

US AIRCREW EQUIPMENTMAN

SECTION ON SINGER 31-15

Sewing machines are like any other tool you use. If you don't have the correct one, the task is harder or impossible to complete. The same applies to sewing machines. You need the right machine for the job; whether it be lightweight, medium weight, or heavy weight, there is a machine designed to perform each task. You work with various types of sewing machines in the process of repairing or fabricating items in the shop. You need to have all the knowledge and skill you can possibly acquire about these machines to fulfill your duty as a PR. If you don't know how to operate and maintain the sewing machines, they will stand idle, not operate properly, or not work at all. When you have a job to do, you need equipment that is operational. Without the proper knowledge of sewing machines, you will not have the confidence to perform necessary sewing machine repairs.

Before you can learn to operate and maintain a sewing machine, you must learn the language of the sewing trade. Through your supervisor and this text you will hear this language often. It is very important that you form a habit of referring to the parts of a sewing machine by their proper names. It would be difficult to communicate with other PRS and impossible to pass a rating exam if you do not know the proper names of the different parts of a sewing machine. Take time to study the illustrations in this chapter that show the important Sewing machine parts and their names.

Sewing machines are classified as two types, OSCILLATING and ROTARY. Both types are operated by electric motors and are fitted with rheostats and special clutch arrangements which enable the operator to control the speed. When it comes to classifying sewing machines into oscillating and rotary, the important part is the rotary hook and oscillating shuttle. This is the device that is out of sight in the base of the machine, but does the very important job of forming each stitch after the needle has passed thread through the fabric.

Oscillating type sewing machines have a sewing hook which rocks back and forth through half of one revolution to complete one stitch.

Rotary type sewing machines have a hook which makes two complete revolutions to complete one stitch.

The type of stitch commonly used and made by sewing machines in repair work is the lockstitch. The lockstitch makes use of two separate threads. One comes from the spool down through the eye of the needle, the other from the bobbin. In making the lockstitch, these two threads must become interlocked, as shown in figure 3-1.

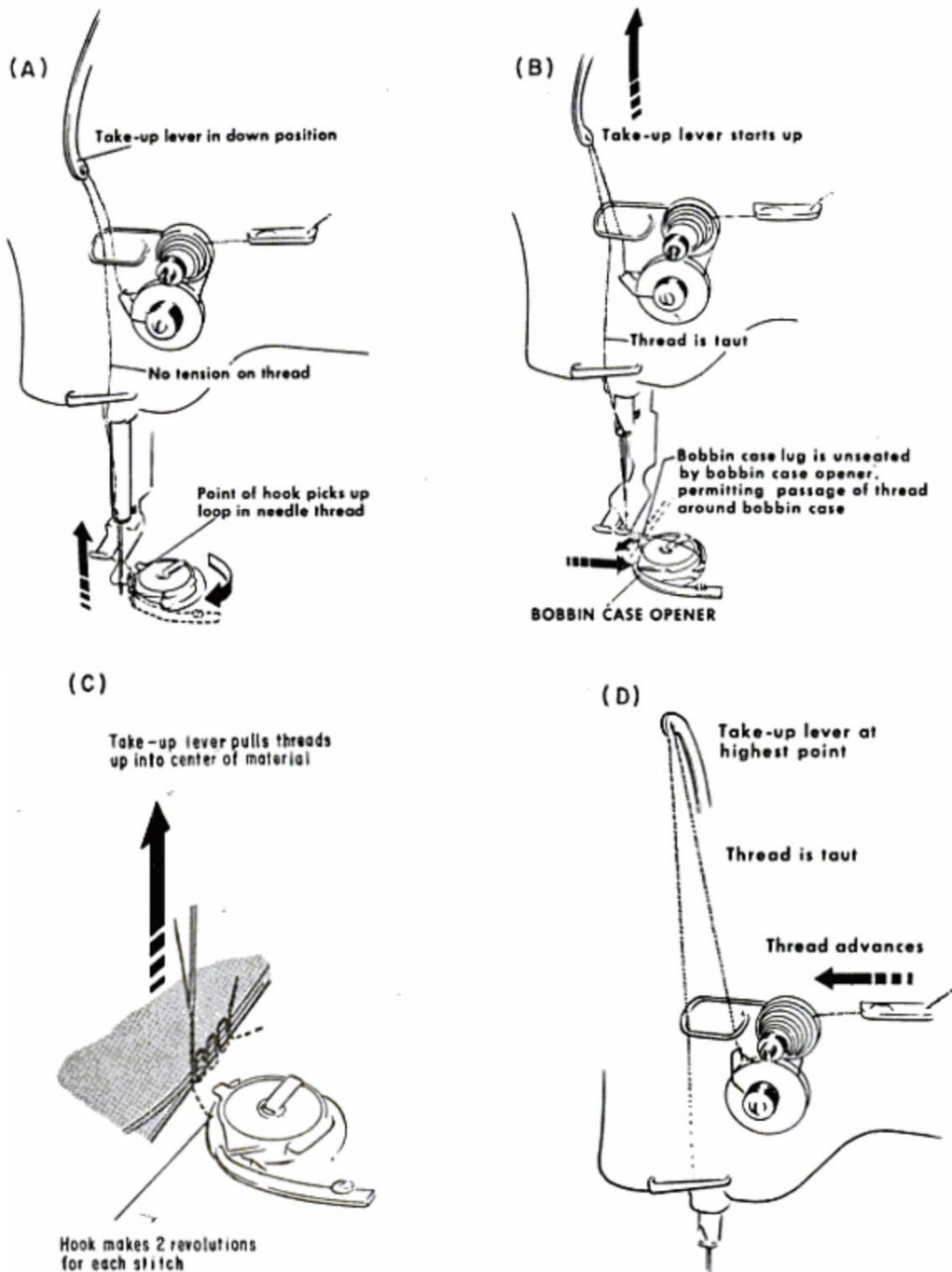


Figure 3-1.—The Lock stitch.

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The thread passing through the eye of the needle is pushed down through the material being sewn. As the needle travels downward to the material, a spring pulls tension on the needle thread to keep it taut to prevent any slack that might tangle the thread around the needle.

After the needle reaches its lowest position and starts its upward movement the process shown in figure 3–1 begins. A small loop of thread forms alongside the needle beneath the throat plate. The sewing hook catches this loop and carries it around the bobbin, which floats in its track in the bobbin case (B in figure 3-1). By locking the loop of needle thread around the bobbin thread, the sewing hook forms the stitch.

As the needle completes its upward movement, the thread tension disks hold the needle thread firmly. The thread takeup lever, rising quickly, pulls on the loop that has been formed and thus tightens the stitch. When the thread takeup lever reaches its highest position, the stitch is completed. (See C and D of figure 3–1.)

