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2,810,280

CLIPPING DIAL FOR CIRCULAR KNITTING MACHINE

Filed Jan. 25, 1956

2 Sheets-Sheet 1

Fig. 1.

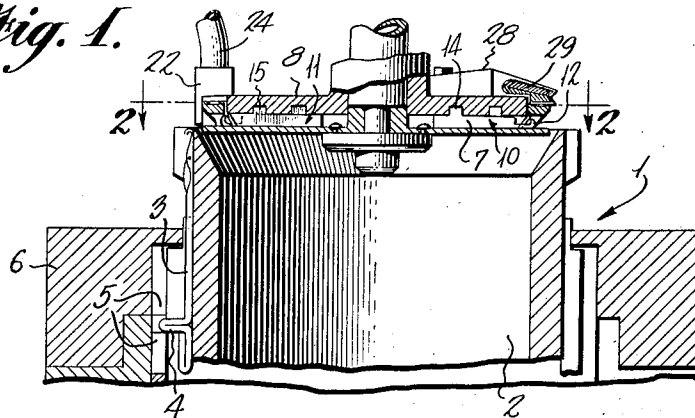


Fig. 2.

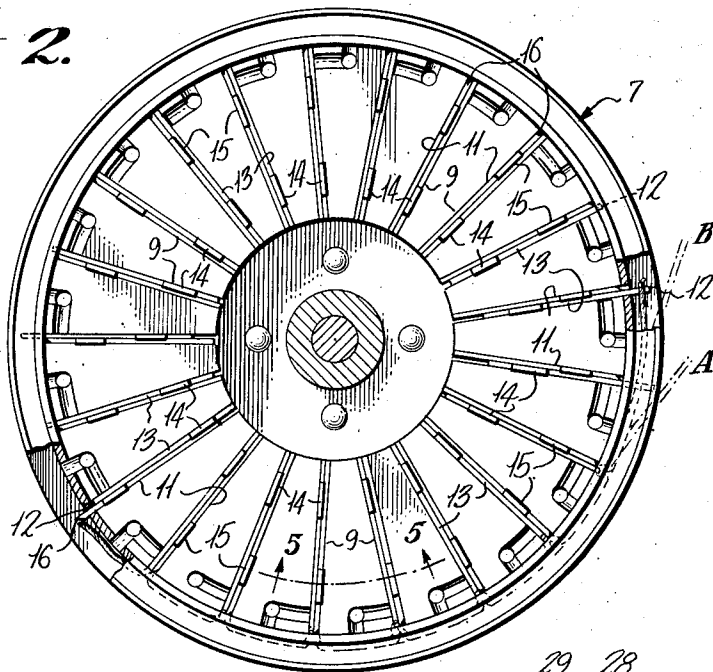
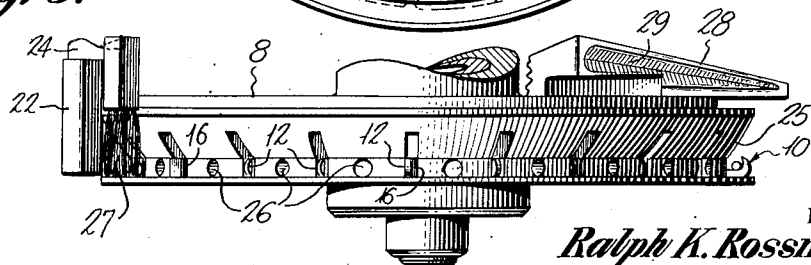


Fig. 3.



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Fig. 4.

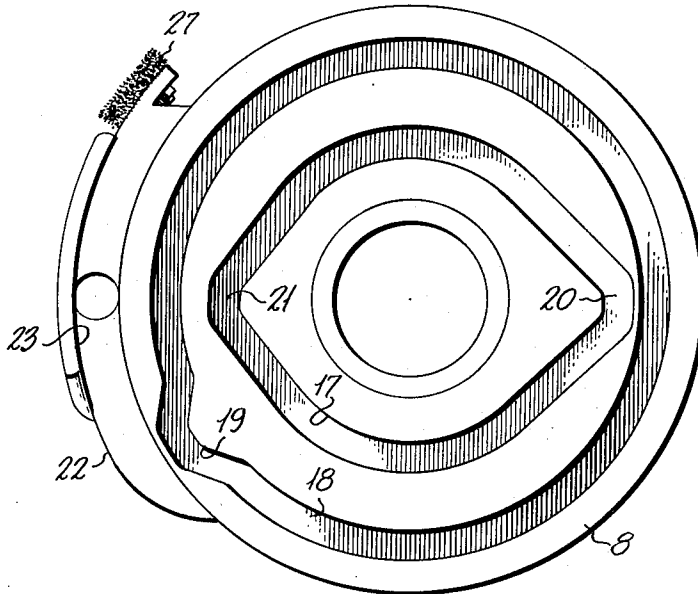


Fig. 5.

