Dec. 30, 1941. H. W. START ET AL. 2,268,313

STRAIGHT-BAR KNITTING MACHINE

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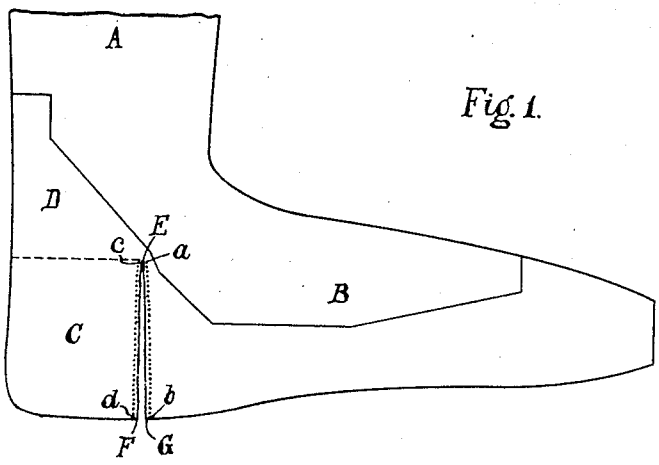



Fig. 1.

Fig. 2.

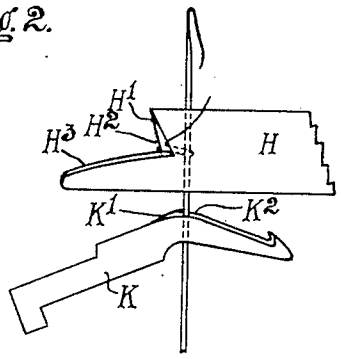



Fig. 3.

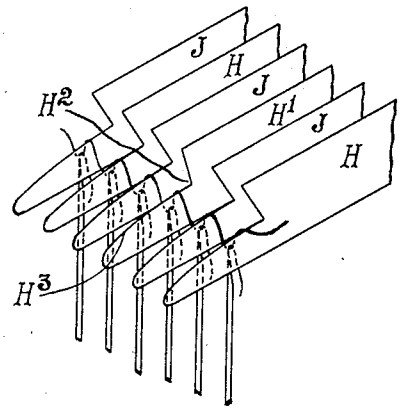



Fig. 4.

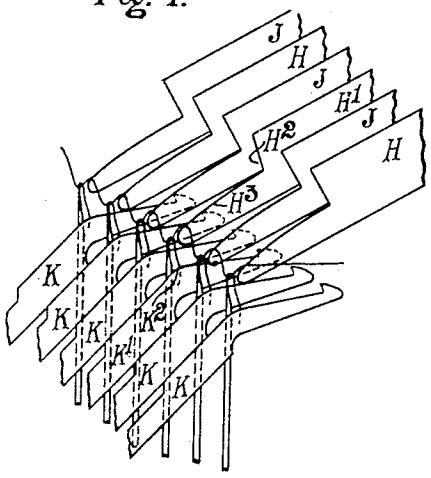
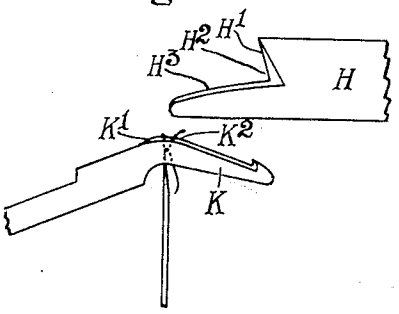



Fig. 5.




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Fig. 6.

