Nov. 6, 1945. H. N. SHEPPARD 2,388,648

METHOD AND MACHINE FOR MARKING CIRCULAR KNIT FABRIC FOR BOARDING

Filed July 1, 1944 4 Sheets-Sheet 1

Fig. 1.

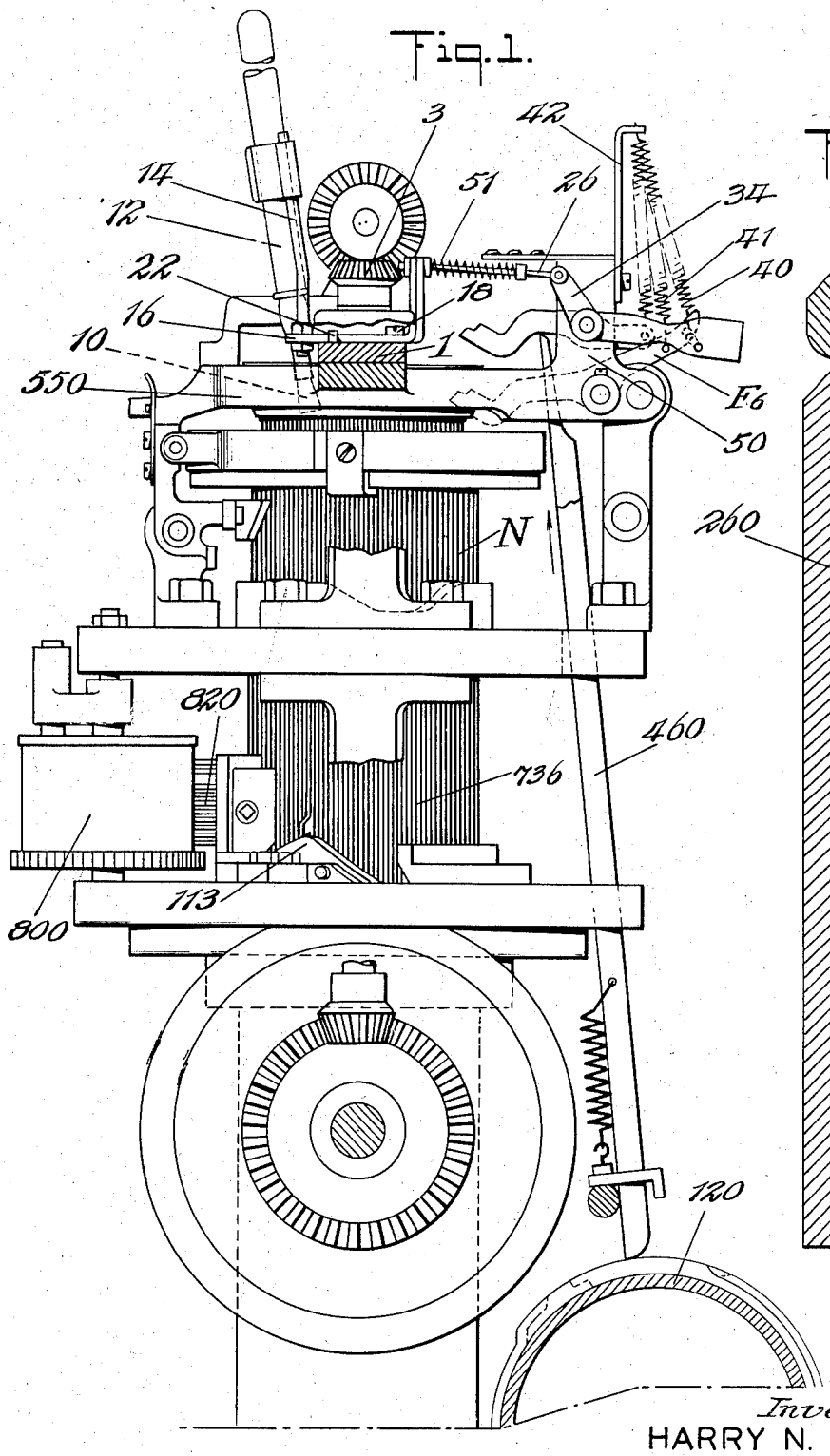
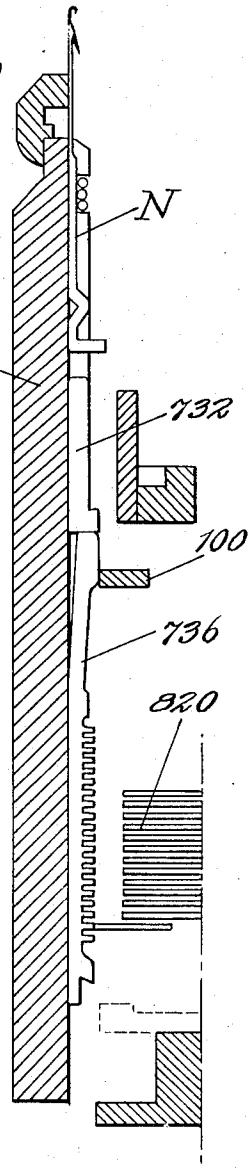


