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CHAPTER - 2

AN INTRODUCTION TO THE INDUSTRIAL SEWING MACHINE

PRE-SESSION ACTIVITY

- The Trainer will ask the Trainees whether they have any experience or knowledge about the Sewing machine and its operations. The interested Trainees will raise their hands to share their experiences.
- The Trainer will show some videos on sewing machine operations in the class.

2.1 Sewing Machine

To put in simple words, Sewing Machine is a machine, with a mechanically attached needle for sewing or stitching clothes. It can be operated manually or electrically. Although a huge variety of sewing machines is available in the market nowadays, they can be categorized mainly into two broad sections:

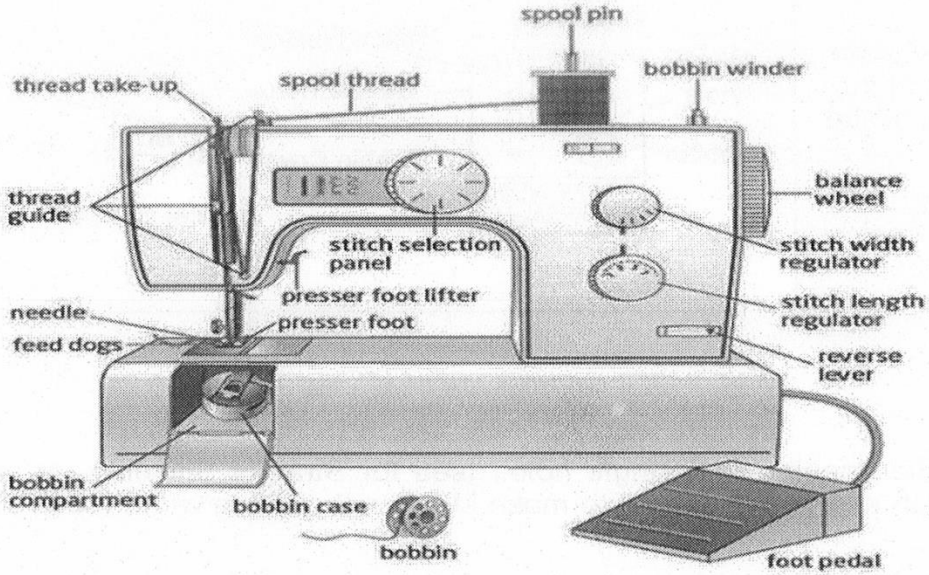
Domestic Sewing Machines.

Industrial Sewing Machines.

Simple hand or foot operated sewing machines, that we have seen our mothers and grandmothers use, were made mostly for domestic use. Fully automatic and computerized sewing machines are nowadays used in industries for bulk production in a limited period of time.

2.2 Domestic Sewing machine and its parts

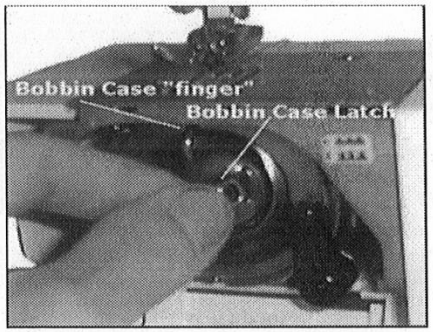
In this section, we will learn about the various parts of a sewing machine and its functions.

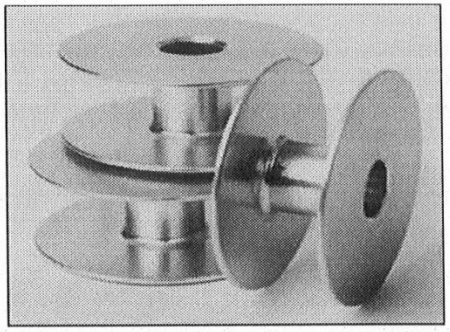


2.2.1 Needle Plate

The Needle Plate, also known as Throat Plate, covers the area that holds the Bobbin. The needle plate consists of:

