

# **STITCH BONDING**

Mechanical technology of nonwovens

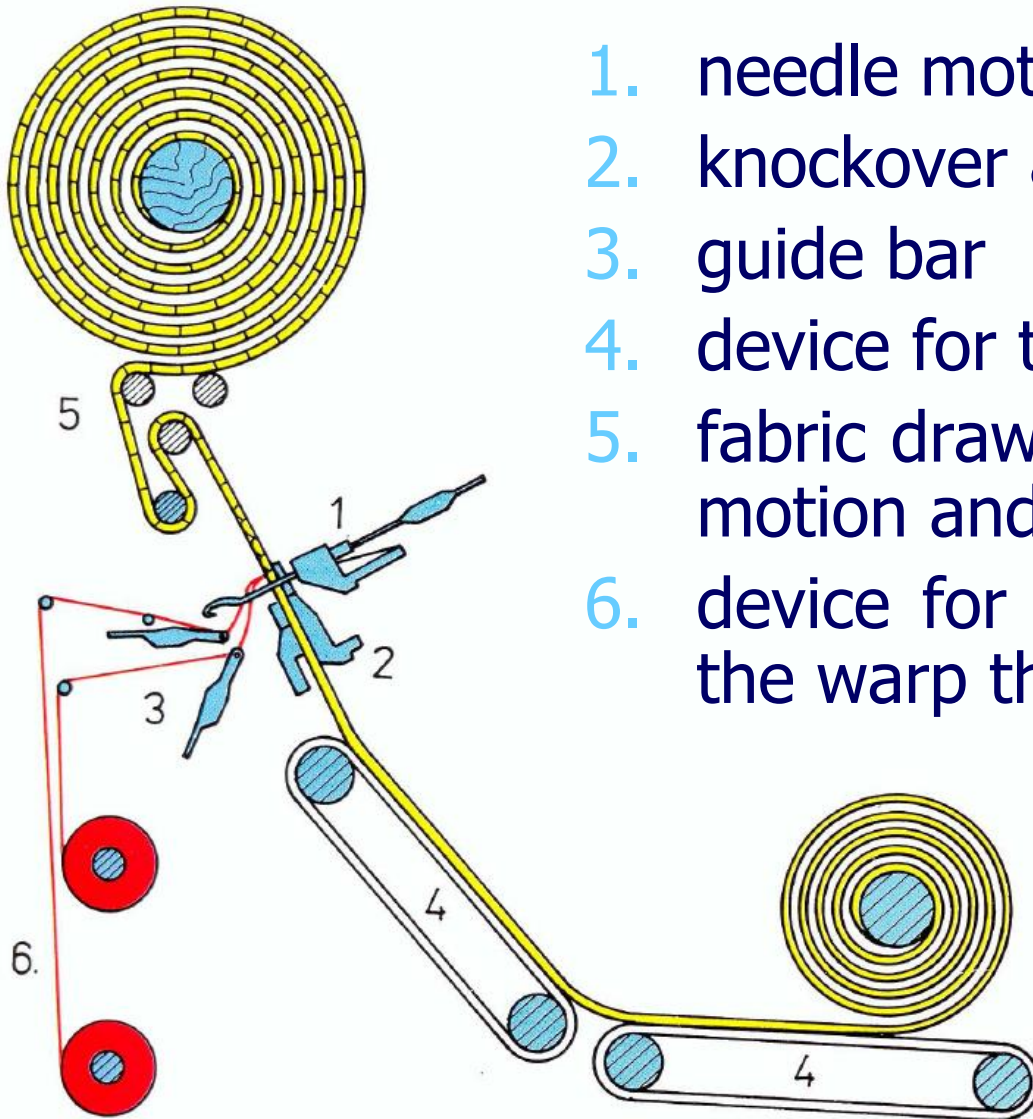
# Stitchbond I

- Stitchbond is a nonwoven construction where the fabric is formed by **stitching or knitting the fibers to form a fabric** with the **appearance of a knit fabric**.
- In the most common cases it involves warp knitting of yarns through a fibrous mat.
- It can also be knitting of fibers without yarns or knitting of yarns around laid warp and filling yarns which do not interlace with each other.

# Stitchbond II

- Fabrics are predominantly made of polyester fibres of various linear density (from 0.33-1.7 tex)
- Depending on the sphere of application and demands of a customer, viscose fibres, cotton and other kinds of fiber raw materials can be used in production.
- By means of varying the fibres, the weight and the width of a fabric, the length of a stitch and the size of loops it is possible to modify the fabric according to the demands of the customer and the specific sphere of application.
- If necessary, the fabrics can be further finished - dyed, printed, imbued, bonded.

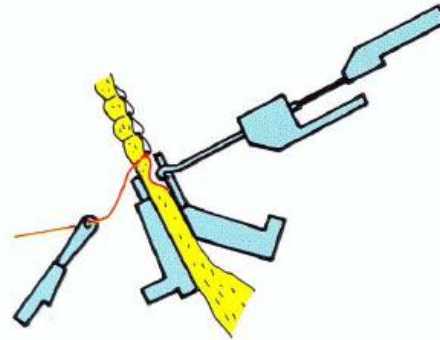
# Stitchbonding machine



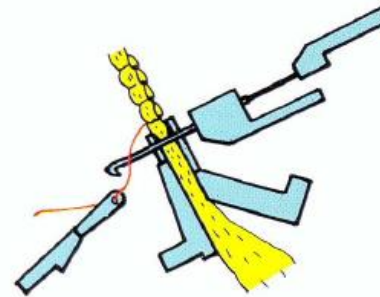
1. needle motion
2. knockover and support combs
3. guide bar
4. device for transport of the web
5. fabric draw-off from the needle motion and fabrics take-up
6. device for feeding and guiding the warp threads