Fig. 4.



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Fig. 2.

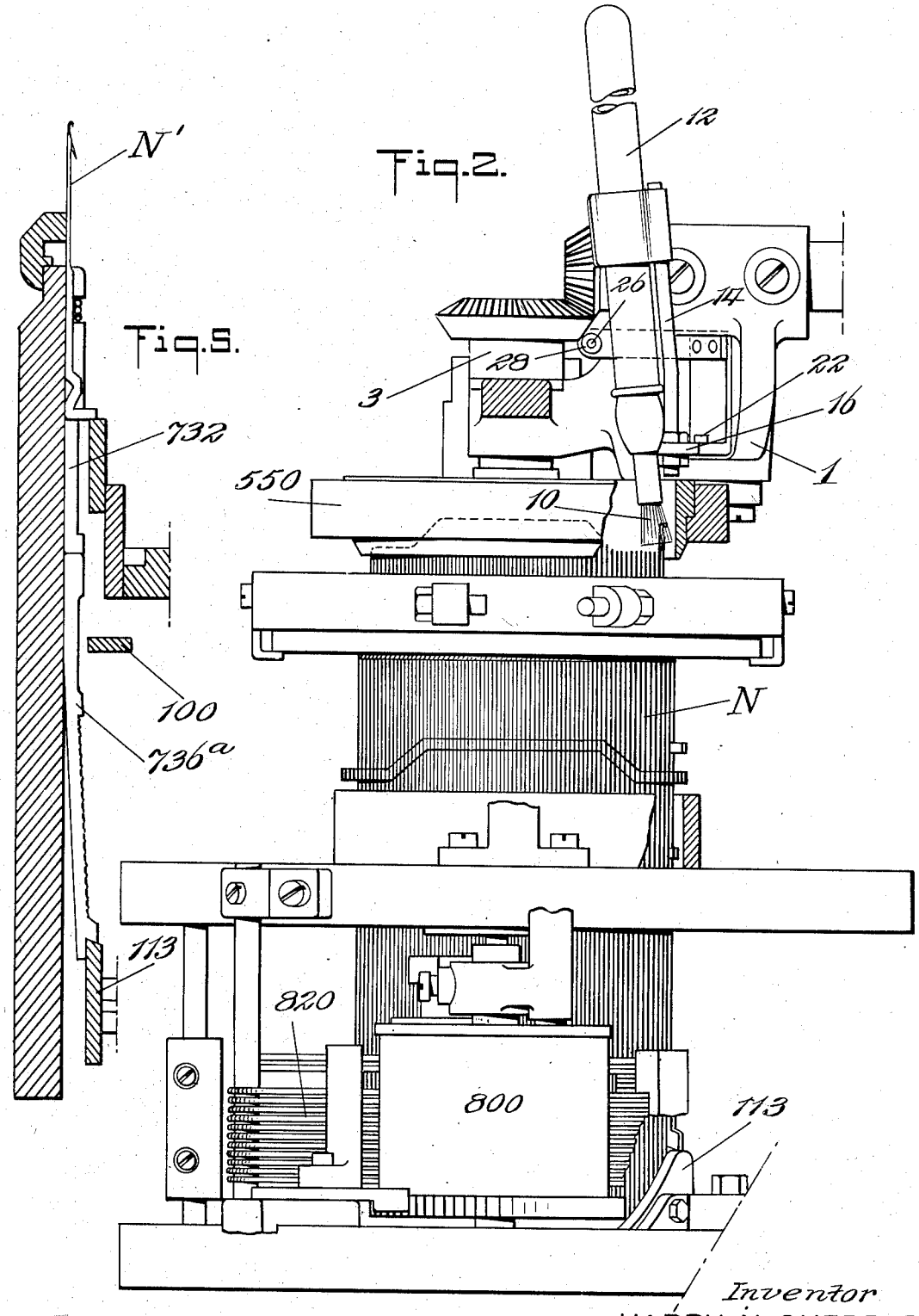


Fig. 5.

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Fig.5.