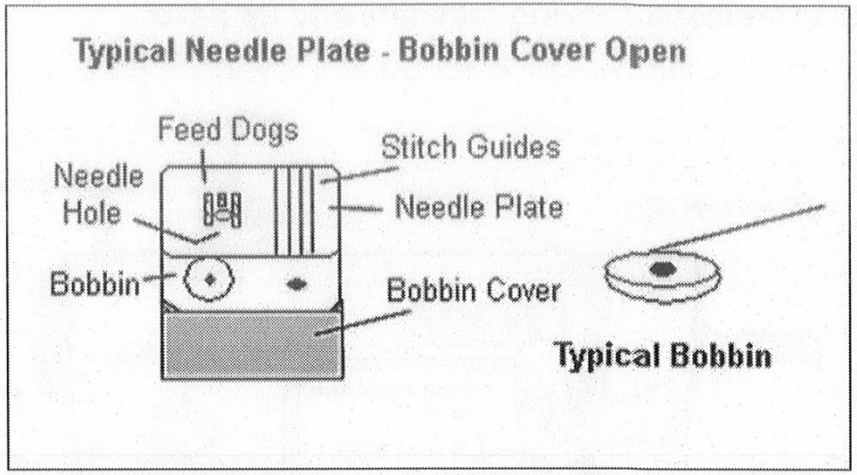
- An opening for the needle to pass through.
- Lines that serve as sewing guides.
- Openings for the feed dogs to fit through.



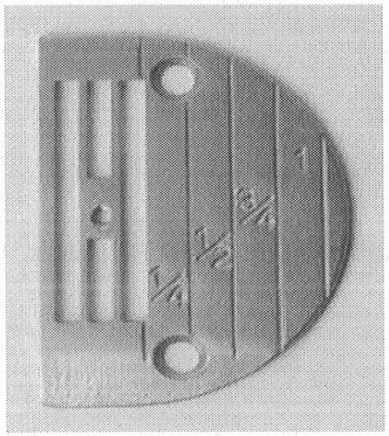


2.2.2 Bobbin

- The photograph on the right shows a bobbin.
- The bobbin is housed by the needle plate.
- Bobbin thread stitches the fabric from the underside and locks the stitches in place.
- It is the thread that you see when you turn the sewn piece over and look at the backside.
- When you sew a line, the stitches on top come from the machine's spool of thread, while the stitches from underside come from the bobbin.
- The bobbin, housed under the needle plate, holds the bobbin thread, and is either set into the machine from the top or the front of the bobbin casing area.
- The bobbin is reached through a sliding door that opens in the front of the bobbin casing area. The bobbin is held safe with the bobbin latch as shown in the diagram.



