6542

# SINGER

# Service Manual

## 331K1 and 331K4


*Sewing Equipment For Industry*

THE SINGER COMPANY

# USE SINGER** OILS and LUBRICANTS

*They insure freedom from lubricating trouble and give longer life to sewing equipment*

*The following are the correct lubricants for this machine:*

TYPE B — MANUFACTURING MACHINE OIL, HEAVY GRADE

*When an oil is desired which will produce a minimum of stain on fabrics, even after a long period of storage, use:*

TYPE D — MANUFACTURING MACHINE OIL, HEAVY GRADE

## OTHER SINGER** LUBRICANTS

TYPE E — THREAD LUBRICANT

For lubricating the needle thread of sewing machines for stitching fabrics or leather where a thread lubricant is required.

TYPE F — MOTOR OIL

For oil lubricated motors and plain bearings in power tables and transmitters.

NOTE: All of the above oils are available in 1 quart, 1 gallon and 5 gallon cans.

GEAR LUBRICANT

This specially prepared grease is recommended for gear lubrication on manufacturing sewing machines.

BALL BEARING LUBRICANT

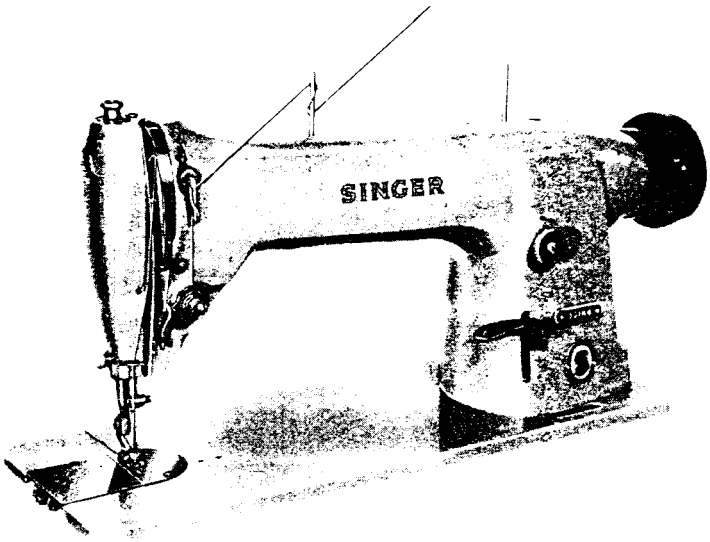
This pure grease is specially designed for the lubrication of ball bearings and ball thrust bearings of motors and electric transmitters, ball bearing hangers of power tables, etc. Furnished in 1 lb. and 4 lb. tins.

Form K6542
(365)

# SINGER*

# SERVICE MANUAL

## 331K1 and 331K4




THE SINGER COMPANY



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Printed in Great Britain

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## DESCRIPTION

**Machines 331K1** and **331K4** produce top quality, single-needle, straight-line lock stitching in suits, shirts, skirts and other clothing.

### MACHINE 331K1:

Stitch Type #**301.**

Central bobbin.

Short beak, oscillating shuttle on horizontal axis.

Link take-up.

Thread take-up lever guard.

Drop feed.

Hinged presser foot **161066.**

Feed dog **149603.**

Throat plate **26606.**

Length of stitch controlled by regulator thumb screw on front of machine arm.

Maximum stitch length—**5-1/3** to the inch.

Front, intermediate and rear plain bearings.

Clamp type needle bar.

Tapped hole and seat in rear of arm provided for mounting light fixture independently of presser bar lifting lever hinge screw.

Needle bar stroke is **1.472** inches.

Clearance under presser foot is **5/16** inch.

Machine dimensions: Bed length **18-3/4** inches, width **7** inches.

Belt guard **174112** available on order.

Knee lifter **139625** regularly supplied.

### MACHINE 331K4:

Similar to **Machine 331K1,** with the following exceptions:

Spring-biased, quick reversible feed mechanism permits operator to feed work backward or forward at will.

Solid presser foot **12144.**

Feed dog **149304.** Throat plate **12414.**

## INSTALLATION

Before placing the machine in its cut-out on table, see that the four cushioning pads are at the four corners of the cut-out. Place the machine on these pads.

## SPEED

The maximum speed for these machines is **2200** stitches per minute, according to the material sewn and the type of work being done.

It is advisable to operate these machines at a more moderate speed the first few days, after which they can be operated at maximum speed.

**Reduce speed** of machine when sewing closely woven fabrics or treated materials.

## MACHINE PULLEY

Machine pulley **139724** (solid discs, balanced) has an outside diameter of belt groove of **2.90** inches for **3/8** inch V-belt. Effective diameter for **5/16** inch round leather belt is **2-5/16** inches.

When in operation, the top of the machine pulley must always turn over toward the operator.

## LUBRICATION AND CLEANING

Use **SINGER*** **OIL, "TYPE B"** or **"TYPE D"**. Use **"TYPE D" OIL** when an oil is desired which will produce minimum stain on fabrics.

A machine in **contin** use should be oiled frequently. Frequency is ... ndent upon the speed at which the machine is op rated and the type of work being done. Basically the machine needs oiling at least twice each working day.

Before starting the machine, at the beginning of the day and again after the midday recess, apply a few drops of oil at each of the oiling points on the machine. Arrows indicate oiling points in **Figs. 2** through **5**.

Never attempt to oil shuttle race (See **Fig. 5**) through holes in throat plate.

### BOBBIN WINDER LUBRICATION

Oil bobbin winder occasionally by applying a few drops of oil to oil wick in bobbin winder frame, as instructed in **Fig. 11, page 7**.

### CLEANING

Clean out all lint and abrasive matter from around the shuttle and between the feed rows on the underside of the throat plate.

Close all covers after oiling and cleaning. Wipe off excess oil from surfaces of machine that may come in contact with material.

