

SINGER
211U157A,165,166,566

Service Manual

SINGER^{*}
INDUSTRIAL PRODUCTS

21

U157A

U165A

U166A

U566A

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DESCRIPTION OF MACHINES

High speed single needle, compound feed, alternating pressers (excluding 211U157), lock stitch, long arm, vertical axis hook, flat bed machines, designed for top performance on a variety of medium to heavy weight fabrics.

GENERAL FEATURES

The compound feeding mechanism which consists of a needle feed and drop feed prevents slipping of the upper and lower plies of material when being stitched, and assists in two or more plies being fed evenly to the end of seam.

Vertical axis hook, with a rigid needle guard, which makes two revolutions each stitch.

Safety clutch, adjustable to suit sewing conditions, and protect the hook from damage in case of accidental strain.

Adjustable feed driving eccentric located on hook driving shaft, produces a uniform stitch length at all speeds.

Arm shaft, hook shaft, and belt driven bed shaft are mounted in ball bearings at rear and in automatically lubricated plain bearings at front.

Plunger for changing length of stitch is on top surface of bed.

Sleeve type take-up.

Belt drive.

Knee lifter.

Federal stitch type 301.

SPECIAL FEATURES

Vertical axis hook with metered lubrication. Hook can be removed without disturbing hook shaft. (211U157 and 211U566).

Fully automatic lubrication to all moving parts from two reservoirs enclosed in the machine. (211U157)

Thread lubricator reservoir, inside face plate, filled through oil hole without disturbing face plate. (211U157)

Needle bar and needle bar driving mechanism are lubricated automatically from oil reservoir in machine arm. (211U157)

Feed reversing mechanism controlled by hand or foot. Direction of feed can be reversed at any time, and at any speed. Spring biased reverse lever resumes forward stitching position immediately, when hand or foot pressure is released. (211U157, 211U166 and 211U566)

Alternating presser system with the needle bar frame mounted on its upper end. (211U165, 211U166 and 211U566)

Push button adjustable lifting eccentric which, via a linkage, enables the step of the alternating pressers to be set to 9/32" (7.1 mm). To suit particular sewing operations the step of the alternating pressers can also be set to a minimum height. (211U165, 211U166 and 211U566)

Controllable thread lubricator which is located in the machine head. (211U165, 211U166 and 211U566)

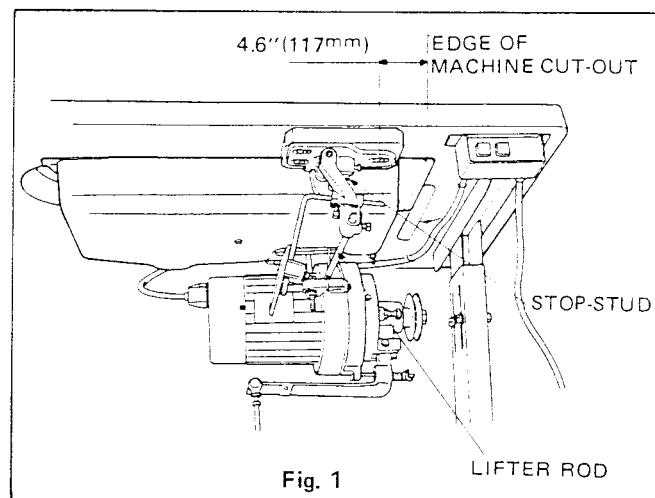
SPECIFICATIONS

| | 211U157 | 211U165 | 211U166 | 211U566 |
|-------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Needle bar stroke | 1-5/16" (33.34 mm) | 1-5/16" (33.34 mm) | 1-5/16" (33.34 mm) | 1.386" (35.20 mm) |
| Take-up stroke | 2.197" (55.8 mm) | 2.433" (61.8 mm) | 2.433" (61.8 mm) | 2-27/32" (72.2 mm) |
| Clearance under presser foot | 1/4" (6.35 mm) | 0.315" (8.0 mm) | 0.315" (8.0 mm) | 0.315" (8.0 mm) |
| Sewing capacity | 15/64" (6.0 mm) | 5/16" (8.0 mm) | 5/16" (8.0 mm) | 5/16" (8.0 mm) |
| Maximum stitch length | 6 SPI (4.2 mm) | 3-1/2 SPI (7.3 mm) | 5 SPI (5.1 mm) | 3 SPI (8.4 mm) |
| Maximum speed | 4,000 SPM | *3,500 SPM | *2,900 SPM | *2,700 SPM |
| Bed length | 18-3/4" (476.5 mm) | | | |
| Bed width | 7" (177.8 mm) | | | |
| Space at right of needle | 9-5/8" (244.5 mm) | | | |
| Needle | Cat. No. 1901 | Cat. No. 3355 | Cat. No. 3355 | Cat. No. 3355 |
| Oil | Type "A" or "C" | | | |

* Depending on lift of alternating pressers, materials used and operations performed.

INSTALLATION

Fasten drip pan to table with its right edge in line with machine belt slot in table. Fasten knee lifter bracket in location shown in Fig. 1. Assemble it so that lifter rod does not strike drip pan. Screw slots in bracket provide necessary adjustment. Set stop-stud to stop the action of knee lifter as soon as presser foot is raised enough to trip hand lever.



LUBRICATION

For the lubrication of the machine, only SINGER OIL "TYPE A or C", supplied by THE SINGER COMPANY, should be used. In order to insure proper function of the machine and to prevent any excess wear of the moving parts and bearings, the machine should be oiled regularly. In case of continuous use, it should be oiled even more often if it used to produce long seams and run steadily.

Fig. 2 shows the oil filler hole for oil reservoir on top of arm on 211U157 machine.

Fill machine arm reservoir to high mark on oil sight gauge as indicated in Fig. 2.

The machine arm reservoir contains an oil vibrating pump which releases oil only when the machine is operating.

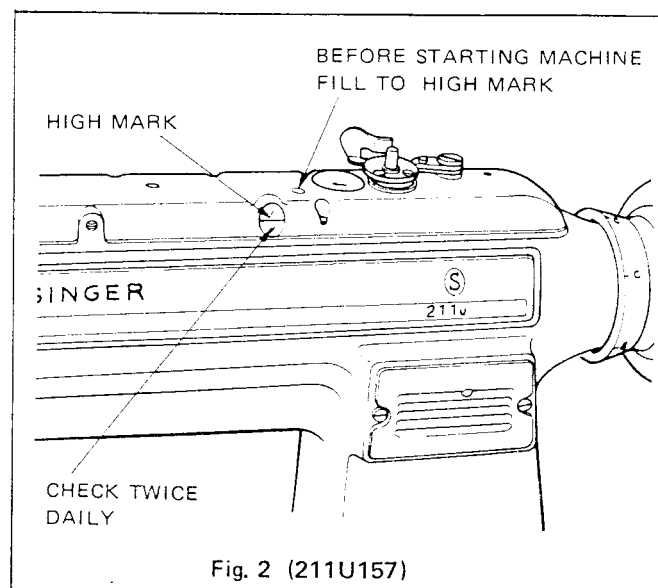
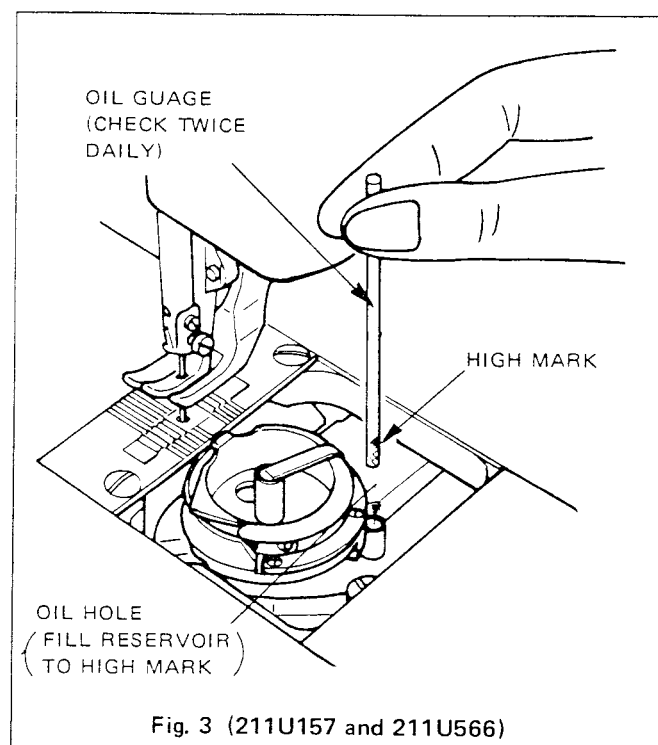


Fig. 3 shows the oil filler hole for hook saddle reservoir on 211U157 and 211U566 machines.

Remove oil gauge as shown in Fig. 3 and fill hook saddle reservoir to full mark on gauge.

Lubricate hook gears and opener gears by applying a generous supply of oil to oil hole indicated in Fig. 3.



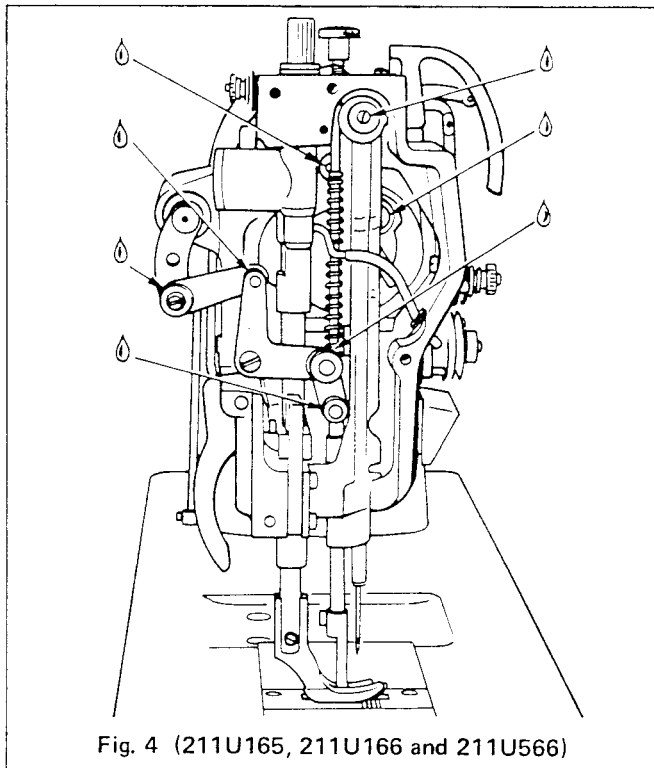


Fig. 4 (211U165, 211U166 and 211U566)

Fig. 4 shows the 211U165, 211U166 and 211U566 machines with the oiling points when the face plate has been removed. These oiling points must be oiled in addition to all other oiling points before the machine is placed in operation for the first time, and at least once daily thereafter.

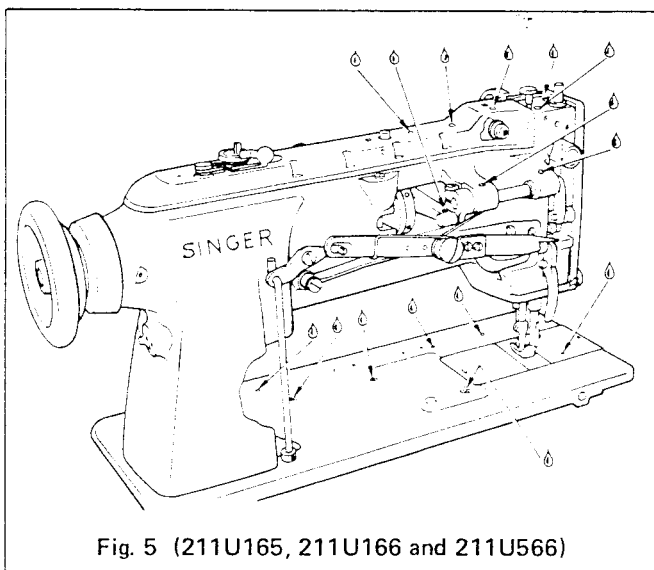


Fig. 5 (211U165, 211U166 and 211U566)

Fig. 5 shows the back of the 211U165, 211U166 and 211U566 machines with various oiling points.

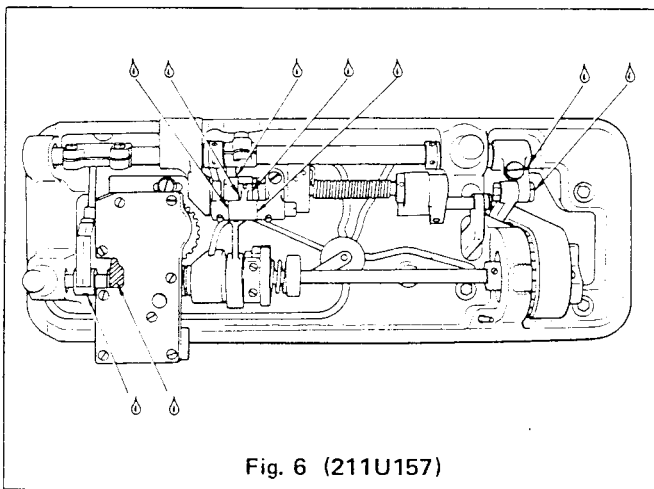


Fig. 6 (211U157)

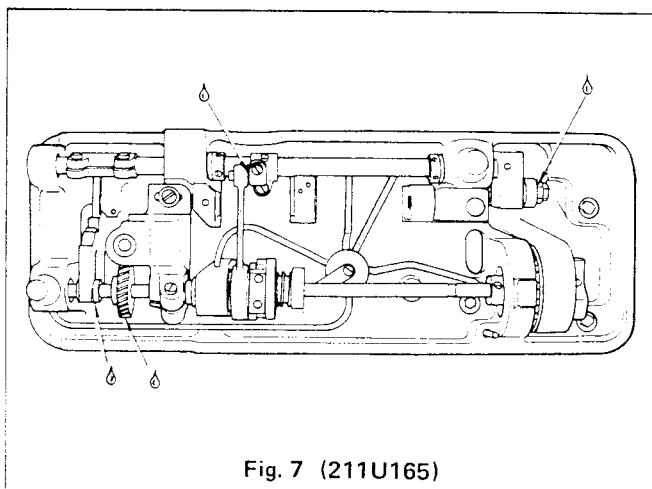


Fig. 7 (211U165)

Fig. 6 shows the underside of the 211U157, Fig. 7 the 211U165, Fig. 8 the 211U166 and Fig. 9 the 211U566 machines with the lubrication points for the four machines. They can be oiled when the machine is tilted back on its hinges.

