lever toward right to point where there is no movement of bracket E3 or driving arm L3. **DO NOT PASS THIS POINT.**

Maintain this position of bight lever and move right stop plate H6 forward (toward operator) against bight amplitude bracket beneath cam stack M5.

Hold stop plate H6 at this setting and securely tighten screw G6.

**TO CENTRALIZE NEEDLE BAR DRIVING ARM  
WITH DISC SELECTOR ARM BRACKET FOLLOWERS**

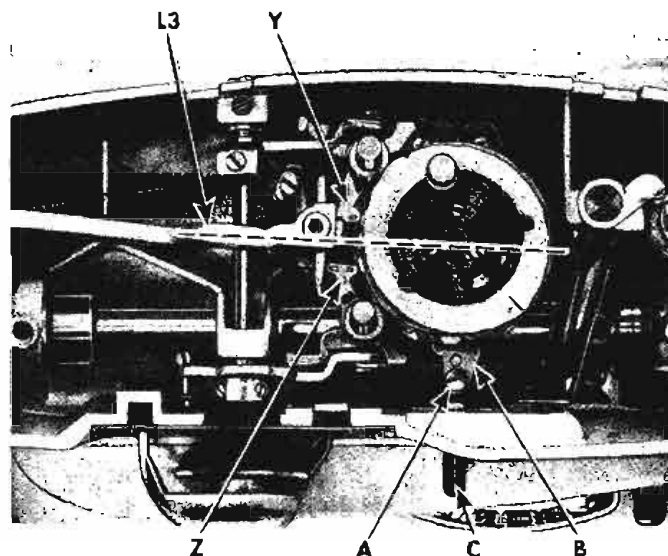


Fig. 62. Centralizing Needle Bar Driving Arm

**PREPARATION:**

Remove arm top cover.  
Set bight amplitude stop plates as instructed on page 33.  
Set bight lever at No. 3 position, as shown in Fig. 63.

**CHECK:**

When bight lever is set at No. 3 position, the center line of needle bar driving arm L3 should coincide with a point midway between followers Y and Z, Fig. 62.

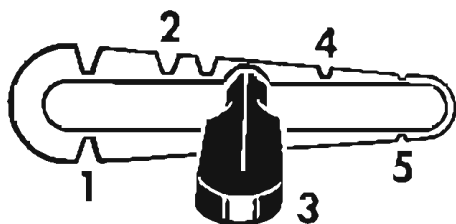


Fig. 63. Bight Lever at No. 3 Position

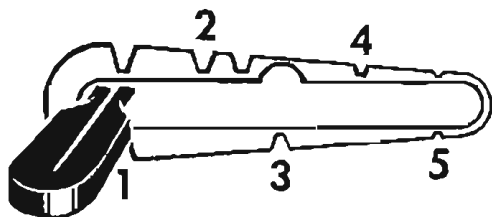


Fig. 64. Bight Lever at No. 1 Position

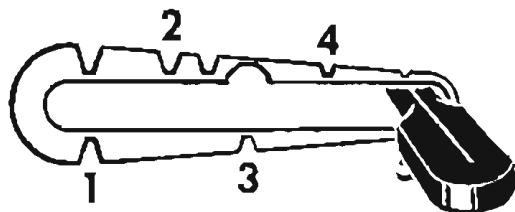


Fig. 65. Bight Lever at No. 5 Position

**SETTING:**

Loosen clamping screw A, Fig. 62 .  
Push lever bracket B toward left as far as possible.  
Align center line groove C of bight lever with No. 1 position, as shown in Fig. 64.  
Tighten clamping screw A.

Move bight lever as far as possible to the right. Groove C should now be in line with No. 5 position, as shown in Fig. 65.

If groove C of bight lever is not in line with No. 5 position, loosen screw A and, while holding bracket B to extreme right, move lever 1/2 the distance that it is off (out of line). Then tighten clamping screw A. Lever will now be an equal distance from center position No. 3 when set at No. 1 and No. 5 positions.

Replace arm top cover.

## REMOVALS AND REPLACEMENTS CAM STACK

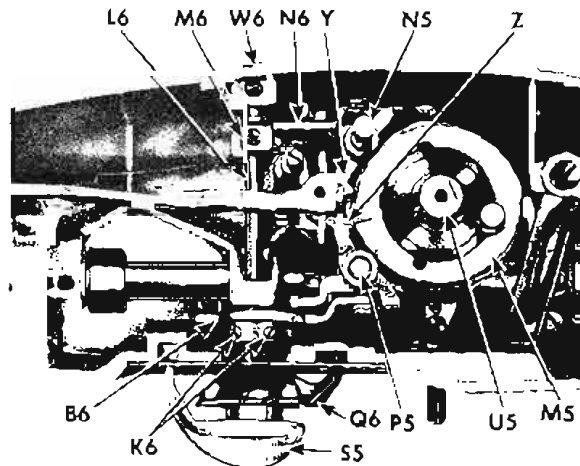


Fig. 66. Cam Stack and Cam Selector Arm Shaft

### REMOVAL:

1. Set stitch pattern selector knobs at "A - K".
2. Remove arm top cover and Special Disc.
3. Remove large screw stud U5 with its spring.
4. Remove cam stack M5.