# Stitchbond stage

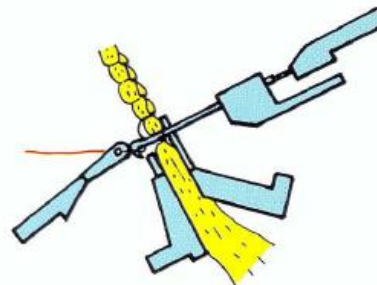
1. penetration
2. lapping
3. closing
4. knocking-over
5. take-down



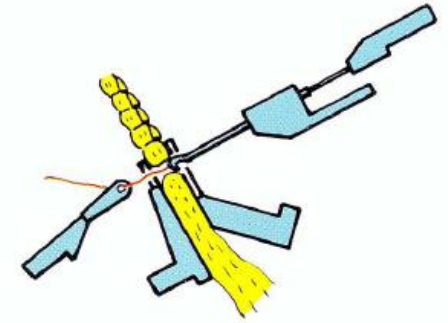
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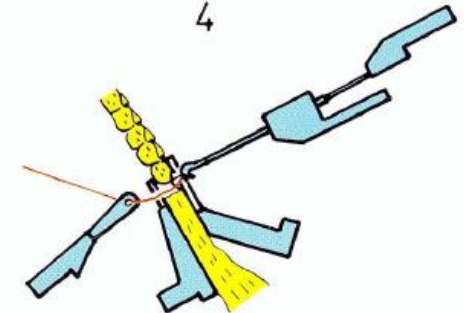
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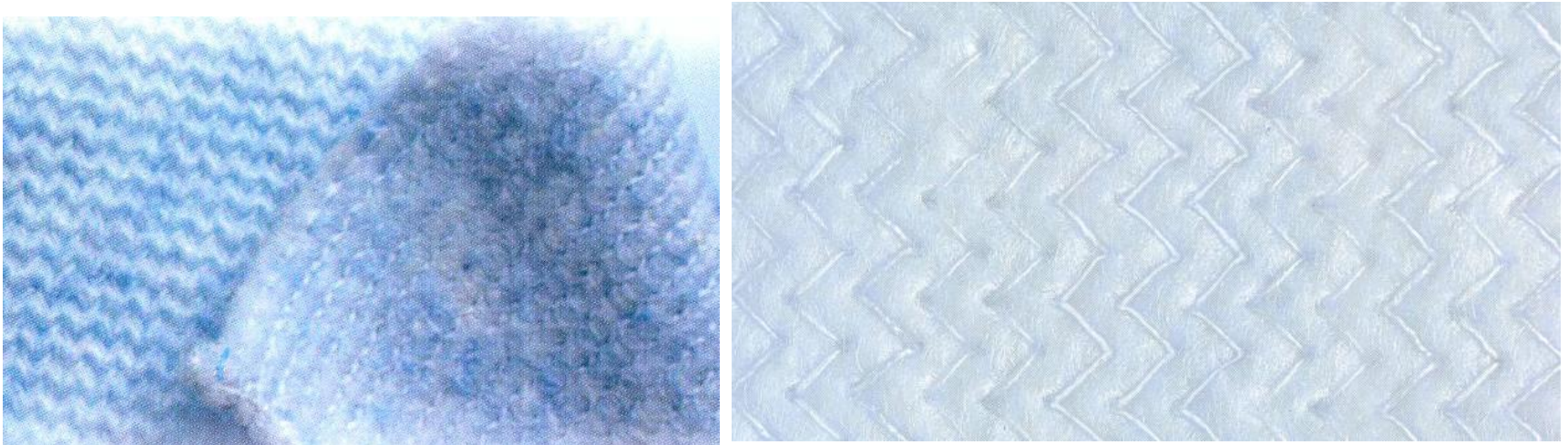
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# Stitch bonding systems

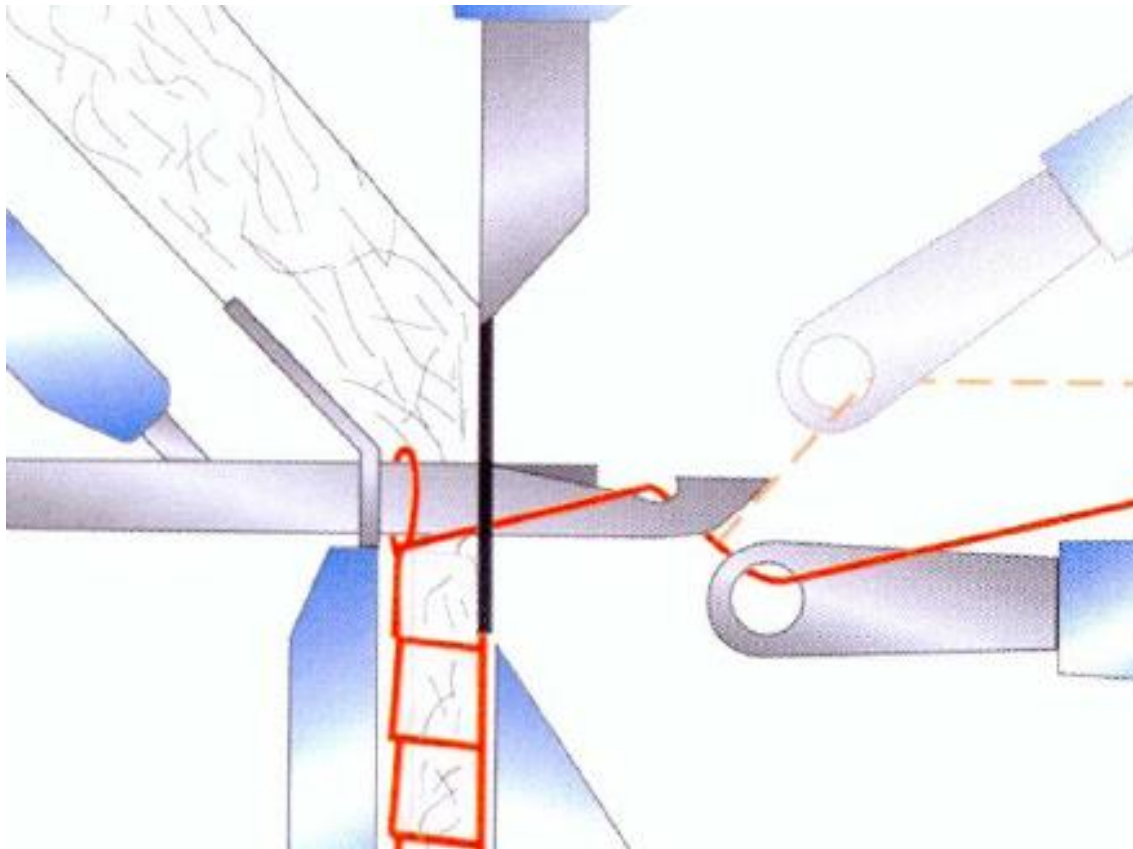
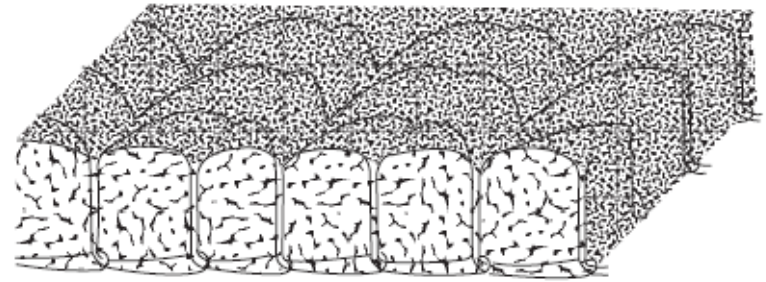
- Maliwatt
- Malivlies
- Malimo
- Malipol
- Voltex
- Kunit
- Multiknit