Now look at figure 3-2. The standard sewing machine has four basic parts: bed, uprise, arm, and face. The BED (1) houses the linkage from the safety clutch pulley to the sewing hook assembly; the UPRISE (14) houses the arm shaft connection belt; the BALANCE WHEEL (12) is connected to the arm shaft in the ARM (11) which operates the needle bar mechanism in the FACE (6) of the machine. The machine is powered by an electric motor, which is connected to the motor driving pulley by a clutch. You connect the motor to the clutch by pressing the forward part of the foot treadle. The aft part of the treadle is the brake which acts upon the clutch.

The material to be sewn is held in position on the feed dog by the presser foot. The pressure of the presser foot upon the material enables the feed dog to push the material forward each time the needle goes up. The pressure of the presser foot on the material is released either by a knee lifter or a hand lifter. The presser foot can be raised by pushing the knee lifter to the right. The hand lifter is located behind the face of the machine. The presser foot may be lifted and locked into position by raising the hand lifter to its highest position.

OSCILLATING TYPE SEWING MACHINES

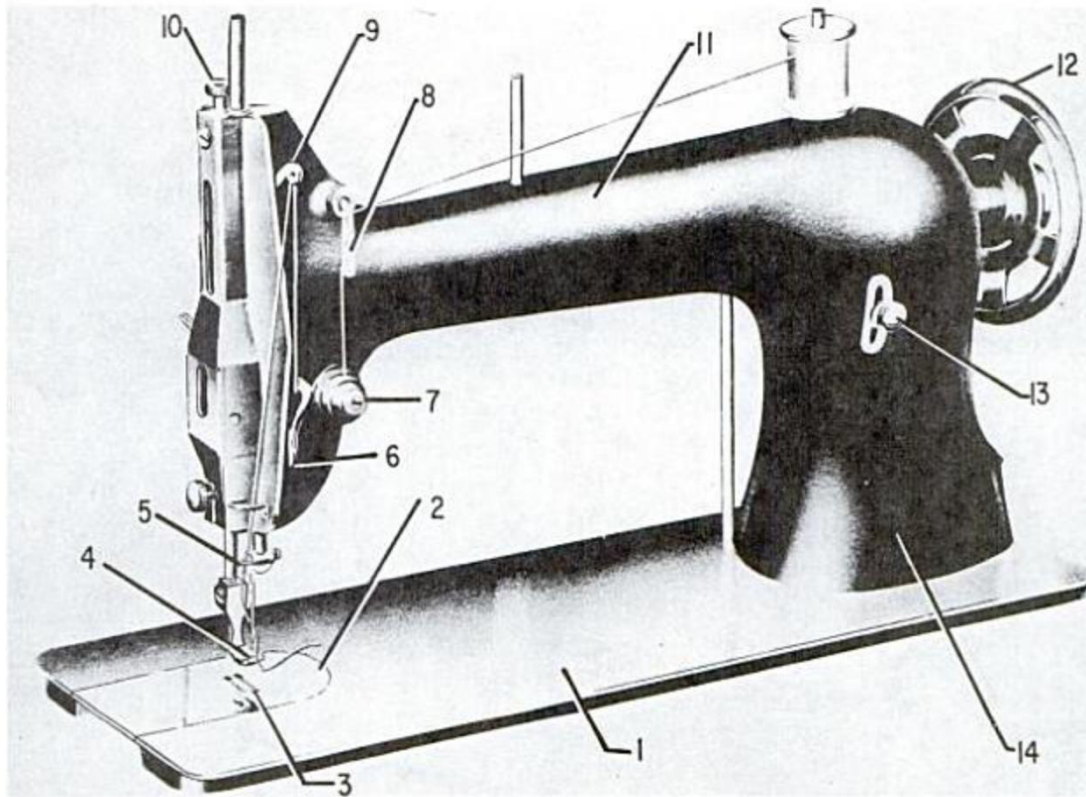
Two of the most commonly used oscillating type sewing machines are the 31-15 and 7–33, both of which are discussed in this chapter.

SINGER SEWING MACHINE 31-15

When starting out as a PR, the 31-15 sewing machine will probably be the one you'll like to use. This machine is smaller and lighter than most of the other machines used in the parachute loft. The manufacturer calls the 31-15 a tailoring machine. It is used to sew and repair clothing, uniforms, shirts, flying clothing, jackets, and lightweight protective covers.

The 31-15 is an oscillating type sewing machine which has a recommended speed of 2,200 stitches per minute and makes a lockstitch. It is very good for nylon cloth sewing and can be used for sewing lightweight canvas up to 8 ounces. The number of stitches can be regulated from 7 to 32 stitches per inch.

When the 31-15 machine is in operation, the balance wheel turns over toward the operator. When hand-turning the balance wheel, always rotate in this direction. The components of the Singer Sewing Machine 31-15 are shown in figure 3-2.



- | | | | |
|------------------|--|--|----------------------------------|
| 1. Bed. | 5. Needle bar. | 8. Thread retainer. | 11. Arm. |
| 2. Throat plate. | 6. Face. | 9. Thread takeup lever. | 12. Balance wheel. |
| 3. Feed dog. | 7. Upper tension regulating thumb nut. | 10. Pressure bar pressure regulating thumbscrew. | 13. Stitch regulator thumbscrew. |
| 4. Presser foot. | | 14. Uprise. | 239.262 |

Figure 3-2.—Sewing machine 31-15.

The following practices and procedures help to ensure safe and smooth operation of the sewing machine:

1. The balance wheel must always turn toward the operator.
2. Do not run the machine with the presser foot resting on the feed dog without material being under the presser foot.
3. Do not run the machine when both bob bin case and needle are threaded unless there is material under the presser foot.
4. Do not try to help the machine by pulling the material. You may bend or break the needle. If properly adjusted, the machine feeds the work without assistance.
5. The slide over the bobbin case should be kept closed when the machine is in operation.
6. Keep your head away from the thread takeup lever and needle bar at the top of the sewing machine face.
7. When running the machine do not take your eyes away from the needle and presser foot.
8. Keep your fingers from under the needle.
9. When running the machine, keep your fingers away from the belt and pulley areas.
10. Never attempt threading the needle when the machine is turned on.

Lubrication

To ensure easy operation and to prevent unnecessary wear of the moving parts, all sewing machines need oiling. When a machine is in constant use, it should be oiled twice a day. A new machine should be oiled more frequently when in constant use. Use only one drop of oil at each oiling point. A castor base oil is recommended since mineral base oil tends to gum the moving parts.