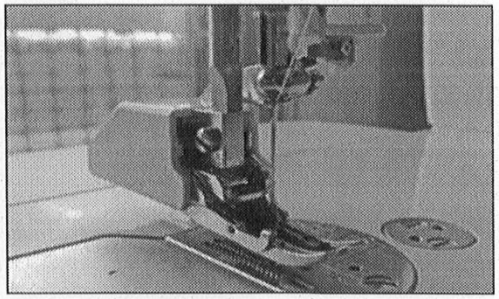
2.2.3 Needle Hole



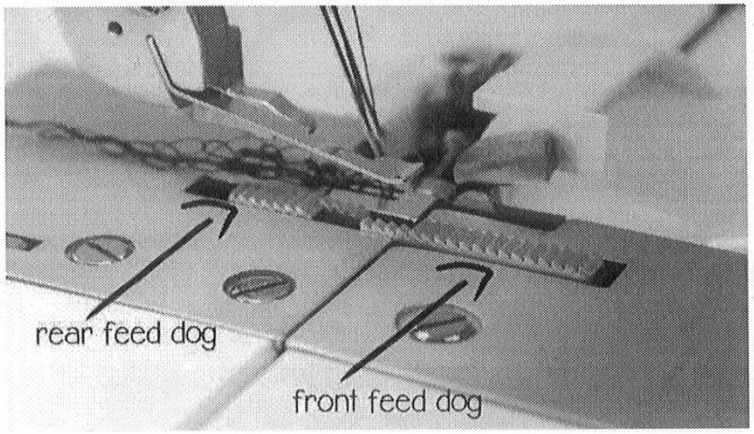
- The needle opening is a single hole, used for Straight Stitching, or an oblong hole, which allows the needle to make stitches that have width (such as zigzag stitches).
- Notice the needle plate on the right, below, has one small circular hole (near the middle of the plate) used for regular, straight stitching, such as quilting or stitching straight seams.
- The two long openings on the outer edges allow the feed dogs to come up (an explanation of feed dogs follows).

2.2.4 Feed Dogs

- On a sewing machine, the toothed mechanism that uses a forward, down, back, and up motion against the presser foot to advance the fabric through the machine evenly is called a feed dog.
- Feed dogs feed the fabric (keep the fabric moving) while the machine sews.



A. Differential Feed and Walking Feet



Feed dogs feed from the bottom only. While sewing through two layers of fabric, it is possible that one layer will be fed at a slightly different rate than the other.
Although your two layers can be perfectly lined up at the start of stitching, by the end of the stitching line the layers can be "off" (one shorter than the other).

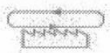
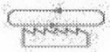
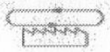
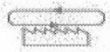
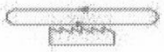
This can be very difficult for the sampling tailor to work with.

To solve this issue, there are two different solutions.

1. **Differential feed**: The differential feed controls the movement of both the front and the rear feed dogs.

• Here both layers of fabric are fed at the same rate.
• You can use the differential feed if you are using a fabric that stretches or puckers.
• With the front feed dog, taking the fabric in a little faster than exiting it helps to prevent your knits from stretching and becoming wavy.
• Another reason you may want to turn up your differential feed dial is that you can intentionally gather your fabric removing the rippling when stitching stretch fabrics.

Differential feed adjustment

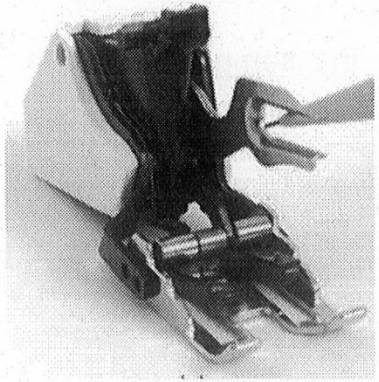
Feed ratio	Main feed (rear)	Differential feed (front)	Effect	Application
0.7 - 1.0			Material is pulled tight.	Prevents thin materials from puckering
1.0			Without differential feed.	Normal sewing
1.0 - 2.0			Material is gathered or pushed together.	Prevents stretch materials from stretching or puckering

2. If your machine does not have differential feed, you can accomplish the same thing by using a Walking Foot.

   It is an unusual looking extension used that is designed to provide an extra set of feed dogs for the top of the fabric being sewn.

   To begin with, the Walking Foot does not look like other sewing machine feet. It is big and bulky and has an arm that attaches to the needle bar.

   This extra bar now tells the sewing machine to pull the top fabric through the machine at the same rate it is pulling the bottom fabric.



- This makes managing unusual fabrics possible.
- It helps to match plaids or make a specific design simpler.
- It makes the knits flow through your machine without growing.
- It prevents slippery fabrics from sliding all over the place and bulky products like quilts sew together effortlessly.

2.2.4 Presser Feet

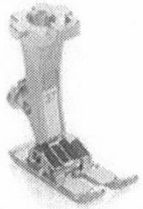
A presser foot holds the fabric in place as the feed dogs guide the fabric being sewn. They also serve various specialized functions, depending on the type used.

Illustrated below are the various types of Presser Feet for different purposes.

