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CZ.02.2.69/0.0/0.0/16_015/0002329

Clothing production Machines

Stroje a zařízení v oděvní výrobě

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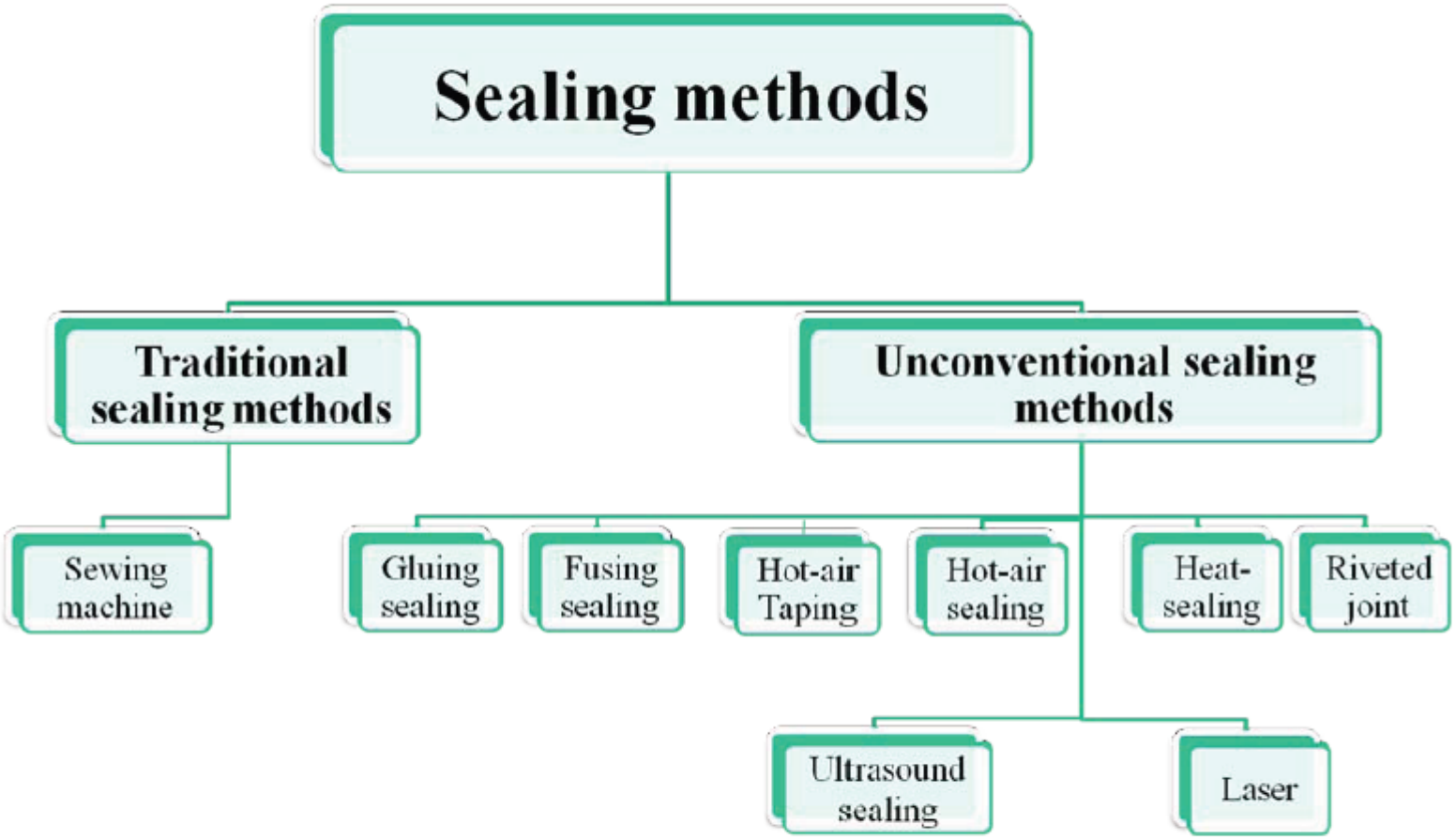
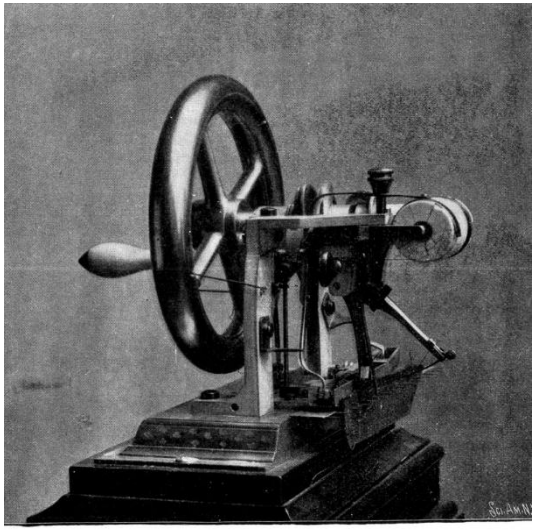

Sealing methods
Traditional sealing methods
Unconventional sealing methods
Sewing machine
Gluing sealing
Fusing sealing
Hot-air Taping
Hot-air sealing
Heat-sealing
Riveted joint
Ultrasound sealing
Laser

History:

1790:The first workable sewing machine was invented and patented by the British inventor Thomas Saint.,
Limitation:*thread has to go all the way in the fabric with needle and mechanical fingers were used*,



THE ELIAS HOWE MACHINE, SEPTEMBER 10, 1846.
Earliest model filed in Patent Office.

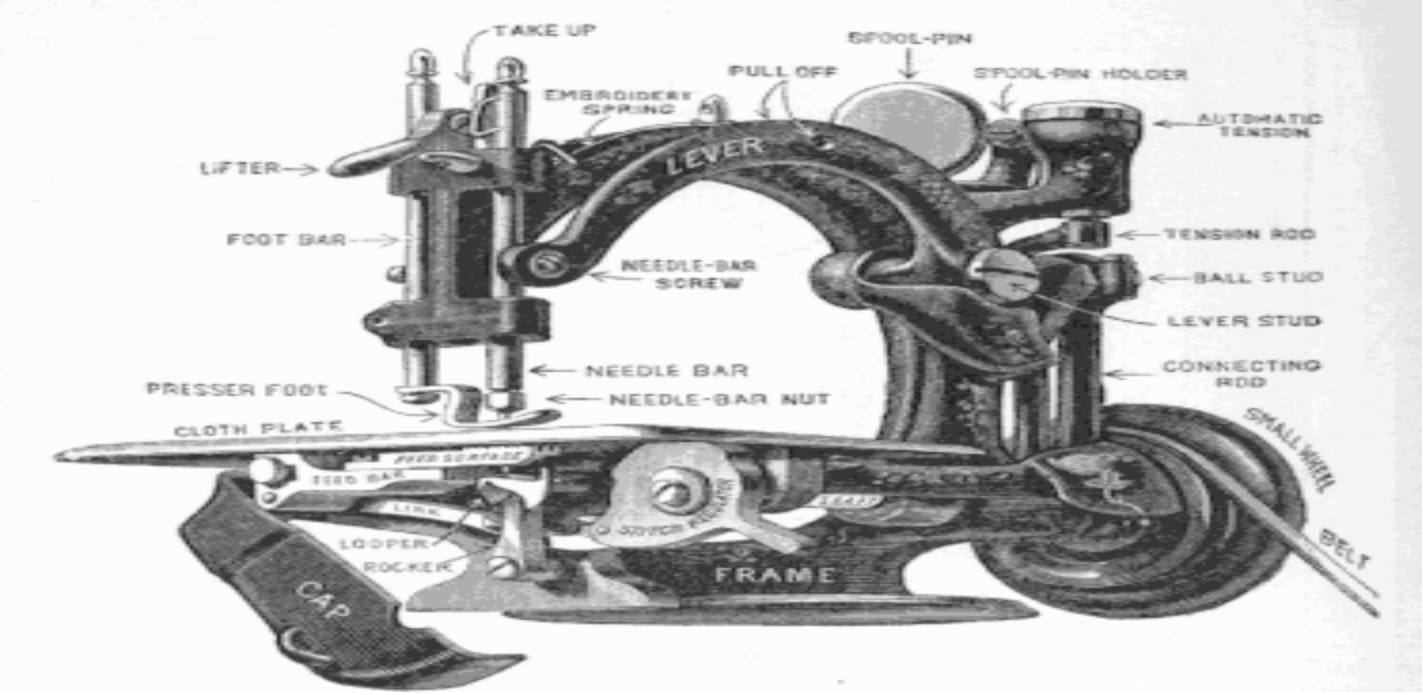
1830 : French tailor, Barthelemy Thimonnier (1793-1857), patented the first practical sewing machine.

1834 :The earliest idea for a double-thread sewing machine came from Walter Hunt (1796-1860) of New York in 1834.

In 1851, Issac M. Singer (1811-75) patented the first rigid-arm sewing machine.

1856:The sewing machine combination was formed consisting of Singer,Howe,Wheeler& Wilson and Grover &Baker,

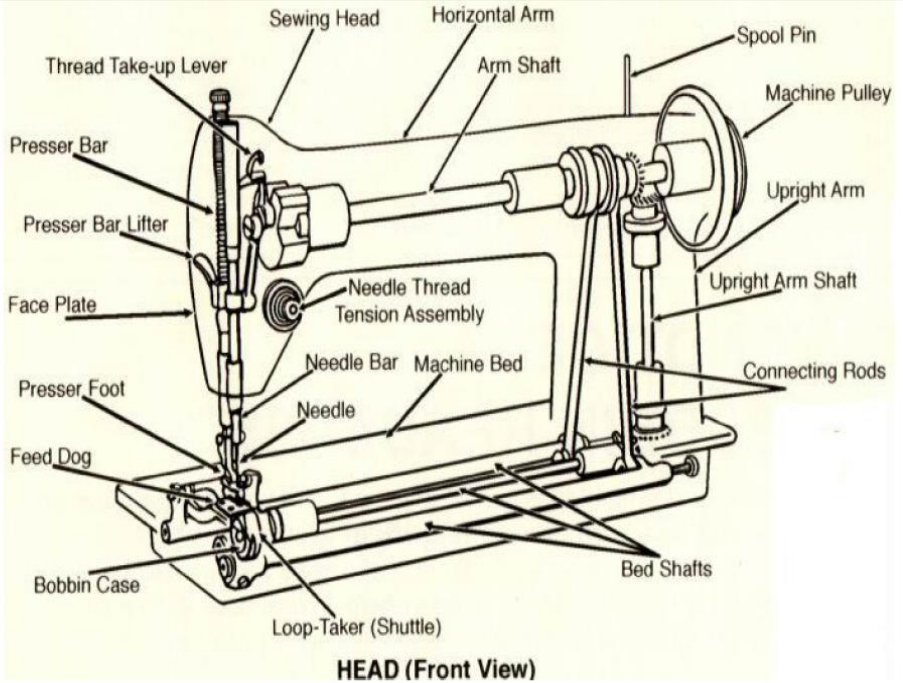
Other known names in the sewing machine history are Allen Wilson(reciprocating shuttle),Wheeler(Hook),Miller(button hole)



Sewing Machine Fundamentals

The major components of a basic sewing machine are :

I. Casting
II. Stitch- forming system
III. Feeding system
IV. Lubrication system



History of the sewing machine

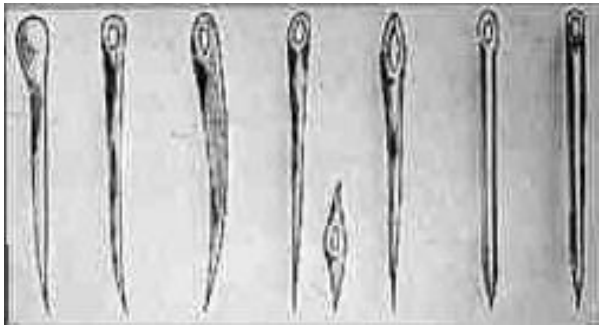
- Before the first people began to sew their clothing, they did not know needle. They used spiky bones, thorns or other subsidiary articles.

- They have been made simple holes into edges of the leathers and later fabrics. Holes with using thongs and strings held single parts together.

- Always people tried to design their clothing not only effective, but also esthetically. Original meaning was need to decorate.

History of the sewing machine II

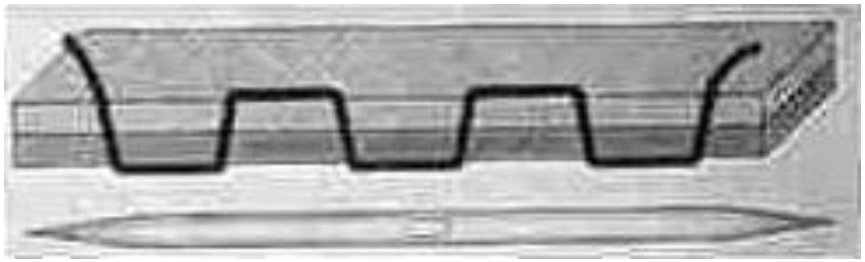
1370 – Nürnberg manufacturers invented needle of steel wire. Before the invention of the needle was difficult made bronz eye needle.

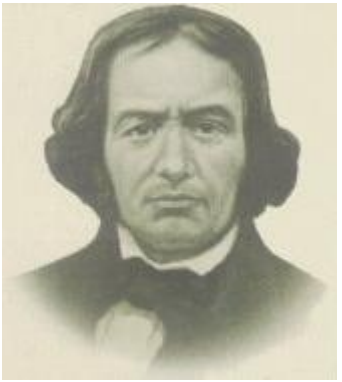


History of the sewing machine III

- 1755 – Charles Weisenthal was awarded British Patent for a double needle with an eye in the middle.

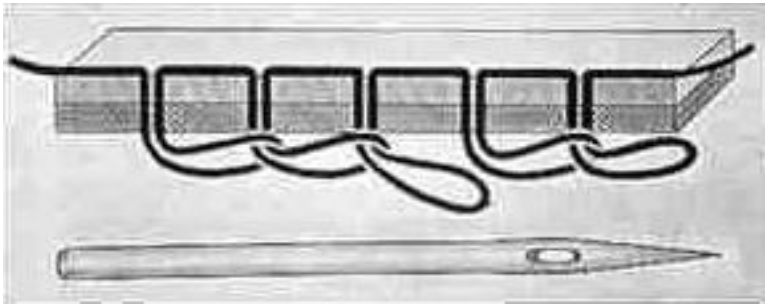
- With that needle, it was possible to sew stitch similar hand stitch.





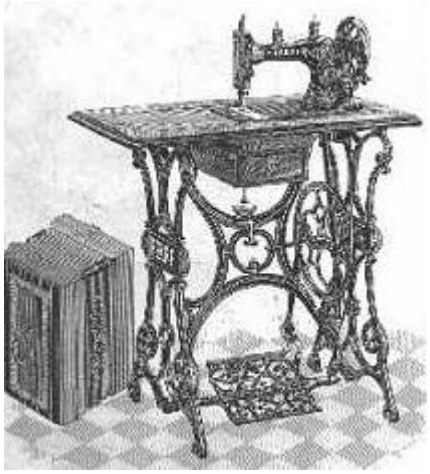
History of the sewing machine IV

- Several years later, around 1790, Englishman Thomas Saint compiled machine stitched chain stitch. But his proposal was never implemented.



History of the sewing machine V

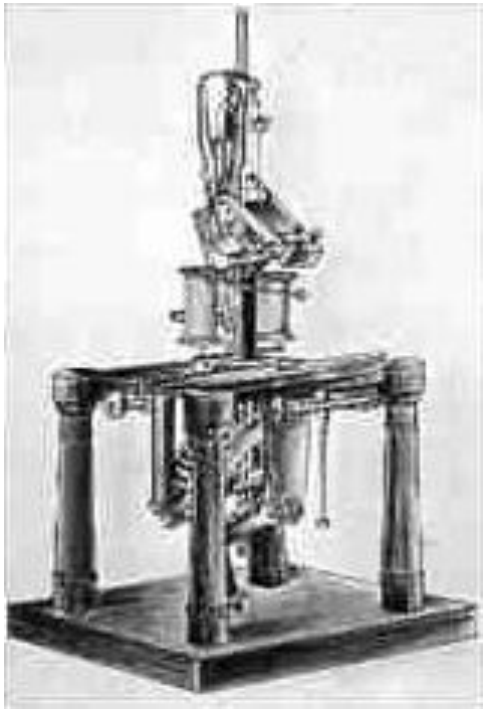
- 1814 - Austrian inventor Josef Madersperger introduced the first working model of the machine with chain stitch and single thread.
- His advanced machine from 1839 have been unsuccessful.



History of the sewing machine VI

- Maderberger used around 1830 into his last machine these two needles and sewed the first stitch similar double stitching seam.

- This machine, for which he was awarded the bronze medal, sew about 200 stitches per minute.

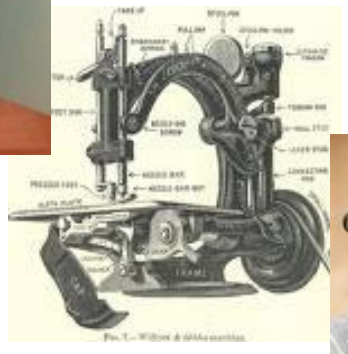


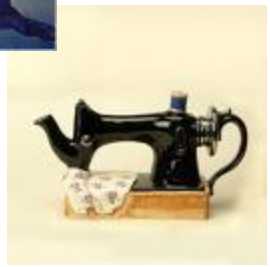
History of the sewing machine VII

- Chain stitch arises when the needle is pushed partially through the quilted material, where then it left a loop thread.

- Following stitch would pass through this first loop whilst creating a loop of its own for the next stitch, this resembled a chain – hence the name.



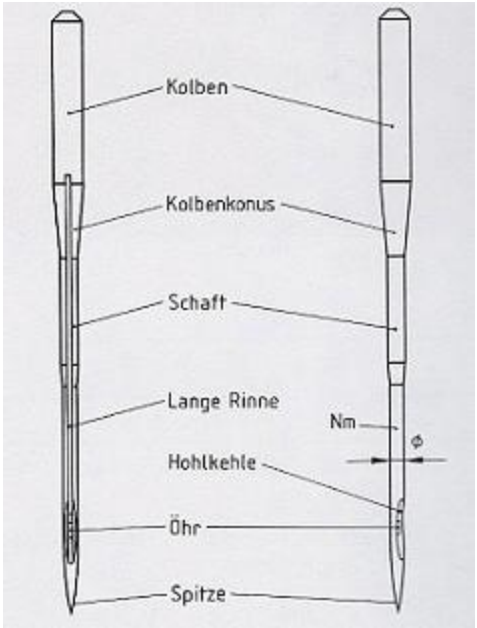
History of the sewing machine VIII

- Around year 1800 German Baltasar Krems aus Mayen compiled perfect sewing machine for chain stitch and used it for sewing hats and zipfel Jacobean caps.

