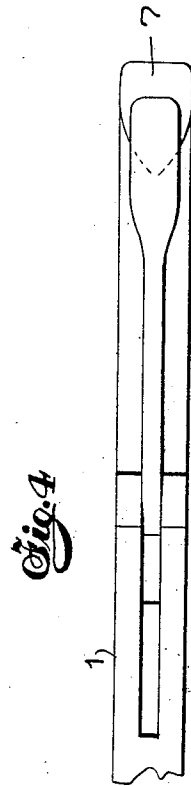
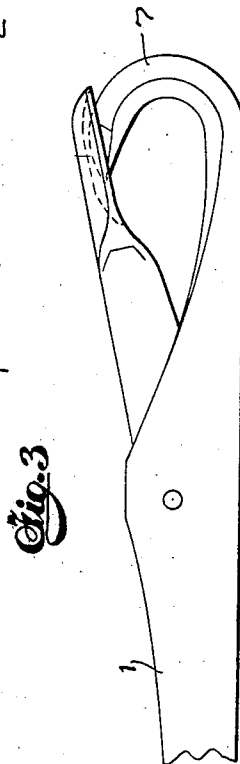
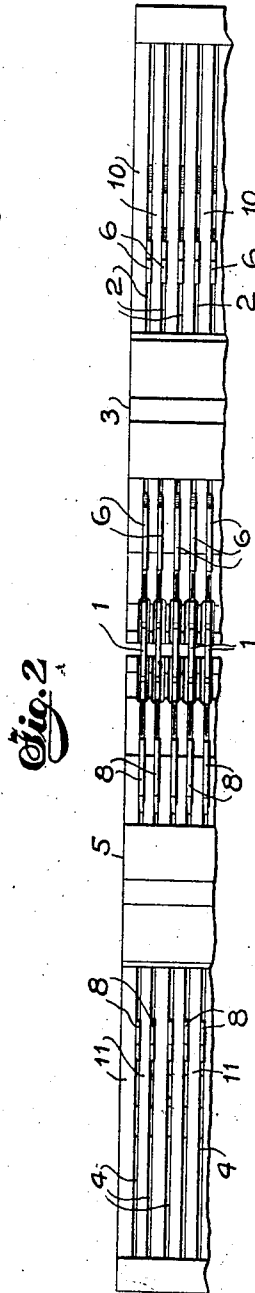
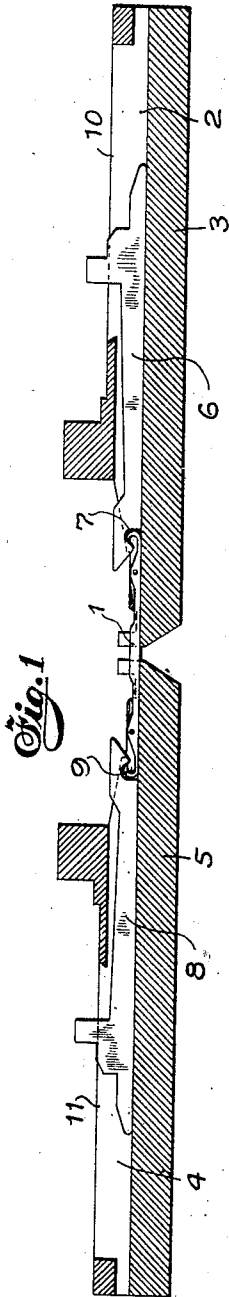


W. FELS.
 BUTTLESS KNITTING MACHINE NEEDLE.
 APPLICATION FILED FEB. 3, 1919.

1,354,096.

Patented Sept. 28, 1920.



William Fels INVENTOR
 BY Emory Booth Janney & Arney ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM FELS, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO MAX NYDEGGER, OF ELIZABETH, NEW JERSEY.

BUTTLESS KNITTING-MACHINE NEEDLE.

1,354,096.

Specification of Letters Patent.

Patented Sept. 28, 1920.

Application filed February 3, 1919. Serial No. 274,607.

To all whom it may concern:

Be it known that I, WILLIAM FELS, a subject of the Emperor of Austria, residing in Elizabeth, county of Union, State of New Jersey, have invented an Improvement in Buttless Knitting-Machine Needles, of which the following is a specification.

