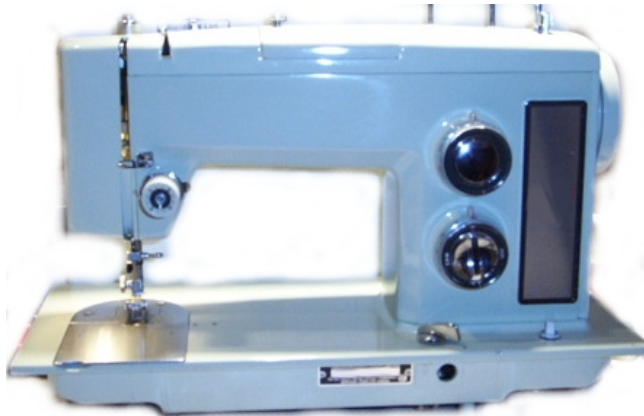


Tune-up Guide

158 series



IMPORTANT SAFETY INSTRUCTIONS

CAUTION

Your sewing machine is designed and constructed only for HOUSEHOLD use.

Before using this sewing machine, read this manual and follow all Safety Rules and Operating Instructions.

DANGER— To reduce the risk of electric shock:

1. This sewing machine should never be left unattended when plugged in. Always unplug this sewing machine from the electric outlet immediately after using and before cleaning.
2. Always unplug before replacing a sewing machine bulb. Replace bulb with same type rated 15 Watts.
3. Do not reach for a sewing machine that has fallen into water. Unplug immediately.
4. Do not place or store this sewing machine where it can fall or be pulled into a tub or sink. Do not place or drop it into water or other liquid.

WARNING— To reduce the risk of burns, fire, electric shock, or injury to persons:

1. Do not allow this sewing machine to be used as a toy. Close attention is necessary when this sewing machine is used by or near children.
2. Use this sewing machine only for its intended use as described in this owner's manual.
Use only attachments recommended by the manufacturer as contained in this owner's manual.
3. Never operate this sewing machine if it has a damaged cord or plug, if it is not working properly, if it has been dropped or damaged, or dropped into water. Return this sewing machine to the nearest Sears store or service center for examination, repair, electrical or mechanical adjustment.
4. Never operate this sewing machine with any air opening blocked. Keep ventilation openings of this sewing machine and foot controller free from accumulation of lint, dust and loose cloth.
5. Never drop or insert any object into any opening.
6. Do not use outdoors.
7. Do not operate where aerosol (spray) products are being used or where oxygen is being administered.
8. To disconnect, turn all controls to the off ("O") position, then remove plug from outlet.
9. Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.
10. Keep fingers away from all moving parts. Special care is required around the sewing machine needle.
11. Always use the proper needle plate. The wrong plate can cause the needle to break.
12. Do not use bent needles.
13. Do not pull or push fabric while stitching. It may deflect the needle causing it to break.
14. Switch this sewing machine off ("O") when making any adjustment in the needle area, such as threading the needle, changing the needle, threading the bobbin or changing the presser foot, and the like.
15. Always unplug this sewing machine from the electrical outlet when removing covers, lubricating, or when making any other adjustments mentioned in this owner's manual.

Before using your sewing machine for the first time, place a waste fabric under the presser foot and run the machine without thread for a few minutes. Wipe away any oil which may appear.

Tuning up your machine

There are three main points to a tune-up on a sewing machine.

- Cleaning and oiling
- Hook and feed timing
- Internal tension adjustment

Start by removing the covers on your machine.

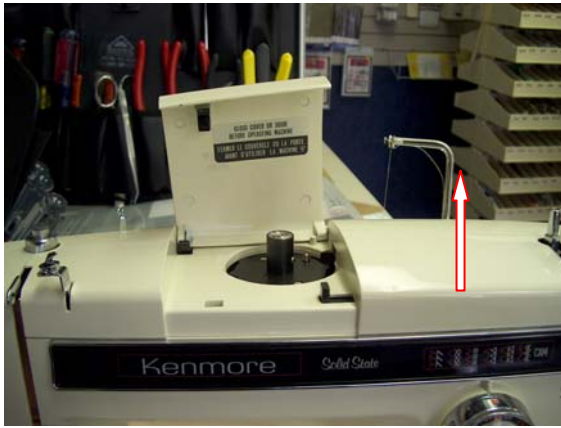
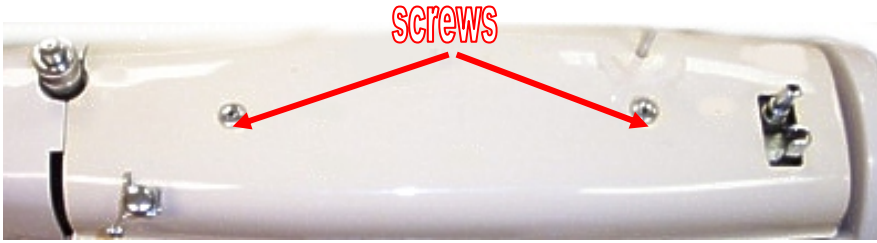
DO NOT START ANY REPAIRS WITH OUT UNPLUGGING THE MACHINE FROM THE WALL OUTLET

Remove the screws on the top cover. Gently lift the cover off of the machine. Fig. A. Different models have top cover screws in different spots. Some 158 models you simply pull off the top cover (there will be no screws).

Check for thread or lint caught in any of the parts in the top of the machine



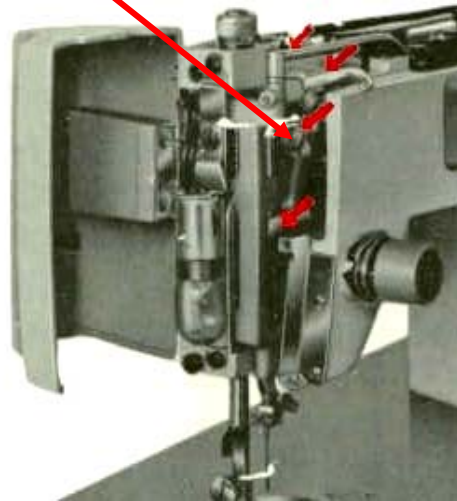
Open the needle bar cover. Check for any thread that may be caught in the take-up. Fig. B. By turning the hand wheel toward you, you can see if there is anything caught.



A



take-up

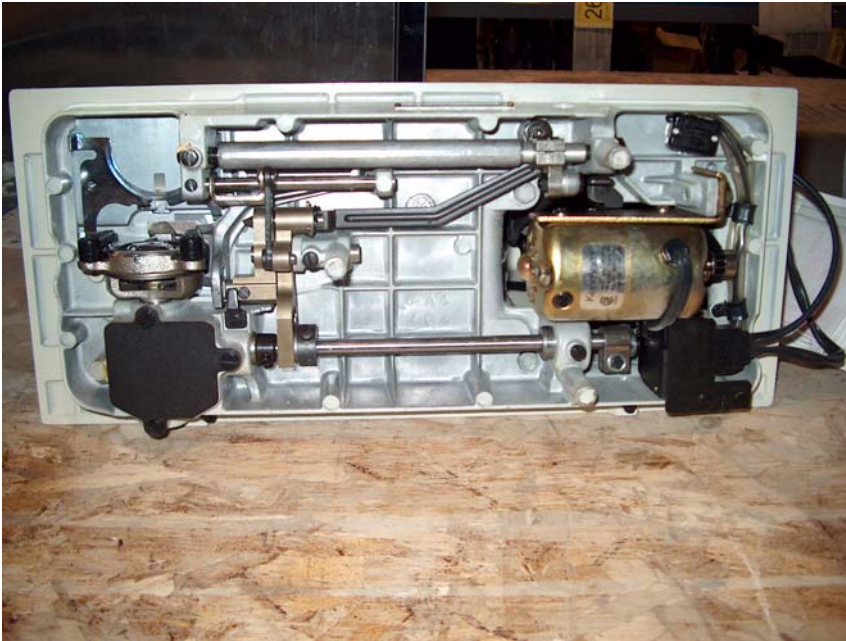


B

Removing covers continued

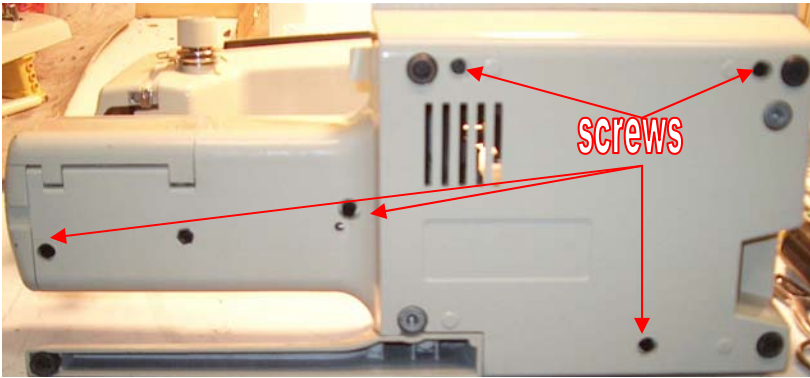
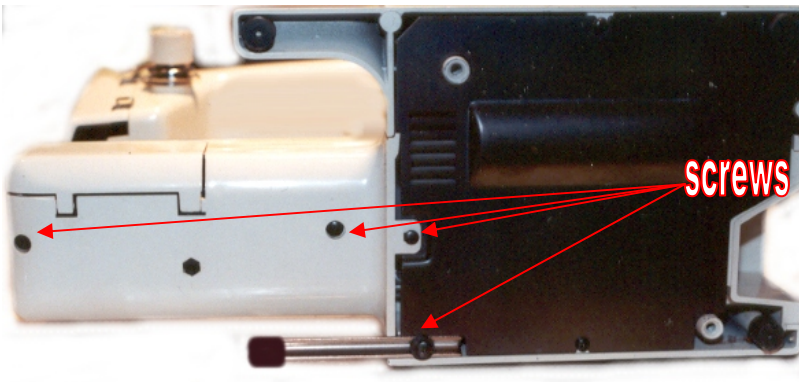
Remove the screws on the bottom covers for open arm machines. Fig. A. locating all of the screws may be tricky but when they are all removed the covers should come off easily. Remove the covers and check for thread or lint caught in any parts.

For flat bed machines simply lay the machine on its back to check it.

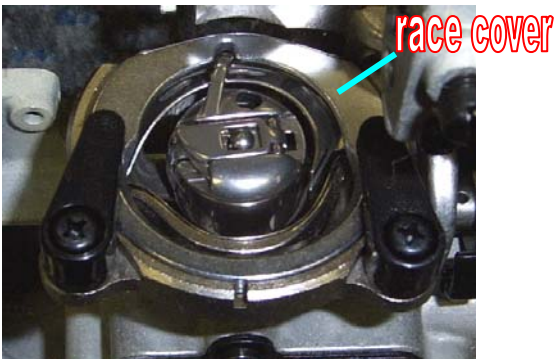


Remove the bobbin case and hook. Fig. B. Check all parts of the hook for burrs. If you have to polish any from the hook be very careful to lightly polish and do not damage it. The hook must be smooth or the thread will get caught. After you check the hook make sure there is no thread caught around the hook. Remove any you find.





A



B

Cleaning and lubrication

The best way to remove lint from the machine is with compressed air. Blow all the lint from the machine. Remove all lint from the gears and again from the bobbin area and feed dogs.

When oiling your machine, make sure you use a good quality oiler and clear sewing machine oil.

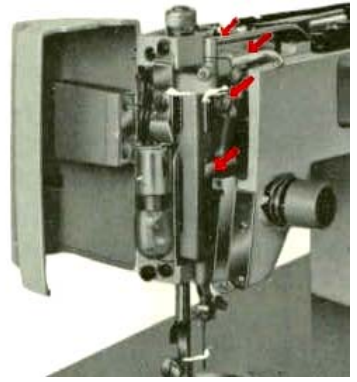
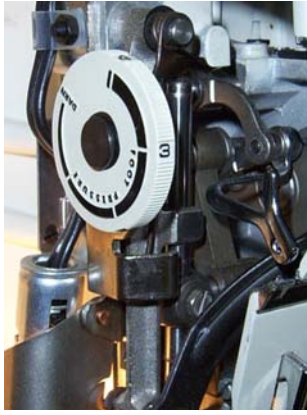


This type of oiler is good because it has an extendable spout and only lets out small drops of oil. A drop of oil is the amount of oil left on the tip of a needle if you dipped it in oil.

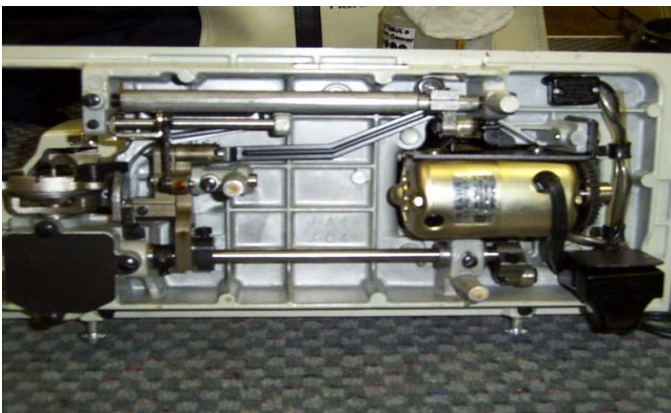
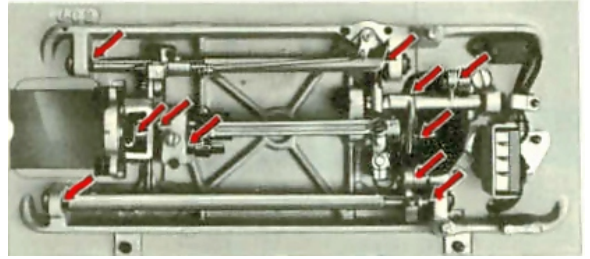
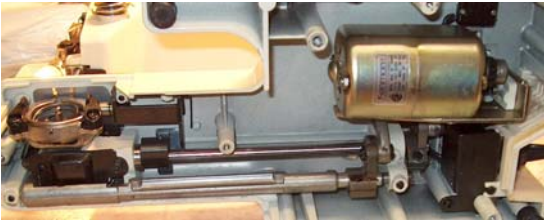
Oil all moving parts in the needle bar area. Fig. A. Make sure only one drop is put on each part. Clean off any excess with a soft cloth. Excess oil will find its way onto the fabric.

Oil all moving parts in the bottom of the machine. Fig. B. Do not oil the motor. Again use small drops of oil. Grease any gears with light sewing machine gear grease.





A

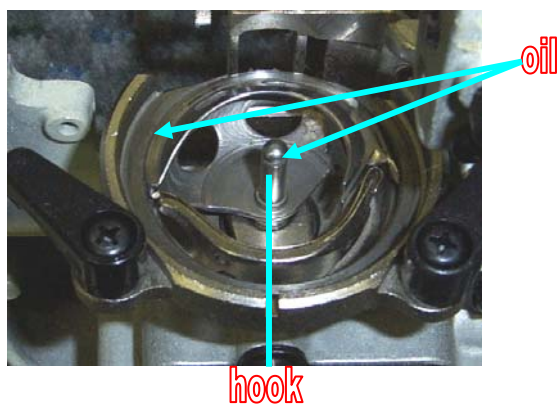
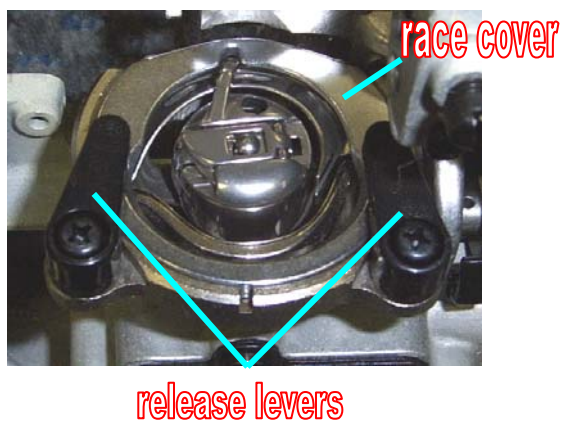


B

Cleaning and oiling continued

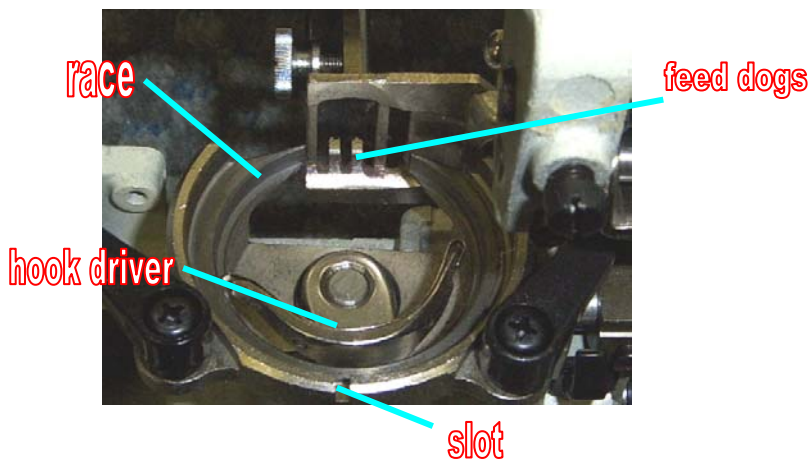
Oil the main parts shown and oil the bobbin winder. Be sure to remove excess oil from the winder before you run it. (bobbin winder is on the top cover on some models) Fig. next page.

Clean all lint from the hook race. Oil the hook and hook pin.

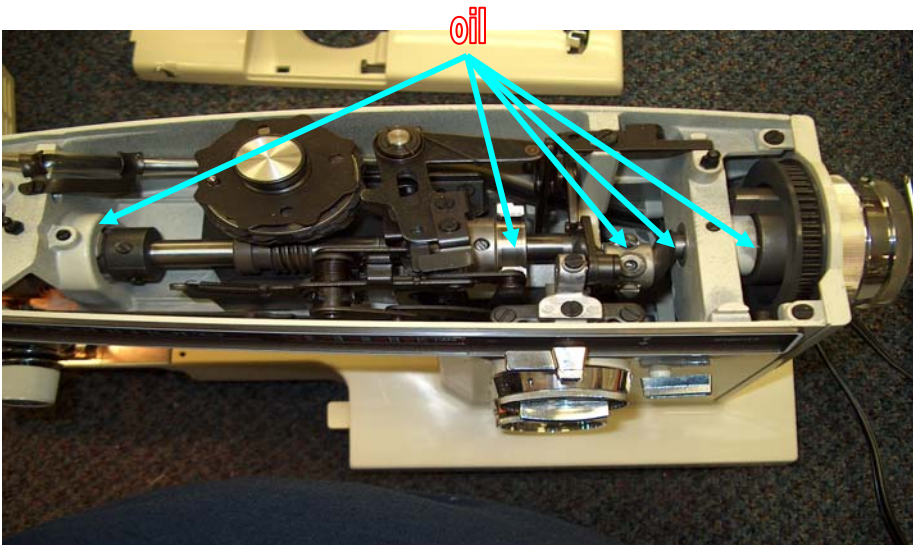
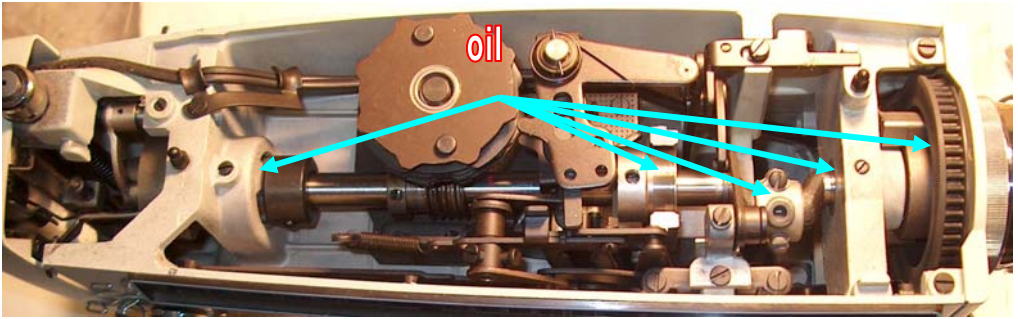
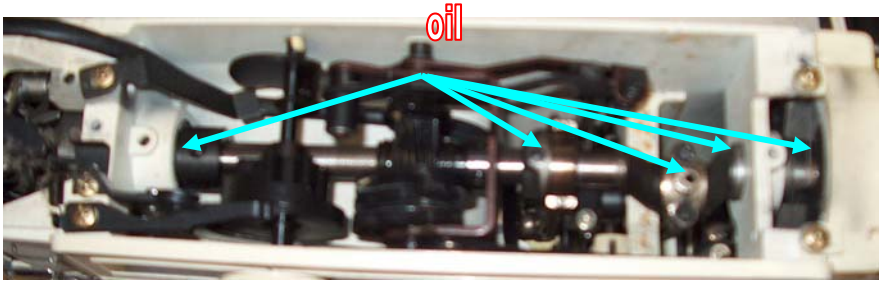
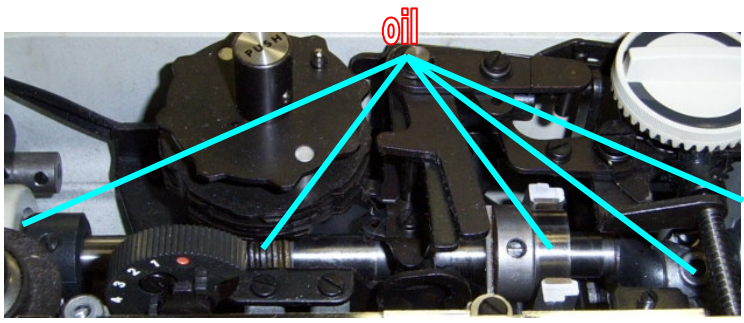


Remove the bobbin case and push the release levers away from the race cover.

Remove the race cover and hook.

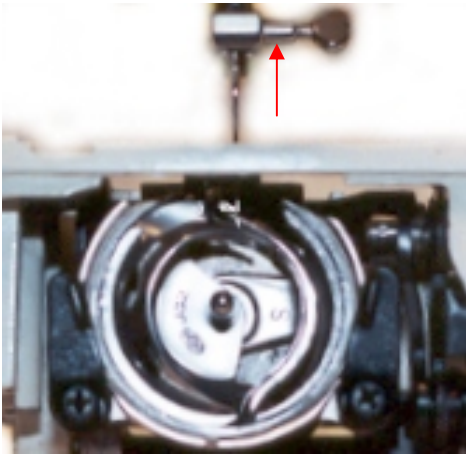


Turn the hand wheel towards you a few times to work in the oil to the whole machine.

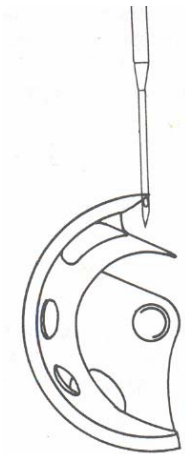


Checking timings

Insert a new needle into the machine. Turn the hand wheel towards you until it is in the lowest position. Set the machine to right needle position (or zigzag right side).

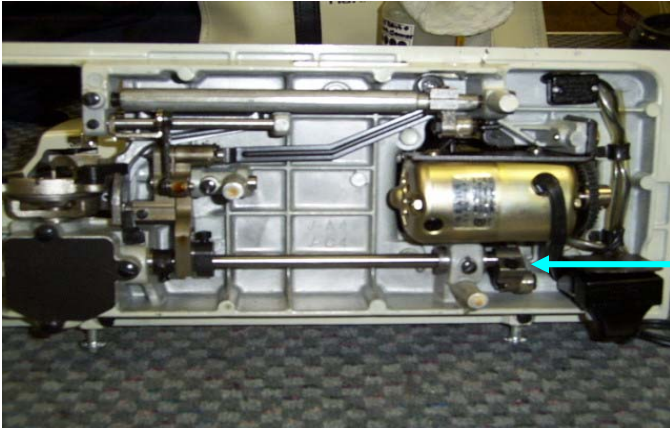


Bring the needle bar up until the hook and needle meet on the right side. The tip of the hook should be in the scarf of the needle and above the eye.



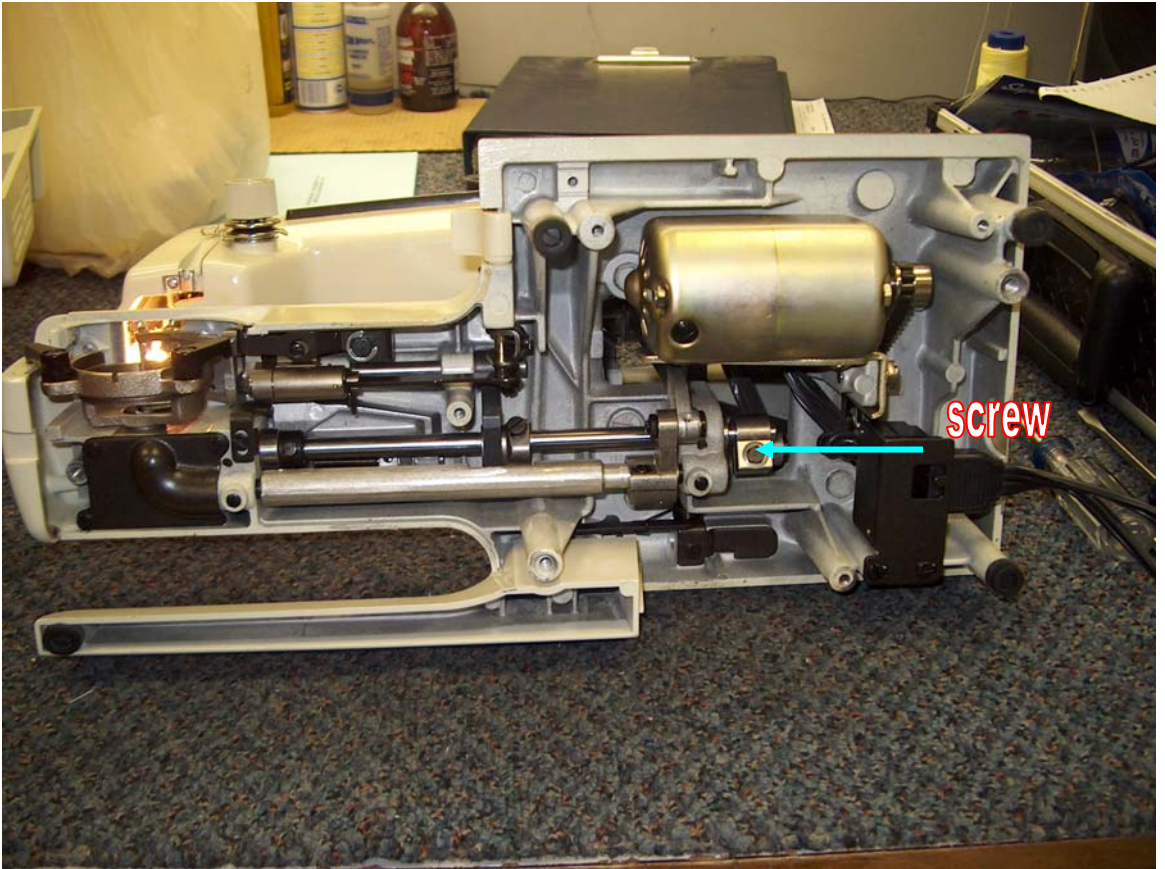
If the needle and hook do not meet as shown, the hook timing will have to be adjusted.

Adjusting timing



SCREW

Loosen the screw as shown. Some models have a 5 sided nut which requires a special tool available through Sears. Carefully turn the hook until the needle and hook meet. Make sure the feed dogs are in the down position when the hook and needle meet. Tighten the screw and recheck the timing.



screw

Adjusting the tensions



adjusting screw

The bobbin tension on your machine should not be too tight. When pulling the thread from the bobbin case you should feel a good amount of tension but not enough so you have to pull hard. When adjusting move the screw $\frac{1}{4}$ turn at a time and recheck the tension.

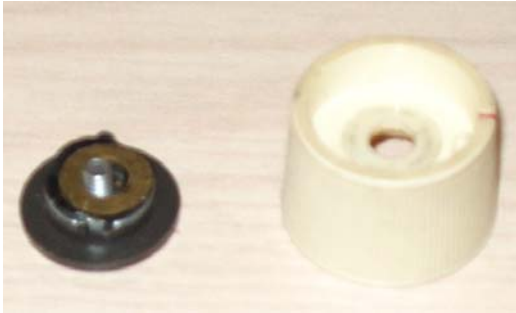
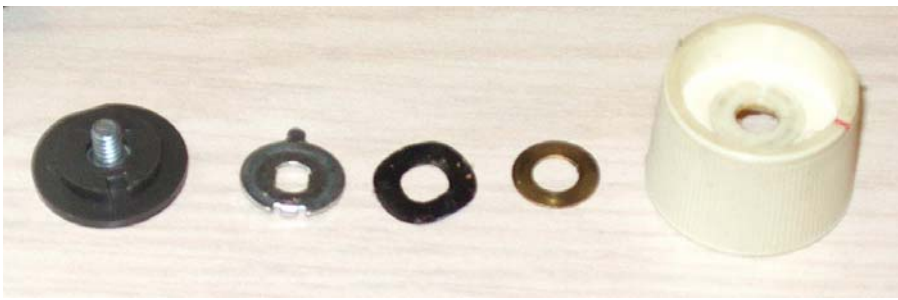


Remove the outer cap off the top tension unit by unscrewing the center screw.



nut

Adjust the inner nut until the best tension is achieved.



