

Feb. 20, 1940.

K. HOWIE

2,190,665

KNITTING MACHINE

Filed Jan. 10, 1938

2 Sheets-Sheet 1

Fig. 1.

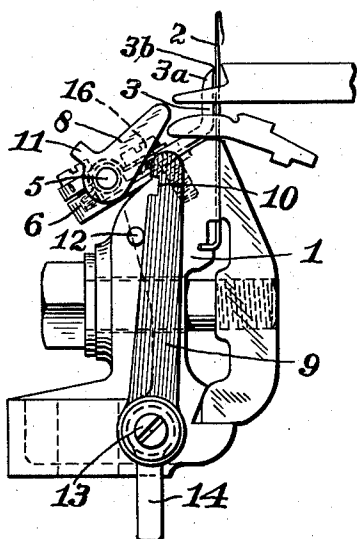


Fig. 1a.

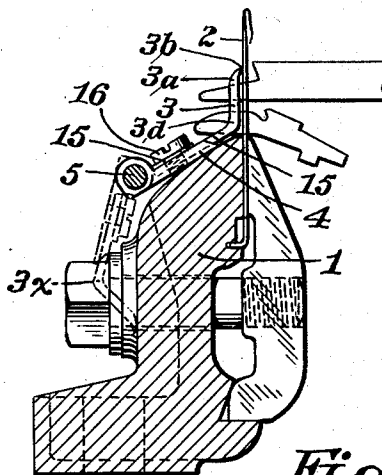


Fig. 7.

Fig. 1b.

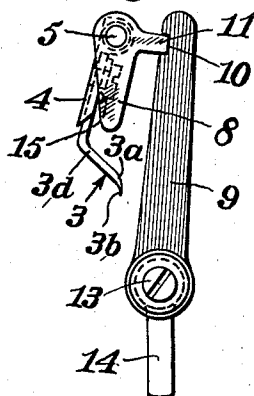


Fig. 4.

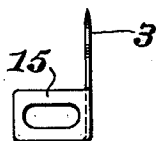


Fig. 5.

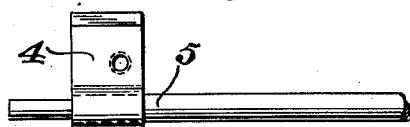
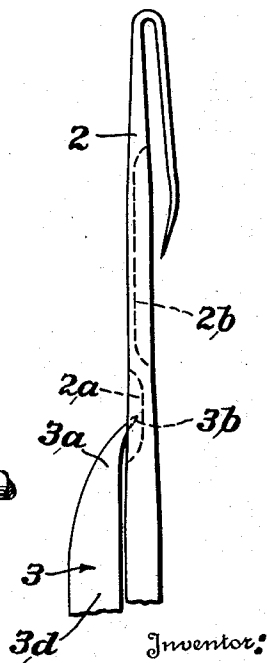


Fig. 6.



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Fig. 3.

