

Your Sewing Machine:

Its Care and Adjustment



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Acknowledgment is made to the Singer Sewing Machine Company and the National Sewing Machine Company for the use of their illustrations.

of the machine function in the making of a stitch? What variation is there in the operation of vibrator, oscillator, and rotary machines? Read carefully the first section (pages 3 to 16), because a thorough understanding of the way a machine sews will help suggest ways of correcting many sewing machine difficulties.

The parts of the sewing machine will be referred to by name in the bulletin, so that there will be no chance of misunderstanding. Figs. 1 and 2 show, respectively, the inside and outside working parts of the machine. Familiarize yourself with these parts, and also with the *names* of the parts, as these will be referred to later.

4. The second section (pages 17 to 20), includes a chart of common sewing machine troubles and their remedies. Check through

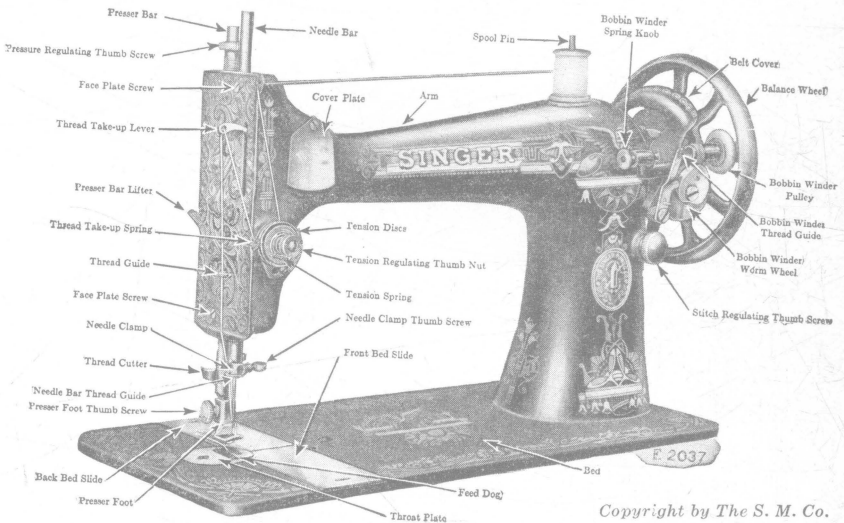


FIG. 2.—Outside working parts of the machine.

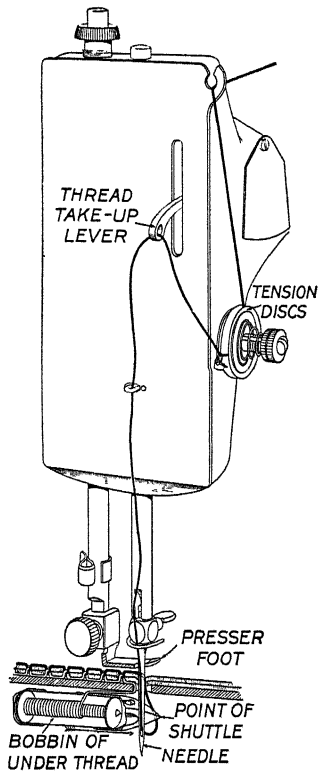
the list until you find your specific trouble. Several causes and remedies are listed under each difficulty. The trouble may be caused by one or a combination of several improper adjustments. Start with the first cause. Check over that part of the machine directly concerned. If an adjustment or replacement is necessary, make the necessary corrections. Try the machine after each adjustment until the trouble is corrected.

Constant reference will be made to the numbered paragraphs in this first section of the bulletin (pages 3 to 16). Be sure you understand these pages stating the principles of operation before referring to your individual difficulties.

Types of Machine Stitches

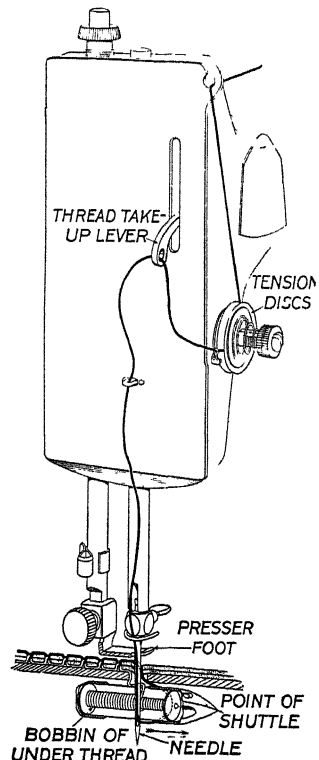
5. The common sewing machine found in most homes makes the lock stitch. Two threads are used, one on each side of the material. These threads cross or lock in the center of the material and return to their respective sides. Points in favor of the lock stitch are strength and durability of stitch, both sides of stitch are alike, and no special care is required for fastening the threads.