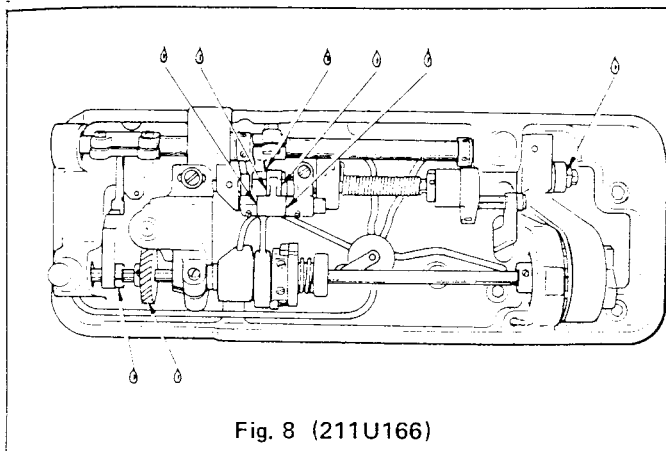


Fig. 8 (211U166)

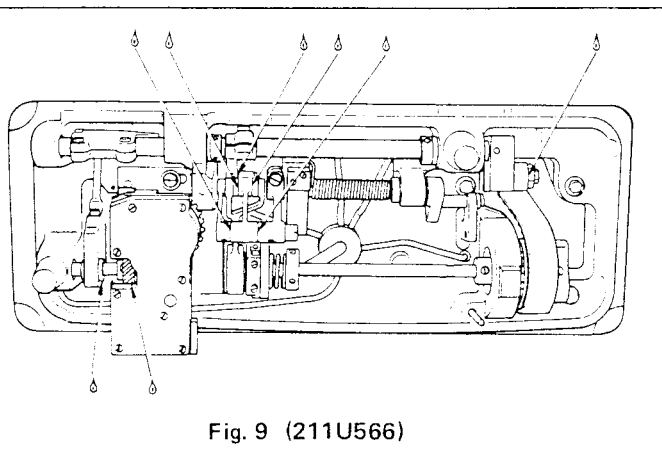


Fig. 9 (211U566)

HOOK LUBRICATION 211U157 and 211U566

The bobbin case raceway is lubricated by oil pumped from the hook saddle reservoir while the machine is operating. The amount of oil received by hook raceway is very important. To check this, first remove bobbin case. Then with the machine running, hold a small piece of white paper near the hook for about 10 seconds. A distinct spray of oil should be visible on the paper.

If there is no trace of oil or an excess of oil on the paper, proceed with the following steps.

1. Tip machine and loosen control valve set screw shown in Fig. 10 and return machine to upright position.
2. Turn control valve screw shown in Fig. 11 clockwise for more oil; counterclockwise for less oil. Re-tighten control valve set screw.

A short test run of at least a minute should be made between adjustments to insure uniform oil flow. After each adjustment of oil control valve screw, oil control valve set screw should be securely tightened.

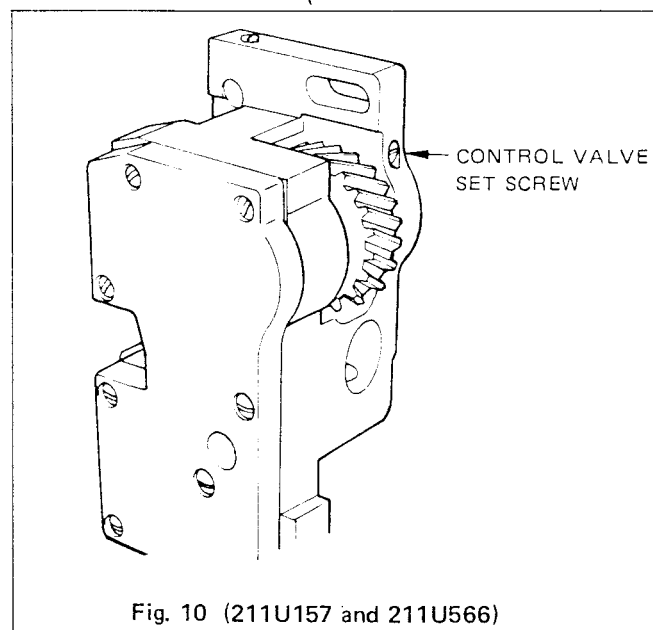


Fig. 10 (211U157 and 211U566)

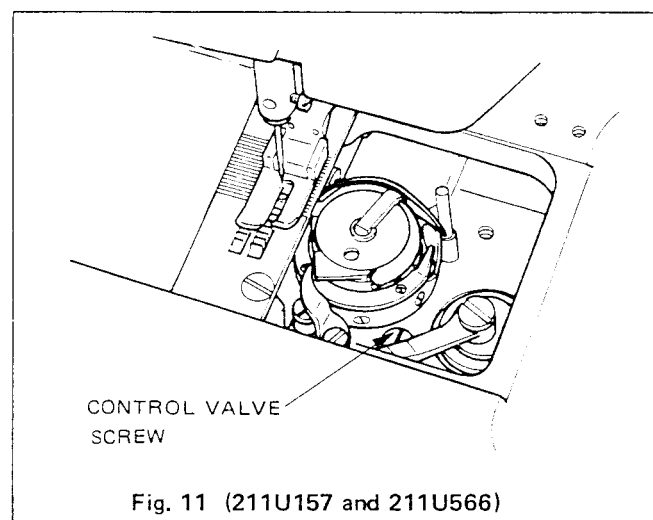


Fig. 11 (211U157 and 211U566)

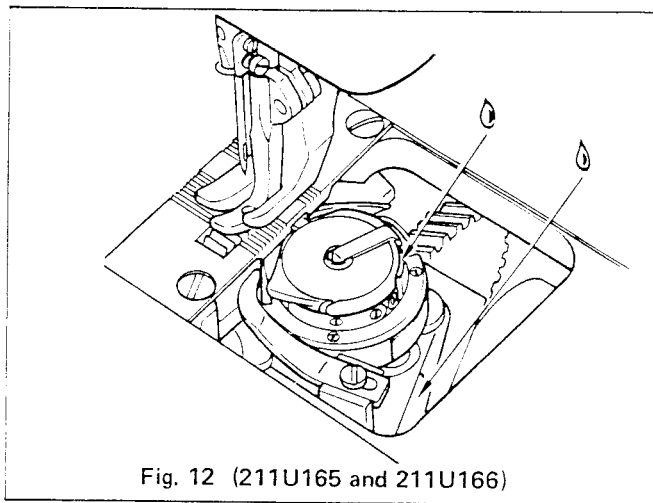


Fig. 12 (211U165 and 211U166)

HOOK LUBRICATION 211U165 and 211U166

Fig. 12 shows the hook lubrication points on 211U165 and 211U166 machines.

The oil reservoir A oils the upper hook bearing and the mechanism for the mechanical opener.

The small green felt on the bobbin case oils the hook raceway and should always be saturated with oil. If the felt appears almost black, then there is sufficient oil. If it is dry, then the color is a light green. On a new machine, the felt should be oiled each time the bobbin is changed.

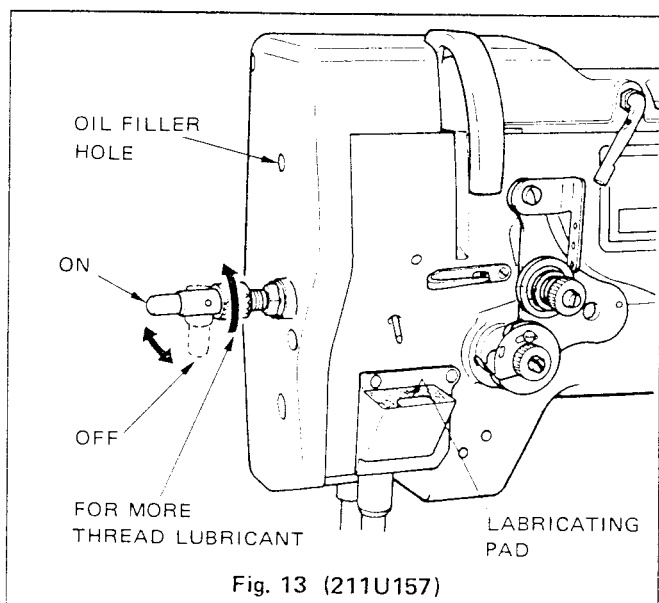


Fig. 13 (211U157)

THREAD LUBRICATION

Use Singer Oil "Type E" for thread lubricator reservoir.

Fig. 13 shows thread lubrication for 211U157 machine. Fill thread lubricator reservoir through oil hole in face plate as shown in Fig. 13. THREAD LUBRICATOR CONTROLLER MUST BE ON WHEN MACHINE IS OPERATING AND OFF WHEN MACHINE IS IDLE. To increase thread lubrication, turn controller in counterclockwise direction as shown in Fig. 13.

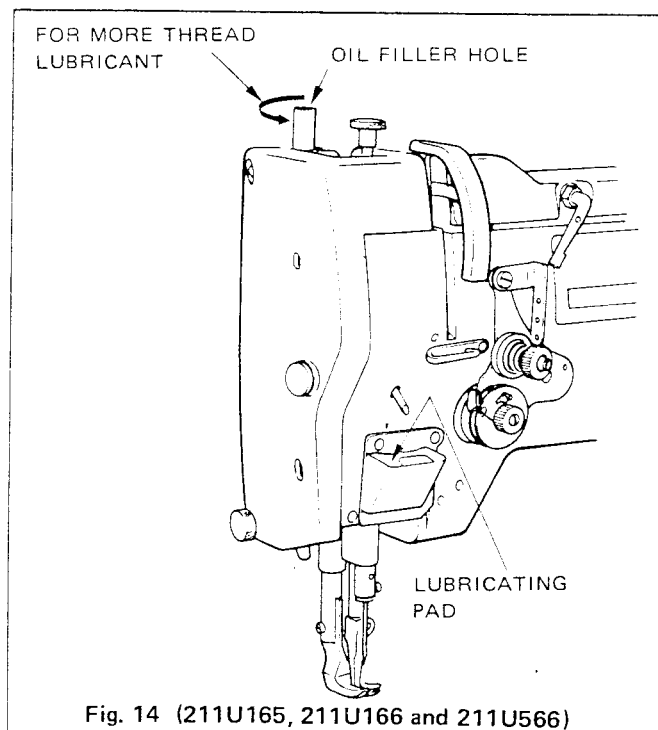


Fig. 14 (211U165, 211U166 and 211U566)

Fig. 14 shows thread lubrication for 211U165, 211U166 and 211U566 machines.

Fill thread lubricator reservoir through oil hole in oil flow control valve.

Turn oil flow control valve counterclockwise for more lubricant when machine is running.

Turn oil flow control valve clockwise to stop oil flow when machine is idle.

SPEED

Maximum speed for machine 211U157 is 4000 stitches per minute.

Maximum speed for machine 211U165 is 3500 stitches per minute.*

Maximum speed for machine 211U166 is 2900 stitches per minute.*

Maximum speed for machine 211U566 is 2700 stitches per minute.*

Maximum efficient speed is dependent upon the nature of the operation, the ability of the operator and the type of material being sewn.

Never run a new machine at maximum speed immediately following a new installation. A speed of 500 stitches per minute less than maximum is recommended for the first 100 hours of operation.

NEEDLES

For machine 211U157, use Singer Needles, Catalog 1901.

For machines 211U165, 211U166 and 211U566, use Singer Needles, Catalog 3355.

Size of needle for a particular operation is determined by size of thread and type of material to be sewn.

Orders for needles should state quantity required, size number and catalog number.

For example:

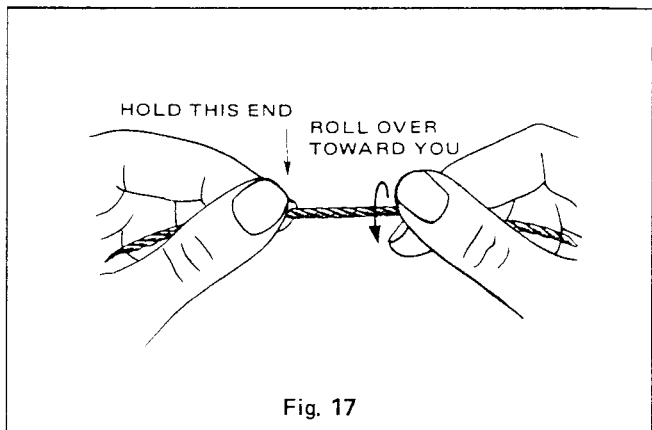
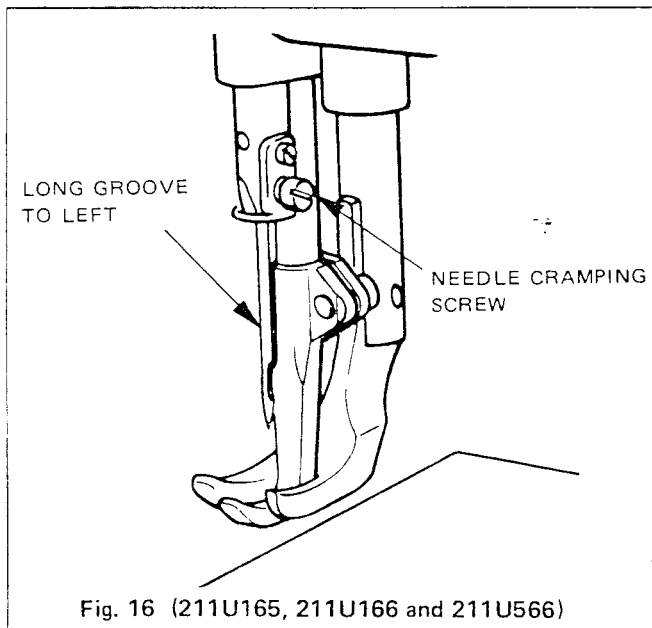
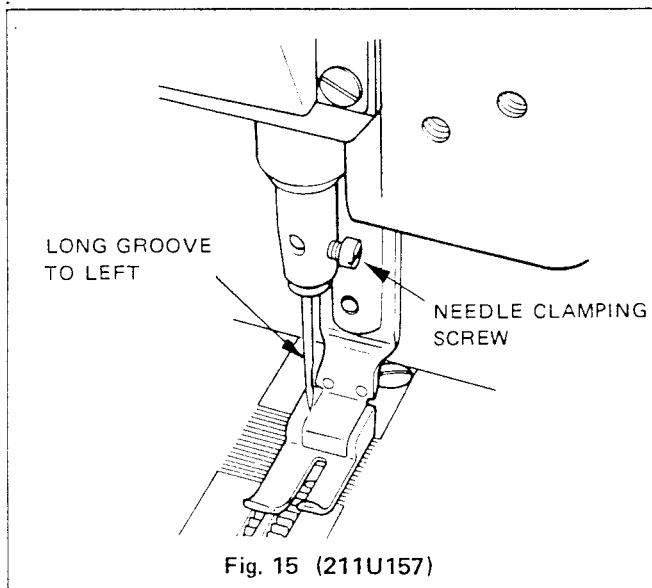
100 Needles, Size 19, Catalog 1901

*Recommended machine speed relative to the operating stroke of the alternating pressers. (211U165, 211U166 and 211U566)

| Presser foot lift | Speed |
|------------------------------|-------------|
| 3/32 inch (2.4 mm) | 3500 s.p.m. |
| 1/8 inch (3.2 mm) | 3300 s.p.m. |
| 5/32 inch (4.0 mm) | 2700 s.p.m. |
| 3/16 inch (4.8 mm) | 2400 s.p.m. |
| 7/32 inch (5.5 mm) | 2300 s.p.m. |
| 1/4 inch (6.3 mm) | 2200 s.p.m. |
| 9/32 inch (7.1 mm) | 2100 s.p.m. |

SETTING THE NEEDLE

1. Turn machine pulley over toward you until needle bar is at highest position as shown in Fig. 15 and Fig. 16.
2. Loosen needle clamping screw
3. Insert needle into needle bar to highest position, with long groove of needle to left of operator and eye of needle parallel to machine arm.
4. Tighten clamping screw.