# Maliwatt

- The horizontal **compound needle** and closing wire system, which operates in conjunction with the knock-over sinker and the supporting rail, **penetrates through the** substrate which is normally a cross-laid web.
- The sheet of **stitching yarn**, which is inserted via the guides into the open hooks of the compound needles, **forms stitches that penetrate the web.**



# Maliwatt



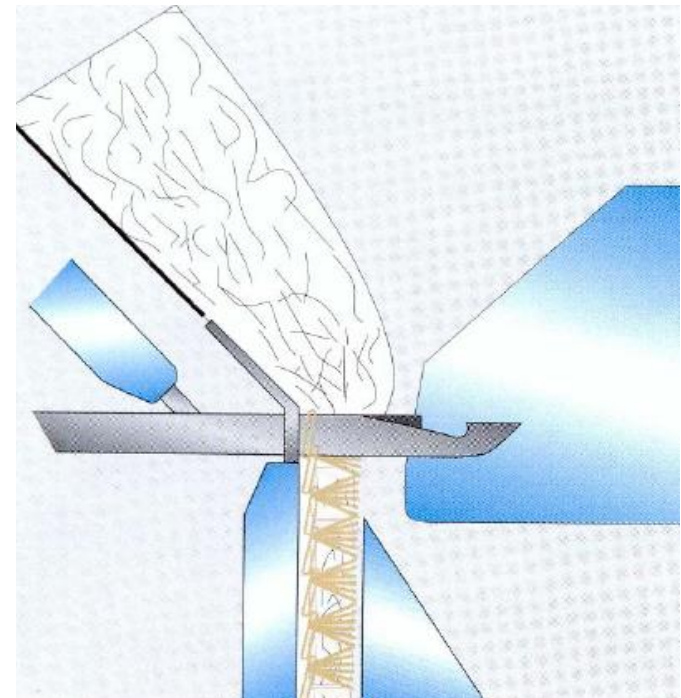
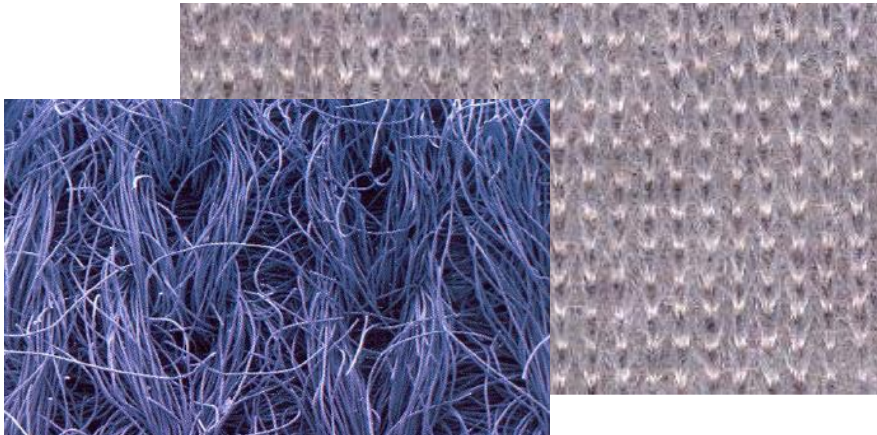
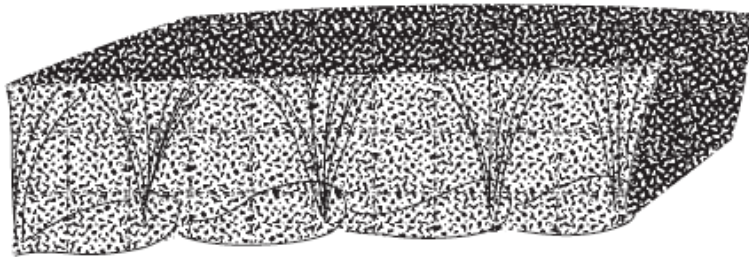


