STUDY MATERIAL FOR B.Sc FASHION TECHNOLOGY

INDUSTRIAL GARMENT MACHINERIES

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PREPARED BY

FASHION TECHNOLOGY DEPARTMENT

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INDUSTRIAL GARMENT MACHINERIES

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UNIT III- MARKING AND PRESSING METHODS

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UNIT V- PACKAGING, SEWING THREADS, STITCHES AND SEAMS

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UNIT - I
STITCHING MECHANISM

I - STITCHING MECHANISM OF NEEDLE

The way in which the fabric is penetrated by the needle during sewing has a direct effect on seam strength and on garment appearance and wearable life.

TYPES OF SEWING NEEDLES:

(1) Hand Sewing Needles
(a) Sewing Needle (i) Standard (ii) Long
(b) Embroidery Needle (i) Pointed (ii) Round
(c) Darning Needle
(2) Machine Sewing Needles
(a) Round Point Needle (i) Ball point (ii) Set point
(b) Cutting Point Needle.

HAND SEWING NEEDLE:

For hand sewing, the needle should be large enough to carry the thread easily. If a needle that is too small it will cut the thread, and a too-large needle may tear the cloth. For basting we suggest the long needle used by the milliners. The needles commonly used in dressmaking are called as Sharps. In your sewing basket you should keep a supply of sharps of numbers.5,6,7,8,9 and 10. For very heavy work use Nos.5 and 6 with threads of 20 to40 (or silk C,D and E). Use needles 7 and 8 for threads of 60 to 90 and needles 9 and 10 for threads of 100 to 150.

MACHINE NEEDLE:

All sewing machine needles have the same basic parts. The variation in the needles is caused by the shape of the parts and the length of the parts.
The function of the sewing machine needle is general are:
(a) To produce a hole in the material for the thread to pass through and to do so without causing any damage to the material.
(b) To carry the needle thread through the material and there form a loop which can be picked up by the hook on the bobbin case in a lockstitch machine or by the looper or other mechanisms in the machine.
(c) To pass the needle thread through the loop formed by the looper mechanisms on the machines other than the lockstitch.

PARTS OF NEEDLE:-

SHANK:

The upper thick part of a sewing machine needle is called as shank. This part of the needle is inserted in the machine. Home sewing machine needles are composed of a flat and a round side, to assist in always having the needle in the correct position.
Always refer to your sewing machine manual for the correct way to insert the needle in your machine.

Industrial machine needles have a completely round shaft and the groove is used to know which direction to put a new needle in the machine.

SHAFT:

The shaft of a sewing machine needle is the area from the bottom of the shank to the point. The shaft contains the groove, scarf, eye and point of the needle.

GROOVE:

A groove is in the side of the needle leading to the eye. The groove is a place for the thread to lay into the needle.

Use your finger nail and feel the groove of the needle on various sizes to understand why a different size thread would be needed for the heavier threads.

SCARF:

The scarf is a groove out of one side of the needle. The scarf allows the bobbin case hook to intersect with the upper thread and form stitches.

EYE:

The eye of the needle carries the thread so the machine can keep forming stitches.

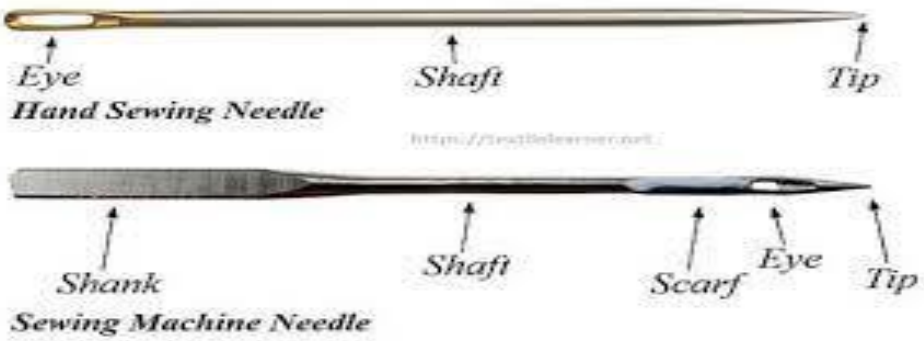
The size of the eye can vary and works in conjunction with the groove of the needle

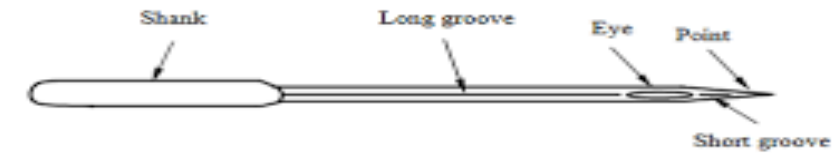
Using a needle with an eye that is too small or too large can cause your thread to shred and break.

POINT:

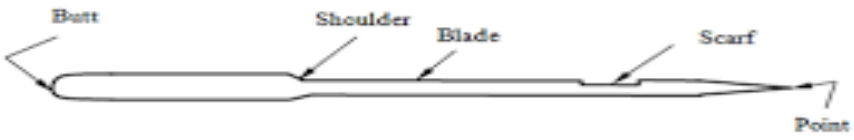
The point of the needle is the first contact with the fabric and responsible for how the needle pierces the fabric.

The most common types of point are sharps, ball point and universal.

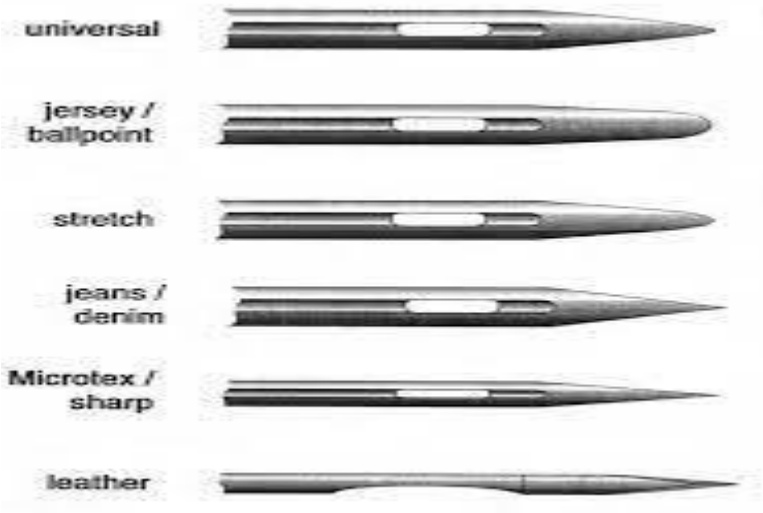




Sewing needle (side view)



Sewing needle (front view)



SHARP NEEDLES:

These are for all woven fabrics. The sharp point is especially helpful when sewing straight lines and tasks such as tops stitching.

BALL POINT NEEDLES:

These are designed for knit fabrics so that the point glides between the loops of a knit fabric without disturbing the fibers that make up the fabric. Ball point needles do not form as straight stitching as sharp needles. The non-straight stitching is more apt to stretch with the fabric.

UNIVERSAL NEEDLES:

It can be used with woven or knit fabrics. The point of a universal needle is sharp yet very slightly rounded giving it the characteristics of a sharp and a ballpoint needle. If you are not happy with the stitches your machine is forming, try switching the needle to either a ball point or sharp.

II - STITCHING MECHANISM OF BOBBIN AND BOBBIN CASE:

BOBBINS:

A bobbin is a spindle or cylinder, with or without flanges, on which wire, yarn, thread or film is wound. It is a small metal with ½" diameter and ½" long which carries a mass supply of threads. The bobbin holds the yards of threads approximately. Bobbins are typically found in the sewing machines, cameras. The price of your sewing machine that holds the bottom threads (bobbin thread) and it is placed in the bobbin case. It is generally under the area the needle penetrates and it loops with the needle thread to form a locked stitch.

TYPES OF BOBBINS:

(a) Drop-In bobbins
(b) Special Drop-In bobbins
(c) Bobbins used in removable bobbin case.

(a) DROP-IN BOBBINS:

They are mostly made up of elastic some of them are made of metals.

(b) SPECIAL DROP-IN BOBBINS:

Bobbins are made of clear plastic with the top part some time larger than the bottom part.

BOBBIN CASE:

It holds the bobbin in position which provides the lower thread and it rotates with the shuttle hook.

TYPES OF BOBBIN CASE:

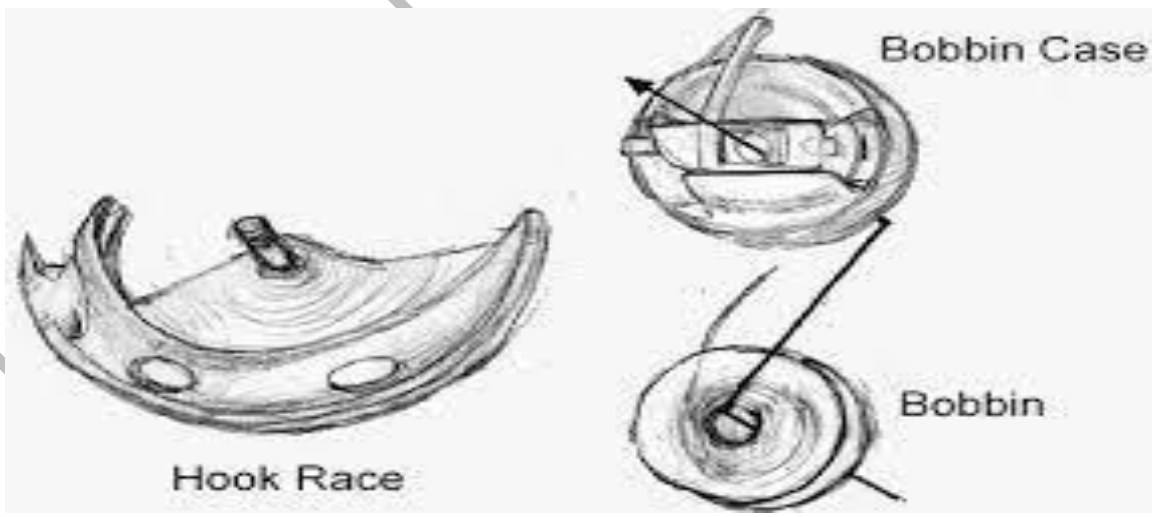
1. Removable bobbin case
2. Built in bobbin case

REMOVABLE BOBBIN CASE:

It is used in a single needle machine and can be removed from the machine easily.

BUILT-IN BOBBIN CASE:

It is attached with the machine and cannot be removed easily.



III - BOBBIN WINDING:

For most machines, the thread must be taken out of the needle in order to wind the bobbin. There is normally a bobbin holder on top of the machine. The thread runs from the spool through a sequence of hooks that are specific to the type of the machine and on to the spool. The needle is disengaged when the bobbin is winding. This is done automatically when the bobbin is in position for winding, or manually, depending on the machine. After the bobbin is wound, the machine is re-threaded, the needle is engaged and the bobbin is placed in its area under the throat plate. If bobbin is not wound smoothly, and evenly there will be an uneven run of threads from the shuttle, which will undoubtedly result in the uneven stitching.

IV - SHUTTLE:

These are made up of steel or plastic placeholders of bobbins, which are the small cocoon sized bundles of back yarns for making the embroidery. The back yarns are pulled or entangled from the shuttles the same way back yarns are used in the ordinary sewing machines. It is present below the machine bed into which the bobbin case along with the bobbin is inserted. It holds the bobbin case and moves to form the loop as the machine is then operated. It is fitted below the feed dog or its left side.

V - SHUTTLE HOOK:

It is a bobbin driven design used in the lockstitch sewing machines of the 19th and 20th century and beyond. It triumphed over competing the designs because it can run at higher speeds with less vibration. Rotary hooks and oscillating shuttles are the two most common bobbin drivers in use today. In this system, the shuttle hook catches the thread when the needle is going back up through the fabric and the hook carries the thread around the bobbin case to form the stitch, going all way around the bobbins.

A common sewing machine uses a floating shuttle hook. The floating hook design allows a top thread loop to pass completely around the bobbin assembly. A lock stitch is formed when the top thread has looped completely around the bottom thread. The take up lever ensures a tight stitch.

VI -1. LOOPERS:

It is a dull pointed metal piece which has a definite motion cycle to grasp the thread from the needle and helps to form a loop of stitches.

TYPES OF LOOPERS:

There are two main types of loopers available based on its shape.

(a) Eye loopers

(b) Blind loopers

EYE LOOPERS:

Eye loopers is used for the machine that has bobbin and bobbin case and used mainly for the class 400, class 600 and for all the class 500 stitches other than the class 501. These types of loopers are carrying the sewing thread through the eye.

It does the two important functions. They are as follows:

(a) To grasp the thread from the needle

(b) To inter lock the bobbin thread with the needle threads.

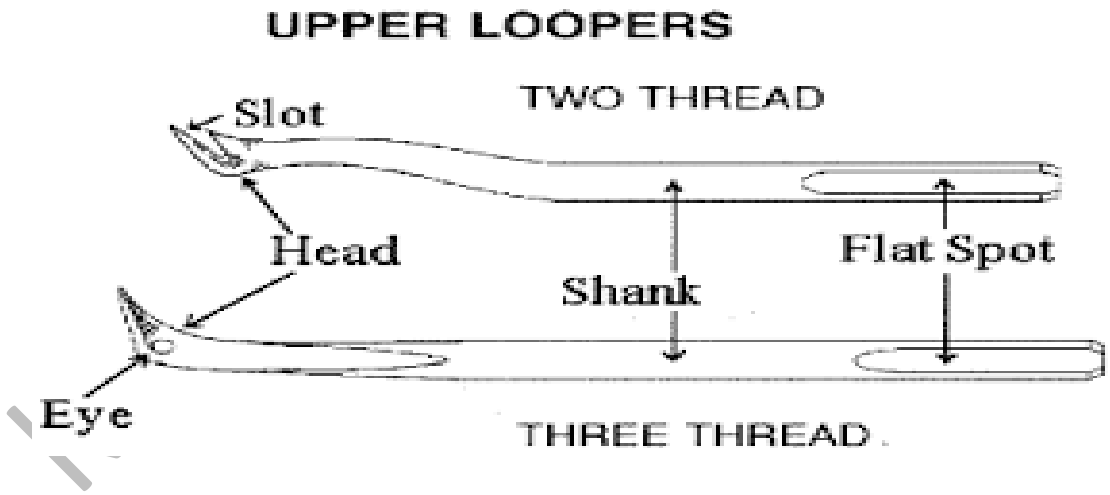
BLIND LOOPERS:

Blind loopers only do the function of grasping the thread from the needle. It is used for the sewing machine without bobbin and bobbin case. Mainly it is used in class 100,101, 102 and some class of 500. These types of loopers are not carrying the threads because of no eye, but it has to guide the threads.

Based on the loopers function it can classify into two types:

(a) Oscillating loopers

(b) Rotating loopers.



2.LOOP SPREADERS:

Loop spreader or snub nosed or dull pointed sharp metal piece which assist the looper in making the stitches. Some blind loopers also have loop spreader. These blind loopers have two dull pointed, the point which grabs the needle thread from the needle is the looper point. The other point which spreads the needle through the thread loop, which the loop spreader pointed. The action of loop spreader is coordinate with the loopers. Some machine has multi-edged loop spreaders which coordinate with more than one loopers. Some loop spreaders are fixed readily there looper mechanism and parallel to looper action. It is used to form the stitch classes of 400,500 and 600 stitches.

VII - THREADING:

UPPER THREADING:

Machines vary as to how exactly they are threaded, but all have certain common features. The thread runs from the spool holder, through a tension device and down through the needle. The tension device controls the tension on the thread. It consists of a groove that the thread slides through. The mechanism for setting the tension may be a dial or buttons (computerized machines).

With the machine on the left, below, the thread runs from the spool to a hook at the top of the tension area, down the right groove and up the left groove, over a little hook and down the left groove again, and on to the needle. The dial is turned to set the tension.

With the machine on the right below, the thread runs from the spool to a hook at the top of the tension area, down and up the left groove and down the right groove to the needle.

The thread runs from the tension devices, down to the needle area. There are usually small grooves in the arm that holds the needle, for the thread to pass through. This holds the thread close to the needle arm. The thread then runs down to and through the eye of the needle.

LOWER THREADING:

Once the bobbin is in place and the machine is threaded, gently turn the wheel of the machine while holding the needle thread off to the side (it should go from the needle under the presser foot and off to the side). This will bring down the needle. The needle will pass down through the

throat plate and the needle thread will catch the bobbin thread and pull it up through the throat plate when it comes back up again.

THREAD FINGERS:

Thread fingers function in the position of the needle above the presser foot shoe. It is a metal link with an eye. These fingers may be static or dynamic. In static links guide the covering thread, were as the dynamic links carry the thread back and forth across the needle path. It is used to form a 600 class stitches.

Thread fingers hooks are assist the finger in interlacing its thread between or among the thread of two or more needles in the machines. The actions of the thread fingers hook are synchronized with the thread fingers and needle.

Most of the thread finger mechanisms are located in the upper arm of the machine which holds the needle mechanism.

VIII - STITCHING AUXILIARY HOOKS:

Stitching auxiliaries are not carrying the thread but it helps the formation of the perfect stitches. There are three types of stitching auxiliary hooks are available. They are as follows:

KNIFE :

It trim the edges of the fabric before sewing and it can be found in the over lock machines.

POSITIONER:

Before stitching the materials are then positioned by these types of positioners.

PIERCING:

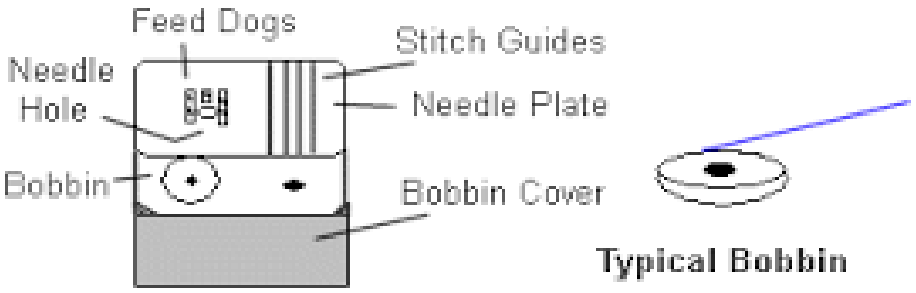
It pierce the fabric before stitching and it is used in the button hole machine to form a button hole.

IX - THROAT PLATE / NEEDLE PLATE:

It covers the area that holds the bobbin. It has an opening for the needle to pass through, as well as lines that serve as a sewing guides. The needle may be a single hole, used for the straight stitching, or an oblong hole, which allows the needle to make the stitches that have width (such as zigzag stitches).

Be careful when using a straight stitch throat plate. If you accidentally change to a zigzag stitch while the straight stitch throat plate is in place, you will BREAK YOUR NEEDLE. A straight stitch throat plate is the best one to use, however, when making a straight stitch (regular sewing stitch). It helps prevent the fabric from being pulled down into the machine (having a needle that is sharp enough helps prevents this also, although you must use a ball-point needle for the knits).