### REPLACEMENT:

1. Replace cam stack, meshing worm wheel of cam stack with worm of arm shaft. (See Fig. 69.)
2. Replace screw stud U5 with its spring.
3. Replace Special Disc and arm top cover.

## CAM SELECTOR ARM SHAFT AND FOLLOWERS

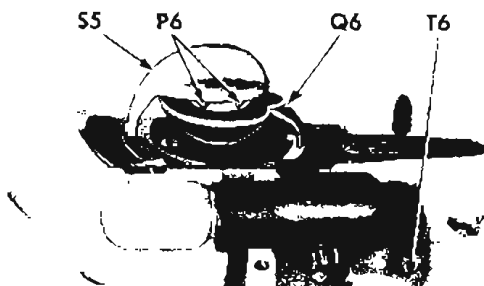


Fig. 67. Removing Selector Arm Shaft

### REMOVAL:

1. Remove cam stack as instructed above.
2. Loosen two screws K6, Fig. 66.
3. Remove screw W5 located at rear of selector arm shaft L6.
4. Loosen screw M6.
5. Withdraw selector arm shaft L6 from front of arm, releasing rear selector arm N6 and front selector arm B6.
6. Remove selector arms B6 and N6 from machine.
7. Remove followers Y and Z from index pins N5 and P5 respectively.

NOTE: Outer selector knob S5 may be removed from shaft L6 by removing the two socket screws P6, Fig. 67. Take care not to lose the spring which is seated in inner knob Q6.

### REPLACEMENT:

1. Replace followers Y and Z, as shown in Fig. 66.
2. Place selector arms B6 and N6 in position shown in Fig. 66, making certain that their hinged brackets fit into slots of followers Y and Z.
3. Replace selector arm shaft L6 through follower arms N6 and B6.
4. Securely tighten screw M6 making certain that it clamps down on counterbore on shaft L6.
5. Replace and securely tighten screw W5.
6. Replace cam stack as instructed above.
7. Tighten one (right) set screw K6 and turn knob Q6 to bring follower Z at rest against top cam of cam stack M5.
8. Loosen the set screw K6 (previously tightened in Step 7) and turn knob Q6 until its pointer is aligned with the "R" of the indicator plate. Then securely tighten both set screws K6.  
NOTE: When inner knob Q6 is pulled out, there should be approximately 1/16 inch clearance between knobs Q6 and S5.
9. With one of socket screws P6 tightened, turn front knob S5 to bring follower Y at rest against top cam of cam stack M5.
10. Loosen the screw P6 and turn knob S5 until its pointer is aligned with the "J" of the indicator plate. Then securely tighten both socket screws P6.
11. Replace Special Disc and arm top cover.



## REMOVALS AND REPLACEMENTS NEEDLE BAR DRIVING ARM

### REMOVAL:

1. Remove arm top cover and face plate.
2. Remove cam selector arm shaft as instructed on page 35.
3. Remove needle bar vibrating bracket as instructed on page 26.
4. Lift needle bar driving arm L3 from machine.

chine so that ball pivot R6 rides in socket provided for it in pattern selector S6, as shown in Fig. 68.

