SINCERE'S

ZIG ZAG

SEWING MACHINE

SERVICE BOOK

$ 10.95

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Service BOOK

SECOND EDITION

by
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INTRODUCTION

Sincere's Zig Zag Sewing Machine Service Book is the natural outgrowth of our first book on sewing machine service because most machines sold in the United States are zig zag or automatic.

I worked closely with Herb Kenaga on this book. He's one of the very few sewing machine men I know who can completely dismantle the latest Singer Touch & Sew and show how it works. It's all in this book. Some of his photography, and pertinent comment, are real gems.

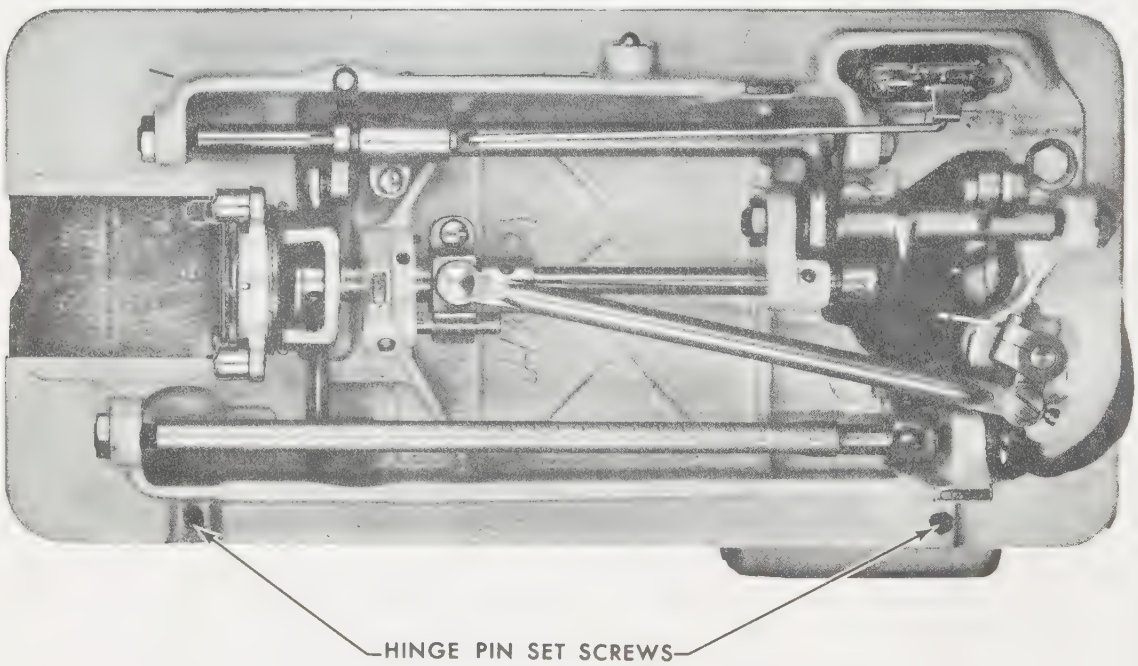
The first service book dealt mainly with principals of sewing machine service, and basic service methods. This book gets right down to facts on each machine, with emphasis on trouble spots. Even if certain machines aren't covered, most basics are, and a certain problem can be solved by research on one machine or another.

William Ewers

Setting Machine Head in Portable or Cabinet.

Before sending a machine in for service, or when recieving it from the repair shop, always check the hinge pin screws. Many repair problems, and many broken heads, result from loose hinge pin screws.

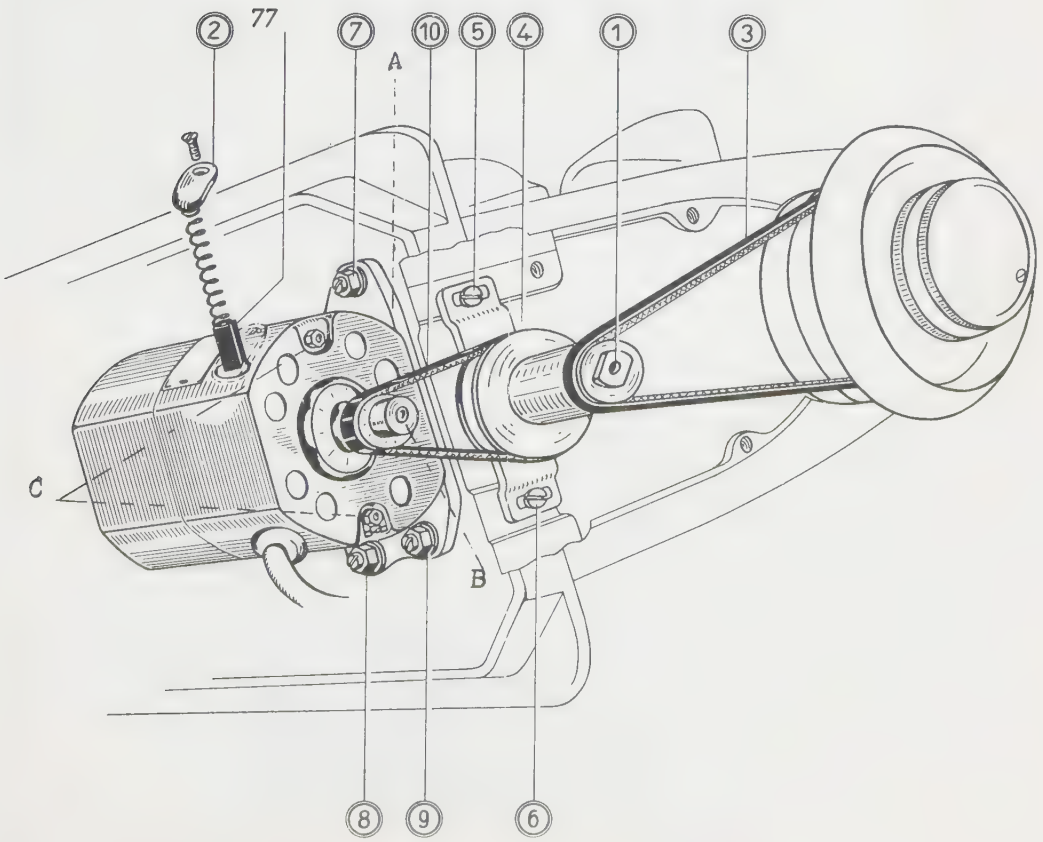
If you're in doubt about which screw to fasten, tilt machine head back. The hinge screws will be in the places illustrated on the head below.



Motor Care:

The illustration below shows an under-the-head mounting, but most of the belt drive motors can be serviced in the same manner.

1. When machine gradually slows down, check belt tension(3).
   a. If too tight and machine binds, loosen screws(5 & 6).
   b. On single belt machines, move motor closer to handwheel.
   c. On two belt machines, adjust for equal tension on each belt.
   d. If belt needs replacing, use V-type whenever possible.
2. If the motor slows down and sparks appear, the brushes may be oil soaked, or chipped and rough, and require service.
   a. Every motor has two brushes. Remove brush cover(2) and remove brushes with spring. If rough or chipped, replace them. If they are oil soaked, hold over a low flame until oil is burned out.
3. If motor pulley is out of line, loosen screw and realign.
4. When motor is sluggish after brushes have been changed, the commutator may be rough or dirty.
   a. Remove screw and pull motor pulley off the shaft.
   b. Remove screws(c) and dis-assemble motor.
   c. Remove commutator and clean thoroughly. Use a non-metallic abrasive.
5. Check wire terminals. If broken, or frayed, replace them.

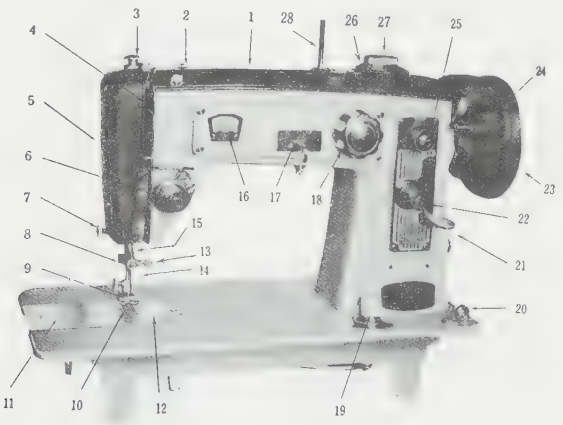


Brother Sewing Machine:

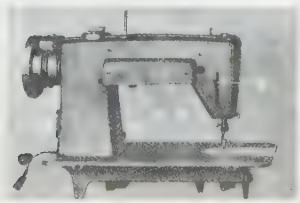
The BROTHER is the product of a pioneer sewing machine company in Japan. The Yasui Brothers have been in the sewing machine manufacturing business since shortly after 1900. They have marketed a variety of machines in this country and this book will cover some of the most popular. Service tips covering the Brother line can also be used to repair Wizard machines sold by Western Auto, Atlas machines, machine heads sold by W. W. Grainger wholesale house in Chicago, and numerous private brand-name machines sold by mail, appliance and furniture stores around the land. Ordinarily, the machine is easy to identify because Brother stamp the name on the underside of the bed, or enclose an instruction book with their name printed on it.

The Select-o-matic, although a few years out of manufacture, is being covered because large numbers were sold, and was one of the first good quality sewing machines imported from Japan.

The Brother Select-O-Matic:



1. Arm Cover
2. Upper Thread Guide
3. Automatic Darner
4. Thread Take-up Lever
5. Front Plate
6. Upper Thread Tension Dial
7. Front Plate Fastening Screw
8. Thread Cutter
9. Needle
10. Presser Foot
11. Slide Plate
12. Needle Plate
13. Needle Clamp Screw
14. Presser Bar
15. Needle Bar
16. Stitch Width Window
17. 3-Position Needle Lever—"C"
18. Knob "B"
19. Drop Feed
20. Bobbin Winder Tension Discs
21. Stitch Regulating Lever
22. Stitch Regulating Dial
23. Balance Wheel
24. Bobbin Winder
25. Zig-zag Pattern Selector—"A"
26. Index Knob—"D"
27. Index Dial
28. Spool Pin
29. Stop Motion Knob
30. Motor Fastening Screw
31. Sewlight Switch
32. Sewlight
33. Sewlight Cover
34. Presser Foot Lifter



The tension and check spring assembly on the Select-o-matic is basic and many Class 15 machines with link take-up arm can be serviced from the text. The Brother does feature a calibrated setting for quick check spring adjustment that can also serve as a guide for other machines because it gives the technician an idea how strong, how much travel, the spring has.

The tension dial(1) is numbered, 1 to 0, but not like the Singer calibrated version with the pre-setting washer. The tension dial can be turned several times without a stop or resetting. To attain proper tension, turn the dial to setting 5, lower the presser foot and pull the thread through the discs. If a slight pressure is present, test sew and observe the stitch. Both threads should knot in center of material. If the upper thread is pulling down to the underside of the material, turn dial clockwise another setting and test sew. If a setting of higher than 7 is required, turn dial back to setting 5 and direct the adjustment to the bobbin case.

To adjust the bobbin tension, use a small screwdriver. If the upper tension has been properly set, and the thread is still going to the underside of material, loosen the lower tension by turning small screw(A) figure 1b, counterclockwise slightly. If the opposite is true, or lower thread is being drawn up through the material, reverse the procedure and turn adjusting screw clockwise slightly.

If adjustment doesn't correct the situation, remove the adjusting screw and check tension spring for a thread cut, or clean lint and dirt from spring. If the bobbin case body is also thread cut, replace it.

In many cases the shuttle(C, fig. 1c) may be damaged causing the thread to hang up on the throw-off part.

Check the entire assembly (fig. 1c for burrs, or damaged surface where either thread must pass. Race cover (B) should be checked at upper side, where it meets the race. Any roughness where needle enters raceway can cause tension problem, break thread.

Check the driver(D, figure 1c). If the spring is broken, or bent out of shape, causing the shuttle to operate in an erratic manner, replace it. Two small screws hold the spring in place.

Figure 1

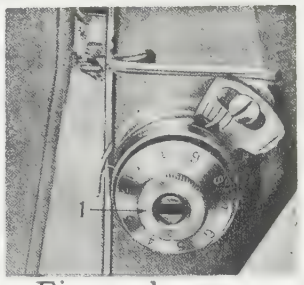


Figure 1a

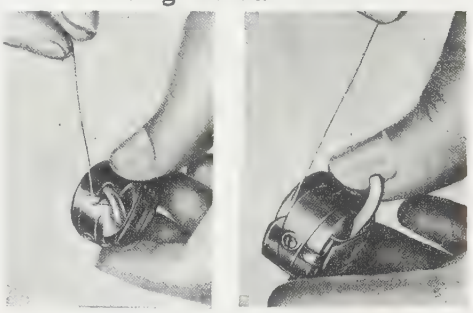


Figure 1b

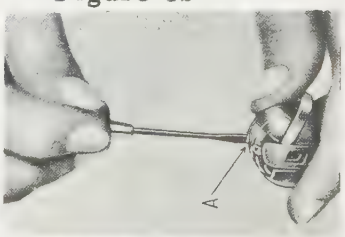
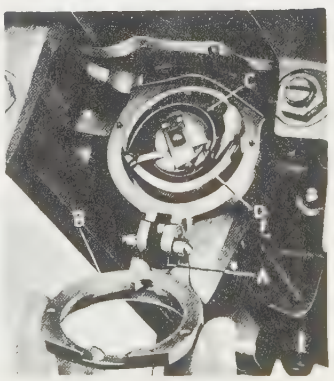


Figure 1c



Principal of Automatic Zig Zag - Select-o-matic.

The Select-o-matic was one of the first automatic machines to feature the builtin camstack for ornamental designs. Figure 2 illustrates various controls and their relation to each other. Selector knob(A) selects patterns the machine is capable of producing. To operate automatically, knob B must be pulled out, and selector knob turned to desired pattern. The automatic indicator (D) indicates pattern being sewn.

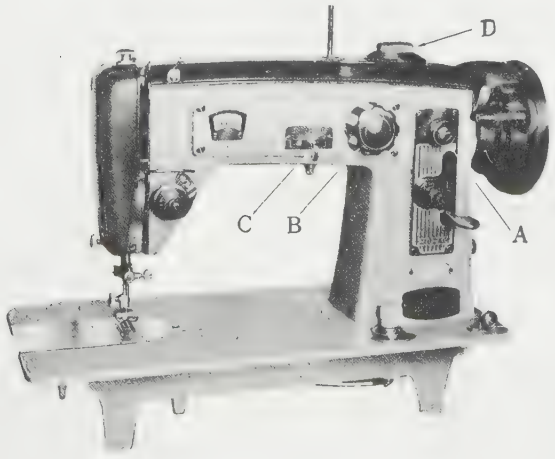
To operate the machine as a manual zig zag, knob B remains in, and selector knob is set on zig zag position. The Select-o-matic features the clutch-type arrangement for changing patterns and zig zag sewing. When knob B is turned to maximum throw of zig zag width, the cam follower is pulled back, and selector knob can be changed. Zig zag width is indicated in window(1).

Knob C is the needle position lever and enables the needle to sew from three different needle positions, center, left of center, and right of center. The basic service procedures pertaining to this phase of operation are explained in the next sequence, which deals with the Brother Model 1630.

Cam follower adjustment and swing needle frame adjustment procedure also apply. In fact, most Brother zig zag units operate the same way.

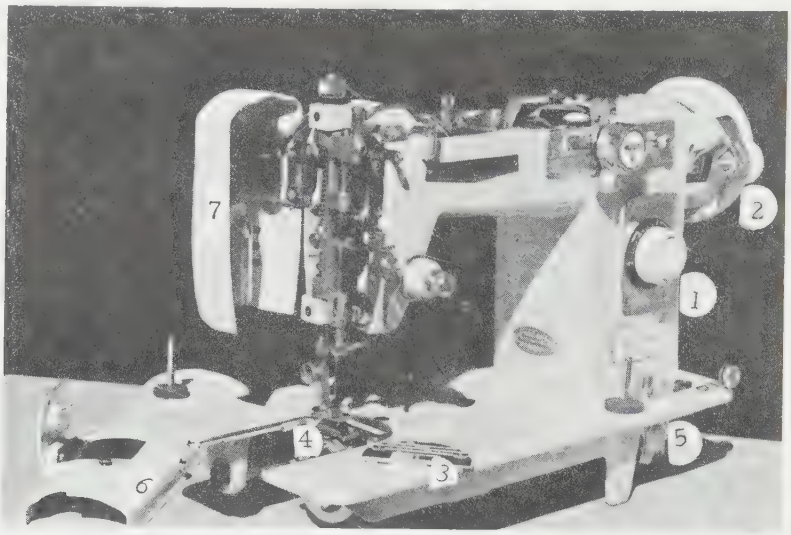
Knob D is the indicator knob and tells the operator at what point in the pattern the machine is stitching. This is a simple version of a sophisticated method used by Bernina. To set in position, press knob B inward. Set knob D at position of desired design. If starting at the beginning, set the knob on setting 0. After the setting is made, pull knob outward and automatic will take over and produce the design.

Figure 2



The Brother Model 1630 is a left needle position automatic with drop-in cam system for making automatic designs. Left needle position denotes the fact the machine sews straight from a single position.

Figure 3



1. Stitch length regulator. Reverse button in center.
2. Bobbin Winder. Conventional type activated against handwheel.
3. Necchi BU style easy change etched needle plate.
4. Conventional Class 15 race assembly.
5. Three position drop feed assembly.
6. Upper arm cover plate. Removable for access to upper arm.
7. Hinged front face plate. Open for access to needle bar frame.

Figure 3a

Figure 3b

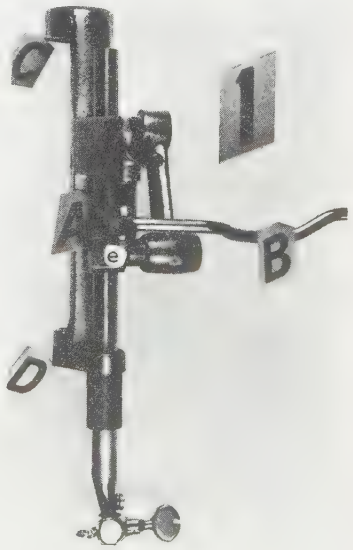


Figure 3a illustrates the face plate assembly including the needle bar and presser bar assemblies, take-up arm and needle bar frame(6). The cut-away illustrates the race and needle plate area, and relationship.

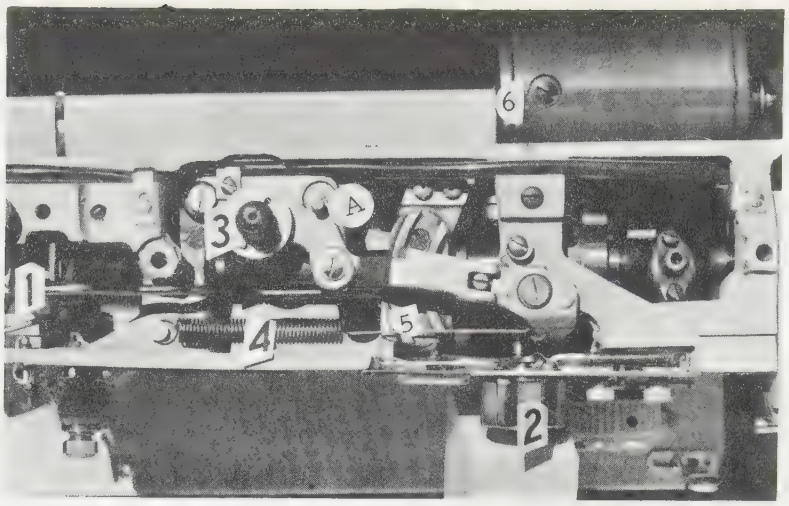
1. Number 1 is adjacent to link connecting stud where timing needlebar to shuttle point(7) is performed. If the machine skips stitches, and the proper needle is utilized, strip machine as in figure 3a and turn hand-wheel until needle drops to lowest point, and starts back up. At that point the shuttle point should be 3/32" above needle eye. If not, return to upper arm and turn handwheel until needle is position shown in fig. 3a and adjust the screw visible under arm opposite link stud(1). Drop or raise the needle bar required amount to achieve above adjustment. If the lower mechanism hasn't been changed, this step should time machine and eliminate the stitch-skipping problem.
2. Tighten the set screw. Use extreme caution and don't allow needle bar to turn during this adjustment. If needle bar turns, re-position it until groove in needle is in straight line with hook point. Replace other components and test sew.
3. Number 2, figure 3a is the removable needle plate. After years of service, check the needle hole, if needle scarred, or elongated from the numerous needle strikes, smooth the hole with a fine emery cord. If unable to smooth, replace the plate. The bed-plate cut-out(3) is notched for the needle plate. Needle plate screws are affixed into the bed, and the plate slides in place. When slide plate is closed, it holds the needle plate firmly in place.
4. Screw(5) figure 3a is used to adjust end play in needle bar frame. If the frame has excess play, or is too tight to swing easily, the screw(5) opens, or tightens the hinge-type bearing.
5. Screw(8) figure 3a is used to adjust the presser bar raising block, which controls the height of presser bar, presser foot over material, and alignment of the presser bar.
    a. If the presser bar is set too high, proper pressure won't be applied when foot is set against material. To adjust, loosen screw (8) figure 3a, and move the presser bar down until lower side of the presser foot is about 1/4" above needle plate. Tighten screw and use extreme caution. Presser bar must not turn, hold presser foot firmly in other hand when tightening the set screw.

Figure 3b illustrates the needle bar frame sub-assembly with all the component parts. The single needle position machine utilizes the simplest form of adjustment. The presser bar fits through the frame at points C & D which are in essence sleeve type bearings, non-adjustable for wear. The only adjustment is screw(5) figure 3a, at point D, which is an endwise adjustment. This type needle bar frame swings like a door from point C & D when the pittman (B, figure 3b) is activated by zig zag width lever. If the needle swings too far, or not far enough for maximum zig zag, loosen the screw in figure 4. If more width is required, shorten the stroke. If less stroke is required, lengthen the pittman stroke.

Point(e) is the needle bar link and stud. This is where screw is adjusted for timing needle bar. Screw is accessible through hole under arm cast. The needle bar link will sometimes freeze from lack of oil. Although oil holes appear on both ends of the link, women rarely oil them. If a machine squeals badly and noise seems to be coming from that area, oil the link. Nine times out of ten oiling the link will eliminate the noise.

If the needle bar frame becomes worn from excess wear, or abuse, it must be replaced.

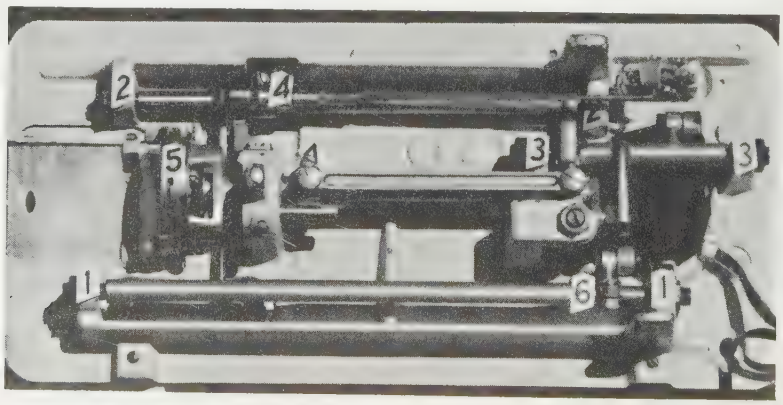
Figure 4



Number(1) figure 4 is the top view of the pittman which guides the needle bar. To adjust zig zag mechanism, first remove the top cover plate.

1. If the width of zig zag, or placement of the needle in needle hole on straight stitch is out of line, adjust screw at right end of pittman. When more width is required, lengthen stroke of pittman. If less width is need - ed, shorten the pittman stroke.
2. Number(2) is the zig zag width dial which can be used manually when a cam is not in machine at position(3). The spring(4) aids cam follower in automatic operation, and brings zig zag width dial back to setting 0, when operator is zig zagging manually. If the spring is broken the dial will not return to 0, and automatic cam patterns may be erratic. If its broken, or bent out of shape, replace it.
3. The automatic feature is activated when the dial is turned and a cam placed at point 3. Cam follower(A) follows the ups and downs of the cam and forms patterns. If the follower doesn't ride on the cam completely deviations will appear in the pattern. To adjust, loosen screw holding cam follower and move follower closer until point of cam touchs cam in deepest valley. Tighten screw and test sew.

Figure 5



Lower Mechanism, Figure 5.

Numbers 1, 3 and 3 are the pivot points, stud with lock nut, for adjusting end play in lower feed bar(6), feed raising bar(4), and hook shaft rocker crank.

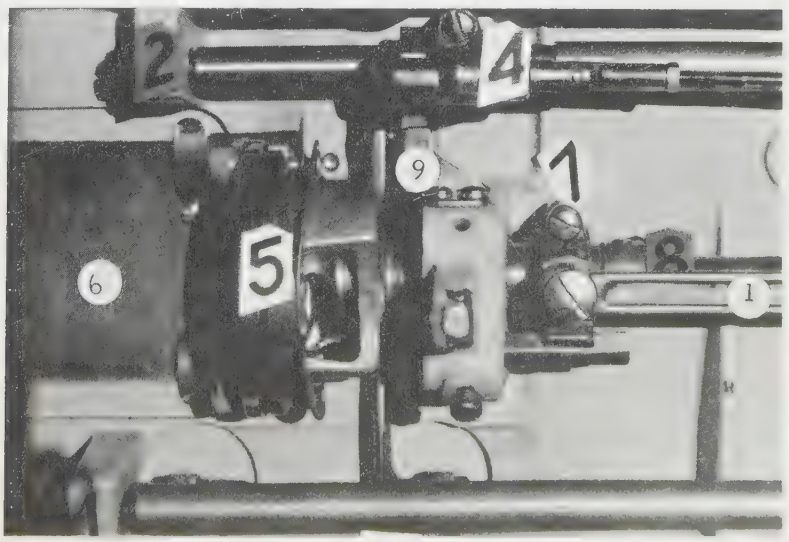
1. When excessive end play is present, loosen the lock nuts on shaft, and turn tapered screw inward until correct. Tighten lock nuts. When the feed dog rises through needle plate and strikes the plate, adjustment laterally, is made at the same three points, generally points 2.
2. To raise, or lower feed dog, loosen screw(4) and raise, or lower, the feed block. Proper adjustment finds teeth about 1/32" above level of needle plate at it's extreme upper throw.
3. To adjust feed for proper fore and aft position, loosen screw(6) and adjust as needed.

Shuttle Race assembly, Figure 5a.

Figure 5a illustrates the shuttle-race mechanism and components.

1. Number (1) is zig zag pittman on lower drive. The hinge studs at end of shaft are not adjustable for wear, merely for freedom of action.
2. When needle to shuttle tolerance is out of adjustment, needle is too close to hook point, or too far away, adjustment is made at clamping screw(7), figure 5a.
3. Loosen the screw slightly and tap entire race assembly in proper direction to adjust. If the needle is striking hook, tap the assembly away from needle to the right. If the spacing is too great, tap assembly toward the needle, to the left.
4. Make adjustment in small increments and hold race assembly firmly so it doesn't lose factory configuration.
5. If driver shaft has excess play after the adjustment, loosen collar (8) and adjust, leaving just enough end play so the shaft doesn't bind. If the assembly binds after adjustment, loosen the collar and move away slightly. Tighten set screws on collar securely.

Figure 5a

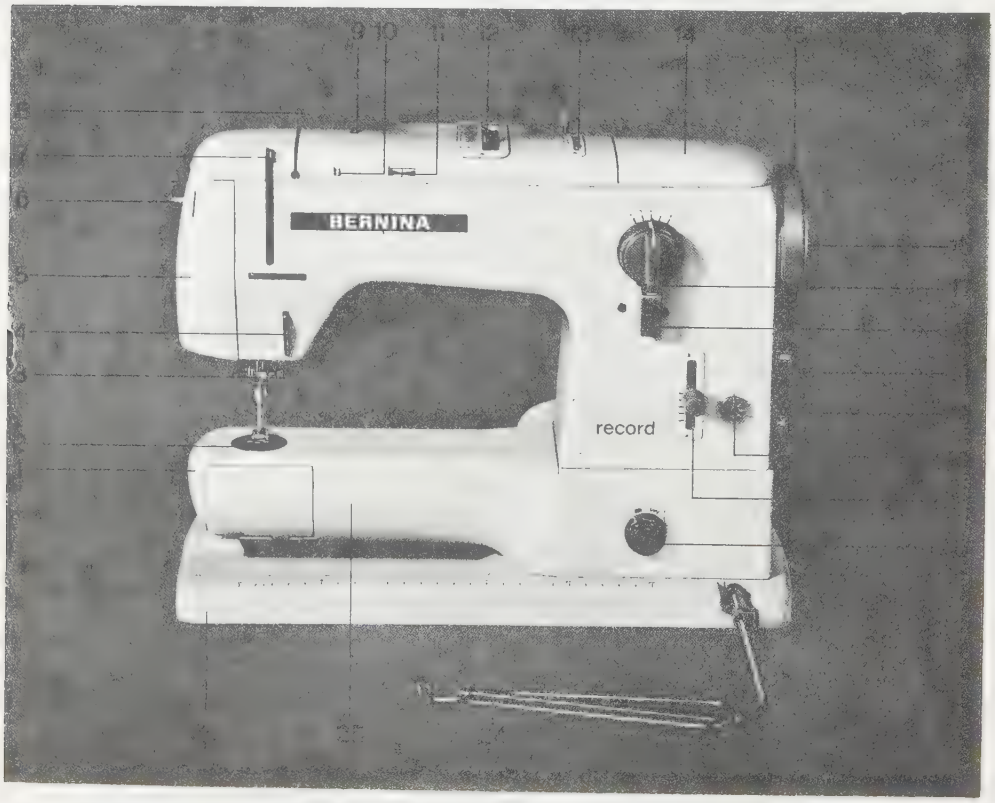


THE BERNINA

The Bernina Record series sewing machine is rapidly becoming one of the best selling machine lines in the United States. The fully automatic Record 730 and 731 are manufactured by the Fritz Gegauf Company Ltd. in Steckborn TG, Switzerland, and distributed in the United States as the

Figure 6

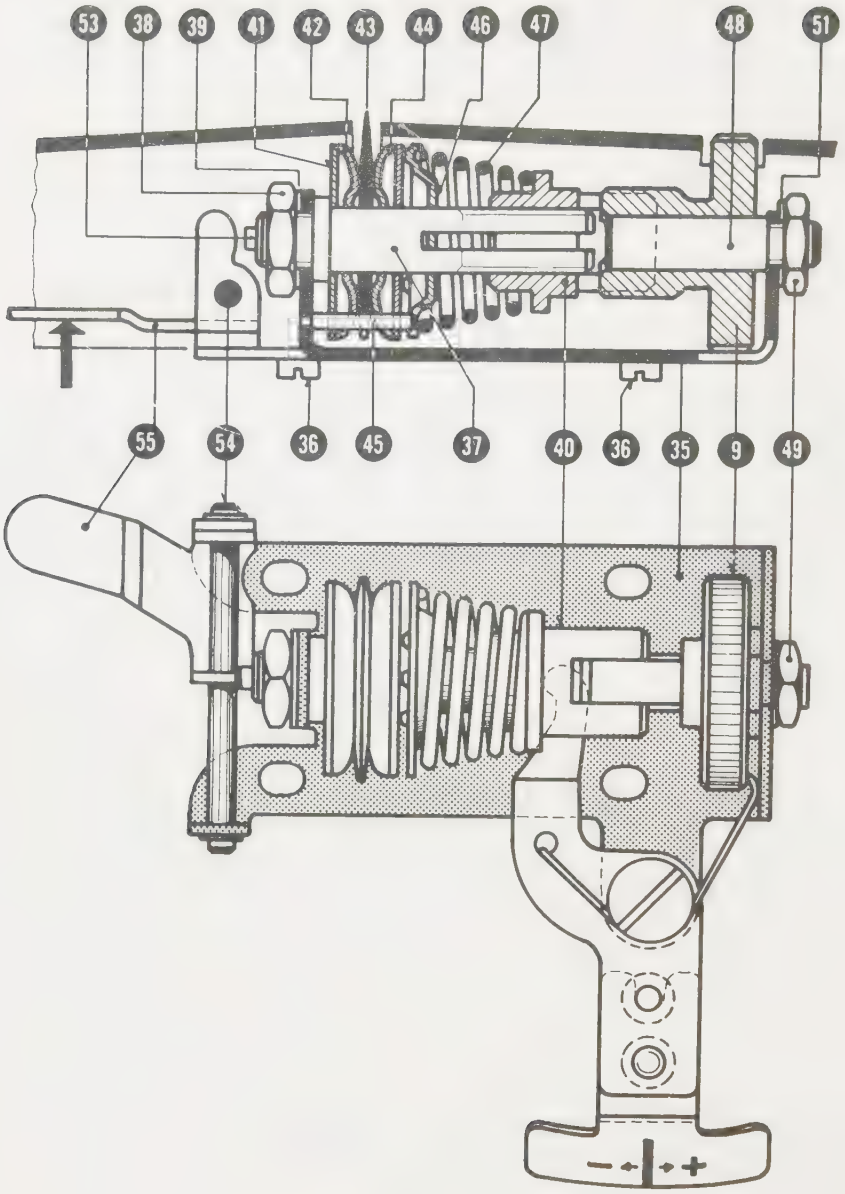
The Model 730 Bernina Record. Knee Controlled, fully automatic portable.



Nomenclature of devices and sub-assemblies on Record 730-731

1. Open Arm Cover Plate.
2. Needle Plate.
3. Needle Holder.
4. Thread Tension Regulator
5. Face Plate.
6. Light Switch.
7. Take-up Lever.
8. Thread Tension & Guide.
9. Thread Tension Control Disc.
10. Sight hole for Tension Control.
11. Sight hole for Satin Stitch Control.
12. Switch Lever for Satin Stitch Selection.
13. Change Lever for Zig Zag Stitching.
14. Flap-Plate Covering Spooling Device.
15. Handwheel.
16. Clutch(Handwheel release).
17. Needle Position Lever.
18. Stitch Control, zig zag, buttonhole.
19. Push Button for Buttonhole Device.
20. Button for Satin Stitch Stop.
21. Adjustment Knob for Satin Stitch.
22. Stitch Length Regulator.
23. Drop Feed Knob.
24. Knee Control Lever.
25. Open Arm.
26. Bed Plate.

Figure 7



The Record Model 730 features a concealed tension assembly similiar to contemporary European machines like Viking and Elna. Although the assembly is located under the arm cover, a unique adjusting method is directly in front of the operator, making it easy for simple tension adjustment. As the machine wears, the tension adjusting spring will lose some of its strength and require more frequent adjustment.

When the upper tension is properly adjusted, the window directly in front of the operator will indicate it. See figure 8b. Number(9) is the adjusting knob for the upper tension. The plus or minus sign in the indicator window advises the operator which direction to adjust the upper tension.

If the upper thread is too loose and is being drawn to underside of the material, turn adjusting knob back to tighten the upper tension and observe the indicator. The black line should move to the plus side.

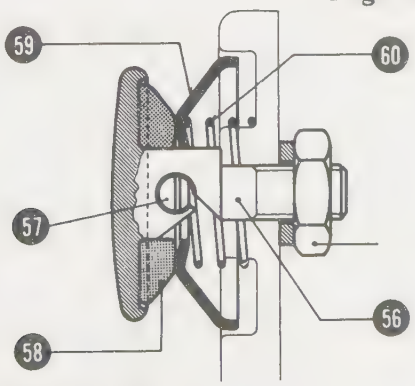
If the upper thread is pulling the bobbin thread up through the material, reverse the above procedure until the black line moves to the minus side. If frequent readjustment is required, dismantle the assembly and reset it.

Components include, see figure 7, support plate(35), holding screw(36), thread tension bolt(37), holding nut(38), washer(39), thread tension nut(40), tension disc(41), thread disc(42), intermediate disc(43), thread disc(44), stop washer(45), covering disc(46), thread tension spring(47), spindle for regulating knob(48), holding nut(49), washer(51), control knob(9), release pin(53), spindle for presser release lever(54), and presser release lever(55).

The Bernina tension looks complicated, but is merely a sophisticated version of most upper tension assemblies in operation today. To pre-set the upper tension, refer to figure 8. The assembly is located on the upper rear machine arm, below the slot. The sub-assembly consists of a tension spindle(56), figure 8, drilled hole(57), spacing disc(58), pre-tension(59), and spring(60). The slotted hole(57) must be in the position indicated in figure 8. Correct position is upward, and in a vertical position.

Later models feature the by-pass ring, figure 8a. When the ring is used thread the upper thread through the loop, and in the cross slit of the upper tension.

Figure 8



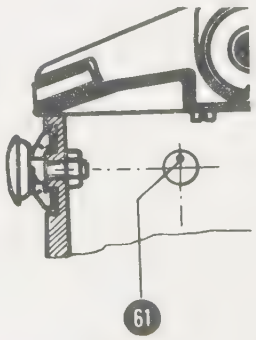


Figure 8a

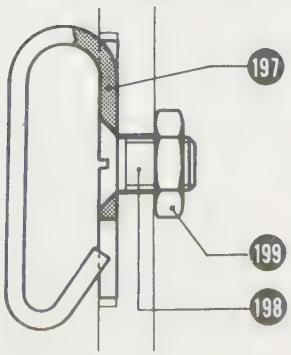


Figure 8b

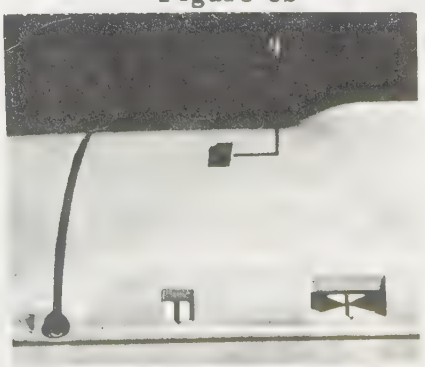
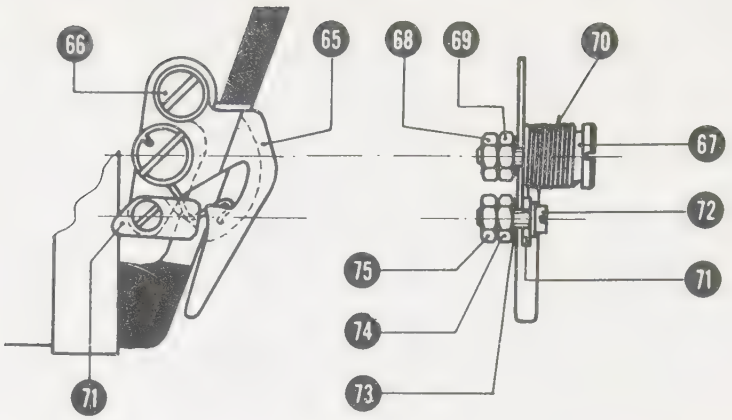


Figure 9



Thread control on the Record models 730, 731 and 732 is located under the take-up lever. The sub-assembly fits on bracket(65), which is attached to the housing with screw(66). The regulator spring is affixed to bolt(67) with the nut and jam-nut(68 & 69). The regulator works in conjunction with the satin stitch stop(71) which is connected to shoulder screw(72), figure 9.

To adjust, loosen shoulder screw(74), then move nut(75), either up or down, as needed to adjust. Spring(73) will hold adjustment in place. Tighten both nuts. The Bernina sub-assembly works on same principal as check spring on other machines.

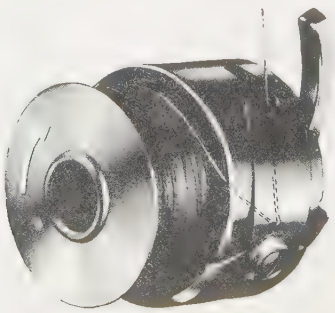
Adjusting the lower tension:

Under ordinary conditions the bobbin case shouldn't be tampered with, except to clean out lint and dust. However, if repeated adjustments to the upper tension fail to correct the tension, the lower adjustment screw must be reset. In some instances the lower tension is reset on purpose for the special sewing of embroidery stitches and the raised buttonhole.

The adjusting screw is located on the bobbin case tension spring(figure 9a). To adjust, use the small screwdriver in your attachment kit, or any small screwdriver available.

1. If the lower thread is drawn up through the material, turn the screw clockwise as needed to correct. When the tension is properly adjusted, both threads should inter-lock in center of material sewn.
2. If the upper thread is being drawn to the underside of material, turn adjusting screw counterclockwise as needed.

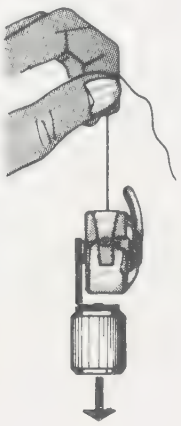
Figure 9a



Another method for getting an approximate setting, which can later be adjusted to perfect setting, is illustrated in figure 9b. A thread weight may be fastened to the bobbin case. By holding the thread in a position like it comes off the bobbin, the bobbin case should drop slightly with an even, steady motion. If an irregular motion occurs, the bobbin case might have lint or dust under the spring which hinders normal flow. To correct, remove the spring by removing adjusting screw counterclockwise. The screw is small and has no more than three or four threads.

Clean surface of the bobbin case and underside of tension spring. If the parts are damaged or thread cut, replace them.

Figure 9b



Bernina utilizes the oscillating shuttle Class 15 system. The original Class 15 was manufactured by Singer sometime before 1900. Many firms use the system today. Mainly because it's a sound mechanism and relatively trouble-free.

The shuttle (103) figure 10, is crescent-shaped with a center pin, and fits in place adjacent to a similiar looking part, the shuttle driver(102). When the shuttle is in place, a race cover fits over the assembly and the bobbin case fits in place over the shuttle spindle, with a position finger sliding in the corresponding slot on the race cover.

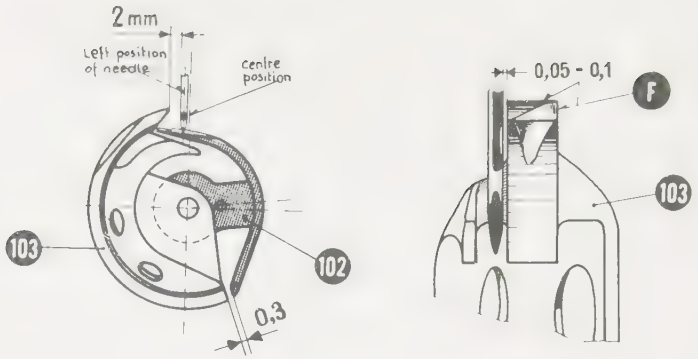
The shuttle race assembly should be removed frequently for cleaning and oiling. A tiny piece of thread, or a glob of oily lint, can change the bobbin tension completely. Check the shuttle race assembly thoroughly.

When the machine starts skipping stitches, and it's been determined the correct needle, is properly set, check the shuttle hook point. If the point is broken, or badly marred from numerous needle strikes, replace the part. If the hook is intact, and machine still skips stitches, check needle to relation to shuttle point.

Turn handwheel one cycle and observe as needle lowers to extreme low point and starts back up. Refer to figure 10. When needle, and shuttle, are in this position, clearance should be 3/32" between shuttle tip and upper side of needle eye.

Figure 10 also illustrates proper clearance between hook and driver. Anything more than 0.3 clearance will cause a sloppy shuttle race assembly and eventually, poor stitching.

Figure 10

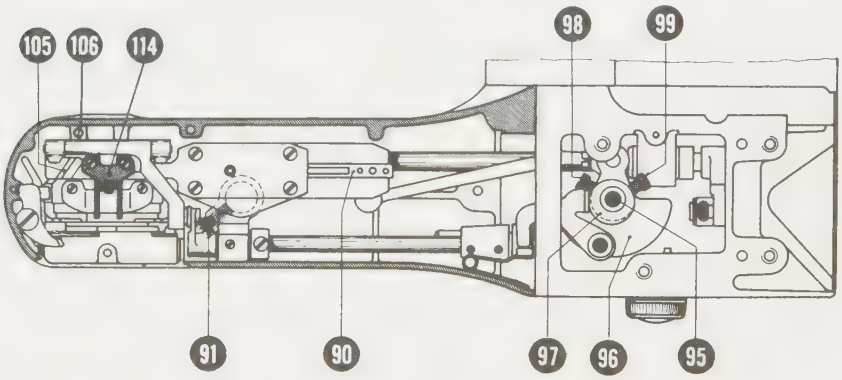


Bernina supplies a special tool to re-align the driver when excessive use has created the above situation. If the tool is unavailable, use a broad head screwdriver. Exercise extreme caution and pry the driver head until the gap is properly set. See figure 10.

Observe the needle gap as well as the distance between the driver and lower end of shuttle.

Place needle position lever in left position when making the adjustment. The simple prying should correct the situation. If not, refer ahead to the text covering setting of the rack, shuttle driver and pinion, where proper setting is attained by changing the gear mesh.

Figure 10a



To check lateral adjustment of needle in relation to the shuttle, refer to figure 10a. The proper distance is very slight, .005. If the needle and shuttle tip are any closer, increased needle breakage will occur. If the distance is more, the machine will probably skip stitches.

To adjust, remove the arm cover loosen screw (106) on the rear base wall.

1. Move the entire shuttle-race assembly forward, or away, whichever is required to achieve proper adjustment. Replace screw (106) and check.

If the space is too great, and adjustment required too drastic, remove the driver entirely and adjust the bushing by tapping it slightly. Replace the driver and check tolerance with the needle. Adjust with caution until corrected. Replace all components and test.

Figure 10b

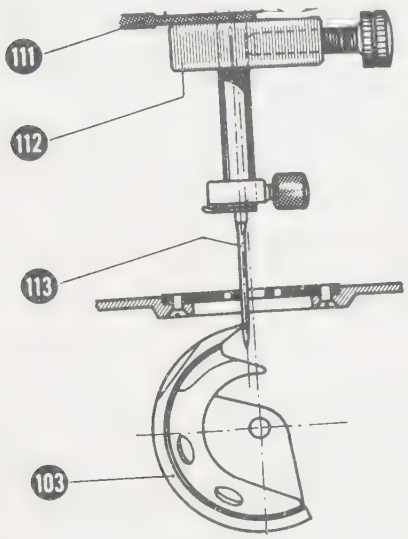
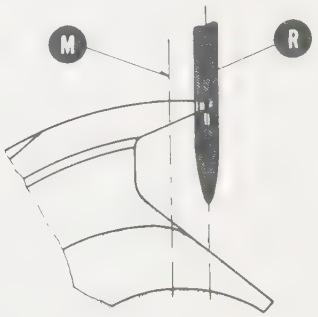


Figure 10c



After adjusting the needle to hook setting, i.e. the loop lift, the needle height setting must be accurate.

To adjust, place needle position lever in right hand position. After the needle has started upward, and is past the loop lift position, the lower edge of the shuttle-hook tip should be even with top of needle eye. (Figure 10c)

Figure 10b, illustrates setting the proper needle height using a guage which is available from Bernina.

Positioning the Feed Dog.

The proper height of feed dog should be slightly more than 1 mm at the highest point of feed dog teeth, in uppermost position. See figure 11.

Figure 11

If adjustment is required due to faulty feeding, refer to figure 11a, below.

To adjust, set drop feed button(23) until sewing mark is opposite the zig zag symbol. Remove base cover plate(117) and needle plate(118). Actual adjustment is made on the feed crank(116).

1. Loosen two screws(118) and move the crank(116) in the proper direction to correct. Turn it toward you to raise the feed position, away to lower the feed position.
2. Tighten both screws, replace needle and cover plate, and check the feed dog for proper height.
    a. To check for proper pressure, simply place a business card under the presser foot when feed dog is in uppermost position. Tug slightly on the card. If it doesn't move, the adjustment is very-close to accurate. 1 mm is approximately 1/16" of an inch.

Figure 11a

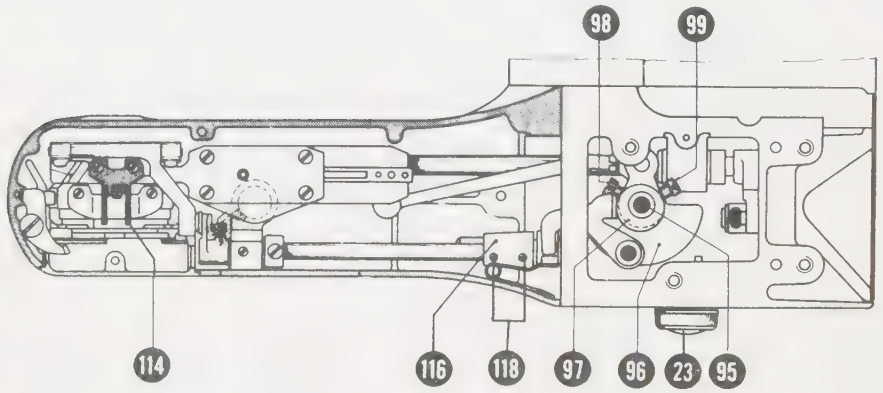


Figure 11b, page 16, illustrates the proper position of needle, in relation to the feed dog, when the needle is on its downward course. The feed dog MUST be below needle plate level, so material doesn't move, while the needle is in the material.

Figure 11b

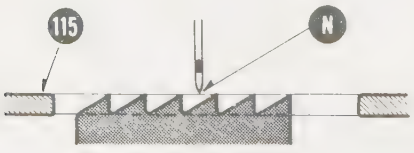
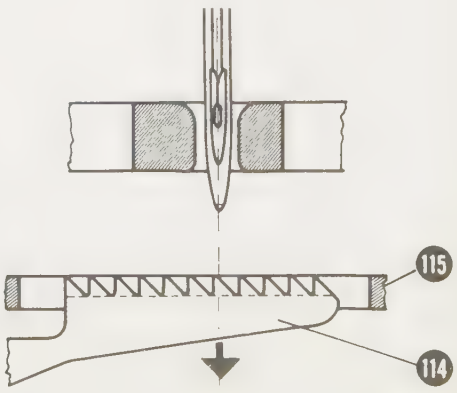


Figure 11c

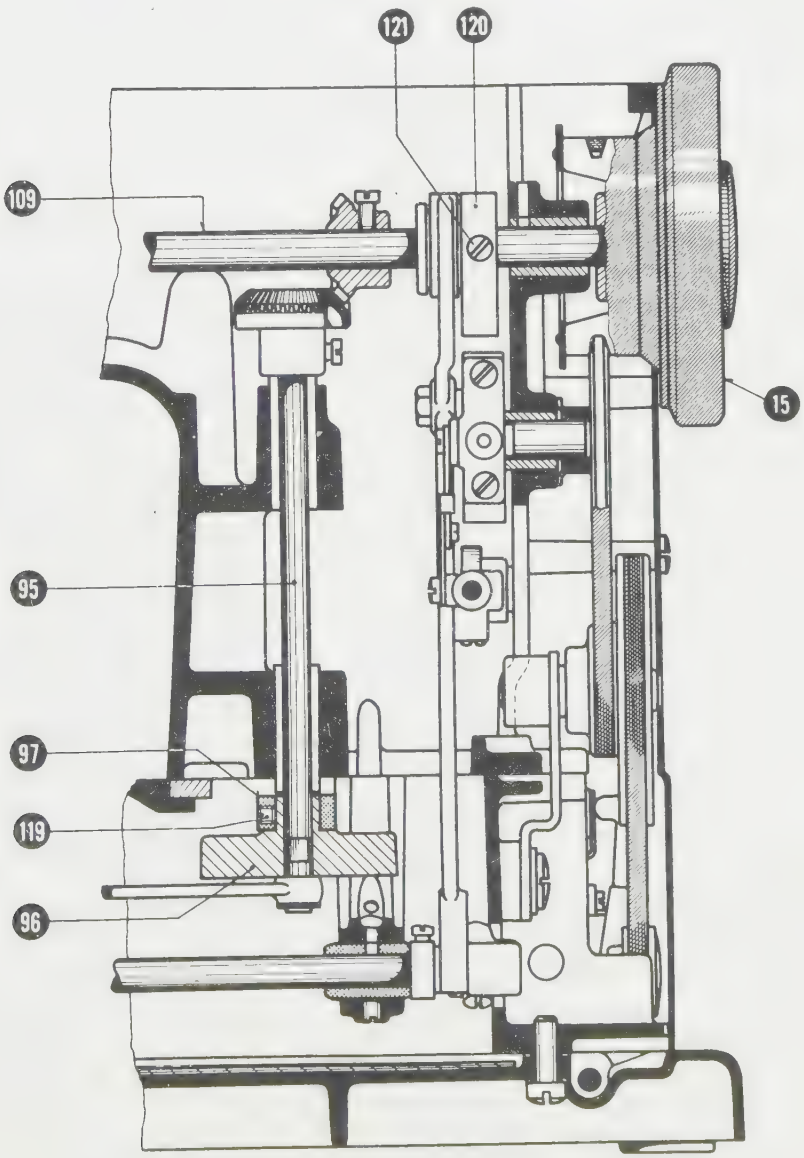


If the relation of needle point to feed dog is out of adjustment, refer to figure 11a for adjustment. Remove lower base cover and lay machine on its back.

1. Loosen screw(119), but hold eccentric(97) in place with screwdriver while turning handwheel forward, or back, as required to change the throw of the eccentric and change the feed timing.
2. When adjustment is complete, tighten screw(119), and test for accuracy.

Figure 12, below, also illustrates the feed components and their relationship. Use either diagram to correct feed oriented problems.

Figure 12



The previous adjustment dealt with feed timing in relation to needle descent. The feed advance must also be timed to coincide with needle position. If the feed dog moves the material while the needle is still forming a stitch, the advance timing must be reset.

1. Set length of stitch regulator on longest stitch.
2. Turn handwheel until takeup lever is at highest point and observe the feed dog. At this point, the feed dog teeth should advance very slightly as you turn the handwheel. In this position the needle should be at right angle with the feed dog, with the point aimed at one of the teeth. Distance between needle point and the farthest advance movement, should be 1/2 a feed dog tooth.
3. To adjust, remove cover and refer to figure 12, page 17. Loosen screws(121) on eccentric cam(120), which is located on the upper main shaft. Hold eccentric cam in place with a braod screwdriver and move the handwheel forward to advance the feed dog if needed, backward to retard the feed dog action. When adjustment is complete, tighten the screws, replace the cover and test. If you're unfamiliar with an adjustment of this kind, it's a good idea to proceed in stages.

Needle Bar.

To adjust the needle bar for proper height, as well as correct position in the needle plate hole, proceed as follows:

1. Position needle bar so the upper edge of the needle stop (figure 13) is in line with the lower edge of needle reverse support(81).
2. Loosen screw(79) on the needle bar frame. Move needle bar up or down as required, and tighten the set screw.
   a. Don't let the needle bar get out of line when adjusting. If the machine skips stitches after making this adjustment, recheck needle bar position. The needle should face operator, with hole pointing straight back.
3. To adjust for proper position, in each of three needle positions, set zig zag lever on 0, or in the straight sewing position and check position of needle in needle hole. The needle should be in exact center of needle hole, lengthwise and crosswise.

Figure 14 on the following page illustrates the proper position for needle in each of the three needle positions.

Figure 13

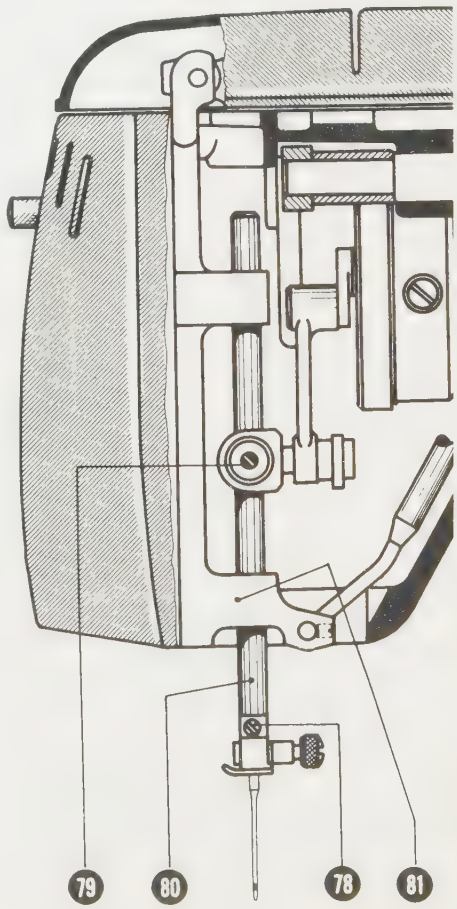


Figure 14

A = correct
B = wrong, stitch too far to the left
C = wrong, stitch too far to the right
(L) = left stitch
(R) = right stitch
(M) = centre stitch

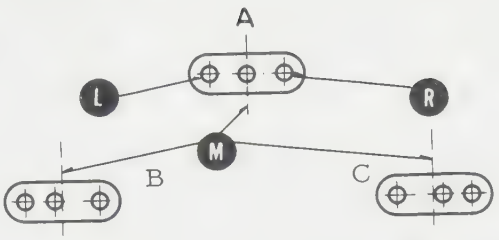
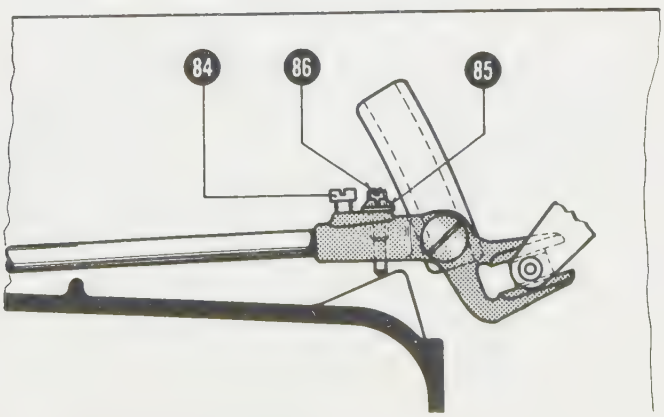


Figure 14 illustrates the proper, and improper, position of the needle in each of the three positions. If correction must be made, proceed as follows:

1. If correction is required longwise in direction of fabric feeding, remove the handwheel and drive pulley. (Number 15, figure 12).
2. Unscrew the four frame screws. This step requires a long, sturdy screwdriver. Press frame of machine into proper position. Hold in place and re-tighten all four screws.
3. Replace handwheel and drive pulley. Observe position of needle on needle plate slot. If properly set, test sew.
4. If correction is required laterally, loosen set screw(84, figure 15) and move the needle until it's centrally located in the needle hole. Hold the fork firmly and tighten the set screw. Screw(84) is located in the upper portion of the machine arm and the upper machine cover must be removed to make this adjustment.

Figure 15



The needle reversing support (frame 81) should always be completely stable, without any motion, except when the zig zag control is activated. If the frame is loose, or improperly set, adjust as follows:

1. Set zig zag control on setting 0, and remove the machine cover plate.
2. Loosen locknut(85, figure 15). It may require a special tool such as a spanner screwdriver which is used for slotted nuts. Adjust the stud(86) up, or down, as required to adjust, until the needle bar frame and needle remain static while the machine is in operation. There should be no sidewise needle motion when zig zag control is on setting 0.
3. Tighten locknut(85).

When the needle enters the needle plate at different positions from position setting of dial, the distribution settings on Left, Middle and Right must be reset.

1. Set zig zag control on setting 0.
2. Turn the balance wheel by hand and observe the needle as it enters the needle plate in each position. The needle should enter each side of needle hole equidistant from the center of the hole, and from each side of the plate.

Figure 16

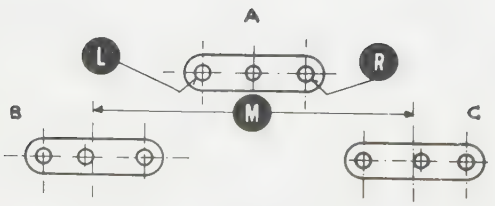


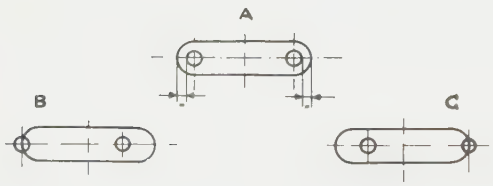
Fig. 24

Ⓛ = left hand stitch
Ⓡ = right hand stitch
Ⓜ = centre stitch

A = correct

B = wrong (stitch too far to left)

C = wrong (stitch too far to right)



A = correct

B = wrong (connecting bridge too long)

C = wrong (connecting bridge short)

Figure 16 illustrates improper needle position in different conditions. Situation A illustrates the proper position in each case. To correct the incorrect settings shown in situations B & C, figure 16(upper), refer to page 19, and adjust as needed.

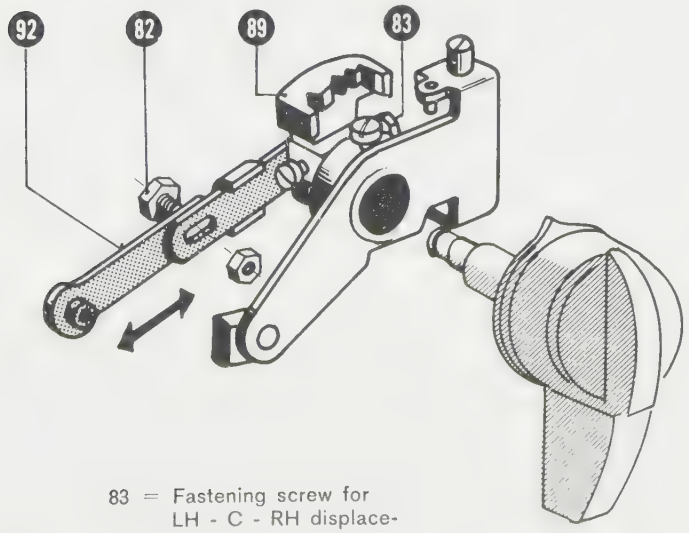
To correct situation shown in figure 16(lower), refer to figure 17 below.

1. To adjust the left-center-right setting, remove the upper arm cover plate and refer to figure 17 which illustrates the needle position lever assembly.
2. The graduated bridge piece(92) is not in proper position and must be adjusted.
   a. When the bridge is too long, the stitch will move too far left, as in situation B. To adjust, set needle position on middle setting and loosen bolt(82), but don't remove it completely.
   b. Move the needle frame until needle enters exact center of the needle hole, then tighten the nut on screw(82).
   c. When the bridge is too short, the stitch will shift to the right, as in situation C. To adjust, repeat the above procedure and move the bridge piece in the opposite direction.

When the adjustment is complete, the needle should enter the needle hole in positions shown in situation A, whether on straight stitch, or zig zag. Replace the cover and test sew.

It's also necessary to re-check needle relation to shuttle-hook point, after making the needle position adjustment.

Figure 17

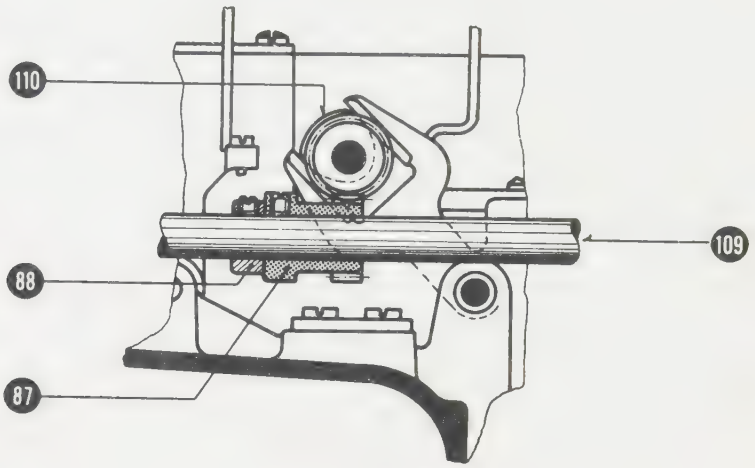


83 = Fastening screw for LH - C - RH displacement lever.

Lateral and vertical movement of the needle play a large role in the sewing process. Needle motion must not start before the needle has left the fabric, and must stop when the needle begins to enter the fabric. Needle motion is derived from the zig zag eccentric(110, figure 18).

Figure 18a, b and c illustrate the proper position for the needle in bebinning and ending of lateral motion, and in relation to the needle plate.

Figure 18

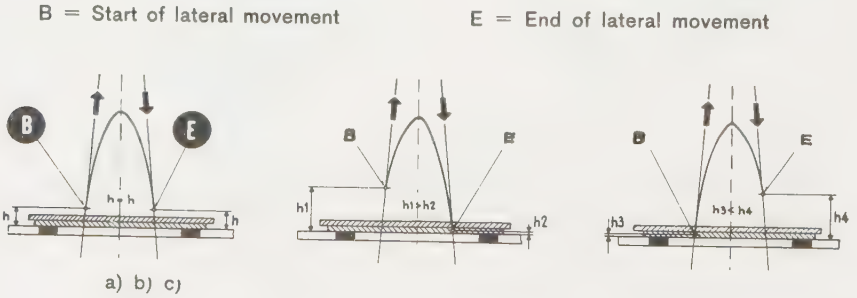


Adjustment is made on the worm gear(87) which is attached to the main shaft(109), which in turn reacts to an adjusting ring. To service this part remove the top cover.

1. Loosen both screws on the worm gear and hold the gear in position against the adjusting ring (88) with a screwdriver.
2. Turn handwheel clockwise to correct when problem resembles figure 18b.
3. Turn handwheel toward you to correct when problem resembles fig. 18c.

Check lower shuttle drive before making this adjustment. Be sure there is no end play in the shuttle drive assembly and rack.

Figures 18a, b, c.



If the lower drive system jams, check the rack(90, figure 19). The rack must be raised if there's a binding, or lowered if there's too much play.

1. Loosen clamp screw(91) see figure 20.
2. Remove lower base and move the bearing pin(93) as needed. If there is too much play in the rack, tap the bearing down. If it's too tight, raise the bearing pin slightly.
3. Tighten screw(91).
4. Place rack in front center, with needle in lowest position. Adjust the crank plate which is fitted to the vertical spindle(95), or lift plate which is another name for the part, since the lift eccentric(96) is also attached at that point.
5. Loosen screws (98 & 99) and move the rack (90) to dead center by turning crank plate(96) on the vertical spindle(95). Tapered screw(99), acts as safety screw against twisting of the lift eccentric.
6. Tighten screws (98 & 99).
7. Replace the free arm cover and lower base of machine and test.

Figure 19

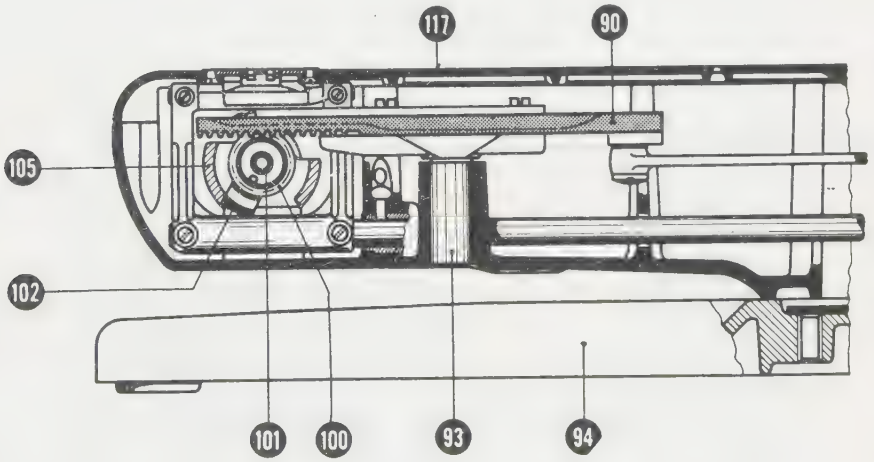
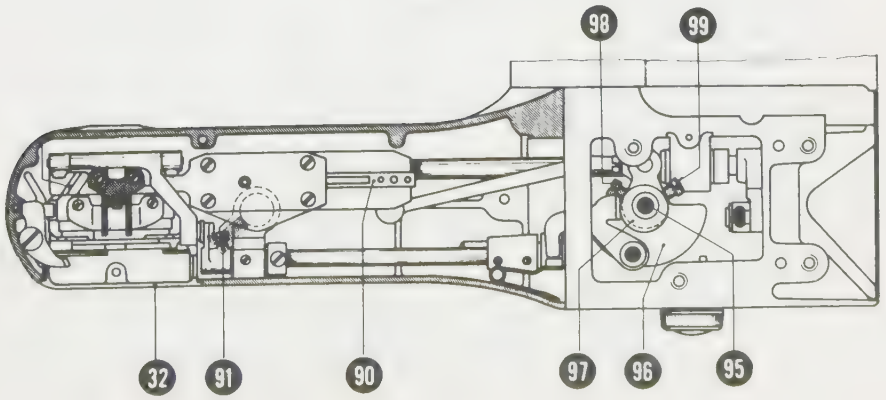


Figure 20



Presser Bar Assembly.

To change cloth pressure on the Bernina sewing machine it's necessary to use a screwdriver. The adjusting screw(77) figure 21 is accessible thru a hole in the upper machine arm after the cover is lifted back.

1. If more pressure is required, turn screw clockwise, or downward.
2. If less pressure is required, turn the screw counterclockwise.

To set presser bar for proper height, which is 9/32" above the needle plate, in up position, refer to figure 22. Although the illustration shows a gauge for this adjustment, it's entirely possible to get a proper setting without it. The average lead pencil is 9/32" in diameter and can be used to judge proper distance if nothing else is available.

Use the regular sewing foot and turn the handwheel until feed dog is in a lowered position. Raise presser foot with lifter(127) and place the gauge in line with the presser foot.

Lower the foot until the cloth bar guide (125) rests on the presser bar lifter(120). If it doesn't, loosen screw(126) and lower the lifter block until it does rest on the lifter.

Tighten the screw, re-check the adjustment for accuracy, and test.

Figure 21

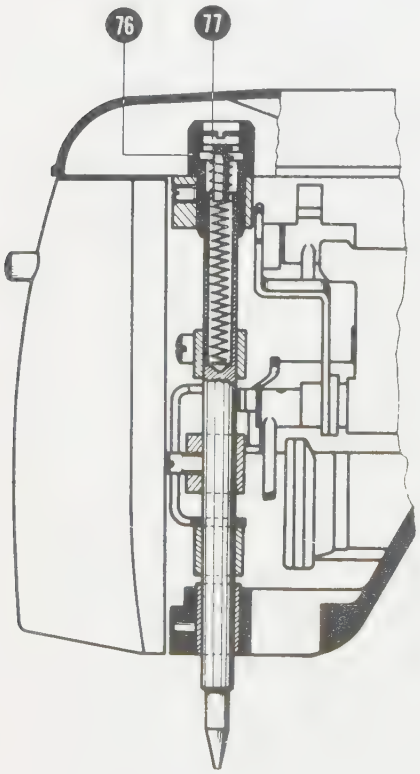
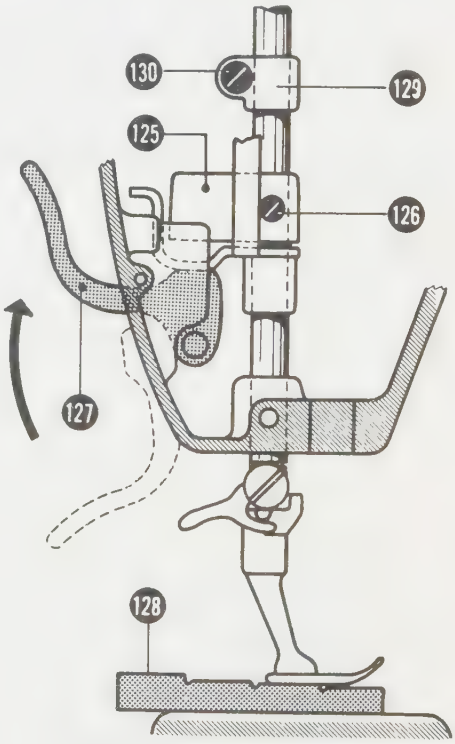


Figure 22



The Bernina Record utilizes the camstack method of automatic operation with a stack of 20 cams. The camstack is driven by a worm gear(137) fig. 23, which works off the main gear(109) and drives gear(157) that is attached to the camstack.

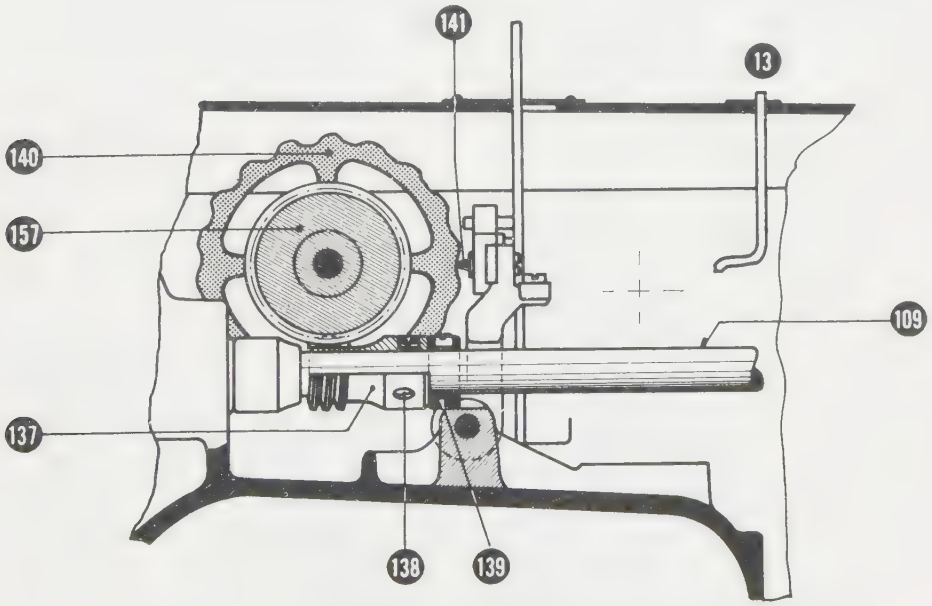
The gear ratio of cam to machine revolution is 1 to 36, and 36 needle stitches produce one complete design. The unique pattern control of the Bernina enables the operator to run a design, change patterns, then return to the original design and start in exactly the same spot on the design.

Pattern selector and control adjustment will be covered later in the text. The ornamental stitch gear must control the same timed movement with the needle as that produced by a properly adjusted zig zag gear.

The lateral movement of the needle must be in adjustment.

1. Use cam number 8 to make the adjustment.
2. Switch scanner(141) also known as follower, to the cam and push engaging lever to the rear. The setting should match the setting of the zig zag eccentric. Lateral needle movement shouldn't start until the needle leaves the fabric, or cease until it begins to penetrate it. See page 22.

Figure 23



To adjust for lateral needle movement, proceed as follows:

1. Loosen screws(138) on the worm gear(130), figure 23.
2. Hold gear firmly against adjusting collar(139) with a screwdriver, and turn hand wheel proper direction to correct.
3. Move the handwheel forward to retard lateral movement, or backward to advance the lateral movement .
4. Tighten screws(138) and test sew.

To sew perfect designs, the adjustment must be accurate.

The scanner(cam follower) transmits impulses for lateral movement of the needle from a given cam on the camstack. The cam follower axial setting affects the distribution of stitches in the needle hole. The cam follow-

er can be shifted to the front, or back, on the direction of the shaft. The rounded tip of the cam follower must always be in full contact with the entire width of the cam being utilized.

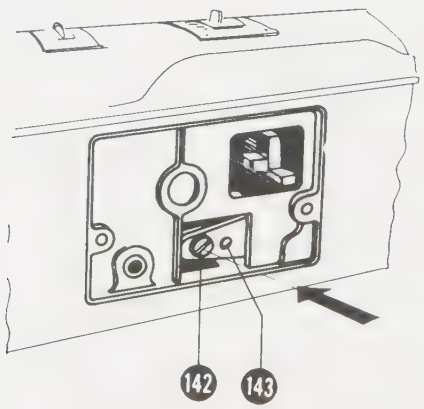
If the cam follower doesn't contact properly, proceed as follows:

1. Loosen screw(142) figure 24.
2. Unscrew and remove bobbinholder.
3. Screw(143) is eccentric and adjustment is made at that point.
4. If the cam follower must be moved forward to follow the cam, turn screw(143) clockwise.
5. If the cam follower must be moved back, turn screw(143) counter-clockwise as needed. Make the adjustment in small increments, and check frequently for accuracy.
6. To insure proper adjustment, check with cam 8, and the last cam on the stack, or any cam that utilizes the full throw of the needle. The needle adjustment is accurate when the lateral movement is the same on ornamental stitching and conventional zig zag stitching.