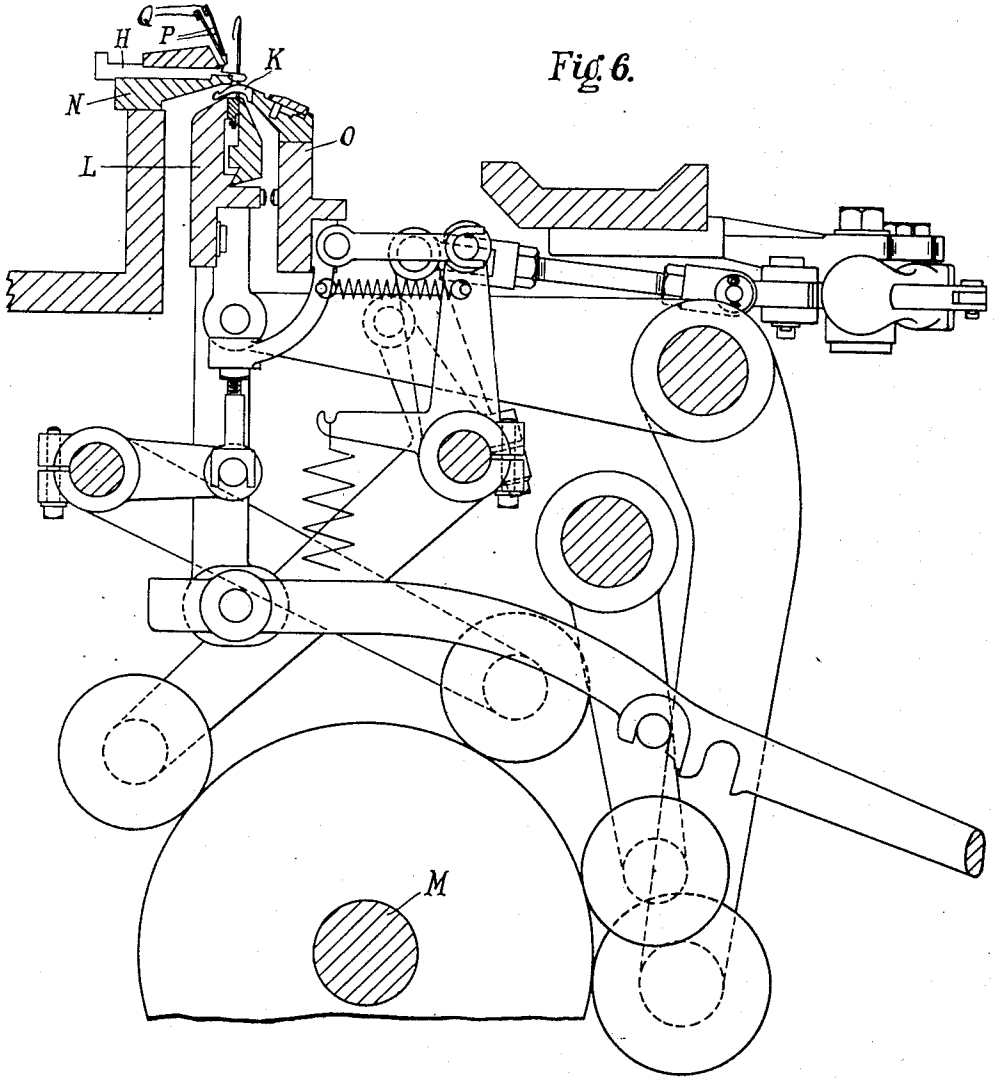
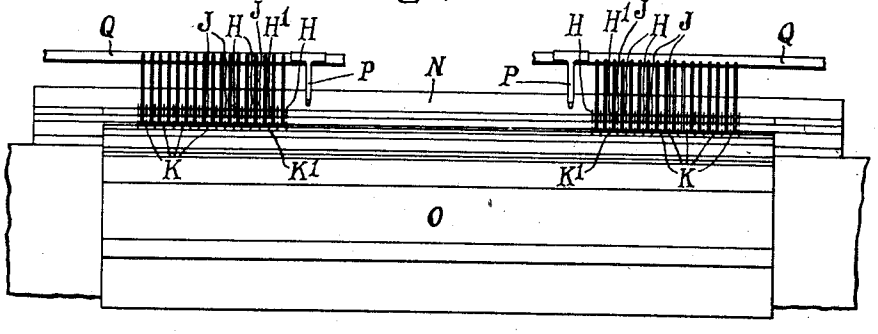



Fig. 7.