Oiling points for the 31-15 machine are shown in figures 3-3, 3-4, and 3-5. Oil should be applied

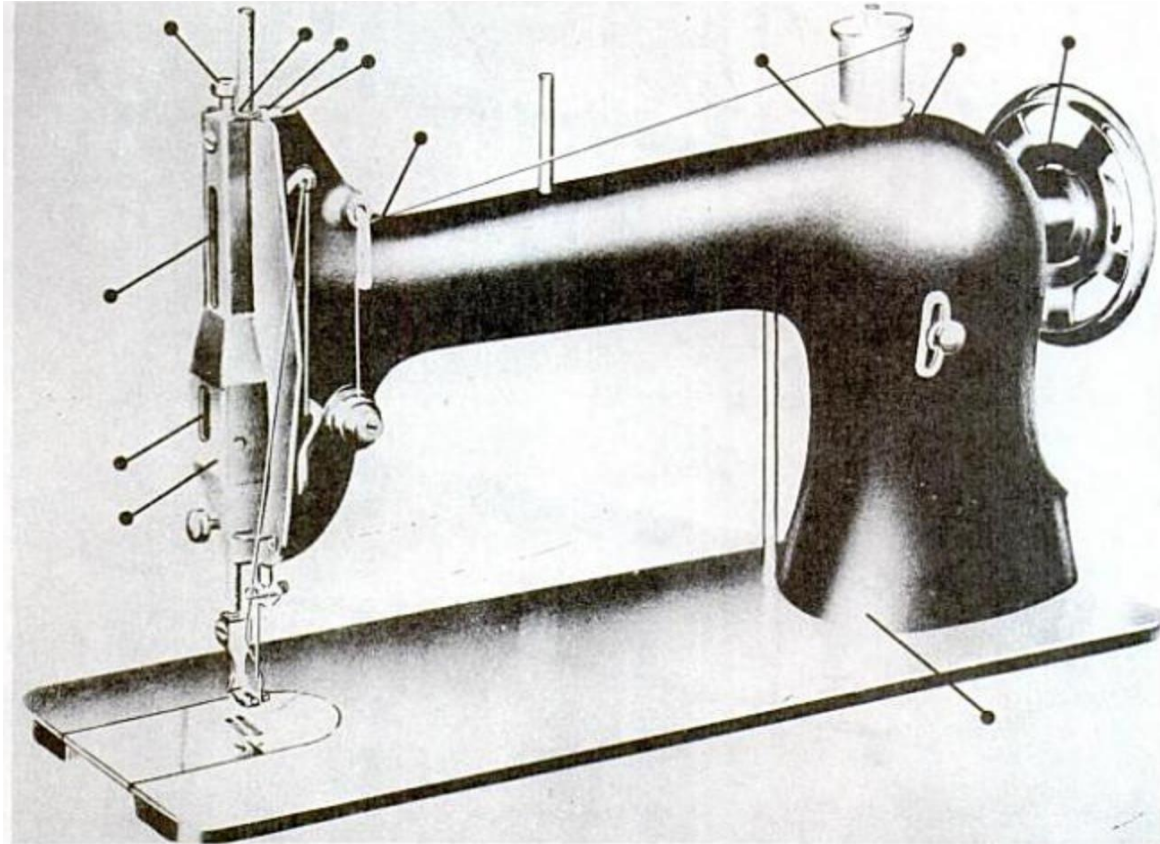
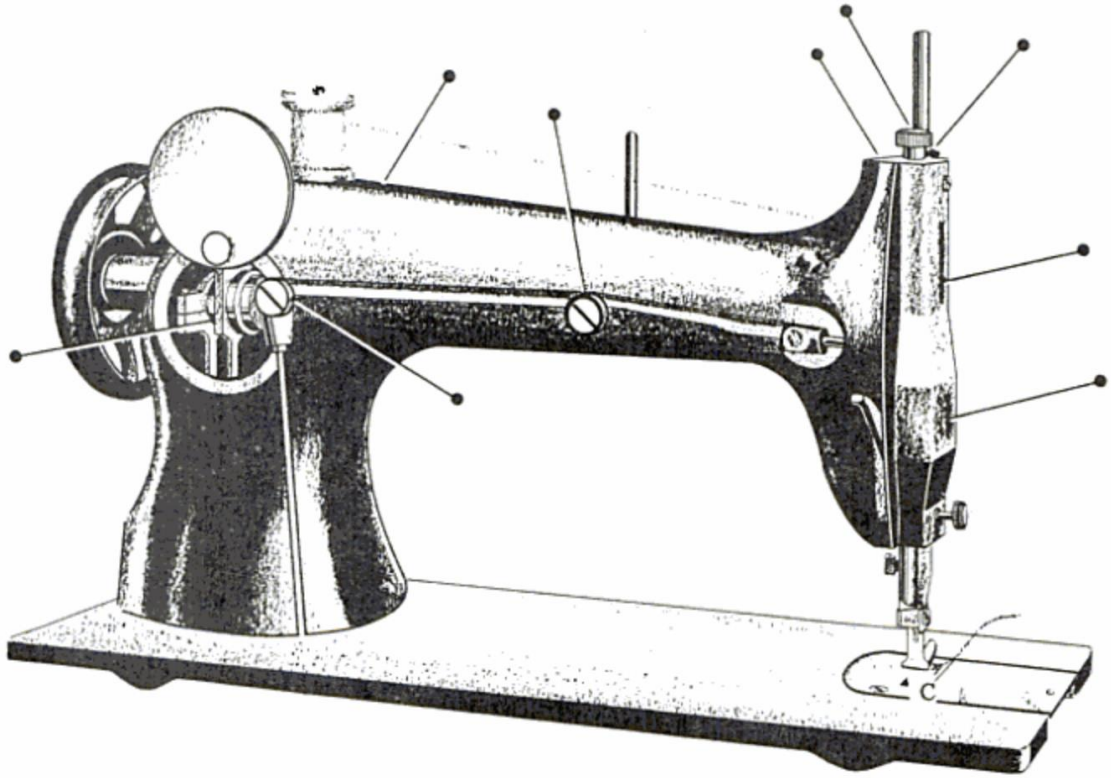


Figure 3-3.—Oiling points at the front of the machine.

