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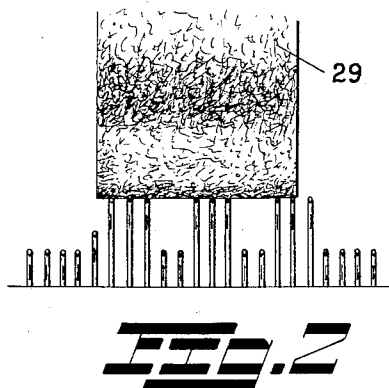
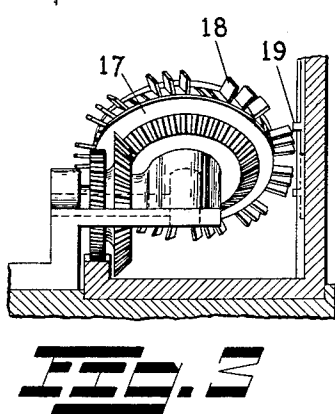
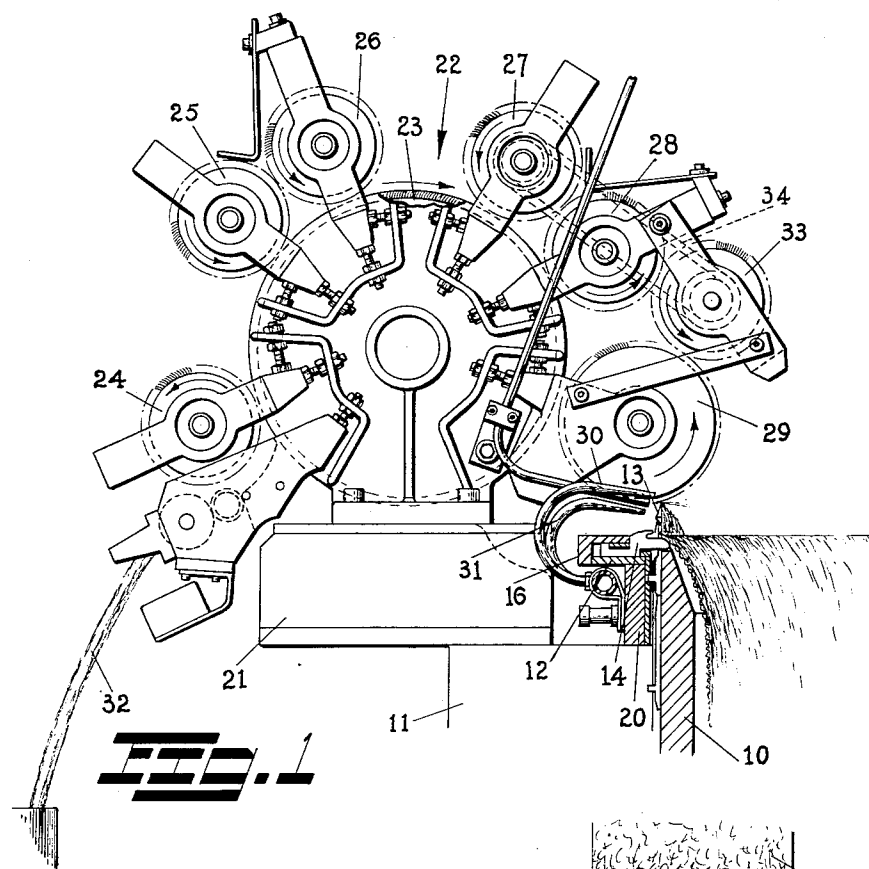
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2,953,002