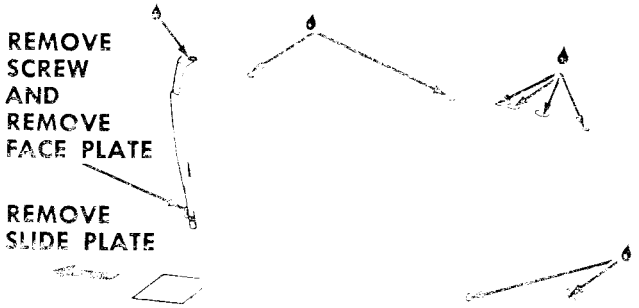



Fig. 2. Oiling Points—Front View

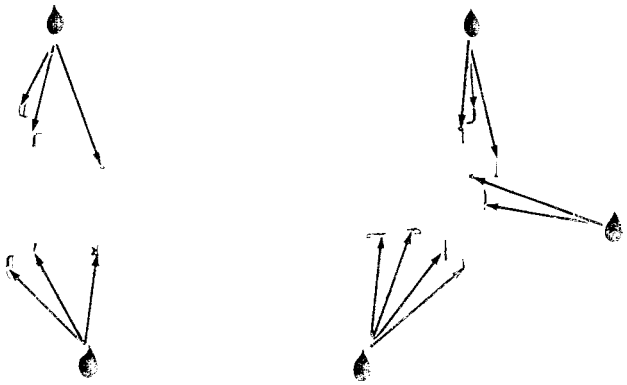


Fig. 4. Oiling beneath Machine Bed

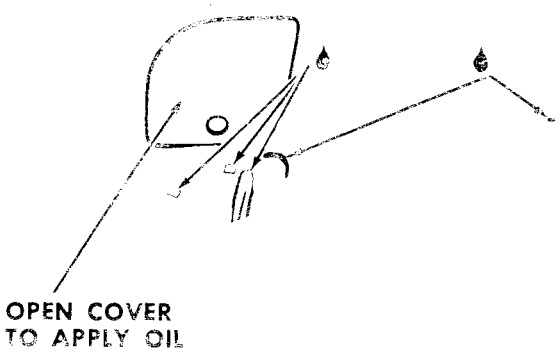



Fig. 3. Oiling Points—Rear View

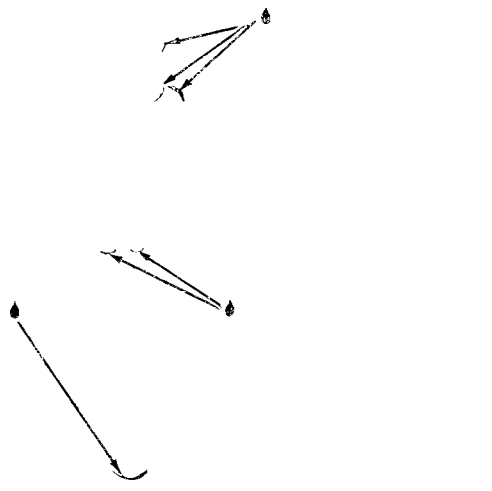


Fig. 5. Oiling Points behind Face Plate and in Shuttle Race

## THREAD

**On Machines of Class 331K,** use only left twist thread in the needle. Either right or left twist thread can be used in the bobbin.

To determine the thread twist, hold the thread as shown in **Fig. 6.** Then twirl the thread over toward you. If the strands of the thread wind tighter, the thread is left twist, if the strands unwind or separate, the thread is right twist. Rough or uneven thread, or thread which passes with difficulty through the eye of the needle, will interfere with the successful use of the machine.

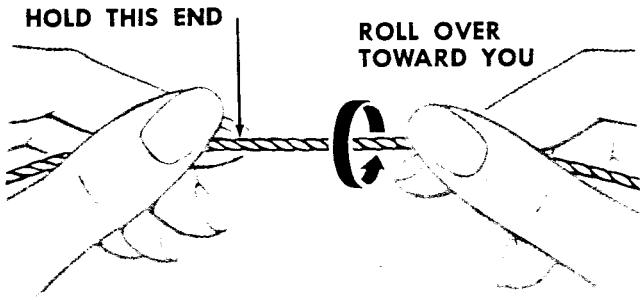



**Fig. 6. How to Determine the Twist**

## NEEDLES

The needle you select will have a very direct effect on the quality, strength and appearance of the stitch produced by the machine.

In selecting a needle size . . . the eye must be large enough to allow the thread you are using to pass through freely without binding or chafing. A simple test is to thread a short length of thread through the eye of the needle selected; hold the thread taut in a vertical position and twirl the needle about the thread. If the size is correct, the needle should slip down the thread easily.

Needles for this machine are of Catalog #**2055 (16 x 87)** in **Sizes 8 to 14, 16 to 19 and 21 to 25.**

**Orders for needles** must specify the **Quantity** required, the **Size** number, also the **Catalog** number.

For example:

**"100 Size 16, Catalog #2055 (16 x 87) Needles"**

For best results always use **SINGER** needles.

## TO SET THE NEEDLE

Turn the machine pulley over toward you until the needle bar moves to its highest point.

After loosening needle clamping screw, remove old needle and insert new needle **UP** into needle bar **AS FAR AS IT WILL GO,** as instructed in **Fig. 7.**

The single continuous groove of the needle **MUST** face away from the shuttle point (toward the left end of the machine, as shown in **Fig. 7**) with eye of needle directly in line with arm of machine.

Securely tighten needle clamping screw.

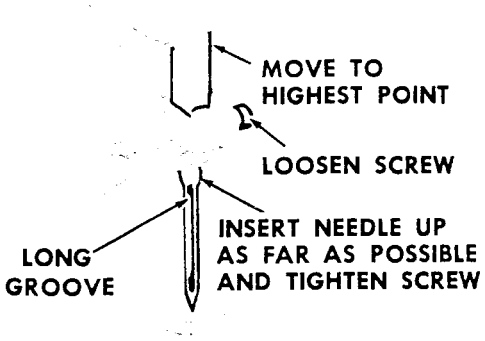



**Fig. 7. Setting the Needle**

## COMMON CAUSES OF STITCHING TROUBLES

Check needles often to make sure these defects are not present . . .