6. The chain stitch machine uses a single thread. It derives its name from the chain-like appearance of the stitches on the under side of the material. The stitch is formed by a series of interlocking loops or stitches, and is found on some ready-made garments. Advantages of the chain stitch are the elasticity of the stitch, the one simple automatic tension, and the ease with which the stitches may be removed.



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FIG. 3



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FIG. 4

Types of Sewing Machines

7. Machines making the lock stitch are known as vibrators, rotaries, or oscillators, according to the style and motion of the shuttle. The principle of operation may vary, but they all make the same stitch. Machines of the rotating or oscillating types will permit high speed operation and are generally quieter running.

Principles of Operation

8. Do you understand how the sewing machine forms a stitch? If you will turn the hand wheel slowly, watching carefully what is going on while the machine sews, and learning the steps of operation, the remedy for many difficulties will become obvious.

9. As the needle starts downward, the thread take-up spring (see Fig. 1), prevents slack thread forming at the eye of the needle until after it has entered the material. As the needle punches through the cloth it carries thread on both sides of the needle. The thread on the long groove side of the needle falls in the groove. On the

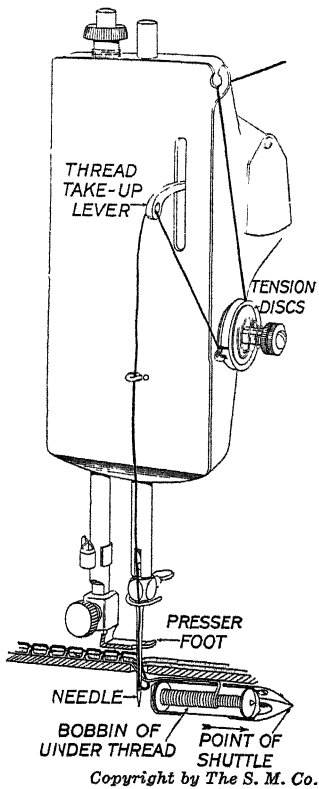


FIG. 5

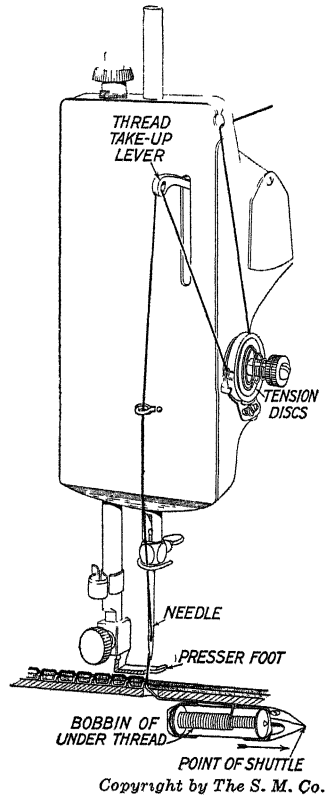
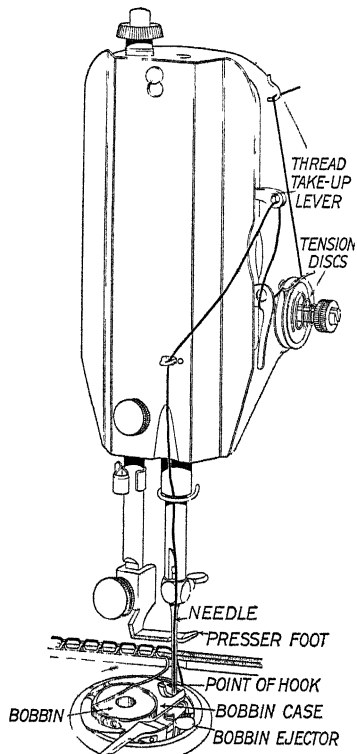


FIG. 6

other side, because there is no groove, the thread slides along the cloth. After the needle has reached its lowest point and just as it starts back up again, a loop is formed at the eye of the needle on the side toward the shuttle (Fig. 3). The next step finds the shuttle advancing and passing through the loop (Fig. 4). Now, because the bobbin is inside the shuttle case, the needle thread passes around the bobbin and bobbin thread and the stitch is formed.