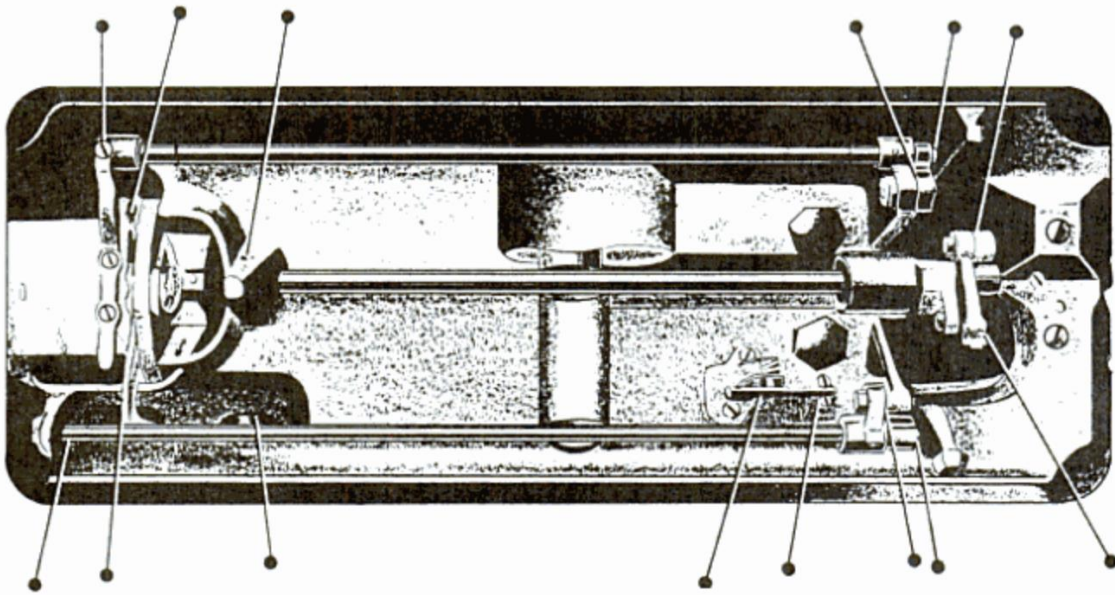
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regularly to the shuttle bearing in the shuttle race. Occasionally remove the faceplate and apply oil to the bearings and points that are uncovered.



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Figure 3-4.—Oiling points at the back of the machine.

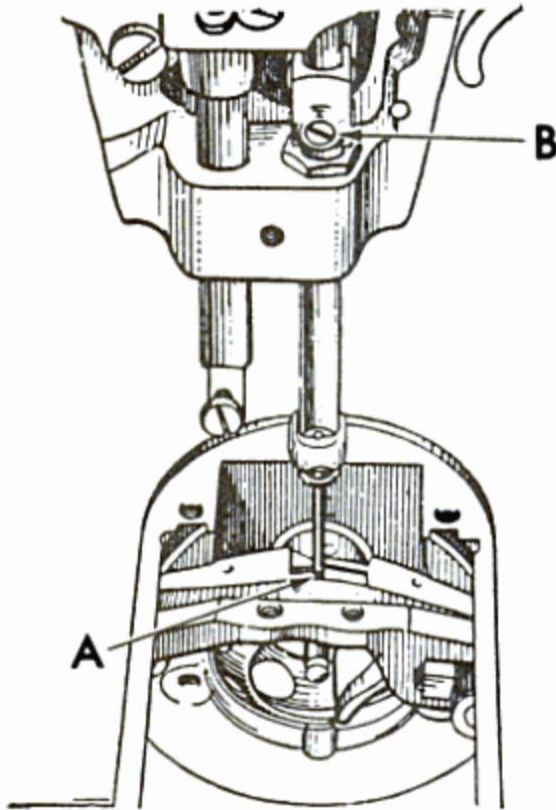


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Figure 3-5.—Oiling points at the base of the machine.

Timing the 31-15

There are two distinct timing operations you perform: One operation times the needle with the shuttle. The other timing operation times the feed dog with the needle. Both the needle with the shuttle and the feed dog with the needle must be in proper time for the machine to function properly. See figure 3-6.



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Figure 3-6.—Timing needle with shuttle.

Timing the Needle with the Shuttle

If a class 31 sewing machine does not form the lockstitch, if it skips stitches, or if it frays or breaks thread, the needle is not moving in the proper relationship with the shuttle's motion. First make sure you have the right needle. Check the needle for the correct class, variety 16 × 87, and size. Insert the needle in the needle bar (long groove to the left) as far as it will go (see figure 3-6). Next compare the needle stroke to the shuttle stroke. To do this, remove the throat plate. Turn the balance wheel toward you until the point of the shuttle on its forward stroke reaches the center of the needle while the needle is on the upstroke. At this time, the needle bar should have risen 1/10 inch and the point of the shuttle should be 1/16 inch above the eye of the needle, as shown in A of figure 3-6.

NOTE: Prior to making adjustments to the sewing machine, always follow the trouble shooting chart in Table 3-1.

If the needle eye is not in this position, the following steps should be taken:

- a. Loosen the needle bar connecting stud screw, as shown in figure 3-6.
- b. Move the needle bar up or down as required; and then tighten the screw.
- c. Rotate the balance wheel through the full cycle to check the timing.
- d. Replace the throat plate.

Table 3-1.—Troubleshooting chart

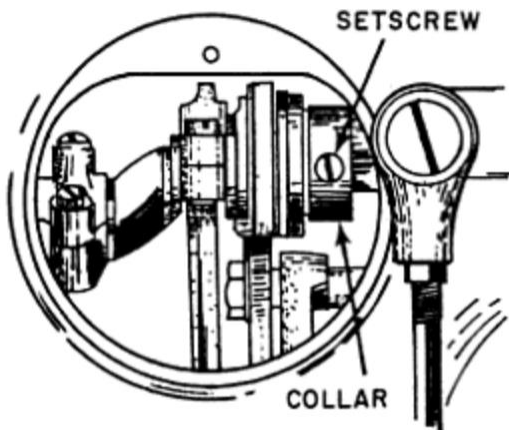
TROUBLE	PROBABLE CAUSE	REMEDY
Needle breakage.	<p>Incorrect class and variety needle being used.</p> <p>Needle loose in clamp.</p> <p>Needle too small for fabric.</p> <p>Operator pulling on the material.</p>	<p>Use correct class and variety needle.</p> <p>Tighten needle clamp screw.</p> <p>Use larger needle.</p> <p>Allow machine to feed material.</p>
Needle thread breakage.	<p>Thread too heavy for needle.</p> <p>Right twist thread being used.</p> <p>Damp or defective thread being used.</p> <p>Machine incorrectly threaded.</p> <p>Needle incorrectly set.</p> <p>Needle thread tension too tight.</p> <p>Thread take-up spring out of adjustment.</p> <p>Burr on bobbin case, Shuttle point or tension disks.</p> <p>Thread rubbing against presser foot.</p> <p>Needle has burr on eye or point, blunted or bent.</p>	<p>Use larger needle or smaller thread.</p> <p>Use left twist thread.</p> <p>Use only dry smooth thread.</p> <p>Check machine for proper threading.</p> <p>Set needle with long groove to the left.</p> <p>Loosen needle thread tension.</p> <p>Adjust thread take-up spring.</p> <p>Smooth with emery cloth.</p> <p>Adjust presser foot.</p> <p>Replace needle.</p>
Bobbin thread breakage.	<p>Bobbin tension too tight.</p> <p>Bobbin incorrectly threaded.</p> <p>Bobbin wound too full to revolve freely.</p> <p>Rounds of bobbin thread lapped over one another.</p> <p>Bobbin case is dirty.</p>	<p>Adjust bobbin tension.</p> <p>Thread bobbin to revolve clockwise.</p> <p>Remove some of the bobbin thread.</p> <p>Insure bobbin thread is straight when winding bobbin.</p> <p>Clean and lubricate bobbin case.</p>
Skipped stitches.	<p>Machine out of time.</p> <p>Thread controller spring out of adjustment.</p>	<p>Time needle to shuttle.</p> <p>Adjust thread controller spring.</p>
Drawing of seam.	<p>Needle and bobbin tension too tight.</p>	<p>Loosen needle and bobbin tension.</p>
Stitches piled up.	<p>Stitch regulator out of adjustment.</p> <p>Pressure on presser foot too tight.</p>	<p>Adjust stitch regulator.</p> <p>Loosen presser foot adjustment screw.</p>
Feed dog striking throat plate.	<p>Feed dog set too high.</p>	<p>Lower feed dog to correct height.</p>