**CAUTION:** Make certain that tension arm A6 is in correct position in relation to driving arm L3, as shown in Fig. 68.

### REPLACEMENT:

1. Install needle bar driving arm L3 in arm of ma-

2. Replace cam selector arm shaft as instructed on page 35.

3. Replace needle bar vibrating bracket as instructed on page 26.

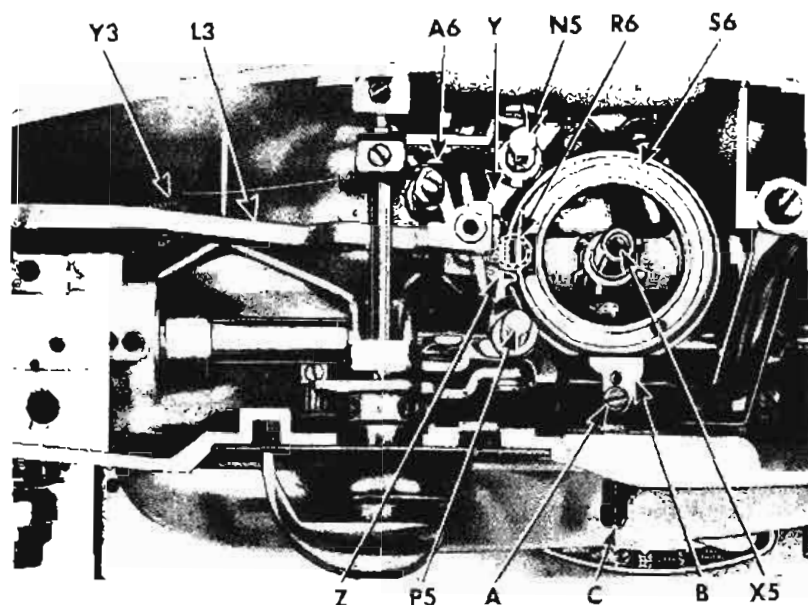


Fig. 68. Location of Ball Pivot on Driving Arm

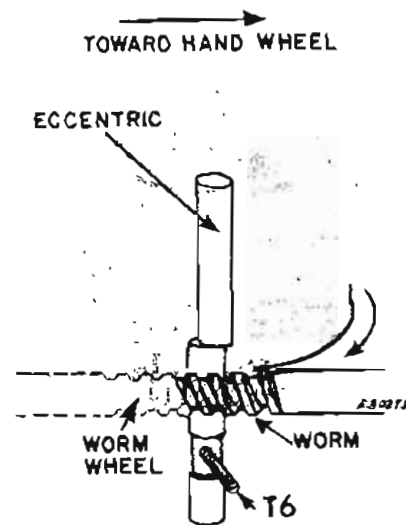


Fig. 69. Eccentric Worm Wheel and Worm Wheel Shaft

## BIGHT AMPLITUDE AND PATTERN SELECTOR

### REMOVAL:

1. Remove arm top cover, face plate and lamp shade.
2. Set stitch selector knobs at "A - K".
3. Remove spring Y3, Fig. 68.
4. Remove screw A from bracket B and remove bight lever C.
5. Loosen set screw T6, Figs. 67 and 69, and remove entire cam stack assembly M5, Fig. 66.
6. Remove bight amplitude and pattern selector S6.

1. Assemble cam stack as a complete unit. Upper eccentric half of worm wheel shaft should be turned toward hand-wheel-end of machine, as shown in Fig. 69.
2. Make certain that driving arm ball pivot R6 is engaged with pattern selector S6, as shown in Fig. 68.
3. Set mesh between worm of arm shaft and worm wheel of pattern selector by turning shaft X5 clockwise so that there is no binding and a minimum amount of backlash.

### REPLACEMENT:

Replace pattern selector S6 in the reverse order of its removal. Observe the following:

4. Tighten set screw T6, Figs. 67 and 69.
5. Replace spring Y3, Fig. 68.
6. Replace bight lever C and fasten with screw A.
7. Adjust machine as instructed on page 34.

**THE FOLLOWING PAGES  
(pages 38 to 42)  
APPLY ONLY TO  
MACHINE 503**

## TO SET INDEX PINS AT CORRECT HEIGHT

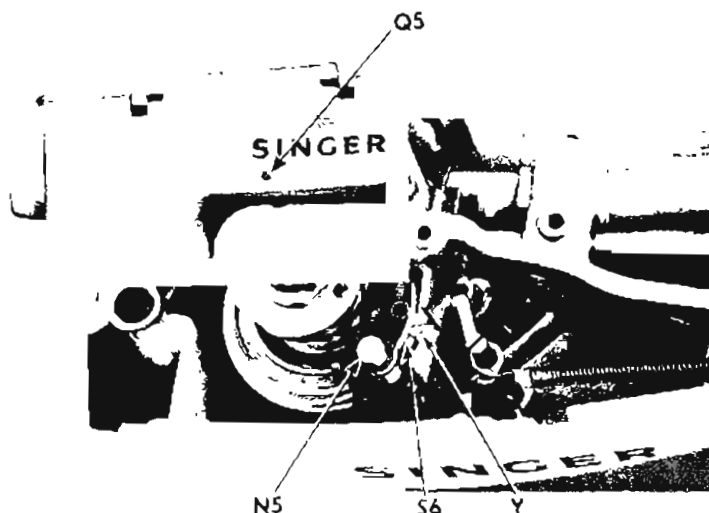


Fig. 70. Setting Height of Rear Index Pin

### PREPARATION:

Remove arm top cover and FASHION DISC.

### CHECK: (Rear index pin N5)

Set needle position knob A in RIGHT needle position.

At this position, top surface of follower Y should be even with (or slightly below) top surface of upper (small) ring of bight amplitude selector S6.

### SETTING:

Loosen set screw Q5, Fig. 70 (inset).

Raise or lower rear index pin, as required, to bring top surface of follower Y even with (or slightly below) top surface of upper (small) ring of bight amplitude selector S6.

Tighten set screw Q5.

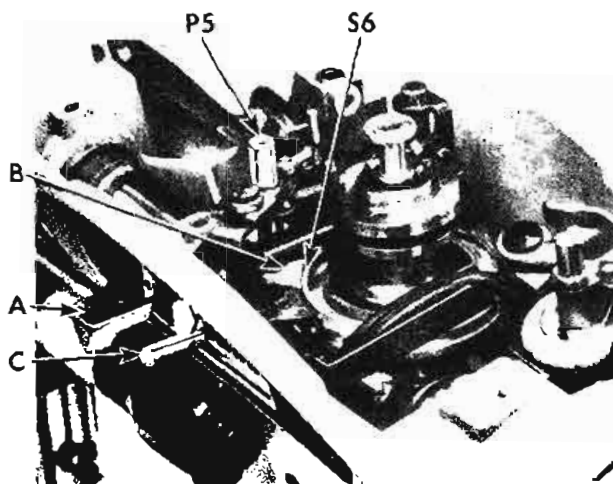


Fig. 71. Setting Height of Front Index Pin

### CHECK: (Front index pin P5)

Set bight lever C in STR position.