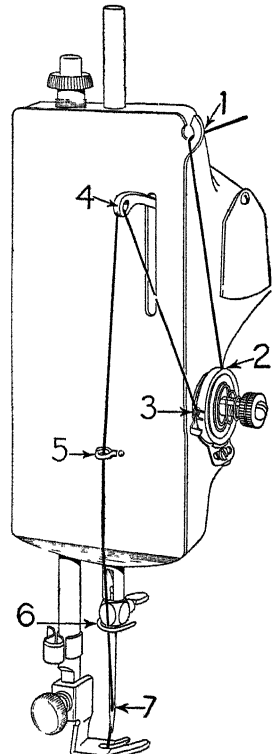
The final step takes up the loop after the threads are crossed. This is accomplished by the upper end of the needle bar or take-up lever (Fig. 5) depending upon the threading of the machine. The stitch is finally drawn tight by the final upward stroke of the take-up lever (Fig. 6). A common expression for the principle of making a stitch is that "it is the same as tatting."

10. The operation of rotary and oscillating machines differs only from the above description in that the shuttle point or hook draws the needle thread out into a larger loop and carries it around the stationary bobbin. Turn the hand wheel several times and watch



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FIG. 7.—Oscillating shuttle



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FIG. 8A.—Upper threading of a long shuttle machine.

carefully so that you become familiar with the process of stitch forming (Fig. 7).

Threading the Machine

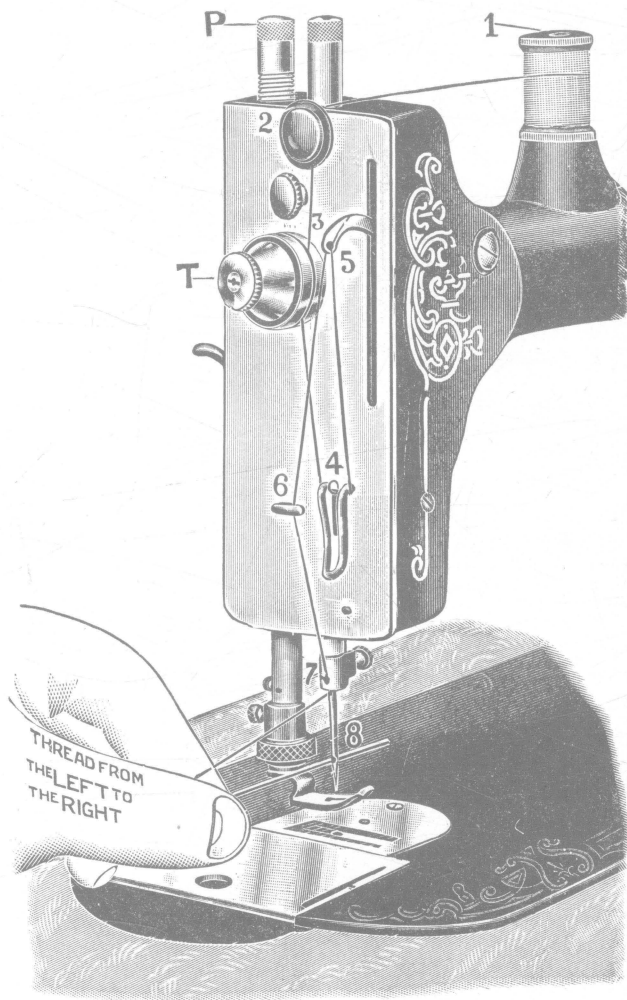
11. Have you ever been puzzled about the threading of a strange machine? Since all machines make the same stitch it is necessary that they use similar devices. Hence, following the same steps will enable you to thread any machine.

12. **Upper Thread.**—Figure 8 A shows a common method of threading. The three steps in threading are: from the spool placed

upon the spool pin to the tension (2); to the take-up arm (4); and then to the eye of the needle entering from the grooved side (7). Guides may be used on the way such as Nos. 1, 5, and 6, Fig. 8A, but the order remains the same.

Some machines lead the thread through an eye in the upper end of the needle bar to serve the same purpose as the take-up arm, Fig. 8A, or use the take-up spring placed somewhere in the threading circuit.

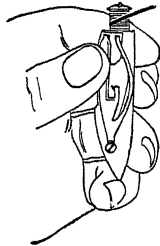
Fig. 8B shows the threading of one make of rotary machine often threaded incorrectly. No-



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FIG. 8B.—Upper threading of National rotary machine.

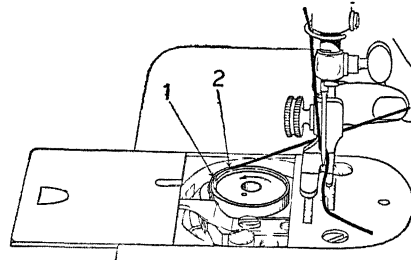
tice that the same principle of threading is used, that is, spool (1), to tension (3), to take-up lever (5), to needle (7).