Example:

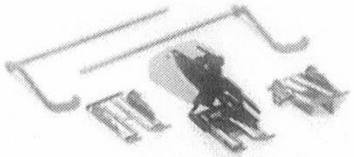
Rolled hem foot causes the fabric to roll under for stitching, and the applique foot, which has an opening at the back, allows the bulk of the satin stitch to pass through. Other special feet that are commonly used include the zipper foot and buttonhole foot. Knowing what types are available, and when to use them, can make all the difference in the quality of your work. These special feet also reduce the causes of frustration during sewing.

1. Straight



4. Zipper

7. Walking



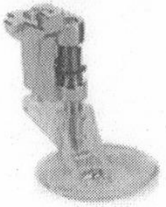
10. Quilting

2. Button foot

5. Overlock

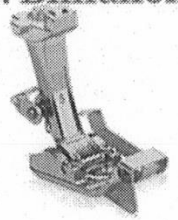
8. Applique

11. Ribbon



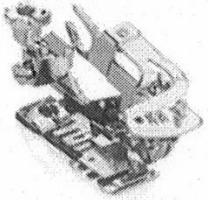
3. Zigzag

6. Blindhem



9. Gathering

12. Ruffler



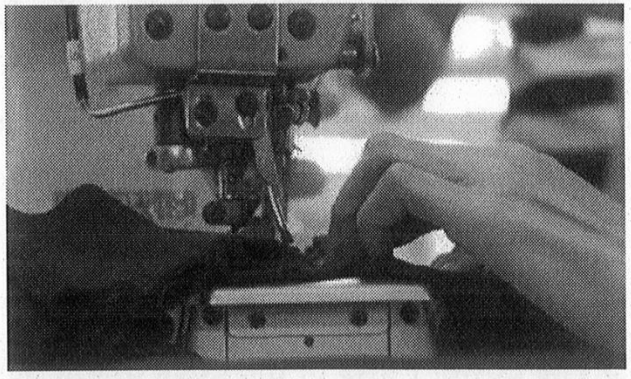
2.3 Industrial Sewing Machine

- The industrial sewing machine is a more advanced and heavy duty version of the standard home sewing machine.
- Industrial sewing machines are generally used for bulk production in garment and textile industries. A typical pocket industrial machine can sew 2,000 pockets in an eight-hour production cycle.
- An industrial sewing machine is designed to sew several layers of tough material, such as leather, canvas, and vinyl, at one time.
- The internal parts and motors in a standard commercial sewing machine are too delicate for the heavy loads.
- An industrial machine comes equipped with a clutch and large servo motor for mass production avowing major wear and tear in its internal parts.

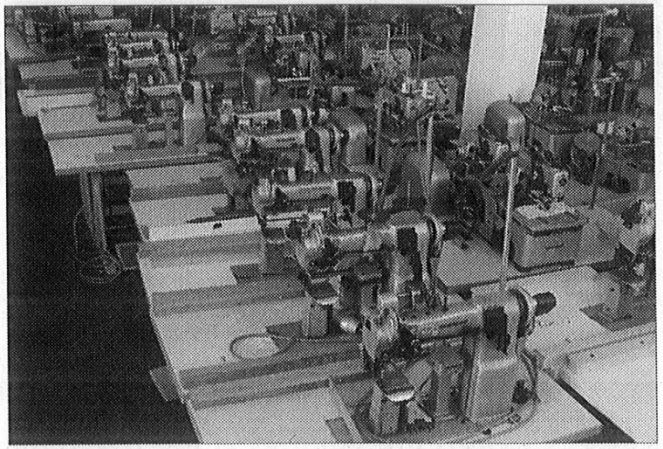
An industrial sewing machine is specifically built to resist long term wear and tear, and is therefore built with superior strength, parts and motors. Traditional sewing machines on the other hand might include nylon or plastic gears.