# Maliwatt – applications:

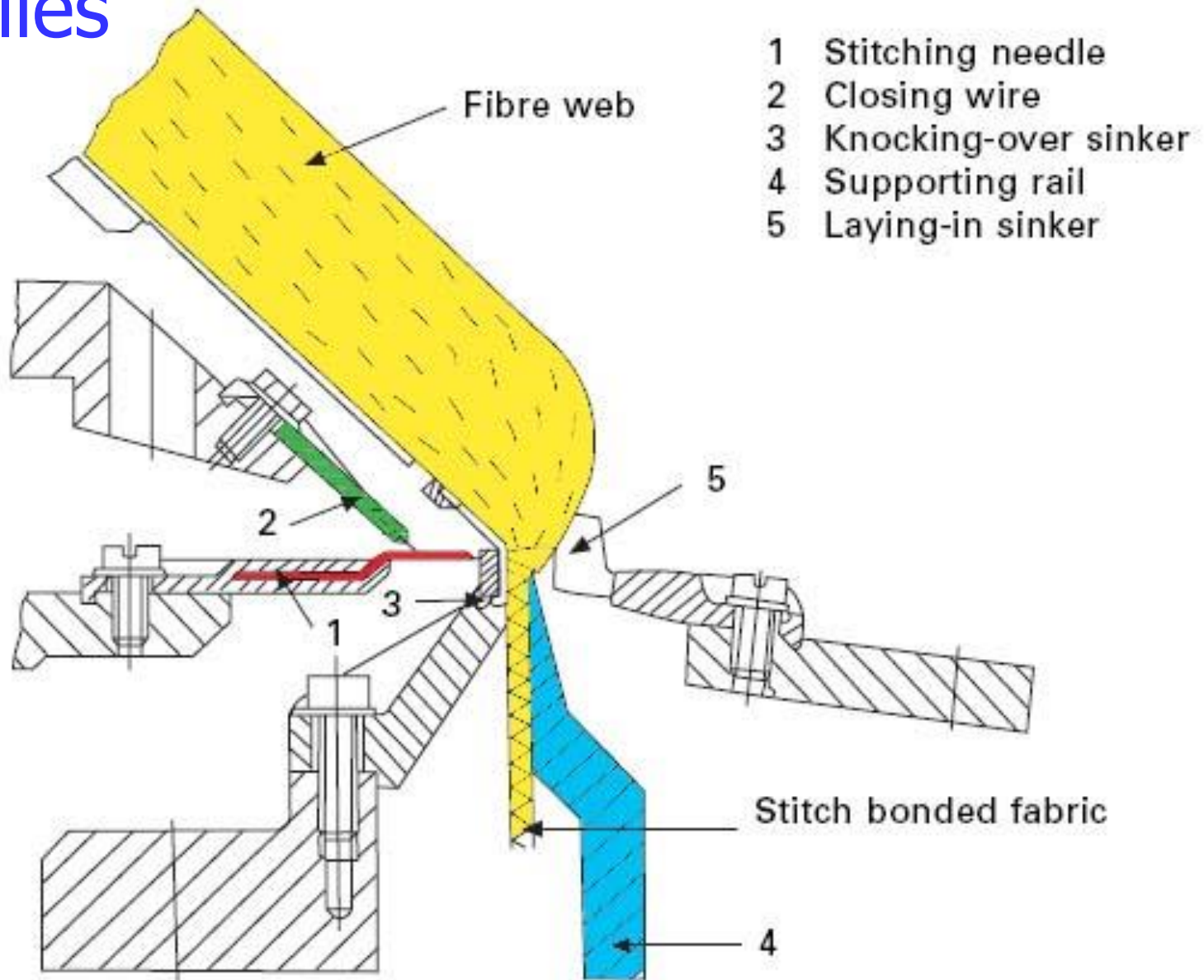
- soft furnishings, upholstery fabrics for mattresses and camping chairs, blankets,
- transportation cloth,
- cleaning cloths, fabrics for hygiene and sanitary purposes,
- secondary carpet backing,
- lining fabrics, interlining for shoes and apparel,
- adhesive tapes (e.g., those used for harnessing electric cables in automobiles),
- velcro-type fasteners,
- laminating fabrics, coating substrate,
- insulating materials,
- geotextiles, filter fabrics,
- composites and flame-retardant fabrics

# Malivlies

- **threadless textile** manufactured without any additional binding
- the **loops, which connect the fibrous fabric, are made from the fibres of the fabric itself**



# Malivlies

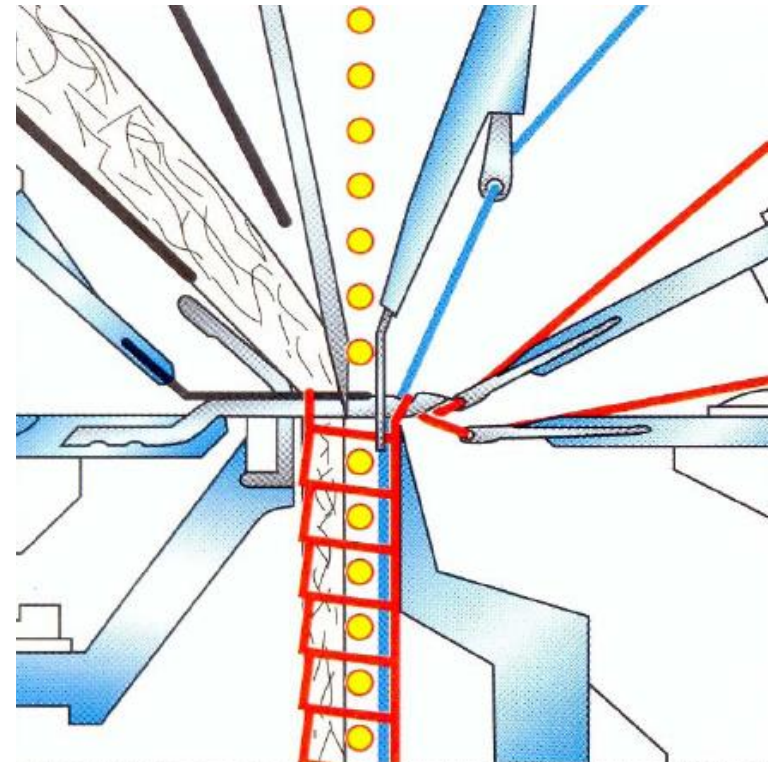
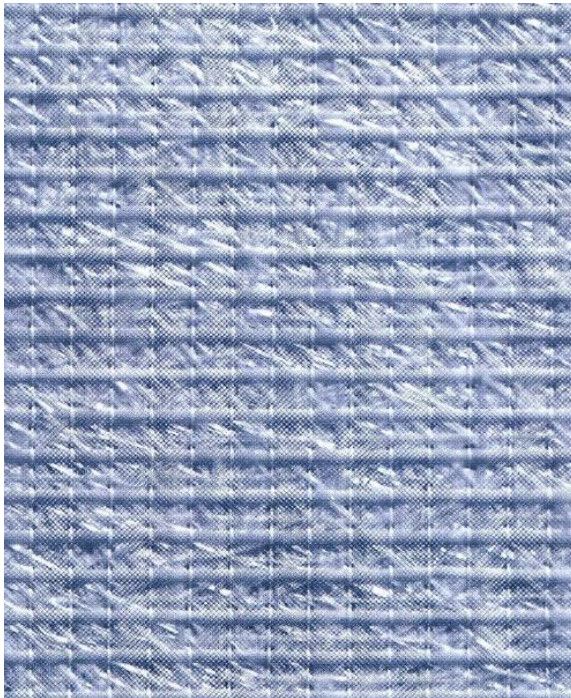