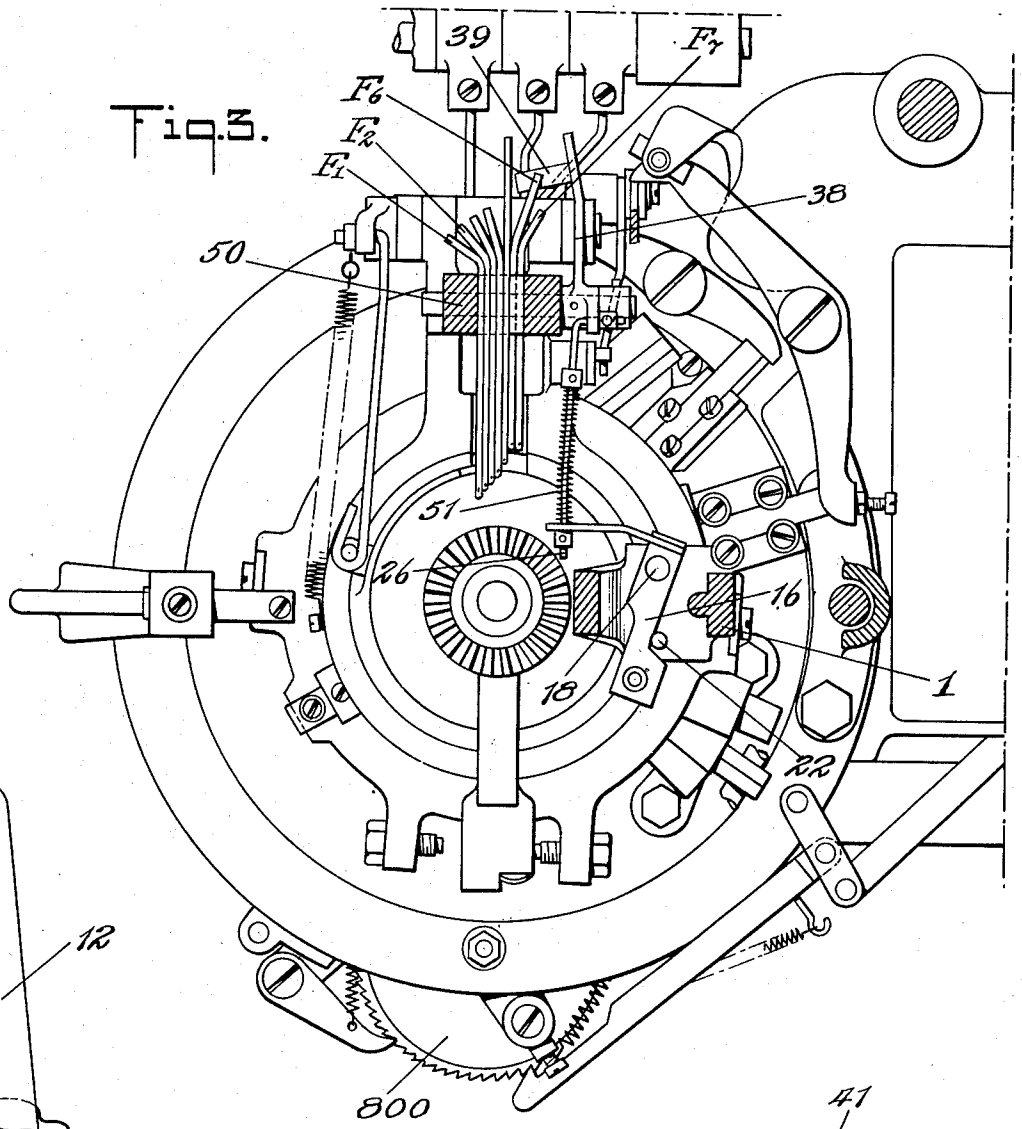
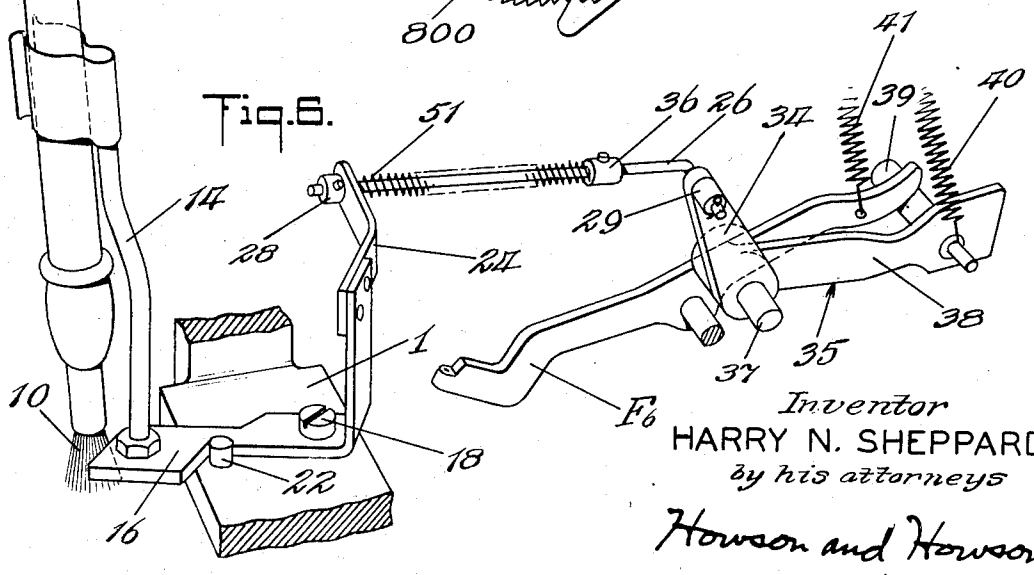


