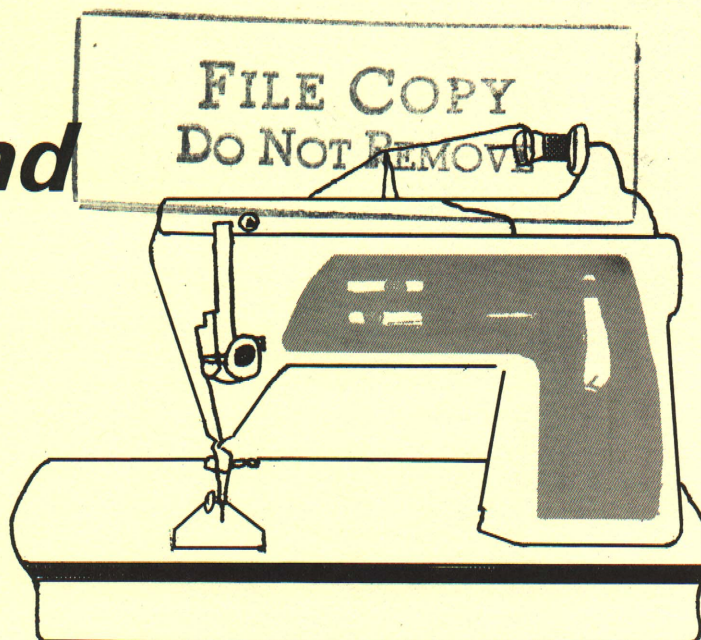


# ***Cleaning and Adjusting your Sewing Machine***



Cooperative Extension Service

Michigan State University

This leaflet is prepared as a guide for homemakers in the cleaning, oiling and proper adjusting of sewing machines. Although it gives information that is of a general nature, it is applicable to any make or model sewing machine on the market.

## **Instruction Book**

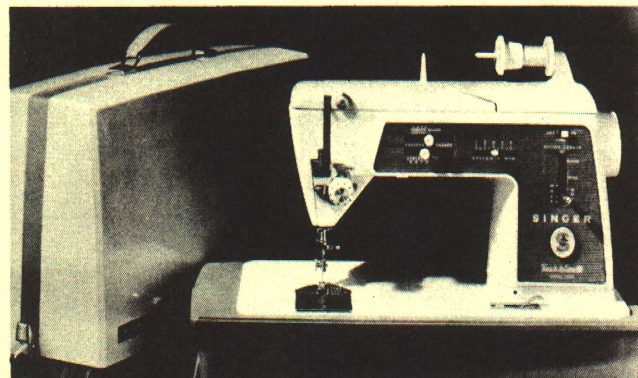
Your instruction book is the best reference available for the specific information about any particular make or model sewing machine. It should be followed explicitly for type of lubrication and specific adjustments to be made. It contains both directions and illustrations. If the book has been lost, try to get another one from your dealer. It may be necessary to write to the manufacturer of your machine. If so, give the name, serial number and approximate age of the machine.

## **Types of Sewing Machines**

There are basically three types of machines that are available in many different makes and models.

- Vibrator sewing machine (has a long shuttle)
- Oscillator sewing machine (hook moves back and forth in an oscillating motion during sewing operation)
- Rotary (hook makes a complete revolution in its sewing operation)

Basically, all sewing machines used in the home make a lock-stitch type of operation. A few of the newer ones have a chain-stitch supplement option that



can be used for basting and temporary sewing for easy removal later.

## **Cleaning and Oiling**

Clean it first, is a safe rule to follow if a machine is giving trouble. Dust, grit, lint, and thread easily collect on the working parts of the machine to form, in time, a packed mass soaked and gummed with oil. This gummed oil and dirt will interfere with the free running of the machine and may cause it to jam and lock.

The following directions do not apply specifically to electric machines that have bearings packed in grease nor to chain-stitch machines. They do apply to either treadle or electric lock-stitch machines, by far the most numerous in homes throughout the country.