The present invention relates to an improvement in needles for knitting machines, more particularly that type in which a single set of needles is arranged to operate on and between a pair of needle beds. In this and other types of knitting machines utilizing buttless needles, it has been found that some needles of the set are frequently tilted from their normal operative vertical position in the needle guiding slots and become jammed between a wall of the slot and a portion of a needle actuating jack. Also, it often happens that the jack fails to engage the needle by reason of its being tilted out of normal position, thus interfering with the continuous fabrication of the article being knitted in the machine.

One object of the present invention is to provide a needle which may be retained in operative position in the slot without the use of special guiding members, the shank and hook portions of such a needle being proportioned with respect to the needle guiding slot in such a manner that the hooks may perform substantially their normal function as well as the function ordinarily performed by guiding means, as butts or other guiding projections.

An embodiment of my invention is illustrated in the drawings accompanying the present specification and in which,

Figure 1, is a transverse vertical section through the needle beds,

Fig. 2, a plan view of a portion of said needle beds, and

Figs. 3 and 4, details illustrating the construction of a portion of one form of needle.

As shown in Figs. 1 and 2, a needle 1 may be positioned to run in a slot 2 of a needle bed 3, said slot registering with a similar slot 4 in a needle bed 5. Such a needle may be actuated by means of a jack 6 engaging one hook 7 of the needle and also by a jack 8 engaging the other hook 9 of said needle, the jacks being operated by any suitable means ordinarily used in the art for this purpose, such as reciprocating or

in the case of circular machines, revolving cams which are not shown.

As more clearly shown in Fig. 3, the hook portions of needle 1 extend beyond the plane of all upper surfaces of the shank portion. Fig. 4 shows a hook portion 7 having substantially the same width as the shank portion. Referring again to Figs. 1 and 2, it will be noted that in the structure there shown, the slots 2 are separated by suitable partitions 10 and the slots 4 by similar partitions 11. As illustrated in Fig. 2, the partitions 10 and 11 are of uniform width except for relatively short portions at their adjacent ends, said portions being cut away to form a widening of the corresponding adjacent slots for the purpose of accommodating the loop of yarn as it is drawn toward and into said slots by the action of the needle in normal operation of the machine. Between these cut away portions of the partitions, the needle has no lateral support and therefore depends entirely for guidance upon the contact of its hook portions with the normally spaced portions of the partitions.

It will also be noted from Fig. 1 that the slots vary in depth from a maximum considerably deeper than the minimum height of the needle to a minimum which is slightly shallower than the minimum height of the shank of the needle, said minimum depth being adjacent to the cut away portions of the partitions herein above referred to. At these relatively shallow portions of the slots, it will be understood that a needle might be tilted laterally by action of the web of the fabric tending to draw the end needles toward the center. Ordinarily, where needles are provided with butts, the possibility of this tilting is eliminated by reason of the leverage exerted by said butts against the walls of the guiding partitions. However, where there are no butts on the needles, it has been found effective to make the hooks or terminal parts of the needle of such novel shape and proportion with respect to the width, the shank and the guiding slots, that portions of the hooks will bear against the walls of the slot. Where moving parts are of such relatively small size as they ordinarily are in a knitting machine, the clearance between a needle and the sides of its guiding slot will commonly

be .001 of an inch or .002 of an inch. In the case of ordinary needles, the hook portion is usually attenuated in the process of manufacture so that the clearance between it and the walls of the guiding partitions is considerably greater than the clearance allowed for the shank and the butt of the needle. In the present case, however, I prefer to make the shank and the hooks of uniform width so that the hook may perform a guiding function in addition to the thread drawing function. Accordingly, although the slot may be shallow as compared with the depth of the needle, it is contemplated that the uniform width of the needle and the maintenance of uniform clearance of all parts will operate to hold the needle in its normal operative position in spite of the pull of the fabric already formed or of any other reasonable force tending to tilt or displace it from its usual operative position.

Although I have shown my invention as applied only to a straight bed machine, it is

contemplated that the principle embodied in said invention may be applied equally well to other types of machines such, for example, as the circular bed type.

I claim as my invention:

1. A buttless knitting machine needle having a shank and terminal hooks, portions of the opposed side faces of said hooks being flat needle guiding surfaces continuous with and lying in the plane of the corresponding opposed side faces of the shank portion.

2. A buttless knitting machine needle having a shank and terminal hooks, portions of the opposed side faces of said hooks being flat needle guiding surfaces continuous with and lying in the plane of the corresponding opposed side faces of the shank portion and extending above the uppermost surface of the shank.

In testimony whereof, I have signed my name to this specification this 31st day of January, 1919.

WILLIAM FEELS.