- The machine was equipped with a smooth serving of the fabric, lever-controlled needle sticks and other interesting devices, which are partly used for special sewing machines today.

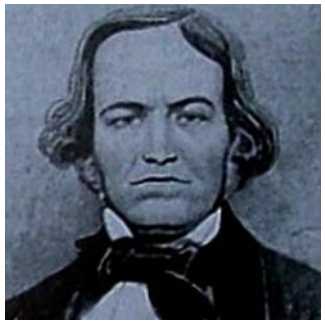
History of the sewing machine IX

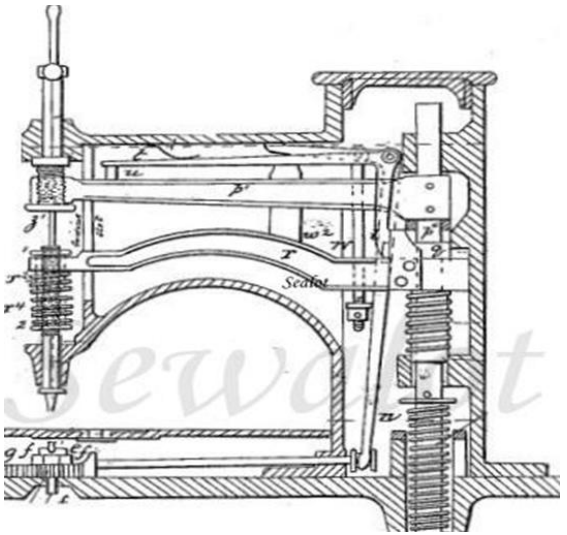
- The most valuable of Krems sewing machine was it invented needle with a eye at the tip. Only the shape of the needle allowed the subsequent invention of t he sewing machine with double-lock stitch.



History of the sewing machine X

- Barthelemy Thimonnier did not try to replicate the human hand stitch, looking instead for a way of finding a stitch that could be made quickly and easily by machine.





- In 1830 compiled machine with chain stitch.

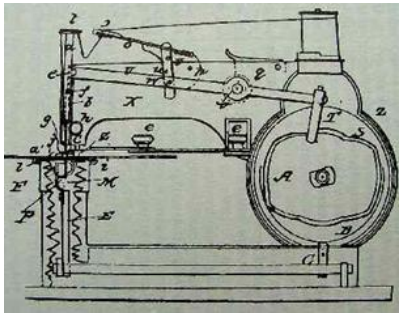
History of the sewing machine XI

- Thimonnier was awarded a French patent in the same year and 1840 of his machines were installed in a factory in Paris to stitch soldiers‘ clothing.

- Others tailors concerned for their livelihood invaded the factory and smashed the machines.

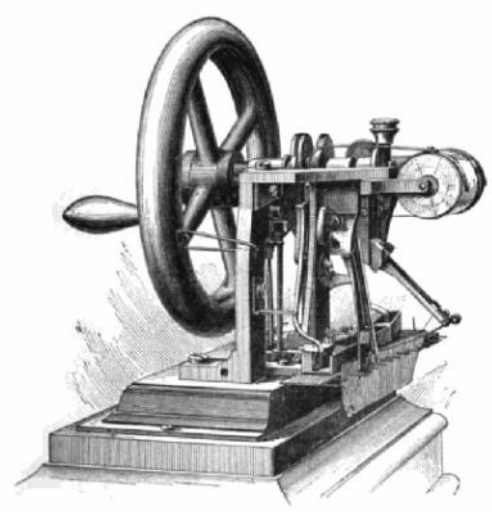
History of the sewing machine XII

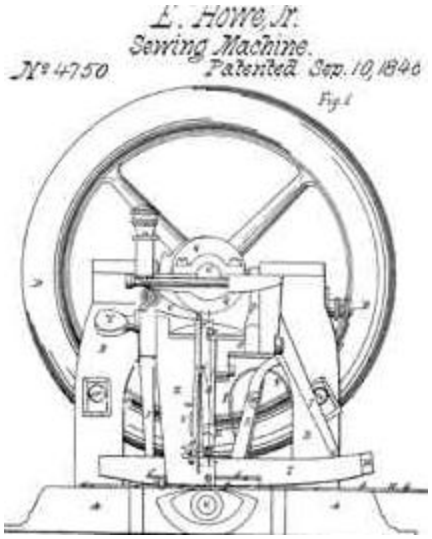
- Chain stitch has one major disadvantage, is very weak and can easily be a lifting of. For better conection of fabrics must be used sewing lock stitch .
- Lock stitch or machine stitch is formed by linking at least two threads so that one thread l furskins oop overriding through the second bottom of thread.
- Lockstitch sewing with a double thread, machine needle (with the eye near the tip) and the shuttle was invented by Walter Hunt in 1833.



History of the sewing machine XIII

- Usable machine built by the same principle, American Elias Howe in 1845, which capped the needle groove.

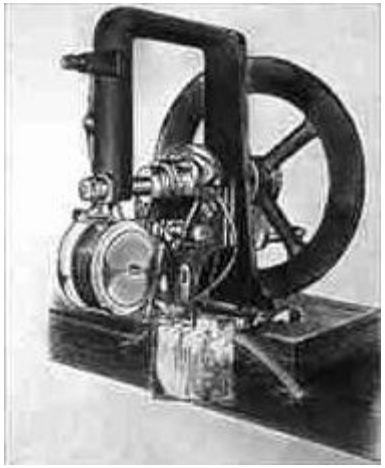


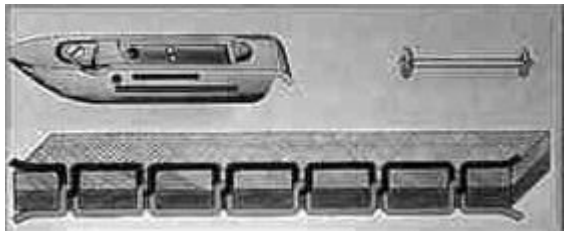


- Elias Howe‘s lockstitch machine, invented 1845

History of the sewing machine XIV

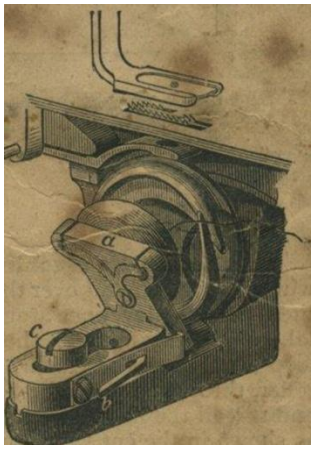
- Elias Howe is now universally known as the the inventor of the first truly usable sewing machine with double lock stitch and shuttles.





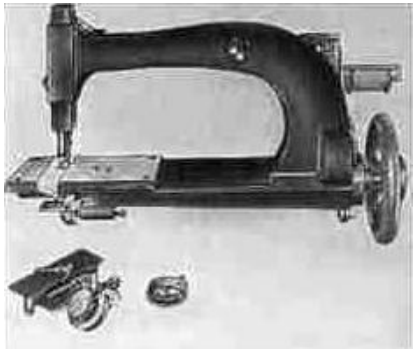
Partnership A. B. Wilson and N. Wheeler

- Especially valuable for the development and improvement of the sewing machine to double stitch was invention of American A. B. Wilson of 1852: The first rotary hook with glasses.

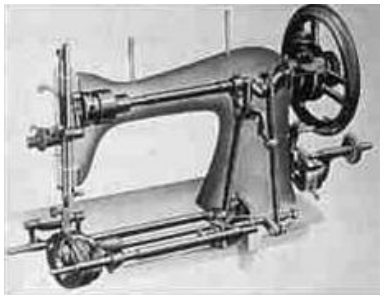


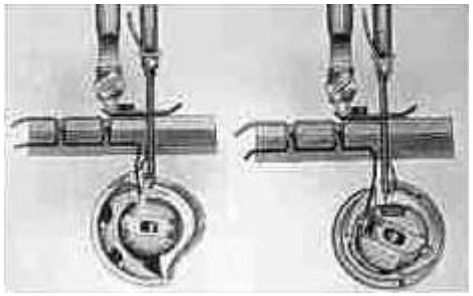
- That patent was improvement over Singer‘s and Howe‘s.

History of the sewing machine XV



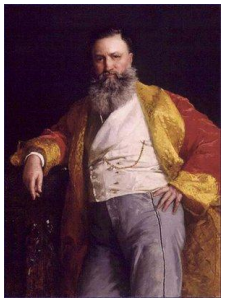
- In 1878 Max Gritzner invented the first rotary hook without glasses and in 1887 Philip Diehl, an American of German origin of Worms, invented hook with an oscillating motion.





- This system of the hook is enforced and is primarily used today. On the picture is illustrated an oscillating hook having a central coil and two rotary hook without glasses with two revolutions during a stitch.

History of the sewing machine XVI

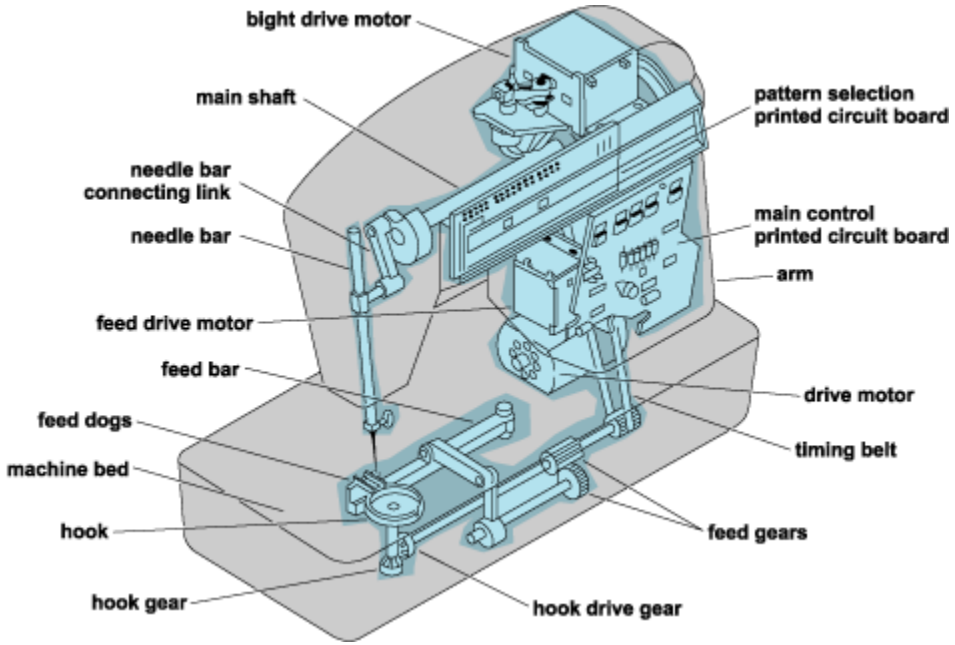


- Isaac Merritt Singer performed simplification of shuttle sewing machine, added heel, tensioner of the threads and pedal. One word adjust to it for household use.
- In 1851 he obtained a patent and subsequently introduced the lease sale, which has earned him immense success.
- In 1889 he introduced a machine electric traction.

Invention of the ¨Buttonholing sewing machine

- Simple stitch holes are replaced by „pure“ designed by experienced tailors stitch.
- In the period 1846 – 1880 inventors Batchelder, Singer, Wilson constituted 18 patents to the buttonholing machine. But all are in production impractical.
- 1881 – patented a machine model J. Reece, he obtained awards at many exhibitions, including the World exhibition in Chicago in 1893.

Components of a home sewing machine



Historical type sewing machine with all the most important parts

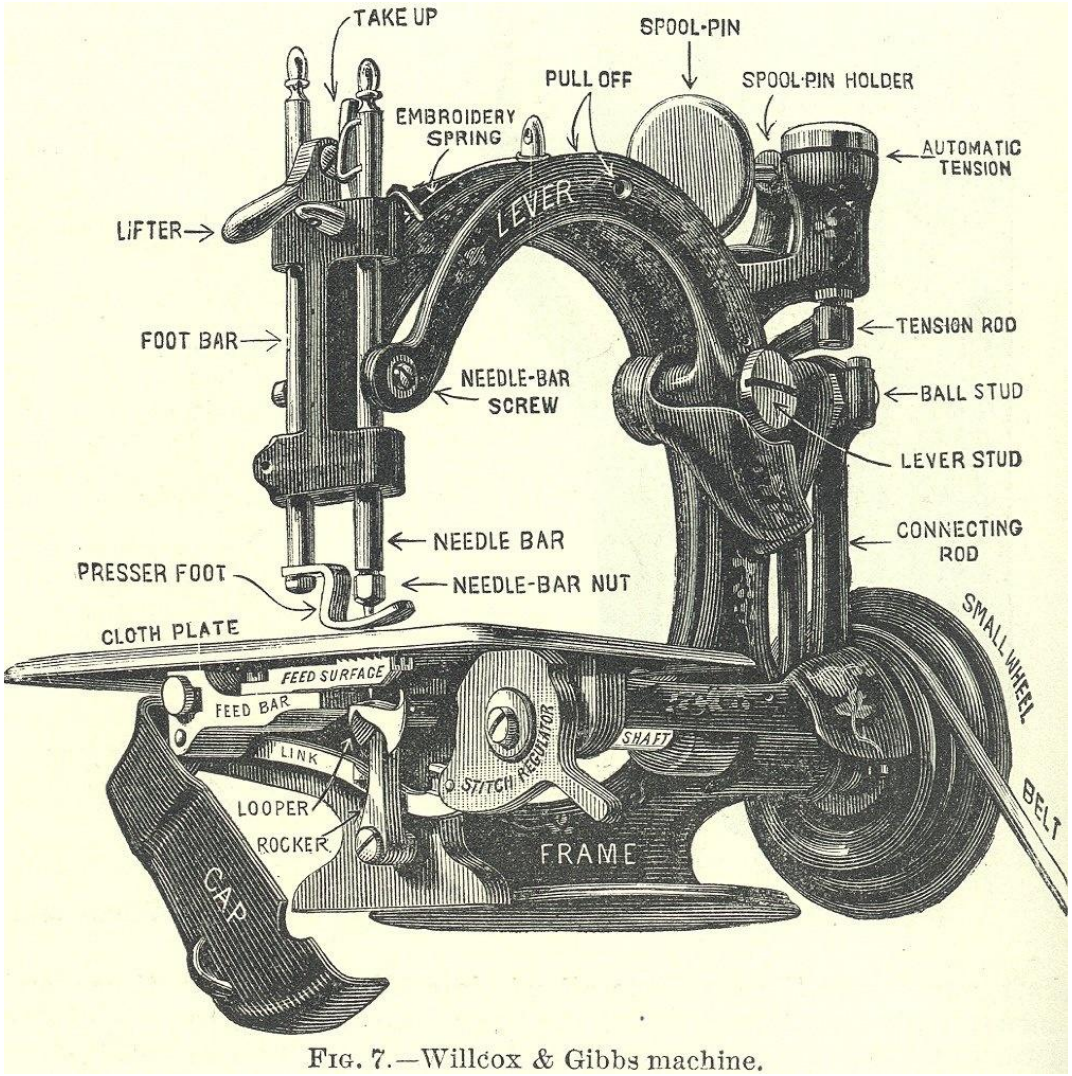


Fig. 7.—Willcox & Gibbs machine.

Flat sewing machine

- Optimized sewing kinematics for perfect sewing results in particularly fine materials
- Special sewing equipment with fine toothing for a material feed without any marks
- Coated needle bar, presser bar and feeding foot bar for minimum oil consumption in the machine head
- Coated hook covers for trouble-free material feed
- New pneumatic venting system for reducting the noise level

Performance features
Max. stitch length 5 mm
Max. sewing foot lift 16 mm
Max. sewing speed 3,800 stitches/min.

Post bed sewing machine

- The slim sewing head and the slim post bed facilitate the handling of difficultly accessible seam areas

- Up to 12 mm long stitches for decorative topstitching seams

- Pneumatic additional thread tension for excellent stitch formation when sewing over thick spots

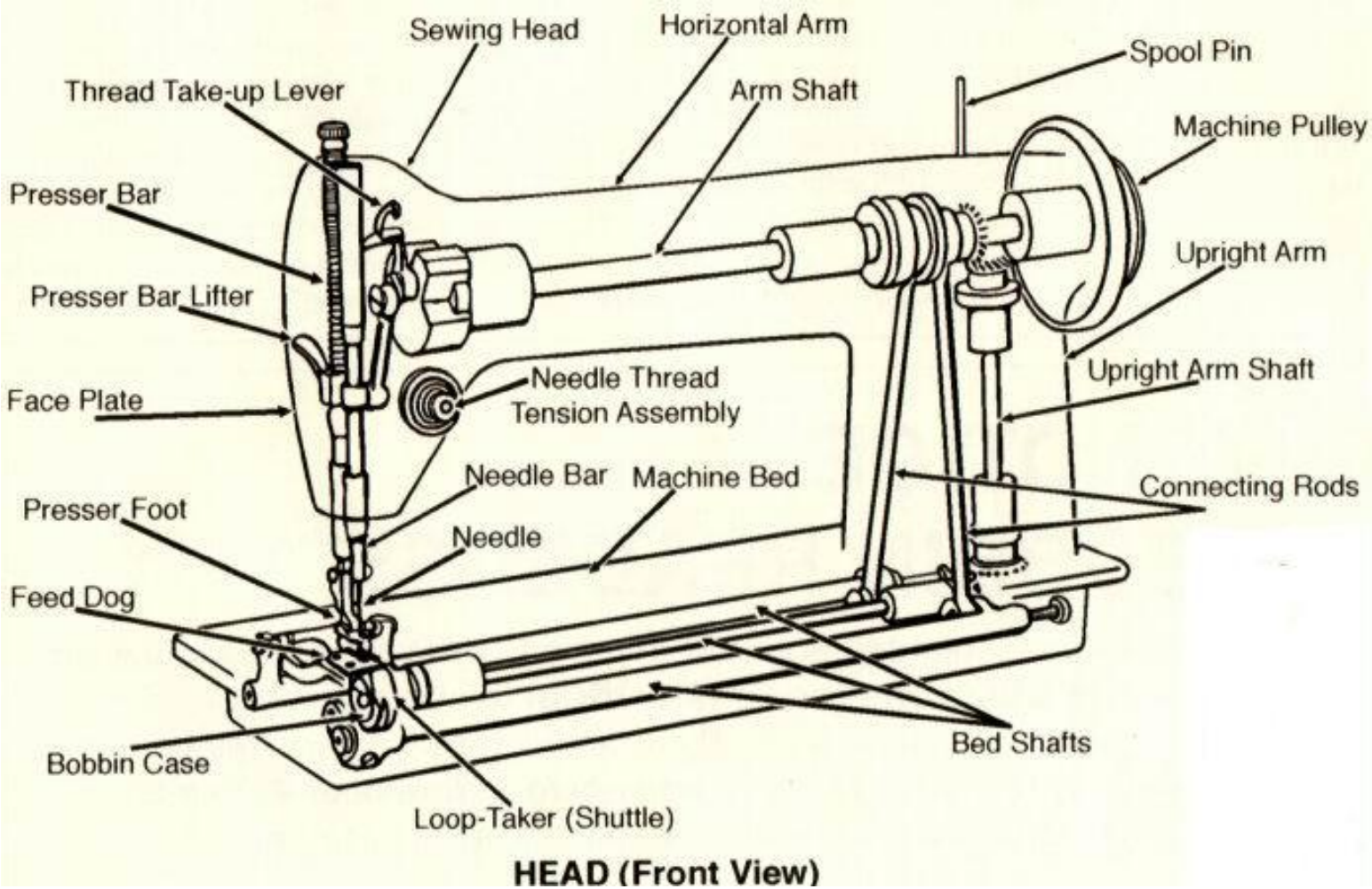
- Thread sizes up to Nm 10/3

- Excellent stitch pattern, constantly tight stitch formation, even with large stitch lengths and extreme thread sizes

- Robust thread trimmer with a remaining thread ends of 15 mm only

Typical field of application
Single-needle decorative stitching in the field of home and car upholstery
Performance features
Max. stitch length 12 mm
Max. sewing speed 2,500 stitches/min.