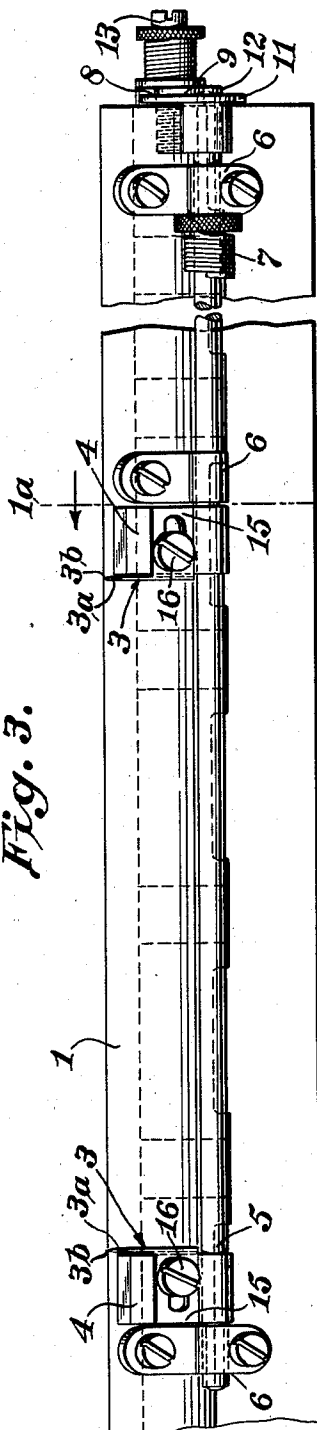
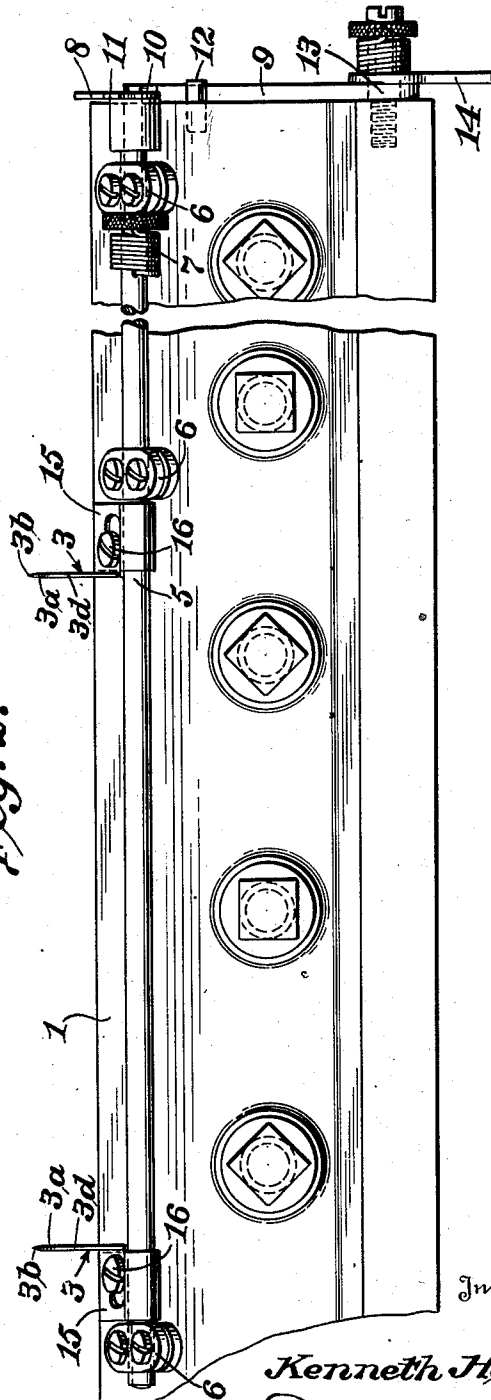


Fig. 2.



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UNITED STATES PATENT OFFICE

2,190,665

KNITTING MACHINE

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Application January 10, 1938, Serial No. 184,329

11 Claims. (Cl. 66—90)

The invention relates to means for providing enlarged needle wale loops along the inner selvages of heel tabs of full-fashioned hosiery, to facilitate the impalement of said loops on the needles for the formation of the foot.

In the accompanying drawings—

Figure 1 is an end view of a needle bar of a full fashioned machine, with a needle mounted thereon, representative of the needle row and with my improvement in place.

Fig. 1a is a sectional view on line 1a of Fig. 3 and showing the loop enlarging point in dotted lines in idle position.

Fig. 1b is a view of a detail.

Fig. 2 is an elevation of the needle bar, with my improvement in place as viewed from the front of the machine.

Fig. 3 is a plan view of the needle bar with my improvement in place.

Fig. 4 is a detail view of the loop enlarging finger and its base plate.

Fig. 5 is a detail view of a bracket member for supporting the loop enlarging finger on the pivot shaft therefor.

Fig. 6 is a view of the bracket member of Fig. 5.

Fig. 7 is an enlarged view of a part of a spring needle of special construction, together with the loop enlarging point in position to cooperate with the needle in the enlargement of the loops.

In these drawings 1 indicates the needle bar of a full fashioned knitting machine. A needle is shown at 2, this being one of the straight row of needles carried by the needle bar as in ordinary practice.

The needles for the most part are of ordinary spring beard construction, except one needle at each side of the fabric designed to make the needle wale loops adjacent the inner selvage edges of the heel tabs. These special needles are provided each with an eye or recess 2a in its back edge at a point some distance below the level of the point of the beard and also below the level of the usual eye or recess 2b on the beard side of the needle.