Typical Needle Plate - Bobbin Cover Open



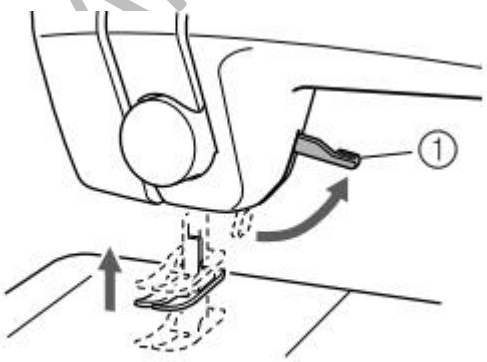
Typical Bobbin

X - Thread the take-up lever

Follow the steps below to thread the take-up lever

1. Turn off the sewing machine

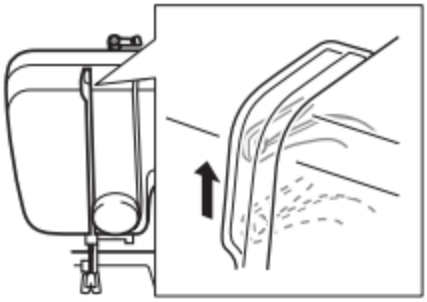
2. Raise the presser foot using the presser foot lever



① Presser foot lever

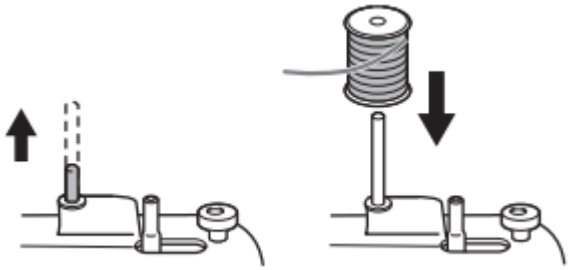
3. Raise the needle by turning the handwheel toward you (if the needle is not raised, the sewing machine cannot be threaded)

- This will raise the thread take-up lever to its highest position



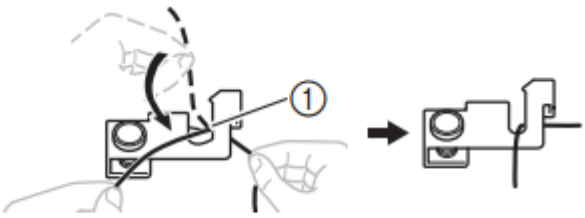
4. Pull the spool pin up (as far as possible) and insert a spool of thread on the spool pin

- If the spool of thread not inserted properly the thread will tangle and will cause the needle to break



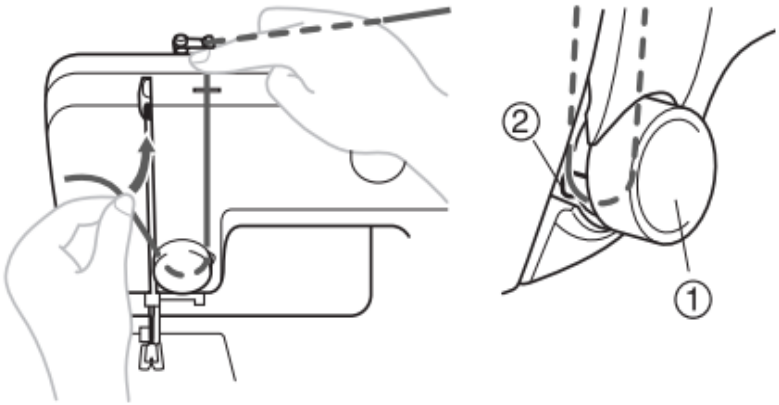
4. Pass the thread toward you, in the groove on the thread guide

- Make sure that the spring in the groove catches the thread



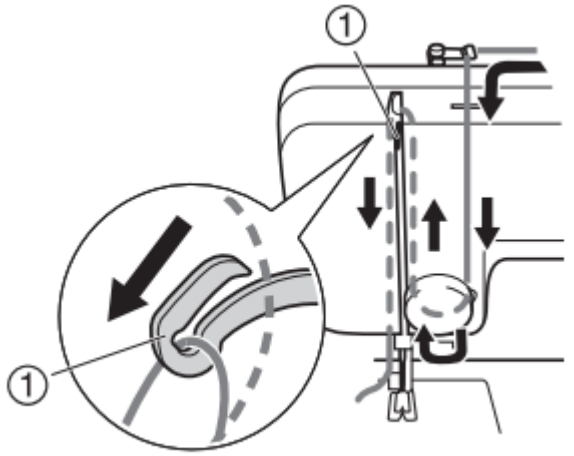
① Spring

5. Pull the thread down and around the upper tension control dial from the right to the left, so the thread picks up the thread check spring



① Upper tension control dial
② Thread check spring

6. Guide the thread through the thread take-up lever from right to left



① Thread take-up lever

XI - TENSION DISCS – UPPER AND LOWER THREAD TENSION

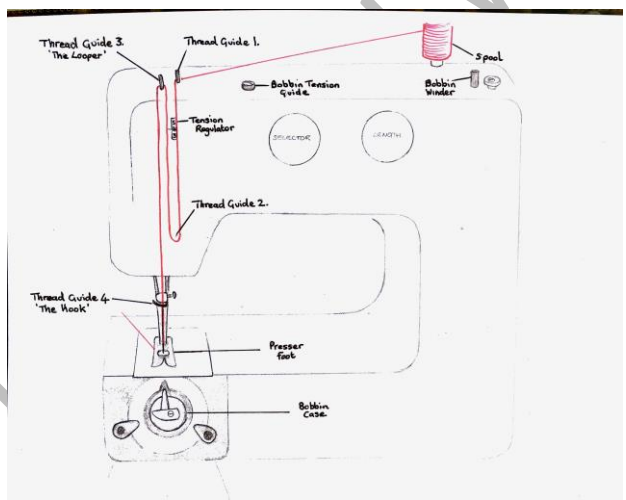
Thread tension' is the resistance that you feel on the thread as it goes through the sewing machine. The perfect 'thread tension' will lead to lovely, flat and even stitches that look the same on both sides of the fabric. This perfectly balanced stitch is what you should try to achieve with all of your sewing projects. If your stitches are not like this, then you will need to find out why and correct the issue.

All sewing machines have a series of 'tension devices' to ensure that the top thread and bobbin thread have the tension they need to produce flat and even stitches. The most prominent of these is the tension regulator. You've probably noticed the tension regulator on your sewing machine. It's usually a dial with the numbers 3, 4, and 5 highlighted or circled. This regulator tightens, or loosens, the tension discs that the thread passes down through before it goes up and through the looper.

There are many factors that can cause problems with your stitches, and so before you move the tension regulator you must first check a few things…

Incorrect threading is responsible for more tension problems than any other factor. If there is an obvious problem with your stitches, such as baggy, messy stitches that don't hold the fabric together sufficiently, or tight stitches that ruche the fabric up, then you've probably not threaded your machine up properly. See if you can figure out whether the issue is with the top thread, or the bobbin thread, and go through the checklist below to see if you can fix it. If you can't easily find the problem, then it is a good idea to unthread your sewing machine and thread it again!

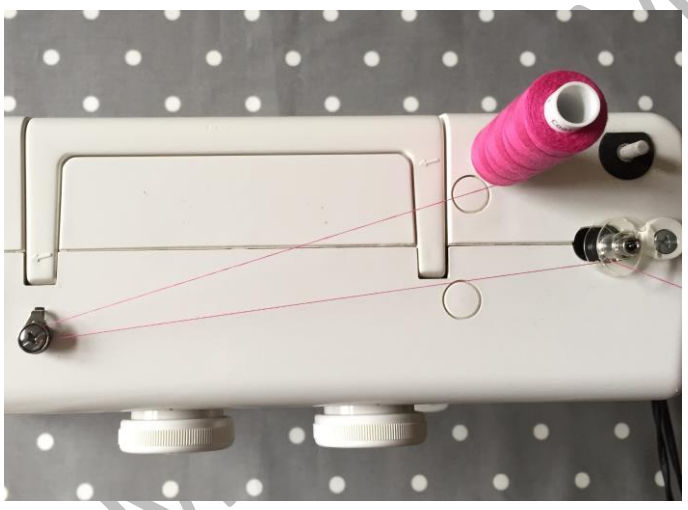
Did you use all thread guides? If the top thread comes out of the looper, you will get a big noisy mess! The hook near the needle really helps to stop the thread bouncing out of the looper as you stitch.



Did you thread your top thread with the presser foot up? The tension discs, operated by the tension regulator, open when the presser foot is up, and close when the presser foot is down. If the top thread isn't able to get between the tension discs, then it will have no tension and create a very loose top thread. Make sure the presser foot is up when threading the top thread.

Is thread unwinding freely from the spool? If it is catching somewhere, it will lead to a very tight top thread.

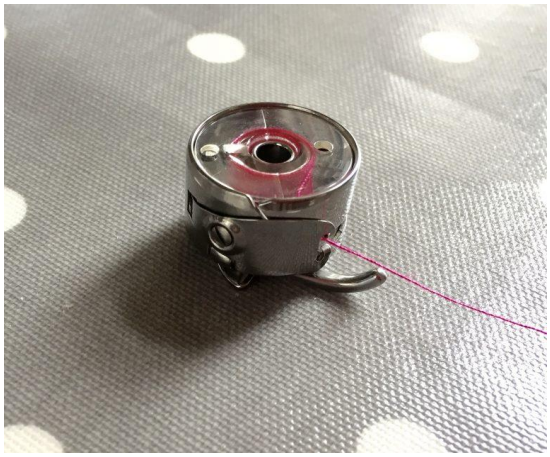
Is the thread on the bobbin flat, and evenly wound? You must make sure you wind the bobbin using the bobbin tension guide. Messy bobbin = messy stitch!



Is the thread unwinding freely from the bobbin case? Remove any thread from the outside of the bobbin, as it could get caught and stop its flow. This would create a tight bobbin thread.

Is the bobbin inserted into the bobbin case correctly? If not, you will have a very loose and messy bottom thread. On front loading machines, make sure the thread is going clockwise as you drop it into the bobbin case. Also, the thread must go behind the flat bobbin-case spring, which squeezes the thread against the bobbin case as it comes out, creating the necessary tension for a flat stitch. This is a common mistake, so please check, even if you think you did it right! On a top loading

sewing machine, check the bobbin thread has tension on it. If not, take it out and pop it in again, following the directions indicated.



Other less common factors could be…

Damaged machine parts… Check for rough or damaged surfaces where the thread passes through and could get caught. Some parts, such as needles, are easily damaged but easily replaced.

Clogged up Machines… This could restrict the flow of the thread. Fluff and thread ends can get stuck between the tension discs, under the needle plate, and around the bobbin/bobbin case. "Floss" between the tension discs, and check in the bobbin area and under the needle plate for fluff (lint) and thread ends.

Needles, threads, and fabrics… A needle that's too large or small for the thread can effect the stitch because the size of the hole adds to, or reduces the total top tension.

USING THE TENSION REGULATOR

So, any major problem should be fixed by going through the checklist above, but to get a perfect stitch, you may still need to adjust the top thread tension using the Tension Regulator. Many sewers are nervous to touch the Tension Regulator, but actually it's very straightforward. There is a way to adjust the bobbin tension too, but only if absolutely necessary!

First of all, to know which way to turn the tension regulator dial, you first need to inspect a sample of stitching on the default tension setting (number 4). It may help to have a different colour on the top thread, to the bobbin thread.

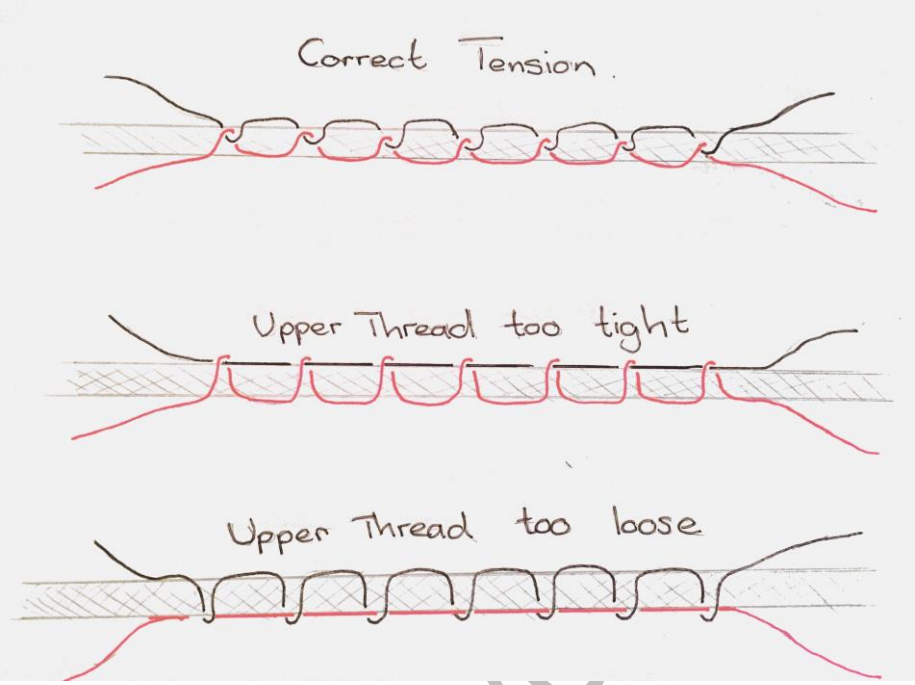
If the bobbin thread shows on the top side of the fabric, the top thread tension is too tight (or bobbin thread is too loose).

You can loosen the top thread tension, by turning the tension regulator dial a little towards a lower number.

If the top thread shows on the underside of the fabric, the top thread tension is too loose (or bobbin thread is too tight).

You can tighten the top thread tension by turning the tension regulator dial a little towards a higher number.

It is important to turn the dial a tiny bit at a time, as even a tiny turn makes a difference to the tension.



Adjusting the bobbin thread tension…

As I said before, you can adjust the bobbin tension too, but only as a last resort! This usually gets tweeked back to perfection when you get your machine serviced, and is unlikely to be the issue. However, for those of you who would like to know, you can adjust the bobbin thread tension by tightening or loosening the tiny screw that holds the flat bobbin-case spring in place and squeezes the thread as it comes out of the bobbin case. Again, it is important to turn the screw a tiny bit at a time as even a tiny turn makes a difference to the tension.

XII - STITCHING AUXILIARIES

Stitching auxiliaries are devices or accessories that can be used with sewing machines to help with sewing, such as:

Circular auxiliary tool: Also known as a circular stitcher or circular sewing attachment, this device can be used for sewing.

Tape piper: This auxiliary device can help a sewing machine reach its pre-programmed speed faster and maintain its maximum speed longer.

Auxiliary presser foot: This accessory can be used for quilting, decorative stitching, and crafts.

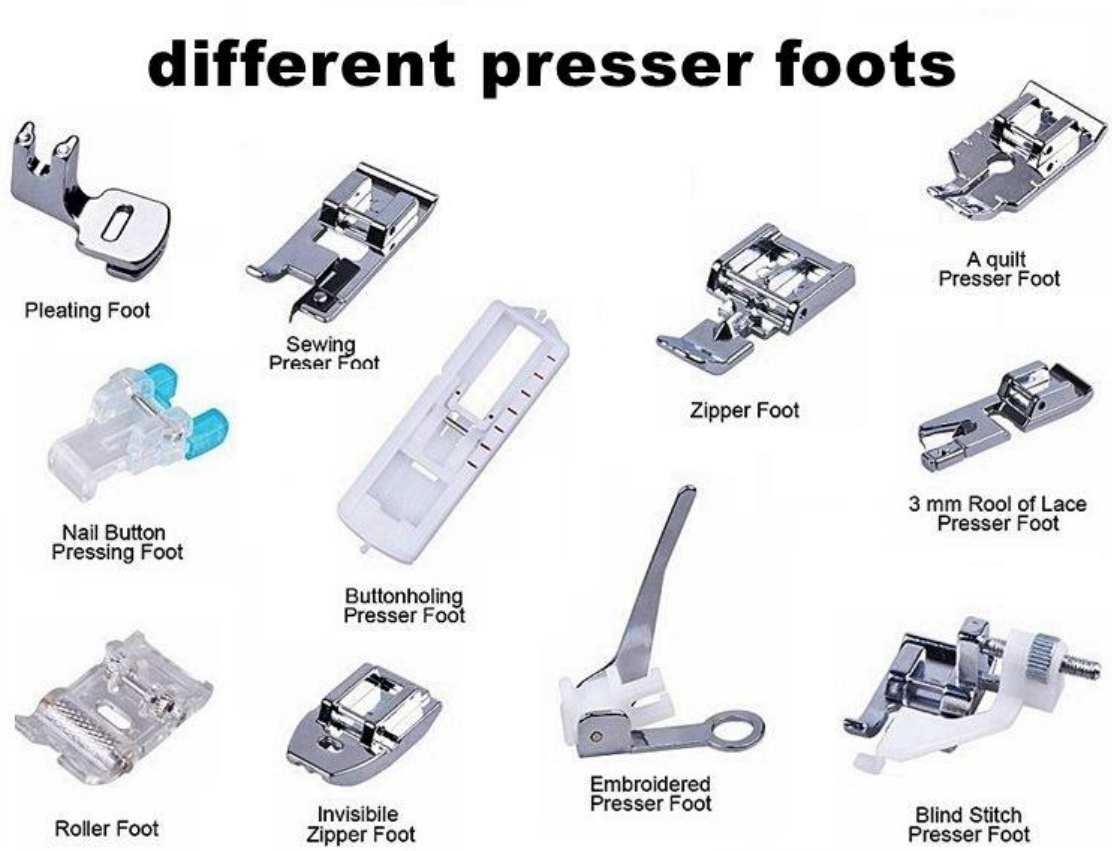
Tailor cutter: This sharp tool can be used for sewing seams and breaking holes.

PRESSER FOOT:

The presser foot can be raised and lowered with a small lever at the back of, or beside, the needle. When up, it allows the free movement of the fabric. When down, it presses the cloth against a base plate. The base plate has a couple of textured moving parts (the feed dogs) that keep the material moving past the needle at an even rate. (You can sew the presser foot up, but you tend to get very uneven stitches. This is because you have to move the fabric yourself, and keeping it moving at an even rate is almost impossible). Presser foot hold down the fabric and help guide it through. They also serve various special functions. Examples of special foot are the rolled hem foot, which causes the fabric to roll, and the applique foot, which has an opening in the back to allow the bulk of the satin stitch to pass through. Other special foot 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 foot also take a lot of the frustration out of the sewing.

Special sewing functions can be performed using other specialty foot such as :

Applique foot, Bias binder, Pin tuck foot, Felling foot, Cording foot, Special hemmers and many more.



1. Straight stitch Presser foot

This foot is the most basic of all presser feet. It sews a straight line. This is the best foot for sewing regular seams as it results in a straight stitching line.

2. Zig zag presser foot

This general all-purpose foot is needed for every other stitch in your sewing machine. You can use it as a general all-purpose sewing foot as you can stitch straight lines as well as most decorative stitches with this.

3. Zipper foot/piping foot

This foot is a necessity when sewing zippers. With this, you can sew very close to the zipper teeth. If you move the needle, you can sew to the right or left of the zipper, right along with the zipper teeth. You can use this foot to sew piping very close to the cord inside, as well.

4. Invisible zipper foot

This is a very nice presser foot to have to sew invisible zippers.

5. Hemmer foot

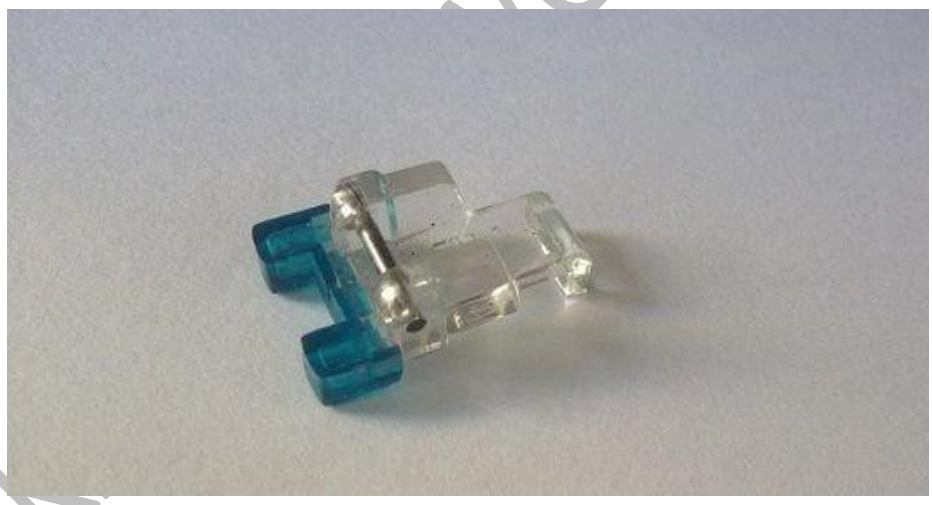
This foot is a heaven send to finish fabric edges in a curling way, especially for fabric which frays a lot. Usually, you get 3mm, 6 mm hemmer feet. A 1/4 inch can make a nice hem. The edge of the fabric is guided to the curl on this foot and stitched with a straight stitch or zig zag stitch.

A similar hemmer foot with a slight difference in its function and looks is the one to make a flat hem – you will find it identical to the hemmer foot in the front. But if you look at the back you will find that it does not have the groove that a round hemmer foot has.

6. Buttonhole foot

This is a foot which can give you beautiful button holes without the hassle of you making it by hand.

7. Button Sewing foot



This foot can help you to sew buttons easily. You can see the buttons very well with this foot and the zig zag stitch is adjusted perfectly to sew the button down, under the foot.

8. Open toe embroidery foot

This is a sewing presser foot which makes it very easy to do embroider or make wide decorative stitches as the wide opening in the front can make you see the embroidery stitches well. If you buy a clear one in plastic all the more clearer. It is very useful in machine applique, quilting and top stitching

9. Quilting foot

This foot is used in quilting for sewing accurately with 1/4 inch/ 1/8 inch seam allowance. It is also called a piecing foot. It has markings on it that make seams accurate from the edge. There are markings on it to pivot accurately as well. The straight stitching guide also makes sure the straight stitches are made straight (what!).

10. Gathering / shirring foot

This is a presser foot used for simple gathering of fabric. It is usually used on lightweight fabrics. You can use this to attach gathered fabric to flat fabric. You get beautiful gathers and ruffles.

11. Applique stitch foot

This is a short plastic presser foot (3/4 of the straight presser foot) which makes sewing around curves of applique pieces easy. The clear foot makes seeing what you are sewing easy.

12. Darning foot

The darning foot is used for free-form stitching in quilting / free motion embroidery/ thread painting. The darning foot with spring makes it easy to sew on fabrics of varying heights. If you have a clear foot, you will get more visibility. The best use of this foot is that with your regular sewing machine, you can do free-motion quilting.

Some may find the movement of the spring darning foot distracting; this foot without the spring does not move.

13. Knit Foot

This foot is also called Tricot foot and is used for sewing with knits. This is also used as an alternative to a walking foot. It can sew knits without stretching them. It works very well with knits that are soft, thin, very stretchy and fragile (eg. spandex knits)

14. Satin Stitch

This is a longer version of the applique foot. The advantage over the regular zig zag satin stitch foot is that the foot has a groove in the back that allows raised thread of the satin stitches you are making to pass through easily.

15. Stitch Guide feet

This is a presser foot with a ruler attached – it makes it easy to sew straight stitches and equidistant parallel stitching lines easily. It is also known as gauge presser foot. This foot has many markings on it from 1/8" up to 13/16", and the outer edge of the foot itself is exactly at 1".

16. Overcast stitch foot

This foot is used to sew an overcast stitch along the fabric edge – interlocking hem is made along a raw edge. It is almost like you have a serger (though, it doesn't cut the fabric edge like a serger); your sewing machine should have an overcast stitch for this to work properly. Otherwise you can use a zig zag stitch

17. Edge Joining Foot

This stitch is also known as a stitch in the ditch foot – it makes stitching in the ditch easy and accurate. It is used to sew in the seam line.

Top stitching works very well with this foot. It is also used for joining. This is a foot that is used to stitch trims to edges in Heirloom sewing.

Beautiful decorative stitches can be made between the trims and the fabric edge at the same time joining them.

18. Blind stitch foot

This is a foot best used for hemming pants. Along with the blind hem stitch, hemming is very easy and beautiful with this foot. It has an adjustment bar, which is very convenient.