Before completing the adjustment, check the change from zig zag gear ornamental stitching gearing, and be sure both lever slots of the fork and angle lever show parallel oscillation. If the slot of the angle lever swings forward, and the zig zag eccentric fork to the rear, turn the zig zag eccentric, 180 degrees by loosening worm gear(87) figure 18, page 22.

Replace all components and test sew.

Figure 24



When an individual design is selected, the design selector lever(12) figure 25, page 27, is moved to that particular cam. The operation is made in two steps.

1. Lifting of the cam follower.
2. Lateral movement of the cam follower.

The notched carrier(144) figure 25, restricts the lateral movement of the needle, and although the cam follower lifting is performed, the needle still enters at the proper time and place. When the carrier is out of adjustment the needle will perform in an erratic manner.

1. To adjust, loosen screws(145, 146, 147) and set the carrier in proper position. Refer to pages 19 through 22.
2. Tighten screws, replace cover and test sew.

The notched segment(148) figure 25, holds the ornamental stitch selector in its proper position. The lateral arrangement of the notches must coincide with both the cam follower, and the cam, and with the black mark on the selector lever, and finally, with the scale on the machine cover.

When the notched segment gets out of line, the selector pattern is also out of line.

1. To adjust, the notched segment must be moved forward, or back, to regain proper selection.
2. Loosen screws(149 & 150).
3. Shift the segment until properly positioned.
4. Hold firmly in place and tighten screws(149 & 150).

Bernina Record models 730 and 731 both have an ornamental stitch pattern indicator which makes it possible to check a pattern for exact position of design, and whether the design has been completed or not. The pattern being sewn appears in the sight hole and changes shape as it's formed. It is synchronized in the window with the notch(9) figure 26.

Set indicator 151, figure 26, and run machine slowly. Observe scale symbol to be sure it's the same distance from both edges of the sight hole.

Figure 25

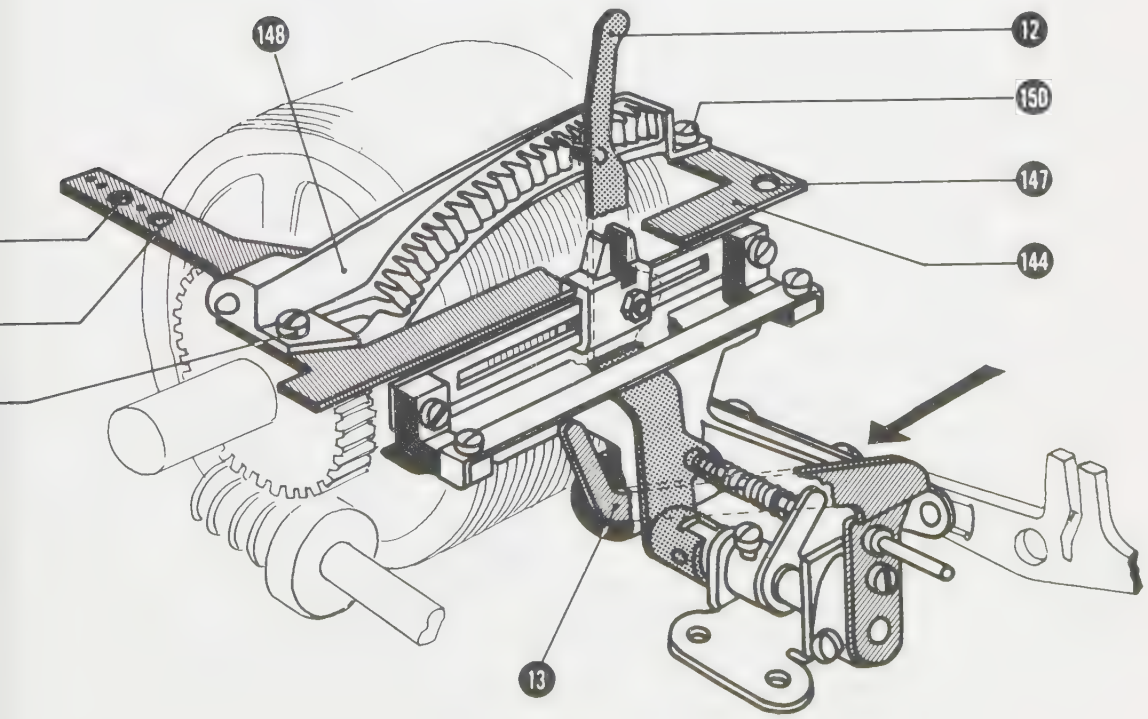
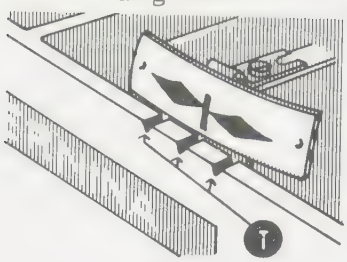


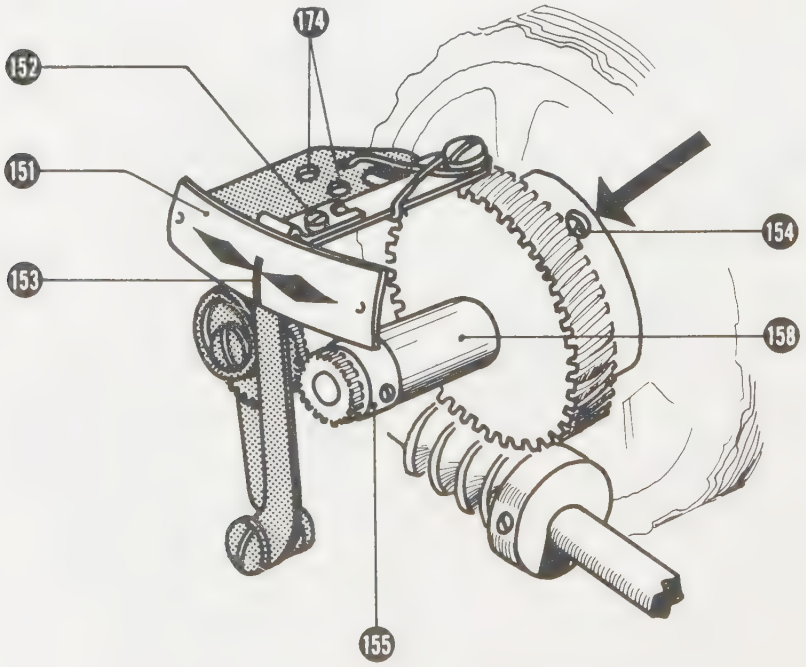
Figure 26



1. Loosen screw(152) figure 27 and shift the scale until proper position has been attained. Scale should be pressed inward slightly, toward the cams, to avoid touching the machine arm cover.
2. Tighten screw(152). Activate lever (13) to selector on cam 12 and test sew. Cam 12 should be used because the needle jumps entire zig zag width only once. Check the indicator when the move occurs. When it happens, the marked line (153) should be directly over the v-mark.
3. If the center mark (153) arrives over the v-mark too soon, loosen screw(154) on cam shaft. Turn the pinion(156) clockwise until both the marks are equal. Tighten the screws and test sew using cam 12.
4. If the mark (153) arrives too late, reverse the procedure and turn the pinion(156), in reverse. Don't loosen the pinion screw because it's also the axial limitation for the worm gear shaft(158). Exercise caution when tightening screw (154). There must be no end play in the shaft.

a. Model 731 has only 4 cams. Use cam 3 for making adjustment.

Figure 27



Adjusting the Automatic Buttonholer.

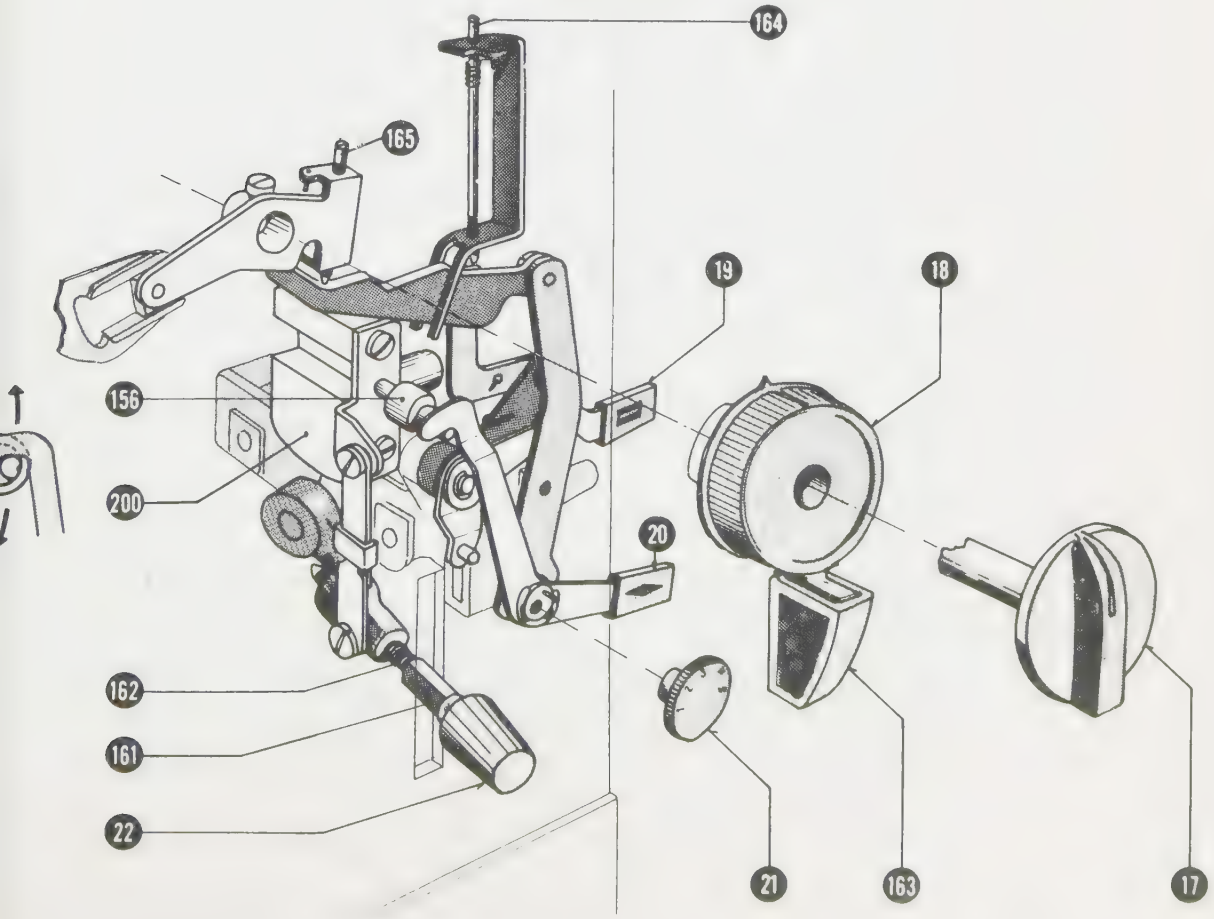
Set stitch regulator(22) figure 28, slightly below setting 0. Engage the buttonholer lever (19) by moving it upward. Set stitch width indicator by pulling downward and to the right. Button(17) should also be turned so the white mark on button (18) is opposite mark on button (17). Move the shift lever(22) up as far as it will go.

Test sew by making a buttonhole.

If the stitch is too far apart, move setting closer to 0 until satin stitch is more pronounced. If setting is still unsatisfactory, remove the cover, and make adjustment.

1. Turn screw (164) until correct feed advance is determined. Turn it clockwise to shorten the stitch, then sew a short seam in reverse.
2. Turn screw in opposite direction and density decreases.
3. To adjust for forward buttonhole stitching, adjust screw(165) on the stitch length control. Turn clockwise for more feed advance, turn it counterclockwise for less feed advance. Both sides of the buttonhole should have equal width and density of stitch.
4. To adjust the satin stitch density, unscrew cover plate over the drive and make adjustment, near lever(20).
5. Set knob (21) on setting 2, and engage lever so. Sew a short seam and check density. If the density is too thick, turn eccentric screw(154) figure 27, counterclockwise. The screw is accessible from under the handwheel. Satin stitch should have the same density as the buttonhole.

Figure 28



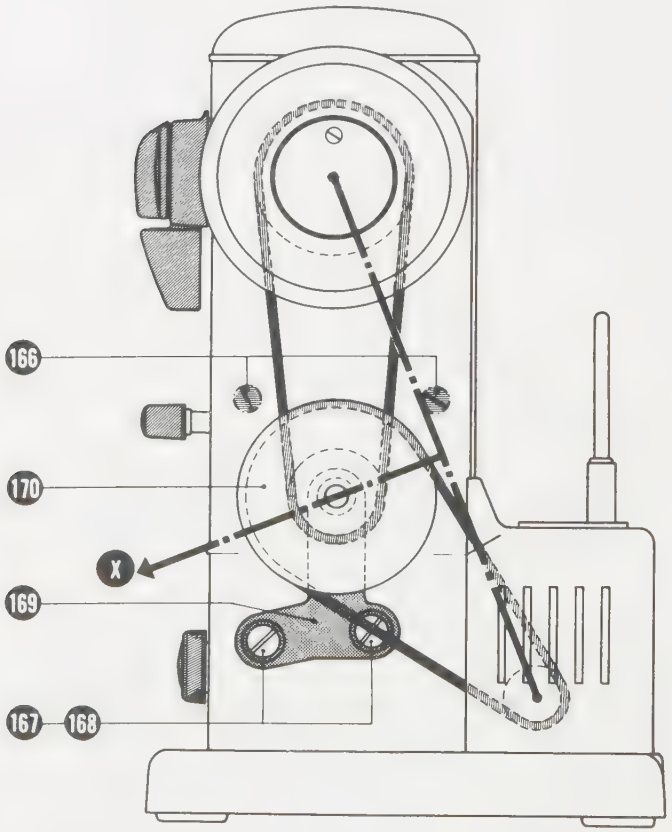
Adjusting the Motor and Drive Belt:

The Bernina is driven by a system of two belts. The first belt connects the motor to the lower drive mechanism, and the second connects both the upper and lower shaft. See figure 29.

After years of use, the belt might have a tendency to slip due to natural stretching. To correct, remove the belt cover and check belt tension.

1. When the belt is too loose, loosen screws (167 & 168).
2. Move entire assembly in direction indicated by letter x. The belt tension on driving shafts must be considerably more than motor drive belt.
3. When proper tension has been attained, tighten screws(167 & 168).

Figure 29

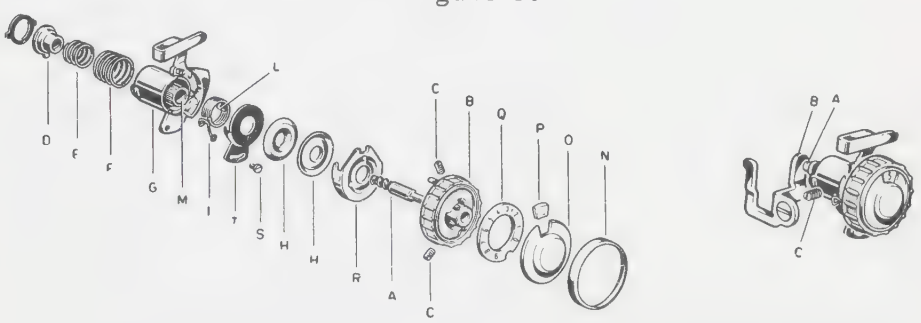


NECCHI.

Most sewing machine tension assemblies are basically the same and the Necchi is no exception. The concept is similiar with some variation in the number of components, but they all attain the same goal, keeping proper tension on both upper and lower threads.

Upper tension discs should always be in top condition, free of scratches or thread cuts. When tension won't hold tension after several adjustments, check both discs for thread cuts(grooves cut in discs by thread).

Figure 30



1. Loosen screws(c) and remove knob(B) and other components in order, according to figure 30. Check tension discs(H) for thread cuts. If they're badly cut, replace them. If slightly scratched, smooth surface with a fine grade abrasive.
2. The Necchi has a positive type tension with the calibrated knob(B), from 0 to 9. Setting 0 should provide a slight tension. As the number gets bigger, the tension should increase, until a setting of 9 should render thread almost impossible to pull through. Make test with presser bar down. A setting of 4 or 5 should be adequate for regular sewing, if the initial setting is correct, and the lower tension is in adjustment.
3. Loosen screws(C) and remove components from head. Figure 30a.
4. Use a small knife or hook and pull outer rim(N) figure 30, away from the dial.
5. Remove components(O, P and Q).
6. When facing the assembly, turn tension stud (A) clockwise, with a small screwdriver, to increase pressure on the tension discs. Turn the stud counterclockwise to decrease it.
7. Reassemble knob(B) in reverse order, after part(R) and tension disc (H) has been replaced.
8. Tighten screw(c) and draw upper thread through the tension on setting 0. If slight tension is present, adjustment is correct.
9. Replace tension assembly in machine head. Re-tighten screw(C) figure 30a.

In addition to lifting the presser foot, the presser bar lifter also activates the tension release pin. After servicing the tension assembly, be sure the lifter activates the release pin(A) figure 30a, allowing thread to be pulled through when presser foot is raised. If not, loosen screw(C) figure 30a, and move tension assembly proper direction to correct. Presser bar activator (B) must be in passive position (away from pin A) when presser foot is down, so the tension will be activated.

The check spring works in correlation with the upper tension assembly and must be adjusted accordingly. The spring is in adjustment when it releases the upper thread just as needle enters the material. If the spring is improperly adjusted, there are two possible corrections.

1. If the spring is too weak and drops slowly with the thread, it has lost control and must be corrected. Check spring (I) figure 30, can be adjusted on part(M), with the small tail(L) inserted into an adjusting notch. To correct, remove the tension assembly. Turn the spring until more pressure is attained. Replace the assembly and re-test. Repeat until corrected.
2. To change the springs travel, loosen screws(S) on plate(T). If more throw is required, move the plate counterclockwise. If less is needed, turn the plate clockwise. Adjust as needed. Remember, the spring must release the thread when needle enters the material.

When truly professional work is preferred, a slight adjustment of the check spring will enhance the seam. Slightly less check spring for sewing on heavy fabric, turn plate(T) counterclockwise. Slightly more for sewing on fine, or the new stretch fabrics, turn plate clockwise.

Needle position.

Timing and proper needle position are important in zig zag sewing. So the loop formed by the upper thread when the needle moves upward, is large enough to be caught by the shuttle point, it's necessary for the axis of the needle eye to be perfectly parallel to the shuttle. Figure 41. If this assembly is out of line, or too high or too low, the adjustment is made to the needle bar through an access hole cut in underside of machine arm. Loosen screw (A) figure 31a, and turn proper direction to correct. If the loop is too small, lower needle bar slightly. If needle drops too low, raise the needle bar slightly.

Always make this adjustment after inserting a new needle.

Turn handwheel toward you. Remove the needle plate, lower the race cover and observe relative position of needle and shuttle point. Turn the handwheel until the tip of the shuttle is directly behind the needle. At this point the shuttle tip should be about 3/32" above the top of needle eye. If not, loosen screw (A) figure 31a, and move needle bar in proper direction to correct.

Figure 31

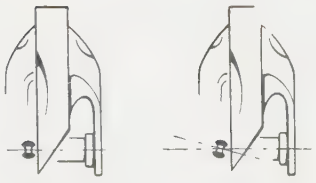


Figure 31a

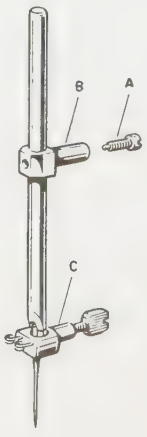
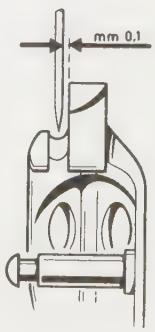


Figure 31b



Needle-Shuttle clearance.

When making needle to shuttle adjustment, one phase of the final adjustment shouldn't be overlooked. The needle to shuttle clearance, from front to back. Figure 31b illustrates the proper distance, which is minute, and the adjustment must be accurate. If it's set too close, the machine might break needles. When set too far away, the machine will skip stitches.

1. Remove the machine head from portable or cabinet (see preface for removal instructions), and set with machine resting on handwheel and shuttle-race pointing up.
2. Refer to figure 31e and loosen screw(A). Hold shuttle-race firmly and move in proper direction to correct. When the setting is too close, needle is striking shuttle, move the assembly to the right, toward screw-(A). If the needle is too far away, machine skips stitches, move the race assembly out toward you.
   a. Keep needle in down position so positioning will be accurate.
   b. Tap with a small hammer at points(B & C) figure 31c, to adjust.
   c. Be sure shuttle-race assembly doesn't twist to right or left and lose factory configuration.
3. After adjustment is completed, recheck shaft collar (B) figure 31c, which regulates shaft play. If there's end play, loosen screws(D), and move collar until slight play remains. If excessive adjustment was necessary, and lower shaft binds, move adjusting collar away slightly.
4. If the assembly gets out of factory-set configuration and twists dur-adjustment, loosen screw(A) figure 31c, and turn assembly until needle enters at proper position as illustrated in figure 31d.
5. If plate(A) figure 31d is scarred from numerous needle strikes, replace it. The entire sub-assembly must be free of scratchs, or marks. The shuttle is a vital part of any sewing machine. It should be clean, and free of scratches.
6. If the shuttle point is broken or damaged, replace it. Machine will generally skip stitches when this malfunction is present.
7. If the surface is scarred from numerous needle strikes, use a fine grade emery cloth and polish until the part is smooth.
8. The shuttle shouldn't fit over driver too tightly. Some play is needed to allow upper thread to slip over freely. It shouldn't fit too loosely, since shuttle will be sloppy and create erratic stitching. Figure 31f, illustrates proper clearance. If adjustment is required, tap the driver on each end, and use caution. In some cases, bending the driver spring will be enough to correct the problem.

Figure 31c

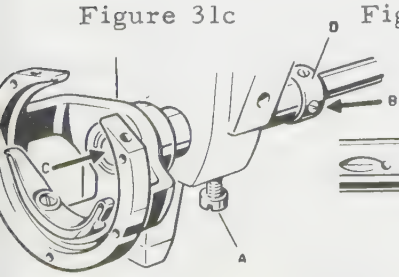


Figure 31d

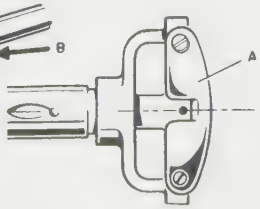


Figure 31e

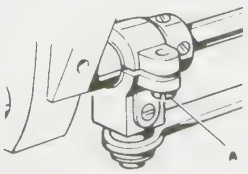
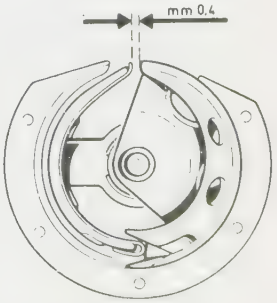


Figure 31f



Feed Dog.

The feed system on the zig zag machine must be more perfectly adjusted to insure equal and systematic feeding on the buttonhole and close satin stitch operations.

Figure 32

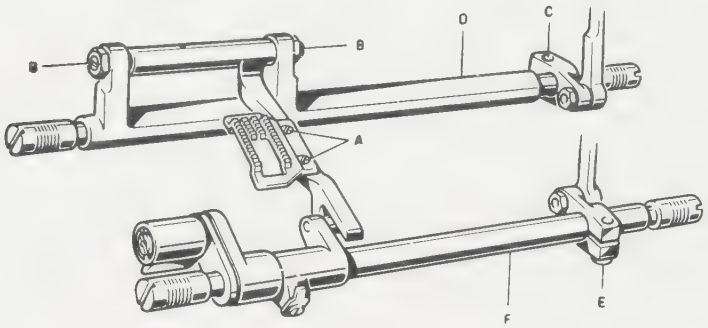
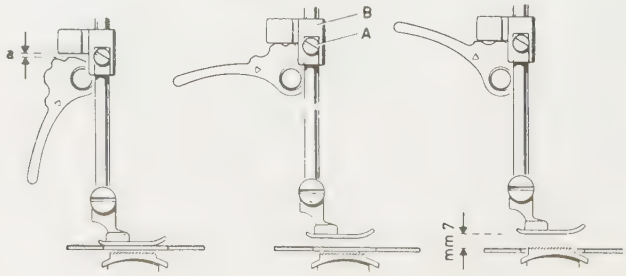


Figure 32a

Many different adjustments figure in proper feeding. From above, the presser bar must exert equal pressure on the presser foot, which presses against the material from above, directly over the feed dog which moves the material from below. To test, place a small sheet of paper between the presser foot and the feed dog, and lower the presser foot. If you can remove the paper, adjustment is required.

1. Figure 32b shows location of presser bar, after face plate has been opened.
2. Loosen screw (A) and move block(B) in proper direction to correct. If foot wasn't pressing down hard enough, lower the block slightly.
3. Tighten the set screw and test sew.
4. One additional test will insure equal feeding at all points of the feed dog. Place the paper under presser foot at each of four pressure points and lower the presser foot. If paper can be removed at any point, check feed dog teeth for possible replacement. See figure 32.
3. If the feed dog is out of line with needle plate, figure 32a, loosen the screws(A) figure 32, and position the feed dog in plate until correct. If repeated adjustments fail to align the feed dog in needle plate, the entire feed bar, or feed rock shaft, may be out of time.
   a. Loosen screw at each end of shaft(D) figure 32, and move shaft in proper direction to attain alignment of figure 32a.
   b. Tighten screws, but avoid over-tightening and binding the unit.

Figure 32b



Occasionally, adjustment must be made to properly position the feed dog in the needle plate slot, front to back. If the feed dog strikes the plate, when machine is set on long stitch setting, adjustment is required.

1. Loosen screw (C) figure 32 and move the shaft(D) slightly in proper direction to adjust. Tighten the screw and test, after replacing needle plate. Figure 32c illustrates proper clearance at front and back of the needle plate slot. Turn balance wheel until one complete cycle has been made, and observe position.

Check feed dog for proper height above needle plate at highest point of travel. Correct setting is 1/32" of teeth above needle plate. If the teeth are too high, the feed will jerk material. If too low, erratic feeding will result.

1. Loosen screw(E) figure 32 and adjust feed dog up, or down, as needed to correct.

a. Necchi dealerships have a guage to make this adjustment, but adjustment can be made by following the preceding steps.

Figure 32c

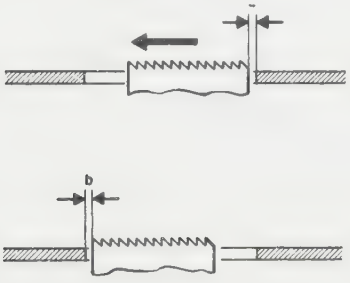
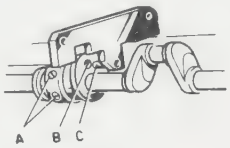


Figure 32d



Feed Dog-Needle bar timing.

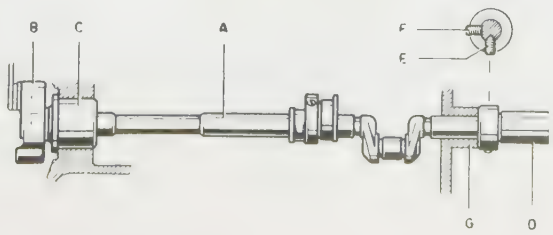
The machine is properly timed when the feed dog movement above the needle plate starts its motion the same instant the needle starts to descend. The feed dog should drop below the needle plate the same time the needle enters the material. Any deviation from this will require adjustment.

1. Remove upper shaft cover, entire arm cover on later models, and turn handwheel until each of screws (A) figure 32d, appear in the slot. Loosen each screw slightly and move eccentric forward, or reverse, if needed to correct. The adjustment should be made in easy stages, especially if being made for the first time. Necchi stores have a gauge, figure 32d, which positions the eccentric with the needle bar.

2. Without the gauge, turn wheel until needle starts to enter the fabric. Turn eccentric until feed dog drops below needle plate, and tighten first visible set screw, then the second when it comes into view.

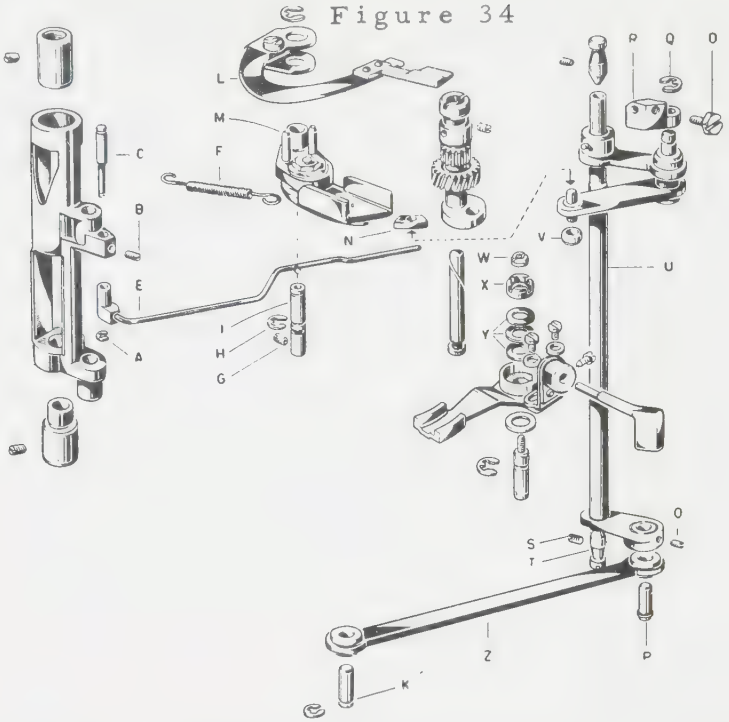
Figure 33 illustrates the main shaft. Adjustment to a main shaft is a rarity, but if the shaft binds, check bushings(C) and point where shaft enters arm cast. If part is frozen at either point, lubricate freely and work until machine turns freely.

Figure 33



Zig Zag Mechanism for manual operation.

Figure 34



The breakdown of parts in figure 34 are sub-assemblies of the zig zag mechanism. Service problems connected with each sub-assembly will be covered on the next several pages.

1. Dismantling the oscillating lever (M) is sometimes necessary when bearings wear, or when excessive use has changed the tolerance. To reach the sub-assembly, remove the upper cover, front plate, and the zig zag plate.

   a. Remove truarc ring(A), loosen screw(B) and remove pin(C).
   b. Loosen screw(D), and remove rod(E) to the left.
   c. To insure proper re-assembly, measure distance H, figure 43a between upper part of pin A, and the upper edge of machine arm.
   d. Release spring(F), figure 43, at its left end.
   e. Loosen screw(G).
   f. Remove retaining washer(H) through zig zag window. Use a hook or small screwdriver.
   g. With a long screw, fashioned to fit, insert into pin (I), and use screw to remove the pin, while holding down lever(L) with a tool.
   h. Remove lever(L) by bringing out between shaft and head frame.
   i. Remove oscillating lever(M) the same way. If this lever is the defective part, it will be easier to dismantle and replace bearings, or to adjust the bearing axial clearance by adjusting the nut which holds bearings in place.
   j. Remove sector(N), and if badly worn, replace it.
   k. Loosen screw(O) and remove pin (P) and retaining ring.
   l. Remove retaining ring(Q) and small block(R).

m. Loosen screw (S) and pull out from under (4 or 5mm's) pointed pin(T) in order to free vertical shaft(U). Roller(V) can now be removed if it's defective. Nut(W) and lock nut(X) are now accessible and can be adjusted. Nut (W) controls pressure on spring washers (Y) and the friction on the zig zag lever. Lock nut(X) prevents the adjusting nut from working loose.

n. To re-assemble, reverse the above steps and follow diagram on page 36.

Figure 34a

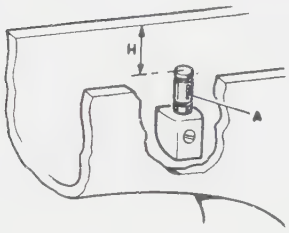
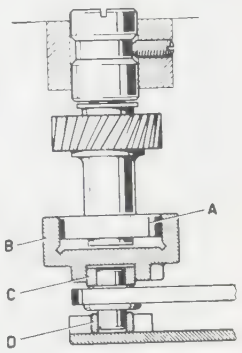
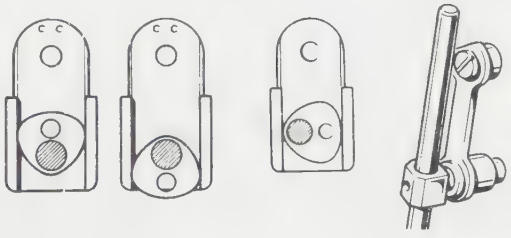


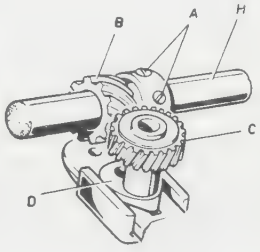
Figure 34b

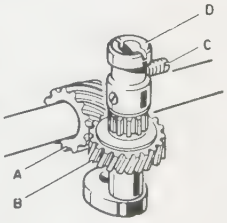


Timing needle bar swing for zig zag operation.

Figure 35 35a 35b 35c







When the needle bar swing is properly timed, it will begin its swing as soon as it leaves the material, on the upward stroke, and end its lateral motion before entering the material on the downward stroke. If it doesn't, adjustment is required.

1. Set needle position in center position and zig zag lever to left. Turn wheel until needle bar is in highest position.
2. Shift zig zag lever from left to right, and back again. When timing is correct, the needle will remain static, with no movement. If needle moves, further adjustment is needed.
3. Loosen screw(A) figure 35a, upper arm cover must be removed, and hold hand wheel so needle bar can't move.
4. Rotate gear(B) until cam(D) is correctly positioned. See figure 35.
5. Tighten screws and test.
6. Check for gear play.
7. To adjust, loosen screw(C), figure 35b.
8. Turn bushing(D), figure 35b, clockwise. It's eccentric, move the gear(B), figure 35b, closer to gear(A) and check gear mesh.
9. Tighten screw(c), after determining gears are meshing properly.

Needle Bar Centering.

To center the needle bar, place needle position lever in center position. Turn handwheel until needle enters the needle plate slot. If the needle does not enter the slot equadistant from each side of slot on a complete revolution, loosen screw (D) figure 34, which holds the needle bar rod. Move the needle bar until properly centered, and tighten screw(D).

To test, replace zig zag plate, then change for straight sewing plate and set zig zag position lever on left, and move zig zag lever to the left. If the adjustment is correct, the needle will enter needle hole properly.

When machine zig zags on straight stitch setting, review last three pages and if stop pin in lower channel of oscillating lever is broken, replace it. See figure 35D.

To adjust on automatic zig zag machine, which is somewhat different, turn to figure 35b.

1. Lower needle bar with needle in left position, until needle drops to lowest position. When the zig zag lever is moved back and forth after a correction has been made, the needle bar should not move, when cam, (D) is in position illustrated in figure 35e.
2. To double check the adjustment, move the needle position lever to right position and test. If adjustment is correct, needle shouldn't, and will not, move.
    a. If not, loosen screw(A) figure 35D.
    b. Turn eccentric(B) to the right, or left, as needed to correct.
    c. Tighten screw(A) and test sew.

Figure 35D

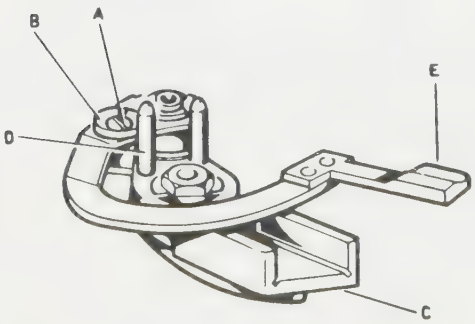
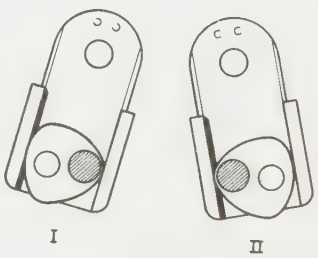


Figure 35e.



Lateral movement of lever(A) figure 35f, for automatic control of the zig zag sewing, works in conjunction with slide bearing(8), figure 35g, which is sliding under oscillating lever(C), shown upside down her for clarity.

Fixed pins(D) act as lever stops.

The eccentric is set by hand above the lever for hand control(H) figure 35f, and can't interfere with movement of lever(A). Lever(F), which controls the width of zig zag in manual operation, must be able to travel freely from left to right and back, and make a zig zag stitch between 3/16" and 7/32".

1. To adjust, loosen screw(G), figure 35f.
2. Rotate eccentric(E) until there is some play between hand lever(H), which is completely to the left, and left edge of the zig zag plate window. If the adjustment is too extreme, the needle might exceed needle plate slot size and hit the plate. Make this adjustment with caution.
3. Tighten screw(G) and hold eccentric firmly so it doesn't move.

Figure 35f

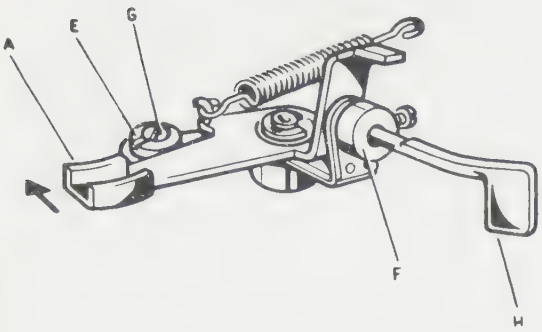
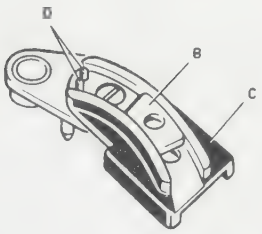
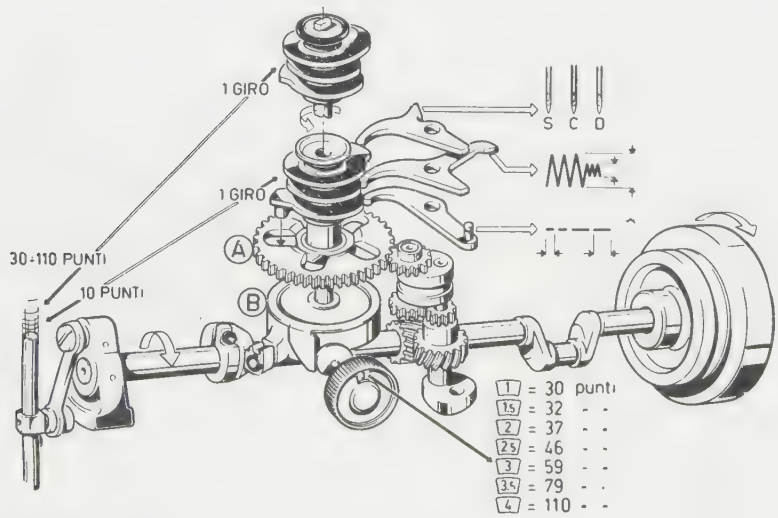


Figure 35g



The automatic featured below is the most popular unit in the Necchi series. Most adjustments on this sub-assembly will apply to other assemblies on various Necchi zig zag sewing machines.

Figure 36



If it becomes necessary to dismantle, or remove, the automatic device use caution. One slight misstep might render the machine useless.

1. Remove upper arm cover.
2. Set length of stitch lever, or knob, on setting 0.
3. Disengage the hooked rod from length of stitch regulator lever.
4. Remove rod disengaging lever, close to machine arm.
5. Remove truarc rings(A & B) figure 36a. Also lever(C) and spring(D).
6. Remove lever(E) by pulling upward.
7. Loosen screw(G) and lever(H).
8. Remove screws(4 of each) holding the assembly and remove plate.
9. If necessary, remove the drum unit(36c) and observe position of the spring tail(E), figure 36b.

To pull the drum, place two brake shoes inside drum(A), after lubricating them, and spring(B), with a high quality household oil.

1. Place pulling spring(B) figure 36c, on the outside of drum, and wind coils downward. Coils should join each other firmly.
2. Use long nose pliers and insert spring into notches of shoes. Grip lightly and rotate them down inside drum until distance between tail of spring and notch of opposite block(E), is approximately 3/4".
3. Notch(C) of drum(D) should line up with notch(E) at this point.
4. Turn unit upside down and insert plate(F) into drum(D), and engage tongue(G) of plate into the slot at bottom of drum.
5. Insert drum (A) into drum(D) and rotate until tail of spring contacts surface(H) of drum(D), see figure 36d. Secure tail of spring with joining plate(I) and screws(L). Notch(E) of the block should be visible thru hole(C), figure 36c.
6. Fasten plate(M) on drum(D), engaging tab (N) against upper coil of spring(B), figure 36c.

Figure 36a

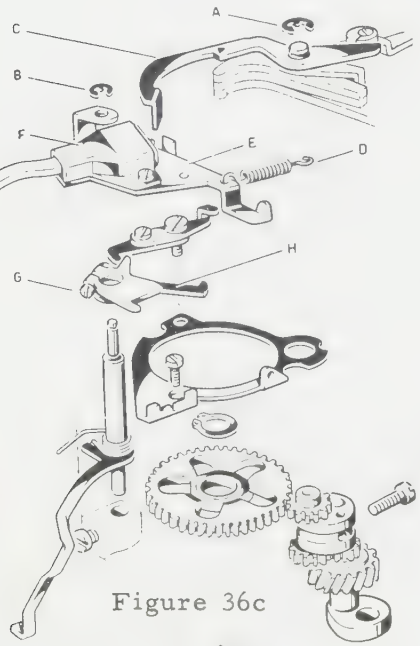


Figure 36b

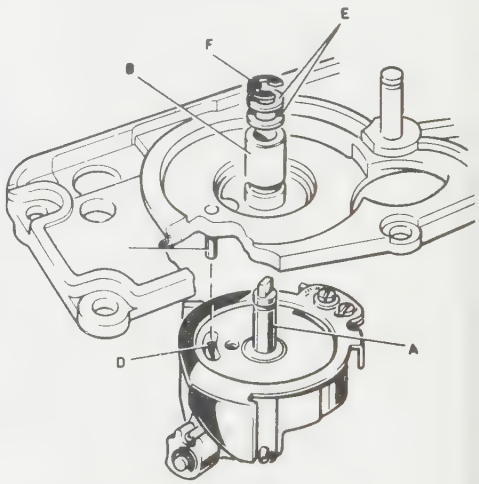


Figure 36c

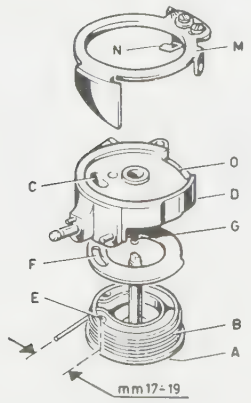
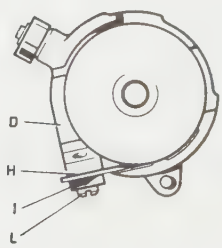


Figure 36d



To fasten the drum to automatic assembly plate, insert axle(A), figure 36b, from the bottom up, into bushing(B), pin(C) should fit into the notch of block, through windown(D).

Insert washers(E) and retaining ring(F) into groove at upper end of axle (A). The washers serve as shims to regulate up and down axial play of the drum inside of the bushing.

1. Set springs(A) and (B) in plate, figure 36e.
2. Re-assemble balance of unit per drawing of figure 36a. After parts are in proper position, the entire assembly should have a smooth feeling.

Figure 36e

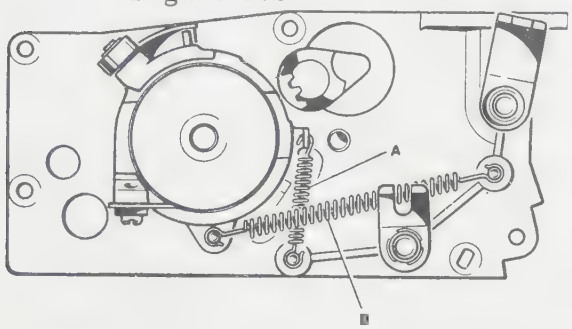
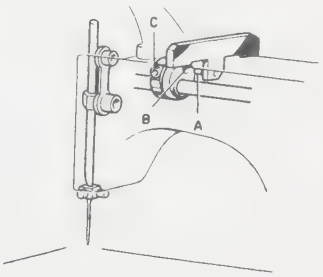


Figure 37



Timing is critical on the automatic sewing machine. When the automatic assembly has been removed for service, recheck needle bar timing after re-assembly. All lateral movement of the needle must be made when the needle is out of the material.

Figure 37 illustrates the critical area. It also illustrates a guide furnished by Necchi to make the adjustment. When the guide is not available, adjust as follows.

1. Turn balance wheel until the needle is at highest point.
2. When the needle bar is in time, the vertical connecting link should be in perfect vertical position, parallel to the needle bar. If not, loosen screw(C) figure 37, and turn balance wheel slightly. The main shaft will turn inside the eccentric.
3. Tighten screw(C) and check the alignment. The eccentric also acts as the adjustment device for shaft end play. After adjustment, recheck position. The eccentric should be slightly away from bushing (D) fig. 37a. Main shaft should have very little end play, just enough so main shaft doesn't bind.

Figure 37a

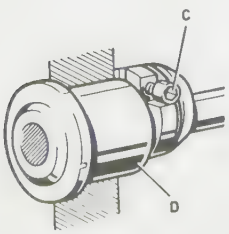


Figure 38

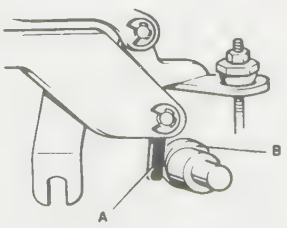


Plate adjustment.

Position eccentric that controls automatic device with it's minimum toward the operator.

2. Place needle position lever and zig lever in left position.
3. Set elongation knob for ornamental design, just beyond setting 4.
4. Set knob for minute setting of feed, which is attached to lever plate with index, in a vertical position.
5. Press two small forks that control zig zag and needle position levers against the fingers, by using upper levers, and insert the entire plate into the machine.
6. When pressing plate against machine, be sure it's properly positioned To check, move zig zag and needle position levers, which should move the relevant upper levels of the plate.
7. To time the pulling gear for proper ratio of 1 to 10(every time the machine makes 10 revolutions, the design cam makes 1. proceed:
   a. Set needle position lever and zig zag lever on extreme left.
   b. Turn wheel until needle is at its extreme low position. When the zig zag lever is moved, the needle should remain still.
   c. Put cam group XXI, 9664383, in place, while pressing the plate toward back of machine. Rotate the cam group and pulling gear, until they are in position illustrated in figure 39, at extreme right of step(A), figure 39.
   d. Move entire plate forward, engaging gear(E) with gear(F), fig. 39a.
   e. Hold the plate against the machine and insert screws (A & B), figure 39a.
   f. Don't tighten completely, since screw hole(A) is cylindrical and screw(A) is used as a pivot for the entire plate, while screw(B) is elongated so screw(B) allows a slight rotation of plate for adjusting mesh of the gears. Before making final adjustment, be sure gears are meshing smoothly.
   g. Tighten screws(A & B), and insert screws(C & D), figure 39a.
   h. Attach part (G), figure 36a, on its axle for controlling the cam group in making buttonholes automatically. Fasten with ring(B) but don't tighten screw completely until smooth meshing is assured.

Figure 39

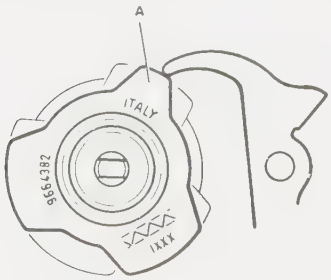
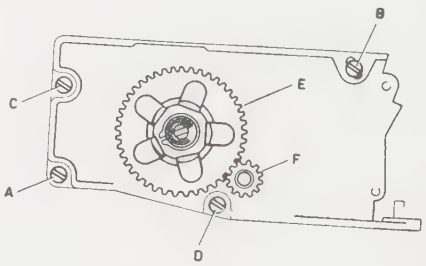


Figure 39a



Adjustment of Fingers.

Fingers A, B and C, are implements which transmit patterns from the cam to the needle bar and feed. One finger regulates the needle position, another the width of zig zag stitch, and the third, length of stitch. Finger (A) is the needle position activator, Finger(B) regulates the width of zig zag stitch, and Finger(C), the length of stitch.

1. If adjustment is required, remove upper cover.
2. Place needle position lever and zig zag lever on left position.
3. Place lever for disconnecting the fingers, next to machine arm.
4. Fingers (A &) should be in position illustrated in figure 40.

5. Left prong of fork (D) should touch pin (E), without forcing it, after pin(F) has been pushed slightly against tail(G) of the finger.

Figure 40

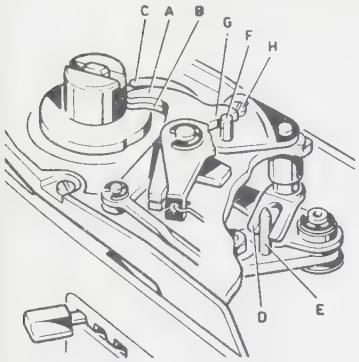


Figure 40a.

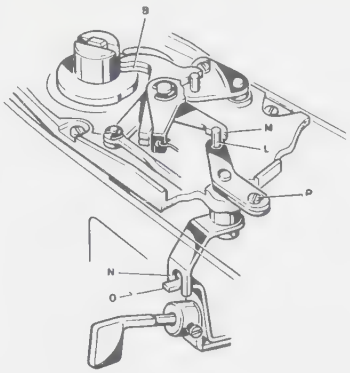
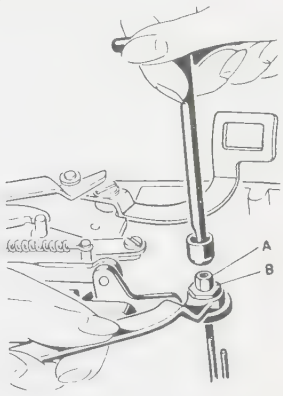


Figure 40b.



At this point, the needle position lever shouldn't be more than 1/16" from left side of position guage.

To position lever finger(B) properly, push pin(L) into slight contact with tail (M) of the finger, with left prong of forked lever(N) touching lever(O)

1. To adjust loosen screw (H) figure 40. Push pin(F) against part(K), while screw (H) moves in the slot toward you, until pin(E) and fork(D), make contact. Tighten screw(H).
2. To adjust width of zig zag lever finger, loosen screw(P), figure 40a and follow the above procedure, except screw (H) must be pushed away.
3. To adjust finger(C), continue left setting position and zig zag levers.
4. Set length of stitch knob for ornamental stitching on setting 1.
5. Set length of stitch regulating knob on setting 4.
6. Set knob for minute stitching on setting 0, or in up osition.

a. Necchi furnishes a guage which fits over the cam holder. The guage may be used for adjusting both sets of zig zag fingers, and the feed finger (C). For length of stitch adjustment the guage has two radius settings. One slightly under 20mm, one slightly over. When the guide isn't available, adjustment should be made in easy stages.

b. Proper adjustment is present when the machine feeds material placed under the presser foot at a spot where needle enters cloth. Draw a line to use as a guide and turn machine slowly. The cloth should move 1/64" before the line, then 1/64" back of the line. If not, loosen lock nut (A) figure 40b, and adjust nut(B), up or down, as needed. Make adjustment in easy stages. Tighten lock nut.

Figure 41

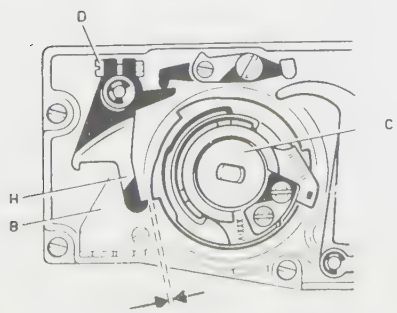
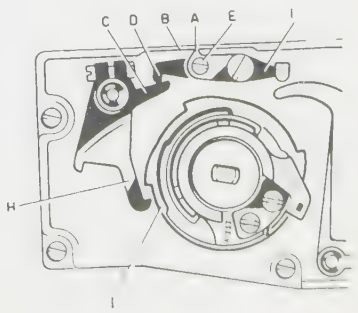


Figure 41a



Automatic Buttonholer.

Place cam group(C) for automatic buttonholer in place, and insert a thin strip of paper between ratchet(H) and plate(B), figure 41.

Mount buttonhole foot on presser bar. Be sure sliding sole is at extreme end of its movement toward you.

Check proper placement of cam step. It should be 1/64, to 1/32" as in figure 41. If the measurement is off mark, adjustment is required.

1. Move ratchet(H) as needed.
2. Tighten screw(D) when in correct position. Remove the paper.
3. Raise and lower the foot several times to be sure adjustment is correct. Remove the foot, and position cam group, figure 41a. Step(H), of ratchet should rest against smaller portion of cam. The adjustment is right when point (A) touches rim(B), and terminals of levers(B & C), touch. Step of ratchet(H) must be close, without touching cam(I).
5. Tighten screw(E). This adjustment opens cam finger(G), figure 41b and ratchet(H) must be moved away slightly, to allow for cam placement without interference.

Figure 41b

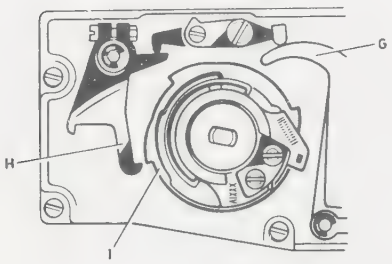
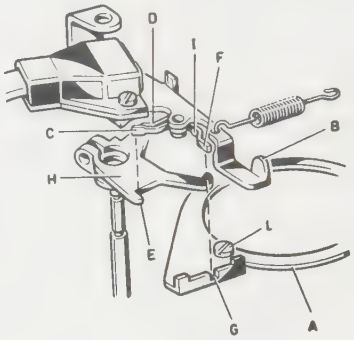
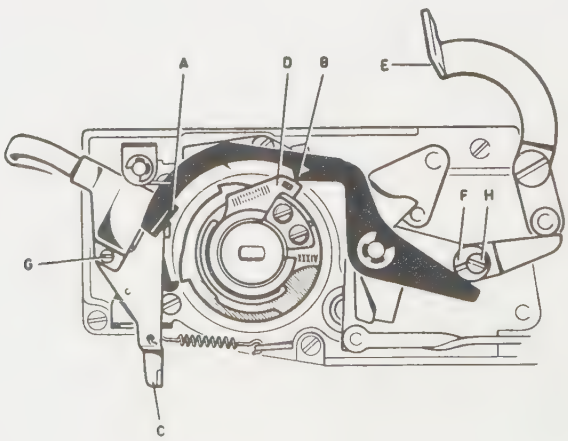


Figure 41c



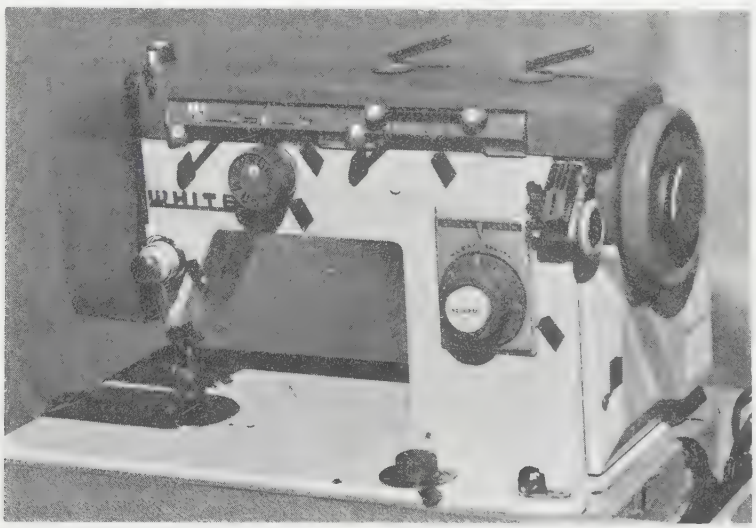
Plate(A), figure 41c, protects the gears from dust and lint, and allows room for adjusting lever (B), which controls the microswitch. Lever(B), also controls the opening of ratchet(H) on later model machines.

Figure 42



WHITE

Since White quit manufacturing sewing machines in the United States, the company has bought machines from many European and Japanese sources. To cover every model they've sold would be a monumental task. We've chosen a few more popular, and will allude to other procedures from makes like Western's Dial & Sew, when they apply.



Tension.

The upper tension assembly on most White zig zag machines is similiar to other sewing machines manufactured in Japan. Basic adjustment will be the same, even though components may vary.

1. If the machine is properly threaded, and lower tension properly adjusted and upper thread is still pulling to underside of material, move tension adjusting dial(B) clockwise slightly, or as needed to correct.
2. If the lower thread is pulling up through material, adjust by turning tension dial(B), counterclockwise until corrected.
3. Check spring must also be in adjustment. Check spring(c) figure 43 should release the upper thread as material is entered by needle. If it doesn't, loosen screw that holds tension assembly in head, open the face plate door, screw will be adjacent to tension assembly. If the assembly is unitized, remove entire unit and loosen additional set screw on the tension barrel. If more spring is required, turn tension stud counter - clockwise. If less spring is required, reverse the procedure. Tighten both set screws, replace tension assembly, and test sew.
4. If tension is the style in which tension stud screws directly into the head cast, loosen the set screw located either in front, or back, of the tension stud, and turn the entire stud counterclockwise for more check spring, or clockwise for less spring.
5. To determine if setting is correct, thread the machine and turn hand wheel as you observe needle descent. When needle tip nears fabric, re-check the spring and its position with the thread. At this point the spring should exert slight pressure on the thread.

Lower tension is controlled on the bobbin case. With one or two exceptions, White machines manufactured outside the United States utilize Class 15 sewing systems. Figure 43a illustrates a Class 15 bobbin case, and adjusting screw where lower tension adjustment is made.

1. If the upper tension is properly set, and check spring is set properly, and machine still won't hold tension, remove the bobbin case and check.
2. Remove the adjusting screw.
3. Remove tension spring and clean area thoroughly.
4. If examination of the spring reveals thread cuts or scratchs, smooth entire surface with emery cloth.
   a. If too badly damaged, replace the part.
5. Replace spring and adjusting screw. Turn screw in about two turns. Replace the bobbin and test by pulling thread through spring. If there's a slight drag, place bobbin case in machine and test sew. Adjust further if needed. Clockwise for more tension, counterclockwise for less.
6. If the bobbin case is thread cut, or bent and damaged, replace it.

Figure 43

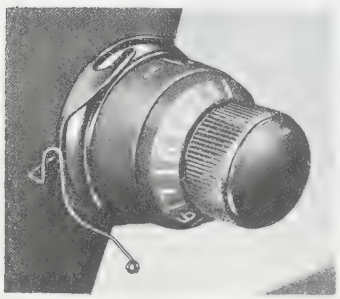


Figure 43a

When a machine skips stitches, and it's been determined the correct needle is properly inserted, check the shuttle point, figure 43c. If the tip is broken, or badly scarred from needle strikes, replace it. Figure 43c illustrates the assembly and the order in which they are placed.

If the shuttle tip isn't broken, check needle bar for timing.

1. Remove shuttle-race components.
2. Replace the shuttle only. See figure 43b.
3. Turn hand wheel until needle arrives at lowest point and starts back. Relative position of needle and shuttle should resemble figure 41b, with tip of shuttle about 3/32" above upper part of the needle eye.
4. If not, open face plate and turn balance wheel until screw on connecting link of needle bar aligns with hole cut under the arm of machine-45. Loosen screw, and move needle bar until above alignment is corrected. Tighten screw and recheck adjustment. Don't allow needle bar to turn.

Figure 43b

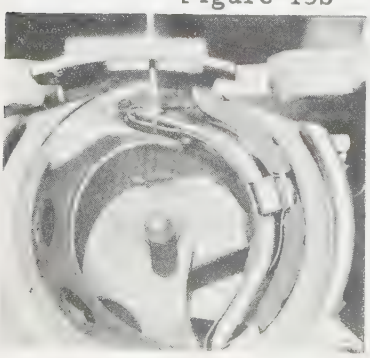
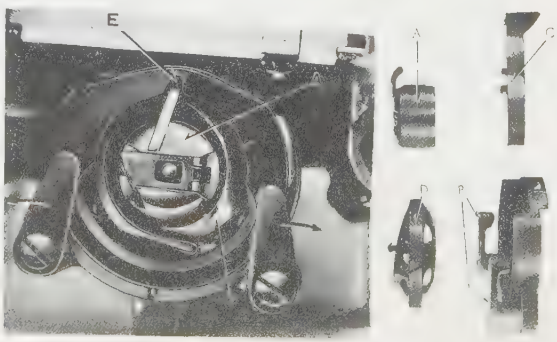


Figure 43c



When clearance between the needle and hook, front to back, is incorrect, the machine will break needles frequently. Remove the needle plate and make an inspection by turning handwheel slowly and observing as the needle tip nears the shuttle. Clearance is slight, but the needle must not touch the hook.

If the needle is set too far away, the machine will skip stitches.

1. On conventional Class 15 machines, where bobbin is inserted from the side, loosen the set screw on race indicated by arrow, figure 43d, and move the entire assembly. Toward the needle if clearance is too much, away from the needle if needle is striking the shuttle.
2. Tighten set screw and test. Don't allow race assembly to twist and lose factory setting.
3. On machines with transverse hook assembly (bobbin case faces the operator), refer to 43e. Lower shaft timing as well as hook to needle timing can be made at this point.
4. Remove gear box cover.
5. Loosen screws(D), figure 43e.
6. Move race assembly (F) proper direction to adjust. Away from the needle, if needle striking hook. Toward the needle if skipping stitches.
7. Tighten screws(D) and replace gear box cover.
8. If there's too much axle play after adjustment, loosen screws (E), and move collar (G) against hub of race. Tighten screws(E). If machine binds after adjustment, move collar(G) slightly away from hub of race.

Figure 43d

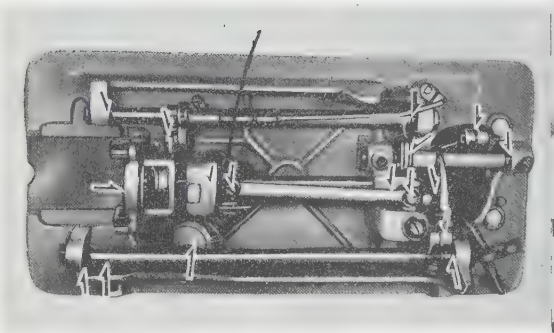
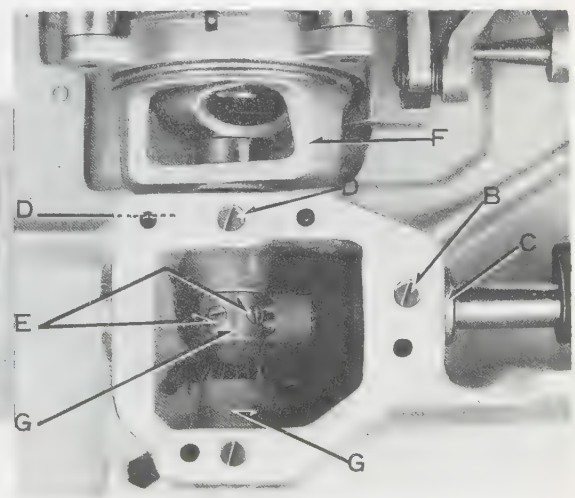


Figure 43e.



Adjusting Needle Position-Model 3354

Like other automatic sewing machines, the needle, in center position, must travel the same distance to either side of needle plate slot.

1. To adjust for proper needle position, set position lever on setting 5.
2. Turn hand wheel until needle is in extreme right position and down.
3. Loosen nut(A), figure 44.
4. Turn screw(B) up, or down, as needed. Correct position is in center of radius, right side of elongated needle plate hole. Tighten nut(A).
5. Turn wheel until needle is in needle hole in extreme right position.
6. Needle should be in center of radius in left side of needle hole.

Figure 44

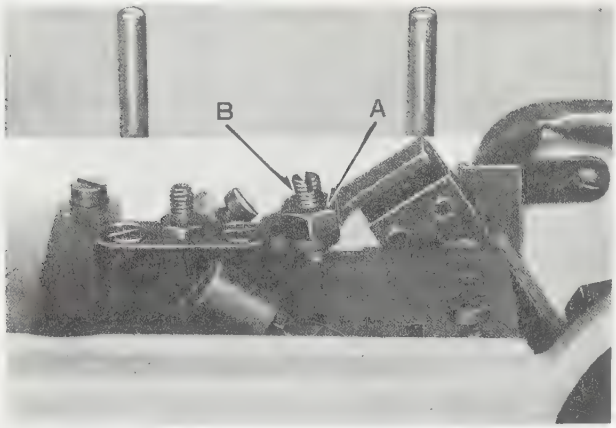
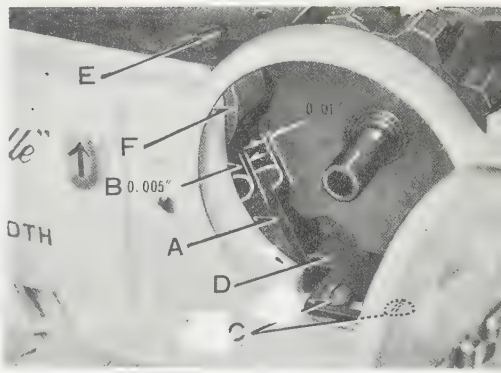


Figure 44a



7. If not, there is too much, or too little clearance at point (B) figure 44a. When needle is in right position, clearance should be .005.
8. To adjust, loosen screw(E) and move arm(F) closer to cam follower finger(A), which will reduce clearance. Reverse procedure to increase clearance. There must be .005 clearance between arm(F) and cam follower(A), when needle is in extreme right position.
9. Tighten screw(E).
10. Cam follower finger must clear tooth-root of built-in cam by .010. Any deviation will change pattern width and bind machine when finger changes from cam to cam.
11. To adjust, loosen screws(C), figure 44a, slightly.
12. Move stop(D) toward cam follower finger for more clearance.
13. Move stop(D) away from cam finger for less clearance.

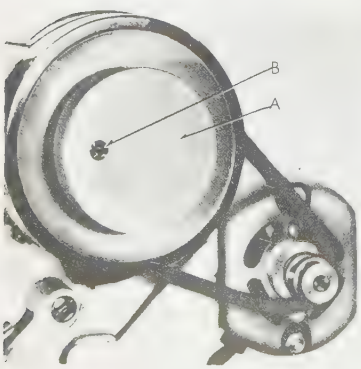
Clutch Assembly and Bobbin Winding.

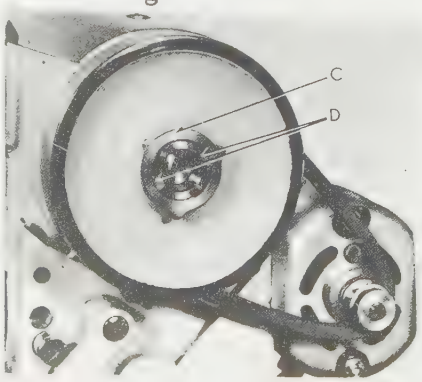
The clutch assembly is alike on most machines. Gear-driven machines are the exception. The clutch assembly illustrated in figure 45 is popular not only on White zig zag machines, but most belt-driven machines as well.

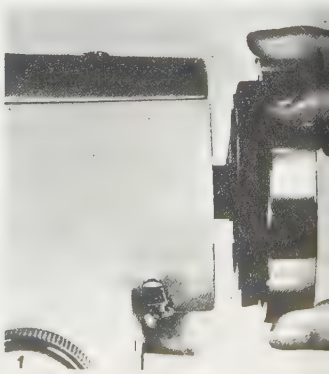
To disengage the machine so only the handwheel turns, clutch nut(A) is turned counterclockwise. If machine continues operating after this move, loosen screw(B) and remove clutch nut from machine.

Clutch nut washer(C) will be exposed in its place on main shaft collar, with prongs (D) fitted in appropriate slots on the collar. If machine runs after clutch is released, turn clutch collar 180 degrees. Replace the other components, and test sew.

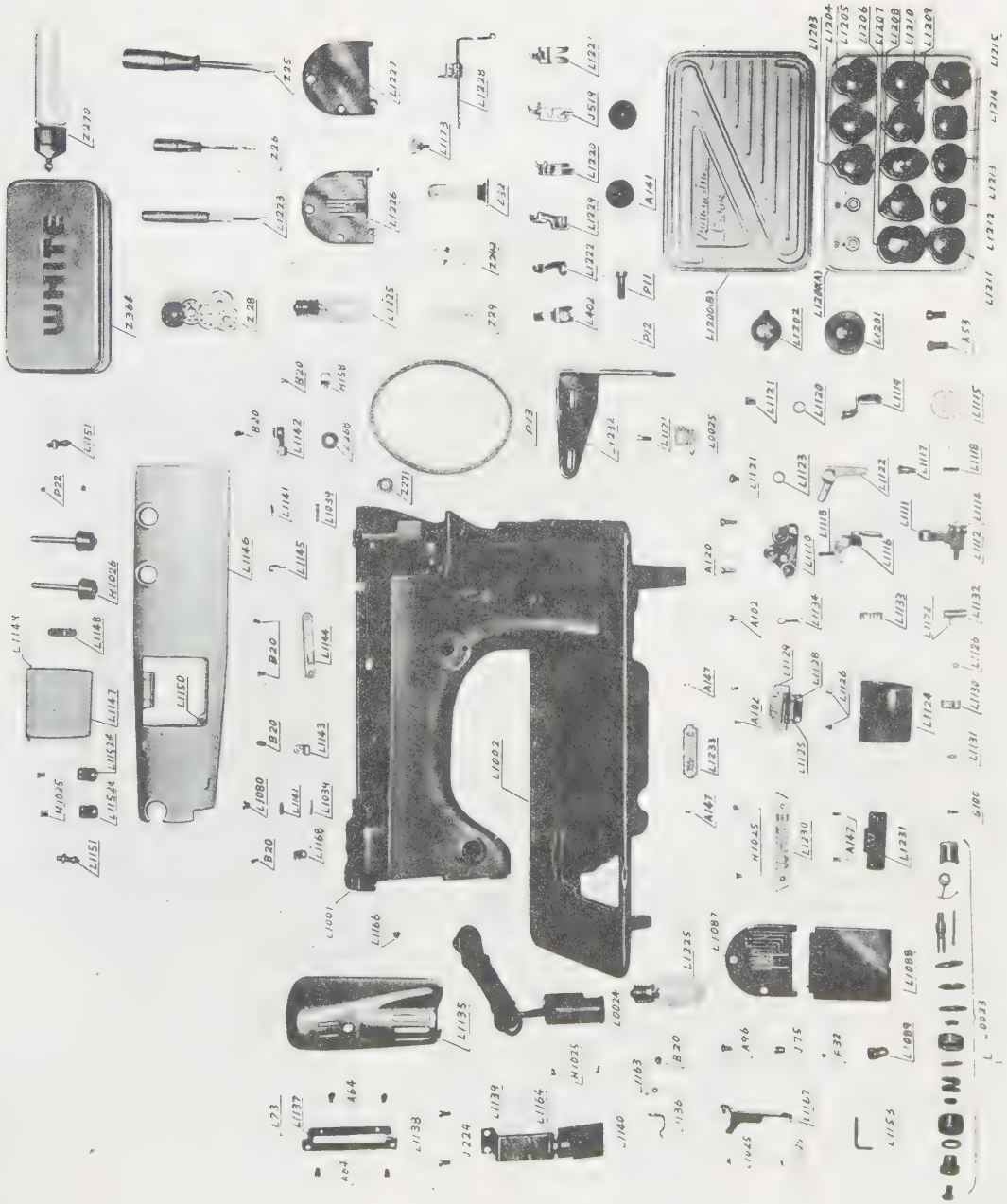
Figure 45



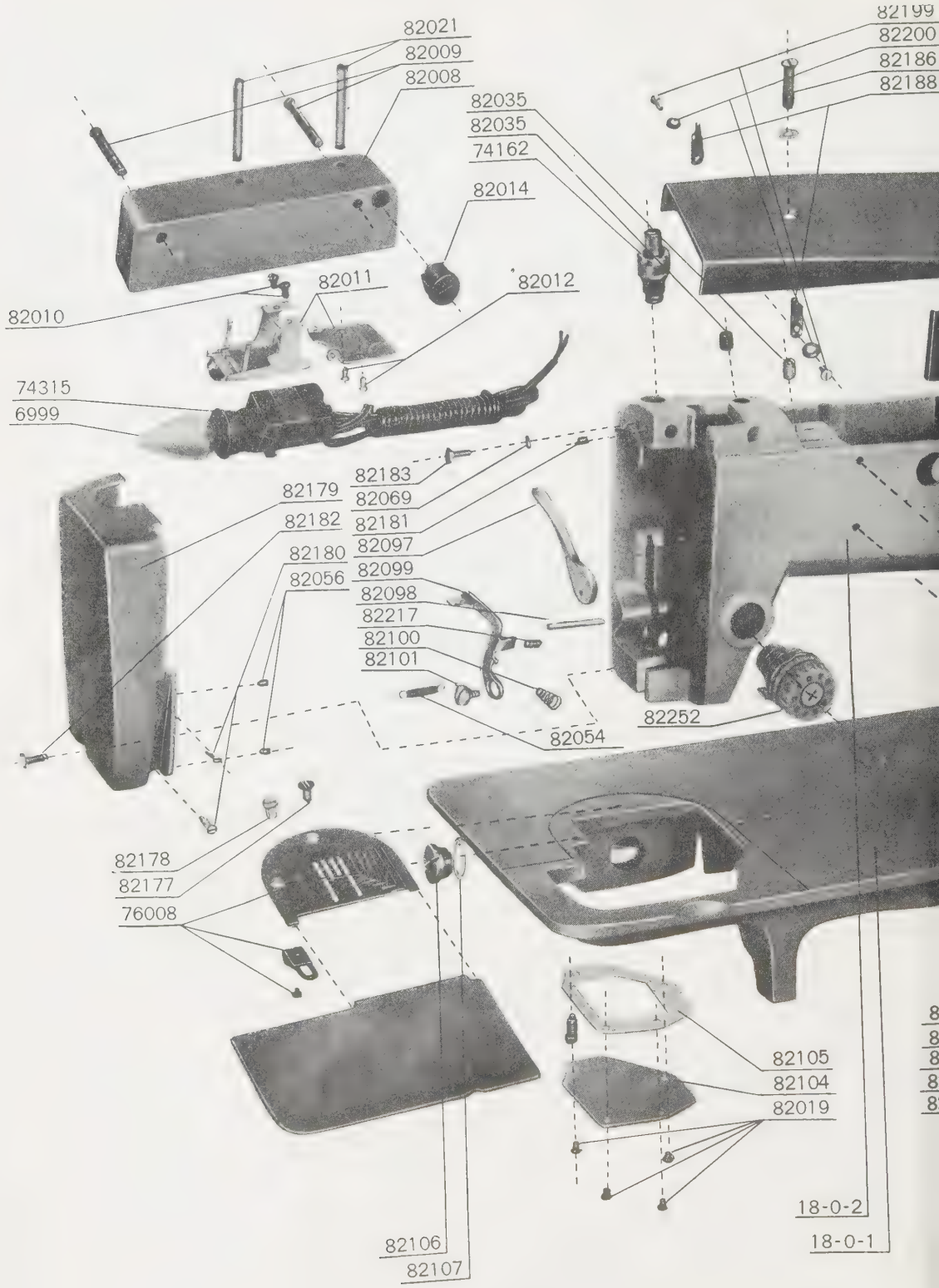


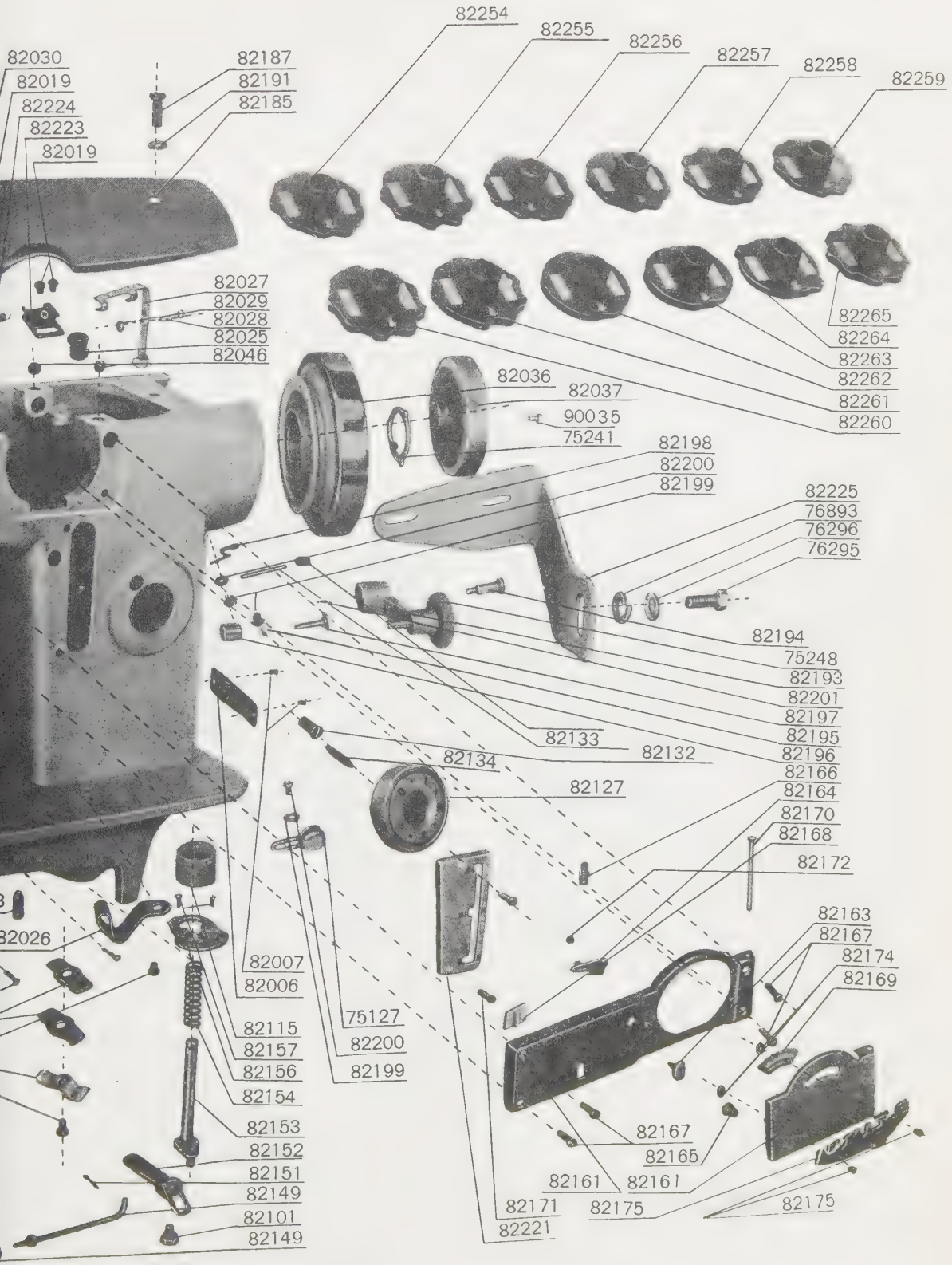


White Automatic made in Japan.