13. **Lower Thread.**—For long shuttle or vibrating machines drop the bobbin in the shuttle so that the thread is unwinding as in Fig. 9, with the thread running from left to right across the front of the bobbin. Next draw the thread out through the notch in the case and under the shuttle tension spring on the outside of the case.



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FIG. 9



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FIG. 10

14. For rotary or oscillating machines using a round bobbin, place the bobbin in the bobbin holder, again drawing the thread out through the notch in the case and under tension spring (Fig. 10).

15. A general rule for checking the lower threading; pulling on the lower thread should cause the bobbin to turn in a counter clockwise direction as viewed from the open end of the shuttle or bobbin case (Fig. 10). If this is not the case, rethread the shuttle or bobbin case, turning the bobbin end for end.

16. To prevent snarling of the threads, it is best to draw up the lower thread by holding the upper thread and turning the hand wheel one revolution. This will bring the lower thread up through the hole in the plate, so that both threads can be held back under the presser foot before starting to sew.

The Needle

17. In order that the machine will sew properly it is necessary that the correct needle for the machine is used. The two important parts of the needle are first its length—that is, the distance from A to B, Fig. 11—and second, its setting (Fig. 12).

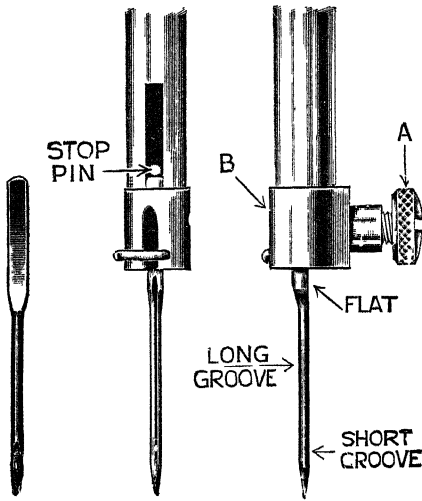


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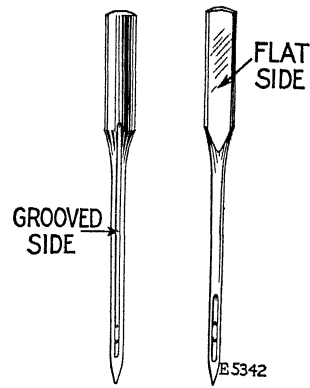
FIG. 11

18. In sewing, the needle must place the center of the loop it forms in front of the shuttle point or hook. In modern machines the needle shank will then be against the stop pin (Fig. 12, center).

19. All family sewing machine needles have a long groove on one side of the needle (Fig. 12, at right), extending from the shank to the eye. The needle must be clamped to the needle bar so that this groove will be on the opposite side of the needle from the point of the shuttle (Fig. 12 shows thumb screw (A) and needle clamp (B)). Self-setting needles have a flat side on the shank (Fig. 12, at left) or a notched top, which, when placed next to the needle bar, will put the long groove in its proper working position.



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FIG 12



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FIG 13

(a) Showing long groove
(b) Flat shank and short groove

Fig. 13, A and B, show the two sides of needle. Note that the side of the needle with the flat side on the shank has a short groove at the eye.

20. Difficulty is sometimes experienced in securing correct needles. This is most likely to occur when asking for needles to fit a certain make of machine. It so happens that different models of the same manufacture, carrying the same name, often require different needles. When purchasing needles take along an old needle that works satisfactorily. Needles may be secured from a number of sources, as replacement companies stock a full line of needles. When purchasing needles from a replacement source make a permanent record on your machine of the number on the package, and thereafter ask for needles by make and number.

21. For example, in getting needles for a White Rotary machine; if secured at —

<i>Store</i>	<i>Ask for</i>
Boye Needle Agency	Boye Needle No. 16
Crowley “ “	Crowley “ No. 62
Singer “ “	Singer “ 15 X 1

22. Always tell the clerk the size thread you expect to use, in order that you will get needles with the proper diameter blade and eye size for quality work. Needles with too small an eye for the thread will break the upper thread; too large an eye will cause irregular stitching.

The Feed Dog

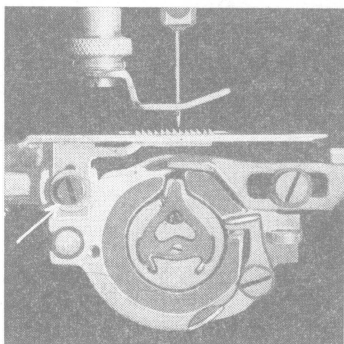


FIG. 14

teeth come up through the slot in the throat plate, engage the material, and carry it back the length of one stitch. The dog next disengages the material by dropping below the plate and returning to the forward position.