19. Adjustable zipper foot

This is a variation of the zipper foot – Adjust the needle to either the right or left to sew both sides of your zipper easily.

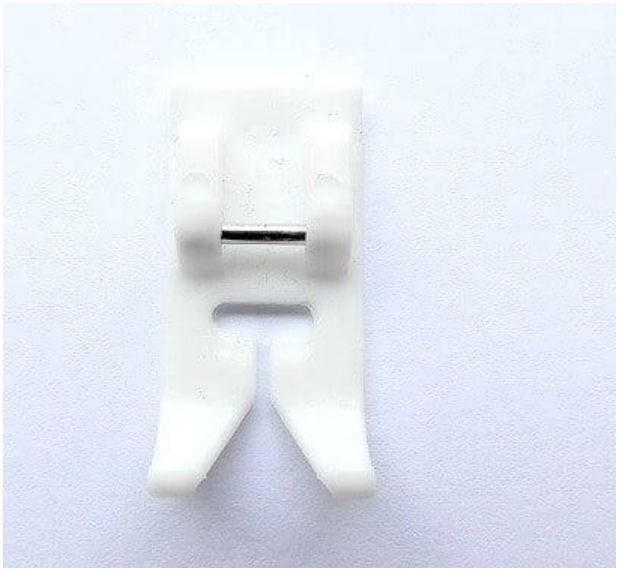
You can change the position of the foot for this with a screw in the back; this is useful when you have a zipper to sew and you cannot change the position of the needle.

20. Walking Foot

This is a foot used for sewing through many layers of fabric. It is a very useful foot to have when sewing quilts or making bags- no more puckering of fabric layers. It is also known as even feed foot.

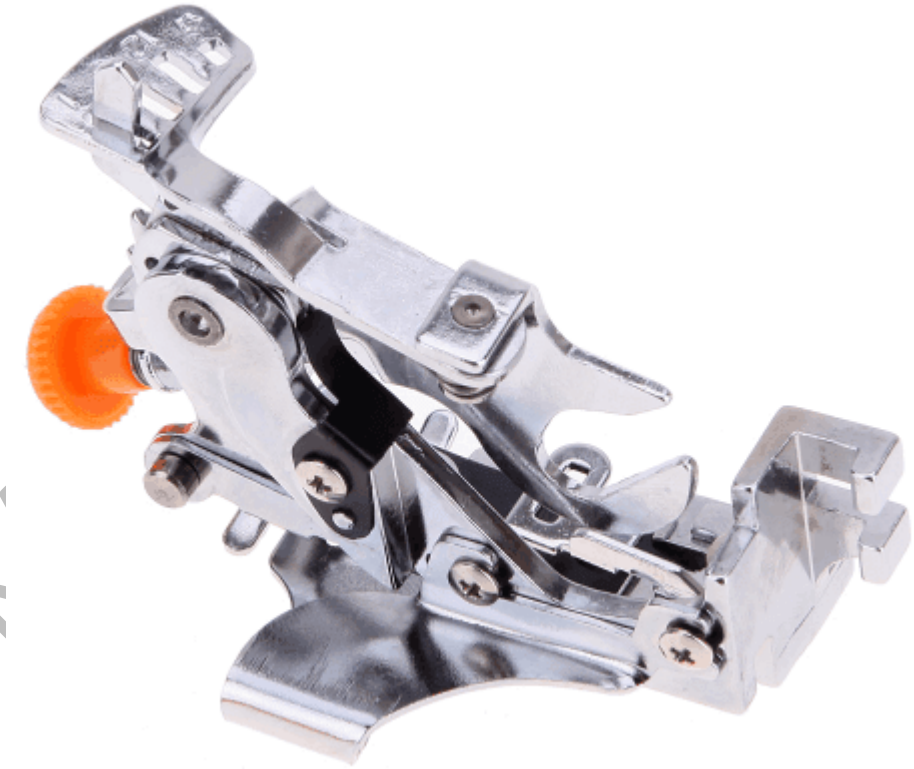
When you use this fabric layers, do not shift much, so this is great when you have to match prints, patterns, checks, etc

21. Teflon foot



The regular metal presser feet usually refuse to move over the fabric like pleather, vinyl (polyethylene fabrics), and leather. We have to use a Teflon foot on this kind of fabric.

22. Ruffler foot



This foot makes incredibly easy ruffles and pleats in varying depths and fullness.

23. Braiding foot

This is the perfect foot to stitch braids or sequins chains, ric racs, ribbons on to fabric surface (should be small enough to pass through the hole in the foot). Ribbons and Trims of about 3/8 inch will pass through the hole in the braiding foot

24. Double welting foot

You can use this for piping (cording covered on the top with fabric).

There are grooves in the back of this foot. These grooves pass through cording ; by adjusting the needle position you can stitch on either side of the cording which is covered with fabric

25. Bias Tape binder foot

An adjustable bias tape binding foot is used to apply bias binding tape to fabric edges. It is adjustable up from 3/8 to 3/4 inch.(there is no adjustable binding foot which is limited to 1/4 inch binding) You can use this to make button loops / straps / ties . The guide in this foot wraps the bias tape around the fabric edge

26. Cording foot

This is used for adding cords on to fabric surfaces. There are holes on this foot (you can add upto 3 cords) through which you can guide the strings/cord.

You have to thread the cord through the holes. Use zig zag stitches to couch the cords in place.

27. Pin tuck Foot

This foot, which makes thin pin tucks, is best used with lightweight fabric.

You can also make corded pin tucks with this foot. It is used with a double needle; depending on the space between the twin needles pin tuck will be wide or narrow.

28. Fringe foot

This foot is used to make loops of stitches on the fabric surface. You can cut these loops and make the fringes.

29. Flower stitch Foot

This is a specialty foot to embroider flowers. It will make a circular pattern that resembles a daisy. You can increase or decrease the size of the circle pattern; the usual size is about an inch. You need a zig zag sewing machine to make these flower designs

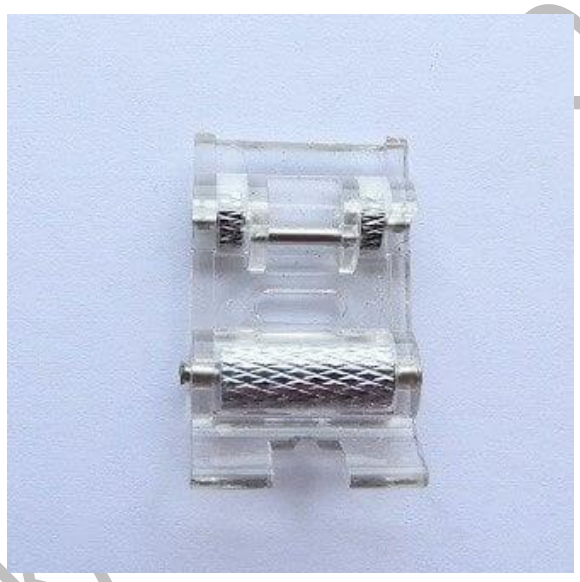
30. Elastic stitching foot

This foot is used to stretch and sew elastic to fabric. There is a guide to inserting elastic through this foot.

31. Multiple Hole cording foot

I have a five hole and seven hole cording foot. There are small holes on this foot. You pass the cord through these holes and stitch them in place with zig zag stitches.

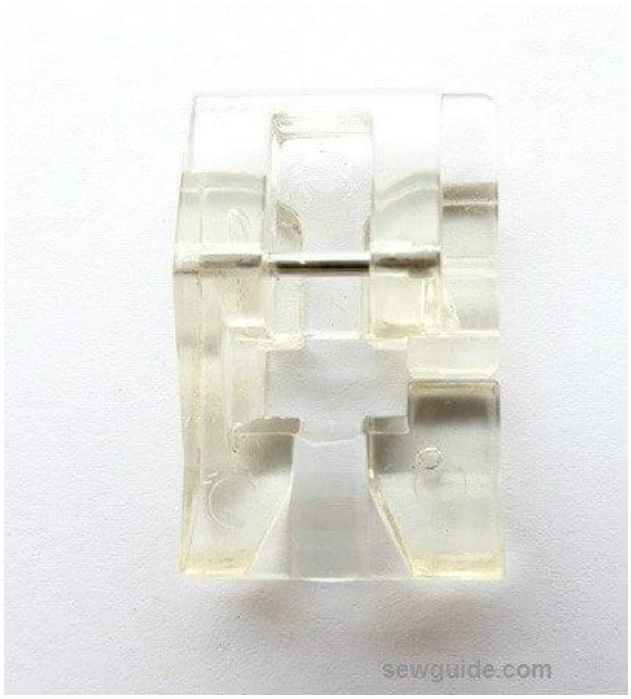
32. Roller foot



This is usually used on fabrics like jersey knits, denim, and leather which do not feed easily, especially as layers. With this foot, the fabric layers move together. When you use it with vinyl, the fabric moves faster.

This foot is an alternative to the Teflon foot. It is a somewhat fragile foot and can be used easily on thin than thick fabrics.

33. Round Bead Foot



This is a foot exclusively used to attach bead strings/ chains on fabric surfaces. Usually, this foot takes beads of 4mm. There is a groove in the back of the foot that accommodates the beads as they are sewn. An appropriately wide zig zag stitch is used to attach the bead strings with this foot

Feed Mechanism of Sewing Machine:

Feed mechanism in sewing machine is the basic motion of needles, loopers and bobbins, the material being sewn must move so that each cycle of needle motion involves a different part of the material. This motion is known as feed mechanism. For general categories, there are: drop feed, needle feed, Differential bottom feed mechanism, puller, unison feed mechanism, adjustable top feed mechanism. Besides these general categories, there are also uncommon feed mechanisms used in specific applications like edge joining fur, making seams on caps, and blind stitching.

Functions:

- To advance the fabric in the feeding zone of the sewing machine.
- To decide the length of individual stitch (spm)
- Appropriate feed mechanism is sleeted to confirm case in sewing
- Operation and to avoid different sewing faults.

Types:

- Drop feed mechanism.
- Differential bottom feed mechanism.
- Adjustable top feed mechanism.
- Needle feed mechanism.
- Unison feed mechanism.
- Puller feed m mechanism.

1. Drop Feed Mechanism:

- The simplest feed system of sewing of sewing machine still commonest.
- Also known as regular feed.
- Main components of drop feed mechanism are:
    a. Throat plate
    b. Feed dog
    c. Presser foot

Problems of Drop Feed:

- When two plies fabrics are sewn- lower ply moves forward by the help of feed dog but foot. So, two plies of fabric cannot move forward at the same speed. As a result, lower ply is more fed than upper ply. This is called ply shifting/differential feeding pucker/feeding pucker. Sometimes roping is occurred during making of hem for ply shifting.
- It pitches of stitch s pitch of feeding dog same then fabric may be damaged for repeating contact of feed dog teeth and fabric at the same place.

Remedies:

- Silk less of the operator.
- Needle manual technique such that, stitch length and pitch of feed dog should not be equal.

2. Differential Bottom Feed Mechanism:

- Modification of drop feed system.
- In the feed mechanism the feed dog consists of 2 section one at back and one at front of the needle.

- Mechanism of each section of feed dog is like the drop feed system. But the speed of each part can be adjusted separately.
- Extensively used for stretchy materials.
- When the speed of the front feed dog is higher than the back-feed dog. “The bottom ply is pulled by the back-feed dog but this will overcome by the greater speed of the front feed dog. So, less possibility of shifting”.
- When the speed of the front feed dog is less “we get lacy effect because the feeding speed in greater than the delivery speed”.
- Stretching and gathering of fabric can be done by this system.

3. Adjustable Top Feed System:

- In general arrangement the presser foot is in two section.
- One holding the fabric in position while the needle form the stitch and the other having length on the lower side and moving or waking in such a way that the top ply is taken along, positively while needle is out of the materials.
- In sewing machine, the feed mechanism can be used with both drop feed and differential bottom feed.
- Combination of adjustable feed and differential bottom feed can make top ply gathering or the gathering of bottom ply.

4. Needle Feed System Mechanism:

- Another name of needle feed mechanism is “Compound feed”.
- Needle itself moves forwards and backward.
- Needle penetrates the fabric enters into the note of the feed dog and for the advance movement of 1 stitch length of fabric feed dog and needle pass the fame distance at the same time.
- Then needle rise up and moves to form the next stitch with one step advance.
- Practically useful in bulky sewing situation such as when quilting through the fabric, wadding and for slapping fabrics
- For the change of stitch length, setting of bath needle and feed dog should be changed.

5. Unison Feed System Mechanism:

- AKA “walking foot system because the presser foot has two independently driven section; the holding and the holding and the feeding feet.
- Mode by combination of needle feed and positive top and bottom feed.

- In this system one presser foot is inside the other presser foot and gives movement at different times.
- The inside presser foot and needle are driven at the same time toward the same direction.
- No possibility of ply shifting.
- Suitable for sewing stitch fabric and for bulk seam in heavy weight materials.
- Normally not so used unless special case.

6. Puller Feed Mechanism:

- Modification of drop feed system.
- A pair of rollers used.
- These rollers give a pulling motion on the fabric behind the presser foot.
- Top roller is generally driven by machine whitest the lower one moves due to control and presser of the top roller.
- The surface speed of puller roller is slightly higher than the feed dog speed to presser ply shifting roping.
- Useful in multi needle machine specially for W/B making.

UNIT – II

SPREADING AND MARKING METHODS

SPREADING

DEFINITION:

Spreading is a preparatory process for cutting and consists of laying plies of cloth one on top of the other in a predetermined direction and relationship between the right and wrong sides of the cloth. The composition of each spread i.e. the number of plies of each color is obtained from the cut order plan. The length is determined by the shape, size, and number of the components to be cut from it. The number of plies in a spread is dependent on the number of articles required and the technical limits of the fabric spreading and cutting processes. Spreading process may be either manual or automated.

OBJECTIVES:

- To place the number of plies of fabric to the length of the marker plan without tension
- To cut the garments in bulk and saving the fabric through the use of multi garment maker plans and cutting many plies at a time
- To make every ply plain and flat.

ADVANTAGES:

- Investment cost is low
- Easy to operate the machines effectively.
- Suitable for the small scale garment industries.

REQUIREMENTS OF SPREADING PROCESS:

- Alignment of plies in both length and width direction: Length and width of fabric must be at least equal to marker length and width.
- Elimination of fabric defects/flaws: Any faults identified on the incoming fabrics will be tagged and will be avoided.
- Correct ply direction (especially for asymmetrically printed fabrics): All faces up, all faces down, face to face etc.
- Correct ply tension: Ply tension must be uniform and as much less as possible.
- Avoidance of distortion in the spread during cutting: Polythene sheets are used under the bottom ply to resist friction of the bottom ply with the base plate of the knife.
- Fabrics must be flat and free from any crinkle & crease: These cause defect in garments due to variation in dimension.
- Elimination of static electricity: In spreading plies of fabric containing man made fibers, friction may increase the charge of static electricity in the fabric.
- Checks and stripes should be matched.

- Easy separation of the cut lay into bundles: Identification marks are used into plies due to color or shade variation of fabric or other cases.

TYPES OF SPREADING:

FLAT SPREADS:

All the plies are of the same length.

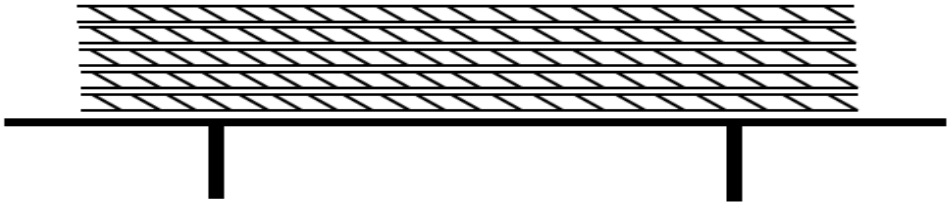
STEPPED SPREADS:

This is built up in steps, with all the plies in one step having the same length. A stepped spread is generally used when there is imbalance between the quantities to be cut. The cut order plan details the colours and ply lengths for the stepped spread.

According to construction:

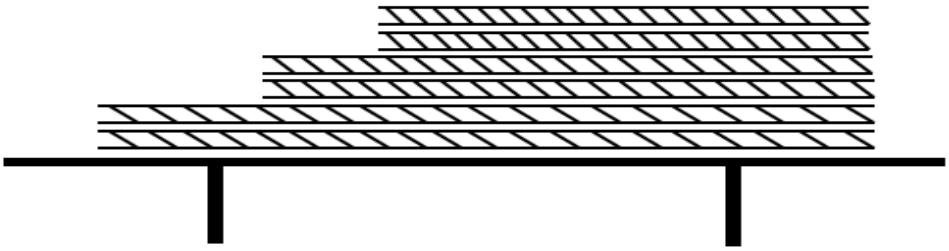
1. Straight lay :

In straight lay each ply of fabric is spread according to marker length, i.e. all plies can have the same length. In that case one marker is used.



2. Stepped lay :

Ply of fabric lay is not spread according to marker length, i.e. when the plies are laid up in different lengths- a step can be formed. Different types of marker are essential for different steps. Its use is very much less because of fabric wastage's and lay making if difficult as well.



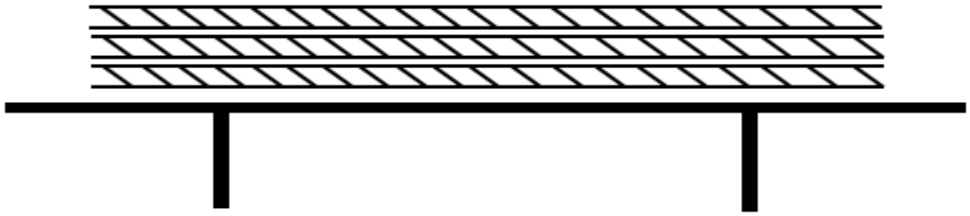
DIFFERENCE BETWEEN STRAIGHT AND STEPPED LAY IS AS FOLLOWS:

S.NO	STRAIGHT LAY	STEPPED LAY
1	Each ply is spread according to marker length	Ply of fabric is not spread according to the marker plan
2	Mostly used	Rarely used
3	Fabric wastage is less	Fabric wastage is more
4	Fabric spreading is simple	Fabric spreading is difficult
5	One marker is used	Different types of markers are used

According to the direction of spreading

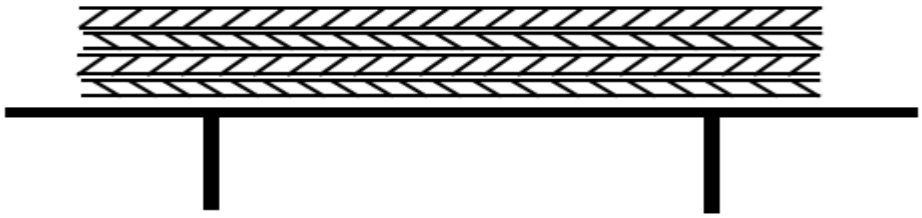
1. **One way spreading (Face to underside):**
   This method is used for open fabrics. The face can lie towards the top or bottom, but always in the same direction. If spreading machines are used, one-way laying-up

necessitates idle motion because the machine always begins its run at the same end of the table and must return to this position after every laying operation.



2. Laying-up in pairs (Face to face):

This method is also used for open piece goods. The face side is always laid onto the previously spread face side so that- as in one way spreading- the machine returns running idle to the working position. The roll of fabric must be turned before the next piece is laid-up. When using spreading machines, these consequently require a device to turn the roll after the fabric has been cut off at the end.



3. Lap (Continuous, Zigzag) lying :

This method was also developed mainly for spreading open piece goods. Contrary to one way spreading and laying-up in pairs, the pieces are not cut off at the lay end but are clamped and then continuously laid in laps. This is the easiest and most popular way of spreading.

<u>Methods of Fabric Spreading:</u>

Primarily there are two methods of fabric spreading; Manual spreading and Automated spreading. But if you deeply explain then you will find numerous methods of fabric spreading. Such as table spreading, flip spreading semi-automatic, fully automatic, one-way spreading, face-to-face spreading, zigzag spreading, tubular spreading, stepped spreading, reversible spreading etc.

The Method of Fabric Spreading are describe below:

1. **Manual method: This method is three types:**

a. By hand

b. By hook

c. Spreading truck with the help of operator.

By Hand: Fabric roll is spreaded on the table by two laborers according to the length & width of marker. Sometimes it is done by entering a rod which is made by wood or metal in the center paper table which is present in the center of the fabric roll.

By Hook: In this process the top of the table on which the fabric is spreaded is set at 10º angle perpendicularly. The hook which placed on the upper face of the table is 15cm long and the hook is joined with one end of selvedge of the fabric. After completing the spreading of fabric, the top of the table is set again. The hooks are displaced and the marker is spreaded on the fabric lay.

Spreading truck with the help of operator: There is a spreading truck on the one end of the spreading table in which the fabric roll is placed. Then the truck is operated by hand from one end to the other end of the table & with the same time the fabric is open out from the fabric roll and the fabric is spreaded according to the length and width.

2. Mechanical or Automatic method: This method is two types:

a. Semiautomatic

b. Full automatic

Semiautomatic: Spreading machine is run on the rails which are placed at two side of fabric spreading table surface and operated by motor. Fabric roll is set in a predetermined place of the machine. The machine is run from one side to the other side of table by using electrical and mechanical motion and fabric is spreaded to make lay.

Full automatic: This is the improvement of semiautomatic machine. There are so many advantages of this machine to make fabric lay because this machine is operated by controlling with the help of robot and micro processor.

TOOLS AND EQUIPMENTS USED FOR SPREADING:

When using industrial machines and tools to produce the garments, the fabric is often ordered in giant rolls and a spreading table is often used in order to eventually roll out and spread the fabric so that it can be cut for each garment piece. Other examples are normal tables, vacuum tables, conveyor tables, pinned tables, fabric loaders, fabric weights/ clamps/ pins.