## Equipment needed for cleaning

Pie tins for small parts and cleaning solution  
Small screwdriver  
Large screwdriver  
Cleaning brush (nylon type available at sewing centers)  
Knife for cleaning use (pocket or paring)  
Long needle or small crochet hook for cleaning  
Cleaning cloths  
Cloth for testing stitch (6-inch squares of old sheeting are excellent)

Can of sewing machine oil (the kind packaged by gasoline filling station companies or sewing machine manufacturers)

Tube of sewing machine lubricant (if gear drive and recommended by manufacturer for electric motor)

Small bottle or can of cleaning solution. (A cleaning solvent which will not flash to flame at temperatures below 120° F. It is usually available at filling station or cleaning establishments. *Never use gasoline for cleaning purposes; it is highly inflammable. Never use carbon tetrachloride for cleaning purposes; it is very poisonous.*)

## Good location for cleaning

Place the sewing machine where you have good light, preferably in a room where there are no rugs. Newspapers can be placed on the floor to protect it from oil or grease. A good floor lamp placed so that it will provide light over your shoulder will provide better visibility for cleaning.

## Areas to be cleaned

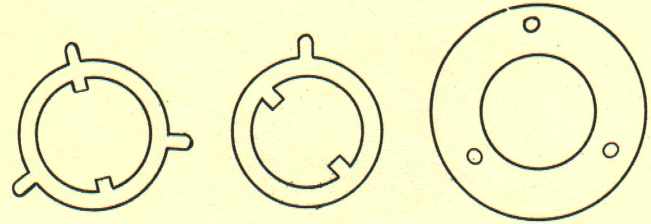
The important areas for disassembling and thorough cleaning include the handwheel bearing and clutch assembly, the needle bar and presser-foot bar, and the hook and bobbin area assembly. Most sewing machines have a basic type clutch assembly for disengaging the needle-bar driving mechanism when winding a bobbin. The handwheel assembly gets gummy and dirty and, accordingly, needs to be thoroughly cleaned to make the clutch assembly function properly.

Some of the new type sewing machines do not have a clutch assembly since the bobbin can be refilled in its regular position. For these machines, it will not be necessary to remove the hand wheel and clean this area.

There are several types of clutch-adjusting washers. All of them, however, are basically for the same purpose—a method of releasing the pressure of the handwheel on the drive shaft.

## Parts to remove

When removing parts, remember that “left is loose and right is tight” on practically all screws, nuts, and bolts found on household equipment. To use a screwdriver most effectively, put the pressure on the push, not on the twist. If a screw will not loosen easily, soak it with cleaning fluid. Then set screw driver in slot and



Different Types of Adjusting Washers

tap driver sharply with a hammer. Be sure to choose a screw driver with a blade as wide as the slot in the screw is long. Always use a wrench on nuts and bolts; never use pliers.

Follow the instructions below for taking off, step by step, the parts that must come off for cleaning. Do not take off other parts.

Remove spool of thread, bobbin, needle, and presser foot before starting cleaning process.

### • Handwheel area

Clean the clutch and handwheel if the wheel does not turn freely when the clutch is released. To remove the clutch and handwheel, loosen the small screw in the face of the locknut—the locknut is the part that is turned to the left to release the clutch for operating the bobbin winder. Next, unscrew the locknut, and then remove the washer and handwheel. Most machines will have a washer that looks like one of the three shown above. Some makes will be slightly different. Notice the position of the washer so you can put it back in the same position.

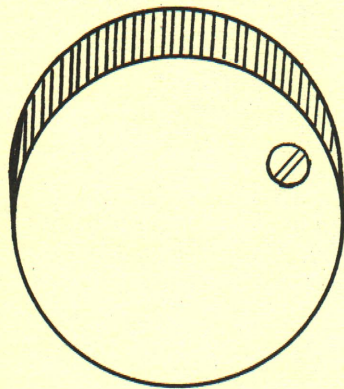
The handwheel should slide off the shaft easily. If the machine is driven by an external belt, this belt will have to be removed before the handwheel will come off. (If the machine has an internal drive belt or the wheel obviously won't come off, do not remove the handwheel. Replace the parts you have removed and skip this area.) Gear driven machines will have a gear on the inside of the handwheel.