KNITTING MACHINE FOR HIGH PILE FABRICS

Filed March 13, 1959

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

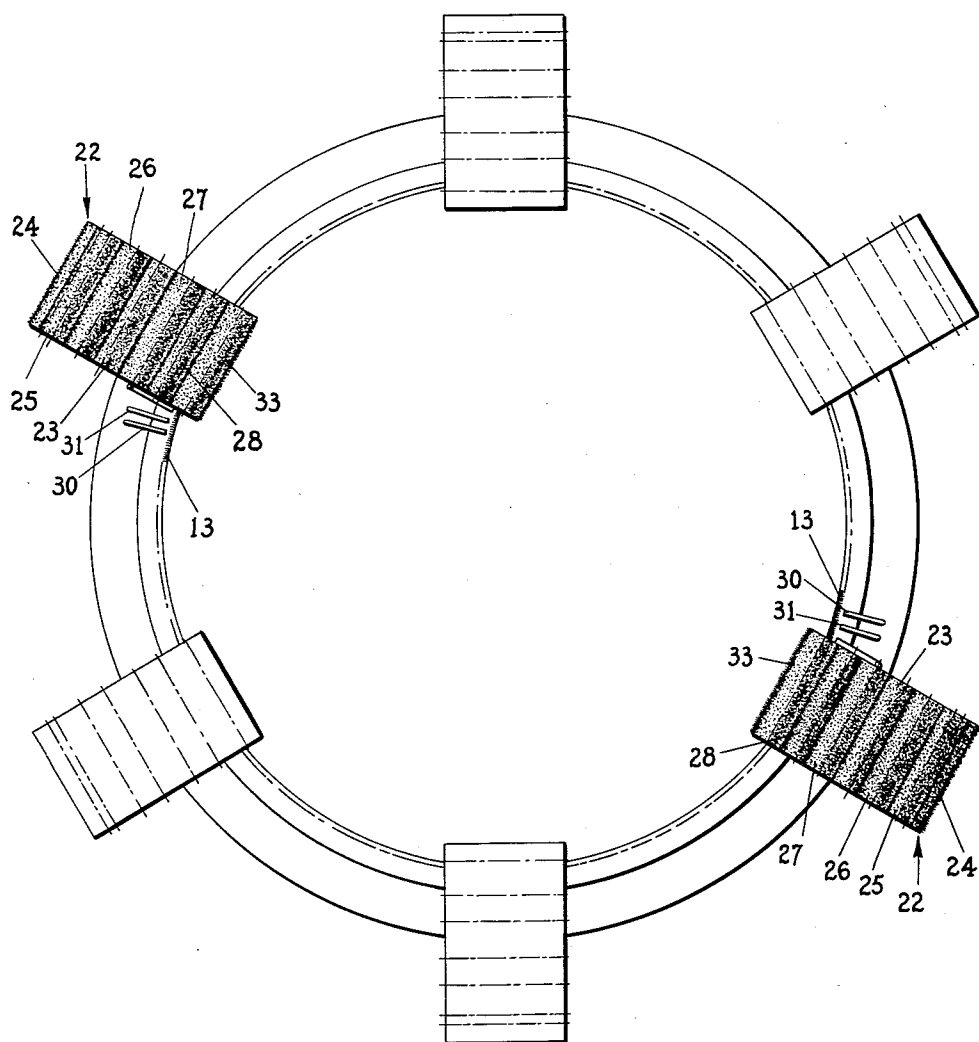


FIG. 4

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1

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KNITTING MACHINE FOR HIGH PILE FABRICS

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7 Claims. (Cl. 66—9)

This invention relates to knitting machines and in particular, to a mechanism by which certain improvements are realized in the production of so-called "high pile" fabrics.

It is a general object of the invention to improve the fiber carding and feeding means for knitting machines adapted to knit high pile type fabrics in which a pattern is knitted.

More specifically it is an object of the invention to so modify the fiber carding and feeding means that while the needles may vary their action in taking fibers at a doffer means in such a way that fibers are not uniformly taken and knitted, the excess will not pile up at the doffer but will be removed therefrom and preferably returned to the mass of fibers being carded.

It is a further object to provide means which make possible the knitting of fabrics having all-over high pile patterns as well as patterns where fibers are fed to spaced areas only, the remaining areas being knit as plain jersey.

A further object is that of accomplishing the desired result with simple means which shall be inexpensive, add a minimum of complication mechanically and which shall be free from trouble during operation of the device.

Other objects will become apparent from the disclosure which follows.

High pile fabrics are those in which a base fabric is supplemented by fibers incorporated in such manner that the fibers are drawn into tufts at each stitch to project to at least one side of the fabric. The pile thus formed is much longer than anything accomplished by way of combing, knapping or by forming terry loops which may or may not be cut. Of course, the pile is usually sheared and treated by processes which enhance its appearance and by which it may be made to resemble very closely several natural materials.