TRACKED TABLE:

Spreading table may have tracks or rails placed along one or both sides of the table top or just a few inches off the floor. This track helps guide and control the spreader as it moves up and down the length of the table. With some types of equipment, the table tracks are geared to synchronize the movement of the spreading machine with the fabric unrolling to regulate tension.

VACUUM TABLE:

These are used to compress the lay-up and prevent the shifting or movement during the cutting. A spread is covered with a plastic film that forms a seal over the lay-up when a vacuum is applied. A lay-up of quilted fabric can be compressed as much as 75% when the vacuum is used. This allows

more plies in the lay-up and restricts the movement of the slippery fabrics for more accurate cutting.

AIR FLOATATION TABLE:

They may be used moved to a lay-up as another lay-up is prepared further down the table, or fabric can be spread on one surface and then transferred to the cutting surface. Air floatation tables, when activated, allow the easy movement of a lay-up onto an adjacent cutting area. A layer of air between the table surface and the bottom layer of paper reduces the friction and allows a lay-up to be moved easily without putting stress on the fabric or the operators.

PINNED TABLE:

Spreading tables may also be specialized for certain types of fabric and cutting equipment. Pin tables have rows of pins located below the surface that can be extended through the slats to hold the fabric at a precise location for accurate matching of the pattern repeats.

SPREADING TABLE/ CONVEYORIZED TABLE:

These are used to assist in the unwinding of large rolls of the fabric. It is often used in order to evenly roll out and spread the fabric so that it can be cut for each garment piece. A spreading table can be used together with a computer controlled rolling machine or manually by one or two peoples. The spreading table is often a couple of inches wider than the fabric itself and it often has the rails on the top of the spreading table to guide the spreader as it moves across the table. From the spreading table, the fabric can be easily transferred onto a cutting table and processed to make the garments. The spreading tables utilizes a row of pins that can help ensure the fabric is in a stable and accurate position. Spreading table with conveyors coated surfaces carry the fabric to the cutting machine so that no time is wasted. Ideally, one lay-up can be cut while another is being spread. Conveyors may be used with the computerized cutting systems, large die presses and laser cutters.

MARKER PLANNING:

Marker planning is the process of plotting all the pattern pieces for all the sizes of a particular style of garment on a thin piece of paper. The marker planner makes a plan for each pattern and its position on marker paper to ensure better efficiency. It can be done manually or using CAD system. It is one of the most important tasks in the garment manufacturing industry. Accurate marker making helps to reduce the fabric wastages which in then ultimately reduces the cost of making the garments.

Marker is a thin paper which contains all the necessary pattern pieces for all sizes for a particular style of garments. It is made just before cutting and its purpose is to minimize the wastages. The width of the marker is equal to the width of the fabric and it should not be greater than the width of the fabric, i.e. fabric width is greater than or equal to marker width. The pattern pieces should be placed very carefully in such a way that it would minimize wastages. Different techniques are used in marker making to minimize the wastages.

MARKING METHODS

Marker can be made either in i) Manual method or in ii) Computerized method.

1. Manual Method:

The method of marker making which is done by the hand of people with his own planning is known as manual method of marker making. In this method physical & mental industry is necessary.

Manual method is of two types:

a) Marker planning with full size pattern.

b) Marker with minimized pattern.

a) Marker planning with full size pattern:

- In this method, all patterns are in full dimension according to standard measurement.
- Hard patterns are placed on paper or on fabric and then all patterns are marked by turning different direction to minimize the fabric usage.
- The tables, on which the markers are placed, are arranged in such a way so that they do no tilt.
- Vacuum system is arranged under the table for suction.
- This method is suitable for markers of shorter length. When different sizes of patterns are taken for making a marker, in that case it is not useful.

b) Marker with minimized pattern:

- Full sized patterns are minimized 1/5 part by a pantograph and the patterns are made up of hard paper or plastic sheet.
- Marker is planned with small pattern pieces.
- After making, snaps are taken by camera.
- The covered area of pattern in marker is measured by planimeter.
- Marker efficiency is measured by calculating marker area & pattern area.
- Marker photograph and miniature markers are stored.
- From more minimized marker, full size markers are made with more marker efficiency.
- Sometimes, for pantographs' problem, full size markers give more efficiency.
- Suitable for large volume.

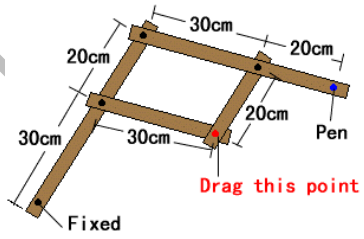


Fig: Pantograph

Planimeter: An instrument for measuring the area of any plane figure, however irregular, by passing a tracer around the bounding line.

Fig: Planimeter

2. Computerized Method:

1. This is the best method of marker making and widely used.
2. In this method, every component of patterns is kept in the memory of the computer and Grade rule is also mentioned.
3. Then the computer makes the marker by its pre-fashioned programming technique.
4. The information of patterns can be stored by

- Digitizing System
- Scanning System

i. Digitizing System:

In this process, patterns are placed in the digitizing board.

Every portion of the components are send to the memory of the computer by clicking special mouse around the pieces.

ii. Scanning System:

This is a special type of machine like photocopiers.

Working patterns are placed on the scanning glass and then marker is made in a selected size.

Grade ruler is used for making other sizes.

Advantages of Computerized Method:

- Suitable for large-scale production.
- Marker efficiency is higher than manual method.

- Least amount of wastage of fabric.
- If required, printout of marker is possible anytime.
- Automatic grading.
- Less time and manpower required, so production is higher.

Disadvantages of Computerized Method:

- High initial investment.
- Skilled operator needed.

Difference Between Manual Technique And Computerize Technique:

	Computerize Technique		Manual Technique
01	Computerized is the best method of marker making and widely used.	01	Manual is not the best method of marker making and not widely used.
02	In this method, every component of patterns is kept in the memory of the computer and Grade ruler is also mentioned.	02	In this method, every component of patterns is kept in the memory of the marker maker and Grade rulers are not mentioned.
03	Suitable for large scale production.	03	Suitable for small scale production.
04	Marker efficiency is higher than manual method.	04	Marker efficiency is comparatively lower.
05	Least amount of wastage of fabric.	05	Large amount of wastage of fabric.
06	If required, printout of marker is possible anytime.	06	Printout of marker is not possible anytime.
07	Automatic grading.	07	Only manual grading.
08	Less time required, so productivity is higher.	08	Productivity is lower.

09	High initial investment.	09	Lower initial investment.
10	Skilled operator needed.	10	Workable without skilled operator.
11	The information of patterns can be stored by – i. Digitizing System, ii. Scanning System.	11	There is no automatic/ electronic way storing information.

Computerized Marker Making:

Computerized marker making method is of two (2) types. They are –

1. Automatic Marker Making
2. Interactive Method

01. Automatic Marker Making:

- In this process computer itself produces marker form different pattern pieces.
- In the automatic marker making system, the computer makes the marker itself according to the command given to computer.
- In this process, higher marker efficiency can be achieved but it is a time-consuming method, because computer use permutation – combination method to produce marker.
- The modern systems however overcome this problem of time and now a days it is possible to get automatic marker only in 2 minutes with a satisfactory level of marker efficiency.

02. Interactive method:

- It is a common process, here the marker planner plan markers by interacting directly with the system through a computer screen.
- Two horizontal lines are shown in middle of the screen which indicates the marker width.
- A vertical line in the left indicates the start of the marker and right side is open at first.
- All the pattern pieces are displayed in the miniature form at the top of the screen.
- They are dragged & dropped in the marker area.
- After placing of all pattern pieces, it is possible to see the data like marker efficiency, marker length, and marker width etc. information just below the parallel lines.
- After completion of marker making, it is saved in the computer memory & it is possible to take the printout of the marker any time.

Difference between Automatic & Interactive method of marker making:

Automatic Method	Interactive Method
Most efficient marker making system	Less efficient than automatic system
More time required to make marker	Comparatively less time required
Marker is made by previously planned data	Marker is made by a manual-computer combination
Small size patterns are displayed in computer screen, but full size in computer memory	All the pattern pieces are displayed in miniature at the top of screen.

POSITIONING MARKING:

Marker making means adjusting and drawing according to pattern pieces on the marker paper. Marker planning is the process of plotting all the pattern pieces for all the sizes of a particular style of garment on a thin piece of paper. The marker planner makes a plan for each pattern and its position on marker paper to ensure better efficiency.

Marker is the thin paper in which all necessary pattern pieces are drawn, in such a way to minimize the fabric wastage. It gives the special instruction for cutting. It can be done both manually and computerized method.

1. Marker width
2. Marker length
3. Grain line
4. Position of pattern pieces
5. Cutting table
6. Production plan

Marker symbol layers are most commonly used in point symbols, usually placed directly on the point feature geometry. You can adjust the anchor points and offsets of a marker to customize their relative position. Marker symbol layers are also used in line and polygon symbols, drawn along lines and outlines, at endpoints, or within polygon interiors.

MARKER PLACEMENTS:

When a marker symbol layer is included in a line or polygon symbol, it includes a marker placement, which determines how and where the symbol positions the markers relative to the feature geometry. Marker symbol layers in a point symbol do not have a marker placement; they are always placed relative to the point geometry. There are a number of marker placements to choose from. Most are valid in both line and polygon symbols, but some are valid in one geometry type only.

RULES TO BE FOLLOWED FOR THE POSITIONING OF A MARKER:

1. With a line or polygon symbol selected, open the format symbol pane and click the properties tab.
2. Add a marker symbol layer to the symbol if necessary.
3. Click the layers tab. Highlight a marker symbol layer and expand the marker placement heading.
4. Specify a placement value as described in the table. Use the symbol preview to validate the settings provided in the screen.

TYPES OF MARKER

Marker type significantly depends on the form in which the fabric is presented for cutting, fabric as well as garment symmetry, and arrangement of pattern piece on the marker.

1. Mixed Marker

A mixed marker is the most popular type of marker. When the garment is asymmetric, or for the purpose of obtaining good efficiency, the mixed marker is used on fabric that is spread open and face up on the table. For most woven fabrics and flat open knits, mixed markers offer the best utilization of fabric because the patterns are placed wherever they fit best in the length of the marker.

2. Open Marker

An open marker is the second most popular type of marker. When the garment is asymmetric, or for the purpose of obtaining the best quality from the spreading process, the open marker keeps pairs of parts (left and right) close together in the length of the marker. The open marker is used on fabric that is spread open and face up on the table. For most woven fabrics and flat open knits, open markers offer the second-best utilization of fabric.

3. Closed Marker

The closed marker is used under special circumstances. As only one-half of the pattern set is used, the fabric spread on the table is folded in its length and is oriented face to face. After cutting, any one pattern piece would yield the left and right piece of the garment when choosing a pair of consecutive plies. Styles that have certain pattern pieces that cover the full width (a one-piece back versus a left and right back pattern piece) can be oriented on the control fold of the marker. Cutting through at the fold yields a one-piece part.

4. Closed-On-Open

The closed-on-open marker is similar to the closed marker. However, since there is no fold at the selvage, the pattern pieces must be either left or right. Styles with one-piece parts like a one-piece back panel cannot be made using a closed-on-open marker without blocking and re-laying. For any one part in the marker, a pair of consecutive plies of fabric (spread face to face) produce the left and right pieces of the garment. Fabric dyeing must be consistent to use this method, as garments will be constructed of two consecutive plies of fabric.

5. Blocking and re-laying

In the case of asymmetric garments when one pattern in the garment is full body width (rather than left and right patterns), blocking and re-laying in the spreading process may be used in conjunction with a closed-on-open marker. In this marker, only the larger pattern is placed in the marker for two consecutive sizes. After cutting the cut block is divided in half and the smaller sized pattern of that part is placed on the second half and then recut for smaller size.

6. Single Section Marker

When the patterns of all the different sizes are scattered throughout the full length of the marker (placed wherever they fit the best), the marker is known as a non-sectional or single-section marker. This marker type has the highest utilization of fabric (highest efficiency) as the highest quantities of patterns (of all marker types) are fitted together. The marker often has multiple sets of the most commonly ordered sizes depending on the ratio of sizes ordered.

7. Section Marker

Markers with more than one section, known as section markers are utilized when the order ratios are unknown in advance. The section marker facilitates producing different order ratios using the same marker through step spreading. Although at the lowest efficiency, single-section markers permit total flexibility in matching varied order ratios.

MARKER EFFICIENCY

Marker efficiency is defined as a ratio of area of marker used in a garment and area of total marker.

Secondly, Glock and Kunz have defined this term in their book, Apparel Manufacturing as Marker efficiency is determined from fabric utilization, the percentage of total fabric that is actually used in garment parts.

The marker planner measures his success by the efficiency of the marker plan created. A formula describes this:

$$\text{EFFICIENCY} = \frac{\text{Area of the patterns in the marker plan}}{\text{Total area of the marker plan}} * 100\%$$

Since the reduction in the fabric cost is so important, the company expects the planner to discover the opportunities for improvements in the marker efficiency by suggesting alterations to patterns and to the cloth, the two elements brought together in the market planning. The first sort of opportunities is commonly designated ensure that the best possible placement of patterns in the marker. In one case the shift of a seam might allow the placement of small parts in areas otherwise wasted, for instance in the armhole of a shirt or jacket or shirt lying next to the edge of

a marker. In another case the seam is moved to enable the better placement of the large panels the whole width of the fabric.

The second sort of opportunity arises in the influence the marker planners has on the selection of the fabric widths where a choice is available. The best width depends among the other factors on the costs of various fabric widths per square meter, the typical number of sizes in a marker, the potential pattern engineering changes at various widths and the marker efficiency of a series of the test markers.

REQUIREMENTS OF MARKER PLANNING

A. Nature of the fabric and the desired result in the finished garment

1. Pattern alignment in relation to the grain line of the fabric:

Pattern pieces normally carry a grain line when pattern pieces are paid down the piece of cloth, as is commonest with large pattern pieces, the grain line should be paralleled to the line of the warp in a woven fabric or the wales in a knitted fabric, where the pattern pieces are laid across the piece, the grain line should lie paralleled to the weft or course direction.

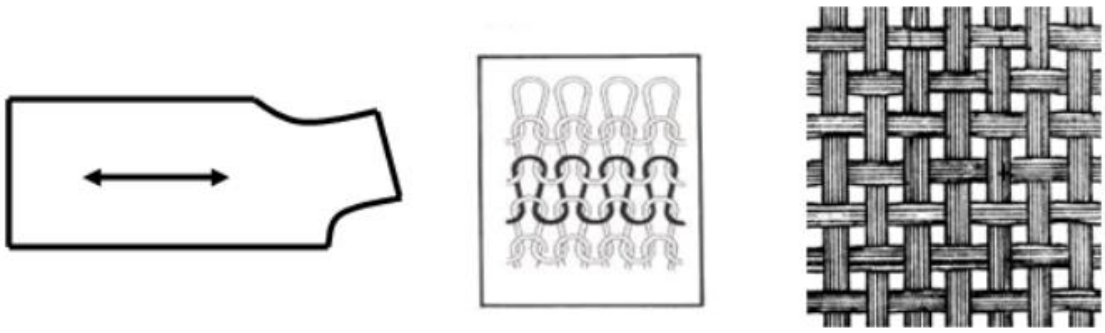


Fig: Weft knit structure

In bias cutting, which is often used in large pattern pieces as a part of garment styles in ladies dresses and lingerie, as well as in small pieces such as pocket facing and under-collar in men's wear as a requirement of satisfactory garment assembly, the grain lines will normally be at 450 to the warp. The designer or a pattern cutter may define a tolerance which allows the marker planner to swing the grain line a small amount from parallel.

If the marker planner lays down a pattern outside the stated rules for grain lines, then the finished garment will not hang and drape correctly when worn. This requirement to follow grain lines restricts the freedom the marker planner has in choosing how to lay the patterns in the marker.

2. Symmetry and asymmetry:

Many fabrics can be turned round (through 1800) and retain the sane appearance and these are designated "EITHER WAY" or "SYMMETRICAL". They require no special action on the part of the marker.

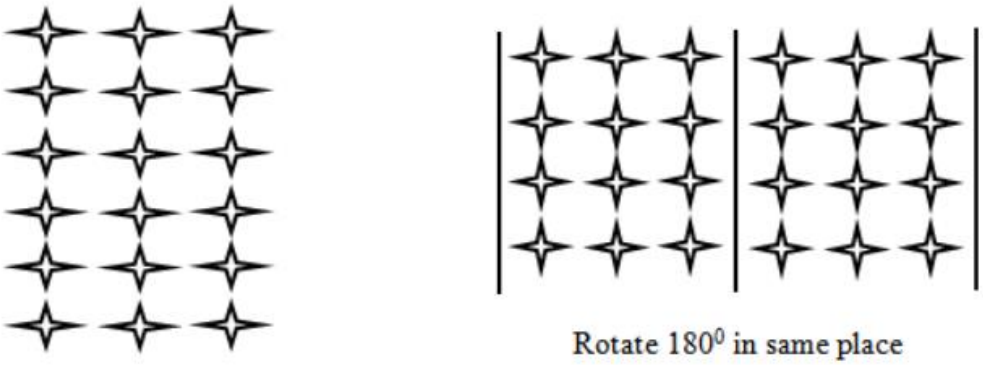


Fig: Symmetrical structure

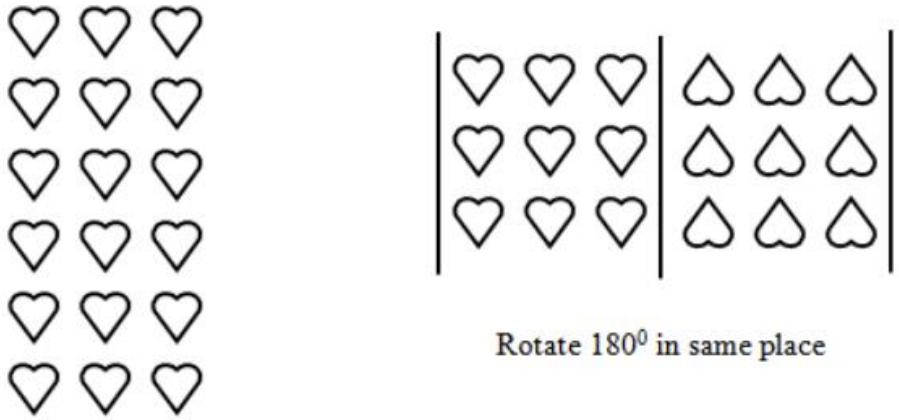


Fig: Asymmetrical structure

In this case, if a fabric is turned round (through 1800) it does not retain the same appearance, especially when the two opposite ways are sewn together. However, as long as the pattern pieces of an individual garments all lie in same direction, which direction they lie does not matter. Example of such fabrics are those with a nap or pile which is brushed in one direction and this presents surfaces which show different reflection of light, knitted fabrics where the loops of the wales always point in the same direction and the fabrics with a surface design which does not run the same way when turned round but where either direction is acceptable.

3. The design characteristics of the finished garment:

For example, if a vertical stripe does not show a complete mirror image repeat, the right and left sides of garment may be designed to be mirror image of each other. In this case, a marker is planned which uses a half set of patterns and the equired effect is created in the spreading of the fabric which places pairs of plies face to face.

UNIT – III
CUTTING AND PRESSING METHODS

CUTTING:

The use of the term cutting can present a difficulty. It is used in the sense of cutting room, an area which normally includes the activities of the marker planning, spreading and preparation for sewing, as well as being used to refer to the actual cutting out of the garment parts from the lay.Cutting is separating of the garment into its components and in a general form, it is the production process of separating (sectioning, curving, severing) a spread into garment parts that are the precise size and shape of the pattern pieces on a marker.

OBJECTIVES OF CUTTING:

The objective of cutting is to separate the fabric parts as replicas of the pattern pieces in the marker plan. In achieving this objective, certain requirements must be fulfilled.

PRECISION OF CUT:

Garments cannot be assembled satisfactorily, and they may not fit the body correctly, if they have not been cut accurately to the pattern shape. The ease with which accuracy is achieved depends on the method of cutting employed.

CLEAN EDGES:

The raw edge of the fabric should not show fraying or snagging. Such defects comes from an imperfectly sharpened knife.

UNSCORCHED, UNFUSED EDGES:

The build-up of heart in the knife blade comes from the friction of the blade passing through the fabric. This in extreme cases, leads to scorching of the fabric and more frequently, to the fusing of the raw edges of thermoplastic fibre fabrics, such as those containing polyamide or polyester. The cutter cannot separate the individual plies from the cut parts. The use of anti-fusion paper during the spreading, spraying the blade and reducing the height of the lay.

SUPPORT OF THE LAY:

The cutting system must provide the means not only to support the fabric but also to allow the blade to penetrate the lower ply of a spread.

CONSISTENT CUTTING:

The cutting system should not be limited in the height or plies it will cut, because of progressive deterioration in the cutting quality, though there may be mechanical or human reasons, such as topping or leaning, for the height of lay being limited.

FUNCTION OF THE CUTTING DEPARTMENT:

- The main function of the cutting department is cut the fabric according to the design.
- Firstly, the cutting department provides the pattern of garment to be cut by the production department.
- The various parts of the pattern are then spread to the appropriate location above the spread fabric by the cutting master.

- After this, all the parts of the pattern are removed by marking with chalk and all these layers are cut together by cutting machine. Here we will discuss the work to be done by the cutting department, which is as follows.

TAKE FABRIC FROM THE FABRIC STORE:
The cutting department receives the order form the production manager to cut the fabric. After receiving the order, the cutting in charge sends the fabric requirement, and receive the fabric from fabric store.

