

Dec. 24, 1968

W. E. SCHOLTIS ET AL

3,417,580

METHOD OF MAKING TEXTILE FABRIC ON SEWING-KNITTING MACHINES

Filed March 9, 1966

FIG. 1

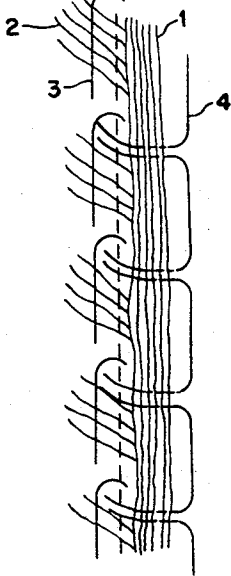


FIG. 2

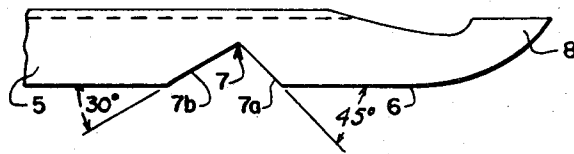


FIG. 3

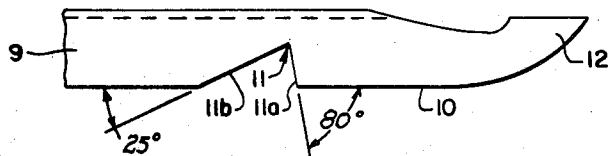


FIG. 4

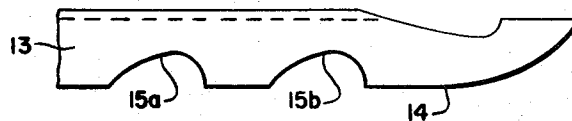


FIG. 5

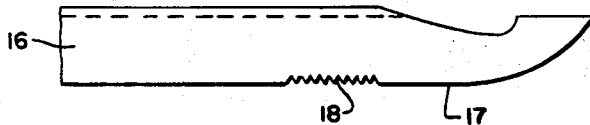
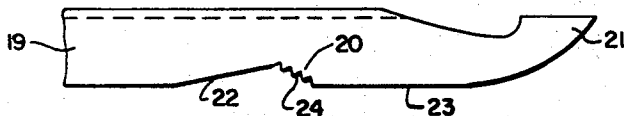


FIG. 6



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METHOD OF MAKING TEXTILE FABRIC ON SEWING-KNITTING MACHINES

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Filed Mar. 9, 1966, Ser. No. 532,920

5 Claims. (Cl. 66—120)

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ABSTRACT OF THE DISCLOSURE

A needle for use in sewing-knitting machines in the production of a textile fabric composed of a layer of fibers reinforced by loop chains, which has a shank provided with a recess defined by a first surface sloping inwardly at a relatively small angle from the outer surface of the shank and facing toward said needle head, and by a second surface sloping from the outer surface at a relatively steep angle, facing away from said head and joining said first surface. In an alternative embodiment, the recess is formed by a series of coherent notches on the back of shank.

The invention relates to a method for making a textile fabric on a knitting-machine by using a layer of textile fibers, which is strengthened by sewing threads in the form of loop chains over the layer. The textile fabrics which are made in this manner will be called sewed-knitted fabrics in the following specification.

When making sewed-knitted fabrics on sewing-knitting machines, in accordance with the invention, the needles of the machine penetrate the layers of fibers and, grip, at any given time, a sewing thread which is formed into loops. When being pulled through the layer of fibers during the withdrawal of the needles. When the sewing thread is always placed on the same needle, a loop chain is formed by each needle and the layer of fibers is bonded by a plurality of separate and parallel loop chains. A locked loop chain, which corresponds to the tricot stitching of the warp knitting process will be achieved when the sewing thread is placed alternately over two adjacent needles. The separate loop chains are disadvantageous in that they rip open too easily, so that the produced fabric is reduced in its quality even to an extent which renders the fabric unusable. With respect to the locked loop chain, it was first assumed that it will not rip open. However, when processing a silk sewing thread, the locked loop chain has a tendency of loop runs as has been especially found when finishing the produced fabric and manufacturing articles from it. Accordingly, a special finish was hitherto necessary which was applied to prevent a ripping of the chain. The application of this finish was not only uneconomical but influenced the sewed-knitted fabric in different properties disadvantageously.

It is an object of the invention to prevent a ripping of the loop chains effectively in such a way that a special after-treatment of the loop chains is not necessary anymore and to avoid the expenses for this special finish.

In accordance with the invention, some fibers of the layer of fibers are withdrawn to the reverse side by the needles of the knitting-machine when the needles are withdrawn from the layer of fibers for forming the loops. Thus some fibers are arranged into the needle loops. It has been surprisingly found that a ripping of the loop chain is prevented when applying this method.