A loop enlarging finger 3 is adapted to cooperate with each of these special needles, it having a curved end 3a terminating in a point 3b which when the finger is set in position to enlarge the loop enters the special eye 2a in the back or beardless side of the needle. This loop spreading member has a vertically extending portion 3d to lie close at the back of the needle, when in operating position, to add its thickness to that of the needle stem for obtaining the enlargement of the loop formed on this needle. The finger has

a main body portion 4 pivotally mounted on the front side of the needle bar as at 5, so that when not in use the finger can be moved to the idle dotted line position shown in Fig. 1a at 3x.

During the making of the body of the stocking the finger will be in its idle position just mentioned, but when the heel tabs are to be knit it will be swung upwardly into its working relation, i. e., at the special needles. This is done when the heel tabs are to be knit so that the needle wale loops along or adjacent the inner selvage of the heel tabs will be enlarged by the addition of the thickness of the fingers to that of the needle stem. In this action of enlarging the needle wale loops, with which the fingers engage, the yarn renders from the adjacent needles at each side of the special needles, thereby robbing them of sufficient yarn to form the enlargement, and thus provide a relatively open wale of standing loops.

The special needles, if only one is to be used at each end of the section of instep needles, may be shifted by taking them out and replacing them in another location. This will necessitate filling the spaces left by the removal and shifting of these special needles with ordinary needles. In other words, the special and ordinary needles may be interchanged in position to get various widths of instep fabric, as may be desired.

By burying the point of the loop enlarging finger in the special eye of the needle, damage to the yarn will be avoided.

With my invention the needle bar may be practically of one piece from end to end, and yet the length of the instep row of needles may be altered at will. This can be accomplished by adjusting the enlarging fingers along the rod 5 which forms their pivotal support. The said fingers may be held in any position to which they may be adjusted by friction or by any other suitable means.

The use of the loop enlarging fingers renders it unnecessary to use a needle bar in sections capable of adjustment or replacements for getting different lengths of the section of the needle row for making the instep.

With the invention above described the needles are maintained in their upright positions. No deflection of the needles take place when the loop enlarging fingers are set in operative position. The loop enlarging fingers provide loop engaging portions which are of rigid construction.

The setting of the loop enlarging fingers is preferably done by turning the shaft or rod upon which they are mounted. This can be accomplished either by hand or automatically. The

setting of the fingers into their operative or idle positions is performed when the needles are in their lowest position.

In operation the fingers push through the 5 stitch on the needle on each upstroke of the needle, enlarging it by robbing yarn from the stitches on adjacent needles.

The machine as usual in full-fashioned machines includes sinkers and knock over bits. The 10 sinkers overlie the stitch which is being enlarged by the upthrust of the fingers. The action of the knitting element; spring beard needles and sinkers and knock over bits is the same relative to each other as in ordinary full-fashioned knitting practice. The upper end of the enlarging 15 finger presents a surface sloping towards its point of engagement with the needle so that in penetrating the opening in the stitch the enlarging action will be that of a wedge acting gradually on the yarn.

A pivotal support 5 may consist of a shaft or rod turnable in bearings 6 on the needle bar. This shaft is under tension of a spring 7 coiled about it and tending to rotate the shaft in a 25 direction to position the loop enlarging point adjacent or virtually against the needle stem. The shaft has a finger piece 8 fixed thereto at its right hand end which may be used in turning the shaft to make the loop enlarging points assume their idle positions as shown in dotted lines 30 in Fig. 1a. When in this position the points will be retained by a catch lever 9 having a notch 10 receiving a projection 11 on the finger piece. This catch may be under control of a spring 35 pressing it against a stop 12 Fig. 1. The catch lever is pivoted at 13 and has a downwardly extending arm 14 by which said catch may be operated. When operated to release the shaft 5 carrying the loop enlarging fingers, by withdrawing its notched portion 10 from the finger piece, 40 the spring will turn the shaft and the loop enlarging fingers thereby will be positioned at the needles to cooperate therewith in enlarging the loops.

45 Preferably the loop enlarging finger will be adjacent the needle stem but need not contact therewith, though the point of the loop enlarging finger will be buried in the special eye in the back of the needle.

50 The loop enlarging points are desirably carried by base plate portions 15 held adjustably by screws 16 passing through slots in said base plates into the platelike bracket members 4 which are brazed to the shaft 5.