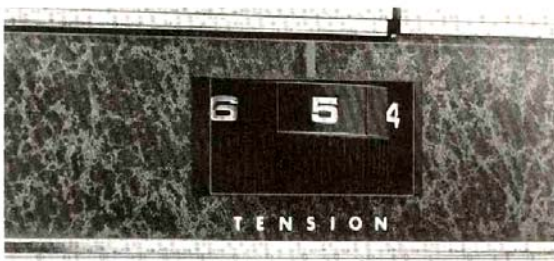
The parts inside the outer dial are shown in order. Replace them as shown then replace the outer dial onto the tension stud with the red line at 4.5. This will give you the best range of adjustment once the dial is back together.

TENSION ADJUSTING

Probably the most important control on your machine is this one that regulates your top thread tension. It consists of discs above the dial between which the thread passes. The pressure on these discs is regulated by turning the dial. The higher the number, the tighter the tension.

There are many reasons for having to reset your tension. The best tension for one fabric may not be correct for another. The required tension depends upon the stiffness of the fabric, thickness of the fabric, numbers of layers of fabric being sewn, as well as the type of stitch you are making.

It is best to test the stitching on a scrap of the fabric you are using before starting to make a garment.





The tension you are trying to get is for the knot to form in the center of the fabric.

When the tension is where you want it, replace the covers.

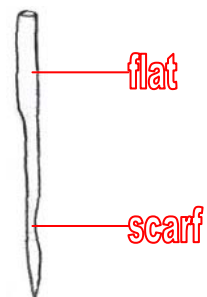
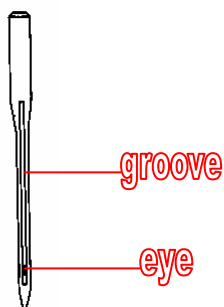
The outside of the machine can be cleaned off with a soft cloth and mild cleaner. Many shops use mild window cleaner. If your machine finish is dull before you clean it do not spray the cleaner directly on the machine. Spray a small amount on the cloth and test to see if you can remove the dull finish. You may require a car wax or cleaner to repair the finish of your machine.

SEWING MACHINE TROUBLESHOOTING GUIDE

In most cases poor sewing results and breakdowns are caused by three main factors:

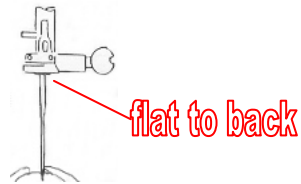
1. The condition of the needle.
2. Threading and the quality of thread being used.
3. Mechanical breakdown or damaged parts.

The condition of the needle is the most common problem. Bent or damaged needles will cause many different sewing problems. The way the needle is inserted into the needle clamp is also very important.



On most machines you install the needle so the flat is to the back of the machine. Side load machines (bobbin case is inserted on the left side of the machine) the flat is to the right. On some older Singer machines the flat is to the left. The needle should be inserted flat to the back on your machine.

Also make sure you use good quality needles. Organ brand which can be found under the Kenmore name are best for your machine.



Thread quality and the type of thread being used can be a problem. Always use good quality thread and try to avoid thread that is old or knotted. When ever possible use the same thread in the top and bobbin tensions. Thread the machine as shown in your manual and make sure the thread is between the tension discs.

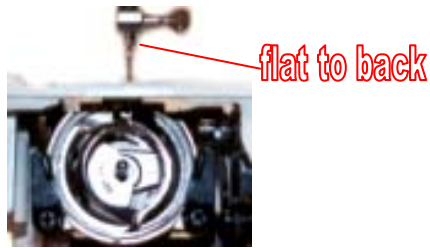
If you start with a new needle (inserted properly) and the machine is threaded as per instructions, sewing problems may be mechanical breakdown or damaged parts.

For best results your machine should be serviced before every large project. This will increase the life of your machine and give you problem free results when sewing.

Here is a checklist we have put together for your type of machine. If you have problems while you are sewing run through the list to correct the problem.

POOR STITCH QUALITY

1. The needle is incorrectly inserted. Check that the flat of the needle is to the back of your machine.



2. The needle is blunt or bent. Your needle should be changed before each large project or if it hits the needle plate or hook. A damaged needle can also snag most fabrics.
3. The tension is not correct. In most cases the top tension is set to a medium number for regular sewing. Make sure the thread is between the tension discs. Make sure the pressure foot is up when threading your machine. (this will release the tension discs) Check for lint or thread caught in the discs.



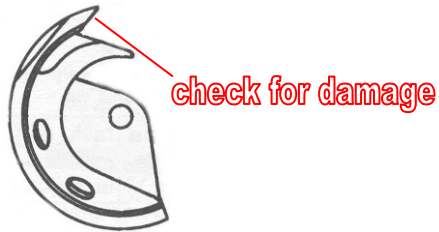
4. Type of thread being used can cause problems. Always use good quality thread. When using heavy thread in the top you will have to use a larger needle. The groove in the needle must fit the thread.

UPPER THREAD BREAKS

1. Check that the needle is inserted correctly and not damaged. Check size of needle for thread.
2. Check your threading. There should be free movement of the thread from spool to needle.



3. Make sure the top tension is not too tight.
4. Check the needle plate for damage.
5. Check the hook for damage.



LOWER THREAD BREAKS

1. Make sure the bobbin is inserted correctly and the right bobbin for your machine is being used. 15 class bobbins metal or plastic can be used in your machine.
2. Check that the thread is in the bobbin tension and the tension is not too tight. Also check for thread or lint caught in the tension spring.

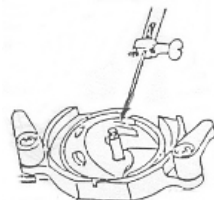


3. Make sure the bobbin is evenly wound.
4. Check the needle plate for damage.

BOBBIN THREAD NOT BEING BROUGHT UP

1. Check that the needle is inserted correctly.

2. Check threading of the machine. If the take-up lever is not threaded properly the thread will not come up.
3. Hook timing may be out. The hook must pick up the thread from



the scarf of the needle.

STITCH LENGTH VARIES OR WILL NOT FEED

1. Check that your feed dogs are coming up above the needle plate.
2. Check the pressure foot pressure. There must be some pressure on the foot to feed the fabric.
3. Check for lint caught in the feed dogs.
4. Is the pressure foot tight on the pressure bar? Make sure the foot is pushed up all the way and tight.
5. If all points check out the feed timing may be off.

SKIPPING STITCHES

1. Check your threading.
2. Check for needle damage or type of needle being used.
3. Check your hook/needle timing.

Notes

Additional Service Information

Sec. A	Pressure bar height
Sec. B	Needle bar height
Sec. C	Needle distribution
Sec. D	Needle position
Sec. E	Feed dog height
Sec. F	Zero feed
Sec. G	Shuttle timing
Sec. H	Zigzag
Sec. I	Straight stitch
Sec. J	Automatic reverse
Sec. K	Cam follower
Sec. L	Width
Sec. M	Cam selector guide plate

PRESSER FOOT HEIGHT

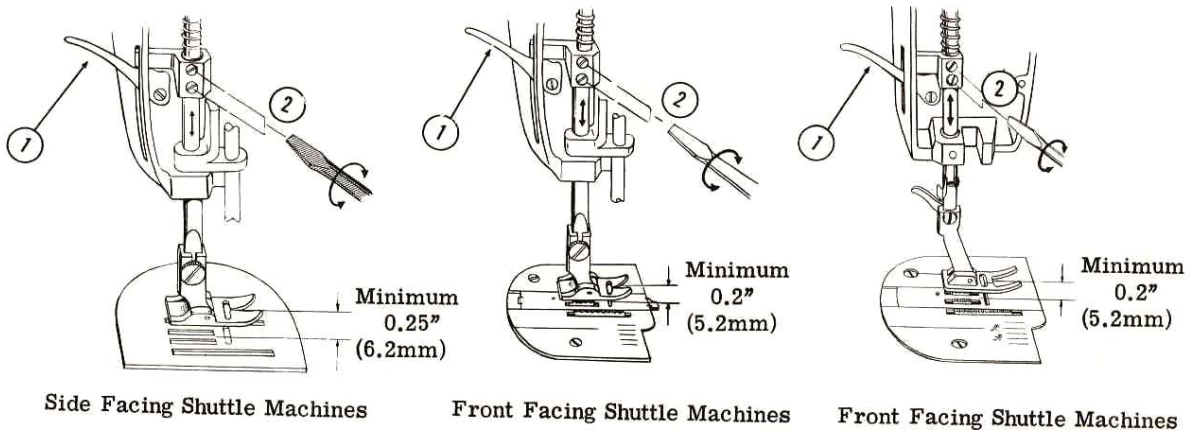


FIGURE 3A-1

PRESSER FOOT HEIGHT

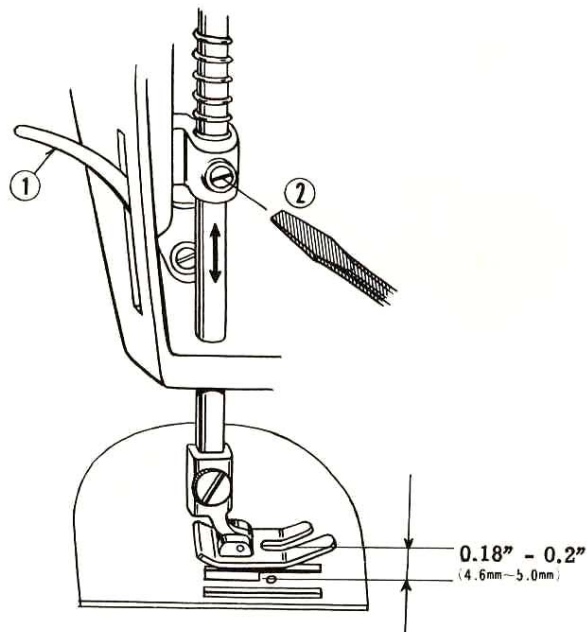


FIGURE 3A-2

Raise presser foot lever (1). Loosen set screws (2) on presser bar holder, and adjust the height of presser foot from needle plate as specified. Check the height of presser foot by turning the handwheel a complete turn and make sure needle bar does not hit presser foot. Tighten the screws securely after adjustment.

NEEDLE BAR HEIGHT

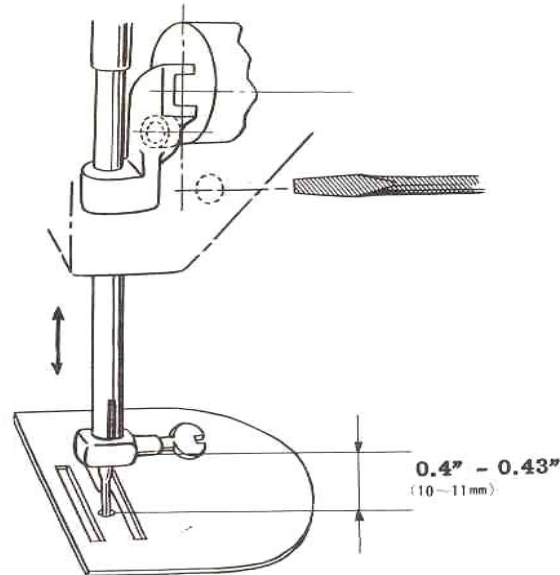


FIGURE 3B-1

Bring the needle bar to its lowest position by turning the handwheel towards you. Loosen the set screw on needle bar holder and adjust the height of needle bar as illustrated. Tighten the screw after adjustment.

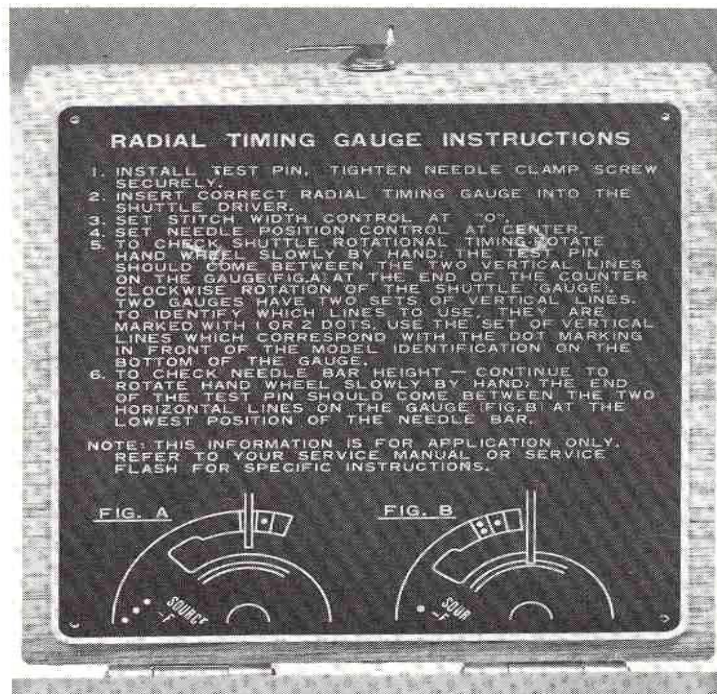


FIGURE 3B-2

DISTRIBUTION OF NEEDLE SWING

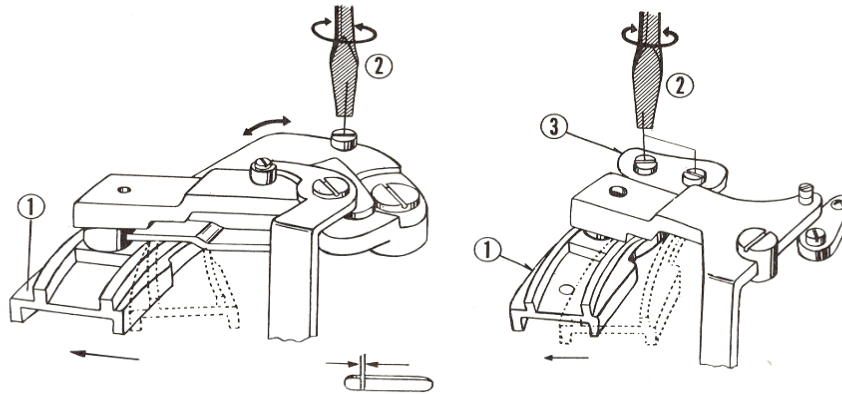


FIGURE 3C-1

Bring the zigzag cam guide (1) to its extreme left end position by turning the handwheel. At this position of zigzag cam guide, move the stitch width control from 0 to 4, and then from 4 to 0, checking to see if the needle swings. If the needle swings, loosen set screw (2) and adjust position of the base, or base stopper (3), repeating the above procedure. Tighten the screw securely after adjustment.

DISTRIBUTION OF NEEDLE SWING

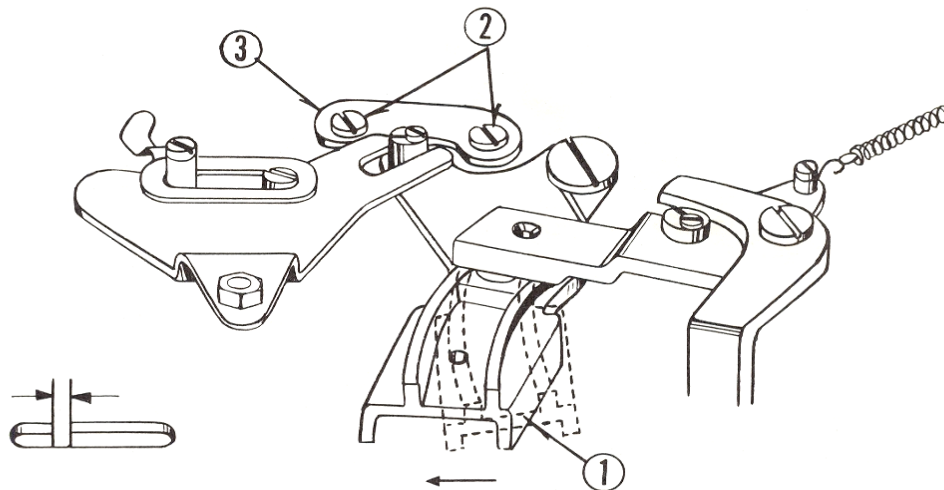


FIGURE 3C-2

Set blind stitch dial at N, and bring the zigzag cam guide (1) to its extreme left end position by turning the handwheel. At this position of zigzag cam guide, move the stitch width control from 0 to 4, and then 4 to 0, checking to see if the needle swings. If it swings, loosen set screws (2), and adjust position of the base stopper (3), repeating the above procedure. Tighten the screw securely after adjustment.

SEE FIGURE 3C-3

Set buttonhole control knob at C, and bring the needle to its lowest position by turning the handwheel. Moving stitch width control from 0 to 4, and 4 to 0, check and note the distance needle travels from its center position towards one side.

Turn the handwheel one complete turn, and bring the needle to its lowest position again. Moving stitch width control from 0 to 4, and then 4 to 0, the needle travels to the opposite direction to what was observed in the previous procedure. Note the distance needle swings.

If the needle travels uneven distances from its center position, loosen the set screw (1) and adjust the position of cam guide base (2) as illustrated.

SEE FIGURE 3C-4

Bring the needle to its lowest position by turning the handwheel. At this needle position, turn the stitch width control from 0 to maximum, and max. to 0, and note the distance needle travels from its center position towards one side.

Turn the handwheel one complete turn, and bring the needle to its lowest position again. Now this time, the needle travels to the opposite side from its center position, as you turn the stitch width control from 0 to maximum, and back to 0. Note the distance needle travels.

If the needle travels uneven distances from its center position, loosen set screw (1), and adjust position of follower rocker pin by turning eccentric pin (2), until you obtain an even distribution of the needle swing as illustrated (3). Tighten the set screws securely after adjustment.

DISTRIBUTION OF NEEDLE SWING

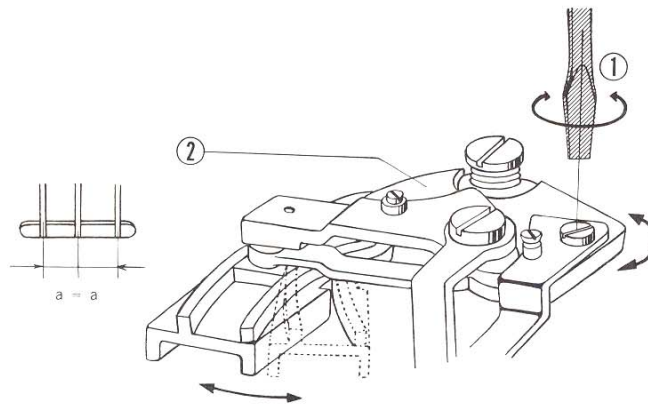


FIGURE 3C-3

DISTRIBUTION OF NEEDLE SWING

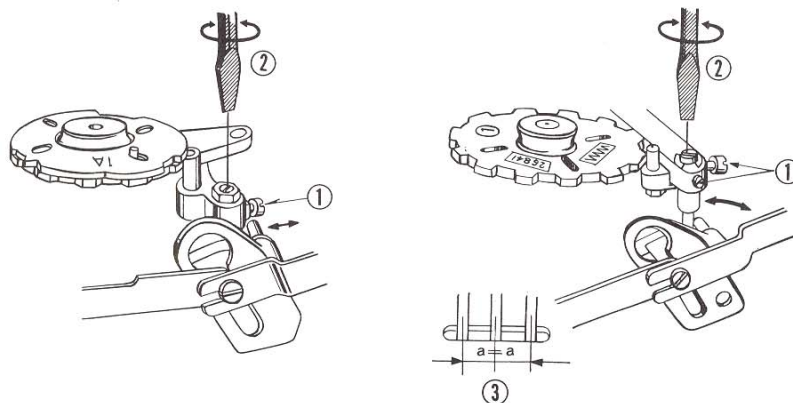


FIGURE 3C-4

SEE FIGURE 3C-5

Set needle position at C, and check the needle swing in the same way as described for C-4. If the needle distribution is uneven, adjustment can be made by turning eccentric pin (2) after loosening the nut (1). Tighten the nut after adjustment has been made.

For models with mechanism shown at right, after the above procedure has been completed, loosen set screws (3) and move the zigzag lever (4) until it touches bracket (5) of limiting rack. Tighten the set screws (3) securely.

SEE FIGURE 3C-6

Bring the needle to its lowest position by turning the handwheel. Moving stitch width control from 0 to 4, and 4 to 0, check and note the distance needle travels from its center to either side.

Turn the handwheel one complete turn, and bring the needle to its lowest position again. Moving stitch width control from 0 to 4, and then 4 to 0, the needle travels to the opposite direction to what was observed in the previous procedure. Note the distance needle swings. If the needle travels uneven distances from its center position, loosen the set screws (1) and adjust the position, of cam guide base (2), to obtain even distribution of the needle swing. Tighten the screws securely after adjustment.

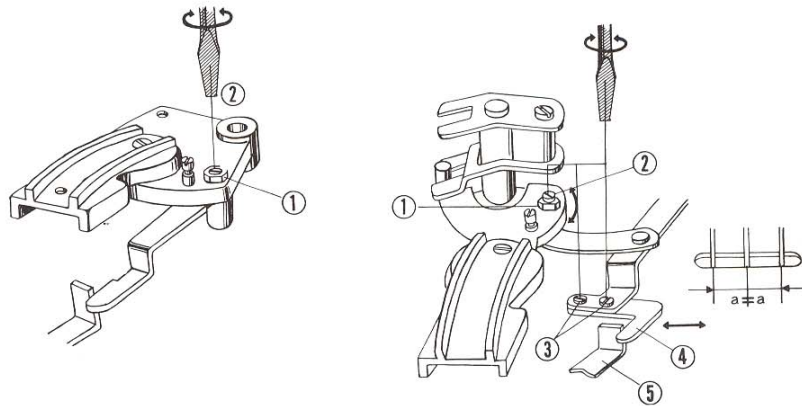


FIGURE 3C-5
DISTRIBUTION OF NEEDLE SWING

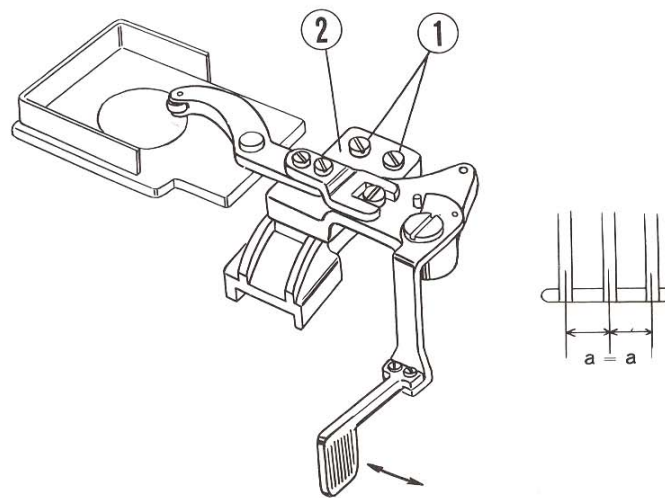


FIGURE 3C-6

SEE FIGURE 3C-7

Set the selector dial at S and stitch width control knob 4. Bring needle to the lowest position. Loosen set screws (1) slightly, insert the eccentric tool (4) into the hole (5) and slide the zigzag cam follower (3) in the direction indicated by the arrow by turning the eccentric tool until you can obtain equal clearance between the needle and the edge of needle slot at both left and right needle positions. Tighten the screws securely after adjustment.

DISTRIBUTION OF NEEDLE SWING

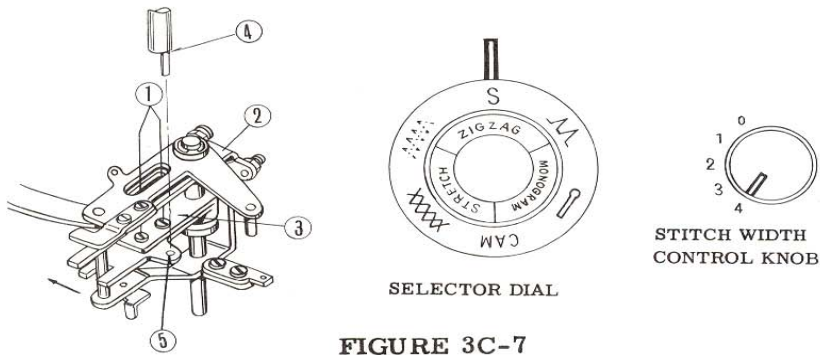


FIGURE 3C-7

SEE FIGURE 3C-8

Set special stitch dial at the red "S" and stitch width control at "S". Drop feed dog. Place paper on needle plate and lower needle to mark needle point (A). Then raise needle to its highest point, set stitch width to 4 setting, and take one zigzag stitch. By using a scale, check and see if each needle point (B) and (C) is the same distance from the needle point (A). If point (A) is not centered between points (B) and (C), as shown in Illustration a, loosen nut (D) slightly and adjust distribution of needle swing by turning eccentric screw (E). (See Illustration b)

DISTRIBUTION OF NEEDLE SWING

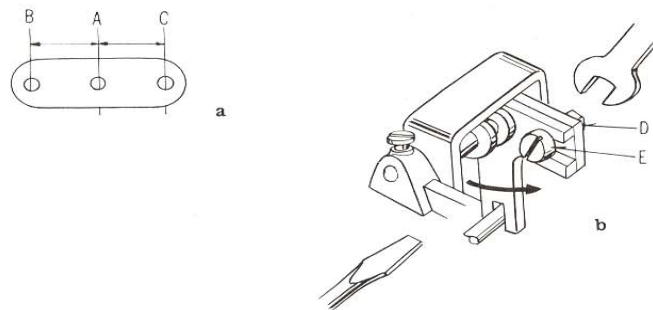


FIGURE 3C-8

SEE FIGURE 3C-9

Loosen nut (A) and screw (B) slightly. Set special stitch dial at red "S". Keep needle above the surface of needle plate and drop feed dog. Place a piece of paper on needle plate and lower presser foot with pressure regulator at maximum. Set stitch width control at 4

and make one zigzag stitch to mark points (L) and (R). Keeping needle above the surface of needle plate again, set stitch width control to red "S" and take one stitch on the same paper. Check and see if distances (X) and (Y) are equal. If not equal, loosen screw (C) and move the forked connection either upward or downward until the distances (X) and (Y) are equal.

DISTRIBUTION OF NEEDLE SWING

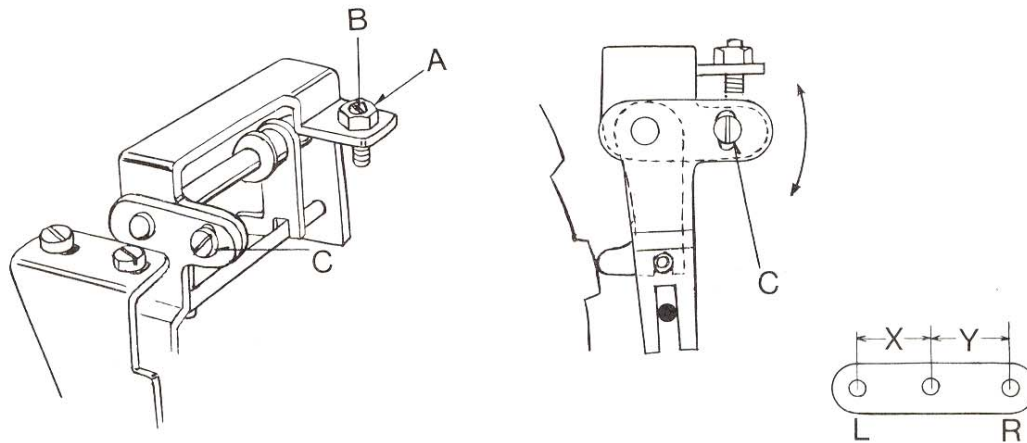


FIGURE 3C-9

SEE FIGURE 3C-10

Set special stitch dial at red "S" and stitch width control at red "S". Using the straight stitch needle plate, check and see if the needle goes in the center of the needle hole. If not, adjust the needle position according to instructions on page 3D-1, Figure 3D-2.

Using the zigzag stitch needle plate, check the needle swing by turning the stitch width control from "S" to "4" with the needle at its lowest position (Step No. 1). Next rotate hand wheel one complete turn and check needle swing by turning stitch width control from "S" to "4" with needle at its lowest position. (Step No. 2).

If needle swing in Step No. 1 is not equal to that in Step No. 2, loosen screw (A), insert eccentric tool in hole (B) and move adjustable plate (C) in either direction (D) or (E) to obtain equal needle swing.

After adjusting tighten screw (A).

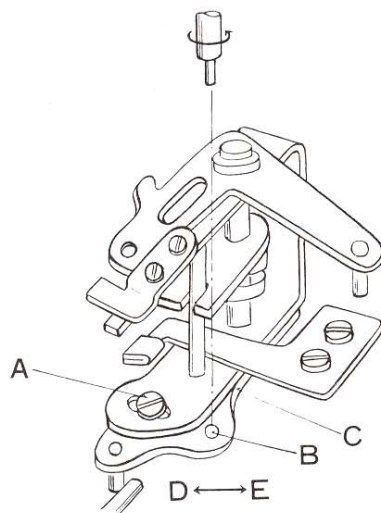


FIGURE 3C-10

SEE FIGURE 3C-15

Set the special stitch dial at red dot and stitch width control knob at 4 respectively. Lower needle to the lowest position. Loosen set screws (1) slightly, insert the eccentric tool (3) into the hole (4), slide the zigzag width bracket (2) to either direction, by turning the eccentric tool until you can obtain the equal clearance between the needle and the edge of needle slot at both of left and right needle positions. Tighten the screws securely after adjustment.