Timing the Feed Dog with the Needle

The feed driving eccentric is an adjustable connection between the arm shaft (the shaft in the head) and the feed rock shaft (first shaft beneath the bed of the machine). If the feed mechanism is properly timed, the feed dog should be on its downstroke and level with the throat plate when the point

of the needle reaches the material. If there is a twisted knot every one to two inches on the bottom of your material, check the timing of the needle before adjusting the feed mechanism.

To adjust the feed eccentric, first lower the stitch regulator to the lowest position so the machine forms its longest stitch. Turn the balance wheel until the feed dog is on its downstroke and is flush with the throat plate. Move to the rear of the machine and take off the arm side cover. Turn the balance wheel away from you until the feed eccentric collar setscrew is visible (figure 3-7).



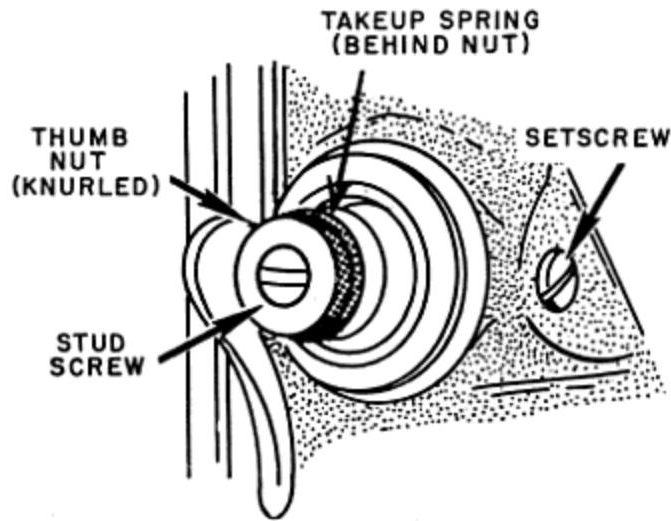
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Figure 3-7.—Feed eccentric.

Hold the collar (figure 3-7) with your left thumb. Loosen the screw and rotate the balance wheel away from you until the needle, on its downstroke, reaches the material. Tighten the setscrew. Rotate the balance wheel to check the timing. Recheck the timing of the shuttle point with the needle, because when you time the feeding mechanism, you may throw the needle out of time with the shuttle.

Adjusting the Feed Dog

The height at which the feed dog should be set depends on the weight and number of plies of the material being sewn. If the feed dog is set too low, the material does not feed through the machine; if it is set too high, it may cut or fray the material. The recommended height of the feed dog for sewing lightweight canopy material is slightly less than 1 tooth above the throat plate. If you are sewing heavier material, raise the feed dog to a height which ensures positive feeding of the material. After you have decided on the correct height for the project you are working on, adjust the feed dog accordingly, by loosening, and then tightening the screw as pointed out in A of figure 3-7. You must remember that each time the height of the feed dog is changed, the feeding mechanism may be out of time. For this reason, set the feed dog first and then make the necessary adjustment on the feeding mechanism. Since most of your canopy repairs involve material of approximately the same weight, one-time adjustment of the feed dog is usually sufficient. Repeated changing of its height is not necessary.



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Figure 3-8.—Tension assembly.

Adjusting the Thread Takeup Spring

To adjust correctly the takeup spring in the tension assembly (shown in figure 3-8), you should first understand its normal operation. The thread takeup lever pulls the thread takeup spring down about even with the slack thread regulator while the needle is going up. While the takeup lever is coming down with the needle, the thread takeup spring pulls the slack out of the thread and keeps it from getting under the needle. If you do not have this adjusted properly, a loop can form over the needle hole in the throat plate and the needle can split the thread as it enters the needle hole. You should set the spring about 1/4 inch

above the slack thread regulator. The thread takeup spring should be set so that the spring will have completed its downward motion and be resting on the stop when the needle, on its downstroke, reaches the fabric.

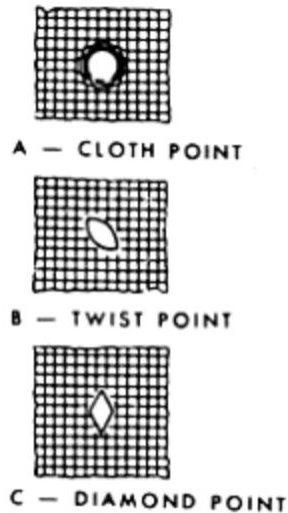
To adjust the spring, loosen the setscrew, B, as shown in figure 3-8 on right. To put more tension on the spring, you turn the assembly clock wise; to put less tension on the spring, you turn the assembly counterclockwise.

It may be necessary for you to replace the thread takeup spring because it can bend and become weak. Loosen the setscrew and insert a screwdriver into the slot of the tension screw stud in figure 3-8. Turn the stud to the left until it is screwed out of the thread takeup spring regulator. Remove thumb nut, A, figure 3-8, the tension spring, and tension discs. The takeup spring is now free for removal. After replacing the old spring with a new one, assemble the parts in reverse procedure.

Replacing the Needle

While replacing a needle is a relatively simple job, you must know a few things about needles in order to decide which needle is required when a needle must be replaced. It is very important that the proper needle be used to ensure good machine operation. The selection of needles by class, variety, and size for different machines and materials is necessary in order to eliminate thread breakage, needle breakage, skipped Stitches, and fraying of the thread.