THREAD

Left twist thread should be used in needle.

Either left or right twist thread can be used in bobbin.

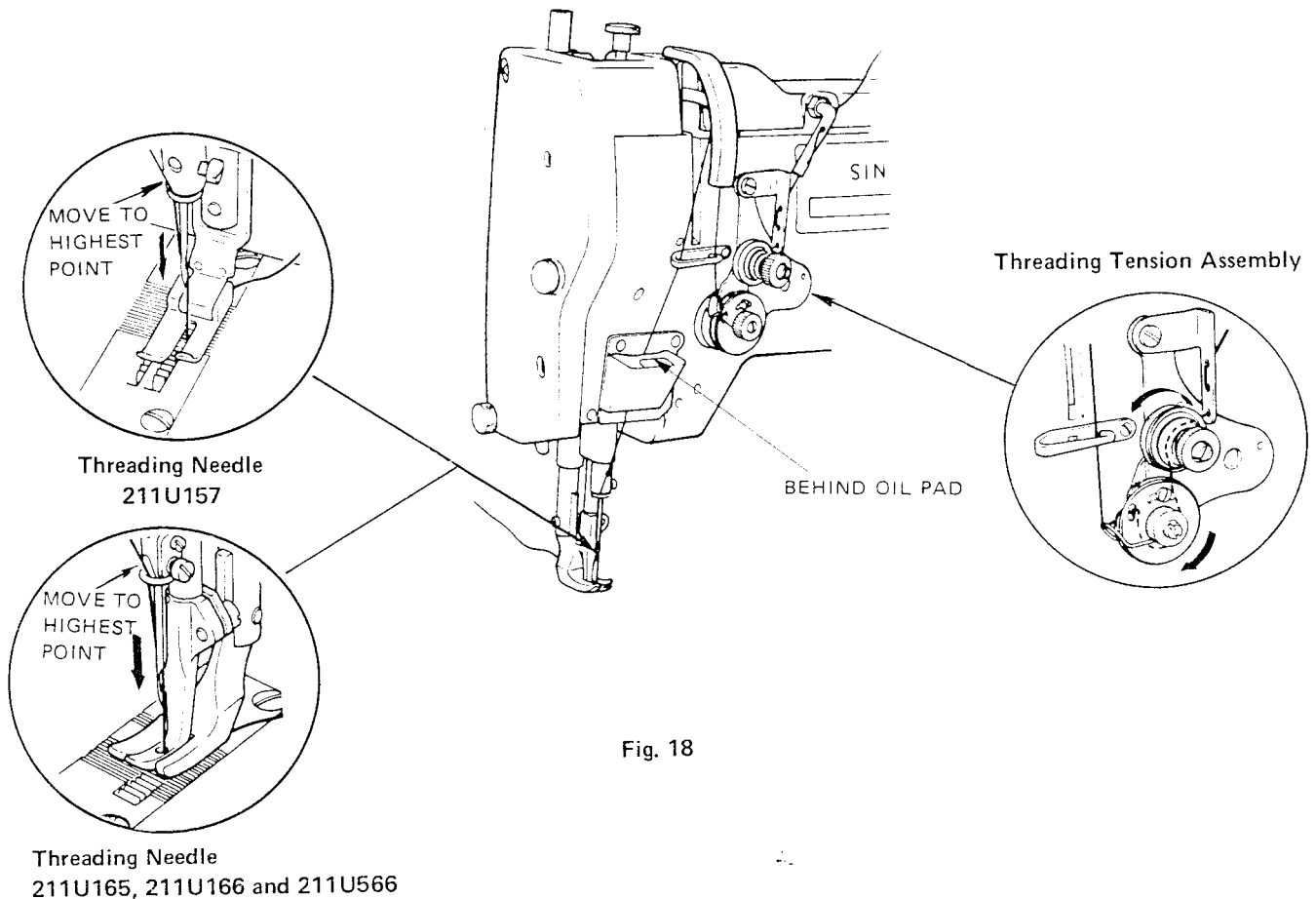
To determine thread twist, hold thread as shown in Fig. 17. With left hand holding one end of thread, twirl other end with thumb and forefinger of right hand over toward you. If left twist thread, strands will wind tighter. If right twist thread, strands will unwind or separate.

UPPER THREADING

Turn machine pulley over toward you until needle bar is at highest position.

Draw about 2 inches of thread through needle eye to start sewing.

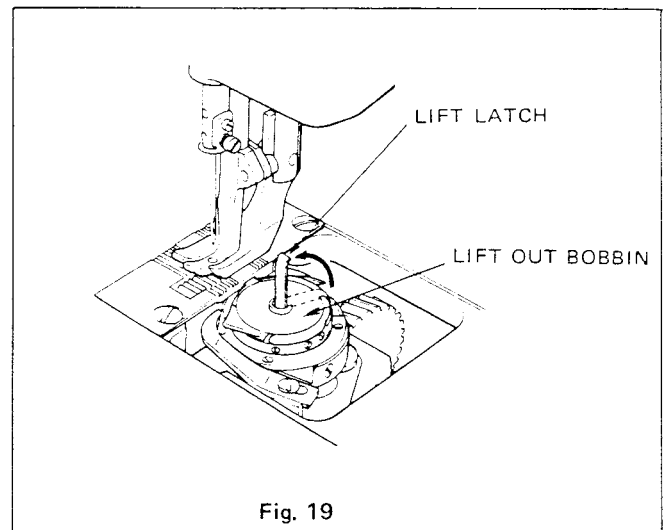
Pass thread through threading points as indicated in Fig. 18.

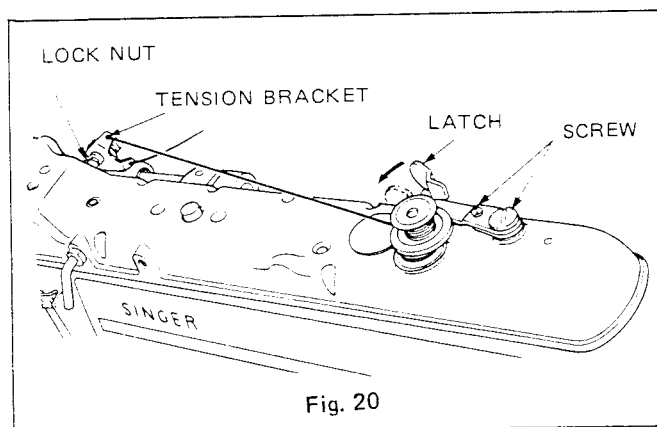


LOWER THREADING

BOBBIN REMOVAL

1. Open slide plate in bed of machine
2. Turn machine pulley over toward you until needle bar reaches highest position.
3. Raise bobbin latch and lift out bobbin as indicated in Fig. 19.





BOBBIN WINDING

Place bobbin on spindle as far as it will go.

Pass the thread from the thread unwinder through threading points as shown in Fig. 20.

Wind end of thread around the bobbin a few times.

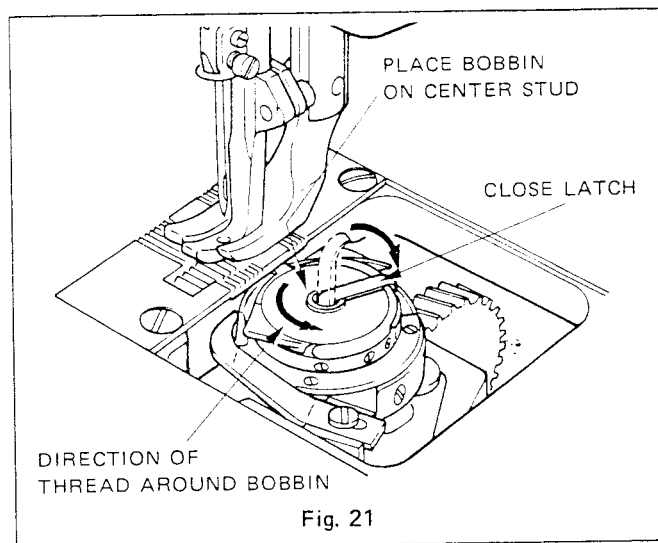
Press latch against bobbin, then start the machine.

The bobbin winder will stop automatically when the amount of thread for which it is regulated is wound upon the bobbin. For more thread on bobbin, loosen screws and swing latch away from bobbin, for less thread on bobbin, swing latch toward bobbin.

Tighten screws.

If the thread does not wind evenly, loosen lock nut and turn tension bracket up or down, as required, then tighten lock nut.

Bobbins can be wound while the machine is sewing.



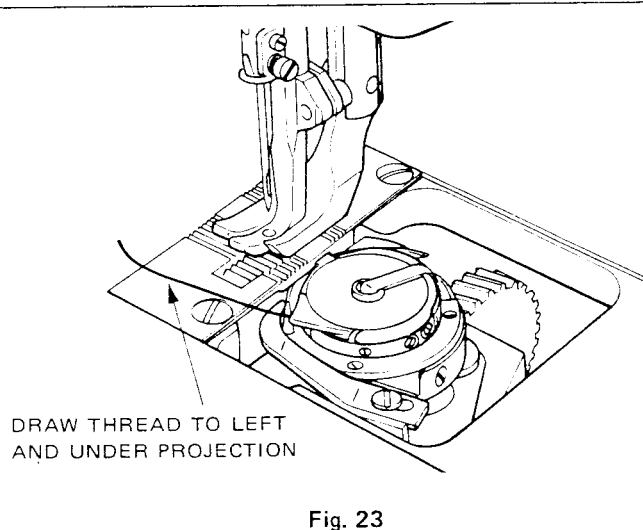
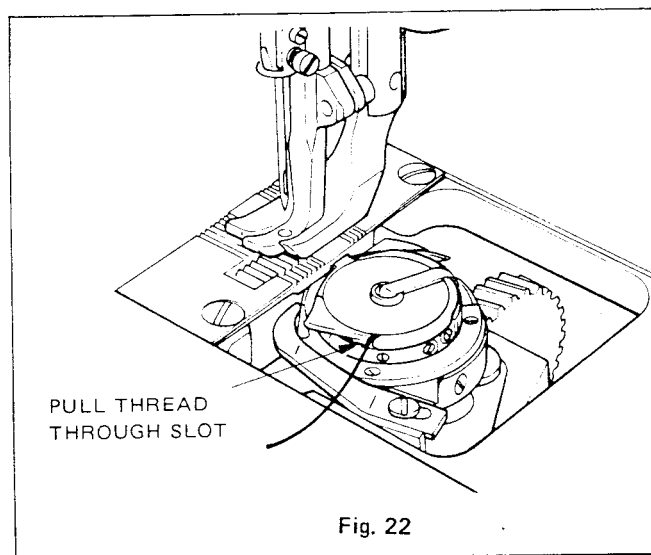
BOBBIN REPLACEMENT

Place bobbin on center stud with thread wound in counterclockwise direction as shown in Fig. 21. Draw about 2 or 3 inches of thread from bobbin.

THREADING BOBBIN CASE

Draw thread through slot in edge of bobbin case as shown in Fig. 22, then to the left and under projection as shown in Fig. 23, leaving about two inches of thread above

the slide to start sewing. Close slide, leaving just enough space for thread to pass freely.



THREAD TENSIONS

Tension on thread should be as light as possible yet sufficient to correctly set stitches in material.

NEEDLE THREAD TENSION

Regulate needle thread tension only when presser foot is down. To increase tension, turn thumb nut shown in Fig. 24, clockwise. To decrease tension turn thumb nut counterclockwise.

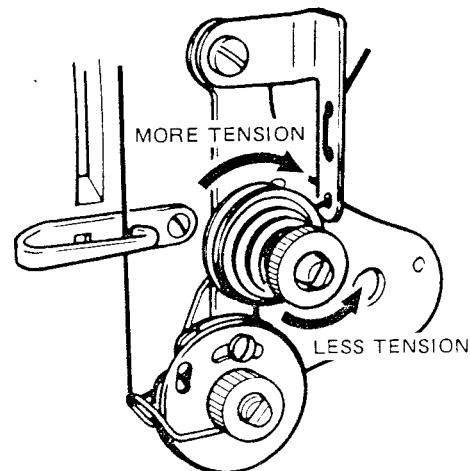


Fig. 24

BOBBIN THREAD TENSION

Bobbin thread tension is regulated by the screw nearest to the center of tension spring on the outside of the bobbin case shown in Fig. 25. Turn machine pulley slowly until screw is accessible. To increase tension, turn screw clockwise.

To decrease tension, turn screw counterclockwise.

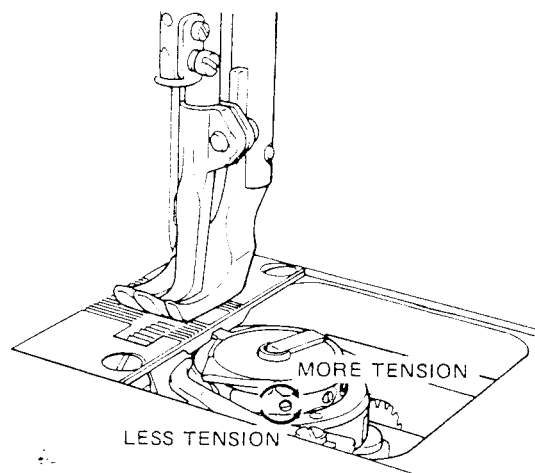


Fig. 25

THREAD CONTROLLER

The thread controller should draw up slack thread before needle point enters fabric to prevent needle from penetrating thread.

To adjust thread controller, loosen set screw A, shown in Fig. 26. Turn thread controller spring stop counterclockwise for more controller action on thread or clockwise for less action. Tighten set screw A.

Thread controller action TENSION should be increased for heavy thread and decreased for light thread.

To adjust thread controller action tension, loosen set screw B shown in Fig. 26. Turn tension stud slightly counterclockwise for more tension or clockwise for less tension.

Tighten set screw B.

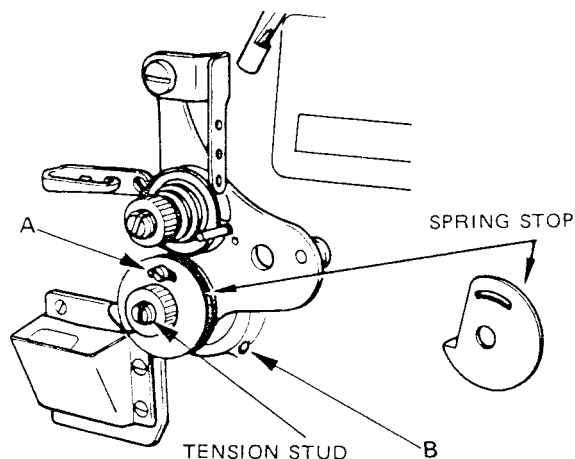


Fig. 26

STITCH LENGTH REGULATION

1. With machine OFF, depress button shown in Fig. 27 on bed surface. NEVER DEPRESS BUTTON WHEN MACHINE IS RUNNING.
2. Turn machine pulley over toward you slowly until button drops (snaps) into position.
3. Turn machine pulley in direction (+) when a longer stitch is desired (less SPI) and in direction (—) when a shorter stitch is desired (more SPI).
4. Release button. NEVER START MACHINE UNTIL BUTTON IS RELEASED.