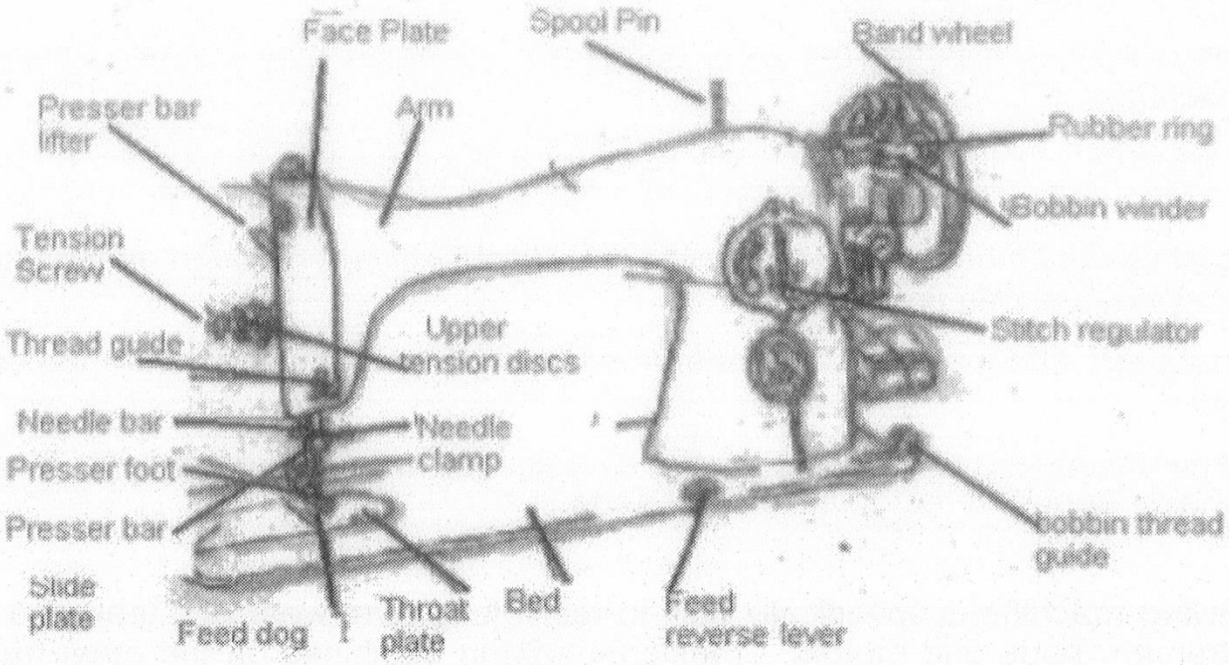
2.3.1 Parts of the Sewing Machine in the Arm:

1. **Spoon:** is the thread holder.
2. **Thread guide:** keeps the thread in position.
3. **Thread take up lever:** releases the thread and interlocks with the bobbin thread.
4. **Pressure bar lifter:** moves the pressure foot.
5. **Tension:** controls the looseness and tightness of stitches.
6. **Needle clamp:** holds and tightens the needle.



7. **Needle bar:** holds the needle in place.
8. **Pressure foot:** holds the fabric in place while sewing.
9. **Needle:** is a slender tool attached in the needle clamp used for sewing.
10. **Bobbin winder:** controls the bobbinwhile winding thread.
11. **Stitch regular:** checks the length of the stitches.
12. **Balance wheeel:** sets the mechanism in motion.
13. **Belt:** connects the balance wheel to the drive wheel.
14. **Stop motion screw:** hinders moving when loosened and starts.