At this position, top surface of disengaging finger B should be even with top surface of upper (small) ring of bight amplitude selector S6, as shown in Fig. 71.

### SETTING:

Remove lamp shade and remove screw which fastens light socket to arm of machine, (see page 18), allowing socket to hang free.

Loosen screw R5 (see Fig. 56, page 31).

Raise or lower front index pin P5, as required, to bring top surface of disengaging finger B even with top surface of upper (small) ring of bight amplitude selector S6.

Tighten screw R5, Fig. 56, page 31.

## TO TIME THE DISC DRIVING WORM WHEEL ASSEMBLY

### PREPARATION:

Place Zigzag Disc No. 0 on disc spindle.

### CHECK:

Turn hand wheel until disc follower D is aligned with timing mark on disc, as shown in Fig. 72.

At this position, needle bar should be at its lowest position.

### SETTING:

Remove FASHION DISC.

Loosen the two clamping screws V5 one complete turn.

Replace Zigzag Disc No. 0 and, while holding needle bar at its lowest position, manually rotate disc clockwise until timing mark on Zigzag Disc is aligned with disc follower D, as shown in Fig. 72.

Remove disc and securely tighten clamping screws V5.

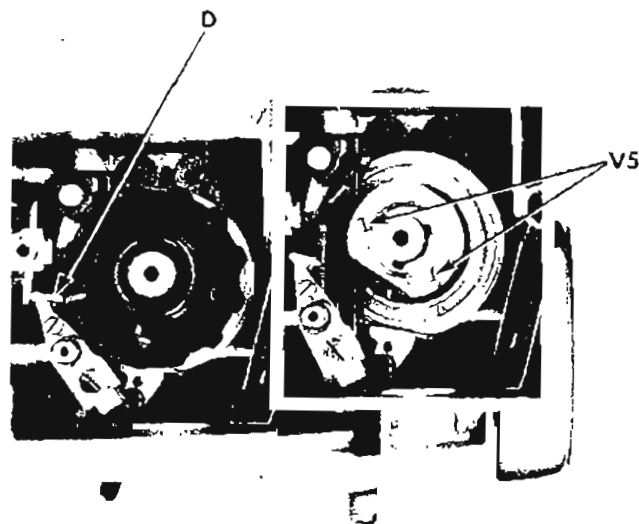


Fig. 72. Timing the Disc Driving Worm Wheel Assembly

## TO SET BIGHT AMPLITUDE STOP PLATES

### PREPARATION:

Remove arm top cover. Place Zigzag Disc No. 0 on disc spindle.

Set index pins at correct height and time the disc driving worm wheel assembly as instructed on page 38.

### CHECK: (Making paper perforation test)

Set throat plate lever in up (darning) position. Remove presser foot.

Place an ordinary sheet of note paper over throat plate, holding it taut.

With bight lever set at STR, make a slight perforation in the paper at each of the LEFT, CENTER and RIGHT needle position settings. Then, without disturbing position of note paper, set bight lever at "5" (maximum width) position and turn hand wheel over toward you. Needle should enter some perforations made previously.

### SETTING:

Check to see that center groove of bight lever C is in line with imaginary line which bisects clamping screw A, as shown in Fig. 73. (To make alignment, loosen screw A, move bight lever C, as required, then tighten screw A.)

Loosen screws E6 and G6.

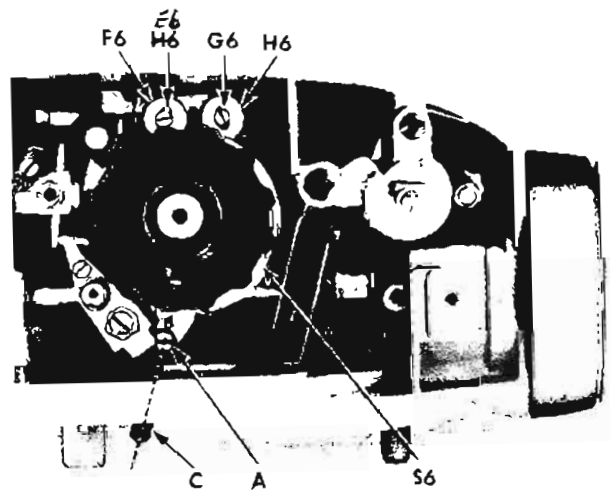


Fig. 73. Setting Bight Amplitude Stop Plates

While bight lever C is in STR position, move left stop plate F6 forward (toward operator) against bracket beneath bight amplitude selector S6 and securely tighten screw E6.

Move bight lever to "5" position. While in this position, move right stop plate H6 forward (toward operator) against bracket beneath bight amplitude selector S6 and securely tighten screw G6.