White Model 3354 Automatic Zig Zag-Made in Japan.

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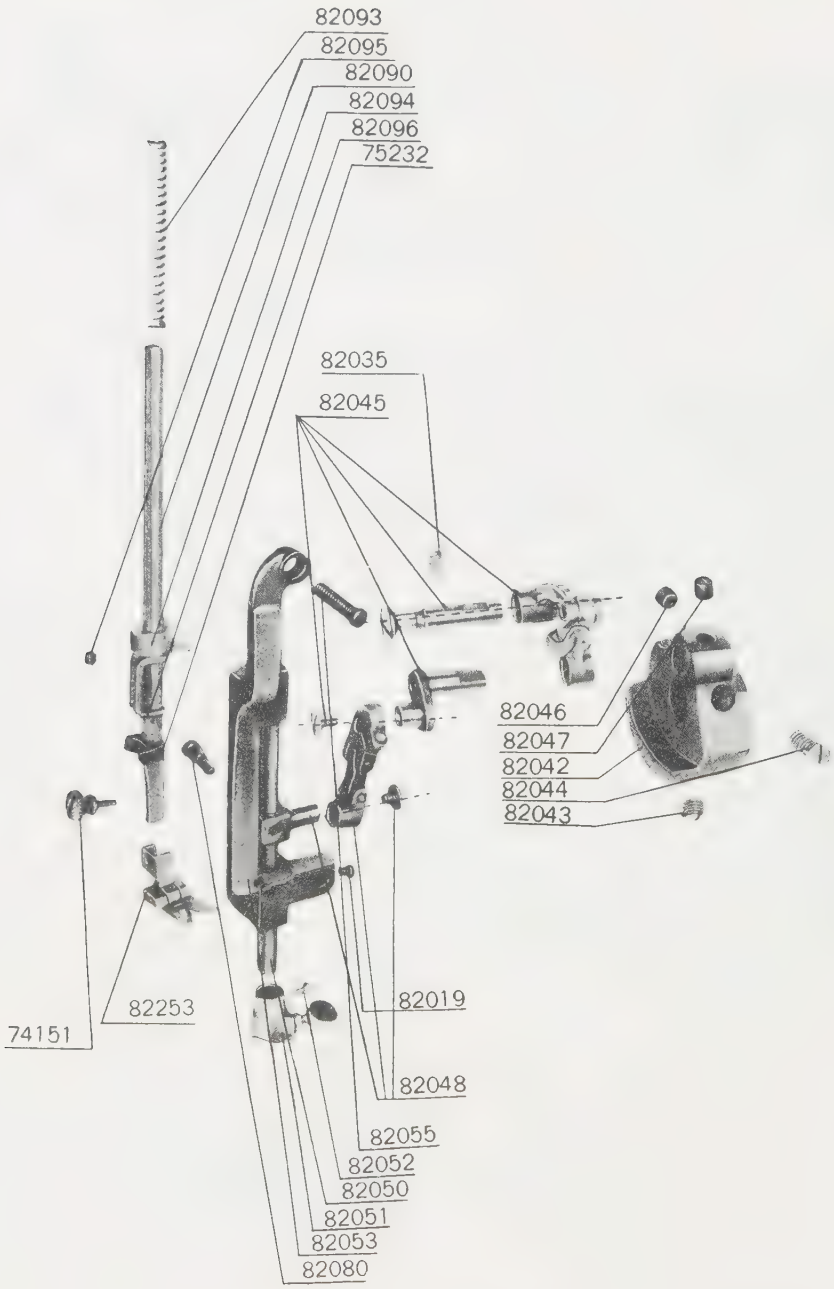
MODEL 3354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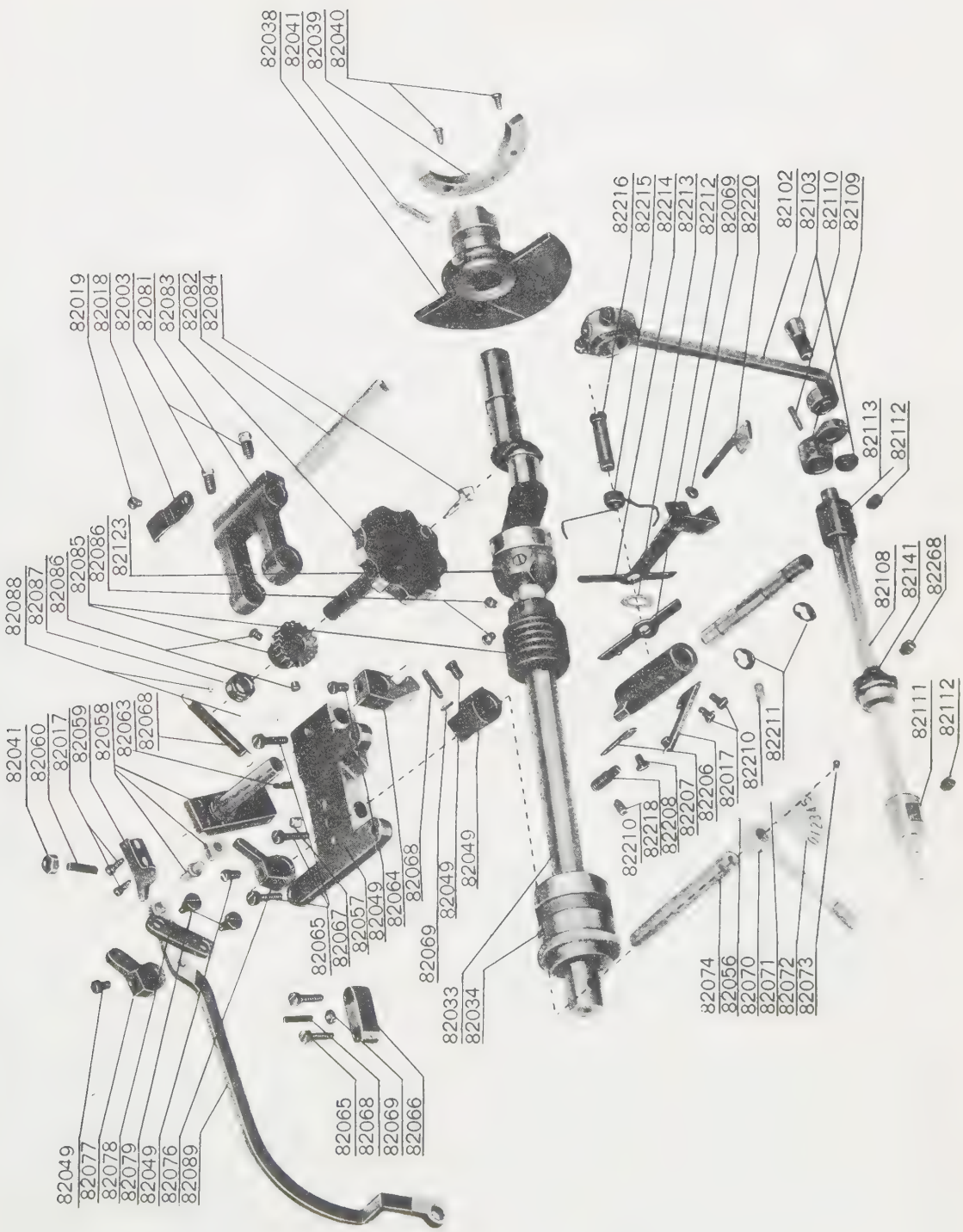
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Figure 46 illustrates tension components of most Signature sewing machines. Most unitized tension units contain the same basic parts, and service procedures will apply to most Japanese-built Wards machines.

Figure 46a illustrates tension adjustment when zig zag stitch is irregular. Many times a machine will sew a good stitch on the straight sewing setting, then sew erratically on zig zag stitching. Figure 46a is self-explanatory. If lower thread is pulling up, loosen upper tension. If upper thread is pulling down, tighten the upper tension.

When the above basic tension adjustment fails to correct the problem check entire tension assembly.

Assuming the lower tension is set properly, remove upper tension components.

Inspect thread check spring (5) for tension, or if broken or bent, replace it. When the spring is properly adjusted, it should release the thread, when the needle enters the fabric.

Inspect tension discs (4) for thread cuts, or rough spots where the thread must travel. Smooth discs with emery cloth. If too badly damaged, replace them. Most discs made by Japanese companies will interchange.

Tension release pin (8) is often overlooked in tension adjustment. If this part becomes bent or worn from years of use, it can stick in tension stud, and not perform. The result is a partially released tension after presser foot has been lowered.

The pin pushes against release disc when presser foot is raised, then fails to retract when presser foot is lowered and leaves tension discs (4) slightly apart, resulting in no tension. If the pin shows signs of wear, replace it. Check the release disc (3). If the center strip is bent, or broken, replace it. Replace components as in figure 46 and insert entire assembly in machine head.

Position properly, the check spring to the front at setting about 9 o'clock. Tension barrel (7) must be placed so tension release lever will activate the release pin (8).

Figure 46

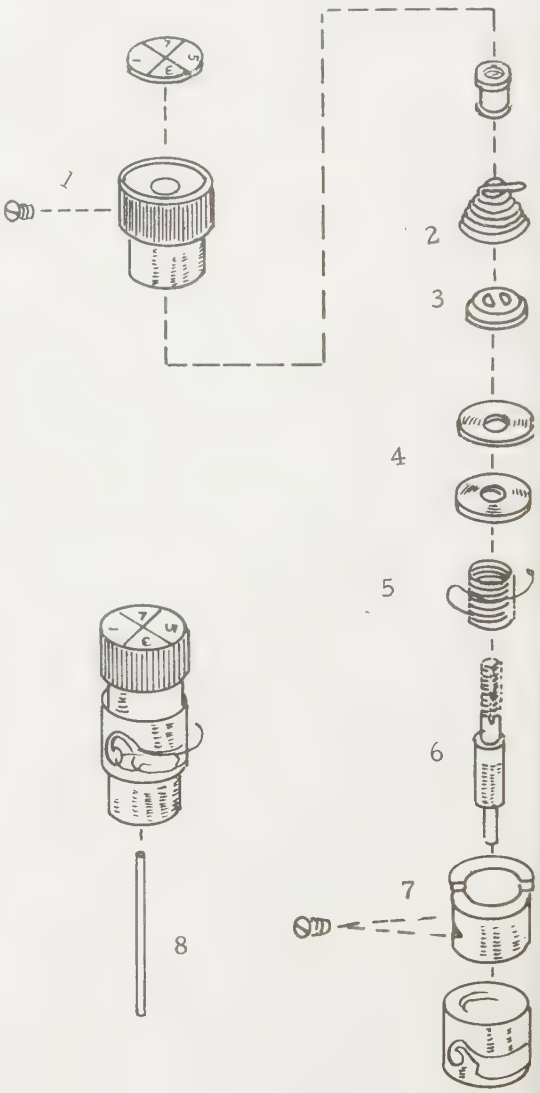
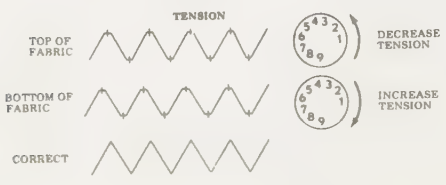


Figure 46a



When the upper tension is adjusted and tension is still bad, check bobbin case tension.

Adjust screw, figure 46b, clockwise for more bobbin tension, the opposite for less tension. If adjusting screw doesn't alter tension, remove the screw and tension spring. If the spring is bent, broken, or thread cut replace it. Clean the spring and bobbin case. If the bobbin case is damaged, or thread cut, replace it.

Inspect the shuttle, figure 46c, especially the shuttle's tip. Numerous needle strikes may have damaged, or broken the tip. If not too badly damaged, buff with emery cloth. If broken replace it.

Inspect the race cover (figure 46c), if thread guide on upper part shows a sign of damage, replace it by removing the two screws.

The bobbin may also cause trouble. If the edge has been struck by a needle or the bobbin has been dropped and bent, throw it away.

Timing Needle Bar to Shuttle

Before determining if needle bar, or shuttle driver, is out of time, replace the needle. Be sure needle stop illustrated in figure 47, is in place.

To check needle height, turn head back on hinges, remove bobbin case, and race cover.

Turn handwheel until needle drops to lowest point and starts back. At that point the tip of shuttle should be 3/32" above eye of needle. If not, set head down and refer to figure 47a.

Lower needle bar, until screw is visible through hole in machine arm.

Loosen screw and adjust needle bar to the 3/32" setting. Tighten screw.

Figure 46b

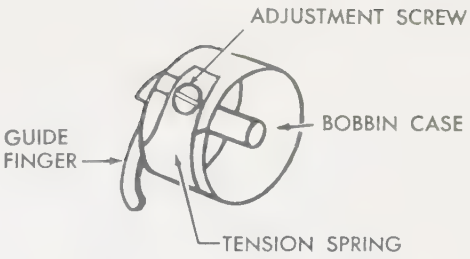


Figure 46c

Figure 47

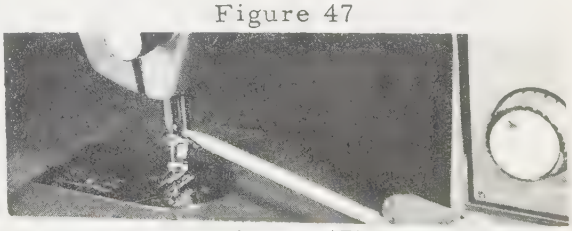


Figure 47a

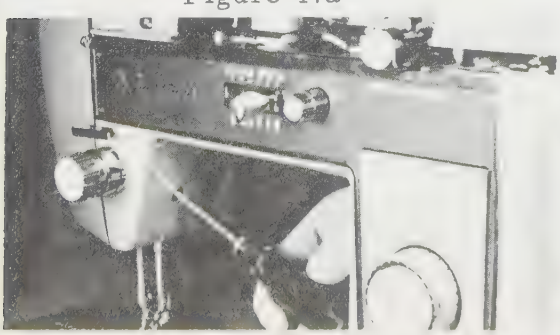
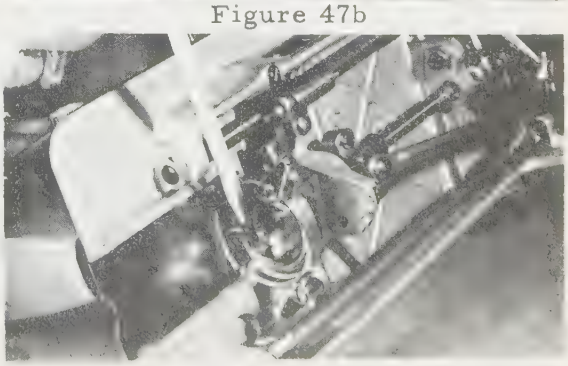


Figure 47b



When checking needle-shuttle timing, relative clearance must also be measured. The distance is so minute, 1/64", barely the width of a sheet of paper, that adjustment must be accurate.

To adjust, tilt head back on hinges, turn hand wheel until needle is just below the needle plate.

Remove race cover and hold shuttle in place by hand while lowering the needle until the tip passes tip of shuttle.

1. If set too close and needle hits the shuttle, loosen screw (1) figure 47d, and move shuttle race assembly to the right 1/64". Tighten screw.
2. If the needle is too far away, loosen screw(1) and move assembly toward the needle, until corrected. Tighten screw(1).
3. If the race assembly and shaft have too much play after the adjustment, loosen collar screws at rear of race assembly and move collar closer to the unit.

Figure 47c

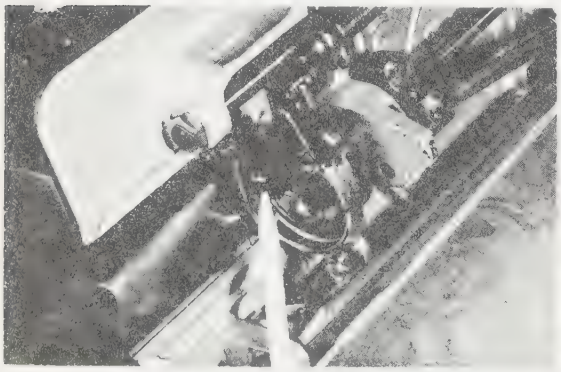
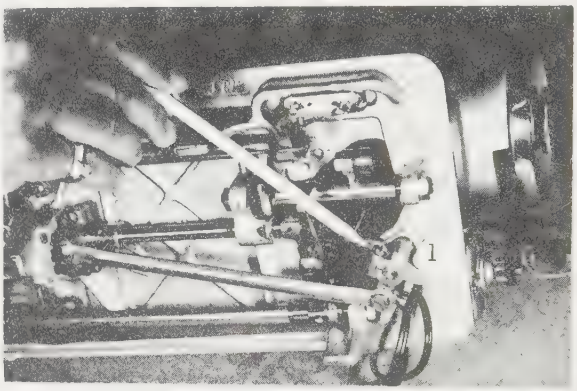


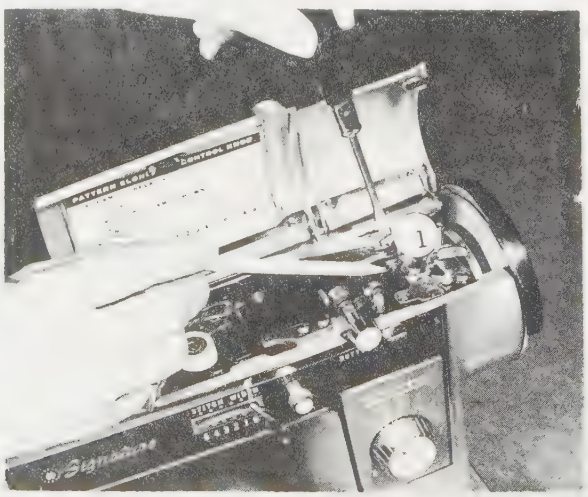
Figure 47d



To center position needle on models 260-285, loosen screw(1), figure 47e, which is located on upright arm shaft. Check needle relation to the needle hole to determine proper direction to make adjustment.

Turn the eccentric pin on top of arm, to the right, or left, as needed to bring needle to center of needle hole. Tighten screw(1) and test.

Figure 47e



Centering the needle for straight sewing on the Model 277 is a slightly different operation. The adjustment is necessary if the needle doesn't enter the exact center of the needle hole on straight stitch. When off center, zig zag sewing can be hazardous.

1. To adjust, lower needle into needle hole.
2. Open face plate cover and loosen set screw(1), figure 47f.
3. Turn eccentric pin(2) on the front of needle swing bar, in the proper direction to correct.
4. Tighten set screw(1), close face plate cover, and recheck position.
5. To center the needle on zig zag cam, Model 277, the machine must be set per the following instructions.
   a. Set stitch regulator knob on setting 0.
   b. Turn buttonhole knob to setting M.
   c. Set drop feed knob on "Darn" position.
   d. Place a business card, or other firm paper, under the presser foot and turn handwheel until needle pierces the paper.
   e. Turn zig zag control to setting 5, and turn handwheel until the needle pierces the paper on each position, left and right. When the holes aren't the same distance on each side of center hole, adjust.
   f. Turn handwheel until cam follower is on high point of tooth(1). Figure 47g.
   g. Retract cam follower (2) with right hand and note the distance between cam follower(2) and the cam(3).
   h. Loosen cam follower retaining screw(4).
   i. To adjust needle to stitch farther to the left, move the nylon arm slightly, to move cam follower closer to cam(A).
   j. To adjust needle to stitch farther toward the right, move the arm slightly, to move cam follower away from the cam(B).
   k. When adjustment has been made, tighten the set screw and make the paper test again.

Figure 47f

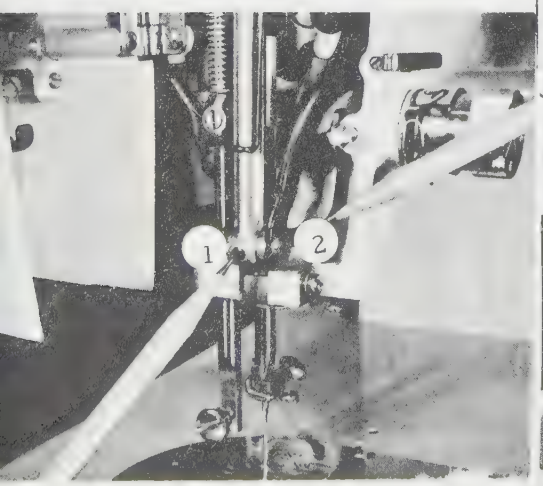
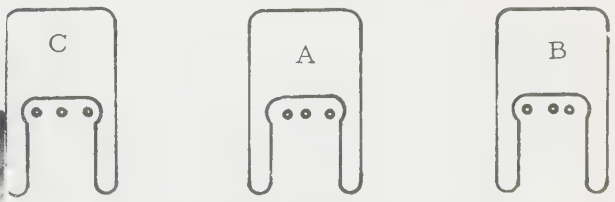


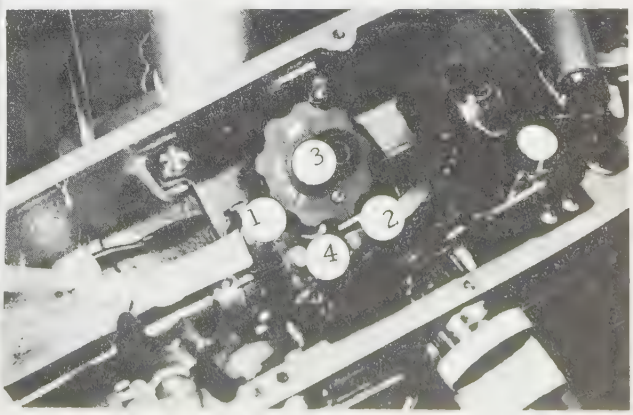
Figure 47g



Correct

Move Follower Closer to Cam

Move Follower Away From Cam



Feed dog adjustment on Models 260-285, and most Signature machines made in Japan, is basically the same adjustment.

It's generally apparent when adjustment is required, but if you're not certain, set length of stitch lever on longest setting. Turn the handwheel and observe relative position of feed dog and needle plate. If the feed dog is striking plate, adjust as follows.

1. Loosen feed rocker shaft retention screw (1) figure 48, at far right end of crank(2).
2. When the feed dog strikes the front of needle plate, move the feed dog in the opposite direction by pressing at point(1) figure 48a.
3. If the feed dog is striking the rear of needle plate, move the feed dog the opposite direction by pressing at point(2), figure 48a.
4. After making adjustment, tighten screw (1) figure 48, and recheck. Feed adjustment on the Model 277 is slightly different. To determine if adjustment is required, check text above.
5. Loosen feed rocker shaft retention screw at far right end of crank. See figure 48b.
6. If the feed dog is striking front of needle plate, correct by pressing at point(1), figure 48c.
7. If feed dog is striking at rear of plate, correct by pressing the feed dog at point(2), figure 48c.
8. Tighten set screw.

Figure 48

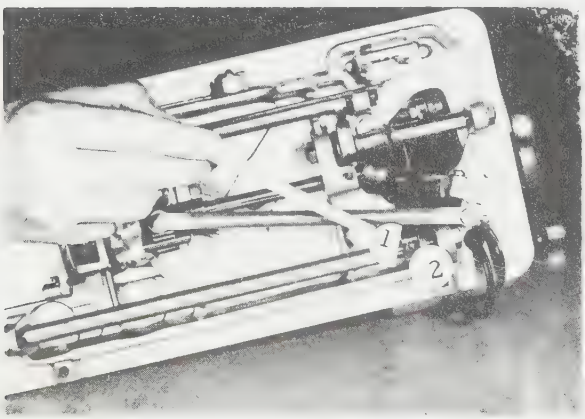


Figure 48a

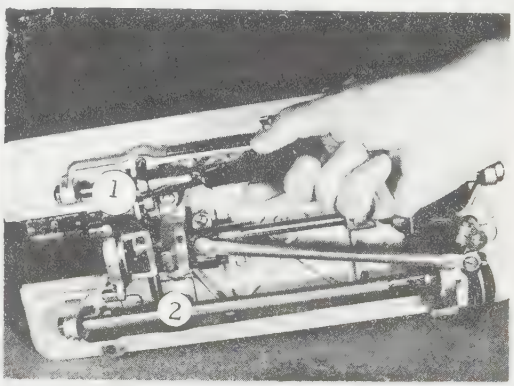


Figure 48b

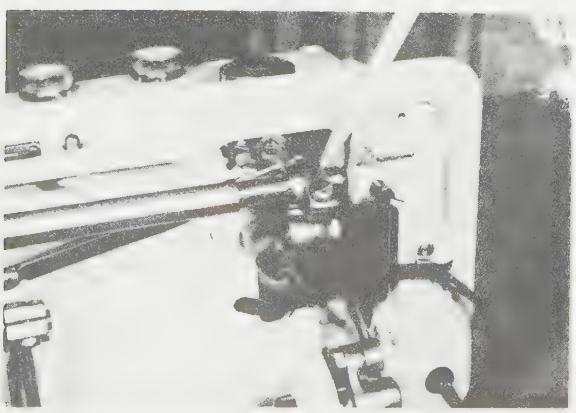
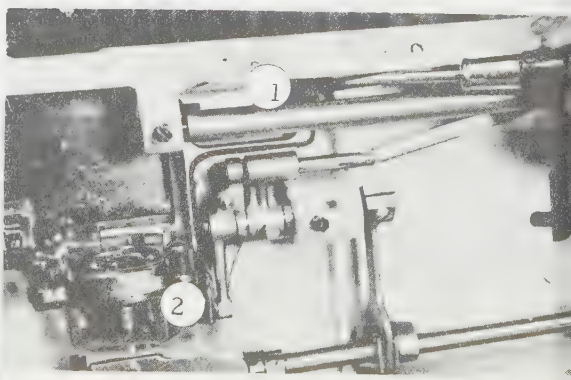


Figure 48c

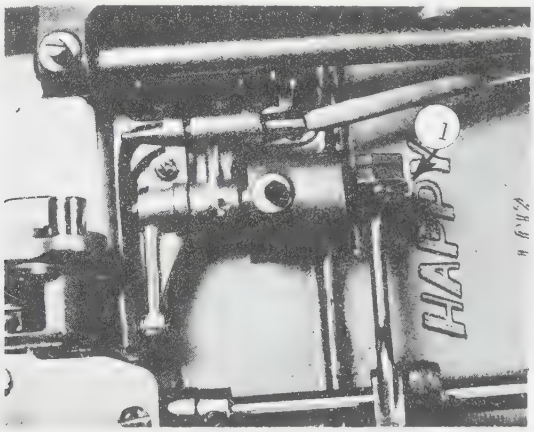


Additional feed dog adjustments often found necessary include, height of feed dog, which man times is set too high or too low.

When the feed dog is set too high, material is generally fed in a jerky manner. After checking the presser bar for proper adjustment, and drop feed for proper position, check the feed dog.

1. Turn handwheel until feed is at highest point.
2. Loosen the feed fork clamp screw(1), figure 48d.
3. Adjust feed assembly until 1/32" of feed teeth appear above upper level of the needle plate. Tighten screw(1) and recheck.

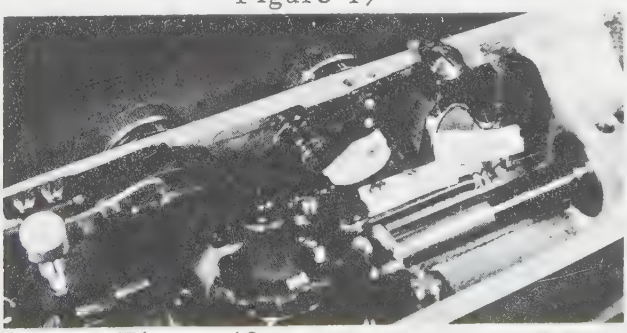
Figure 48d.



Adjusting machine when it zig zags on straight setting.

If machine zig zags when a zig zag cam is in place, zig zag control is on setting 0, and position lever is on setting M, adjustment is needed.

Figure 49



1. Open cam cover. Figure 49.
2. Remove two screws from cover plate and remove cover plate.
3. Turn the stitch width regulator knob and observe the movement of the nylon cam against metal roller that positions the zig zag mechanism.
4. When the stitch width regulator is at setting 0, the high lobe of the nylon cam should point to the right, and the roller should be in contact with the low point of the cam.
5. If the roller isn't on the low point of the cam, or doesn't touch the cam at that point only, the machine will zig zag on straight setting.
6. Loosen set screw on stitch width regulator knob to loosen the knob on the shaft.
7. Hold stitch width regulator on setting 0, and adjust the cam until the roller doesn't touch the cam. Press underneath pointed end of cam.
8. Tighten knob set screw. 9. Open the face plate door.

10. Run the machine slowly and onserve the zig zag motion of the needle bar assembly, then turn zig zag width knob slowly toward setting 0, until the needle bar assembly stops all zig zag motion.
11. Press firmly on the nylon cam to hold it against form of cam to prevent it and the shaft from turning, and again loosen the knob set screw.
12. Hold the cam and turn the knob counterclockwise until it contacts the stop. Setting 0 on zig zag width knob should be at 12 o'clock.
13. Tighten set screw.
14. Test sew. Machine should sew a straight stitch on setting 0.

Figure 49a
Adjustment for setting model 277 machine for straight stitching.

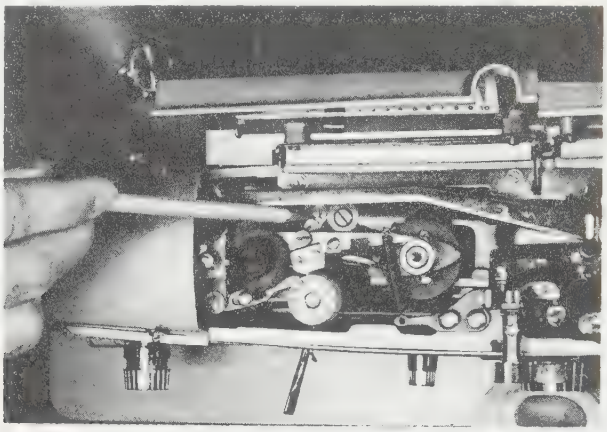
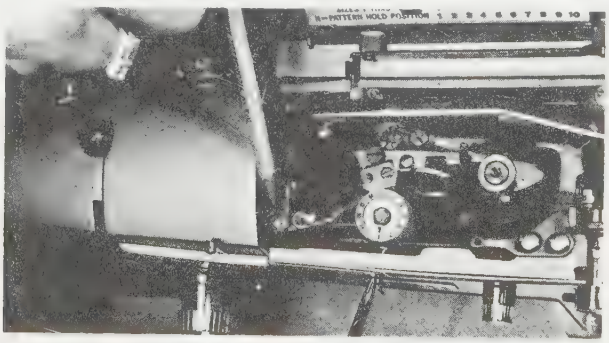


Figure 49b
Adjustment for width of zig zag stitching on model 277 machine.



To adjust the cam follower, remove inside cover plate after removing two screws, and place cam number 1 in place on the shaft.

1. Ratchet the cam around until cam follower is on outer extremity of cam tooth. At this point there should be some play in the zig zag width control knob. If not, zig zag width is set too wide. If there's too much play, the width setting is too narrow. When the setting is correct, the knob setting should be 4 1/2.
2. Turn cam number 1, per setting in step one.
3. Loosen the screws on cam follower adjustment collar, figure 49b.
4. Turn eccentric collar in proper direction to change width setting.
5. Tighten set screws and recheck the setting. Re-adjust if needed.

Figure 50

eedle Timing

w the needle must be timed to the sharp int of the shuttle hook. Make certain the gzag cam is on the machine. Place the gzag stitch width regulator at "5". Position e buttonhole knob at "M". Turn the hand- eel to bring the needle to the left side of e needle plate. Note that when the needle at its lowest point, the sharp point of the uttle hook, which is approaching the needle, ould be 1/8" to 3/16" to the left of the edle.

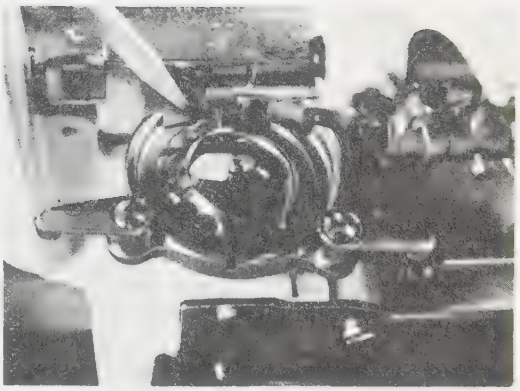
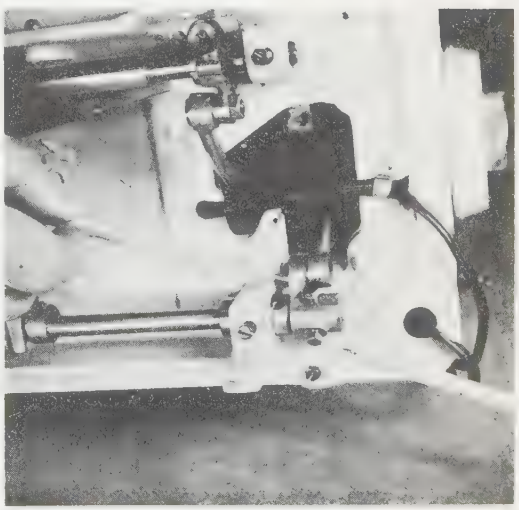


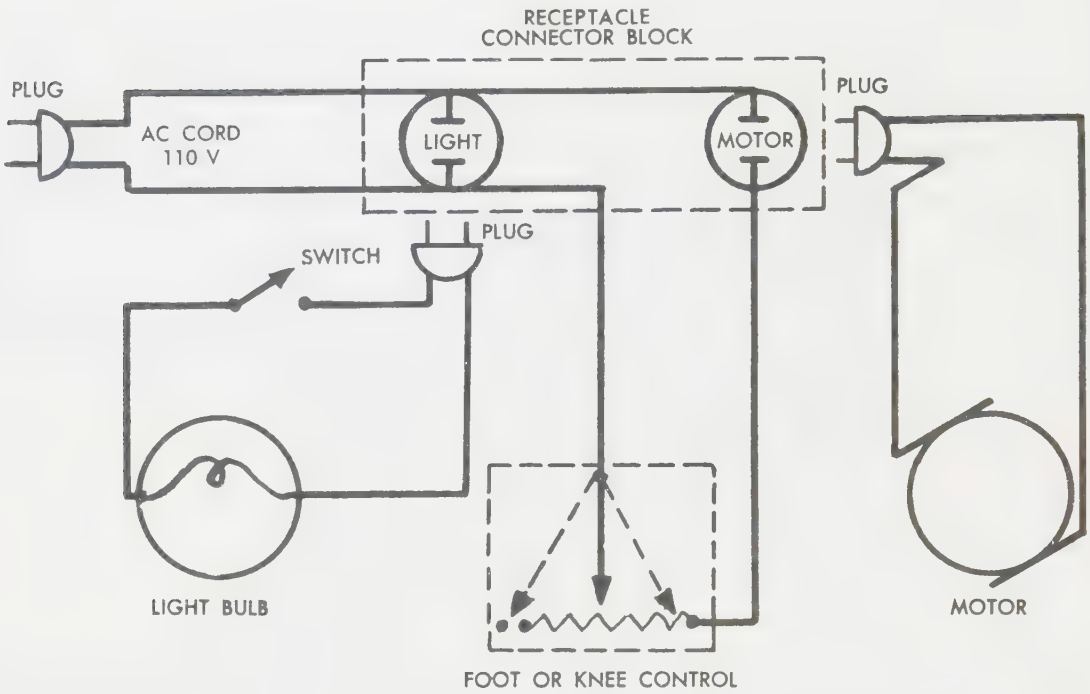
Figure 50a

he shuttle is improperly timed: Position stitch width regulator at "5". Turn the ndwheel to bring the needle to its highest sition. This will expose two hexagon set ews on the shaft. Loosen the lower screw d turn the handwheel until the needle reaches lowest position on the left side of the needle te. Now loosen the second set screw on the nk. Adjust the shuttle shaft up or down for correct setting of the sharp point of the uttle to a position 3/16" to the left of the edle. Retighten the set screw and turn the ndwheel to tighten the other screw. Turn handwheel to raise the needle to its highest sition; replace the shuttle race cover and the obin case.



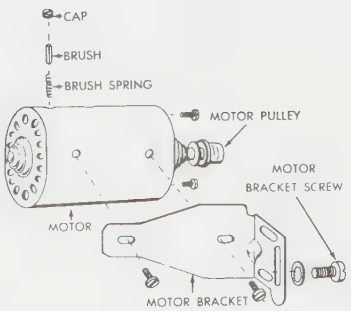
Wiring diagram for most Signature sewing machines.

Figure 51

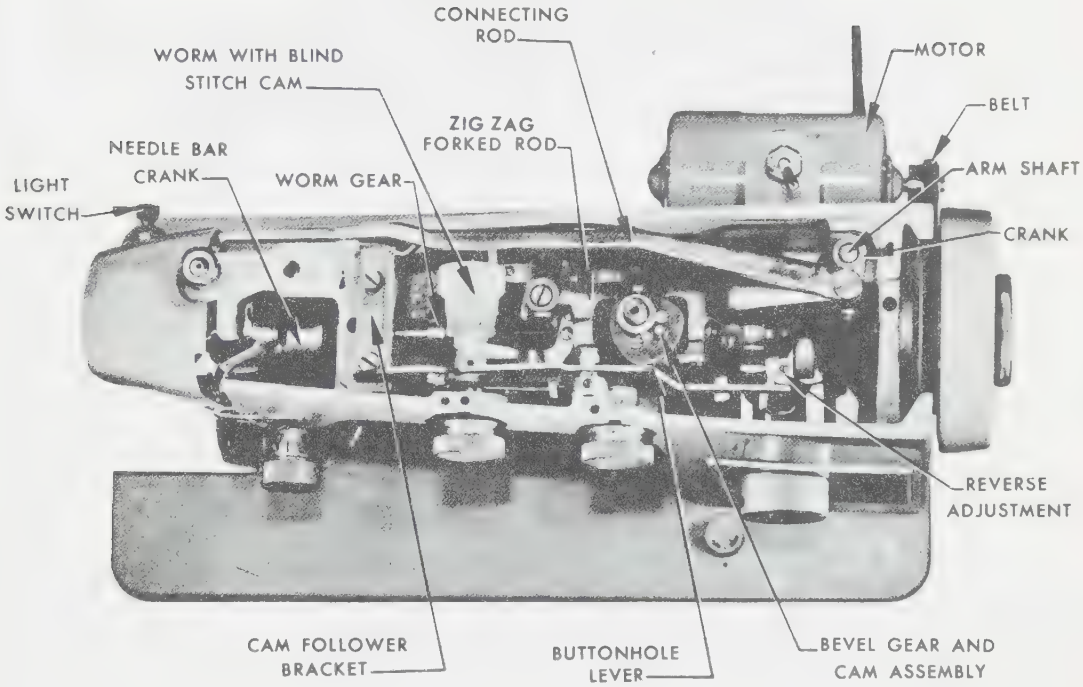


Motor Components

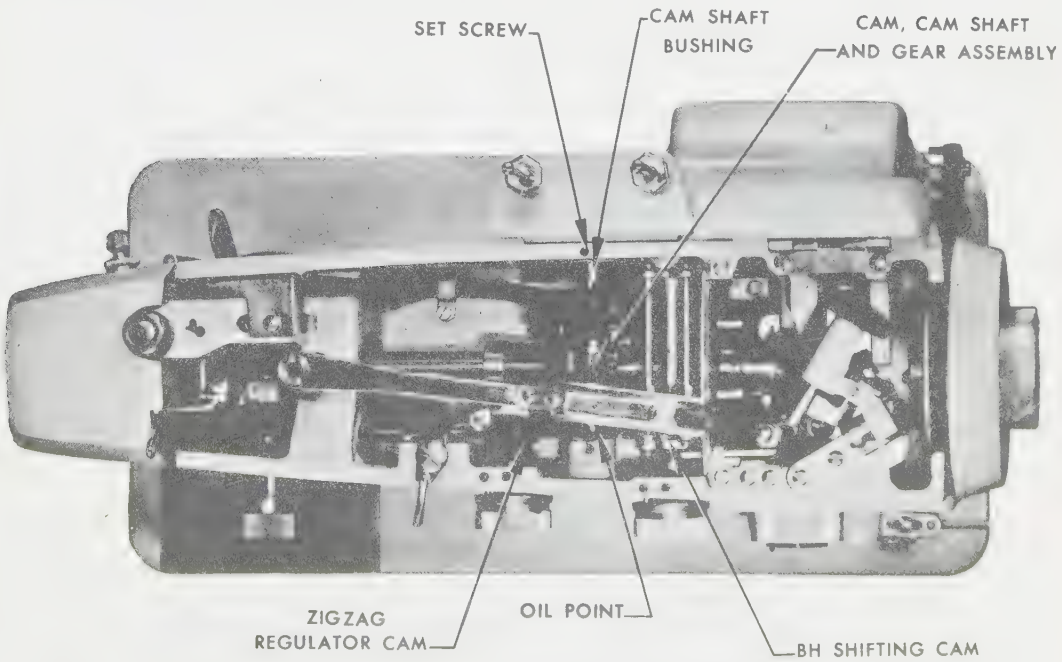
Figure 51a



Zig Zag Assembly, Model UHT-260A
Figure 52

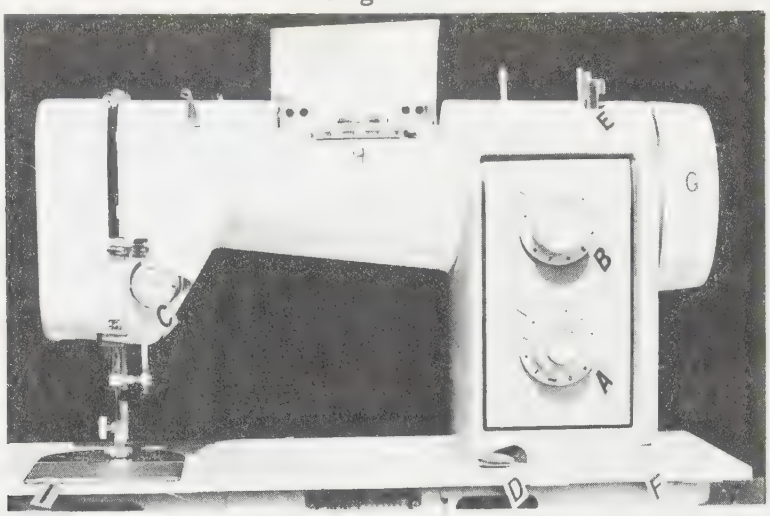


Zig Zag Assembly, Model UHT-276A
Figure 53



Sears & Roebuck's "Kenmore" Model 158.162

Figure 54



This model is a left-position, single needle p ition, cam-type machine with an oscillating (Class 15) transverse hook.

One big selling feature is the extra wide zig zag stitch it sews.

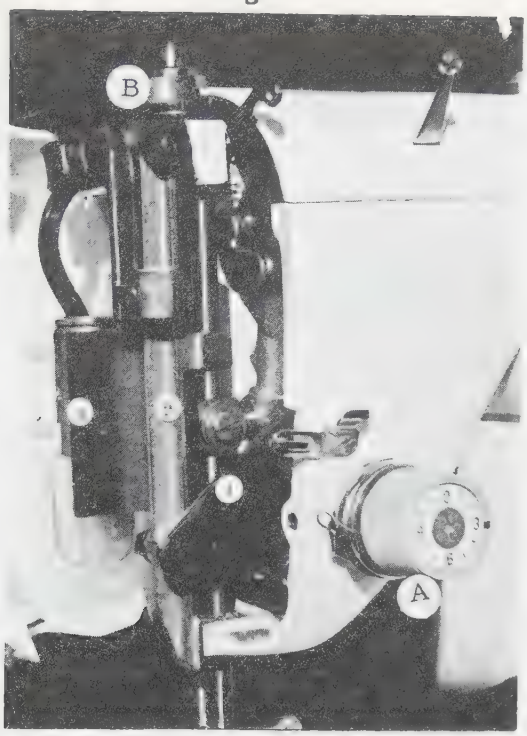
A. Length of stitch regulator with built-in push button reverse.
B. Zig Zag width control dial.
C. Calibrated unitized tension assembly with improved check spring & bracket. The check spring is factory set and not adjustable.
    1. The tension dial is numbered 0 thru 6, with dot for regular sewing position.
D. Two position drop feed device.
E. Semi-builtin bobbin winder.
F. Power switch, conveniently located on machine head.
G. Hand wheel with conventional clutch.
H. Cam loading area. Cams are two-sided.
I. Slide plate and hook area.

Face Plate and Tension assembly. Figure 55, page 65

A. Tension assembly with dial set at 3, on the dot. The setting is attained by setting dial and turning phillips screw and the dial plate. The setting of 3 leaves enough room for adjustment either direction. Some check spring adjusting can be made by loosening screw which holds the unitized tension, and turning the unit down for more throw, up for less.
B. New style patcho-matic with calibration for adjusting pressure on the presser foot, for various types of fabric.
    1. When fully released, the unit allows freedom under the presser foot which enables the operator to darn or mend.

1. Puller-style pittman. Connects to the swing needle bar frame(2) by an eccentric stud, washer and locknut.
2. To align the needle in needle hole, first remove light assembly.
3. Loosen lock nut on eccentric stud.
4. Turn handwheel and lower needle into needle plate slot.
5. Turn eccentric stud until needle is properly placed. Tighten nut.

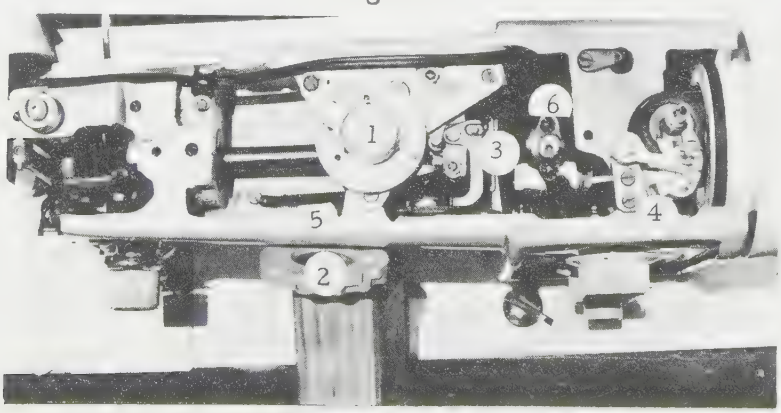
Figure 55



The visible hex head screw(near number 2) in needle bar link connecting stud is used in timing the needle bar.

On this model, the needle bar frame swings from a stud located at the top of machine cast. Its action can be adjusted, using the set screw in the hinge stud to casting. Proper adjustment leaves slight play.

Figure 56



1. To service components in the upper arm, the cover must be removed. Loosen the two holding screws and lift off.
2. Cam is placed on post at area(1).
3. If patterns are erratic, and zig zag widths vary when zig zag cam stack is in place, check relative position of cam follower(3) and zig zag cam. If the follower isn't engaging properly, loosen screw and move it

toward, or away from the cam, until adjusted properly.

4. The pittman which moves needle bar frame is connected to the cam follower(3), while spring(5) aids in pulling the pittman back as the cam follower creates the pattern while following hills and valleys of cam.

1. If patterns become erratic, check the spring. If broken, it will have to be replaced.

2. Check cam follower for proper alignment. It should ride a cam at one time. If it straddles both, loosen screw and adjust.

3. Lower sewing mechainsm is connected to eccentric bearing on the main shaft by connecting rod(6). Oil the bearing frequently.

Figure 57

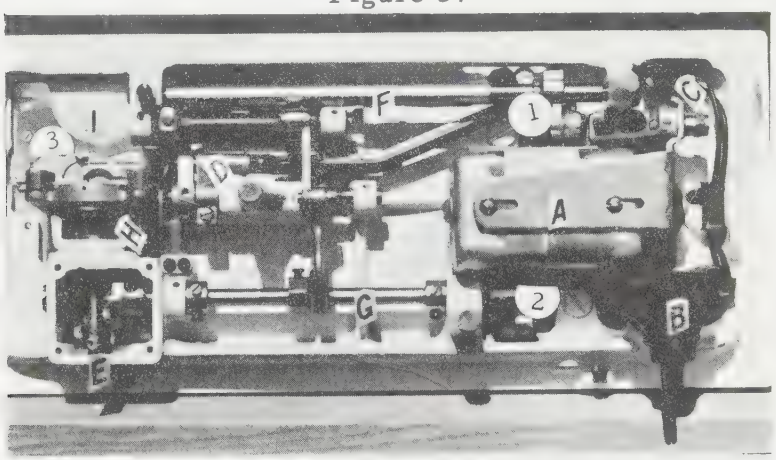


Figure 57 illustrates components of the lower sewing mechanism, with motor(A) concealed. Motor can be serviced from preface text.

1. Kenmore has standardized on the three-prong connector that was a White invention and standby for years.

2. Feed dog adjustment is similiar to other Japanese-made machines. To raise or lower feed dog, adjust clamp screw(D) at feed adjusting. Proper height is about 1/32" of teeth above needle plate at high point.

3. To position feed dog in needle plate slots, fore and aft, adjustment is made on main feed bar at point(1).

4. Place length of stitch dial on maximum length. Turn handwheel and observe. If feed dog strikes plate, loosen screw on adjusting block and move feed dog proper direction to correct. Tighten adjusting screw.

5. To adjust sidewise play, loosen set screws at each end of feed shaft and adjust tapered screws inward as needed. Tighten set screws.

6. This model is a gear-driven transverse hook machine. Lower shaft (G) connects from upper shaft at junction(2), and terminates at the hook race assembly(H) in gear box(E).

Figure 58, page 67, illustrates lower sewing mechanism components.

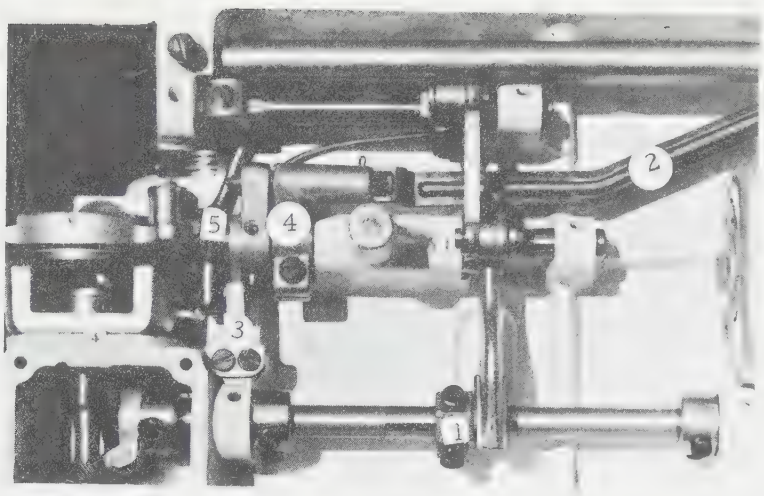
1. When feed system and sewing mechanism get out of time, adjusting is performed on cam(1). The feed dog must rise and move cloth while needle is at its high point, and drop when needle enters the fabric.

a. If not, loosen set screw and turn handwheel until corrected.

2. Drop feed connecting link(2) must be in position in feed adjusting to facilitate good feeding. If the tapered slide bar slips out, erratic feeding will result.

3. Most feeding problems will be found in the mentioned areas.

Figure 58



Although this machine is a Class 15 machine, the shuttle is quite different as figure 58a illustrates. Shuttle(B) has a much longer throw-off and a extra deep needle channel. Shuttle(A) is conventional Class 15 found in almost all Japanese-made machines. There's enough difference in each of the other parts, bobbins and bobbin case, to caution against trying to inter change them.

The needle descends farther, and on a broader scale, due to the wider zig zag the machine is capable of sewing. However, the timing has really been improved over earlier transverse hook models.

Figure 58a

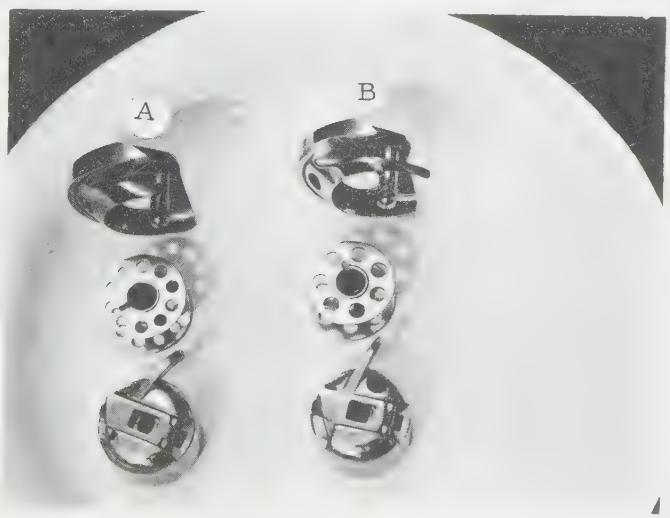
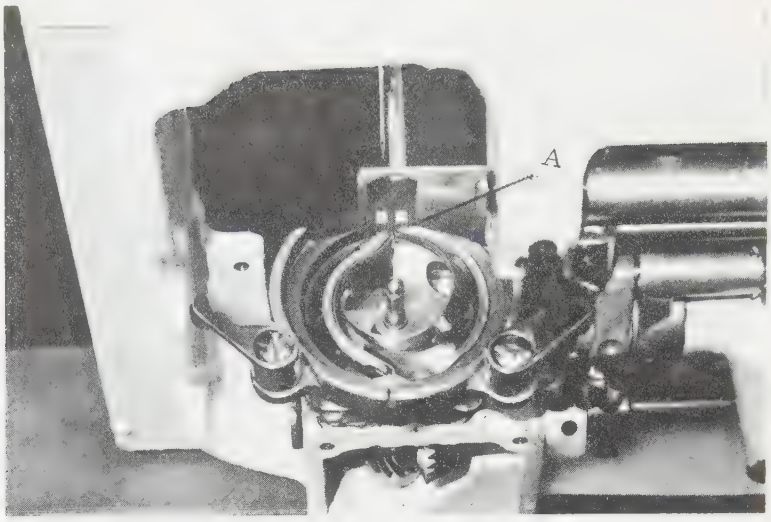


Figure 58b



Contrary to previous needle to shuttle timing, this machine is timed at the heel of the hook instead of the tip.

1. Remove race cover, bobbin case and needle plate.
2. Turn hand wheel until needle is at highest point. The hook should, if properly timed, be in position shown in figure 58b.
3. If not, remove gear box cover, figure 58c, also gasket and grease.
4. Loosen set screws on gear(1) and turn shuttle driver to position(A), figure 58b.
5. Tighten screws, replace all components and test sew.
6. If hook to needle spacing is incorrect, machine will either break a lot of needles, or skip stitches.
7. Use a small punch and tap pin out of pinion gear(2).
8. Loosen set screws in adjusting collar(3) and screws holding race in place(6). Tap gear back slightly before adjusting race assembly to the proper setting. Lower needle to hook point and hold in place.
9. If a dramatic setting is required, place shims at point(4).
10. Shim(5), can be added, or removed to position assembly.
11. Replace all components, tighten all set screws and test sew.

Figure 58c

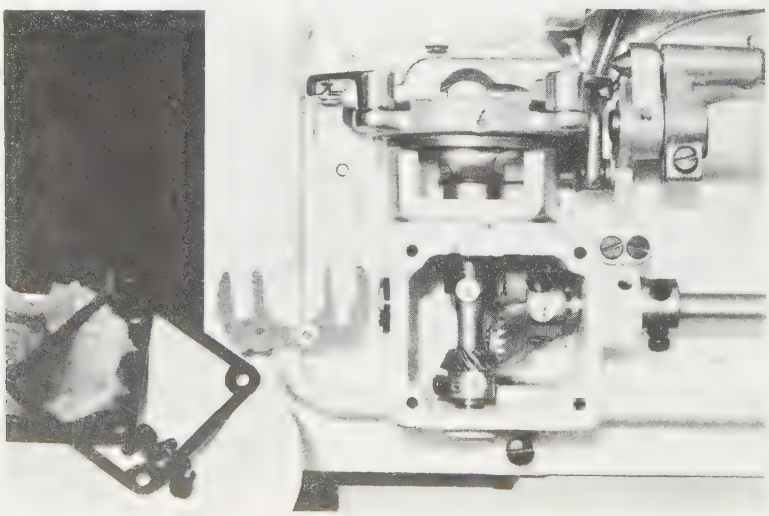
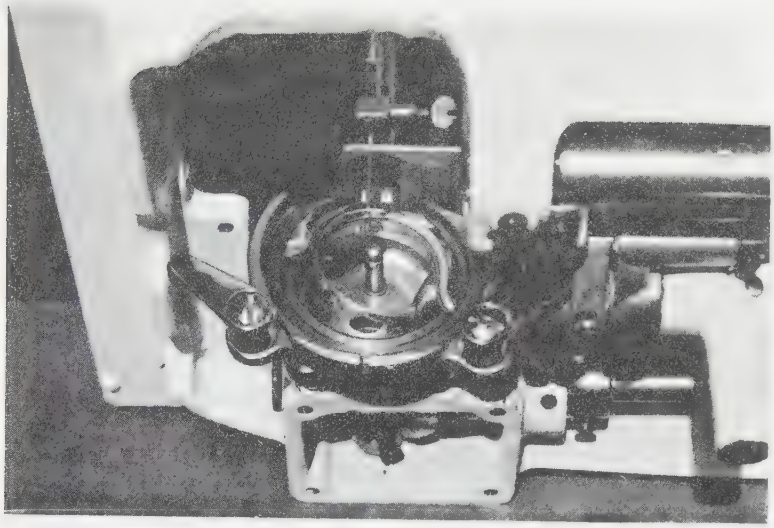


Figure 58d



If the hook is properly timed and machine is still out of time, check the needle bar timing.

1. Loosen hex head screw in face plate, figure 55.
2. Turn handwheel and lower needle until hook to needle relationship is similiar to figure 58d.
3. Tighten hex head screw and turn handwheel. Tip of hook should be about 1/16" above needle eye.
4. Zig zag control should be on widest setting for this adjustment.
5. Replace all components and test sew.

Figure 59

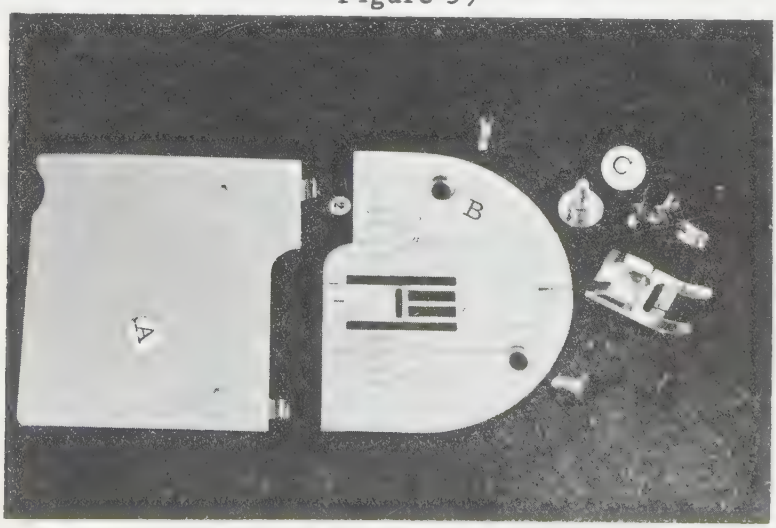
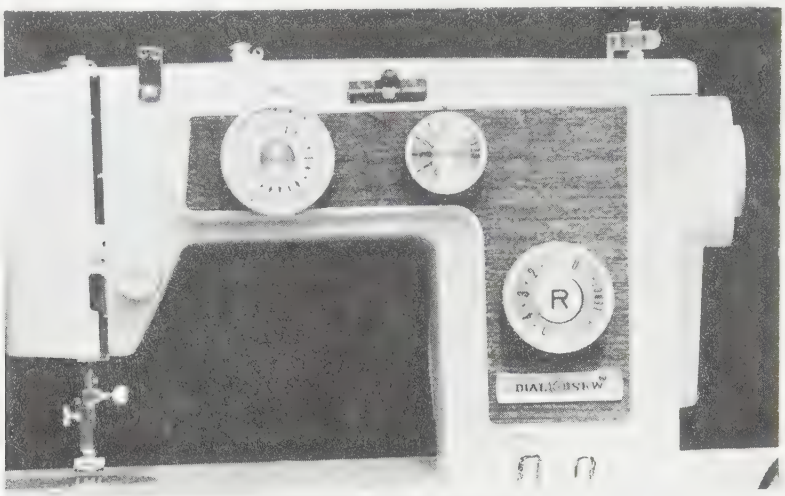


Figure 59 illustrates the new snap-out needle plate, which doesn't inter change with other makes, and the new quick change presser foot set-up.

Dial N' Sew by Western Sewing Machine Distributors.

The Dial N' Sew Model 816, and the Model 1803B, are two automatic & zig zag machines distributed in the United States by Western.

Figure 60



The Model 816 features a vertical double-hinge style needle bar frame. This style frame(1) operates in bearings(2 & 3), top and bottom, giving it more rigidity, and they can be adjusted to compensate for wear, using the two visible set screws.

A rigid style needle bar and link connecting stud(5) operate easily, and the needle bar can be timed through an access hole cut in the arm.

The machine features the direct drive type pittman which connects with needle bar frame at point(8). Vertical play adjustment is made at point(8)

Figure 61

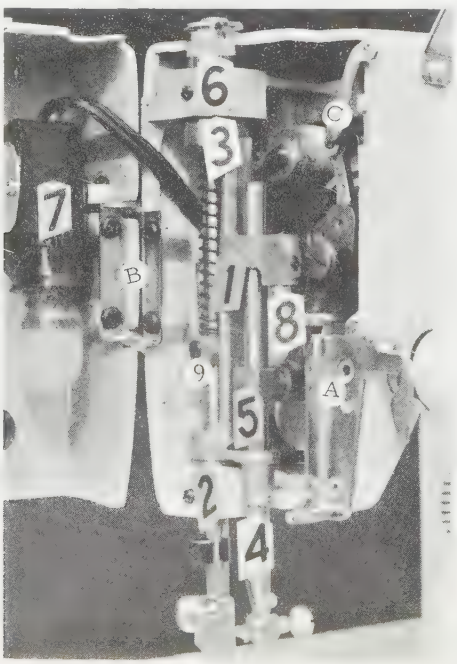
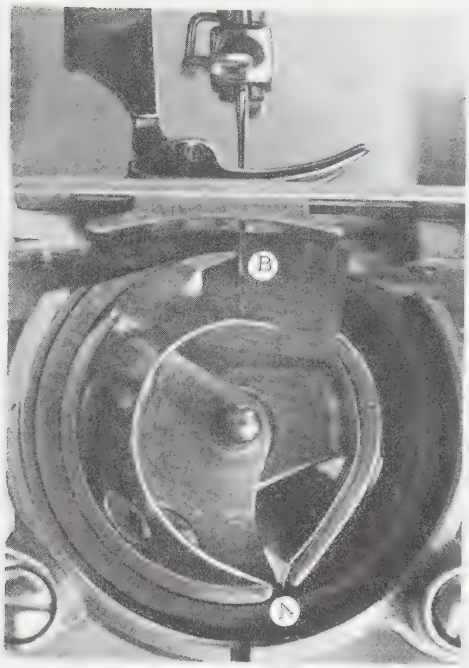


Figure 62



Timing of needle to shuttle point.

1. Insert a new needle and insert it all the way into clamp.
2. Remove bobbin case and race cover, see figure 62.
3. Turn hand wheel until needle is relative to hook point.
4. As needle starts to ascend, stop and check distance between point of hook and needle. Tip of hook should be 3/32" above needle eye.
   a. If hook point is broken or damaged, replace it.
5. Check distance between heel of shuttle and driver(A).
6. Some play should be present to allow free passage of thread, however, too much play can interfere with smooth sewing.
   a. If the spring is bent, or broken, replace it.
   b. If adjustment is required, reshape spring to appear like (A).
7. To adjust needle bar height to 3/32", turn handwheel until setscrew appears in access hole, figure 61.
8. Loosen screw in block and move needle bar proper direction to adjust to 3/32" setting. Tighten set screw.
   a. Don't allow needle bar to turn. Hold firmly during adjustment.
9. To adjust sidewise tolerance of shuttle to needle, loosen screw(A), in figure 62a.
   a. If setting is too close and machine breaks needles, tap race on cover at point(B) figure 62a, as needed. Tighten the screw.
   b. If setting is too far, and machine skips stitches, tap the race, using a small hammer, toward the needle as needed.
10. Replace all components.
11. Test sew, using a variety of sewing chores such as zig zagging on a wide stitch, pattern cam sewing, basting stitch etc.
12. The shuttle-race assembly is a critical area. Keep it clean and oil frequently.
13. Inspect it often and watch for needle strikes and other damages that could harm the machine.

Figure 62a

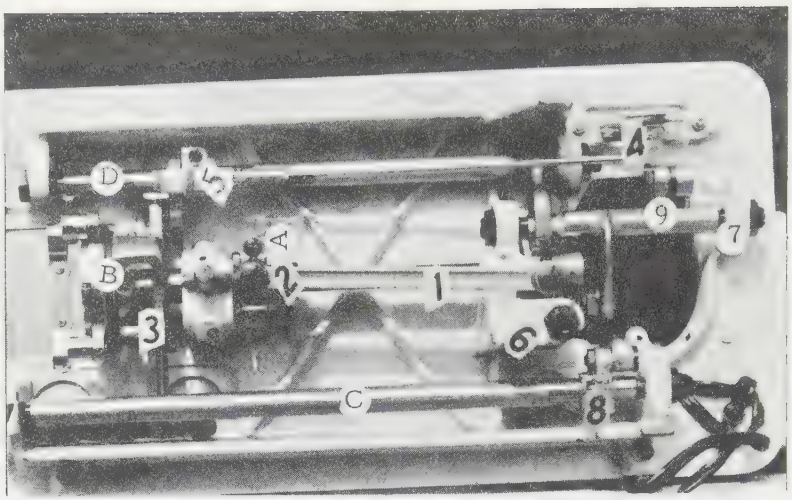


Figure 62a illustrates the lower sewing mechanism. Zig zag pittman(1) controls the lower carriage and is not adjustable when it wears.

The pittman junctions with driver at clamping collar for race assembly and guide block(2).

Rocker shaft for zig zag has a tapered screw for adjustment at point(6).

Feed dog adjustment for height is made at screw(5).

Fore and aft adjustment of the feed is made at point (8).

1. Set length of stitch on longest stitch, and turn handwheel to observe action of feed dog. If it strikes plate, loosen screw(8) and adjust.
2. Sidewise feed dog adjustment is required when feed strikes needle - plate on side, or rides at an angle in feed slots.
   a. To adjust, loosen lock nuts holding tapered screws in place on each end of feed bar and feed rock shaft.
   b. Move shafts proper direction to adjust and tighten set screws.
   c. Minor feed dog alignment can be made by loosening two screws holding feed dog in place on plate and positioning. Tighten screws.

Figure 62b

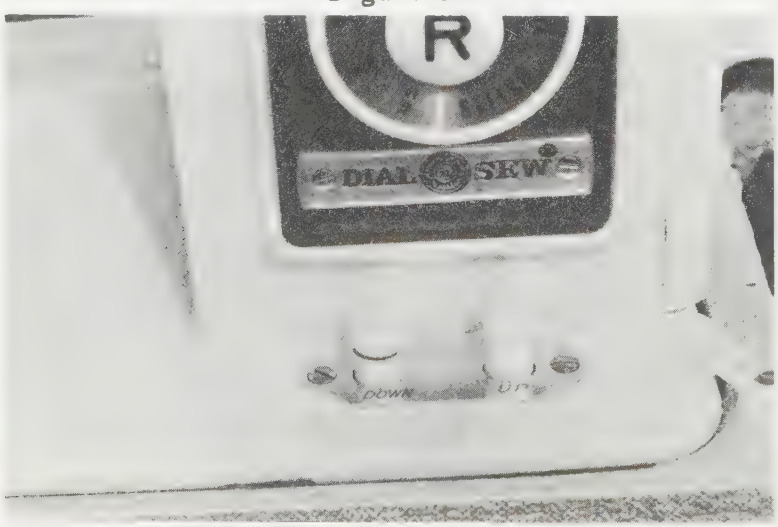
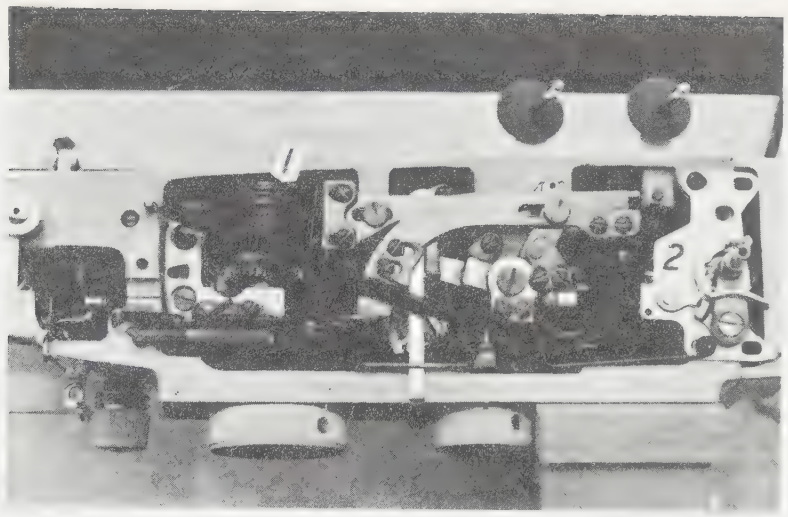


Figure 63



To service components related to automatic and zig zag operation, the upper cover plate must be removed.

The model 816 features the multiple camstack system(1) figure 63.

Figure 63 also illustrates position of pittman, cam follower and return spring for automatic operation.

Adjustment of Pattern Selector.

Figure 63a illustrates relative position of zig zag width control(132)and pattern selector(142) when machine is set in manual position. When width control(132) is moved to setting 5, the pattern selector can be moved to a different cam.

If unable to move width lever to setting 0, or change pattern selector to a different setting, adjust the unit.

1. Remove zig zag plate.
2. Place pattern selector cam(141) in a manual position, see fig. 63a.
3. Set zig zag width control on setting 5. Move clockwise until stopped by restricting pin.
4. Loosen screws(143) slightly. There are two of them.
5. Move pattern selector restricting plate(136) forward until it engages the first tooth of pattern selector base(142).
6. Make adjustment so there is no end play between pattern cam(141), and pattern selector base(142), then tighten screws(143).

Adjustment of Pattern Cam Follower

When the cam follower is out of adjustment, pattern widths vary and a binding might occur. Refer to figure 63b.

1. Pattern selector cam(141) is at highest point and the cam follower, is lined up on the last cam.
2. The cam shaft base should be at right angles with the upper shaft.
3. If not, loosen screw(119) and move cam shaft base to adjust.
4. When cam follower doesn't rest on selected pattern, loosen the two screws hold the plate and reposition.

Figure 63a.

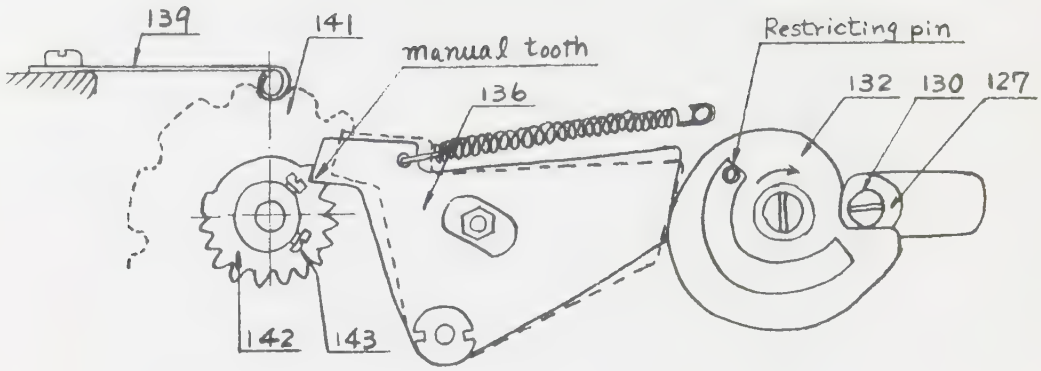


Figure 63b

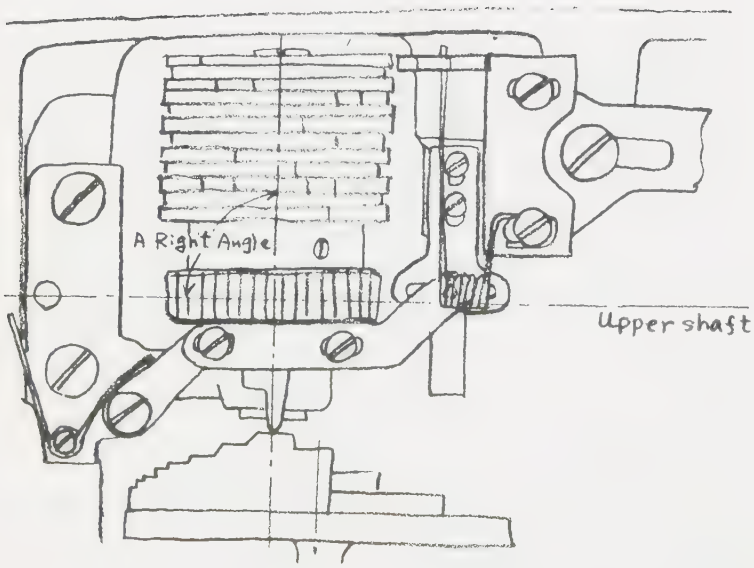
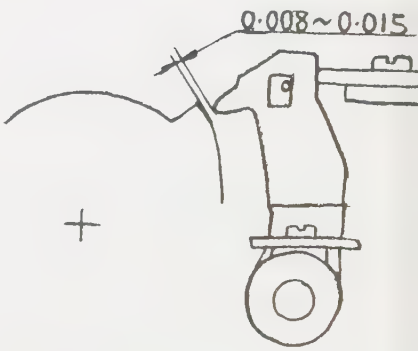


Figure 63 c



When cam follower rides two cams at the same time, adjust the follower.