- **Wrong needle** for thread and material in use.
- **Bent needle, clogged needle eye,** or dirty needle grooves may cause skipped stitches.
- **Hook or burr on needle point** may cause picking or fraying of the material.
- **Incorrect setting** of needle.

## UPPER THREADING

**NOTE:** Thread unwinder **225258** is recommended for use with these machines.

First, turn the machine pulley over toward you until needle is at its highest point, then pass the needle thread from the unwinder through the threading points in the order shown in **Fig. 8**.

Pass the thread from left to right through needle eye.

Draw about two inches of thread through the eye of the needle with which to start sewing.

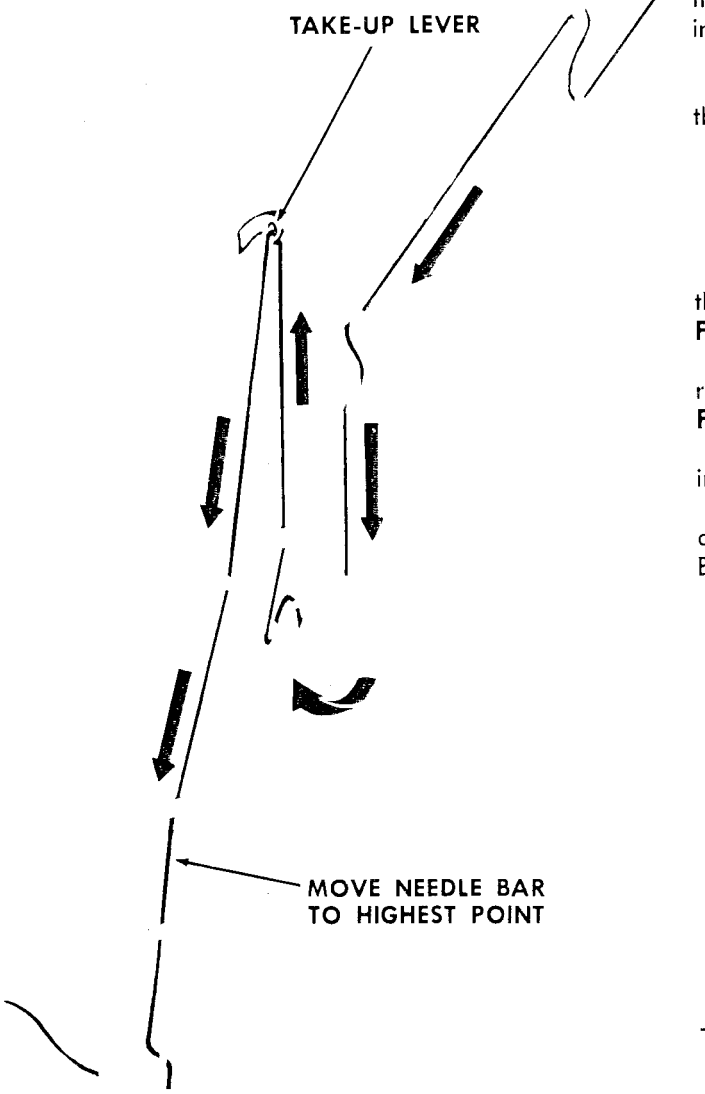



Fig. 8. Upper Threading

## TO REMOVE THE BOBBIN

Turn machine pulley over toward you until needle thread take-up lever is at highest point, as shown in **Fig. 8.**

Reach beneath bed of machine with left hand and remove bobbin from shuttle body, as instructed in **Fig. 9.**

While latch is kept open, bobbin will be retained in bobbin case.

To remove bobbin from bobbin case, release latch and turn the open end of bobbin case downward. Bobbin will drop out, as shown in **Fig. 10.**

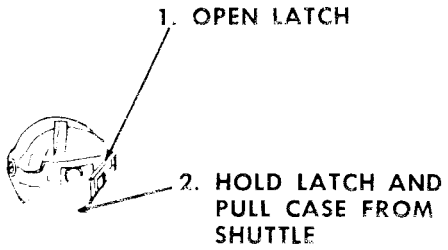



Fig. 9. Removing Bobbin Case and Bobbin from Machine

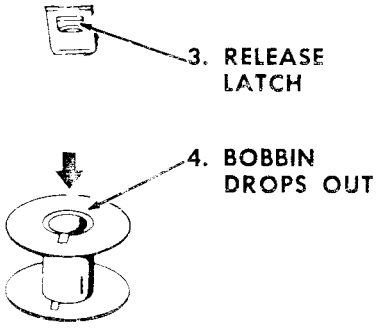



Fig. 10. Removing Bobbin from Bobbin Case

## TO WIND THE BOBBIN

(See "STOP MOTION DEVICE" for treadle machines on **page 11**)

Bobbin winder should be fastened to table with its driving pulley approximately **1/4** inch in front of the machine belt. Bobbin winder driving pulley will then make firm contact with machine belt when thumb latch is pressed down. Bobbin winder pulley will be released from contact with belt when sufficient thread has been wound upon the bobbin.

Place bobbin on spindle, pushing it on as far as it will go and pass thread through threading points, as shown in **Fig. 11.**

Wind end of thread around the bobbin a few times in the direction shown in **Fig. 11.** Press down on thumb latch, pushing driving pulley over against belt.

Start the machine.

Bobbins can be wound while the machine is stitching.

**TO AVOID SPILLAGE:** Regulate bobbin winder to stop automatically when bobbin is wound approximately **1/16** inch short of bobbin rim.

