

Nov. 24, 1959

V. DUCHARME

2,913,887

CIRCULAR KNITTING MACHINE

Filed Oct. 29, 1957

2 Sheets-Sheet 1

FIG. 1.

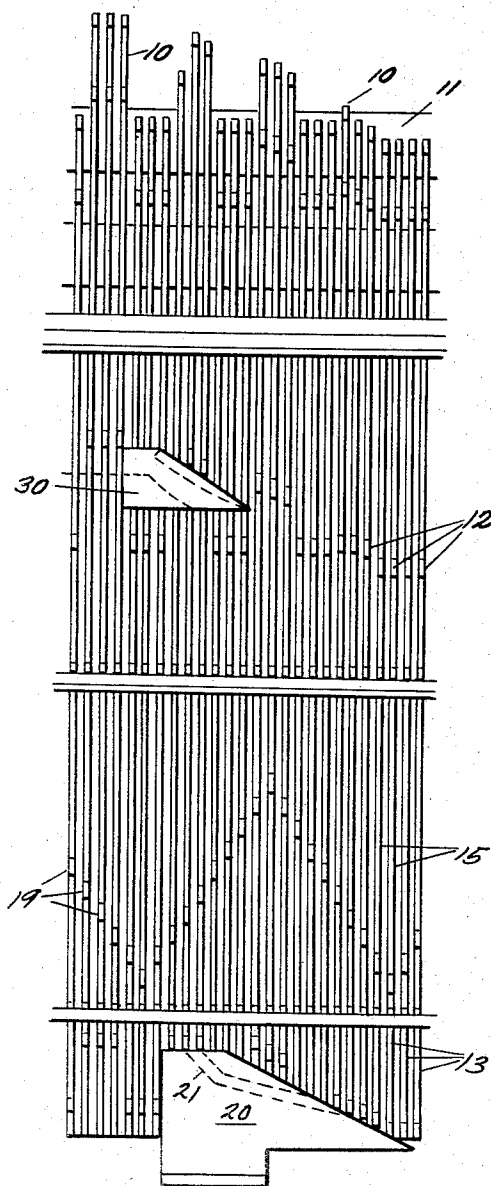


FIG. 2.

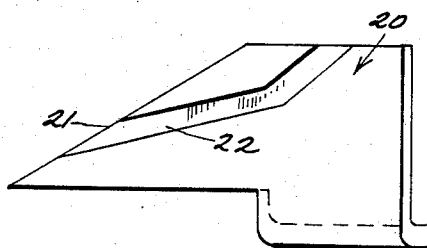


FIG. 3.

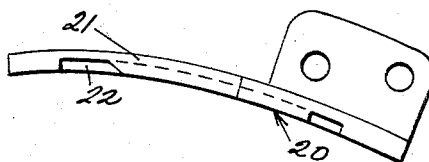
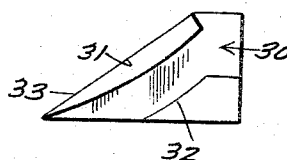


FIG. 4.



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2 Sheets-Sheet 2

FIG. 5.

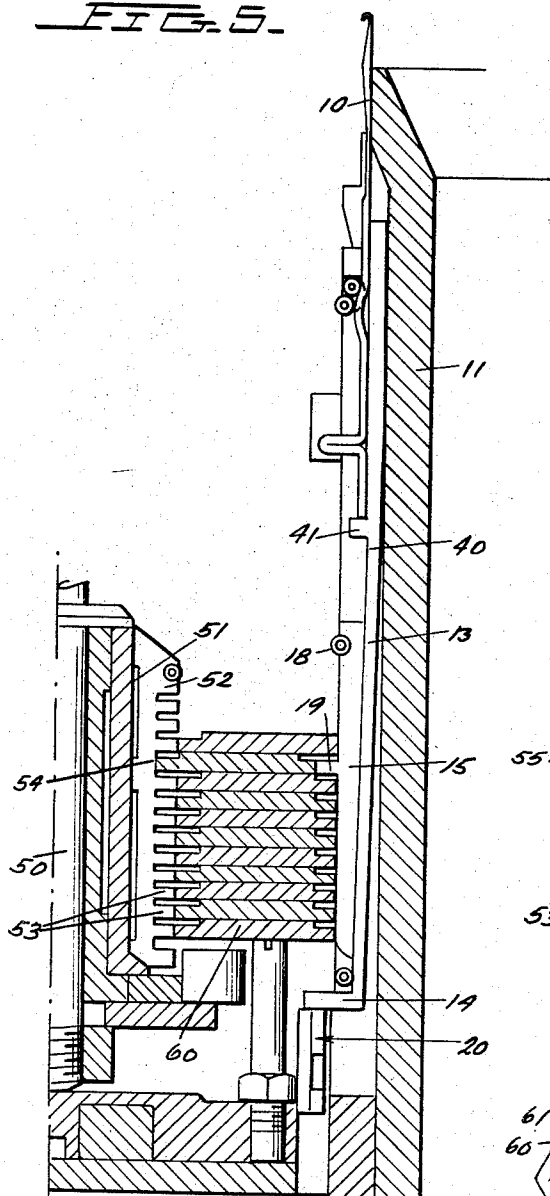


FIG. 6.