RELAXATION OF FABRIC:
Knitted fabric takes longer to relaxation then woven fabric. So, after getting the fabric from the fabric store, the cutting department first opens the fabric rolls, and then spreads the fabric on the table and leaves it to relax overnight. As a result, the fabric is fully rested.

CUT ORDER PLANNING:
The cutting master first plan to cut any order. This planning takes into account the cutting master, garment design, numbers of pattern, pattern components, types of fabric, fabric print, fabric design, embroidery, fabric spreading length and thickness and machine available for cutting etc. there is no mistake in cutting and the fabric wastage should be minimized in cutting.

FABRIC SPREADING:
It is very necessary to spread the fabric properly for cutting. There are large tables in the cutting department to spread the fabric. Several fabric layers are spread on these tables for mass production. The length of fabric spread on the table is kept as per requirement and the number of layers of fabric to be spread is determined according to the cutting machine or cutting order.

PLANNING AND MAKING MARKERS:
After fabric spreading, the cutting master systematically spreads the pattern on the topmost surface of the fabric. First the large parts of the pattern are spread, and later the smaller parts are spread. Now these stretched patterns are traced over the fabric with the help of chalk and after marking all the parts of these pattern is removed.

FABRICS CUTTING:
All the layers are cut together by a cutting machine after marking by paper pattern. Several types of cutting machines such as : straight knife cutting machine, round knife cutting machine, band knife cutting machine, Die cutting machine, notcher machine, computerize cutting machine etc. are used to cut these layers of fabric.

SORTING:
After cutting the fabric, all these parts should not be mixed together. For this, different size and colour are sorted.

BUNDLING:
After shorting the cut fabric parts or components, the cut parts are made into separate bundles of size wise and colour wise. So that it does not mix with other parts, colour or size. Numbering of garment plies (Parts): After the bundle is created, the numbering on the layers starts. After bundling all the separated parts, stickers are numbered on each layer of the bundle. And now all these bundles are placed on the inventory table before sending them to the next operation.

INSPECTION COMPONENT:

After shorting, the cutting quality and standard of all these cut components are inspected and if any type of defect is seen in any component, then the defective parts are either replaced of removed.

SHORTING EMBROIDERY OR PRINTING PARTS:

Now in these finished bundles, according to the order requirement, the panels of the garment on which painting or embroideries are to be done, the size wise is taken apart and then these parts are sent for printing or embroidery. After embroidery or printing, all these are re-examined by the cutting department. Now after the investigation, all these bundles are sent to the sewing department together.

RE-CUTTING PANELS:

Whatever panel of garment is found to be defective in the bundle is re-cut. After receiving these bundles by the sewing department, the parts in which the defect is found are replaced by the cutting of the cutting department.

CUTTING TOOLS AND EQUIPMENTS:

SCISSORS:

These have round handles and the blades are usually less than 6 inches. They are designed mainly for snipping the thread and trimming the seams. However, scissors with 5 inch blade can be used by the beginners for cutting fabric as well. For embroidery and for cutting button holes sharp pointed scissors with blades ½ inch to one inch long are very useful. The best types of scissors have blades of uneven width. They should be held so that the wider blade is above the narrower blade.

DRESS MAKER'S SHEARS:

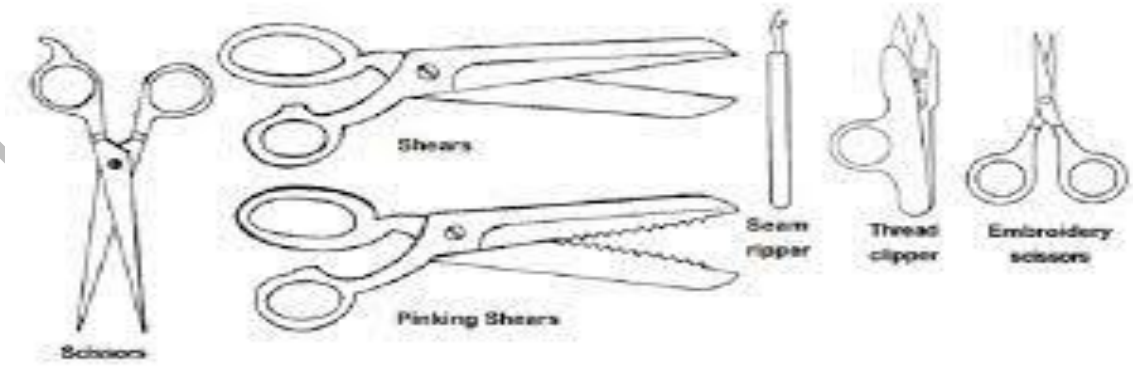
For cutting fabric, shears are more satisfactory than the scissors. Shears differ from scissors in that they have one small ring handle for the thumb and a large ring handle for the second, third and fourth fingers. They also have longer blades (6 to 12 inches). It is better to select the bent- handled shears made of high quality steel and having blades joined with a bolt or screw rather than a rivet. Take good care of your shears and use them only for cutting the fabrics. Do not drop them or leave them out to rust.

PINKING SHEARS:

They are useful for finishing the edges of seams and other raw edges of fabric. They produce a notched (zigzag) cutting line which prevents the ravelling of firmly woven fabrics. Pinking gives a neat appearance to the inside of the garments.

BUTTONHOLE SCISSORS:

These can be adjusted so as to cut the buttonholes in any size you require. They are useful if you are an expert in tailoring and need to make many buttonholes.



METHODS OF CUTTING:

Majority of cutting rooms today, the cutting process makes use of the hand shears, a mechanized knife blade in one of the several possible types, or a die press which stamps out the garment shapes.

- Hand shears
- Straight knife cutting
- Band knife cutting
- Round knife cutting
- Die cutters
- Notches
- Drills and thread markers
- Computer controlled cutting knife
- Laser cutting
- Plasma cutting
- Water jet cutting
- Ultrasonic cutting

HAND SHEARS:

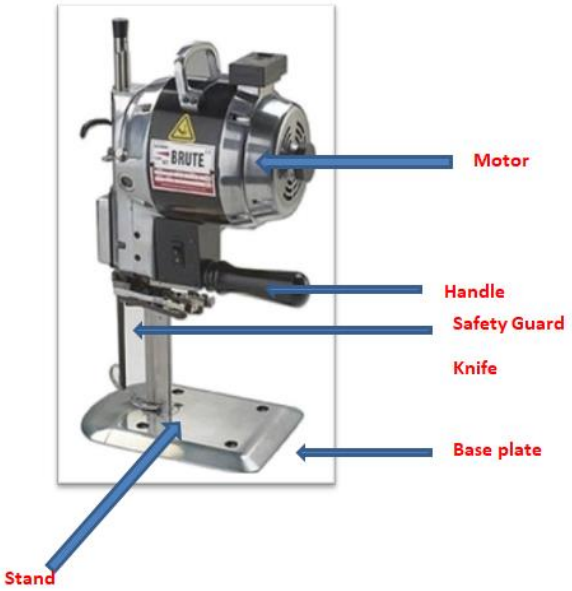
Hand shears is normally used when cutting only single or double plies. The lower blade of the shears passes under the plies, but the subsequent distortion of the fabric is only temporary and accurate cutting to the line can be achieved with practice. Left-handed shears are available since the cutting line will not easily be seen if right-handed shears are used by a left-handed person. This method is flexible enough to accommodate any fabric construction and pattern shape. The obvious disadvantage of any method lies in the time it consumes and the consequent high labour cost per garment, but it appropriate for made-to-measure garments.

STRAIGHT KNIFE CUTTING MACHINE:

It consists of a base plate, an upright stand to hold the vertical blade, motor, a handle for moving assembly, a sharpening device and a handle to transfer the whole assembly from one place to another. Two kinds of power are required to operate a straight knife. Motor power drives the reciprocating blade and operator power drives the knife through the lay. Normally the available blade heights vary from 10 cm to 33 cm and normally available strokes vary from the 2.5 to 4.5 cm. The greater the blade movement the faster the blade cuts the fabric and more easily the operator can move the machine.

The most important consideration is selecting a straight knife is the power required from the operator to move the knife is the power required for the operator to move the knife through the lay. Operator effort is affected by the weight of the motor, the shape of the stand, handle height, stroke, sharpness of the blade and the base plate movement.

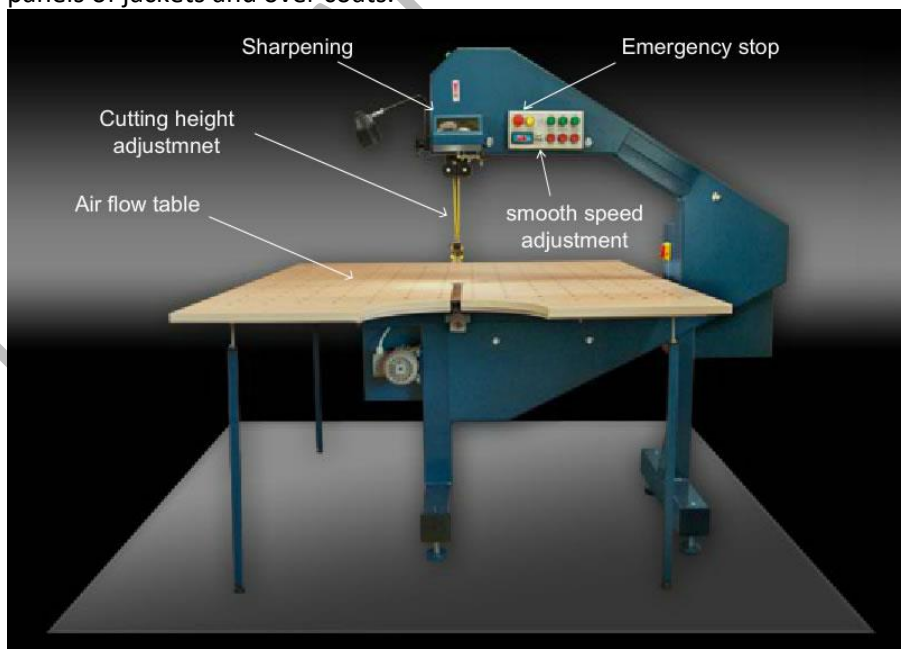
The normal blade has a straight edge that varies from coarse to fine depending upon the type of the fabric being cut. Wavy edged knifes are used to reduce the heat generation and hence can be used for cutting synthetic materials without fusing difficulties. The speed of the blades can also be adjusted by having the variable speed mechanisms. The band knife is mainly used for curve and sharp edges. The straight knife is a common means of cutting lays in conventional cutting rooms because it is versatile, portable, cheaper than a band knife and easy to maintain. Even if a blade is used for the main cutting operation, a straight knife will be used to separate the lay into sections for easier handling.



BAND KNIFE CUTTING MACHINE:

A band knife comprises a series of three or more pulleys powered by an electric motor. With a continuously rotating steel blade mounted on then, one edge of the blade is sharpened. The principle of operation is different from a straight knife, in that the band knife passes through a slot in the cutting table, in a fixed position and the section of lay to be cut is moved past it. The blade is usually narrower than on a straight knife. Band knives are used when a higher standard or cutting accuracy is required that can be obtained with a straight knife. Space must be left around garment parts when marking so that they can be cut from the lay using a straight knife and then cut exactly using the band knife.

When small parts such as collars, cuffs and pockets are cut, a template of metal or fibre board in the shape of the pattern pieces may be clamped to the section of lay on top of the marking which is then drawn past the band knife blade, cutting exactly along the hard edge. Band knife cutting machines are used more in men's wear than in the women's wear and are often used to cut the large garment parts such as the large panels of jackets and over coats.



ROUND KNIFE CUTTING MACHINE:

The elements of a round knife cutting machine are a base plate, above which is mounted an electric motor, a handle for the cutter to direct the blade, and a circular blade rotating so that the leading edge cuts downwards into the fabric. Blade diameters vary from 6cm to 20cms. Round knives are not suitable for cutting curved lines in high lays because the blade does not strike all the plies simultaneously at the same point as a vertical blade does. Therefore a round knife is used only for the straight lines or lower lays of relatively few plies. It is naturally much more difficult for a circular blade to cut a tight curve, such as armhole.

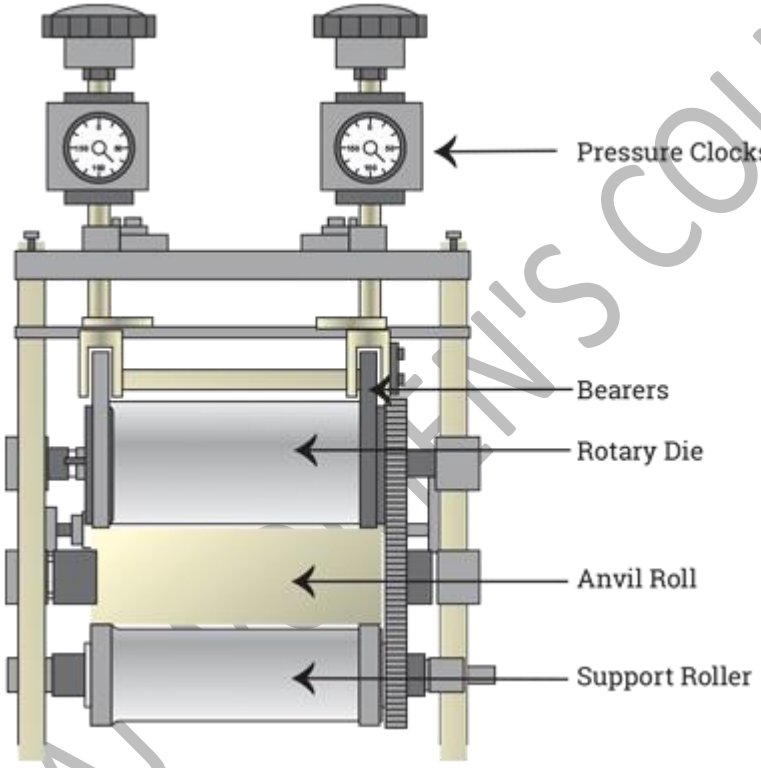
DIE CUTTERS:

In contrast to the fast moving blades used in the methods of cutting previously described, die cutting involves the pressing rigid blade through the lay of fabric. The die (called a clicker in the shoe industry) is a knife in the shape of a pattern periphery, including notches. One or more tie bars secure its stability. Free standing dies generally fall into two categories. They can be of strip steel manufactured by bending the strip to the shape required and welding the joint. These cannot be sharpened and must be replaced when worn. Alternatively, they can be heavier gauge, forged dies which can be re-sharpened but which are about five times the price of the strip steel. The position of the tie bars determine the depth of curt which is generally greater than the forged dies.

Free standing dies cut the small parts of larger garments such as collars and trouser pocketing or the parts of a larger garment part, such as bras. They can also be used for part of a larger garment part such as the neck area, of a coat front. They provide a high standard of accuracy of cutting but, because of the cost of dies, they are only appropriate to situations where large quantities of the same pattern shape will be cut. Die cutting also offers much faster cutting than knife cutting for the same depth of cut. It is proportionally more economic for small parts which have a greater periphery in relation to their area than do large parts. In addition, the level of accuracy demanded of small parts is not only greater but correspondingly more difficult to achieve with conventional knives.

The die press generally has a cutting arm supported by a single pillar at the back of the machine; it swings to the side to allow the placing of dies on top of the fabric. The downward cutting stroke of the press should be so controlled that the edge of the die just penetrates the cutting pad or surface in order that the fibres of the lowest ply are completely separated. Die presses are of two types: impact, which makes a single press on the die, and, more commonly, hytronic (hydraulic and electronic) which exerts continuous pressure on the die until it has cut the fabric and made contract with the soft metal or nylon pad. Once the pad, after repeated cutting, reaches an unsatisfactory state of wear, its surface is re-cut and re-levelled.

For die cutting, the spreader spreads a lay to the required number of plies and may place a marker on top to guide the placement of dies. The spread is cut into sections to allow transport to the cutting pad. In some cases, no marker is used the operator placing the dies by eye to the correct grain line and as close together at this method allows.



One important disadvantage of the die cutting is its greater use of fabric. When the die press forces the dies through the fabric it also forces a barrow wedge of fabric between the dies. The narrow wedge exists because the sharpened cutting edge of the die is necessarily of narrow gauge than the top of the die. Thus if dies are butted together, they touch at the top but show a small gap at the level of the cutting edges. The action of the press will compress this narrow wedge of fabric to the point where it will rupture the dies. Hence it is necessary to leave a significant gap between two dies, say 2 to 3 mm. Similarly a single die will not cut satisfactorily if placed closer than 3 to 4 mm to a previously cut edge.

Large area die cutting presents a number of technical problems. A complete lay of free dies several meters long on top of the fabric could be cut by a twin pillar or four pillar press extending across the lay. For economic and engineering reasons the depth of the press is limited.

NOTCHES:

Many garment parts require than notches are cut into the edges of them to enable the alignment during sewing with other garment parts. The previous four methods of cutting can be used to cut notches, but accuracy depends of the operator. Specialized notching equipment provides greater accuracy, because a guide lines up the notcher with the cut edge to give consistent depth of notch at a consistent right angle to the edge. Both straight notches and vee notches are available. A further machine, the hot notcher,

incorporates a heating element in order that the blade may be slightly scorch the fibres adjacent to the notch in order to prevent it fraying and disappearing. This cannot be used with the thermoplastic fibres and certain unlined garments. One fabric requiring it may be loosely woven tweed.

DRILLS AND THREAD MAKER:

Where reference marks are needed away from the edge of a garment part, such as for the position of pockets, darts and similar features, a hole is often drilled through all the plies of the fabric on the lay. The drill mounting includes a motor, a base plate with a hole to allow the drill to pass through, and a spirit level to ensure that the base is horizontal and hence the drill is vertical.

On many fabrics, the drill is used cold and the hole remains visible until the sewing operator comes to use it. On looser weave fabrics, where the hole may close up, a hot drill is used, which will slightly scorch or fuse the edges of the hole

A hypodermic drill may also be used which leaves a small deposit of paint on each ply of the fabric. If it is important that no mark remains on the fabric, a long thread may be passed through the lay which is then cut with the scissors between each ply, leaving a few centimeters visible on each garment panel. All drill holes must eventually be concealed by the construction of the garment.

COMPUTER CONTROLLED CUTTING:

This methods provides the most accurate possible cutting, at high speed, and to keep the larger systems fully occupied they are frequently used in a central cutting facility that supplies a number of separate sewing factories. Increasingly, though smaller, cheaper systems are being developed which are suitable for companies wanting to cut lower lays of similar quantities of garments and these are appropriate for a single factory operation.

A typical computer system has a table with the cutting surface consisting of nylon bristles which support the fabric lays but are flexible enough to permit penetration and movement of knife blade which is supported only at the top. The bristles also allow the passage of air through the table to create a vacuum, reducing the height of the lay and holding it in the place. The carriage supporting the cutting head has two synchronized servo-motors which drive it on tracks on the edges of the table. A third servo-motor positions the cutting head on a beam across the width of this carriage. These two movements are co-ordinate to give a knife position at any point on the table. The cutting head contains a knife , automatic sharpener and a further servo-motor which rotates the knife to position it at a tangent to the line of cut on the curves. A further facility controls the deflection of the knife which inevitably occurs on curves by adjusting the angle to equalize the pressure on each side of the blade. This ensures the accurate cutting through all the layers. A sheet of airtight polyethylene covers the top of the lay which control the cabinet houses the computer and the electrical components required to drive the cutter, its carriage and the vacuum motor.

The spreader spreads the lay on a conventional cutting table equipped with the flotation. Paper is spread below the bottom ply so that the lay can be moved onto the cutting table without distortion and so that the bottom plies are supported during the cutting operations. This paper is performed to enable the vacuum on the cutting table to operate to compress the lay. After loading the disc into the computer, the operator positions the cutting head's origin light over the corner of the spread. This provides the computer with a reference point. A lift and plunge feature enables the knife to negotiate the sharp corners and straight or vee-shaped notches can also be cut. A motorized drill behind the cutting head can provide the drill hole as required. Different systems is available which are designed to cut the different heights of compressed plies. The maximum height is usually 7.5 cm when compressed, with the height before compression and hence the number of plies, being dependent on the nature of the fabric.

Different arrangement of cutting room tables is possible, but they must allow for the fact that in this situation the cutting process takes very much less time than spreading and somewhat less time than bundling. A typical arrangement would consist of four spreading tables supplying each cutting table.

The cutting table and its carriage and cutting head is able to move between the spreading tables by means of tracks on the floor and has, beyond it, four bundling tables onto which the cut garments are moved.

LASER CUTTING:

A laser produces a beam of light which can be focused into a very small spot (0.25mm) producing a very high energy density. The energy transferred to the material on which it is focussed, producing a rapid increase in temperature. Cutting takes place by vaporization. A laser beam does not become blunt and need renewing but it does not suffer from limited depth of focus. This limits the depth of the fabric it can cut and the best results are achieved when cutting the single plies. The system includes a stationary gas laser, a cutting head carrying a system of mirrors which reflect the laser beam to the cutting line, a computer which operates the entire system and a means of removing a cut parts from the conveyor carrying the single ply of the fabric. Laser cutters are rare in the UK clothing industry and but are being used successfully in the cutting of sails where the single ply cutting is the norm and a slight fusing of the edge of the synthetic, woven materials that are used is actually desirable. They are also used for cutting in some areas of home furnishings.

PLASMA CUTTING:

It was originally developed to satisfy a demand for high quality cutting on stainless steels and aluminium but it can also be used to cut the textile materials. Cutting is achieved by means of a high velocity jet of high temperature ionized gas. If engineering problems could be overcome, this method has the potential to become the faster cutter of single plies, but there is not currently a high demand for single ply cutting.