Scheme of sewing machine



Feeding system

The material handling components of the machine are often referred to as feeding system. The feeding system controls fabric movement.

It consist of three parts

i. Presser foot
ii. Throat plate
iii. Feed mechanism

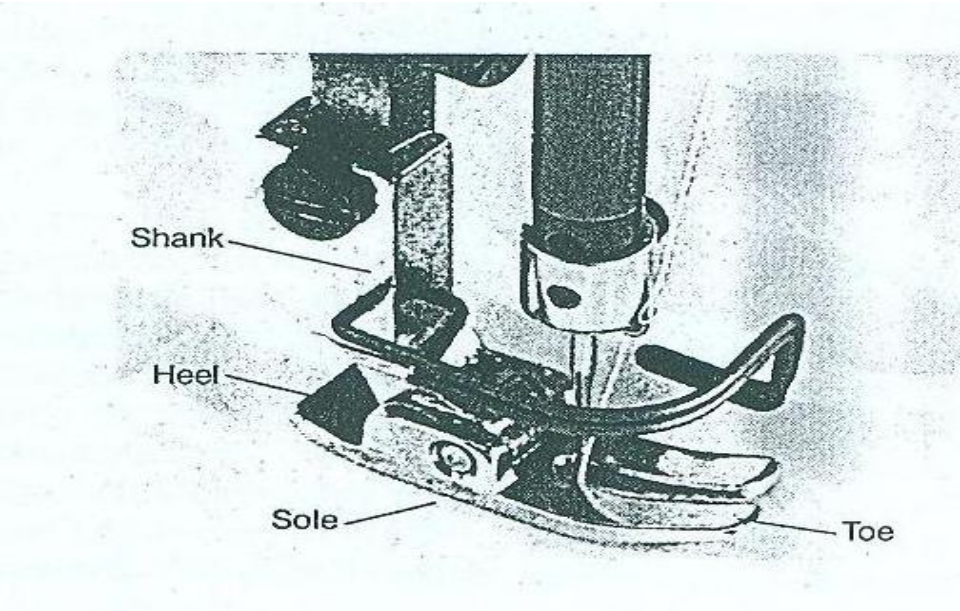
Feeding system

i. **Presser Foot:**

It is the upper part of the feeding system responsible for applying pressure and holding fabric

Parts of presser foot

a. **Shank**
b. **Heel**
c. **Sole**
d. **Toe**



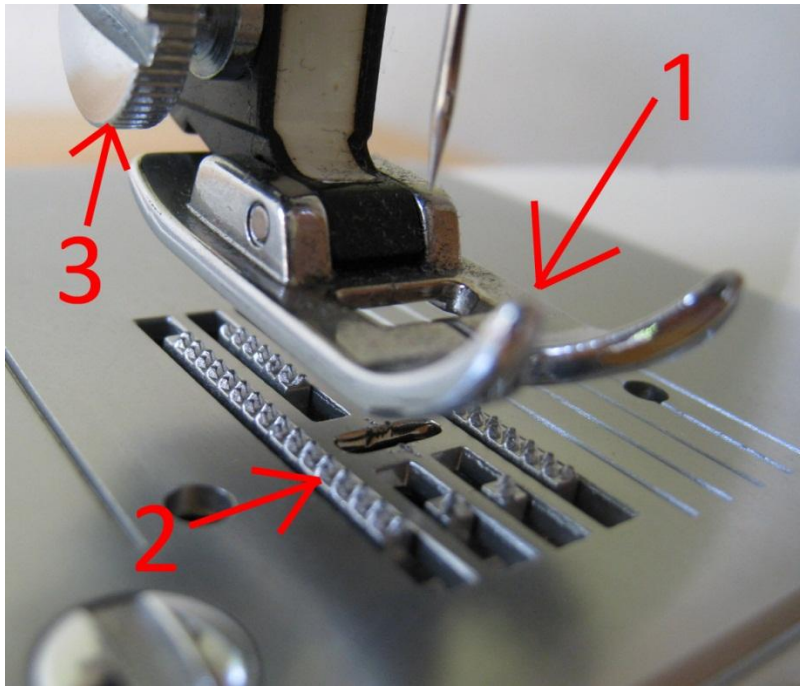
Feeding system

ii. Throat Plate:

These are metal plates directly under the needle. Throat plates support the fabric as needle penetrates to form stitch.

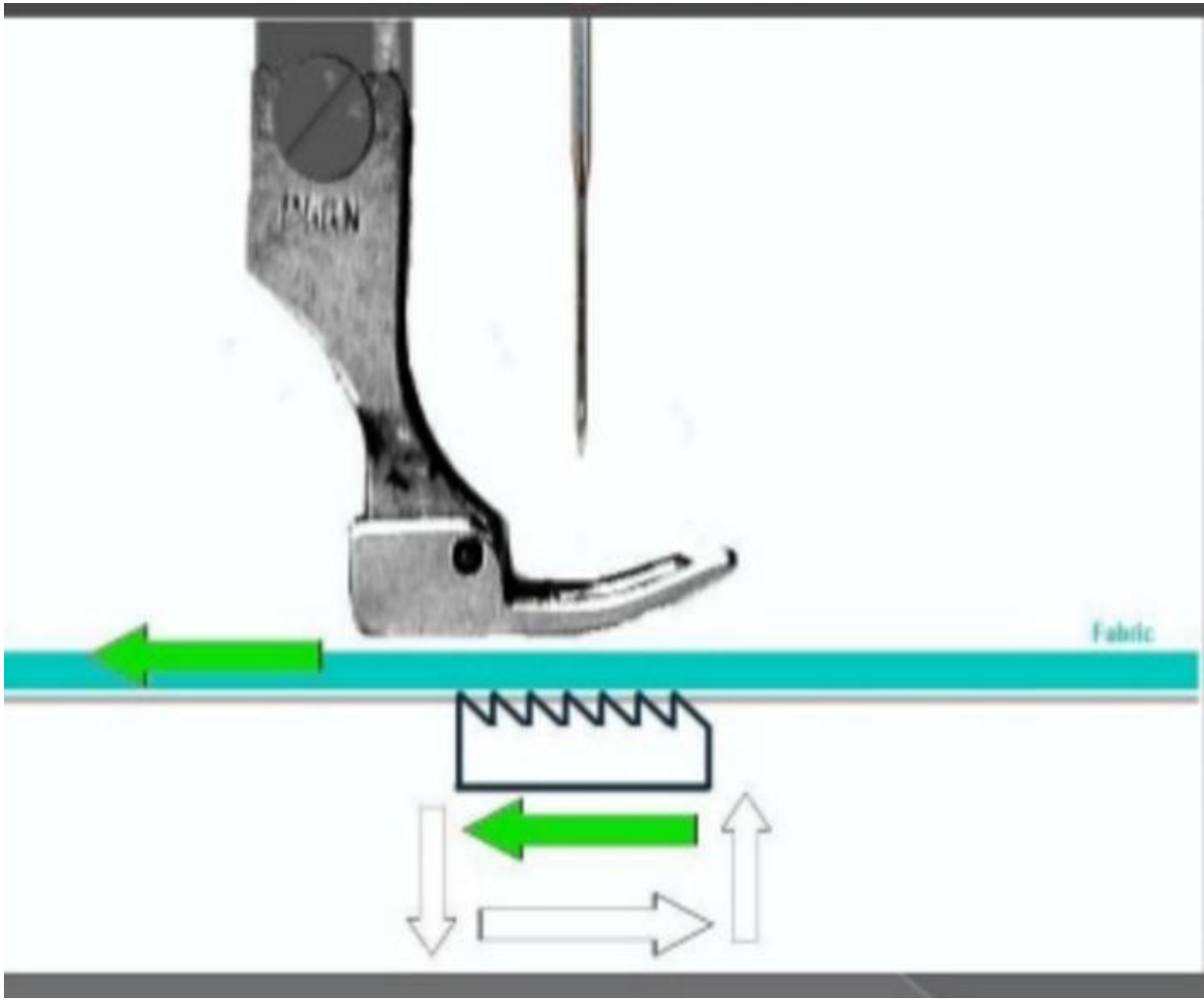
Throat plates have openings for needles and lower feed devices.

- **Types of feeding mechanisms:**
  - **I. Bottom feed or drop feed**
  - **II. Differential feed**
  - **III. Needle feed**
  - **IV. Unison feed**
  - **V. Puller feed**
  - **VI. Clamp feed**



Sewing Machine Fundamentals

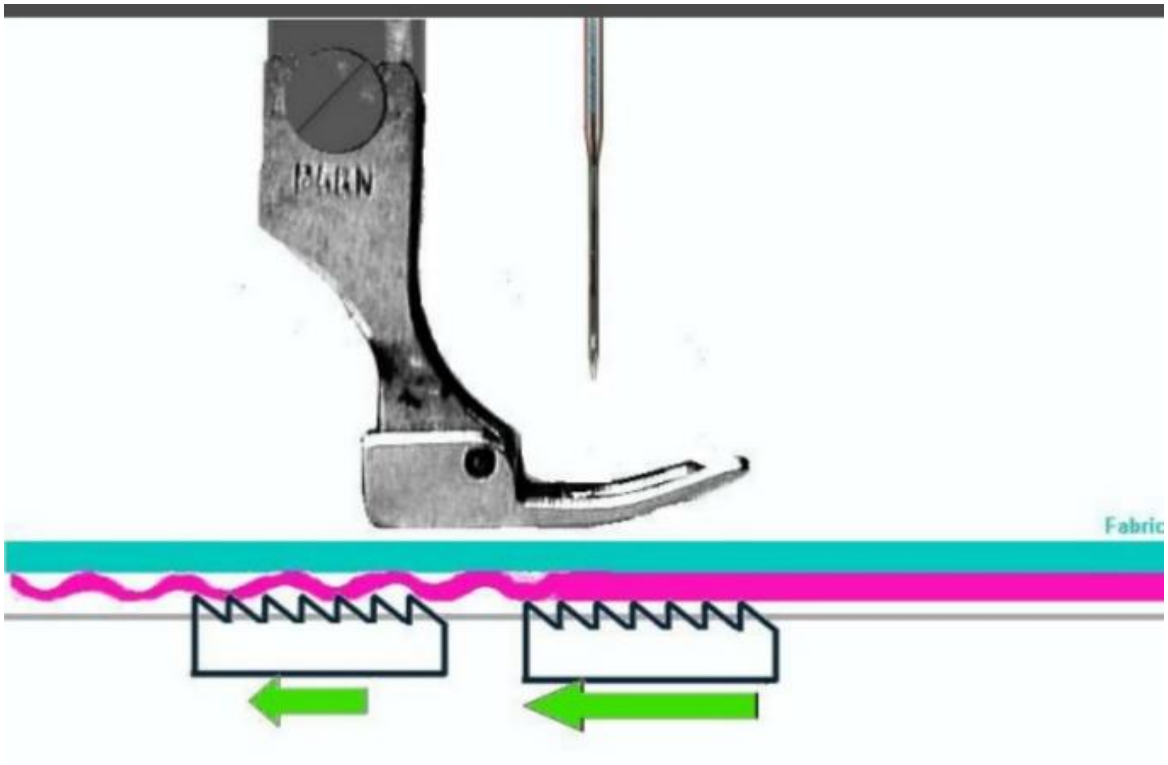
- **Bottom Feed or drop feed:**
  This is the most standard feed
  mechanism, which feed the
  material with lower feed dog
  only.



Sewing Machine Fundamentals

- **Differential feed:**

  In this feed mechanism, feed dog is divided into front and rear. Used in overlock machine. This is suitable for…..

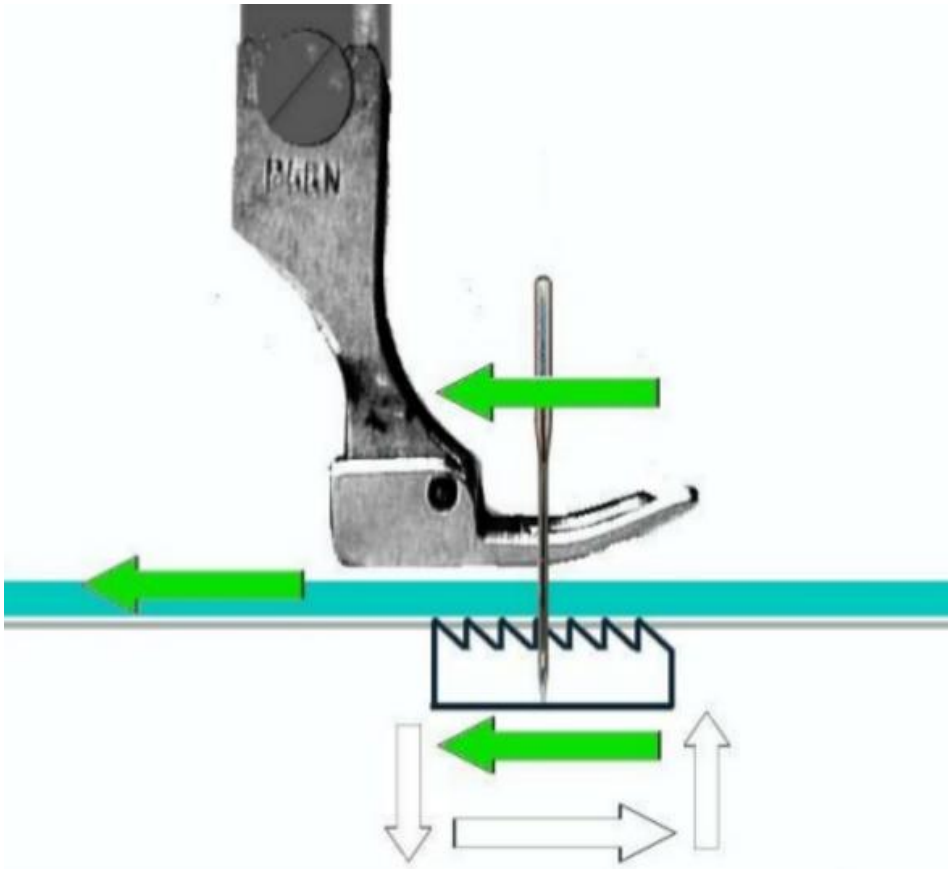


Sewing Machine Fundamentals

- **Needle feed:**

  In this feed mechanism needle bar moves in synchronization with bottom feed.

  This feeding force is strong as compared to bottom feed

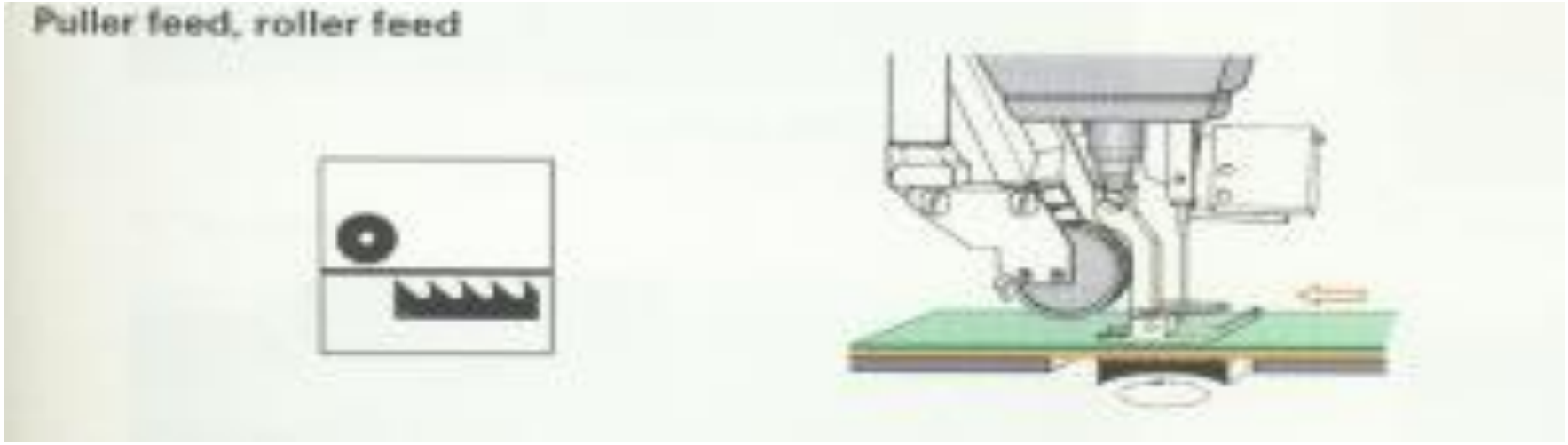


Sewing Machine Fundamentals

- **Puller Feed:**

  Roller located in the rear of presser foot pulls material and sewing is performed. Uneven material feeding is reduced and working is improved.

  Suitable for long straight seams as in bed sheets.