# Malivlies

- As the **compound needles** move back to their knock-over position, **fibres lying across the front of the web are** hooked by the open hooks of the needles, held within the needle hook by the closing wires and **pulled through the web thickness.**
- As these fibres are pulled through the **stitches formed by fibres** on the previous course, which are still hanging on the needle stems, the newly formed stitches are pulled through the existing stitches.
- A loop structure that resembles the technical face of a warp-knitted fabric is produced on the side facing the knock-over sinkers.

# Malimo

Plain over stitching of loose yarn sheets laid on top of one another (weft and warp yarns – featuring manifold possibilities of modification)



# Malimo

- The **compound needles pierce the yarn layers** (warp and weft yarns), webs, backing fabrics, films, paper or any other sheet material.
- The guides place the stitching yarns into the open hooks of the compound needles.
- The previously formed stitches slide up the compound needle shanks and closing wires.
- The needles start to withdraw to their knock-over position, the hooks of the compound needles with the new stitching yarn overlaps are now closed by the closing wires so that the old stitches can slide off over the top of the needles.
- The old stitches are knocked over and the new loops are drawn through them to complete the new course.

# Malimo - areas of application

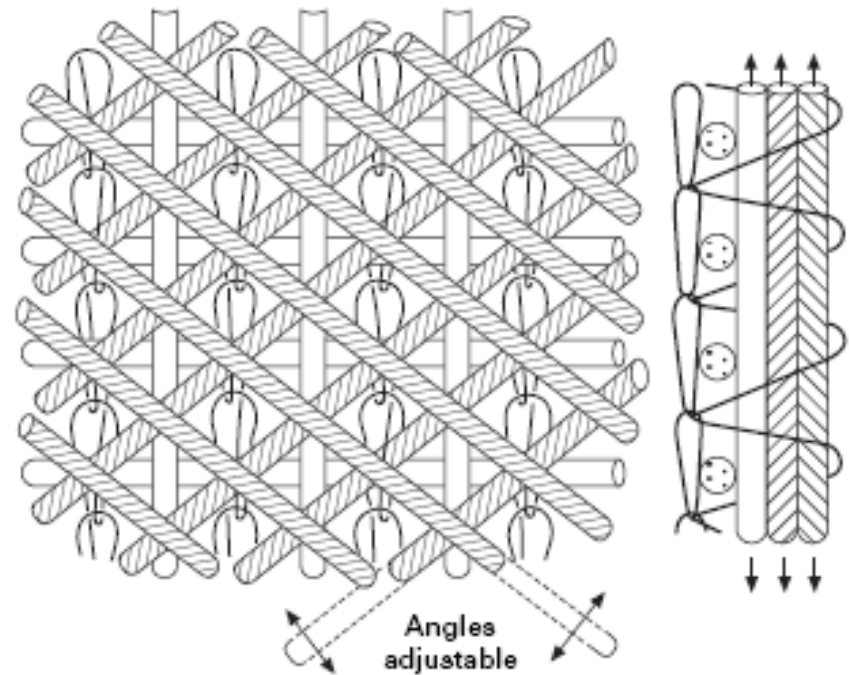
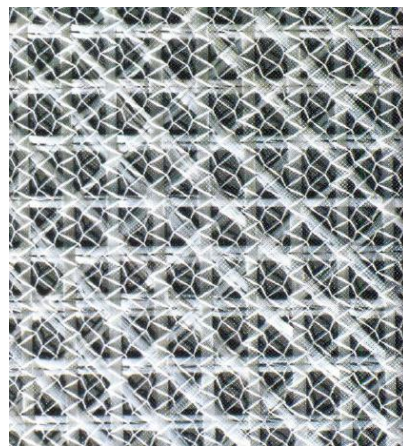
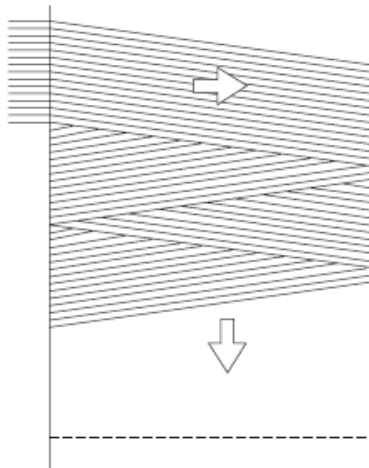
- Industrial textiles: composites for high-tech areas (fiberglass, carbon, Kevlar, HD-PE), sandwich nonwovens, geotextiles, insulating materials, laminating substrates, packing textiles
- Furnishing fabrics, home and household textiles: furnishing fabrics, upholstery fabrics, textile wall coverings, cleaning and polishing cloths



# Malimo

Based on the Malimo platform, different versions and auxiliary devices have been developed. These developments enable:

- non-continuous and continuous parallel weft insertion
- multiaxial constructions
- cross weft insertion
- glass fabric manufacture.