1. Loosen two screws on the cam follower.
2. Align the cam follower on the single cam selected.
3. Tighten the set screws.

Clearance between the cam follower and highest point of the cam should be .008, see figure 63c. If the cam is hanging up on follower adjust.

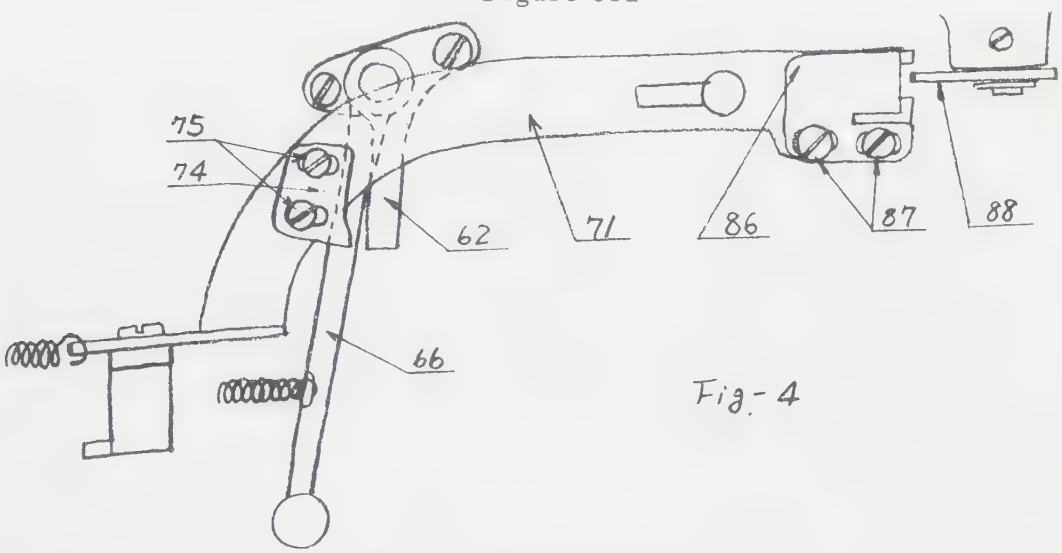
1. Loosen screws on on stitch width moving plate, and move cam fol - lower toward the rear of machine until properly adjusted. Figure 63 .
2. Cam follower adjustments are all basically the same. The steps in servicing the Model 816 can be used on White Automatic machines.

Buttonhole Adjustments.

To adjust buttonhole cutting space, loosen screws(75) figure 63d.
1. If the cutting space is too wide, move plate(74) forward as needed.
2. If the cutting space is too narrow, move the plate back.

If the stitch varies on reverse segment of the buttonhole, see figure 63d.
1. Loosen screws(87) on the buttonhole control plate(86).
2. If the reverse stitch is rough, move the plate forward slightly.

Figure 63d

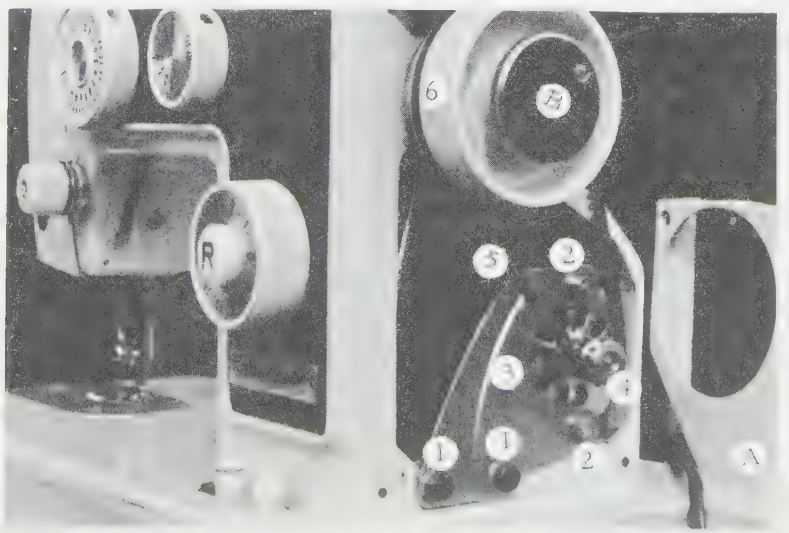


Motor Assembly.

The motor service procedures are similiar to those outlined in preface except the motor is located on the upper side of the head.

1. To adjust the posi-trac style belt, loosen screws(2) and move until belt is snug tight.
2. If further motor is service is needed, remove bracket with screws, and refer to service procedure in the preface.

Figure 64



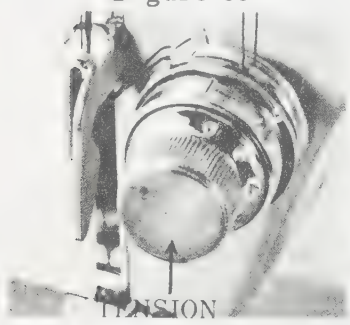
Model 1803, Automatic Zig Zag, by Western-Bega.

Tension.

The tension assembly is the simple unitized type and adjustment is the same as machines covered previously.

1. If upper tension is too loose, turn dial clockwise as needed.
2. If upper tension is too tight, reverse the adjustment.
3. When machine doesn't hold a tension, dismantle the unit and check discs for thread cuts. Smooth them with emery paper.

Figure 65



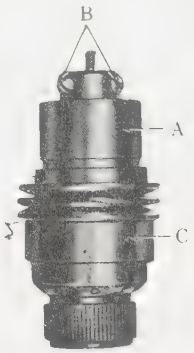
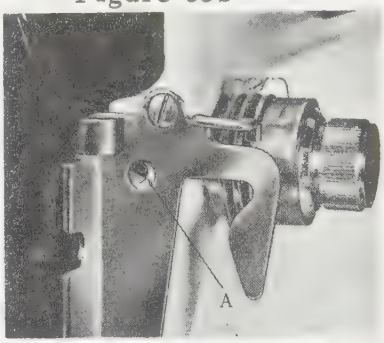


Figure 65b



Proper check spring adjustment is more important on the zig zag machine. The spring is properly adjusted when it releases the thread on downward stroke just as needle enters the material.

If adjustment is required, open face plate cover.

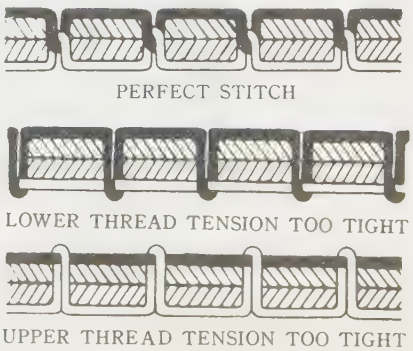
1. Loosen screw(A) figure 65b, and remove tension assembly, fig. 65a.
2. Loosen screw(B) figure 65a.
3. Turn tension unit(C) clockwise if more check spring is needed.
4. Turn tension unit counterclockwise if less spring is needed.
5. Tighten set screws(B) and replace entire assembly in machine head.
6. Spring must be in position shown in 65b.
7. Entire adjustment should be made with presser foot down.
8. Check tension release system. Tension discs should part slightly, if release pin is functioning properly.
9. If release pin is broken, or bent, replace it.

If upper tension and check spring are properly adjusted, and machine is still sewing badly, refer to the bobbin case and shuttle-race assembly.

1. If lower thread is pulling through fabric, tighten lower tension.
2. If upper thread is pulling down through fabric, loosen bobbin tension with adjusting screw, figure 65c.
3. When repeated adjustment fails, remove screw and check the spring on bobbin case. If thread cut, bent or broken, replace it.

Figure 65c.

Figure 65d



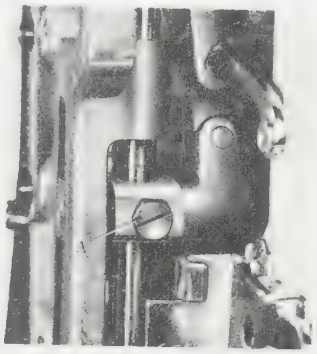
Timing.

To adjust proper height of needle bar, remove race cover.

1. Turn handwheel and observe as needle approaches point of hook.
2. Zig zag width dial should be on setting 6, with cam 10 in place.
3. If needle to shuttle point doesn't resemble figure 66, proceed.
4. Open face plate cover and adjust hex head screw(A) figure 66a.
5. Move needle bar proper direction to attain settings in figure 66.
6. Tighten screw(A), replace components and test sew.

Figure 66

Figure 66a



When machine still skips stitches after timing the needle bar, refer to figure 66b, and timing the shuttle hook.

1. Remove the gear box cover and gear grease.
2. Turn handwheel until needle drops to lowest point and starts back.
3. Loosen screws(D) on the driver gear and move hook to correct.
4. Tighten screws(D). Use caution and keep mesh of gears correct.
5. If gears lose configuration and shafts bind, loosen screws(D & F) in figure 66b. Loosen screw(H) on collar, then position properly.
6. Tighten screw(H) first, then the others. Adjust as needed.

When tolerance between the needle and hook tip varies more than 0.05-0.20(very slight), with either the needle striking the hook, or machine has a tendency to skip stitches, loosen screws(D), and lock screw(G), and position hook to above setting. Tighten screws and re-affirm gear mesh. The gears must mesh smoothly. Don't allow race assembly to twist.

Figure 66b

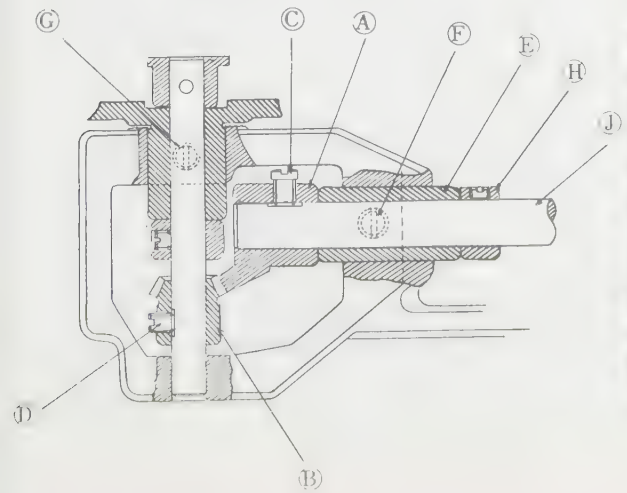
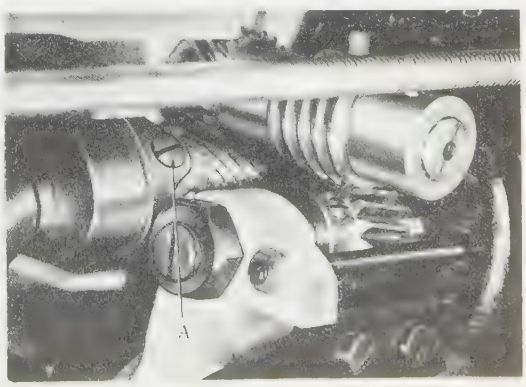


Figure 66c



One timing situation often overlooked is the needle to feed movement. If the feed rises and starts moving cloth before needle reaches high point or moves material while needle is in it, adjustment is made at feed cam.

1. Loosen screw(A) figure 66c, on feed cam and hold firmly.
2. Turn handwheel until timing is corrected, and tighten set screw.

Feed Adjustment.

Proper height for feed dog is 1/32" above needle plate at highest point of travel. To adjust, push sew button down.

1. Turn handwheel until feed is at high point of travel.
2. Loosen screw(A), figure 67.
3. Move block toward front of machine bed to lower the feed.
4. Move block toward rear of bed to raise the feed. Tighten screw(A)

When feed dog strikes needle plate on long stitch, adjust as follows.

1. Set length of stitch regulator on longest stitch.
2. Loosen screw(A) figure 67a.
3. Move feed bar(B) in proper direction to correct. Tighten screw(A)

If feed dog is strking needle plate on the side, refer to figure 67c.

1. Remove the needle plate.
2. Loosen screws(A) and align the feed dog.
3. Replace the needle plate and position by hand, while turning handwheel to be sure feed dog travels freely in slots.
4. Remove the plate carefully, and tighten feed dog screws.
5. Replace needle plate and fasten securely.

When feed is adjusted properly and machine still won't feed, check the drop feed system. Refer to figure 67. If tapered pin is not positioned & releasing, lubricate the pin. If adjustment is required, loosen the nut.

Figure 67

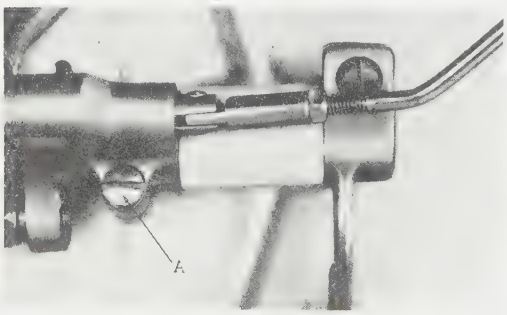


Figure 67b

Figure 67a

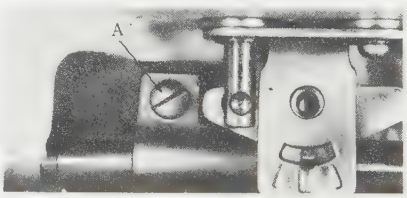
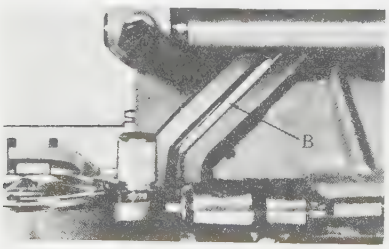
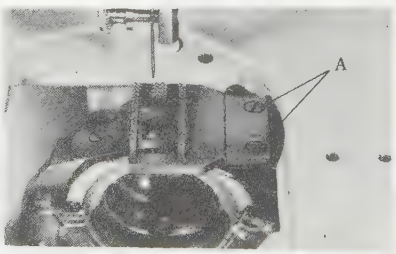


Figure 67c





Timing Needle bar for zig zag sewing.

In zig zag sewing the needle must follow a perfect path on its downward swing. Figure 68 illustrates two incorrect and one correct path.

1. To adjust, set zig zag width control on setting 6, with number 8.
2. Loosen 2 worm gear screws(188) and hold gear(187) figure 71.
3. If situation resembles (A), turn hand wheel away from you.
4. If situation resembles (B), turn hand wheel toward you as needed.
5. Hold the gear firmly and tighten set screws when corrected.

When the machine sews zig zag on a straight stitch setting, set cam 10 selector, and zig zag width control on setting 0.

1. Loosen crank plate screw(154) figure 71.
2. Oscillate the fan-shaped block(152) while turning hand wheel.
3. Tighten the crank plate screw when needle bar is inactive.
4. Adjust until the 0 setting position restricting screw hits the needle bar connecting rod plate(152).

To adjust the zig zag width indicator, remove the top plate.

1. Turn zig zag dial to extreme right position.
2. Loosen indicator screw(A) figure 68a and align with setting 0.

Figure 68

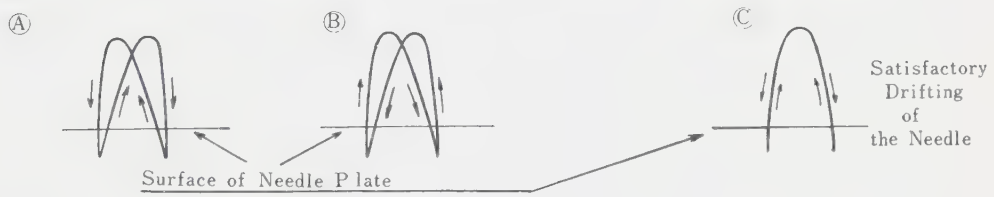


Figure 68a

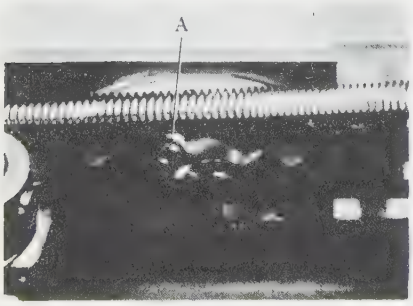
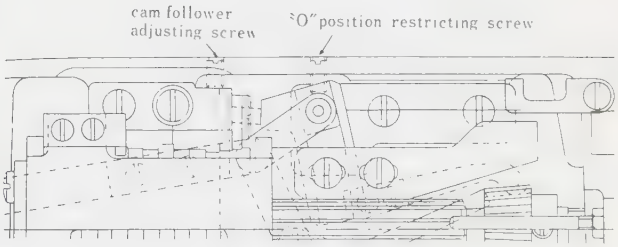


Figure 68b



Irregularity of needle position is a common malady on the zig zag type sewing machine. Use figure 68b for adjustment diagram.

1. If pattern sewn by cam 7 doesn't sew straight in left setting, turn to figure 71.
2. Move the cam follower(137) into lowest portion of cam 10.
3. Loosen cam follower foundation plate screw(138).
4. Move zig zag width control back and forth several times.
5. When needle bar oscillates to the left, twist cam follower screw(a) figure 68b, inward to move cam follower forward until the needle stops moving. Tighten binding screw(138), figure 71.
6. When needle bar oscillates to the right, back the screw outward.

When needle sews off-center in needle plate slot, adjustment must be in upper arm of machine.

1. Remove arm cover and refer to figure 71.
2. Loosen connecting rod screw(119).
3. Use number 10 cam, and set zig zag width control on 6.
4. Move connecting rod until needle is centered in the needle slot.

When the machine doesn't sew straight down the middle on straight setting, with cam 9 and zig zag lever set on 6, adjustment is needed.

1. Loosen screw(129) and adjust follower to straight sew adjusting part (128).
   a. If needle falls to the right, move plate toward the rear.
   b. If needle falls to the left, move plate forward as needed.

If machine sews irregular patterns on automatic setting, check gears.

1. If maladjusted on spline shaft(174), adjust screw(177) as needed.
2. If the gears are worn, or out of mesh, adjust upper worm gear.
3. Remove right side of screw hole cap(71) figure 70.
4. Loosen cam gear lock screw(185) figure 71.
5. Turn driver groove(A), figure 68c, on the cam gear axle, clockwise with a screwdriver until gears mesh properly. Tighten lock nut(185).
6. When the problem is between spline shaft cam gear(175), and cam-gear(184), loosen both worm gear lock screws(176) and adjust.
7. Tighten set screws after making sure gear mesh is smooth.
8. When cam follower rides two cams at once, loosen screws(149A), and move foundation plate(149) proper direction to correct.

Figure 68c

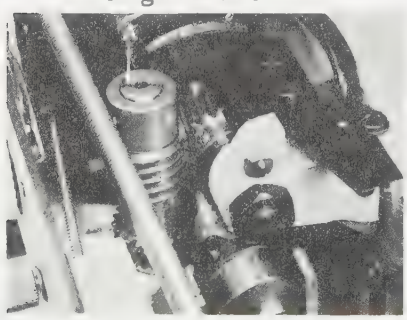
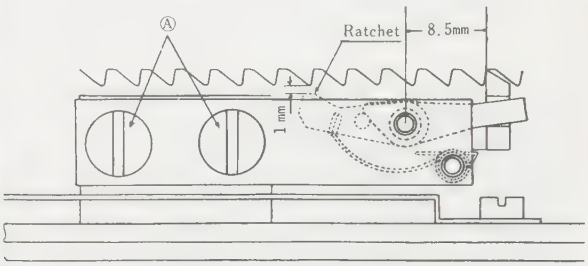


Figure 69



When improper cam follower displacement creates trouble, remove the upper arm cover and adjust cam follower plate.

1. Move selector to cam 10 and check position of cam follower(137).
2. When selector lever is activated follower should be slightly above, almost touching, the upper portion of cam.
3. If not, move follower plate after loosening screws(149A), to proper position. Follower should slide into valleys and out to peaks of cams , with equal ease.

When ratchet plate(139) is out of adjustment, the cam won't move when lever is activated.

1. Loosen ratchet plate screws(A) figure 69, and move ratchet forward until in proper place. See figure 69.
2. If cam doesn't move step by step, adjust ratchet the opposite way.

After a machine has been standing for sometime without use, clean and oil all sub-assemblies, especially gear assemblies and slide bearings.

1. Occasionally, clean areas like the shuttle-race assembly, with air blower to rid the machine of packed lint and oil particles.

Buttonhole Adjustments.

If satin stitch is irregular on buttonhole setting of 0.5, with cam # 11, remove stitch regulating dial.

1. Loosen both screws(A) figure 69a.
2. Move the entire plate upward slightly and tighten screws.
   a. Re-check setting of regulator at setting 0. Cloth must'nt move.
3. To adjust amount of reverse feed on cam 13, remove top cover.
4. Cam cover(130) should contact cam stopper screw(168). Fig. 71.
5. If not, adjust plate in figure 69b. Loosen screws(A) and adjust.
   a. If reverse feed is too small, move spring(165) to the right.
   b. If reverse feed is too long, move spring to the left.

Figure 69a

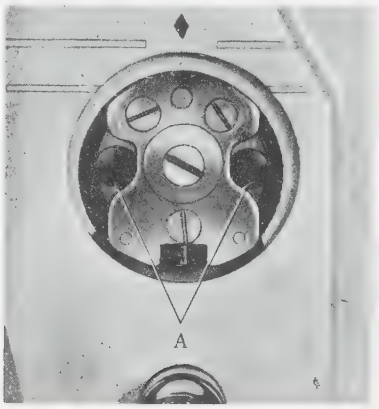


Figure 69b

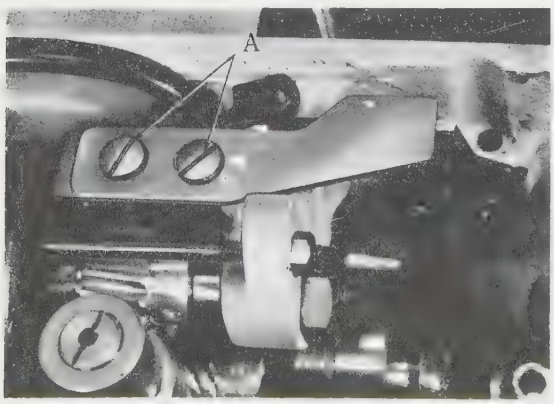
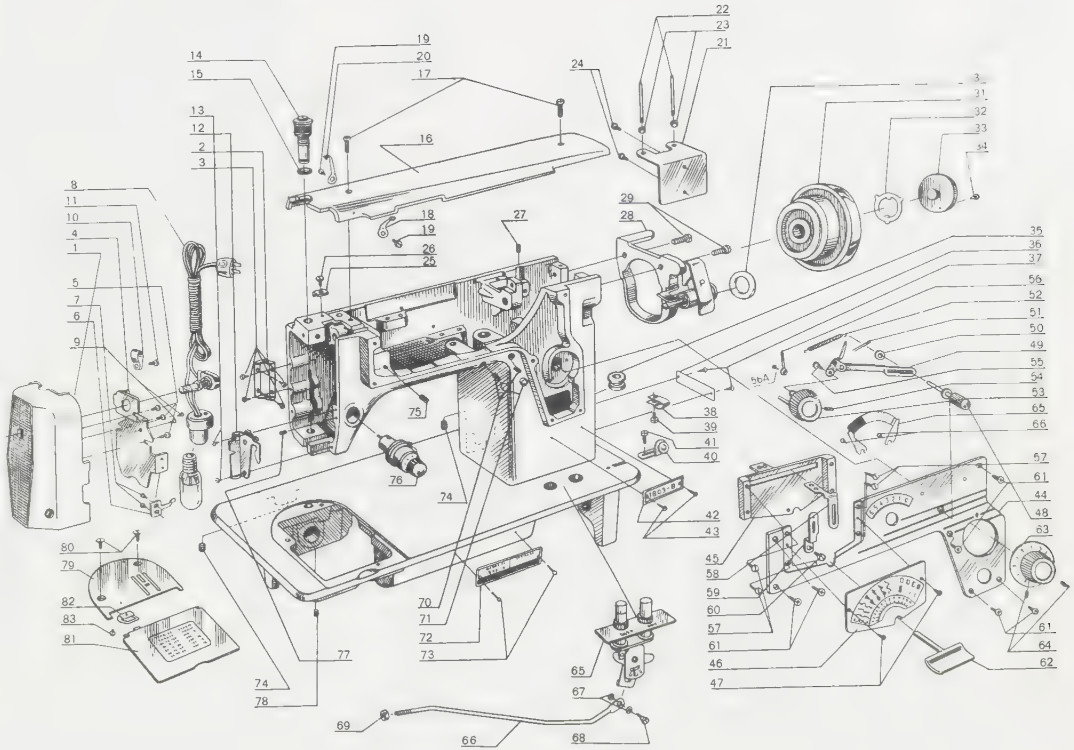


Figure 70



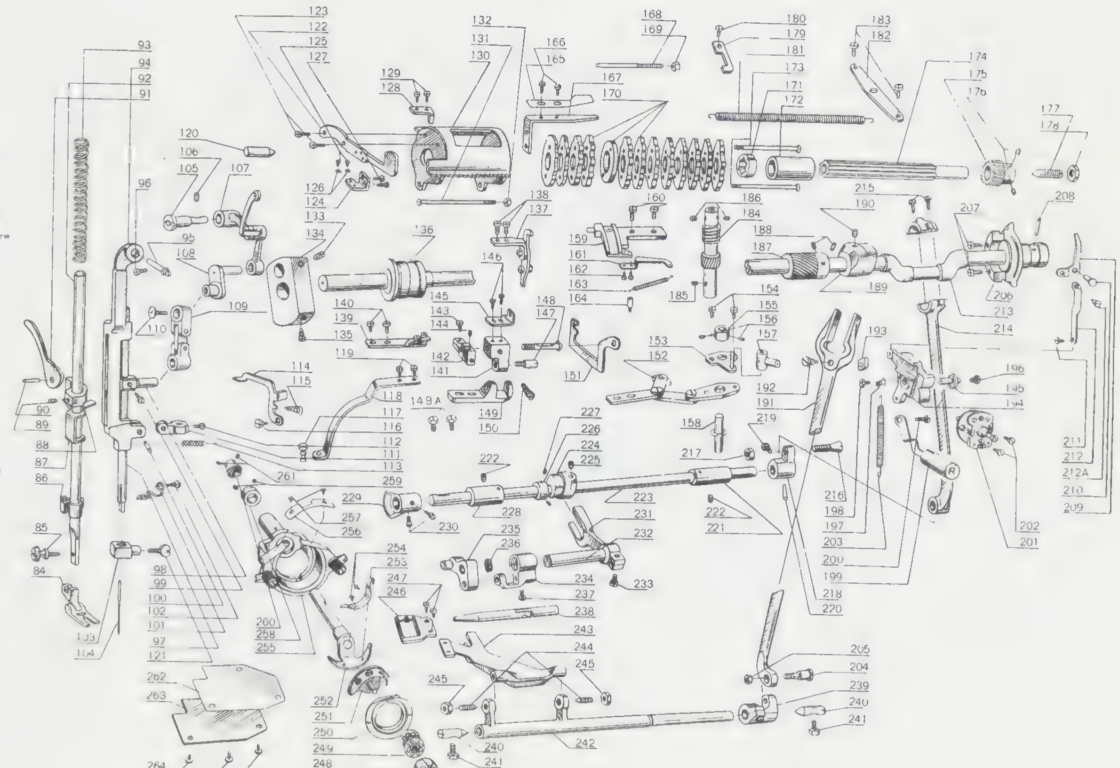
No.	Names of Parts
[illegible]	[illegible]
[illegible]	[illegible] Plate Hinge
[illegible]	[illegible] Hinge Screw
[illegible]	[illegible]
[illegible]	[illegible] Screw
[illegible]	[illegible] Spring
[illegible]	[illegible] Screw
[illegible]	[illegible]
[illegible]	[illegible] Screw
[illegible]	[illegible] Motor [illegible] Plate Side
[illegible]	[illegible] Motor Screw
[illegible]	[illegible]
[illegible]	[illegible] Plate Screw
[illegible]	[illegible]
[illegible]	[illegible] Washer [illegible]
[illegible]	[illegible]
[illegible]	[illegible] Screw
[illegible]	[illegible] Front
[illegible]	[illegible] Guide Screw
[illegible]	[illegible] Rear
[illegible]	[illegible] Plate
[illegible]	[illegible]
[illegible]	Spool [illegible] Set Nut
[illegible]	[illegible] Plate Screw
[illegible]	[illegible] Motor Arm Side
[illegible]	[illegible] Motor Screw
[illegible]	[illegible] Plate Screw
[illegible]	Bobbin Winder [illegible]
[illegible]	Bobbin Winder Screw
[illegible]	Rubber Ring for Bobbin Winder
[illegible]	[illegible]
[illegible]	[illegible] Stop Motion Clamp Washer
[illegible]	[illegible] Stop Motion Large Screw
[illegible]	[illegible] Stop Motion Clamp Stop Screw
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible] Plate Screw
[illegible]	[illegible] Motor Bed Side
[illegible]	[illegible] Motor Screw
[illegible]	[illegible] Winder Thread Guide Comp
[illegible]	[illegible] Winder Thread Guide Screw
[illegible]	Model Number Plate
[illegible]	Model Number Plate Screw
[illegible]	Zigzag Window
[illegible]	[illegible] Plate Rear Screen
[illegible]	Pattern [illegible]
[illegible]	Pattern [illegible] Screw
[illegible]	Zigzag Width Restricting Knob
[illegible]	Restricting Knob Setting Plate
[illegible]	Washer for Restricting Knob
[illegible]	Restricting Knob Locking Meta
[illegible]	Spring for Restrictor
[illegible]	Zigzag Width Regulating Dial
[illegible]	Zigzag Width Regulating Dial Screw
[illegible]	Restricting Knob Setting Plate Screw
[illegible]	Zigzag Width Indicator
56A	Zigzag Width Indicator set Screw
[illegible]	Pattern Plate Rear Screen Screw
[illegible]	Zigzag Width Indicator Moving Arm
[illegible]	Pattern Indicator
[illegible]	Pattern Indicator Screw
[illegible]	Zigzag Window Screw
62	Pattern Selector Lever

No.	Names of Parts
[illegible]	Stitch Length Regulating Dial
[illegible]	Stitch Length Regulating Dial Screw
[illegible]	Drop Feed Comp
[illegible]	Drop Feed Connecting Rink
[illegible]	Vinyl Washer for Drop Feed
68	Terraced Screw for Drop Feed
[illegible]	Drop Feed Connecting Rink Nnt
70	Oscillating Shaft Screw
71	Screw Hole Cap
[illegible]	Bed Number Plate
[illegible]	Bed Number Plate Set Pin
[illegible]	Hinge Shaft Screw
[illegible]	Upper Shaft Metal Screw
[illegible]	Thread Regulator Comp
[illegible]	Thread Regulator Screw
78	Shuttle Race Set Screw
[illegible]	Needle Plate
80	Needle Plate Screw
[illegible]	Bobbin Case Cover Plate
[illegible]	Spring Plate for Cover Plate
[illegible]	Spring Plate Screw
[illegible]	Presser Foot
85	Presser Foot Thumb Screw
86	Thread Cutter
[illegible]	Tension Releaser Rink
88	Presser Bar Connecting Stud
[illegible]	Presser Bar Connecting Stud Screw
[illegible]	Presser Foot Lifter Tapered Pin
[illegible]	Presser Foot Lifter
92	Presser Bar
93	Presser Bar Spring
94	Needle Bar Oscillator Bracket
[illegible]	Needle Bar Oscillator Bracket Pin w/Snap Ring
96	Needle Bar Oscillator Bracket Pin Screw
97	Needle Bar
98	Needle Bar Bracket
[illegible]	Needle Bar Bracket Screw
100	Needle Bar Oscillator Bracket Joint Connecting Pin
[illegible]	Needle Bar Thread Guide
[illegible]	Needle Bar Thread Guide Screw
[illegible]	Needle Clamp
[illegible]	Needle
[illegible]	Thread Take up Lever Rod Shaft
[illegible]	Thread Take-up Lever Rod Shaft Screw
[illegible]	Thread Take up Lever
[illegible]	Needle Bar Connecting Link Pin
[illegible]	Needle Bar Crank Rod (Comp)
[illegible]	Needle Bar Crank Rod Screw
[illegible]	Needle Bar Connecting Joint
[illegible]	Needle Bar Oscillator Bracket Joint connecting Pin Screw
[illegible]	Needle Bar Oscillator Bracket Spring
[illegible]	Tension Releaser
[illegible]	Tension Releaser Spring
116	Tension Releaser Screw
[illegible]	Needle Bar Connecting Rod Fixing Pin
118	Needle Bar Connecting Rod
[illegible]	Needle Bar Connecting Rod Set Screw
120	Spline Center
121	Needle Clamp Screw
[illegible]	Cam Lever
[illegible]	Cam Lever Screw
[illegible]	Cam Indicator Arm Joint
[illegible]	Cam Indicator Arm Screw

Figure 71

No	Names of Parts
[illegible]	[illegible] Indicator Arm Screw
[illegible]	[illegible]

No	Names of Parts
[illegible]	Feed Regulator Setting Shaft Screw
[illegible]	Washer for Feed Regulator
[illegible]	Washer Set Screw
[illegible]	Push Button
[illegible]	Push Button Screw
[illegible]	Feed Window Foundation Comp
[illegible]	Feed Window Foundation Screw
[illegible]	Feed Regulator Pull [illegible] Spring
[illegible]	Forked Rod Terraced Screw
[illegible]	Nut for Forked Rod Terraced Screw
206	Handwheel Bushing w Balance Weight
[illegible]	Balance Weight Screw
[illegible]	Knock Pin for Handwheel Bushing
[illegible]	Buttonholer Function Plate
[illegible]	Buttonholer [illegible] Plate Set Pin
[illegible]	Buttonholer Carrying Plate Terraced Screw
[illegible]	Buttonholer Carrying Plate
[illegible]	Buttonholer Function Plate Connecting Screw
[illegible]	Upper Shaft
[illegible]	Crank Rod
[illegible]	Crank Rod Set Screw
[illegible]	Crank Rod Taper Screw
[illegible]	Nut for Crank Rod Taper Screw
[illegible]	Lower Shaft Crank
[illegible]	Lower Shaft Crank Screw
[illegible]	Knock Pin for Lower Shaft Crank
[illegible]	Lower Shaft Metal Rear
[illegible]	Lower Shaft Metal Screw
223	Lower Shaft
[illegible]	Feed Lifting Rock Cam
[illegible]	Feed Lifting Rock Cam Screw
226	Lower Shaft Collar
227	Lower Shaft Collar Screw
228	Lower Shaft Metal Front
[illegible]	Bevel Gear Large
[illegible]	Bevel Gear Screw
[illegible]	Oscillating Rock Shaft
232	Oscillating Shaft
[illegible]	Oscillating Rock Shaft Screw
[illegible]	Drop Feed Support
[illegible]	Feed Lifting Rock Shaft Crank Roller Stud
[illegible]	Feed Lifting Rock Shaft Crank Spring
[illegible]	Drop Feed Support Screw
[illegible]	Drop Feed Center Assembly
[illegible]	Feed Rock Shaft Bracket
246	Feed Bar Center Screw
[illegible]	Screw for Feed Bar Center Screw
[illegible]	Feed Shaft
[illegible]	Feed Bar
[illegible]	Feed Bar Center Screw
[illegible]	Nut for Feed Bar Center Screw
[illegible]	Feed Dog
[illegible]	Feed Dog Screw
[illegible]	Bobbin Case
[illegible]	Bobbin
[illegible]	Shuttle Race Cover
[illegible]	Shuttle Hook
[illegible]	Shuttle Driver
[illegible]	Shuttle Driver Spring
[illegible]	Shuttle Driver Spring Screw
[illegible]	Shuttle Race Comp
[illegible]	Shuttle Race Spring
[illegible]	Shuttle Race Spring Screw
[illegible]	Shuttle Race Shaft Collar
[illegible]	Shuttle Race Shaft Collar Screw
[illegible]	Bevel Gear Small
[illegible]	Bevel Gear Screw
[illegible]	Plate for Gear Cover
[illegible]	Gear Cover
[illegible]	Gear Cover Screw



Singer Slant-O-Matic and Touch & Sew series.

The Singer series 400 & 500 are commonly called Slant-o-matic, named for the general appearance of the head and the cant of the needle and presser bars. The 400 & 500 series still utilized the conventional bobbin and bobbin winder concept. With the advent of the series 600 Touch & Sew, the bobbin (per se) was eliminated in favor of a special reel that can be filled right in the machine. See figures 79 & 80.

The series 600 Touch & Sew also utilizes more plastic parts, and the new transistorized controls. Basically, the machines are much alike. When there are different adjusting procedures, they will be pointed out.

Due to the slant concept, conventional attachments and feet will not fit.

Figure 72
Singer Model 401A -- Slant-O-Matic- Automatic zig zag

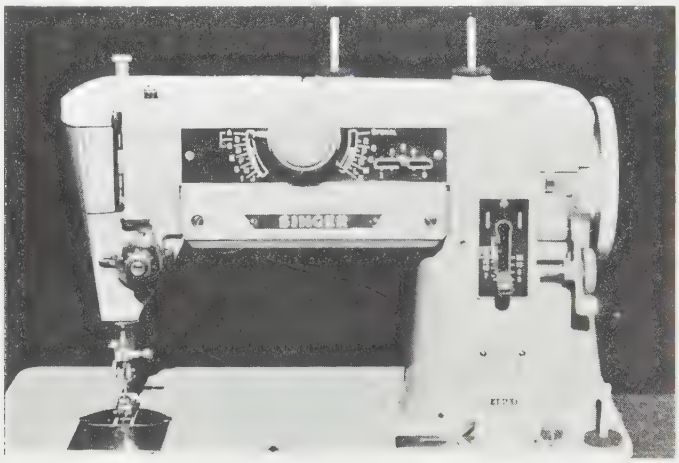


Figure 72a

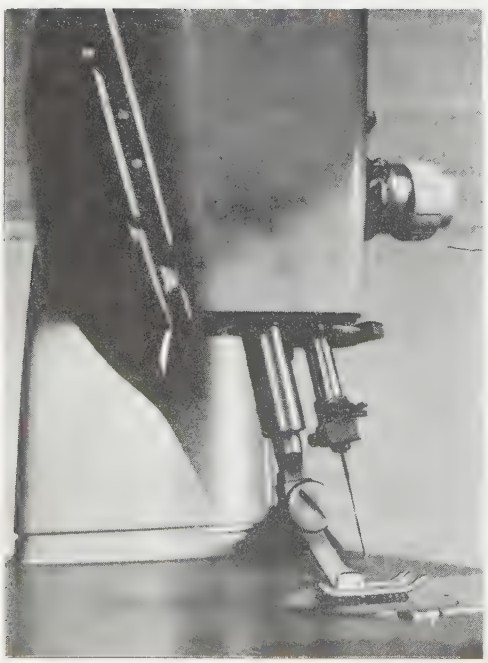


Figure 72b

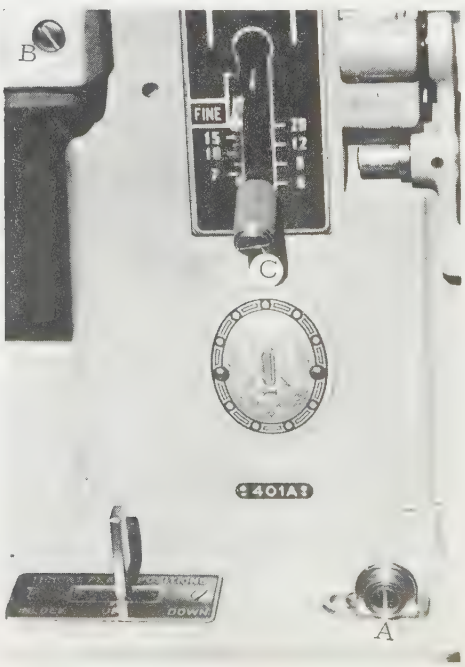


Figure 72b illustrates the length of stitch control, and the needle-plate raising lever. Unlike machines covered so far, where the feed dropped, the Singer system raises the needle plate to obtain the same objective.

1. If service is required on or near the plate, move lever to the left, and remove the plate. Clean this area frequently.
2. Stitch length regulator(C) is conventional. When necessary to adjust the assembly, remove two screws and remove the guage plate.

Figure 73

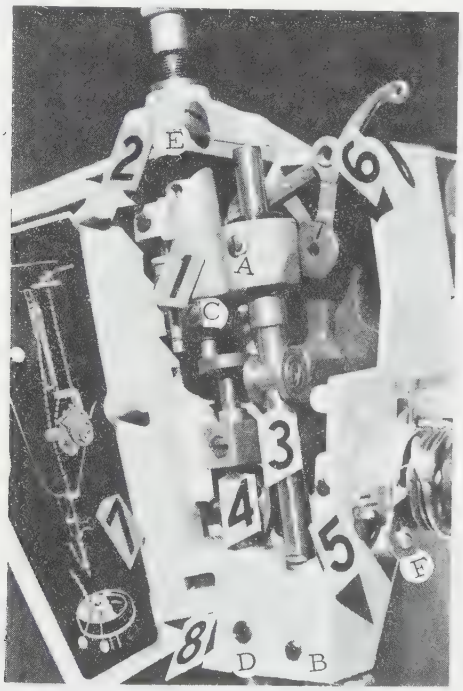


Figure 73 illustrates the face plate assembly with plate cover open. It also shows the threading chart for upper and lower tension.

1. This model has a rather short-action needle bar frame(1) which controls the sidewise motion of the needle from the top of needle bar.
2. Needle bar bearings(A) in pivot, and (B) in lower pivot are adjustable if the needle bar wears.
3. If the needle bar frame works loose, or wears from hard use, play can be eliminated by adjusting collar(C), on eccentric pinion stud which is held in place by clamping screw(E).
4. Needle bar(3) is activated by the knuckle-action link assembly. The needle bar is timed at visible screw facing operator. Most Singer's do have a timing mark at lower end of needle bar.
   1. Time the needle bar by loosening screw and setting on mark.

The presser bar lifter position block(4) serves a dual purpose. The adjustment for presser bar height is made by loosening the set screw and moving up or down as needed. The block also keeps presser bar in line and presser foot can be aligned by loosening set screw and correcting.

Figure 73a illustrates the components that make up the needle bar frame assembly.

1. Needle bar frame (A) and its relative components are activated by the pitman (B) which is connected to the zig zag mechanism controls. They are connected by pin(1). If the needle fails to swing when control is activated, a broken pin at this point is one possibility.
2. Needle alignment adjusting screws (accessible through hole in rear casting) connect pitman to the hinge pin plate. Check these screws on occasion, they must be kept tight.
3. Adjustment for needle position in needle plate slot is made on pinion eccentric stud(C).
4. Spring(E) is portion of zig zag cycle used to return needle bar frame to starting position. When the spring breaks, or weakens, shorten or replace it.
5. Timing marks referred to on page 85 are illustrated at point(F). All timing should begin with a resetting of these marks. Don't attempt hook timing if the marks are not timed properly.
    a. Upper mark should be flush in face casting when needle descends to lowest point of travel. Lower mark should become visible and flush with face casting at precise moment hook point picks up the needle thread loop.
    b. If necessary to change timing, loosen screw(G) and move needle bar in proper direction to correct. Tighten screw(G) tightly.

Figure 73a

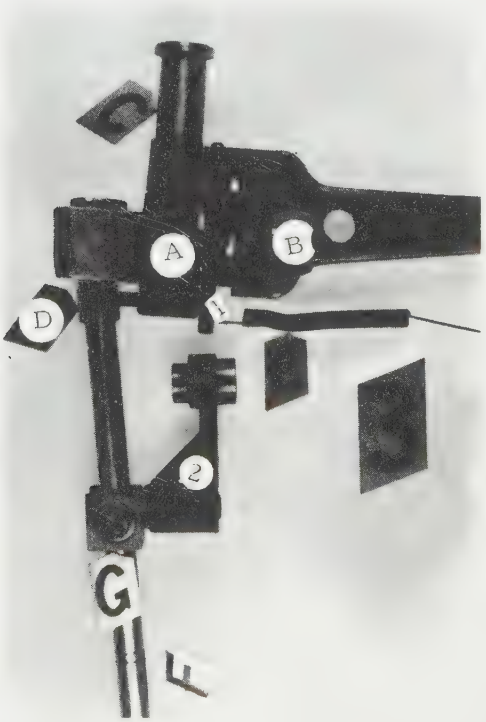
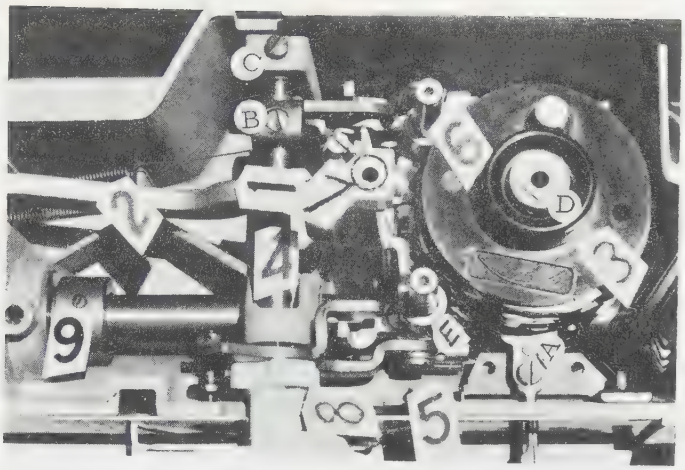


Figure 74



The Singer zig zag mechanism operates very much like machines already covered. The series 400 & 500 machines have knob type selectors, while the Touch & Sew series utilize a push-type lever.

Figure 74 illustrates the 401A unit with cam followers(6) and (E) which transmit pattern selection through the pitman rod (1) to the needle frame.

The pattern cam (3) is the drop-in type. To position, press down until it snaps into place. To remove, simply pull upward.

Cam stack assembly is held in place by lock nut(D).

1. For cam follower adjustment, refer to single control shaft(4) which transmits selector impulses from both controls (8). However, each of the cam followers are adjustable.
2. Set pattern selector on a cam. Loosen set screw on cam follower where adjustment is required and move closer, or away from the cam.
3. Small adjustments for needle position, and width of zig zag can be made with screw(A).
4. If main shaft accumulates end play after years of use, adjustment can be made at adjusting collar (9). Loosen set screw and adjust the collar as needed. Leave some play so machine won't bind.
5. If main zig zag control shaft(4) gets out of factory configuration, the bearing(c) can be adjusted for some degree of control.
6. Oil all moving parts with a high grade household oil, and keep all sub-assemblies clean and free from dust or lint.

Figure 75

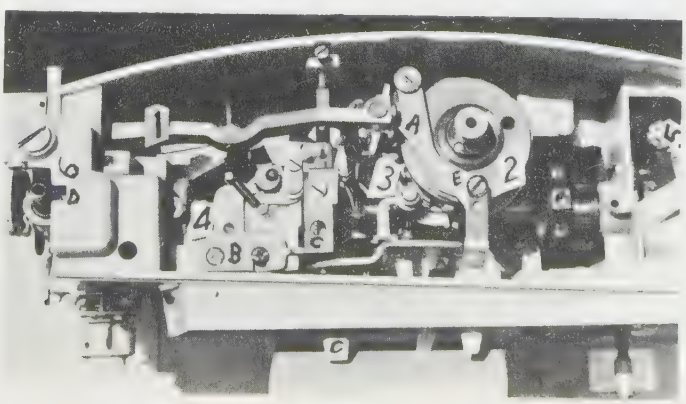


Figure 75 is a close-up of the automatic mechanism of the Model 676, which is a built-in cam system with single cam follower. There is no provision for additional cams.

Service methods are similiar to those already covered except there is just one cam follower(A). Adjustment is the same. If cam doesn't follow the cam properly, loosen screw and move tip of follower until corrected.

Lower Mechanism.

Both series utilize a lower base cover first made popular on the Singer Model 101, back in the early 1920's.

To remove the cover on series 400 & 600, remove the thumb screw and remove the cover.

To remove cover on Touch & Sew, loosen all screws at four corners.

Figure 76

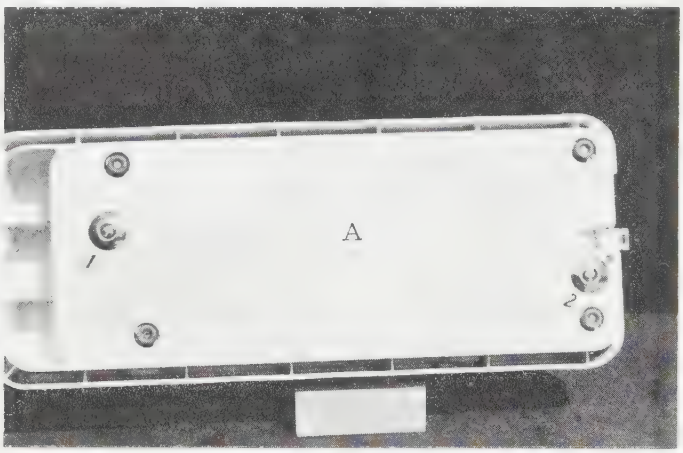
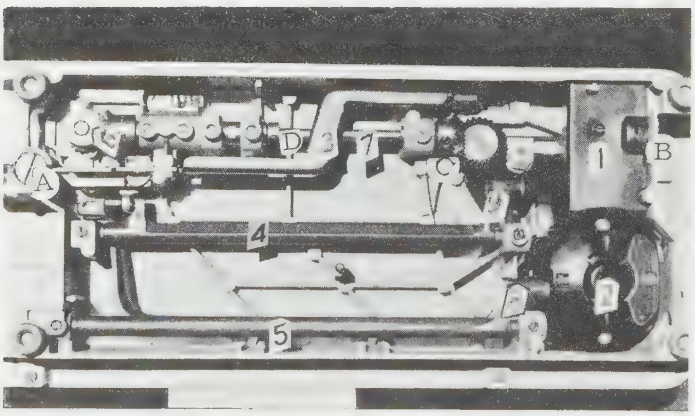


Figure 77



The gear-driven motor is mounted(1) inside head in a vertical position. Motor service methods are similiar to those covered in the preface.

If needle plate position lever gets out of adjustment, press upward on raising bar(3) near adjusting screw(A). To raise the plate, turn the screw clockwise. To lower the plate, turn the screw counterclockwise. Bar(3) must seat into slots of screw(A).

The feed raising bar (4) is held in place by two tapered screws with set screws. If bar becomes loose, or feed dog is out of line in needle plate slots, loosen set screws and adjust tapered studs proper direction to correct. Tighten set screws. Don't overtighten, machine assembly must be allowed freedom to move.

The feed bar(4) is attached to vertical connecting rod, and held in place by an eccentric stud and nut. Main feed bar(5) is also held in place by the tapered screw, set screw arrangement. Same adjustments apply.

Main feed bar(5) junctions with vertical feed bar assembly which is activated by a cam on the upper main shaft. Travel of feed dog is controlled by a feed block assembly which is attached to the stitch length regulator.

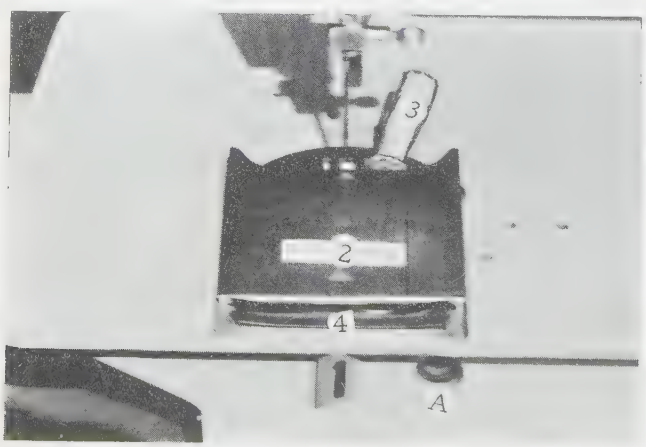
When feed dog strikes needle plate on long stitch, adjustment is made by loosening lock nut on eccentric stud (8). After nut is loose, turn machine until corrected. Tighten the nut. The feed dog must not strike needle plate at any length setting.

Timing the lower drive mechanism is performed at gear(C). After the needle bar has been set with timing marks, remove lower cover and refer to gear(C). Loosen set screws and lower needle bar to lowest point of travel. Move drive shaft to proper setting. Tighten screws on gear(C), but keep gear mesh smooth. If machine binds after making the adjustment, loosen the screws and back the gear away slightly.

If end play is present in shaft after adjustment, loosen screw at collar (D) and move collar proper way to correct. Tighten set screw.

If vertical end play in hook shaft is excessive, loosen set screw in gear (6) and adjust to correct. Always check machine by hand after making a gear adjustment. If the slightest binding is present, review your adjustment and make correction as needed. Any deviation will interrupt smooth operating motion of the high speed, gear-driven machine.

Figure 78



To remove slide plate raise needle to highest point, and remove presser foot. Slide the blade of a small screwdriver under plate and force plate(2) out of slots. If spring(4) breaks, loosen screw and force new spring in.

Figure 79

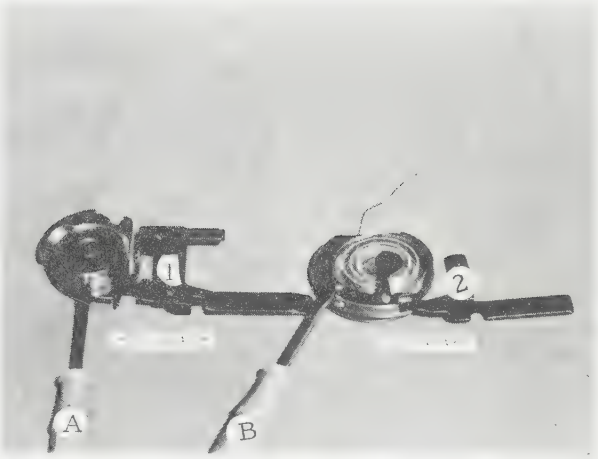


Figure 79 illustrates the difference between series 400 & 500 machine(1) and series 600 (2). Style (1) is similiar to countless Singer machines and contains many conventional features. Style(2) features new innovation where bobbin is wound right in the bobbin case.

Tension adjustment is the same. If lower tension is too tight, turn adjusting screw counterclockwise as needed. If lower tension is too loose, turn adjusting screw clockwise as needed. See style(A).

Style(B), on the Touch & Sew, is somewhat different. It features a bobbin latch holding screw, which is accessible from the top. A small nut, located under edge of bobbin case, holds screw. When screw is tightened, latch pressure increases in center of plastic bobbin. The edge of bobbin rides on steel bobbin case and creates a tension on the thread, equally on sizes, since there is no spring for thread to pass under. Tension actually better quality under this Singer concept.

Bobbin case brackets function alike, although not interchangable. Each has an adjustable cushion spring that fits in place over adjustable eccentric stud in the race casting.

Thread clearance in bracket to bobbin case is changed by adjusting slotted eccentric stud from the top. Set screw(A) figure 78, must be loosened to allow adjustment of the stud. After adjustment, tighten the set screw.

When properly set, all threads should pass freely around bobbin case, and between bobbin case and position bracket. If thread loops gather on the underside, or a clicking sound is heard, bracket is probably set too close.

Figure 80 illustrates bobbin case, needle plate area components.

1. Part(2) is position bracket mentioned in text above, with set screw (3) for holding the adjustment.
2. Button(4) is used to activate the bobbin winding assembly.
3. Figure 81 is a close-up shot of the latest model 640. Engaging button(1) is depressed and turned to left to wind bobbin. On other Touch & Sew machines it is depressed until it locks. All this style bobbin winding assemblies, disengage when the slide plate is closed.
4. Winding plate(2) rises under side of bobbin when engaging, and point (3), to hold plate for positive rotation of the bobbin as thread from upper machine fills it.

Figure 80

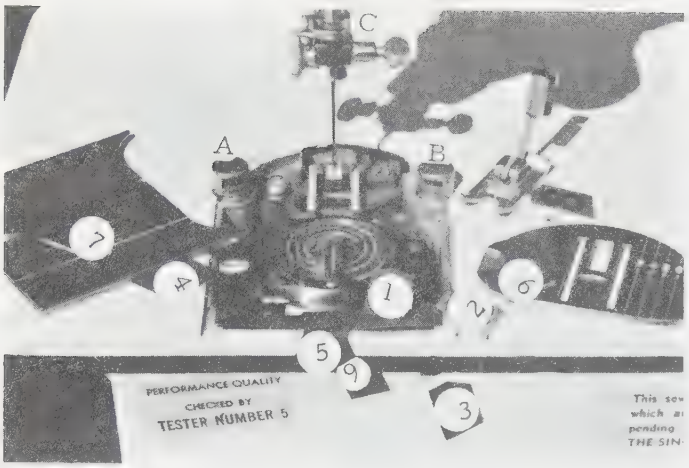
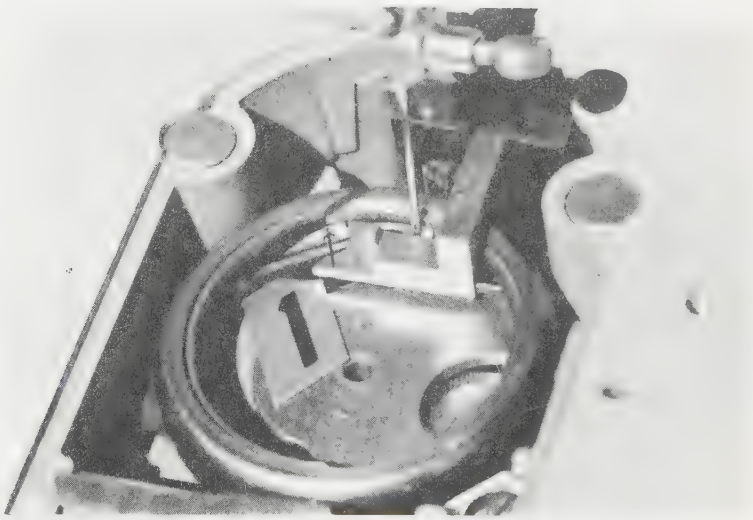


Figure 81

Figure 82



Timing Hook to Needle Bar.

After checking needle bar timing by referring to timing marks, and it's determined adjustment is correct, hook is probably out of time. Proper timing occurs when the hook starts passing through upper thread loop which is thrown by the needle as it reaches lowest point and starts back.

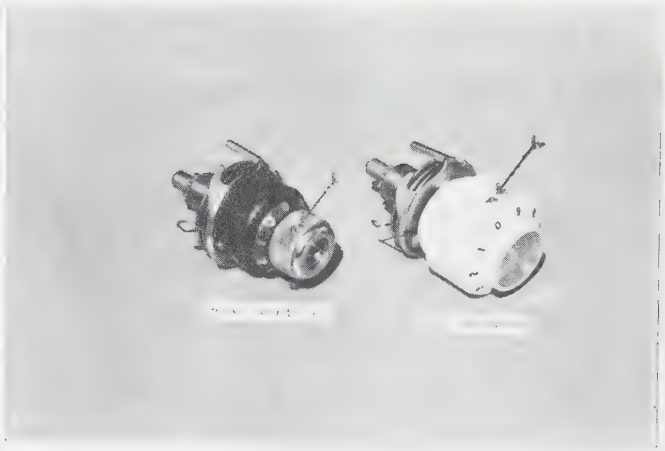
Relative position of hook point to needle should resemble picture in fig. 82, above.

If needle bar is out of time, refer back to page 86 for instruction.

If the hook is out of time, refer to page 89 for instruction.

One good innovation on this series Singer is the built-in safety guard on the hook(see point 1), which prevents needle from damaging hook.

Figure 83



Although Singer tension assemblies differ in appearance, components from series 400 & 500, will interchange with series 600. They function the same and settings of check spring and inner setting of calibrated dial are adjusted in the same manner.

The tension is set on inner setting, then the outer dial is set in place, and anchored by set screws.

If the tension stud compresses after years of use, and adjusting nut will not hold a setting, remove all components. Use bigger screwdriver from accessory kit and spread prongs of stud slightly. Replace the adjusting nut and turn on to determine correct position of stud prongs. When positioned properly, replace all components, reset tension for desired setting.

The tension assembly contains three discs so machine may be used for double needle sewing. Double side disc should always be placed in center.

Figure 84 illustrates close-up of tension assembly and proper position for check spring(A), which should, when properly timed, come to rest on bracket(B) just as needle enters fabric on downward stroke. If check spring is out of time, loosen position bracket screw(1) and adjust as needed.

Figure 84

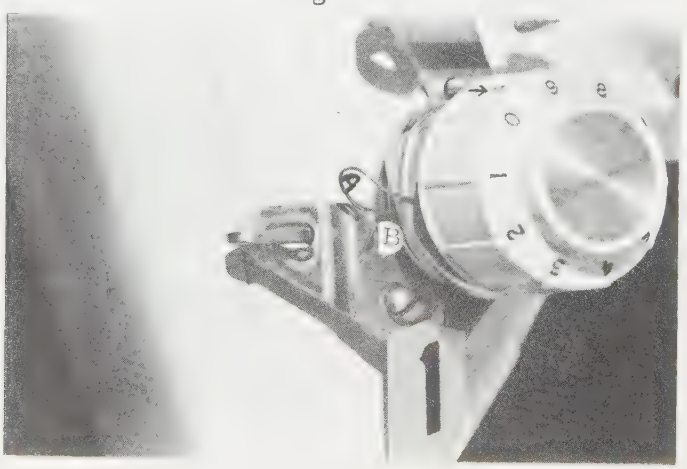


Figure 85 illustrates the latest "Touch & Sew" tension, which is basically the same as previous models. Suggested settings for straight stitch & zig zag sewing are shown on the tension dial. The usual premise for sewing on a zig zag machine is tighter tension for a better straight stitch, and lesser tension for zig zag and automatic sewing. There are exceptions, but generally the rule applies.

Figure 85

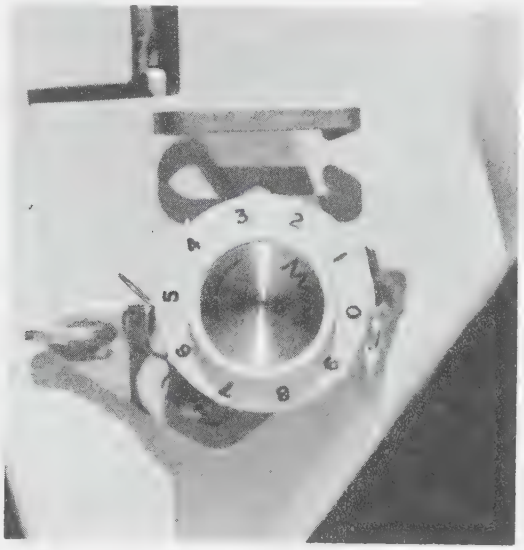


Figure 86

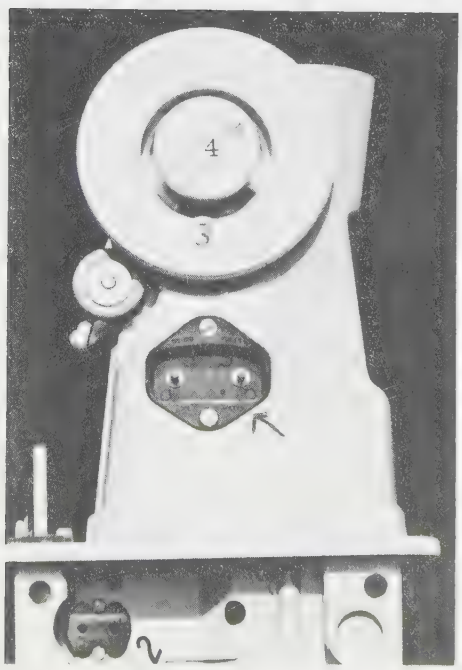
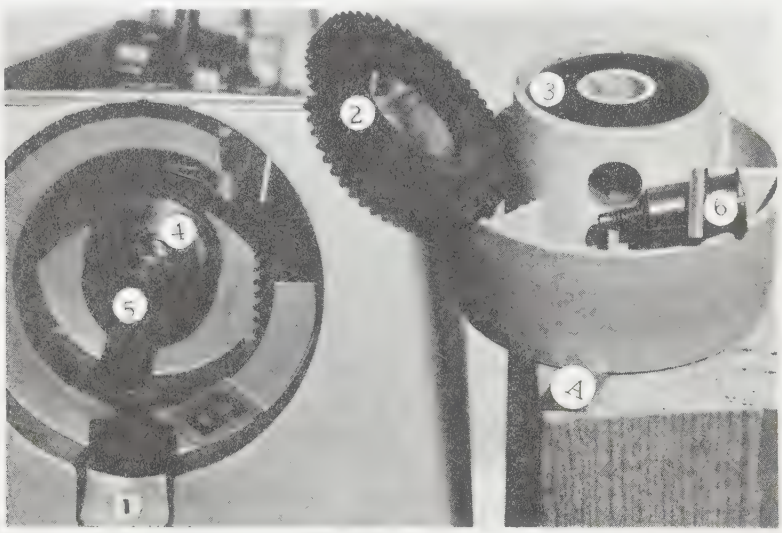


Figure 86, page 93, illustrates hand wheel view of Model 401a. Arrows point to terminal for wall plug, and different plug for foot control(2).

1. To service wiring or terminals, loosen set screws and remove.
2. If clutch assembly or hand wheel need service, loosen set screw in clutch nut(4) and turn nut off, counterclockwise. When machine is a few years old, remove the components, remove old grease and replace with fresh new lubricant. Grease loses its viscosity after years of use.
3. Always re-check machine by dis-engaging clutch, after working in the handwheel area. When clutch is activated, wheel should turn while machine remains inert. If not, remove clutch nut(4), turn washer exactly 180 degrees and replace all parts.

Figure 87



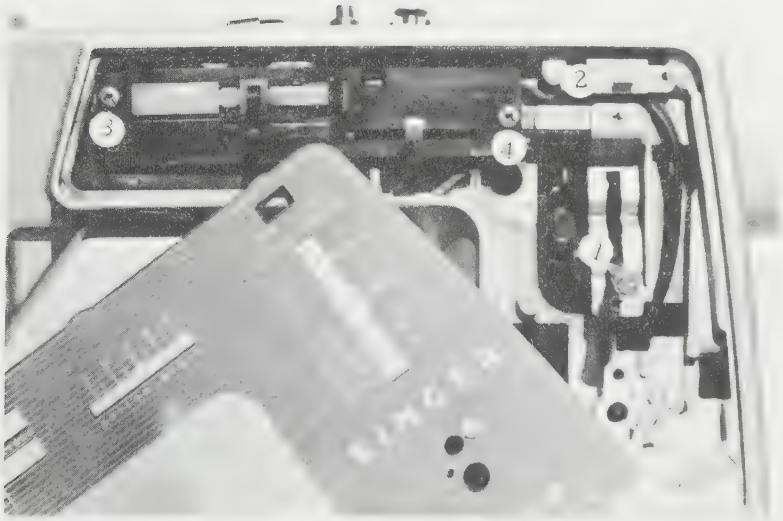
The series 600 features a non-releasing clutch drive. See figure 87. Handwheel(A) fits in place in (B). The assembly operates with a shock-type spring which fits in gear (2) and fits in area(3) before attaching it to collar (4) and finally, all components fit in place over the main shaft(5).

Feed Fork Assembly.

1. Part(1) is plastic covering for feed fork block assembly screw.
2. To remove feed fork assembly, remove the plug.
3. Remove eccentric stud and nut at lower end of feed fork, see figure 77, at point(8).
4. Remove hinge screw stud(6), washer(5) and spring(4), figure 88.
5. Stitch regulator(A), is now loose for removal.
6. Feed fork assembly(B) and the slide bearing (1) can be removed for service. Feed fork(B) sometimes becomes loose on cam bearing. One or two well directed strikes should solve the problem. Use care.

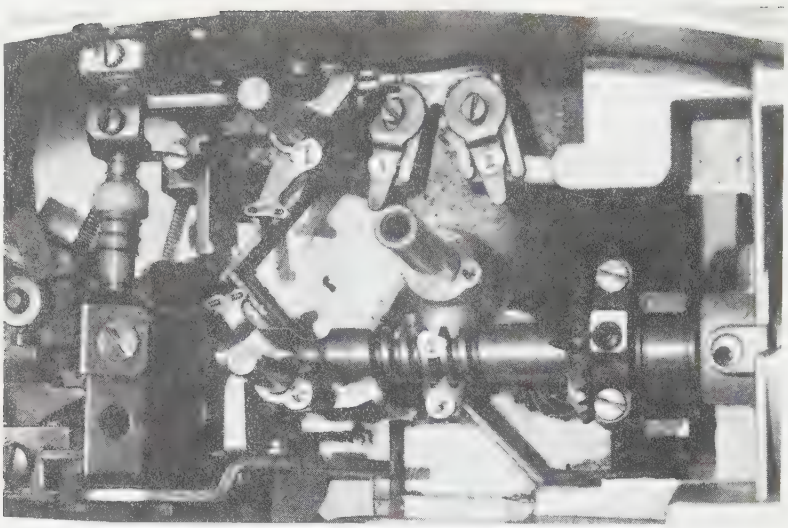
Figure 88

Figure 89



To remove the front panel on series 600 machines, place screwdriver behind Singer emblem and pry forward. Remove solo screw and remove the panel. Removal of panel gives access to sewlight area and length of stitch regulator bracket(1). Removal of screws(3 & 4) gives access to the upper arm mechanism not accessible from above.

Figure 90



View of Model 625 zig zag mechanism, partially stripped, to show components not otherwise so clearly visible. Parts (1 & 2) are dogs for stop position on base of cam stack, they are adjustable from above and control maximum movement, left and right, of the camstack.

Point(3) is location of set screw(accessible through front arm, figure 89) to lock cam stack post(4) in proper configuration and height. The base gear of cam stack meshes with worm gear(5). Tolerance and mesh of gear can be adjusted by screw(3) on post(4).

Cam follower(6 & 7) follow the cam to sew selected patterns.

Figure 91

Deluxe Model 640 "Touch & Sew", showing controls and method of opening upper arm cover.

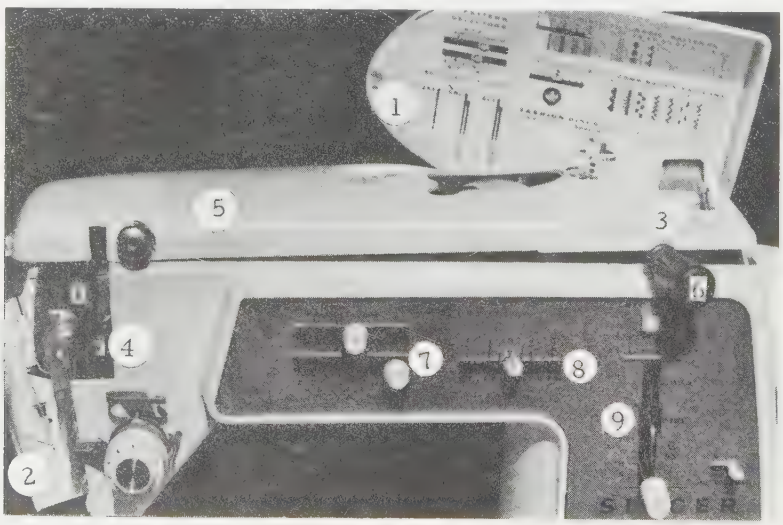


Figure 92

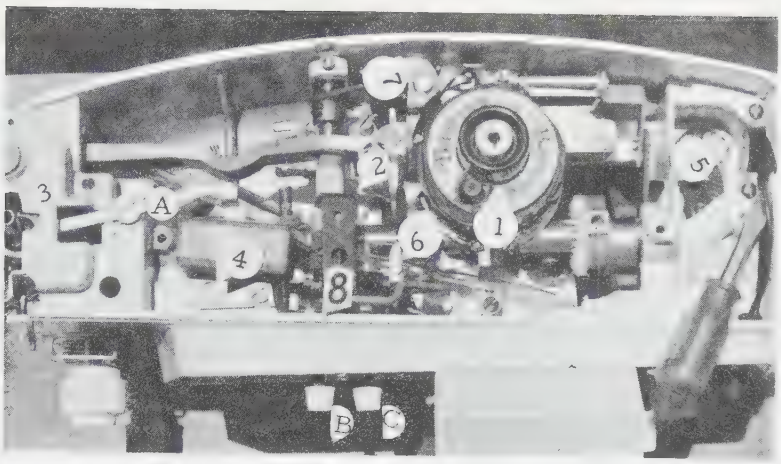


Figure 92 illustrates the full automatic mechanism of series 640 Deluxe "Touch & Sew" Singer.

1. Point (1) is special drop-in cam for sewing the long basting stitch, which can, with modifications, sew a basting stitch two inches long.
2. Point (2) is cam follower plate. It's hinged to pusher-type pitman, and activates both cam followers (6 & 7). Cam follower adjustment is similiar to procedures covered by earlier text.
3. Switch(4) is electronic unit which activates automatic threader button, via switch bar(A).
4. Motor drive gear(5) is visible where it meshes with fiber gear of the spring clutch mechanism.
5. Shaft (8) sets automatic mechanism in motion when activated by the selector push buttons(B & C).

Lower mechanism of series 640 Deluxe. Unit is basically the same as models covered in earlier text, with exception of suction motor(4) and solid state electronic components. See figure 93 below.

Figure 93

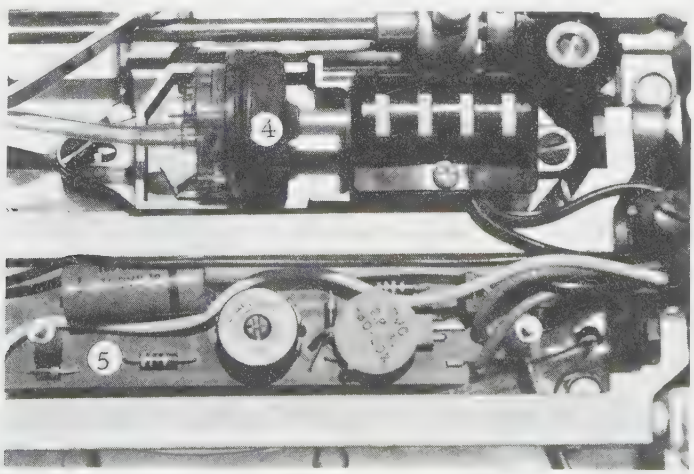


Figure 94

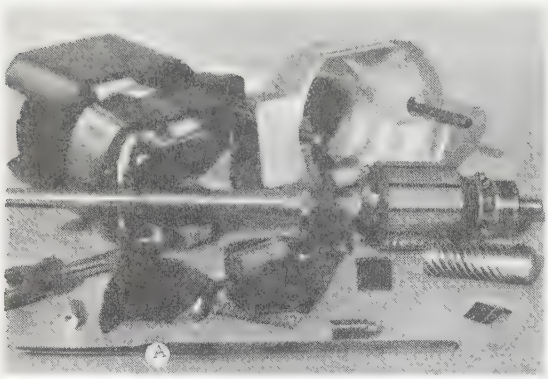
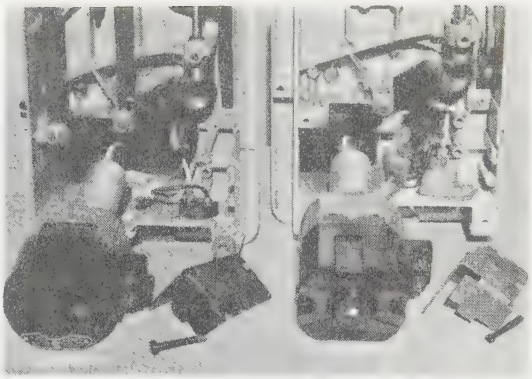


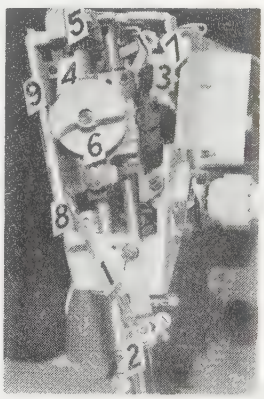
Figure 95-96



Figures 94, 95 and 96 illustrate motor components of series 400-500, & series 600. Basic motor service procedures will apply. Variations can be easily determined.

