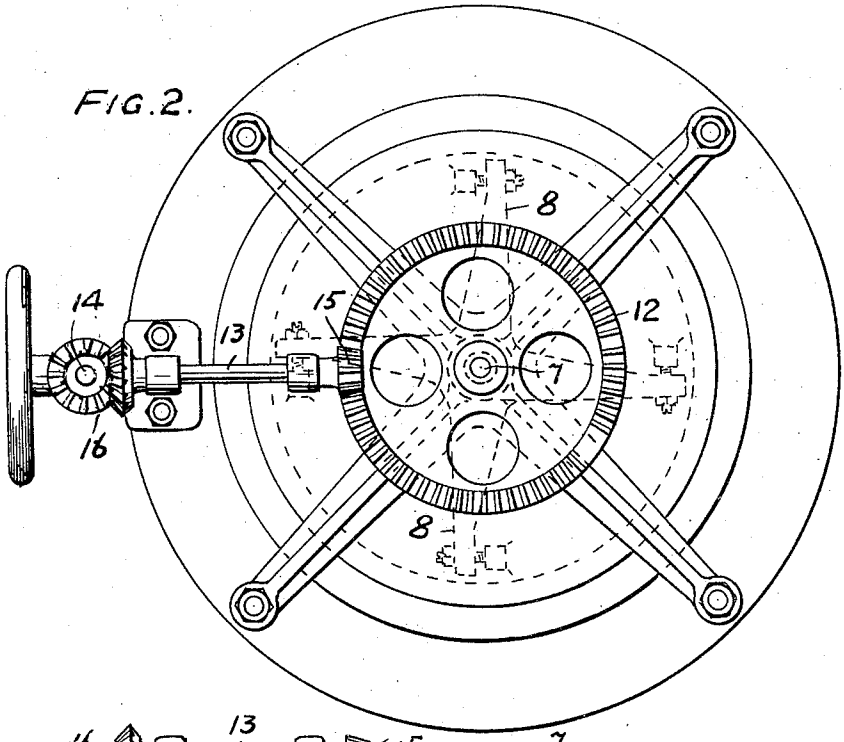
Dec. 29, 1931. C. H. BREAITHWAITE 1,838,739

MACHINE FOR KNITTING PILE FABRICS

Filed Dec. 13, 1928 3 Sheets-Sheet 1

FIG. 2.



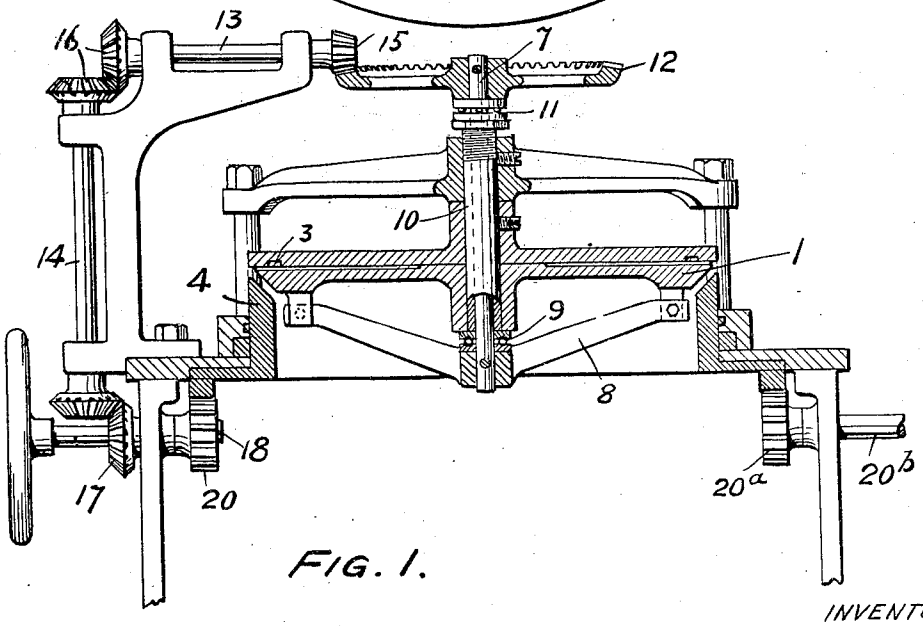


FIG. 1.