Clean the handwheel, washer, and shaft. Lubricate the shaft with two drops of oil and place a small amount of grease on all gears.

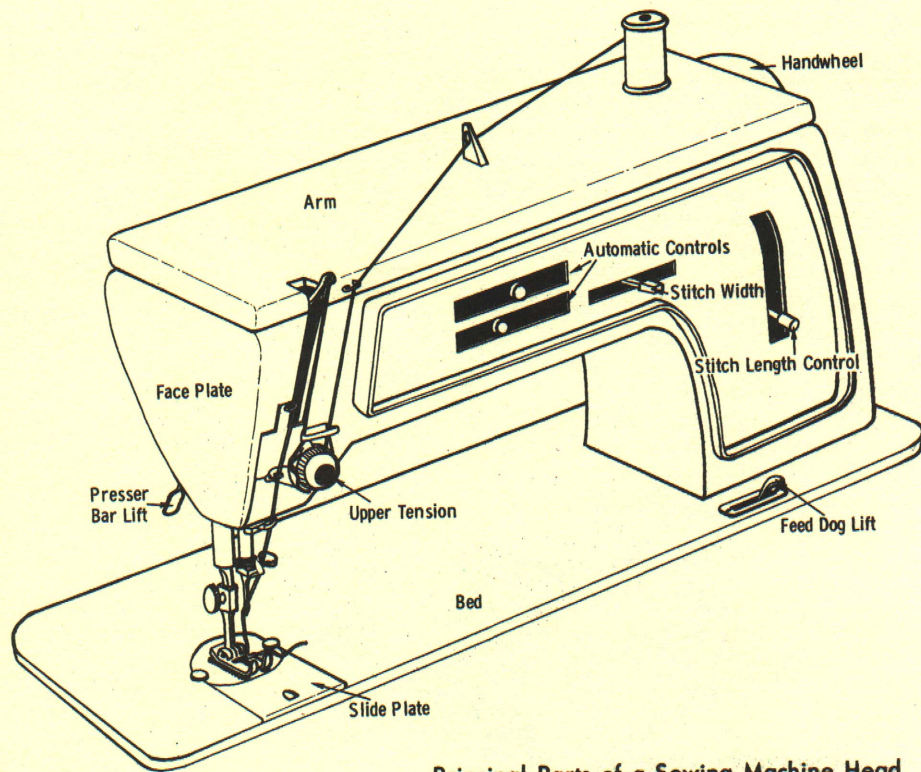
Reassemble the handwheel and clutch. If the clutch fails to operate, either because it will not hold or fails to release, remove the locknut again and turn the washer one half turn (180°) and reassemble. The clutch should then work properly.

### • Faceplate area

The faceplate on most machines is held in place with one or two screws. By removing these, the plate can be easily removed for cleaning of the needle bar and presser foot bar. On some of the newer machines, the faceplate is a part of a housing that is mounted on hinges that can be easily moved outward away from the bars and mechanisms behind it. No other parts need to be removed for cleaning in this area. First use a dry brush to clean out all lint and other foreign ma-



Handwheel Locknut



Principal Parts of a Sewing Machine Head

terial. A small piece of cloth with a little solvent on it can be used to clean the needle bar and presser bar of any gummy grease.

After thoroughly cleaning, place a drop or two of oil on each shaft where it slides through the housing and oil all other moving parts according to your instruction book before replacing faceplate.

• *Bobbin and Hook area*

Lint will be the primary offender in this area. The bobbin case can be removed on all makes of machines. Use a dry brush to clean out all lint in this area. Remove any thread that may be wound up around the hook shaft. On many machines, the hook assembly can also be removed for more complete cleaning. Place one drop of oil on the exterior perimeter of the hook and race to lubricate it after cleaning.

**Use of cleaning solvent**

Use a minimum amount of cleaning solvent in the cleaning process. A cloth dampened with some of the cleaning solvent will normally be enough to clean all rods, shafts, and bearing areas that are accessible. Take care to prevent any of the solvent getting on the electric motor cord, the belt, and any other rubber parts as it will soften and damage them.