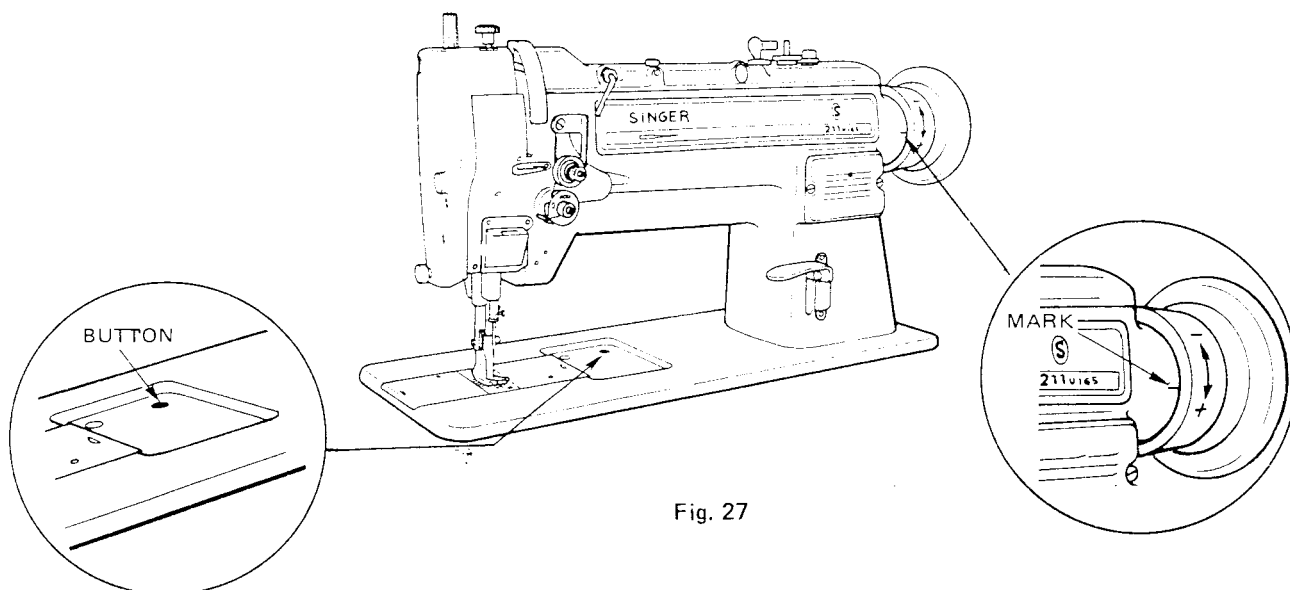


Fig. 27

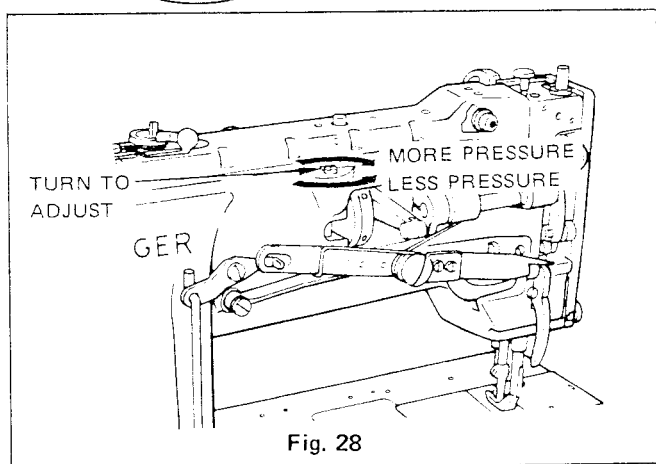


Fig. 28

PRESSURE ON MATERIAL

Pressure of presser foot on material should be as light as possible while being sufficient to insure correct feeding.

Pressure is regulated by screw shown in Fig. 28 at rear of machine arm. Turn screw clockwise to increase pressure or counterclockwise to decrease pressure.

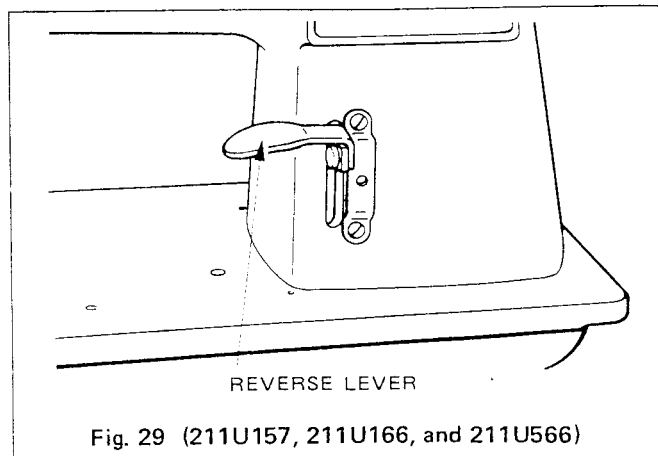


Fig. 29 (211U157, 211U166, and 211U566)

REVERSE FEED MECHANISM (211U157 and 211U166)

To reverse feed direction by hand, push reverse lever completely down in order to have same stitch length as in forward stitching position.

To reverse the feed with foot treadle, the foot treadle chain should be connected to hole in reverse feed lever shown in Fig. 30.

Release hand lever or foot treadle only when you wish to resume forward stitching.

REVERSE FEED MECHANISM (211U566)

The reverse feed mechanism of machine 211U566 is the same as that for 211U157 and 211U166 with the exception of maximum reverse stitch length being limited to 5 mm.

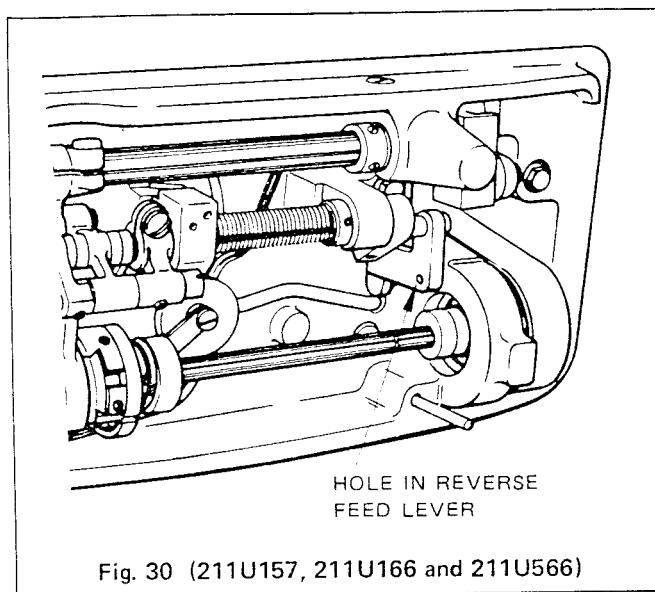


Fig. 30 (211U157, 211U166 and 211U566)

TO RE-ENGAGE THE SAFETY CLUTCH

A safety clutch to prevent any overload and damage to the hook is installed in the lower belt pulley. If it is disengaged, open the bed slide and check the hook. Remove all thread and foreign matter from the hook by carefully turning the machine pulley forward and backward until the machine turns freely. By pressing the stitch length regulator button, and at the same time turning the machine pulley, the hook driving shaft is locked until the safety clutch is re-engaged. Reset the stitch length and the machine is ready for sewing.

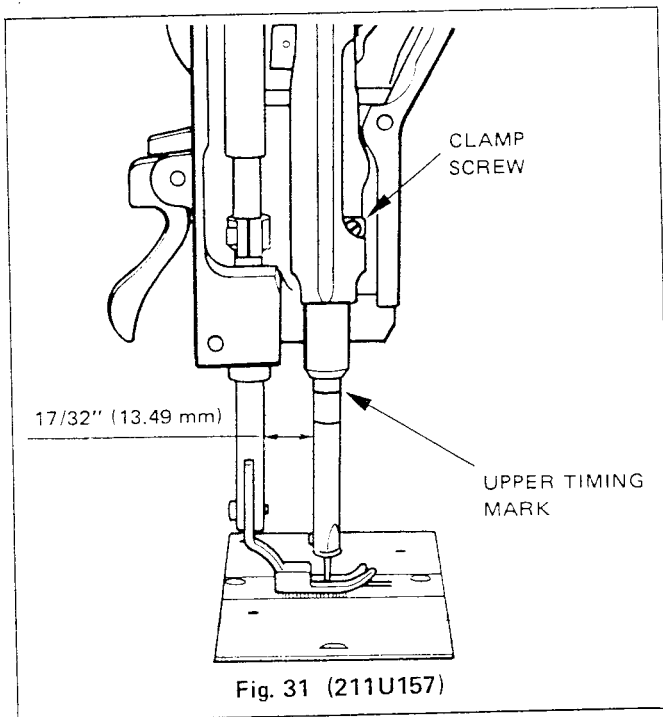
ADJUSTMENTS

SETTING NEEDLE BAR HEIGHT 211U157

When needle bar is at lowest position of its cycle, the correct gauge distance from throat plate seat to needle stop in needle bar is .991 inch (25.16 mm).

Needle bar is correctly set when, at the lowest position of its cycle, the upper timing mark is just visible at lower edge of needle bar frame as shown in Fig. 31.

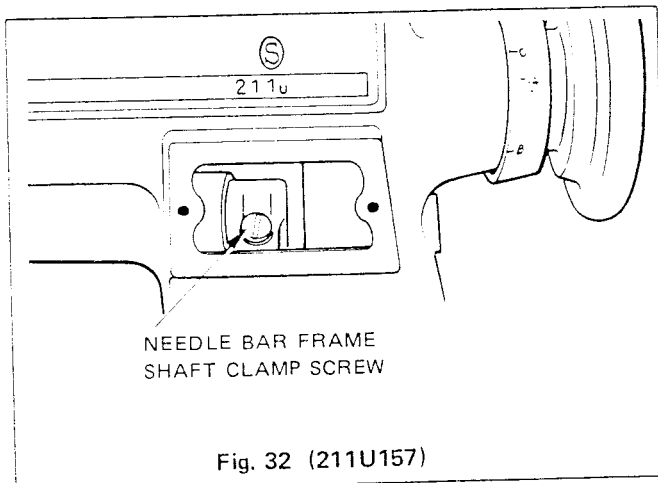
If needle bar is not correctly set, loosen needle bar connecting stud pinch screw shown in Fig. 31 and correct needle bar position. Re-tighten needle bar connecting stud pinch screw.



DISTANCE OF NEEDLE BAR FROM PRESSER BAR 211U157

The distance between needle bar and presser bar (after regulating stitch length so that there is no feed movement) should be 17/32 inch (13.49 mm) as shown in Fig. 31.

If the distance between needle bar and presser bar is more or less than 17/32 inch (13.49 mm), first turn machine pulley over toward you until needle bar is at highest position. Remove cover plate from front of machine arm. Loosen needle bar frame clamp screw shown in Fig. 32. Move needle bar frame forward or backward to correct its position. Re-tighten clamp screw.

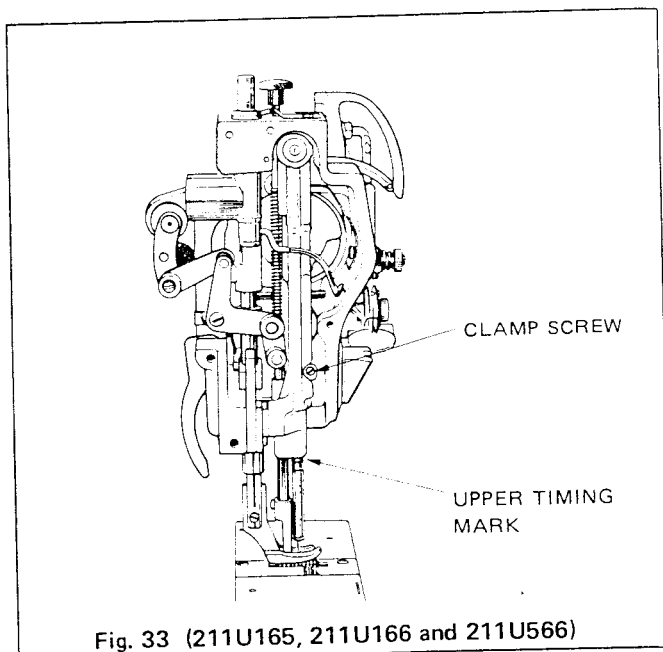


SETTING NEEDLER BAR HEIGHT 211U165, 211U166 and 211U566

When needle bar is at lowest position of its cycle, the correct gauge distance from throat plate seat to needle stop in needle bar is 1.188 inch (30.18 mm).

Needle bar is correctly set when, at the lowest position of its cycle, the upper timing mark is just visible at lower edge of needle bar frame as shown in Fig. 33.

If needle bar is not correctly set, loosen needle bar connecting stud pinch screw shown in Fig. 33 and correct needle bar position. Re-tighten needle bar connecting stud pinch screw.



DISTANCE OF NEEDLE BAR FROM VIBRATING PRESSER BAR 211U165, 211U166 and 211U566

On the 211U165, 211U166 and 211U566 machines the needle bar rock frame is driven by a compound drive mechanism which can be made synchronous or differentiated with the lower feed. It must be adjusted so that, in zero position of synchronous feed, the distance between the vibrating presser bar in the needle bar rock frame and the vertically moving presser bar, in the arm, is 21/64 inch (8.33 mm) for 211U165, 19/64 inch (7.54 mm) for 211U166 and 11/32 inch (8.73 mm) for 211U566. (see Fig. 34)

For synchronous feed, and for alignment of the needle bar rock frame, adjust the feed driving eccentric for zero stitches. Loosen lock nut A, Fig. 35, and bearing nut B. Then move screw C, Fig. 35, to its normal operating position along the slot of the adjustable crank D.

Remove the front arm cover, loosen screw E, Fig. 36, and adjust the needle bar rock frame to the vertically moving presser bar to obtain the distance between the vibrating presser bar and the vertically moving presser bar as shown in Fig. 34.

For differentiated feed, adjust the feed driving eccentric to the desired number of stitches per inch.

Loosen lock nut A and bearing nut B. Move screw C in the adjustable crank to the back in order to get a larger movement of the upper feed relative to the lower feed, and to the front for a smaller movement.