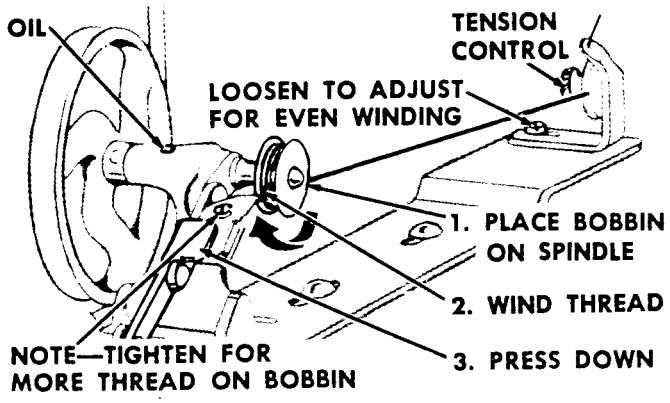



**Fig. 11. Winding the Bobbin**

## TO THREAD THE BOBBIN CASE

Hold the bobbin so that the thread will unwind in the direction shown in **Fig. 12.**

Hold the bobbin case as shown in **Fig. 12** and place the bobbin into it.

Pull the thread into the slot **1, Fig. 13** and under the tension spring **2, Fig. 13.**

Draw the thread into the delivery eye at the end of the tension spring, as shown at **3, Fig. 14.**

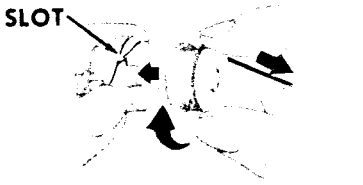



**Fig. 12. Placing Bobbin in Bobbin Case**

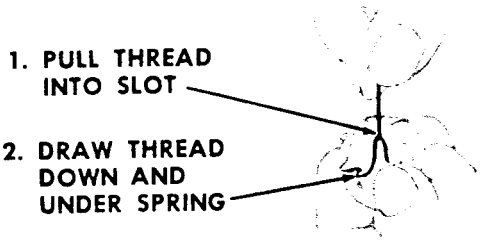



**Fig. 13. Pulling the Thread into the Slot**

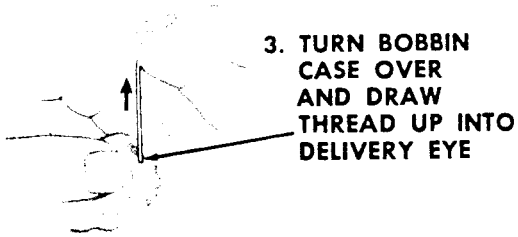



**Fig. 14. Drawing the Thread Under the Tension Spring**

## TO REPLACE THE BOBBIN CASE

After threading, take bobbin case by latch in the left hand.

Place bobbin case on centre stud of shuttle body with position finger pointing upward, in front of notch in upper plate over shuttle race, as shown in **Fig. 15.**

Release latch.

Press bobbin case back until latch catches groove near end of stud.

Allow about two inches of thread to hang free.

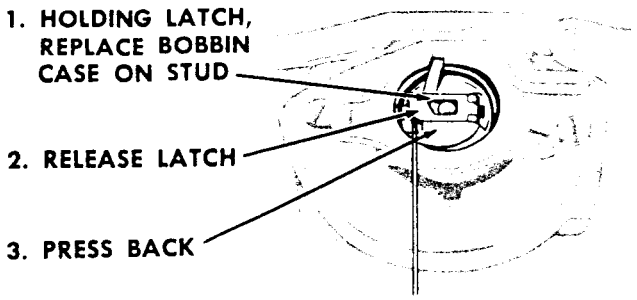



**Fig. 15. Bobbin Case Threaded and Replaced**

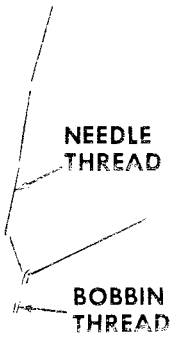



Fig. 16. Drawing Up the Bobbin Thread

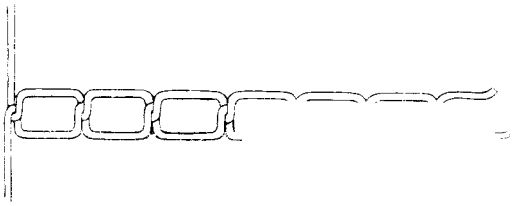


Fig. 17. Perfect Stitch

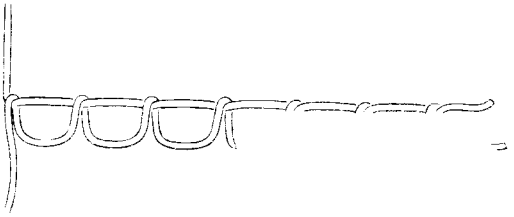


Fig. 18. Too Tight Needle Thread Tension

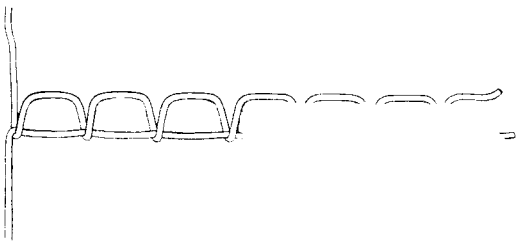


Fig. 19. Too Loose Needle Thread Tension

## TO PREPARE FOR SEWING

Hold slack end of needle thread loosely and turn machine pulley over toward you until needle moves down and up again to its highest point, catching bobbin thread.

- Draw up needle thread; bobbin thread will come up with it through hole in throat plate, as shown in **Fig. 16.**
- Lay both threads back under presser foot.
- Close the bed slide.
- **Always keep the bed slide closed** when the machine is in operation.

## TO START SEWING

- Move take-up lever to top of its stroke as shown in **Fig. 8, page 6.**
- Place material beneath the presser foot. Lower the presser foot. Start to sew, turning the machine pulley over toward you.

## TO TURN A CORNER

- Stop the machine when needle is rising but **before it is out of the material.**
- Raise the presser foot.
- Turn material for next line of stitching, using needle as a pivot.
- Lower the presser foot.
- Resume sewing.
- Avoid aiding the machine by pulling the fabric, lest you damage the needle. The machine feeds the work without assistance.