## TO TIME THE DISC FOLLOWER ASSEMBLY

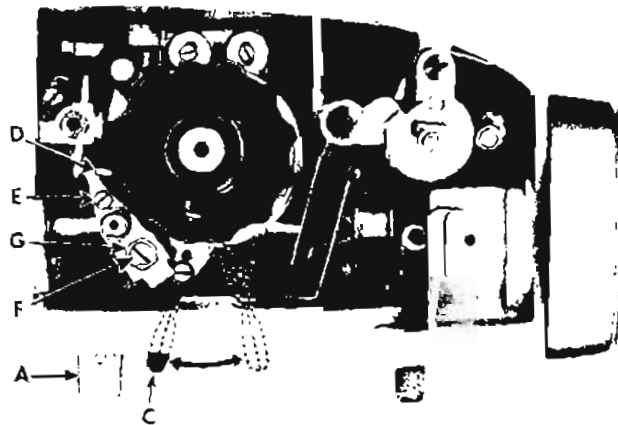


Fig. 74. Timing the Disc Follower Assembly

### PREPARATION:

Remove arm top cover and place Zigzag Disc No. 0 on disc spindle.

Set needle position knob A in LEFT needle position.

### CHECK:

Turn hand wheel until disc follower D is aligned with timing mark on disc, as shown in Fig. 74.

Slowly move bight lever C from left to right position. While doing so, there should not be any movement of needle bar.

### SETTING:

Loosen screws E and F and, while moving bight lever C from left to right, turn eccentric G clockwise until there is no movement of needle bar.

Tighten screw E. Then, while maintaining correct position of eccentric G, tighten screw F.

## TO ADJUST NEEDLE BAR DRIVING ARM PLATE DISENGAGING MECHANISM

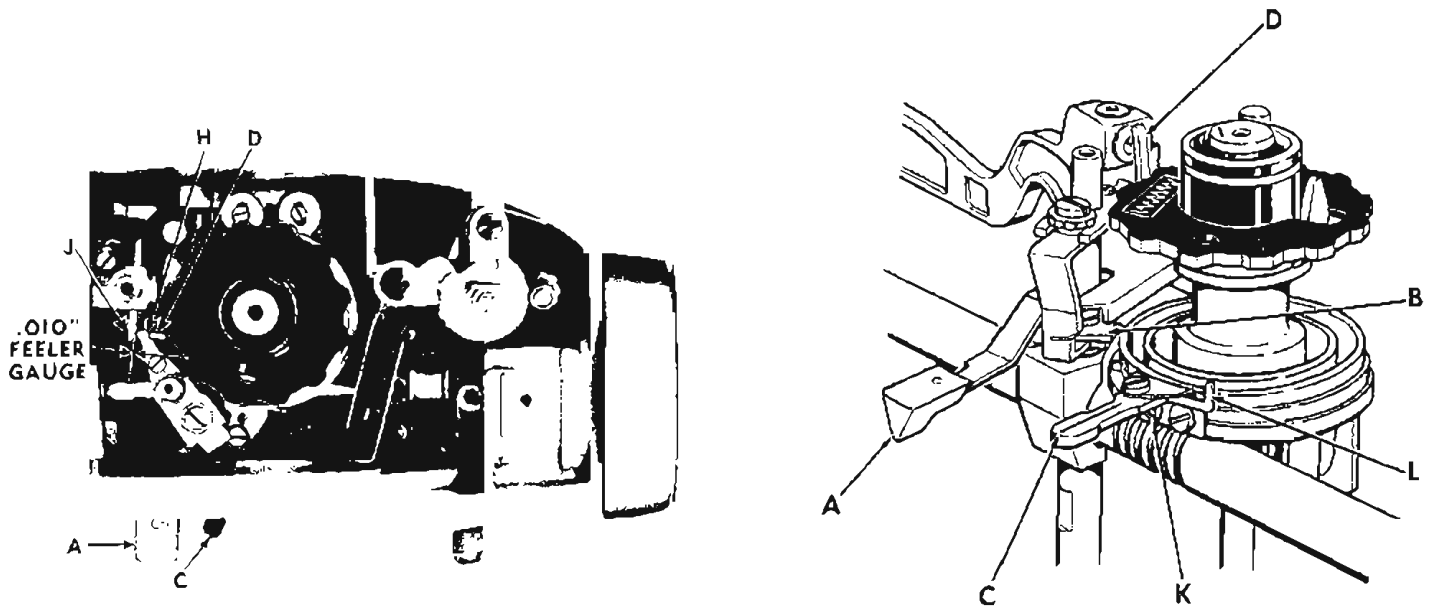


Fig. 75. Adjusting Driving Arm Plate Disengaging Mechanism

### PREPARATION:

Remove arm top cover and place Zigzag Disc No. 0 on disc spindle.  
Set bight lever C in STR position.

### CHECK:

Turn hand wheel until disc follower D is aligned with timing mark on disc, as shown in Fig. 75.  
At this position, there should be .010 inch clearance between adjustable follower H and driving arm plate J, as shown in Fig. 75.

### SETTING:

Remove lamp shade as instructed on page 29.  
Remove needle position knob A by removing the screw (on underside) which fastens knob to bracket assembly.  
Remove needle position and bight indicator plate by removing the two screws which fasten it to machine arm.  
Insert screwdriver through slot for bight lever and loosen left bracket screw K, Fig. 75.  
With bight lever in STR position, insert .010 inch Feeler Gauge between adjustable follower H and driving arm plate J.  
Move tail of disengaging bracket L until bracket comes in contact with disengaging finger B, Fig. 75.  
Tighten screw K.  
Replace indicator plate, needle position knob and lamp shade. Replace arm top cover.