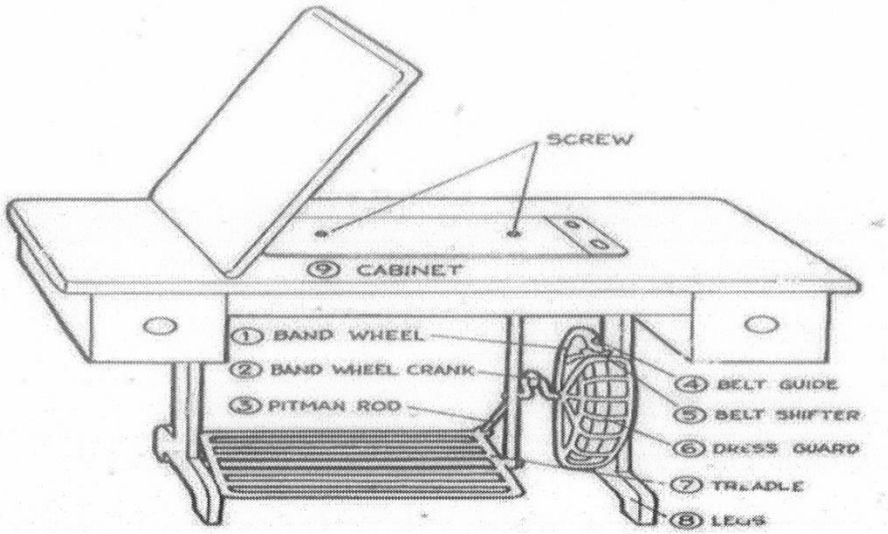
2.3.2 Parts of Sewing Machine under the Bed:

1. **Feed dog:** Moves the fabric while sewing.
2. **Throat place:** This is the windows of the feed dog and it is where the bobbin threads come out.
3. **Slide plate:** Is a movable plate that covers the shuttle and bobbin case.
4. **Shuttle:** Holds the bobbin case while sewing.
5. **Bobbin:** Is a metal spool for winding thread.
6. **Bobbin case:** This holds the Bobbin.

2.3.3 The Lower Parts of the Lock Stitch Sewing Machine:

The Lower parts of the Sewing Machine are the cabinet and the stand. The cabinet has drawers and screw on the hinges for the attachment of the head. The following are the lower parts of the sewing and their uses:

1. **Band Wheel:** Leads the balance wheel through the bell connection.
2. **Band Wheel Crank:** Moves the band wheel.
3. **Pitman Rod:** Holds the treadle to band wheel crank.
4. **Belt Guide:** Holds the belt to its place.
5. **Belt Shifter:** Removes the belt from the wheel.
6. **Dress Guard:** Protects the dress from the wheel.
7. **Treadle:** This is where the feet are stationed to drive the band heel through the pitman rod.
8. **Legs:** Support the cabinet of the machine.
9. **Cabinet:** Holds the head of the machine by interlocking screw on the hinges.



2.4 Sewing Machine Maintenance

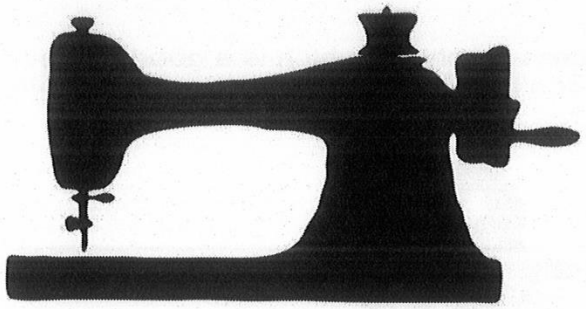
2.4.1 Check List for Preventive Maintenance

- Check to see if the machines are being kept clean.
- Machines should be blown off every day to remove lint and trash.
- On lockstitch machines, the hook should be cleaned regularly during the day to prevent lint or dirt from building up in the oil ports in the race of the hook.
- Check to see that the machines are being lubricated regularly.
- Oil levels should be checked daily and additional oil added if necessary.
- Randomly check the oil levels in the machines.
- A high quality white machine oil should be used that will not stain.
- Check availability of proper machine oil in the factory.
- Check to make sure the oil is not contaminated.
- Check to see that oil reservoir pump filters are cleaned regularly.