Fig.6.



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Fig. 7.

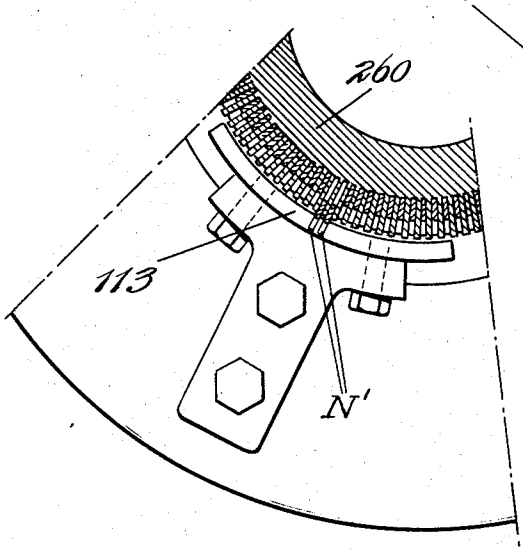


Fig. 8.

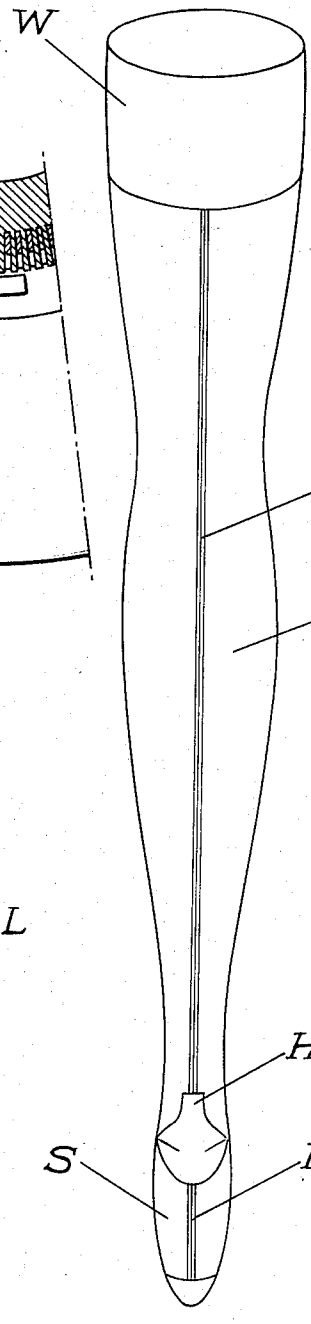


Fig. 9.

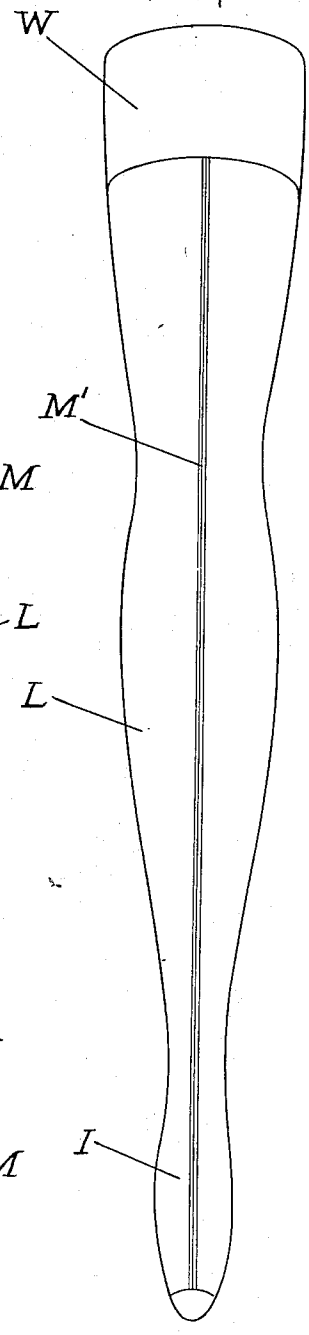
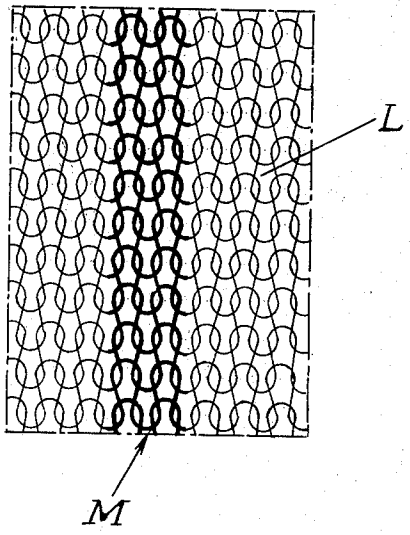


Fig. 10.



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Patented Nov. 6, 1945

2,388,648

UNITED STATES PATENT OFFICE

2,388,648

METHOD AND MACHINE FOR MARKING CIRCULAR KNIT FABRIC FOR BOARDING

Harry N. Sheppard, Maplewood, N. J., assignor to Scott & Williams, Incorporated, New York, N. Y., a corporation of Massachusetts