DISTRIBUTION OF NEEDLE SWING

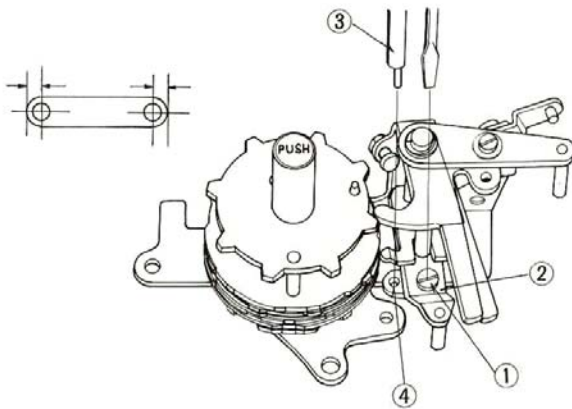


FIGURE 3C-15

SEE FIGURE 3C-17

Insert design cam #1 onto the cam shaft and drop feed dogs and place a piece of paper on needle plate and lower needle to mark needle point (A) on it with stitch width control at red dot setting. Then raise needle to its highest point, set stitch width to 4 setting, and take one zigzag stitch. Check and see if each needle point (B) and (C) are almost same distance from point (A) as shown in Figure 2, loosen a screw (D) slightly. Then adjust the plate (E) as shown until you can obtain the equal distance between A-B and A-C. Tighten the screw securely after adjustment.

DISTRIBUTION OF NEEDLE SWING

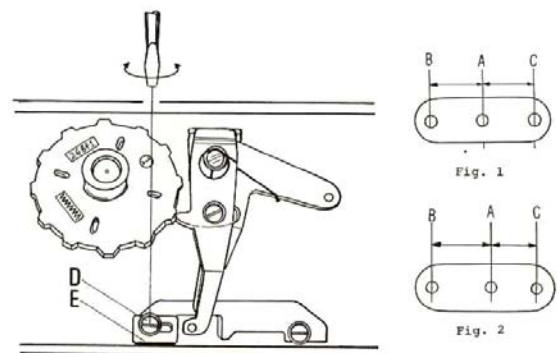


FIGURE 3C-17

SEE FIGURE 3C-16

Lower needle to its lowest position. Moving stitch width control from red dot to 5, and 5 to red dot, check and note the distance needle travels from its center position to either one side.

Turn the handwheel one complete turn, and bring the needle to its lowest position again. Moving stitch width control from red dot to 5, and then 5 to red dot, the needle travels to the opposite direction to what was observed in the previous procedure. Note the distance needle swings.

If the needle travels an unequal distance from its center position, loosen the set screw (A) and adjust the position of zigzag guide base plate (B) as illustrated.

DISTRIBUTION OF NEEDLE SWING

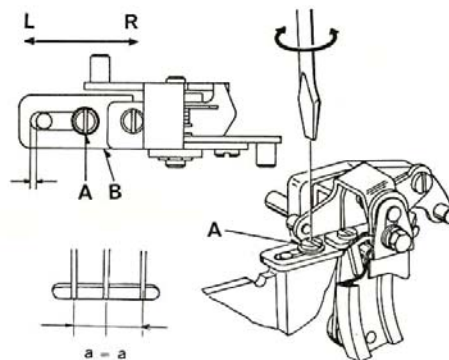


FIGURE 3C-16

Set the special stitch dial at red dot and stitch width control at 4. Lower needle to the lowest position. Loosen set screw (A) slightly, insert the eccentric tool (B) into the hole (C) and slide the zigzag width bracket (D) to either direction, by turning the

eccentric tool, until you can obtain the equal clearance between the needle and the edge of needle slot at both left and right needle position. Tighten the screw securely after adjustment.

DISTRIBUTION OF NEEDLE SWING

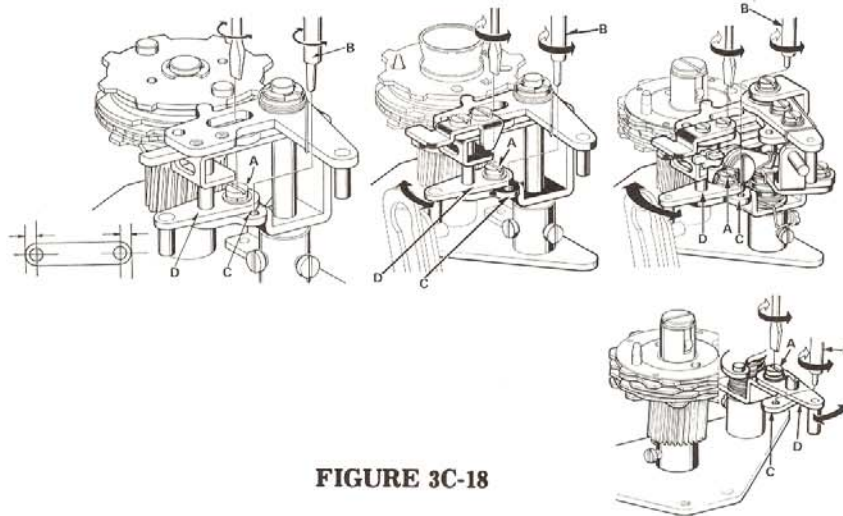


FIGURE 3C-18

SEE FIGURE 3C-19

Set the special stitch dial at red dot and stitch width control at 4. Lower needle to the lowest position. Loosen set screw (A) slightly, and slide the zigzag width bracket (B) to either direction, until you can obtain the equal clearance between the needle and the edge of needle slot a both left and right needle position. Tighten the screw securely after adjustment.

SEE FIGURE 3C-20

Drop feed dogs. Place a piece of paper on needle plate and lower needle to mark needle point (A) with stitch width control at red dot setting. Then raise needle to highest point, set stitch width to 4 setting, and take one zigzag stitch. By using a scale, check and see if each needle point (B) and (C) is the same distance from the needle point (A). If point (A) is not centered between (B) and (C), as shown in Figure 2, loosen screw (D) slightly and adjust distribution of needle swing by moving cam follower (E) as illustrated, until you can obtain the equal distance between AB and AC. Tighten screw (D) after adjustment.

DISTRIBUTION OF NEEDLE SWING

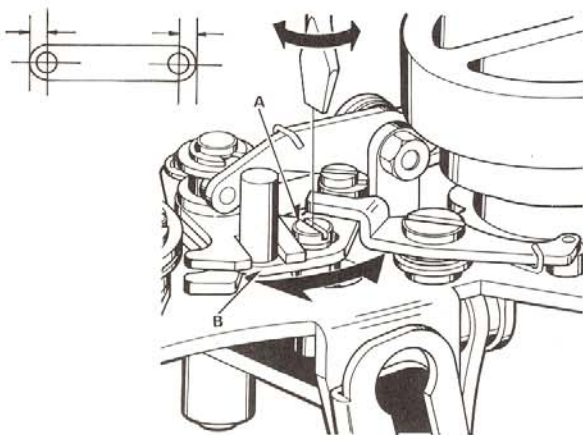


FIGURE 3C-19

DISTRIBUTION OF NEEDLE SWING

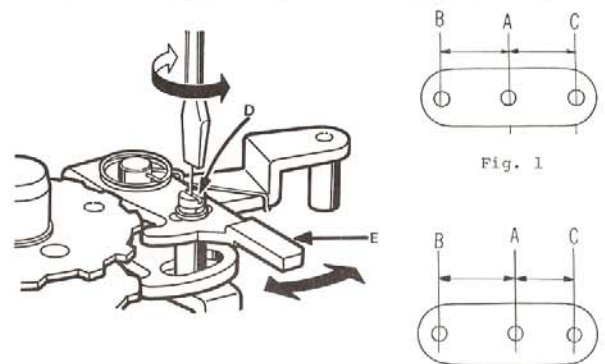



FIGURE 3C-20

DISTRIBUTION OF NEEDLE SWING

See Figure 3C-21

1. CHECKING DISTRIBUTION OF NEEDLE SWING

Check needle position at straight stitching (D-6) before checking distribution of needle swing.

- Set the machine as follows:
 Special stitch selector — 
 Stitch width control — 4
 Stitch length control — any number
 Special stitch modifier — red dot
- Use zigzag stitch needle plate.
- Turning handwheel, check to see if clearances between needle and edge of needle slot at left and right needle position (A and A') are nearly equal.

2. ADJUSTMENT

- Loosen screw (E) slightly.
- Insert eccentric tool (B) into hole (C).
- Shift zigzag guide bracket (D) to either direction by turning the eccentric tool (B) until you can obtain equal clearance between (A) and (A').
- Tighten screw (E) securely after adjustment.
- Check needle position for decorative stitching (3C-22) and clearance between cam and cam follower (3K-22) after adjustment.

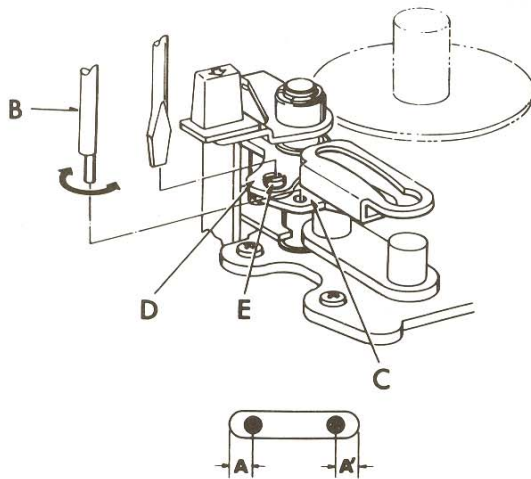


FIGURE 3C-21

See Figure 3C-22

1. CHECKING NEEDLE POSITION FOR DECORATIVE STITCHING

Check needle position at straight stitching before checking needle position for decorative stitching mentioned below. (3D-6)

- Set the machine as follows:
 Special stitch selector — zigzag stitch position

Stitch width control — 4
 Stitch length control — 0
 Special stitch modifier — red dot

- Use zigzag stitch needle plate.
- Turning handwheel, check to see if clearances between the needle and edge of needle slot are equal at left and right side strokes of needle bar.
- Turn special stitch selector to cam position.
- With needle in right position, the needle should not touch the right edge of needle slot. The needle should be between right edge of needle slot and right needle position at zigzag stitching.
- With needle in left position, the needle should not touch the left edge of needle slot. The needle should be between left edge of needle slot and left needle position at zigzag stitching.

2. ADJUSTMENT

- Use screw (A) for right side stroke and screw (B) for left side.
- Turn handwheel by hand until the eye of needle is under needle plate.
- Loosen nut (C) slightly.
- Adjust needle position by turning screw (A) or (B) so that needle will not touch either edge of needle slot and needle is slightly beyond maximum width at zigzag stitching.
- Tighten nut (C) securely.
- After adjustment, check following points:
 Distribution of needle swing (3C-21)
 Clearance between cam and cam follower (3K-22)

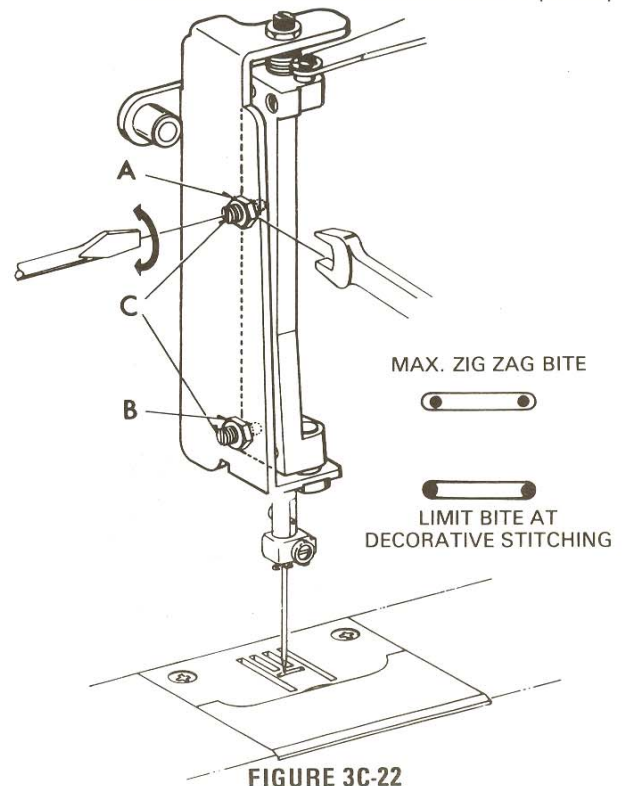


FIGURE 3C-22

DISTRIBUTION OF NEEDLE SWING

See Figure 3C-23

Bring the needle to its lowest position by turning the handwheel. Moving stitch width control from red dot to 4 and then 4 to red dot, check and note the distance needle travels from its center position to either side.

Turn the handwheel one complete turn and bring the needle to its lowest position again. Moving stitch width control from red dot to 4 and then 4 to red dot, the needle travels to the direction opposite to what was observed in the previous procedure. Note the distance needle swings.

If the needle travels uneven distance from its center position, loosen screws (1) and (2) and adjust the position of geared cam, as illustrated. Tighten the screws (1) and (2) securely after adjustment.

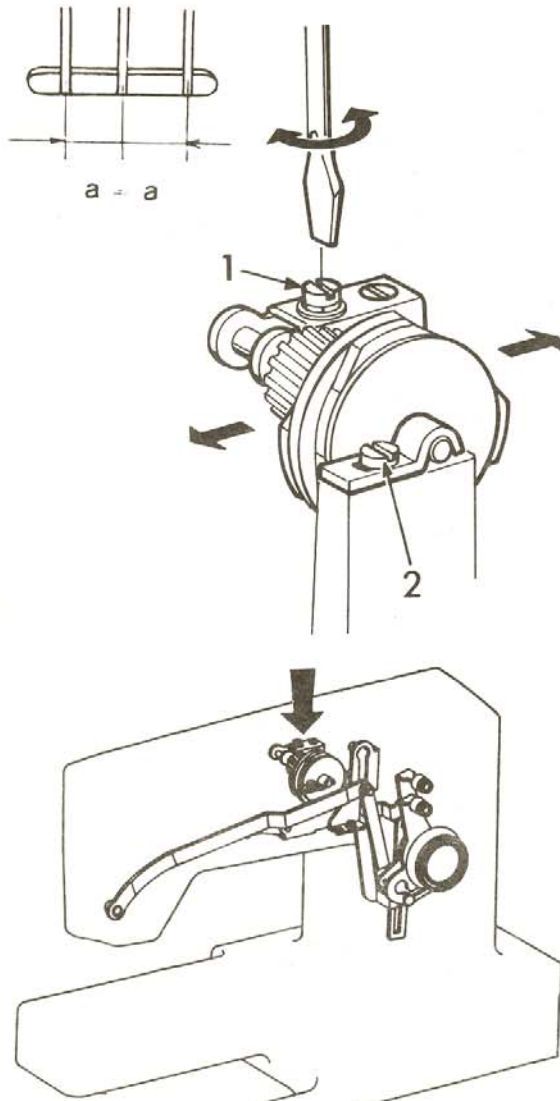


FIGURE 3C-23

See Figure 3C-24

Set the special stitch dial at red dot and stitch width control at 4. Bring needle to the lowest position. Loosen screw (A) slightly, insert eccentric tool (B) into hole (C) and slide the zigzag width bracket (D) to either direction, by turning the eccentric tool, until you obtain equal clearance between the needle and the edge of needle slot at both left and right needle positions. Tighten screw securely after adjustment.

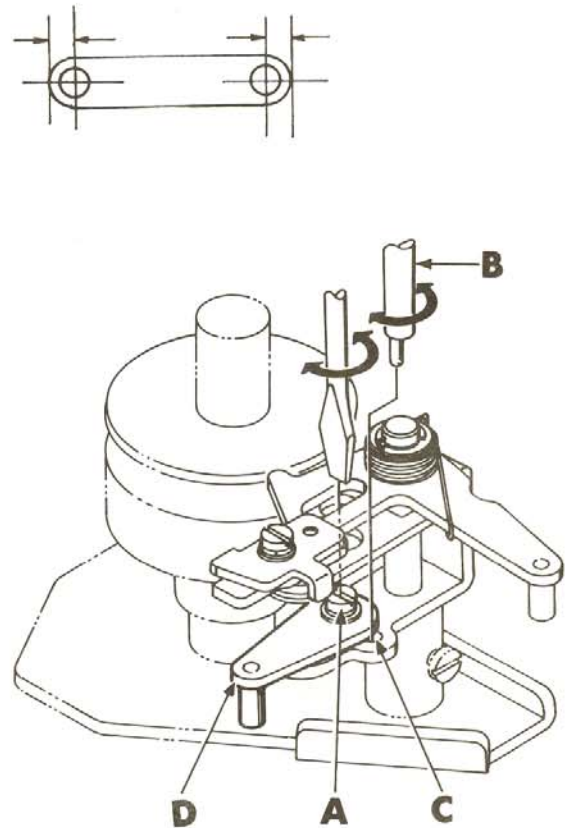


FIGURE 3C-24

SEE FIGURE 3D-1

Set the stitch width control at maximum. Turning the handwheel, check and see if the needle goes through the needle slot at points of equal distance from each end of the needle slot.

If not, loosen the set screws on the bracket of vertical rocker shaft, and adjust as illustrated. Tighten the set screws securely after adjustment.

SEE FIGURE 3D-2

Set stitch width control at 0. Prepare the needle plate for straight stitching by reversing or sliding the center plate (3). Turning handwheel, check and see if the needle goes through the needle hole at its center. If not, loosen nut (1) and adjust needle position by slightly turning the eccentric roller pin (2). Tighten the nut securely after adjustment.

NEEDLE POSITION

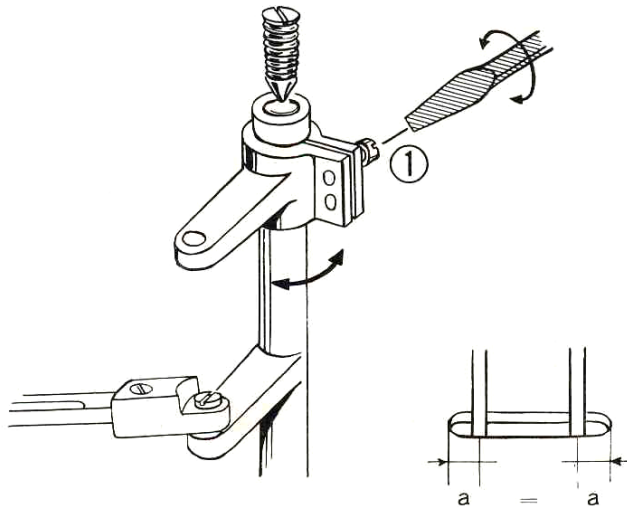


FIGURE 3D-1

NEEDLE POSITION

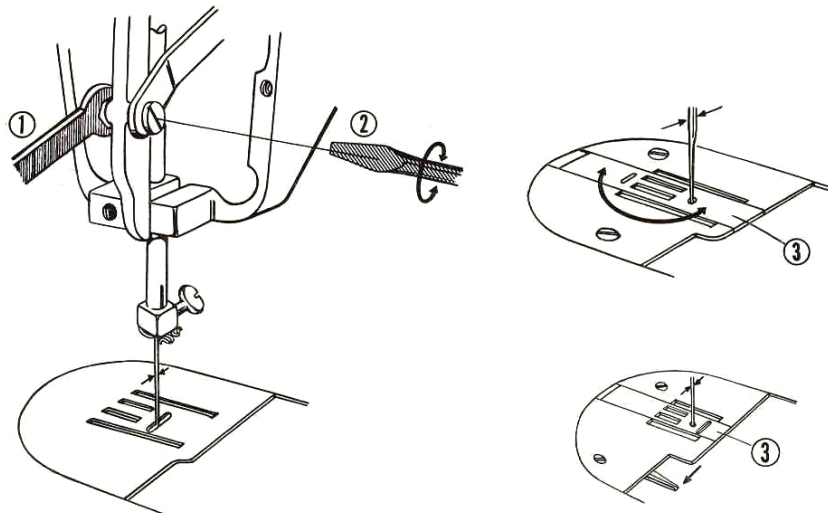


FIGURE 3D-2

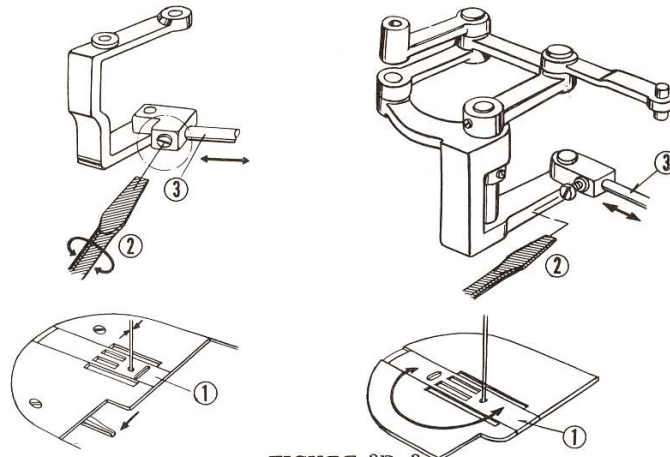


FIGURE 3D-3

Set stitch width control at 0 and needle position control at C, remove the pattern disc from cam shaft, and prepare the needle plate for straight stitching by sliding the center plate(1).

Turning the handwheel slowly, check and see if the needle goes through the needle hole at its center. If not, loosen set screw (2), and adjust position of the zigzag guide bar (3) towards either direction as illustrated until you obtain the correct Center position of the needle. Tighten the screw firmly after adjustment.

Set stitch width control at 4 and needle position control at S, and remove the pattern disc from cam shaft, and prepare the needle plate for straight stitching by reversing the center plate (1).

Turning the handwheel slowly, check and see if the needle goes through the needle hole at its center. If not, loosen set screw (2), and adjust position of the zigzag guide bar (3) towards either direction as illustrated until you obtain the correct S position of the needle. Tighten the screw firmly after adjustment.

NEEDLE POSITION

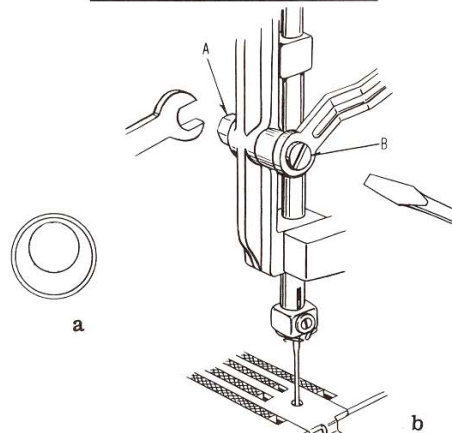


FIGURE 3D-4

Raise needle bar to its highest position. Needle plate must be set for straight stitching. Set special stitch dial to "S" and stitch width control to "S". Turning the handwheel, check and see if the needle goes into hole of needle plate. If not, loosen nut (A) and adjust needle position by turning eccentric screw (B) with a screw driver as shown in Illustration a. When adjusting needle position, make sure that eccentric area of screw (B) is positioned downward as shown in Illustration b.

NEEDLE POSITION

See Figure 3D-6

1. CHECKING NEEDLE POSITION AT STRAIGHT STITCHING

Check needle side motion at straight stitching before checking needle position at straight stitching. (3I-10)

- Set the machine as follows:
 - Special stitch selector – straight stitch position
 - Stitch width control – 0 or red dot
 - Stitch length control – any number
 - Special stitch modifier – red dot
- Use straight stitch needle plate.
- Lower needle bar by turning handwheel by hand.
- Check to see if needle centers on the needle hole of needle plate.

2. ADJUSTMENT

- Loosen screw (A) on needle bar support (C) slightly.
- Turn eccentric screw (B) which connects zigzag guide bar (D) with needle bar support (C), so that needle centers on the needle hole of needle plate.

In adjusting eccentric screw (B), the front range as shown should be used. Don't turn around to the rear range.

- Tighten screw (B) securely.
- After adjustment, check following points:
 - Needle clearance to shuttle (3G-9)
 - Needle timing to shuttle (3G-10)
 - Distribution of needle swing (3C-21)
 - Clearance between cam and cam follower (3K-22)

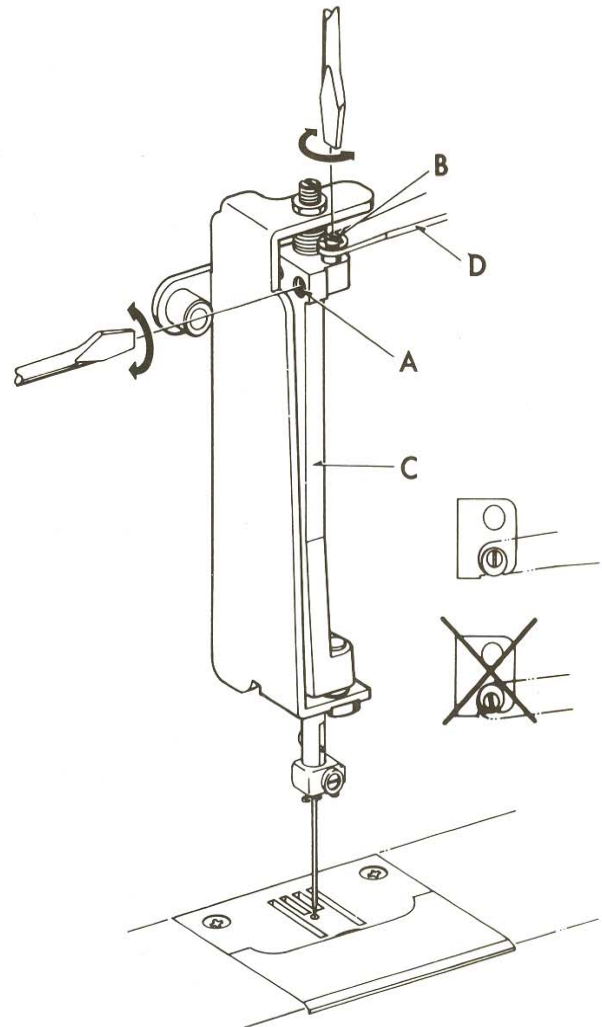


FIGURE 3D-6

For front facing shuttle models, place the feed dog height gauge at the position as illustrated (2) with no-go side of the gauge facing needle plate. Turning the handwheel slowly by hand, check and see if the gauge is moved by the feed dog teeth. If not, feed dog teeth are too low. Then, place the gauge up-side-down, with go-side facing the needle plate, and repeat same procedure. If the gauge is moved, the feed dog teeth are too high.

To make adjustments, loosen screw (1) on drop feed center block and adjust the feed dog height as specified. Tighten the screw securely after adjustment.

CAUTION:

For side facing shuttle models, be sure the gauge is placed on the surface of needle plate-not with one end resting on the handhole cover plate.

FEED DOG HEIGHT

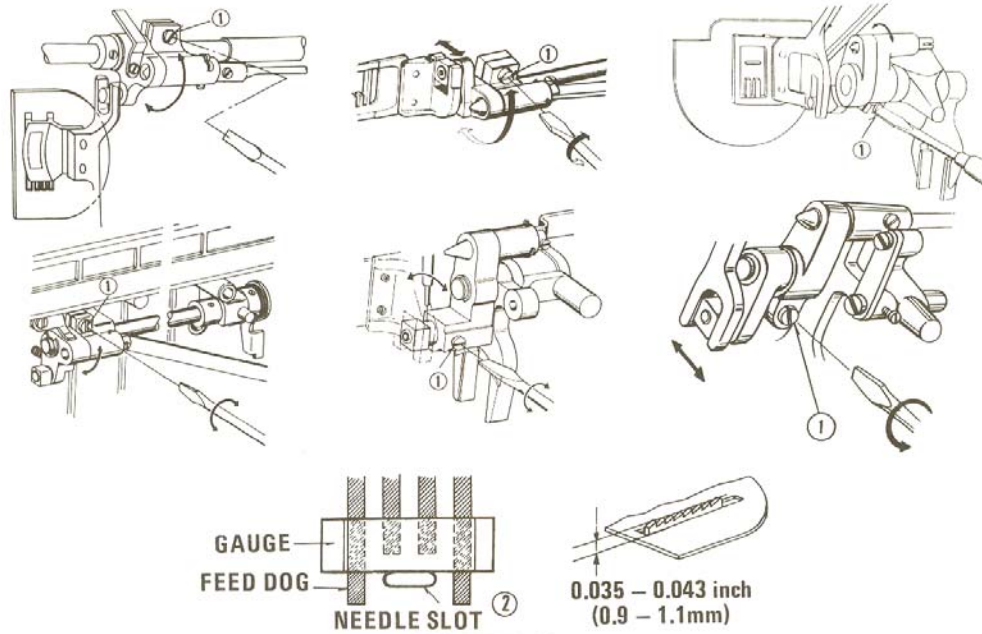


FIGURE 3E-1

SEE FIGURE 3E-2

Check the feed dog height over the needle plate for specified dimensions (A). If an adjustment is needed, raise the needle to its highest position, and loosen the screw (1). Adjust the feed dog height as specified sliding the feed dog up and down along the screw hole. Tighten the screw securely after adjustment.