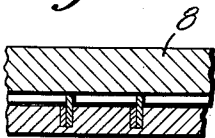


Fig. 6.

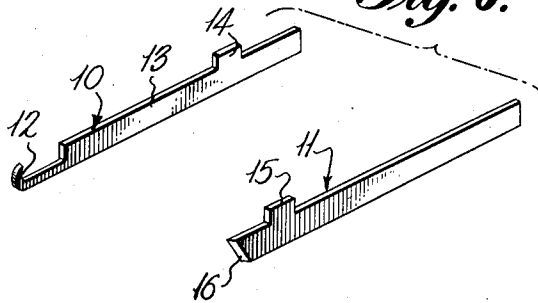
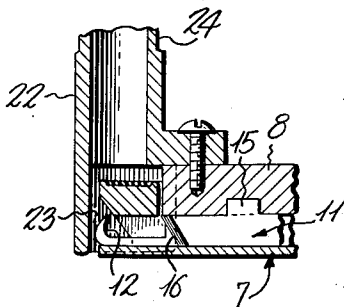


Fig. 7.



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CLIPPING DIAL FOR CIRCULAR KNITTING MACHINE

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11 Claims. (Cl. 66—147)

This invention relates to knitting machines, and more particularly to circular knitting machines adapted to automatically knit patterned fabrics from several yarns with the base yarn floating across the back of the fabric in the pattern area with means for cutting away the floaters during the knitting operation.

It is common practice to knit patterned fabrics from two or more yarns, plating one yarn over the other in some areas and floating the unwanted yarn across the back of the fabric in other areas, or, instead of plating, floating the unwanted yarn or yarns in all areas. This is true, for example, in the knitting of socks having an Argyle pattern. When a sock is completed, the inside of the sock is filled with a mass of relatively large floaters which would seriously interfere with putting the sock on. It has been customary for the mills to employ persons to turn the socks inside out and clip off the floaters by hand. This is not only time consuming but costly, adding materially to the price which must be charged for the finished article.

It is the primary object of the present invention to provide a knitting machine capable of producing patterned goods of this type wherein the floaters will be automatically removed as the fabric is knit.

Another object of the invention is to provide a dial machine for this purpose and utilize the dial and cap as means for removing the floaters.

A further object is the provision in a machine of such type of means to remove the cut off floaters to prevent their accumulation in the machine and the possibility of clogging the machine.

Yet another object is to provide a knitting machine with a dial whereby hooks in the dial will draw the floaters from the knitting area and hold them until they are cut off.

Other objects of the invention will become apparent from the following description of one practical embodiment thereof when taken in conjunction with the drawings which accompany, and form part of, this specification.

In the drawings:

Figure 1 is a vertical section through the center of a portion of the needle cylinder of a knitting machine, with a dial and cap in place above the cylinder;

Figure 2 is a top plan view of the dial, parts being broken away;

Figure 3 is a side elevation of the dial and cap;

Figure 4 is a bottom plan view of the dial cap, illustrating the cam tracks;

Figure 5 is a section taken on the line 5—5 of Figure 2;

Figure 6 is a perspective view of one of the dial hooks and dial knives; and

Figure 7 is a partial vertical section through one side of the dial and cap at the cutting position, showing the vacuum chamber for gathering cut lengths of yarn.

In general, the invention concerns knitting machines having dials, wherein the dial is provided with hooks and knives for drawing in and severing floaters formed during the knitting of patterned fabrics from two or more yarns.

Referring to the drawings in detail, there is shown a

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portion of a conventional knitting machine 1. The machine has the usual vertically grooved needle cylinder 2 with standard latch needles 3 mounted for reciprocation in the grooves. The needle butts 4, through cooperation with the stitch cams 5 carried by the cam ring 6 control the vertical movement of the needles.