If the sewing machine runs hard, try to locate the specific area and, with a little more solvent, clean that part more thoroughly.

**Oiling after cleaning**

Apply oil freely into all oil holes and wherever one surface rubs against or turns within another. Use oil freely because all oil has been removed from the bearings by the cleaning process. Never oil the tensions.

Run the machine to work the oil thoroughly into all the bearings. When oiling is completed, wipe excess oil from all parts of the machine. This excess oil collects dust and too much oil on the shuttle race or needle can cause skipped stitches.

Be sure to oil any wool or felt that feeds oil to the shuttle race. Put oil on the wool in the oilhole under the shuttle slide plate of long-bobbin machines with such a hole. Some long-shuttle machines have a block of felt or ball of wool so set against the front end of the shuttle race that the point of the shuttle touches it and carries oil back along the race as the shuttle operates. On machines with no such device, wipe a thin film of oil on the race with a cloth or your finger.

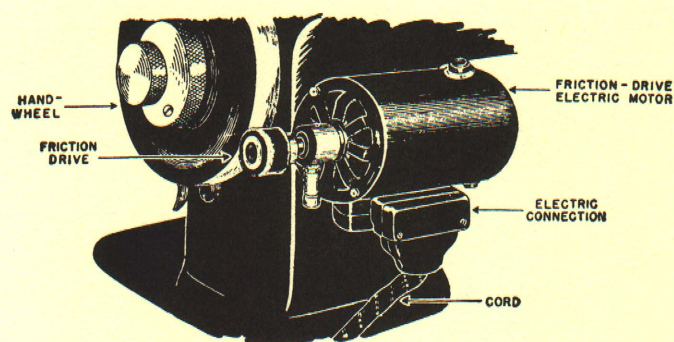
**Replacing parts**

After oiling the machine head, clean, wipe dry with a clean cloth and put back on the machine all parts that were placed in the pan. When you put them back, never force parts or screws into place. You may damage or break them. If a screw balks, probably it does not belong in that place. Again remember "left is loose;

right is tight," or screws and nuts tighten if you turn them in a clockwise direction.

Run the machine with some waste cloth under the presser foot to absorb excess oil from around the needle and the feed mechanism. Be sure the presser foot has been pushed back into its clamp as far as it should go so the slot in the presser foot is directly above the needle hole in the needle plate and the sides of the slot are parallel to the sides of the feed dog. A small piece of cloth placed under the presser foot when not in use will absorb any oil running down the shaft and save wear on the foot.

### Motor and motor control



Lubricate the electric motor according to the manufacturer's instructions. Some motors need to be lubricated only once a year; some need no lubrication. Some require grease; others, oil. Using too little lubricant, the wrong kind, or too much may ruin a motor.

Check to see that all electric connections to the motor control and motor are tight. If the cord covering is not in good condition, tape it or, if necessary, replace the cord. The belt that connects the motor to the handwheel should have just enough tension to keep it from slipping. On some machines, the belt can be adjusted by slightly shifting the position of the motor.

Take good care of the rubber driving ring or wheel on motors that drive machines by friction contact with the handwheel. If this driving ring or wheel becomes flat-sided or unevenly worn causing excessive vibration, replace it with a new one. Keep the handwheel clean and dry, the driving ring adjusted firmly to the handwheel and in line, and the machine will run with a minimum of vibration.

## Regular Oiling

For periodic lubrication, one drop of oil in each bearing and oilhole is enough. It is good practice to oil the machine after each day's work or after 8 to 10 hours of use. Oil occasionally, whether the machine is used or not to keep the oil from drying and gumming.

## Adjusting the Machine

### Threading

Refer to your instruction book. The thread should run from the spool to the upper tension, to the thread take-up, and then to the needle. Various guides hold the thread in the correct position as it feeds to those three main points—tension, take-up, and needle. Pass the thread through the needle from the side with the long groove to the side with the short groove.