Figure 97

Figure 98



Figures 97 & 98 illustrate the series 640 face plate assembly with the suction-type needle threader(1) figure 98.

Figure 99

Figure 100

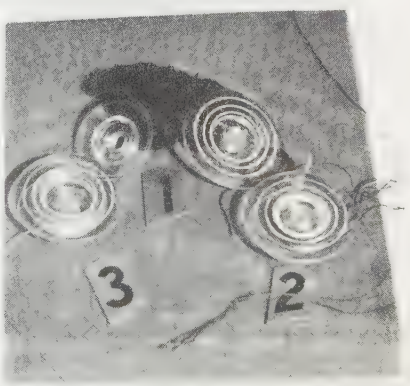
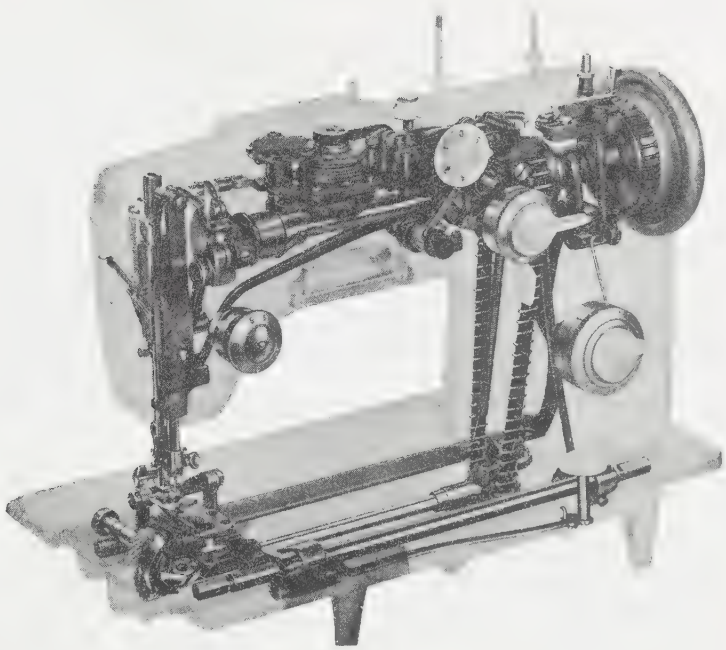
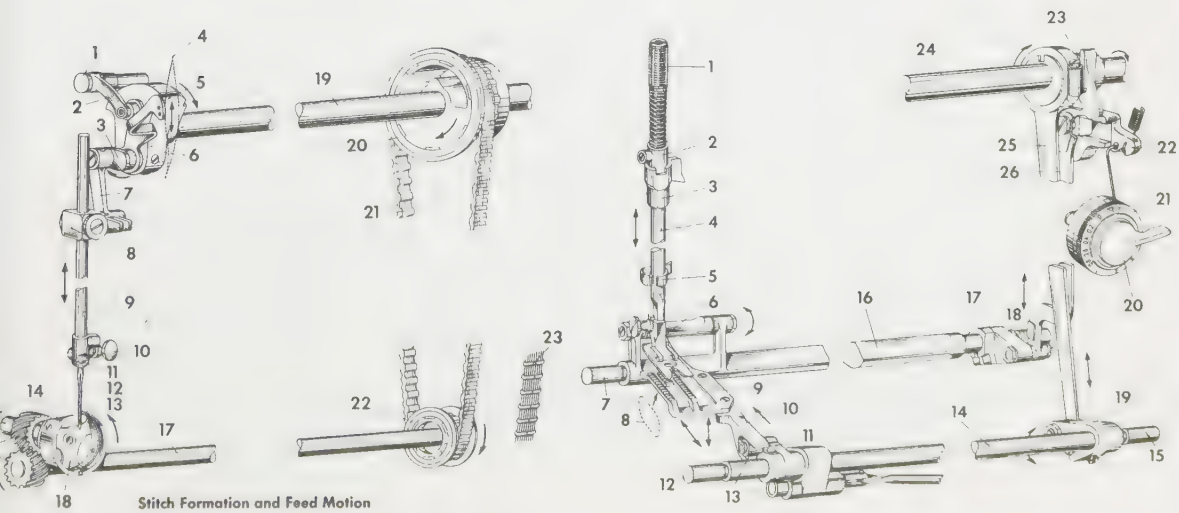


Figure 101



Skeleton of a Pfaff Automatic sewing machine.

Figure 102



Stitch Formation and Feed Motion

Nomenclature for Figure 102-Pfaff 230-360

1. Hinged stud from main cam.
2. Take-up arm link.
3. Connecting crank.
4. Take-up arm travel. (illustrated to show path).
5. Take-up arm.
6. Main cam. (Activates needle bar and take-up arm).
7. Connecting link to needle bar.
8. Needle bar stud.
9. Needle bar.
10. Needle clamp screw.
11. Needle clamp.
12. Needle.
13. Hook.
14. Hook thread guard.
15. Hook spindle.
16. Helical drive shaft gears. (Pfaff has a transverse hook).
17. Lower drive shaft.
18. Main hook body.
19. Main shaft.
20. Upper belt sprocket.
21. Drive belt.
22. Lower belt sprocket.

Nomenclature for feed mechanism(lower figure 102)

1. Regulator screw for presser bar.
2. Presser bar guide and adjustment block.
3. Presser bar lifter bracket.
4. Presser bar.
5. Thread cutter.
6. Presser foot.
7. Retainer stud, lower feed mechanism.
8. Indicates feed dog travel pattern.
9. Feed dog.
10. Feed fork.
11. Feed lifting assembly, including drop feed and adjusting screw.
12. Retainer stud, lower feed mechanism.
13. Roller.
14. Main feed lifting shaft.
15. 18. Retainer studs, lower feed mechanism.
16. Feed rock shaft.
17. Rock shaft crank assembly.
18. See above.
19. Feed lifting crank.
20. Stitch regulator(260-360) 130 assembly shown in future text.
21. Stitch length dial.
22. Feed regulator assembly.
23. Feed eccentric(attached to main shaft(24).
25. Feed lifting connection.(from main shaft to lower assembly).
26. Feed fork connection. (from stitch regulator to feed lifting shaft.

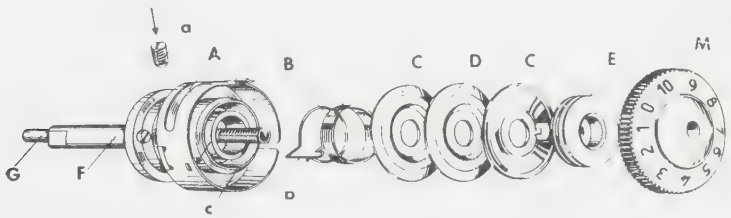
Upper tension.

A. Tension holder.
B. Check spring.
C. Tension discs(2).
D. Middle tension disc.
E. Tension spring.
F. Tension stud.
G. Tension release pin.
M. Numbered tension dial.

Sub-assembly for check spring.

a. Set screw for removing assembly from machine.
b. Check spring loop. (If broken or missing, replace).
c. Regulator. Adjust for changing throw of check spring.

Figure 103



Tension adjustment on the Pfaff is a relatively easy chore. The adjustment dial(M) is calibrated from 0 to 10, giving a wide variety of settings for the user.

It's wise to jot down the number where machine sews a proper stitch and keep it near the machine. If tension is changed for a special sewing chore, good tension can be restored by glancing at the number.

As a general rule, a tight stitch is used for straight sewing and a looser stitch for zig zag or fancy sewing.

The Pfaff, also true of most automatics, has a third tension disc for the double needle application. A seperate control is not required as one dial, controls both threads .

The tension is preset at 3 or 4 at the factory.

If the setting has been altered, proceed as follows.

1. Loosen face plate and upper cap assembly and remove. Loosen the set screw and remove tension assembly. Turn dial(M) until red indicator points to 0 on the dial.
   Pull a length of thread through discs(C-D) and turn stud(F) into dial (M) until a light tension is present. Hold dial firmly, replace stud and tighten set screw.
   Turn dial to 3 or 4. When properly set, the red indicator should point upward.
2. To replace a broken or bent check spring, follow same procedure for tension adjustment and remove assembly.
   Screw tension stud out of dial until other components can be removed.
   Replace broken spring and replace components in reverse order.
   Extreme caution must be exercised when slipping spring loop over the red indicator.

Tension adjustment illustrated.

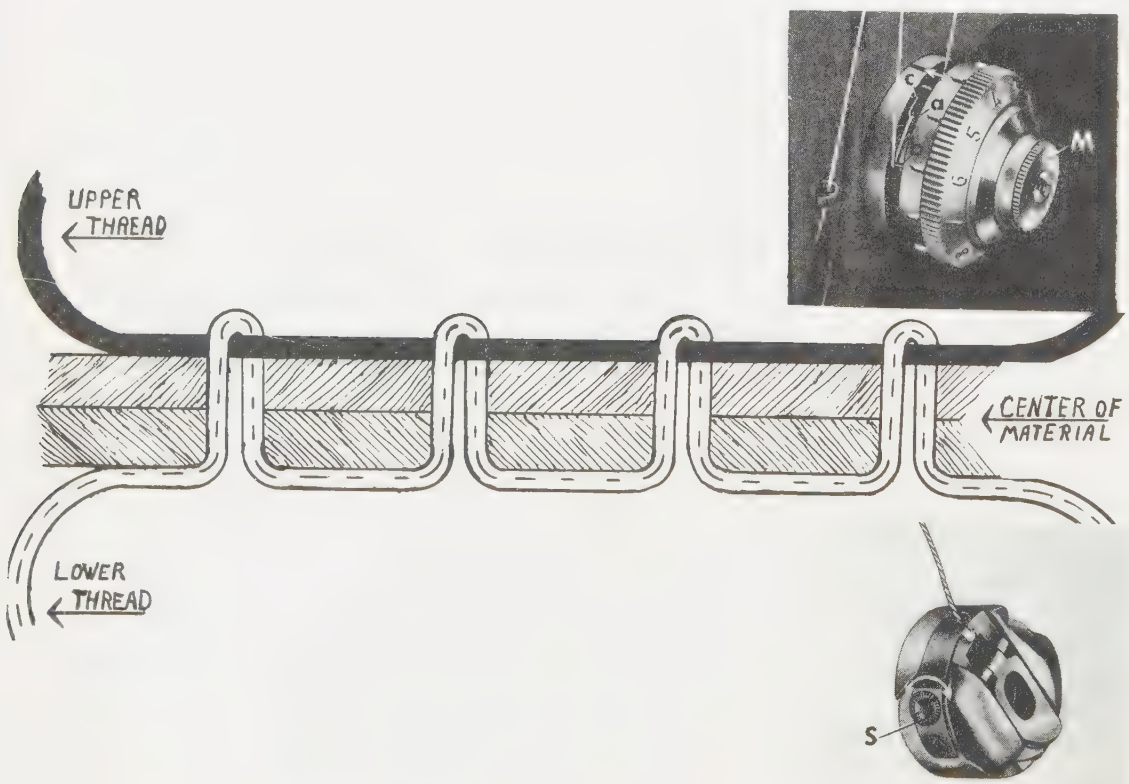
Probable cause:

1. Upper tension too tight.
2. Lower tension too loose.
3. Improper check spring setting.

Correction:

1. Turn dial to 3 or 4 setting, or reset tension per text page 99.
2. Tighten knurled screw on bobbin case, notch at a time until corrected.
3. Proper adjustment of check spring is present when spring releases thread as needle enters the cloth.
   For a weak spring(releases thread too soon), loosen small screw in slot by red indicator and turn regulator down.
   If spring is too tight, reverse the procedure.
   When properly adjusted, spring should fall sharply to spring rest.
   If check spring is broken or bent, replace it.

Figure 104



Lower tension.

Adjusting proper tension on the Pfaff 260-360 sewing machine is a departure from methods used on previous machines.

1. The above models feature a calibrated knurled screw instead of split screw used on other models.
   To adjust, turn clockwise for more lower tension, opposite for less.
   Tension should be tight enough to allow bobbin case to slide down the thread when held in position as in figure 105.

Adjustment screw(S) changes lower tension.
When bobbin case falls rapid, turn screw a notch, clockwise until corrected.
If jerking motion fails to move case, reverse adjustment until corrected.
Test sew.

Figure 105

Figure 106 illustrates stitch created when lower thread pulls upper through material.
If upper thread is too loose, tighten dial M as needed.
If lower tension is too tight, follow text above until corrected.
Test sew.

Figure 106

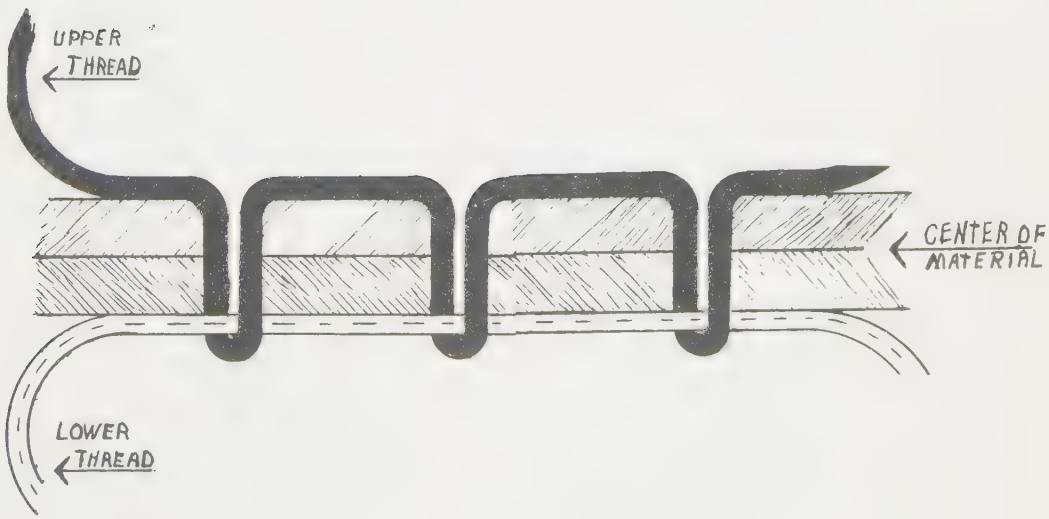
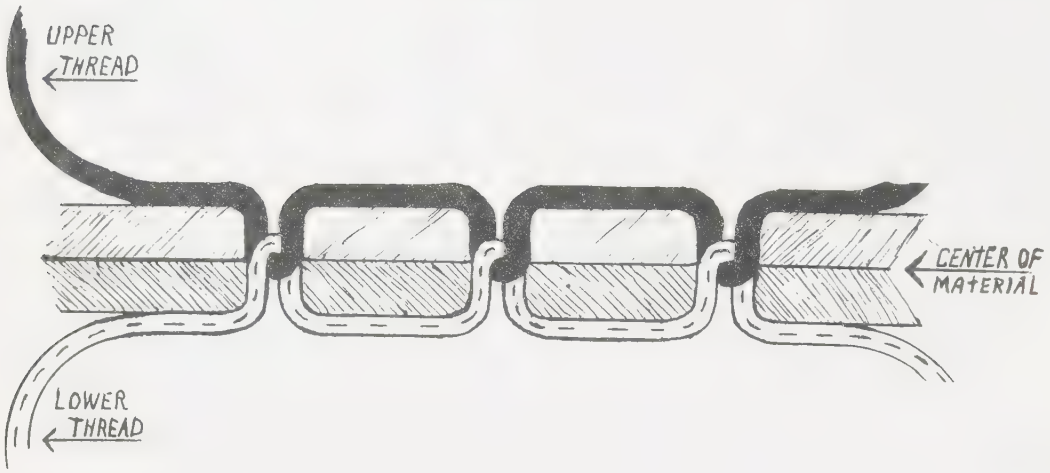


Figure 107 illustrates how the threads should appear after both tensions have been properly adjusted.

Dial M should be between 3 and 4 setting.

Bobbin case should drop slowly when thread test from figure 105 is made.

Figure 107



Tension adjustment on zig zag stitch should show a lock at the zig and zag of the seam.

Most zig zag machines require a slightly lighter tension for zig zag and decorative stitching. Straight stitch tension should remain normal.

Use a tighter tension for making buttonholes.

If several adjustments fail to produce a lock at the zig and zag of a seam, sew with a loose tension on top and one notch tighter on the bottom. The seams do vary slightly, even with a factory setting.

Double needle.

Pfaff machines have two tension disc tension assembly plus a third for double needle sewing.

The take-up arm is drilled for both threads.

A different needle clamp must be installed to accomodate two needles.

Remove the single clamp and attach double clamp to needle bar. See figure 108.

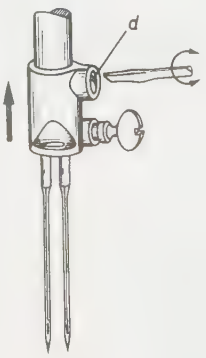
Tighten screw(d).

Presser foot and needle plate must be exchanged for one used with double needle.

Caution: Check zig zag dial. Can't use past a 2 setting.

If user complains that machine breaks double needles constantly, check this setting.

Figure 108



Hook assembly

Figure 109

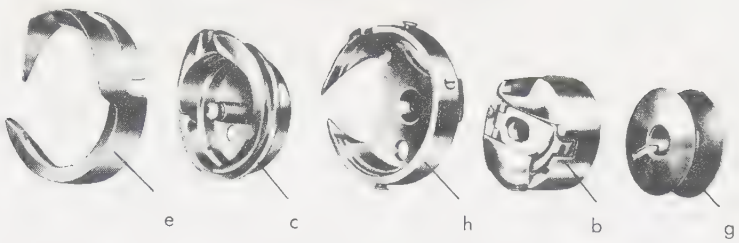


Figure 110

a = Position slot
b - Bobbin case base
c - Bobbin
d = Bobbin case latch
e = Bobbin case cap
f = Sewing hook
g = Hook point
h = Hook thread guard

The hook and bobbin case assembly are transverse. If the assembly is broken(point of hook, etc), or machine jumps time, adjust as follows.

1. Remove position finger, then remove hook, with caution.
2. Loosen set screw(a), and remove parts b, c, d & g(figure 111).
3. Check position of hook point.

Clearance between point of hook and needle should be .004".
Replace parts in reverse order from removal.
Tighten screw(a) and replace position finger.
Position finger should be exactly 1/32" from end of position slot.

Figure 111

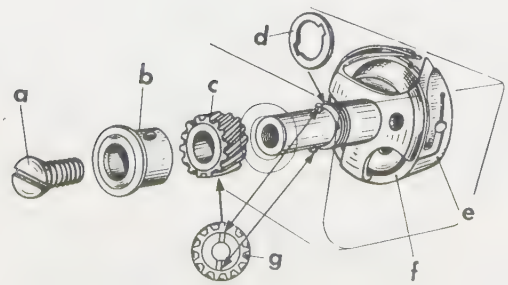
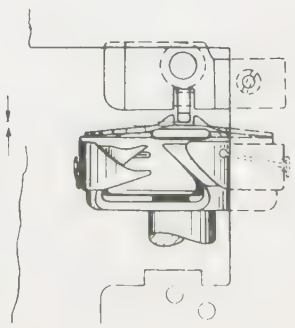


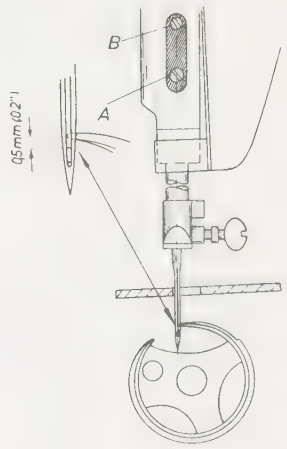
Figure 112



Timing the needle bar.

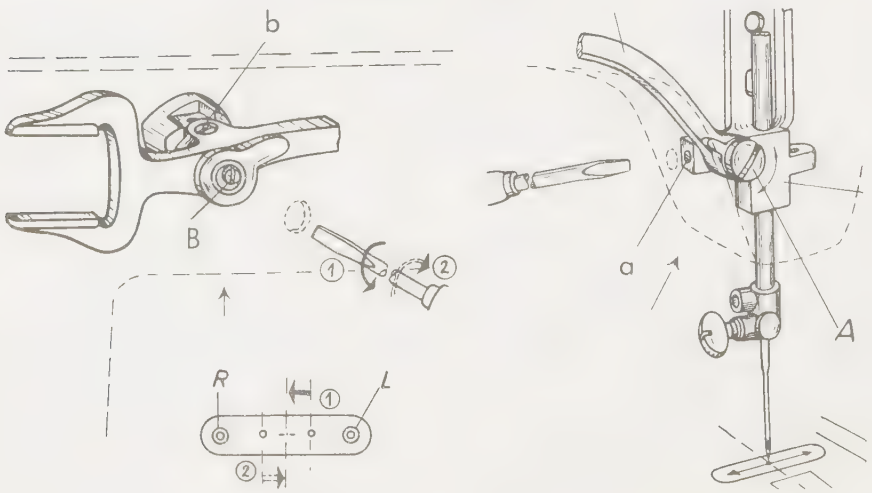
If the machine continues to skip stitches after the hook has been timed, the needle bar must be timed.

1. Set machine for widest zig zag stitch.
   Put position lever in center position.
   Remove face and needle plate.
   Turn balance wheel until needle is on down stroke.
2. Loosen screw(A) through opening in needle bar frame.
   Hold needle bar firmly so bar doesn't turn.
   Correct height: Point of hook should be .02" above top of the needle eye.
   Position needle bar and tighten set screw(A).
   Replace face cover and test sew.



3. For centering the needle throw in needle plate slot, set zig zag dial on 4. Place position lever in center notch.
   Turn balance wheel and observe needle descent. Needle should be the same distance from plate on right and left descent.
   To adjust, loosen set screw(a), figure 114, and turn eccentric correct direction to adjust.
4. Centering throw in relation to center line, requires zig zag dial on 0 and position lever(B) in center position.
   Place a business card under presser foot. Lower foot and turn the balance wheel until needle stitches it slightly.
   Turn zig zag dial to 4 and watch needle as you turn balance wheel. The two outer punctures should be equadistant from center puncture.

Figure 114



When finalizing the adjustment pertaining to needle bar adjustment, remember the needle must not make a sidewise motion while in the material.

With zig zag dial set on 4, the needle should stop swinging motion exactly 5/32" above needle plate.

Feed system.

Feed dog adjustment should be made if material isn't feeding properly.

Check drop feed lever. If it's set in "UP" position, tilt machine head back. Raise presser foot and turn balance wheel until feed dog rises to highest position.

Loosen set screw on front feed crank and move feed dog upward until the teeth are 1/32" above upper level of needle plate.

Tighten set screw, replace head in sewing position and test sew.

Feed dog adjustment in needle plate slot.

Correct position places feed dog in center of needle plate slots.

If situation resembles position 1, remove needle plate and loosen two feed dog screws.

Position properly, hold in place, and tighten screws.

If like position 3, replace needle plate, tilt head back and loosen both rock shaft studs.

Tap shaft with small hammer until feed dog is properly set.

Be sure flat spot on shaft face the screws.

Tighten and test.

Don't overadjust, rock shaft must have some end play.

If machine binds after you've made this adjustment, loosen screws and back off slightly.

If position 3 is extreme, adjustment must be made on the feed bar.

Loosen lock nuts(1, figure 116).

Turn screws(2) direction needed.

Tighten lock nuts and test sew.

Always allow a little end play so machine won't bind.

Lengthwise adjustment as in position 2, is made by setting length of stitch lever on longest setting.

Tilt head back. Loosen crank.

Turn crank until center feed row rises in needle plate without striking it.

Tighten screw. Turn the wheel.

Feed dog shouldn't strike plate.

If it does, adjust until corrected.

Figure 115

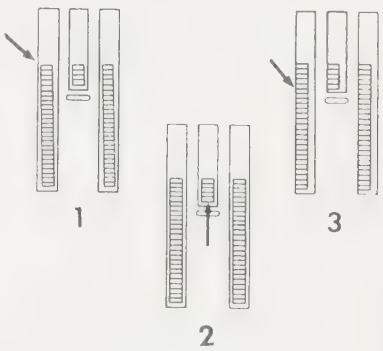


Figure 116

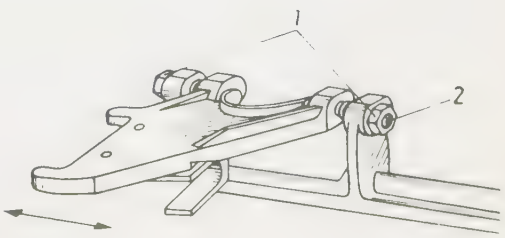
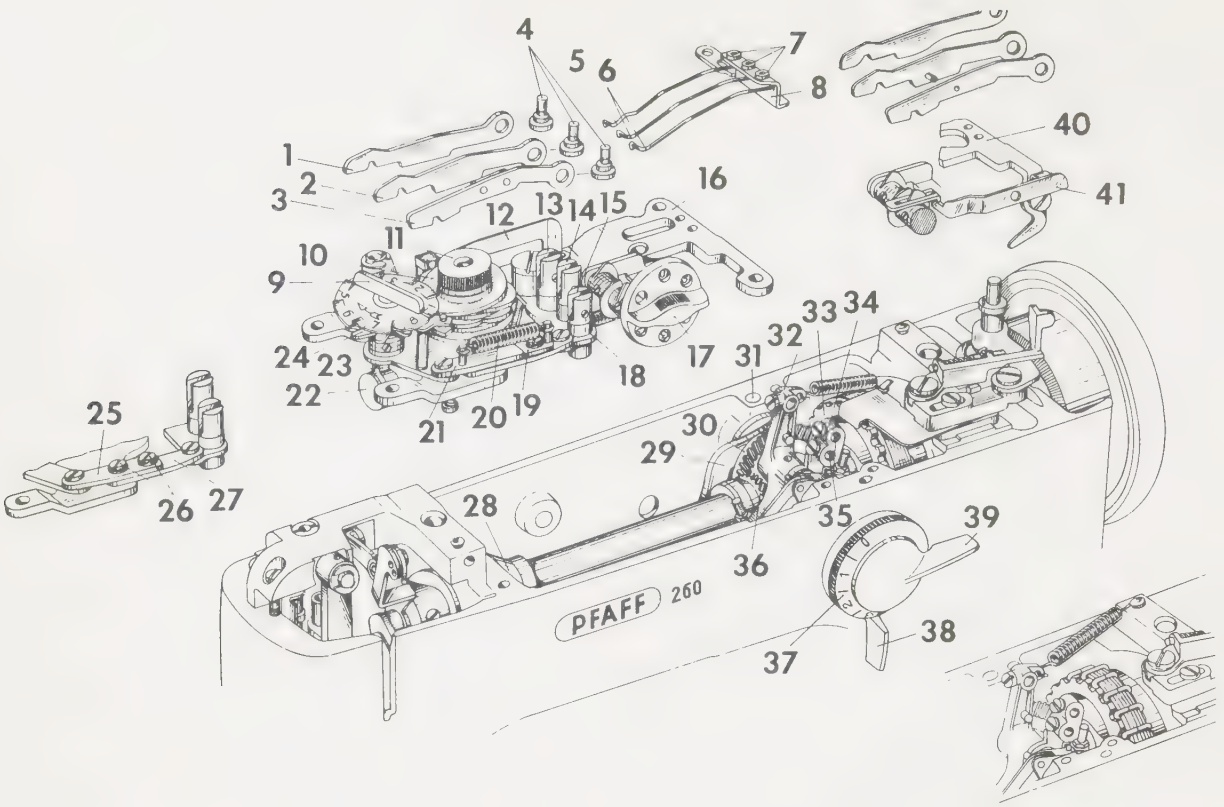


Figure 117



Essential Parts of the Pfaff (-261) Automatic

1 — Needle position engaging lever
2 — Needle vibration engaging lever, full width
3 — Needle vibration engaging lever, half the width
4 — Eccentric stud, rear / Eccentric stud, center / Eccentric stud, front
5 — Pressure spring, rear
6 — Pressure spring, center / Pressure spring, front
7 — Regulating screw
8 — Pressure spring assembly bracket
9 — Cam selector dial (D)
10 — Cam assembly
11 — Thumb nut
12 — Oil pad holder
13 — Clutch stud, rear
14 — Clutch stud, center
15 — Clutch stud, front
16 — Base (incorporated until Apr. 30, 1960)
17 — Engaging lever dial (C)
18 — Engaging lever driver
19 — Connection, front section (incorporated until Apr. 30, 1960)
21 — Connection, rear section (incorporated until Apr. 30, 1960)
22 — Driving roller
23 — Driving lever
24 — Contact finger assembly
25 — Connection, rear section (incorporated as from May 1, 1960)
26 — Screw
27 — Connection, front section (incorporated as from May 1, 1960)
28 — Driving eccentric for automatic mechanism
29 — Needle bar frame pitman
30 — Needle vibrating eccentric bevel gear
31 — Transverse shaft set screw
32 — Zigzag regulator arm
33 — Driving belt sprocket, upper
34 — Cam finger (upper end)
35 — Eccentric stud boreholes
36 — Arm shaft bevel gear
37 — Stitch width dial (A)
38 — Needle position lever (B)
39 — Zigzag finger-tip control (F)
40 — Base (incorporated as from May 1, 1960)

Feed eccentric.

To time the feed eccentric, remove the top plate and refer to page 97.
Both the eccentric(illustrated under number 23) and the main shaft(24), have a timing mark.
When the marks coincide, the machines feeding mechanism is in time.
If eccentric has moved on the shaft, loosen screw and return to within 5/64" of rear main bearing and tighten set screw.
When this occurs, the upper drive sprocket is generally out of place also. Loosen set screws and move toward eccentric.
Be sure position pin fits hole on eccentric. Tighten all screws and test.

Drop feed.

Drop feed lever is located at right end of machine bed.
When activated, the feed dog drops below needle plate level and material will not move.
Only adjustment required is when feed dog is set too high and continues feeding material after drop feed has been lowered.
Tilt machine head back and loosen set screw on feed lifting crank.
Raise feed manually to high point of 1/32" above needle plate. Tighten set screw and test.

Length of stitch regulator.

The stitch length regulator is calibrated for different lengths of stitch forward and two settings in reverse.
To sew in reverse, the operator pushes lever down. When finished, she releases lever and lever returns to original forward setting.
The regulator also contains a setting for fine short stitching used in decorative stitching.
To adjust, remove top cover and disconnect spring.
Tilt machine head back, loosen set screw and set control on 0.
Turn balance wheel by hand. Feed dog should rise and fall in place.
If feed dog moves, even slightly, back, adjust screw until corrected.
Make adjustments in small increments.
Tighten screw, connect the spring. Replace cover.
Don't over-adjust or machine will sew in reverse on a forward setting.

Presser bar.

The ideal setting for space between presser bar in up position and needle bar should be 1/4".
If setting is lower, it's difficult to insert material. If higher, full pressure of presser foot is not applied to material.
To adjust, remove face plate. Loosen set screw on guide collar.
With presser bar in "UP" position, set for proper clearance and tighten set screw.
Replace face plate and test sew.
Caution: Don't allow presser bar position to change during adjustment. Before tightening set screw, lower presser bar and check relation of foot to needle hole and feed dog.
Place zig zag control on 4 and turn balance wheel. If needle clears, tighten set screw.
For regular sewing, regulating cap should be flush with top of casting.
For lighter material, turn out a couple of turns. For heavier fabric cap must be turned down a couple of turns.

Bobbin winder.

The bobbin winder is built-in with only the winder spindle protruding.
If the bobbin winds unevenly, adjust as follows:
If thread piles up on top end, move stem to right. If thread piles up on the lower end, reverse procedure.
When rubber ring wears and winder doesn't activate, loosen set screw.
Move winder toward balance wheel until rubber ring touches. Tighten the screw, test. If ring rides too hard on balance wheel, reverse procedure.
If rubber ring shows sign of wear, replace it.

Balance wheel.

The Pfaff balance wheel has a groove on outer rim of wheel.
On machines with exterior motor, belt fits in groove and drives machine.
On machines with built-in motor, belt fits over sprocket in head.
Figure 118 illustrates breakdown of balance wheel and clutch assembly.

Figure 118

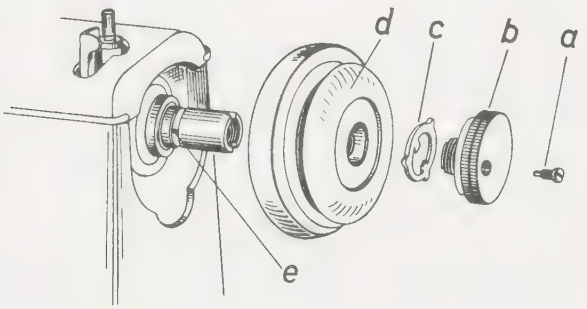


Figure 119

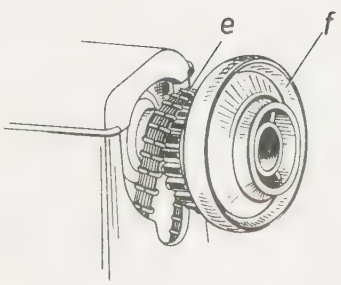
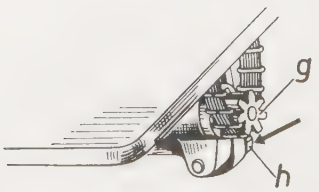


Figure 120



Zig zag sewing.

Zig zag stitching is performed when a machine is equipped with a swing-needle bar instead of the rigid bar found on straight sewing machines.

In addition to sewing straight, the needle bar moves sidewise.

Some of the adjustments have been covered by previous text. This text will cover principle and delve deeper into correction procedure.

To swing sidewise, the needle bar is attached to a frame which is pinned to the upper portion of face assembly.

A connecting bar moves needle bar when control F, fig. 121 is activated.

The stitch width control lever determines amount of sidewise motion.

Maximum width differs with various manufacturers.

The Pfaff is 3/16". Control in the figure 121 is for model 260-360.

Pfaff 130 is covered in later text.

Needle position lever(B) differs a little from machine to machine. The dial shown in figure 122 is for Pfaff 230.

Figure 124 shows result of needle position change and stitch change in each position.

When the dial A is on 0 and dial B on 2, the machine is a straight sew.

Move dial B to 1 or 3 and machine still sews straight, but from a different needle position.

Move lever F and zig zag is activated.

Set dial A on any number past 0 and machine sews a zig zag stitch.

Bigger number makes wider zig zag.

Figure 121

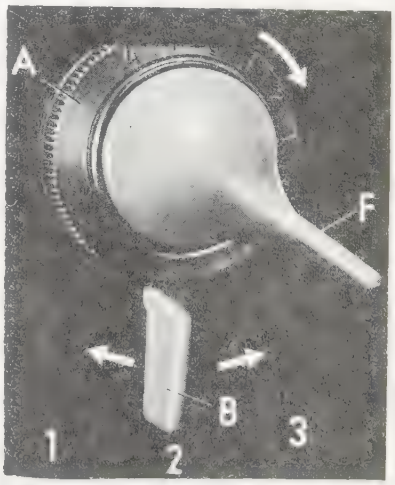


Figure 122

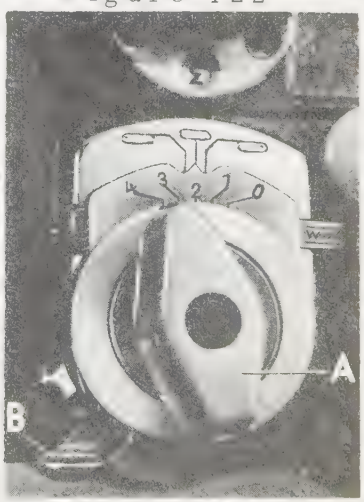
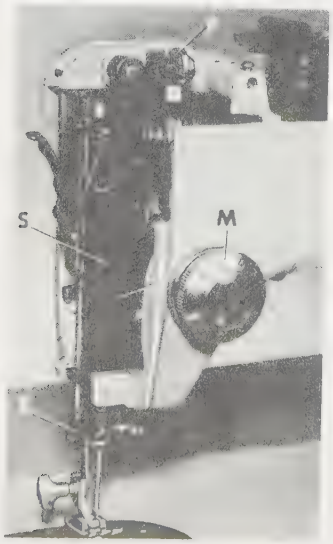
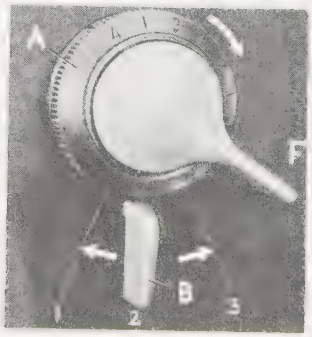


Figure 123
Left





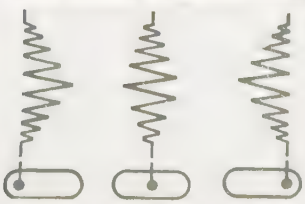


Figure 124
Right

There are many differences between the manual and automatic zig zag but the most prominent is the method of producing decorative stitches.

On the manual zig zag, the operator must move the individual control to create various different designs.

On the automatic, a mechanism is built in the machine which operates all controls automatically.

Figure 125 shows the mechanical principle of the automatic with built-in cam mechanism. The finger(2) rides cam(3) and activates connecting lever, which transmits throw of cam to regulator stud(5). The connecting link in slot of stud, transmits change to needle bar, which in turn makes the design.

Figure 125

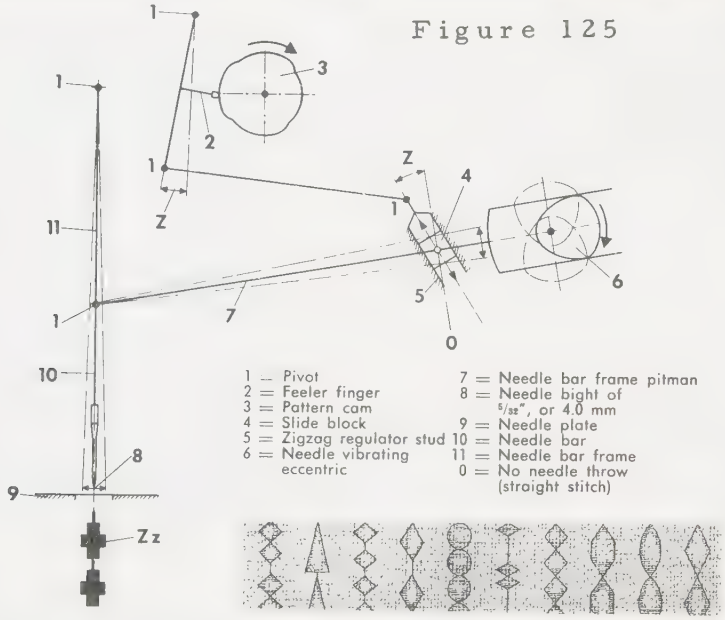
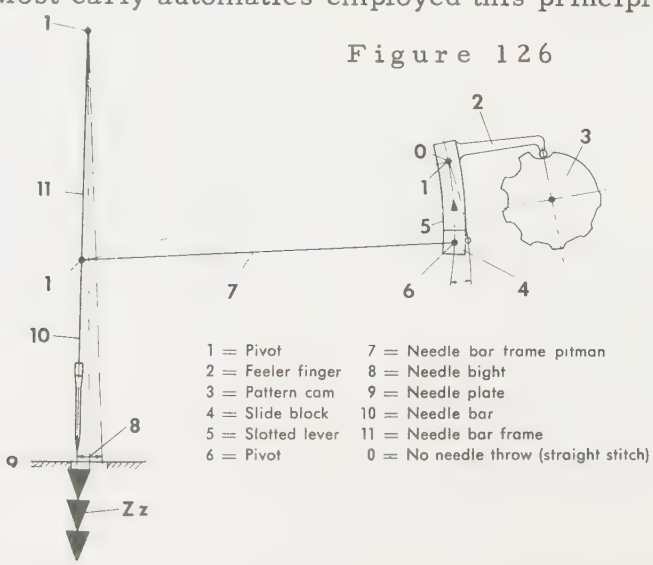


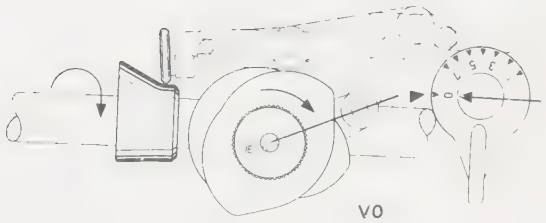
Figure 126 illustrates mechanical principal of automatic with drop-in cam. The cam is changed each time a different design is desired. The basic difference is that both needle bar regulator and needle bar frame operate directly from pattern cam. Finger 2 is part of regulator and as finger traces the pattern over cam, it transmits motion directly to needle bar frame(11), via connecting link 7. Most early automatics employed this principle.

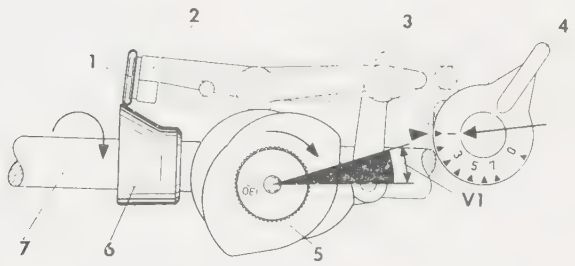
Figure 126

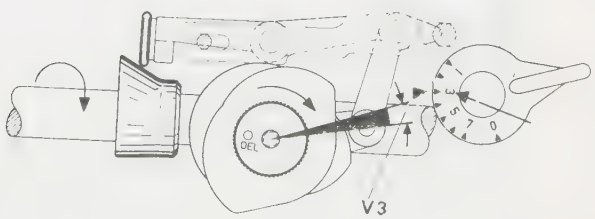


Driving eccentric system-Pfaff 260-360 machine

Figure 127







Zig zag and regulator mechanism for Pfaff 260-360.

Figure 128

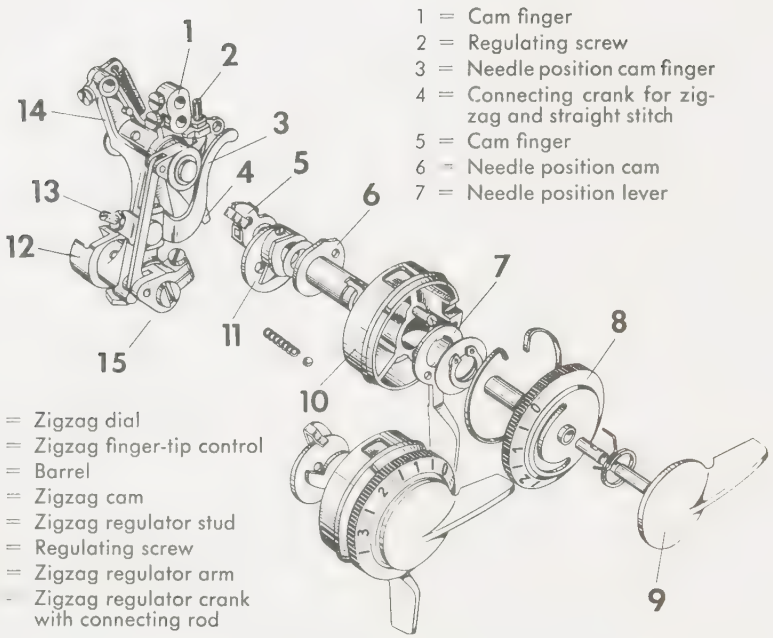
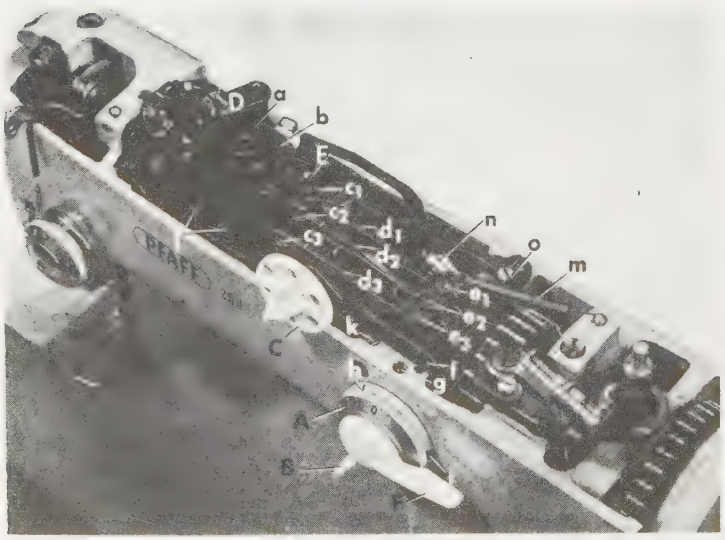


Figure 129



Principle and operation of Automatic Pfaff.

As mentioned earlier, the Pfaff utilizes the indirect mechanism control. The big advantage is versatility since needle position and stitch width can be varied at the same time or individually.

All patterns can be sewn in different lengths without altering the stitch density.

The motion begans as a result of eccentric motion from cam on the main shaft. The cam also acts as a collar to hold zig zag mechanism in place.

Roller cam is held against eccentric by a spring attached to the driving lever sidewise a set distance.

Sidewise motion determines cam assembly speed.

Regulating control varies the number of stitches per revolution. When set at 0, the drive roller comes back from eccentric to idle position, thus disengaging the automatic mechanism.

If end play is present in main shaft or automatic drive mechanism, the adjustment is made at the eccentric cam.

Figure 130, opposite, illustrates proper adjustment.

Loosen set screw and move cam toward front main bearing and needle bar crank from the front.

Leave enough room for oil to seep between.

Make sure main shaft doesn't bind when the set screw is tightened.

Caution: Never tap a balance wheel to loosen binding main shaft.

Bearings may be jarred loose and irreparable damage result.

At one point or another, every single moving part emanates from main shaft.

Exercise caution when adjusting.

When final adjustment is made on main shaft, a slight clearance must be preserved between balance wheel and rear main bearing.

Figure 130

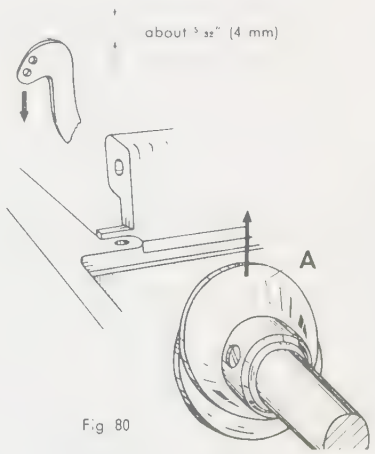


Fig 80

Before replacing top cover, oil all working parts.

Run machine slowly, observe parts in motion.

Engage the levers and notice their reaction as machine runs.

If all parts move smoothly and the machine operates properly, tighten all screws.

Button down the top cover.

Any machine that operates on the same principle as the Pfaff can be adjusted from this text.

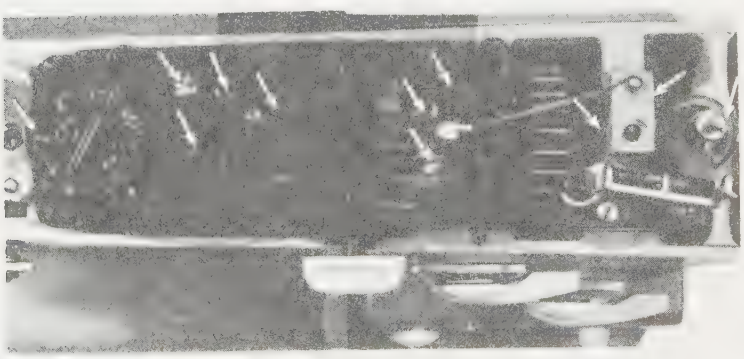
The zig zag regulator mechanism on the Pfaff 260/360 is a unitized body, as is the automatic mechanism.

To remove automatic mechanism, proceed as follows.

1. Disconnect tension screw from regulating arm and unscrew pressure spring assembly 0.
   Remove screws from base and loft mechanism out. Don't force it. If it hangs up, recheck procedure until error is discovered.
   Dial A is on 4, loosen set screws holding the three engaging lever eccentrics.
   Remove stud from rear lever(d-1).
   Reset dial A to 0, to remove levers(d-2 and d-3).
2. Replace in reverse order.

3. To remove regulator mechanism, turn dial A to 0.
   Set needle position lever in center slot and loosen set screw directly above it.
   Remove top plate.
   Push control lever F up. Move stitch width regulator to a left position while turning mechanism barrel slightly to the right.
   Ease the barrel out of hole without force.
4. To replace, reverse the procedure. To reset properly, make slight mark where red mark appears on regular barrel.
   Notch the head slightly, it saves a lot of guesswork.
5. Needle position B should point down from central position, when set properly.
   The lobe of eccentric stud(B) should point toward the balance wheel, and needle bar pitman should be in extreme right position.
   The lobe of eccentric cam(A) in needle bar frame will point upward.
   Diagrams referred to are figures 128 and 129 on page 112.

Figure 131



Checking the automatic mechanism.

After replacing mechanism, machine can be tested on several patterns.

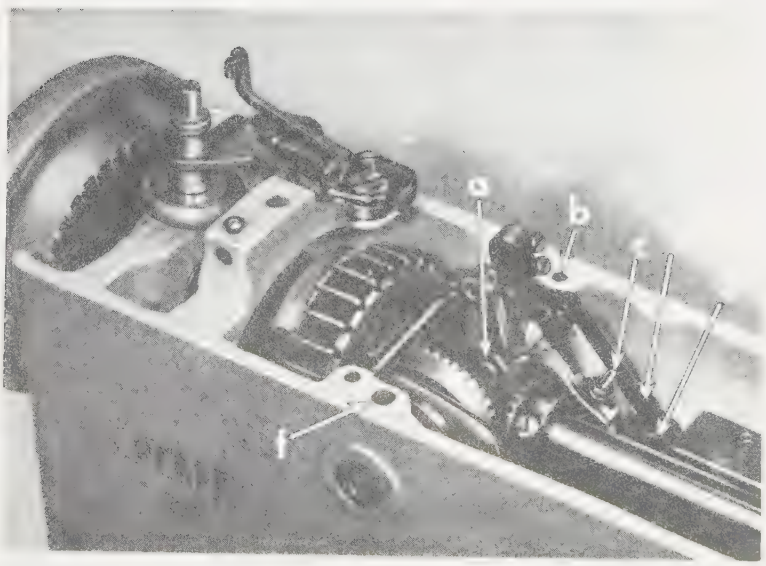
1. Use setting D3-C2-B left-E1
2. Use setting D7-C3-B left-E1
3. Use setting D4-C5-B left-E1

Remove top, run machine slowly and observe mechanism.
When width changes from 0 to 4 and back again, there shouldn't be a bind.
Top thread shouldn't break.
Replace top cover and test sew.

Oiling the machine.

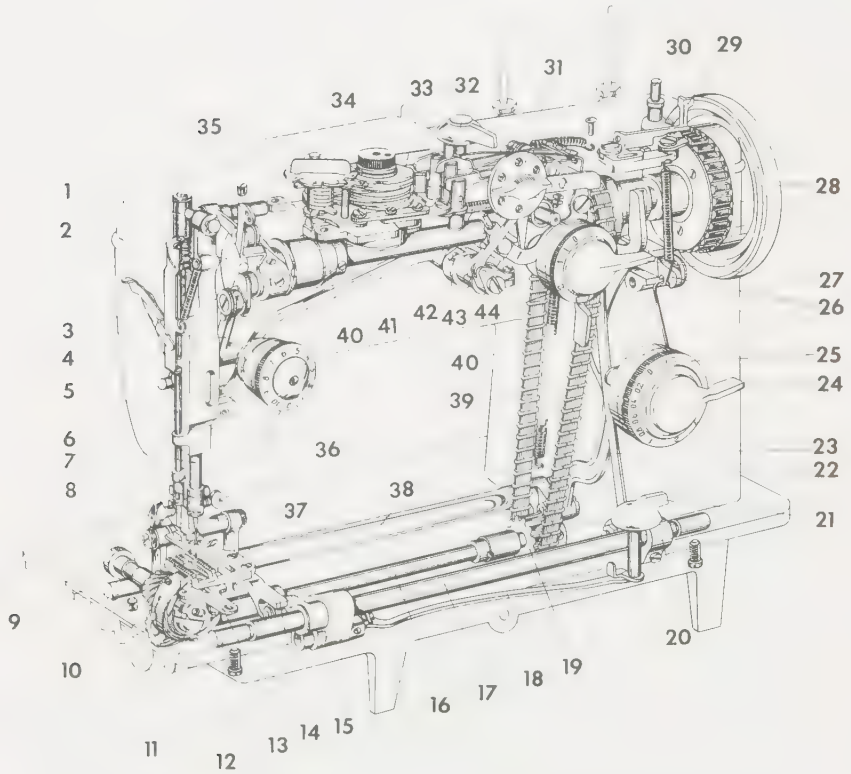
When servicing the Pfaff, or any machine, oil thoroughly.
If user, lubricate your machine at least once a month.

Figure 132



Skeleton of the Pfaff automatic illustrating mechanism.

1 = Pressure regulating screw
2 = Needle bar crank (driving needle bar and take-up mechanisms)
3 = Needle bar connecting link
4 = Needle bar frame
5 = Threader bar
6 = Needle bar
7 = Needle holder
8 = Presser foot
9 = Hook shaft with helical gear
10 = Hook drive shaft helical gear
11 = Hook with bobbin case
12 = Center for shafts 17 and 38
13 = Bobbin case position finger
14 = Feed bar
15 = Feed lifting shaft crank, front
16 = Hook drive shaft
17 = Feed lifting shaft



18 = Drop feed connecting rod
19 = Driving belt sprocket, lower
20 = Feed lifting shaft crank, rear
21 = Drop feed knob
22 = Feed lifting connection
23 = Feed forked connection
24 = Reverse feed control H
25 = Stitch length dial G
26 = Feed regulator
27 = Zigzag finger-tip control F
28 = Balance wheel
29 = Bobbin winder thumb lever
30 = Bobbin winder spindle
31 = Engaging lever dial C
32 = Pattern length lever E
33 = Cam assembly
34 = Cam selector dial D
35 = Take-up lever
36 = Tension dial M
37 = Feed dog
38 = Feed rock shaft
39 = Driving belt (cord)
40 = Driving eccentric for automatic embroidery mechanism
41 = Needle bar frame pitman
42 = Arm shaft
43 = Zigzag regulator stud
44 = Stitch width dial A
45 = Needle position lever B

Pfaff 130.

Although the Pfaff 130 is not an automatic, it will be covered here due to similarity in design and operation.

Most adjustments have been covered.

The service procedure in following text is unique to the 130 alone.

Upper tension and check spring adjustment.

The tension dial on a Pfaff 130 is not calibrated.

To adjust, turn clockwise for more upper tension, counterclockwise for less.

The components are basically the same as previous models covered.

Check spring adjustment on the Pfaff 130 can be made without removing, or disassembling the tension assembly.

Lever(figure 134) can be changed to compensate for different materials.

Position A, or up, is for fine material and embroidery work.

Position B, or center, is for regular sewing, especially straight stitch.

Position C, or down, is for heavy sewing.

The check spring tension is increased as lever is depressed.

So much for the school of thought that check spring doesn't effect tension and vice versa.

Lower tension and hook assembly.

Adjusting tension on the 130 bobbin case is similiar to machines already covered.

For more lower tension, turn screw(A), figure 135, clockwise as needed to correct.

For less lower tension, turn screw counterclockwise as needed.

If case tension spring is thread cut, loosen screw(A) and replace.

If lower thread breaks constantly, probable causes are:

1. Lower tension too tight. Loosen as needed to correct.
2. Dirt or lint in case. Clean as needed.
3. Bobbin bent or scarred. Throw it away, replace with new one.
4. Case incorrectly threaded. See figure 135.
5. Case inserted wrong. Hold latch until case is on spindle.
6. Bent bobbin case. Replace with a new one.

Figure 134

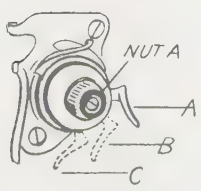
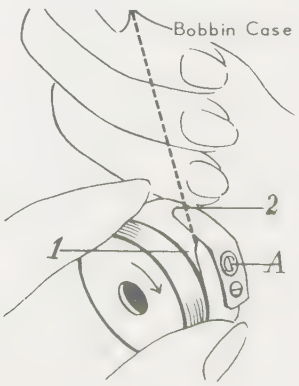


Figure 135

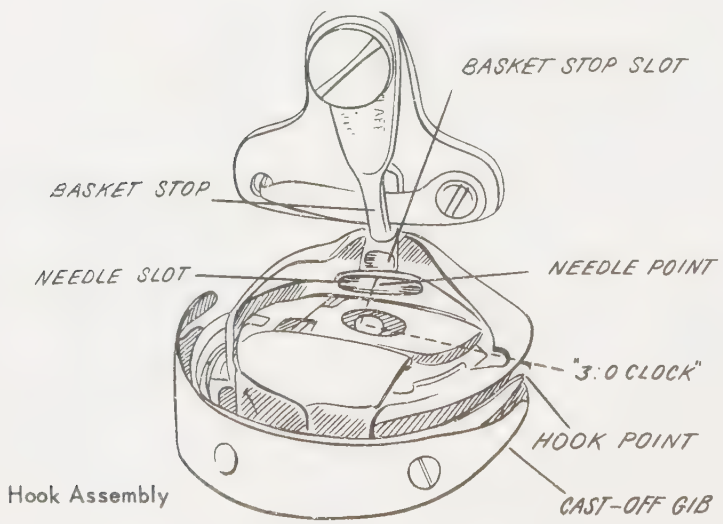


To time the hook with needle bar, set needle bar position in slot 2.
Set zig zag control on 0.
Turn balance wheel until needle barely shows on downstroke, figure 136.
Hook point should point at 3 o'clock, if not, adjust as follows.
If hook point is above mark, loosen three screws and turn down.
If hook point is below mark, timing is slow and must be moved up.
Tighten set screws and test sew.
Clearance between needle should remain at .004.
When tightening the three screws on hook, be sure of tolerance.

Disassembling the hook.

Remove holder finger(basket stop).
Loosen three screws on cast-off gib.
Turn balance wheel until cutter edge comes into open area.
Lift out bobbin case holder.
Loosen three screws holding hook and remove.
If hook point is broken, replace. Don't attempt rebuilding it.
If numerous needle strikes show on outer shield, retime machine.
Re-assemble in reverse order.
Be sure timing and needle point/hook tolerance are accurate.
Allow enough space between holder finger and bobbin case holder for the large size thread to slip by without hanging up.
If hook shaft binds, adjust as follows:
Tap end of shaft until free play is present.
Turn balance wheel several times(with hook removed) until running free.
Tighten both screws on set-ring.
Grease gear box frequently. Use a high viscosity grease or vasoline.

Figure 136



Hook Assembly

Needle bar adjustment.

To time the needle bar for proper height, set position lever in center.
Set zig zag control on 0.
Turn balance wheel until needle is at lowest point.
Recheck needle position in needle clamp, or insert a new needle.
Clearance should be 1/8" above bobbin case opening.
Insert screwdriver through needle bar frame(figure 137) and loosen the set screw on needle bar clamp and set to correct height.
After making sure needle bar is properly aligned, tighten set screw.
To adjust needle bar for proper zig zag motion, turn dial to 4.
Turn balance wheel until needle bar descends on right and left side of needle plate.
Check clearance between needle and needle slot on each side.
If incorrect, loosen set screw in needle bar frame.
Turn eccentric cam pin proper direction until clearance is equal.
Tighten the set screw.(screw is accessible through hole in rear cast.

Timing the zig zag.

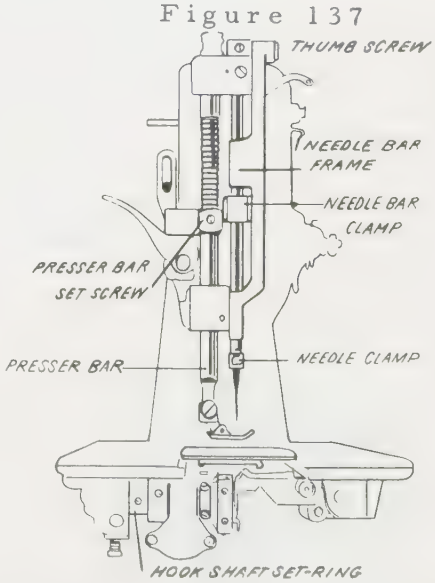
Turn zig zag dial to 4.
Turn balance wheel and observe needle bar descent and upper cycle.
If bar doesn't cycle at upper-most position, adjust as follows:

1. Remove arm plate.
2. Loosen two set screws on eccentric bearing ring. Remove ring.
3. Move gears until grooves are aligned.
4. Mark on eccentric gear should be at 3 o'clock.
5. Move gears apart, turn balance wheen until marks coincide.
6. Re-engage gears, replace bearing set ring with oil hole up.
7. Tighten all set screws, replace arm plate.
8. Check and test sew.

Adjusting height of presser bar.

Remove face plate.
Raise presser bar.
-Proper clearance is 1/4" between presser foot and needle plate.
Loosen presser bar set screw.
Adjust to proper height.
Be sure needle clamp doesn't hit.
Tighten set screw.
Hold presser bar firmly. If not aligned, needle may strike foot.
To adjust pressure on cloth, adjust bar pressure screw.
For more pressure, turn down.
For less, turn up.
On models with patcho, push button as needed.
If tension doesn't release when the lifter is raised, bend release lever.
If problem is in tension, remove.
Check pin and release washer.
If tension remains released when lever is down, bend lever back.

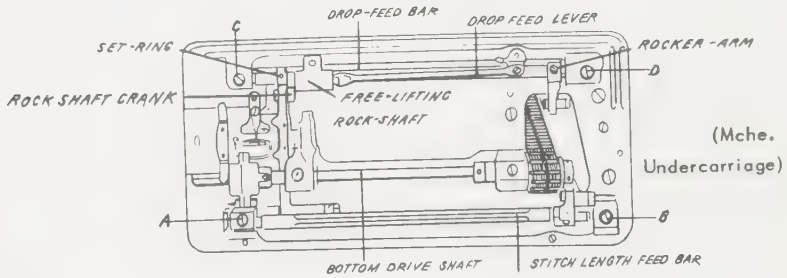
Figure 137



Adjusting the feed dog.

Turn balance wheel until feed dog is at highest point.
Proper height is 1/32" above level of needle plate.
If adjustment needed, loosen set screw on rocker arm of feed bar.
Turn feed bar until teeth appear at proper height above needle plate.
Tighten set screw and test.

Figure 138



To adjust proper length of stitch, set stitch regulator on 0.
Loosen screws on stitch regulator fork clamp.
Move feed dog manually until centered in needle plate slots.
Tighten screws and test sew. Feed dog should rise and fall in place.
To time feed motion, set stitch regulator on 0.
Loosen both set screws on the feed cam.
Hold cam firmly and turn balance wheel toward you.
When the needle bar and feed dog are both at highest point, tighten screw.

Adjusting zig zag control.

Place position lever in slot 2.
Turn zig zag control dial to 0, and hold firmly in place.
Loosen pointer set screw.(screw G).
Run machine at a medium speed.
Insert screwdriver in slot of control dial. Loosen set screw.(a).
Turn right or left and observe needle path.
When needle moves straight up and down, tighten set screw.
If control dial is too loose and won't hold a setting, adjust as follows.

1. Loosen set screw and adjust. Hold firmly in place and tighten.
2. Remove face plate and loosen set screw on needle bar frame.
3. Tap upper needle bar frame gently and align as needed.
4. Tighten set screw, replace face plate and check.

If complete dial is too tight and moves hard, loosen set screw slightly.

Figure 139

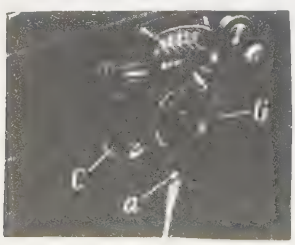
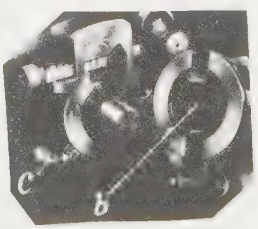


Figure 140



The Viking Automatic.

The Viking is manufactured by Husqvarna Corporation in Sweden. Famous throughout the World for excellent gun works, their sewing machine is one of the finest on the market.

The Viking 21 through latest model 6000 series is a free arm automatic portable which converts to a flat bed by using an adaptable plate.

The model 21 is a cam stack automatic with each stack containing five different designs.

Later model utilizes what the company calls its "Colorcode" system. To choose decorative design user wishes, she merely checks color, then uses that color cam.

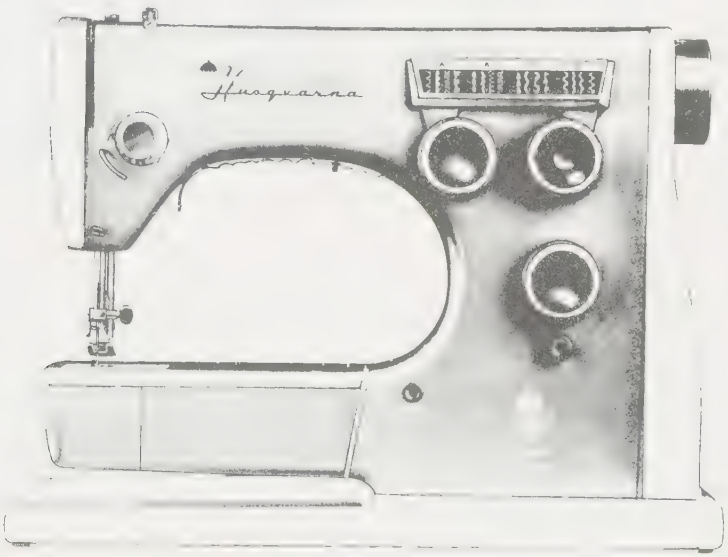
The service and repair guide will cover (with minor differences) model 20, 2000, 6000, 19, 8E, modified 21's and flat bed 51 machines.

Where necessary the Viking 33 and straight 12 will be alluded to.

The model 12 is a class 15 machine with link take-up. Refer to Chap. 2.

The Viking 33 closely resembles the Pfaff, both in operation and service and can be repaired from text earlier in this chapter.

Figure 141



The tension assembly, as on most modern machines, is unitized.

After the face plate has been opened, loosen set screw and entire assembly may be removed.

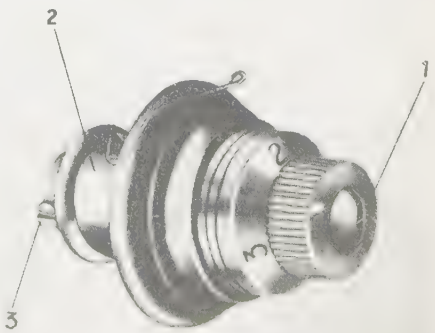
Figure 142 shows older unit that was used on model 20, 21 and 51.

Regulating dial is numbered from 1 to 3 and corresponds with a series of rings around adjusting nut.

Adjustment is quite simple. When bobbin case tension is set, turn knob inward until second line matches the disc guard. This is proper tension for regular sewing. For loose top tension turn out to line 3.

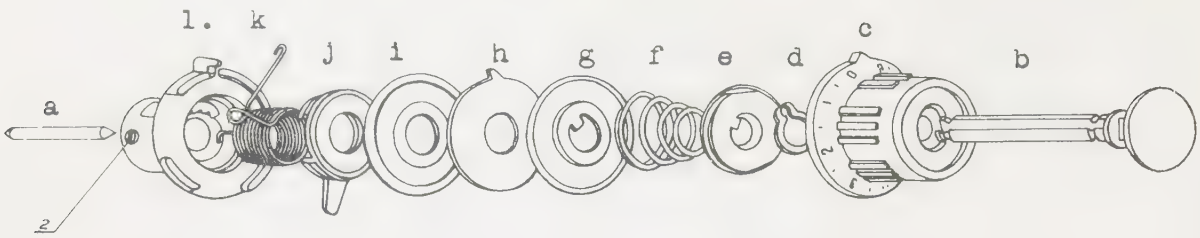
Tension assembly

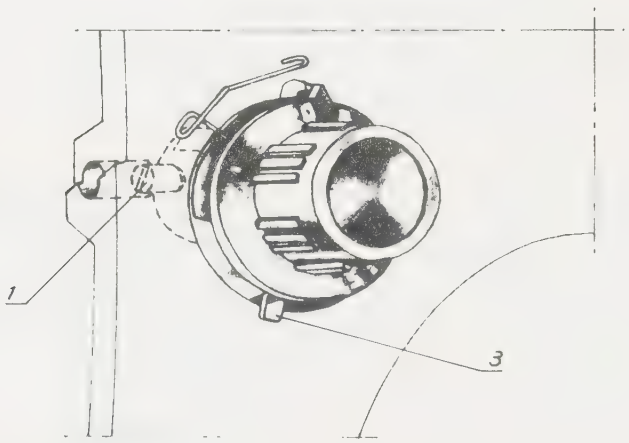
Figure 142



Tension assembly-later model Viking free arm.

Figure 143





To remove for adjustment, loosen screw(1) and pull out.
Remove thread release pin(a)
Loosen set screw(2) on barrel, and pull out stud and control knob.
Slip out discs(g-h-i) and turn stud to right until nut is loose.

1. If tension discs are thread cut, replace them.
2. Broken or badly bent check spring must be replaced.(page 123).
3. If tension doesn't release properly, check release pin(a). If too short, replace it, but be sure tension assembly is against machine head when set screw is tightened.

To re-assemble, reverse procedure.
Check spring is in center position when adjusting ring(j) is against it.
Adjusting handle(3) must be down.
Hold tension stud(b) and replace control knob(c), in place.
Lock washer(d), tension spring holder and spring(e and f), are next.
Tension discs go together with embossed side away from each other.
Center disc goes on with finger pointing up and toward the machine.
Finger should be opposite 0 on adjusting dial.
Entire assembly fits into check spring and then into the barrel.
Tighten screw(2) and replace assembly in head of machine.
Place assembly in position shown in figure 143 and tighten screw(1).
Test sew and adjust tension as needed.
For more upper tension, turn dial clockwise as needed.
For less upper tension, turn dial counterclockwise.
Always make tension adjustment in small increments.
For zig zag stitching, loosen top tension slightly.

Check Spring adjustment, old style.

To adjust the check spring on a model 20, 21 or 51, loosen set screw(1), and remove tension assembly.

Test sew to determine which adjustment is required. If check spring doesn't release thread as needle enters the cloth, spring is out of adjustment.

1. When check spring releases the thread too soon, turn tension stud, counterclockwise, 1/4" turn, or as needed.
   Tighten set screw, replace tension barrel in machine and test sew.
2. If check spring holds thread until it's in material, reverse the procedure. Turn tension stud clockwise as needed.
   Replace tension barrel and test sew.

Figure 144

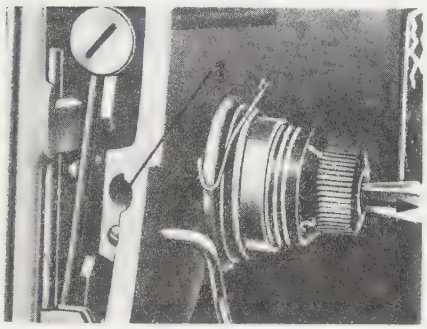
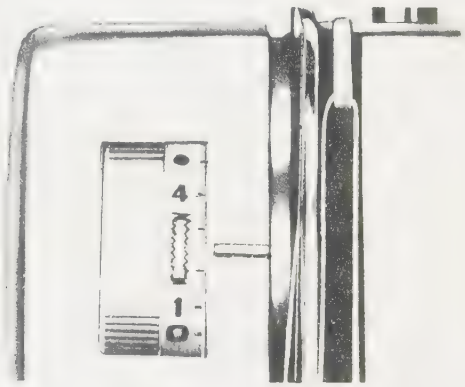


Figure 145



Check spring adjustment, new style.

Check spring adjustment on the new style Viking has been greatly simplified. Unless the machine is several years old, or the machine has been a bent check spring, the proper position may be attained by placing adjusting lever(j), figure 143, in center position.

As machine wears with age, advance lever clockwise to compensate for wear.

If machine has too much throw, retard lever a notch, or as needed.

When making a tension or check spring adjustment, always tighten screws securely and be sure tension barrel is flush against machine head.

Never force a screw, if it's balky, pour a drop or two of penetrating oil in general area and let it soak.

Tension adjustment on series 6000.

The tension assembly on 6000 series is enclosed and represents a novel advancement in the sewing machine industry.

Adjustment dial is knurled and protrudes toward operator.

Graduation is from 0 to 10, with a special mark for regular sewing, and a special setting for buttonhole work. (Buttonhole stitch must be somewhat tighter than regular sewing). See figure 145.

Except for regulating knob, the tension is internal and accessible through face plate door.

Lower tension.

The lower tension should be adjusted to make a good lock stitch with very little tension.

To remove bobbin case, lower front access door and remove toward you.

1. If upper tension is properly adjusted and thread pulls through cloth, loosen bobbin thread. Turn screw(2) counterclockwise as needed.
2. If lower thread is pulled up through material, opposite is true. Turn screw(2) clockwise, 1/4 turn or as needed.
3. If neither of first two adjustments remedy situation, remove spring.
   If tension spring is thread cut, replace it.
   If lint and dust have accumulated under spring, clean it.
   Check case for damage. If bent or scarred, replace it.
   If bobbin case keeps falling out and distorting tension, replace latch.
   a. Check spring latch and hook spindle.
      If dust or lint have gathered in latch, it may not hold.
      Check hook spindle for bits of thread, remove at once.
      Bobbin case must be latched securely to insure good tension.
      Check area for needle strikes. Smooth with emery cloth.

   b. Check the bobbin for needle strikes.
      If bobbin is needle scarred, destroy it and replace with new one.
      Thread passes over bobbin on every stitch.
   c. Oil hook spindle before test sewing.

Replace the bobbin case.

Thread machine and test sew while observing through opened door.

If threads pass smoothly and lock properly in material, adjustment completed and corrected.

Figure 146

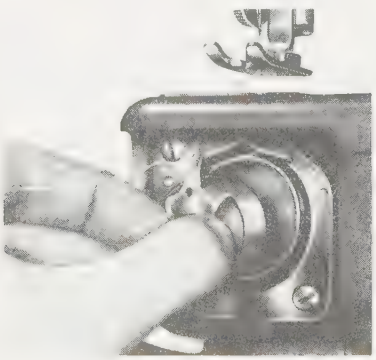
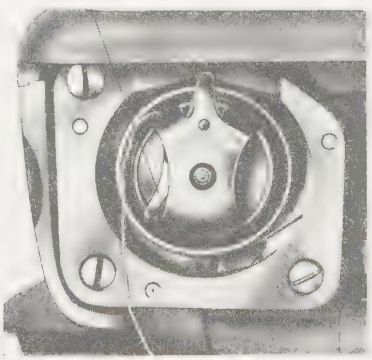


Figure 147



Timing and adjusting the hook.

When the sewing machine breaks needles, the first place to check is the needle plate. Many operators still have a habit of pulling material even though machines all have elaborate feed systems.

If this is the case, advise the user to let machine do the work, and go on about your business. If not, remove the needle plate and check lower sewing mechanism.

Check sewing hook.

If there are needle strikes on or near the sewing hook, remove hook and smooth area with emery cloth. See figure 152 for procedure.

Needle strikes on hook or immediate area indicate the machine is out of time.

If the machine skips stitches or doesn't bring up the lower thread, it's probably out of time.

Before making the final analysis, replace existing needle with a new one. Exercise extreme caution and place in needle clamp properly.

More users have spent countless dollars to have a needle placed properly than any other single adjustment or malfunction.

After above procedure has been followed and machine still malfunctions, proceed with timing adjustment.

Timing the hook.

Set zig zag dial on 0, and needle position lever in center position.

Remove lower cover plate and free arm cover.

Rest machine on its back, turn balance wheel until each of three screws is exposed. (Screw 1, figure 149).

Loosen each screw and turn balance wheel until needle reaches lowest point. Bring wheel around until needle rises .098" and observe relation to the point of hook.

Hold hook securely in driver, with hook in slot. Press firmly to eliminate any play between the two parts.