The dial 7 is mounted above the needle cylinder and fixed for rotation with the cylinder. The dial cap 8 is mounted above the dial and is fixed with respect to the cam ring 6.

The details of mounting and driving the above-mentioned parts are not shown, as these features are well-known and well-understood in the textile machinery art.

The dial is very similar to conventional construction. It is circular in form, and provided with a plurality of radial grooves 9 which are open to the peripheral edge of the dial. There may be as many grooves as there are needles in the cylinder, but it has been found that this is not necessary as the device will function capably with a lesser number. The grooves are equally spaced apart, however, there being one groove for every two, three or four needles as particular needs may require.

In each groove of the dial, in side by side relation, there will be slidably positioned a hook 10 and a knife 11. The hook is very similar to the usual needle, but the hook end 12 is somewhat larger, there is no latch, and the shank 13 is flattened and fairly thick in a depthwise direction. A butt 14 projects upwardly from the shank. The knives are flat and provided with butts 15 located much closer to the outer ends of the knives than are the butts of the hooks. The leading edges of the knives decline rearwardly and are sharpened, as at 16.

The dial cap fits over the dial in usual fashion, and is provided with cam grooves 17 and 18 which receive the butts 14 and 15 respectively of the hooks and knives. Cam groove 18 is concentric to the axis of the cap for most of its length, being offset outwardly, as at 19, at a point well beyond the stitch point of the cylinder needles, so that the knives will be forced outwardly and retracted immediately once each revolution of the dial. The hook cam groove 17 is offset outwardly at the diametrically opposed points 20 and 21, with the offset 20 being of greater amplitude than the offset 21. Offset 20 is located just beyond the stitch point of the needles to project the hooks 10 to engage floating yarns, as will be described, and offset 21 will move the hooks outwardly to free them of cut yarn ends and lint. The reference to the stitch point of the needles is used to indicate the timed relation of the various functions, whereas in fact this is accomplished by proper orientation of the dial cap with respect to the stitch cam.

At this point it should be noted that as a yarn is floated during the knitting process, the hooks in the dial will be moved outwardly by their cam to pick up the floater and draw it in close to the dial. At the proper time in the cycle, the knives will move out to shear the yarn against the hooks which are holding it.

In order to remove the cut yarn sections from the machine, a housing 22 is provided, carried by the cap and closely embracing the periphery of the dial. The arcuate extent of the housing is sufficient to encompass the cutting area and the second projection of the hooks beyond the cutting zone. Housing 22 has an open face 23 toward the dial, and is in communication with a vacuum tube 24, coupled to any convenient vacuum source.

Means are provided to insure a complete cleaning of the dial through the vacuum action. It will be noted that the periphery of the dial is grooved, as at 25, and that the hook grooves 9 open into the peripheral groove. As the hooks are moved outwardly while within the span of the vacuum housing their hold upon the cut yarn will be released and a strong suction will be induced at the

mouths of the radial grooves. In addition to this, ports 26 are provided to afford communication between the interior of the radial grooves and the peripheral groove 25 so that lint drawn into the radial grooves by reciprocation of the hooks will be sucked out to prevent clogging within the dial.

In order to loosen any lint particle which might remain after passing through the vacuum housing, a brush 27 is employed. The brush is secured to the vacuum assembly and bristles brush over the dial edge and the hooks, which will be projecting beyond the dial as they pass the brush.

The yarn which is to be floated may be fed to the needles in any convenient manner, but it has been found advantageous to employ a yarn guide 28 carried by the cap and having an inclined guide groove 29 to lead the yarn across the peripheral groove in the dial where it may be caught by the dial hooks.

In operating the machine, the dial and cap will be set closely adjacent the needle bank and the yarn which is to be floated in predetermined areas led over the yarn guide 28. The other yarn or yarns to be used may be fed by conventional yarn carriers. In Figure 2 there is shown in dotted lines the two angular positions which the yarn will assume; the position A being that of the yarn being knitted, and the position B being that assumed by the floaters. It will be obvious from this illustration that the yarn when being knitted will lie tangential to the dial but its angle is such that the projected hooks of the dial will not reach it. When the yarn is no longer knit but is floating, it will extend from the last stitch in which it was included and thus will be brought across the path of the projected hooks. After the hooks engage the floaters, they will be retracted by the cam and draw the floaters into close contact with the bottom of the peripheral groove in the dial, out of the way of the cylinder needles. The dial hooks will progressively pick up a floater for its full length and hold it tightly against the dial. As the dial rotates the offset 19 in cam groove 18 will cause the knives to move outwardly, severing the held yarn against the hooks. Due to the fact that each hook has its accompanying knife, the yarn will be severed adjacent each hook which is in engagement with the yarn. Thus the severing is done irrespective of the hooks engaging the yarn and but short lengths will be left attached to the fabric at the sides of the patterned area. By this process all floaters will be removed as formed and the finished fabric will have all floaters cut off.