## TO REMOVE THE WORK

- Stop the machine with the take-up lever at top of its stroke.
- Raise the presser foot.
- Draw the work toward the rear until it is clear of the needle.
- Cut the threads close to the goods.
- Lay the threads back under the presser foot.

## THREAD TENSION

**For ordinary stitching,** tension on needle and bobbin threads should be **balanced with needle and bobbin threads locked** in centre of thickness of **material** as shown in **Fig. 17.**

When there is too much tension on needle thread and not enough on bobbin thread, needle thread cannot be pulled down into material, as required. Poor stitching results. **Needle thread will lie on top of material as shown** in **Fig. 18.**

When there is too much tension on bobbin thread and not enough on needle thread, you get the reverse of the condition shown in **Fig. 18.** The stitching is just as poor. The **bobbin thread** will lie on bottom of **material** as shown in **Fig. 19.**

# REGULATION

## BOBBIN THREAD TENSION:

For average sewing, tension on bobbin thread should be **very light.**

To regulate tension on bobbin thread, remove the bobbin case and turn screw in tension spring, as instructed in **Fig. 20.**

When tension on bobbin thread has been **correctly adjusted for ordinary stitching,** the required stitch can usually be obtained thereafter to suit the work in process by **varying the tension on needle thread only.**

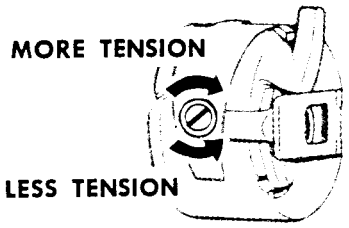



**Fig. 20. Regulating Bobbin Thread Tension**

## NEEDLE THREAD TENSION:

To avoid accumulating excessive tension on needle thread, first obtain correct tension on bobbin thread, as instructed above.

**Regulate needle thread tension only when presser foot is down** (since needle thread tension is automatically **released** when presser foot is raised).

Tension on needle thread should be just enough to set stitch correctly in material.

Having lowered presser foot, turn thumb nut at the front of tension discs either over toward right or left, as required. See instructions in **Fig. 21.**

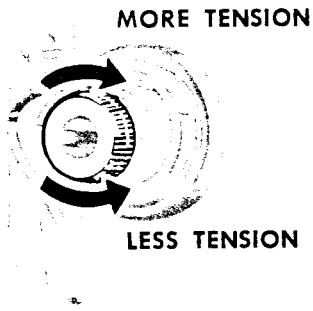



**Fig. 21. Regulating Needle Thread Tension**

## PRESSURE OF PRESSER FOOT ON THE MATERIAL:

The correct presser foot pressure helps feed the work efficiently. You can regulate the amount of pressure exerted by the presser foot on the material by means of the thumb screw, as shown in **Fig. 22.**

The pressure on the material should be as light as possible, while sufficient to insure correct feeding.

To **increase** the pressure turn the thumb screw **downward.**

To **reduce** the pressure turn this screw **upward.**

The pressure is correct when the work moves steadily and smoothly without stalling.

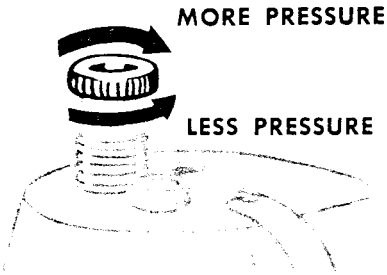



**Fig. 22. Regulating the Pressure on the Material**

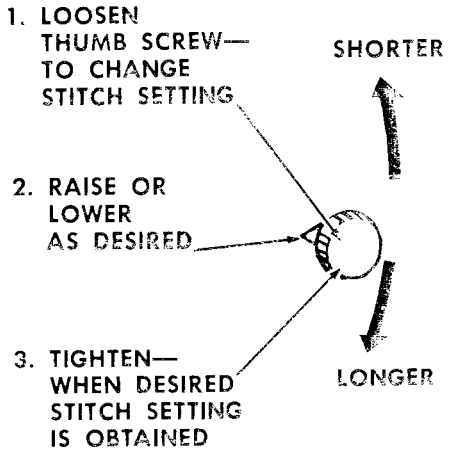



Fig. 23. Regulating Length of Stitch on Machine 331K1

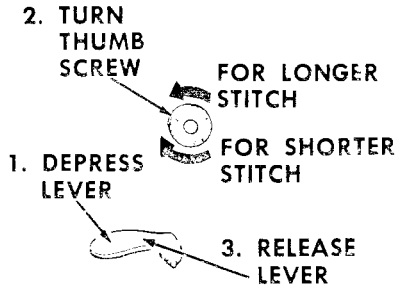



Fig. 24. Regulating Length of Stitch on Machine 331K4

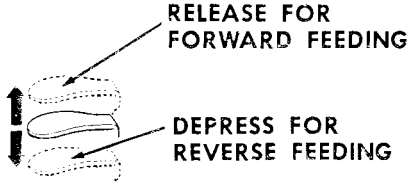



Fig. 25. Reversing the Feeding Movement on Machine 331K4

## REGULATION

### LENGTH OF STITCH, ON MACHINE 331K1:

The length of stitch is regulated by moving the pointer in the stitch indicator plate on the front of the machine as instructed in **Fig. 23.**

When pointer is set at **0** there can be **no feeding motion.**

Maximum length of stitch is **5⅓** stitches per inch.

Move pointer to desired length of stitch and firmly tighten thumb screw.

### LENGTH OF STITCH, ON MACHINE 331K4:

Depress the feed-reversing lever slightly and turn thumb screw over to the left to lengthen the stitch or over to the right to shorten the stitch, as instructed in **Fig. 24.**

Thumb screw is marked with numerals from "**0**" to "**5**".

When thumb screw is set at "**0**" feed reversing lever is fixed at central position and there can be no forward or reverse feeding.