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MACHINE FOR KNITTING PILE FABRICS

Filed Dec. 13, 1928 3 Sheets-Sheet 2

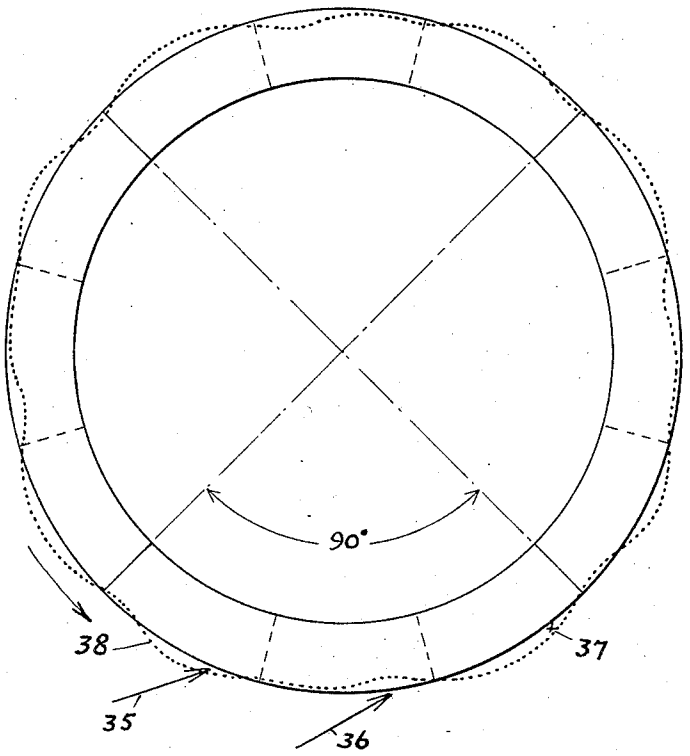


FIG. 3.

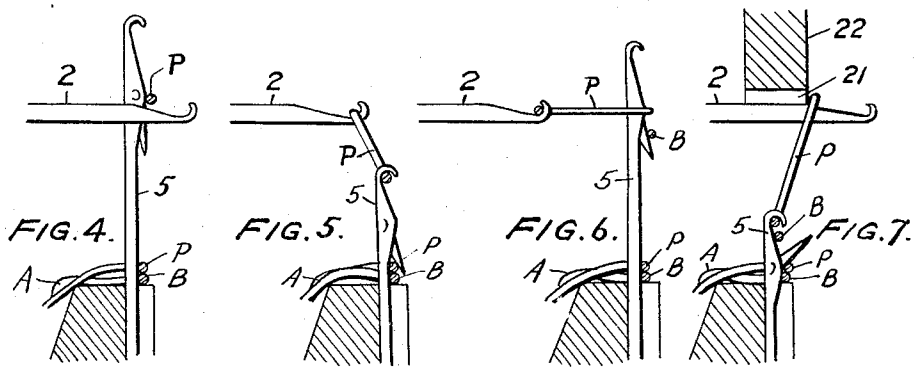


FIG. 4. FIG. 5. FIG. 6. FIG. 7.

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MACHINE FOR KNITTING PILE FABRICS

Filed Dec. 13, 1928 3 Sheets-Sheet 3

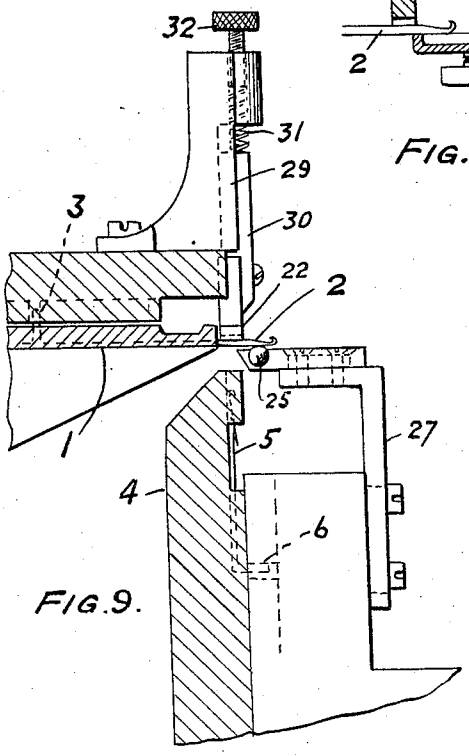


FIG. 9.

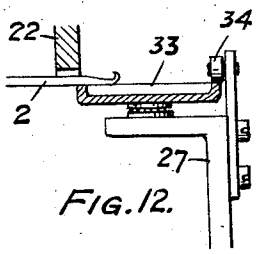


FIG. 12.

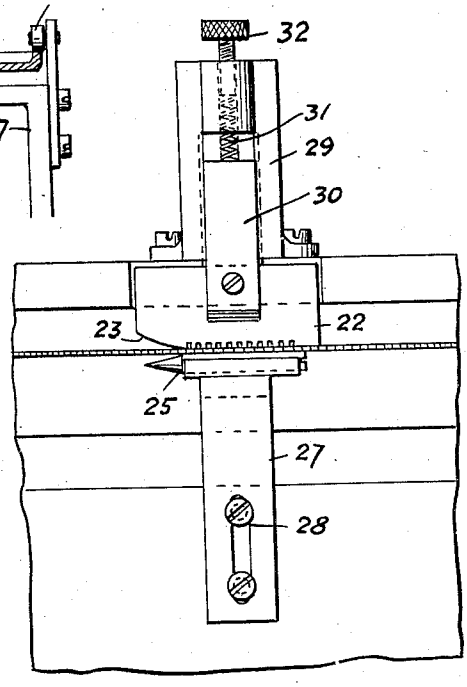


FIG. 8.