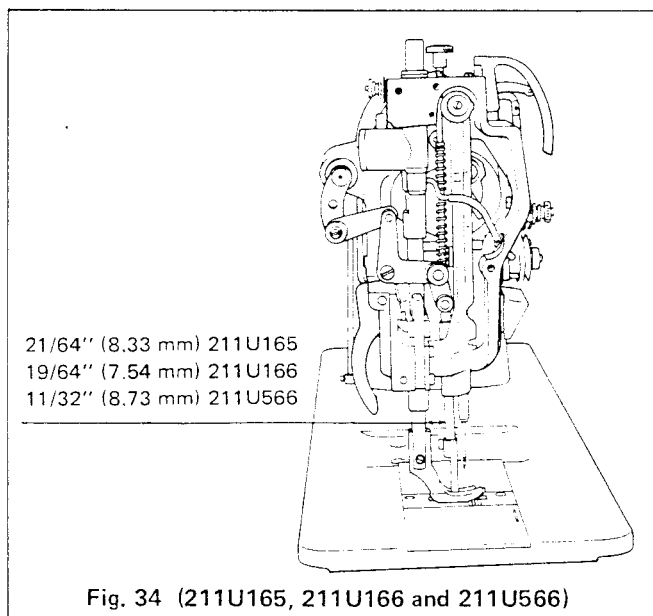


Fig. 34 (211U165, 211U166 and 211U566)

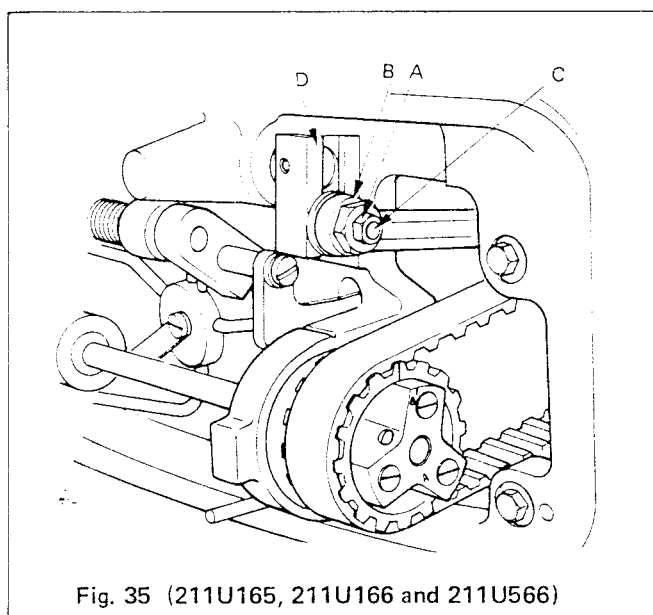


Fig. 35 (211U165, 211U166 and 211U566)

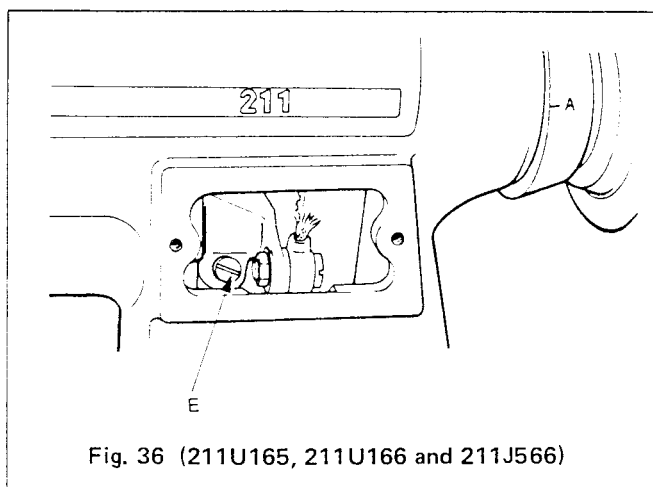


Fig. 36 (211U165, 211U166 and 211J566)

ADJUSTING FEED REVERSING MECHANISM 211U157 and 211U166

Adjust stitch length to .5 stitches per inch, on the 211U166 machine, and to 6 stitches per inch on the 211U157 machine. Loosen screw A and adjust crank shown in Fig. 37 so that the above stitch length can be obtained.

When you depress the reversing lever, the eccentric head of the bearing pin B should rest against the bearing block. Loosen set screws C and turn bearing pin B until the stitch length is the same in reverse feed as in forward feed. Tighten all screws.

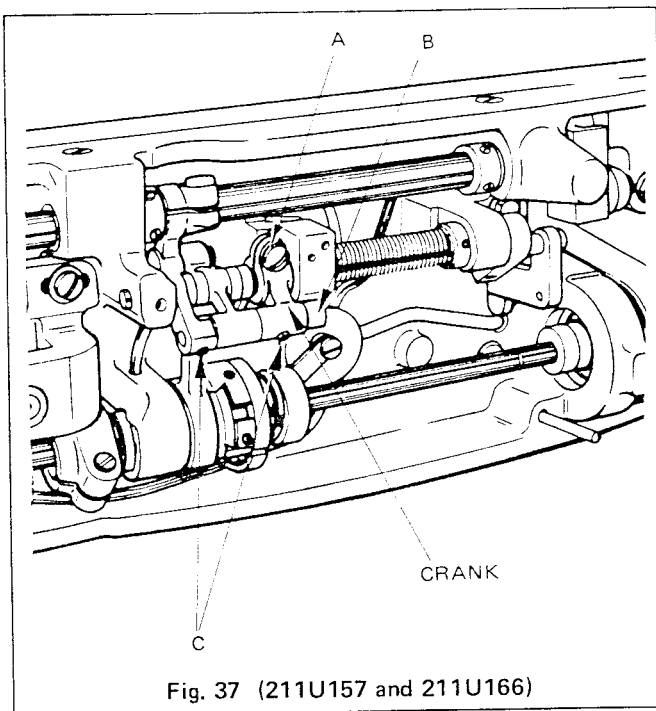


Fig. 37 (211U157 and 211U166)

211U566 Only

The maximum forward stitch length of approximately 8.4 mm is adjusted with the adjusting screw B, Fig. 38.

In reverse feed, the maximum stitch length is limited to approximately 5 mm with the feed reversing shaft crank hinge stud stop A.

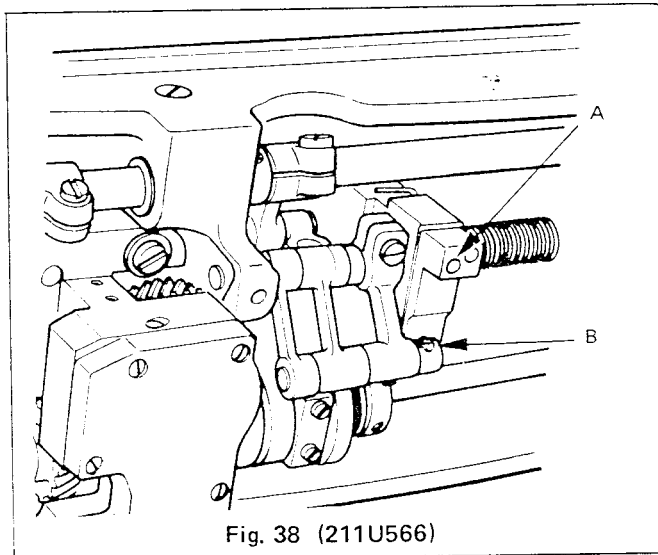


Fig. 38 (211U566)

ADJUSTMENT OF SEWING HOOK HEIGHT

When lower timing mark on needle bar is just visible at lower end of needle bar frame on upward stroke of needle, the hook should pass about .079 inch (2.0 mm) above upper edge of needle eye as shown in Fig. 39.

The clearance between bobbin case stop finger and throat plate should be .032 inch (0.8 mm), as shown in Fig. 40.

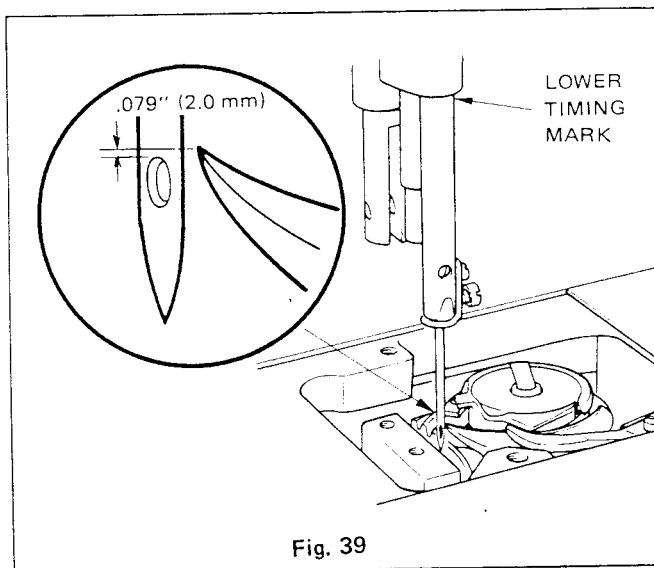


Fig. 39

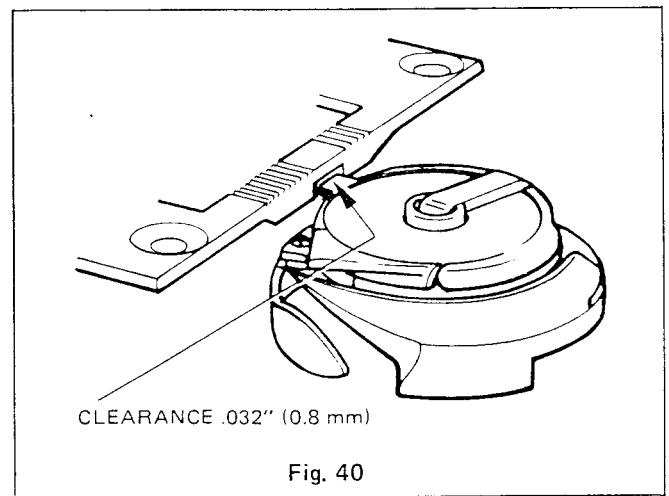


Fig. 40

TO ADJUST HEIGHT OF SEWING HOOK 211U157

To adjust height of sewing hook, first fasten throat plate to bed of machine and place bobbin case stop finger in sewing position. Pass a .032 inch (0.8 mm) shim between bobbin case stop finger and throat plate. If shim is too tight or too loose, turn machine pulley over toward you so that the hook hub socket screws shown in Fig. 41 are accessible with a socket wrench. Loosen both screws and remove cloth washer from bobbin case. Turn hook until one of the holes is in line with hook height adjusting screw. To raise hook, turn hook height adjusting screw downward. To lower hook, turn hook height adjusting screw up. Re-tighten socket screws and turn hook height adjusting screw again just enough to leave a light tension. Check sewing hook timing.

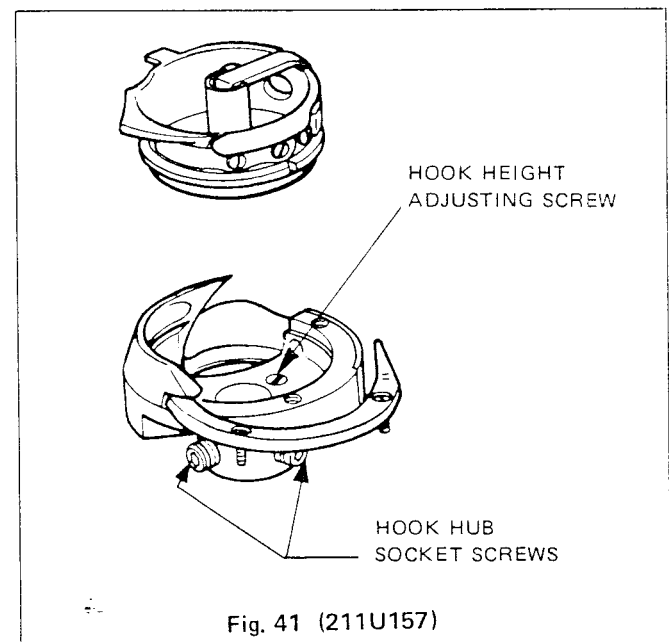


Fig. 41 (211U157)

TO ADJUST HEIGHT OF SEWING HOOK 211U165 and 211U166

On the 211U165 and 211U166 machines, the height of sewing hook is set by inserting the hook shaft into the hook shaft bushing until its step portion is in contact with the end face of the bushing.

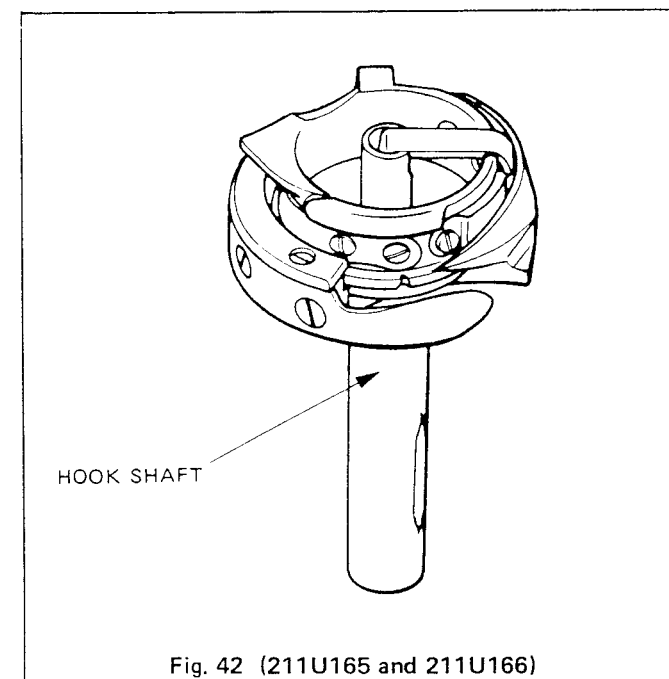


Fig. 42 (211U165 and 211U166)

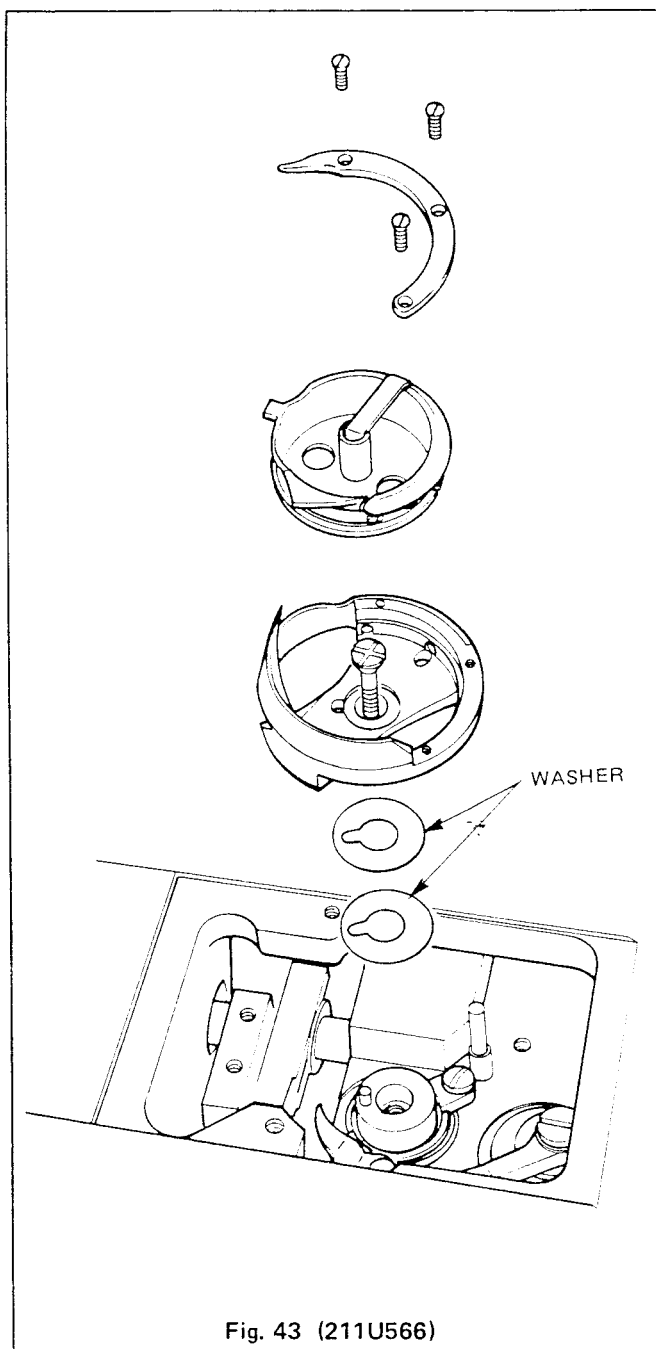


Fig. 43 (211U566)

TO ADJUST HEIGHT OF SEWING HOOK 211U566

1. Loosen and remove hook as instructed on page 21.
2. Adjust hook height by adding or removing washers. Maximum number of washers to be used should not exceed 4.
3. Replace and fasten hook as instructed on page 21.
4. Check hook height in compliance with Fig. 40 on page 17.