Application July 1, 1944, Serial No. 543,129

14 Claims. (Cl. 66—1)

This invention relates to seamless hosiery and more particularly to seamless hosiery knit of a thread formed of a material such for example as the synthetic fibre forming polymeric amides known as "nylon" which is adapted to be set to a definite shape by subjecting the material to heat or heat and moisture as in the hosiery preboarding operation. In order that the hosiery may be properly shaped by the preboarding operation it is necessary that the hosiery be placed on the preboarding form with particular wales at the back and front of the hosiery exactly following the back and front edges, respectively, of the thin flat form used in this operation. In boarding full-fashioned hosiery the seam at the back and bottom of the hosiery provides a raised guide enabling the operator to rapidly and accurately position the hosiery on the boarding form by placing the hosiery seam along the back edge of the form, an operation which can be carried out by feeling the position of the seam on the form. With seamless hosiery there is no seam to guide the operator and in order to place seamless hosiery on a boarding form so as to have the hosiery present the most attractive appearance when offered for sale it is necessary to place particular wales of the hosiery on the back and front edges of the form. Careful inspection and adjustment, therefore, are required to insure seamless hosiery being properly placed on the form and the operation is slow and costly and requires additional facilities to be provided. It is an object of this invention to provide seamless hosiery of the class described having means for guiding the positioning of the hosiery on the forms for the preboarding operation. It is also an object of this invention to provide a method of placing the guiding means on the hosiery during the knitting thereof such that the guiding means will correctly indicate the proper wales to be alined with the edges of the form and it is a further object of this invention to provide a knitting machine having means for placing such guiding in proper position on the hosiery during the knitting thereof.

The invention is shown in the drawings in connection with a Scott and Williams circular knitting machine for knitting hosiery having turned welts, the machine being of the general construction shown in the patent to Scott, No. 1,282,958, issued October 29, 1918, and provided with patterning mechanism comprising jacks and jack selecting means such as are shown in the patent to Page No. 1,969,853 issued August 14, 1934, and only such parts of the knitting machine are shown as are necessary to clearly illustrate the invention.

In the drawings,

Figure 1 is a partial view in side elevation of a knitting machine in accordance with this invention, parts being broken away to show other parts more clearly;

Figure 2 is a view in front elevation of the knitting machine head shown in Figure 1, parts being broken away to show other parts more clearly;

Figure 3 is a partial plan view of the knitting machine shown in Figure 1, parts being broken away to show other parts more clearly;

Figures 4 and 5 are vertical sections through the needle cylinder taken at different places so as to show different phases of the jack and needle operation, Figure 4 showing the operation of a jack for a needle other than those at the wales to be placed on the preboarding form edge while Figure 5 shows the operation of a jack for a needle at a wale to be placed on the form edge;

Figure 6 is a perspective view of part of the operating means for applying coloring material to the needles knitting the wales to be placed on the preboarding form edge;

Figure 7 is a fragmentary plan view showing the cam operating the jacks of the needles to which coloring material is applied;

Figures 8 and 9 are views in elevation of the back and front, respectively, of hosiery having coloring material applied in accordance with this invention; and

Figure 10 is an enlarged view of a fragment of the hosiery fabric showing the coloring material applied to two wales.

As shown in Figures 8 and 10, hosiery in accordance with this invention has a guide mark M of a width of one or more needle wales extending down the center of the back of the leg L from the welt W to the heel H. The mark is omitted from the heel and toe but extends along the bottom of the sole S. A similar guide mark M' may extend along the center wale or wales of the front of the leg from the welt W to and along the top of the instep I to the toe. Preferably the guide mark is formed of fugitive dye contrasting sufficiently in color with the thread of which the hosiery is knit to be readily seen when the hosiery is being placed on the preboarding form. As the preboarding operation sets the thermo-setting thread of which the hosiery is knit so that the hosiery tends to maintain the shape and size given it by the preboarding operation, the removal of the fugitive dye forming

the guide mark during the subsequent dyeing and finishing operations does not interfere with rapid and efficient boarding of the hosiery as the shape assumed by the hosiery guides its placing on the boarding form.

The machine for forming the guide mark on the hosiery during the knitting thereof shown in the drawings is a circular hosiery knitting machine having a needle cylinder 260 mounted for rotation in a suitable frame and having needles N intermediate jacks 732 and pattern jacks 736 alined in the grooves thereof, there being a jack of each kind for each needle. The machine is also provided with the usual needle operating cams, yarn fingers F^1, F^2, etc. operated through push rods 460 from cams on the main pattern drum 120. The pattern jack selecting means provided comprises a pattern drum 800 rotated step by step and operating reader cams 820 to select jacks for operating needles in the usual manner.