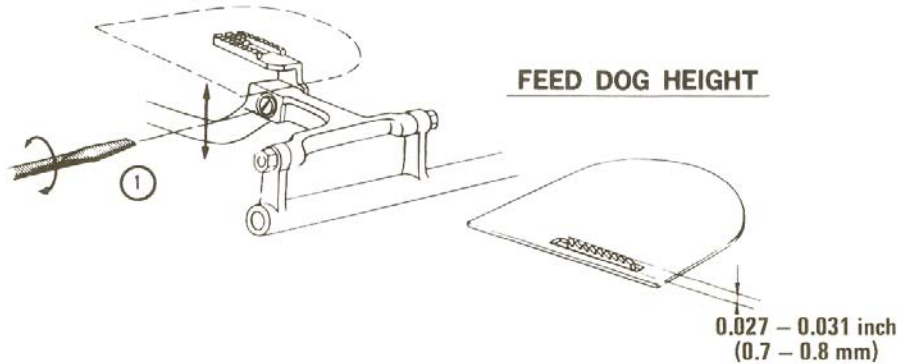


FIGURE 3E-2

(A)

FEEDDOG HEIGHT

See Figure 3E-3

1. CHECKING FEEDDOG HEIGHT

- Set the machine as follows:
 - Special stitch selector – straight stitch position
 - Stitch width control – 0 or red dot
 - Stitch length control – 6
 - Special stitch modifier – red dot
- Place feeddog height gauge at the back of needle plate as shown (Figure 1).
- Turning handwheel, check feeddog height.

FEEDDOG HEIGHT GAUGE	GO SIDE (Facing needle plate)	NO-GO SIDE (Facing needle plate)
Correct	Not moving	Moving
Low	Not moving	Not moving
High	Moving	Moving

2. ADJUSTMENT

- Turning handwheel, align center of roller (C) on feed lifting link (B) with indicator line on feed lifting cam (A) (Figure 2).
- Place the feeddog height gauge with go-side facing needle plate (red on top) at the back of needle slot.
- Lower presser foot.
- Loosen screw (D) slightly.
- Turn eccentric screw (E) so that feeddog touches the gauge slightly.
- Tighten screw (D) securely.

NOTE

When adjusting, turn eccentric screw (E) with eccentric portion facing to the feeddog (to the left) (Figure 3).

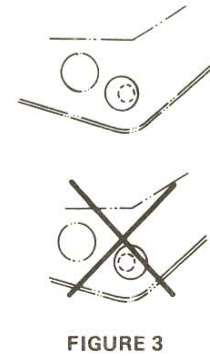
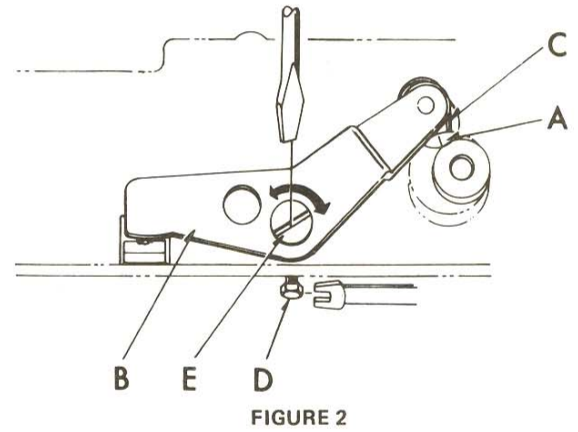
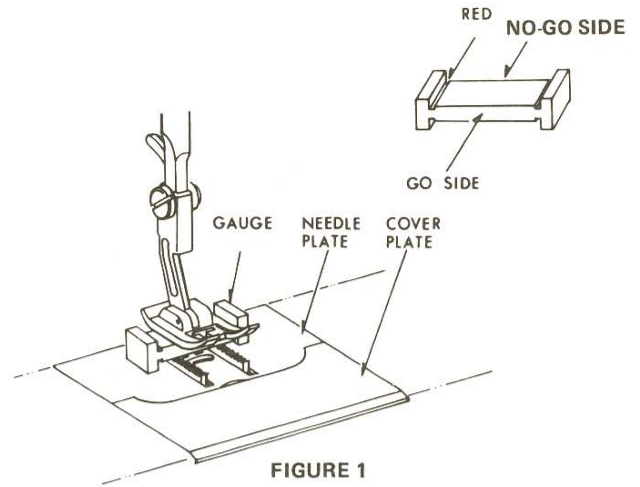


FIGURE 3E-3

FEEDDOG HEIGHT

See Figure 3E-4

Set stitch length control at 6 (maximum). Place the feed-dog height gauge at the position illustrated, with no-go side of the gauge facing needle plate. Lower presser foot while turning the handwheel slowly by hand, the gauge should be moved by the feeddog teeth. If not, feeddog teeth are too low. Then, place the gauge up-side-down, with go side facing the needle plate, and repeat same procedure. The gauge should not be moved by the feeddog teeth. If the gauge is moved, the feeddog teeth are too high.

To make adjustment, loosen screw (2) on feed roller & bracket assembly and adjust the feeddog height as specified. Tighten the screw securely after adjustment.

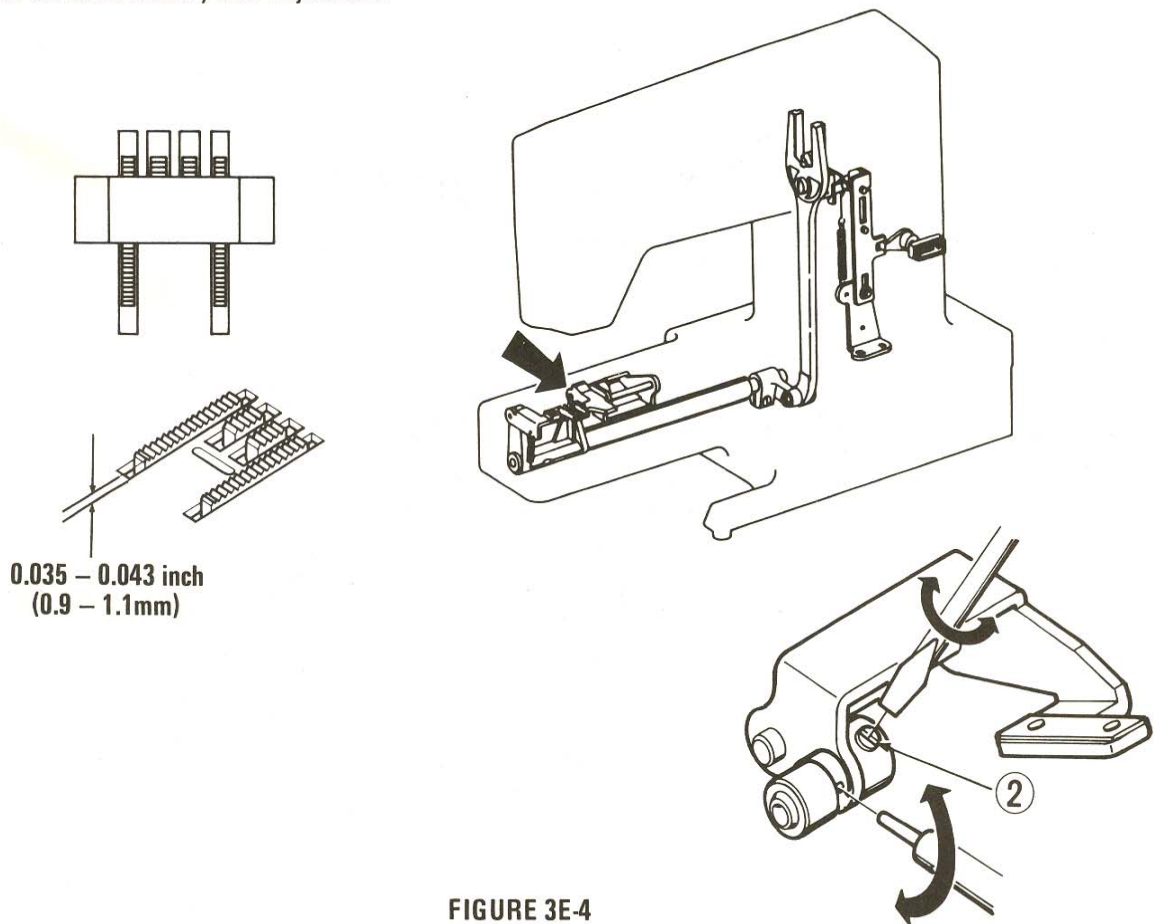


FIGURE 3E-4

O-FEEDING

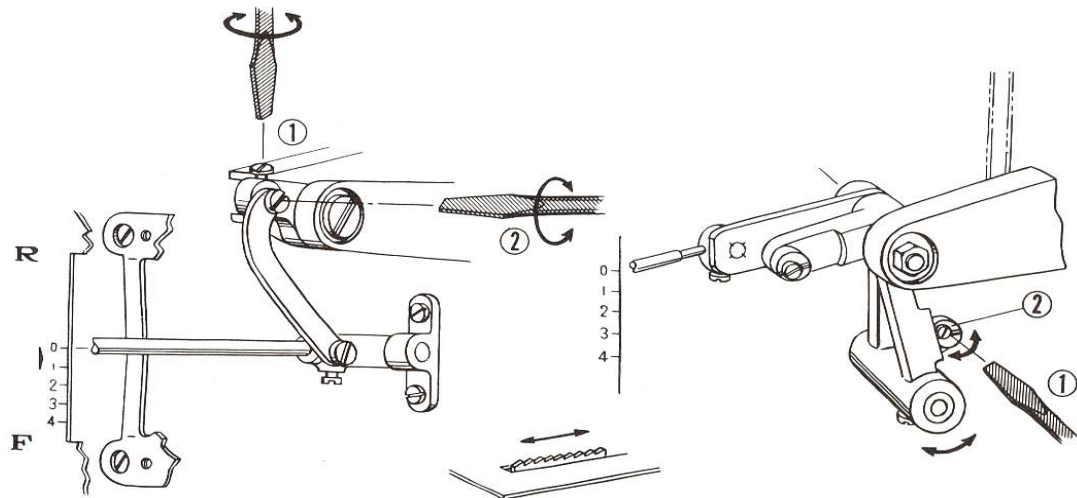


FIGURE 3F-1

Set stitch length control at 0. Turning handwheel, check and see if the feed dog moves horizontally. At 0 position the feed dog should not move. If so, loosen the set screw (1) and adjust by turning the eccentric roller pin (2). Tighten the set screw (1) securely after adjustment is made.

O-FEEDING

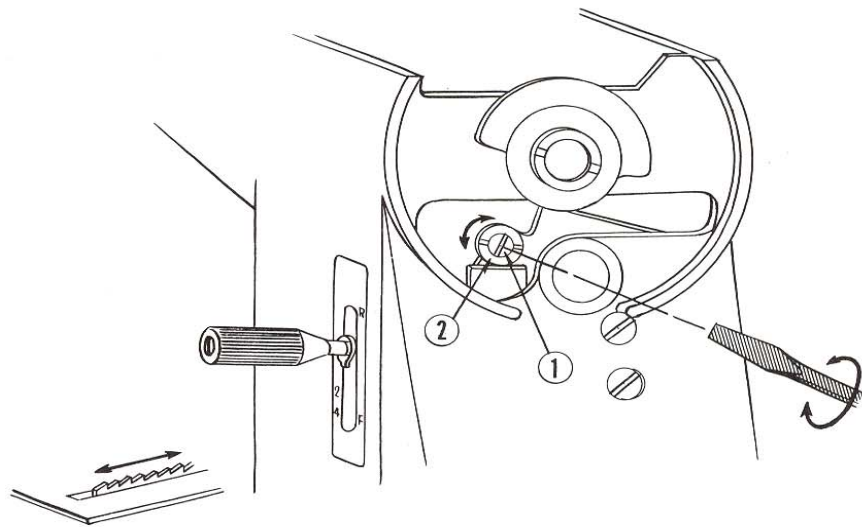


FIGURE 3F-2

Set stitch length control at 0. Turning handwheel, check and see if the feed dog moves horizontally. At 0 position the feed dog should not move. If so, loosen the set screw (1) and turn the eccentric pin (2) for adjustment. Tighten the screw (1) securely after adjustment.

O-FEEDING

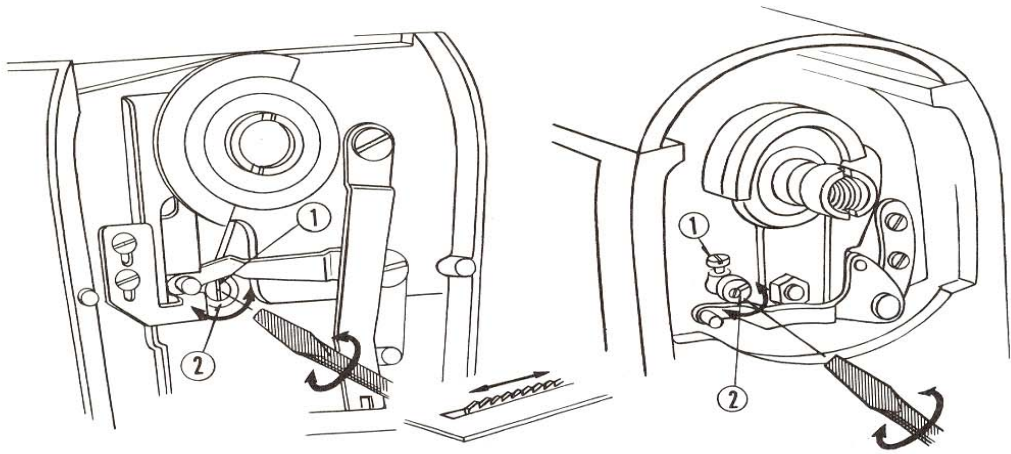


FIGURE 3F-3

Set stitch length control at 0. Turning handwheel, check and see if the feed dog moves horizontally. At 0 position the feed dog should not move. If so, loosen the set screw (1) and turn the eccentric pin (2) for adjustment. Tighten the screw (1) securely after adjustment.

O-FEEDING

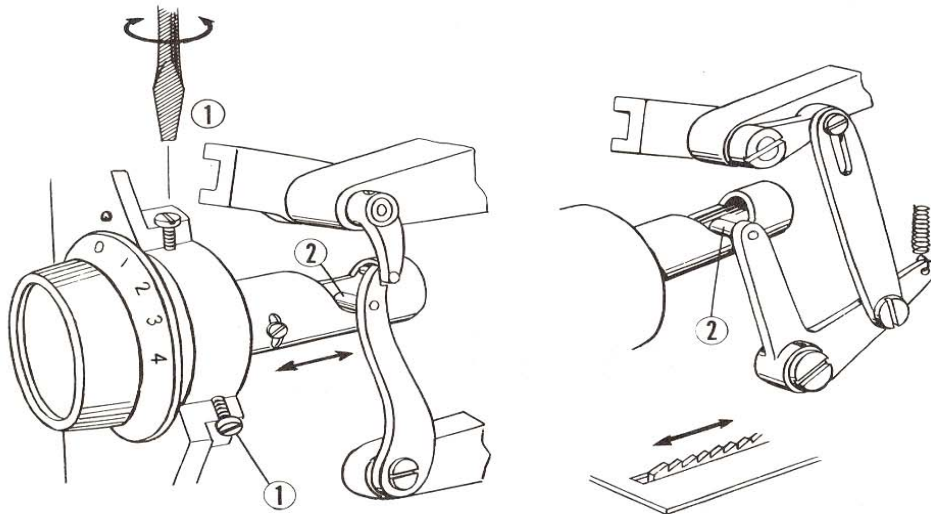


FIGURE 3F-4

Set stitch length control at 0. Turning handwheel, check and see if the feed dog moves horizontally. At 0 position the feed dog should not move. If so, loosen the set screws (1), and adjust position of the cylinder cam by sliding the whole control knob assembly back or forth very slightly, so that the pin (2) rests at the bottom of the cylinder cam. Tighten the screws (1) securely after adjustment.

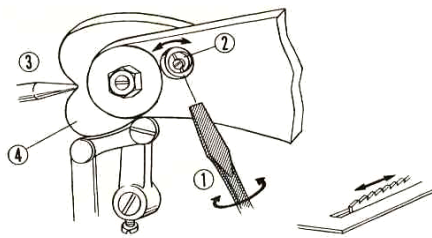


FIGURE 3F-5

Set stitch length control at 0. Turning handwheel, check and see if the feed dog moves horizontally. At 0 position the feed dog should not move. If so, loosen the set screw (1), and adjust the angle of heart cam (4) by turning the eccentric pin (2), so that the regulating pin (3) points at the bottom of heart cam dent. Tighten the screw (1) securely after adjustment.

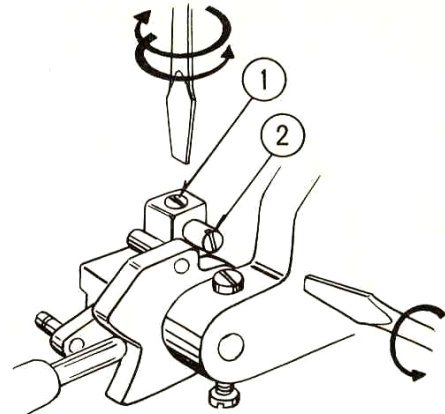


FIGURE 3F-7

Set special stitch dial at "S", stitch width control at "S" and stitch length control at "O". Loosen screw (1) slightly. Turn eccentric screw (2) either clockwise or counterclockwise until machine does not feed on the "O" setting.

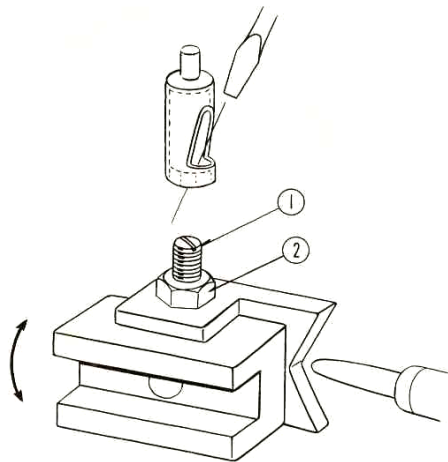


FIGURE 3F-6

Set stitch length control at 0. Turning handwheel, check and see if the feed dog moves horizontally. At 0 position the feed dog should not move. If so, loosen the nut (2) holding the set screw (1). Turn the set screw either way to eliminate movement of the feed dog. After adjustment, tighten the nut (2) securely holding screw (1).

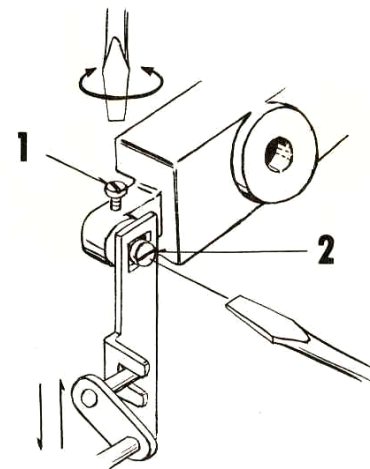



FIGURE 3F-8

Set stitch length control to "0". Turning hand wheel, check and see if the feed dog moves horizontally. At "0" position the feed dog should not move. Place a piece of paper on needle plate. Take eleven stitches with pressure regulator at maximum position and presser foot down. Loosen screw (1) and turn screw (2) clockwise or counterclockwise so that the length of eleven stitches taken is approximately $0 + .04$ " (1mm). After adjustment tighten screw (1) securely and again check that the length obtained is in the range of $0 \pm .04$ " (1mm).

O-FEEDING

See Figure 3F-13

1. CHECKING O-FEEDING

- Set the machine as follows:
 - Special stitch selector — 
 - Stitch width control — 0
 - Stitch length control — 0
 - Special stitch modifier — red dot
- Place paper on needle plate, lower presser foot and turn handwheel several times by hand (with needle, without thread). The needle hole left on the paper should be a single round hole.

If not, adjust O-feeding.

2. ADJUSTMENT

- Using screw driver through window (B) provided on base plate (A), loosen screw (D) for feed link (C).
- Insert gauge pin (E) — 3 mm diameter — into round hole (F).
- While lightly depressing gauge pin (E) with finger, slowly and carefully move feed link (C) with screw-driver toward the left as indicated by the arrow.
- Finger on gauge pin may feel pin going further into the machine, and feed link (C) will not move further toward the left. Tighten screw (D) at this position of feed link (C). Remove gauge pin.

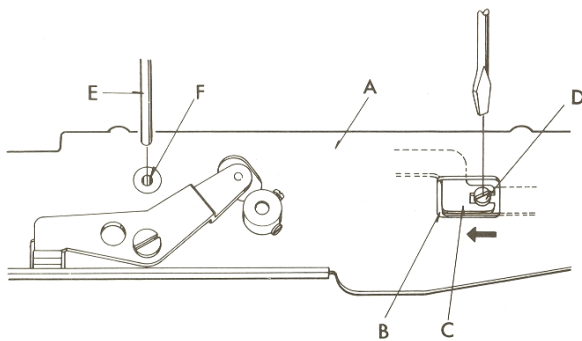


FIGURE 3F-13

See Figure 3F-14

Set stitch length control at "O." When turning handwheel, the feeddog should not move horizontally. If adjustment is needed, loosen screw (1) on feed regulator assembly and turn eccentric screw (2) in either direction to eliminate movement of feeddog. Tighten screw (1) securely after adjustment.

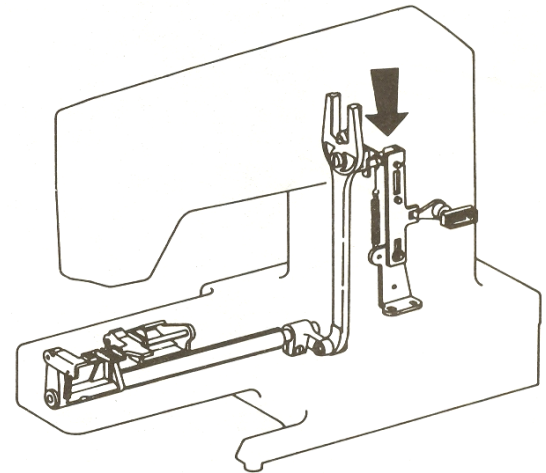
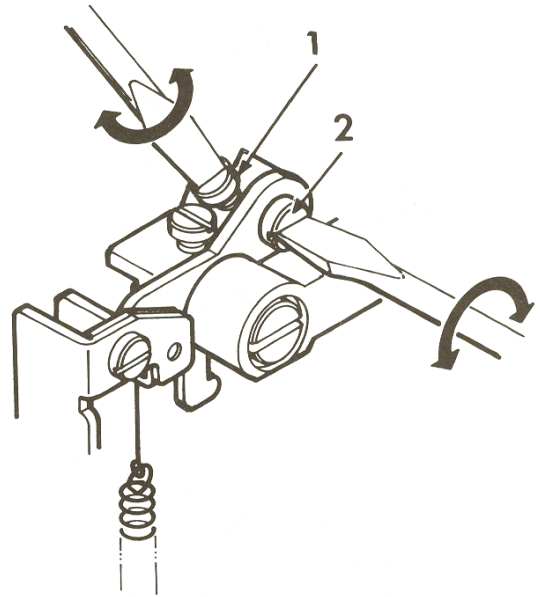


FIGURE 3F-14

O-FEEDING

See Figure 3F-15

Set stitch length control at "O." When turning handwheel, the feeddog should not move horizontally. If adjustment is needed, turn screw (A) in either direction to eliminate movement of the feeddog.

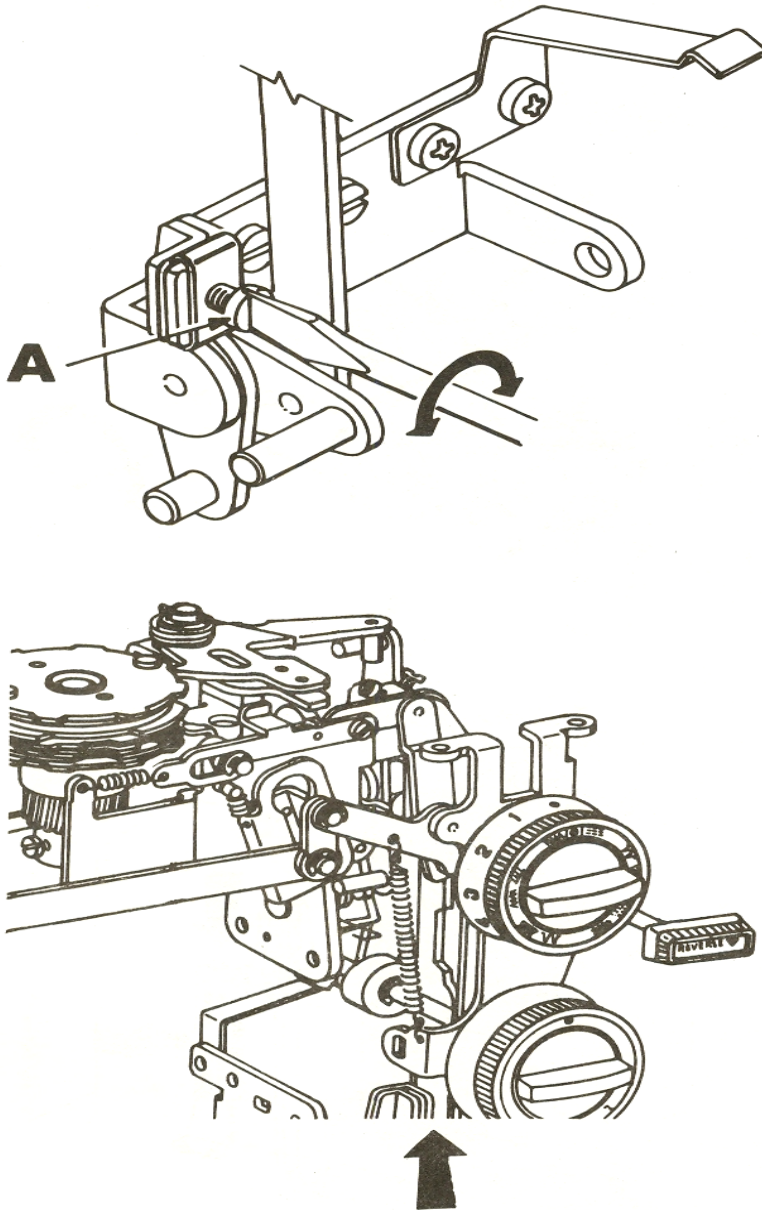
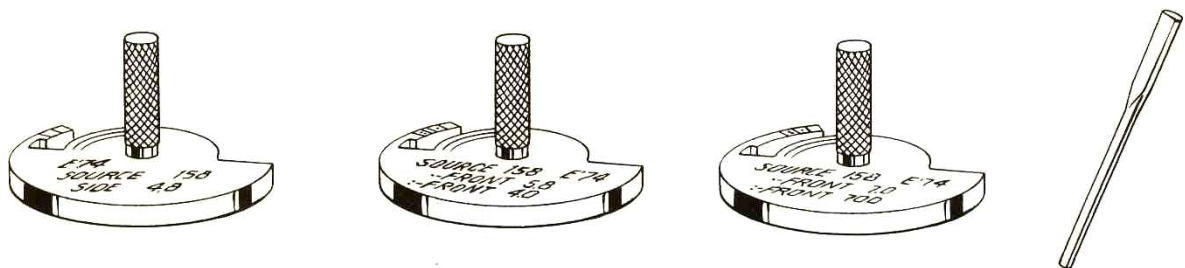


FIGURE 3F-15

NEEDLE TIMING TO SHUTTLE
FIGURE 3G-1
(INSTRUCTION FOR RADIAL TIMING GAUGE)

USE GAUGE	SOURCE 158 • FRONT 7.0 ⚙ FRONT 7.0D			SOURCE 158 • FRONT 5.8 ⚙ FRONT 4.0			SOURCE 158 SIDE 4.8		
USE MARK	• FRONT 7.0	⚙ FRONT 7.0D		• FRONT 5.8		⚙ FRONT 4.0			
MACHINE BITE	7.0	7.0	5.8	5.8	4.0	4.0	4.8		
	160	925	18141	17530	150	15250	650	340	All Side Face Shuttle Models
	161	16030	18150	17550	151	16000	10200	341	
	162	16031	19130	17560	152	16001	10300	342	
	163	17010	19131	17570	680	16010	10301	520	
	920	17011	19140	17571	850	16011	10302	521	
	921	17012	19141	17572	950	16012	10304	522	
	922	17030	19142	17740	960	16020	10400	523	
	923	17031		17741	12110	16021	10401	540	
	924	17032			12310	16210	10401	540	
	17000	17033			13050	16250	10402	541	
	17001	17511			13150	16410	10450	542	
	17490	17540			13160	16490	10500	880	
	17510	18011			13170	16500	10501	881	
	18010	18020			13180	16510	10600	882	
		18021			13190	16520	16530	900	
		18022			13200	16540		901	
		18023			13201	16600		902	
		18024			13250	17200		903	
		18030			13360	17300		904	
		18031			13470	17310		905	
		18032			13471	17500		18000	
		18033			13570	17501			
		18034			13571	17520			
		18130			14000	17600			
		18131			14001	19310			
		18140			14002	19311			
					14003	19400			
					14100	19410			
					14101	19411			
					14300	19412			
					14301	19460			
					14310	19461			
					14311	19470			
					15140	19471			
					15150				
					15160				

The radial timing gauges and test pins, as illustrated below, are available through Department 206, Chicago only. The kit is identified as #69659.