To carry out this method the knitting-machine is provided with knitting needles, such as, slide, tube, or tongue needles which have additionally at least a large notch directed toward the needle head and thereby gradually

ascending on the side which is diverted from the needle head and steeply declining on the side directed toward the needle head, or a plurality of notches forming a continuous face on the needle shaft, but preferably on the side opposite to the head of the needle.

The notches act like barbs. When retracting the penetrated needles from the layer of fibers the notches grip fiber portions of the layer of fibers and pull them through the needle loops which are about to be formed, and they are interwoven with the needle loops. Thus a ripping open of the loops will be prevented since they are retained by the fiber portions pulled through the loops. With this method the known needles which have notches cannot be used, since these notches which extend in the direction of the needle head do not allow a gripping of the thread portion during the return movement of the needles from the layer of fibers.

For a better understanding of the invention, its operating advantages and the specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which:

FIG. 1 shows a longitudinal section of a sewed over with the needle designed in accordance with the invention;

FIGS. 2 through 4 show sliding latch needles provided with notches of different shapes in accordance with the invention, and

FIGS. 5 and 6 show sliding latch needles provided with notches forming a continuous notch face.

FIG. 1 of the drawings shows a longitudinal section of a sewed over layer of fibers 1 in accordance with the invention. As can be seen, portions of fibers 2 are pulled from the layer of fibers and are pulled into needle loops 3. Should a stretching strain occur from sinker loops 4, fiber portions 2 will prevent a ripping open of the loop chains.

In order to carry out the method of forming such fabric in accordance with the type of the layer of fibers to be processed, the needles may be provided with notches having different shapes, that is, they may be formed angularly or they may be round. Preferably, the notches are formed in such a way that they gradually ascend longitudinally toward the needle head. It is advantageous to arrange the notches close to the tip of the needle.

When processing a layer of fibers having a fine fiber denier, it will suffice that the needles have a notch face which is formed by a plurality of small notches. Sewed-knitted fabrics which were processed by using sliding needles with notches, and for the sake of comparison, others which were processed with common needles, a test on safety against run loops per 100 threads revealed the following result.

Ripping open of thread length	Sliding needles with notch, percent	Common sliding needles, percent
Above 100 mm	-----	100
3-5 mm	8	-----
2-3 mm	25	-----
1-2 mm	25	-----
To 1 mm	42	-----

The fiber portions which are pulled from the layer of fibers by the needles form a more or less fine fiber pile on the surface of the sewed-knitted fabric depending on the type of needle used and cover thereby the perforations made by the needles in the fabric.

In FIGS. 2-6, embodiments of the inventive needles are shown which may be used for making the above-described produced fabric. With respect to the embodiment of FIG. 2, there is shown a sliding needle 5 having a notch 7 on back shank portion 6 of needle 5, wherein a short surface or leg 7a is disposed toward needle head 8 and forms an angle of 45° together with back 6 of needle 5, while a longer surface or leg 7b which is directed away

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from the needle head forms an angle of 30° together with the back of needle 5.

In accordance with FIG. 3, sliding needle 9 is provided with a notch 11 disposed on back 10 of the needle, wherein a short leg 11a is disposed toward needle head 12 and forms an angle of 80° together with the back of needle 9. A longer leg 11b which is directed away from the needle head forms an angle of 25° together with the back of needle 9.

As can be seen from FIG. 4, needle 13 is provided with rounded notches 15a and 15b disposed on back 14 of the needle, in contrast to the angular notches shown in FIGS. 2 and 3. Sliding needle 16, according to FIG. 5 is provided with notch face 18 consisting of a plurality of small notches. FIG. 6 shows a sliding needle 19 provided with a notch 22, having a short leg 20 disposed on back 23 of the needle. The short leg extends in the direction of needle head 21, whereby notch 22 is additionally provided with a plurality of small notches 24 located on the short leg thereof.

What is claimed is:

1. A latch needle of the sliding, tubular or tongue type for use in a knitting machine for the production of a textile fabric composed of a layer of fibers reinforced by loop chains, which comprises a needle body with a head and a shank, and at least one recess formed in the back of said shank, said recess being defined by a first surface sloping inwardly from the outer surface of said shank at a relatively small angle and facing toward said needle

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head, and by a second surface sloping from said outer surface at a relatively steep angle, facing away from said head, and joining said first surface.

2. A needle according to claim 1, wherein said first and second surfaces are plain.

3. A needle according to claim 1, wherein said first and second surfaces are curved.

4. A needle according to claim 1, wherein one of said first and second surfaces is provided with a plurality of notches.

5. A needle according to claim 1, wherein said shank has formed thereon a series of said recesses in the form of coherent notches.

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U.S. Cl. X.R.

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