As the dial continues to rotate the second offset 21 on the hook cam will move the hooks outwardly releasing the cut yarns. Both the cutting action and the second outward movement of the hooks will take place within the vacuum housing and cut ends and lint will be carried off, leaving the dial clean.

While in the above one practical embodiment of the invention has been disclosed, it will be understood that the details of construction shown and described are merely for purposes of illustration and that the invention may take other forms within the scope of the appended claims. What is claimed is:

1. In a knitting machine, a needle cylinder, needles vertically reciprocable about said cylinder, stitch cams about said cylinder in engagement with said needles, a dial rotatably mounted adjacent the top of said cylinder, means carried by said dial to engage yarn floated back of said needles, and means carried by said dial to cut off floating yarn so engaged, said means to engage the yarn comprising a plurality of hooks mounted in said dial for reciprocable movement radially of said dial.

2. In a knitting machine, a needle cylinder, needles vertically reciprocable about said cylinder, stitch cams about said cylinder in engagement with said needles, a dial rotatably mounted adjacent the top of said cylinder, means carried by said dial to engage yarn floated back of said needles, and means carried by said dial to cut off

floating yarn so engaged, said means to cut off the yarn comprising a plurality of knives mounted in said dial for reciprocable movement radially of said dial.

3. In a knitting machine, a needle cylinder, needles vertically reciprocable about said cylinder, stitch cams about said cylinder in engagement with said needles, a dial rotatably mounted adjacent the top of said cylinder, means carried by said dial to engage yarn floated back of said needles, and means carried by said dial to cut off floating yarn so engaged, said means to engage the yarn comprising a plurality of hooks mounted in said dial for reciprocable movement radially of said dial, and said means to cut off said yarn comprising an equal plurality of knives, one knife mounted beside each said hook, in said dial for reciprocable movement radially of said dial independently of said hooks.

4. In a knitting machine as claimed in claim 3, means to reciprocably move said hooks and said knives in predetermined order.

5. In a knitting machine as claimed in claim 4, means to remove yarn lengths cut off by said knives.

6. In a knitting machine, a needle cylinder, needles vertically reciprocable about said cylinder, stitch cams about said cylinder in engagement with said needles, a dial rotatably mounted adjacent the top of said cylinder, a plurality of radial equally spaced grooves in said dial, a hook mounted for radial sliding movement in each of said grooves to engage and hold yarn floated back of said needles, and means carried by said dial to cut off floating yarn so held by said hooks.

7. In a knitting machine as claimed in claim 6, said means to cut off floating yarn comprising a plurality of knives arranged one in each of said grooves in side by side relation to said hooks for sliding movement independently of said hooks.

8. In a knitting machine as claimed in claim 7, a dial cap fixedly mounted above said dial and having radially spaced hook controlling and knife controlling cam grooves therein, said hooks and said knives having butts to ride in the respective cam grooves in said dial cap.

9. In a knitting machine, a needle cylinder, needles vertically reciprocable about said cylinder, stitch cams about said cylinder in engagement with said needles, a dial rotatably mounted adjacent the top of said cylinder, a plurality of radial equally spaced grooves in said dial, a hook mounted for radial sliding movement in each of said grooves to engage and hold yarn floated back of said needles, a plurality of knives arranged one in each of said grooves in side by side relation to said hooks for sliding movement independently of said hooks, butts on said hooks and said knives, a dial cap fixedly mounted above said dial, said dial having a cam track to receive the butts on said hooks to move said hooks when said dial cap is rotated and a cam track to receive the butts of said knives to move said knives when said dial cap is rotated, and means to remove yarn lengths cut off by said knives.

10. In a knitting machine as claimed in claim 9, said means to remove cut off yarn lengths comprising, a vacuum chamber having an open face positioned adjacent the periphery of said dial.

11. In a knitting machine as claimed in claim 9, a yarn guide carried by said dial cap to lead yarn across the peripheral edge of said dial.

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