According to the invention of the instant case, fiber stock in the form of roving is fed to the knitting instrumentalities of a knitting machine by way of carding and doffer means at one or more feeding stations which may feed rovings which differ in material, texture, color or in any other desired manner from the roving fed at another feeding station. Pattern or other variegated effects may be produced, for example, by providing means which cause some of the knitting instrumentalities to take fibers from the doffer means of one carding unit and other of the knitting instrumentalities to take fibers from the doffer means of a second carding unit, which fibers may differ in some respect from the first-mentioned fibers. Such selection of the knitting instrumentalities results in certain areas of the doffer means becoming overloaded with fibers from its carding unit and novel means have been additionally provided for continually removing fibers from these overloaded areas and returning them to be reworked by the carding unit.

The invention will be described in detail by reference

2

to a specific embodiment thereof illustrated in the accompanying figures of drawing, wherein:

Fig. 1 is a sectional view of a knitting machine to which the invention has been applied;

Fig. 2 is a front view of the doffer means showing one pattern of needle selectivity which may be employed in carrying out the invention;

Fig. 3 is a front elevational view of a trick wheel and its associated mechanism employed in effecting desired needle selectivity; and

Fig. 4 is a plan view of a knitting machine showing six carding units applied thereto.

Now referring to Fig. 1, the invention is applied to a knitting machine having a needle cylinder 10, circular base 11, sinker head 12, needles 13 and sinkers 14. Cams in sinker cap 16 actuate the sinkers in known manner.

A so-called "trick wheel" 17 having spaced butts 18 effects a predetermined selection of the needles by acting upon the needle butts 19 and raising them sufficiently to be acted upon by cams in cam sections 20. Such trick wheels are well known in the art and for a more complete description thereof, reference may be had to United States Patents 2,127,224 and 2,269,288.

On a base 21, attached to circular base 11 or to any fixed part or parts of the machine, is mounted a card mechanism generally denoted by numeral 22 for parallelizing and delivering fibers to hooks of knitting instrumentalities and having among other parts, a card cylinder 23 rotatable as shown in a clockwise direction, a licker-in cylinder 24, stripper roll 25 and worker roll 26. A second set of rolls is shown at 27 and 28 but the roll 28 is moved away from the card cylinder so that it does not make contact therewith and does not function as a worker, but instead serves to transfer excess fibers back to stripper 27 in a manner to be described. Finally, a doffer cylinder 29 removes the fibers from the card and as the hooks of needles 13 enter the card clothing, they take a tuft of fibers and then the base yarn and knit, the fibers being cast off as pile at the back of the fabric. A number of air nozzles 30 and 31 assist by projecting air streams to cause the fibers to appear cleanly at a single face of the fabric.

A supply of fibers of staple lengths or in any other suitable form are furnished as very loosely twisted slivers or rovings 32 and are advanced to the licker-in cylinder.

According to the invention, one or more of these carding cylinders are used, each of which preferably feeds rovings having characteristics which differ from the rovings of the other carding units. For example, it may be desired to produce a striped fabric of two different colors in which case each of the colors would be fed at one of two carding units. A trick wheel is set to select a predetermined needle pattern so that some of the needles are caused to take fibers from the doffer wheel 29 at one of the carding units. After these needles have taken their fibers, they are lowered to approximately a tuck position but do not knit at this time. A second trick wheel adjacent a second carding unit (Fig. 4) is patterned to raise those needles which were not previously selected and to cause them to take fibers from this second carding unit and at this time all of these needles take a base yarn from a means adjacent thereto. The fibers of this second carding unit may differ in color or in any other property from those of the first unit. Then, after all of the needles of these two groups have taken their fibers as well as the base yarn, they are caused to knit in the usual manner. Accordingly, a course results at each second feeding station.

Alternately, base yarn may be fed at each feeding station while those needles that take fibers at a particular station knit it at that station. When operating that

way, floats are left at the needles which do not knit then. Of course the opposite should occur at the intermediate feeding stations.

