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[33] **Germany**

[31] **P 17 60 009.8**

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[54] **KNITTING MACHINE NEEDLE**
6 Claims, 2 Drawing Figs.

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[51] Int. Cl..... D04b 35/04

[50] Field of Search..... 66/116-
—124

ABSTRACT: Knitting machine needle having an upward depression formed therein intermediate the butt and hook portions of the needle, the upper depression being located such that the shank is raised with respect to the upper surface of the needle guide groove in the vicinity of the forward edge of the needle guide groove to prevent the lower surface of said needle from bearing against the forward edge of the needle guide groove during operation of the needle.

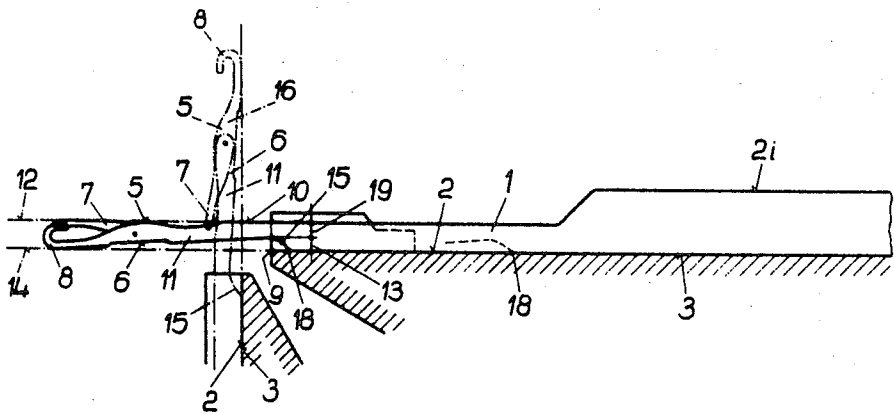


Fig. 1 PRIOR ART

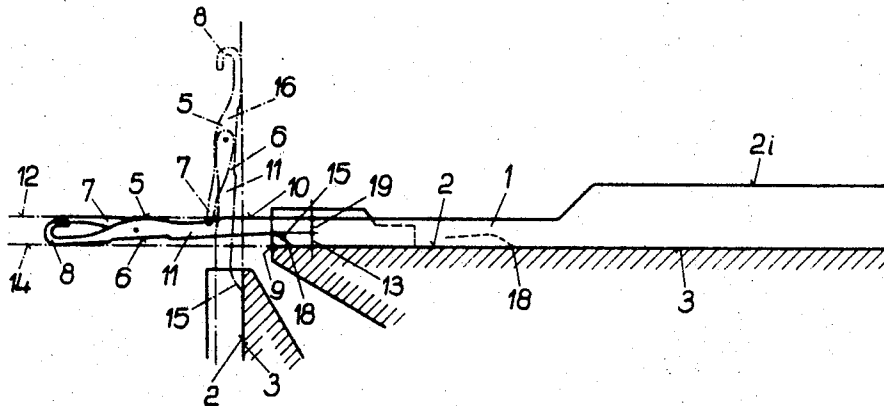
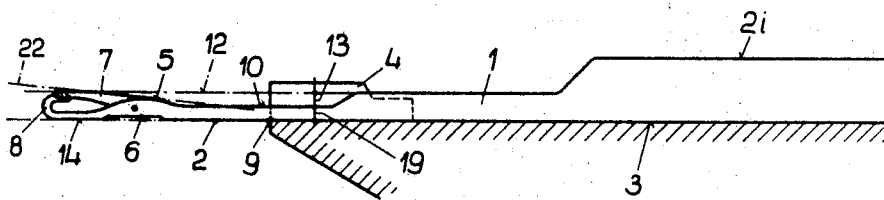


Fig. 2

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KNITTING MACHINE NEEDLE

The present invention relates to a needle for knitting machines and knitting looms wherein the needle is movably located in a needle guide groove or the like.

The needles to which the present invention relates are preferably as shown and described in my copending U.S. Pat. application, Ser. No. 762,074 filed Sept. 24, 1968 and in my U.S. Pat. No. 3,426,551.