Turn hook and driver until point of hook is in line with needle. (figure 150)

Tighten one of set screws(1, figure 149) and recheck timing by threading machine and observing as hook enters the loop.

If hook catches thread each time, tighten other two screws and re-assemble other components. Tighten all screws securely and test sew.

Figure 149

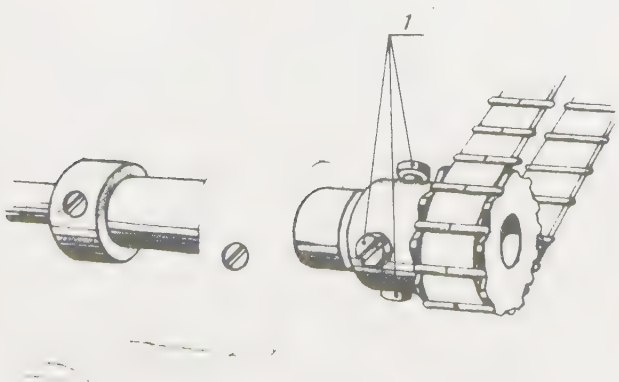
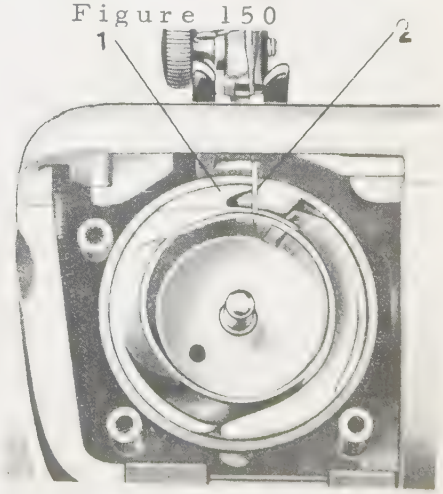


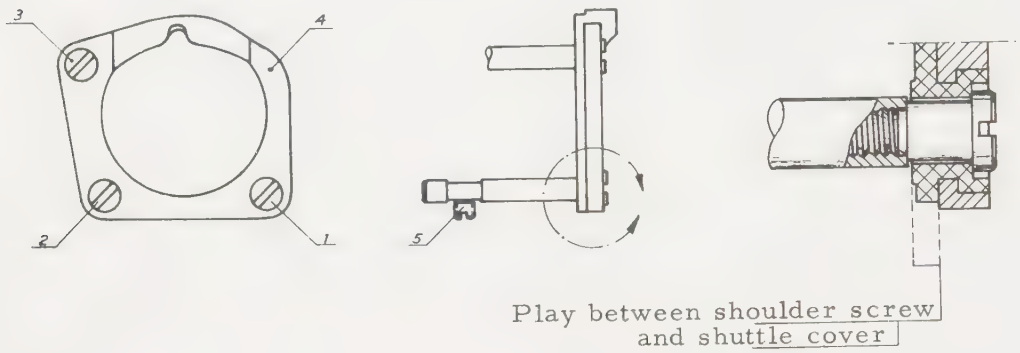
Figure 150



Setting clearance between hook and race cover.

Loosen set screws(1, 2 and 3) and remove cover(4). Figure 150.
Loosen holder screws(5) and move holders proper direction to correct.
Clearance between hook and needle scarf should be .0039".
Adjust holders by pushing inward with finger tips against shoulder screw.
Hook and cover are in place, continue pressing until screws touch cover.
Lock holders in place(1 and 3). Adjust holder 2 last.
Avoid play by pressing at point 4, which automatically adjusts holder 2 in correct position.
Tighten the lock screw.
Proper clearance should be .0157".
Check adjustment by turning balance wheel a few turns. It shouldn't bind. If there is a slight bind, back holders off slightly and re-check.
Re-check needle clearance per figure 151.

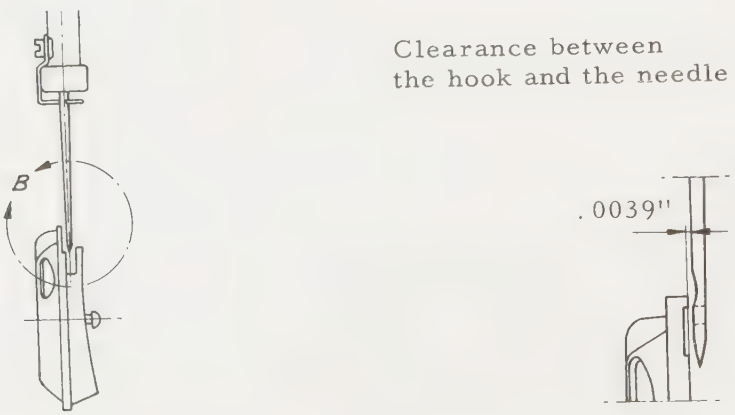
Figure 150



Setting clearance between hook and needle.

Remove free arm cover.
Remove hook assembly and driver.
Observe shims on drive shaft. If adjustment is closer to needle, add one or more shims as needed. If hook is too close, remove as needed.
Re-assemble and test sew.

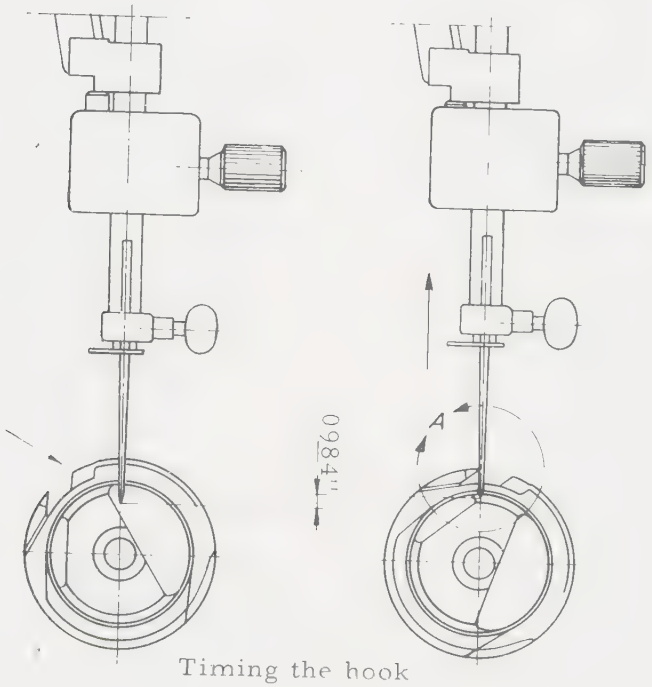
Figure 152



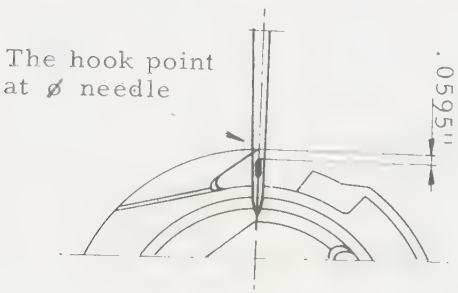
Diagrams showing relation of hook/needle in timing.

For test covering the following illustrations, refer to pages 124-126.

Figure 153



Timing the hook



Setting the needle bar height

Timing the needle bar.

Set machine for straight sewing and turn balance wheel until needle reaches lowest point.

Point of hook should be in line with center of needle.

Open face cover and loosen screw(1). Adjust needle bar until top of needle eye is .059 below point of hook. See figure 153, page 127.

Check clearance, when correct, tighten set screw.

Hold needle bar firmly so it doesn't turn while adjustment is made.

Eye of needle must face the front.

Flat side of needle goes to back.

Face plate assembly.

Figure 154 shows components and relation to each other.

Needle bar and spring(a).

Take-up arm(b).

Tension and check spring assembly(c)

Presser bar(d).

Lifter(g), adjusting block(h) and release block(i).

The main cam is visible behind other components.

The swinging face plate door makes service much simpler.

Later model 6000 series have the tension assembly, built in face plate.

Adjusting needle bar frame.

Set zig zag lever on 4.

Turn balance wheel until needle is at extreme left position.

Lower needle slowly until needle reaches needle plate.

If needle strikes plate, adjust screw (2), figure 155, with allen wrench until adjustment is complete.

Turn balance wheel slowly when lowering needle for this adjustment.

Make one complete revolution so the machine is on proper stroke.

To check further, activate the pattern selector and observe needle path.

Check set screw(3). Be sure spring (1) is tight.

Test sew.

Figure 156 shows top view of bar.

Figure 154

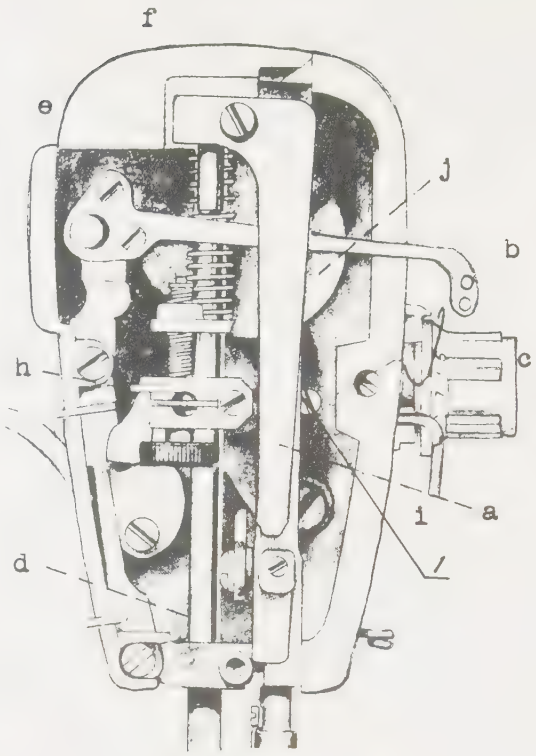


Figure 155

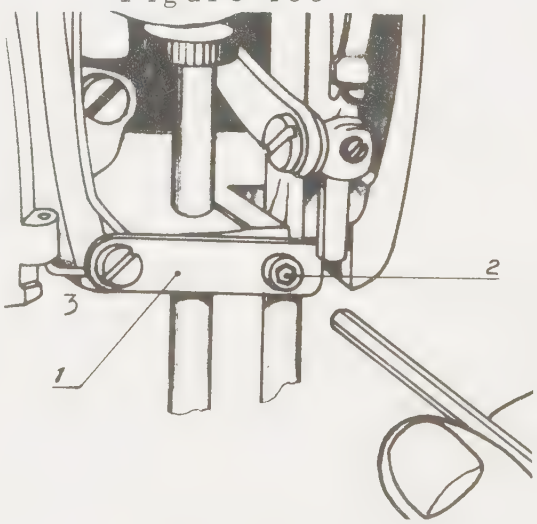
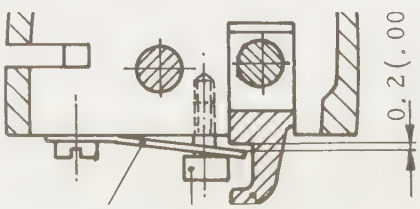


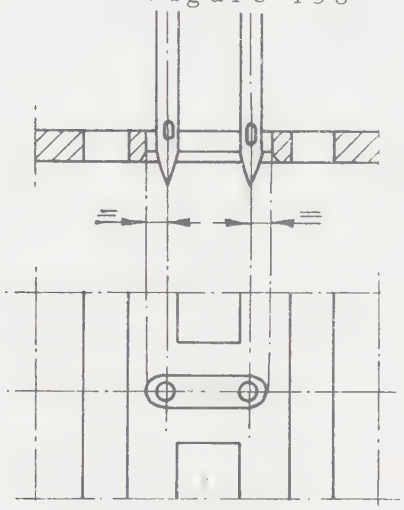
Figure 156



Centering needle in needle plate-zig zag.

Set zig zag control knob on 4.
Turn balance wheel until needle enters needle hole.
Open face cover, loosen screw, (1) on needle bar frame.
Observe path of needle descent, on right and left hand stroke.
Return needle to left stroke.
Lower needle to needle hole.
Turn eccentric screw(2) until the needle enters hole at equal spots.
Tighten set screw(1) and test.

Figure 158



Centering front to rear.

Loosen screw(1). Fig. 157
Drop needle into hole.
Set zig zag control on 0.
Set position lever on center.
Move needle bar frame as needed to correct.
Tighten set screw and test.

Figure 160

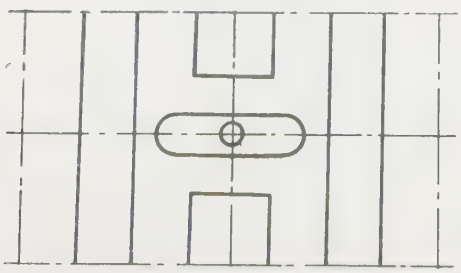


Figure 157

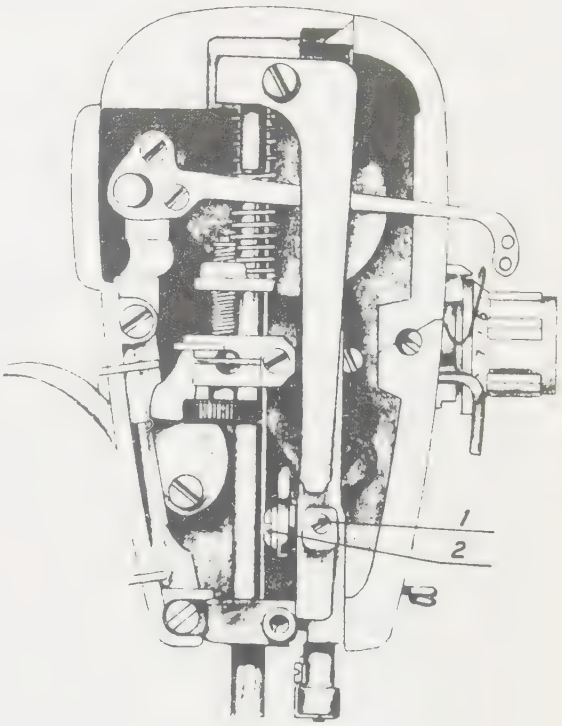
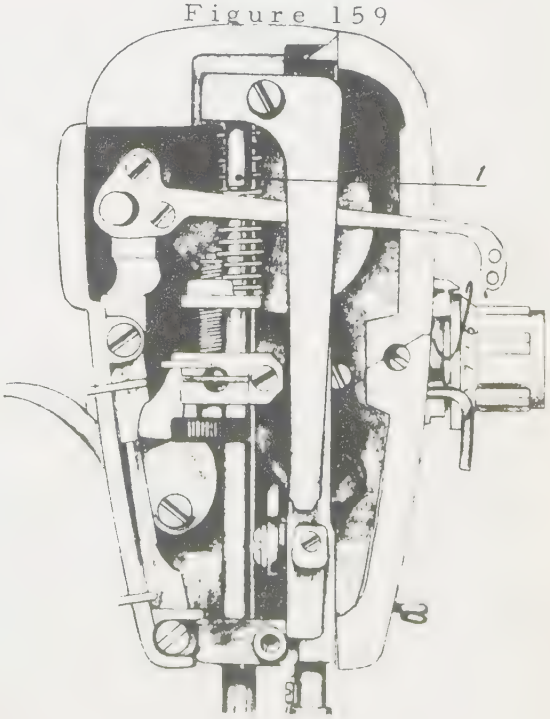


Figure 159



Presser bar.

Proper height of presser foot above needle plate is 1/4".

If user complains that cloth feeds unevenly, and feed dog is properly adjusted, check the presser bar.

Adjust spring(3) with knurled adjusting knob.

Check pressure by lowering presser foot on material with feed dog raised.

If foot doesn't hold cloth firmly, the presser bar must be lowered.

Few repairmen have access to a guage so correct height should be set at 1/4". Loosen set screw(1) and adjust presser bar as needed.

Feed dog must be in down position.

Presser bar lifter should be in "UP" position.

Tighten set screw and test sew.

After setting is made, reset pressure for regular sewing.

Caution: Check alignment of foot in relation to needle hole.

Needle must clear presser foot when in zig zag position.

Needle clamp must not strike presser foot when it's raised.

Hold presser bar securely when set screw is tightened.

The knurled regulating screw may be turned down, releasing all pressure so machine may be used for darning and mending.

The free arm feature enables user to mend socks and trouser legs with equal ease.

The drop feed feature aids operator in mending, as well as other operations.

Figure 161

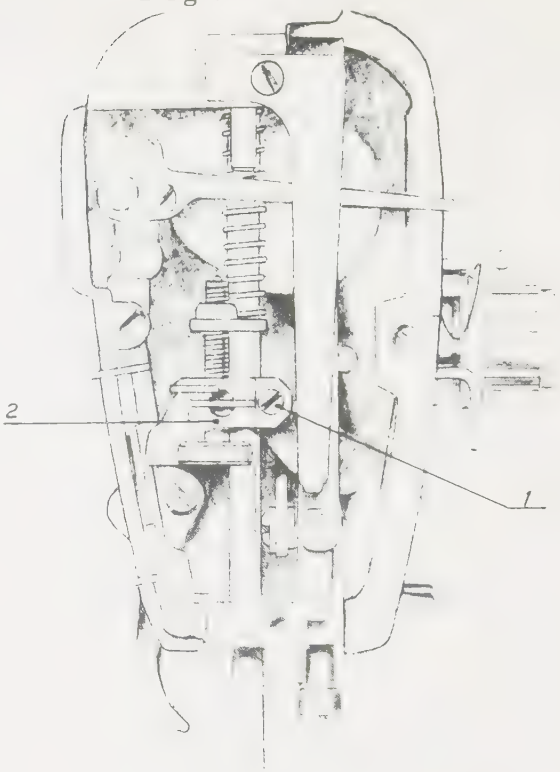


Figure 162

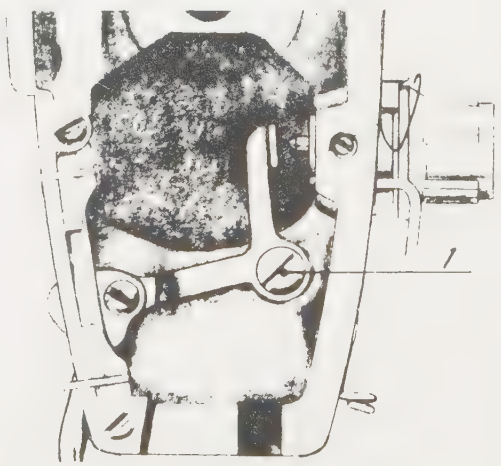
Tension release lever.

If user complains that thread doesn't release when presser foot is raised, the tension release lever may need adjusting.

Open face plate, lift presser bar lifter and observe relation of release lever to release pin.

If they don't make contact, turn eccentric screw(1), figure 162, until contact is made.

It isn't necessary to remove needle bar. Diagram is to show proper screw.



Feed dog.

If material doesn't move, or feeds erratically, and it's determined presser bar adjustment is correct, the feed dog should be adjusted.

Remove lower cover plate and free arm cover. Set stitch length control on 4 and turn balance wheel until feed dog is at its highest point.

The correct setting is 1/32" above needle plate when feed dog is at highest point.

If not, loosen set screw(1), move the feed dog to correct. See figure 163.

Tighten set screw.

Turn balance wheel and observe.

If feed dog motion seems consistant, tighten screw securely and replace the cover.

When feed dog strikes needle plate in slots, lateral adjustment is required.

Remove free arm cover.

Loosen screw(2), figure 164.

Move feed dog carrier proper direction to correct.

Snug screw(2), turn balance wheel and observe relation of feed dog and plate.

If corrected, tighten screw, replace free arm cover and test sew.

If feed dog strikes needle plate in end of slot, adjust as follows.

Remove free arm cover.

Set stitch length regulator on 4.

Loosen screw(1), figure 164, and set feed dog, manually, forward until clear and free.

Tighten set screw and turn balance wheel. If feed dog clears, replace all parts.

Test sew.

Figure 163

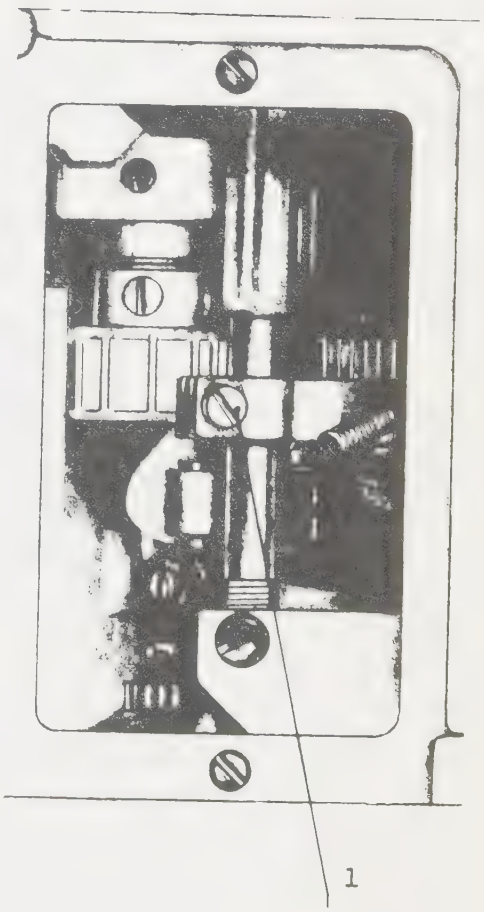
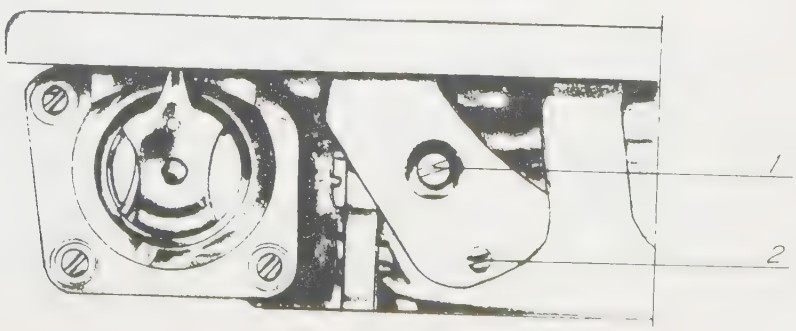


Figure 164



Feed Dog adjustment, model 20, 21 and 51

For lateral adjustment, loosen nut(4), figure 165, and nut at other end of feed rocker bar.

Free arm cover must be removed. Adjust tapered screw(5)opposite the direction from side feed dog is hitting.

Adjust as needed.

Tighten lock nuts.

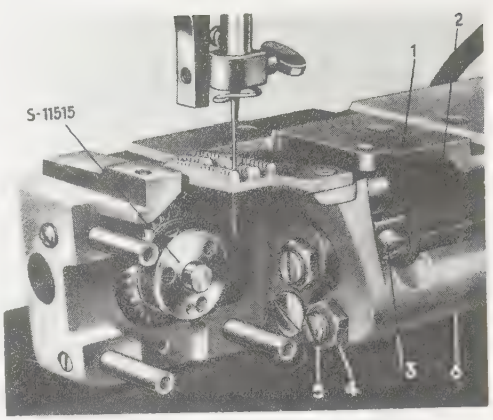
For lengthwise adjustment, loosen set screw(2).

Move feed dog proper direction to correct.

Turn balance wheel and observe.

Feed dog should have maximum throw, without striking plate, when stitch length control is on 4.

Figure 165



Timing feed to needle bar.

In the sewing operation, the feed should be up, moving the material, when needle is at highest point.

If it doesn't, adjust as follows.

Set position lever in center.

Set zig zag control on 0 and the length of stitch control on 4.

Turn balance wheel until needle starts on downward stroke.

Press reverse button to find position where feed dog is inert.

At this point, the needle should be .472"(approx. 1/2") above needle plate.

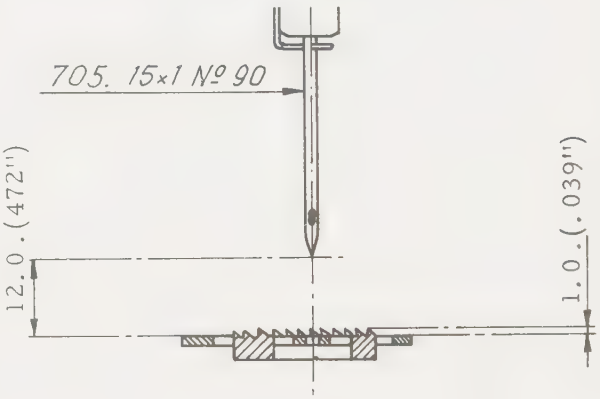
To correct, loosen rear inspection plate and observe two set screws on feed eccentric cam.

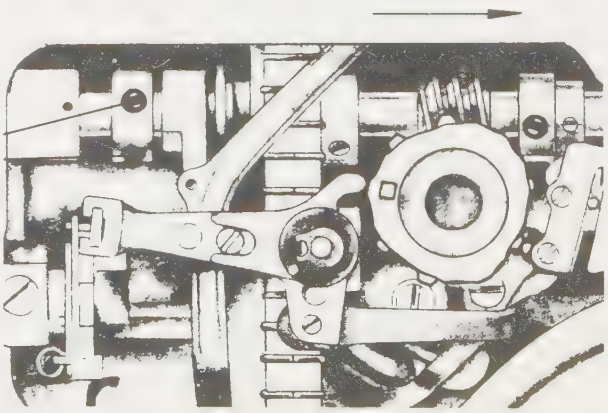
Loosen the set screws and turn balance wheel until corrected.

Tighten set screws and replace inspection plate.

Test sew.

Figure 166





Caution; Tighten all set screws, securely, since even a slight vibration may loosen them and distort the entire sewing operation.

In many cases a loose screw will result in an expensive repair job.

The mechanic must be very careful. One free call back will take all the profit from a repair job.

Adjustment for zig zag conformity.

On the model 21 and 51, set zig zag dial on 0.
Loosen set screw(2) on underside of dial. Figure 167.
Remove rear cover plate, figure 168, and move follower(4) until cam follower(1), figure 168, retracts from the camstack.
Tighten screw(2), figure 167.
The cam follower should leave camstack when dial is set on 0.

Figure 167

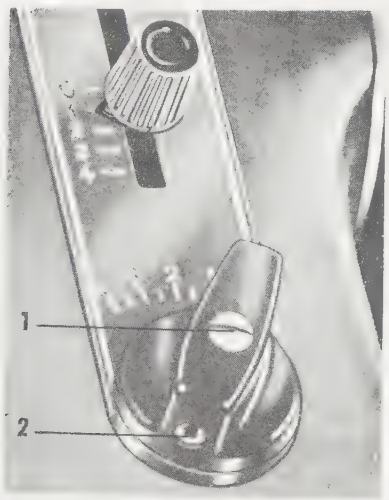
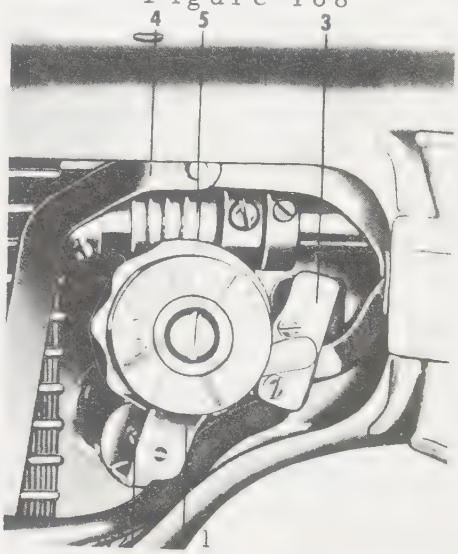


Figure 168



Needle position adjustment.

To set middle position, put zig zag dial on 0.
Turn balance wheel until needle enters needle plate.
Adjust eccentric screw(1), figure below, through rear inspection plate.
Turn screw until needle is centered. See figure 169.
To set left position, place business card under presser foot and set zig zag dial on 4.
Lower needle into cloth in left position.
Raise needle and return zig zag dial to 0.
Lower needle into card. If the needle doesn't enter card in exact spot, correct as follows.
Remove rear inspection plate and turn eccentric screw(2)until needle moves to proper place.
Test sew.

Figure 169

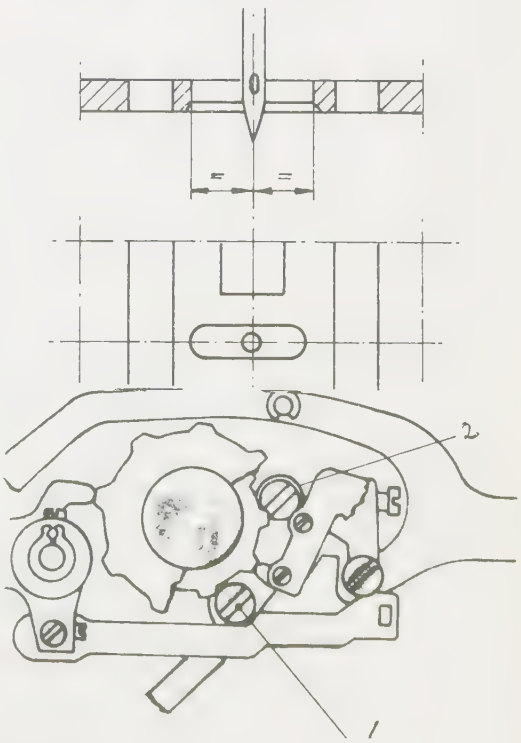


Figure 170-opposite.

Setting zig zag width.

Set pattern selector on zig zag and width on 4.
Drop the feed and place a business card under presser foot.
Lower needle into extreme left and right positions. Measure marks.
Distance should be same as dimension A, figure 172.
Loosen screw(1), figure 171, turn counterclockwise to increase width.
Turn clockwise to decrease width.

Figure 171

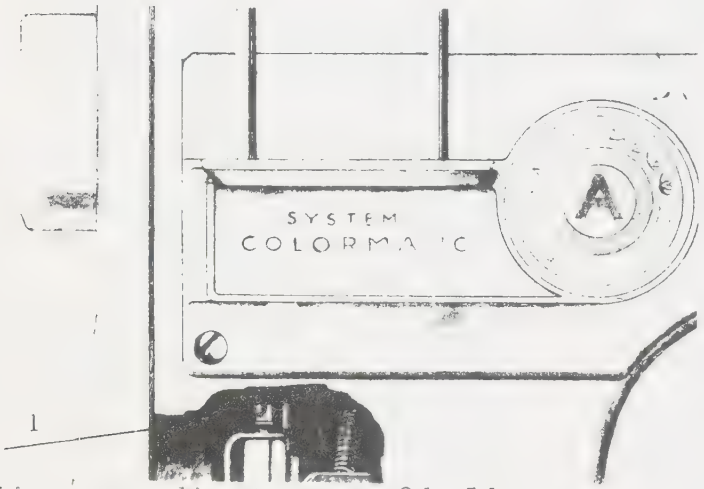
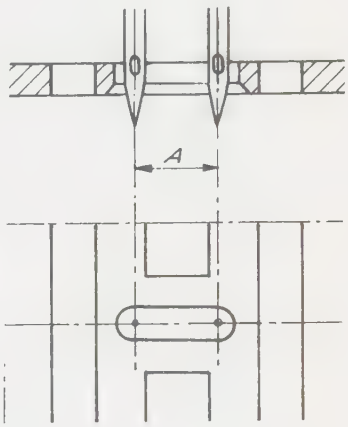
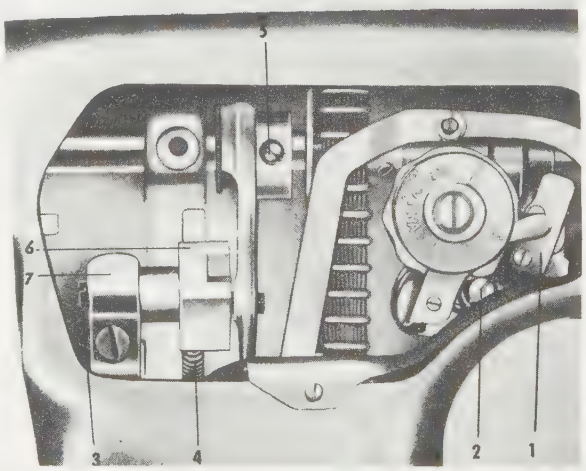


Figure 173



Zig zag adjustment, 21-51

Figure 172



Set zig zag lever on left position.
Place cam pattern on 5.
Open rear plate and turn balance wheel until cam follower(1) contacts a lobe on the cam.
Loosen screw(2) and adjust follower to pivotal point.
Tighten screw(2) and turn zig zag dial to 0, and back to 4.
Extreme caution should be exercised when working on or near camstack.
Camstack material is fragile and can be easily broken.

Timing zig zag motion.

If machine develops a loud clatter or needle bar jumps violently to right on upward zig zag stroke, worm gear and camstack spur must be adusted.
Remove rear inspection plate and camstack.
Loosen set screws(2), figure 174, next page, and move worm gear to-

ward cam spur gear(3), until gears are properly meshed.

Loosen set screws on collar(4), and move snugly against worm gear.

Tighten set screws on worm gear and turn balance wheel several times.

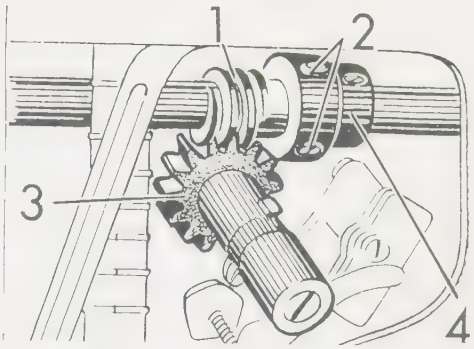
If binding occurs, gears are too close together.

Loosen screws, move back until mesh is smooth.

Tighten screws.

Tighten collar and test sew,

Figure 174



Timing zig zag movement, new style.

Open rear inspection plate.

Place pattern selector on zig zag and stitch width indicator on 2.

Loosen worm gear screws and turn pattern cam clockwise until follower contacts cam.

Hold worm gear and cam, turn balance wheel until needle reaches lowest point.

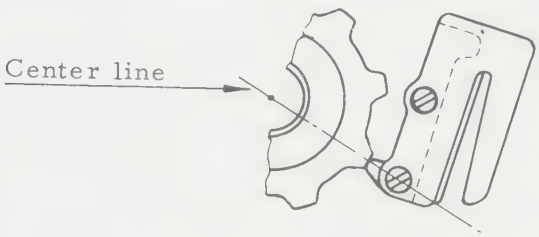
Tighten set screws and test sew, adjust further if necessary.

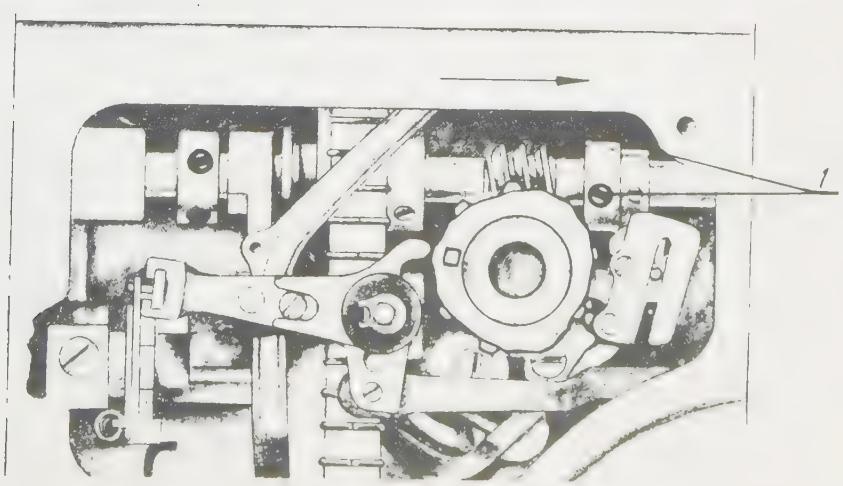
To check path of needle on zig zag, set dial on 4 and observe descent.

Needle should stop swinging and start downward into cloth, about 1/4" above needle plate.

As it rises, the needle swing should start about 3/8" above the plate.

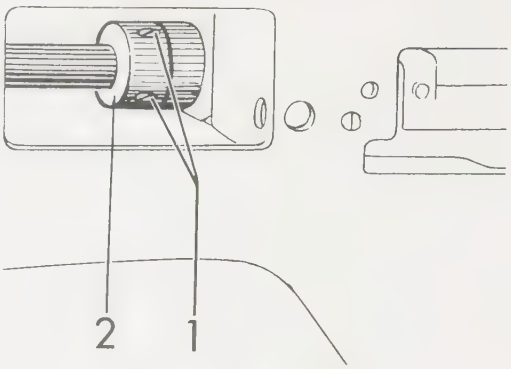
Figure 175





Adjusting end play in main shaft

Figure 176



An indication of main shaft end play, is excessive noise or vibration especially when using automatic patterns.

Loosen set screw and remove wheel.

Loosen set screws(1) on collar, and slide collar against front main bearing until snug.

Leave a small crack for oiling.

Tighten set screws.

Replace wheel and test sew.

Gear reduction box.

The gear box serves a dual purpose. In addition to gearing down to the slow speed, it contains the bobbin winder.

When bobbin is placed on spindle(A), machine is taken out of gear.

Remove bobbin, machine's in gear.

To remove or adjust, the shield has to be removed.

Loosen three screws(1 & 2, fig.178 lower right).

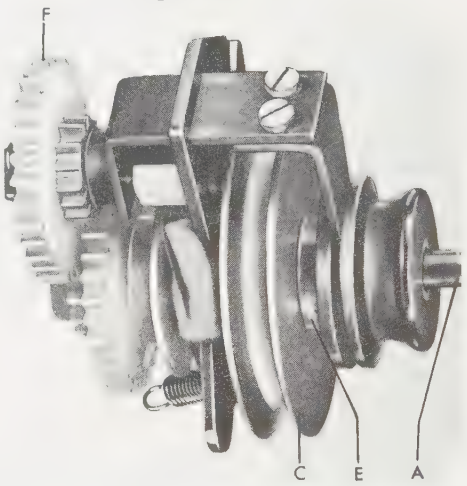
Remove button on model 20 and 21.

Loosen screws(3) and remove gear box, pull it toward you.

If machine fails to change gears, a spring may be broken.

Check spring on gear(f), figure 177, and replace if broken.

Figure 177



Changing drive belt.

To change drive belt, loosen the set screw holding balance wheel, remove.

Remove belt from pulley(D, fig 177) and replace with a new one.

Belt is "V" type and is available.

Changing motor belt.

To change motor belt, loosen gear box and move toward the motor.

Remove worn belt and replace.

Use the "V" type if possible.

Place belt over pulley and move the gear box until belt is taut.

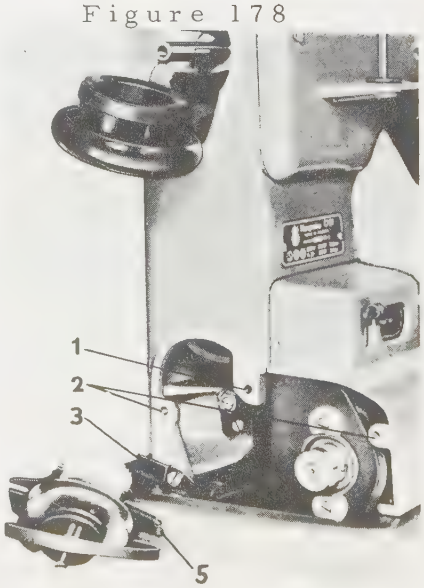
Tighten set screw(1) and position as needed.

Tighten screw(c) and replace cover.

Figure 180 illustrates later system.

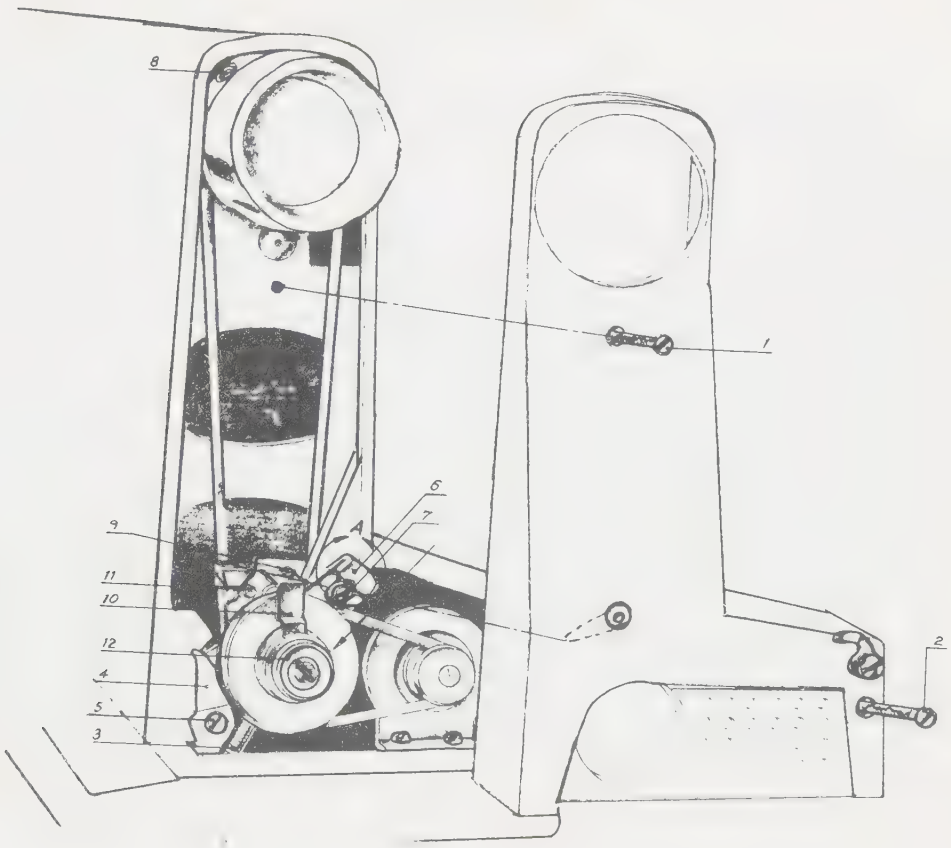
Button is attached to gear box.

Figure 178



Gear box and motor assembly, new style.

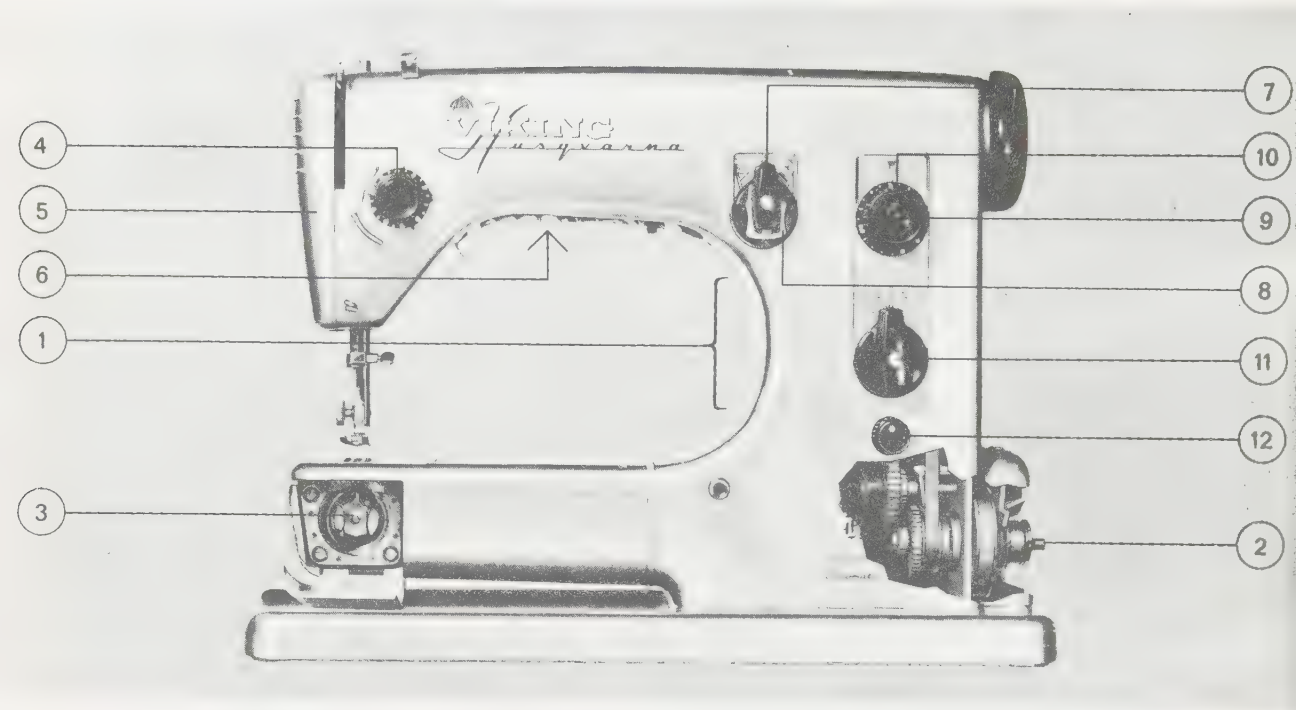
Figure 179



To adjust for gear noise or malfunction, remove the cover plate.
Loosen screws(1 and 2, figure 179).
Turn eccentric screw(11), clockwise to decrease tension between shafts (gear mesh), or counterclockwise to increase it.
Keep machine running during this adjustment.
To change drive belt, remove cover plate.
Loosen screw(5), disconnect spring(3) from guide plate(4) and remove the motor belt.
Remove gear box.
Remove balance wheel and drive belt.
Replace belt with "V" type, see text page 136.
Replace gear box.
To replace balance wheel, place on shaft and push on as far as possible.
Tighten screw(8).
After gear box is in place, tension it in place with drive and motor belt.
When both belts are taut, tighten screw(5).
To replace motor belt alone, loosen screw(5) and move gear box toward motor.
Put on new belt and tension as needed.
When both belts are taut, tighten screw and replace cover.

Partial cut-away and description of the Viking 21E.

Figure 180



Viking Automatic #21E

1. The head and the free arm are cast in one and the same piece—a guarantee of superior strength and lasting precision.

2. Low-speed gear—just pull out the button, and the machine sews with 1/5th of its normal speed with the same pressure on the pedal—while the motor power increases accordingly.

3. 100% jam-proof shuttle. Needs no oiling, does not soil the thread.

4. Thread tension is clearly graduated from 0 to 9.

5. Pressure on the presser foot releases with a flick of the finger. You can darn and mend with the ordinary presser foot.

6. Built-in sewing light gives a glarefree and pleasant light over the working area.

7. Regulation knob for the zig-zag seam's starting position (right, left or center).

8. Pattern selector.

9. Press the button and this machine sews in reverse, release and the machine sews forward again. The button can also be locked in reverse.

10. The stitch length regulator has a micro-setting for the shortest stitches.

11. The control for seam width is graduated from 0 to 4 and can be set for any width between these figures.

12. The feed dog can be lowered with this control; for embroidering and darning.

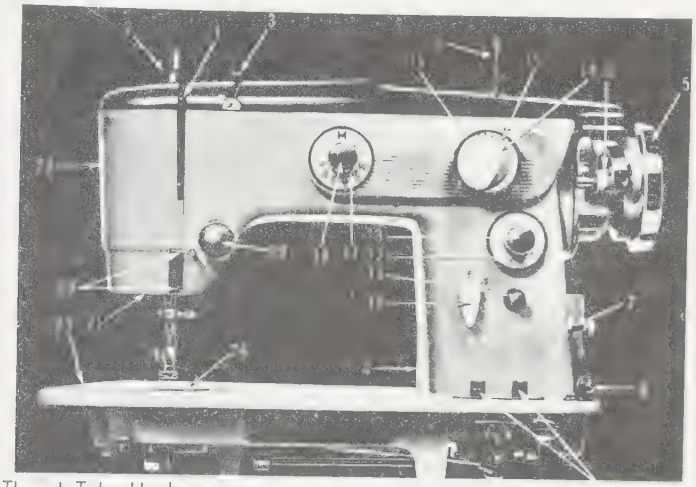
13. The motor is equipped with a radio and TV disturbance suppressor.

The model RZ304B is a typical Japanese-made automatic. Simple to operate, and built to sew numerous designs automatically. Riccar makes several machines of similiar design, but the model RZ304B will be covered in depth.

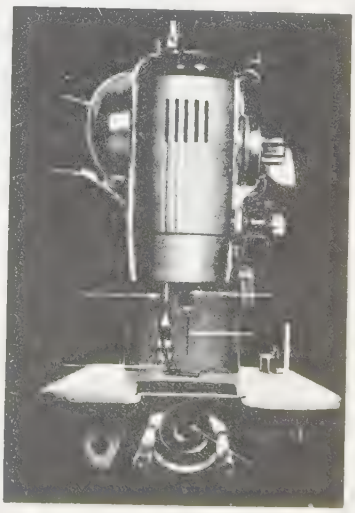
Owners of other brand name machines of Japanese manufacture may refer to this chapter for service. Many of the service and repair procedures are the same.

Like many of their contemporaries, Riccar utilizes the class 15 mechanism. Some models are straight class 15, others utilize the transverse hook arrangement.

Figure 182



1. Thread Take Up Lever
2. Patch-O-Matic Darner
3. Arm Thread Guide
4. Spool Pin
5. Hand Wheel
6. Bobbin Winder
7. Built-in-Light Switch
8. Bobbin Winding Thread Guide
9. Drop Feed Push Button
10. Button Holer Device
11. Reverse Sewing Push Button
12. Stitch Length Regulating Dial
13. Stitch Length Regulating Knob
14. Zigzag Width Regulating Knob
15. Zigzag Width Regulating Dial
16. Needle Position Regulating Knob
17. Pattern Selecting Dial
18. Pattern Selecting Knob
19. Upper Thread Tension
20. Thread Guide
21. Built-in-Light
22. Face Plate
23. Slide Plate
24. Needle Plate
25. Needle Bar
26. Needle
27. Presser Bar
28. Presser Foot
29. Open Race
30. Presser Bar Lifter
31. Cam Door



Upper tension assembly

The tension assembly as pictured in figure 182 is unitized, and entire assembly may be removed at the same time.

The tension dial is calibrated, and should be used to adjust the tension unless there is a malfunction elsewhere.

A setting of 3 to 5 is necessary for regular sewing, then a tighter or looser stitch setting can be made when the situation warrants it.

Most common problem of a tension assembly, is the thread cut disc. If a tension disc is thread cut, replace it.

Proper check spring adjustment is necessary, especially in zig zag sewing. The spring is properly adjusted when it releases the thread as the eye of the needle enters material, on the downward stroke.

If check spring is out of adjustment, proceed as follows:

Open face assembly door(figure 182a).

Use the tension screwdriver and loosen set screw(1). Remove tension assembly.

Loosen both screws on tension assembly block(figure 182b), and pull the tension stud outward.

If the check spring is broken or bent, replace it.

When adjustment is necessary, replace the spring over end of tension stud, with small finger of spring fitted into one of the slots on stud.

Replace tension stud in block and snug-tighten the two screws.

Flick check spring with your finger. If spring appears weak, loosen the two screws and turn tension stud clockwise, slightly. Tighten screws.

If spring seems too tight, loosen the screws and turn tension stud counterclockwise. Tighten both set screws.

Replace tension components and test sew. Reset tension to proper setting.

Check spring adjustment is largely "Feel". What is proper amount of check spring on one machine, may be too little on another.

Figure 182

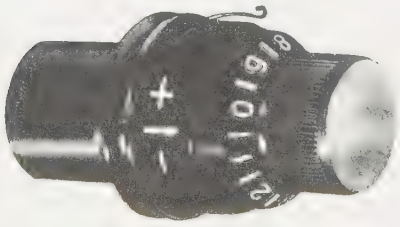
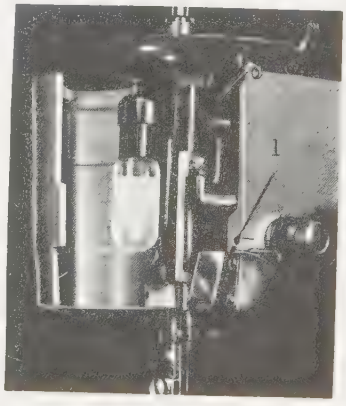


Figure 182b

Figure 182a



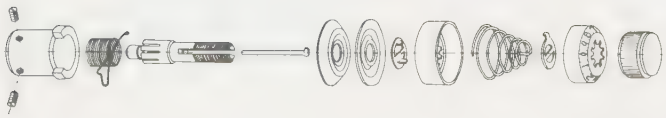
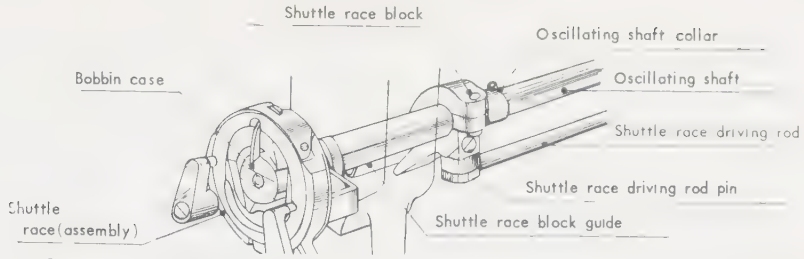


Figure 183



The shuttle mechanism on a zig zag machine(class 15), is basically the same as a class 15 straight stitch, except it moves back and forth in rhythm with the needle bar when the zig zag control knob is turned.

Figure 183 illustrates the lower sewing mechanism and components.

To adjust the lower tension, remove bobbin case from shuttle spindle.

Check bobbin case for proper threading(figure 183a).

If the bobbin case is properly threaded and machine still sews badly, and the upper tension is properly set, adjust bobbin case tension screw.

If lower thread is pulling through cloth, use the tension screwdriver to adjust screw(figure 183b), clockwise to tighten lower tension.

When upper thread is pulling down through cloth, turn screw counter-clockwise to loosen lower tension.

If either adjustment fails to correct the situation, remove screw entirely and check the tension spring(c & d, figure 183c).

If tension spring is bent, broken, or thread cut, replace it.

Bobbin case body should also be checked for thread cuts. If it's damaged, replace it. Emery cloth can dress it up temporarily, but replacement would be best.

If bobbin case doesn't latch, when placed on shuttle spindle, check the groove on the spindle for lint or pieces of thread.

When shuttle is clean, check latch assembly(A & B, figure 183C, and the small spring illustrated next to bobbin case.

The latch must work smoothly in the slotted raceway. If it doesn't, replace the entire bobbin case.

Remove shuttle and check race area for lint or broken threads. After cleaning the area, put a few drops of oil on the shuttle.

Replace all components in proper order.

Inspect the shuttle. If the point is broken, or marred by numerous needle strikes, replace the shuttle.

Figure 183a

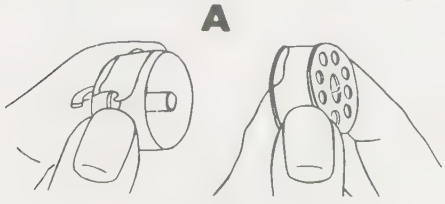


Figure 183b

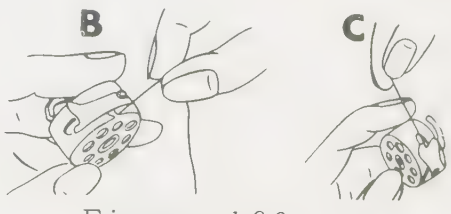
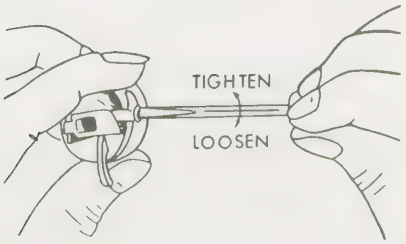
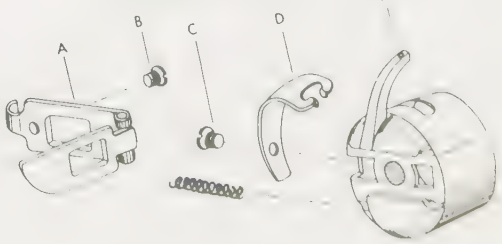


Figure 183c

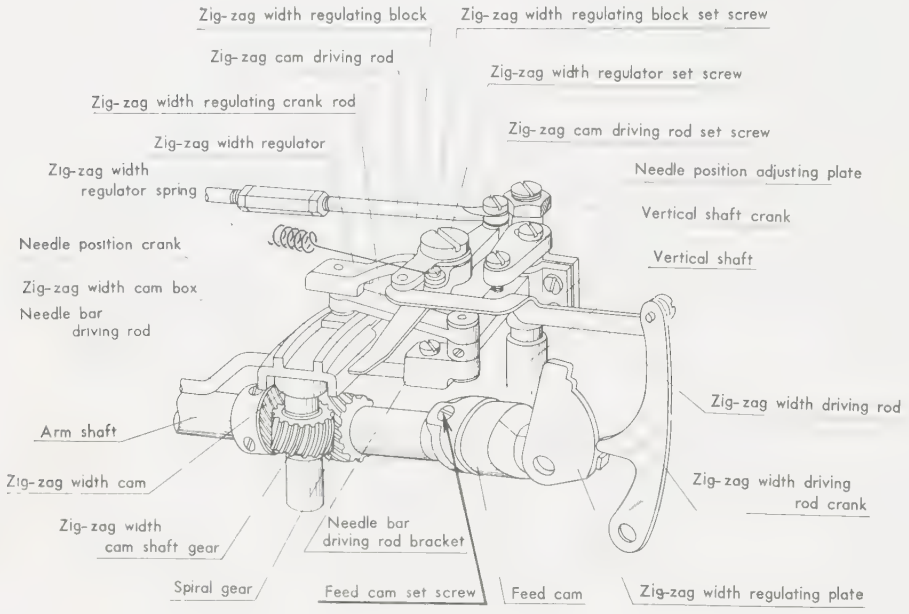




The zig zag mechanism

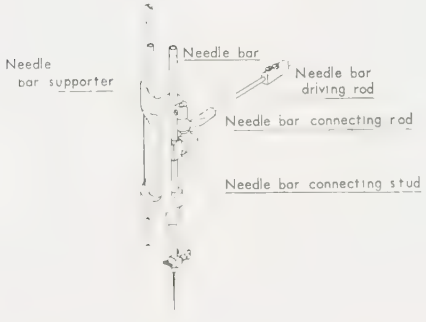
The RZ304 zig zag mechanism is similiar to text covering the manual zig zag machine on pages 85 and 86.

Figure 184



Needle bar and connecting components

Figure 184a

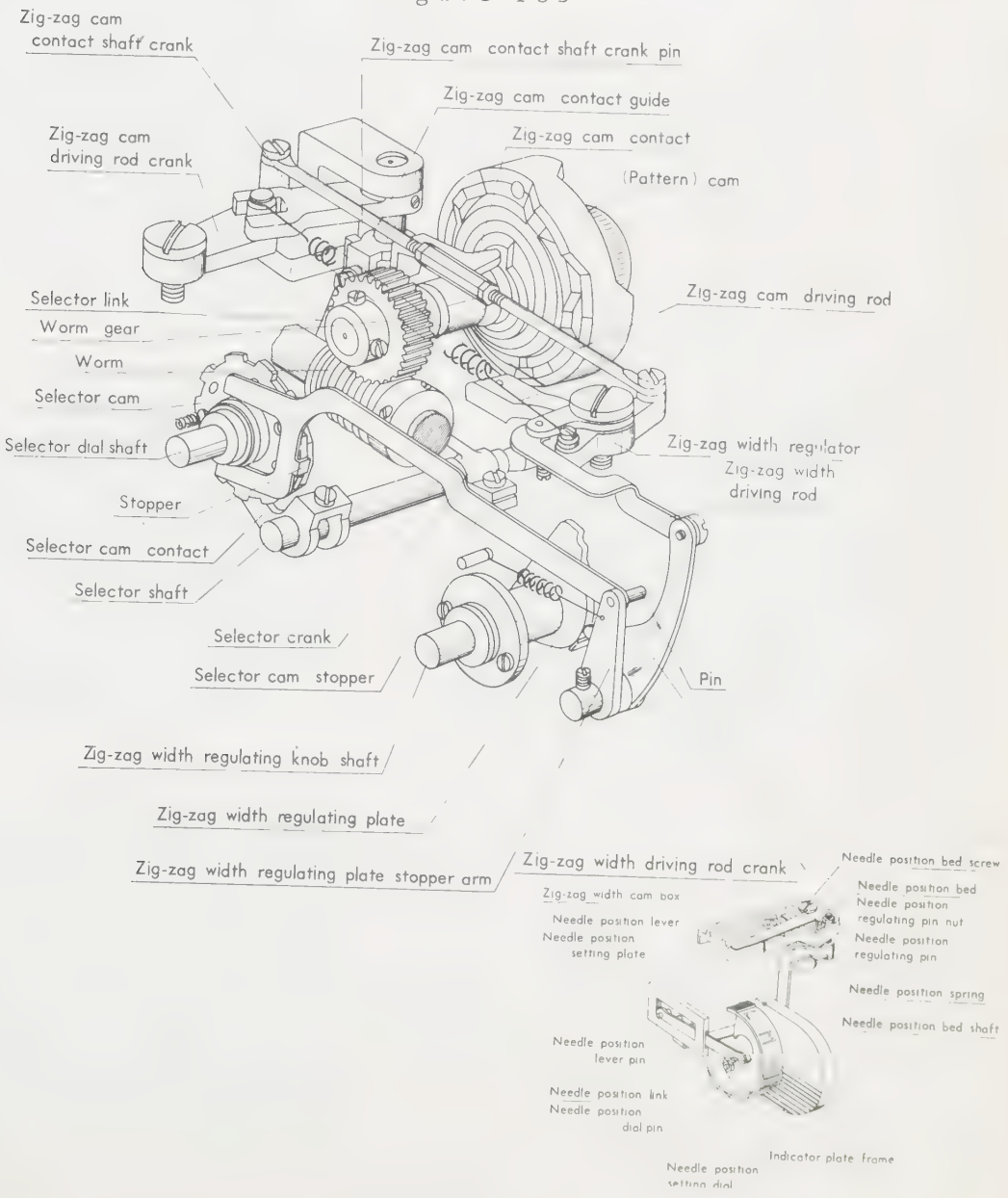


The Automatic Mechanism

Figure 185 illustrates the basic components of the automatic assembly. The indicator plate assembly(185a) fits over the extended shafts of the assembly on the upper arm of the machine. The nomenclature on each part is self explanatory. Service and repair principals will be covered on the next several pages.

Figure 185b illustrates the zig zag width control and the needle position dial. L, M and R stand for Left, middle and right respectively. Do not confuse the M on the Cam selector dial with the M on the needle position dial. The "M" on the Cam Selector Dial indicates the machine can make manual zig zag stitches at that point, otherwise, the machine will sew the stitch the cam selector indicates.

Figure 185



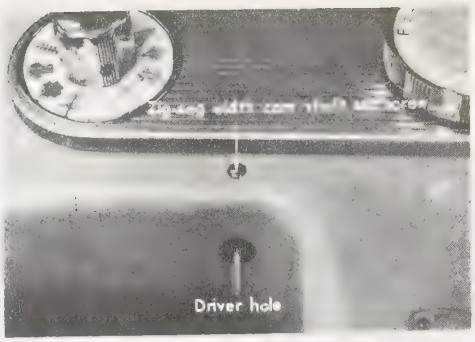
Gear Adjustment: Zig Zag

To adjust the mesh of the main shaft, and the spiral gear on the zig zag width cam shaft, loosen set screw located under control panel. (figure 186).

Insert screwdriver in driver hole.

Turn zig zag width cam shaft supporter(it's eccentric), slightly to the right, or left, as needed to correct.

Figure 186



Adjustment: Needle to needle hole

To adjust, replace zig zag plate with straight sew needle plate.

Remove top cover from machine.

Set zig zag control dial on setting 1.

Loosen set screw (a), figure 187, on needle bar driving rod bracket.

Adjust the rod(B), until needle enters needle plate at proper place.

Tighten all screws, and replace top.

Test sew.

Figure 187

Adjustment: Zig Zag width regulator

Place needle position lever(figure 187a) in left position.

Turn balance wheel, remove top cover, and observe. Cam block(C), figure 187 should be in extreme left position.

When needle enters needle plate, stop turning the balance wheel.

Move zig zag control dial back and forth and if needle moves, adjustment is required.

Loosen needle position regulating pin nut(D), figure 187.

Pin(E), is eccentric. Turn slightly, then turn balance wheel by hand. When needle doesn't move back and forth, adjustment is correct.

Tighten nut(D), and double check the adjustment with straight needle plate.

Replace top cover and test sew.

Figure 187a

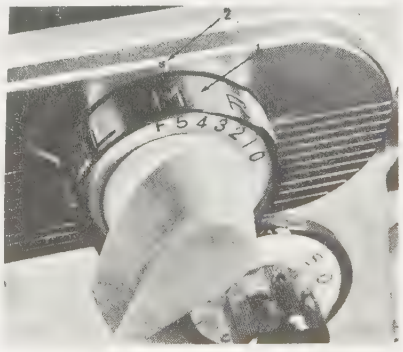
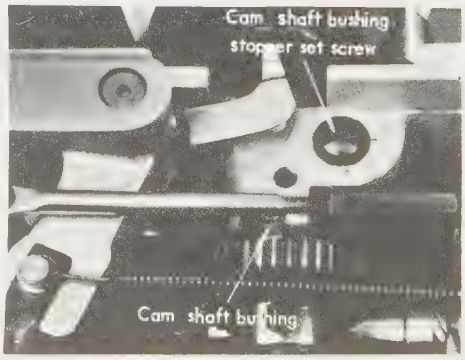


Figure 188



Adjusting zig zag swing

When needle doesn't enter needle hole at same place, on left or right swing, refer to figure 187 for adjustment.

Remove top cover and loosen set screw (F), on spiral gear.

Set zig zag control on 5.

Observe which direction the needle bar

must be moved. Move the gear, either right or left, as needed to adjust. Tighten set screw. Use extreme caution, don't allow the gear to slip.

Adjustment when machine zig zags on straight setting.

Set zig zag width control dial on "0" setting.
Remove top cover.
Loosen set screw(figure 187), located on needle position adjusting plate (G), page 146.
Turn balance wheel.
Adjust needle position plate(G), until needle rises and falls in same place.
Tighten set screw and test. Place a business card under presser foot and turn balance wheel by hand. When the needle rises and falls in same hole, without enlarging it, the adjustment is correct.

Adjustment of cam shaft worm gear.

If cam shaft gear is out of mesh, adjust as follows:
Remove top cover.
Loosen set screw on cam shaft bushing(figure 188).
Turn cam shaft bushing until gears mesh properly.
Tighten set screw.
Replace top cover plate, and test sew.

Figure 188a

Figure 189

Adjustment of cam contact finger.

Put a cam in machine(see figure 188a), and turn balance wheel until pin on cam shaft is straight up.
Set zig zag width control dial on 0.
Check the regulator, it must position needle stop.
Move cam driving rod until extreme point of cam control is slightly detached.
If cam contact is between two cam tracks, adjust as follows:
Set zig zag regulator dial on setting "F".
Turn selector dial until cam contact is at its highest point.
Loosen set screw on selector crank(figure 189, page 148, move the cam contact up, or down. Cam contact should descend on the middle of inner cam track, or M position(figure 189a). If adjusted properly, tighten selector arm securely.
Check the other cam tracks and watch selector stop. It should operate the zig zag width regulating dial, and pattern selector dial, in turn.

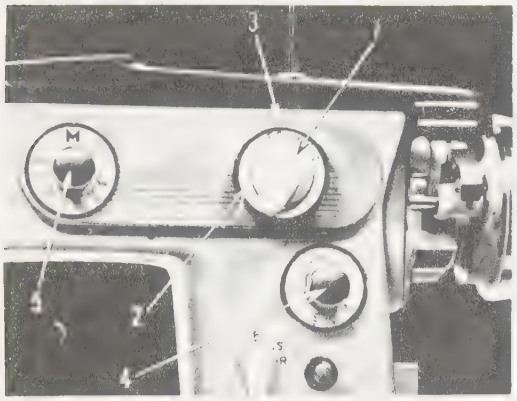
Adjusting the pattern selector

If machine doesn't sew pattern indicated on pattern selector dial(5, figure 189a), the dial may be out of place.

Loosen pattern dial screws, and turn dial until pattern corresponds with pattern being sewn. Tighten set screws.

The zig zag cam control MUST move freely on zig zag cam shaft.

Figure 189a



Buttonholer assembly

When adjusting the buttonholer assembly put needle bar in left position, and pattern selector dial on "M".

Remove top cover, and hand wheel cover, if one is present.

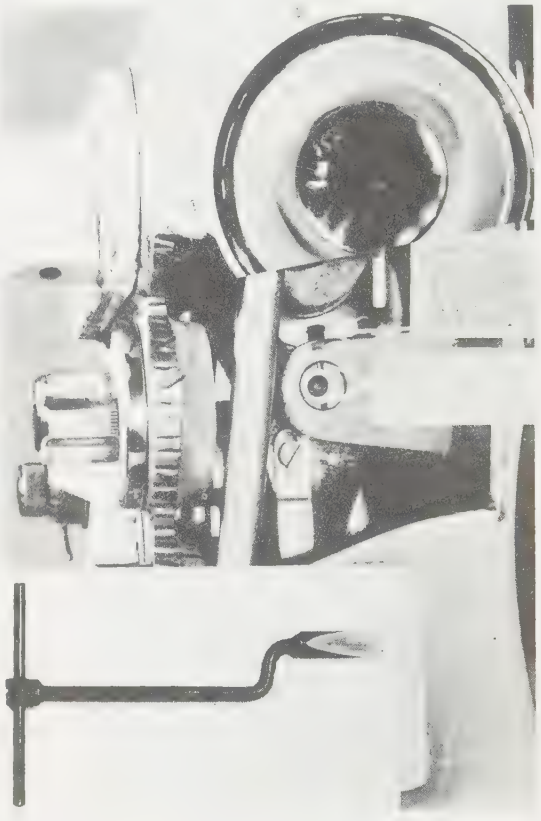
If machine is sewing a denser stitch in forward, than reverse, loosen feed reglator bushing, set screw(figure 190).

Turn feed regulator bushing counterclockwise, as needed. Tighten screw.

If machine is sewing a denser stitch in reverse, repeat procedure, but turn feed regulator bushing, clockwise, as needed.

NOTE: Unless the special tool furnished by Riccar is used, balance wheel will have to be removed for adjustment.

Figure 190



Adjusting buttonholer bar tack.

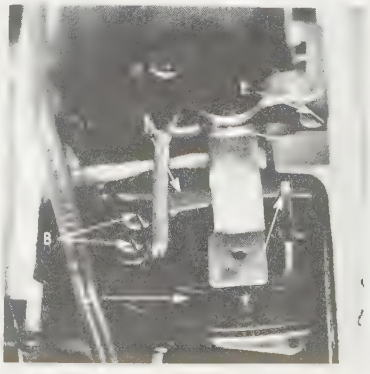
To adjust the bar tack, set zig zag dial on 0, and buttonholer knob on S.

Turn balance wheel until zig zag width cam block(A), arrives at extreme right position.

Loosen set screws(B, figure 191), on needle position crank and turn until needle is at center, at maximum zig zag width adjustment, and extreme right.

Hold needle position crank(C, figure 191), at the point where bar tacking crank, (D), touches zig zag width cam block(A).

Figure 191



Timing

Figure 192

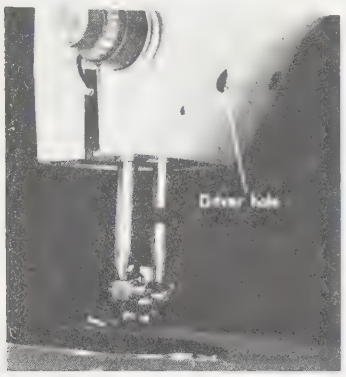


Figure 192a

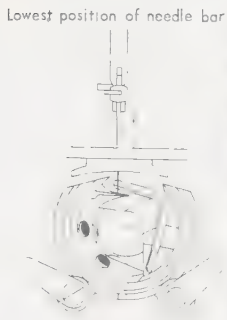
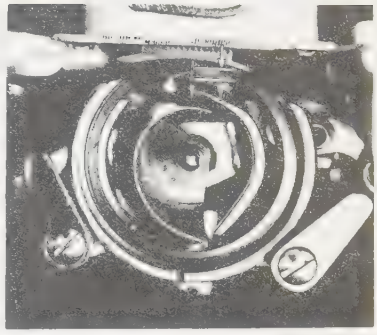


Figure 192b



If the machine skips stitches, remove shuttle race cover, and bobbin case.

Tilt machine head back, and set zig zag regulator knob on setting 0.

Thread machine, and turning balance wheel slowly, observe the needle travel, and its relation to the shuttle point when needle starts its upward travel.

Timing is incorrect if shuttle point doesn't pick up the upper thread.

To adjust, loosen set screw on needle bar, through driver hole (figure 192, and move needle bar until needle is in proper position.

Figure 192b shows proper position of needle in relation to shuttle hook at lowest point of needle bar travel.

Tighten set screw, replace shuttle components, and test sew.

Figure 192a, shows position of needle bar at lowest position. Measurement between arrows should be approximately 25/64ths of an inch.

The proper distance between eye of needle and point of hook, at position shown in figure 192b, is 3/32".

Before timing a sewing machine, always start with a new needle, and be sure needle is properly inserted.

To adjust clearance between needle and point of hook, loosen shuttle race block screw(figure 192c).

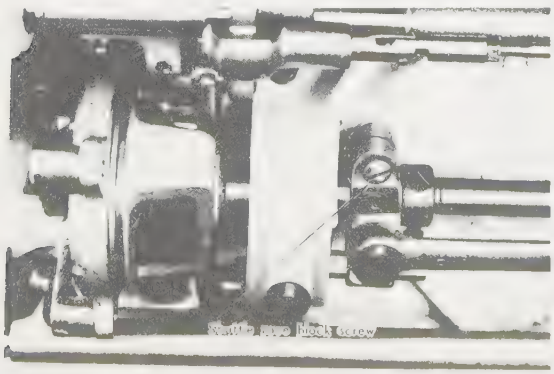
Proper clearance is .004". This is quite close, about the thickness of a sheet of paper, doubled.

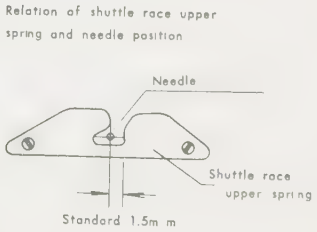
Move entire race assembly to correct. Remove needle plate.

Check needle position. Race assembly must not turn while this adjustment is being made. The needle must pass through the center of slot.

Tighten set screw on race block, and test sew.

Figure 192c





Adjusting the oscillating shaft.

When there is end-play in the oscillating shaft, loosen set screws on the shaft collar and adjust. (See figure 193).

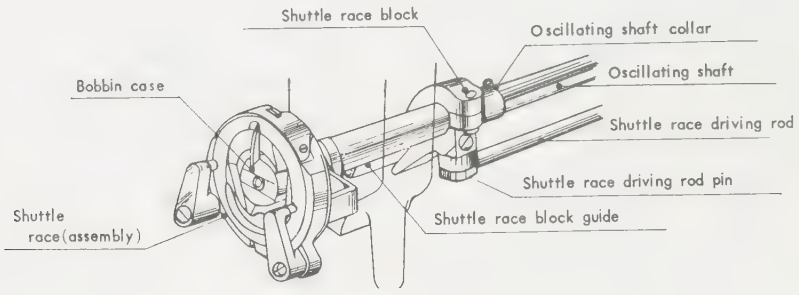
Move collar slightly to the left, and the shaft to the right.

Tighten set screws snugly.

Turn balance wheel by hand. If machine binds, collar is too tight.

Loosen set screws and back collar off slightly. Tighten set screws.

Figure 193



Adjusting the feed dog.

The proper height of the feed dog is 1/32" above needle plate, at its high point.

If adjustment is required, loosen feed lifting rock shaft crank clamping screw(figure 193a), and adjust as needed. (Figure 193a on page 151).

If feed dog is too low, raise it to proper height. If it's too high, lower to proper height, at high point of feed dog rise.

Tighten set screw and test.

Although this adjustment should solve the feeding problem, the presser bar unit might also need adjusting, and don't overlook the drop feed. It may be in "DOWN" position.

If problem is in presser bar assembly, open face plate door, and raise the presser bar lifter(figure 193b, page 151).

There should be about 1/4" clearance between the needle plate and lower part of presser foot, when the lifter is in "UP" position.

Loosen set screw on presser bar guide bracket.