Place the bobbin in its case or shuttle. Pull the thread under the lower or bobbin tension according to the instruction book. In most machines the bobbin should rotate in a counterclockwise direction as the thread unwinds. If the shuttle is not threaded correctly, the thread may catch and break, or loops may form in the stitching along the top side of the cloth. If the bobbin is put in the bobbin case incorrectly, the case may unthread.

### Tensions

Upper and lower tensions must be balanced to produce a perfect stitch. The upper tension varies in location on different machines. It may be on the faceplate, on the face of the needle-bar housing, on the front of the needle-bar housing, or on the upper arm of the machine head. It is adjusted by a thumb nut.

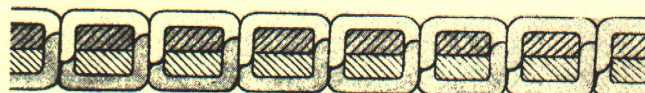
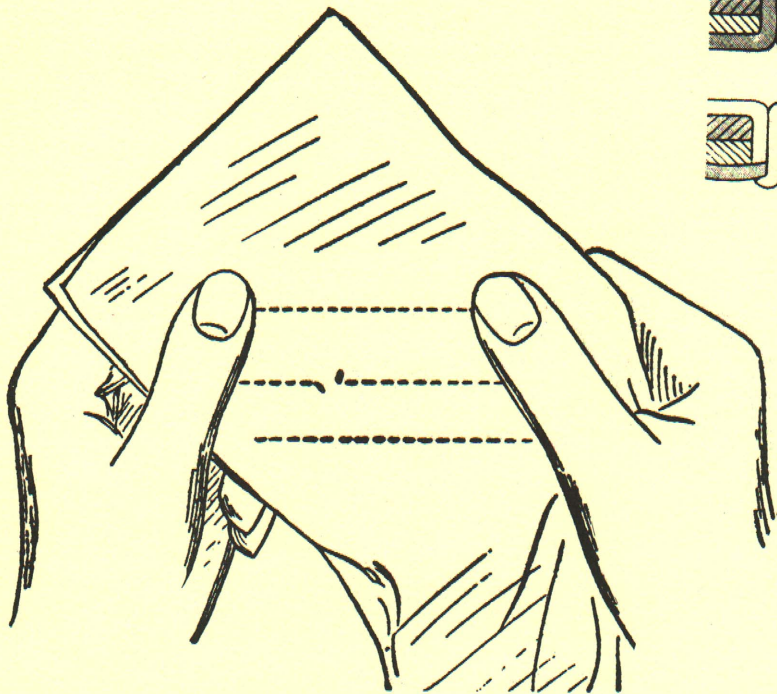
The lower tension, located on the shuttle or bobbin case, is adjusted by a screw. If two screws fasten the lower tension spring to the bobbin case, adjust by turning the screw nearest the center of the spring—not the screw on the end.

If, during the cleaning, the lower tension spring has not been removed or its adjustment changed, the adjusting procedure is the same as in the ordinary use of the machine. That is, assume the lower tension to be correct until proved wrong, and make all adjustments on the upper tension.

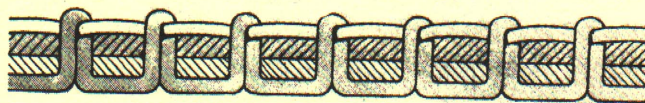
If the lower tension has been disturbed, set both lower and upper tensions so there will be a slight drag on each thread. Use the same size thread on both bobbin and spool. Assume the lower tension to be correct until proved otherwise by testing, and make all adjustments on the upper tension.

Now, to guide you in the adjusting, take a look at the stitching the machine makes. Set stitch-length control for a medium length of stitch. Fold a 6- or 8-inch square of sheeting or average weight cloth and stitch diagonally across it at an angle of about 45 degrees.

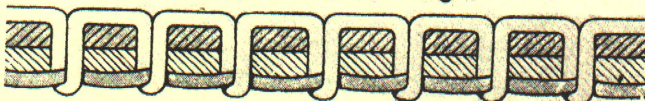
Now, inspect the stitching. A perfect stitch will have threads locked in the center midway between the two layers of cloth, with no loops on the top or bottom of the seam and no puckers in the cloth. If loops of the bobbin thread show on the top side of the seam and the top thread is straight, the upper tension is tighter than the lower. If loops of the spool thread show on the underside of the seam and the lower thread is straight, the upper tension is looser than the lower.