In textile machines, movable needles are generally located in needle guide grooves in a needle cylinder and/or a rib dial in the case of circular knitting machinery. In flat-bed knitting machines, the needles operate in needle guide grooves in a flat needle bed.

With the object of obtaining improved stitch quality it was proposed in the above-mentioned patent application and patent that the needle shank be provided with a portion bent away from the lower edge of the needle so that the upper edge of the needle would be as nearly straight as possible. With such a needle, in order that the portion of the needle head that is bent away will not unduly hinder the needle's operation or cause undue wear, a hardened steel ring is arranged in the groove bed on which the lower edge of the needle slides. The needle, however, is only properly supported in one place which is capable of withstanding relatively high surface pressures. This is undesirable. Also, in known needles having an essentially straight needle shank, the needle tends, under the action of the fabric bearing or weighing on the needles, to tilt to a certain extent over the cam or edge portion of the needle guide groove. This tends to cause undue wear on the needle and on the edge of the needle guide groove.

Ordinarily, latch (or tongue) needles exhibit a slitlike opening therein to receive the latch. The slitlike opening ends in defined edges on the lower surface of the needle. In practice, due to the back-and-forth motion of the needle, the lower edges of this slitlike opening saw or cut into the needle guide groove, especially in the area of the edge of the guide groove. This effect is accentuated by the weight of the fabric on the needles, which keeps pressing the lower edges of the slitlike opening against the surface on which the needles rest. Thus, the edges of the expensive cylinders and dials, for example in circular knitting machines, can become so worn out in a relatively short period of time that replacement is necessary. Also, the needle itself wears out relatively quickly.

Therefore, the main object of the present invention is to provide a new knitting needle design which reduces wear on the edges of the needle guide grooves and wherein the life of the needle itself is prolonged.

SUMMARY OF THE INVENTION

In accordance with the present invention a knitting machine needle has a shank ending in a hook portion on one end and a butt portion on the other end, and is adapted to be movably operated in a needle guide groove or the like. The lower surface of the shank has an upward depression therein intermediate said butt and hook portions of said needle, said upward depression being located such that said shank is raised with respect to the upper surface of the needle guide groove in the vicinity of the forward edge of the needle groove.

By means of this invention, the needle during its in-and-out movement is amply supported on the surface on which it rests, while, due to the upward depression (or raised portion), any cutting into the edge or cam surface of the guide groove is substantially eliminated. These advantages are achieved without modification of the knitting machine itself.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a prior art needle having a straight needle shank, and

FIG. 2 is a side view of a needle in accordance with the present invention.

FIG. 1 illustrates a needle of conventional design and is shown merely by way of example. The needle shank 1 has a straight lower edge 2, which rests on a surface 3 of a needle guide groove 4 (represented in a cross section). The needle shown in FIG. 1 is adapted for use in a circular knitting loom. However, similar conditions exist in cylindrical looms as well as in flat-bed knitting looms or the like. The hook portion 8 of the needle is provided with an opening which in the area of the needle's lower edge 2 ends in an opening 6, in which a latch 7 is hinged mounted which can close the needle hook 8. As the needle is operated, the edges of the opening 6 bear on the surface 3 of the groove 4. This causes wear between the edges of opening 6 and surface 3, and particularly in the area of the edge or cam 9 of surface 3. This is due to the fact that the needle, with the fabric bearing down on it, is constantly being pushed back and forth with the edges of opening 6 running over the forward (or edge) region 9 of surface 3, thereby producing a sawing or grinding action. This wearing action is further enhanced since the needle bears particularly on cam or edge 9, i.e. the needle is tilted on it. At the butt end of the needle the end opposite the hook 8, the upper edge 21 of the needle is adjacent to the needle-controlling drive (not shown).

The necessary play between the needle and the drive device results in a tendency for the wearing (or sawing) action to increase. In FIG. 1 the chain-dotted line 14 designates the plane defining the lower extremities of the shank portion 1 of the needle. The chain-dotted line 12 designates the plane defining the upper extremities of the shank portion 1 of the needle. The chain-dotted line 22 illustrates how the hook portion 8 of the needle projects in an upward direction, and the projection of line 22 is shown at 13.