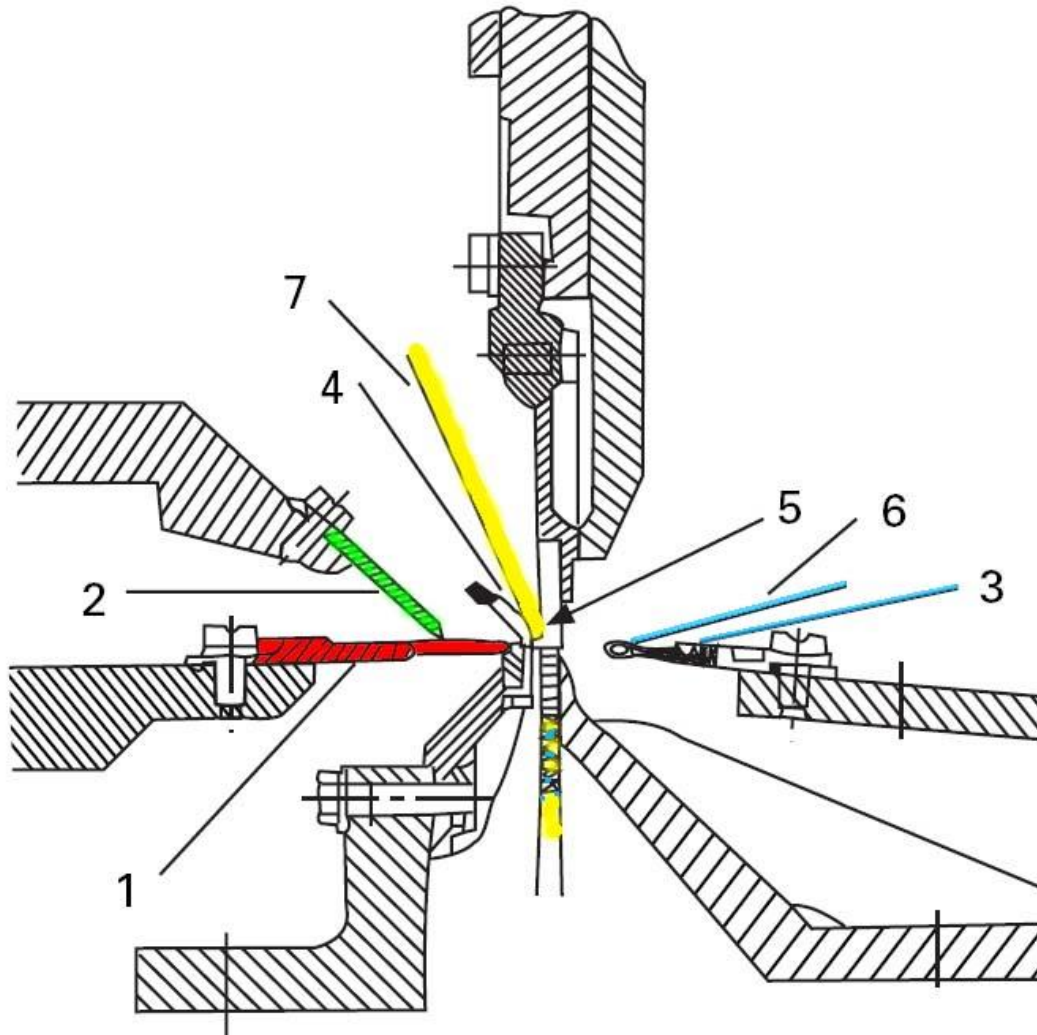


# Malipol

- Malipol stitch bonding systems have the following main elements:
  - pile yarn
  - ground fabric
  - stitch bonding head
  - fabric take-down and batching
- The **compound needles penetrate the ground fabric** and the stitching or **pile yarn** is overlapped in the needle hook.
- The pile yarn is also laid on top of the pile sinker at the same time so that a tricot movement is used to create the pile and knit the yarn into the ground structure.



# Malipol



- 1 = Compound needle bar
- 2 = Closing wire bar
- 3 = Guide bar for pile yarn
- 4 = Knock-over sinker bar
- 5 = Pile sinker bar
- 6 = Pile yarn
- 7 = Ground fabric