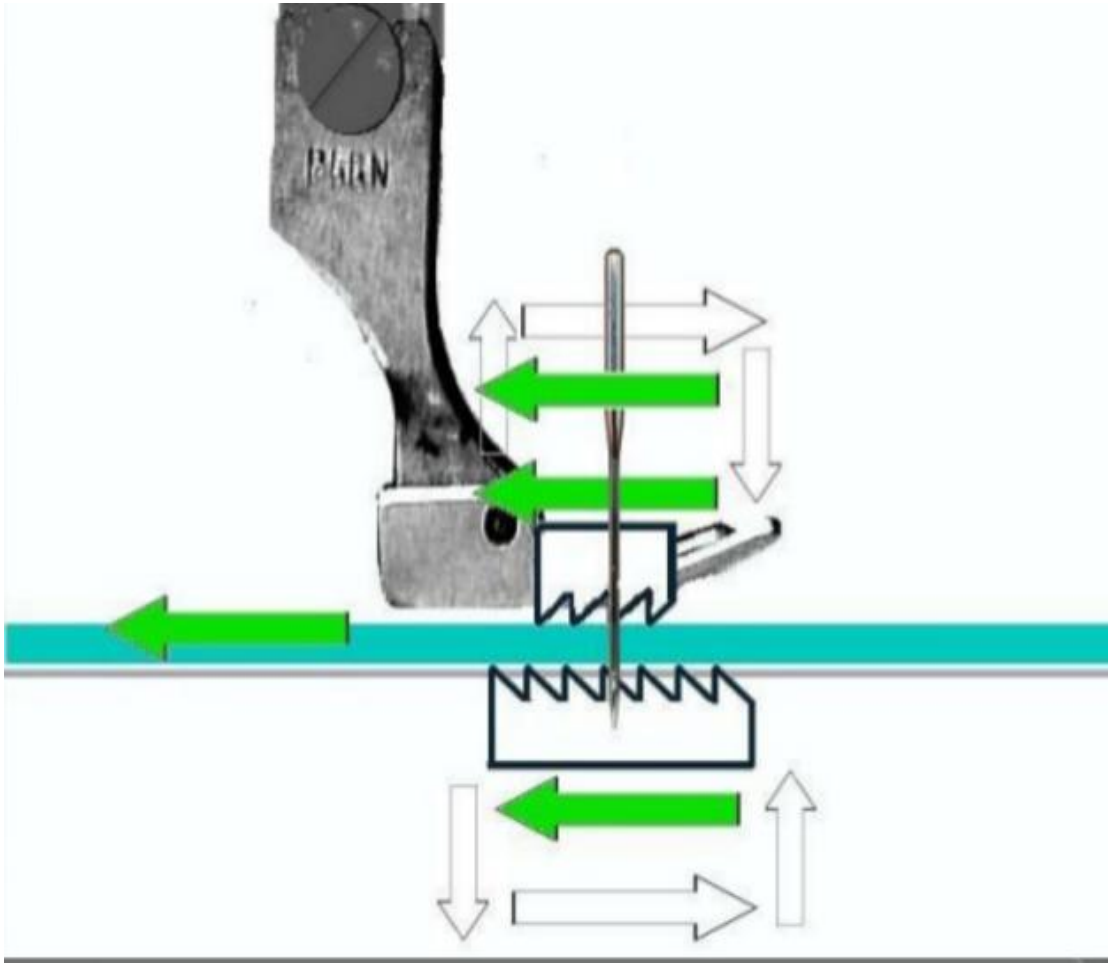


Sewing Machine Fundamentals

- **Unison Feed:**

  This is most superior feed mechanism. It is combination of bottom feed and needle feed.

  Suitable for sewing…..

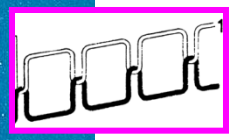


Walking Foot

- **For compressible cushion materials**

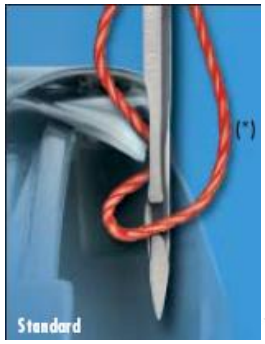
Timing the Hook

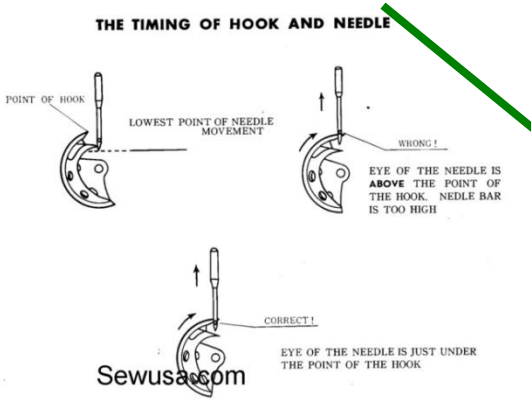
Rotary Hook



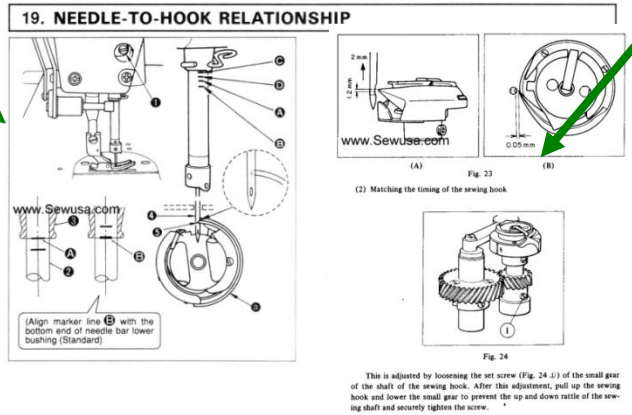
Looper

Rotary Hook (Vertical)





Rotary Hook (Horizontal)

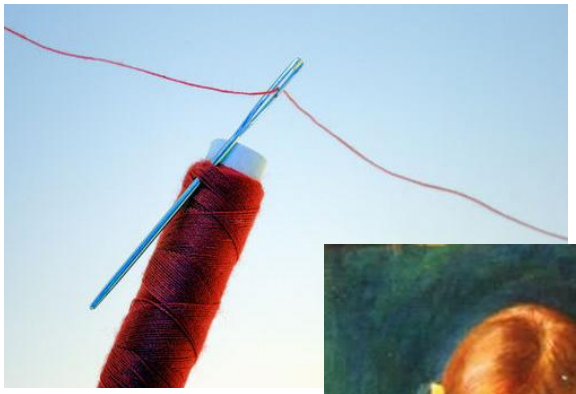


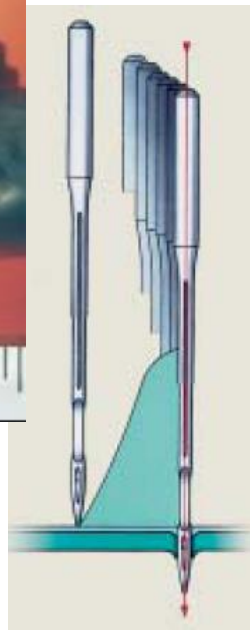
Modern Sewing Machines

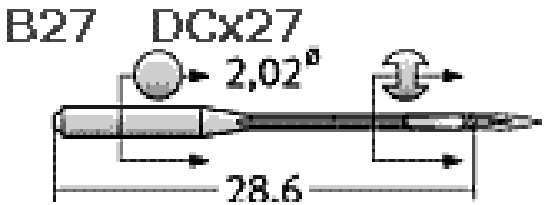
- the usage of sewing machines has grown over the years and is generally now used far more than sewing by hand

- the industrial market has come to be dominated by several large brands such as Juki, Brother Industries, Merrow, Durkopp Adler, Pfaff, Consew to name a few

Sewing needle

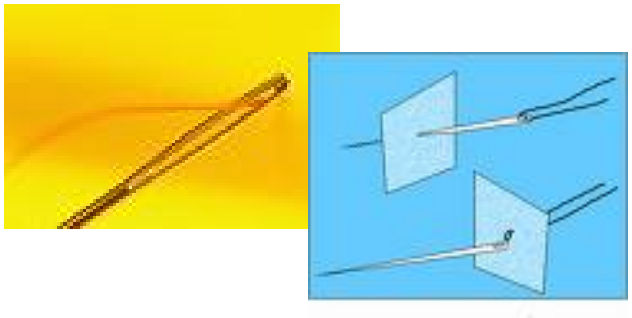






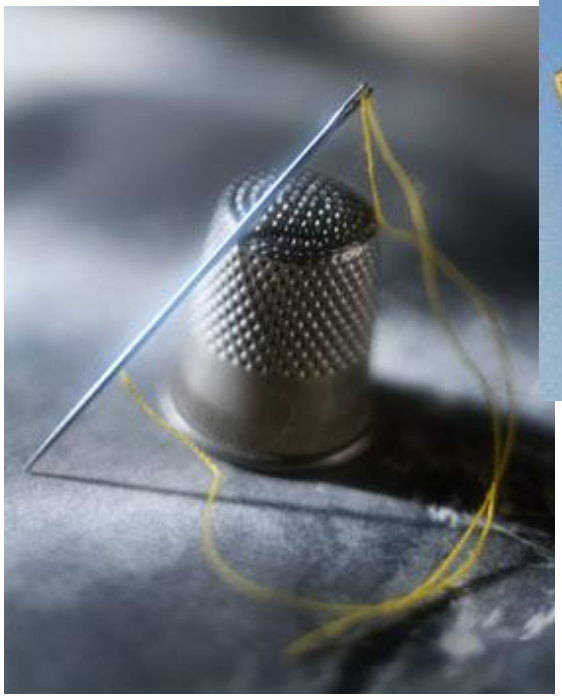
Sewing needle

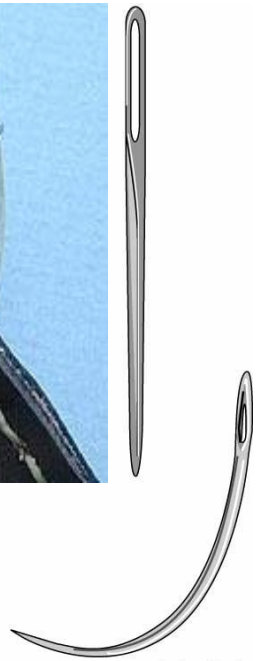
- a sewing needle is a long slight object with a pointed tip
- the first sewing needles were made of bone or wood
- modern ones are manufactured from high carbon steel wire, nickel- or gold plated for corrosion resistance
- the highest quality embroidery needles are made of platinum



Hand sewing needle

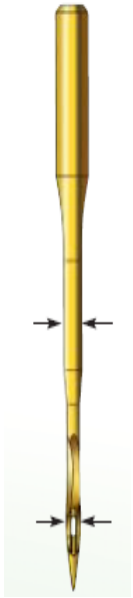
- a needle for hand sewing has a hole at the non-pointed end to carry thread or cord through the fabric after the pointed end pierces it
- little reserve of yarn





Machine sewing needle

- needle size is denoted by a number on the packet



- the convention for sizing is that the length and thickness of a needle increases as the size number increases also

- for example, a size Singer 10 needle will finer , while a size 16 will be thicker

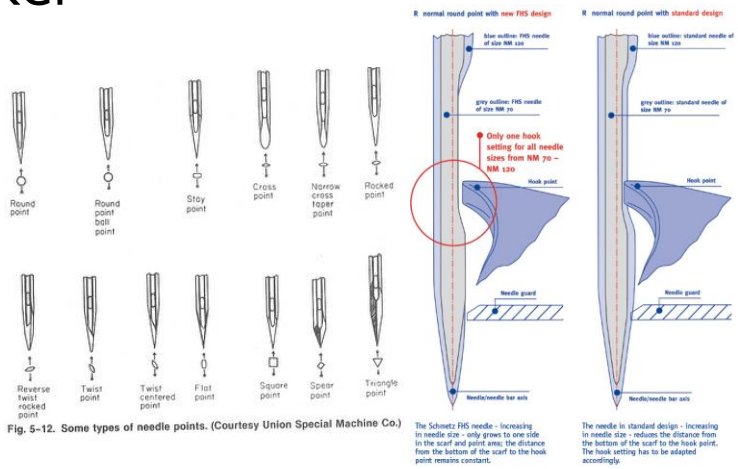
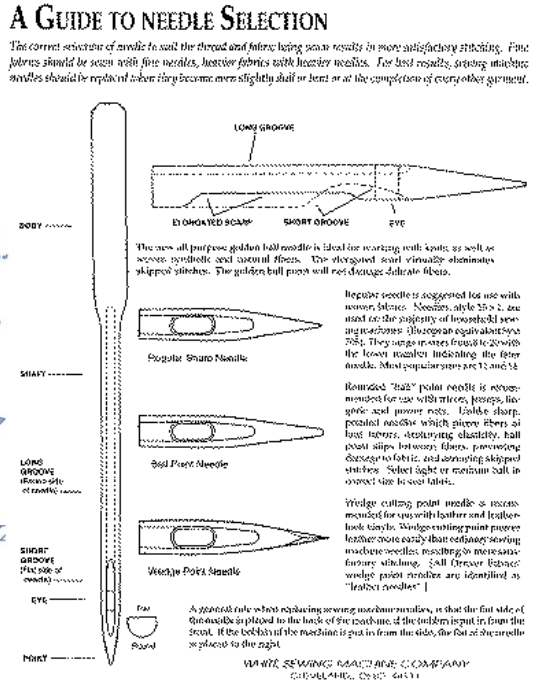
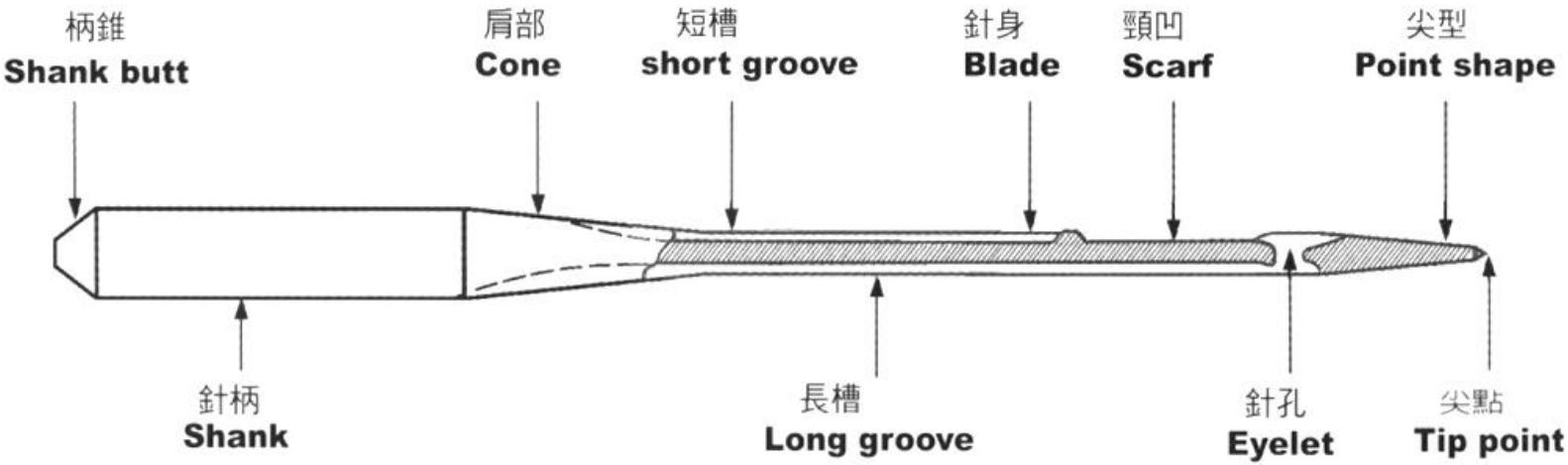


Fig. 5–12. Some types of needle points. (Courtesy Union Special Machine Co.)



Needle

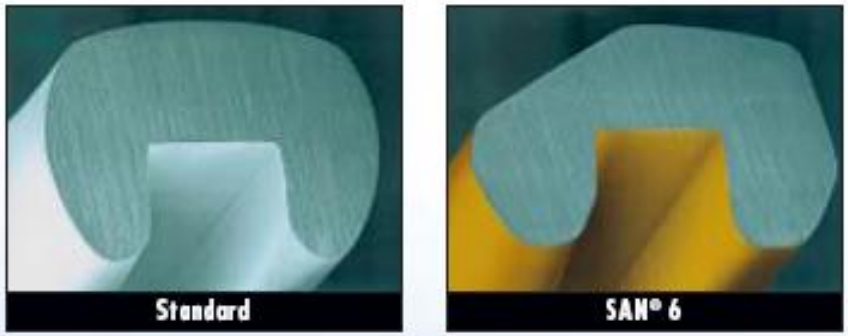
車針主要部位名稱 / Needle positions description



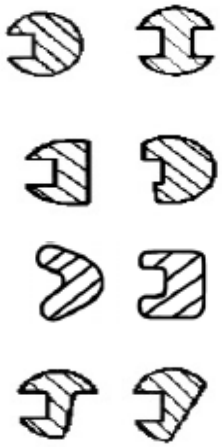
Needles are mechanical strain for buckling and bending

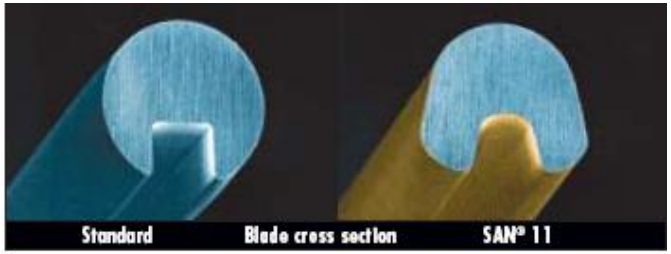
SCARF CROSS SECTION

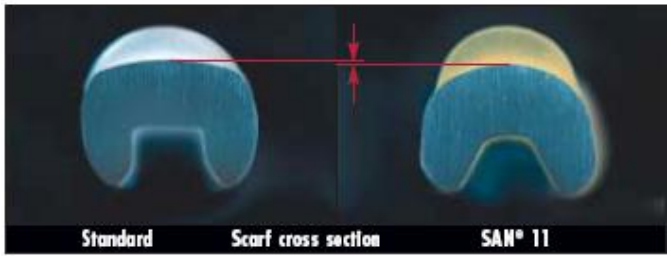
The special shape of the scarf cross section gives the SAN® 6 needle a higher stability in the scarf area. The lateral chamfer on the scarf protects the looper point from being damaged.