24. Stitches of different lengths are secured by changing the distance the dog travels while it is engaged with the material. The length of stitch is changed by a thumb nut, lever, or slide on the arm or base of the arm of the machine (Fig. 15).

25. The feed dog is adjustable for height and is properly set when, in its *highest position*, the bottom of the notches between the teeth are exactly level with the top of the plate (Fig. 14). Should the dog require adjusting, loosen the screw to which arrow points in Fig. 14, push the dog into the position described above, and again tighten the screw. All machines have this adjustment for changing the height of the feed dog. Find that adjustment on your machine.

23. If the fabric does not feed through the machine properly, two parts of the machine should be carefully checked: first, the toothed feed dog (Fig. 14), projecting up through the throat plate; second, the presser foot. The function of the feed dog is to carry the cloth under the needle a stitch at a time. Turning the hand wheel you will observe it accomplishes this by following a rectangular path. The



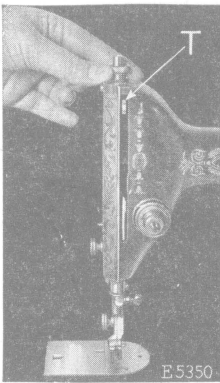
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FIG. 15

The Presser Foot

26. The presser foot rests on the cloth, holding it in position while sewing and assisting the feed dog in gripping the material. The presser-foot is held down by spring pressure, the amount of which is regulated by the thumb screw on top of the pressure bar (Fig. 16). Only enough pressure should be used to enable the cloth to feed along smoothly. Heavy and starchy materials require greater pressure in order that the dog will take hold of them. Fine materials cling to the dog readily and require a light pressure. Too much pressure will leave the print of the feed on the fine material or prevent the presser foot raising over seams.

The presser foot should be tight enough to feed the material evenly, and loose enough so that the material can be turned easily while you are sewing, such as in darning or mending.



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FIG. 16



FIG. 17.—Tensions balanced.



FIG. 18.—Upper tension tighter than the lower.



FIG. 19.—Lower tension tighter than the upper.

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Adjusting the Tensions

27. Does your machine sew so that the top and bottom of the stitching appear alike? If not, let us consider the factors which contribute to make a perfect stitch (see Figs. 17, 18, 19).

Select the Thread to Use with the Material.—Choose a thread comparable in size to a thread of the material. It is better to get strength in the stitching by making a well formed stitch rather than using a coarser thread. By this means you will also improve the appearance of the stitch.

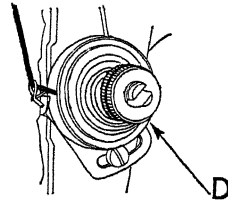
Select a Needle to Suit the Thread.—Use a sharp needle of a size to correspond with the thread used. A large or dull needle will

make a large, ragged hole not filled by the thread. A needle too fine for the thread will not have a large enough eye to permit free passage of the thread. This will interfere with the looping of the thread, and may cause dropped stitches and broken thread.

Adjust the Tension to the Material.—Too much tension on the threads will cause the material to be drawn or puckered. Not enough tension will cause a loose stitch of poor wearing qualities. A rule for the amount of tension is to have the tension tight enough so that the threads are drawn in or imbedded somewhat in the material but not tight enough to draw or pucker the goods. This will prevent the thread of the stitch from being subjected to undue wear when the garment is put in service.

The lighter the material, the less body and the easier drawn, so, less tension should be used. Loosen the tension rather than sew on paper to avoid puckering of fine materials. The heavier the material, the more body and the more tension required to imbed the thread in the material, so a tighter tension should be used.

Balancing Tension on the Two Threads.—The appearance of the stitch is determined by the relative adjustment of the upper and lower tensions, since they bear directly on the upper and lower threads. In Fig. 20, at D, is shown the thumb nut by which the upper tension may be adjusted. Turn the thumb nut to the right to tighten the thread; turn to the left to loosen.



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FIG. 20

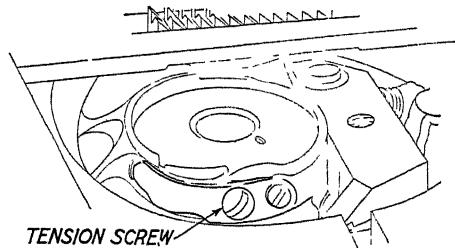


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FIG. 21

The tension on the bobbin thread is regulated by the tension adjusting screws shown at I on the long bobbin, Fig. 21. To tighten the ten-

sion, turn screw to the right; to loosen, turn it to the left. Fig. 22 shows where the tension adjusting screw is found on the round bobbin. Adjust as suggested for Fig. 21.