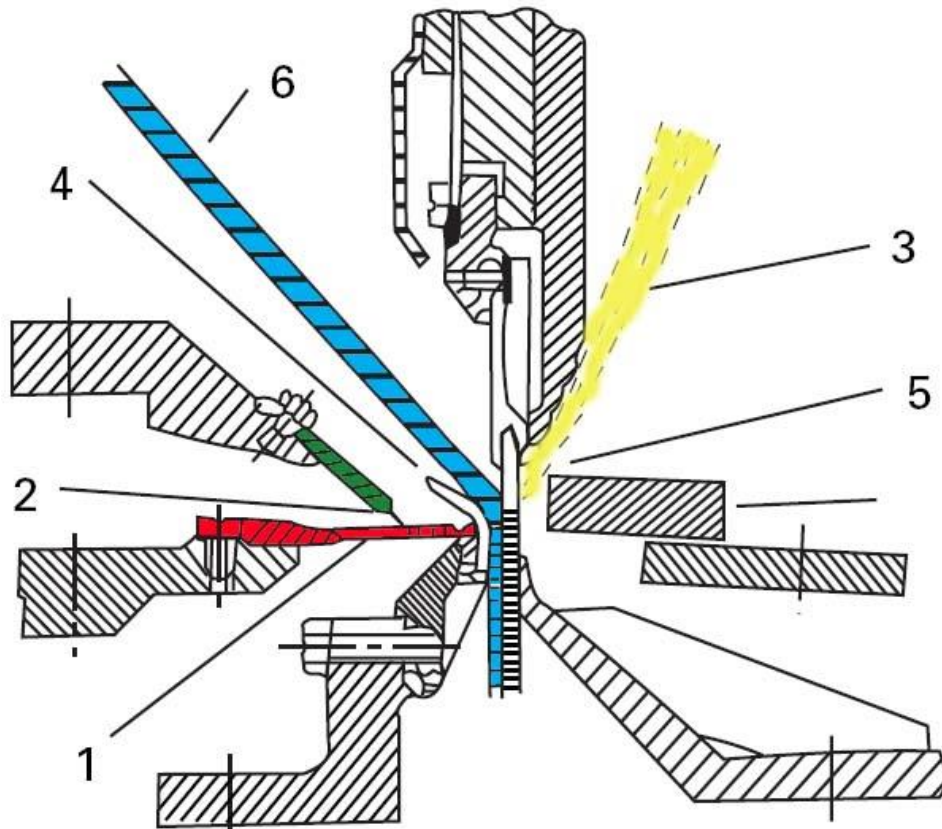
# Malipol - areas of application

- blankets
- cleaning textiles (wiping mop)
- pile fabric for velcro fastening stripes
- lining plush and soft-toy plush
- bathroom sets
- one-sided terry fabric

# Voltex

- **High pile or high plush fabrics** based on two principal reformed elements, a ground fabric and a web, which are continuously introduced.
- No stitching yarn or yarn preparation, such as winding or warping are required.
- Applications: lining fabrics, imitation furs, soft-toy plush, shoe uppers and shoe lining, floor coverings and upholstery fabrics.

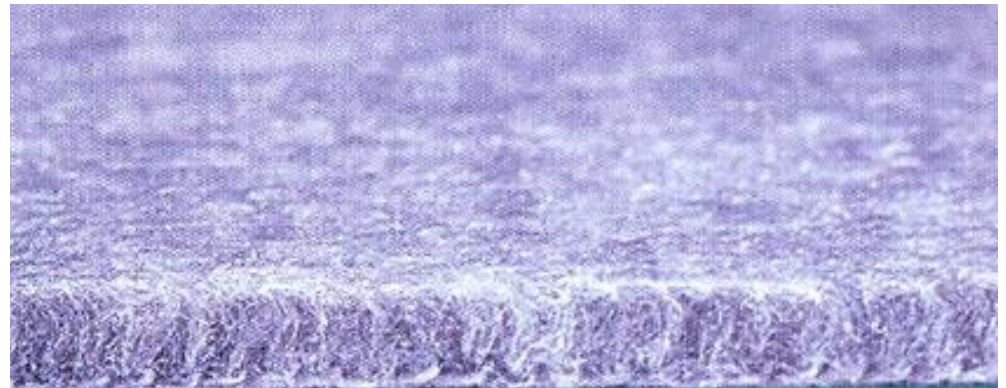
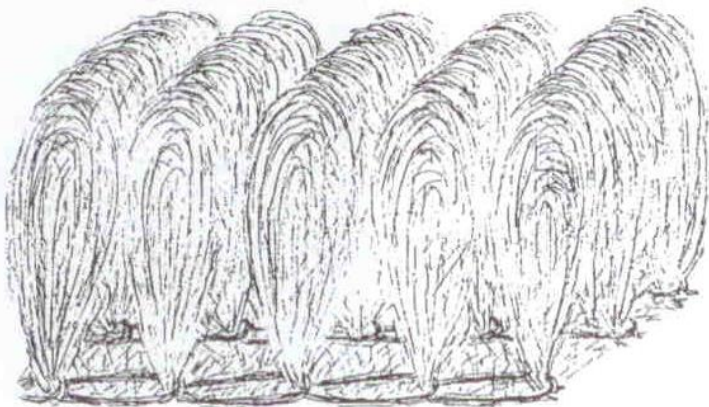
# Voltex



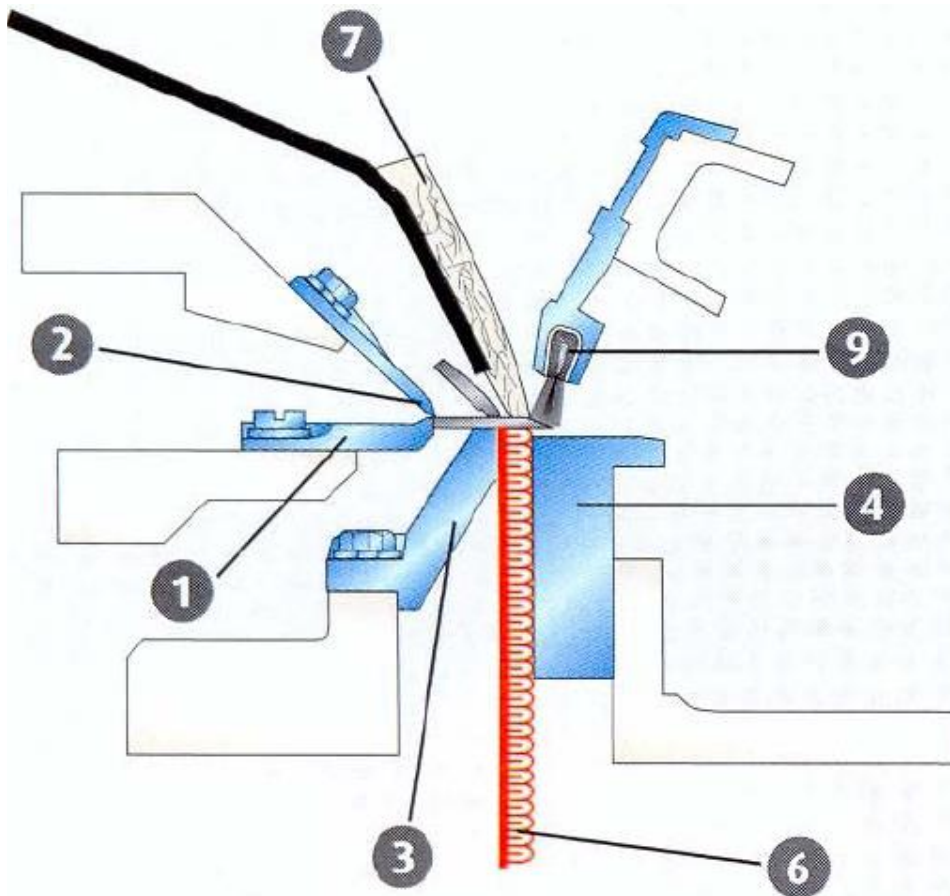
- 1 = Compound needle bar
- 2 = Closing wire bar
- 3 = Fibre web
- 4 = Knock-over sinker bar
- 5 = Pile sinker bar
- 6 = Ground fabric