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# UNITED STATES PATENT OFFICE

2,268,313

## STRAIGHT-BAR KNITTING MACHINE

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Application February 13, 1941, Serial No. 378,796
In Great Britain November 9, 1939

3 Claims. (Cl. 66—82)

This invention relates to improvements in straight-bar knitting machines and refers particularly to the type of machine used for knitting the heel tabs to a stocking blank. In one method of manufacturing a stocking, a blank comprising a leg and foot portion is first made and this blank is then run on the needles of a machine having two groups of needles specially adapted for knitting the heel tabs to the blank at the appropriate point. After the heel tabs have been knitted to the blank the latter is cut on each side just below where the heel tabs are attached and the edges thus formed are joined to the edges of the corresponding heel tabs in order to form the foot portion of the stocking.

The operation of joining the edges of the heel tab and foot portion is carried out on a linking machine and in order to facilitate the running of the two edges onto the points of the linking machine, a slack course extending inwards the requisite distance from the selvedge edge on either side, just below where the blank is severed after the heel tabs have been attached, is made in the blank during the manufacture thereof and the loops in a sinker wale adjacent the edges of the heel tabs are enlarged by scoring the wale with a pointed instrument manually operated. Alternatively a slack wale may be obtained adjacent the edge of the heel tabs by omitting a needle at this point from each set of needles upon which the heel tabs are knitted.

With this latter method however there is nothing to lock the loop in the corresponding needle wale in the blank to which the heel tabs are attached and unless special precautions are taken the loops in this wale will run back and a ladder form. It has also been proposed to use a special knocking over bit in connection with each set of needles for knitting the heel tabs to form a slack sinker wale but this method and that of scoring the wale is unsatisfactory as the additional yarn is drawn from the adjacent needle wale loops and the additional strain placed on these loops may result in the breakage of the yarn.

It has also been proposed in mock rib work to form slack sinker wales by the use of sinkers having deeper noses to extend the loops drawn thereby and associated knocking over bits to retain the extended loops in position in the work but in this case the extra yarn in the sinker wales is drawn from the adjacent loops and puts an undesirable strain on the yarn.

The object of the present invention is to produce a slack wale at the desired point adjacent the edges of the heel tabs during the knitting of the latter without the disadvantages of the previous methods or the necessity of performing this operation manually.

According to this invention a straight-bar knitting machine having two groups of needles for knitting the heel tabs to a stocking blank comprising a leg and foot portion is provided at the appropriate point in each group with a sinker adapted to form a longer loop than the remainder during the drawing of each course and so shaped that in co-operation with an associated knocking-over bit the longer loop is held during the knitting motions of the machine so as to produce a slack sinker wale in the heel tabs.

The invention will now be more particularly described with reference to the accompanying drawings in which,

Fig. 1 is a view of a stocking blank ready for seaming,

Fig. 2 is a diagram showing the position of the needles, sinkers and knocking over bits after drawing a course,

Figs. 3 and 4 show diagrammatically the movements of the loops down the sinker noses during the withdrawal of the sinkers and lowering of the needles, and

Fig. 5 shows the loops lowered onto the knocking over bits.

Fig. 6 is a cross section of part of a machine adapted for knitting the heel tabs to a stocking blank and

Fig. 7 is a front elevation of part of the machine showing the two groups of needles and associated sinkers, knocking-over bits and thread carriers.

Like letters indicate like parts throughout the drawings.

The stocking comprises a leg part A (see Fig. 1) and an instep and foot part B made in one piece and then run on the needles of the machine for knitting the heel tabs C which are knitted on each side of the blank. The heel tabs, only one of which is shown, are connected to the blank at the lower edge of the high spliced part D and are formed with a shaped outer selvedge edge and a straight inner selvedge edge EF. After the heel tabs are knitted the blank is severed just below the point where the heel tabs are attached and the edge EG is formed. A similar edge is formed on the other side of the blank. When the blank is seamed up the edge EG is joined to the inner edge EF of the heel tab, the corresponding edge on the other side of the blank being joined to the inner edge of the other heel tab. The stocking is completed by seaming to-

gether the outer edges of the blank and heel tabs, which forms a seam down the centre of the back of the leg part and along the centre of the foot bottom, and seaming across the end to form the toe.

The edges EF and EG are joined together on a linking machine and in order to facilitate the running of the edges on the points of the linking machine a slack course *ab* is knitted in well known manner close to the edge EG during the knitting of the blank and a slack sinker wale *cd* is formed in the heel tabs during the knitting of the latter. This slack sinker wale is formed closed to the inner edge of the heel tabs and is produced by the following arrangement.