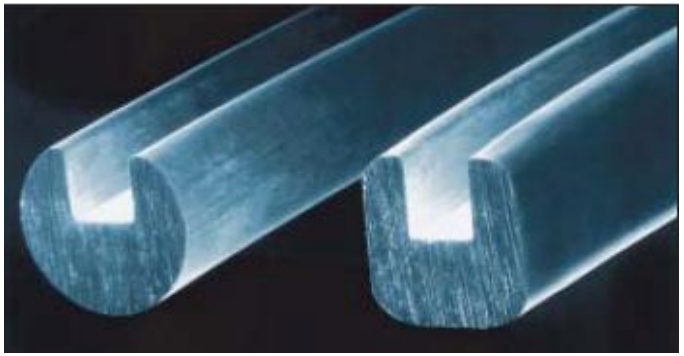
Scarf cross section







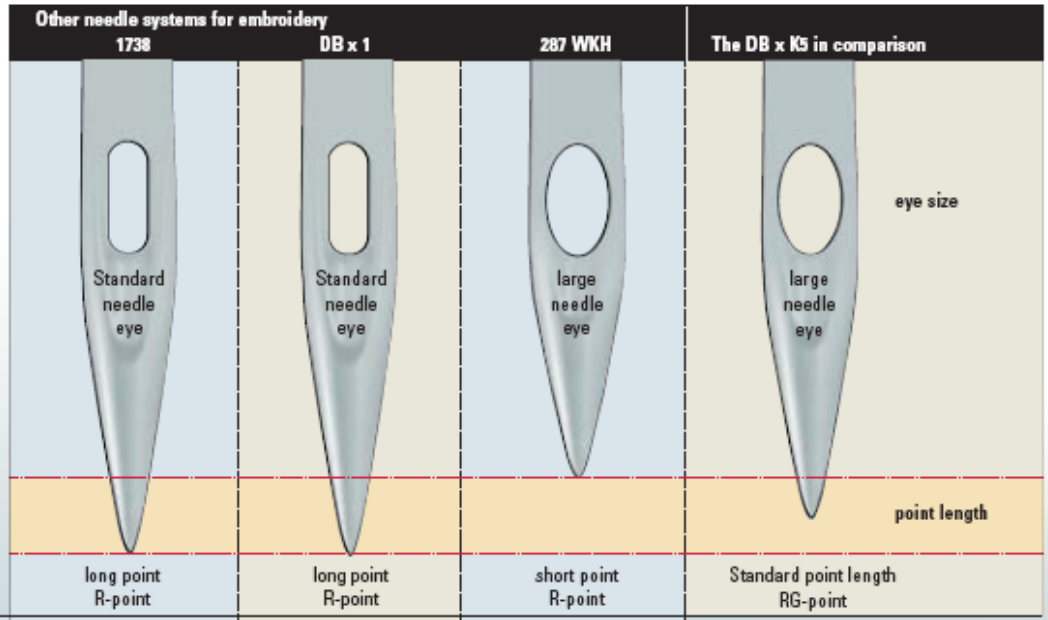
$$F_{cr} = \frac{\pi^2 E J_y}{4 l^2}$$

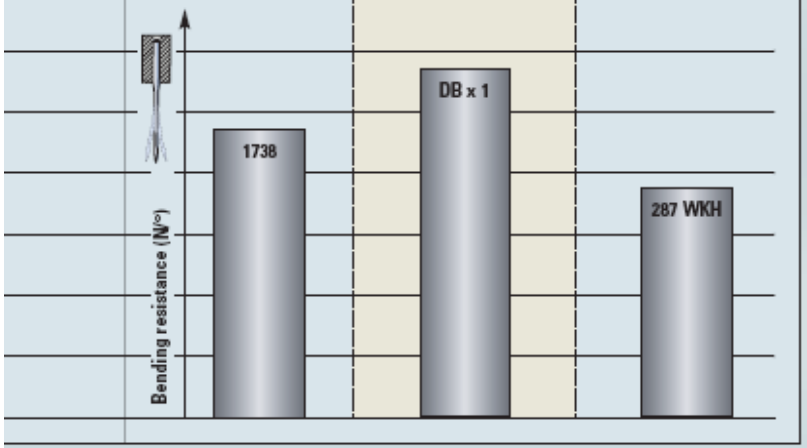


$F_{c.}$ …critical force

J_y …central moment of inertia

E…..Young‘s modulus of elasticity

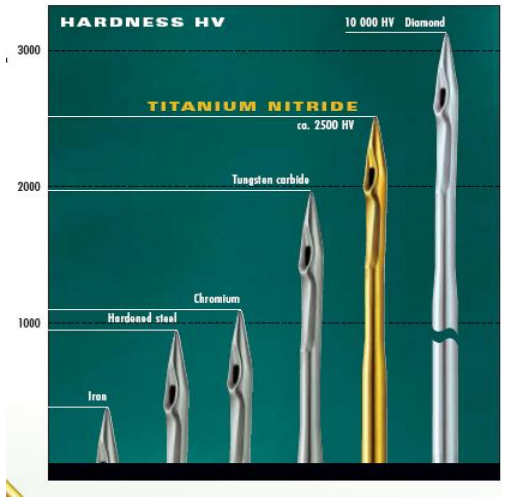




THE NEEDLE STABILITY

The other needle systems here were not specifically designed and produced for embroidery. Their application related features are designed for the use in single needle lockstitch machines. Nevertheless, many embroidery factories still today use these needles.

Their stability, defined as resistance against bending, is shown in the diagram opposite and can be compared with the DBxK5 variations.

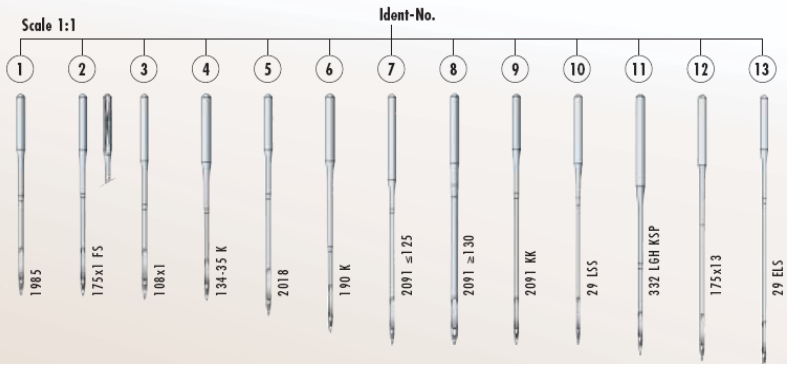


PROGRAM BUTTON SEWING NEEDLES:

System	Size-Range	Ident-No.	GB-designation
29 ELS	100 - 130	13	517.174 AC01 RG
29 L	60 - 125	7	470.174 AC01 RG
29 L	130 - 150	8	470.174 AC01 RG
29 LES	60 - 150	9	470.174 AC02 RG
29 LSS	60 - 125	10	470.174 AC03 RG
29 LSS	130 - 150	8	470.174 AC01 RG
29 S	60 - 150	1	371.174 AC01 RG
108 x 1	60 - 140	3	373.163 AC02 RG
108 x 3 FFG	60 - 140	3	373.163 AC02 RG
134 - 35 K	50 - 200	4	381.200 AC02 RG
175 x 1	60 - 150	1	371.174 AC01 RG
175 x 1 FR	60 - 150	2	371.174 AC02 RG
175 x 1 FS	60 - 150	2	371.174 AC02 RG
175 x 3	60 - 150	5	412.174 AC01 RG
175 x 5	60 - 150	1	371.174 AC01 RG
175 x 7	60 - 125	7	470.174 AC01 RG
175 x 7 KK	60 - 150	9	470.174 AC02 RG
175 x 9	60 - 125	10	470.174 AC03 RG
175 x 9	130 - 150	8	470.174 AC01 RG
175 x 13	100 - 140	12	502.174 AC01 RG
175 x 15	60 - 125	7	470.174 AC01 RG
175 x 15	130 - 150	8	470.174 AC01 RG
175 x 25	100 - 140	12	502.174 AC01 RG
175 x 31	60 - 150	5	412.174 AC01 RG
175 x 33	60 - 150	5	412.174 AC01 RG
178 H	60 - 150	5	412.174 AC01 RG
190 K	60 - 140	6	445.200 AC02 RG
332 LGH KSP	90 - 140	11	485.198 AC02 RG
1661	60 - 150	1	371.174 AC01 RG
1661 ELG	60 - 125	10	470.174 AC03 RG
1661 ELG	130 - 150	8	470.174 AC01 RG

System	Size-Range	Ident-No.	GB-designation
1661 EXT LG	60 - 125	10	470.174 AC03 RG
1661 EXT LG	130 - 150	8	470.174 AC01 RG
1661 LG	60 - 150	5	412.174 AC01 RG
1661 M	60 - 150	1	371.174 AC01 RG
1985	60 - 150	1	371.174 AC01 RG
1985 SAN® 1	60 - 150	2	371.174 AC02 RG
1986	60 - 150	5	412.174 AC01 RG
1987	60 - 125	10	470.174 AC03 RG
2018	60 - 150	5	412.174 AC01 RG
2091	60 - 125	7	470.174 AC01 RG
2091	130 - 150	8	470.174 AC01 RG
2091 K	60 - 125	7	470.174 AC01 RG
2091 K	130 - 150	8	470.174 AC01 RG
2091 KK	60 - 150	9	470.174 AC02 RG
2091 LGK	60 - 125	7	470.174 AC01 RG
2091 LGK	130 - 150	8	470.174 AC01 RG
2134 - 35 K	50 - 200	4	381.200 AC02 RG
SY 2851	60 - 150	1	371.174 AC01 RG
SY 2852	60 - 150	1	371.174 AC01 RG
SY 3049	60 - 140	3	373.163 AC02 RG
SY 4051	60 - 150	5	412.174 AC01 RG
SY 4052	60 - 150	5	412.174 AC01 RG
SY 4531	60 - 125	7	470.174 AC01 RG
SY 4531	130 - 150	8	470.174 AC01 RG
SY 4533	60 - 125	10	470.174 AC03 RG
SY 4533	130 - 150	8	470.174 AC01 RG
SY 4536	60 - 125	7	470.174 AC01 RG
SY 4536	130 - 150	8	470.174 AC01 RG
SY 4538	60 - 125	10	470.174 AC03 RG
SY 4538	130 - 150	8	470.174 AC01 RG
SY 4539	60 - 125	7	470.174 AC01 RG

System	Size-Range	Ident-No.	GB-designation
SY 4539	130 - 150	8	470.174 AC01 RG
SY 4631	100 - 140	12	502.174 AC01 RG
SY 4632	100 - 140	12	502.174 AC01 RG
SY 7226	50 - 200	4	381.200 AC02 RG
SY 7585	60 - 150	9	470.174 AC02 RG
SY 7586	60 - 150	9	470.174 AC02 RG
SY 7587	60 - 150	9	470.174 AC02 RG
SY 7700	100 - 130	13	517.174 AC01 RG
SY 8138	60 - 150	5	412.174 AC01 RG
SY 8661	60 - 150	5	412.174 AC01 RG
SY 8662	60 - 150	5	412.174 AC01 RG
SY 8701	50 - 200	4	381.200 AC02 RG
SY 8724	60 - 150	1	371.174 AC01 RG
SY 8727	60 - 150	5	412.174 AC01 RG
SY 8728	60 - 125	7	470.174 AC01 RG
SY 8728	130 - 150	8	470.174 AC01 RG
BQ x 1	60 - 140	3	373.163 AC02 RG
DP x 35 K	50 - 200	4	381.200 AC02 RG
LS x 18	60 - 125	10	470.174 AC03 RG
LS x 18	130 - 150	8	470.174 AC01 RG
MT x 190 K	60 - 140	6	445.200 AC02 RG
TQ x 1	60 - 150	1	371.174 AC01 RG
TQ x 3	60 - 150	5	412.174 AC01 RG
TQ x 5	60 - 150	1	371.174 AC01 RG
TQ x 7	60 - 125	7	470.174 AC01 RG
TQ x 7	130 - 150	8	470.174 AC01 RG
TQ x 9	60 - 125	10	470.174 AC03 RG
TQ x 9	130 - 150	8	470.174 AC01 RG
TQ x 13	100 - 140	12	502.174 AC01 RG
TQ x 14 N	60 - 150	9	470.174 AC02 RG

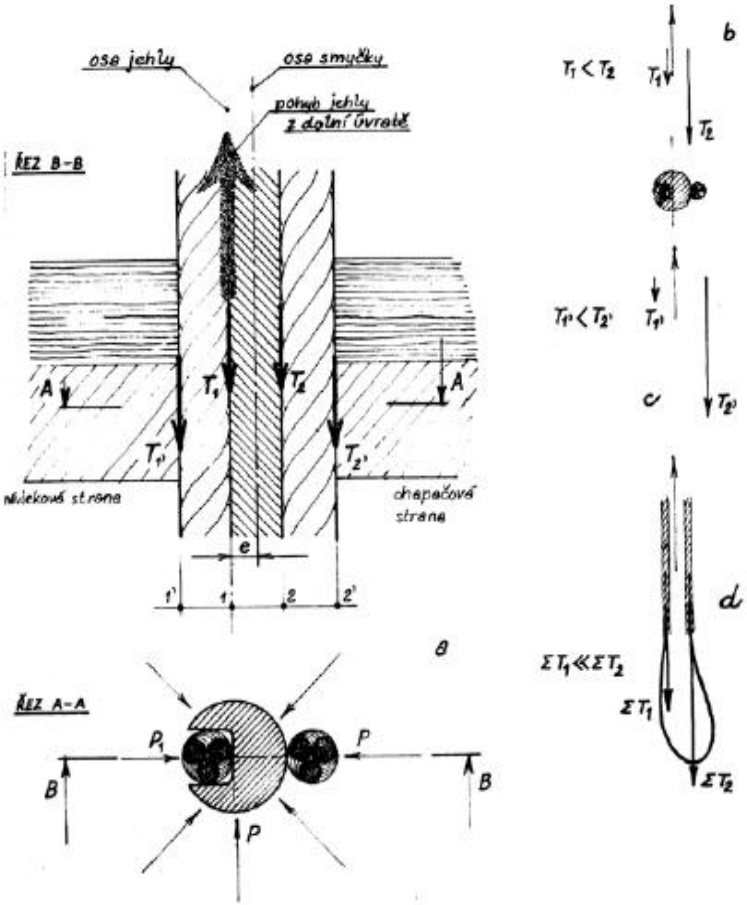


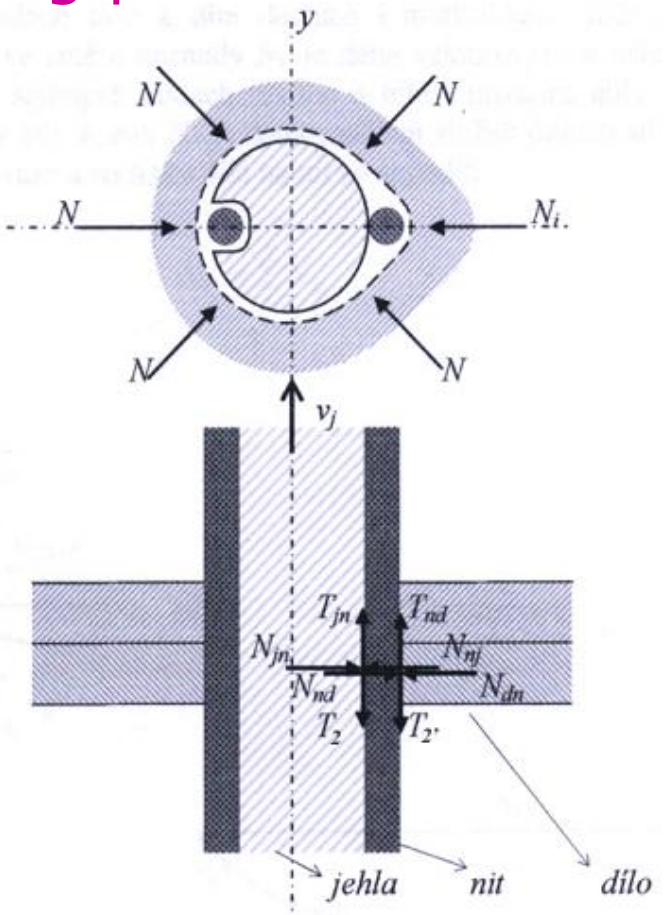
PROGRAM - NEEDLE SYSTEM 118:

Variation	Blade/Grooves	Looper-contact area	Point	Application
118 GAS*	• double groove • no scarf	• close looper adjustment not possible	RG	For fine and medium knitted fabrics and for woven cloth. For uncritical sewing threads with low elasticity.
118 GAS FFG	• like GAS, but with ball point	• like GAS	FFG	For coarser knitted structures and for superelastic fabrics.
118 GKS*	• double groove • with scarf	• for closest looper adjustment • safe loop pick-up • avoidance of skipping	RG	Universal application for fine and medium knitted fabrics. For texturised sewing threads.
118 SAN® 10	• double groove • tapered blade • scarf providing hook protection	• like GKS • high stability • fabric protection	RG	For fine and critical to sew knitted fabrics and for woven cloth.
118 GKS FFG	• like GKS, but with ball point	• like GKS	FFG	For fine and medium knitted fabrics and for woven cloth.
118 GBS*	• one groove only • with scarf	• sturdier needle, but higher thread tension required	RG	For fine and medium knitted and woven fabrics. Reduced deflection on cross-seams.
118 GHS*	• like GBS, but with ball point	• like GBS	FFG	For coarser knitted structures and for high elastic fabrics. Reduced deflection on cross-seams.
36211	• without eye	• blind needle	RG	Holds the bobbin thread during stitch formating and prevents lateral forces to the needle.

*also available in GEBEDUR®-Version.