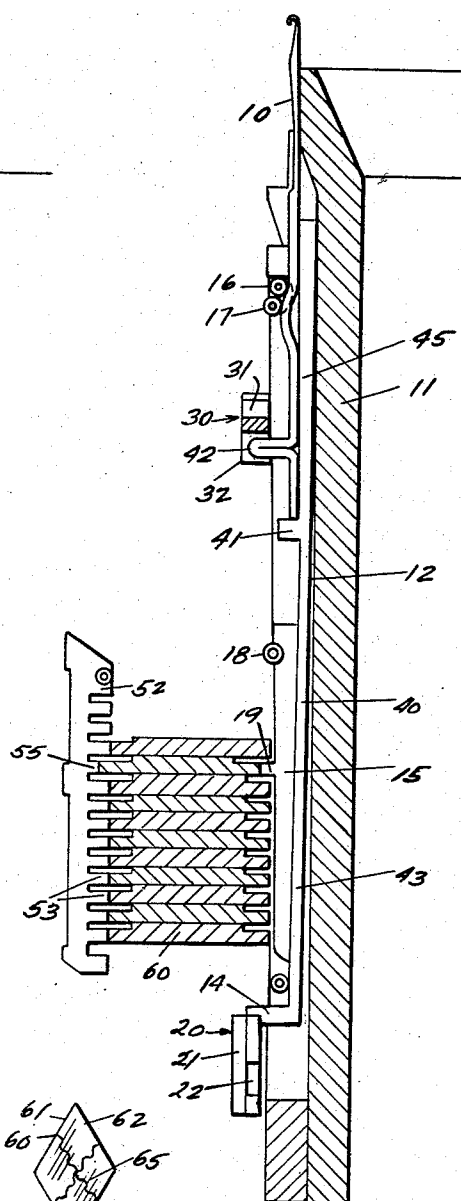
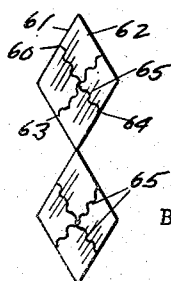


FIG. 7



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1

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CIRCULAR KNITTING MACHINE

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2 Claims. (Cl. 66—50)

This invention relates to an improvement in circular knitting machines of the type known as trick wheel machines wherein a design in one or more colors of yarn is determined by the trick wheel.

Such machines are especially adapted for the knitting of gloves or socks and as heretofore constructed they are able to knit and tuck or knit and float the yarns but they are not adapted to knit, tuck and/or float the yarns.

Among the objects of this invention is to provide a combination of cams, etc. whereby the needles of such trick wheel machines may knit, tuck or float.

The objects of the invention are attained by adding one cam, a tucking cam to the needle cams, by altering the jack raising cam so that it has two jack raising surfaces one lagging behind the other and by altering the tricks of the trick wheel so that at least one of said tricks is adapted to push the presser bar only a portion of the distance necessary to completely inactivate the raising butt of the jack so that the inner course of the jack cam operates to raise the needle after the needle has passed the knitting cam and before the needle passes the tucking cam.

In the formation of a design in the circular knitted product by yarns of different colors wherein the added yarn moves back and forth along only a portion of the fabric knitting in one direction and floating at the inside of the circular knit fabric in the other direction, a more attractive and compact product is obtained when it is possible to tuck the added yarn at the corners of the design and when this is done it is also possible to cut out the floats on the inside after the product is completely formed without causing the fabric to unravel.

The invention both as to its organization and its method of operation together with additional objects and advantages thereof will best be understood from the following description of specific embodiments thereof when read in connection with the accompanying drawing in which:

Fig. 1 is a partial linear development view of the jacks, pressers, needles and cams of the machine of the invention.

Fig. 2 is a detail side view of the jack raising cam from the inside thereof.

Fig. 3 is a top view of the jack raising cam of Fig. 2.

Fig. 4 is a view of the needle stitching and tucking cam from the inside thereof.

Fig. 5 is a partial side cross sectional view of the trick wheel and knitting cylinder arrangement.

Fig. 6 is a view similar to Fig. 5 but showing the operation of a different trick of the trick wheel.

Fig. 7 is a representation of a knitted fabric design for illustrating the advantages of the invention.

The trick wheel machine shown is similar to that of Ames U.S. Patent No. 1,722,989 and in general comprises the needle cylinder 11 having radial slots 12 therein in which the needles 10 are positioned. Back of needles 10 are the upper ends 45 of the jacks 40. Jacks

2

40 have lugs 41 for raising the needles and butts 14 attached to the lower flexible portion 43 of jacks 40 adapted to contact the jack raising cams 20. Also in each slot 12, is a presser 15 adapted to be operated on the lower portion 43 of jack 40 to control the position of jack butt 14. Springs 16, 17, 18 are provided to hold the various elements 10, 40, 15 in the slots 12 of cylinder 11.