The guide mark is formed in the hosiery by applying a fugitive dye to the hooks of one or more needles knitting the central wale or wales at the back or back and front of the hosiery. In order that the dye may be applied to the desired needles only such needles are selected by being raised in each revolution when the guide mark is being formed prior to the raising of the adjacent needles to take the thread for knitting. To secure the raising of the selected needles, the pattern butts of the jacks 736*a* for the selected needles are broken away so that these jacks, after having their operating butts moved outwardly by the engagement of the upper portion of the jack with the cam 100, do not have their operating butts pressed inwardly by engagement of a reader cam 820 with one of their pattern butts. The operating butts of the selected needles, accordingly are left positioned for engagement by the cam 113 which raises the selected jacks and the needles N' associated with these jacks while leaving the remaining jacks and their needles in their lowered positions at this point in the revolution of the needle cylinder. In knitting the leg and foot of the hosiery shown the only jacks operated are those for raising the needles to take the coloring material and these jacks are returned to their lowered positions by the usual cams. The remaining jacks are not operated, the needles of the remaining jacks being operated by the usual needle operating cams to take and knit the thread.

To apply the dye to the raised selected needles there is provided a fountain brush comprising a suitable brush 10 supported in the lower open end of a tubular dye holder 12 clamped to a post 14 secured to one arm of an angular member 16 pivotally secured to a bracket 1 by a bolt 18. The bracket 1 is mounted on the latch ring 550 and serves to support the dial spindle 3. A pin 22 in the bracket 1 limits the pivotal movement of the angular member 16 in one direction to a position in which the brush 10 is held in the path of the raised selected needles. The other arm of the angular member 16 has secured thereto a laterally projecting arm 24 having at its outer end an opening in which a rod 26 is slidably mounted. Fixed on the rod 26 adjacent its ends are collars 28 and 29, the collar 28 securing the rod 26 in the arm 24 while the collar 29 secures the bent end of rod 26 in an opening in an arm 34 of a bell crank lever 35. Fixed on the rod 26 intermediate its ends is a collar 36 which, with the arm 24, confines a spring 51 coiled about the rod 26. The bell crank lever 35 is pivotally mounted on a pin 37 carried by the yoke 50 which supports the yarn fingers F^1, F^2, etc. and has an arm 38 provided with a laterally projecting pin 39 which extends beneath the adjacent yarn finger F^6. Springs 40 and 41 extending between the bracket 42 and the arm 38 and yarn finger F^6, respectively, hold the pin 39 engaged with the yarn finger F^6 and bias the yarn finger toward the position in which yarn is fed to the needles.

In the construction shown, a push rod 460, when raised by a cam on the main pattern drum 120, raises the associated yarn finger to withdraw the yarn from the needles and when the push rod passes from the cam holding it raised, it permits the spring to operate the yarn finger to a position in which a yarn is fed to the needles. As shown, the yarn finger F^6 does not supply a yarn to the needles but serves only as a means for operating the fountain brush to and from a position in which the brush supplies coloring material to the raised selected needles N'. When the yarn finger F^6 is raised by its push rod, the finger F^6, through its engagement with the pin 39, operates the bell crank lever 35 to retract the rod 26, rotating the angle member 16 and shifting the fountain brush from a position in which it is engaged by the raised selected needles to a position clear of the path of the needles. When the push rod is withdrawn from the yarn finger, the springs 40 and 41 operate the bell crank lever 35 and the yarn finger F^6, causing the rod 26 to slide in the opening in the arm 24, compress spring 51 and rotate the angle member 16 to engage the pin 22 and place the fountain brush in the path of the raised selected needles.

In the knitting of the seamless hosiery shown in the drawings the thread used in the knitting of the turned welt was different from that used in knitting the leg and foot and the pattern in the welt was such that the thread could be taken and knit in all courses by the needles selected to form the guide mark. During the knitting of the welt the fountain brush is held from the path of the raised selected needles by a push rod holding the yarn finger F^6 in raised position. The main pattern drum cams controlling the yarn finger F^6 and those controlling the yarn finger, as F^7, which feeds the thread to the needles for the knitting of the leg and foot are similar and similarly placed on the main pattern drum 120 so that the fountain brush is positioned to apply coloring material to the raised selected needles when the yarn is supplied to the needles for the knitting of the leg and foot and the fountain brush is withdrawn when that thread is withdrawn during the knitting of the heel and toe.