Theoretical analysis of sewing process

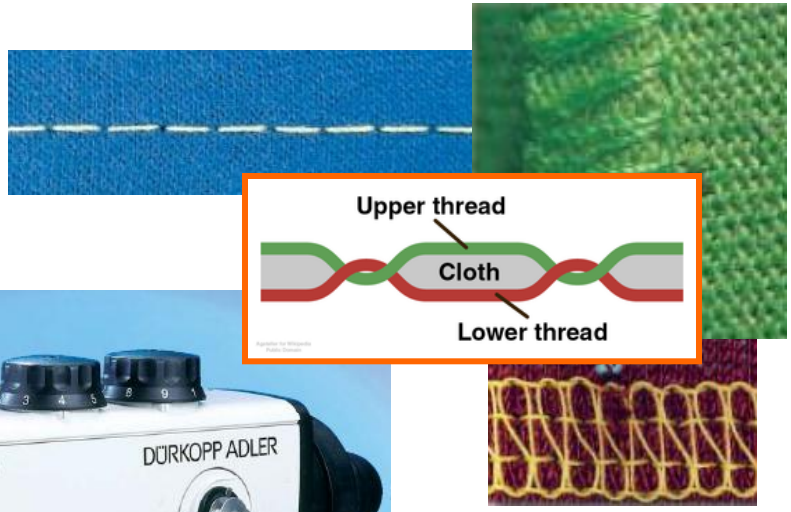


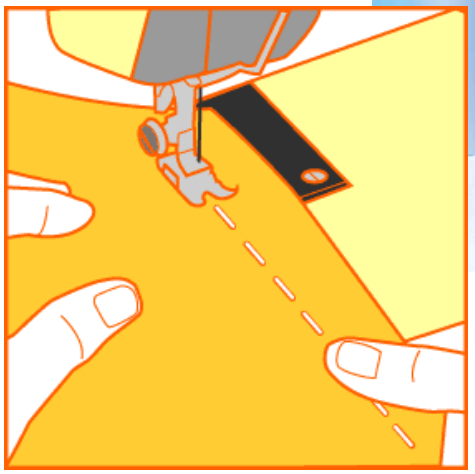


Σ frictional forces the left side << Σ frictional forces the right side (long groove) (scarf)

result is loop on the right side

Stitch



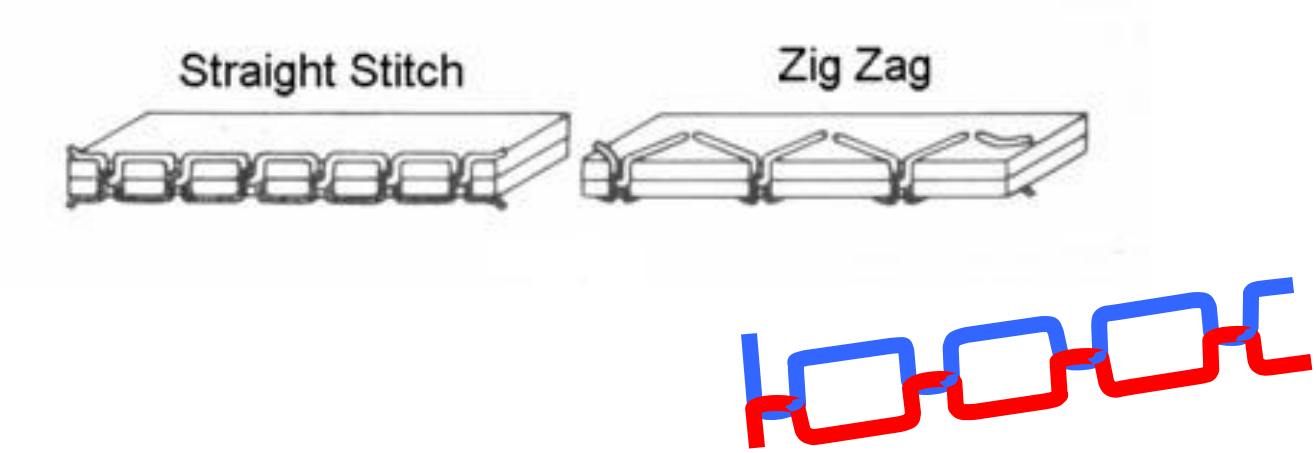


types

Stitch

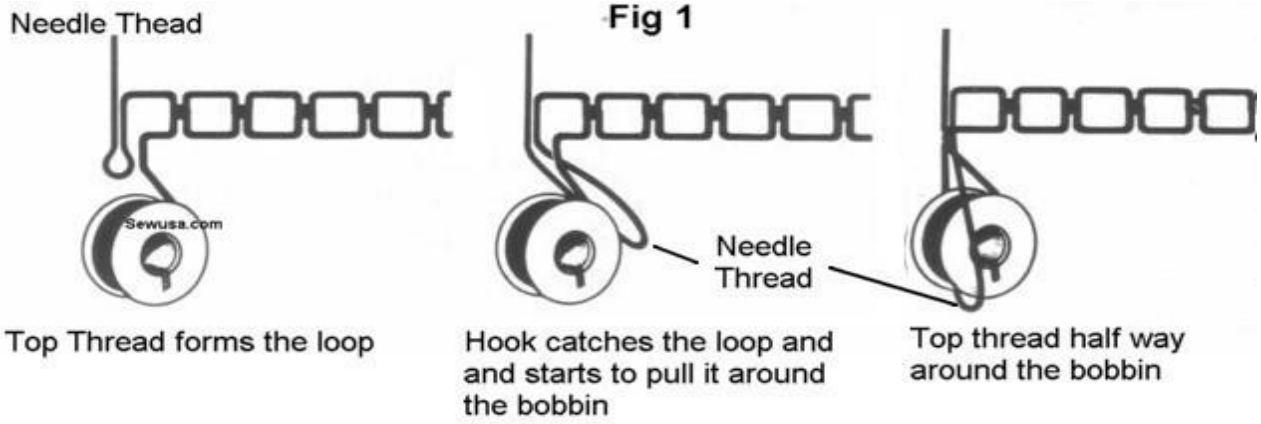
Definitions:

One unit of conformation resulting from one or more strands or loops of thread intralooping, interlooping or passing into or through material

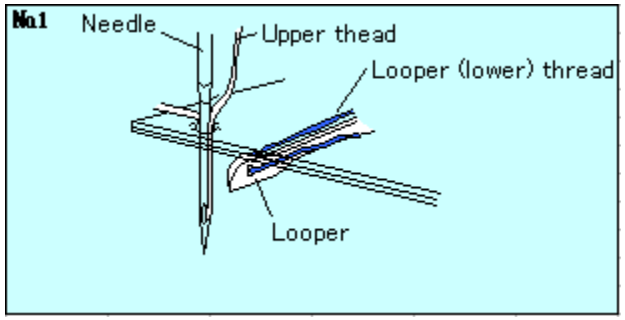


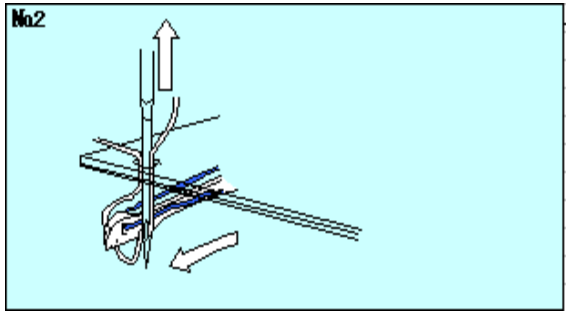
Creation of stitch - lockstitch

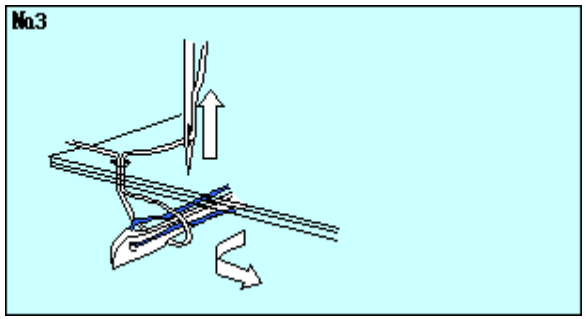
Fig 1

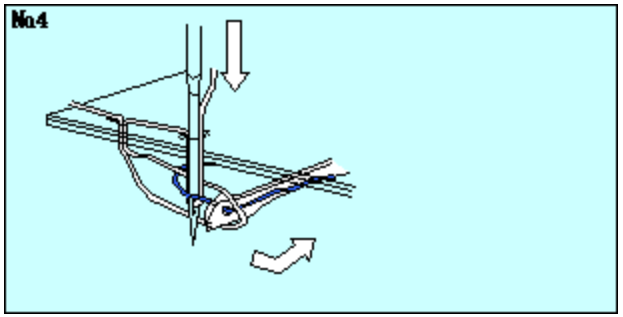


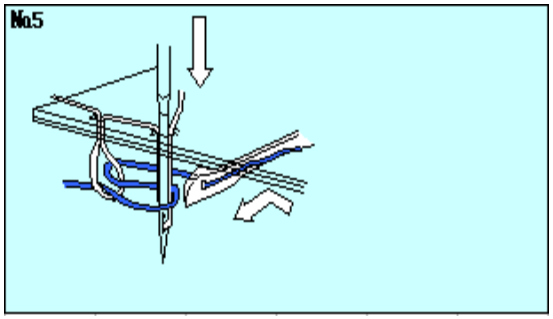
Creation of stitch - chainstitch

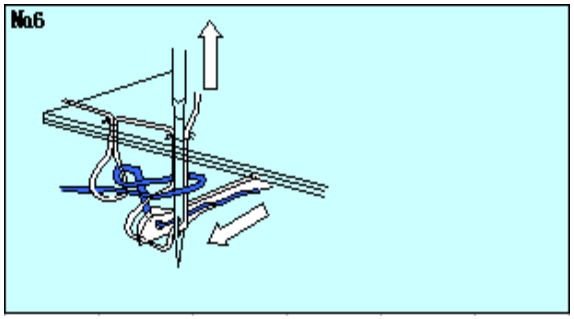










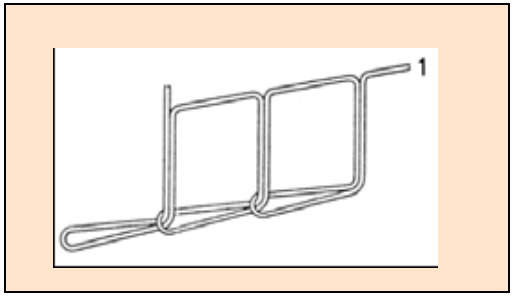


Stitch types – ISO 4915

Stitch types are divided into six classes.The characteristics of these classes are indicated below.

Class 100 – Chain stitches

In this class, stitch types are formed with one or more needle threads, and are characterized by intralooping. One or more loops of thread are passed through the material and secured by intralooping with a succeeding loop or loops after they are passed through the material.

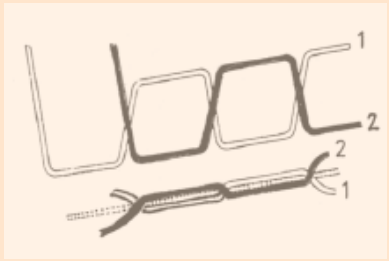


Class 100 – sewing machine

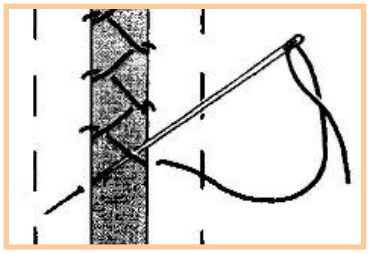
Stitch types – ISO 4915

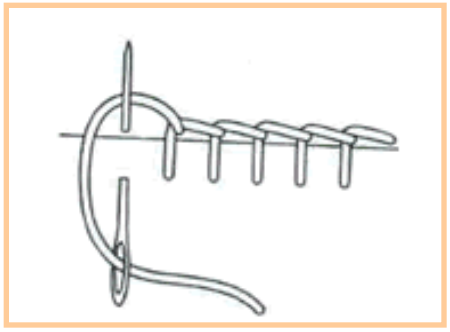
Class 200 – Originated as hand stitches

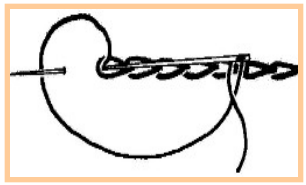
In this class, stitch types which originated as handstitches are characterized by a single thread, which is passed through the material as a single line of thread and the stitch is secured by the single line of thread passing in and out of the material.

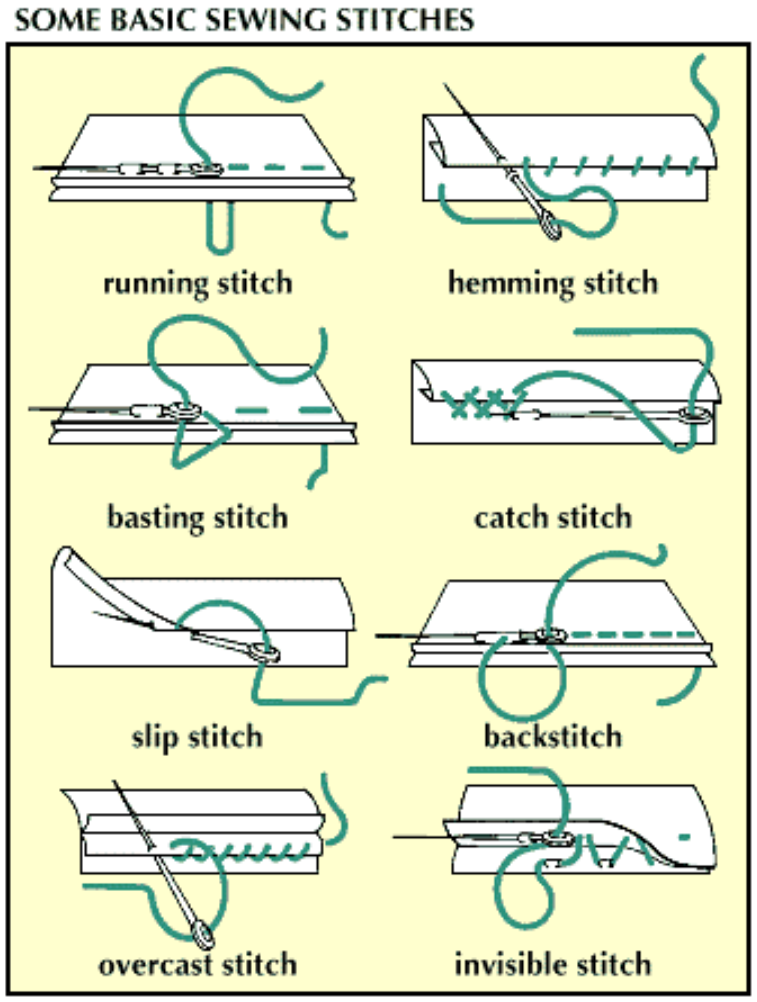


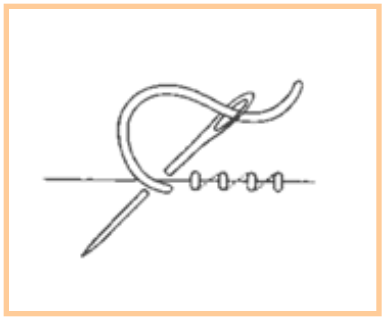
Class 200

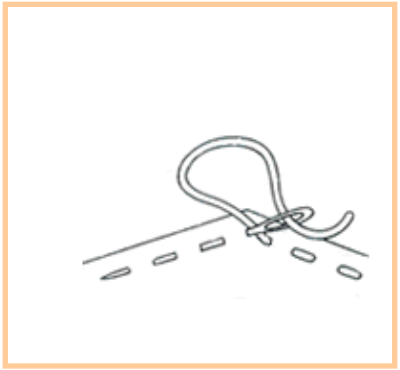







SOME BASIC SEWING STITCHES
running stitch
hemming stitch
basting stitch
catch stitch
slip stitch
backstitch
overcast stitch
invisible stitch

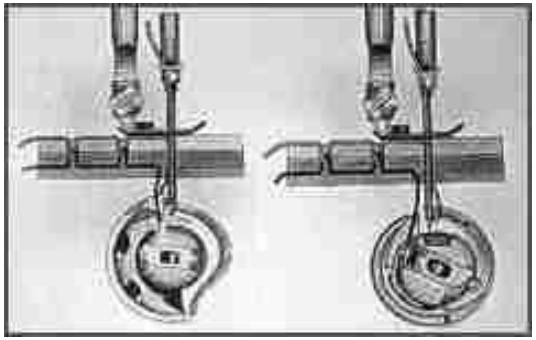


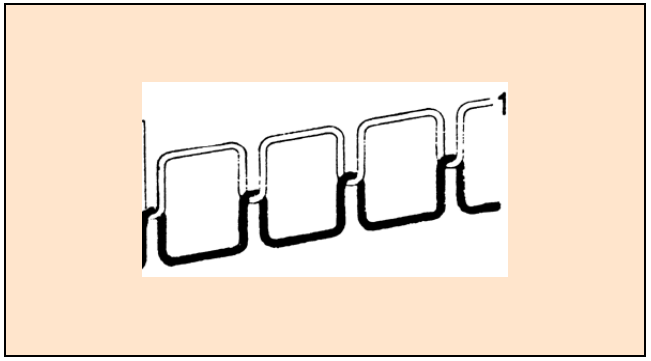


Stitch types – ISO 4915

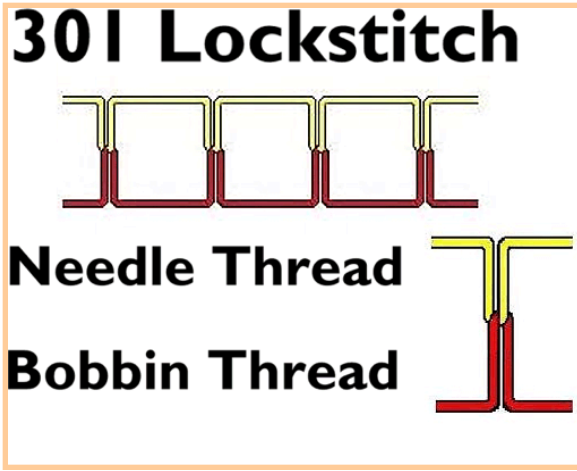
Class 300 – Lockstitches

In this class, stitch types are formed with two or more groups of threads, and have for a general characteristicthe interlacing of the two or more groups. Loops of one group are passed through the material and are secured by the thread or threads of a second group.





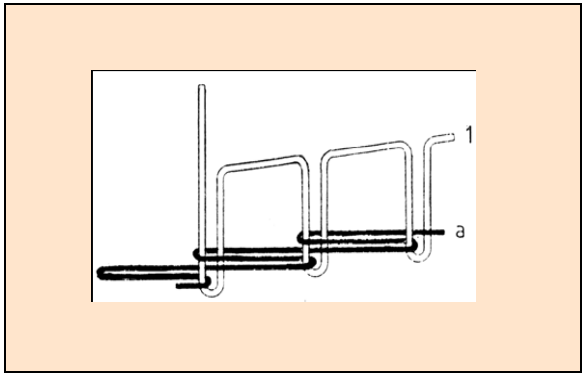
Class 300 – sewing machine



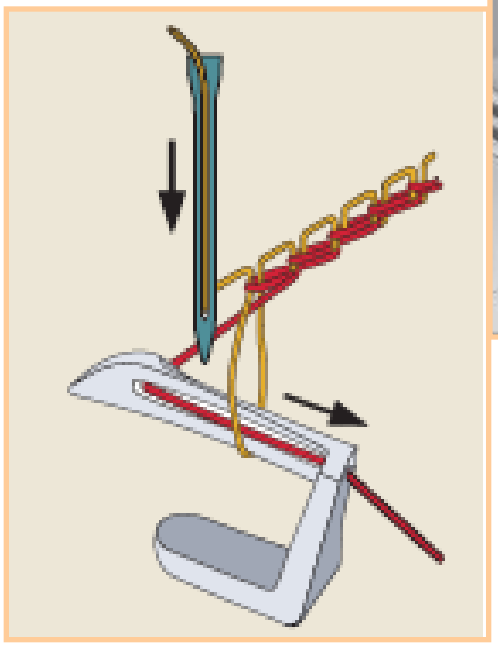
Stitch types – ISO 4915

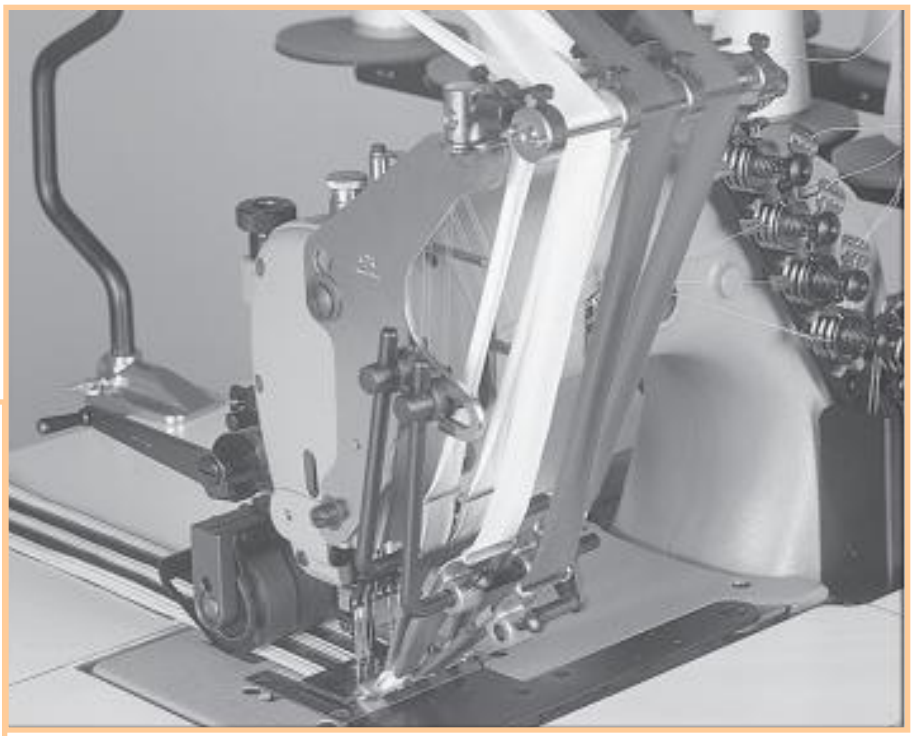
Class 400 – Double-thread chain stitches

In this class, stitch types are formed with two or more groups of threads, and have for a general characteristic the interlooping of the two groups. Loops of one group of threads are passed through the material and are secured by interlacing and interlooping with loops of another group.