When thumb screw is set at "**5**", machine will feed at maximum stitch length.

### REVERSE FEED, ON MACHINE 331K4:

(See instructions in **Fig. 25**)

Simply depress the feed-reversing lever as far as it will go.

Feeding in reverse continues only as long as lever is held in depressed position.

Forward feeding is resumed upon release of lever.

Direction of feed can be reversed at any point in a seam while machine is in operation, without disturbing the work. Back tacking is therefore readily accomplished and ends of seams are easily fastened.

The range of movement of feed reversing lever is limited by the setting of thumb screw as instructed above under stitch length regulation.

When lever is released it will rise to highest point permitted by setting of thumb screw and machine will stitch forward at the set stitch length.

When lever is depressed as far as permitted by the thumb screw setting, machine will feed in reverse at the set stitch length.

## THE STOP MOTION DEVICE

Machine **331K1** and **331K4** are regularly fitted with solid disc (balanced) machine pulley **139724, without stop motion device.**

When required for treadle operation a machine may be obtained, on specific order, with machine pulley **139725**, including a stop motion device, as shown in **Fig. 26.**

This device allows machine pulley to turn without turning arm shaft so that bobbins may be wound and correct treadling acquired without disturbing the stitching mechanism.

To loosen the machine pulley, hold pulley with left hand and, with right hand, turn the stop motion screw over toward you, as shown in **Fig. 26.**

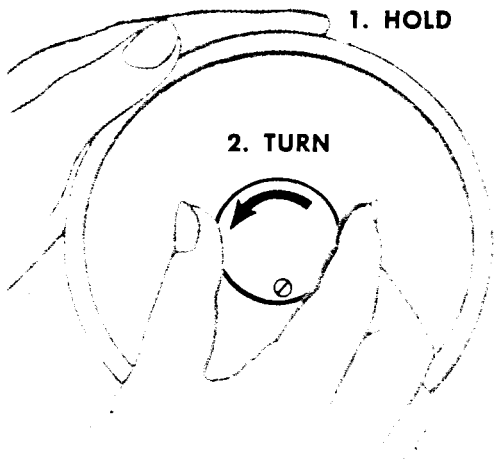



**Fig. 26. Loosening Machine Pulley**

## TREADLING

To acquire correct treadling habits, loosen the machine pulley, as instructed in **Fig. 26** and place both feet squarely but comfortable upon treadle, as instructed in **Fig. 27.**

Turn machine pulley over toward you by hand and at the same time, **allow your feet to move freely and lightly with motion of the treadle.**

Continue to do this until a regular, easy movement is acquired and you are able to **stop and restart the machine without the machine pulley turning in the wrong direction.**

Tighten the stop motion screw and practice sewing until you have become accustomed to the necessary motion of hands and feet during the actual operation.

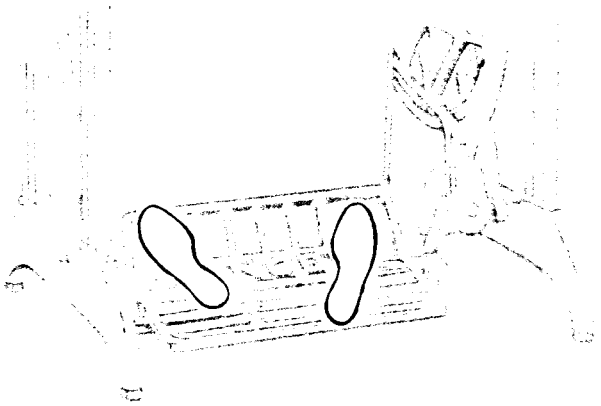


**Fig. 27. Position of Feet Upon Treadle**

**NOTE:** The instructions on the following pages are for **Service Representatives.**

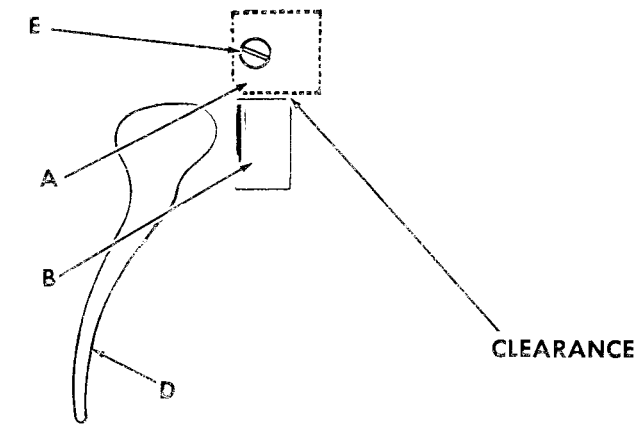
To insure correct timing and avoid unnecessary repetition, these instructions should be followed in the order given.

## SPECIFICATIONS

The following gauge distances should be of help to adjusters of these machines:

- Height of presser foot above throat plate **5/16** inch.
- Distance from throat plate seat to needle stop in needle bar (needle bar at lowest point), **1.004** inches.
- Needle bar stroke **1.472** inches
- Rise of needle bar when point of shuttle is at center of needle (loop lift), **.100** inch.

**VARIATIONS: Certain conditions of sewing may necessitate slight variations from these settings.**



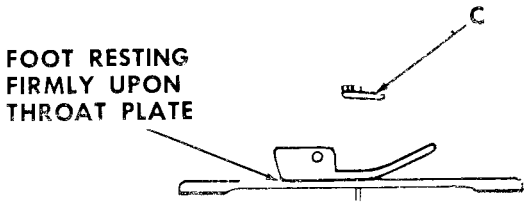




Fig. 28. Checking Height of Presser Bar

## TO SET THE PRESSER BAR AT THE CORRECT HEIGHT

### PREPARATION:

Remove face plate and slide plate.

Accumulation of lint, oil and dirt on presser foot seat on presser bar may prevent proper seating of foot. Clean this area before checking and setting the presser bar.