3G-2

See Figure 3G-2

The clearance "a," "b," "c," and the angle "d" are very critical points in relation to the needle timing to shuttle. However, these points are visually determined by using the Radial Timing Gauges.

NOTE:

No adjustment is allowed for "Dimension C" for the front-facing shuttle models. For adjustment for side-shuttle models, please refer to Figure 3G-3.

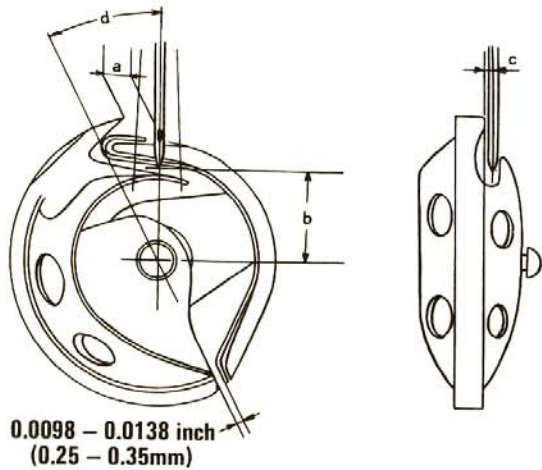


FIGURE 3G-2

See Figure 3G-3

Do not attempt adjustments other than those specified in this manual. If, by following the prescribed procedures, it is determined that a machine is out of radial time, handle per Bulletin S-820.

RADIAL TIMING GAUGE INSTRUCTIONS

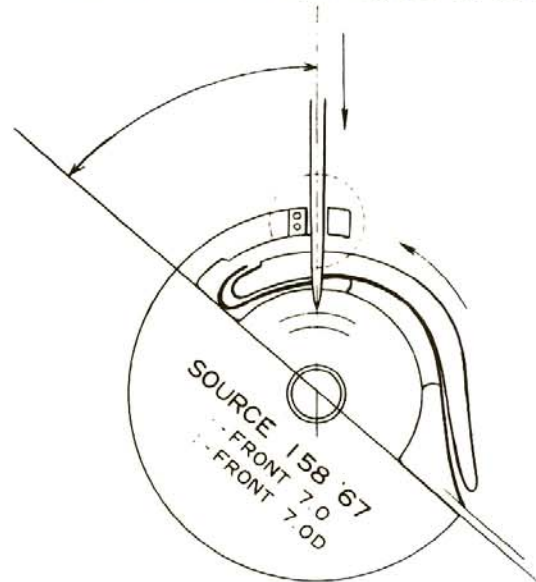
1. Remove needle and replace it with test pin which has a blunt tip.
2. Insert correct radial timing into shuttle driver. Refer to Figure 3G-1.
3. Set stitch width control at "O" or "S" (depending on model involved).

On machines with 7.0 zigzag bite which have a left needle straight stitch position, center the needle by means of the stitch width control. Use center strip between rear feeddogs as a guide for centering the needle.

4. Set needle position control at center for models which have this control.
5. Rotate handwheel slowly by hand. (See Figure 3G-3a.) The test pin should come between the correct two vertical lines at the end of the counterclockwise rotation of the gauge. (Refer to Figure 3G-1 to determine correct vertical lines.)

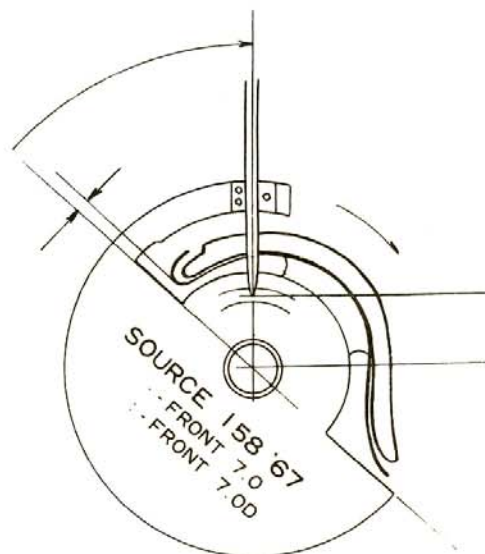
6. To check needle bar height, continue to rotate handwheel slowly by hand. (See Figure 3G-3b.) At the lowest position of the needle bar, the end of the test pin should come between two horizontal lines on the gauge.

If necessary, adjust needle bar height. Loosen screw on needle bar holder and adjust height on the test pin.



Dimension "a"

FIGURE 3G-3a



Dimension "b"

FIGURE 3G-3b

SEE FIGURE 3G-3

The following adjustment is allowed only for the side facing shuttle models.

First check the needle with needle gauge to make sure the needle is straight and is the correct needle. Place needle in position. Tighten the needle clamping screw securely. Bring the needle to its lowest position by turning the handwheel. Check and see if the clearance between the needle and the shuttle is within the specified limit. If not, loosen the set screw (2) on the shuttle guide bracket and adjust the position of shuttle by sliding it either towards left or right until you

obtain the proper clearance. Tighten the screw securely after adjustment.

Caution: Be sure that shuttle assembly does not rotate during adjustment.

SEE FIGURE 3G-4

Bring the needle to its lowest position, by turning handwheel. The long shuttle will be located at the extreme left side on the machine as illustrated. Loosen the nut and turn the eccentric screw (1) to either direction to adjust the distance between the needle and the point of long shuttle as specified. Tighten the nut after adjustment without moving the eccentric screw.

NEEDLE CLEARANCE TO SHUTTLE

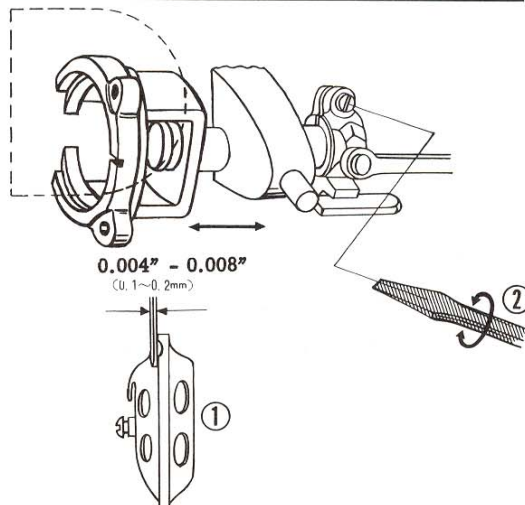


FIGURE 3G-3

NEEDLE TIMING TO SHUTTLE

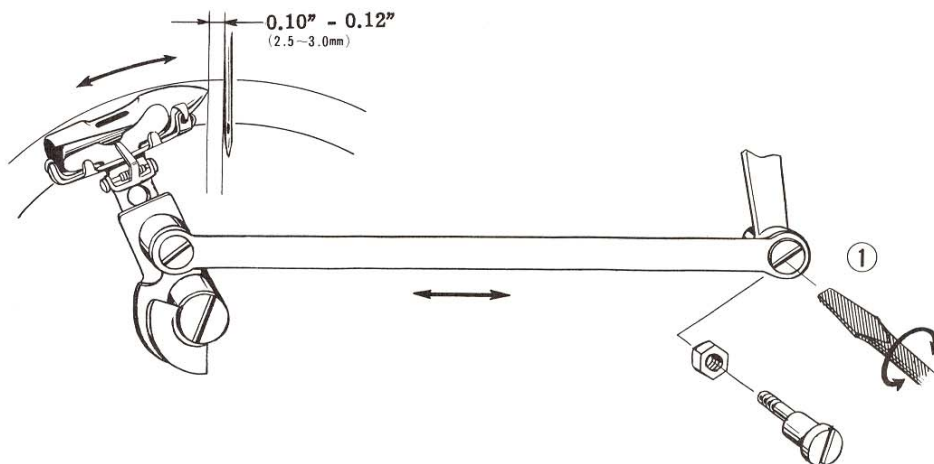


FIGURE 3G-4

NEEDLE TIMING TO SHUTTLE (Instruction For Radial Timing Gauge)

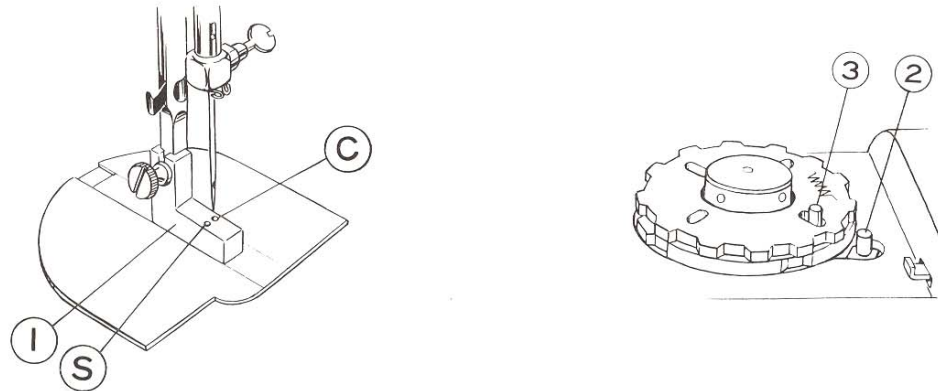


FIGURE 3G-5

Models which do not have a center needle position for straight stitching must be accurately set to the center position before using the Timing Gauge.

First, install test pin instead of needle and tighten needle clamp screw securely. Place pattern disc number 1081 1B, or number 26842 number 2 disc (according to the model) onto the cam driver shaft and turn it by hand until the cam follower (2) touches the cam surface at the maximum diameter of the disc. On models that have the standard cam built in, set the special stitch dial to the "S" position. Remove the presser foot and install the Low Bar Alignment Gauge (source 158 A 67) onto the presser bar. Locate center needle position by rotating stitch width control until the test pin comes to the C hole on the Gauge as shown. Confirm test pin is in C hole, raise the needle bar by rotating handwheel, remove the Alignment Gauge from the presser bar. Reinstall presser foot and check the needle timing by using the Radial Timing Gauge.

Insert correct radial timing gauge into the shuttle driver. Rotate handwheel slowly by hand; the test pin should come between the two vertical lines on the gauge at the end of the counterclockwise rotation of the shuttle (gauge).

Two gauges have two sets of vertical lines. To identify which lines to use, they are marked with one or two dots. Use the set of vertical lines which correspond with the dot marking in front of the gauge mark on the bottom of the gauge. Refer to line 15 in the Specification Section for the correct bight.

CAUTION:

Pinned at the factory and no field adjustment is allowed, except a slight adjustment as described under "Needle Position".

To check needle bar height - continue to rotate handwheel slowly by hand; the end of the test pin should come between the two horizontal lines on the gauge at the lowest position of the needle bar.

NEEDLE TIMING TO SHUTTLE

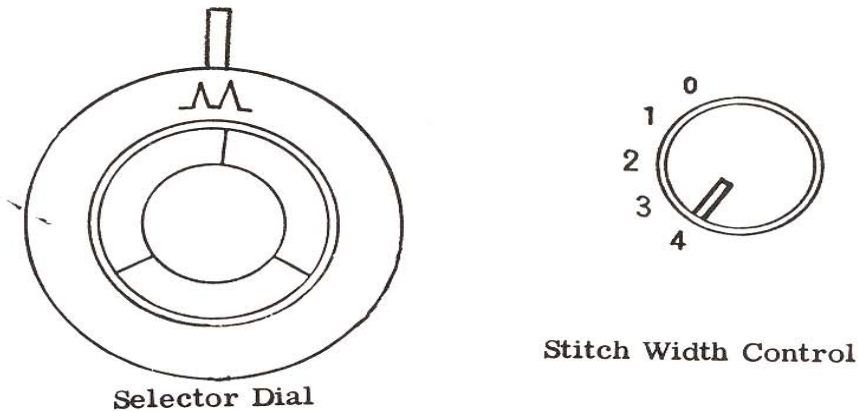


FIGURE 3G-6

Set the selector dial at blind stitch position and the stitch width control at 4. Turning the handwheel towards you, observe the movement of the needle. It takes one zigzag stitch after every 4 straight stitches. Stop rotation of the handwheel immediately after the needle has swung to the left and returned to the right position.

Replace needle with test pin and tighten the needle clamp screw securely. Remove presser foot and install super high bar alignment gauge. Remove shuttle hook from the machine and insert the radial timing gauge "FRONT 7.0D".

Locate center needle position by adjusting the stitch width control. At the center needle position, the test pin must go into the hole provided in the alignment gauge. After locating the center position bring the test pin to its highest position, and remove the alignment gauge.

To check shuttle rotational timing, rotate the handwheel slowly by hand. The test pin should come between the two vertical lines on the gauge at the end of the counterclockwise rotation of the shuttle (gauge). The gauges have two sets of vertical lines and are marked with one or two dots. Use the set of vertical lines which correspond with the dot marking in front of the gauge mark on the bottom of the gauge.

If radial timing is incorrect, file an MCIR stating the condition. No field adjustment is allowed.

3G-4 NEEDLE CLEARANCE TO SHUTTLE

See Figure 3G-6

The following adjustment is allowed only for the side-facing shuttle models.

Insert needle and tighten the needle clamp screw securely. Bring the needle to its lowest position by turning the hand-wheel. Check to see if the clearance between the needle and the shuttle is within the specified limit. If not, loosen screw (2) on the shuttle guide bracket and adjust the position of shuttle by sliding it either toward the left or right until the proper clearance is obtained. Tighten the screw securely after adjustment.

CAUTION: Be sure that shuttle assembly does not rotate during adjustment.

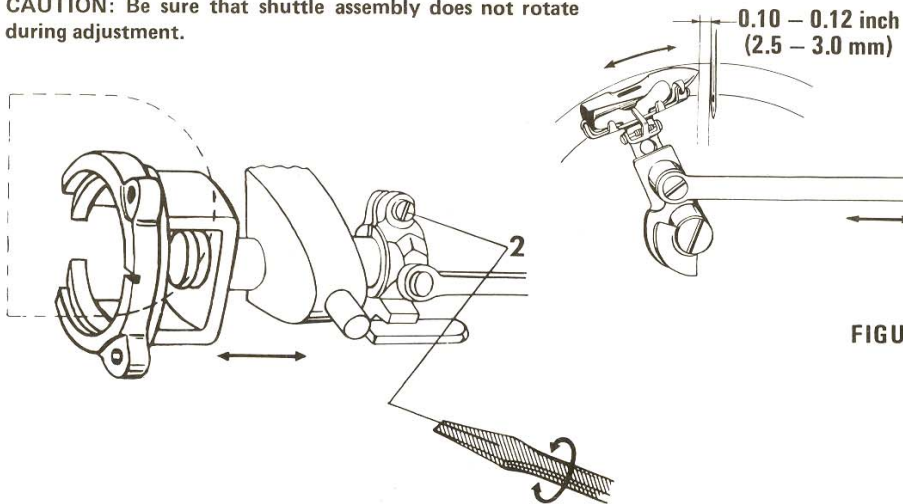


FIGURE 3G-6

NEEDLE TIMING TO SHUTTLE

See Figure 3G-7

Bring the needle to its lowest position by turning hand-wheel. The long shuttle will be located at the extreme left side on the machine, as illustrated. Loosen the nut and turn the eccentric screw (1) to either direction to adjust the distance between the needle and the point of long shuttle as specified. Tighten the nut after adjustment without moving the eccentric screw.

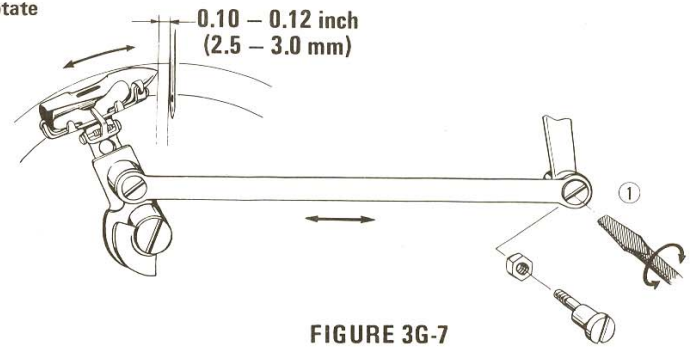


FIGURE 3G-7

NEEDLE TIMING TO SHUTTLE

See Figure 3G-8

Set the selector dial at blind stitch position and the stitch width control at 4. Turning the handwheel toward you, observe the movement of the needle. It takes one zigzag stitch after every 4 straight stitches. Stop rotation of the handwheel immediately after the needle has swung to the left and **returned to the right position.**

Insert test pin with blunt tip and tighten the needle clamp screw securely. If the Super High Bar Alignment Gauge is available, the following method may be used. Remove presser foot and attach gauge. Locate center needle position, by adjusting the stitch width control. At the center needle position, the test pin must go into the hole provided in the alignment gauge. After locating the center position bring the test pin to its highest position, and remove the gauge.

Check the radial timing and needle bar height following the instructions under 3G-3.

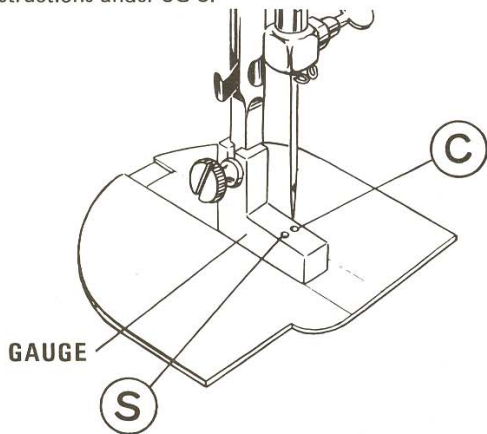


FIGURE 3G-8

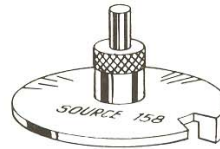
See Figure 3G-9

Check needle bar height (3B-2) and needle position at straight stitching (3D-6) before checking needle timing to shuttle.

CHECKING NEEDLE TIMING TO SHUTTLE

- Set the machine as follows:
 - Special stitch selector — straight stitch position
 - Stitch width control — 0 or red dot
 - Stitch length control — any number
 - Special stitch modifier — red dot
- Remove needle, presser foot, cover plate and needle plate.
- Remove bobbin case.
- Holding test pin (A) with flat side away from you, slip it into the needle bar and tighten the needle clamp screw.

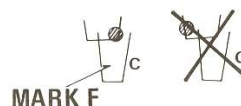
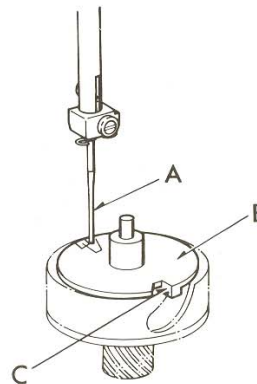
- Insert radial timing gauge (B) into the shuttle.
- Turn gauge so that the ear (C) of the gauge touches the pointed hook of shuttle.
- Turn handwheel slowly until test pin touches the surface of radial timing gauge.
- Check to see if the point of test pin is within Mark (F) or (G).
- If this check indicates machine is out of time, contact
- If this check indicates machine is out of time, handle per Bulletin S-820.



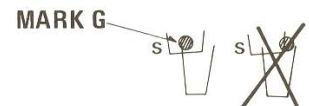
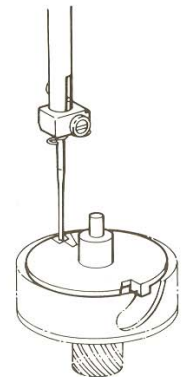
RADIAL
TIMING
GAUGE



TEST PIN



C-POSITION
FIGURE 1



S-POSITION
FIGURE 2

FIGURE 3G-9

See Figure 3G-10

Check needle position at straight stitching (3D-6) before checking needle clearance to shuttle.

CHECKING NEEDLE CLEARANCE TO SHUTTLE

- Set the machine as follows:
Special stitch selector — zigzag stitch position
Stitch width control — 4
Stitch length control — any number
Special stitch modifier — red dot
- Release clutch by pulling handwheel to the right.
- Remove needle, presser foot, cover plate and needle plate.
- Remove bobbin case.
- Holding test pin with flat side away from you, slip it into the needle bar and tighten the needle clamp screw.
- Turning handwheel slowly, check to see if the test pin clearance to the pointed hook of shuttle is within limits stated below. Check at right and left side strokes of needle bar.

Minimum clearance — pointed hook doesn't contact with #14 needle but contacts slightly with test pin.

Maximum clearance — up to 0.05 mm (0.002 inch)

NOTE: At the first stroke of needle bar, carefully observe test pin clearance to pointed hook of shuttle, turning handwheel very slowly. If the test pin should contact tightly with the pointed hook, proceed to adjustment step. Tight contact will result in damage to the test pin and pointed hook. At the factory, this timing is closely controlled to the extent that you may hear a feasible clicking sound, when handwheel is turned quickly back and forth. This is the maximum. Do not over-do.

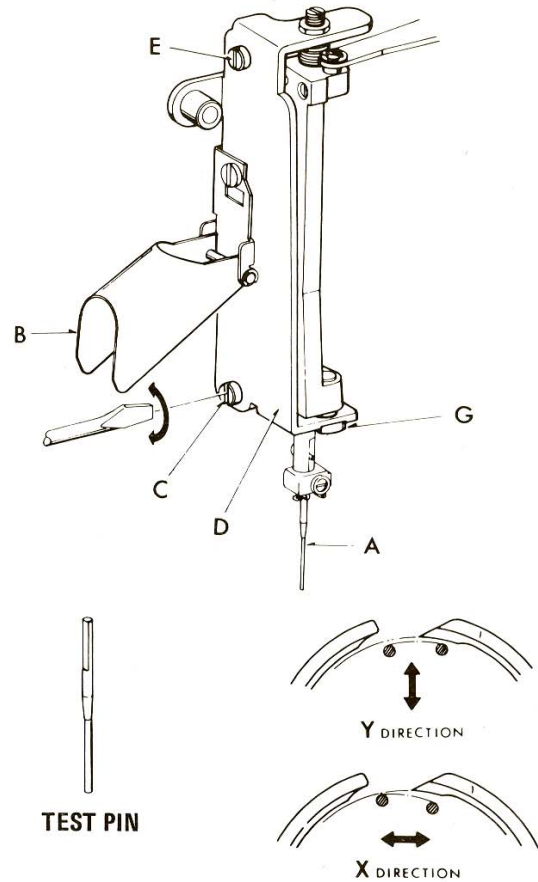


FIGURE 3G-10

ADJUSTMENT

To adjust clearance in X direction:

- To balance clearance between right and left side strokes of needle bar, turn triangular cam (G) on the bottom of support holder (D) with wrench. This adjustment shifts the needle in X direction.

To adjust clearance in Y direction:

- Raise lamp holder (B), remove bulb and loosen screw (C) slightly.
- Tap front or back edge of support holder with grip of screw driver to shift it Y direction. (See Figure.)
- X and Y direction adjustments should be made so that pointed hook may hit test pin with feather touch at both strokes of needle bar.
- Tighten screws (C) and (E) securely.
- Remove test pin and insert #14 needle. If pointed hook hits #14 needle, the Y direction adjustment is too close and further adjustment must be made to achieve the proper clearance.

ZIGZAG SYNCHRONIZATION

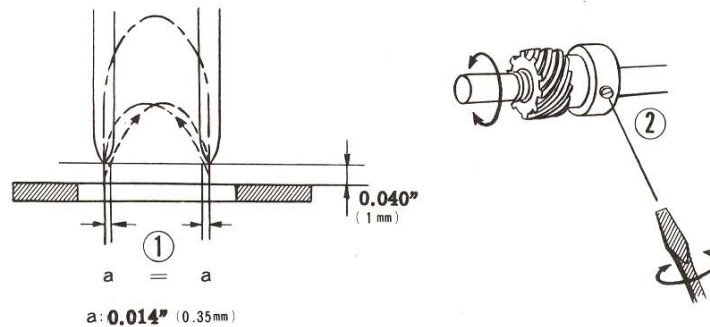


FIGURE 3H-1

Set stitch width control at maximum. Turning the handwheel, check and see if the needle side motion on the standard plane (0.040 inch above the upper surface of the needle plate) at both needle positions come within the engineering limit of 0.014 inch. If not, loosen set screw (2) and then the worm gear in either direction. Tighten the screw (2) securely after adjustment.

ZIGZAG SYNCHRONIZATION ON BLIND STITCH

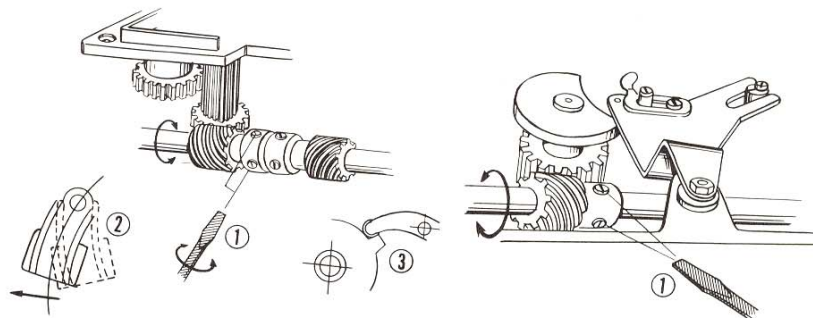


FIGURE 3H-2

Set stitch width control at 0 and buttonhole control knob at B. Place the blind stitch cam on the cam shaft. Turning the handwheel, check the needle side motion under the blind stitching condition in the same way as described for H-1. If the needle side motion is out of the engineering limit, bring the zigzag cam guide (2) to its extreme left position by turning the handwheel. Then, loosen the set screws on worm gear (1) and turn the handwheel slightly so that the roller of the cam follower touches the cam as shown in illustration (3). Tighten the screws securely after adjustment.

Set stitch width control at 0, and "Blind Stitch Control" for blind stitching. Turning the handwheel, check the needle side motion in the same way as described for H-1. If any adjustment is necessary, loosen the set screws (1) on the blind stitch worm-gear, and adjust its set angle by slightly turning the handwheel. Tighten the screws (1) securely after adjustment.

FIGURE 3H-3

Insert cam No. 1 on the cam shaft and set stitch width control at 4. Check if the machine has play of worm gear on upper shaft. If it has much play, reduce the amount by loosening screw (1) and moving the axle plate toward the upper shaft. Note the torque affect on the upper shaft. After adjustment, tighten screw No. 1 securely. Check if the needle moves within the range of .01" while the needle at "R" position rises from the lowest position up to .04" above the surface of the needle plate. If not, loosen screws No. 2 and No. 3 through hole of axle plate and obtain correct zigzag synchronization by rotating hand wheel toward you slightly holding one of the screws (2 or 3) with a screwdriver, tighten both screws. Check the zigzag synchronization again according to above procedure. After adjustment, tighten both screws securely. Note that the worm gear on upper shaft must not be moved in either direction, right or left, during adjustment.

ZIGZAG SYNCHRONIZATION

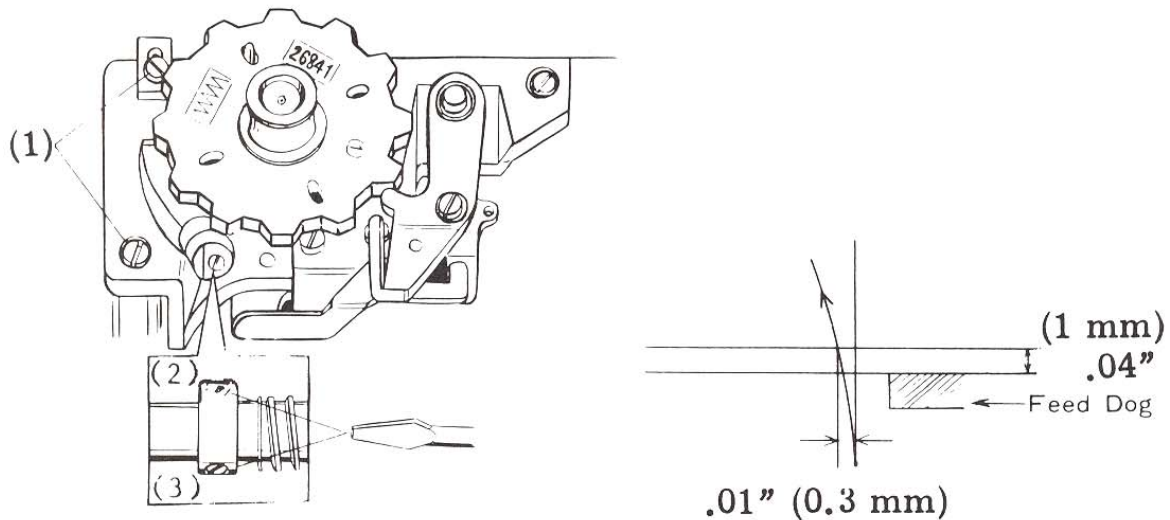


FIGURE 3H-3

SEE FIGURE 3I-1

Set stitch width control at 0, and turn the handwheel towards you. If the needle swings at this setting, loosen screw (1) and adjust the position of zigzag stopper in either direction to maintain perfect straight stitching. Tighten the screw securely after adjustment.

SEE FIGURE 3I-2

Set stitch width control at 0, and blind stitch control at N, if the machine has this control. Turn-

ing handwheel, check and see if the needle swings. If it does, loosen screw (1), and adjust the position of stitch width stopper as illustrated. In case the needle still swings after this adjustment, loosen set screw (2), and slightly adjust the position of zigzag lever contacting eccentric roller (3) on cam guide base by turning eccentric roller.