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FIG. 22

Figs. 18 and 19 illustrate exaggerated cases of poor stitches caused by unbalanced tensions. These two illustrations can be described by saying one thread is *tighter* (the straighter appearing of the two) than the other, or that one thread is *looser* than the other. In order to secure equal tension and a balanced stitch as in

Fig. 17, we can either *loosen* the tighter thread or *tighten* the looser one. Just which to do will be determined when we consider the material we are working with, and the discussion under "Adjusting the Tension to the Material," on page 13.

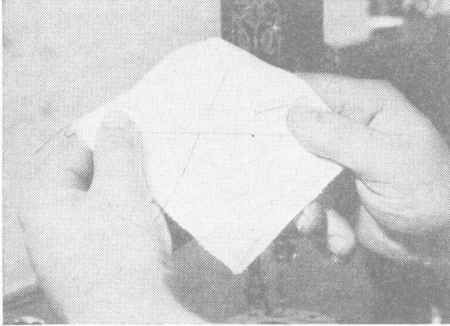
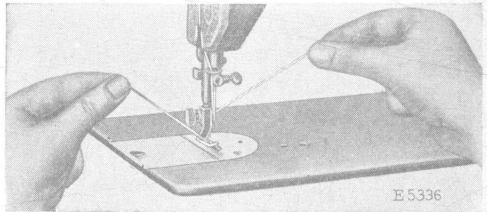


FIG. 23

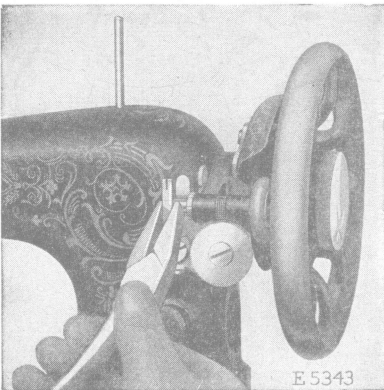
are equal or balanced. In case only one thread breaks, it is the tighter or straighter one.

Another method of testing the relative tightness of the two threads is by pulling on both threads as in Fig. 24. Always pull on the thread as you make an adjustment to see if turning the screw actually changes the tension of the thread.



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FIG. 24



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FIG. 25.—Adjusting thread guide.

If the tensions are balanced as in Fig. 17 and occasion demands that they be changed, both should be adjusted, as changing only one will produce a condition such as in Figs. 18 or 19.

The upper and lower tensions are of equal importance and should be used, especially when changing from heavy to light material or vice versa.

Wind Bobbins Evenly.—If the thread winds unevenly, the guide may be bent. Fig. 25 shows method of adjusting it.

Cleaning and Oiling the Machine

28. Does your machine run hard? Do the adjustments change while sewing? A thorough cleaning is the most satisfactory remedy. This cleaning job should not be difficult if not neglected and if reasonable care is exercised. Clean your machine once each year, and oftener if used to any considerable extent. Until you acquire sufficient confidence, it will probably help to use the following procedure as a guide in cleaning and oiling operations.

- a. Remove the spool, shuttle, and bobbin.
- b. Then, using a large oil can, pour a generous amount of gasoline into all oil holes and over the working parts of the head of the machine. Run the machine until the gasoline has loosened any gummed oil present. You should be able to notice the machine treads with less effort.
- c. Remove the needle, presser foot, shuttle, and needle plates. Next remove the face plate from the outer arm. Machines vary in this detail depending on whether removing the face plate also removes the needle bar or only exposes it. Machines that have a nicked face plate have the screws on the outside, or to the left as you sit at the machine; machines that have a dull or painted face plate have the screws on the inside or at your right as you sit at the machine.
- d. Place a pie tin of gasoline on the bed of the machine and under the left end of the arm. With a small brush and old cloths vigorously clean the presser bar, needle bar and other mechanism of the outer arm. If the machine has a removable plate on either the front or back of the vertical part of the arm, clean through this opening with the brush also. The hand wheel oilcase and bobbin winder should be cleaned with the brush while holding the pie tin under them to catch excess gasoline.
- e. Next tip the head of the machine away from you and holding the pie tin underneath clean all the mechanism on the under side. Be sure to remove all lint from around the feed dog, as it may prevent the machine feeding properly.
- f. Clean the treadle after removing any thread that may have wrapped around the large band wheel bearings. Using the brush and gasoline clean the bearings of the treadle platform, the band wheel and the pitman rod connecting these two.
- g. Using a clean cloth, wipe the machine and the parts, which have been removed, as dry as possible.