Adjust to proper setting and tighten set screw.

When making this adjustment, hold presser bar firmly in place. If the presser bar slips, needle will strike presser foot, especially on wide zig zag stitching.

If pressure seems to be insufficient to feed material, screw patcho-matic down as far as it will go. If the foot still lacks enough pressure, remove the darner assembly, and the presser spring.

Stretch the spring, replace spring and darner assembly, and test.

NOTE: If the spring is broken, replace it.

When your machine is not equipped with a darner, turn adjustment nut.

Figure 193a

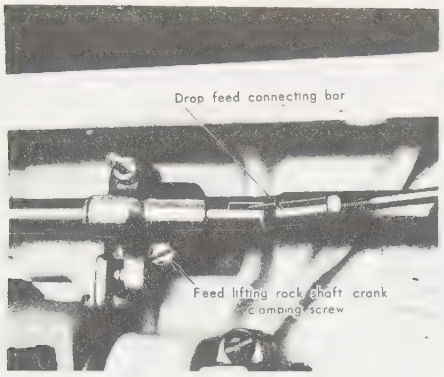
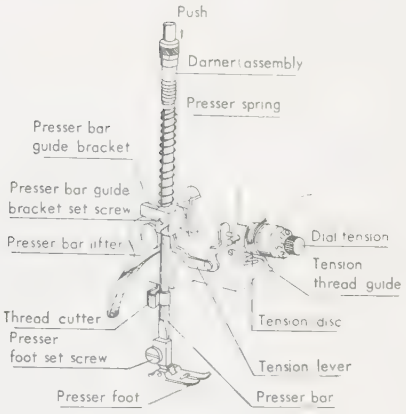


Figure 193b



Timing the feed system.

When the feed system is properly timed, the feed dog starts its motion, when the needle is at its highest point.

To adjust, place stitch length control lever on longest stitch.

Loosen feed cam set screw.

Move cam until angle changes. Tighten set screw and test.

If further adjustment is needed, repeat the procedure.

To advance the feeding, turn cam clockwise.

To retard the feeding, turn cam counterclockwise.

Most machines have a timing mark on the feed cam. Set it on mark cut on the arm shaft, and feed timing should be accurate.

Figure 194

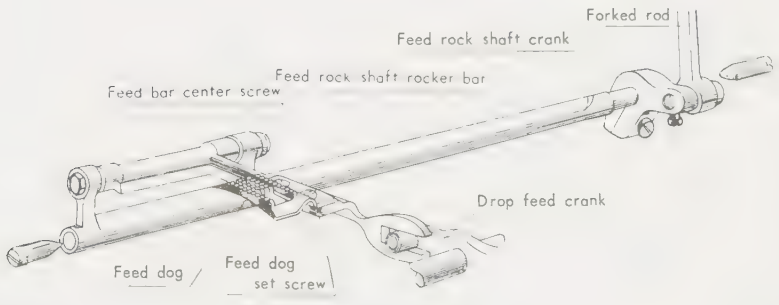


Figure 195

MECHANICAL DRAWING OF RZ-777

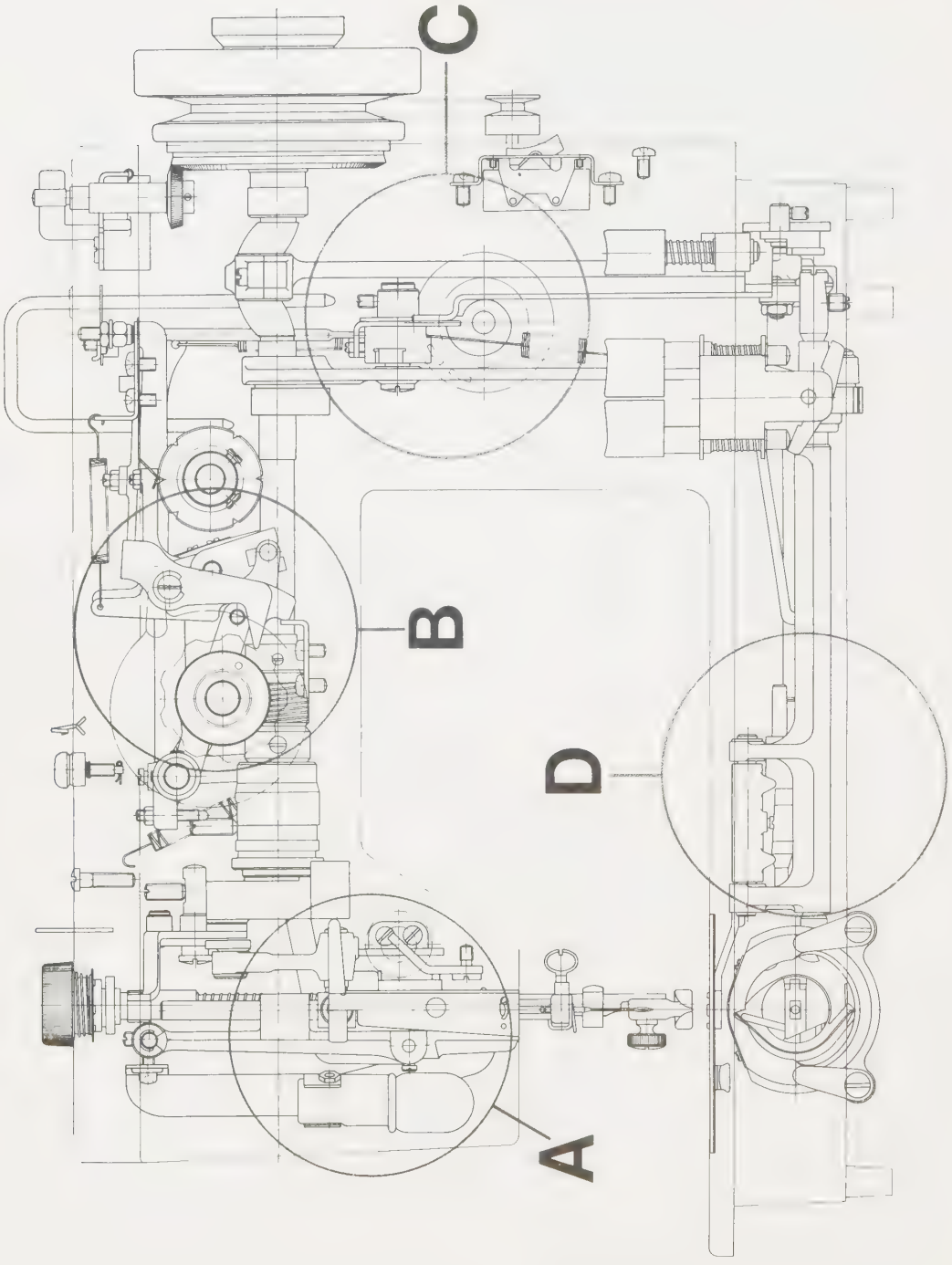
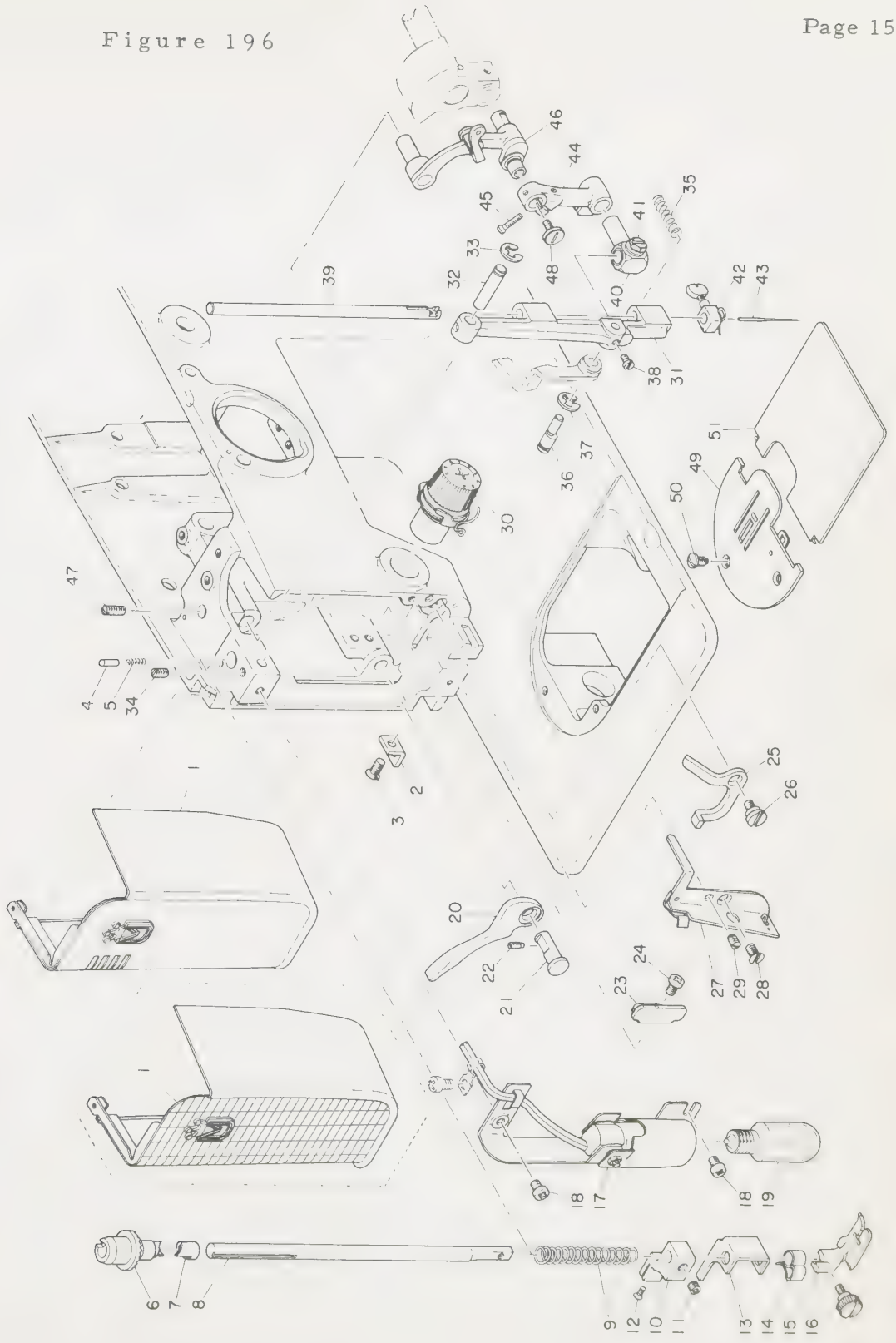


Figure 196



BLOCK-A

PARTS LIST

1.	Z-5510	Face plate (compl.) (RZ-777)
(1)		Face plate (compl.) (RICCAR-777)
2.	Z-5517	Face plate hinge
3.	L-6227	Face plate hinge set screw
4.	L-4082	Pressure regulator dial stopper pin
5.	L-4083	Pressure regulator dial stopper pin spring
6.	Z-5546	Pressure regulator
7.	L-4084	Presser spring supporter
8.	L-4086	Presser bar
9.	Z-5547	Presser spring
10.	L-4091	Presser bar bracket
11.	H-1063	Presser bar bracket set screw
12.	L-1073	Presser bar bracket adjusting screw
13.	Z-5545	Tension lever lifter
14.	H-1065	Thread cutter
15.	Z-1050	Presser foot (compl.)
16.	Z-2084	Presser foot thumb screw
17	Z-5880	Lamp holder (compl.)
18.	L-4036	Lamp holder set screw (2 pcs.)
19	Z-5895	Lamp
20.	Z-2083	Presser bar lifter
21.	H-1068	Presser bar lifter pin
22.	H-1069	Presser bar lifter pin set screw
23.	Z-5552	Needle bar crank guide
24.	L-4036	Needle bar crank guide set screw (2 pcs.)
25.	Z-5544	Tension lever
26.	Z-6125	Tension lever step screw
27.	Z-5540	Arm thread guide (compl.)
28.	Z-5518	Arm thread guide set screw
29.	Z-6048	Dial tension set screw
30.	L-4060	Dial tension (compl.)
31.	Z-6044	Needle bar supporter
32.	Z-6046	Needle bar supporter pin
33.	Z-6047	Needle bar supporter pin set ring
34.	Z-6048	Needle bar supporter pin set screw
35.	Z-6045	Needle bar supporter spring
36.	Z-5853	Needle bar driving rod pin (eccentric)
37.	Z-6047	Needle bar driving rod pin set ring
38.	Z-1363	Needle bar driving rod pin set screw
39.	Z-6043	Needle bar
40.	Z-5930	Needle bar bracket (compl.)
41.	Z-5949	Needle bar bracket set screw
42.	Z-6080	Needle clamp (compl.)
43.	H-1413	Needle
44.	Z-5551	Needle bar crank rod
45.	H-1077	Needle bar crank rod set screw
46.	Z-5570	Thread take-up lever (compl.)
47.	Z-1187	Thread take-up lever set screw
48.	Z-1185	Arm shaft balance pin left handed screw
49.	Z-5561	Needle plate
50.	H-1394	Needle plate set screw (2 pcs.)
51.	Z-5562	Hinged plate

NOTE: Parts in bracket must be ordered together with the parts which they are assembled with.

BLOCK-B

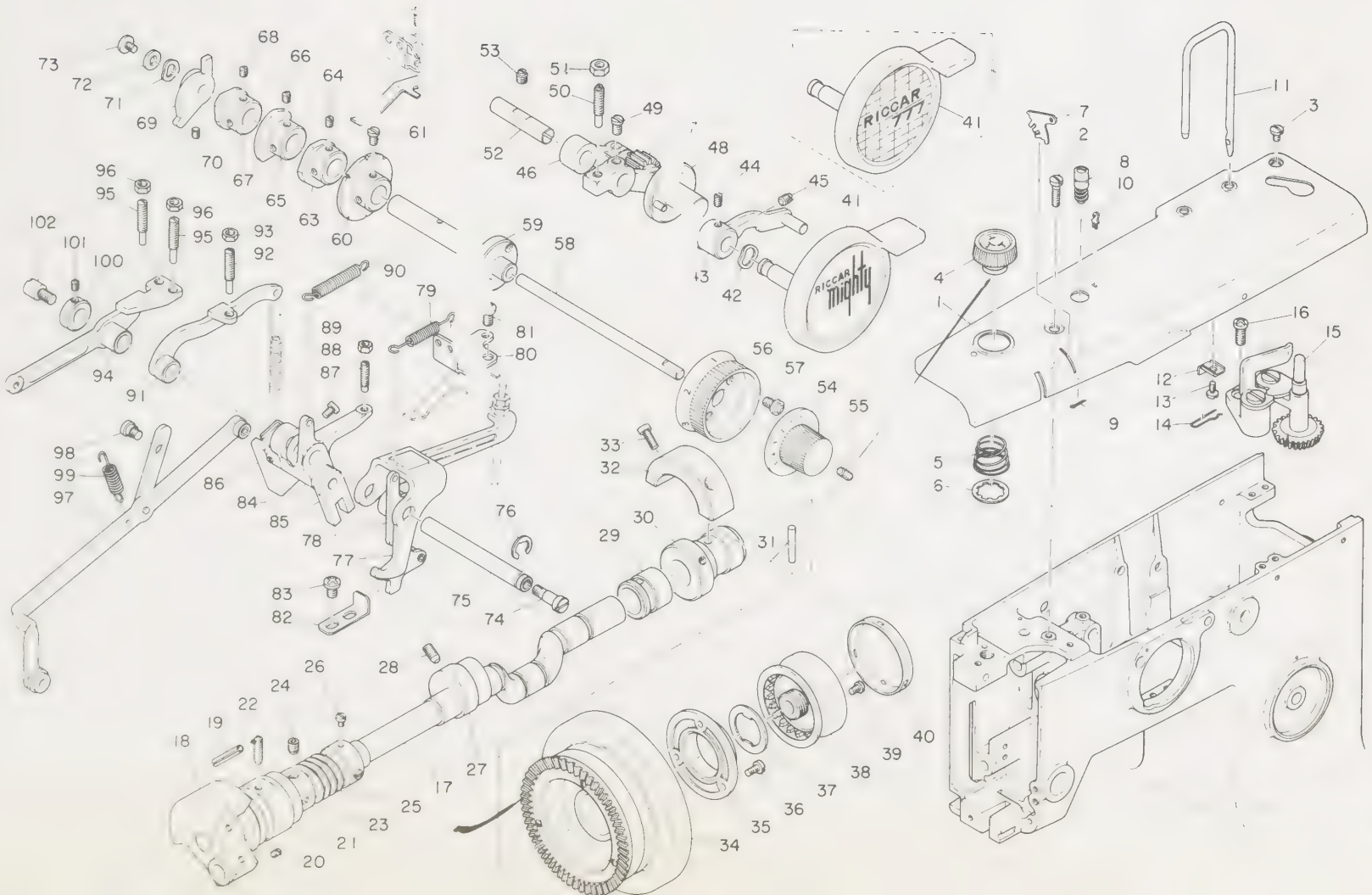
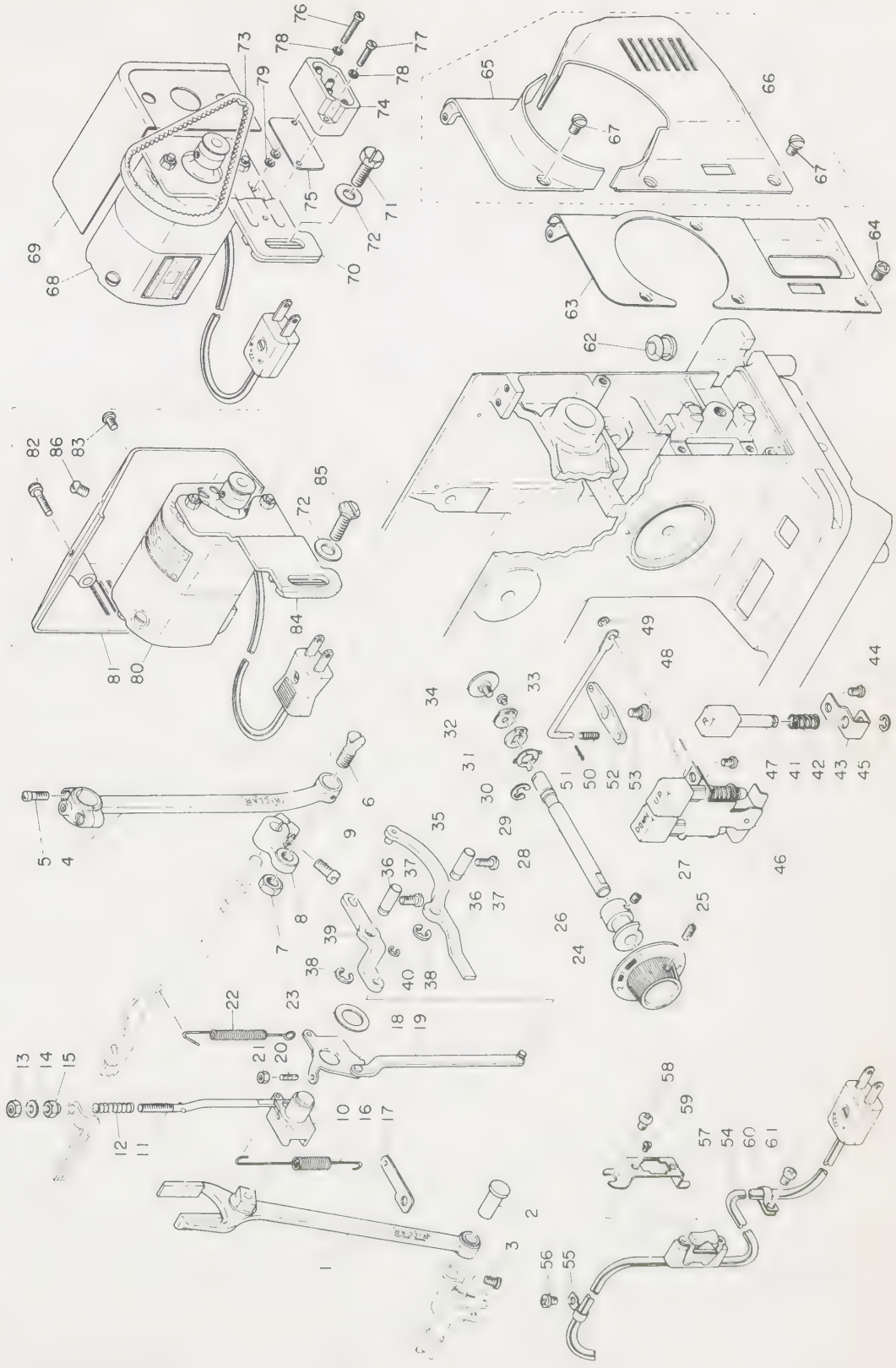


Figure 196

PARTS LIST

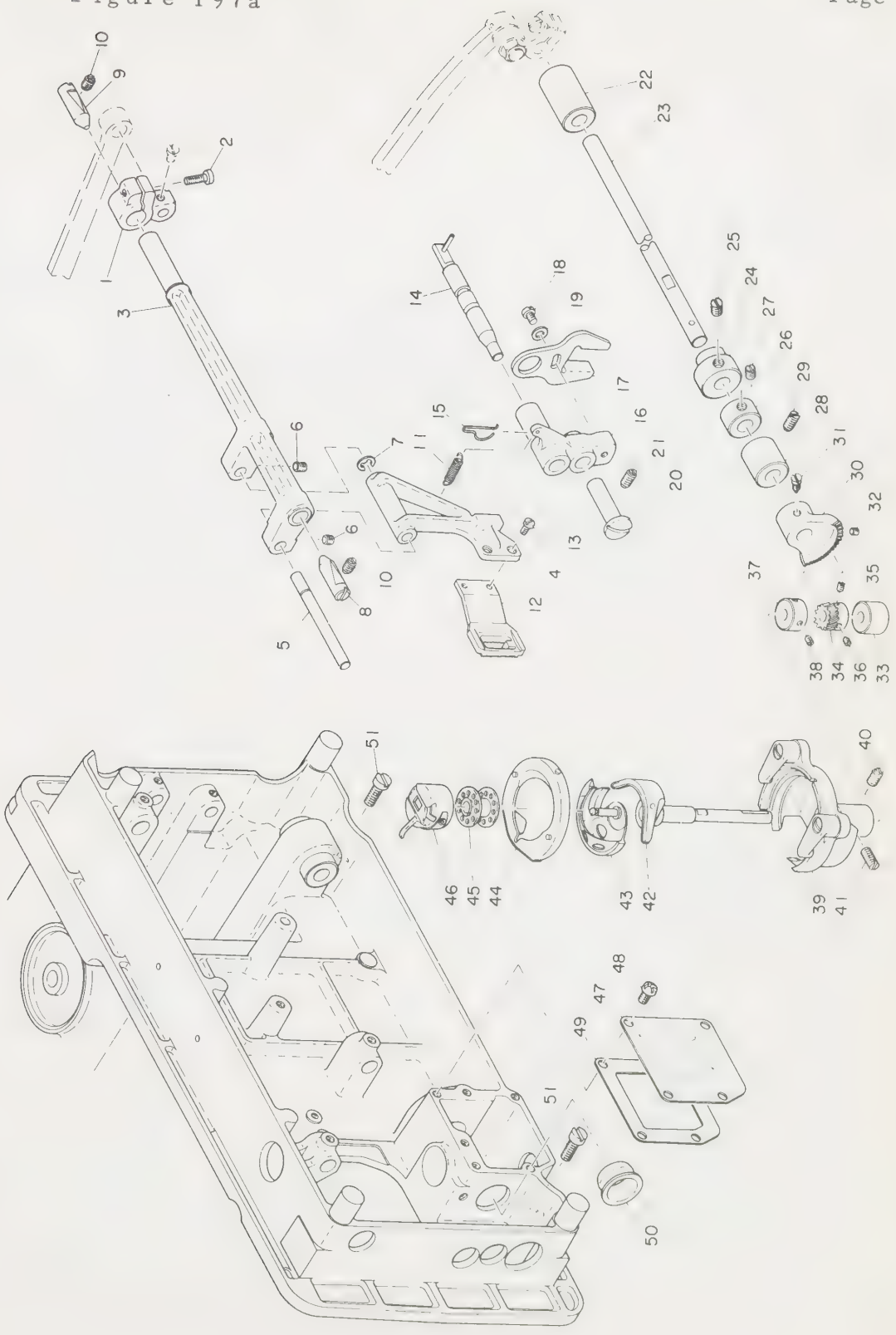
1.	Z-5521	Arm cover
2.	Z-2307	Arm cover set screw (2)
3.	Z-6041	Arm cover set screw (1)
4.	Z-5533	Pressure regulator dial
5.	Z-5535	Pressure regulator dial spring
6.	Z-5536	Pressure regulator dial spring set washer
7.	Z-5531	Arm cover thread guide (1)
8.	Z-5950	Thread guide (compl.)
9.	L-6087	Thread guide adjusting screw set pin
10.	Z-5532	Arm cover thread guide (2)
11.	Z-5537	Spool pin
12.	Z-5528	Spool pin adjusting plate
13.	L-1104	Spool pin adjusting plate set screw
14.	Z-5538	Spool pin spring
15.	Z-5870	Bobbin winder (compl.)
16.	L-4124	Bobbin winder set screw (2 pcs.)
17.	Z-5581	Arm shaft (assembled)
[18.	Z-2101	Arm shaft balance]
19.	L-2044	Arm shaft balance set pin
20.	H-1069	Arm shaft balance set screw
[21.	Z-5582	Arm shaft bushing (1)]
22.	Z-5592	Arm shaft bushing (1) set screw
[23.	Z-6156	Arm shaft collar]
24.	Z-6571	Arm shaft collar set screw (2 pcs.)
[25.	Z-5591	Worm]
26.	H-1174	Worm set screw (2 pcs.)
[27.	H-1396	Feed cam]
28.	H-1254	Feed cam set screw
29.	Z-6157	Arm shaft bushing (2)
30.	Z-5862	Hand wheel bushing
31.	H-1148	Hand wheel bushing set pin
32.	L-4128	Balance weight
33.	L-6113	Balance weight set screw (2 pcs.)
34.	Z-5861	Hand wheel
35.	Z-4519	Clutch
36.	H-1234	Clutch set screw (3 pcs.)
37.	Z-4518	Clutch motion washer
38.	Z-4510	Clutch motion (compl.)
39.	Z-4515	Clutch motion set screw (2 pcs.)
40.	Z-4517	Cap
41	Z-5700	Cam door (RZ-777)
(41)		Cam door (RICCAR-777)
42.	Z-5704	Cam door spring washer
43.	Z-5710	Cam contact detaching lever (compl.)
44.	H-1272	Cam contact detaching lever set screw (1)
45.	Z-1154	Cam contact detaching lever set screw (2)
46.	Z-5670	Holder (compl.)
[47.	Z-5681	Worm gear]
[48.	Z-5690	Cam shaft (compl.)]
49.	H-1174	Holder set screw
50.	Z-5673	Holder adjusting screw
51.	L-6151	Holder adjusting screw nut
52.	Z-5672	Holder supporting pin
53.	H-1069	Holder supporting pin set screw
54.	Z-5830	Zigzag width regulating dial (compl.)
55.	L-2056	Zigzag width regulating dial set screw
56.	Z-5775	Needle position selector dial
57.	L-4125	Needle position selector dial set screw (2 pcs.)
58.	Z-5773	Zigzag width regulating dial shaft
59.	Z-5772	Needle position selector dial shaft
60.	Z-5781	Dial positioner (compl.)
61.	Z-1363	Dial positioner set screw (2 pcs.)
62.	Z-5783	Dial positioner spring
63.	Z-5791	Needle position regulating cam
64.	Z-1154	Needle position regulating cam set screw (2 pcs.)
65.	Z-5801	Buttonholer feed cam
66.	Z-1154	Buttonholer feed cam set screw (2 pcs.)
67.	Z-5811	Buttonholer zigzag width regulating cam
68.	Z-1154	Buttonholer zigzag width regulating cam set screw (2 pcs.)
69.	Z-5821	Zigzag width regulating cam
70.	H-1174	Zigzag width regulating cam set screw (2 pcs.)
71.	Z-5833	Zigzag width regulating dial shaft spring washer
72.	Z-5774	Zigzag width regulating dial shaft washer
73.	Z-1078	Zigzag width regulating dial shaft fastening screw
74.	Z-5723	Cam contact shaft fastening screw (2)
75.	Z-5721	Cam contact shaft
76.	Z-6308	Cam contact shaft set ring
77.	Z-5724	Feed cam contact
78.	Z-5725	Zigzag width cam contact
79.	Z-5764	Zigzag width cam contact spring
80.	Z-5765	Spring holder
81.	L-4036	Spring holder set screw (2 pcs.)
82.	Z-5762	Cam contact stopper
83.	L-4036	Cam contact stopper set screw (2 pcs.)
84.	Z-5730	Needle position conductor (compl.)
[85.	Z-5736	Zigzag width connecting fork]
[86.	Z-5733	Zigzag width controller]
87.	L-6017	Zigzag width controller slide block stopper set screw
88.	Z-5732	Needle position conductor adjusting screw
89.	H-1263	Needle position conductor adjusting screw nut
90.	Z-5763	Needle position conductor spring
91.	Z-5741	Buttonholer feed lever
92.	Z-5673	Buttonholer feed lever adjusting screw
93.	H-1263	Buttonholer feed lever adjusting screw nut
94.	Z-5751	Zigzag width lever
95.	Z-5673	Zigzag width lever adjusting screw (2 pcs.)
96.	H-1263	Zigzag width lever adjusting screw nut (2 pcs.)
97.	Z-5840	Needle bar driving rod (compl.)
98.	Z-1273	Zigzag width link step screw
99.	Z-5852	Needle bar driving rod spring
100.	Z-5761	Cam contact shaft collar
101.	Z-1175	Cam contact shaft collar set screw (2 pcs.)
102.	Z-5722	Cam contact shaft fastening screw (1)



BLOCK-C

PARTS LIST

1.	Z-6314	Forked rod
2.	Z-6583	Forked rod pin
3.	H-1174	Forked rod pin set screw
4.	Z-6358	Crank connecting rod
5.	H-1393	Crank connecting rod set screw (2 pcs.)
6.	H-1163	Crank connecting rod tapered screw
7.	H-1164	Crank connecting rod tapered screw nut
8.	Z-6350	Crank connecting rod crank
9.	H-1243	Crank connecting rod crank set screw
10.	Z-5600	Feed regulator (compl.)
[11.	Z-5603	Feed interlocking rod]
12.	Z-6045	Feed interlocking rod spring
13.	Z-5605	Feed adjusting nut
14.	Z-5608	Feed adjusting stopper washer
15.	L-6151	Feed adjusting lock nut
16.	Z-5614	Reverse spring
17.	Z-5555	Reverse spring holder
18.	Z-5610	Feed regulator plate (compl.)
[19.	ZZ-5612	Reverse link]
20.	Z-5619	Feed regulator plate adjusting screw
21.	H-1263	Feed regulator plate adjusting screw nut
22.	Z-5743	Buttonholer feed lever spring
23.	Z-5554	Feed regulator bushing washer
24.	Z-5630	Feed regulator dial
25.	L-6042	Feed regulator dial set screw
26.	Z-5651	Feed regulating cam
27.	Z-1154	Feed regulating cam set screw
28.	Z-5641	Feed regulator shaft
29.	Z-6308	Feed regulator shaft set washer
30.	Z-6349	Feed regulating stopper spring
31.	Z-5653	Feed regulating stopper (1)
32.	Z-5654	Feed regulating stopper (2)
33.	Z-6348	Feed regulating stopper adjusting screw
34.	Z-6351	Feed regulating stopper fastening screw
35.	Z-5615	Reverse lever (1)
36.	Z-5618	Reverse lever pin
37.	L-4124	Reverse lever pin set screw
38.	Z-6047	Reverse lever pin set ring
39.	Z-5617	Reverse lever (2)
40.	Z-6193	Reverse lever (2) set ring
41.	Z-5621	Reverse sewing button
42.	Z-5622	Reverse sewing button spring
43.	Z-5623	Reverse sewing button supporting plate
44.	L-4036	Reverse sewing button supporting plate set screw
45.	Z-6047	Reverse sewing button set washer
46.	Z-5660	Drop feed (compl.)
47.	L-4036	Drop feed supporting plate set screw (2 pcs.)
48.	Z-5667	Drop feed connecting bar
49.	Z-6193	Drop feed connecting bar set ring
50.	Z-6377	Drop feed connecting bar spring
51.	L-6216	Drop feed connecting bar set pin
52.	Z-6378	Drop feed regulating crank
53.	Z-6125	Drop feed regulating crank step screw
54.	Z-5890	Switch cord (compl.)
55.	Z-5898	Cord holder (1)
56.	L-4036	Cord holder (1) set screw
57.	Z-5899	Switch bracket
58.	L-4036	Switch bracket set screw (2 pcs.)
59.	Z-2417	Switch set screw (2 pcs.)
60.	Z-5932	Cord holder (2)
61.	L-4036	Cord holder (2) set screw
62.	Z-5927	Rubber bushing
63.	Z-5863	Back cover plate (RZ-777)
64.	L-4036	Back cover plate set screw (4 pcs.)
65.	Z-5413	Belt cover (1) (RICCAR-777)
66.	Z-5414	Belt cover (2)
67.	Z-6132	Belt cover (1) (2) set screw (3 pcs.)
68.	E-1130	Motor (compl.) (RZ-777)
69.	E-1010	Motor cover
70.	E-1013	Motor bracket
71.	E-1051	Motor bracket clamping screw
72.	E-1052	Motor bracket clamping screw washer
73.	E-1023	Belt
74.		Consent
75.		Consent inserting plate
76.		Consent set screw (1)
77.		Consent set screw (2)
78.		Consent set screw washer (2 pcs.)
79.		Consent washer (2 pcs.)
80.	E-1140	Motor (compl.) (RICCAR-777)
81.	Z-5411	Motor cover
82.	Z-2307	Motor cover set screw (1)
83.	Z-6132	Motor cover set screw (2)
84.	E-1019	Motor bracket
85.	E-5412	Motor bracket clamping screw
86.	Z-6041	Belt cover set screw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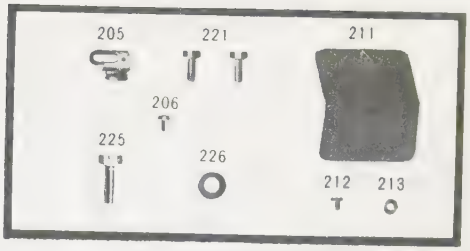
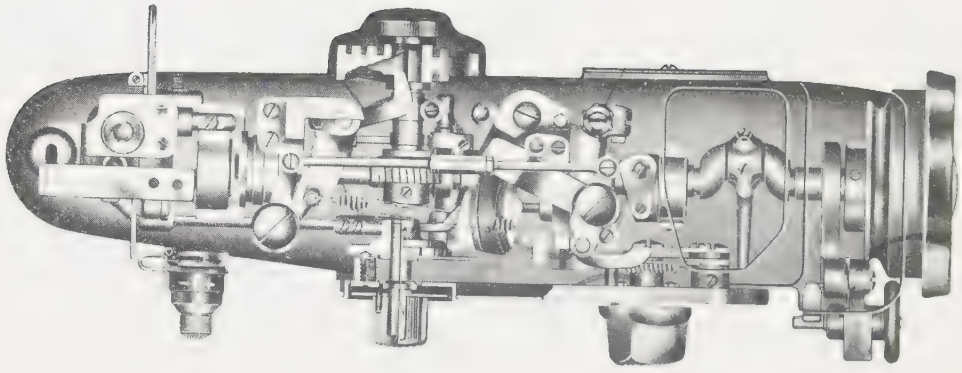
BLOCK-D

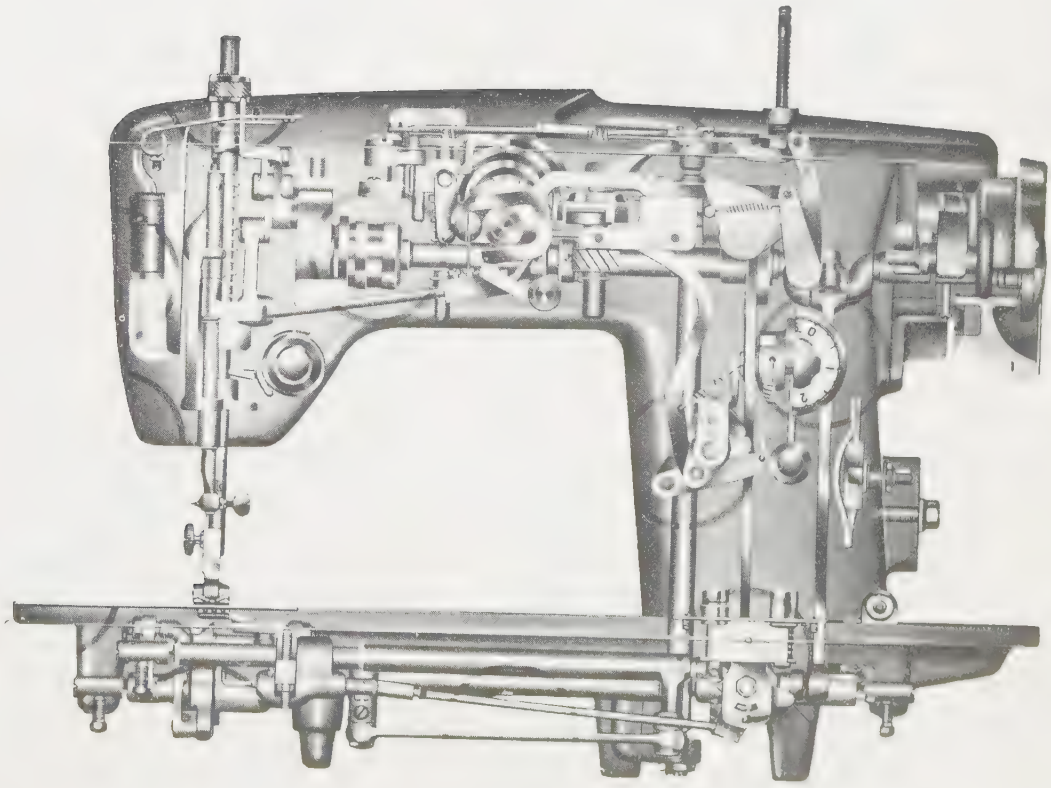
PARTS LIST

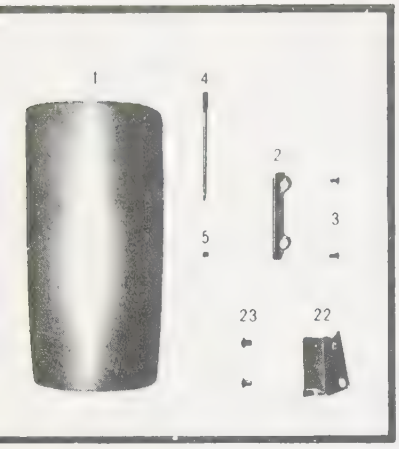
1.	Z-6352	Feed rock shaft crank
2.	H-1243	Feed rock shaft crank set screw
3.	Z-5940	Feed rock shaft (compl.)
[4.	Z-5942	Feed bar]
[5.	Z-5943	Feed bar shaft]
6.	H-1174	Feed bar shaft set screw (2 pcs.)
[7.	Z-6047	Feed bar shaft set ring]
8.	L-6115	Center bar (1)
9.	L-6116	Center bar (2)
10.	H-1069	Center bar set screw (2 pcs.)
11.	Z-2373	Feed bar spring
12.	Z-6357	Feed dog
13.	H-1234	Feed dog set screw (2 pcs.)
14.	Z-6503	Feed lifting regulator bar (with pin)
15.	Z-6505	Feed lifting regulator bar spring
16.	Z-2374	Feed lifting rock crank
17.	Z-6367	Feed lifting rock crank fork
18.	H-1383	Feed lifting rock crank fork set screw
19.	Z-2252	Feed lifting rock crank fork set screw washer
20.	Z-6369	Feed lifting rock crank pin
21.	H-1069	Feed lifting rock crank pin set screw
22.	Z-6363	Oscillating shaft bushing (2)
23.	Z-6361	Oscillating shaft
24.	Z-6366	Feed lifting cam
25.	H-1069	Feed lifting cam set screw (2 pcs.)
26.	Z-6364	Oscillating shaft collar
27.	H-1063	Oscillating shaft collar set screw (2 pcs.)
28.	Z-6362	Oscillating shaft bushing (1)
29.	H-1069	Oscillating shaft bushing (1) set screw
30.	Z-6365	Oscillating shaft gear
31.	Z-6572	Oscillating shaft gear set screw
32.	H-1063	Oscillating shaft gear set screw
33.	Z-6383	Shuttle driver shaft bushing
34.	Z-6381	Shuttle driver shaft gear
35.	Z-1154	Shuttle driver shaft gear set screw (1)
36.	Z-6388	Shuttle driver shaft gear set screw (2)
37.	Z-6401	Open shuttle race holder collar
38.	Z-1154	Open shuttle race holder collar set screw (2 pcs.)
39.	Z-6390	Open shuttle race (compl.)
40.	H-1069	Open shuttle race set screw (1)
41.	Z-2379	Open shuttle race set screw (2)
42.	Z-6382	Shuttle driver (compl.)
43.	Z-1389	Shuttle hook
44.	Z-6393	Shuttle hook holder
45.	H-1229	Bobbin
46.	Z-6450	Bobbin case
47.	Z-2376	Gear box cap (1)
48.	L-4036	Gear box cap set screw (4 pcs.)
49.	Z-2377	Gear box cap packing
50.	Z-6385	Gear box cap (2)
51.	H-1159	Hinge set screw (2 pcs.)

LIST OF PARTS





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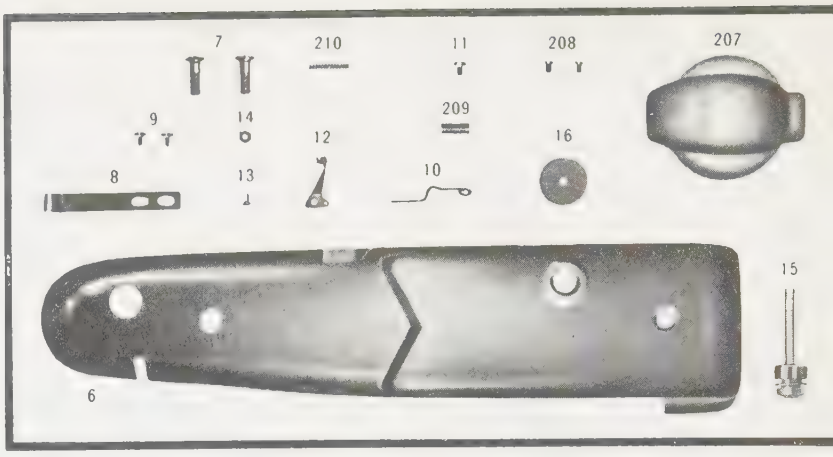
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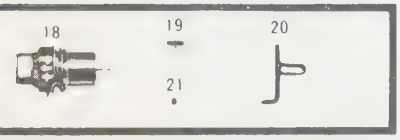
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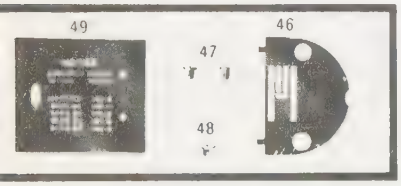
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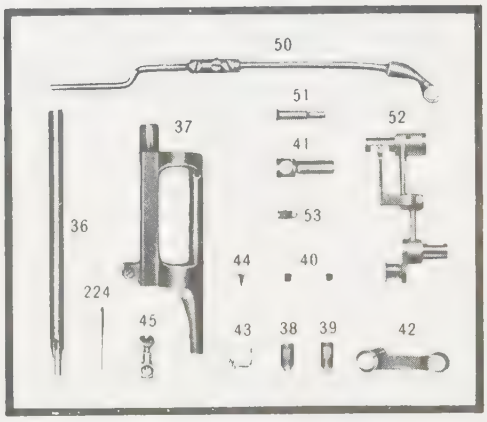
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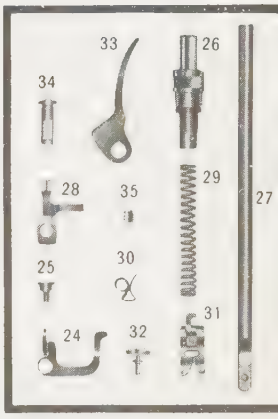
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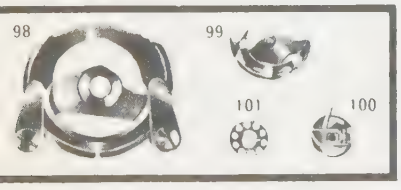
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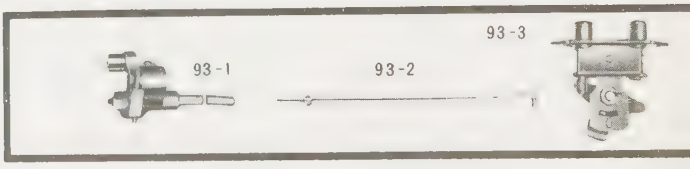
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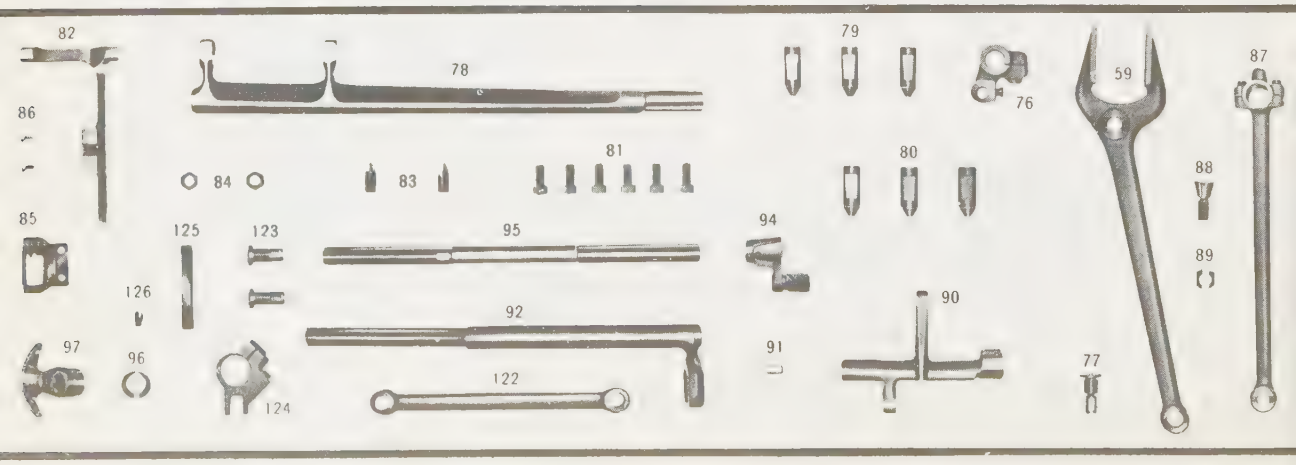
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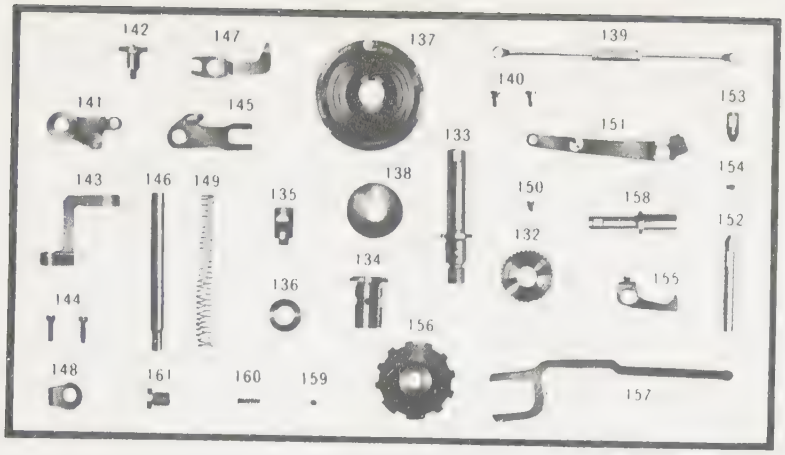
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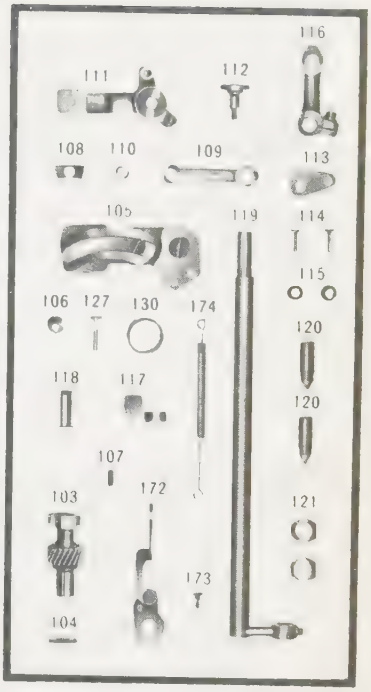
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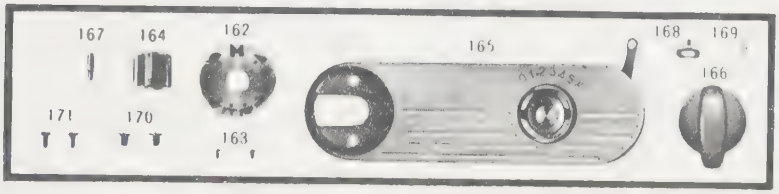
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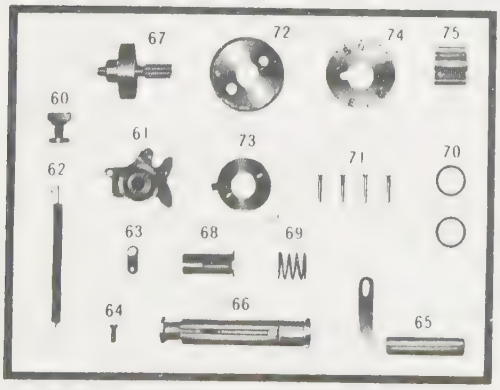
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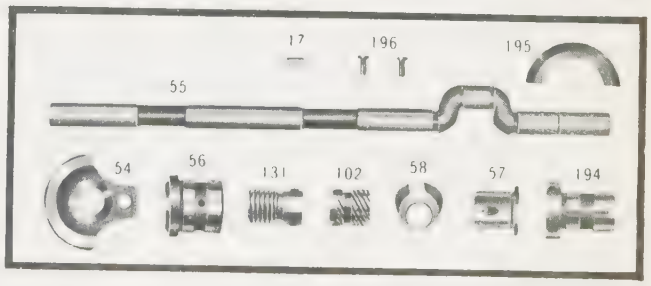
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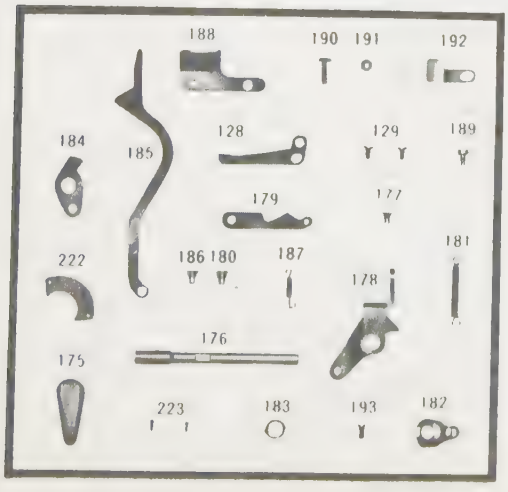
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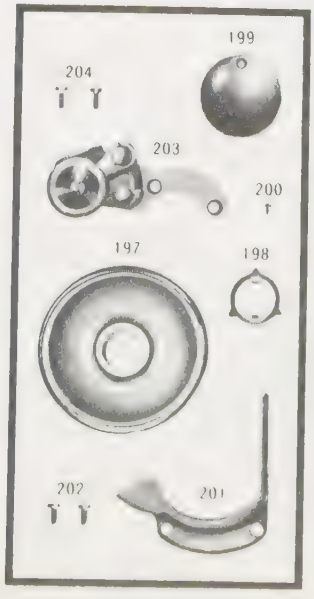
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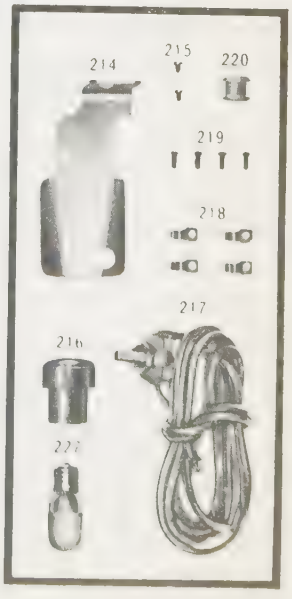
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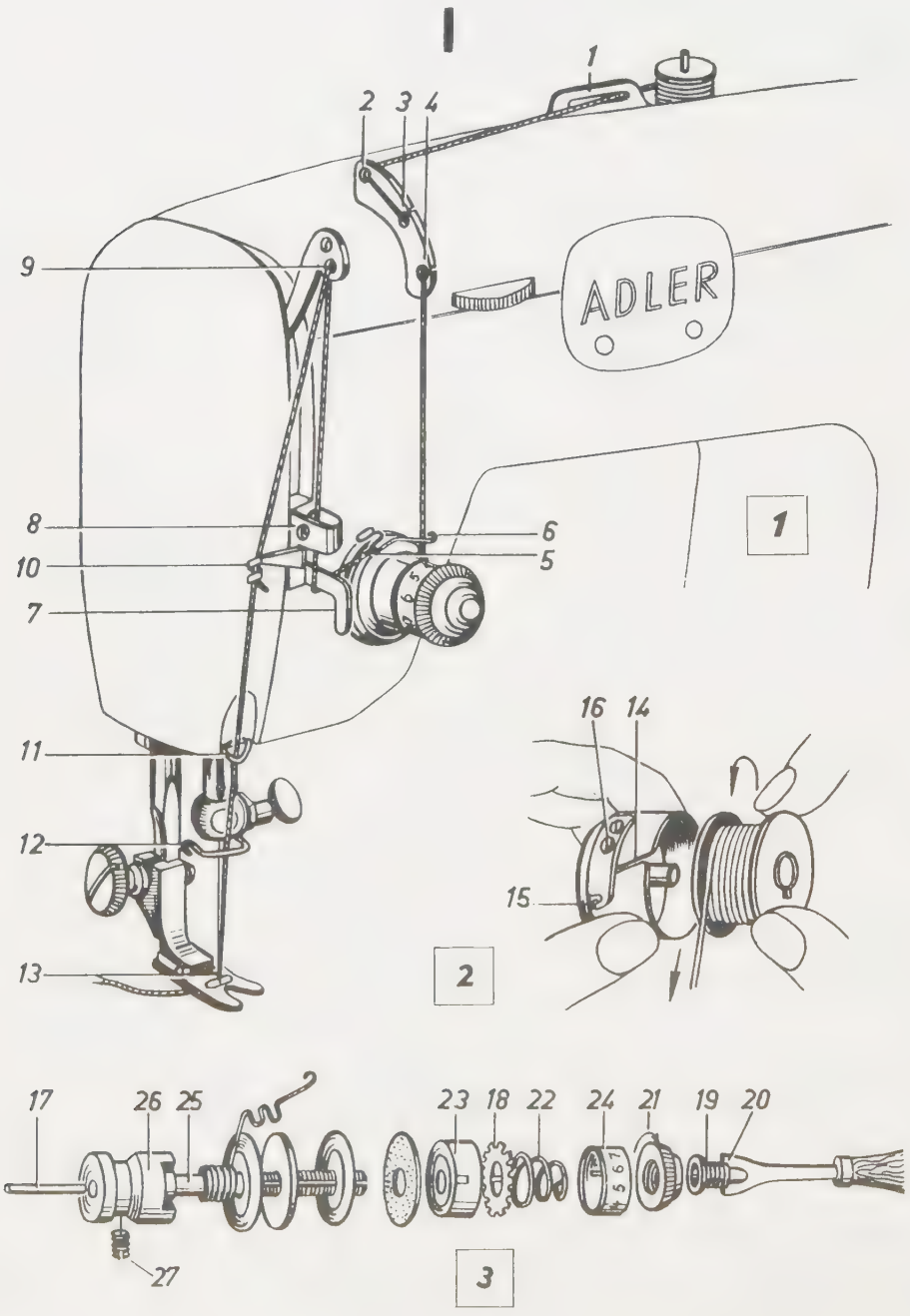
The Adler Automatic.

The Adler is another example of the excellent workmanship European companies build into their machines.

They are precision made with extremely close tolerances at all vital spots and are made to last for many years.

Figure 198



Upper tension.

Steps 1 thru 13 illustrate correct threading of the Adler 289A-589A automatic.

Nothing new here except excellent thread control at points 2, 3 and 4.

Take-up lever is drilled for double needle operation.

Sewing mechanism is transverse hook, therefore needle threads from the front. Flat shank of needle faces away from the operator.

To dismantle tension assembly, a special screwdriver with cut-out blade must be used.

Hold threaded sleeve(19, figure 198, securely, while turning knurled knob (21), counterclockwise with a pair of pliers.

Remove balance of components according to sub-assembly 3, figure 198.

Tension control is made by adjusting numbered dial.

0 setting is for extremely loose upper tension.

10 setting is for extremely tight upper tension.

To tighten beyond setting 10, turn threaded sleeve inward as needed. Lock in place with special screwdriver.

If tension discs are thread cut, smooth with emery paper.

If damage is too severe, replace the tension discs.

If upper thread fails to release when presser bar lifter is activated, check release pin(17).

A broken or bent pin must be replaced.

Check spring adjustment.

Properly adjusted check spring should release the thread as needle enters the material.

To adjust, loosen pin(25), in adjustment sleeve(26).

Release tension pin. (tension components must be removed so tension dials will release far enough for spring to be adjusted.

If spring has too much check, turn adjustment sleeve counterclockwise as needed.

Reverse the procedure if spring has too little check.

Tighten pin, re-assemble tension components.

Test sew.

If spring is broken or bent, replace it.

The bobbin case.

Correct threading of bobbin case is illustrated in figure 198, sub-assembly 2.

Thread comes off bobbin counterclockwise into notch 14, under spring and into notch 15.

Bobbin tension is adjusted by turning adjusting screw(16).

For more lower thread tension, turn screw(16), clockwise as needed.

For less bobbin thread tension, turn screw counterclockwise.

If spring fails to hold tension, remove and inspect closely.

A thread-cut bobbin case spring should be replaced.

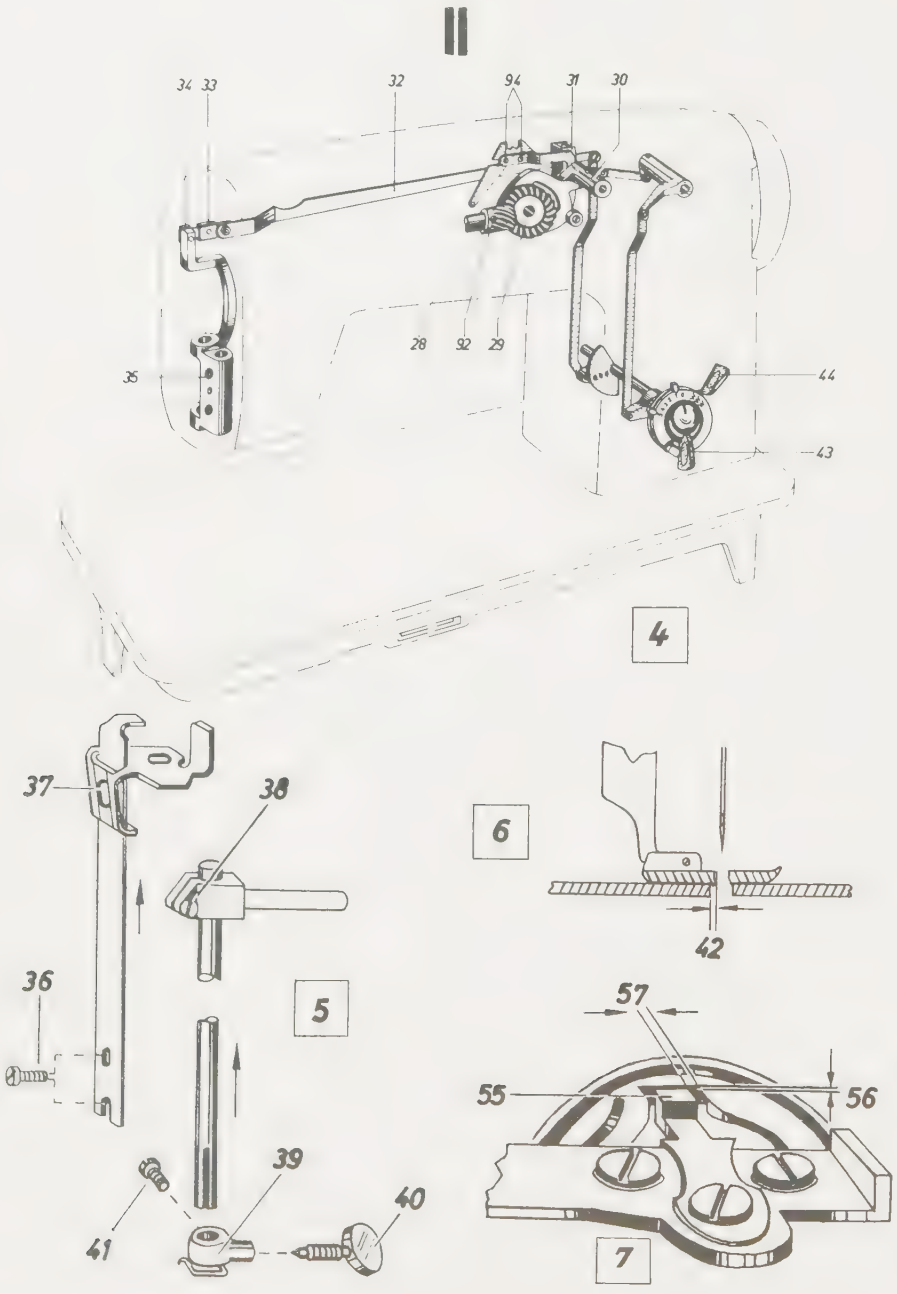
Clean lint and dirt from the area.

Oil all moving parts one every service call, or once a month.

Service tip: When new parts are needed, always replace them. Always insert a new needle when servicing a sewing machine.

Skeleton showing zig zag and needle bar assembly.

Figure 199



Needle bar components.

1. Needle bar rocker(35).
2. Needle bar.
3. Block and adjusting screw(38).
4. Needle clamp and screw(39-40).
5. Needle stop screw(41).
6. Quick adjuster and set screws(36-37).
7. Needle(not illustrated).

To remove needle bar, loosen screws(36, figure 199) on bar adjuster.
Remove the adjuster by pulling out toward the top.
Loosen screw(38).
Remove needle clamp, screw and stop screw.
Pull needle bar out top of machine.
Replace new bar in reverse order.
Later text covers timing.

The needle stop(41) prevents needle from sliding too far up into bar.
If the stop screw is broken, or missing, machine will skip stitches.

Sub-assembly 6 illustrates needle guard in presser foot.
If groove becomes dirty, machine may break thread.

Zig zag system.

Lever(43) changes the width of zig zag
When lever is changed it changes position of width link(31).
Sidewise motion is caused when machine turns and lever(43) is activated. Main shaft turns gears(28-29), which turns stitch width fork(30) and link(31) which connects with link(32) with link and rod(33 & 34) and moves rocker.
The rocker fits over needle bar and moves sidewise when activated.

Needle bar position lever.

The needle position lever(44) changes needle from left, center and right, straight sewing position. Zig zag will operate from all three positions.

If needle bar acts erratically when zig zag lever is activated, check gear (29). If mesh isn't accurate, loosen screw(92) and move until correct. The screw is accesible through a hole in rear of machine.

Double needle.

The double needle is adaptable by using a twin needle clamp.
Before using, check timing with hook and be sure clearance is correct.

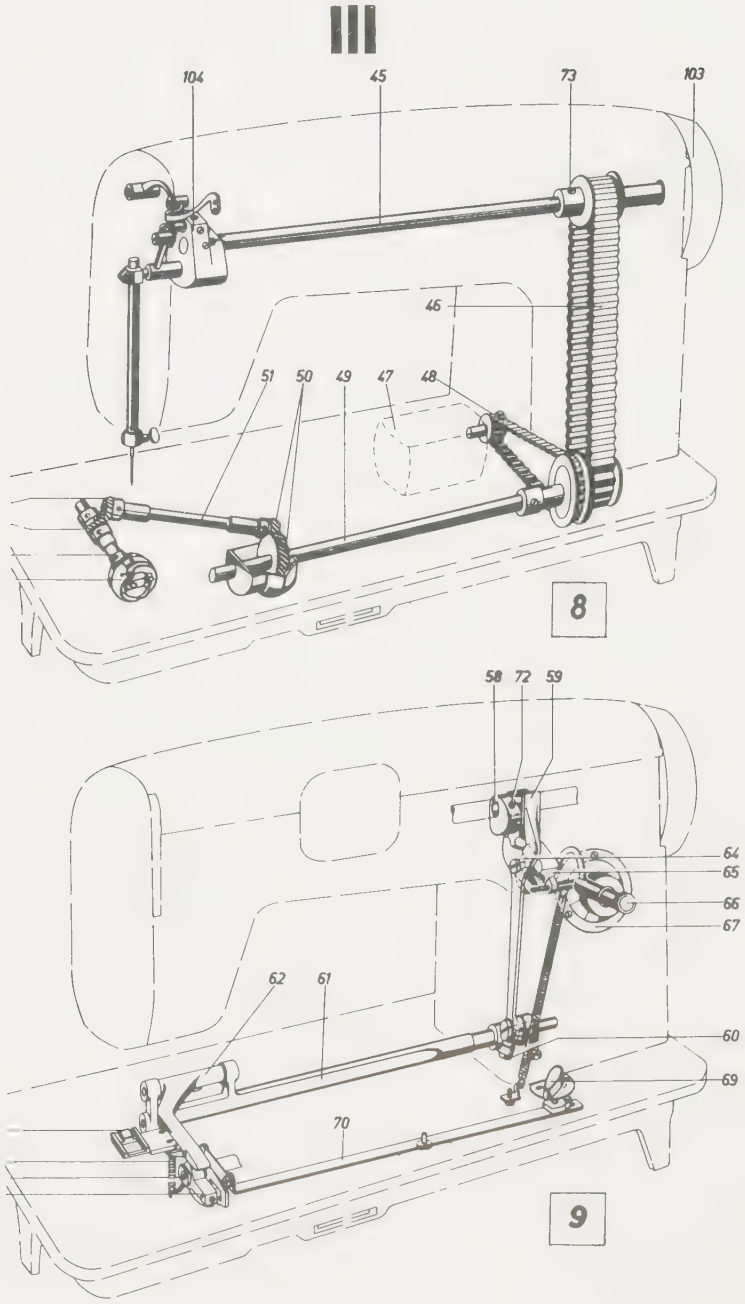
Sub-assembly 7.

Sub-assembly 7 illustrates bobbin case holder and lug(55, 56).
Screw should be adjusted so space(57), allows thread through easily.
Over-adjustment will cause thread to break.
Under-adjustment will cause a lot of noise and loose thread control.

Needle.

Drive assembly(upper and lower) and feed assembly.

Figure 200



The hook and lower drive.

The lower drive is activated driectly from the motor(47) with belt(48) and lower assembly is timed at this point.
The hook is driven from shafts(49 & 51) by two sets of helical gears.
The Adler hook functions in same manner as other high speed rotarys do, and is one of quieter machines on the market.
The hook catches the upper thread as loop is thrown when needle is on up-stroke.
If hook contains needle strike marks, smooth with emery cloth. If marks are too severe, replace the part.
Timing is covered in later text.

The feed mechanism. (Figure 200).

The feed fork(59) runs off cam(58) which is attached to upper main shaft, and is controlled by length of stitch knob(66).
The fork connects lower feed mechanism at feed block(60).
Fork action transmits through feed bar and rocker shaft(61 and 62) to the feed dog.
To raise height of feed dog, loosen set screw on rocker cam and adjust it as needed. Proper height is 1/32" above level of needle plate.

Timing the needle bar and feed dog.(figure 201).

To time feed dog, loosen set screw(73, figure 200).
Turn balance wheel until feed makes motion like 10, figure 201.
Hold the belt and turn balance wheel until needle and feed dog are at highest point.
Tighten set screw and test sew.
Correct motion of feed dog is: forward motion(74), dropping of dog(75). Return to starting position(76), and upward motion of feed dog(77).

Timing the needle bar.

Lower needle to it's lowest position(sub-assembly 12, figure 201).
Take-up arm should be half-way on downward stroke.
Tip of hook should be at 45 degrees away from needle.
Feed dog should be at lowest position, starting toward starting point.
Loosen screw(36) and turn balance wheel until hook enters loop.
Move needle bar up slightly, until top of needle eye is .04" below hook.
Tighten set screw.
When the needle is set in middle position, clearance between hook point, and needle should be .004".
Disregard gauge shown in sub-assembly 15. Above adjustment will do.

The bobbin case.

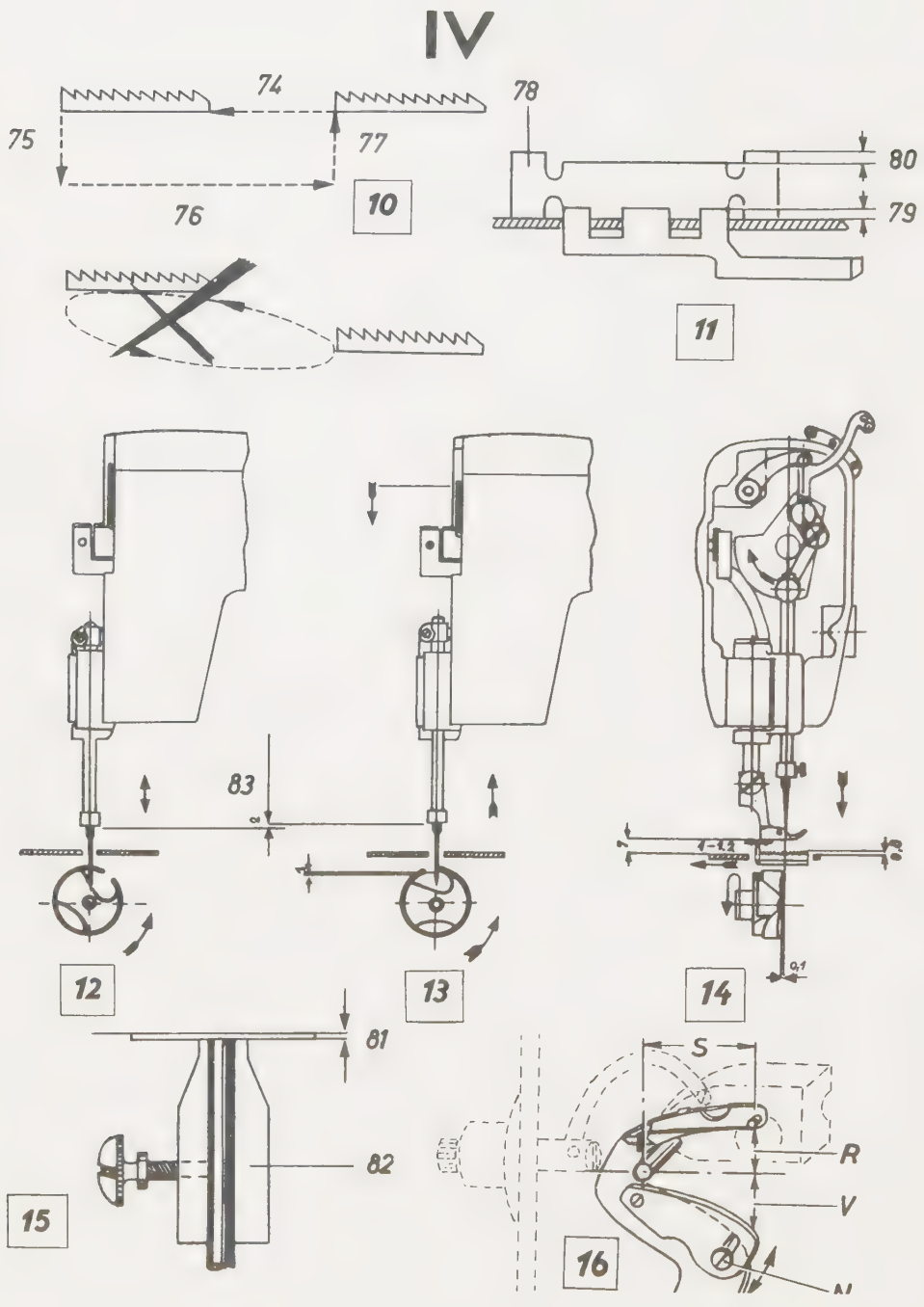
The bobbin case holder should fit in place with lug on holder located accurately in notch in lower end of case so feed dog won't strike it.
If bobbin case does contact the feed dog, bend holder downward.

Tension assembly.

The tension is similiar to many models already covered, refer to previous text earlier in this chapter.

Timing, for both needle bar and feed dog.

Figure 201



The Automatic assembly.

The automatic unit(sub-assembly 17, figure 202) when activated, controls the width of stitch, position and length of stitch.

The Adler automatic is removable cam type, with three control unit.

When automatic controls are engaged, the manually operated controls become inert and may be re-engaged only after automatic operation ceases.

The automatic unit doesn't alter any manual operational settings.

Service.

If automatic unit becomes extremely noisy, or sews decorative stitches in an erratic manner, remove cover on upper arm.

Inspect gears(84 and 85, figure 202).

If loose, loosen screw(86).

Adjust screws(87 and 88), until gears mesh properly.

Adjusting stitch width mechanism.

When stitch width mechanism is properly adjusted, needle should lower in motion illustrated in figure 18, of figure 202.

Needle must enter cloth in straight downward motion.

To adjust, loosen screw(92), figure 199, and move bevel gear back.

Turn bevel gear(29) until properly adjusted. Tighten screw.

Adjusting automatic stitch width mechanism.

Engage automatic stitch width control.

Needle shouldn't swing when in this position.

If needle moves, turn eccentric screw(93) until corrected.

To check zig zag needle position, set automatic stitch position knob on.

Set width control on widest throw.

Disengage the drop feed.

Place a business card under presser foot and lower foot.

Penetrate card at all three positions per drawing 19.

Return stitch width control to 0.

Turn balance wheel and lower needle into center position.