If the stitch width control pointer is found out of alignment after above adjustment, loosen the screw on the knob and correct the dial position against the shaft. Be sure the screws are securely tightened after any adjustment has been made.

STRAIGHT STITCHING

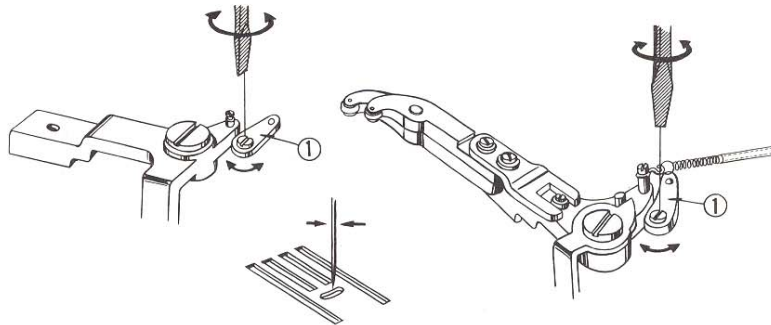


FIGURE 3I-1

STRAIGHT STITCHING

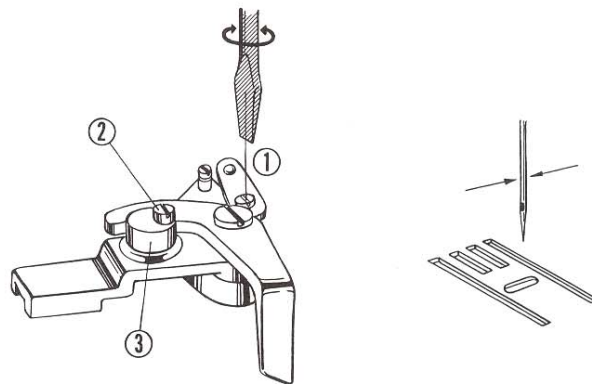


FIGURE 3I-2

STRAIGHT STITCHING

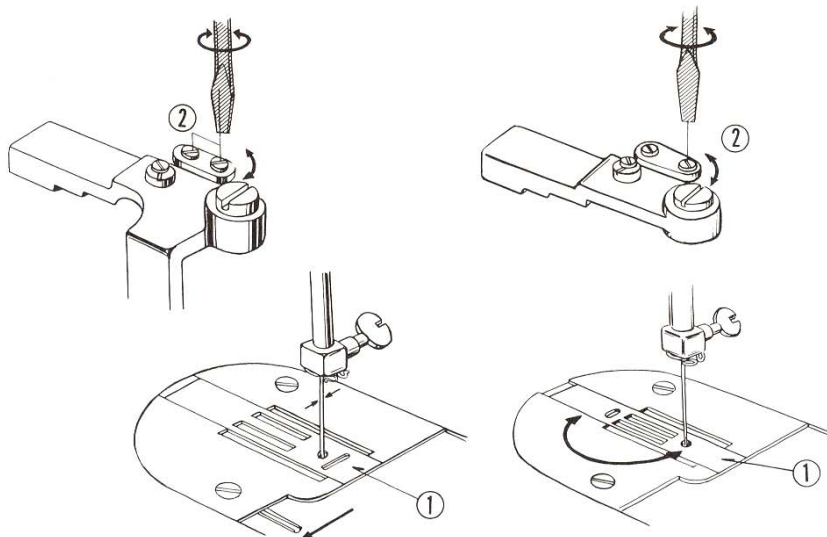


FIGURE 3I-3

Set stitch width control at 0 and needle position control at C, remove the pattern disc from cam shaft, and prepare the needle plate for straight stitching by sliding the center plate (1).

Turning the handwheel slowly, check and see if needle swings. If so, loosen the set screw (2) and adjust position of zigzag stopper to correct the condition. Tighten the screw securely after adjustment.

Set stitch width control at 4 and needle position control at S, remove pattern disc from cam shaft. Prepare the needle plate for straight stitching by reversing the center plate (1).

Turning the handwheel slowly, check and see if needle swings. If so, loosen the set screw (2) and adjust position of zigzag stopper to correct the condition. Tighten the screw securely after adjustment.

STRAIGHT STITCHING

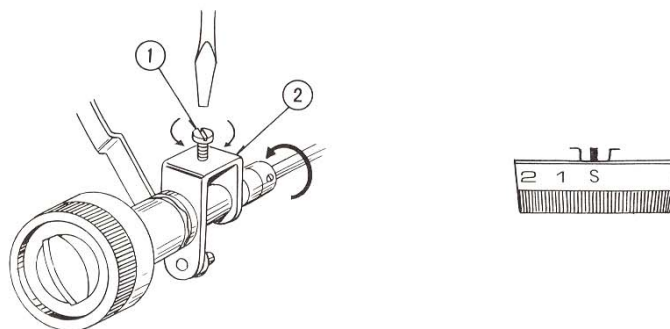


FIGURE 3I-4

Set stitch width control at "S" and turn the handwheel toward you. If the needle swings at this setting, loosen screw (1) and move the zigzag width arm (2) to the extreme left position. Tighten screw(1).

SEE FIGURE 3I-5

Set stitch width control for straight stitching, and turn the handwheel towards you, if the needle swings at this setting, loosen the screws (2) and adjust the position of zigzag stopper (1) in either direction to obtain a straight stitch. After adjustment, tighten both screws securely.

STRAIGHT STITCHING

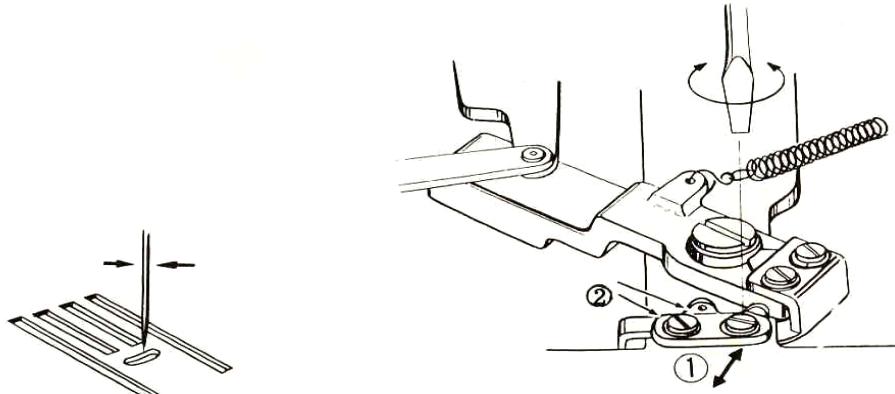


FIGURE 3I-5

STRAIGHT STITCHING

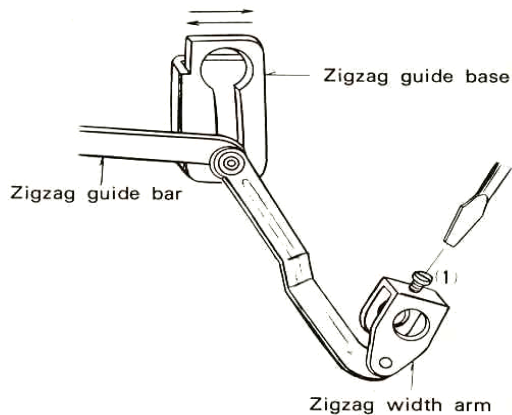


FIGURE 3I-6

SEE FIGURE 3I-6

Set stitch width control at "S" and check if needle moves by moving the zigzag guide base in either direction as shown. If so, loosen screw (1), press the zigzag guide bar downward slightly and tighten screw (1) securely. Note that the zigzag width arm must be held in position firmly.

SEE FIGURE 3J-1

The buttonhole reverse stitch length control is used to match the length of the reverse stitches with that of the forward stitches. Turn the dial down for shorter stitches and up for longer stitches. Generally, a slight adjustment of this control is required. Excessive movement of this control will cause the forward stitch length to change and may reverse the forward motion. If the amount of adjustment required is beyond this control, keep the red line on the dial at about center of the window, and the buttonhole control knob at R. Loosen the set screw (2), and adjust the reverse stitch length by turning the eccentric pin (3) clockwise for longer stitches, and counterclockwise for shorter stitches. Tighten the screw securely after adjustment.

SEE FIGURE 3J-2

If the length of reverse stitches is shorter, or longer than that of forward stitches, and the amount of adjustment required is beyond the control of buttonhole reverse stitch length control, further adjustment should be made in the following way. Set the control (2) in the upright position, and the buttonhole control knob at R. Loosen the double nuts (3) and adjust the reverse linkage bar (4) up for longer stitches and down for shorter stitches, by turning the nut. Lock the nuts after adjustment. If such an adjustment has been made on model 950, its automatic mechanism must be also checked in the way described for 3K-3.

AUTOMATIC REVERSE STITCH (BUTTONHOLE)

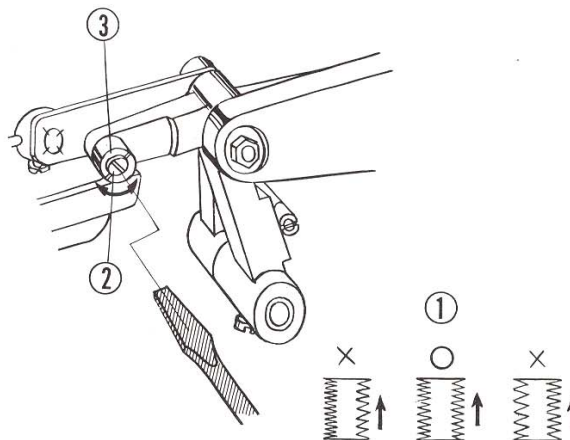


FIGURE 3J-1

AUTOMATIC REVERSE STITCH (BUTTONHOLE)

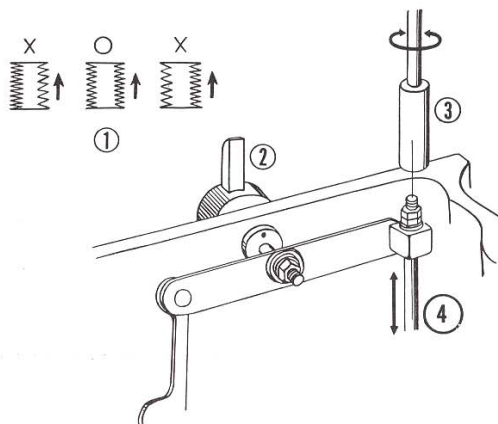


FIGURE 3J-2

SEE FIGURE 3J-3

If the length of reverse stitches is shorter or longer than that of forward stitches, the adjustment is made by the following procedure. Set the buttonhole dial at R. Loosen the set screw (1), and pull off knob (2). Adjust the dial shaft (3) by turning either way until you can obtain the correct pattern. After adjustment, place knob (2) onto the shaft correctly directing it upward as illustrated. Tighten the screw (1) securely. It is necessary to have a slight gap between the knob surface and arm side. After this adjustment the automatic mechanism must also be checked as described for Figure 3K-9.

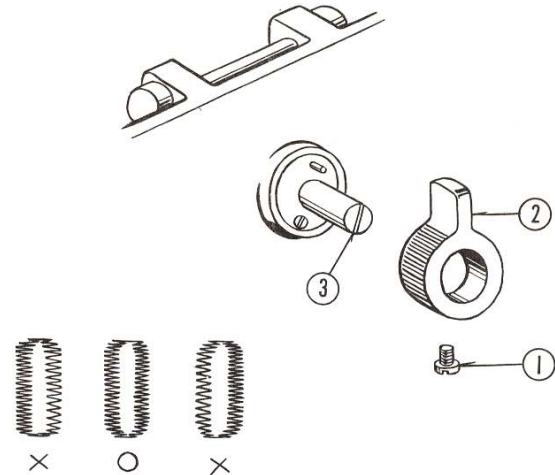


FIGURE 3J-3

AUTOMATIC REVERSE STITCH (SUPER STITCH)

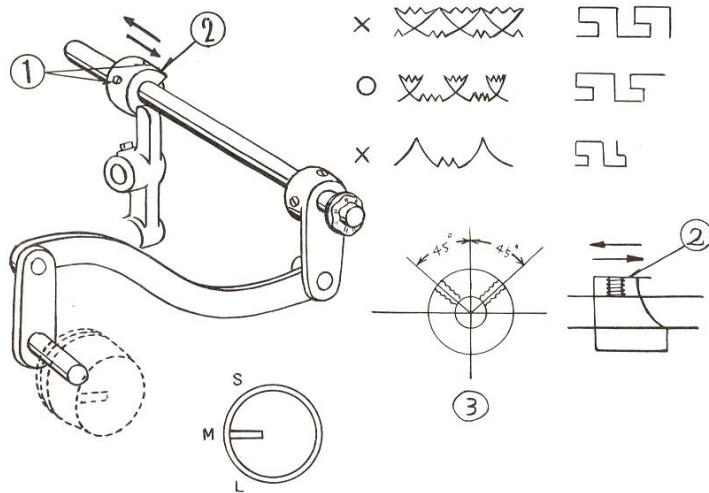


FIGURE 3J-4

SEE FIGURE 3J-4

If the machine produces incorrect patterns when using the reverse pattern cams, set reverse stitch length control at M, adjust the position of regulator cam (2) on the shaft in either direction forward or backward as illustrated with arrows, after slightly loosening the set screws (1). Be sure to maintain the set angle of regulator cam to the shaft as shown (3). For adjustment, cam No. 23 or No. 24 is recommended.

AUTOMATIC REVERSE STITCH (Super Stitch - Models 16011, 17011 and 18022)

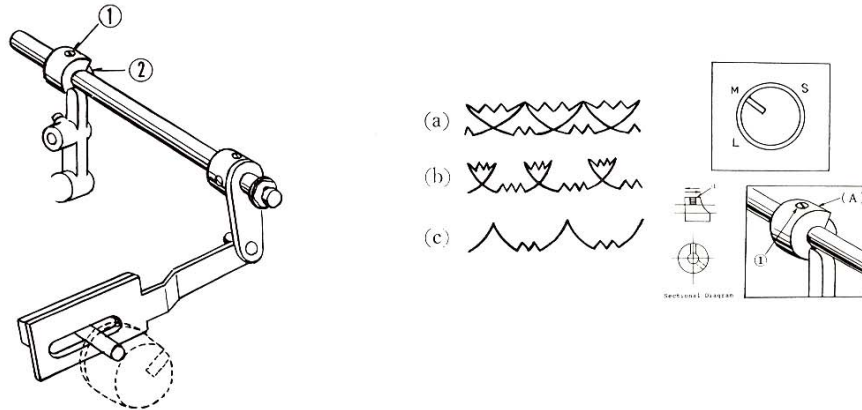


FIGURE 3J-5

If the machine produces incorrect patterns when using the pattern cam, adjust per the following instructions.

- * Set the design elongator dial at the marking M as shown.
- * Loosen the set screws (1) and (2) slightly.
- * Keeping the top of screw (1) upright as illustrated, slide the regulator cam (A) forward or backward, to adjust the position of regulator cam on the super shaft so that correct pattern (b) can be obtained. If pattern (a) is produced, slide the regulator cam away from you. If pattern (c) is produced, slide the regulator cam toward you.
- * Tighten set screws securely.

AUTOMATIC REVERSE STITCH (BUTTONHOLE)

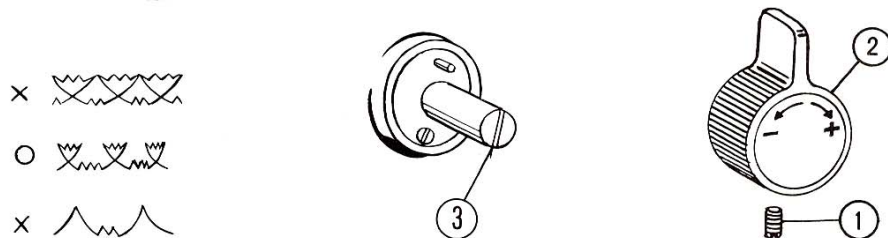


FIGURE 3J-6

If the length of reverse stitches is shorter or longer than that of forward stitches, the adjustment is made by the following procedure:

Loosen the set screw (1), and pull off the knob (2). Adjust the dial shaft (3) by turning either way until you can obtain the correct pattern. After adjustment, place the knob (2) onto the shaft correctly directing it upward as illustrated. Tighten the screw (1) securely. It is necessary to have a slight gap between the knob surface and arm side. After this adjustment the automatic mechanism must also be checked as described for Figure 3K-9.

SEE FIGURE 3J-7

If the machine produces an irregular buttonhole, adjust the screw (1) by turning it in either direction, clockwise or counterclockwise as illustrated, so that the correct pattern of buttonhole is obtained.

AUTOMATIC REVERSE STITCH (BUTTONHOLE)

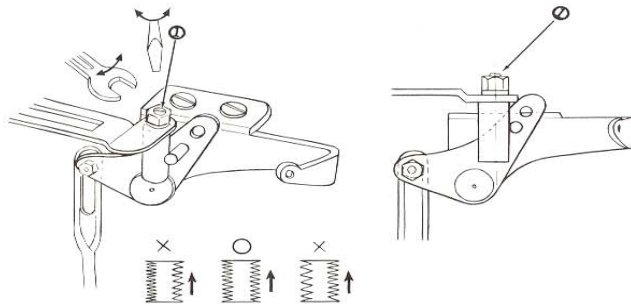


FIGURE 3J-7

SEE FIGURE 3J-8

Set stitch length control to 12. Turn special stitch variegator to the white dot. Press inner pin of pressure regulator to maximum. Set stitch width control to maximum. Place a paper folded in two over the feed dog. Check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. When the length of stitches in reverse stitching is smaller, adjust the length by positioning the eccentric area of screw pin (A) downward. If eccentric area of screw pin (A) is already positioned downward, take following steps:

1. Position eccentric area of screw pin (A) to the right or left.
2. Adjust the length of stitch by sliding regulator cam (B) in either direction (C) or (D). After finishing the adjustment, make sure that a .010" feeler gauge can be inserted between the eccentric screw and the super bracket (E).

AUTOMATIC REVERSE STITCH (Super Stitch)

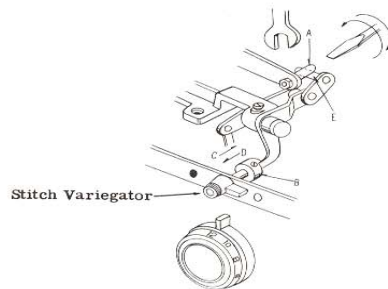


FIGURE 3J-8

FIGURE 3J-9

Set special stitch dial at \blacksquare marking. Place a piece of paper on needle plate and take eleven stitches (See Figure 1). Loosen screw (1) slightly and turn screw (2) clockwise or counter-clockwise so that the length is approximately $1/8'' - 3/16''$. After obtaining the correct length, tighten screw (1) securely and recheck length.

AUTOMATIC REVERSE STITCH (SUPER STITCH)

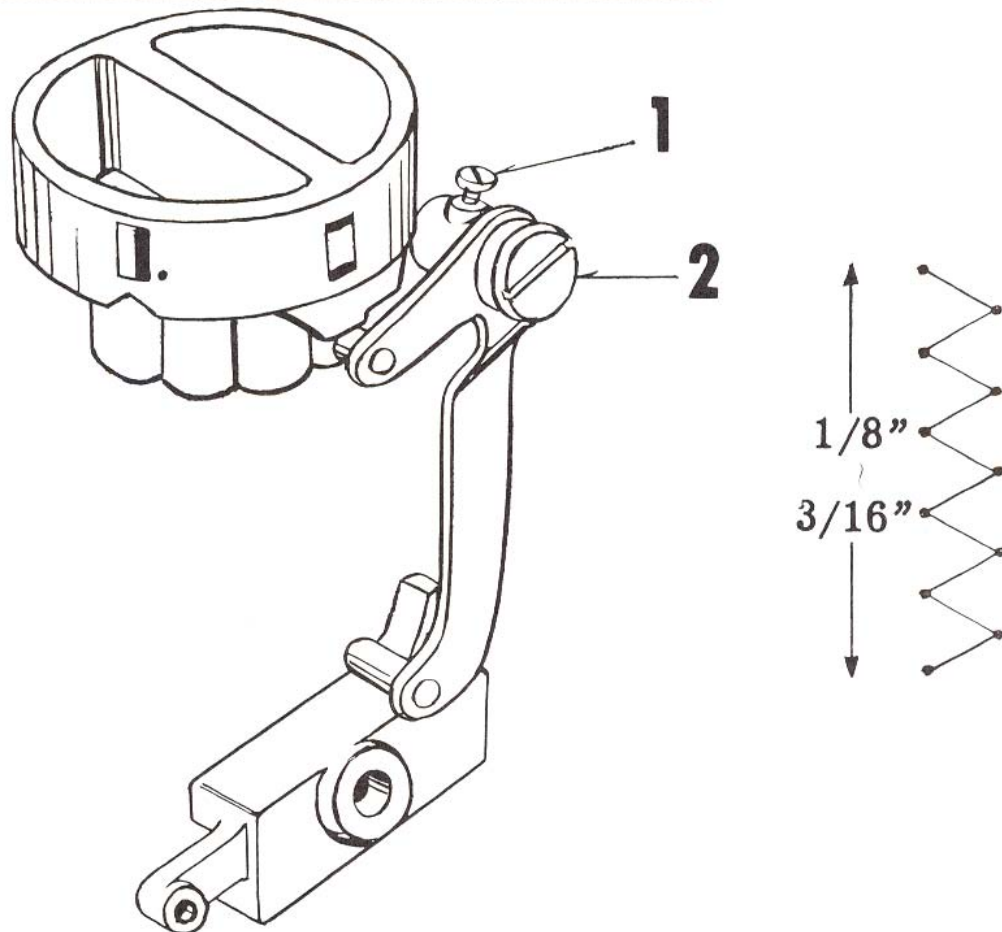


FIGURE 3J-9

SEE FIGURE 3J-23A

Set stitch length control at 6, stitch modifier at \equiv and stitch width control at 4. Place a piece of paper (folded in two) over the feed dogs. Turning stitch modifier slightly counter-clockwise, check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If the length of stitches in reverse stitching is smaller, loosen screw (A) and slide the super adjuster (B) to right side, until the both stitches are equal in length. Tighten screw (A) after adjustment.

**AUTOMATIC REVERSE STITCH
(Stretch Stitch)**

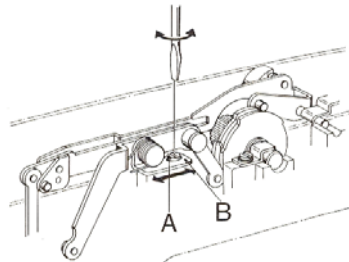


FIGURE 3J-23A

SEE FIGURE 3J-23B

Set stitch length control at 6, stitch modifier at \equiv and stitch width control at 4. Place a piece of paper (folded in two) over the feed dogs. Turning stitch modifier slightly counter-clockwise, check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If the length of stitches in reverse stitching is smaller, loosen screw (A) and turn eccentric screw (B) in either direction (counter-clockwise or clockwise). Tighten screw (A) after adjustment.

**AUTOMATIC REVERSE STITCH
(Stretch Stitch)**

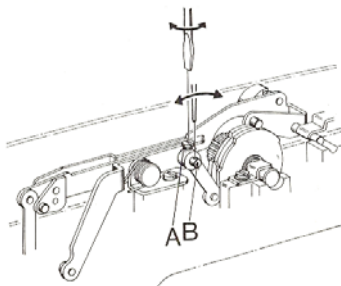


FIGURE 3J-23B

SEE FIGURE 3J-24

Set stitch length control at 6, special stitch dial at red dot and stitch width control at 4. Place a piece of paper (folded in two) over the feed dogs. Check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If the length of reverse stitches is shorter or longer than that of forward stitches, loosen nut (A) and turn eccentric pin (B) in either direction until the both stitches are equal in length. Tighten nut (A) after adjustment.

AUTOMATIC REVERSE STITCH (STRETCH STITCH)

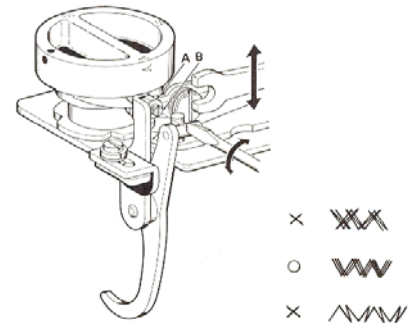


FIGURE 3J-24

SEE FIGURE 3J-25A

Set special stitch dial at red dot, stitch width control at 4, stitch length control at 6 and special stitch modifier at white dot. Place a piece of paper (folded in two) over the feed dogs. Check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If length of stitches in reverse stitching is shorter or longer than forward stitching, loosen screw (A) and adjust plate (B) to direction as illustrated, turning stitch modifier slightly counter-clockwise in order to get clearance between pins (C) and (D) for easy adjustment. Tighten screw (A) after adjustment.

**AUTOMATIC REVERSE STITCH
(Stretch Stitch)**

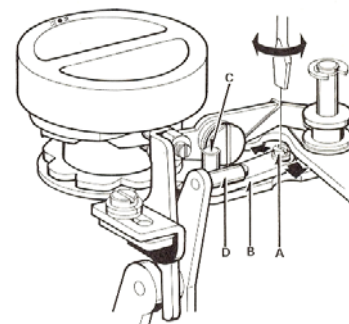


FIGURE 3J-25A

SEE FIGURE 3J-25B

Set special stitch dial at red dot, stitch width control at 4, stitch length control at 6 and special stitch modifier at white dot. Place a piece of paper (folded in two) over the feed dogs. Check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If length of stitches in reverse stitching is shorter or longer than forward stitching, loosen screw (A) slightly, insert the eccentric tool (C) into the hole (D), adjust plate (B) to direction as illustrated by turning the eccentric tool (C). Tighten screw (A) after adjustment.

**AUTOMATIC REVERSE STITCH
(Stretch Stitch)**

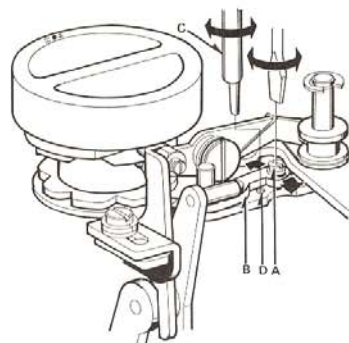


FIGURE 3J-25B

SEE FIGURE 3J-27

Place #20 metal cam into the machine. Set special stitch dial at red dot, stitch length control at 6, stitch width control at 4 and special stitch modifier at white dot. Press inner pin of pressure regulator to the maximum. Place a piece of paper (folded in two) over the feed dogs. Check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If length of stitches in reverse stitching is shorter or longer than forward stitching, loosen screw (A) and adjust eccentric screw (B) in either direction (counter-clockwise or clockwise). Tighten screw (A) after adjustment.

AUTOMATIC REVERSE STITCH (STRETCH STITCH)

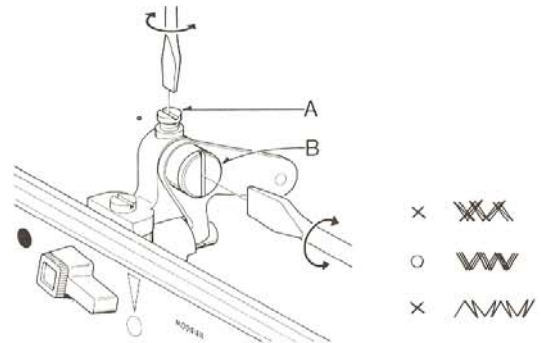


FIGURE 3J-27

SEE FIGURE 3J-26

Set special stitch dial at □ marking. Place a piece of folded paper on needle plate and take eleven stitches (See Figure 1). Loosen screw (A) slightly and turn screw (B) clockwise or counter-clockwise so that the length is in the range of 3.85 mm to 4.5 mm. After obtaining the correct length, tighten screw (A) securely and recheck length.

AUTOMATIC REVERSE STITCH (BUTTONHOLE)

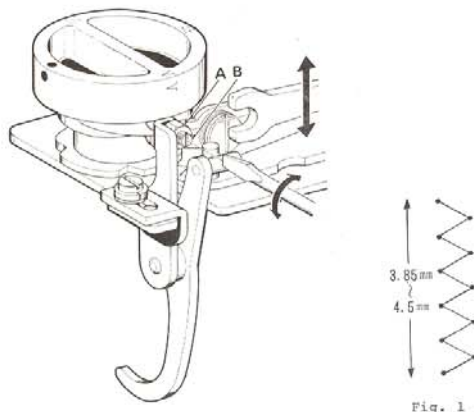


FIGURE 3J-26

SEE FIGURE 3J-28

Set stitch length control around 10, stitch width control at 4, special stitch dial at red dot and special stitch modifier at middle position between S and L. Place a piece of paper (folded in two) over the feed dogs. Check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If not, loosen set screw (1) slightly, insert the eccentric tool (2) into the hole (3), adjust the position of super adjuster (4) to direction as illustrated by turning the eccentric tool (2), until both stitches are equal in length. Tighten screw (1) after adjustment.

Set stitch length control around 10, stitch width control at 4, special stitch dial at red dot and special stitch modifier at middle position between S and L. Place a piece of paper (folded in two) over the feed dogs. Check and see if forward stitches are equal in length with reverse stitches by zigzag stitching on paper. If not, turn screw (1) in either way as illustrated, until both stitches are equal in length.