Needles for the various machine classes are selected and ordered by needle number and size. The needle numbers consist of a class number and variety number separated by an "X"; for example, the class and variety needle 16 × 87 is used in the 31-15 sewing machine. Cloth point needles are round, sharp pointed needles used for sewing cloth, since they do not cut the Strands as they are forced between the woven threads of the fabric. Many different varieties of cutting point needles are available,



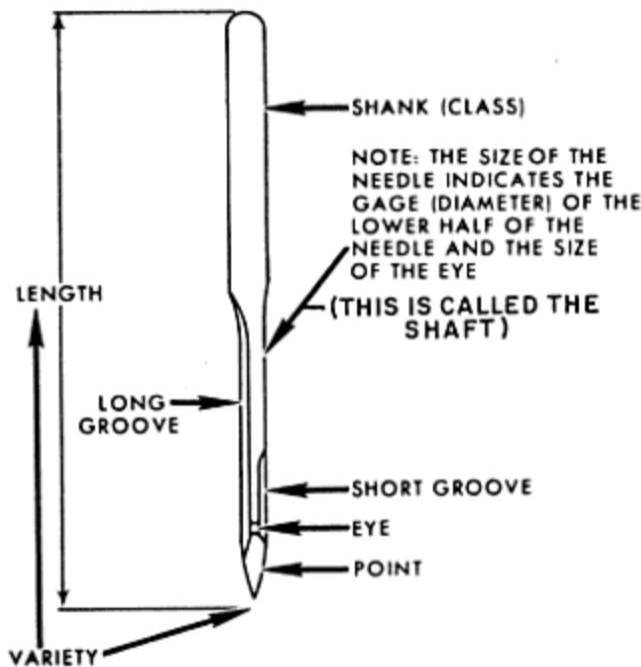
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Figure 3-9.—Shapes of needle points.

but they are used only for sewing heavy leather. Figure 3-9 shows the shape of the openings made in material by the cloth point (A), twist point (B), and the diamond point (C).

Figure 3-9 illustrates why it is important that a round-pointed needle be used in cloth; B and C show how cutting point needles can cut the warp and filler threads.

Machine needles have a long groove on one side, and either a short groove or a scarf on the opposite side, as shown in figure 3-10. The purpose of the grooves is to allow the thread to fall back into the needle when it enters the material to prevent the thread from breaking or fraying; therefore, it is important that the long groove be placed in the machine properly. On different class machines, the direction varies with the position of the bobbin assemblies. On class 31 machines, the long groove is placed to the left.



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Figure 3-10.—Sewing machine needle.

Needles are sized by the diameter or gauge of the needle and the needle eye. The selection of the correct size needle is determined by the size and type of thread and material used. The thread must pass freely through the eye of the needle in order to prevent thread fraying or breaking. The sizes of the 16 × 87 needles for most sewing operations you will do range from size 18 through size 22. The needle size number increases with the diameter of the needle; therefore size 18 needles are used for lighter weight materials than size 22. Listed below are some of the needle sizes you will be working with and their uses:

a. Size 18. For sewing two to four plies of thin material, such as silk, nylon, or rayon, with size E thread.

b. Size 20. For sewing five or more plies of the above.

c. Size 21. For sewing two to four plies of medium weight materials, such as

aircraft cloth, 12-ounce duck, light leather, and artificial leather.

d. Size 22. For sewing two to four plies of medium weight material, such as heavy duck, lightweight and medium weight webbings, and russet leather.

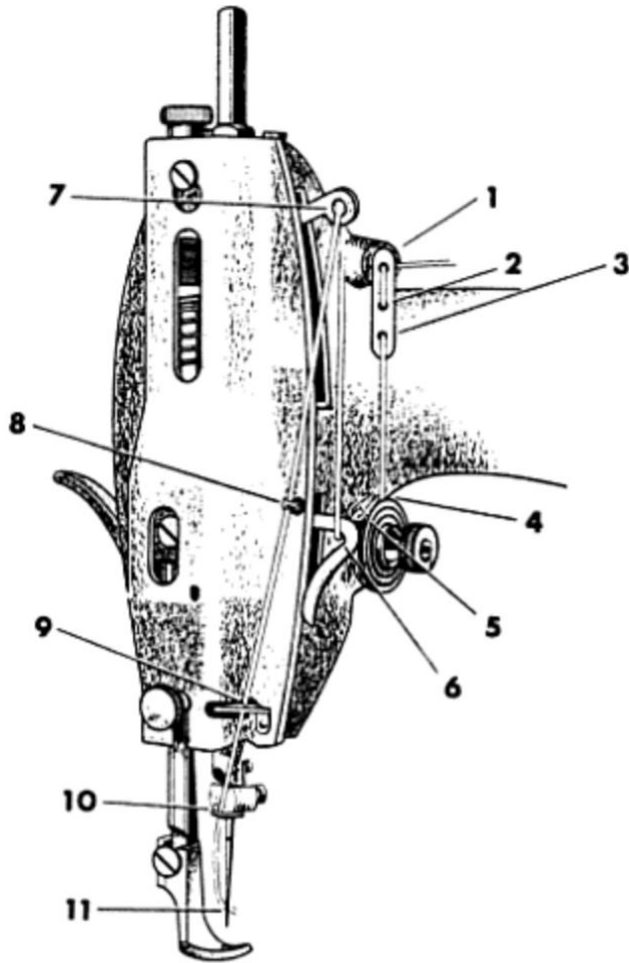
e. Size 24. For sewing elastic or rubberized materials.

You should check the condition of the needle's point before you start to sew. A dull or rough round needle acts the same as a cutting needle. It cuts or pulls threads and may weaken the seam. The condition of a needle may be checked by sliding the fingernail over the point. If it scratches or catches the nail, the needle should be replaced with a new one. A dull needle may be sharpened by placing it in the chuck of a drill press, and the drill operated at high speed while holding a fine grain sharpening stone lightly against the side of the needle at the proper angle. The point is then polished with a piece of russet leather.

Having selected the proper needle, turn the balance wheel toward you until the needle bar moves to its highest point. Loosen the needle clamp screw and put the shank of the needle up into the groove as far as it will go. Turn the long groove so that it faces to the left and is directly in line with the arm of the machine. Then tighten the clamp screw and check to see that the needle does not turn or slip. For troubleshooting, refer to table 3-1.

Threading the Machine

Threading a machine is a very simple job. The procedure may vary slightly with different models; but after working with the various machines in the loft, the task becomes automatic.



1. Top hole of thread retainer.
2. Middle hole of thread retainer.
3. Bottom hole of thread retainer.
4. Tension disks.
5. Thread takeup spring.
6. Tension thread guard.
7. Thread takeup lever.
8. Thread guide.
9. Thread guide.
10. Thread guide.
11. Needle eye.

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Figure 3-11.—Threading the 31-15 sewing machine.

The component parts used in threading the 31-15 sewing machine are shown in figure 3-11. Use this figure in studying the procedures which follow. Pass the thread from the thread Stand to the thread post on top of the machine, right to left through the bottom hole, and then right to left through the top hole. Pass the thread from right to left through the top hole in the thread retainer (1). Pass the thread from left to right through the middle hole in the thread retainer (2). Pass the thread from right to left through the bottom hole in the thread retainer (3). The thread is then passed down and under from right to left between the tension disks (4). Draw the thread up into the thread takeup spring (5), drawing the thread up and beyond the spring end so that it comes out in the center of the spring. The thread is then placed under the tension thread guard (6). Pass the thread up and from right to left through the hole in the thread takeup lever (7). The thread is now drawn down through three thread guides (8), (9), and (10). Pass the thread from left to right through the eye of the needle (11). Draw about two inches of thread through the eye of the needle with which to commence sewing.