Class 400 – sewing machine

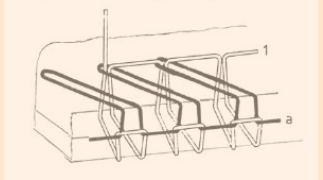




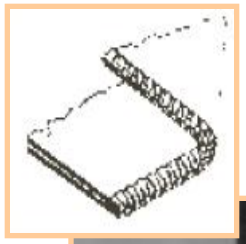
Stitch types – ISO 4915

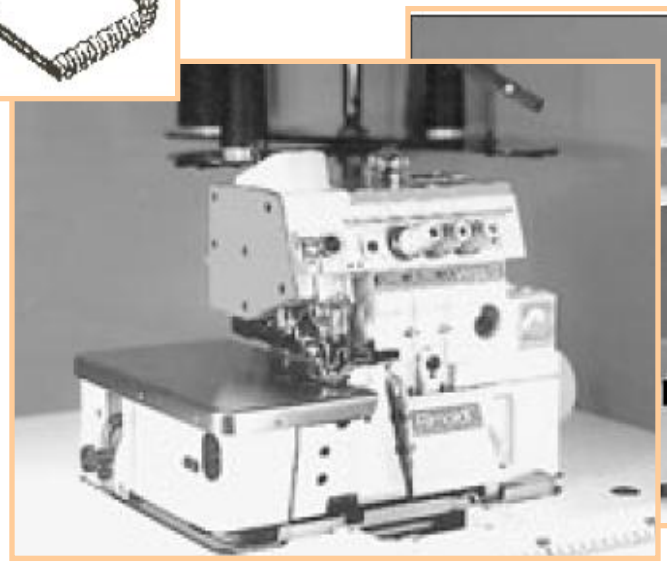
Class 500 – Overedge chain stitches

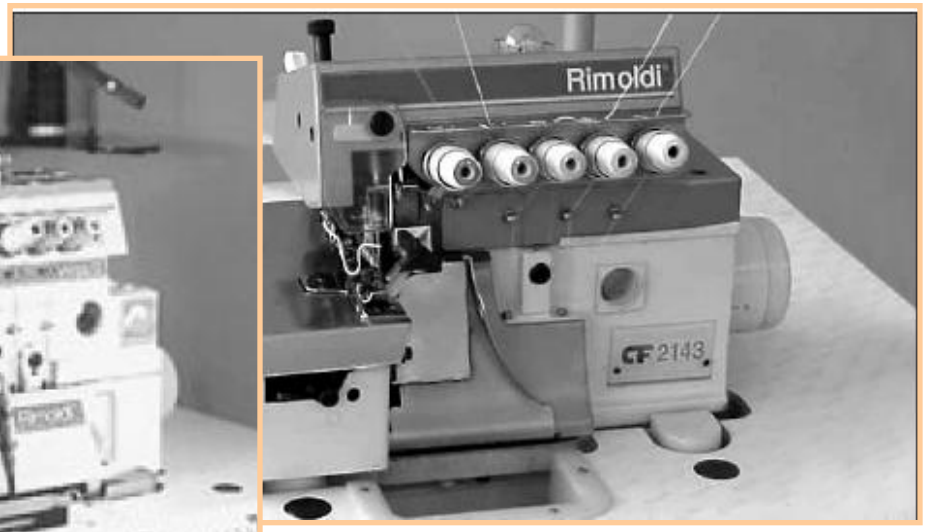
In this class, stitch types are formed with one or more groups of threads, and have for a general characteristic that loops from at least one group of thread pass around the of the material. Loops of one group of threads are passed through the material and are secured by intralooping before succeeding loops are passed through the material, or secured by interlooping with loops of one or more interlooped groups of threads before succeeding groups of the first group are passed through the material.

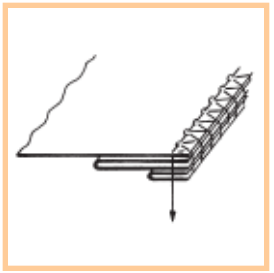


Class 500 – sewing machine





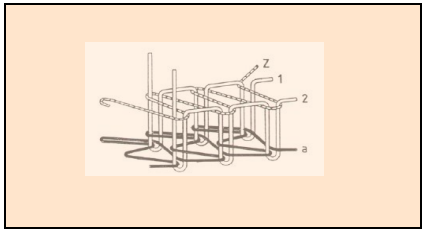




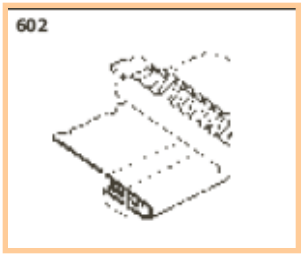
Stitch types – ISO 4915

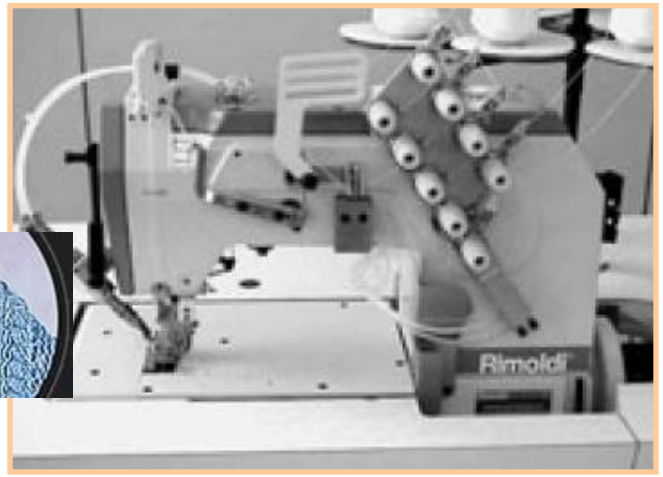
Class 600 – Covering chain stitches

In this class, stitch types are formed with three or more groups of threads, and have for a general characteristic that two of the groups cover surfaces of the material. Loops of the first group of thread are passed through loops of the third group already on the surface of the material and then through the material where they are interlooped with loops of the second group of thread on the underside of the material. The one exception to this procedure is stitch type 601 where only two groups of threads are used and the function of the third group performed by one of the threads in the group.



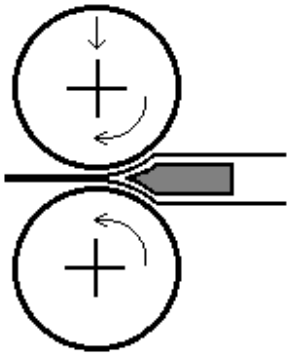
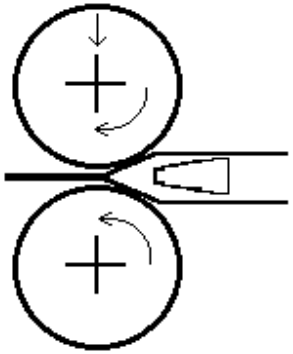
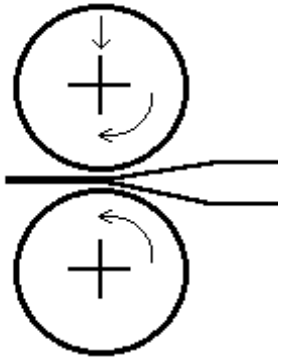
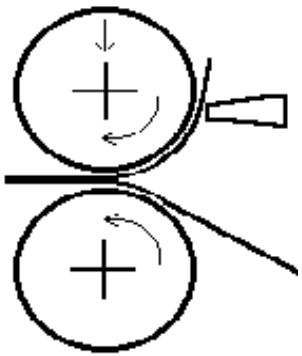
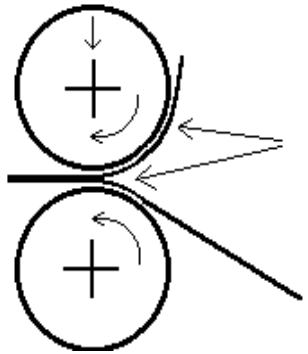
Class 600 – sewing machine





Clothing treds- Unconventional sealing methods

Welding methods

Heat sealing	Hot-air sealing	Ultrasonic	Hot-air Taping	Laser
				
Welding Parameters: Roller Pressure, Speed, Temperature	Welding Parameters: Roller Pressure, Speed, Temperature, Hot Air Flow	Welding Parameters: Roller Pressure, Speed, Ultrasonic Energy	Welding Parameters: Roller Pressure, Speed, Temperature, Hot Air Flow	Welding Parameters: Roller Pressure, Speed, Laser Energy

Heat-contact

With hot wedge: mainly for welding PVC. Typical applications are production of smaller tents, tarps, pool liners, banners, inflatable structures, motorcycle seats etc. Hot wedge creates a durable thermoplastic joint, together with low fume emission when welding PVC (compared to welding PVC by hot air).

Hot air

Regarding hot air it is important to distinguish between direct welding with hot air and seam sealing of a tape. The latter is the most common sealing method, used for creating a waterproof seam for membranes inside garments (used for outdoor applications). It is actually a hot melt gluing process by using a hot melt layer on the seam sealing tape. Direct welding by hot air depends a lot on the fabric. Typical application is welding of needle felt for filters (no perforation of the seam, no additional sealing of a sewn seam needed).

Ultra-sonic

Welding with the ultrasonic method is probably the most diverse of the applications. It can be used for: disposable protective clothing, covers and cloths from the medical sector, filters, roller blinds, lingerie and outdoor garments. Specially knitted fabrics are very comfortable because there is no thread that limits the elastic stretch of the fabric. Pfaff ultrasonic uses inaudible 35 kHz - contrary to some other competitors from overseas. But not all fabrics can be welded by ultrasonic. Specially the fabric thickness is limited to a certain thickness: beyond a certain strength the outside is burned before the inside is liquefied.

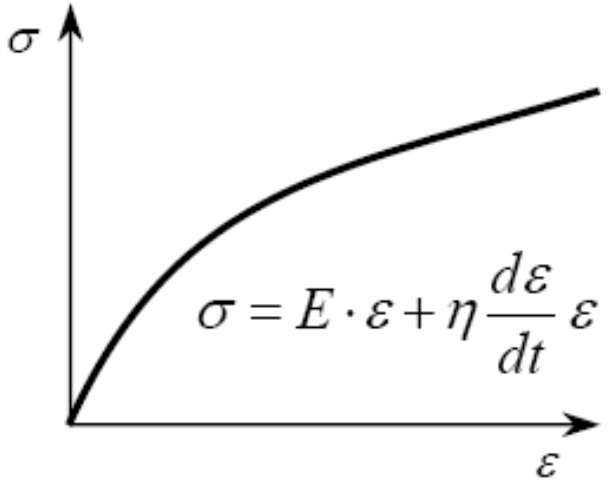
Laser

Welding with Laser technology is used for many years in various metal applications. Now the laser welding technology can be used for heating the tape on tape machines as well as for direct welding of technical textiles. The laser that the coorperation of Pfaff and ProLas use is a near infrared – invisible – laser of class 4. a special protection glasses need to be worn duringthe operating process

What type of material we can use

for unconventional welding methods ?

It is possible to use only thermoplastic materials which can be in plastic state.

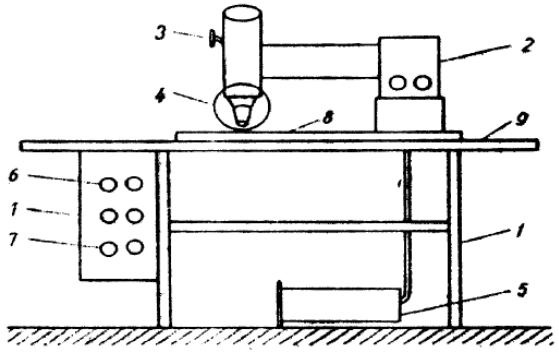


For example:

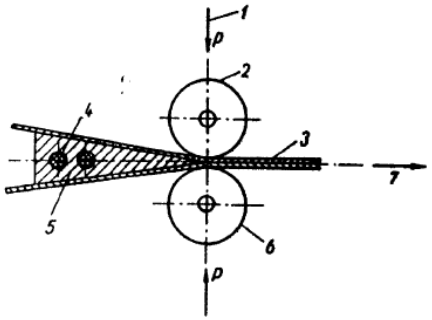
- polycarbonate,
- polystyrene,
- polypropylene,
- PVC,
- imitation leather,
- natural fabrics with synthetic fibres,
- and the like.

Welding can be divided into:

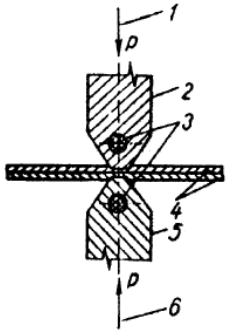
1. Exothermic – the heat is brought to the joint either from out side or inner side.
2. Endothermic – the heat is made in the sticking surfaces of welding joint.



Principle of the welding machine



Inner side heating



Outer side heating

Hot-air sealing

PFAFF 8303

Hot-air sealing machine for continuous seam-sealing on water-resistant, waterproof and breathable materials, also for cross seams with 3 layers of material

Applications may be: seam sealing for the production of clothing, shoes, tents and awnings.

Seam preparation for foam padded automobile seats, head and side rests as well as the application of reflecting foils.

Specifications:

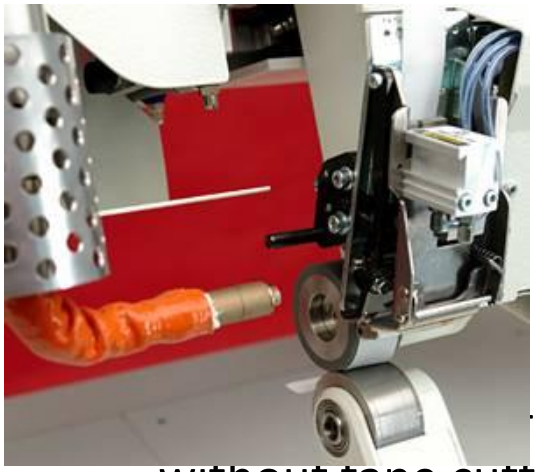
- Tape width PFAFF 8303-040: up to 22 mm (PFAFF 8303-041: up to 26 mm)
- Welding temperature: up to 650 C°
- Heating capacity: 3 KW
- Welding speed: up to 10 m/min.
- Compressed air requirement: 60 -120 l/min.
- Weight (machine body): 67 kg
- Measures (machine body): 113 x 67 x 105 cm

PFAFF 8303

Features:

– Even and constant temperature profile through patented, adjustable double-chamber nozzle, quickly exchangeable
– Tape cutter with separate motor and pressure roller for welding of tape ends (no cutting of tape ends necessary); Special heat shield
– Available in three types of post available for clothing and shoe production
– Feed rollers are chain driven for optimum sealing of thick seams
– New hot-air swing-in fixture with possibility for reproducing the nozzle setting
– Precise temperature adjustment and increased heating capacity
– Reliable sealing of cross seams due to the penetration depth adjustment of the top feed roller and separate roller pressure adjustment. Nozzle rises with the top roller
– Depth stop for upper feed roller and separate roller pressure regulator for perfect sealing of cross seams and long life time of silicone rollers
– New processing possibilities which can be controlled from the conveniently located control panel, such as:

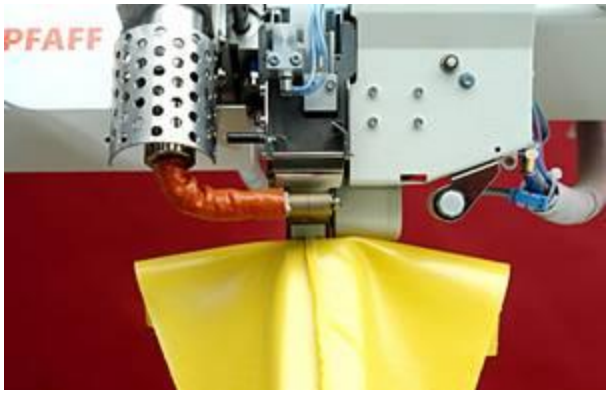
- •cold "pressing"
- •warm "pressing"
- •logical electronics stop tape feed motion during pressing function
- •"roller presser" raised
- •"roller presser" lowered
- •automatic tape threading



PFAFF 8303

Advantages:

- Automatic reverse motion when stopping within seam without tape cutting
- Microprocessor control with error diagnostic
- Operator friendly control panel
- New processing possibilities which can be controlled from the conveniently located control panel (such as cold „pressing“, warm „pressing“, „roller presser“ raised, „roller presser“ lowered, automatic tape threading)



Ultrasonic sealing

The ultrasonic welding

is a method of connection of different materials in the hard state by ultrasonic vibrations.

Ultrasonic vibrations converted from electrical energy by a transducer are directed to the area to be welded by means of a horn, and localized heat is generated by the friction of vibration at the surfaces to be joined.