## REMOVALS AND REPLACEMENTS DISC FOLLOWER ASSEMBLY

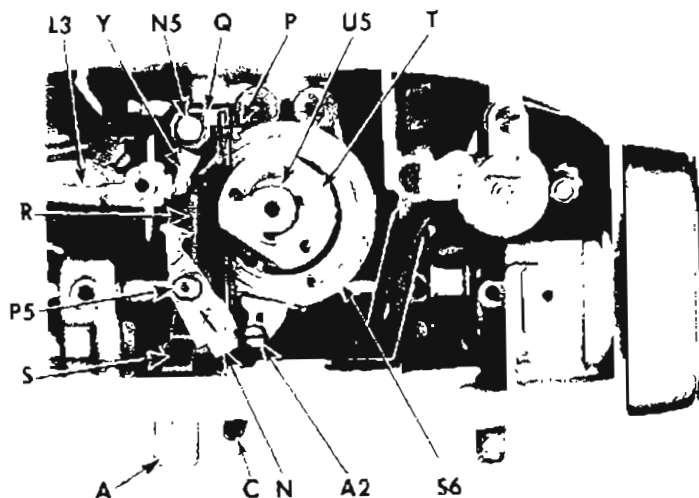


Fig. 76. Disc Follower Assembly

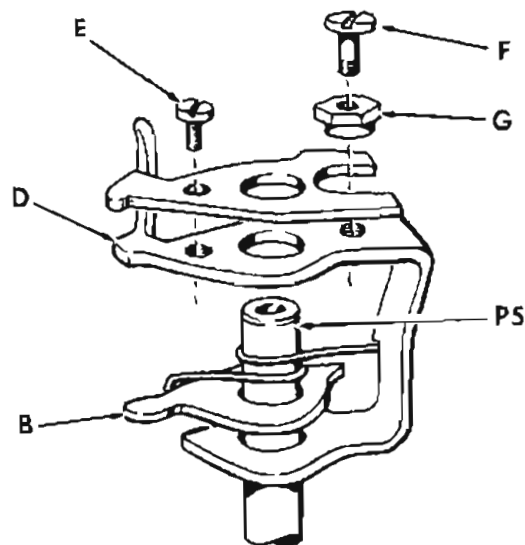


Fig. 77. Exploded View-Disc Follower Assembly

### REMOVAL:

Remove arm top cover, lamp shade and FASHION Disc.

Remove needle position knob A by removing screw which fastens it to position lever S.

Remove plate M, Fig. 71, page 38, by removing two screws which fasten it to machine arm.

Loosen screw P and remove selector lever pivot and stop arm Q.

Disengage spring R from hook on selector lever S.

Move bight lever C to extreme right position. Press selector lever S into machine and disengage it from rear follower Y by pushing follower Y down.

Loosen screw Q5, Fig. 70, page 38 and remove rear index pin N5 from machine.

Raise disc follower assembly N and remove spring R from index pin P5.

Remove entire disc follower assembly N together with selector lever assembly S from machine.

### REPLACEMENT:

Assemble disc follower assembly in the order shown in Fig. 77 and replace on front index pin P5. Do not lower entire assembly.

Assemble needle position lever S on index pin P5. NOTE: Disc follower assembly N must be raised sufficiently to permit assembly of lever S on index pin P5.

Assemble spring R (wide loop) on index pin P5. Locate rear follower Y in relative position over hole for rear index pin N5. Replace pin N5 with its "flat" portion toward its set screw Q5, Fig. 70, page 38. Tighten set screw Q5.

Lower entire disc follower assembly N until it rests on disc follower spacer on index pin P5, and disengaging lever B, Fig. 77, rests against lower section of follower N.

Attach loop of spring R to hook of selector lever S.

Press selector lever S into machine and, at same time, raise rear follower Y, as required, until rear section of lever S engages slot of follower Y.

Replace indicator plate M, Fig. 71, page 38, and needle position lever knob A, Fig. 76.

Set selector lever S at RIGHT needle position. Loosen set screw Q5, Fig. 70, page 38 slightly. With selector lever S pushed in, raise or lower index pin N5 until rear portion of lever S engages top slot provided for it on index pin N5. Then set index pin at correct height as instructed on page 38.

Replace selector lever pivot and stop arm Q so that it fits in slot provided for it in selector lever assembly S. Tighten set screw P.

Time disc follower assembly as instructed on page 39.

Adjust disengaging mechanism as instructed on page 40.

## REMOVALS AND REPLACEMENTS DISC DRIVING WORM WHEEL

### REMOVAL:

Remove arm top cover and FASHION DISC.  
Remove needle position selector lever assembly as instructed on page 41.  
Remove screw stud U5, Fig. 76.

Remove disc driving worm wheel assembly, T.

### REPLACEMENT:

Replace disc driving worm wheel assembly in reverse order of its removal.