Perfectly Locked Stitch



Upper Tension Too Tight



Upper Tension Too Loose

### Test for Tension Balance and Adjusting Needed

To make a closer test of tension balance, grip the ends of the bias stitching between the thumb and first finger of each hand. Pull evenly, strongly enough to break threads. One of four things happen:

### Adjustment

1. The upper thread only may break. This shows that the upper tension is tighter than the lower.

2. The lower thread only may break. This shows that the upper tension is looser than the lower.

3. Both threads may break. This shows that the tensions are balanced. The stitch may be perfect. However, if the cloth puckers at the same time, both tensions are too tight.

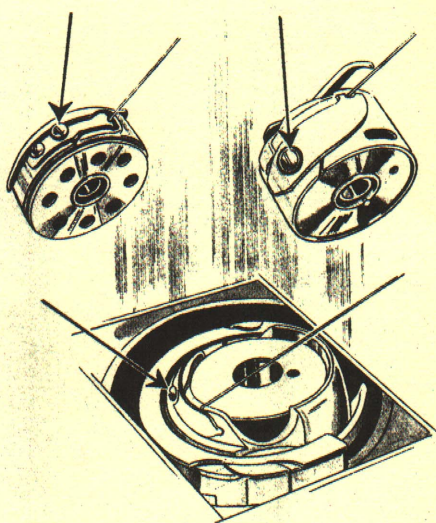
4. Neither thread may break. This shows that tensions are balanced but both are too loose.

Loosen the upper tension by turning the adjusting nut about one-fourth of a turn to the left. Make another diagonal seam and test the stitch again. Repeat if necessary, changing the upper tension by slight turns until tensions are balanced—that is, until both threads break at the same time or until neither thread breaks. They may both need to be loosened or tightened, as described in 3 or 4, below.

Tighten the upper tension by turning the adjusting nut about one-fourth of a turn to the right. Make another diagonal seam and test the stitch again. Repeat if necessary, changing the upper tension by slight turns until tensions are balanced—that is, until both threads break. Again, if the cloth puckers follow directions in 3.

No adjustment is needed unless the cloth puckers. If the cloth puckers, loosen the lower tension first; then adjust the upper tension as in 1 above. Repeat the adjustments until the result is a perfect stitch—with tensions balanced and no puckering of the cloth along the seam.

Tighten the lower tension slightly. Then obtain a balance by tightening the upper tension a little at a time, as in 2 above.



**ADJUSTING BOBBIN TENSIONS**—Turn the screw nearest the center of the small spring on the bobbin case. An eighth of a turn will make a noticeable difference. Turn left to decrease tension, to the right to tighten tension.

## Presser Foot

The way material feeds through the machine depends in great part on the pressure of the presser foot on the feed dog. The operator, while continuing to sew, should be able to swing the cloth in any direction or make a complete loop or turn without raising the presser foot. This freedom of operation will be reduced as the pressure on the presser foot is increased.

This pressure is adjusted by turning the pressure-control screw at the top of the presser bar on top of the needle-bar housing. Some newer machines increase pressure by pushing down on the presser bar tension control and release pressure by pressing a release mechanism. Maintain only enough pressure on the presser foot to keep the cloth moving and have the machine make a straight seam. If the pressure is too light, the cloth may slip from side to side, causing staggered stitches and a crooked seam. Too much pressure makes the machine run hard and may leave marks of the feed dog on the material. Less pressure usually is required for thick or bulky material than for thin material. If the above adjustment is correctly made, the pressure is light enough so that sewing over a pin will not blunt or break the needle.

## Running the Machine

Always be sure before you start to use a machine that it is wiped clean.

Select the thread, either cotton or silk, of a size to suit the material you are sewing on. Finer thread is used for machine sewing than for hand sewing. The table in your instruction book or the table on this page will guide you in making the correct selection of thread for a given material. The finer the material the finer the thread.