AUTOMATIC REVERSE STITCH (STRETCH STITCH)

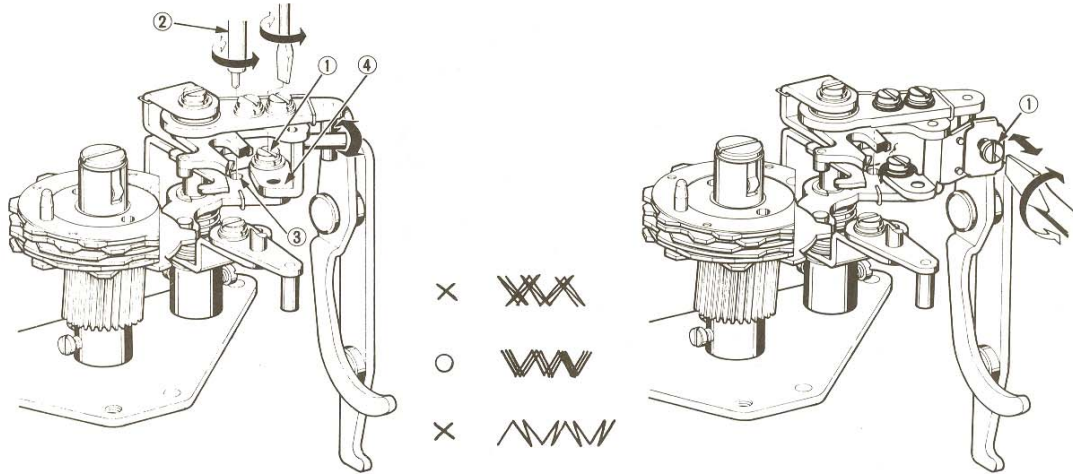


FIGURE 3J-28

SEE FIGURE 3J-29

If the length of reverse stitches is shorter or longer than that of forward stitches, turn screw (A) either way until you can obtain the correct balance.

AUTOMATIC REVERSE STITCH (BUTTONHOLE)

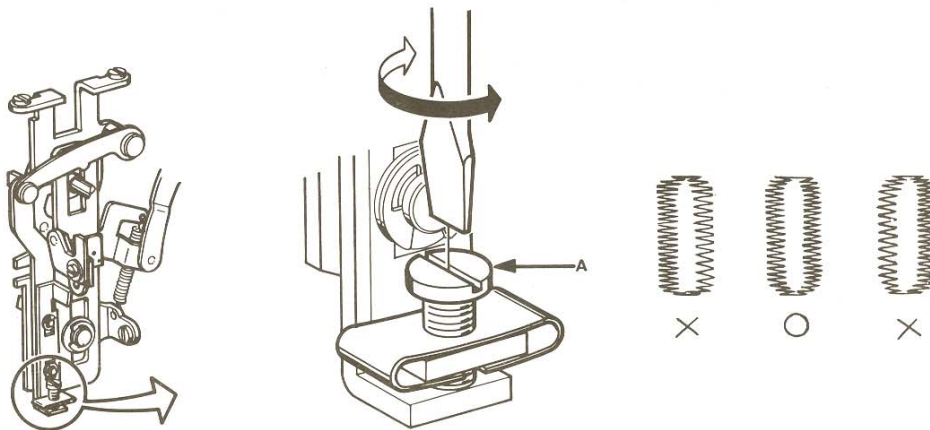


FIGURE 3J-29

AUTOMATIC REVERSE STITCH (Stretch Stitch)

See Figure 3J-30

1. CHECKING STRETCH STITCHES

Adjust automatic reverse stitch by turning stitch modifier between S and L. If the adjustment is beyond this control range, adjust using the following procedure.

- Set the machine as follows:
 - Special stitch selector — zigzag stitch position
 - Stitch width control — 4
 - Stitch length control — 6
 - Special stitch modifier — middle position between S and L (intermediate notched position)
- Use zigzag stitch needle plate.
- Place paper on the needle plate and lower presser foot.
- Turning handwheel, check to see if needle penetrates into the same hole (A1, A2, A3).

If not, adjust as necessary.

2. ADJUSTMENT FOR FIGURE 1A

- Loosen screw (B) slightly.
- Insert eccentric tool (D) into hole (C) on lever (E). Adjust the position of lever (E) and (F) by turning the eccentric tool (D), until needle penetrates into the same hole (A1, A2, A3).
- Tighten screw (B) securely.

ADJUSTMENT FOR FIGURE 1B

- Adjust the position of levers (E) and (F) by turning screw (G), until needle penetrates into the same hole.

NOTE: At factory, this setting (feed balance) is fixed at the notch located at the center of modifier zone. In the owner's manual a fine adjustment by the modifier only for decorative stitching is suggested. Actually, this control range can be used on built-in utility stitches as well.

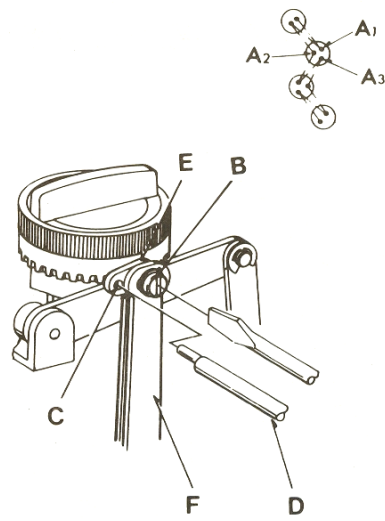


FIGURE 1A

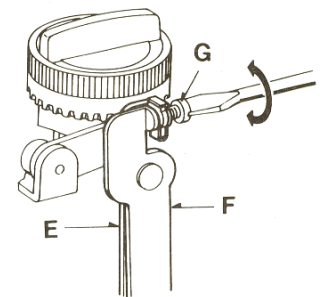




FIGURE 1B

FIGURE 3J-30

AUTOMATIC REVERSE STITCH (Buttonhole)

See Figure 3J-31

1. CHECKING BALANCE OF STITCHES

- Check O-feeding, following Section F-13.
- Set the machine as follows:
 - Special stitch selector — 
 - Stitch width control — 1 to 1-1/2
 - Stitch length control — red zone
 - Special stitch modifier — 
- Sew a buttonhole and check to see if pitches of forward and reverse stitches are balanced. If not balanced, adjust.

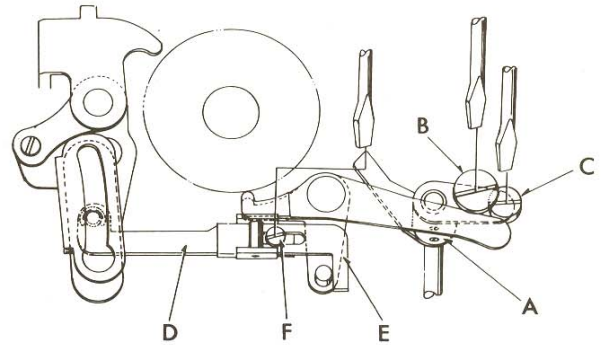


FIGURE 1

2. ADJUSTMENT



- Loosen screw (B) on buttonhole crank (A).
- Adjust the balance of forward and reverse stitches by turning eccentric screw (C). Turn eccentric screw (C) with eccentric portion away from buttonhole crank (A).
- Tighten screw (B) securely.



FIGURE 2

3. CHECKING BUTTONHOLE POSITIONING

Check needle position at straight stitching (D-5) before checking buttonhole positioning.

- Set the machine as follows:
 - Special stitch selector — 
 - Stitch width control — 1 to 1-1/2
 - Stitch length control — red zone
 - Special stitch modifier — 

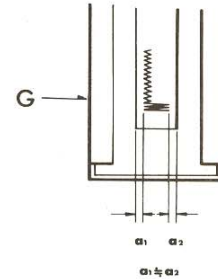


FIGURE 3

- Use built-in buttonhole foot
- Sew a buttonhole and check to see if bartack is placed in the center of buttonhole foot (Figure 3).

If not, adjust.

4. ADJUSTMENT

- Loosen screw (F) and shift link (E) until the bartack is placed in the center of buttonhole foot.
- Tighten screw (F) securely.

FIGURE 3J-31

AUTOMATIC REVERSE STITCH (Buttonhole)

See Figure 3J-32

If the length of reverse stitches is shorter or longer than that of forward stitches, turn screw (A) clockwise or counterclockwise, until you obtain the correct balance.

EXAMPLE
OF CORRECT
BALANCE

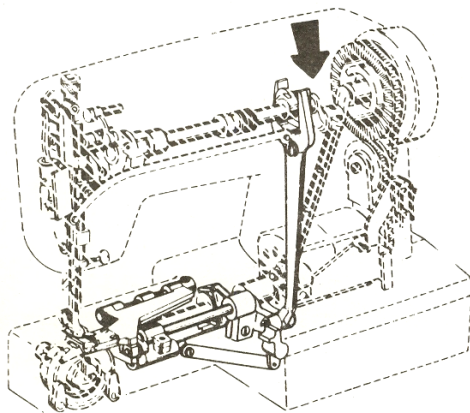
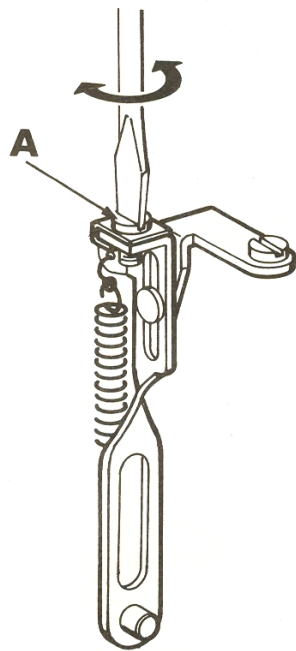


FIGURE 3J-32

AUTOMATIC REVERSE STITCH (Stretch Stitch)

See Figure 3J-33

Set stitch length control at 6, stretch stitch control at S and stitch width control at 4. Place a piece of paper (folded in two) over the feeddogs. Sliding stretch stitch control slightly toward red dot, check and see if needle penetrates same hole during forward and reverse stitches. If not, loosen screw (1) on super follower operating plate assembly (3) and turn screw (2) in either direction (counterclockwise or clockwise), until both stitches are equal in length. Tighten screw (2) after adjustment.



EXAMPLE OF
FORWARD AND
REVERSE STITCHES
EQUAL IN LENGTH

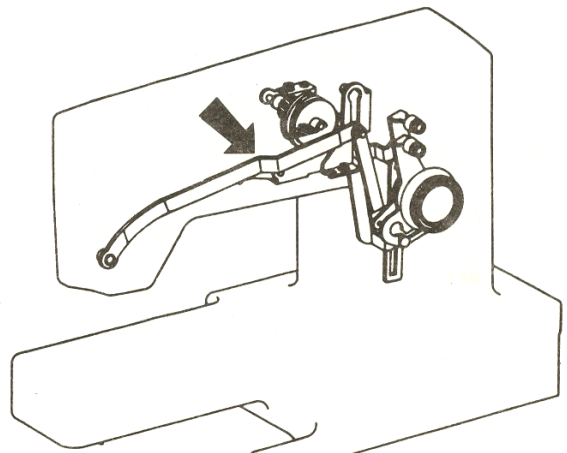
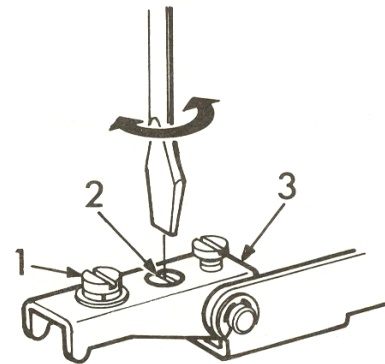


FIGURE 3J-33

AUTOMATIC REVERSE STITCH (Stretch Stitch)

See Figure 3J-34

Set stitch length control at 6, stitch width control at 4, special stitch dial at red dot and special stitch modifier at middle position between S and L. Place a piece of paper (folded in two) over the feeddogs. Check and see if needle penetrates same hole during forward and reverse stitches. If not, turn screw (A) in either direction (counterclockwise or clockwise), until both stitches are equal in length.

**EXAMPLE OF
FORWARD AND
REVERSE STITCHES
EQUAL IN LENGTH**

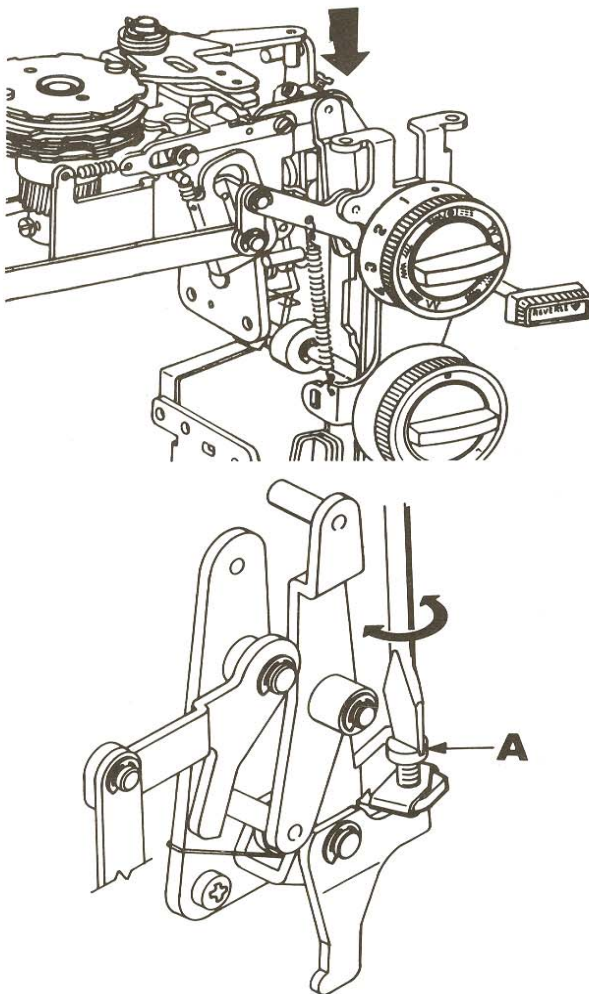


FIGURE 3J-34

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

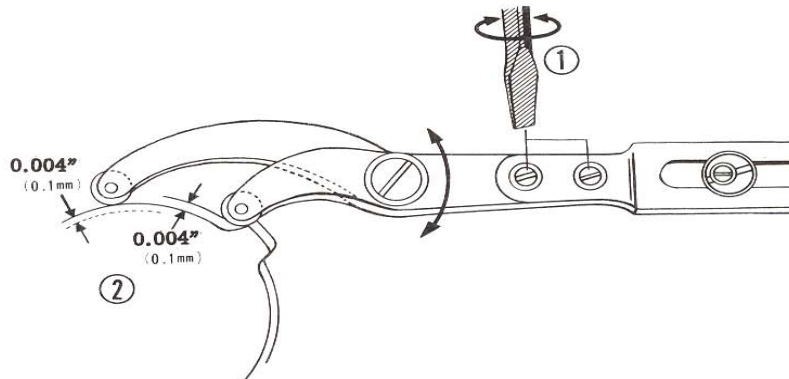


FIGURE 3K-1

If the machine produces an irregular pattern of blind stitches, adjust the clearance between the cam and cam follower in the following way. Set stitch width control at 0, and buttonhole knob at B. Insert blind stitch cam in position. Loosen the screws (1) on the cam follower, and adjust the clearance between the cam follower and the cam surface as specified (2).

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

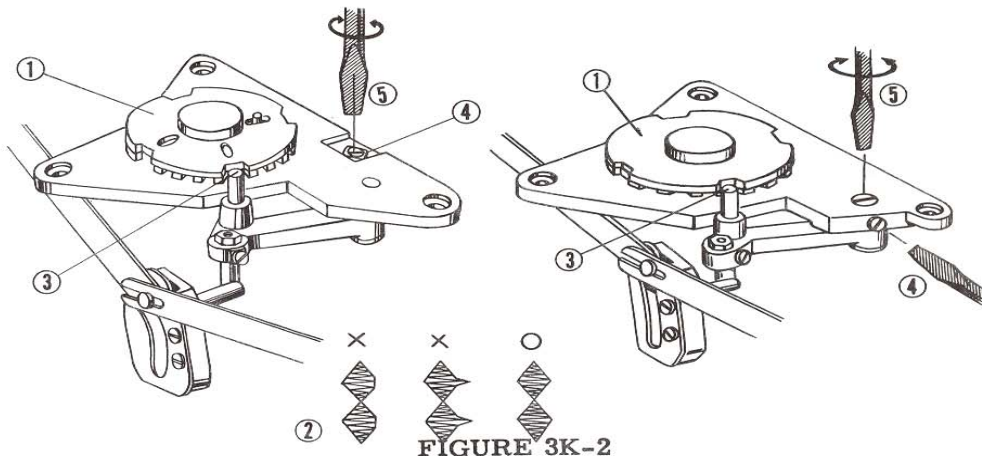


FIGURE 3K-2

Set the stitch width control knob at maximum point. Insert pattern disc No. 1A (1) in position and run the machine. If the machine produces an irregular pattern as shown in illustration (2), the cause may be improper clearance between the cam follower (3) and the cam surface. For adjustment, loosen the nut or screw (4). Turning the eccentric pin (5), adjust position of the cam follower so it has a clearance of 0.020 inch with the cam surface at the minimum diameter of pattern disc. Tighten the screw or nut securely after adjustment.

SEE FIGURE 3K-3

If the machine produces an irregular pattern as illustrated (1), it may be corrected by adjusting the clearance between cam follower and the cam surface. Insert pattern disc No. 1A in position, and loosen the set screws (3). Adjust position of the cam follower by moving the stopper (4), so it has a clearance of 0.020 inch to the cam surface at the minimum diameter of the pattern disc.

Tighten the screws securely after adjustment.

SEE FIGURE 3K-4

If a super pattern disc (containing automatic reverse stitching) produces incorrect pattern as illustrated (1), the machine can be adjusted as follows. Loosen nuts (2) and rotate the turnbuckle (3) in either direction until you obtain the correct pattern. Tighten the nuts (2) securely after adjustment.

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

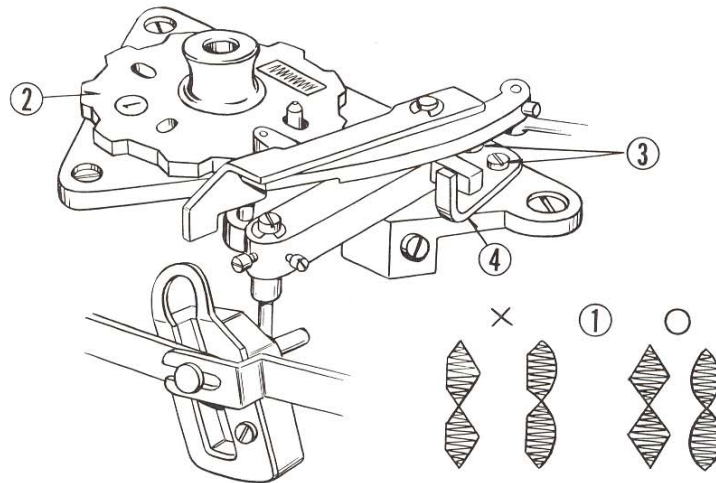


FIGURE 3K-3

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

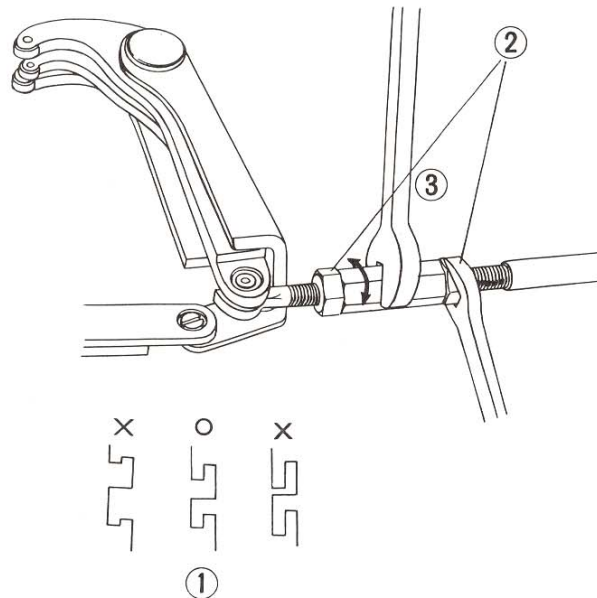


FIGURE 3K-4

SEE FIGURE 3K-5

If a super pattern disc (containing automatic reverse stitching) produces incorrect pattern as illustrated (1) by pattern disc No. 21, adjust the machine in the following way. Set stitch width control at maximum, and buttonhole reverse stitch length control (2) in upright position. Loosen the nuts (3) and adjust the turn-buckle in either direction (4) or adjust the reverse linkage bar (5) up or down until the correct pattern is obtained. Tighten the nuts (3) securely after adjustment.

Caution: For model 950, adjustments for automatic reverse stitching (3J-2) must be made before the above adjustments.

SEE FIGURE 3K-6

Set stitch width control at 0, and needle position at L. Insert pattern disc No. 20 in position, and check the clearance between the middle cam follower and the cam surface at the minimum diameter of the pattern disc. The clearance should be maintained at 0.008 inch. For adjustment, loosen the screws (1) and correct the position of cam follower to have the specified clearance. Tighten the screws (1) securely after adjustment. For adjustment of the bottom cam follower loosen screw (2) and correct the position of bottom cam follower, to have no clearance at the minimum diameter of the pattern disc. Tighten the screw (2) securely after adjustment.

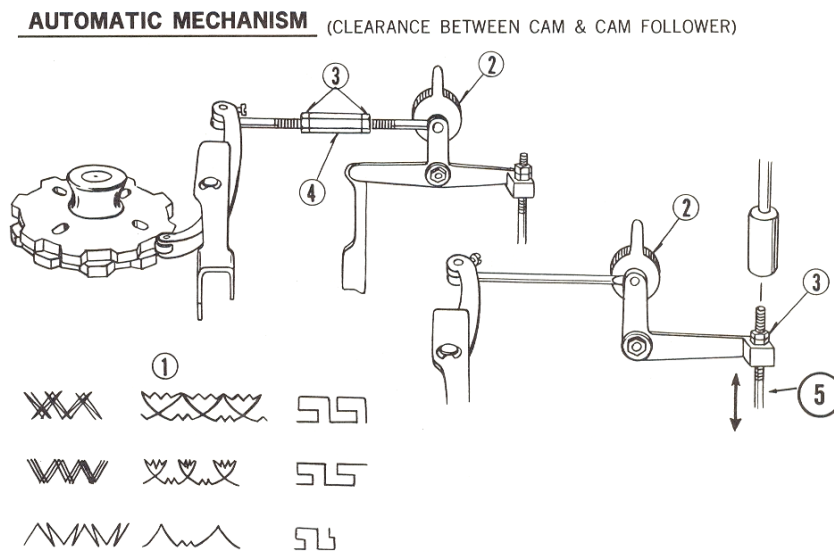


FIGURE 3K-5

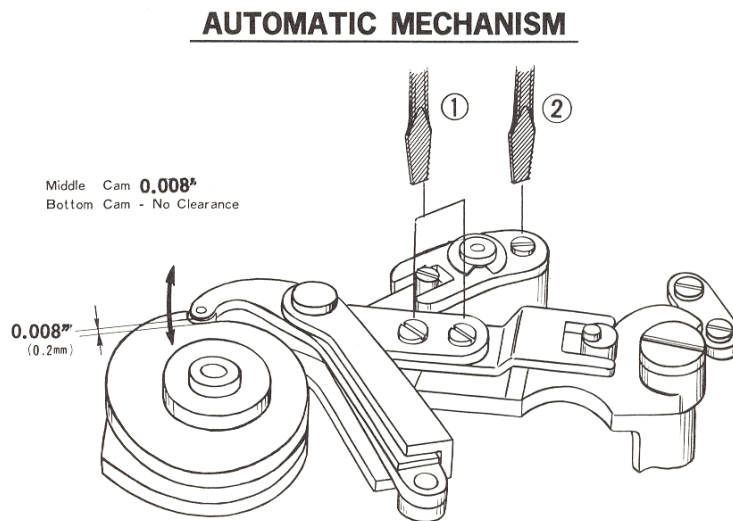


FIGURE 3K-6

SEE FIGURE 3K-7

Open the cam cover fully, and check the clearance between the cam follower and the cam surface at the maximum diameter of the pattern disc. The clearance must be 0.008 inch at the full open position of cam cover. For adjustment, loosen the screws (2) and adjust position of cam follower by slightly moving the lever as shown on the drawing. Tighten the screws (2) securely after adjustment.

SEE FIGURE 3K-8

If the machine produces an irregular pattern as illustrated (X), adjust the machine in the following way. Insert pattern disc number 1 onto the cam shaft, and check for a clearance of 0.020 inches between cam surface of pattern disc at its shortest diameter and cam follower rocker pin. If incorrect, loosen the screw (1) and adjust screw (2) turning either way. Tighten screw (1) securely after adjustment.

AUTOMATIC MECHANISM

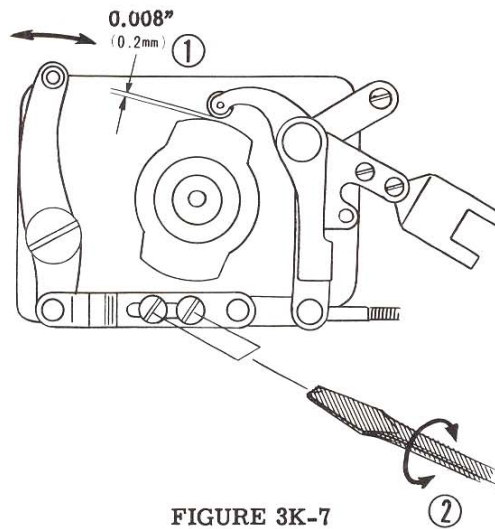


FIGURE 3K-7

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

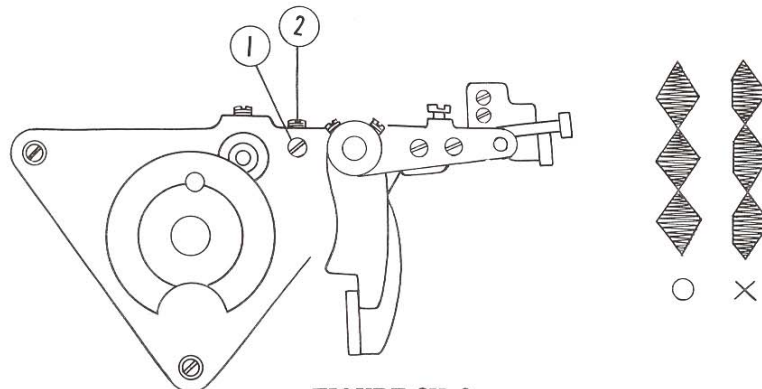


FIGURE 3K-8

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

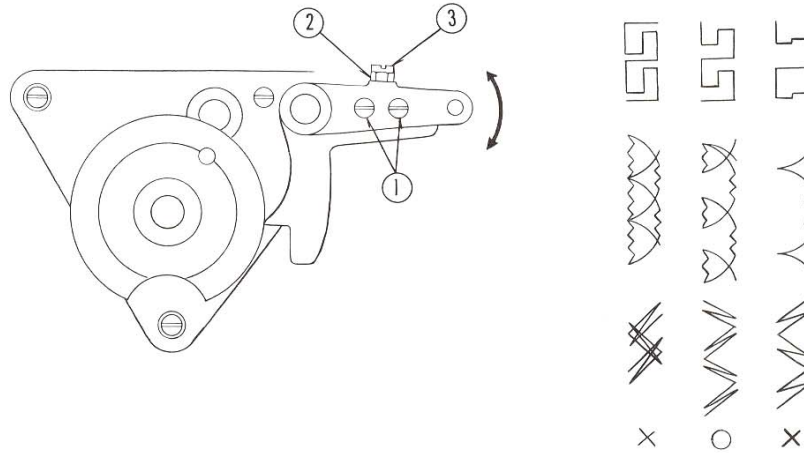


FIGURE 3K-9

SEE FIGURE 3K-9

If a super pattern disc (containing automatic reverse stitching) produces an incorrect pattern as illustrated, the machine can be adjusted as below. Set stitch width control at maximum, and buttonhole reverse stitch length control in upright position. Loosen the set screws (1) and nut (2) slightly and adjust the screw (3) turning in either direction while running the machine with a super cam, until you obtain the correct pattern. If the length of forward stitches is longer or shorter than that of reverse stitches, turn the screw (3) clockwise or counter-clockwise respectively. After adjustment, tighten the screws (1) and nut (2), holding screw (3) securely.

SEE FIGURE 3K-10

If the selector dial can not be turned, it may be due to insufficient clearance between the cam and the cam follower. Excessive clearance however, will result in an irregular pattern.

To adjust the mechanism, set the stitch width control at 2, and the selector dial at the center point of the buttonhole mark and the word "CAM" as illustrated. Loosen the lock nut (1), set screws (2) and (3) until you can get a slight movement of claw opening plate (4) in either direction as shown until you can get the correct clearance (.004 - .008 inch) between the highest point of the cam and the cam follower. Tighten the screws and nut (3), (2), (1) securely.