## NEEDLE BAR DRIVING ARM

### REMOVAL:

Remove arm top cover and face plate.  
Remove needle bar vibrating bracket as instructed on page 26.  
Lift needle bar driving arm L3, Fig. 76, from machine.

### REPLACEMENT:

Install needle bar driving arm L3, Fig. 76, in arm of machine so that ball pivot R6 (see page 36) rides in socket provided for it in pattern selector S6, as shown in Fig. 68.

**CAUTION:** Make certain that tension arm A6, Fig. 68 is in correct position in relation to driving arm L3.

Replace needle bar vibrating bracket as instructed on page 26.

## BIGHT AMPLITUDE SELECTOR

### REMOVAL:

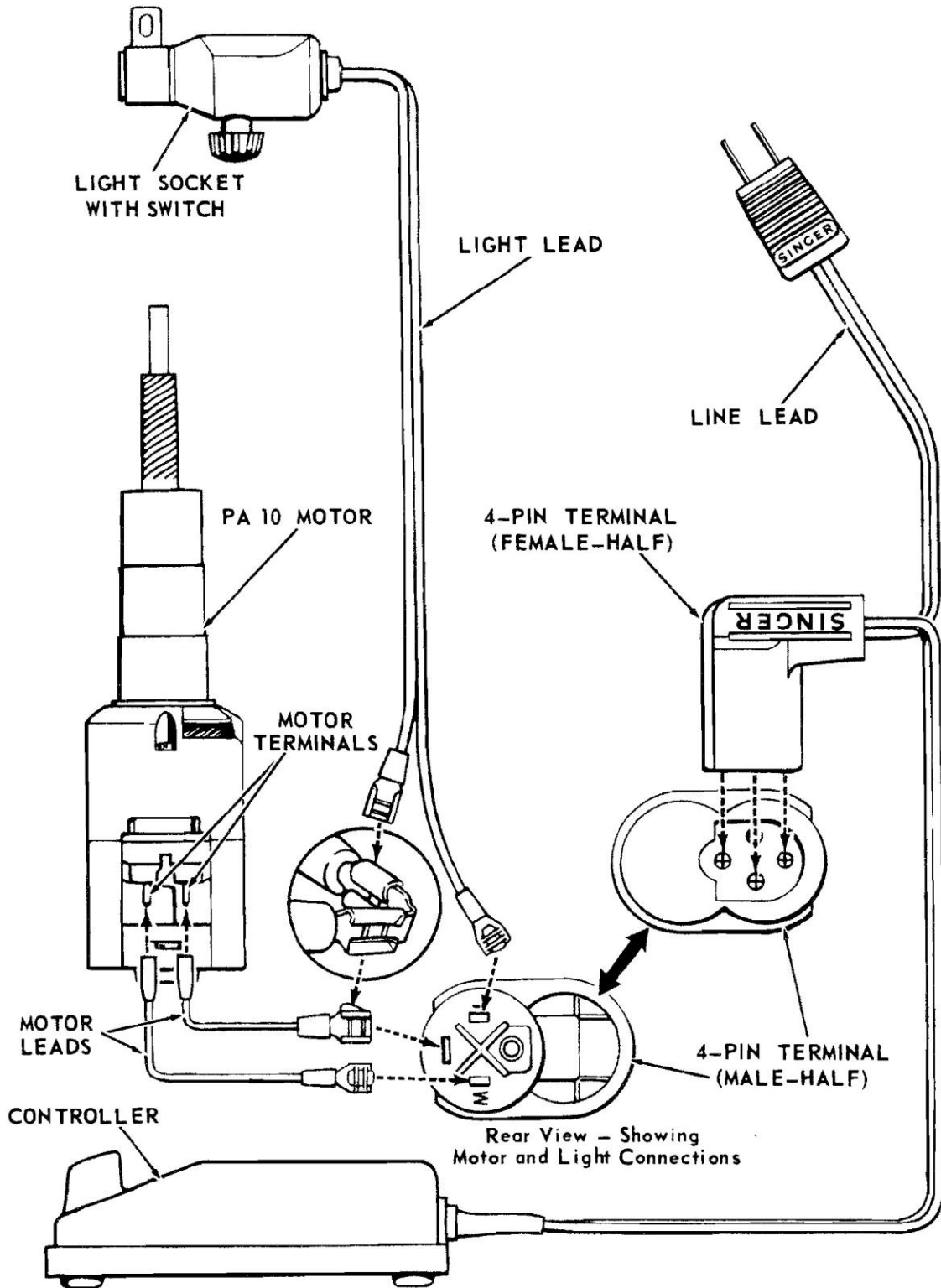
Remove arm top cover, face plate and lamp shade.  
Remove disc driving worm wheel assembly as instructed above.  
Remove spring Y3, Fig. 76.  
Remove screw A, Fig. 76 and remove bight lever C.  
Loosen set screw T6, Fig. 69, page 36 and remove bight amplitude selector S6.

**NOTE:** Although Machine 503 does not have a cam stack as has Machine 500, the removal, replacement and timing of bight amplitude selector S6 and eccentric shaft X5 (see Figs. 68 and 69, page 36) are identical for both machines.