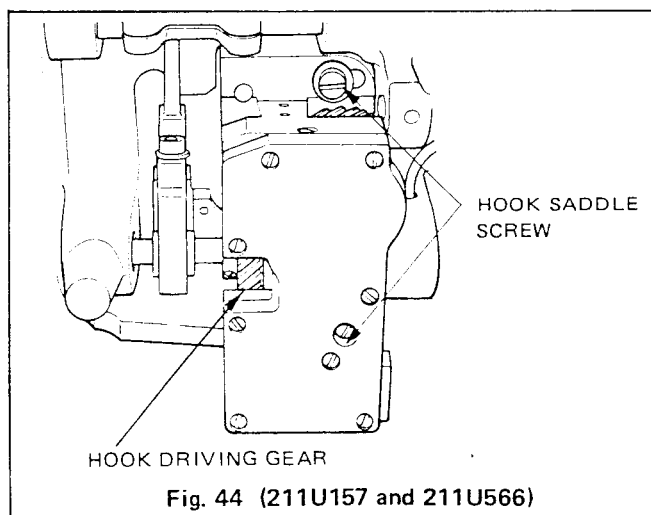


Fig. 44 (211U157 and 211U566)

ADJUSTMENT OF DISTANCE BETWEEN SEWING HOOK AND NEEDLE 211U157 and 211U566

To prevent hook point from dividing strands of thread, it should pass as near to the needle as possible without hitting it.

Turn machine pulley over toward you until sewing hook point is in the position nearest to needle. Tip machine and loosen hook saddle screws shown in Fig. 44. Adjust hook saddle until hook point is as close to needle as possible without hitting it. Retighten hook saddle screws. BE SURE HOOK DRIVING GEAR SHOWN IN FIG. 44 IS CORRECTLY SET WITH RELATION TO FACE OF HOOK SADDLE. USE .008 INCH (0.2 mm) SHIM.

ADJUSTMENT OF DISTANCE BETWEEN SEWING HOOK AND NEEDLE 211U165 and 211U166

To prevent hook point from dividing strands of thread, it should pass as near to the needle as possible without hitting it.

Turn machine pulley over toward you until sewing hook point is in the position nearest to needle. Tip machine and loosen hook saddle screws shown in Fig. 45. Adjust hook saddle until hook point is as close to needle as possible without hitting it. Retighten hook saddle screws.

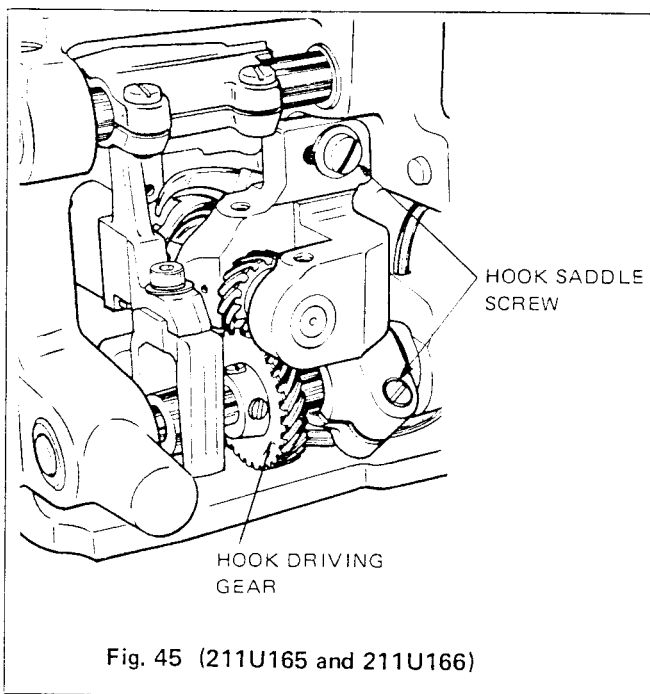


Fig. 45 (211U165 and 211U166)

NEEDLE GUARD

The function of the needle guard shown in Fig. 46 is to prevent hook point from striking needle, if needle is deflected after penetrating material. The needle guard can be bent with a pair of pliers, if necessary, but care should be taken to prevent guard from interfering with normal path of needle.

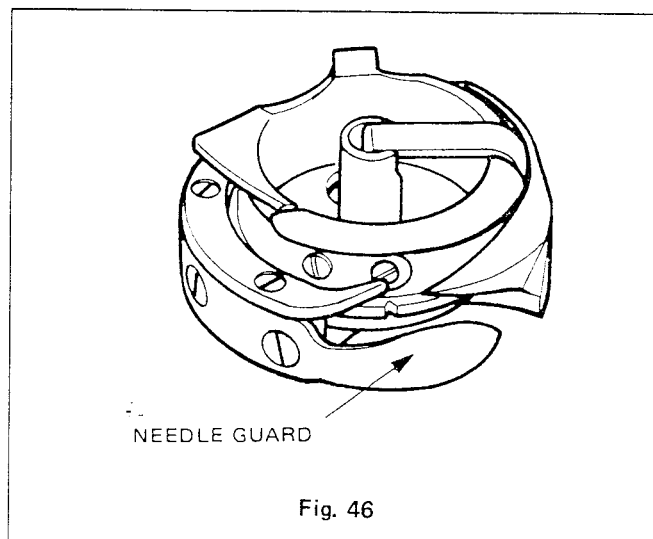


Fig. 46

TIMING THE SEWING HOOK 211U157 and 211U566

Regulate stitch length so that there is no feeding motion.

Remove throat plate and turn machine pulley over toward you until lower timing mark on needle bar is just visible at lower edge of needle bar frame on upward stroke of needle. With needle in this position, sewing hook is correctly timed if hook point is at vertical centerline of needle blade.

If sewing hook is not correctly timed, loosen socket screws shown in Fig. 47 and turn hook to proper timing position specified above.

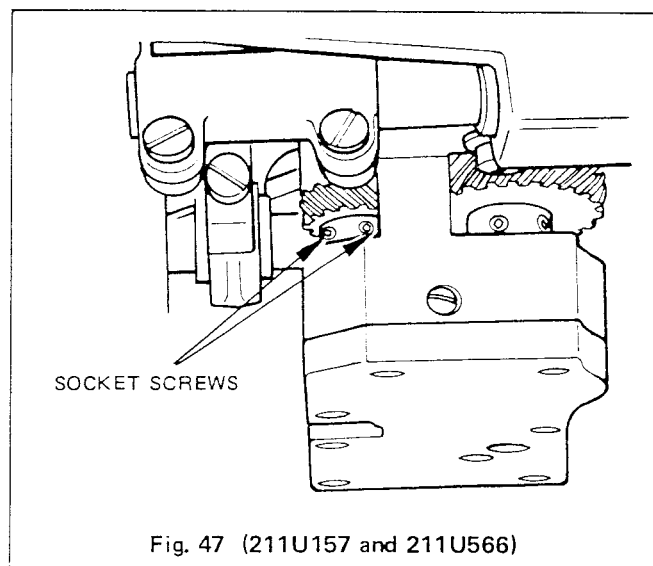
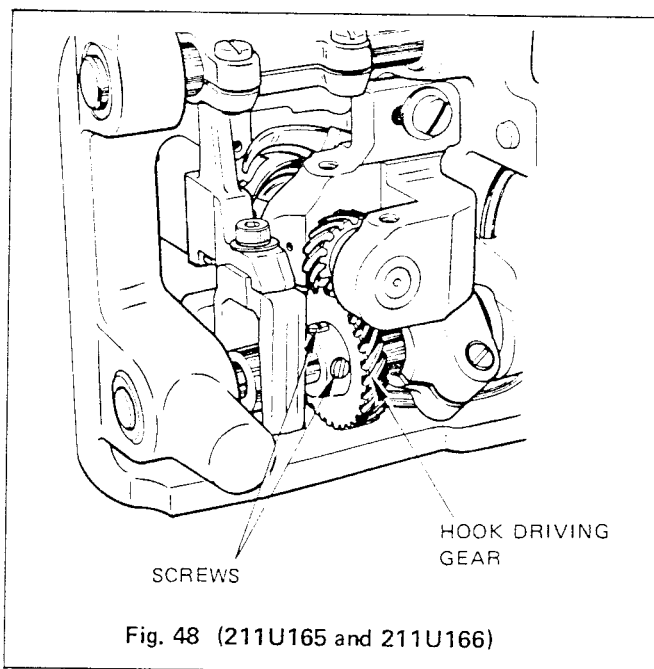


Fig. 47 (211U157 and 211U566)

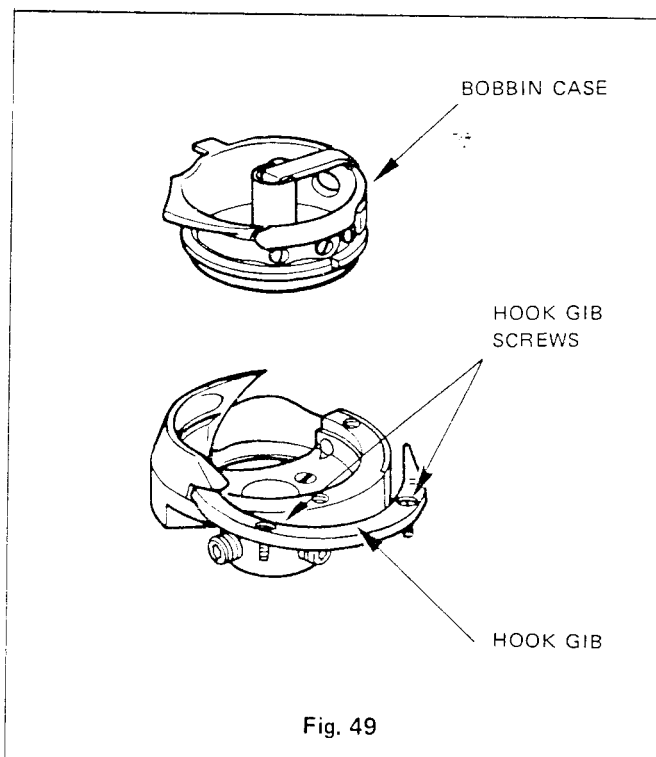


TIMING THE SEWING HOOK 211U165 and 211U166

Regulate stitch length so that there is no feeding motion.

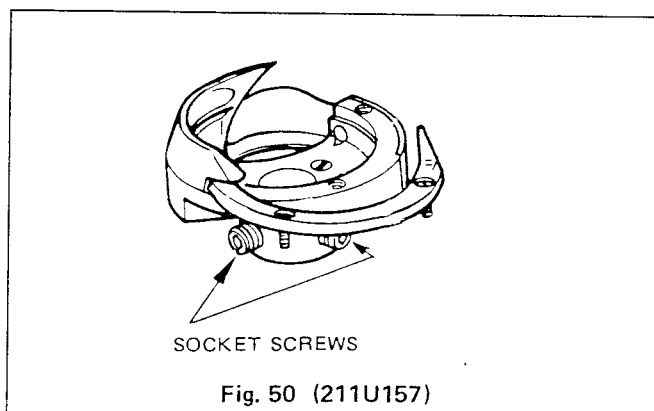
Remove throat plate and turn machine pulley over toward you until lower timing mark on needle bar is just visible at lower edge of needle bar frame on upward stroke of needle. With needle in this position, sewing hook is correctly timed if hook point is at vertical centerline of needle blade.

If sewing hook is not correctly timed, loosen screws in the hub of hook driving gear and move gear to right to advance the hook timing, and to the left to retard the hook timing. (see Fig. 48)



REMOVING BOBBIN CASE FROM SEWING HOOK

Remove hook gib screws, indicated in Fig. 49, from sewing hook. Lift off hook gib and remove bobbin case.



REMOVING SEWING HOOK FROM MACHINE 211U157

Remove presser foot, throat plate and feed dog. Loosen hook hub socket screws shown in Fig. 50. Lift hook off end of shaft.

REMOVING SEWING HOOK FROM MACHINE 211U165 and 211U166

Remove presser foot, throat plate, feed dog and bobbin case opener. Loosen screws in the hub of hook driving gear and lift out sewing hook from the hook saddle. (see Fig. 51)

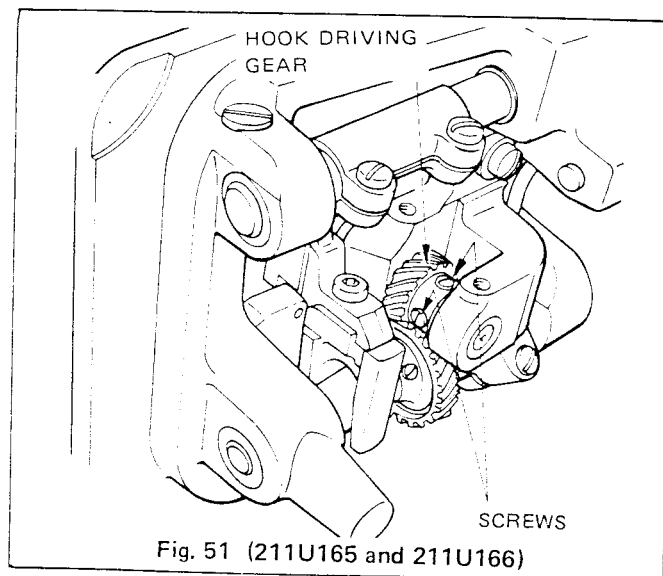


Fig. 51 (211U165 and 211U166)

REMOVING AND REPLACING SEWING HOOK 211U566

Removal

1. Remove presser foot, throat plate and feed dog.
2. Turn out hook gib screws, and remove hook gib.
3. Remove bobbin case from hook.
4. Turn out hook screw.
5. Remove hook from hook shaft.