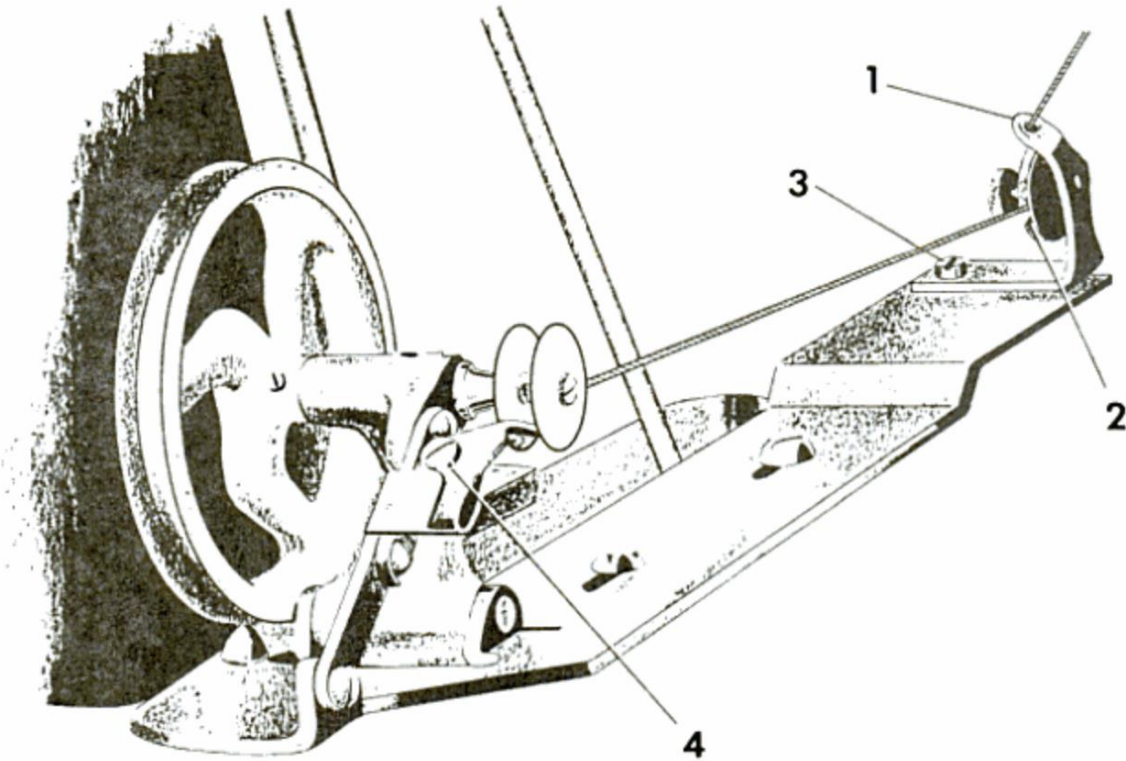
Removing the Bobbin Case

Before attempting to remove the bobbin case, turn the balance wheel toward you until the needle moves upward to its highest position.

Remove the slide in the bed of the machine so you can see what you are doing. Reach under the table with your left hand, and, using your thumb and

forefinger, open the bobbin case latch (figure 3-12) and lift out the bobbin case.

While the latch is held open, the bobbin is retained in the bobbin case. Release the latch, turn the open end of the bobbin case down, and the bobbin will drop out.



- | | |
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| 1. Thread guide. | 3. Setscrew. |
| 2. Tension disk. | 4. Bobbin winder stop latch screw. |

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Figure 3-13.—Winding the bobbin.

Winding the Bobbin

The bobbin winder is fastened to the table with its driving pulley in front of the Sewing machine belt. The bobbin winder is so positioned to allow the pulley to drop away from the belt when sufficient thread has been wound on the bobbin.

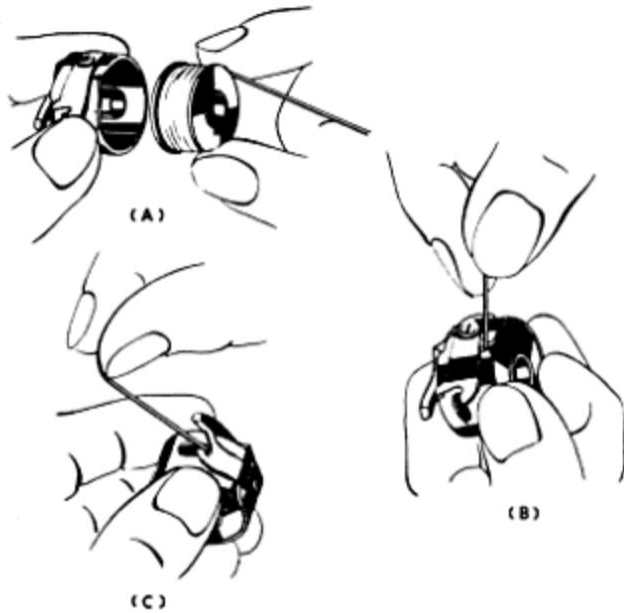
Figure 3-13 illustrates the bobbin-winding operation. The procedure is as follows: Place the bobbin on the bobbin winder and push it on the shaft as far as it will go. Pass the thread from the spool down through the thread guide. Loop the thread around back and through the tension disks.

The thread is then wound around the bobbin a few times and the pulley pushed up against the machine belt. The bobbin can be wound while the machine is being used for sewing. If there is no material under the presser foot, make certain that the presser foot is raised and not riding on the feed dog while winding the bobbin.

When sufficient thread has been wound on the bobbin, the pulley on the bobbin winder drops back from the machine belt automatically. If the thread does not wind evenly on the bobbin, loosen the setscrew in the tension bracket and move the bracket to the right or left as required; then tighten the bobbin winder stop latch Screw. The amount of thread wound on the bobbin is regulated by the bobbin winder stop latch. To wind more thread on the bobbin, turn the screw to the right; to wind less thread on the bobbin, turn this screw to the left.

Threading the Bobbin Case

Hold the fully wound bobbin between the thumb and forefinger of the right hand with the thread end running over the top toward the right, as shown in figure 3-14 (A). With the left hand, hold the bobbin case as shown, with the thread slot near the top.



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Figure 3-14.—Threading the bobbin case.

Place the bobbin into the bobbin case and pull the thread into the slot in the edge of the bobbin case (B). Draw the thread down under the tension spring and into the delivery eye at the end of the tension spring (C). When the free end of the thread is pulled, the bobbin will rotate clockwise if the bobbin case has been threaded properly.