29. **Note:** Care should be taken not to get too close to an open flame when using gasoline. Kerosene may be substituted for gasoline, but since it is slower in evaporating from the inaccessible places allow more time for drying before oiling the machine.

30. Oil the machine as you reassemble it. Place a few drops of oil in each oil hole and at each point of contact between two moving parts. Turn the hand wheel slowly with the head tipped back to discover where these moving points are. Under the front shuttle slide on most machines is found a small hole containing cotton or wool. Oil should be placed upon this material in order to lubricate the shuttle. Place a few drops of oil on a cloth and rub it on the shuttle race in case your machine is not provided with this device. The shuttle has a tendency to wear and develop sharp edges which, if not properly lubricated, cut the thread.

Note: Use only a good grade of sewing machine oil on your machine; preferably an oil secured from a merchant selling sewing machines or accessories. General purpose oils are to be treated with suspicion, for although sewing machines may be listed on the label of the can, some oils will leave a gummy residue which is difficult to remove.

31. **Caution.** In reassembling machines like the White, where the needle bar is removed with the face plate, be sure the needle is centering in the hole in the plate before clamping the face plate screws tight.

32. If you notice a tight spot when turning the hand wheel of machines with a flat needle bar, as the Domestic or New Home, loosen slightly on the two screws at the rear of the outer arm before tightening the face plate screws. These screws are intended to take excess play out of the needle bar. Make certain the small roller which drives the needle bar of these machines is in its place. Notice which side of the roller is worn and place that side toward the needle bar.

Sewing Machine Motors

33. Sewing machine motors require little attention other than a periodic lubrication. Care should be taken not to over-oil the motors, as an excess may reach the brushes and commutator, causing the motor to run slowly or stop. Consult your instruction book as to lubrication, as some motors use oil and others require special grease. The usual precaution about keeping electrical connections tight and well insulated should be followed.

TROUBLE AND REMEDY CHART

A THOROUGH understanding of *how* the machine sews in most cases will suggest remedies to the troubles with the machine. Be sure you understand how all the parts operate in reference to making a stitch. There are troubles, however, that are not easily traced. This outline will suggest the remedy for the difficulty. Notice that in most cases several things may cause one difficulty. Be sure to check all that are listed and any others you may think of.

In locating and correcting a specific trouble the following suggested procedure may be helpful:

1. Check through the list until you find the specific trouble.
2. Check through each cause separately. Check the ones that seem most likely first. Try the machine after each adjustment.
3. If you do not locate the difficulty on the first attempt, check through the others listed until you locate and correct the difficulty.
4. If you do not understand what is meant in the suggested remedy, refer to the first part of the bulletin, pages 3 to 16, where an explanation is made.

I. Machine Runs Hard—

1. Lack of oil.
Remedy: Locate the oil holes, clean them out and oil. Oil where one moving part rubs against another.
2. Thread in either band wheel bearings.
Remedy: Dig the thread out with a pin.
3. Gummed oil or dirt in the bearings or between moving surfaces.
Remedy: Follow instructions for cleaning, Par. 28.
4. Bent needle bar.
Remedy: Remove and straighten.
5. Tight bearings.
Remedy: Adjust so as to run free.

II. Machine Makes an Imperfect Stitch—

1. Either or both tensions out of adjustment.
Remedy: See instructions for adjustment of tensions, Par. 27.
2. Either or both tensions not functioning properly.
Remedy: Upper Tension.—Where possible take the upper tension apart, clean and polish the inner surfaces of the tension plates, thereby removing any lint, dirt, or rust spots, Fig. 20.
Lower Tension.—Take off the lower tension spring and remove any lint, dirt, pieces of thread, or other foreign materials. Figs. 21-22.
3. Dirt or lint in bottom of shuttle.
Remedy: Remove by scraping inside of shuttle thoroughly.

III. Goods Does Not Feed Through the Machine—

1. Dirt under the throat plate and around the feed dog.
Remedy: Clean feed works.
2. Feed dog set too high or too low.
Remedy: Turn the machine in the proper direction until the dog starts to move forward. Now the **bottom of the notches of the teeth should be level with the top of the feed plate**. Raise or lower the dog until set at the correct height. Fig. 14. Par. 23.
3. Too much or too little tension on the compressor foot.
Remedy: Tighten or loosen until the goods will feed through the machine properly but you are yet able to turn the goods as you stitch without raising the compressor foot. Fig. 16. Par. 26.

IV. A Seam Will Not Feed Through the Machine—

1. Usually due to too much tension on the presser foot spring.
Remedy: (Goods does not feed through the machine.) See cause 1-2-3 under III.