# Kunit

- Fibres are fed to the stitch bonding head in the form of either a thin web or a batt. Voluminous, **three-dimensional pile fabrics** can be produced that have a distinctive folded pile; the pile can have a variable thickness and density if required.
- It uses a **brushing bar** in conjunction with the stitch-forming elements, whose oscillating path may be varied between 6 and 51 mm by exchanging the cams.



# Kunit



1. Compound needle bar
2. Closing wire bar
3. Knockover sinker bar
4. Supporting bar
6. Kunit-fabric
7. Fibre web
9. Brush bar

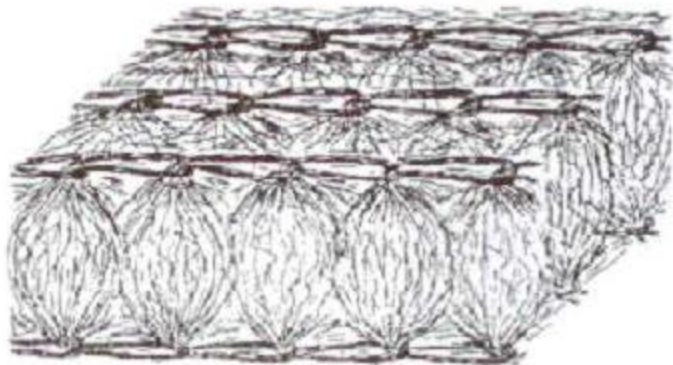
# Kunit

- No finishing is required for many applications or when the fabrics are to undergo further processing on the Multiknit machine.
- Finishing processes applicable to Kunit materials are back-coating, raising, polishing and shearing, tumbling to achieve surface effects, coating and laminating with other substrates.
- Applications: linings, soft-toy fabrics, filtration media (particularly depth filters), covering materials for polishing discs, coating substrates and as upholstery materials for car interiors.

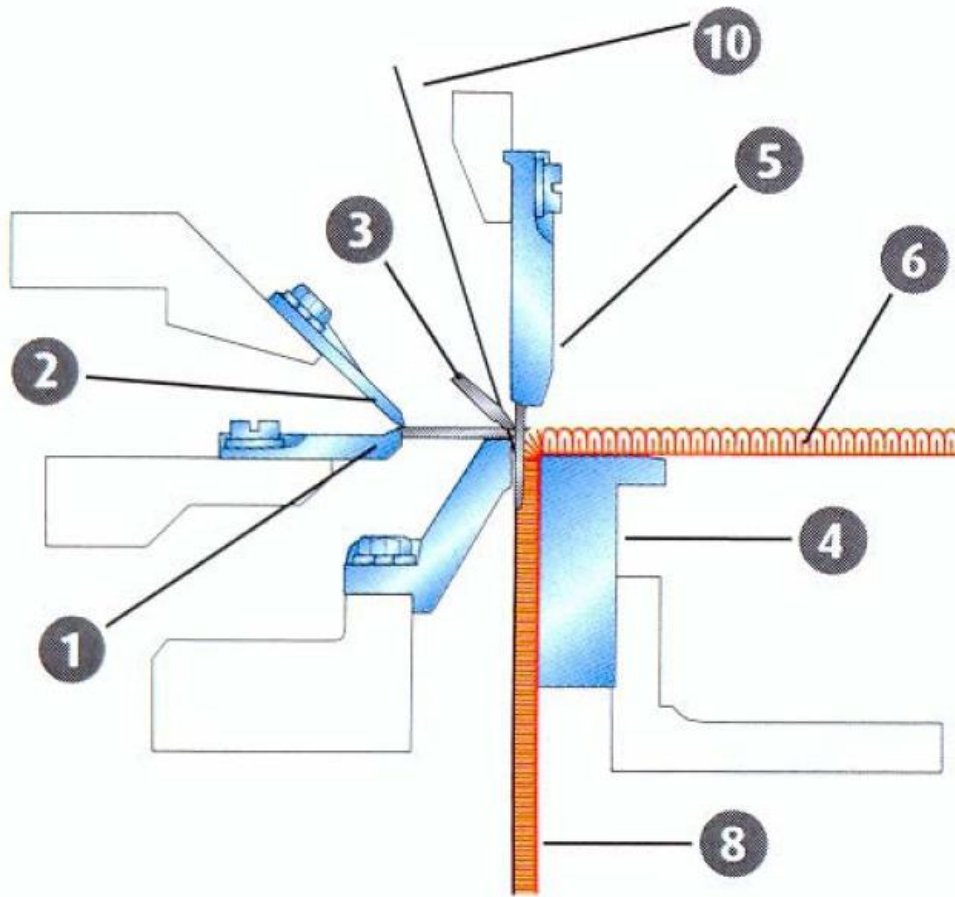


# Multiknit

- The **base materials** are **one or two** textile **fabrics** with open-pile structure, preferably **Kunit** nonwovens.
- In the **end product**, the **two nonwoven surface textiles are interlaced by fibers**, forming a uniform and tight surface, being connected by almost vertically arranged fibers.
- Special advantages are high degree of volume (bulkiness) and elasticity of compression



# Multiknit



1. Compound needle bar
2. Closing wire bar
3. Knockover sinker bar
4. Supporting bar
5. Counter retaining bar
6. Kunit-fabric
8. Multiknit-fabric
10. Additional base cloth