Replacement

1. Check proper seat of washer on the hook shaft.
2. Place hook onto the hook shaft so that the pin is seated in the appropriate hole of the hook.
3. Tighten hook screw.
4. Place bobbin case into hook.
5. Replace hook gib and fasten with screws.
6. Replace feed dog, throat plate and presser foot.

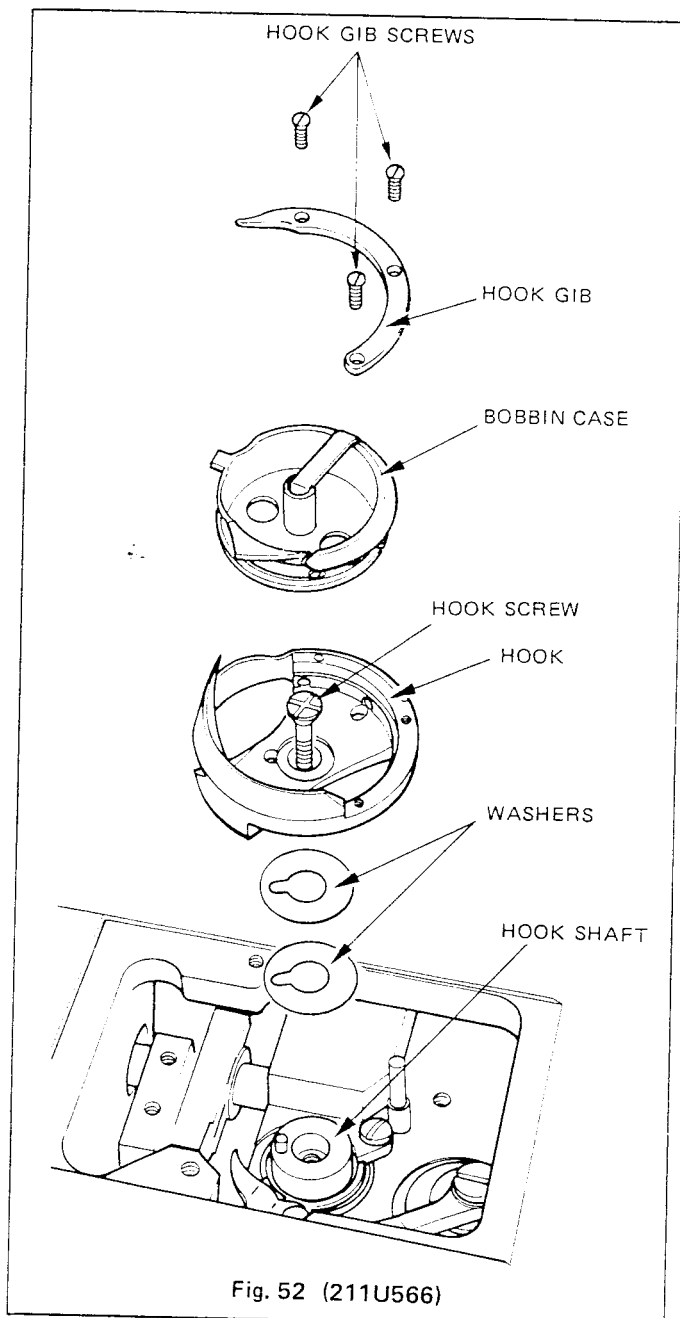


Fig. 52 (211U566)

REMOVING HOOK SHAFT 211U157 and 211U566

To remove hook shaft, first remove ball bearing retaining cap screws directly under hook shown in Fig. 53. Tip machine back and loosen hook shaft gear hub socket screws shown in Fig. 54. Lift out shaft from top end. If shaft does not lift out easily, loosen screws in cover plate of hook saddle just enough, at first, to permit the oil to drain out. Then remove cover plate completely, being careful not to damage the gasket. Tap the end of hook shaft.

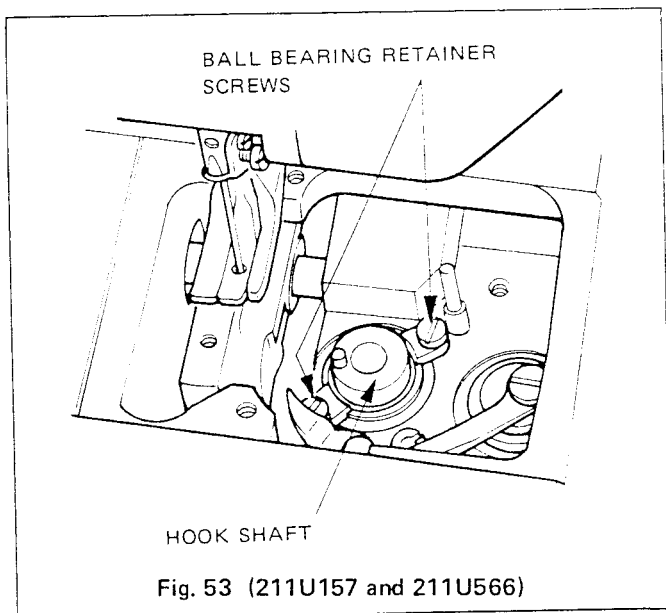


Fig. 53 (211U157 and 211U566)

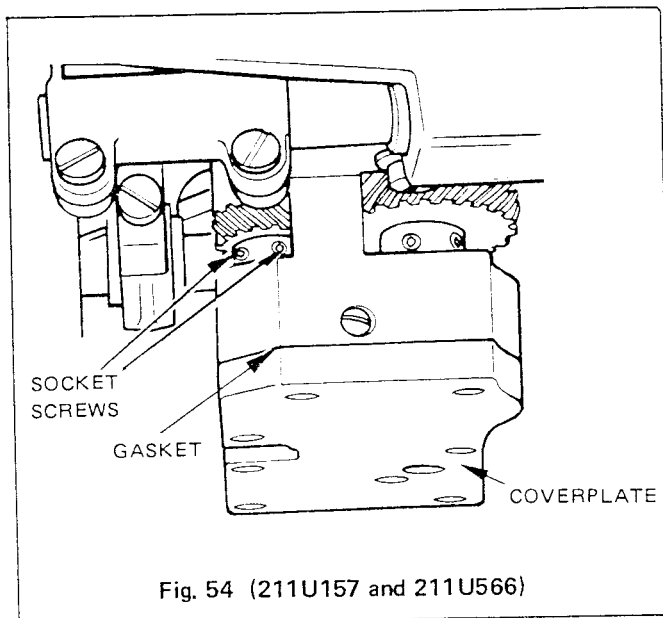


Fig. 54 (211U157 and 211U566)

ADJUSTING BOBBIN CASE OPENER 211U157 and 211U566

The bobbin case opener, shown in Fig. 55, should be set so that it turns the bobbin case enough to make a sufficient opening for the free passage of thread between throat plate and bobbin case.

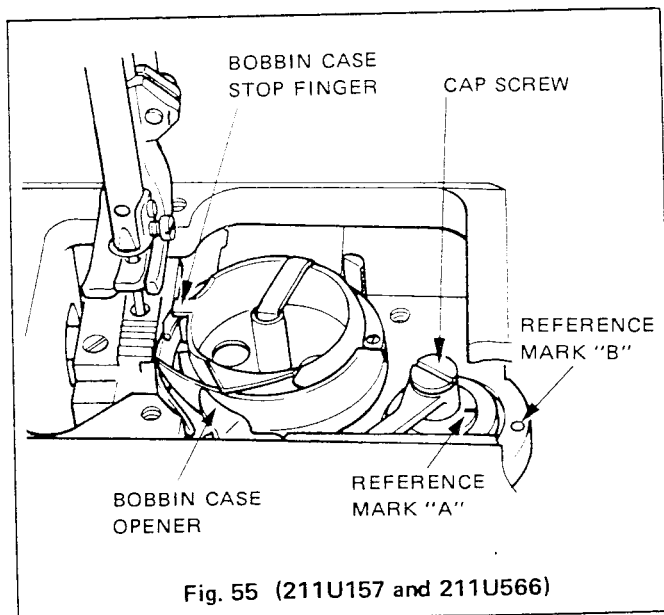


Fig. 55 (211U157 and 211U566)

TIMING BOBBIN CASE OPENER 211U157 and 211U566

Turn machine pulley over toward you until lower timing mark on needle bar is even with edge of needle bar frame on upward stroke of needle. When needle bar is in this position, reference mark A should line up with reference mark B on hook saddle, as indicated in Fig. 55. If opener shaft is out of time, tip machine back and loosen socket screws shown in Fig. 56. Return machine to upright position and turn opener driving shaft with screw drive in cap screw shown in Fig. 55. Tighten socket screws in opener driving gear hub.

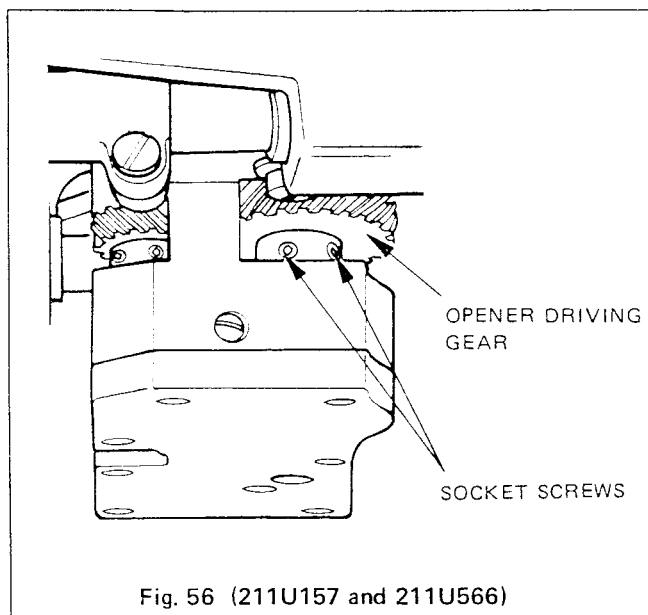


Fig. 56 (211U157 and 211U566)

ADJUSTING BOBBIN CASE OPENER 211U165 and 211U166

The bobbin case opener, shown in Fig. 57, should be set so that it turns the bobbin case enough to make a sufficient opening for the free passage of thread between throat plate and bobbin case.

Timing of the bobbin case opener is not necessary since bobbin case opener is driven by the eccentric cam on the hook shaft.

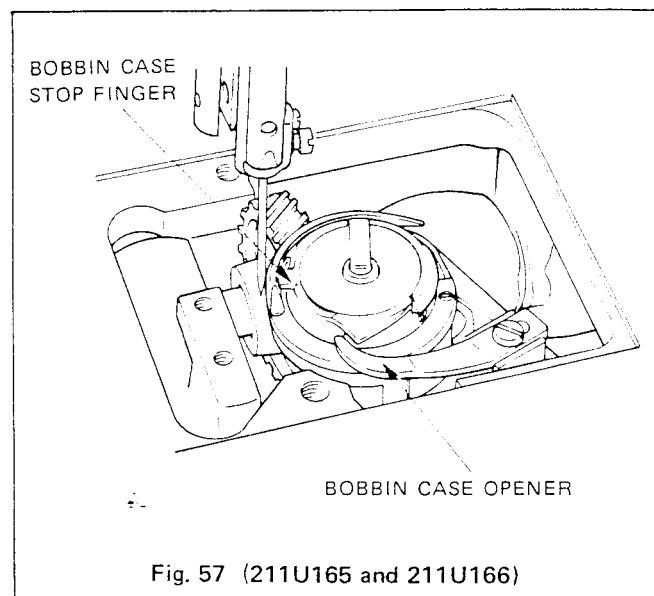


Fig. 57 (211U165 and 211U166)

FEED DOG ADJUSTMENT

Before adjusting feed dog, regulate stitch length for longest stitch. If feed dog is correctly adjusted, all teeth should rise evenly and completely above throat plate as shown in Fig. 58.

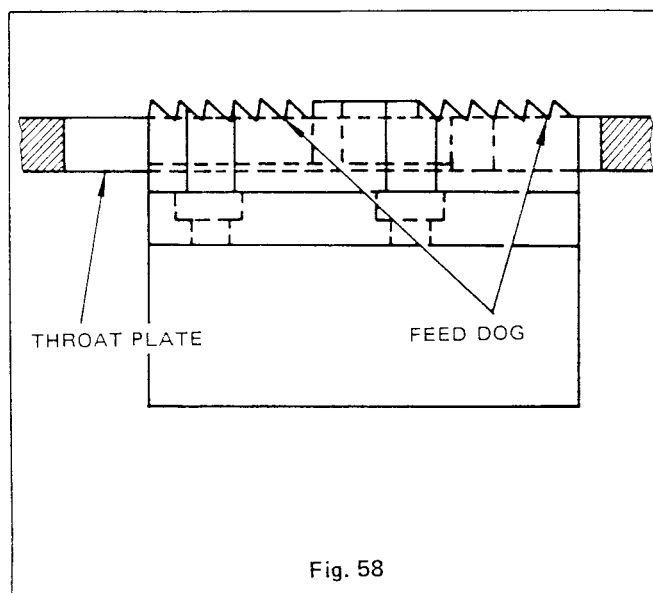


Fig. 58

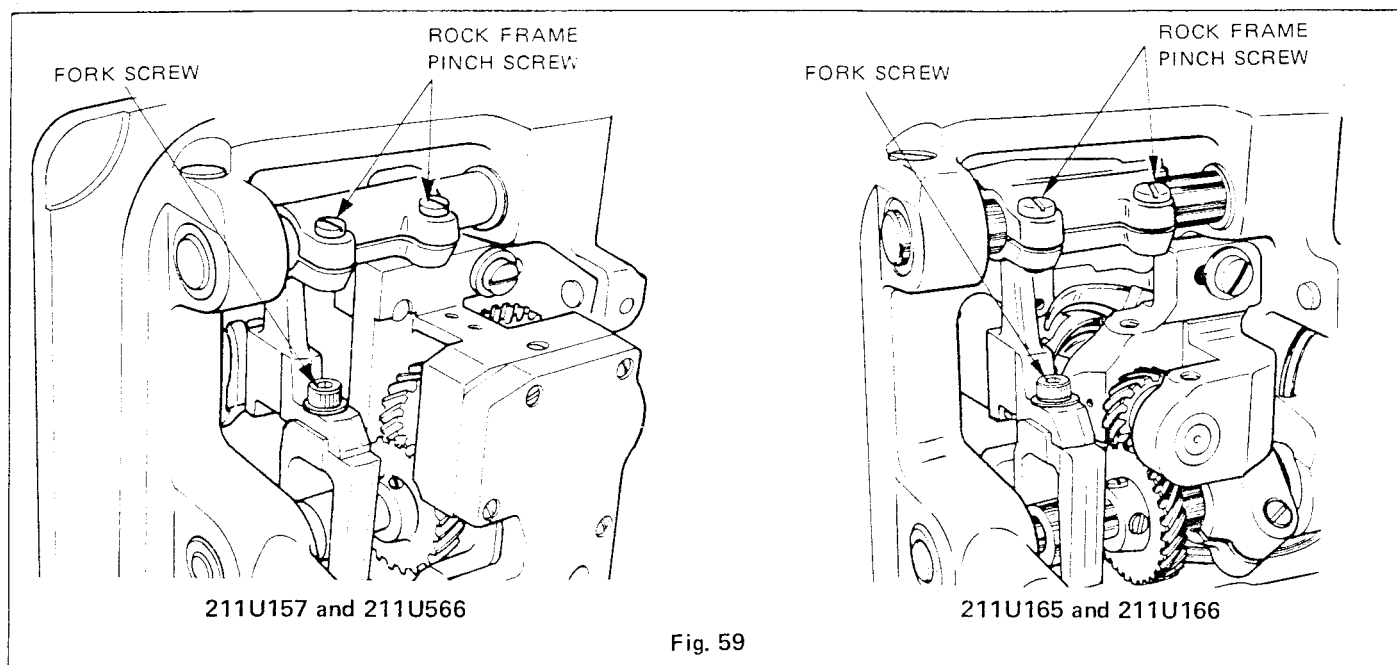


Fig. 59

If adjustment is required, first remove throat plate, then tip machine back and turn machine pulley over toward you until feed dog is at its highest position. Loosen fork screw shown in Fig. 59 and raise or lower feed dog to correct position. Re-tighten fork screw.