### CHECK:

1. When presser foot is raised with presser bar lifting lever there should be a **5/16** inch clearance between presser foot and throat plate.

2. When presser foot rests firmly upon throat plate (with feed dog below throat plate) there should still be some clearance between guide bracket **A, Fig. 28** and lifting bracket **B**, as shown in **Fig. 28.**

3. When presser foot is at its highest point and needle bar is at its lowest, top of presser foot should clear the needle thread eyelet **C, Fig. 28** at the lower end of needle bar.

### SETTING:

- Release the presser bar lifting lever **D, Fig. 28,** lowering the presser foot.
- Loosen clamping screw **E, Fig. 28.**
- Raise or lower guide bracket **A**, as required.
- Make certain presser bar is positioned correctly so that needle will locate centrally between the two toes of the presser foot.
- Securely tighten screw **E.**

**Whenever guide bracket A, Fig. 28 has been moved on presser bar, check the setting of check spring as instructed on page 14.**

## TO SET THE NEEDLE BAR AT THE CORRECT HEIGHT

### PREPARATION:

Remove face plate, slide plate and throat plate. See that needle is correctly set in needle bar, as instructed on **page 5.**

### CHECK:

When shuttle point passes centre of needle, top of needle eye should be approximately **1/16** inch below point of shuttle. See **Fig. 29.**

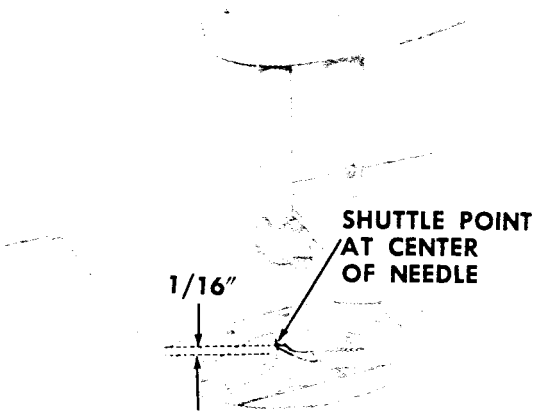



**Fig. 29. Relationship of Shuttle Point to Needle Eye**

### ALTERNATE CHECK:

The gauge distance from throat plate seat to needle stop in needle bar (at lowest point) should be **1.004** inches, as indicated in **Fig. 30.**

### SETTING:

Loosen clamping screw **F, Fig. 30.** Raise or lower needle bar, as required. Then securely tighten screw **F.**

Replace throat plate, slide plate and face plate.

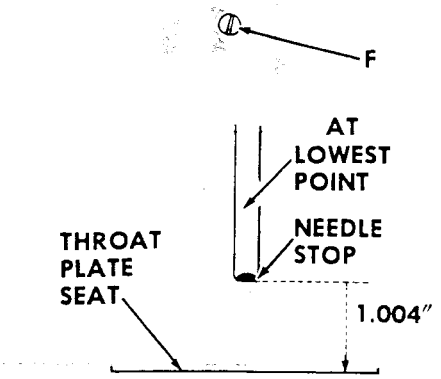



**Fig. 30. Setting Needle Bar Height**

## TO TIME THE SHUTTLE

### EXPLANATION:

Timing of shuttle is fixed at the factory for normal sewing conditions at a **1/10** inch loop lift.

This is accomplished by pinning the shuttle driver at one end of the oscillating shaft and then pinning crank **G, Fig. 31** at the other end of the shaft at the specified timing location.

### TO CHECK THE TIMING:

Turn the machine pulley over toward you until needle bar descends to lowest point and then rises approximately **1/10** inch.

At this setting, for normal sewing, the point of the shuttle should be at the centre of the needle as shown in **Fig. 29.**

### TO RE-SET THE TIMING:

When it becomes necessary to replace one or more of the shuttle driving parts or to alter the timing to suit a particular sewing condition, **remove pin H, Fig. 31.**

Loosen set screw **J, Fig. 31.**

Move point of shuttle to desired timing position and securely tighten set screw **J** in crank **G.**

Plug pin hole in shaft and drill new hole to receive pin in desired location.

Insert pin **H.**

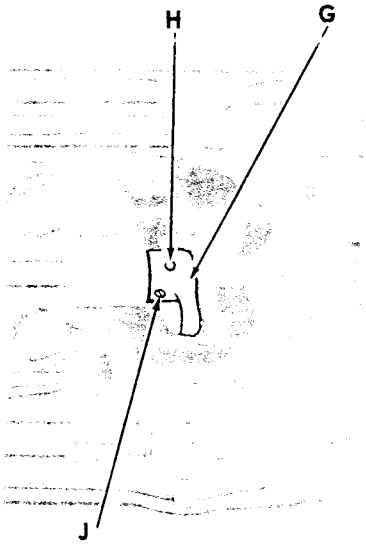



**Fig. 31. Setting the Oscillating Shaft Crank to Time of Shuttle**

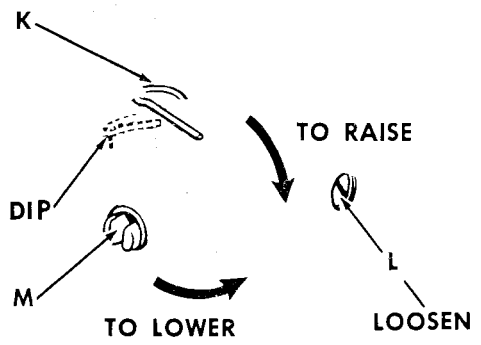



Fig. 32. Setting Height of Check Spring

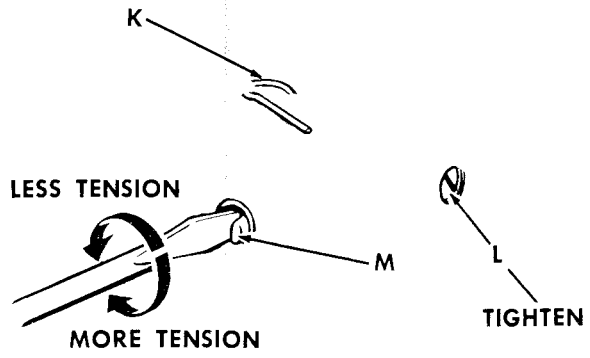



Fig. 33. Adjusting Tension on Check Spring

## HEIGHT SETTING

**PREPARATION:**

Thread the machine.