Infrasound 1÷16 Hz Audible sound 16÷20 000 Hz

Ultrasound 20 000÷1 000 000 000 Hz

until 10^5 Hz

1,5 Hz ÷ 2 ×10^4 Hz

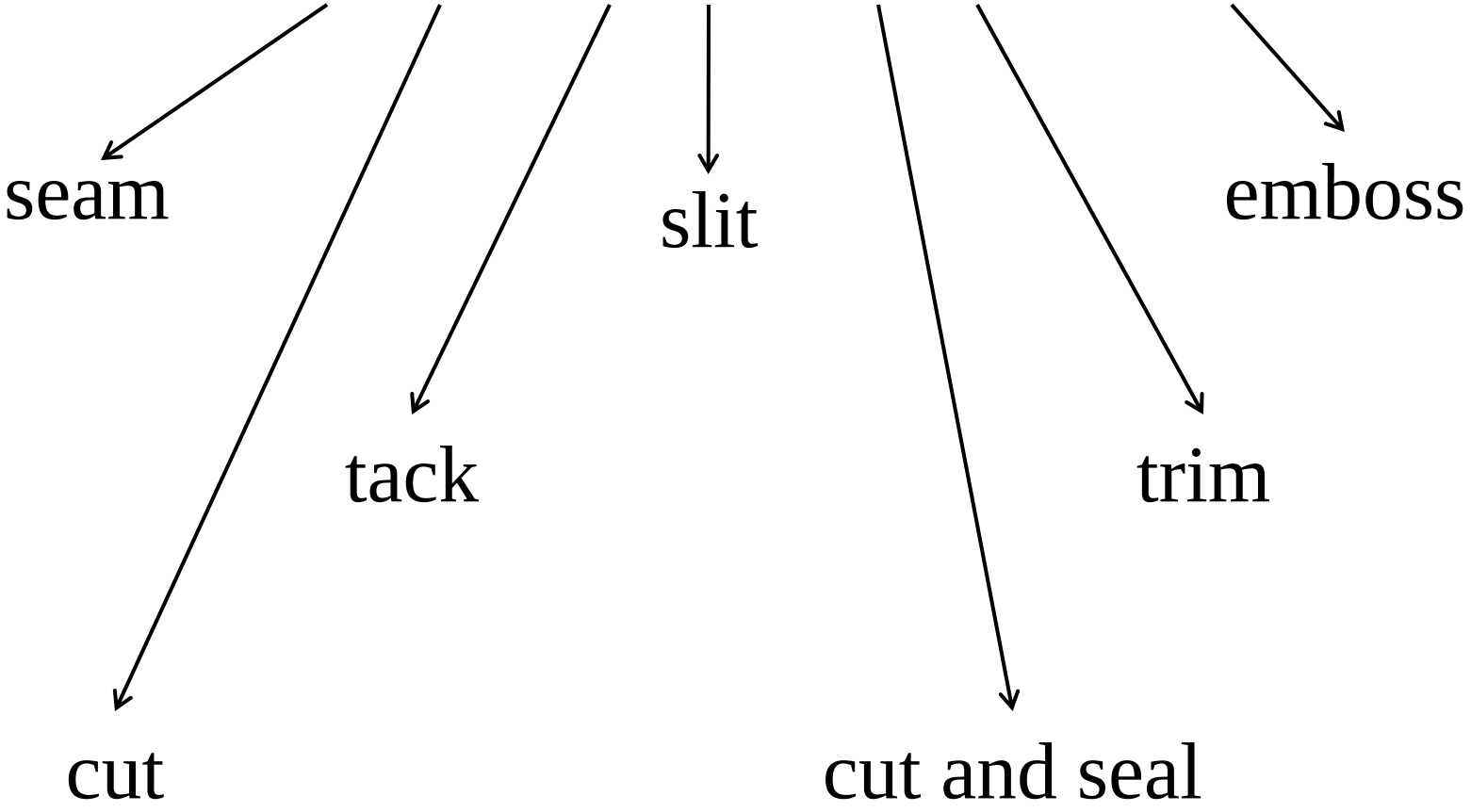
3 Hz ÷ 15×10^4 Hz

10 Hz ÷ 19,6×10^4 Hz

until 4×10^4 Hz

2 ×10^4 Hz ÷ 14×10^4 Hz

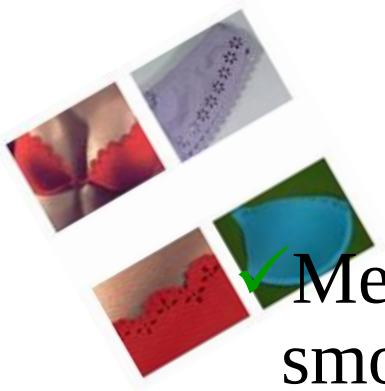
ULTRASONIC PROCESS



It is simple and efficient, with no needles, threads, or other consumables.

Advantages of ultrasonic sealing:

- ✓ Fast, economical, strong seals.
- ✓ No smoke
- ✓ No burned plastic left over
- ✓ No hurt fingers from heat
- ✓ No consumables such as staples, adhesives, or clips.
- ✓ Consistent results - from start-up to end of run
- ✓ No warm-up time, costly temperature maintenance, or recovery time.
- ✓ Single operation cut and seal with no raw edges.
- ✓ Eliminates needles, threads, bobbins, and associated color matching, inventory, winding, and trimming.
- ✓ Noncontaminating , eliminates toxic glue or solvents.
- ✓ Edges are sealed with no stitch holes preventing penetration of chemicals, bloodborne pathogens, and particulates as required by OSHA.



To be widely adopted:

- ✓Medicine (medical and the surgical disposable smock, disposable head-dresses, shoe covers, respirators, disposable gloves);
- ✓Industry (antistatic clothing and antidust clothing, technical filters, safety waistcoats);
- ✓Motor-car industry (covers for cars and boats,
- ✓ pillow-shams for head restraint);
- ✓Clothing industry (outdoor wear,
- ✓ lingerie)
- ✓and etc.

Two basic modes of operation

- 1 Plunge: the ultrasonic horn operates perpendicularly to the material and fuses the layers together in the pattern of the stationary anvil.
- 2 Continuous: material is moved beneath a stationary horn.

PFAFF 8310

The Pfaff 8310 Seamsonic ultrasonic welding machine with a 400 W ultrasonic generator and a frequency of 35 kHz. Sonotrodes are made of titanium with a 104 mm diameter and a maximum weld width 10 mm. Welding speed ranges from 6 to 136 dm min^{-1}, and welding pressure ranges from 0 to 800 N (5 bar). Amplitude and gap between the sonotrode and anvil wheel may be regulated.

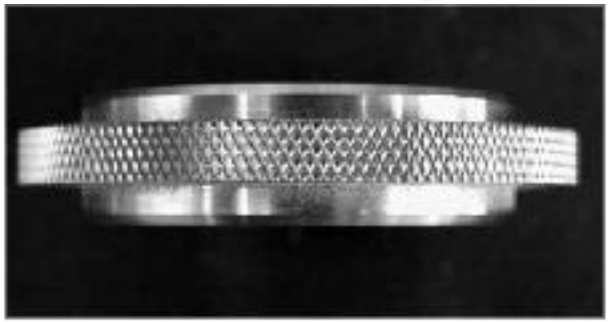
PFAFF 8310

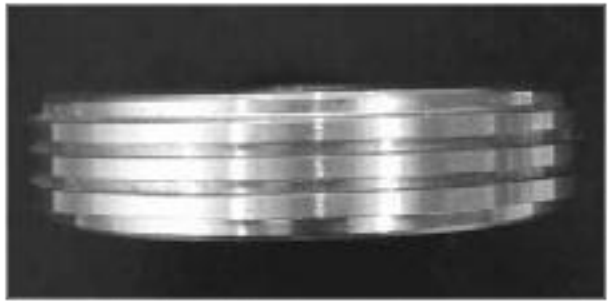
Due to vibrations of the sonotrode (bottom roller) the piles of the work piece are mechanically hammered in the seam area. Through the hammering motions of the sonotrode the work piece is heated, until it becomes viscous and at the same time it is pressed and fed to form a seam.

Technical data:

- Digital PLC-control
- Operated through touch screen
- Functions: manual or automatic operation with speed regulation via foot pedal, amplitude from 50 - 100 %, start delay for ultrasonic generator and motor, stop delay for speed, automatic reverse
- Available optional: with free arm, feed-off-the-arm for overlap seams and tubes, as well as with post beds (modules can be interchanged) and as a flat bed version.

Geometry of the anvil wheels

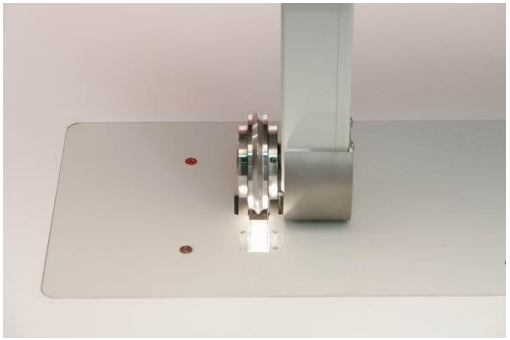




The appearance of the ultrasonically welded seam, i.e. the impression of an engraved pattern depends on the shape of anvil wheels.

Innovation PFAFF 8310 Cut & Seal

- Latest innovation from Pfaff
- Cut and seal with ultrasonic
- Finest and thinnest seams possible



Applications of PFAFF 8310 Cut & Seal

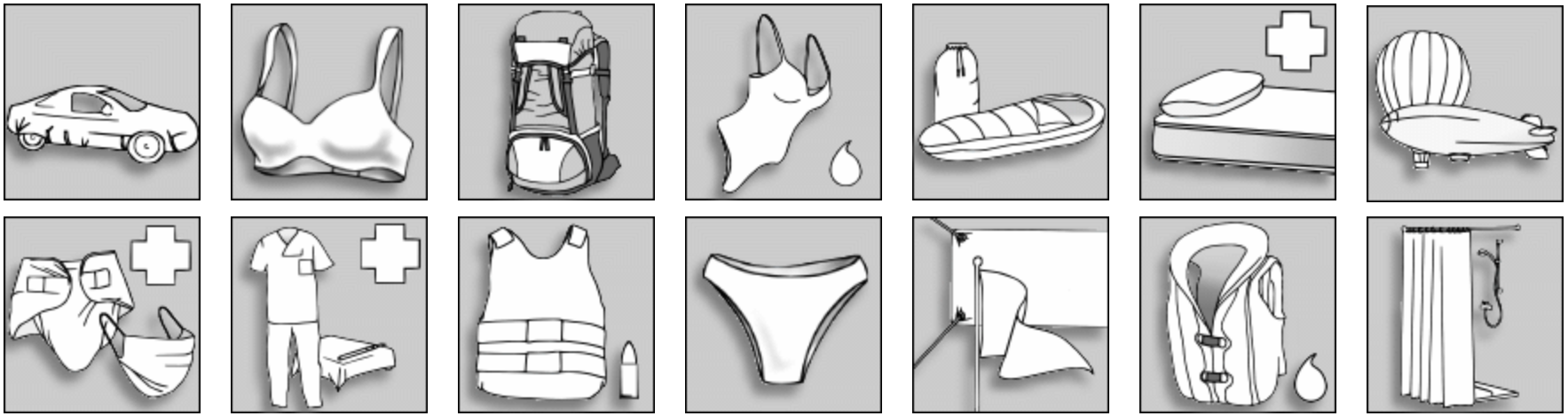
Typical applications in the technical section:

Filter bags, health care articles, medical mattresses and pillows, needle felts operations sheets and clothing, foils, Tyvek protective clothing, blinds and awnings, shower curtains, covers for cars etc.

… and in the garment section:

outdoor garment and shoes, protective clothing, bras, lingerie and similar

More applications of PFAFF 8310 Cut & Seal



Customer benefits of PFAFF 8310 Cut & Seal

- Maximum repeatability of welding process
- 20% higher output compared to standard machines
- Transferable machine settings via data file
- Minimum seam width - microseam
- Process control enabled
- Subsequent procedure of taping with 8303 or 8322 formaximum firmness of seam

Heat-sealing

PFAFF 8304-020

Universal plastics sealing machine as hot-wedge and/or hot air model

Features:

- The heat-sealing parameters (temperature, speed, pressure) can be set separately.
- The special silver alloy of the hot wedge guarantees low-noise, clean work without smoke development during the heat-sealing operation.
- Various seam types are possible with the corresponding guide attachments.
- Infinitely variable temperature adjustment.

PFAFF 8304-020

Advantages:

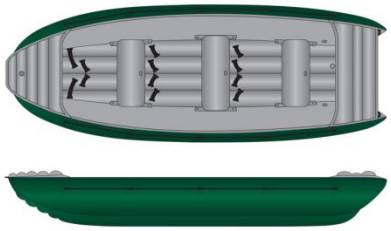
- Low power consumption (with the hot wedge < 1KW).
- High productivity due to the continuous heat-sealing method.
- Short conversion times from hot wedge to hot air and vice versa.
- High seam quality (no shiny spots or similar).
- No stop-marks.

Specifications:

- Heat-sealing:	with hot air up to 450°C with hot wedge up to 600°C
- Heat-sealing speed:	0 - 10 m/min (infinitely variable)
- Material thickness:	from 0,2 mm
- Weight:	approx. 110 kg
- Dimensions:	1265 x 1450 x 600 mm
- Seam width:	5 - 20 mm

High frequency welding

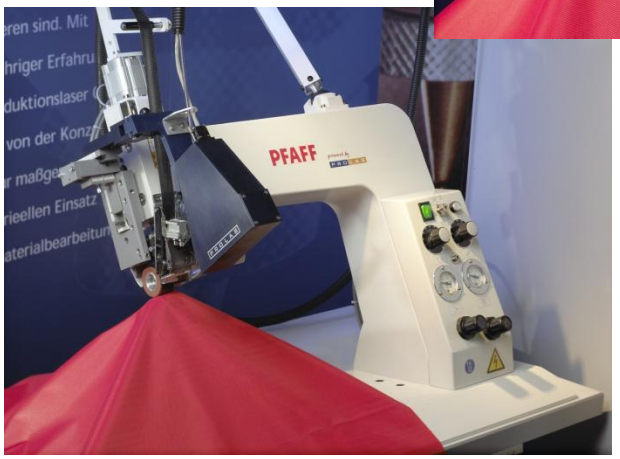
➢ High frequency plastic welding produces welds with a uniform maximum strength, which ensures perfect continuity, aesthetics and maximum life connections of PVC materials.



➢ It operates in the frequency range 200 – 400 kHz. There is during the process oscillation dielectric.

PFAFF 83XX Laser

- Maximum repeatability of welding process
- 50% higher output compared to standard machines
- Transferable machine settings via data file
- 100% process control
- Welding of different materials with one machine
- Finer adjustment of power

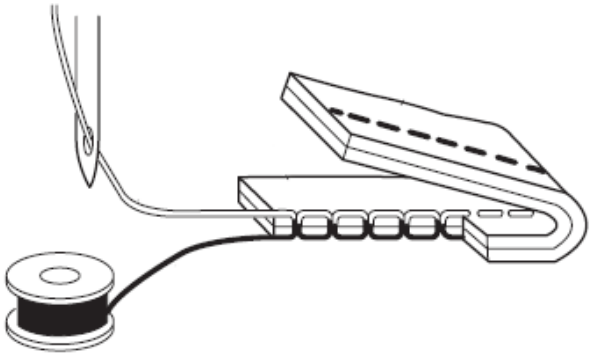


Features Innovation

- Unique machinery
- Innovation award Techtextil 2005
- Noiseless and clean process
- 100% process control
- Patent for Laser taping operation
- Point precise welding
- Coorperation with ProLas GmbH
- Unforeseeable potential
- High speed, up to 20m. / min.

Threads

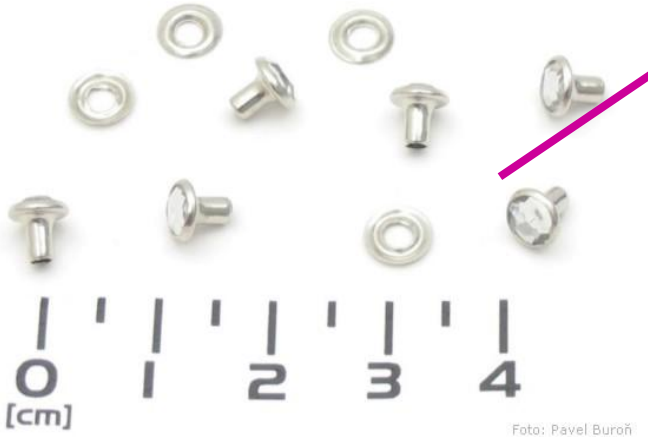

Col.8998
Lot.304
Nr120 400m
Col. 8380
Lot.402
No.120 400m
100% Polyester
Art. No. 9125



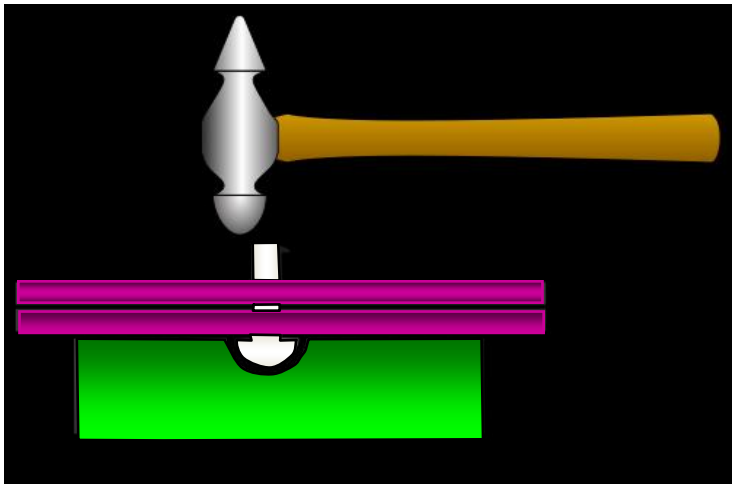

NewStar

Riveted joint

- this technology was originally used for decorating proposes, e.g. for fixing pockets at the jeans clothes
- nowadays riveting is mostly used for fixing clothes parts

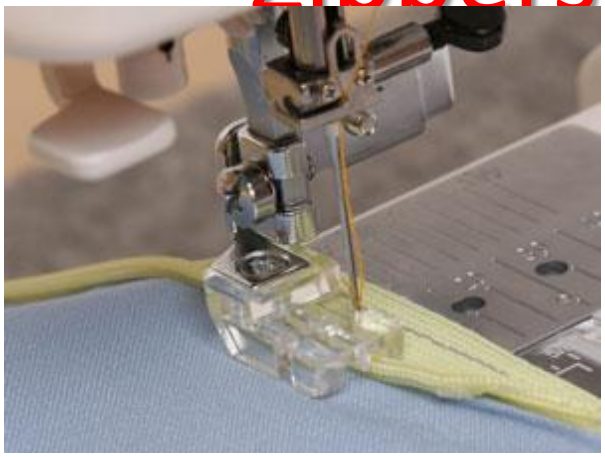


- riveted joint can not be parsed
- therefore it is not very suitable for textiles clothes
- these joints are made in points



- for riveting press machine are used, they use little pressure which will only the rivet pull down but not break down

Zippers



Thank you for attention