As shown in Fig. 5 the trick wheel 50 contains a plurality of slots 51 adapted to hold the tricks 52. The tricks 52 contain a plurality of the lugs 53. Only thirteen such lugs 53 are shown but the lugs may be made narrower and more numerous as desired. In conventional practice one or more of such lugs 53 are completely removed as shown at 54 of Fig. 5. According to the present invention one or more of the lugs 53 are completely removed as shown at 54 of Fig. 5 and/or one or more of the lugs is half removed as shown at 55 in Fig. 6.

The tucking or stitching of the needles 10 of the machine is controlled by the cooperating jack raising cam 20 and needle raising cam 30 in the manner best shown in Fig. 1. The needle raising cam 30 comprises two cam surfaces 31 and 32. When a needle 10 is raised to a position so that its butt 12 is above the lower level 33 of surface 31 the said needle 10 will be raised above the cylinder 11 a sufficient distance to take on a new thread and release the previously held thread or in other words to knit or stitch. When, however, the needle is raised but only after the butt 12 thereof has passed the lower end 33 of cam surface 31, the needle 10 will be controlled by cam surface 32 which raises the needle 10 sufficiently to take on a new thread but not sufficiently high to release the previously held thread. As a result the needle 10 which is controlled by surface 32 creates a tuck. When a needle is not raised at all, the thread it carries floats on the inside of the circularly knit fabric.

The jacks 13 cooperate with the jack cam 20 to raise the needles 10 to the proper position for knitting or tucking. When the jack butt 14 is in the position shown in Fig. 5 it travels on the top cam surface 21 of jack cam 20 and raises a needle 10 so that the butt 12 thereof is above the lower end 33 of needle cam surface 31 before it reaches the latter. When the jack butt 14 is completely depressed by its presser bar 15 the jack is not lifted by jack cam 20 and the yarn carried by the needle associated with that particular jack floats. When, however, the jack 13 is only partially depressed by its presser bar 15 as shown in Fig. 6 the butt 14 is affected only by the inner jack cam 22 which raises the jack 13 and its corresponding needle 10 but after the butt 12 of that particular needle has passed the lower end 33 of needle cam surface 31. Then the needle butt 12 is controlled by cam surface 32 so that said needle 10 does not knit but tucks instead.

The presser bars 15 are operated from the trick wheel 50 through cams 60 corresponding in thickness to approximately the thickness of the lug 53 of the trick 52. The cams 60 may be mounted on the machine in known manner being pivoted at one end and having the position of their opposite end controlled by corresponding lugs on each of the tricks 52 of the trick wheel 50. As a rule the lugs 19 of the adjacent presser bars 15 are vertically spaced from each other in some such way as illustrated in Fig. 1.

It is common in the production of circular knit fabrics to produce a color design such as shown at 60 (Fig. 7) by including an additional yarn of different color into the background and working this additional colored yarn back and forth across the wales of the fabric to produce the design required. The added colored yarn is knitted into the background along one course then floats back on the inside of the fabric to the point where it is in-

3

corporated into the next course. At various times the added yarn may be floated in for one or two stitches to form additional lines 65 in the design 60. According to the present invention, the needles are controlled to tuck along the lines 61, 62, 63, 64. This produces a much more compact and attractive design and further permits one to cut out the long floats of colored yarn in back of the design. In other words the tucks at the edges lock the added yarn into the fabric so that the floated yarn in back of the design (which is annoying in a glove, for example) may be cut away.

The features and principles underlying the invention described above in connection with specific exemplifications will suggest to those skilled in the art many other modifications thereof. It is accordingly desired that the appended claims shall not be limited to any specific feature or details thereof.

I claim:

1. In a circular, pattern-forming, knitting machine of the type having a plurality of butted needles in the slots of a circular cylinder, knitting cams for said needles, a plurality of jacks mounted in said needle slots behind and below said needles each having at least one butt and a needle raising lug for raising the corresponding needle, cams for said jacks, a plurality of presser bars one in front of each of said jacks, each presser bar having at least one lug and being adapted to press said jack into the needle slot so as to inactivate the raising butt

4

of the jack, a plurality of cams for operating the presser bars by pressing against the lug of the same, and a trick wheel comprising a plurality of tricks having at least one lug for operating the presser bar cams whereby to produce the pattern, the improvement comprising a needle cam having a knitting cam surface adapted to raise the needle to knitting position and a tucking cam surface adjacent to but following the knitting cam surface and adapted to raise the needle to tucking position, a jack raising cam comprising an outer surface and a juxtapositioned inner cam surface which lags behind the outer surface, in combination with a plurality of tricks at least one of which comprises a frictional lug adapted to operate a presser bar so that the jack is pressed only part of the way in whereby the jack butt is then operated by the inner cam surface of the jack raising cam to thereby cooperate with the needle tucking cam.

2. The device as claimed in claim 1 wherein the tucking cam surface is in the form of a groove having a depth of the order of about half the thickness of the cam.

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