WATER JET CUTTING:

A very high velocity, small diameter stream of water is created by applying a high pressure water to a nozzle. The high pressure jet acts a solid tool when it encounters the material to be cut, tearing the fibres on impact. As the jet penetrates successive plies in the spread, the momentum decreases and the cutting ability is reduced. It is most effective with the harder sheet materials, including plastic and leather. A marker plan is made in which the pattern pieces are planned onto the hide, allowing the blemishes and for

the varying thickness that occur in leather, and the hide is then automatically cut, in a single layer by the water jet.

ULTRASONIC CUTTING:

It is the most recently developed system which uses an ultrasonic driven knife blade. Vibration frequencies in the 20 KHz range produce 1/20 mm movement in the blade, small enough to remove the need for a bristle base to the cutting table. Disposable knife blades save sharpening time and last for 14 days. In the systems developed so far, two cutting heads are used, moving in the different but synchronised paths.

PRESSING:

Pressing is a finishing process done by a cloth to heat and pressure with or without steam to remove creases and to impart a flat appearance to the cloth or garments. In garment industries pressing is also called ironing.

OBJECTIVES OF PRESSING:

- Removal of unwanted creases and wrinkles because creases occurs in the garment during their manufacturing processes.
- In the apparel, darts and seams are used for more attractive and this pressing referred to as “shaping” of the garment.
- To apply the creases wherever necessary in the manufacturing unit
- Under pressing: Before sewing some parts needed minimum creases to satisfy the requirements of the shape of the garment.
- It is used to hide the imperfections such as puckered seams and Neps.

IMPORTANCE OF PRESSING:

The importance of each parameters involved in the pressing process is discussed below:
Heat: Heat is required in most pressing operations to enable the fibres to soften and thus stabilise the garment.
Moisture: Moisture is introduced by the use of steam. Steam at different pressures has different moisture contents.
Pressure: Pressure is applied to the garment during pressing to give good crease retention and permanency. Excessive.
Vacuum: Vacuum is applied at the completion of the pressing operation. This draws cool air through the...

METHODS OF PRESSING:

UNDER PRESSING:

Operating performs on apparel parts during making up. Moreover, under pressing requires to give minimum ironing to some parts of the garments before sewing easily and beautifully. Besides, most of the apparel industries apply under pressing for making a coat, jacket, trousers and others.

FINAL OR TOP PRESSING:

Final pressing operations are done on the fully assembled apparel. In fact, special kinds of pressing machines are employed for applying final pressing. Overall, the final pressing is used to apply heat and pressure to the garments. This is usually applied in a jacket, trouser, skirt and so on.

NO PRESSING:

Generally knitted fabric types does not require any pressing process for example, underwear, briefs and swimwears.

MINIMUM PRESSING:

Minimum finishing is done by applying heat but no need for pressure when garments are pressed by steaming and by flowing dry air and these fabrics are such as nightgowns, knitted t-shirts, Lounge wear and so on.

PERMANENT PRESSING:

It is done by applying high steam and temperature besides sometimes there is a needed for pressure. However, it is a special type of pressing process when it applied to retain the shape of a garment or special conditions.

PRESSING EQUIPMENTS:

IRON:

In ancient times, heat were generated firing the coal or the wood in an iron made case and garments pressing or ironing were done under the smooth and hot surface of the case. With the passage of time, the use of the iron case has been replaced by the use of electricity, which (electric iron) is being used in houses till now. In electric iron, regulator is used to control temperature. Presently, steam iron, one step forward edition of electric iron, has come in the market. By supplying steam in the steam iron, the iron is made hot. By controlling a button in the steam iron by finger, the supply of steam through the iron is regulated. Steam is supplied in the iron through a pipe from the central large boiler or mini boiler and by operating the switch in the iron, steam is made out through a number of holes placed at the bottom of the iron. The shape of the iron is generally triangular and the weight may be from 1 kilogram to 15 kilogram. Ironing bed or table is required for calendaring of garments with the help of iron. For electric iron, generally flat bed or shaped bed can be used but for steam iron, ironing bed having facility of air-suction is required. Just after ironing bed, the heat and moisture of the calendared portions of the garment are removed instantaneously. As a result, the possibility of unwanted crease in the garments becomes less and the fabric dries quickly, moreover, the high quality pressing can be done comparatively in high speed. The dimension and shape of ironing bed may be of various types. If the ironing bed of special shapes are used, the ironing of the specific parts of a garment can be done very nicely and rapidly.

STEAM PRESS:

There is a static buck and a head in the steam press whose shapes are proportionate to each other. Keeping the garment on the buck, the head is placed on the buck and the garment is ironed by applying heat and pressure. The buck is set in a frame and the ironing bed is made by spreading a few layers of fabrics or foam on the buck. There is system of the flow of steam and air-suction through the buck. There are tables around the buck where the garments are kept. The head remains in a frame on which bedlike arrangement is made by a number of layers of fabrics or foam. There is arrangement for supply of steam also through the head. Generally, the head is brought down on the buck with the help of scissors action and pressure is applied. In the old pressing system, the head is brought down on the buck by a foot operated switch and pressure is applied by the scissors action and by another switch operated by hand or

by foot, steam is supplied through the head and buck. Finally, the head is brought upward by controlling another switch and air is sucked through the buck. In modern and automatic steam press machine, all jobs are done automatically in cyclic order by switching only once. Specially how much amount of pressure the head will apply by coming down on the buck, how much time will supply the steam and then the head will go upward from the buck, how much time the air will be sucked through the buck etc. can be given pre-setting and if requires, they can be changed also. In the old system of garments pressing, skill operator is required, because, it is very difficult to maintain that when and what switches are to be controlled regularly and properly. On the otherhand, as the jobs are performed in cyclic order in the modern steam press, the job of operating of the machine is comparatively easy.

STEAM AIR FINISH:

This type of garments pressing machine is mainly known as “Puffer” or “Dolly” press. In Dolly press, there is a form in the frame in which arrangement is there for flowing of steam and compressed air with the help of a pipe. The pressing form is generally made by coarse canvass fabric. The size of the pressing form is used as per the size of the body of the garments, but there are no sleeves. Timer is used for flowing of steam and air for pre-setted time. An operator, covering from the upper side of the pressing form, pull downs a garment. Then steam is flowed from inside the pressing form with the help of a pipe, as a result, both the pressing form and the garment swell up. This way, steam is flowed for first 8 seconds. Then hot air is flowed for the next 8 seconds. As the outcome of garments pressing this way, if any unwanted creases are there in the garments, they are easily removed. Also minimum time is required for garments pressing. A padded clamp is used along the button hole lines so that during pressing the holes are not de-shaped. During pressing of the garments made with knitted fabrics in these machines, special care should be taken so that the volume of the garments is not stretched. In dolly pressing, there is no system of giving any creases in the garments but if any creases are required then it is done by hand iron or by steam press. For the purpose of pressing of garments of various sizes, the pressing forms of similar sizes are used.

Dolly press is generally used for pressing of t-shirts, blouses, night dresses, sports wears etc. but dolly press can also be used for pressing of jeans shirts, pants, jackets etc.

STEAM TUNNEL:

In this process, pressing is done without applying any pressure on the garments. Hanging the garments in hangers, the hangers are placed in the running rail. The running rail carries the hangers with garments through a tunnel. There are a number of chambers in the tunnel. In the first chamber, the required temperature is controlled by steam. During passing through the chamber, the garments hanging in the hangers are heated by steam and if there is any unwanted creases in the garments, they are removed due to the fabric relaxation causes by heat and for the pulling of the gravitation force. Then during the period of passing through the second chamber, the garments are dried by the flow of dry hot air. In this process, if there is any crease in the garments, they can be removed, but no creases can be created in the garments. Generally, steam tunnel is used for pressing of t-shirts or garments made with knitted fabrics.

In this article I only discuss common garment pressing equipment those are generally used in apparel industry

SPECIAL TYPES

PLEATING:

Pleating is the process of creating pleats in the garment. Pleats are a type of fold actually formed during stitching by doubling fabric upon itself and securing it in place. However, these pleats can also be introduced in pressing by creating a set of creases in the garment and making it set by pressing. The pleats can even be according to a geometrical pattern. Pleating is done by using pressure, moisture and heat. There are two types in machine pleating.

Fig: Fabric pleating machine for apparel

One is a blade machine in which pleats are formed by the action of blades and then set by heat and pressure when they pass through a pair of rollers and the other type is a rotary machine in which the rollers are fitted with complimentary dies. Crystal pleating, hand pleating, box pleats and fan-shaped pleats

PERMANENT PRESS:

The permanent press method normally results in reduction of fabric strength. This method was developed for producing better crease recovery of cellulosic fabrics. The process involves processing the fabrics during its manufacture with a resin. A permanent press fabric is processed after the resin treatment and is then made into garments. The method is commonly used for trousers to introduce the creases at the seams and hems and down the front and back. The garments are then passed through an oven to cure the resin in the fabric.

UNIT – IV

SEWING MACHINERIES

SEWING MACHINES:

A sewing machine is a machine used to stitch fabric and other materials together with thread. Sewing machines were invented during the first Industrial Revolution to decrease the amount of manual sewing work performed in clothing companies. Before the invention of a useable machine for sewing, everything was sewn by hand. Most early attempts tried to replicate this hand sewing method and were generally a failure. Some looked to embroidery, where the needle was used to produce decorative, not joining stitches. This needle was altered to create a fine steel hook-called an aguja in Spain. This was called as Crochet in France and could be used to create a form of the chain stitches.

Sewing machine is a machine which is used to sew two or more pieces of fabrics together. A sewing machine sew not only fabrics but also other materials such as bags, leather, tent and more. Sewing machine is also used to improve the fineness and appearance of the fabrics. Different sewing machines follow their own duty to produce perfect products as we want, such as garments, mattresses, protectors etc.

In textile industry, two types of sewing machines are used: Manual and Electric sewing machines.

Manual sewing machine is powered by hands or legs. That is to say, the users have to operate the machine by their own hands or legs. Comparing with electric sewing machine, the production capacity of manual sewing machine is low. Due to its low cost and easy use, most of the sewing machines are used in a trailer shop or home, which are usually used by their own manufacturers.

Electric sewing machine is driven by electrical power, so it works quickly and smoothly. Due to its high production capacity and efficiency, it is also called as the industrial sewing machine. Some common types of industrial sewing machine includes the lock stitch machine, chain stitch machine, over lock machine, zigzag stitch machine, blind stitch machine etc., Some machines have been programmed to make automatic sewing. However, this kind of machines are almost expensive and difficult to maintain. Although they can produce better goods than the others, they are rarely used in our country.

HISTORY OF SEWING:

As with most innovations, the sewing machine was invented in stages:

- In 1755, Charles T. Wiesenthal of the United States patented a double-pointed sewing needle, which did not need to be turned around between stitches.
- In 1830, a Frenchman, Barthelemy Thimonnier attached the Wiesenthal's needle to a connecting rod to make a sewing machine.
- In 1846, Elias Howe created the lock stitch sewing machine. This used the modern mechanism, because the lock stitch machine is the core of the function of the modern sewing machine, Howe is generally credited with its invention. However, his machine was difficult to use well, and too expensive for home use.

- In 1849, the American Benjamin Wilson introduced an automatic feeding mechanism which solved the main usability problem with the Howe's machines.
- In 1851, Bostonian Issac Meritt Singer Patented two refinements to the sewing machine, a fixed arm structure still used today, and the presser foot. He began manufacturing a sewing machine priced for home use.

The sewing machine predates the electricity. Early machines used a hand crank or a treadle lever to drive them. These turned out to be easily electrified, and many are still in use today.
Later innovations apart from the electricity include the ability to zigzag and to make more microprocessors, and pre-programmed fonts for monogramming. All cute, but unnecessary.

CLASSIFICATION OF SEWING MACHINES:

S.No	Machine types	Applications
1	a. Lock stitch machine b. Chain stitch machine c. Double chain stitch machine	Straight, zigzag seams
2	a. Blind stitch machine b. Linking machine	Blind stitch machine for blind stitch and hemming Linking machine for attaching trimming and to make cuff of knitted fabrics.
3	a. Over edge machine b. Safety stitch machine	Edge neatening, combined neatening and seam closing Safety stitching
4	a. Button hole machine b. Button sewing machine c. Bar tack machine	Specific sewing operations.
5	a. Profile sewer b. Pocket sewer	Automatic, complex sewing operation.

SINGLE NEEDLE LOCK STITCH SEWING MACHINE:

A machine for sewing fabric, leather etc., specifically, one that uses two threads (an upper and a lower or bobbin thread) and is best at sewing the woven materials.

It has an eye at the sharp end. The other end is attached to a rod that goes up and down inside a fixed arm. The arm also holds a presser foot, which can be raised or lowered manually, but which is kept down when sewing. Its role is to press the fabric against a base plate. The needle plunges into the fabric from the top, through a hole in the presser foot. There is a thread which goes from a spool, through a thread tensioning mechanism, and through the eye of the needle.

There is another thread, which comes up from under the fabric being sewn. This is the bobbin thread, which was wound onto its bobbin before sewing. The bobbin sits in a bobbin case, which is not fixed to the sewing machine case. It floats in its own casing (this is important). To begin sewing, the needle plunges through the fabric, taking a loop of the top thread with it. Here's the clever bit. A small hook on the bobbin case catches the needle thread. The bobbin case rotates, effectively passing the entire bobbin through the loop of the top thread. These yarns twist up the bobbin thread with the top thread, making the stitch. The needle is then pulled back up. If

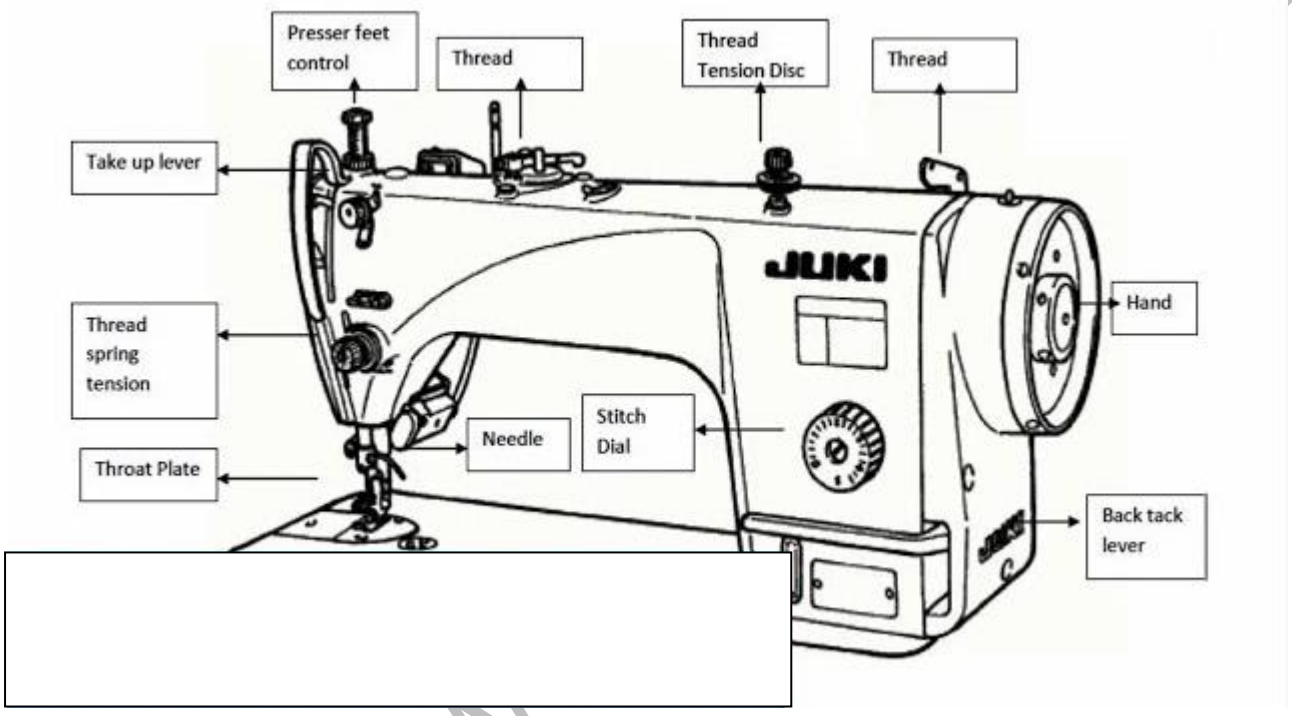
your thread tension is correct, the twist between the top and bobbin threads is pulled into the fabric you are sewing as it goes. Once the needle is out of the way, the feed dogs, which are then located in the base plate, push the fabric up against the smooth underside of the presser foot. As they then slide backward, they push the fabric with them to make a visible stitch.

There is also a backstitch lever on the machine. When that is pressed, everything happens as described above except that the feed dogs push the fabric toward you rather than pulling it away from you.

PARTS AND FUNCTIONS OF A SINGLE NEEDLE LOCK STITCH MACHIE:

1. Spool pin- It is used to hold the spool of thread.
2. Thread guides-It holds the thread in position from the spool to the needle.
3. Tension disc- This is a simple mechanism where two concave discs are put together, with the convex sides facing each other. The thread passes between the two. The tension of the thread is adjusted by the spring and a nut which increases or decreases the pressure on the disc.
4. Take-up lever- At the outside end of the lever, there is a small hole through which the thread passes. The lever moves down to loosen the top thread while the stitch is being formed; then it moves up and pulls the loop of thread tight to complete the stitches.
5. Needle bar- This is a steel rod which holds the needle at one end with the help of a clamp.
6. Bobbin case- This moves into position of the catch the top thread and form the stitch as the needle is lowered into the bobbin chamber.
7. Presser foot- This is attached to the presser bar and it holds the cloth firmly in position when lowered.
8. Presser foot lifter- This is a lever attached to the presser bar for raising and lowering the presser foot.
9. Stitch regulator- This controls the length of the stitch. Some regulators can be set to stitch in the reverse.
10. Bobbin winder – This facilitates the winding of thread on to the bobbin. Some are made to stop automatically when the bobbin is full.
11. Flywheel- When this is made to revolve, it works the mechanism of the machine.
12. Clutch screw- This is in the center of the flywheel and it engages and disengages the stitching mechanisms.
13. Slide plate- This is a rectangular plate which can be slid open to remove or put in the bobbin case.

14. Needle plate/ Throat plate- This is a semi-circular plate with a hole to allow the needle to pass through it.
15. Feed dog- This consists of a set of teeth fitted below the needle plate. It helps to move the cloth forward while sewing operations.
16. Face plate- This is a cover which when removed gives access to the oiling points on the needle bar, presser bar and thread take-up.
17. Spool pin for bobbin winding- Spool of thread is placed on this at the time of winding the bobbins.



DOUBLE NEEDLE LOCK STITCH MACHINE:

This machine is similar to the single needle lock stitch machine. But here all the components are having two sets .i.e., two sets of bobbin case, tensioner, take ups, thread guides, spool pin, needle holders. In this the bobbin case are fixed one. The bobbin only taken out from the machine. This machine adapts two straight needles, vertical axis rotating hook with self-lubricating feature of catching thread loops and sliding cam take-up to produce two lines of double lock stitch. The needle bar can be engaged and disengaged mechanically and the arm shaft and hook shaft are supported by the ball bearing. It is provided with synchronous tooth belt for driving and plunger pump for the lubricating, and knob-type stitch regulator and lever type reverse feeding mechanism. A bobbin thread pullback spring in the bobbin case guarantees the unanimous result of sewing between the bottom thread and the upper thread. It is suitable for stitching shirt, uniform, jeans, overcoats or similar clothing.

OVERLOCK MACHINE:

An over lock stitch over the edge of one or two pieces of cloth for edging, hemming or seaming. Usually an over lock sewing machine will cut the edges of the cloth as they are fed through (such machines called as “sergers”), though some are made without cutters. The inclusion of automated cutters allows over lock machines to create finished seams easily and quickly. An over lock sewing

machine differs from a lockstitch sewing machine in that it utilizes loopers fed by multiple thread cones rather than a bobbin. Loopers serve to create thread loops that pass from the needle thread to the edges of the fabric so that the edges of the fabric are contained within the seam. Over lock sewing machines usually run at high speeds, from 1000 to 9000 rpm, and most are used in industrial setting for edging, hemming and seaming a variety of fabrics and products. Over lock stitches are extremely versatile, as they can be used for decoration, reinforcement or construction. Over locking is also referred to as “overedging”, “merrowing”, or “serging”. Though serging technically refers to over locking with cutters, in practice the four terms are used interchangeably.

FORMATION OF AN OVERLOCK STITCHES:

1. When the needle enters the fabric, a loop is formed in the thread at the back of the needle.
2. As the needle continues its downward motion into the fabric, the lower looper begins its movement from the left to right. The tip of the lower looper passes behind the needle and through the loop of thread that has formed behind the needles.
3. The lower looper continues along its path moving toward the right of the serger. As it moves, the lower thread is carried through the needle thread.
4. While the lower looper is moving from the left to right, the upper looper advances from right to left. The tip of the upper looper passes behind the lower looper and picks up the lower looper thread and needle thread.
5. The lower looper thread now begins its move back into the far left position. As the upper looper continues to the left, it holds the lower looper thread and needle thread in place.
6. The needle again begins its downward path passing behind the upper looper and securing the upper looper thread. This completes the over lock stitch formation and begins the stitch cycle all over again.

CHAIN STITCH MACHINE:

Chain stitch machines are used to create strong, flexible seams for clothing, bags, and other items made from stretchy fabrics. They use a single continuous thread that loops back on itself to create a chain stitch, which is more flexible than a lock stitch.

Some parts of a chain stitch machine include: thread tension mechanism, needle bar and lever mechanism, feed mechanism, looper mechanism, and presser foot mechanism.

Chain stitch machines can be used for a variety of purposes, including:

Over-edging

Chain stitch over-edging machines use one or more needles and looped thread to create over-edge chain stitches that bind and neaten cut edges.

Hems

Chain stitching is a traditional way to hem jeans, creating a rope effect with a characteristic rippling.