Use a needle of the right size for the thread. A needle that is too coarse will cut yarns in the fabric causing bad appearance or will cause skipped stitches.

Use the same size thread on the bobbin as on top of the machine, except when you want special stitching effects.

If the machine has no automatic bobbin winder release, be careful not to wind the bobbin too full or too tight or the thread may break in stitching. It is good practice not to wind on a bobbin partly filled with thread. You may be deceived later about the amount in the top winding and forget what kind of thread is underneath. If you do not have a spare bobbin, then wind the thread back on spool and start with an empty bobbin.

Set the stitch length; then, if necessary, adjust the upper tension to suit the thread and material. For ordinary sewing on a lock-stitch machine, 12 to 16 stitches to an inch is about right. Use a longer stitch for heavy material; a shorter one for fine. If stitch length isn't

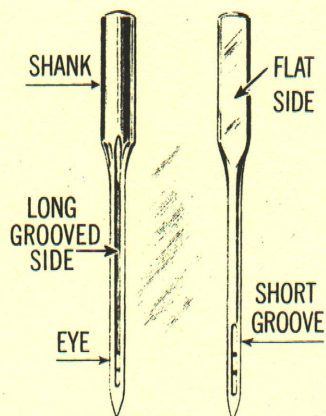
specified on the stitch control, count the stitches in a measured inch of sewing.

Pull enough thread through the needle to keep the needle threaded when the take-up lever rises to its highest point. Pull the under thread up from the bobbin and draw both threads back under the left side of foot and hold them loosely until you start to stitch. This prevents bunching of thread during the first few stitches.

Place the material so the needle will be sure to go through the cloth; then lower the presser foot. In general, it is best to stitch with the seam at the right-hand side of the goods. This is more convenient for the right-handed worker and keeps the material from being crushed and wrinkled in the limited space under the head. For this reason, the seam guide is attached to the plate at the right of the feed dog.

Never try to hasten the feeding of the material through the machine by pushing or pulling it while stitching. This will produce imperfect stitches and cause the needle to bend or break. When the end of a line of stitching is reached, stop the machine before the stitching runs off the material. Bring the take-up lever to its highest point, raise the presser foot, remove the material and cut the thread. Then there will be enough thread to start the machine again.

A machine kept clean, oiled, and correctly adjusted should produce perfect stitching. If there is any difficulty in securing good results, consult the summary of machine troubles and their possible causes and make the adjustments indicated.



Flat and Grooved Side of Needle

## Needle Selection

Sewing machine needles come in many styles differing as to needle length and shape of the shank. Each style of a given brand has its own number. Each style can be used in a number of different machines.

The needle should be of the correct length, sharp and straight. It needs to be so set in the needle-holding clamp that the short groove on the needle faces the shuttle point or hook as it passes the needle. In all the newer machines, the needle sets up against a stop pin in the needle bar. Two marks placed on the machine, will make a good reference to indicate the correct length between the end of the shank and the eye of the needle.

## FABRIC, THREAD AND NEEDLE CHART

Fabric	Thread size	Singer machine needle size	Stitches per inch
<i>Sheer</i> Like Chiffon and Organdy	80—150 Cotton 50—Mercerized A—Silk A—Nylon	9-11	14-20
<i>Lightweight</i> Like Gingham and Poplin	60—70 Cotton 50—Mercerized A—Silk A—Nylon	11-14	12-16
<i>Medium</i> Like Jersey	40—60 Cotton 50—Mercerized A—Silk A—Nylon	14-16-18	10-14
<i>Heavy</i> Like Tickings and Heavy Woolens	24—36 Cotton Heavy duty mercerized A—Silk A—Nylon	18-19	8
<i>Very Heavy</i> Like Canvas, Duck and Heavy Denim	8—20 Cotton Heavy duty mercerized 40—60 Linen	21	6
<i>Plastics</i>	50—Mercerized Heavy duty mercerized	11-21	6-12

## SEWING MACHINE NEEDLE STYLES\*

Singer needle style number	Boye needle style number	Needle (actual length)
15x1	6, 16	
20x1	4, 12, 14, and 24	
1x1	20	
1x2	10	
1x4	8	
1x7	2	
9N1	18	

\* Actual needle lengths shown above represent the style number of two brands of needles normally sold at sewing centers.