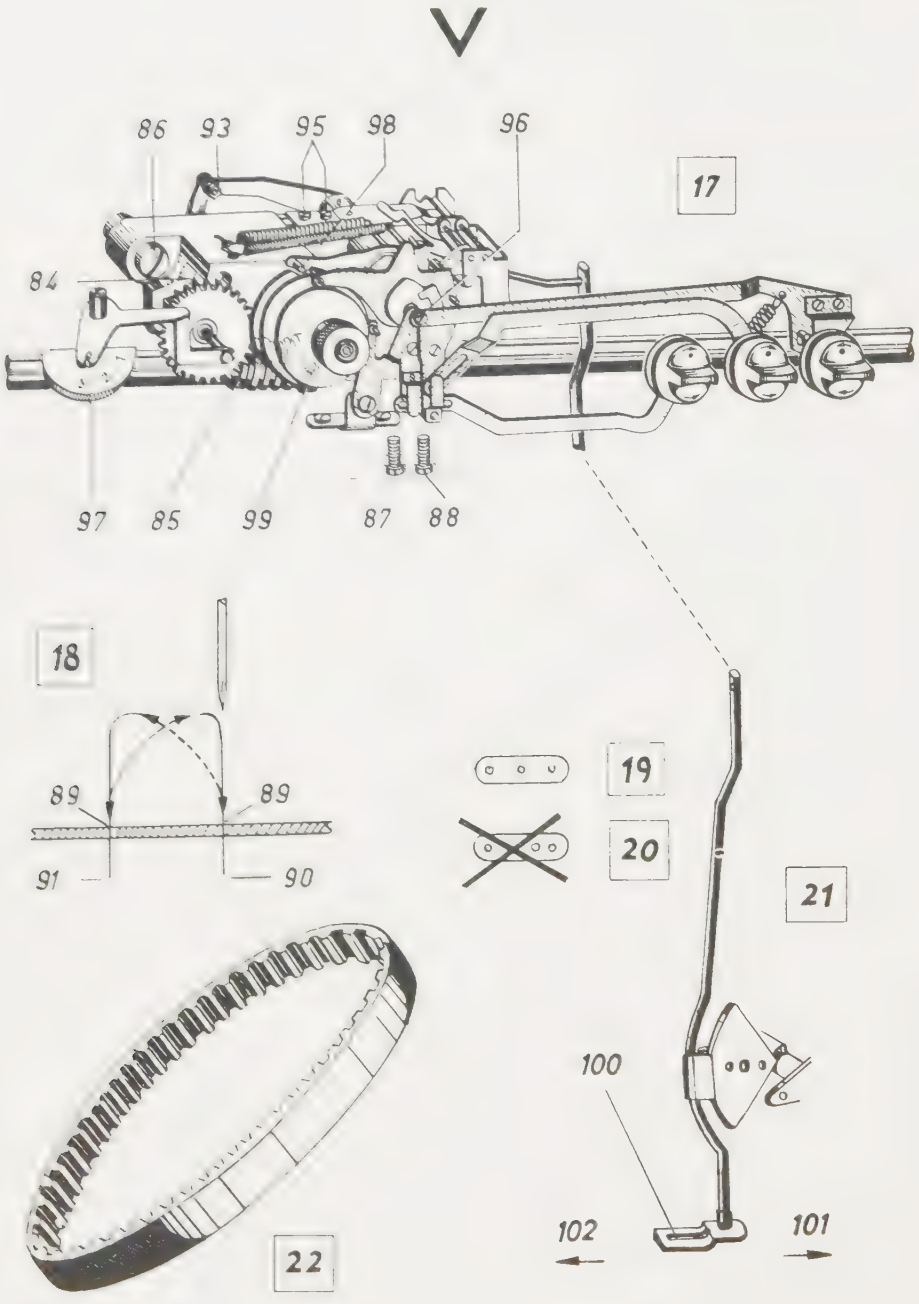
If needle doesn't enter hole in exact spot, loosen screws(94, figure 199), and holding bracket in place, engage lever 44 until needle is properly set.

Tighten set screws(94) and test sew.

If further adjustment is needed, loosen screw(95), hold spring in place as you press the spring into center position of the catch.

Tighten screw(95).

Figure 202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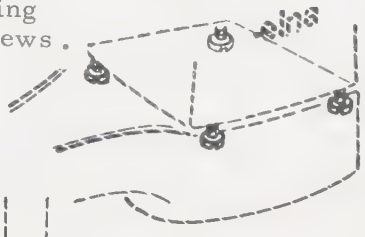
The Elna Supermatic.

Needle clearance-Free Arm

Loosen 4 casing assembly screws.



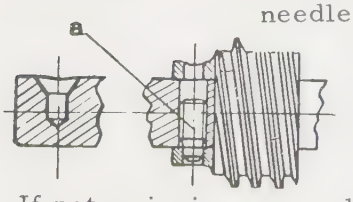
Adjust to proper clearance by moving upper casing in relation to lower casing.

(.002")

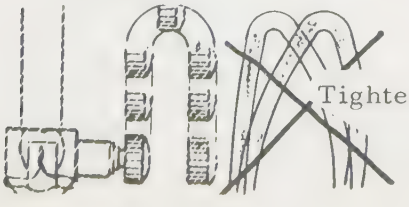
Tighten all casing screws.

Elna Disc drive.

Run machine full speed and observe arc of the needle bar.

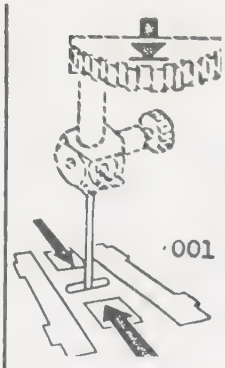


If not swinging properly, loosen screw(a). Loosen worm gear and change it's position until corrected.

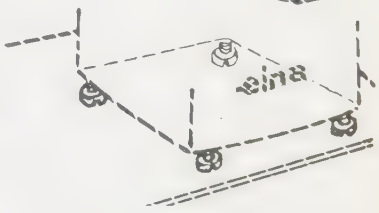


Tighten screw(a).

Needle clearance-Flat Bed



Loosen 4 casing assembly screws.

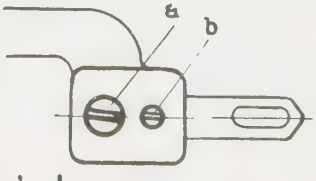


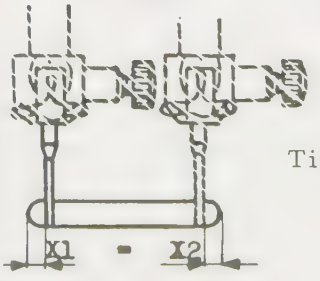
Loosen 3 of 4 screws slightly and adjust the clearance like #1.

Tighten 3 lower casing screws.

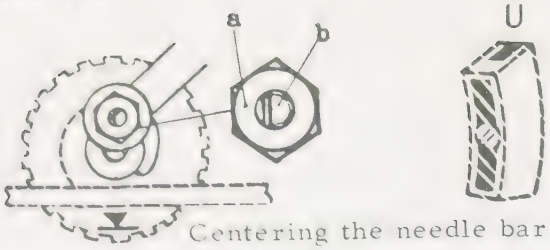
Needle bar swing.

Loosen screw(a) and adjust screw(b) until corrected.





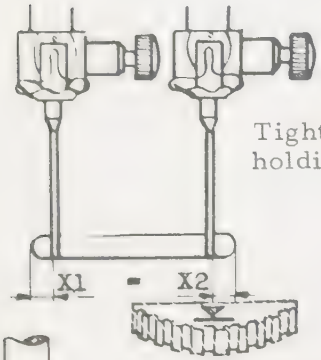
Tighten screw(a).



Centering the needle bar

Loosen nut(a) and adjust screw(b) as needed. See X-1/X-2.

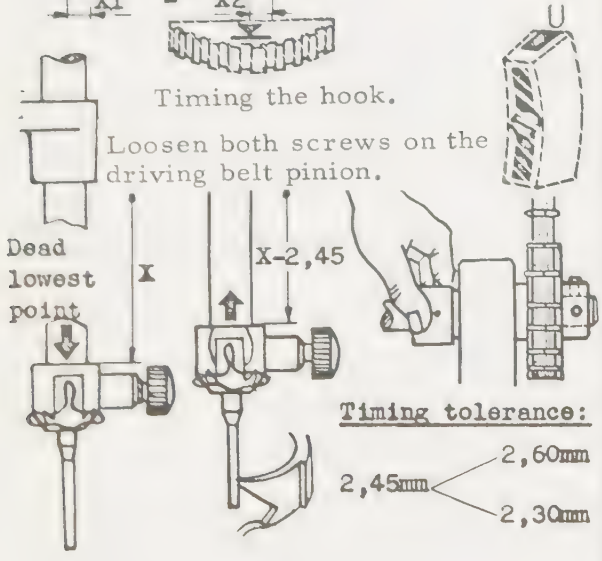
The groove on eccentric(b) must be to the left.



Tighten nut(a) while holding eccentric(b).

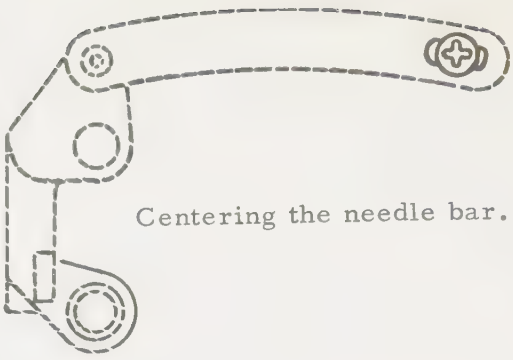
Timing the hook.

Loosen both screws on the driving belt pinion.



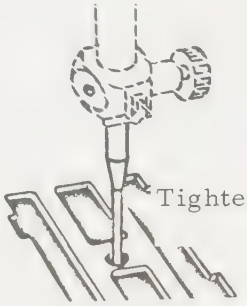
Drop needle to lowest point.

Turn to right as lower shaft is turned direction of operation, and bring hook point around to the needle.
Snug the shaft with driving belt pinion and tighten screws.
Lower shaft must turn freely.



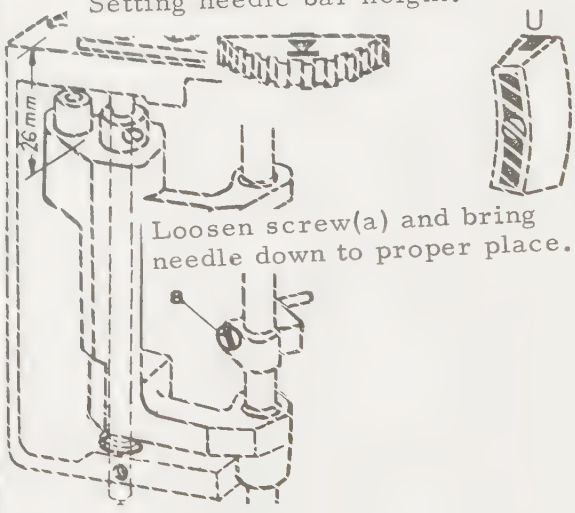
Centering the needle bar.

Loosen screw(a) and adjust the retainer to center of needle hole.



Tighten screw(a).

Setting needle bar height.

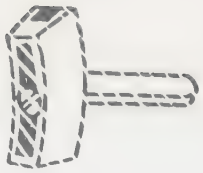


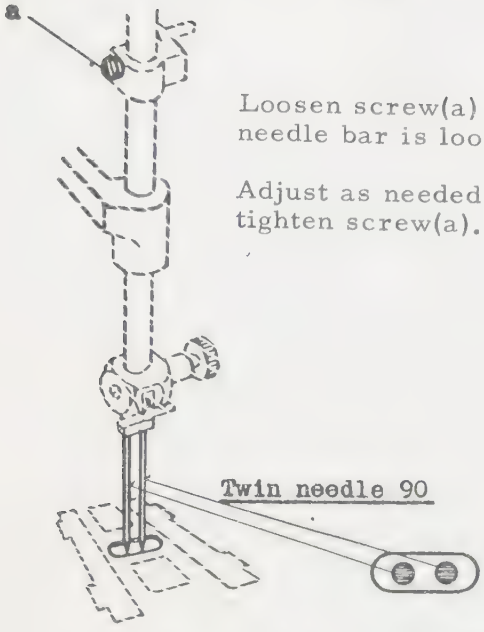
Loosen screw(a) and bring needle down to proper place.

The needle frame(cradle) should be approx. 1" from upper surface of machine.
If adjustment needed, push upward manually as needed.

Tighten screw(a).

Needle bar position

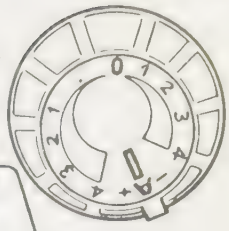




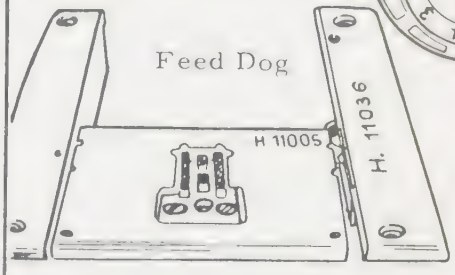
Loosen screw(a) until needle bar is loose.

Adjust as needed and tighten screw(a).

Loosen both screws and position as needed.



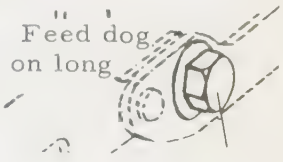
Feed Dog

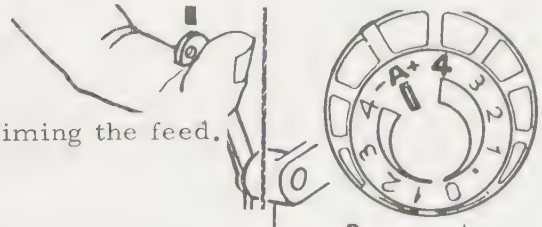


Tighten screws after positioning.

Proper height is 1/32" above needle plate.
To adjust, loosen nut(a) and turn upward.

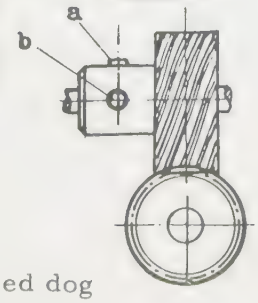
Check stitch length. Feed dog must not touch plate on long stitch at setting 4.





Timing the feed.

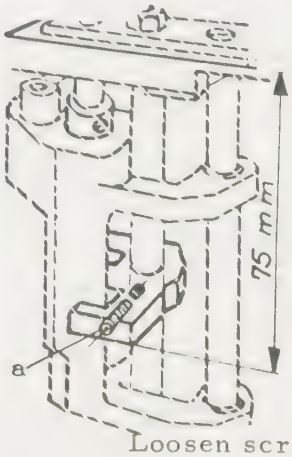
Loosen screws(a, b), to disengage feed pinion.



Place take-up arm at highest point.

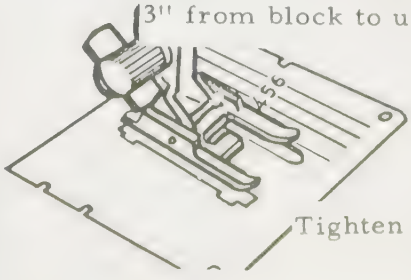
Turn feed gear until feed dog will continue 1 mm more.

Engage feed pinion so you can tighten both screws while lining it with the center of the feed gear.



Presser Bar

Loosen screw(a) and drop feed to lowest position.
Lower presser foot and hold bar in proper place.
Measurement is less than 3" from block to upper cast.



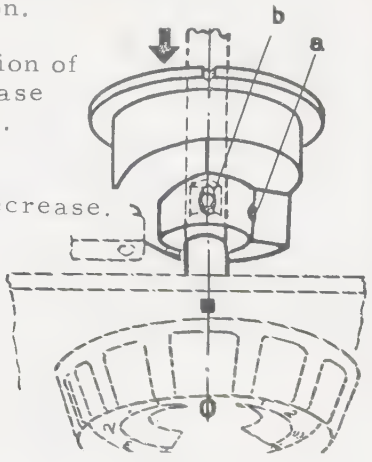
Tighten screw"a".

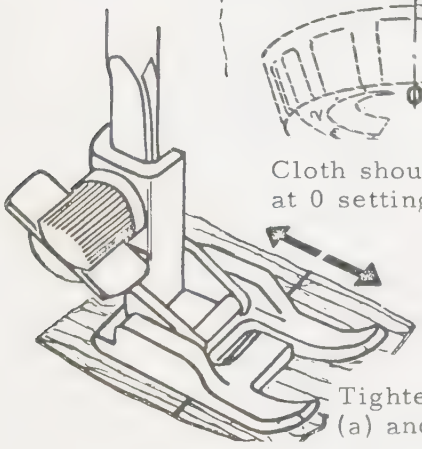
Stitch length

Free screw(a), and loosen(b) just enough to move feed control cam proper direction.

Move in direction of arrow to increase length of stitch.

Backward to decrease.



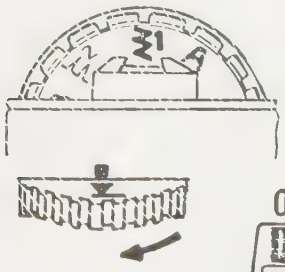


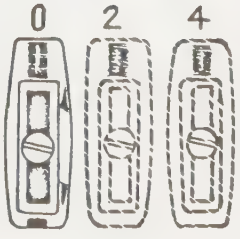
Cloth shouldn't move at 0 setting.

Tighten screws (a) and (b).

Automatic Buttonhole feed

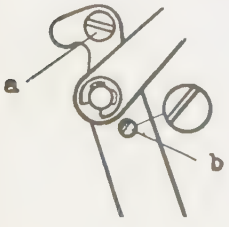
No double disc in the machine.



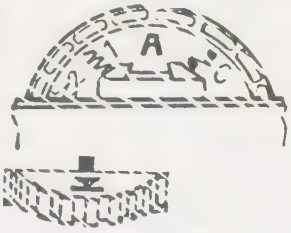


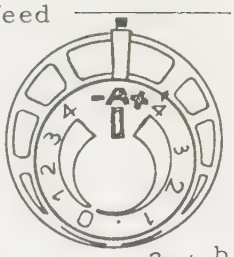
Loosen screw(a) and adjust (b)

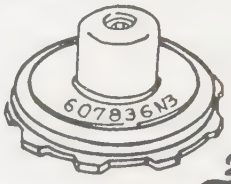
Adjust always on the first row of buttonhole.

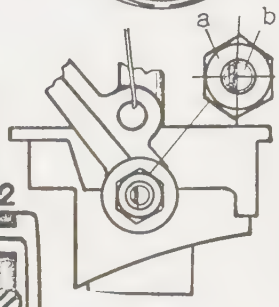


Automatic feed



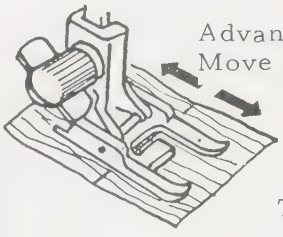






Loosen nut(a) adjust(b) to inert position, at setting A

The eccentric groove must be on the left.

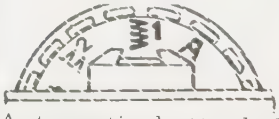


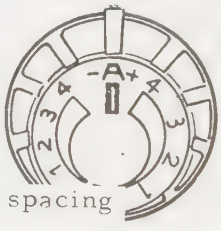
Advance at plus.
Move back at minus.

Advance and return nearly equal length

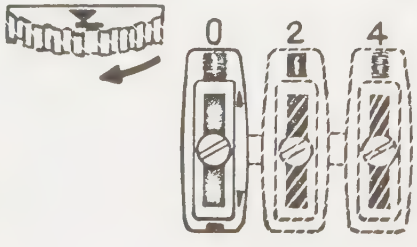
Tighten screw(a).

No double disc in the machine.

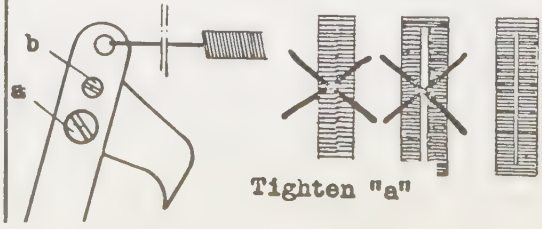




Automatic buttonhole spacing



Loosen screw(a) and adjust (b) to obtain ideal spacing.



NELCO SERIES "R" AUTOMATIC ZIG ZAG

Nelco is one of the more popular makes from the factories of Japan. The distributors originally brought the Necchi/Elna to America before going to Japan for a more moderately priced line of machines. The Nelco is quite popular in the "private brand" field as many national selling groups market the line under private label.

UPPER TENSION ASSEMBLY

Setting an upper tension for proper stitch forming is perhaps the simplest adjustment to make on a sewing machine. It's also one of the most misunderstood. When the lower thread pulls through the material, the upper tension is too tight, assuming the bobbin case tension is properly adjusted. To adjust, turn tension dial counterclockwise until corrected. When the upper tension pulls down through the material, upper tension is too loose, again assuming the lower tension is properly adjusted. To adjust, turn the tension adjusting dial, clockwise, until corrected.

When neither of the above adjustments correct the problem, additional service is generally required. The maladjustment could be in the check-spring, or somewhere in the tension assembly. If the spring is broken, and a quick inspection will reveal this, it must be replaced. This spring (fig. 215, #14) must function properly for good stitch forming. To replace it, it's necessary to remove the entire tension assembly.

REMOVAL OF TENSION ASSEMBLY

1. Loosen set screw(#2, figure 214) and remove assembly.
2. To disassemble, push button in center of knob-dial as knob(2, fig. 215) is turned counterclockwise, until pin behind numbered ring(3), is released. Loosen set screws(#5), figure 215.
   a. Remove components in order(as illustrated in figure 215). Note any discrepency in the order, that could be the problem.
3. To remove the check spring, loosen set screws(#16), and remove tension stud(#12), release pin(#11), and spring(#14).
4. Inspect components carefully. If any are broken or bent, replace them. If the check spring is broken, replace it.
   a. The tension discs are especially vulnerable to wear. Constant thread travel tends to wear grooves in the discs. If the wear tracks are shallow, buff the discs with a suitable abrasive to insure a very smooth surface. If the discs are too deeply thread cut and beyond correction by buffing, replace them.
   b. Check both tension springs (#'s 6 & 8). If the resiliency is gone replace the springs.
5. If the tension dial doesn't hold a setting, use a small screwdriver to spread tension stud(#12) at threaded end. Use extreme caution.
6. To reassemble, simply reverse the order of removal(figure 215).

Figure 214

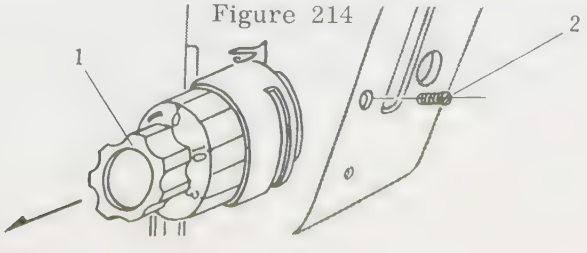
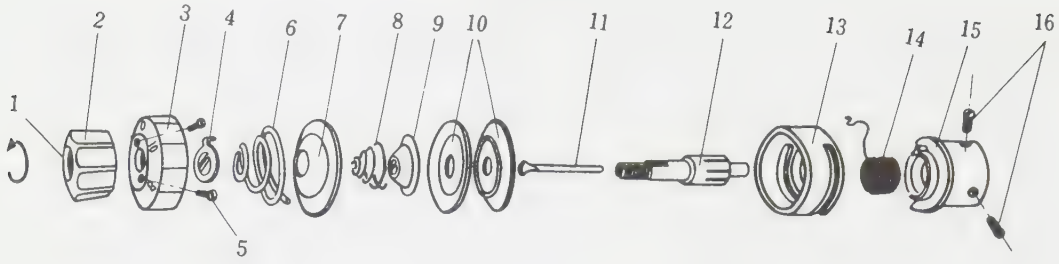


Figure 215
Components-Tension Assembly



LOWER TENSION & RELATED COMPONENTS

Lower tension adjustment is a sometimes thing, and generally contingent upon proper upper tension adjustment. Adjusting the upper/lower tension so the threads tie in the center of materials sewn can be likened to the egg and chicken adage, which comes first. A good rule of thumb would be to thread the bobbin case, with the thread coming off the bobbin counterclock wise, and hold the bobbin thread with the bobbin case dangling below. If the bobbin case tension is properly adjusted, the case should drop slowly.

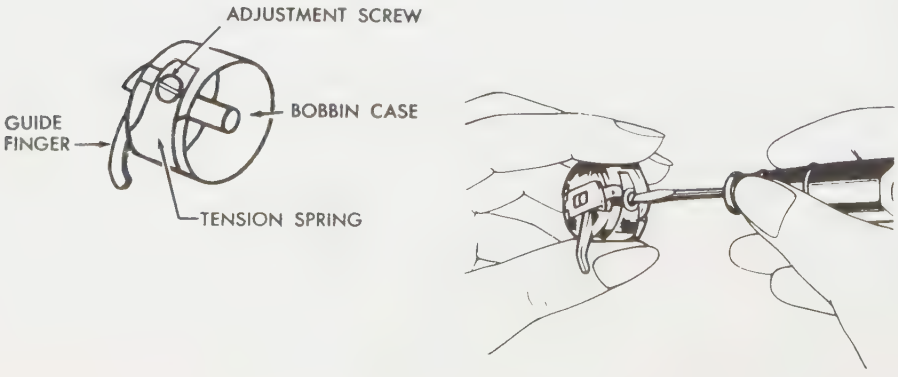
If the lower tension is too loose, turn adjustment screw(figure 216) 1/4" clockwise, or more, if needed to correct.

If the upper tension is too tight, turn adjustment screw, counterclockwise as needed to attain proper adjustment.

Years of use and abuse will often result in tension spring breakage, or a thread cut where thread has travelled. If either of these conditions exist, replace the tension spring. If the bobbin case body is also thread cut, replace the entire bobbin case.

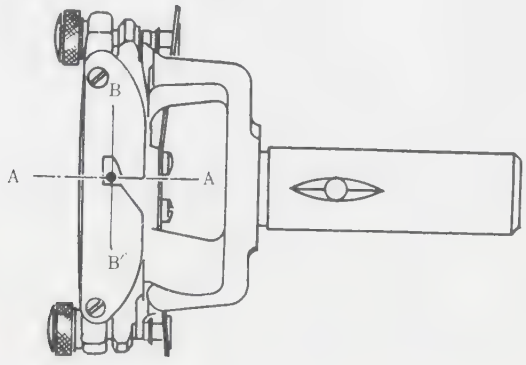
If the machine isn't too old but bobbin case won't hold a consistent tension, loosen the adjustment screw (use caution and don't lose it because of small size), and check under spring for lint or bits of thread. Clean as needed and replace the spring. Reset tension per above instructions.

Figure 216
Bobbin case and components nomenclature



There are other related malfunctions that can alter lower tension; they are shuttle/race related and require additional adjustment or correction. If it becomes necessary to investigate this possibility, the shuttle/race body and components must be removed. Figure 217 illustrates proper entry path of the needle, looking from the top down. To make this inspection, first remove the needle plate.

Figure 217

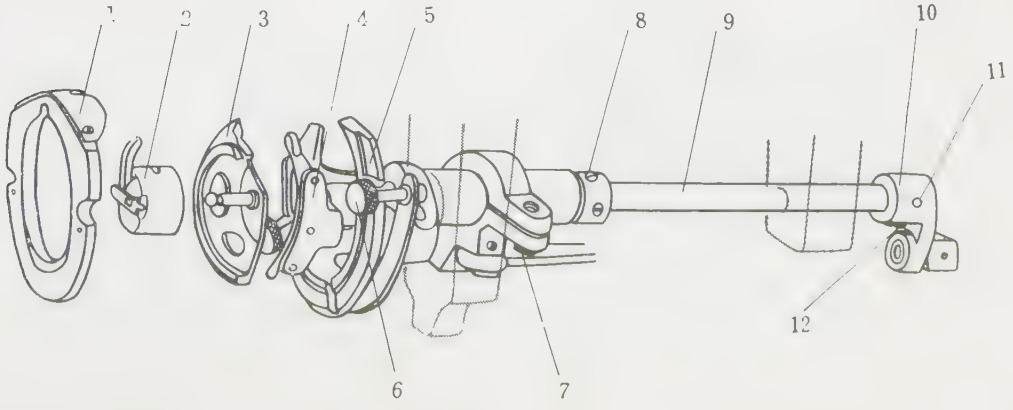


Rarely, if ever, is it necessary to remove the entire race body to correct a malfunction in this area, but it does happen. If the repairman understands this sub-assembly and related components, it simplifies all service work in the lower sewing assembly. To replace, proceed as follows:

1. Unlock latches(#6, fig. 218)on both sides; remove race cover(#1).
2. Remove shuttle(#3) and bobbin case(#2).
3. To remove entire driver assembly(#9) and drive out pin(#11).
4. Loosen collar screw(#8) until collar is loose on the shaft.
5. Loosen driver shaft/crank set screw(#12).
6. Remove driver(#4) and shaft (#9).
7. Loosen screw(7) on shuttle guide bracket, and remove race body(5) from the machine
8. To replace, reverse above procedures. Tighten all screws.

Figure 218

Components-Lower sewing mechanism



As stated before, the necessity of removing the entire assembly is rare. To adjust, or replace, key components in the shuttle/race assembly, use procedures pertaining to that component. A prime adjustment in that area is the needle to point of shuttle(lateral) adjustment.

1. Remove the race cover(#1) figure 218, and remove the shuttle. Inspect it closely. If the point is damaged or broken off, replace it. If point is needle pocked, buff with a fine grade emery cloth.
2. If the shuttle is functional, prepare for checking needle to shuttle adjustment. Check for accuracy. When properly adjusted, tolerance is so minute it's almost invisible, the correct measurement is 0.1(015 metric), see fig. 219, when point of shuttle is adjacent to needle, just above the needle eye.
3. If adjustment is required, loosen screw(F), figure 220, and move the race body and driver assembly in an axial direction, in proper direction to attain the correct tolerance.

Figure 219

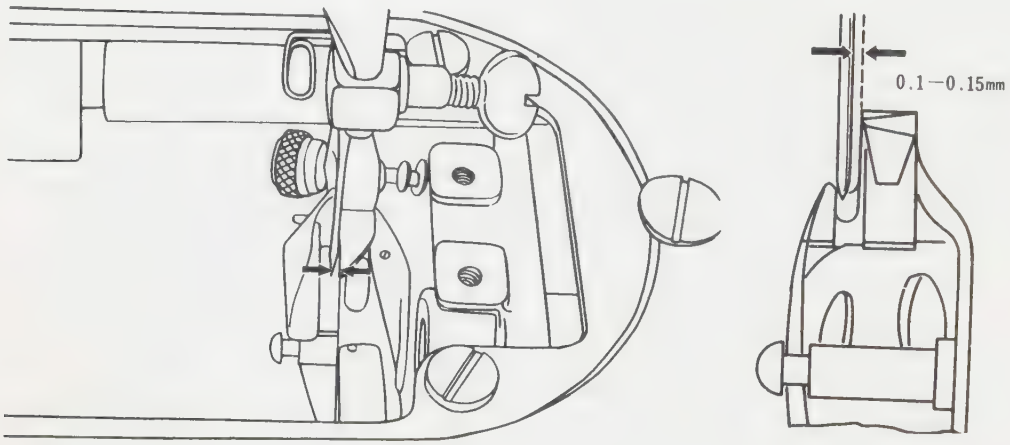
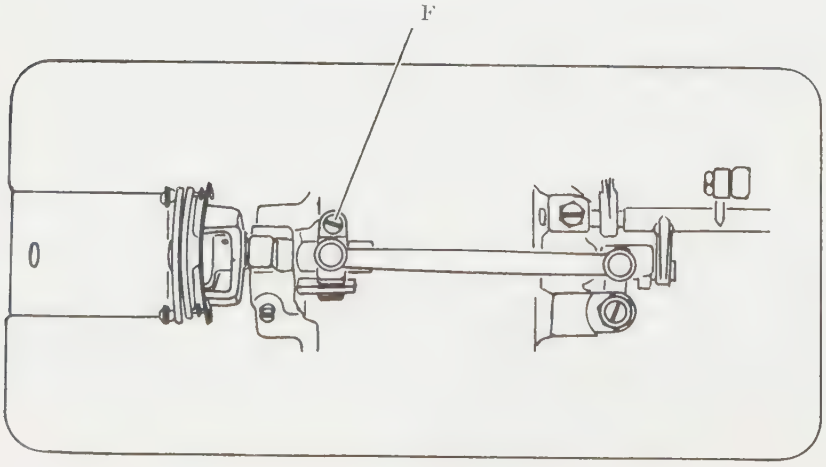


Figure 220



The relativity of needle-to-shuttle point must also be properly set when the needle has traversed to lowest point(figures 221-222).

1. When the needle is at lowest point of travel, the tolerance should be 5/32"(3.6 metric), see figure 221.
2. When the needle rises to position shown in figure 222, the proper distance between shuttle point and needle eye is 3/32" (2.5mm).

Figure 221

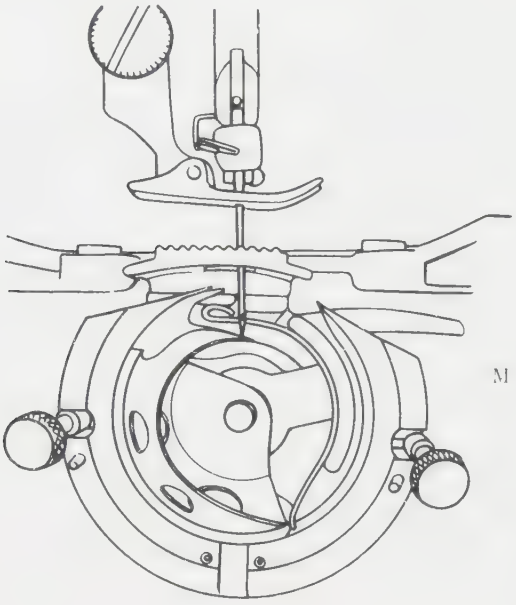
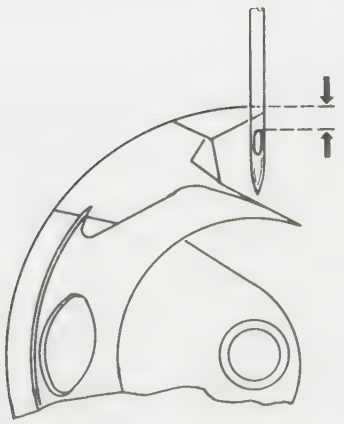


Figure 222



The preceding adjustments also necessitate adjustment to relativity of the shuttle to thread take-up arm. When adjustment is correct, the take-up arm should be in position illustrated in figure 223.

Figure 223

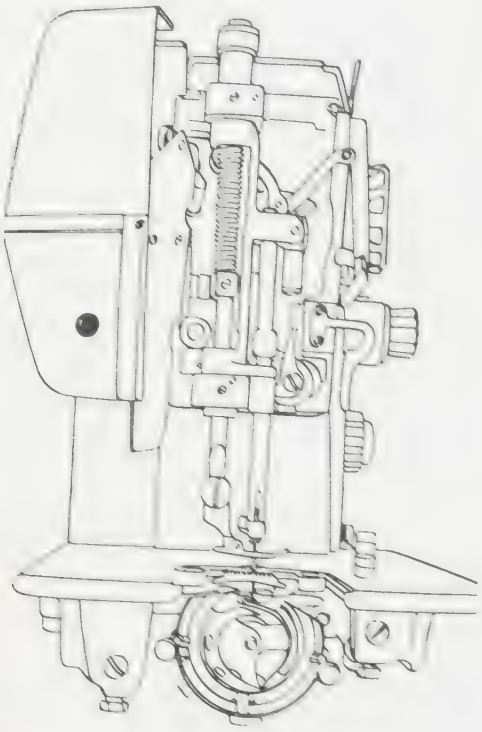
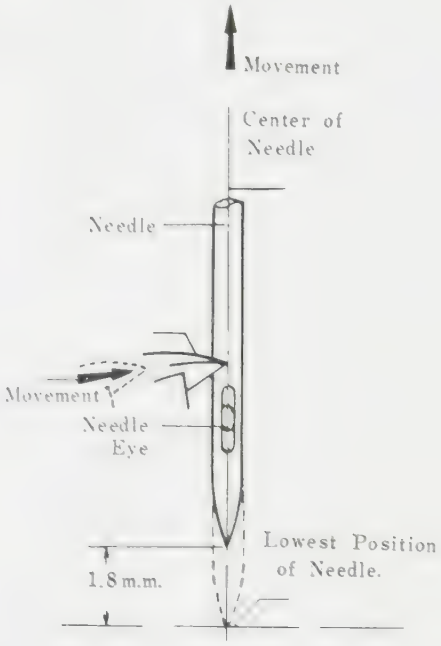


Figure 224



When both adjustments are correct, the needle should rise 3/32" from the lowest point of travel to position above the needle eye. When this tolerance is inaccurate, the machine will skip stitches.

To adjust proper distance between driver spring(C, fig. 225) and the end of shuttle(D, figure 225), check tolerance. Proper setting is 1/32".

If adjustment is required, loosen driver spring adjusting screw(F). Or if loosened by constant use, tighten. This should correct the situation. If not, bend spring slightly, as needed, to correct.

1. If you can't reach the screws, loosen collar set screws(F fig. 226 and move the shaft assembly outward as needed. Return to exact position, and retighten set screws securely.
2. After final adjustments on any of the preceding problems, make a final check to be sure all components are properly set. The race cover spring must be positioned so the needle enters at points illustrated in figures 217 & 227.
3. If the components are properly set, and the needle doesn't enter at point shown in figure 217, loosen screws(F, figure 227) and center the plate properly. Sung-tighten the screws and lower the needle. If the plate is centered, tighten the screws. If not, re-adjust as needed.
4. Tighten all screws and replace the needle plate.

Figure 225

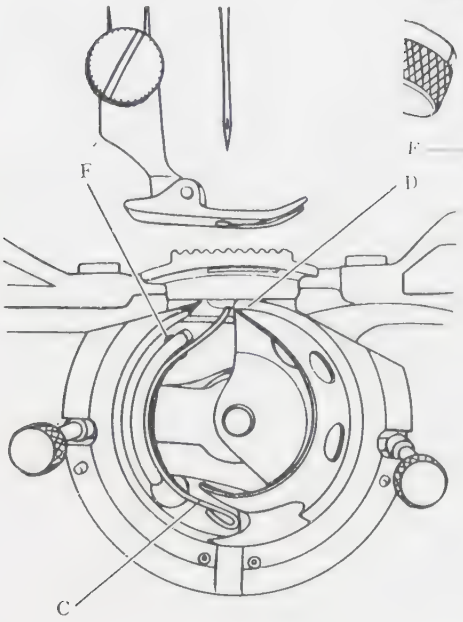


Figure 227

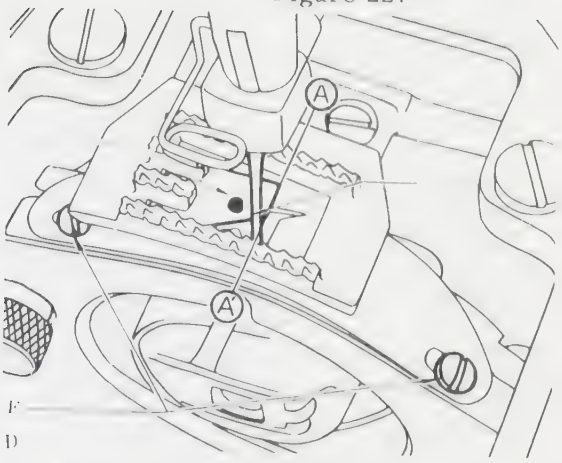
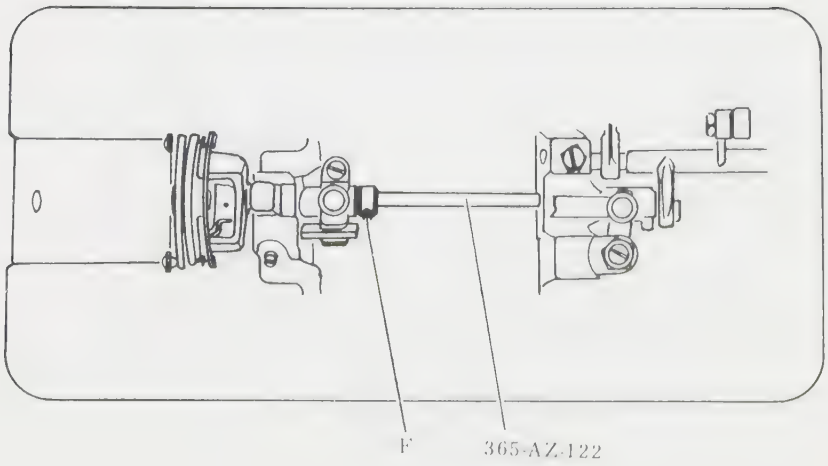


Figure 226



FEED DOG REPLACEMENT

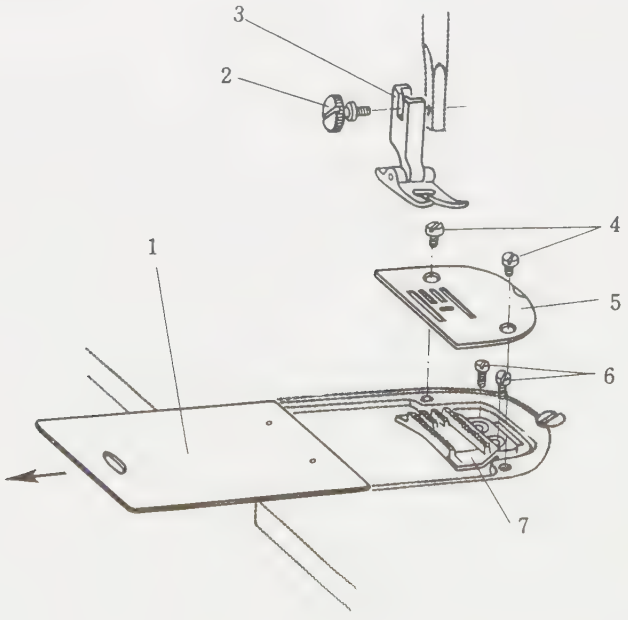
The feed dog is a very vital cog in the operation of a sewing machine. It is often almost totally overlooked, even by many repairmen. If the feed dog and allied components are out of adjustment, it can change not only the feeding of the material, but tension settings as well. When the setting is too high, the teeth will jerk material and on many types of material, even tear or rip the fibers. If the setting is too low, the material will be moved in an erratic manner.

To check for proper setting, turn balance wheel and observe travel of the feed dog. When the dog is at it's highest point, place a business card or similiar paper object over the teeth and lower the presser foot. Tug on the card and if it moves freely, the teeth are set too low. Proper setting on most machines is 1/32" above needle plate at highest point of travel. This is an arbitrary setting and may vary slightly on some models.

Check the teeth for wear; they must be sharp. If the teeth are rounded or in any way damaged, replace them.

1. Remove thumb screw(#3, figure 227), and presser foot(#2)from the presser bar.
2. Remove slide plate(#1) and remove needle plate(#5), by unscrewing
3. Loosen and remove screws(#6) holding feed dog to feed bar.
4. Replace feed dog exact equal.
5. Replace other removed components in reverse order of removal.
6. Recheck heighth setting and adjust to the 1/32" setting.

Figure 228



TIMING FEED DOG TO NEEDLE BAR

1. To adjust timing of feed dog to needle bar, loosen set screw(F), in figure 229, and turn the feed cam until timing mark is aligned with mark etched on the shaft.

2. If feed dog is mis-aligned in needle plate slots, the feed dog will strike the plate. To adjust, loosen screw(E) figure 230, and turn feed-rock shaft crank(a) until properly aligned.

Figure 229

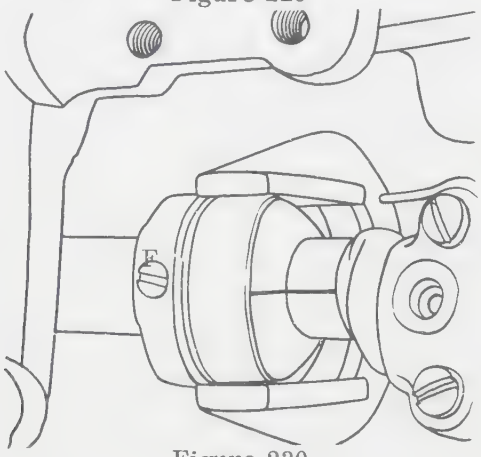


Figure 230

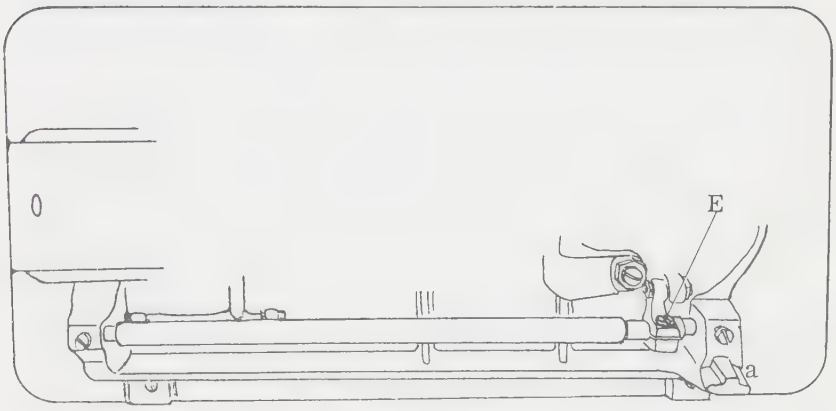
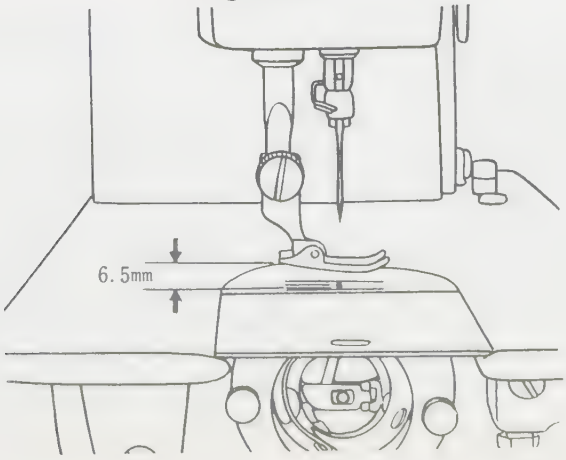


Figure 231



ADJUSTMENT OF PRESSER BAR

After the feed dog is properly adjusted it may be necessary to re-adjust the presser bar. Refer to figure 231, previous page, and note the proper distance between bottom of presser foot and needle plate is 1/4" when the presser is in "UP" position.

1. If adjustment is required, refer to figure 232, below, and adjust as follows:
   a. Loosen screw(F) on presser bar bracket(T).
   b. Move the presser bar in proper direction to attain 1/4" setting.
   CAUTION: Don't allow presser bar to turn when adjusting.
   c. If alignment does change, refer to fig. 232 and re-align.
   d. When properly aligned, tighten set screw(F).

Figure 232

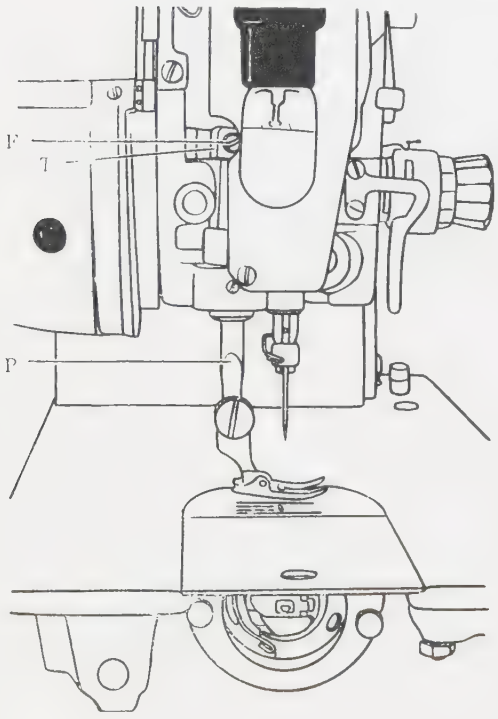
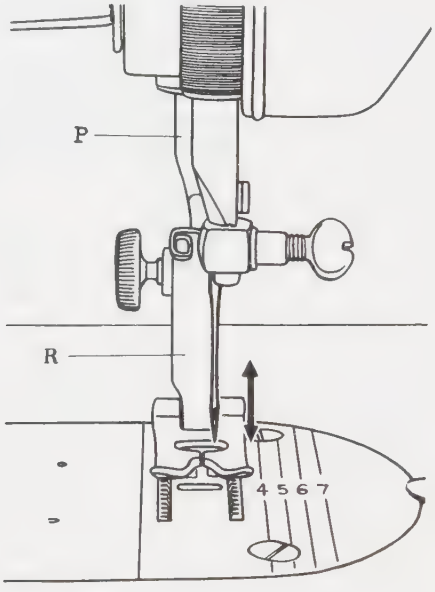


Figure 233



NEEDLE BAR ADJUSTMENT

If may be necessary to adjust the needle bar position when needle doesn't enter needle hole in proper place. This situation will be reflected in timing, or after presser bar is adjusted, striking the presser foot.

To adjust, remove zig zag needle plate, and replace it with straight stitch needle plate supplied with accessory kit. Refer to figure 234.

1. If adjustment is required, remove top cover plate from machine and refer to figure 235, on the following page.
2. Loosen screw(F) and position needle bar as needed to correct.
3. Tighten screw(F) securely and replace face plate assembly.

Figure 234

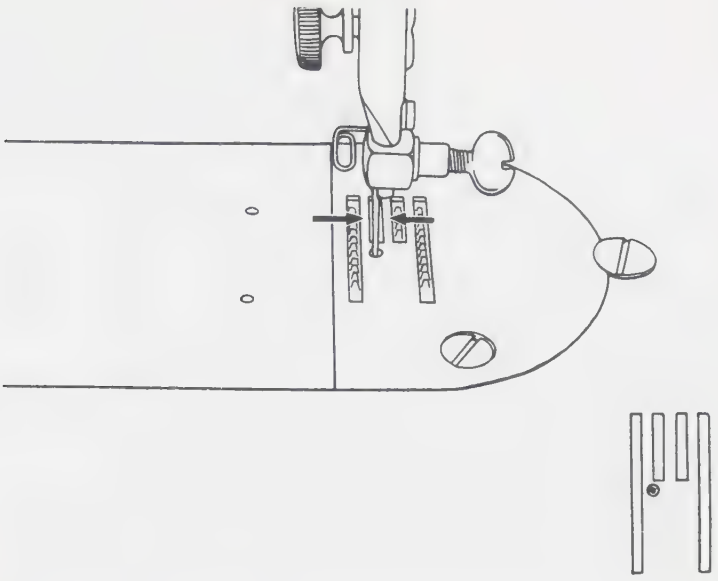
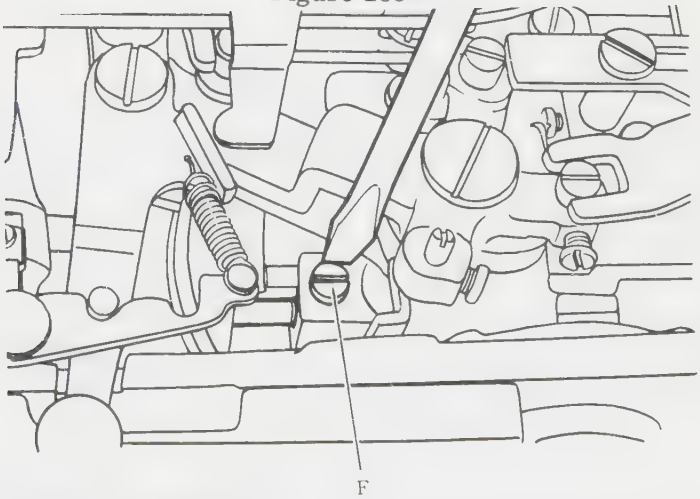


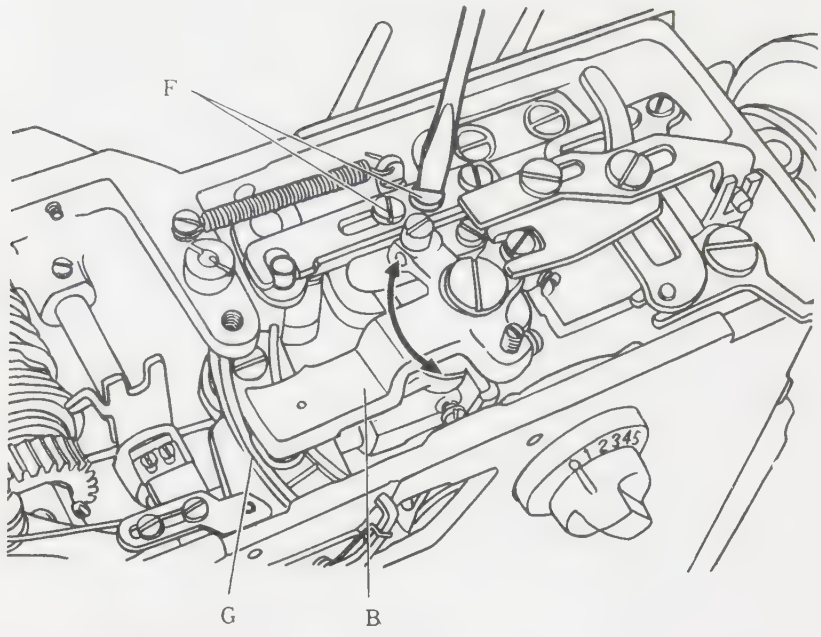
Figure 235



NEEDLE POSITION ADJUSTMENT

1. Remove machine cover plate; refer to figure 236, page 188.
2. Replace straight stitch needle plate with zig zag plate.
3. Set machine in straight stitch position and turn balance wheel until zig zag cam guide(G) is at extreme left, and needle bar is in the lowest point of travel.
4. If the needle moves, loosen set screws(F), move position-plate(B) until the needle remains static when zig zag width crank bar is moved along zig zag cam guide.
5. If necessary, repeat again as needed until needle remains static.
6. Replace machine cover plate.

Figure 236



ADJUSTMENT OF ZIG ZAG WIDTH CONTROL DIAL

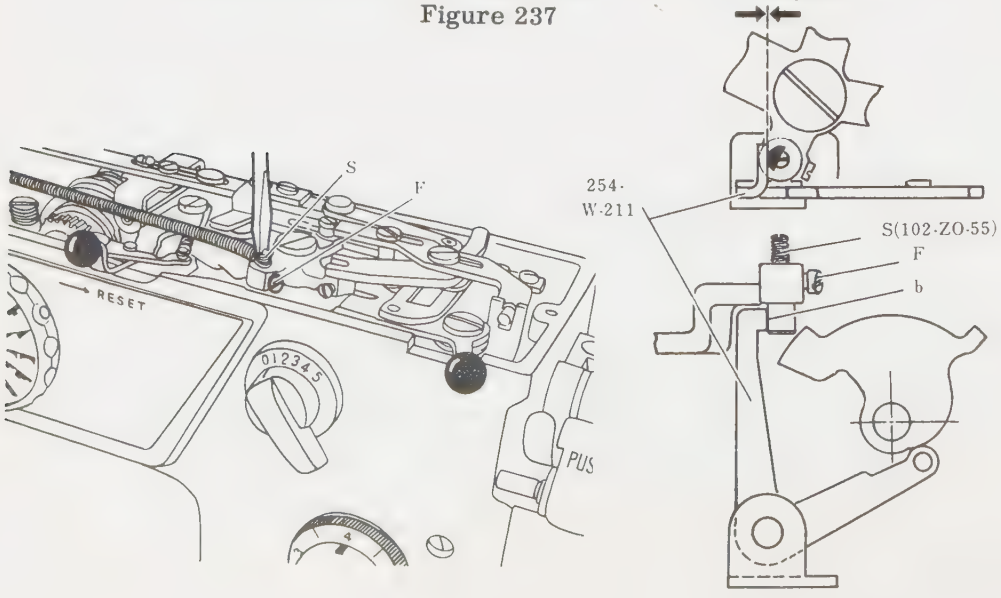
1. When pattern dial is set on straight stitch(figure 237), zigzag width control dial must be set a "O" setting and the cam lever(254-W- 211), should touch eccentric screw(102-Zo-55) at point (b), figure 237, if adjusted properly. If adjustment is required, proceed as follows:

   a. If overadjusted, machine will zig zag on straight stitch setting.

   b. If underadjusted, machine will sew narrow width zig zag, even if set on widest setting.

   c. To adjust, loosen eccentric screw(S), then re-adjust until contact is made at point(b), on cam lever. Don't overadjust.

Figure 237

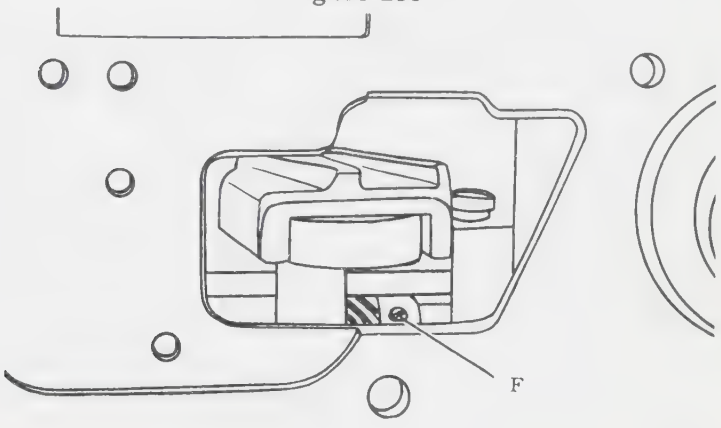


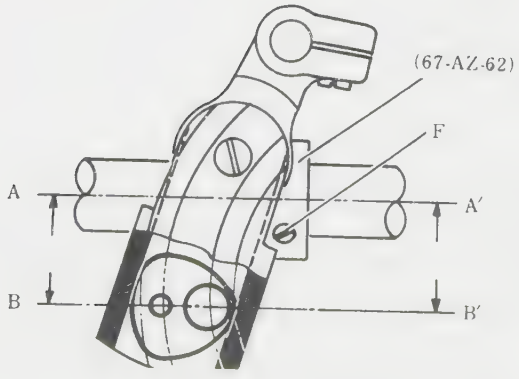
TIMING ZIG ZAG MECHANISM AND NEEDLE BAR

When properly adjusted, the needle should swing during zig zag operation on the downward movement only. If it swings on the upswing, adjustment is required. Refer to figure 238, below:

1. Remove cover plate and pattern selector dial.
2. Loosen set screw(F, figure 238) on upper shaft spiral gear.
3. Hold the gear(67-AZ-62) firmly, and turn balance wheel slowly.
4. When line between the center of eccentric cam shaft(A--A line fig. 238), and center of the face of largest portion of eccentric cam(B--B line fig. 238) are parallel with the upper shaft, with needle at lowest-point of travel, the adjustment is correct.
5. Replace cover plates and pattern selector dial.

Figure 238



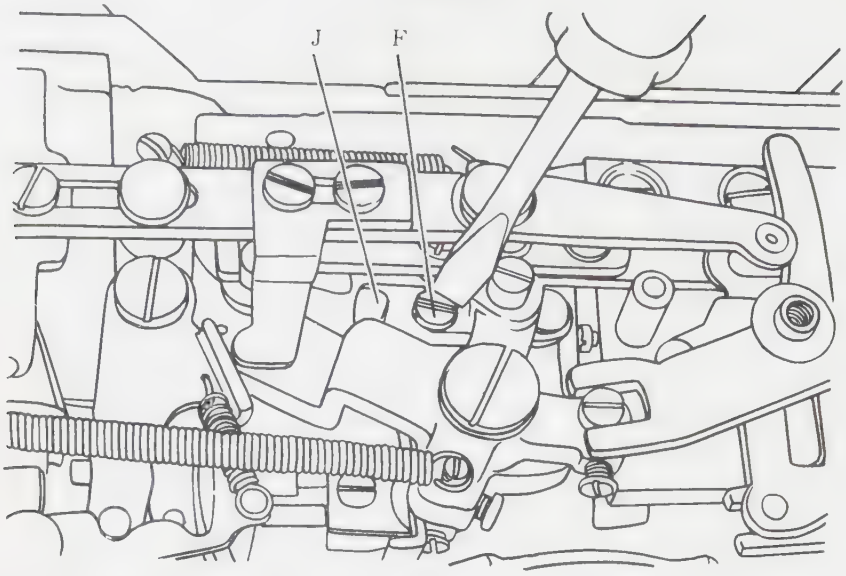


ADJUSTMENT OF ZIG ZAG STOP BAR

The properly adjusted machine will not zig zag on straight stitch. If the machine makes even a slight zig zag in straight stitch position, adjust it.

1. Loosen set screws(F), figure 239, following page.
2. Position stop(J) until corrected. Tighten set screws.

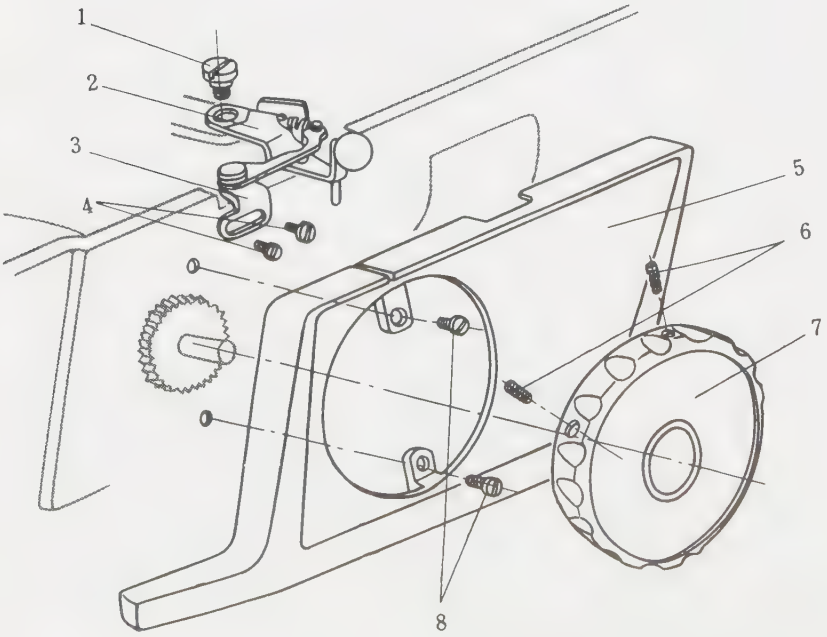
Figure 239



REPLACEMENT OF RESET LEVER

1. Loosen pattern dial set screws(6, figure 240) and remove dial.
2. Remove parallel plate set screws(8) and plate(5).
3. Remove set screws(4), center screw(1) and remove reset lever.
4. Replace components in reverse order of removal.

Figure 240



REPLACEMENT OF TAKE-UP ARM

1. Open face plate, remove screws(1) and remove the reflector.
2. Loosen screw(7) and remove needle bar guide pin(10) figure 242.
3. Remove thumb screw(14) and presser foot(15).
4. Loosen presser bar bracket screw(9).
5. Remove set screw(4) and remove the darner(3).
6. Pull presser bar(13)upward, remove spring(6) and bracket(8).
7. Loosen presser bar bushing(lower-#11) and remove bushing(12).
8. Remove needle bar support(5).
9. Remove take-up arm crank set screw(18) and needle bar link(19).
10. Loosen screws(17) on the balance cam(21), turning clockwise, and remove thread take-up crank(20).
11. Loosen thread take-up lever stud set screw(22) and knock out pin , from the rear.
12. Replace the arm and all worn components.
13. Replace components in reverse order of removal.

Figure 241

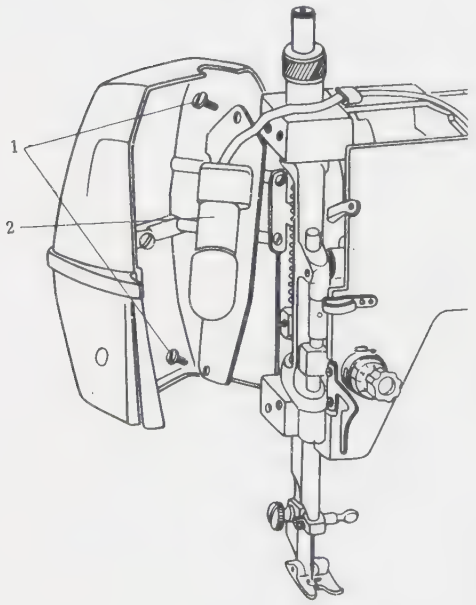
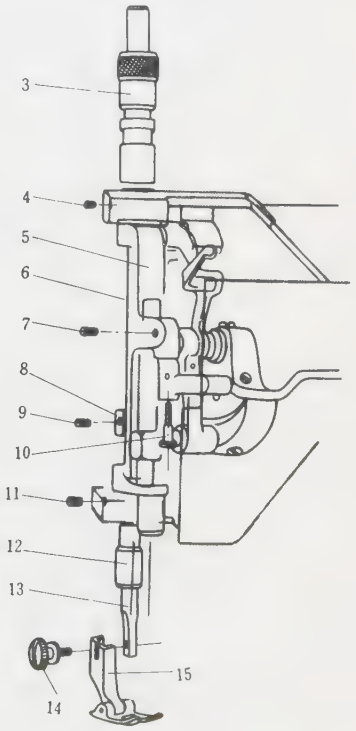
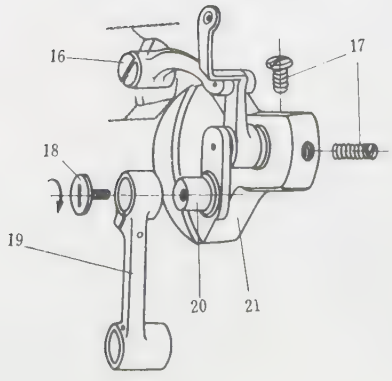
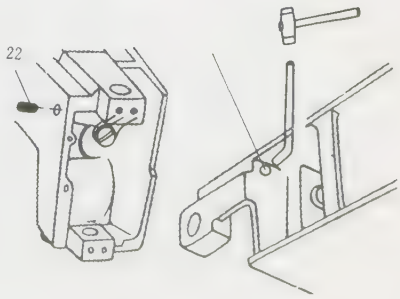


Figure 242







STITCH CONTROL-FORWARD & REVERSE LEVER

A. Adjustment of Stitch Length Regulator.

1. When dial is set at "O" setting, tip of adjusting screw(A, figures-243 & 244) should rest at low point of cam(B).

2. To adjust, loosen set screw(F)figure 244, set the dial on "O", and push dial until extreme point of adjusting screw contacts cam at proper point(figure 243). When properly set, tighten set screw.

3. Replace cover plates.

Figure 243

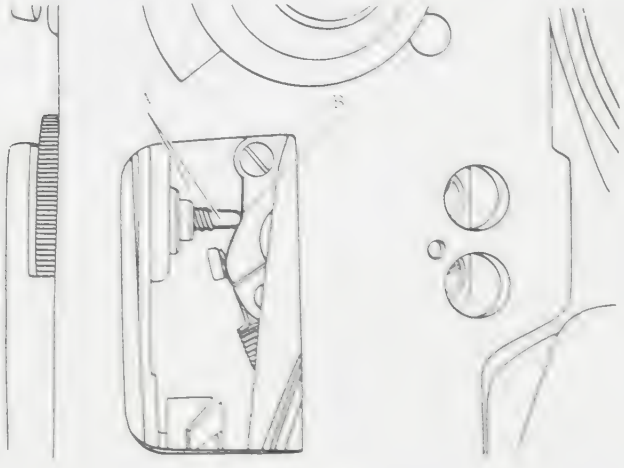
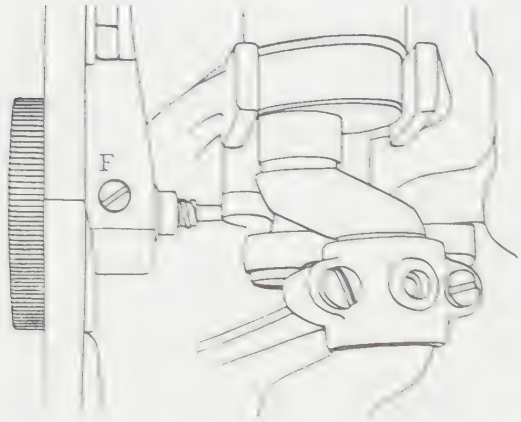


Figure 244



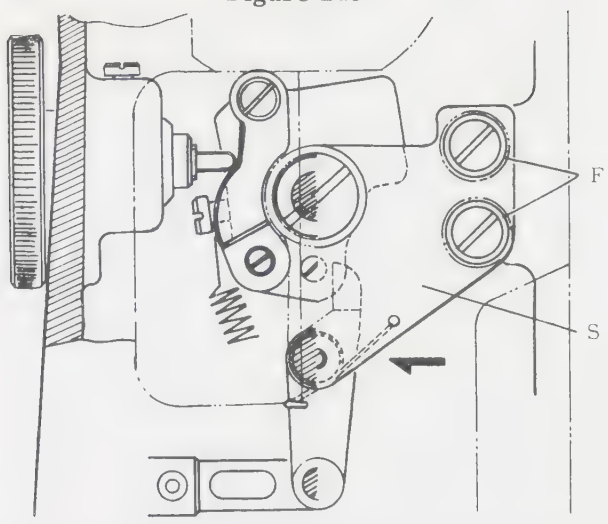
B. Adjustment of Stitch Length-Forward & Reverse

1. Set dial in "O" position. The adjusting screw should touch cam as in figure 243, above. If stitching is too short on longest setting, there is need for adjustment.

2. Refer to figure 245, following page, and loosen screws(F).

3. Shift cam bracket(S) in direction of arrow(if forward stitch is longer than reverse. If opposite is true, move bracket the other way.

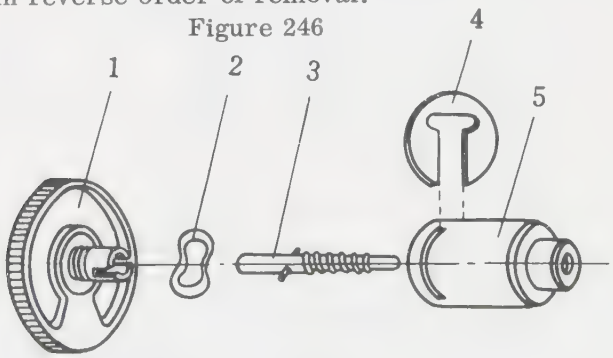
Figure 245



C. Dis-Assembly of Stitch Length Regulator

1. Remove retaining washer(4) and remove dial(1) and washer(2).
2. Screw center shaft(3) from regulator base(5).
3. Replace in reverse order of removal.

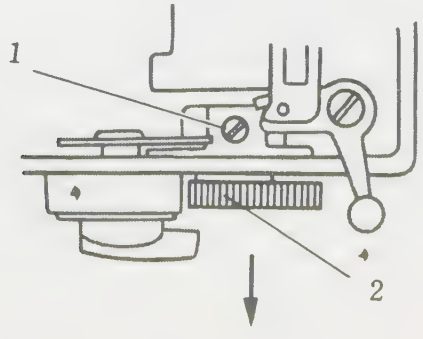
Figure 246



D. Replacement of Stitch Length Regulator

1. Remove regulator cover plate.
2. Loosen screw(2, figure 247) and remove the mechanism.
3. To replace, reverse order of removal
4. Replace cover plate.

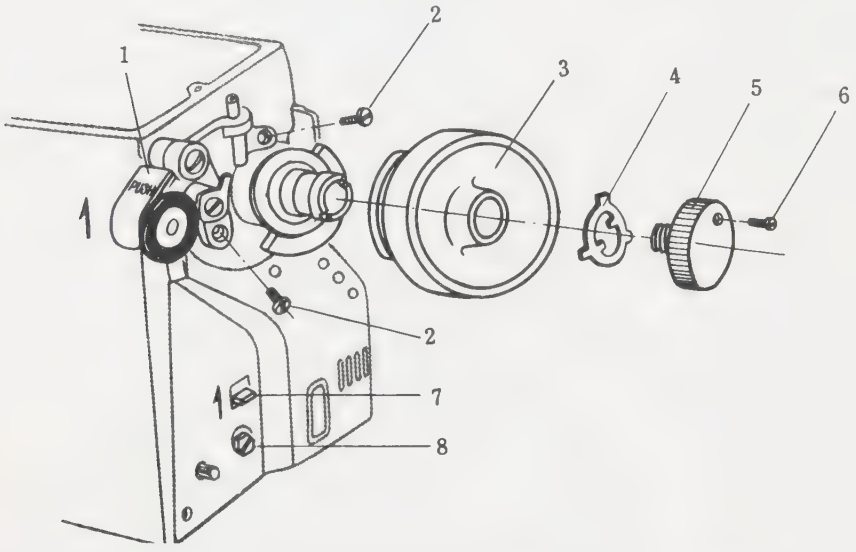
Figure 247



REPLACEMENT OF BOBBIN WINDER

1. Loosen stop-motion-clamp-screw(6), remove stop-motion(5), and stop-motion-clamp-washer(4), figure 248.
2. Loosen motor bracket screw(8) and push upward, loosening belt.
3. Remove the balance wheel.
4. Remove set screws(2) and remove bobbin winder, upward.
5. It's not necessary to remove the winder to change rubber ring.
6. To replace, reset components in reverse order of removal.

Figure 248



WIRING OF MOTOR, LIGHT & RHEOSTAT(foot or Knee control)

1. Proper wiring is illustrated in figure 249.
2. Wires should lead through bed plate to terminal per fig. 249a.
3. Terminal box markings are shown in figure 249b.

Figure 249

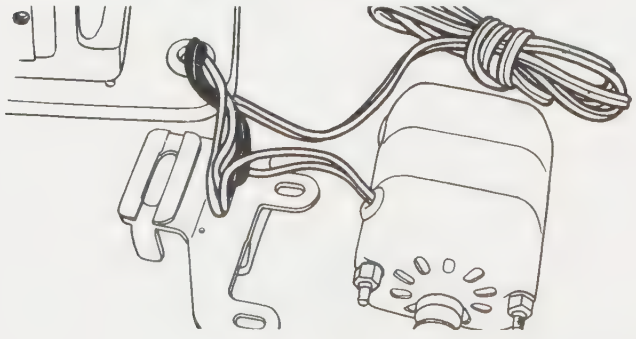


Figure 249a

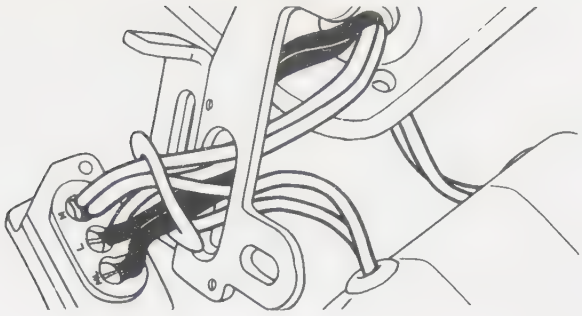


Figure 249b

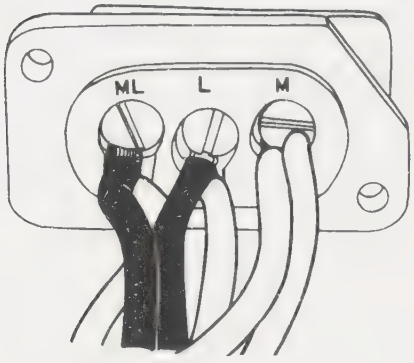
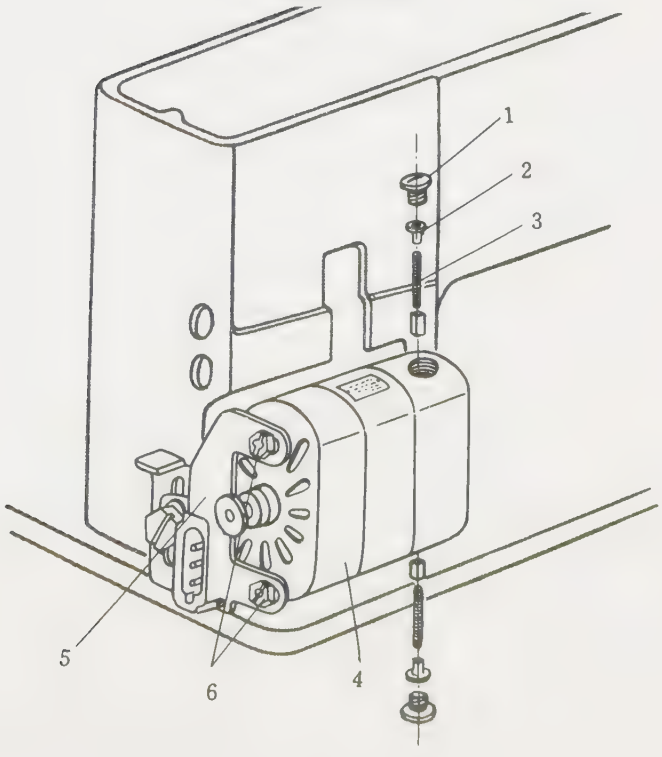


Figure 250



REPLACEMENT OF MOTOR BRUSHES

1. Replace brushes when motor becomes sluggish.
   a. Remove motor cover.
   b. Remove motor(4) from bracket by removing screws(6).
   c. Remove screw caps(1) from opposite ends of motor.
   d. Use caution and don't allow springs to get away.
   e. In some instances, brushes may be merely oil-soaked, and burning them may solve the problem. Light a match and hold brush above the flame(hold with needle-nose pliers)until oil is burned out.
   f. If brush is chipped or badly damaged, replace it.
   g. Be sure bevelled side of the brush coincides with curve of the armature of motor.
   h. Replace components in reverse order of removal.
   i. When resetting motor, be sure belt is taut for maximum drive.