Closing bags

Portable closer machines with double needle, 2 thread single chain stitching mechanisms can close filled bags in the food grains, chemical, rice, and seed industries.

BAR TACKING MACHINE:

The bar tacking machine has much application in the garment manufacturing industry. One of them is sewing dense tack around the open end of the button hole.

These machines are sewing a number of stitches across the point to be reinforced and then sew covering stitches at the right angles over to the first stitches. The variable is the number of tacking stitches and the number of covering stitches.

Some of the bar tacking are fitted with the following special attachments.

(a) Signals are available and it is controlled by special mechanism, when the bobbin thread is below a certain level.

(b) Automatic thread cutters are available.

(c) A pedal which opens and close the work clam.

This machine is used for the following applications in the garment industry.

(a) Closing the end of the button hole

(b) Reinforcing the ends of the pocket opening.

(c) To finish the bottom of files.

(d) Sewing on belt loops.

BUTTON HOLE SEWING MACHINES:

Button hole machines are used for making button hole in the garment and to finish the edges and make the button hole in neat finish. These come in a variety of types according to the type of button hole needle on garment. The simplest button hole are used on shirt, blouses and other light weight garment and the more complex one on the heavier tailor garments. The various nesses in the button hole machines are form in side button hole. The stitch type, the stitch density whether the button hole is cut after or before sewing and the presents or absence of the gimp.

The button hole machine may form a simple circle where the stitches radiate from the center of an eyelet home, 2 legs on either side of a straight out with bar tack on both ends as in shirt, a continuous line of sewing up one leg, round the end and down the other without the cut as in shank button hole on the cups of Jacques a button hole similar in form but larger in length with the hole partially on holy cut and the separate bar tack closing of end, a button hole with 2 legs and an eyelet hole at one end with a separate bar tack closing of other end as in front of Jacques overcoats, a variation in which the 2^{nd} leg is sewn over the 1^{st} stitches of 1^{st} legs to close the end as frequently on the knit wear and an end as eyelet the edges of which one lightly over sewed known as the cut and serge which they no more than provide a firm edge to receive a hand sewn bottom hole known as the increasing rare.

The choice between the lock stitch and chain stitch is affective by the security requirements or hole the finish appeared require and the relative causes are involved. In general button hole on tailor outward make use of the 2-thread chain stitch the chain effect giving an attractive purl appearance to the button hole. The simpler shape of the button hole on shirts and other light weight garment is often used with the single thread chain stitch and in some cases,

the sewing is done inside on the garment. So that the purl side of back stitch is on right side increasing used is being make of the lock-stitch button holes sewing to give greater security on these types of garments for shirts.

The work button hole is slipped in fabric finished with either hand or machine stitches. It has two sides equal in length to the button hole opening and 2 ends finished with bar tacks or with a fascinate arrangement of stitches. A hand work button hole is slip lot stitched. A machine work button hole is stitched the slit. The match of actual button hole opening and for the stitch button hole are however difference. The finished length of the worked button hole will be equal the opening plus extra 3mm for stitches used for the stitches work to finish the each end.

There are various ways in which the machine work button hole may be made. One way is wilt button hole stitches that come with the machine by means of a few movements of a weaver or turn of grain. A button hole with finish end is stitched. There is no need to turn the fabric by hand. This method is used when the machine has a built in and zigzag stitch capability.

A second method makes use of a special attachment the plane on to the needle bar and presser foot of the machine. This attachment moves the fabric in button hole shape while the machine with zigzag stitching attachments will vary from the machine to machine. But in most cases the since and of the button hole is determined by the button placed in the attachments. The button hole size is limited by a capability of attachments.

BUTTON FIXING MACHINE:

Without damaging the garment this machine is used to sew the button in the garment. Button with two holes, four holes or shanks canal can be sewn on the same machine by simple adjustments to the button clamp and the spacing mechanism. The sewing action consists of a series of parallel stitches whose length is equal to the spacing between the centers of the hole. The needle has a vertical movement only and the button is moved from side to side by the button clamp. Button can be sewn on with one or two threads, the number of stitches depending on the type of machines used. Each machine has a maximum number of stitches i.e., 16, 24 or 32 and can be adjusted to sew the full amount or half. Generally decorative button would be sewn on with half the number of stitches used for the functional buttons.

Hopper feed is a special attachment which is automatically feeds the button to the clamp of the needle point of the machine. Here the button and needle can be automatically poisoned and the threads are clipped.

Where a 'neck' is required between the underside of the button and the garment, the stitch length between the button and the garment is increased and this surplus length can be left as it is, or 'whipped'. The whipping operation can be incorporate as a second, successive operation on the button sewing machine.

BLIND STITCH MACHINE:

Blind stitch machine is used to stitch the hem in a knitted fabric. As the hem stitch is too small in right side of the garment and it is invisible. Sometime the machine can be set to skip stitch that is to pick up the fabric on alternate stitches only. But this type is reduces the durability of the stitches.

Zigzag stitches or lock stitches with a side to side width as well as a stitch length. In mechanical machines basic stitch formation in dictated mainly by a stitch pattern camp

maximum pattern width us established by stitch width regulator. Stitch length is selected or for straight stitching and is the same for both stitch types at the same setting but occurs eye as a distance between points and then actual stitch measurement. The camps built into mechanical machine control stitch formation by means of in their outer edges. A stitch pattern selector positions a finger like follower on appropriate cam. The follower connected to the needle bar cracks those indentations moving the needle from side to side. In most electronic machines the zigzag stitch is programmed by a microcomputer which controls the movement of the stepping motor to direct zigzag movement of the needles. Besides the control mentioned most machine have needle position selector which places the stitches to left or right of normal position.

Zigzag patterns uses straight stitches as a part of the design. An example is in blind stitch, length and width variations affect the practical uses. For example when stitch length of land stitch is shortened there is more zigzag to catch the fabric. A consideration on hemming. When the stitch is widened the zigzag extends further from the straight stitches to cover wider.

The needle used in this machine is slightly curved because it does not penetrate through the fabric completely, but penetrate partially. Based on the application and fabric the stitches can be grouped into two types. First one is for fine fabric producing long and narrow stitches. Second one is for heavy fabric with short and wide stitches. Again, the level of insecurity is often high but can be improved by the uses of slightly hairy rather than smooth sewing threads.

FABRIC EXAMINING MACHINE

Fabric examining machines, also known as fabric inspection machines, are used to examine fabrics for defects and imperfections before they are used in production. They can have many parts, including:

- Front rollers: Wind and unwind fabric
- Edge control system: Helps the roll foam evenly
- Relaxing system: Helps the fabric be made evenly
- Length counter: Displays the length of the fabric being inspected
- Digital fault counter: Counts the number of defects in the fabric
- Emergency stop switch: Stops the machine suddenly in case of an emergency

Fabric inspection machines can be used to:

- Improve quality and consistency: Inspecting fabric at various points in the production process can help reduce product rejects.
- Detect and mark defects: Roll-to-roll machines can automatically detect and mark defects in large fabric rolls.
- Measure length: Some machines are dedicated to measuring the length of tubular fabrics.
- Fabric inspection machines are a crucial tool in the textile industry, especially in high-volume production industries like garment manufacturing.

CARE AND MAINTENANCE OF THE SEWING MACHINES:

Regular cleaning, oiling and care of the machines ensure satisfactory sewing and a long life for the machine. When not in use, keep your machine covered to prevent it from the dust from settling on it.

(a) CLEANING:

You should always remove lint deposits, dust and thread bits before oiling any part of the machine. Use a small dry brush or old tooth brush and a soft cloth to remove the dust and lint. Use a pointed instrument like a needle to pick out the bits of thread and lint that cannot be brushed out. To clean the feed dog, remove the needle plate of the machine and brush off all the lint deposits and dirt sticking to the feed mechanism. To clean the shuttle race, remove the two screws holding the shuttle race assembly to the machine, take out the shuttle race and wipe its groove free of dirt, fluff and broken bits of thread. Sometimes loose threads wind around the pivots of the treadle and make the machine hard to run. You must remove the thread bits which are caught in the wheel and all lint and dust sticking to the treadle parts.

(b) OILING:

It is necessary to oil and lubricate the machine periodically. If the machine is used every day, oil it once in a week. If you use it infrequently, then once in a month should be sufficient. To oil thoroughly, remove the upper thread, needle plate, slide plate, face plate, bobbin case, Needle and presser foot. Read the instruction manual for location of parts needing application of the oil. Put special sewing machine oil in all oil holes and joints where one part rubs against another. One drop of oil is enough for each point. While oiling turn the flywheel back and forth to help the oil flow to the moving parts. It is essential to oil the points on the under side. On a treadle machine, the belt will have to be released before tilting the machine head back. Do not forget to oil the pivots of the treadle. When the machine has been thoroughly oiled, wipe away excess oil and run it slowly for several minutes on a waste piece of material. Before you close the machine, place a scrap of fabric under the presser foot and lower the needle. The fabric will absorb the excess oil that might drain down through the machine and will prevent formation of oil spots on your work, next time the machine is used.

If the machine becomes gummed with oil, put a drop of kerosene or petrol in each oil hole and at joints and run it rapidly for the several minutes. Then wipe off the oil that oozes out with a soft cloth and re-oil the machine. It will need a second oiling within a few hours after this treatment. The motor of electric sewing machines may requires a periodic greasing. It is advisable to get this done by a qualified service agent.

COMMON PROBLEMS AND REMEDIES OF A SEWING MACHINE:

You should know what to look when you have some common problems with your sewing machines. The causes of these problems are listed below with their corresponding remedies:

THREAD BREAK:

CAUSES

- Sudden jerk while sewing
- A manufacturing defect in the needle with eye being rough
- Use of poor quality thread
- Thread getting wrap around the spool holder
- Improper selection of thread

REMEDIES

Uniform smooth start of the machine

- Use of good quality needle and replace in proper interval
- Use of good quality thread
- Use of recommended thread

MISSED OR IRREGULAR STITCH:

CAUSES

- Needle put in the wrong way round
- Insufficient pressure on the pressure foot
- Blunt or bent needle

REMEDIES

Check the manual for proper needle insertion

- Increase the pressure
- Change needle upon damage

FABRIC NOT MOVING FORWARD:

CAUSES

Stitching has bunched forming a lump

- Feed teeth not raised
- Negligible pressure on the pressure foot
- Stitch length set at Improper selection of thread

REMEDIES

Increase stitch length

- Raised feed teeth
- Increase pressure in pressure foot
- Increase stitch length

NEEDLE BREAK:

CAUSES

A Needle inserted in the wrong way

- Fabric pushed or pull through machine
- Incorrect foot attachment
- Incorrect needle plate attached

REMEDIES

Insert needle as directed in manual

- Allow fabric to feed at its normal pace
- Attach foot as required
- Check needle plate

MACHINES FAIL TO TURN ON:

CAUSES

Switch of the machine not turned on or insufficient power available

REMEDIES

Check for the switch and power supply

PUCKERING:

CAUSES

Zig-zag too wide for the thickness of the fabric

- Stitch length too long for thickness in fabric
- High thread tension
- High SPI (stitch density)

REMEDIES

Change to a narrower stitch width

- Change to a shorter stitch length
- Check the thread tension
- Set SPI based as per the material

BIRDS NESTING:

Birds nesting means looping on the back of the fabric and down the bobbin area

CAUSES

Incorrect threading of the machine

- Insufficient pressure on the pressure foot
- Balance wheel turned clockwise
- Needle thread not passed through the take-up lever
- Thread not passing properly due to dirt in the tension disk

REMEDIES

Rethread machine properly again

- Check and control pressure
- Balance wheel should always be turned anti-clockwise
- Rethread the machine properly
- Check for thread insertion between tension disk and clean it in process

FABRIC GETS PUSHED DOWN THROUGH THE NEEDLE PLATE INTO THE BOBBIN AREA:

CAUSES

Fabric is fine

- Needle is blunt

REMEDIES

Do adjustment with the pressure foot, like for straight stitch use straight stitch foot and needle plate

- Change the needle

THREAD NOT LOCKING IN THE CENTRE OF THE FABRIC:

CAUSES

Weight (thickness) of the two thread (needle &bobbin thread) not balanced

- Top and bottom tensions are not correctly balanced

REMEDIES

Use same thread or threads of same properties

- Change tension of both needle as well as bobbin thread

STITCHES BUNCH AT THE START OF SEWING:

CAUSES

Starting to sew too quickly without letting down the pressure foot

- Not allowing the fabric to feed freely under the foot

REMEDIES

Start smoothly by properly placing the pressure foot. Do hold back the threads pulled tight at the back of the foot while starting to sew

- Do not hold on to the fabric

MACHINE JAMMING AND KNOTTING:

CAUSES

Thread or a broken needle caught in the raceway

REMEDIES

clean the bobbin area

INDUSTRIAL SEWING MACHINE ATTACHMENTS AND THEIR USES

Industrial sewing machine attachments are essential tools that expand the capabilities of your machine, allowing you to perform specialized tasks with precision and efficiency. These attachments can be used to achieve different types of stitches, hems, and other sewing effects that might be difficult or time-consuming to do manually. Below is a list of common industrial sewing machine attachments and their uses:

1. Presser Feet

Zipper Foot:

Use: Allows you to sew close to the zipper teeth. Ideal for installing zippers on garments or accessories.

Walking Foot:

Use: Ensures even feeding of both the top and bottom layers of fabric, which is particularly useful for quilting, sewing thick fabrics, or matching patterns.

Teflon Foot:

Use: Designed for sewing sticky or slippery materials like vinyl, leather, or plastic. The non-stick surface prevents these materials from sticking to the foot.

Hemming Foot:

Use: Used for creating narrow rolled hems on lightweight fabrics. It folds the fabric edge under itself as it sews, creating a neat hem.

2. Binders

Tape Binder:

Use: Attaches binding tape to fabric edges, such as necklines, armholes, or the edges of quilts. It ensures a clean and consistent finish.

Bias Binder:

Use: Specifically designed for applying bias tape to fabric edges, allowing for flexibility and stretch on curves and corners.

3. Folding Attachments

Hemmer/Folder:

Use: Automatically folds and hems fabric edges as you sew. Available in various sizes for different hem widths, ideal for making consistent hems on garments.

Edge Folder:

Use: Folds the fabric edge under itself, perfect for finishing raw edges neatly, particularly on garments and upholstery.

4. Seam Guides

Adjustable Seam Guide:

Use: Helps maintain a consistent seam allowance. The guide can be adjusted to various widths to ensure accuracy in stitching straight seams.

Magnetic Seam Guide:

Use: A magnetic attachment that can be positioned anywhere on the sewing machine bed to guide fabric and ensure straight seams.

5. Rufflers and Pleaters

Ruffler Foot:

Use: Creates evenly spaced pleats or gathers in fabric, useful for making ruffles on garments, home décor, or crafts.

Pleating Attachment:

Use: Specifically designed for creating precise pleats. It can be adjusted for different pleat sizes and is often used in garment construction or upholstery.

6. Edge Stitching Attachments

Edge Stitch Foot:

Use: Ensures accurate stitching along the edge of the fabric, useful for topstitching and decorative stitches on collars, cuffs, and hems.

Edge Stitch Guide:

Use: A metal guide that helps maintain a consistent distance from the fabric edge while stitching, ensuring a straight and even line.

7. Quilting Attachments

Quilting Guide:

Use: An adjustable guide that helps maintain consistent spacing between quilting lines, useful for straight-line quilting or echo quilting.

Free-Motion Quilting Foot:

Use: Allows for free-motion quilting, where the fabric can be moved freely under the needle for intricate quilting designs.

8. Piping and Cording Attachments

Piping Foot:

Use: Used to insert piping into seams and edges, providing a professional finish on cushions, bags, and garments.

Cording Foot:

Use: Designed for sewing over cording, creating decorative or structural elements in garments or home décor.

9. Elastic and Shirring Attachments

Elastic Foot:

Use: Guides and stretches elastic as you sew it onto fabric, perfect for waistbands, cuffs, or creating gathers.

Shirring Foot:

Use: Creates gathers by sewing over elastic thread or by gathering fabric directly with the attachment.

10. Button Attachments

Button Sewing Foot:

Use: Designed to hold buttons in place while the machine sews them onto the fabric, streamlining the button-sewing process.

Buttonhole Foot:

Use: Creates consistent buttonholes with adjustable sizes, ensuring a neat and professional finish.

UNIT – V

PACKAGING, SEWING THREADS, STITCHES AND SEAMS

GARMENT PACKAGING

Garment packaging is the procedure of wrapping, compressing, filling or creating of goods for the purpose of protection too their appropriate handling. This is the concluding procedure inward the production of garments, which prepares the finished trade for delivery to the customer. It is an of import part of the garment manufacturing process. Garment packaging is also job to learn lot of attending from the customer. After completing the entire manufacturing task, wearing clothing is required to live packed. After packing, it is placed inward cartons every bit per instructions too and so it is stored inward a shop subdivision earlier it is delivered to the respective buyer.

Flowchart of Garment Packaging:

Received garments from the finished subdivision

↓

Hang tagging

↓

Folding amongst inserting dorsum board, tissue

↓

Poly Bagging

↓

Cartooning

↓

Applied adhesive record on the pack

↓

Bar-coding

↓

Packing consummate

The basic types of parcel forms used for garment packaging are bags, boxes, cartons, cases, wrappers etc.

The basic properties packaging material to be used in packaging of apparels are clarity, thickness, weight, yield, tensile strength, flammability, moisture resistance, sunlight transference, resistance to odors and Dimensional stability to estrus too sunlight.

Based on Garment Packaging:

Different types of packaging are there for different types of garments. Following is the most used packing types –

- Stand up pack
- Flat pack
- Hanger pack
- Dead man Pack

Stand-Up Pack:

This type of packing is commonly used for shirts and hence termed 'shirt packing'. For this type of packing, the garments have to be pressed prior to packing and are packed with additional packing materials like tissue paper, back support, pins or clips, inner collar patty, outer patty, etc.

The advantages of the stand-up pack are:

• It is an attractive pack so it enhances the appeal of the garments to the customer.

• It is a safer pack as it has inner and outer cartons, therefore the packed garments can be handled easily.

• On account of its better presentation, it can increase the sales of a product.

The disadvantages of the stand-up pack are:

It is costlier.

• It needs many packing materials.

• It involves a lot of effort as well as time.

• Unpacking this kind of package needs more time and once unpacked it is tough to repack.

• In case it is crushed by any source, creases and wrinkles are formed on the garments and thus the pressed condition is disturbed.

Flat Pack:

In this packing method, the garments are pressed and folded well as like in a stand-up pack, however with fewer additional packing materials. It is generally normally used for ladies' garments and has a flat surface. The size of the folding is based on the garment style and specifications of the buyer. The common sizes of the flat packs are 8" × 10" and 10" × 12".

The merits and demerits of a flat pack are:

- It is less expensive than the stand-up pack as it requires less material.
- It is less attractive than the stand-up pack.
- For shirts it does not present the beauty of the collar portion very well.
- The disadvantages are the same as that of the stand-up pack.

Hanger Pack

It is a simple garment packing method where the garments are secured in a poly bag with a hanger after pressing. Here polybag is the only material used. This type of packing can be used for all types of garments, especially for blazers, coats, pants, etc.

The merits and demerits of a hanger pack are:

- Because of its simplicity it reduces the cost of packing and materials.
- All the components/panels of the garments could be seen easily without removing the bag.
- The time for packing and unpacking is less.
- Material handling is not easy.

Dead man Pack

This kind of packing is used for shirts. Here, the sleeves are folded in front of the pack and pinned with each other. Next, the garments are folded in the center. As it resembles the appearance of a dead body, it is called a 'dead man pack'. It is a simple packing method using only pins or clips and polybags.

The merits and demerits of this pack are

- The costs of packing materials and packing are less compared with other methods due to their simplicity.
- The packing and unpacking time is less.
- Garments can be examined in packed condition.

• This type of packing enables easy handling of garments.

• This type of packing is not suitable for shirts because it does not show the collar and the collar point as in the stand-up pack; hence, it is less attractive.

Packaging Design

Merchandising packaging

The merchandise package is the unit the consumer receives when he selects the product. What functions must a merchandising package perform in order to stimulate sales of the product in the package? From the consumers point of view the merchandise package should :

- Identify the product
- Enhance the appeal of the product
- Attract the consumer to the package
- Protect the product quality until the consumer uses the item

Transparent plastic film is useful in meeting all of the requirements. Seeing the product makes it easy to identify and attract the consumer. Colour and design on the package are other ingredients that are used to identify, enhance and attract. The manner in which the product is packaged geometrically is a big factor in enhancing the appeal of the garment. The utility of the package is a big factor in attracting the consumers. The artistic value of a package is another persuader which attracts consumer.

Vacuum Packaging

The function of a vacuum packaging is:

- To reduce the shipping bulk of unfinished garments
- To reduce the shipping weight of garments shipped
- To prevent a garment from accumulating dust or objectionable odours before and during shipping
- To prevent garments from acquiring wrinkles or creases, during shipping, this will have to be removed before the retailer displays the garments
- To minimize storage space for both the manufacturer and retailer

Vacuum packaging is used not only for packing and storing garments, but also for packaging household accessories made from textiles, such as blankets, bedspreads, pillows and towels- anything with bulk that can be easily compressed.

Vacuum packaging was introduced in the 1970s by Swematex AB, of Ganghester, Sweden. (Rheemes Textile Systems, Inc., New York City, is the U.S. licensee for this equipment.) The system consists of:

- Reducing the moisture content of the garment;
- Encasing the garment in a plastic film sack; after which
- The air in the sack and garment are vacuumed out as the garment is compressed within
- Which is sealed at the end of the vacuum and compression cycle.

The moisture content is removed by passing the hung garment on a conveyor through a conditioning chamber which decreases the moisture content of the garment with hot dry.