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

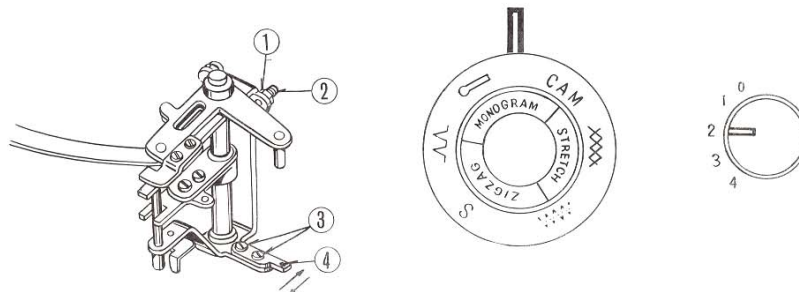


FIGURE 3K-10

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

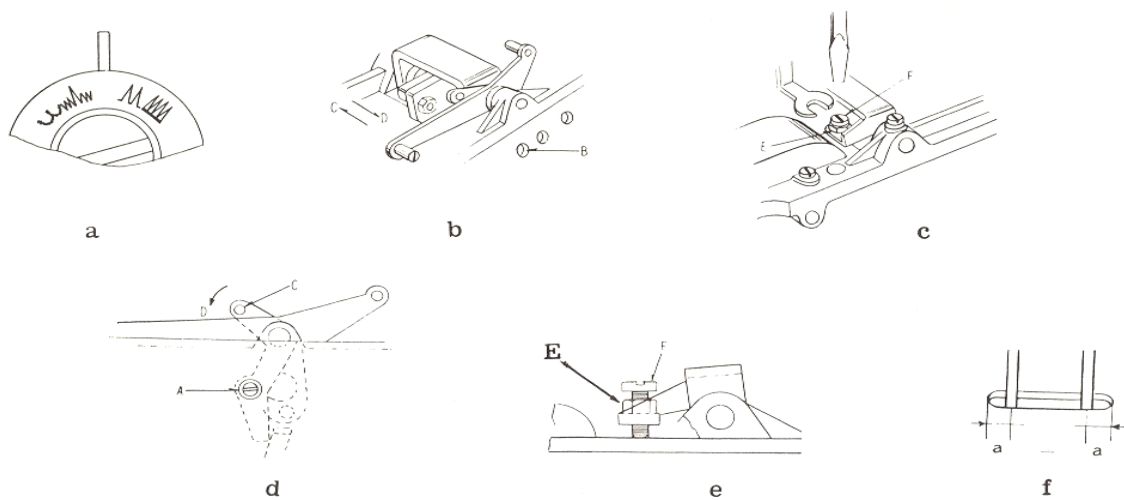


FIGURE 3K-11

SEE FIGURE 3K-11

If the special stitch dial cannot be turned, it may be due to insufficient clearance between the cam and cam follower. Excessive clearance, however, will result in an irregular pattern.

To adjust the mechanism, set the stitch width control to 4 and special stitch dial between blind stitch setting and scallop design setting as shown in illustration a. Remove "Sears Kenmore" logo plate from the back of the machine arm. Loosen plated screw (A) by using a screw driver through hole (B) at the back of machine arm (see illustration b). Insert eccentric tool SE-6065 through hole (C), illustration d, and turn in direction (D) to adjust cam holder bracket setting so that needle tip does not touch the needle plate (see illustration f). After adjusting, tighten the plated screw securely. Then, by turning the special stitch dial, check to be certain the needle does not touch the needle plate.

When the above adjustment has been completed, set the special stitch dial between blind stitch setting and scallop design setting. Set the stitch width control to 4. Loosen nut (E), illustrations c and e, and turn screw (F) until it touches the surface of the Cam Driver Axle and Plate. Tighten nut (E) securely.

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

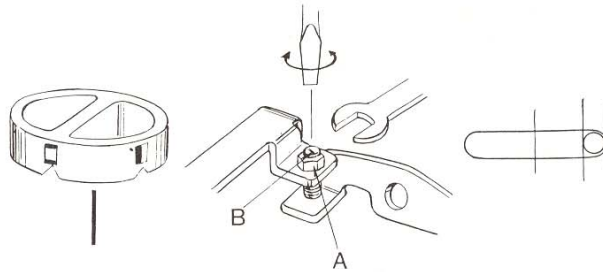


FIGURE 3K-12

FIGURE 3K-12

It may be necessary to adjust the automatic mechanism for any of the following reasons:

1. If the needle hits the plate.
2. If the cam stack is replaced by a Service Technician.
3. If the knob won't turn.

Follow these instructions for this adjustment:

Set stitch width control to 4, and special stitch dial between \square setting and \square setting as shown in Figure 1. Lower needle to its lowest position. Loosen nut (A) slightly and turn screw (B) clockwise or counterclockwise so that the rightside face of needle tip almost touches the right rounded portion of needle hole (See Figure 3). Holding screw (B) with a screw driver, tighten nut (A) securely. After adjustment, turn special stitch dial clockwise or counterclockwise, checking to be sure the cam follower aligns with each built-in cam at each setting.

FIGURE 3K-13

If the special stitch dial cannot be turned, it may be due to insufficient clearance between the cam and cam follower. Excessive clearance however, will result in an irregular pattern.

To adjust the mechanism set the special stitch dial between any two settings. Loosen screw (A), push operating plate (B) in direction (C), move claw opening plate (D) in direction (E), then tighten screw (A) with zigzag width bracket pin (F) held in direction (H) against locker plate (G).

Next set special stitch dial at one of four settings and stitch width control at (4). Lower needle to its lowest position. Check if needle moves to the right when special stitch dial is set between each setting and if it almost touches the right edge of the needle hole. If needle hits the needle plate, refer to instructions on page 3C-5, Figure 3C-10.

Check if zigzag cam follower moves without touching each built-in cam when special stitch dial is turned clockwise or counterclockwise. If it does not move properly, refer to instructions on page 3M-2, Figure 3M-3.

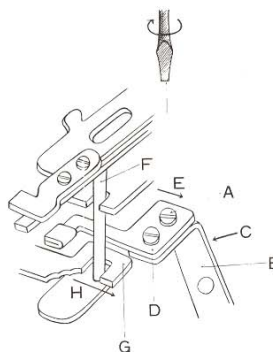


FIGURE 3K-13

FIGURE 3K-14

If the machine produces an incorrect pattern as shown in illustration (A), adjustments are required that should not be made in the field. Contact the Consumer Service Manager, Department 620, for disposition of the machine.

AUTOMATIC MECHANISM (CLEARANCE BETWEEN CAM & CAM FOLLOWER)

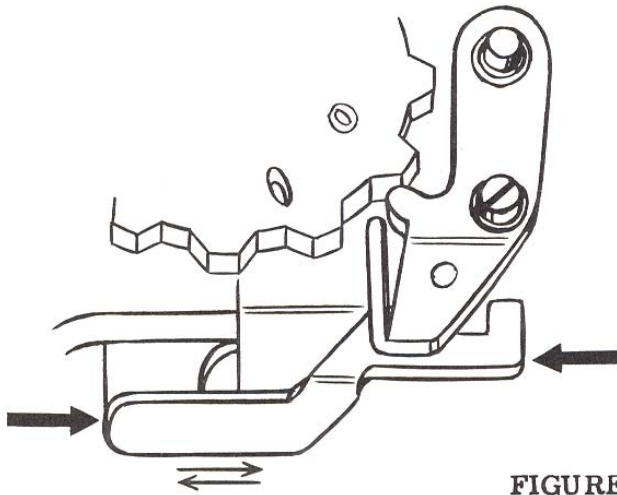


FIGURE 3K-14



AUTOMATIC MECHANISM (Clearance Between Cam & Cam Follower)

See Figure 3K-21

If the special stitch dial cannot be turned, it may be due to insufficient clearance between cam (A) and cam follower (B). Excessive clearance will result in an irregular pattern.

To adjust the mechanism, set the stitch width control at 4, and special stitch dial between any two settings, as illustrated. Loosen screw (C) and turn the eccentric collar (D) in either direction as shown, until you can get the correct clearance (0.006 inch) between the highest point of cam (A) and cam follower (B). Tighten screw (C) after adjustment.

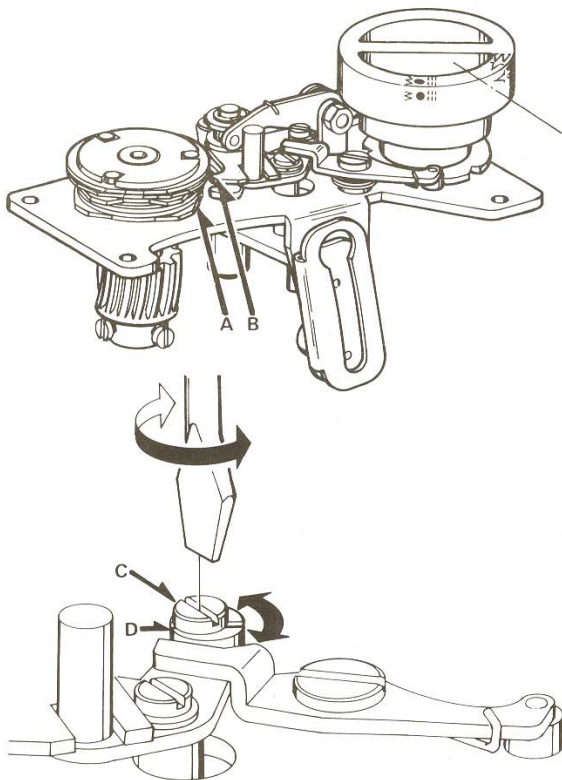


FIGURE 3K-21

See Figure 3K-22

Check the following points before checking clearance between cam and cam follower.

- Needle position for decorative stitching (C-22)
- Needle position at straight stitching (D-6)
- Cam selector guide plate setting (M-7)


1. CHECKING CLEARANCE BETWEEN CAM AND CAM FOLLOWER

- Set the machine as follows:

- Stitch width control — 4
- Stitch length control — any number
- Special stitch modifier — red dot

- Special stitch selector should turn smoothly.
- Turning special stitch selector, check if each pattern of stitches selected can be sewn.
- If not, adjust as necessary.

2. ADJUSTMENT

- Set special stitch selector at 
- Loosen screw (D) slightly.
- Insert eccentric tool (E) into hole (H). Shift link (F) by turning eccentric tool (E), until you obtain about 0.2 mm (0.008 inch) clearance between cam follower (G) and the camming surface on the maximum diameter of the cam, when moving cam follower (G) away from the cam by turning special stitch selector slightly.
- Tighten screw (D) securely.

NOTE

If the above clearance is too wide, needle bar support will hit the screw which controls left side stroke of needle bar, when turning special stitch selector, and stitch selector will not turn or will not turn smoothly.

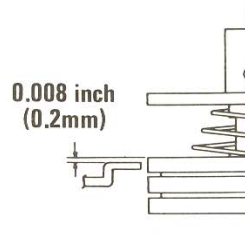
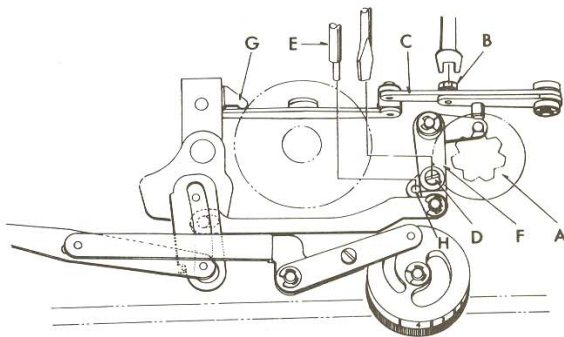


FIGURE 3K-22

Set special stitch dial between any two settings and stitch width control at 4. Loosen nut (A) and screw (B). Pushing claw opening plate (C) to operating plate (E), move operating plate (D) to the left and tighten nut (A) and screw (B).

Set special stitch dial at one of six settings and stitch width control at 4. Lower needle to its lowest position. Check if needle moves to the right when special stitch dial is set between each setting, and if it almost touches the right edge of the needle plate. If needle hits the needle plate, refer to 3C-22.

Check if zigzag cam follower (F) moves without touching each built-in cam (G) when special stitch dial is turned clockwise or counterclockwise. If it does not move properly, refer to 3M-8.

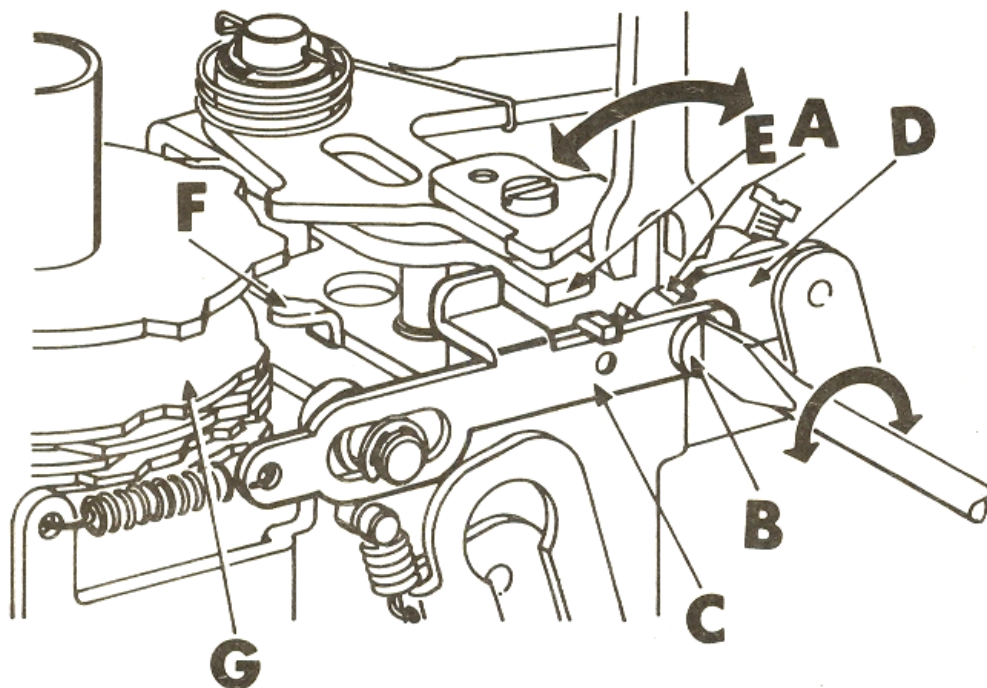
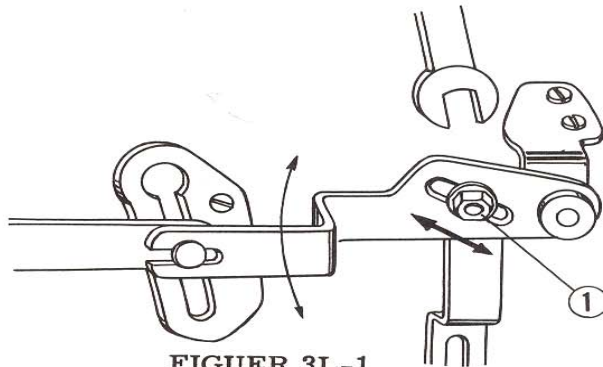


FIGURE 3K-23

STITCH WIDTH ADJUSTMENT



FIGUER 3L-1

Set the stitch width control dial at the maximum point. Using the single needle, check and see if you can obtain the width of the zigzag bight which is listed on the specification chart in this text. If not, loosen the nut (1) and move it to either direction as indicated by an arrow along the elliptical screw hole, until you get the specified width. Tighten the nut securely after adjustment.

STITCH WIDTH ADJUSTMENT

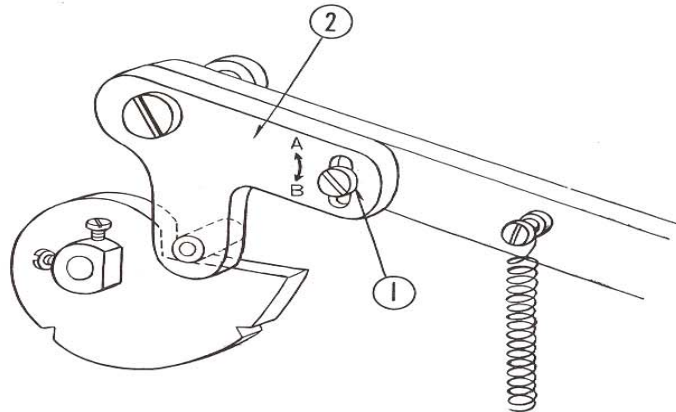


FIGURE 3L-2

Set the stitch width control at the maximum point. Using the single needle, check and see if you can obtain the width of the zigzag bight listed on the specification pages.

If the stitch width is narrower or wider than the specified width, set the stitch dial at 0, and holding the zigzag cam operating plate (2), loosen the set screw (1) slightly. Move the operating plate (2) to A direction when the width is narrower and B direction on the wider width until you can get correct width. Tighten the screw (1) securely after adjustment.

STITCH WIDTH ADJUSTMENT

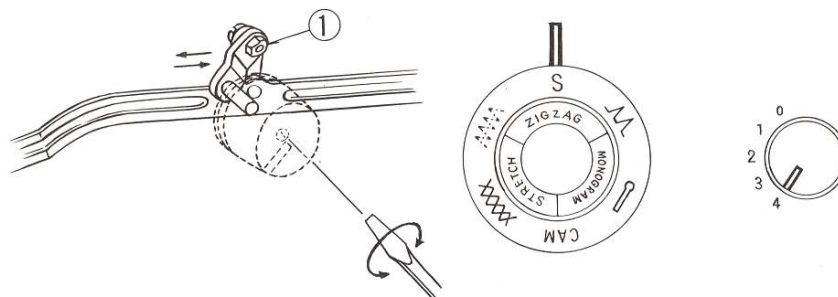


FIGURE 3L-3

FIGURE 3L-3

When you can not get the correct 7.0 mm stitch width at the stitch width setting 4, the adjustment is made in the following way. Set the stitch width control at 4 and selector dial at S. Loosen the set screw of the stitch width knob. (Do not pull the knob out). Loosen nut (1) and move the zigzag guide bar and the stitch width control knob shaft assembly in either direction, as shown in Figure 3L-3, until the correct width is obtained.

While holding the mechanism in the correct position, tighten nut (1) and pressing the stitch width knob inward against the shaft, tighten the set screw. Check to be certain the knob has not moved from the number 4 position.

FIGURE 3L-4

Set stitch width control to 4 and special stitch dial at "S"- Drop feed dog and place a piece of paper on needle plate. Take one zigzag stitch to mark points (L) and (R) with pressure regulator at maximum position. Check the distance between (L) and (R). It should be approximately 4.1mm to 4.3mm. If the distance is greater than 4.3mm, loosen screw (1) and turn the cam counterclockwise to obtain proper zigzag bight. When proper zigzag bight is obtained, tighten screw (1). Then set stitch width to "S" and make certain that the needle swing at "S" setting is approximately .001 inches (.03mm) and the zigzag bight at 1/4 setting is wider than .001 inch (.03mm).

STITCH WIDTH ADJUSTMENT

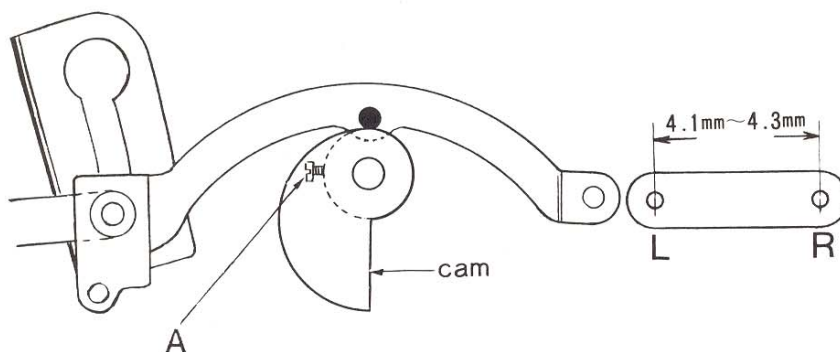


FIGURE 3L-4

CAM SELECTOR GUIDE PLATE SETTING

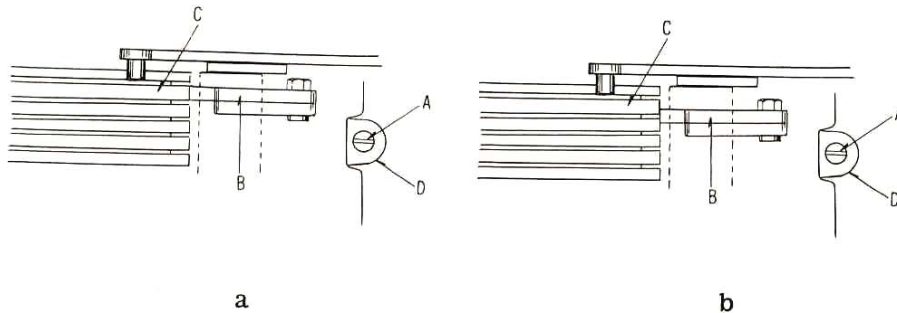


FIGURE 3M-1

SEE FIGURE 3M-1

If the machine produces an irregular pattern, the cam and cam follower may be misaligned. (Illustration b shows a misalignment of the cam selector guide plate (B) with the blind stitch cam (C). Correct alignment can be obtained as follows:

Set special stitch dial at blind stitch setting. Loosen screw (A) and move upper plate (D) of the selector lever assembly toward the back side of the machine arm to align the cam selector guide plate (B) with the blind stitch cam (C) as shown in illustration a. Tighten screw (A).

FIGURE 3M-2

If the cam follower does not align with the cam check the play on the upper shaft. Adjust in the following manner:

Set stitch width control at "S" and special stitch dial at "S". Check and see if the cam for straight stitching aligns with cam follower as shown. If not, loosen screw (A) on the cam shaft and move cam shaft either toward you or away from you, so that the cam for straight stitching aligns with cam follower. After positioning, tighten screw (A) securely.

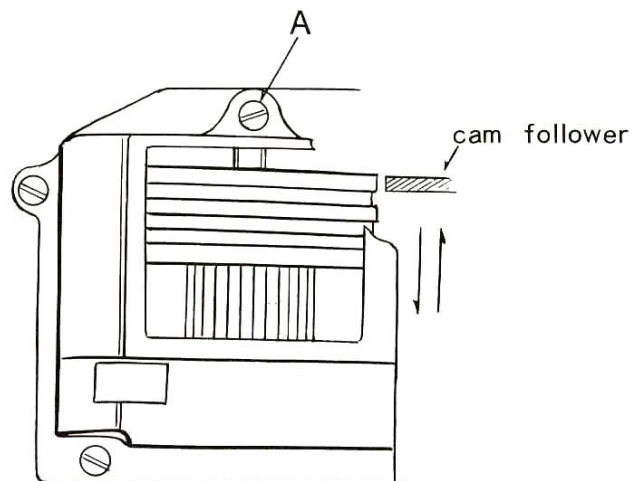


FIGURE 3M-2

CAM SELECTOR GUIDE PLATE SETTING

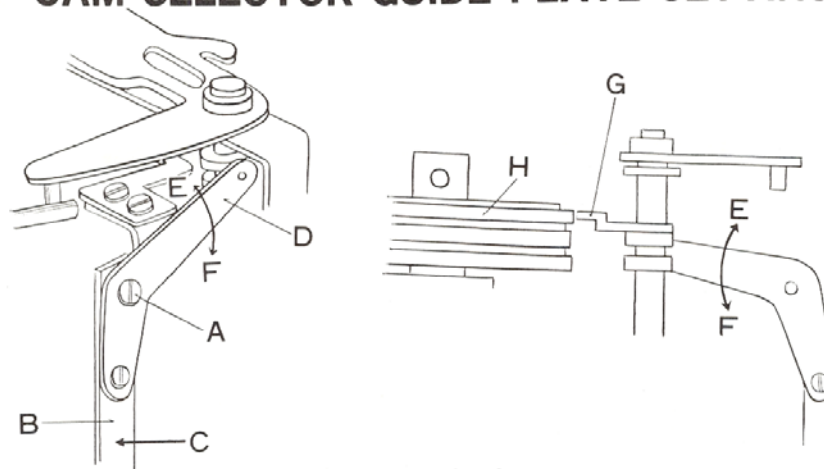


FIGURE 3M-3

FIGURE 3M-3

If the cam follower does not align with the cam adjust in the following manner.

Set special stitch dial at blind stitch setting. Remove the cap on back side of machine arm and

loosen screw (A) with a screw driver through the hole of the machine arm. Pushing selector plate (D) either direction (E) or (F) in order that zigzag cam follower (G) is aligned with blind stitch cam (H). After obtaining proper position tighten screw (A). Be sure zigzag cam follower is aligned with each built-in cam.

SEE FIGURE 3M-5

Set stitch length dial at 6 and special stitch dial at "S" or red dot. Check and see if the cam follower aligns with a cam as shown. If not, loosen nut (A), and turn eccentric screw (B) slightly to either direction (counter-clockwise or clockwise) so that the follower aligns with a cam. Tighten nut (A) securely after adjustment.

CAM SELECTOR GUIDE PLATE SETTING

SEE FIGURE 3M-6

If the cam follower (A) does not align with the cam, adjust the following manner:

Set stitch width control at 4*. Loosen screws (B) and align the cam follower (A) with the lowest cam, except Model 1815 & 1913 in which cam follower (A) should be aligned with the second cam from the bottom. After obtaining proper position, tighten screw (B). Be sure cam follower is aligned with each built-in cam.

* Model 1431, 1940 & 1941 - Set special stitch dial at red dot.

* Model 1731, 1851, 1913 & 1931 - Set special stitch dial at mending stitch setting.

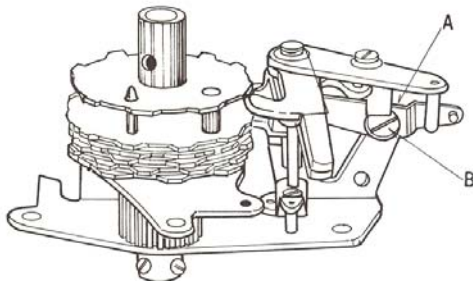


FIGURE 3M-5

CAM SELECTOR GUIDE PLATE SETTING

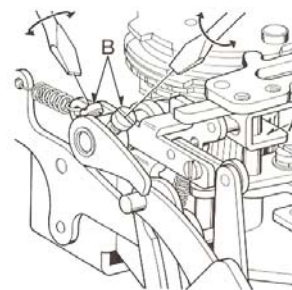


FIGURE 3M-6


CAM SELECTOR GUIDE PLATE SETTING

See Figure 3M-7

1. CHECKING ALIGNMENT OF CAM FOLLOWER TO CAMS

- Set the machine as follows:
Stitch width control – 4
Stitch length control – any number
Special stitch modifier – red dot
- Check if each pattern of stitches selected can be sewn.

2. ADJUSTMENT

- Set special stitch selector at 
- Loosen screw (B) slightly and align cam follower with the highest zigzag cam below super cam by moving link (C) up and down.
- Tighten screw (B) securely.
- Check distribution of needle swing (3C-21) after adjustment.

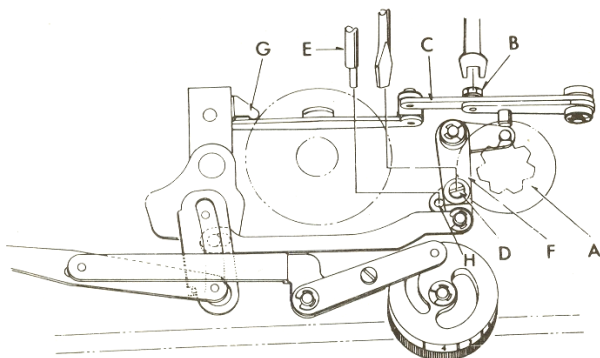


FIGURE 3M-7

See Figure 3M-8

Set stitch width control at 4, stitch length control at any number and special stitch modifier at red dot. Check to see if each pattern of stitches selected can be sewn. If not, set special stitch dial at red dot, loosen screws (B) and align cam follower (A) with the lowest cam. After obtaining the proper position, tighten screws (B) securely. Be sure cam follower (A) is aligned with each cam.

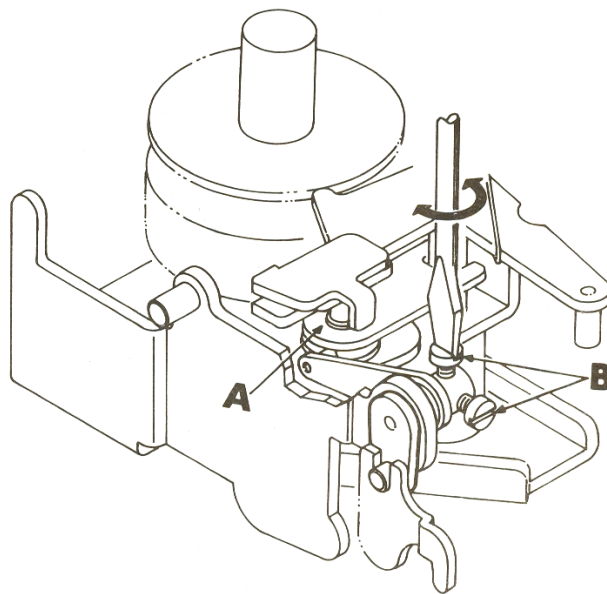


FIGURE 3M-8