# Machine Troubles and Possible Causes

## Machine runs hard

Lack of oil.  
Thread wound around handwheel or bobbin area.  
Gummed oil or dirt in bearings.  
Tight bearings.  
Belt too tight.  
Bobbin winder against wheel or belt during stitching.

## Runs noisily

Lack of oil.  
Loose bearings.  
Shuttle loose in its carrier. (Long bobbin machines.)  
Loose bobbin case.

## Imperfect Stitches

- *Looped stitches on top of cloth or upper thread lies straight along top of cloth.*

Upper tension too tight or lower too loose.  
Bobbin incorrectly threaded.  
Dirt, lint, or rust between upper tension disks.  
Dirt, lint, or pieces of thread under lower tension spring.

- *Looped stitches on lower side of cloth or lower thread lies straight along bottom of cloth.*

Incorrect threading.  
Upper tension too loose or lower too tight.  
Dirt, lint, or rust between upper tension disks.  
Dirt, lint, or pieces of thread under lower tension spring.  
Dirt, or lint in end of shuttle or bottom of bobbin case.

- *Skipped stitches.*

Needle bent.  
Needle too small for thread.  
Needle set too high or too low.  
Needle set wrong side out.  
Needle incorrectly threaded.  
Needle too long or too short.  
Oil on needle or too much on shuttle race.

- *Staggered stitches.*

Too little pressure on presser foot.  
Take-up spring weak, broken, or missing.  
Incorrect adjustment of take-up spring.

- *Stitches of uneven length.*

Improper pressure on presser foot.  
Feed dog not adjusted properly.  
Dirt around feed mechanism.

## Upper thread breaking

Poor, knotty, or rotten thread.  
Machine threaded incorrectly.  
Needle set wrong side out.  
Needle set too high or too low.  
Needle bent.  
Needle too fine for thread.  
Needle threaded incorrectly.  
Needle rubs against presser foot or needle plate.  
Rough or sharp places on hook, bobbin case, or eye of needle.  
Upper tension much too tight.  
In long-shuttle machine—not enough clearance between shuttle and shuttle cradle.

## Lower thread breaking

Poor, knotty, or rotten thread.  
Lower tension much too tight.  
Bobbin case threaded incorrectly.  
Burr or sharp edges on needle plate.  
Bobbin wound too loosely or too tightly.  
Bobbin wound too full.  
Bobbin wound unevenly.  
Rough or sharp edges on bobbin shoulders.  
Rough or sharp edges on lower tension spring.  
Packed lint in shuttle or bobbin case.

## Material not feeding correctly

Stitch-length regulator turned too far so feed is not acting.  
Dirt under needle plate around feed dog.  
Incorrect setting of feed dog.  
Incorrect pressure on presser foot.  
Bent presser foot or feed dog.

## Bobbin won't wind correctly

Drive wheel on winder not bearing heavily enough on handwheel or belt.  
Rubber tire on bobbin-winder wheel loose, oily, or worn.  
Thread guide on winder bent so thread piles up at one end of bobbin.

## Clutch not releasing handwheel

Handwheel bearing gummed.  
Clutch bound with thread or gummed with dirt, thread or oil.  
Incorrectly assembled.

## Puckers in cloth

*Seam puckers*—One or both tensions too tight.  
*Side puckers*—Dull needle.

## Needle breaking

Pulling the material while stitching.  
Needle too long or set too low.  
Presser foot incorrectly attached.  
Failure to raise needle before removing material.

## Clothing Needs in a Disaster



Proper clothing is needed for survival. Clothing items can be packed in metal closets, footlockers, trunks or heavy cardboard containers and stored in the family fallout shelter or in the area of the house offering the most protection.

If clothes cannot be stored the next best thing is to keep a list of clothing to be taken to the shelter on each person's closet door. Long storage will require precautions to prevent mildew, insect or fire damage.

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