Shipment Packaging

The shipment package performs the distributors function. It is the package the carrier receives and delivers to the retailer. It delivers the merchandise package to the retailer (or the wholesaler).

Shipping packing's may be divided into the classes with respect to the protection from

- Closed containers carrying garments

1. covered completely individually by a merchandising package (closed merchandising packages)
2. without a covering merchandising package (an open merchandising package)

- Open containers carrying garments

1. In closed merchandising packages,
2. In open merchandising packages.

Costs, suits, or dresses transported without individual covers on hangers, suspended from portable hanger racks, are examples of open merchandising packages carried in open containers. Cartons with hanger racks. "Hanger Pac", are examples of closed containers designed to carry the garments in open or closed merchandising packages. In fact, any shipping packages can carry open or closed merchandising packages.

In order to protect and preserve the merchandise package and its garment during the distribution process, the shipping package can be designed to do the following:

- Fusion, (2) separate, (3) brace, and (4) ward for water and dirt. A shipping package is proper when it prevents normal loads and pressures exerted on it, during the distribution process, from damaging the merchandise package or its garments.

Packaging Materials

- Plastic clip
- Paper board
- Wooden Boxes and Crates
- Butterfly
- Plastic collar
- Tag pin
- Ball head pin
- Poly bag
- Inner box
- Tissue paper
- Carton
- Scotch tape

What is Sewing Thread?

External appearance and qualities of a seam are directly concerned with the sewing thread. Specially, the quality of a garment also depends on the selection that what sort of sewing thread will be used for the sewing of the garment. The construction of sewing thread, the fiber types in the thread and the finishing material in the thread etc. influence on the external appearance of the seam and its qualities. There are various types and of various sizes of sewing threads but specific thread is to use for specific fabric and specific thread size should be used for specific needle size.

Properties of Sewing Thread:

Sewing thread is important for garment manufacturing. Different properties of the sewing thread give better efficiency of sewing operation. So, it is important to know the properties of sewing thread. The following are the properties of sewing thread that we should know before selecting the sewing thread.

1. Tensile strength
2. Loop Strength Ratio
3. Tenacity
4. Loop Strength

5. Elongation at Break
6. Minimum loop strength
7. Elasticity
8. Stress-Strain Curve
9. Abrasion Resistance
10. Colorfastness

Essential Requirements for Sewing Thread:

Uniformity

The thread should be consistent in diameter and mass per unit length. This helps ensure the thread passes smoothly through the needle and tension disks, which results in better seam quality.

Tensile strength and elongation

These properties affect the loop properties of the thread, which are important for seam performance.

Loop and knot strength

The thread's ability to contribute to seam performance is measured by its loop breaking strength.

Sewability

A thread with good sewability will have consistent stitch formation, no skipped stitches, and no breakages during high-speed sewing. It will also be abrasion resistant and have a smooth surface so it can pass easily through the machine guides.

Stretch

The thread should have enough stretch to prevent seams from puckering or the thread from breaking.

Strength

The thread should be strong enough to hold seams together through regular wear and laundering.

Types of Sewing Threads:

Polyester Thread (All-Purpose Thread);

The most widely used thread for sewing is all-purpose or polyester thread because it can work with many different types of fabrics, it's very strong and it's cheap. Polyester threads from reputable brands like Gutter man are made from high-quality polyester. You can find all-purpose thread in hundreds of different colors making it easy to match your fabric. Polyester has exceptional color retention making it long-lasting for wear and tear over time. It is suitable for both sewing machine use and hand stitching. Look for a polyester thread that is 40-50wt for multiple uses. This is the standard universal weight for everyday sewing and projects.

Cotton Thread;

Cotton thread is made from natural cotton fibers and comes in a few different weights, 12wt, 50wt and 80wt. Cotton thread comes in many colors just like all-purpose and can be found in most good craft stores or online. 80wt is a very thin thread that is used for hand appliques, machine appliques or embroidery and paper piecing.12wt is the thickest cotton thread weight that can be used on a sewing machine as it can still safely fit through the eye of the needle. 12wt cotton thread can be used for sewing hand applique, buttonholes, blanket stitches, hand quilting and embroidery. If you want to machine stitch your quilts, then 12wt will help give a 'hand stitched' look.50wtis the most popular cotton thread with hundreds of colors to choose from. This cotton thread is strong and thin, but it is only best suited for cotton fabrics. 50wt cotton thread is best used for clothing, paper piecing, lace making, machine applique and embroidery or quilting. Mercerised cotton thread is a versatile option that has long, strong lustrous threads that sew beautifully creating smooth and even seams. This cotton takes on dyes better than standard cotton thread making it more color-lasting and durable. Many brands cotton threads are mercerised for high-quality are used.

Linen thread:

Oldest sewing thread and was used at a wide range for sewing threads during the making of garments. This type of sewing thread has high strength and slightly can make more strength of the seam. The linen sewing thread was used at a large rate to sew canvas, coarse fabric, and so on. But now it is mostly replaced by synthetic threads.

Nylon Thread:

Nylon thread is an extremely strong thread that is used to sew heavy-duty items like upholstery, canvas, or leather. It has incredible strength and durability which is important for anything heavy-duty. It comes in many different weights from thin like invisible thread to thick.

Viscose thread:

It may be made from continuous filament or staple fibers. The strength and stability are comparatively less but more brighten. It has limited use as a sewing thread but is widely used in embroidery work

Embroidery Thread:

Embroidery threads are used for hand-stitching projects like cross-stitching or fabric embroidery. They come in strands of colors that can be broken apart into the thickness required for sewing.

Silk Thread:

This type of sewing thread is made from both continuous filament and broken filament silk. Comparatively, it contains higher strength, extensive, lustrous, and good qualities. Silk sewing thread is the most expensive, that is why using it is comparatively less. It is used to sew expensive garments.

Elastic Thread:

Elastic thread is just that, an elasticised thread that is used in the bottom of a sewing machine. It is usually hand-wound onto a bobbin and used with an all-purpose thread on the top to sew shirring, smocking or ruffles.

PEFE thread:

The use of PEFE sewing thread is limited due to the higher cost. It is used for protecting against flame, melt, and chemical garments.

What Is the Difference Between Ticket Size and Tex Size for Bonded Thread?

Bonded thread size is communicated in various ways, mainly by ticket number and tex size. Although it's easy to get caught up in the lingo and confuse the two, the ticket number and tex size are distinct characteristics of a bonded thread.

Here's a look at what each of these terms means, as well as some tips on understanding the differences between them.

Tex Size

The term "tex size" most likely derives from the word "textile" and is a universal measurement that allows consistency in sizing. The International Organization for Standardization (IOS), a global consortium of standards experts, prefers tex sizing for yarn and thread over other methods of measurement.

The tex size of thread is just one of several numbering systems that are classified as either direct or indirect systems. Tex falls under the direct system. It is the weight of a fixed-length rather than the length of a fixed weight (indirect).

The higher the tex number, the heavier the thread.

Tex size is the weight in grams of 1,000 meters of thread. For example, if 1,000 meters of a thread weighs 1 gram, tex size = 1.

So if 1,000 meters of a particular thread weighs 30 grams, it would be labeled tex 30, and if it weighs 35 grams, it would be tex 35, and so forth.

Keep in mind that 1,000 meters of one individual weight-type (lightweight, heavy-duty, etc.) of yarn will not weigh the same as 1,000 meters of another type, so they will have different tex sizes even though they are the same length and fiber. So a medium-weight cotton at 1,000 meters might be tex 25, while a heavy-duty cotton at 1,000 meters might be tex 72.

Ticket Size

Ticket size is a manufacturer's reference to the final denier size of a given thread, with denier being the weight in grams of 9,000 meters of thread. However, it's not about the single's denier size alone.

When you figure ticket size, you also have the impact of multiple thread plies, level of singles, ply twist, and overall twist contraction, which reduces the length and adds to the denier. So, to give a reference point for denier and ticket size, the rule of thumb is:

Singles denier x number of plies x 0.11 = ticket size. For example 1680 x 3 x 0.11 = ticket size #554.

Ticket size is not an exact calculation and due to minor differences in denier between substrates, different final denier sizes may lend to the same final ticket size. Let's look at an example of this.

A polyester that is ticket size 69 is made of 3 plies of 220 denier each, total 660 denier x 0.11 = 72.6. A nylon that is ticket size 69 is made up of 3 plies of 210 denier, which equals 630 denier x 0.11 = 69.3. The same ticket size will be given to both and they will also be given the same tex size of 70.

Ticket Number

A ticket number is yet another reference to the size of a thread. Ticket numbers typically resemble the fixed weight system, whereby the higher the number the finer the thread, and lower numbers will be thicker threads.

To arrive at a ticket number from a tex size, use the following calculation: 1000/tex size x 3

For example 1000/Tex 40 x 3 = ticket 75.

To learn more about this topic, we encourage you to read our related blog post that explains industrial sewing thread sizes.

Ordering by Ticket Number, Ticket Size, and Tex Size

Although ticket numbers, ticket sizes, and tex sizes can be a bit tricky until you get used to them, it soon becomes second nature to look at these numbers for information about the industrial thread you purchase. You can always use Service Thread's conversion calculator to quickly switch between common thread types and sizes.

SEAM TYPES OR CLASSES:

A formal description of the configuration of a seam is called seam type. Seam may be hundred types and these types are classified into six main classes. Also, in present time two more classes are used.

The following are the 8 classes of seam:

Seam Class-1: Super Imposed Seam

Seam Class-2: Lapped Seam

Seam Class-3: Bound Seam

Seam Class-4: Flat Seam

Seam Class-5: Decorative Seam

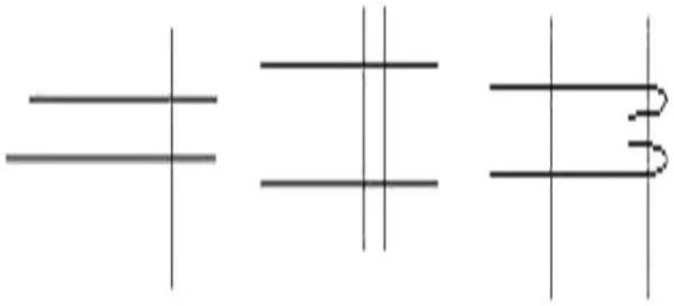
Seam Class-6: Edge Neatening

Seam Class-7: Applied Sea

Seam Class-8: Enclosed Seam

Seam Class-1 (Super Imposed Seam):

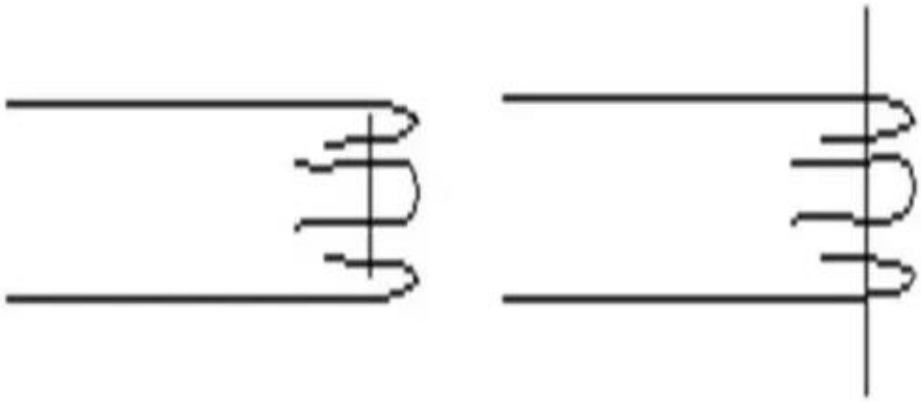
- This is most ordinary used seam.
- This type of seam is formed by correctly placing the ends of the fabric on the other ends of the fabric and sewn.
- Generally the seam ends are in the same direction.
- Different types of stitch are used to form this type of seam.
- Seam strength may be changed.
- This seam can be used for joining the fabric and neatening the edge.



Seam Class-1 : Superimposed Seams

Seam Class-2 (Lapped Seam):

- Simplest seam is formed by lapping of two pieces of fabric.
- Two sewn ends of the fabric are in opposite direction and overlapping one ends on other.
- Uses of this seam is very less because the threads draw off from the fabric edge and create problem.
- The seam thread may be damaged due to frictional resistance.
- Seam strength is higher.
- Possibility of seam slippage is very less.
- Seam thickness increased.
- Twin needle sewn machine is used to prepare seam.

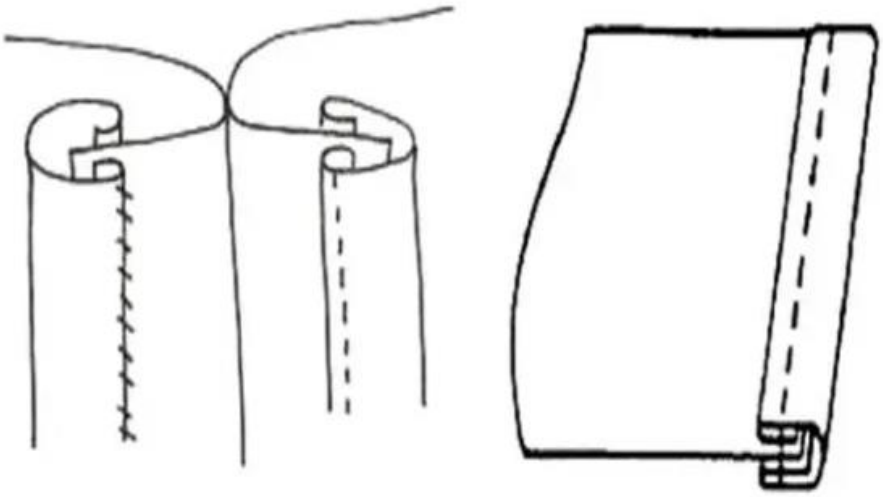


Seam Class 2 : Lapped Seam

Seam Class-3 (Bound Seam):

- Two fabrics are required.
- Here one edge of the fabric is bounded by the other fabric.
- The binder fabric may be of different colors.
- Widely used.
- Can be applied for both functional and decorative purposes.
- Folder must be required to produce bound seam.

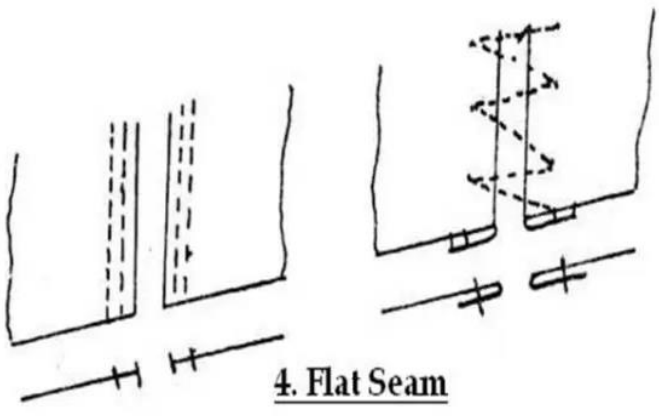
- Mostly used for knit fabric than woven fabric.



Seam Class-3 : Bound Seam

Seam Class-4 (Flat Seam):

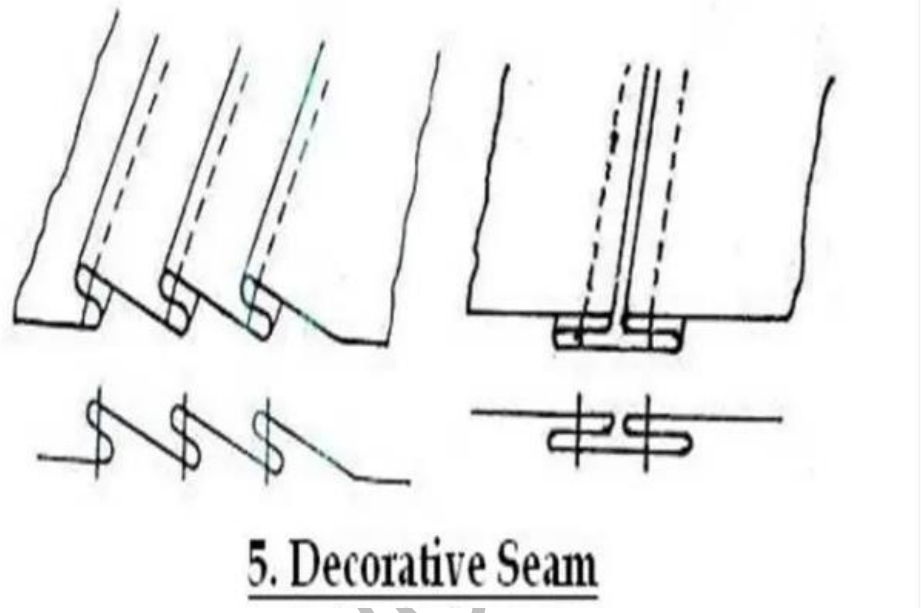
- Two or more fabric ends are joined without overlapping.
- Seam can be made with the gap of the ends of the fabric for decorative purposes.
- Generally twin needle sewing m/c is used to produce this type of seam where continuous binding can be made by covering thread between needle threads
- Seam thickness is comparatively less.
- Zigzag stitch causes sufficient stretch for knit fabrics.
- Neat join forms.
- Before sewing, Edge should be cleaned.



4. Flat Seam

Seam Class-5 (Decorative Seam):

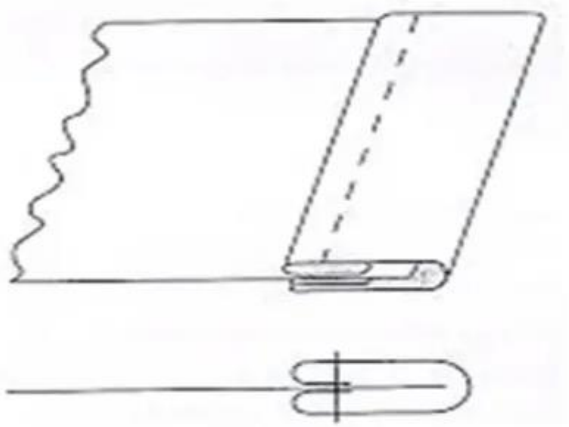
- This type of seam is made by making one or more adjacent stitch lines in one or more layer of fabric.
- Multi-needle sewing machine is used.
- This type of seam is called decorative stitching.
- This seam is produced and used to increase the beauty or decorative value of fabrics.



5. Decorative Seam

Seam Class-6 (Edge Neatening):

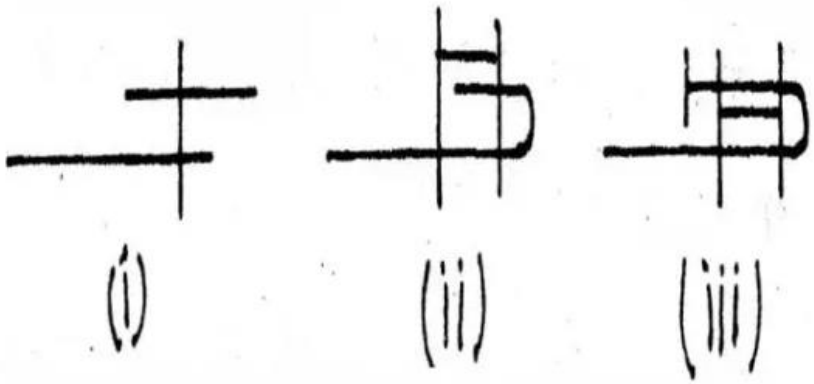
- This type seam is used to bind the edge of fabric, so that thread cannot be drawn off.
- Various stitches are used in this type of seam.
- It can be made by over lock machine.
- If folder is used, the seam can be made easily.



Seam Class-6 : Edge Neatening

Seam Class-7 (Applied Seam):

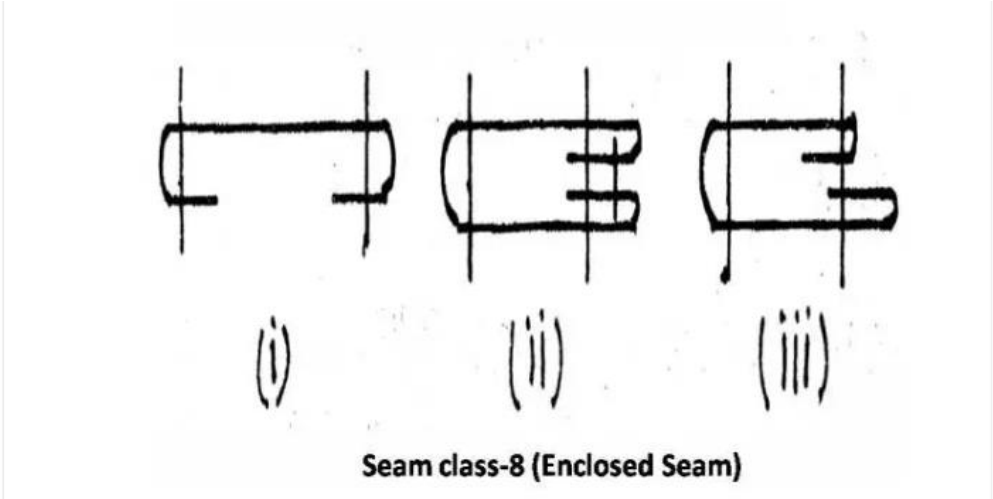
- Similar to lapped seam (Seam Class-2), but the joined component is extended limited on both sides from sewn line.
- This is used for joining of different parts of garments with additional or extra materials such as lace, elastic braid, elastic etc.
- Multi needle sewing machine and folder is used to produce this seam. It will be easier this function is involved.



Seam class-7 (Applied Seam)

Seam Class-8 (Enclosed Seam):

- Mainly one piece of fabric is used.
- The edges of fabric are sewn by folding in various ways.
- Very used of folder to make the seam.
- Seam is made in one time completed by twin needle machine and folder.



Seam class-8 (Enclosed Seam)