**CHECK:**

Turn machine pulley over toward you slowly. When take-up lever begins to rise, spring **K, Fig. 32** "checks", showing a slight dip and a return to its highest position. Later, as take-up lever approaches top of stroke, setting the stitch, this "check" spring **K** should be drawn all the way down. As lever descends, check spring **K** returns to rest.

## TO SET THE CHECK SPRING

**SETTING:**

To obtain the slight dip in check spring when take-up begins to rise, loosen screw **L, Fig. 32.** Turn stud **M, Fig. 32** (at the same time turning entire tension assembly) either **over toward left to lower the spring's resting position and decrease its movement, or over toward right to raise the spring's resting position and increase its movement.** Securely tighten set screw **L.**

**VARIATIONS (FOR MACHINE 331K4):**

Under certain conditions of tacking, it may be necessary to set the check spring higher than it is otherwise normally set.

## TENSION SETTING

**PREPARATION:**

Thread the machine. Securely tighten set screw **L, Fig. 33.** Make certain thumb nut is on stud **M, Fig. 33.**

**CHECK:**

Tension on check spring **K, Fig. 33,** should be sufficient to ensure action at top speed; but still light enough to permit itself to be drawn all the way down before any thread is drawn through the tension discs, as take-up lever approaches height of stroke.

Check spring setting should be reviewed each time a different foot is applied to machine.

**SETTING:**

Using a large screwdriver in slot of stud **M,** turn stud either over toward left to **decrease** tension or over toward right in **increase** it, as shown in **Fig. 33.**

**VARIATIONS:**

The tension on the check spring may require a different setting, depending upon the thread and material used. Heavier thread or bulkier material requires more tension to ensure correct thread control.

## TO TIME THE FEED

**CHECK:**

Test feed assembly linkage for freedom of movement. Action of feed dog must be regular and smooth for maximum efficiency

When the feeding movement is correctly timed——

- The feed dog stops moving toward the rear just as the take-up lever reaches the top of its stroke.
- The feed dog drops below surface of throat plate just as needle is about to enter material.

**TIMING:**

- Set the machine for longest stitch as instructed on **page 10.**
- Turn up the cover plate at the rear of the machine arm.
- Loosen set screw **N** in feed eccentric **P, Fig. 34.**
- Rotate feed eccentric **P** as required to obtain desired timing.
- Securely tighten set screw **N.**
- Close cover plate at rear of arm.

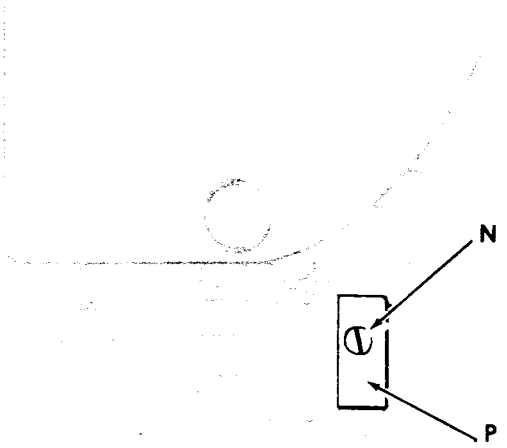



**Fig. 34. Timing the Feed**

## TO SET THE FEED DOG AT THE CORRECT HEIGHT

Before checking height of feed dog, set the machine for **longest** stitch, as instructed on **page 10.**

When the feed dog is at its highest position, approximately the full depth of the **rear teeth** of the feed dog should project above the top surface of throat plate, as shown in **Fig. 35.**

**Variations** of feed dog height may be necessary to balance the height with the presser foot pressure.

To adjust the height of the feed dog, loosen screw **O, Fig. 35** and raise or lower the feed bar **R, Fig. 35,** as required.

When the feed dog is set to the desired height, securely tighten screw **O.**

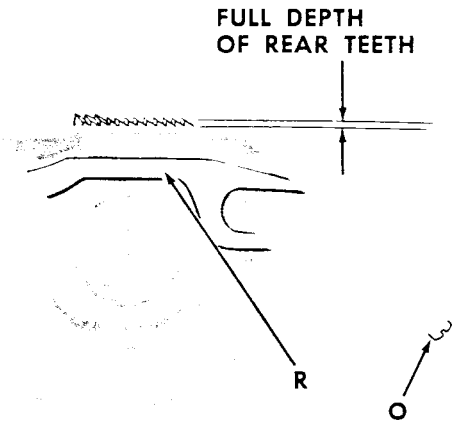



**Fig. 35. Adjusting Height of Feed Dog**

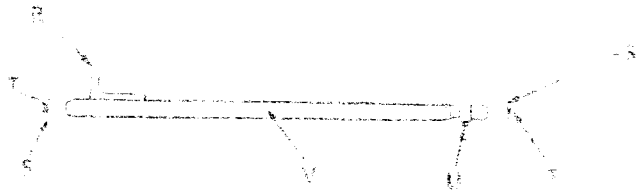
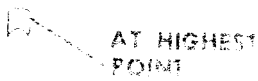


Fig. 36. Centralizing Feed Dog



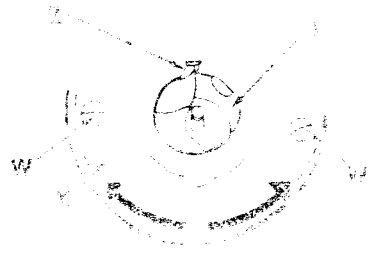



Fig. 37. Shuttle Race