55 The adjustment of the loop enlarging members allowed by the screw and slot arrangement along the shaft may be as desired, say 1/4" or more.

The catch lever 9 may be controlled automatically by a connection engaging the arm 14 thereof, said connection being operated automatically from the control cam shaft at the rear of the 60 knitting machine, such, for instance, as shown at b in Letters Patent of the United States No. 1,982,991, December 4, 1934, though as above indicated, the invention is not limited in this respect and setting of the loop enlarging points may be effected by hand.

70 The loop enlarging finger is limited in its movement towards the needle by the plate 4 contacting the upper surface of the needle bar. The finger 3 when in position for operation does not contact with the needle, nor does the point 3b strike the bottom of the eye, but is limited to a position intermediate the depth of the eye.

The spring needle disclosed herein is the subject of a divisional application filed August 23, 1938, Ser. No. 226,365.

It will be understood that the term "back" as applied to the needle refers to that side or edge 5 which is opposite to that side upon which the spring beard is located, this being so notwithstanding the fact that when the needle is mounted in a flat full-fashioned knitting machine, this side or edge which we now refer to as "back" 10 faces towards the front of the machine.

I claim:

1. In combination with a needle bar of a full fashioned knitting machine, a row of needles carried thereby, including those located at the points 15 in the needle row where the wales adjacent the inner selvages of the heel tabs are knit and which have an eye in the back surface thereof, and fingers movably mounted on the needle bar to be adjusted to and from the needles having 20 said eyes, said fingers having points to enter the eyes of said needles, the loops formed by said needles being enlarged by the combined thickness of the fingers and the needles adjacent which they lie, substantially as described. 25

2. In combination a needle bar of a full fashioned knitting machine, having a row of needles and fingers pivotally mounted on the needle bar and thereby swingable into a position adjacent 30 the stems of those needles which form the loops adjacent the inner selvages of the heel tabs, or into a position away from said stems, substantially as described.

3. In combination with a needle bar of a full fashioned knitting machine, loop enlarging fingers 35 mounted thereon, adjustable to and from the needle row and adjustable on the bar to different positions along the needle row, said fingers when in position adjacent certain of the needles enlarging the loops along the inner selvages of the heel tabs, the adjustment of said fingers along 40 the needle row enabling the length of the instep section of the needle row to be varied, substantially as described.

4. In combination with a needle bar of a full 45 fashioned knitting machine and its row of needles, loop enlarging fingers adjustable to operative position adjacent certain needles and to an idle position relatively remote from the needles, a rod mounted on the needle bar forming a pivot 50 for the said fingers, said fingers being adjustable lengthwise of said rod to coact with the desired needles for varying the length of the instep section of the needle row, substantially as described.

5. An appliance according to claim 2 in which 55 the finger is pivotally mounted on the front portion of the needle bar to swing downwardly and forwardly of the machine to idle position, substantially as described.

6. In combination with a needle bar of a full 60 fashioned knitting machine with its needles, loop enlarging fingers adjustable to either idle or active position relative to the needles which form the loops along the inner selvages of the heel tabs, and adjustable along the needle row to accord with different lengths of the series of needles which form the instep. 65

7. In combination with needles, sinkers and knock over bits of a full fashioned knitting machine, fingers adjustable from idle position to 70 active position at the needles, said fingers pointing in the same direction as the needle penetrating the loops on the beardless side of the needles to enlarge the same, while held by the sinkers against the thrust of the advancing needles, by 75

drawing thread from loops on adjacent needles, substantially as described.

8. An appliance according to claim 7 in which the loop enlarging finger lies along the needle stem and terminates in a point engaging the needle.

9. An appliance according to claim 7 in which the loop enlarging finger has a surface at its loop penetrating end sloping to the needle, substantially as described.

10. In combination with the needles of a full fashioned knitting machine, loop enlarging fin-

gers, associated with certain of said needles, having portions to lie along the needle stems and points deflected at an inclination to said portions to make close engagement with the needles on the beardless side thereof to penetrate the loops on the needles, substantially as described.

11. In a full fashioned knitting machine a spring beard needle having a recess in its back edge and a loop enlarging member carried by the needle bar and having a point to enter said recess, substantially as described.

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