When adjusting feed dog, make certain it does not strike sewing hook.

Feed dog should be set so that when needle is at lowest position of cycle, it will be slightly in front of center point of needle hole in feed dog. If needle is not correctly located in needle hole, tip machine back to loosen pinch screws shown in Fig. 59 and adjust feed dog to correct position. Prior to above adjustment, check needle bar to presser bar setting.

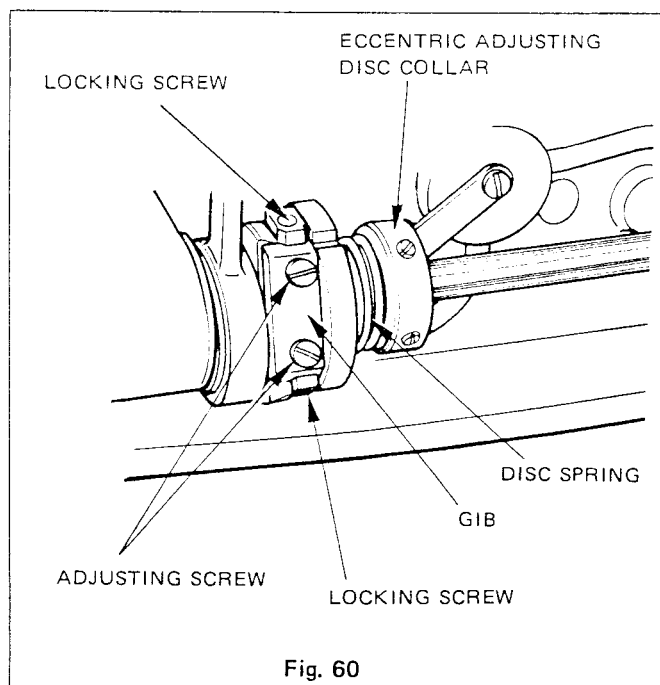
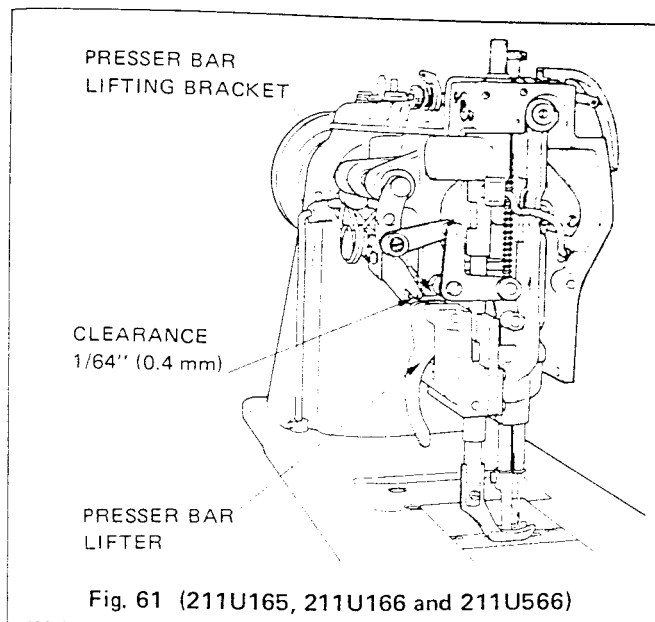


Fig. 60

FEED ECCENTRIC ADJUSTMENT

The feed eccentric is provided with a gib which can be adjusted to take up unnecessary play between feed eccentric and eccentric body. To adjust gib, first loosen two locking screws beside gib and turn in two adjusting screws in gib until all play is eliminated and eccentric fits snugly into slot of eccentric body. Securely tighten two locking screws.

The feed driving eccentric adjusting disc spring provides pressure against feed eccentric cam to prevent it from moving out of position while the machine is operating. The disc spring collar may be moved to right or left to adjust spring pressure. Normally, collar is set flush with hub of eccentric body.



ADJUSTMENT OF THE PRESSER BAR HEIGHT

211U165, 211U166 and 211U566

The presser bar lifting bracket which is a part of alternating presser mechanism should be set so that there is 1/64 inch (0.4 mm) clearance between presser bar lifting bracket and presser bar lifter when both presser feet are lowered on the throat plate, (Fig. 61).

To adjust, loosen presser bar lifting bracket pinch screw and move lifting bracket up or down, as required, then firmly tighten pinch screw, (Fig. 62).

ADJUSTMENT OF THE LIFTING ECCENTRIC AND THE LIFT OF THE ALTERNATING PRESSER FEET

211U165, 211U166 and 211U566

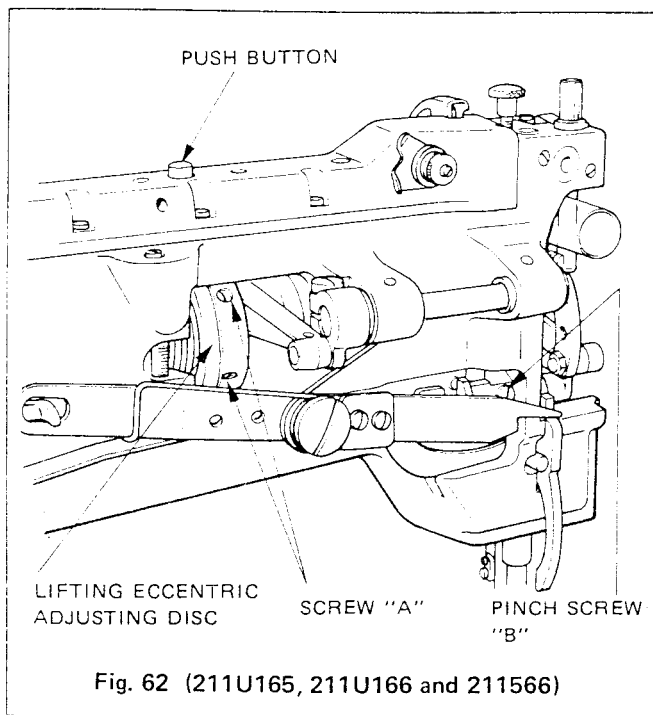
The lift of the alternating presser feet is governed by the thickness of the material sewn, and should be no higher than necessary.

Normally, the lift is the same for both presser feet and is infinitely variable within the machine's capability by means of the adjustable lifting eccentric.

To adjust the lift of the presser feet, press the button on the arm top cover to hold the lifting eccentric adjusting disc, Fig. 62, from turning. To increase the lift, turn machine pulley toward you, to decrease, turn machine pulley away from you.

To time the lift of the alternating presser feet, loosen set screws, Fig. 62, in the lifting eccentric and adjust the eccentric on the arm shaft. For normal work, the lifting eccentric is regulated with the presser feet at the same height, so that the point of the needle enters the throat plate when the feed dog touches the movable presser foot while both are even with the upper edge of the throat plate.

Securely tighten set screws.



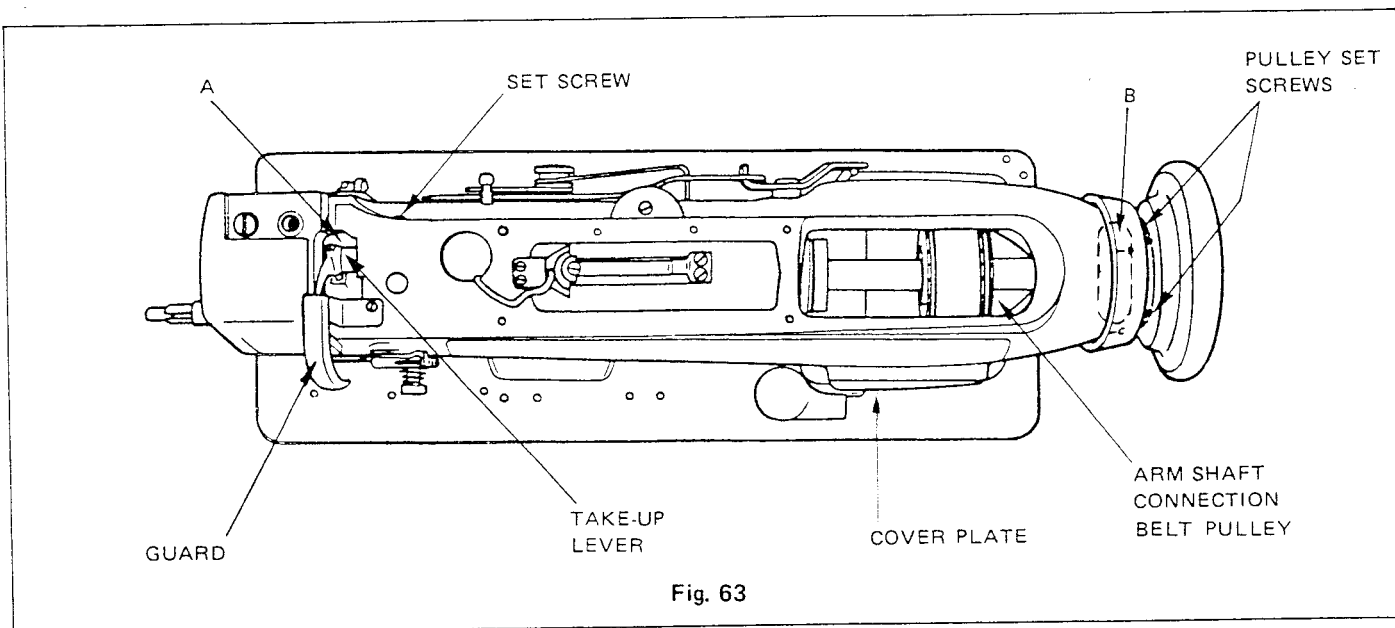


Fig. 63

REMOVAL OF TAKE-UP LEVER 211U157

Remove arm top cover and face plate. Loosen take-up lever hinge stud set screw shown in Fig. 63. Remove take-up lever hinge stud and take-up guard. Lift take-up lever out through slot A in top of arm shown in Fig. 63.

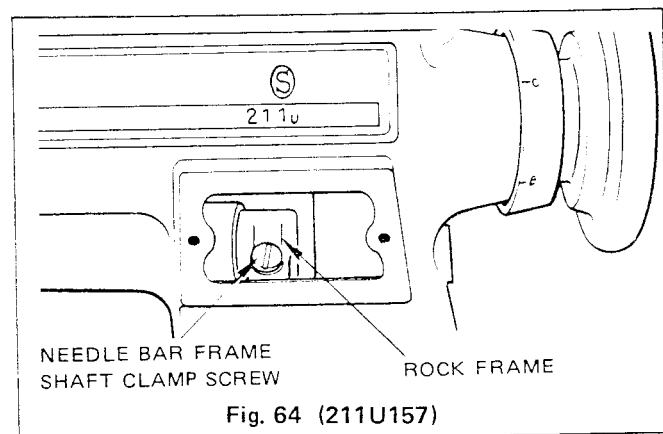


Fig. 64 (211U157)

REMOVAL OF NEEDLE BAR ROCK FRAME 211U157

Remove face plate and arm top cover. Loosen take-up lever hinge stud set screw shown in Fig. 63. Extract take-up lever hinge stud, take-up guard and take-up lever. Remove cover from front of machine arm. Loosen needle bar frame shaft clamp screw shown in Fig. 64. Pull needle bar rock frame with its shaft from machine.

REPLACEMENT OF ARM SHAFT CONNECTION BELT

Remove needle, to avoid damage, before proceeding to replace belt. Tip machine and slide belt off lower pulley shown in Fig. 65. Loosen two set screws in machine pulley and remove pulley and ball bearing. Lift belt up and draw it around arm shaft through space at B indicated in Fig. 63.

Replace belt through ball bearing space of B. After placing belt over arm shaft connection belt pulley, replace machine pulley with ball bearing. To remove all end play from shaft, tighten set screws in machine pulley and (holding needle bar crank in place) tap machine pulley into position with palm of hand. Tighten machine pulley set screws.

Turn machine pulley over toward you until thread take-up lever is at its highest position. Then turn hook driving shaft until the setting mark A on safety clutch is in line with setting mark B cut into machine bed as shown in Fig. 65. With both arm shaft and hook driving shaft in position, slip belt over lower pulley. This procedure should correctly time sewing hook with needle. Check timing as indicated on page 19 or page 20.

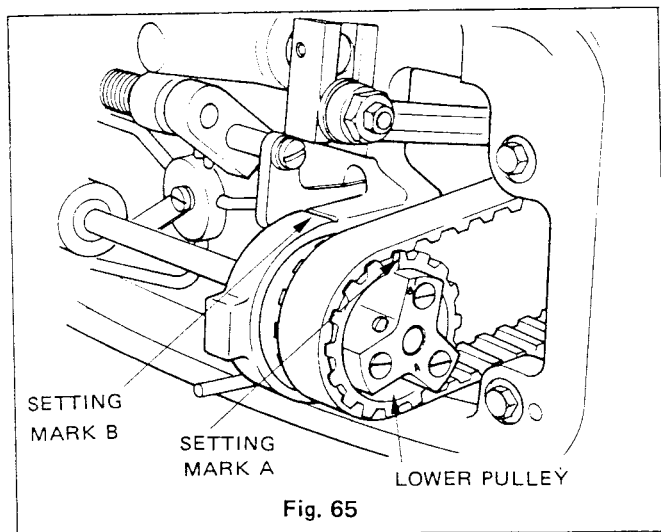


Fig. 65

INFORMATION FOR REFERENCE PURPOSE
SKETCH OF SEWING MACHINE TABLE

Unit mm