FIG. 2 illustrates a latch needle according to the present invention. The needle shank 1 has a head portion 11, the lower surface 2 of which is curved inwardly, or relieved with respect to plane 14. The upper edge 5 of shank 1 extends in a substantially straight line to hook 8, as indicated by chain-dotted line 12. This line 12 also runs parallel to needle guide surface 3 on which the needle rests and to plane 14. The needle shank 1 has an upward depression or relief 15 therein, thus raising the lower surface of shank 1 with respect to plane 14 and to surface 3 in the vicinity of the edge 9 of surface 3. The upward depression 15 extends over a length in shank 1 in advance of projection 13.

Thus, the lower edge 2 of the straight region of the needle shank 1 lies in plane 14 running beneath the outline of hook 8. The needle's upper edge runs substantially along the straight line 12 which is substantially parallel to the lower edge 2 of the straight region of the needle shank. The width dimension of the needle of FIG. 2 is increased by the amount of the projection 13. The needle shank 1 has the upward depression or relief 15 in the region of the needle shank lower surface 2, out of which the bent portion 11 projects.

With the known needle shown in FIG. 1, the edge 9 of the needle bed in a certain degree acts as a "pivot-point" of the needle as it tilts somewhat because of play. Thus, edge 9 is continuously exposed to intensive overloading with corresponding wear and tear in the area of this high surface pressure spot.

In the needle of the present invention as shown in FIG. 2, due to the upward depression 15, there is substantially no wear on edge 9. The lower corner 18 of depression 15 does not move back and forth over edge 9. Corner 18 moves only on the needle guide groove bed 3. Wearing out of the edge 9 is practically avoided. The relief 15 is formed as a stepped indentation. Corner 18 is rounded off to reduce wear on the groove bed 3 due to the back and forth motion.

A comparison between FIGS. 1 and 2 demonstrates that the needle shank 1 in the needle of the present invention can be made the same height as the known prior art needles, so that full interchangeability is possible, without any reworking of existing machines. The throat width of the needles indicated at 19 in FIGS. 1 and 2 can in both cases be the same, so that the dimension 19 is substantially the same in both cases. Dimen-

sion 19 in FIG. 1 is the actual width of the needle, plus dimension 13. The usefulness of the present invention is not limited to a dial needle. For example, the same design considerations are equally valid for cylinder needles, as shown in chain dotted outline.

The present inventive concept is not limited to latch needles. The invention is equally applicable to other movable needles used in processes involving knitting looms and knitting machines, which utilize a bent portion (such as portion 11—FIG. 2) in the region of the needle head. For example, the invention is also applicable to tubular needles or slide needles which sometimes exhibit such bent portions.

I claim:

1. Knitting machine needle having a shank (1) ending in a hook portion (8) on one end and a butt portion on the other end, adapted to be movably operated in a needle guide groove (4) or the like,

the lower surface of the shank (1) being formed with an upwardly extending relief (15) therein and extending from the hook portion towards said butt portion of said needle, said upwardly extending relief being located such that said shank (1) is raised with respect to the upper surface (3) of the needle guide groove (4) in the vicinity of the forward edge (9) of the needle groove (4)

said relief extending lengthwise of the needle exceeding the extent of movement of the needle over said edge (9) during knitting.

2. Needle according to claim 1 wherein said relief (15) forms a lower corner (18) with the needle shank (1), the lower corner (18) being rounded off.

3. Needle according to claim 1 wherein said needle is a latch needle having a slitlike opening (6) extending to the lower surface of said needle, wherein said relief (15) is dimensioned with respect to the length of the needle such that the lower surface of said needle including said opening (6) does not contact said edge (9) of said needle groove (4).

4. Needle according to claim 1 wherein said relief (15) is dimensioned with respect to the width of the needle such that the outer surface of said needle clears the edge (9) of said needle groove even with the weight of goods to be knitted hanging from said needle.

5. Needle according to claim 1 wherein the upper edge (12) of the needle extends from the needle shank (1) towards the hook portion (8) substantially parallel, or just slightly rising with respect to the lower edge (2) of the needle shank (1).

6. Needle according to claim 1 wherein the upwardly extending relief (15) is a step like indentation.

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