Each group of needles is provided with a set of sinkers comprising jack sinkers H and dividing sinkers J and a special jack sinker $H^1$ is provided at the appropriate point in each set. The special jack sinker $H^1$ is preferably disposed between the second and third needles from the inner edge of the group and is provided with a shallower throat $H^2$ than the other sinkers of the set and also with a correspondingly deeper nose $H^3$ as shown in Fig. 2. The usual knocking-over bits K carried from either the front or rear of the needles as desired, are provided in connection with each group of needles and associated with each special sinker $H^1$ is a special knocking-over bit $K^1$ which is so shaped that the yarn retaining part $K^2$ is higher than that of the remaining knocking-over bits in the set as shown in Fig. 2.

When the sinkers are advanced to sink loops on the needles as shown in Fig. 2 owing to the shape of the special jack sinker $H^1$ this latter sinks a longer loop, that is, it draws more yarn than the others and this extra length of yarn or longer loop is retained thereby after the dividing sinkers have been moved into position. When the needles are moved down to knit in the usual manner this extra length of yarn or longer loop is retained in the wale associated with the special jack sinker $H^1$ by the deeper nose $H^3$ of the sinker as shown in Figs. 3 and 4 until the loop is released thereby when the loop is lowered onto the knocking-over bit $K^1$ associated therewith and retained in its correct position during the completion of the knocking-over operation without any additional strain being placed on the yarn.

In machines for the purpose described the two groups of needles are carried by a needle bar L (see Fig. 6) which is operated in well known manner by a system of links and levers actuated by cams on the main shaft M. The sinkers associated with each group of needles are carried in the usual manner in a sinker slay N and the knocking-over bits associated with each group of needles are mounted on a knocking-over bar O operated in well known manner by a system of links and levers actuated by cams on the main shaft M. A thread carrier P mounted on a thread carrier bar Q is provided in connection with each group of needles.

With the arrangement described a slack sinker wale is produced in the heel tabs during the knitting of the latter which is readily discernible after the heel tabs are completed and can be run on the points of the linking machine together with the slack course in the edge of the sole part to which the edge of the heel tab is joined. A full set of needles is used in the manufacture of the heel tabs so that there is no danger of a ladder forming in the blank to which the heel tabs are attached, the slack wale is produced without any strain on the yarn, the necessity of forming the slack wale manually is obviated and consequently the time taken to perform this operation is saved.

What we claim as our invention is:

1. A straight-bar knitting machine for knitting the heel tabs to a stocking blank comprising in combination two groups of needles carried by a needle bar, a thread carrier, set of sinkers and associated knocking-over bits in connection with each group of needles, and a sinker disposed at the appropriate point in each set adapted to form a longer loop than the remaining sinkers during the drawing of each course and so shaped that in co-operation with its associated knocking-over bit the longer loop is retained during the knitting motions of the machine so as to form a slack sinker wale in the heel tabs substantially as described.

2. A straight-bar knitting machine for knitting the heel tabs to a stocking blank comprising in combination two groups of needles carried by a needle bar, a thread carrier, set of sinkers and associated knocking-over bits in connection with each group of needles, and a sinker disposed at the appropriate point in each set having a shallower throat and deeper nose so as to form a longer loop than the remaining sinkers during the drawing of each course and in co-operation with its associated knocking-over bit retain the longer loop during the knitting motions of the machine to form a slack sinker wale in the heel tabs substantially as described.

3. A straight-bar knitting machine for knitting the heel tabs to a stocking blank comprising in combination two groups of needles carried by a needle bar, a thread carrier, set of sinkers and associated knocking-over bits in connection with each group of needles, a sinker disposed at the appropriate point in each set having a shallower throat and deeper nose so as to form a longer loop than the remaining sinkers during the drawing of each course and a knocking-over bit associated therewith having a loop engaging part at a higher level than the remaining knocking-over bits so that in co-operation with the sinker the longer loop is retained during the knitting motions of the machine to form a slack sinker wale in the heel tabs substantially as described.

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