- If compressed air is used, make sure the air system is regulated properly and has humidity dryers, filters and lubricator in the air lines.
- Check for rusted areas due to excessive moisture in production area.
- Check Machines for wear on critical moving parts.
- Check for shake in needle bar due to worn needle bar bushings.
- Check for excessive movement in stitch forming devices, etc.
- Check condition of critical screws.
- Check for missing screws.
- Check for defective screws that are difficult to tighten properly.
- Check condition of mechanics tools to see that they are being maintained properly.
- With buttonhole or other specialized equipment, cleaning of the machine should not be done with compressed air but with a soft bristle brush.

2.5 Treadle Sewing Machine and its parts

Most of the treadle sewing machines which are available in markets are efficient for all kind of stitches. As a treadle sewing machine has no plastic gears inside to slip, they can easily sew through anything with the result of perfect topstitching and leather projects as well as fine woven. In a new treadle sewing machine, there are more options from automatic rolled hems to ruffles. Some treadles can also use modern feet and new bobbins.

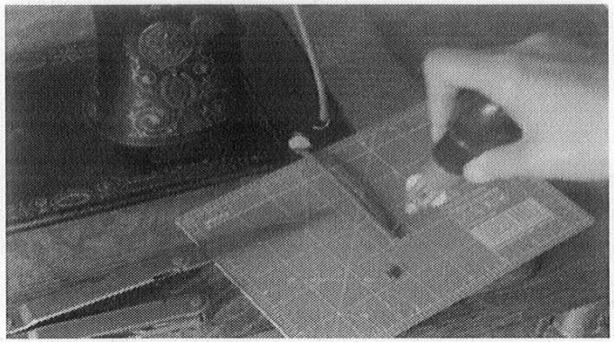


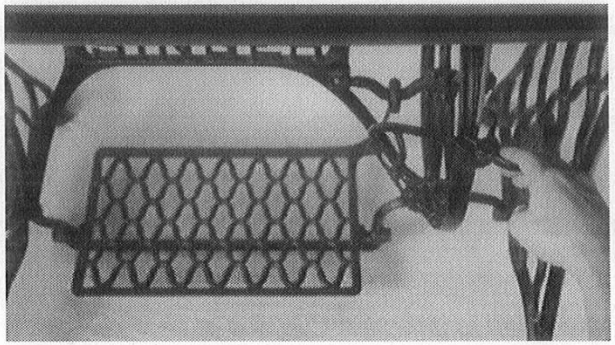
DO YOU KNOW?

Ancient sewing threads consisted of thin strips of animal hide that were used to stitch together larger pieces of hide and fur.

2.5.1 The Belt & the Treadle Motion

The most important feature of the treadle machine is the control over the rhythm of feet. The treadle motion twists a large flywheel, which is connected by a leather belt to the smaller hand wheel, turns the machine. The greater is your control over your feet, smoother will be the work with the different motion levels.





A. Tips to handle the Belt and the treadle motion:

1. If your treadle machine has been idle for a while, the belt may need tightening or replacing. It should be just tight enough to turn the hand wheel without slipping. The two ends of the belt are fastened with a staple.
2. To tighten the belt, use pliers to flatten one side of the staple and slide one end of the belt off. Cut off just a little bit of the leather and make a new hole for the staple about ¼" away from the new end, using a thick leather needle. When you reattach the belt, make sure it goes through all guides near the large wheel and follows a clear path through the cabinet to either side of the machine wheel.
3. To extend the life of the belt, release the tension on it whenever you're done sewing for a while. Slip the belt off the large flywheel, using the lever near the wheel if there is one. When you get ready to sew again, just smooth the belt into the channel on the flywheel with your hand. Nevertheless, when the belt eventually gets stretched out and fragile, it is time to get a new one.

2.5.2 The Bobbin Winder

If your treadle takes modern bobbins, you can wind them on a modern machine, which is a good option if the original bobbin winder is broken or missing. But even if you don't need a machine-specific bobbin, you may find yourself charmed by the mechanism of the old winder.

Just like on a modern machine, there is a way for the Bobbin Winder to engage and disengage (contacting the wheel or the belt for power) and a mechanism to spin the bobbin and to move the thread back and forth.