As a result of this limited selection of needles adjacent each doffer means, certain areas of the doffer are never cleared of fibers by the needles and the fibers would pile up excessively in these areas if no means were provided for the removal thereof. For this purpose a cleaner roll 33 has been provided adjacent roll 28 and is driven by a chain 34 from a 20-tooth sprocket on stripper 27 to a 10-tooth sprocket on the cleaner roll so that the speed of the latter is approximately twice that of the stripper. Both of rolls 28 and 33 preferably have straight doffer wire on them. Thus the cleaner roll removes excess fibers from the doffer and transfers these to roll 28 which in turn transfers them to the stripper 27 for reprocessing.

It is possible, by means of predetermined needle selection, to produce a fabric having horizontal stripes or a checkerboard pattern. Also, colors may be blended together to simulate naturally occurring furs.

The input of fibers to the carding unit should be balanced to the requirements of the pattern. Also, instead of feeding the excess fibers back to the carding unit directly, they may be discharged and subsequently reprocessed in any desired way, for example, they may be reclaimed and incorporated into the stock from which rovings are made.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This invention is, therefore, not to be limited to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. In a knitting machine of the type described, the combination of knitting instrumentalities for drawing yarn into loops to form a fabric, fiber carding and doffer means for parallelizing and delivering fibers to the hooks of the knitting instrumentalities, means for causing certain of said knitting instrumentalities to take fibers from limited portions only of the surface of said doffer means, and means for removing fibers from the remaining portions of said surface and for delivering said fibers to said carding means.

2. In a knitting machine of the type described, the combination of knitting instrumentalities for drawing yarn into loops to form a fabric, fiber carding and doffer means including a stripper roll for parallelizing and delivering fibers to the hooks of said knitting instrumentalities, pattern means for causing selected ones of the knitting instrumentalities to take fibers from some portions of the doffer means but not from others, and means for removing fibers from said other portions of said doffer means and delivering them to said stripper roll.

3. In a knitting machine of the type described, the combination of knitting instrumentalities for drawing yarn into loops to form a fabric, fiber carding and doffer means including a stripper roll for parallelizing and delivering fibers to the hooks of said knitting instrumentalities, pattern means for causing selected ones of the

knitting instrumentalities to take fibers from some portions of the doffer means but not from others, and means comprising a cleaner roll adjacent said doffer means for removing fibers from said other portions of said doffer means and for delivering them to said stripper roll.

4. In a knitting machine of the type described, the combination of knitting instrumentalities for drawing yarn into loops to form a fabric, at least two fiber carding and doffer means for parallelizing and delivering fibers to the hooks of said knitting instrumentalities, pattern means for causing some of said knitting instrumentalities to take fibers from some portions only of one of said doffer means but not from other portions thereof, means for causing other of said knitting instrumentalities to take fibers from some portions only of another of said doffer means but not from other portions thereof, and means for removing fibers from said other portions of said doffer means and for delivering said fibers to said carding means.

5. In a knitting machine of the type described, the combination of knitting instrumentalities for drawing yarn into loops to form a fabric, at least two fiber carding and doffer means each including a stripper roll for parallelizing and delivering fibers to the hooks of said knitting instrumentalities, pattern means for causing some of said knitting instrumentalities to take fibers from some portions only of one of said doffer means but not from other portions thereof, pattern means for causing other of said knitting instrumentalities to take fibers from some portions only of another of said doffer means but not from other portions thereof, and means comprising a cleaner roll adjacent each of said doffer means for removing fibers from said other portions of said doffer means and for delivering them to said stripper roll.

6. In a knitting machine of the type described, the combination of knitting instrumentalities for drawing yarn into loops to form a fabric, at least two fiber carding and doffer means for parallelizing and delivering fibers to the hooks of said knitting instrumentalities, pattern means for causing only some of said knitting instrumentalities to take fibers from one of said doffer means and others of said knitting instrumentalities to take fibers from another of said doffer means and means at each carding means for removing excess fibers from portions of doffer means thereat which fibers result from failure of certain instrumentalities to take fibers therefrom.

7. The mechanism of claim 6 wherein said fiber removing means comprises a cleaner roll adjacent each of said doffer means for removing fibers from said portions of said doffer means and adapted to deliver them to said carding means.

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