V. Skipping Stitches—

1. Crooked needle.
Remedy: Replace needle.
2. Needle too small for the thread. See instruction book for correct size of needle.)
Remedy: Replace needle.
3. Incorrect threading of needle.
Remedy: Pass the thread through the eye of the needle toward the shuttle point or hook. (See your instruction book.) Fig. 5.
4. Needle set wrong side out.
Remedy: Set the needle so that the long groove is away from or on the opposite side of the needle from the point of the shuttle. Figs. 12 and 13. Par. 19.
5. Needle set too high or too low.
Remedy: Set the needle so that when the point of the bobbin or the point of the shuttle hook crosses the needle, the point or hook is $\frac{1}{8}$ inch above the eye of the needle. Fig. 3. Par. 9.
6. Excess oil on the shuttle or shuttle race after oiling.
Remedy: Wipe excess oil from shuttle race.

VI. Breaking Thread—

A. Upper Thread.

1. Machine threaded incorrectly. (See your instruction book.) Pars. 11 to 16.
2. Needle set too high or too low. (See 5 under V, Skipping Stitches.)
3. Needle threaded incorrectly. (See your instruction book.) Fig. 7.
4. Bent needle. (Replace.)
5. Dull needle. (Replace.)

6. Needle rubbing against throat plate, presser foot or attachments.
Remedy: See that the needle does not rub against the presser foot or the edge of the hole in the throat plate. The adjustments necessary may be (a) replace a bent needle, (b) adjust the presser foot so that its slot is central over the hole in the throat plate, or (c) on those machines on which the needle bar housing is removable loosen the screws which hold it in place, slide the housing slightly back or ahead, and then tighten the screws. On some machines having a removable needle bar housing there are adjusting screws for side alignment of the needle. (See your instruction book for White machines.)
7. Sharp edges on the eye of the needle.
Remedy: Change the needle.
8. Needle too fine for the thread.
Remedy: Change the needle. (See your instruction book for correct size of needle and thread.)
9. Upper tension much too tight.
Remedy: Loosen the upper tension. Par. 27.
10. Knot or bad place in the thread.
11. Rough or sharp places on the shuttle
Remedy: Smooth with fine whetstone.
12. Insufficient clearance between the shuttle and the shuttle carrier on the long bobbin machine.
Remedy: Loosen screw that holds shuttle carrier in place and move shuttle carrier to permit play.

B. Lower Thread.

1. Lower tension much too tight.
Remedy: Loosen the lower tension. Par. 27.
2. Shuttle incorrectly threaded. Figs. 9 and 10. Pars. 13-16.
3. Rough or sharp edges on the hole in the throat plate, caused by needle striking edge of hole.
Remedy: Smooth the plate or replace.
4. Bobbin too full.
5. Uneven winding of the bobbin.
Remedy: With pliers bend arm that carries thread toward side of bobbin that does not fill. If bobbin does not fill on both ends bend arm toward bobbin. If bobbin fills too much on both ends bend arm away from bobbin. Fig. 25.
6. Loose winding of the bobbin.
Remedy: Hold the thread taut with hand.
7. Rough places or sharp edges on the shuttle tension spring.
Remedy: Smooth with fine whetstone.
8. Sharp edges on the shoulders of the bobbin.
Remedy: Smooth.
9. Accumulation of dirt in the shuttle cavity, to such an extent as to prevent the bobbin from turning freely.
Remedy: Clean with cloth or screw driver.

VII. Looped Stitches on Bottom of Cloth—

1. Machine incorrectly threaded.
Remedy: See Pars 11 to 16.
2. Upper tension much too loose.
Remedy: Tighten the upper tension. Fig. 20.
3. Thread catches on either a rough place on the shuttle or between the shuttle carrier and the shuttle in the long bobbin machines.
Remedy: Smooth.

VIII. Looped Stitches on Top of Cloth—

1. Incorrect threading of bobbin.
Remedy: See Pars. 13-16.
2. Bobbin tension much too loose.
Remedy: Tighten the bobbin tension. Figs. 20-21.

IX. Puckered Goods—

1. One or both tensions too tight for material used.
Remedy: See instructions for adjusting tensions. Par. 27.
2. Dull needle.
Remedy: Change needle.
3. Incorrect size of needle. (See your instruction book for correct size of needle for various sizes of thread.)

X. Tensions—

Tensions do not stay in adjustment.

Remedy: Upper or lower tensions may work loose due to vibration of the machine. Take screws out of the shuttle case. In most machines the screw is split on the point. Spread the point of the screw with knife blade or screw driver enough to hold the screw where it is placed.