Replacing the Bobbin Case

Hold the latch open on the threaded bobbin case with the thumb and forefinger of the left hand, with the latch in a horizontal position. Place the bobbin case on the center Stud of the shuttle body. Release the latch and press the bobbin case back until the latch catches the groove near the end of the stud.

Preparing for Sewing

With the left hand, hold the end of the needle thread, leaving it slack from the hand to the needle. Turn the balance wheel toward you until the needle moves down and catches the bobbin thread. Continue to turn the balance wheel forward until the needle comes up and brings the bobbin thread up with the needle thread.

With the thread takeup lever at its highest position, lay both threads back under the presser foot.

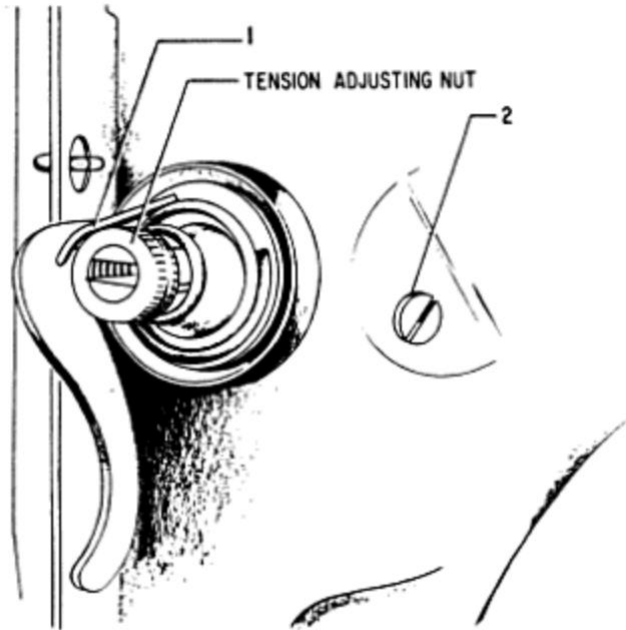
Commencing to Sew

Place the edge of the material beneath the presser foot, lower the presser foot, turn the balance wheel by hand until the needle is in the material, and press lightly on the treadle. To prevent fouling the needle thread in the bobbin case, hold the ends of both threads until the first few stitches are made.

While sewing, hold the work flat, but do not pull or push on the material. Let the feed dog carry the work evenly under the presser foot and needle. If the operator pulls on the material, the needle bends, strikes the throat plate, and is either dulled, or more likely, broken. When the needle is about to cross a seam or other unusually thick or uneven place in the work, disengage the clutch, and hand-turn the machine over the rough place; otherwise, the needle may be broken or thrown out of time.

Regulating the Tension

The tension on the needle thread should be regulated only when the presser foot is down. If the tension of the machine thread is not correct, it should be adjusted by turning the tension adjusting nut, as shown in figure 3-15. To INCREASE THE TENSION, turn the nut clockwise; to DECREASE THE TENSION, turn the nut counterclockwise.



1. Thread takeup spring. 2. Setscrew.

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Figure 3-15.—Adjusting the machine thread tension.

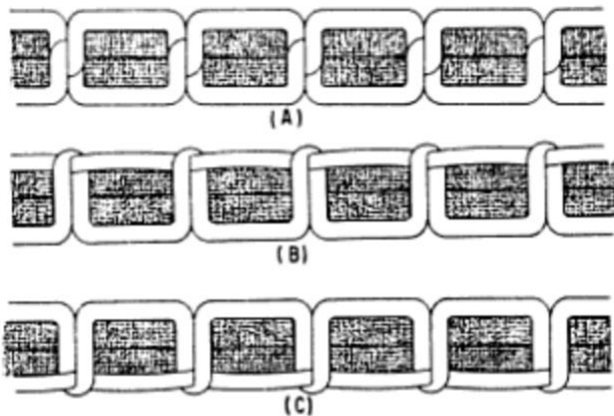
The tension on the bobbin thread is regulated by the Small screw in the bobbin case tension spring. To increase the tension turn the screw clockwise; to decrease the tension turn the screw counterclockwise.

This screw is very small and is easily lost if extreme care is not exercised in backing it out when the tension is decreased. If the screw is tightened excessively or is slightly too long, it will penetrate into the inside of the bobbin case and prevent removal of the bobbin.

When the tension on the bobbin thread has once been properly adjusted for a particular size of thread, it is seldom necessary to change it. A correct stitch can usually be obtained by varying the tension on

the needle thread, which is an easier adjustment.

For ordinary stitching, the needle and bobbin threads should be locked in the center of the thickness of the material as shown in figure 3-16 (A). When adjusting the tensions, you will not have a cross section of the stitch.



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Figure 3-16.—Properly and improperly adjusted tensions.

If the tension on the needle thread is too tight, or if the bobbin tension is too loose, the thread will lie straight along the upper surface of the material and appear as small loops (figure 3-16 (B)).

If the tension on the bobbin thread is too tight, or if that on the needle thread is too loose, the bobbin thread will lie straight along the underside of the material (figure 3-16(C)).

Regulating the Length of Stitch

The length of stitch can be checked at the time the tension of the stitch is checked, as a trial run of Stitches is necessary during both procedures.

The length of stitch is regulated by the thumbscrew in the slot on the front of the uprise of the machine. To LENGTHEN the Stitch, loosen the thumbscrew and move the lever DOWN. To SHORTEN the Stitch, loosen the thumbscrew and move the lever UP. When the desired length of stitch has been obtained by test running the machine on scrap material, tighten the thumbscrew.

Regulating the Pressure on the Material

Pressure on the material is regulated by the pressure regulating thumbscrew on top of the machine face. To increase the pressure, turn the thumbscrew clockwise. The pressure should be just heavy enough to enable the feed dog to move the work along evenly.

Removing Work

Hand-turn the balance wheel toward you until the thread takeup lever is at its highest position. Raise the presser foot, either by the hand lever or by the knee lift, and draw the work and threads straight behind the presser foot. Cut the threads close to the material, leaving about 2 free inches of bobbin and machine thread.

Adjusting the Thread Takeup Spring

The thread takeup spring (figure 3-15) should be set so that when the eye of the needle reaches the material on the downward stroke of the needle bar, the spring will be through acting on the thread, and will rest against the stop of the thread takeup spring regulator.

If the thread takeup spring is not correctly set, loosen the setscrew (2) in the arm of the machine and turn the tension adjusting stud to the right for more movement of the spring, or to the left for less movement. When the spring is correctly set, retighten the setscrew.

The tension on the thread takeup spring should be just sufficient to take up the slack of the needle thread until the eye of the needle reaches the material on its descent. To increase the tension on the thread takeup spring, loosen the tension adjusting stud and move the takeup spring from the recess in the regulator to the right between the regulator and the tension disks. When the required tension is obtained, securely tighten the tension adjusting stud and move the spring back into its position in the regulator recess. To decrease the tension, move the spring to the left between the regulator and the tension disks.