### REPLACEMENT:

Replace bight amplitude selector in the reverse order of its removal. Observe that high point of eccentric shaft X5 (Figs. 68 and 69, page 36) faces hand wheel end of machine and is adjusted in the same manner as instructed on page 36.

# WIRING DIAGRAM





## HINTS FOR ADJUSTERS AND MECHANICS

### CHECK THESE POINTS WHEN A MACHINE BINDS

1. Sprung or cracked bed or arm, incurred during transit.
2. Bent arm shaft.
3. Arm shaft collar (at front of arm) set too tight against casting.
4. Bent needle bar.
5. Tightness in needle bar vibrating bracket assembly or in bottom ball bushing assembly.
6. Improperly seated needle bar vibrating bracket hinge pin.
7. Burr or foreign particles in needle bar driving arm ball pivot hole in bight amplitude pattern selector.
8. Bent take-up lever.
9. Thread take-up stud set too tightly.
10. Misalignment of thread take-up lever link hinge stud.
11. Insufficient thread clearance in hook area.
12. Hook jammed with thread.
13. Hook driving shaft collar set too close against hook bracket bushing.
14. Mesh between hook shaft gear and hook driving shaft gear too tight. (Hook shaft gear should be a slip fit on hook shaft.)
15. Hook driving shaft gears (at both ends of shaft) set too close against bushings.
16. Hook shaft bushing is "floating", even though fastening screw may be securely tightened.
17. Mesh between gear at top of arm may be too tight. (Observe **CAUTION** at top of page 27.)
18. Feed dog striking ends of throat plate slots or rubbing against sides of slots.
19. Feed bar screw centers set too tightly.
20. Feed lifting rock shaft connecting rod may be damaged or bent. Remove cap and check for burrs or foreign particles.
21. Feed rock shaft and feed lifting rock shaft screw centers may be set too tightly.
22. Feed forked connection may be damaged or bent. Check bearing surface at fork end.
23. Cam stack (disc driving) worm wheel set too close to driving worm on arm shaft.
24. Height of index pins not correctly set.

### TO "RUN-IN" THE MACHINE

When a machine is completely assembled and adjusted, it should first be checked for binding or objectionable noise due to excessive end play. Lubricate the machine as instructed on pages 2 and 3. Then "run-in" the machine with an electric motor for 5 to 10 minutes at medium speed or until all moving parts run smoothly when machine is turned over by hand.

"Running-in" a machine should be done after every installation of an arm shaft, a hook driving shaft or a cam selector mechanism, and after every general repair or overhaul.

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## DESCRIPTION

### Machine 500

For straight, zigzag and decorative stitching.  
Gear driven lockstitch machine with built-in motor and built-on light.  
Single or two needle stitching using Needle Catalog 2020 – threaded from front to back.  
Needle bar and presser bar inclined at 9° from vertical.  
Machine is fitted with seven built-in cams and one removable "Special" cam. (Four additional "Special" cams supplied with machine.)  
Two cam selector knobs and a stitch width (bight) lever located at front of arm. Outer knob controls rear cam follower; inner knob controls front cam follower. Bight lever controls position of needle during straight stitching and width of primary patterns; also produces variations of combination patterns.  
Reversible feed – graduated stitch length indicator plate provides for delicate adjustment of stitch lengths above 20 and positive locked setting at maximum stitch length.  
Gear driven rotary hook on vertical axis, located in front of needle, makes two revolutions per stitch.

Maximum width of zigzag stitch, approximately 3/16 inch.  
Numerically graduated thread tension device, with central spacing disc for two needle threads. Automatic thread control ensures smooth flow of thread from spool to needle for uniform stitch setting.  
Throat plate positioning lever locks throat plate in down position for general sewing, raises throat plate sufficiently for darning or embroidery, and unlocks throat plate for easy removal.  
Concealed automatic bobbin winder.  
Hinged face plate houses threading chart and swings open for easy access to oiling points.  
Built-in eye-level stitch chart for reference while sewing. Hinged nylon spool pins are self-positioning when top cover is raised.  
Dial-operated pressure adjustment.  
Single 4-pin terminal connection beneath machine bed and out of view of operator.  
Maximum stitch length – 6 per inch  
Needle bar stroke – 1-9/64 inches  
Presser bar lift – 5/16 inch  
Bed – 16-1/2 inches long – 7 inches wide  
Working space at right of needle – 7-3/16 inches  
Speed – up to 1500 R. P. M.

### Machine 503

Machine 503 has the same basic characteristics of Machine 500 with the following exceptions:

Machine has accommodation for only one bakelite cam (FASHION DISC) which is manually inserted on disc spindle of machine. For each decorative stitch pattern, a disc must be manually inserted into the machine. Nine FASHION DISCS are supplied with machine while thirteen others are available for separate purchase.

Stitch width (bight) lever, located on front of arm, regulates width of zigzag and decorative stitch up to 3/16 inch width. Straight stitching is accomplished with bight lever in **STR** position.  
Needle position knob, located to left of bight lever, locates stitching in LEFT, CENTER, or RIGHT position of needle at widths less than "5".