What is claimed is:

1. In a method of manufacturing hosiery on a seamless hosiery machine, the step of marking hosiery fabric during knitting with a line in fugitive dye on a body thread to indicate a wale for engaging an edge of a preboarding form.

2. In a method of manufacturing hosiery on a seamless hosiery machine, the step of marking seamless tubular hosiery during knitting with a line in fugitive dye on a body thread indicating a wale for engaging an edge of a preboarding form.

3. In a method of manufacturing hosiery on a seamless hosiery machine, the step of marking hosiery fabric by the needles during knitting with a line in fugitive dye on a body thread indicating wales for engaging an edge of a preboarding form.

4. In a method of manufacturng hosiery, the steps of applying fugitive dye to a selected needle and applying the dye on the needle to the loop drawn by said needle in the knitting of each course to mark a line during the knitting indicating a wale for engaging an edge of a preboarding form.

5. In a method of manufacturing hosiery, the steps of applying fugitive dye to the same selected needles prior to the taking of the thread by said selected needles and applying the dye on the needles to the loops drawn by said needles in the knitting of each course to mark during knitting wales for engaging an edge of a preboarding form.

6. In a circular hosiery knitting machine, means for raising selected needles prior to the raising of adjacent needles to take a thread, brush means for applying fugitive dye to the hooks of said raised selected needles, and pattern means controlling the application of the fugitive dyes to said needle hooks.

7. In a knitting machine having independent needles, means for isolating a selected needle above adjacent needles, means for supplying coloring material to said isolated selected needle prior to operation of said selected needle to take a thread in the knitting of a course, and means operating said needles to draw loops of the thread, said selected needle applying the coloring material to the thread loop drawn thereby.

8. In a circular knitting machine, means for isolating selected needles above adjacent needles, means for applying coloring material to said isolated selected needles prior to operation of said selected needles to take a thread in the knitting of a course, and means to operate said needles to draw loops of the thread, said selected needles applying the coloring material to the thread loops drawn thereby and said selected needles being the same needles in each revolution of the machine whereby said selected needles knit a colored stripe or stripes.

9. In a circular knitting machine, means for isolating selected needles above adjacent needles, means for supplying coloring material to said isolated selected needles prior to operation of said selected needles to take a thread in the knitting of a course, and means for operating said needles to draw loops of the thread, said selected needles applying the coloring material to the thread loops drawn thereby and said selected needles knitting colored loops in the same wales in successive courses to form a contrasting preboarding guide in the fabric.

10. In a circular hosiery knitting machine, means for isolating selected needles above adjacent needles, means for supplying coloring material to said isolated selected needles prior to operation of said selected needles to take a thread in the knitting of a course, means for operating said needles to draw loops of the thread, said selected needles applying the coloring material to the thread loops drawn thereby, and means for rendering said coloring material supplying means operative during the knitting of the hosiery leg and foot.

11. In a knitting machine having independent needles, means for differentiating a selected needle in position from the adjacent needles prior to the operation of said selected needle to take a thread in the knitting of a course, means for supplying coloring material to said selected needle while said selected needle is differentiated in position from the adjacent needles, and means operating said needles to draw loops of the thread, said selected needle applying the coloring material to the thread loop drawn thereby.

12. In a circular knitting machine, means for operating a selected needle to a position differentiating said selected needle from adjacent needles prior to the taking of a thread by said selected needle in the knitting of a course, means for applying coloring material to said selected needle while said selected needle is differentiated in position from said adjacent needles, and means to operate said needles to draw loops of the thread, said selected needle applying coloring material to the loops drawn thereby and said selected needle being the same needle in each revolution of the machine.

13. In a knitting machine having independent needles including at least one differentiated needle, means for supplying coloring material to said differentiated needle prior to the operation of said needle to take a thread in the knitting of a course, and means operating said needles to draw loops of thread, said differentiated needle applying the coloring material to the thread loop drawn thereby.

14. In a knitting machine having independent needles including at least one differentiated needle, means for supplying coloring material to said differentiated needle prior to the operation of said needle to take a thread in the knitting of a course, and means operating said needles to draw loops of the thread, said differentiated needle applying the coloring material to the thread loop drawn thereby and said differentiated needle being the same needle in each revolution of the machine.

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