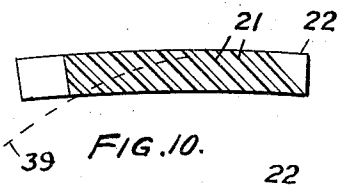


FIG. 10.

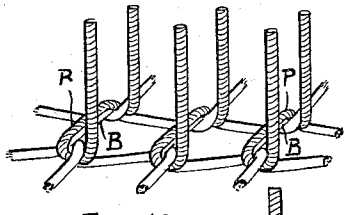


FIG. 13.

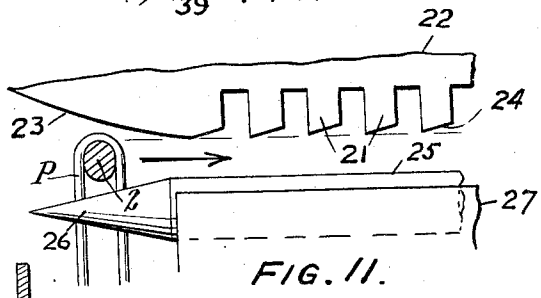


FIG. 11.

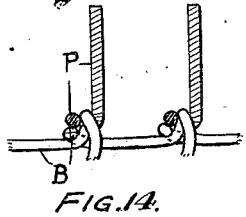


FIG. 14.

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UNITED STATES PATENT OFFICE

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MACHINE FOR KNITTING PILE FABRICS

Application filed December 13, 1928. Serial No. 325,703.

The principal objects of the present invention are, first, to effect an economy in the use of pile yarn; second, to produce knitted plush or pile fabric with a clean back, that is, a back at which no part of the pile yarn is visible; third, to produce a fabric which shall be free from streaks such as are produced by the lugs between which the fabric is passed in dial knitting machines with which I am familiar; and fourth, to provide a machine adapted to accomplish the results above indicated.

To these and other ends hereinafter stated or appearing the invention comprises the improvements to be presently described and finally claimed.

In the following description reference will be made to the accompanying drawings forming part hereof and in which

Figure 1 is a view partly in section and partly in elevation, more or less diagrammatic, illustrating a knitting machine embodying features of the invention.

Fig. 2 is a top or plan view of the same.

Fig. 3 is a diagrammatic view to which reference will be hereinafter made.

Figs. 4, 5, 6 and 7 are detached highly diagrammatic views illustrative of the operation of the machine.

Fig. 8 is an elevational view illustrative of cutter mechanism.

Fig. 9 is a transverse sectional view of the same.

Fig. 10 is a plan view of the cutter looking upward.

Fig. 11 is an enlarged elevational view of portions of the cutter.

Fig. 12 is a sectional view illustrating a modified form of cutter mechanism, and

Figs. 13 and 14 are diagrammatic views hereinafter referred to.

In the machine about to be described the cams do not rotate. There is dial mechanism 1 and it includes hooks 2 and a cam 3. There is knitting cylinder mechanism and it includes a rotatable needle carrying cylinder 4 and latch needles 5, and a cam 6 for the latch needles. 7 is a shaft connected at its lower end, as shown, by way of a spider 8 with the rotary element 1 of the dial mechanism. This shaft passes through suitable bearings 9, 10 and 11 and is turnably mounted in the bearings. At its upper end the shaft 7 is provided with a toothed wheel 12 driven through shafts 13 and 14, and toothed wheels 15, 16 and 17, from the shaft 18, which by the toothed wheel 20 is driven from the needle cylinder 4, in turn driven by toothed wheel 20^a from drive shaft 20^b. By these means the rotary element of the dial mechanism and the rotary element of the knitting mechanism are driven synchronously while at the same time the knitted fabric can pass between the two mechanisms without contacting with any part of either, so that it is not striped. The pile loops are cut on the hooks 2 and a description will be given of cutter mechanism which has the advantage that it cut the loops so accurately and well that the fabric does not have to be sheared and without shearing presents a well finished smooth face.

Referring to Fig. 10, there are fixed and parallel obliquely disposed spaced cutters 21. They are shown as provided on the face of a block 22 beveled off as at 23, Fig. 11. The faces of the cutters are also beveled off as at 24 to provide clearance. A support is provided for cooperation with the cutters, and in Figs. 8, 9 and 11 it is shown as a rod 25 having a pointed end 26 and mounted in a holder 27 or, more accurately, in a groove provided in the holder so as to expose the top portion of the rod 25. The holder 27 is made adjustable by the slot and screw connection 28, and the slide 29 in which works a shank 30 connected with the block and acted upon by a spring 31 adjustable by the thumb screw 32. In Fig. 12 there is shown a modified form of support, and it consists of a revoluble disk of which the rim 33 runs under a roller 34 and under the hook 2, otherwise the construction is as has been described in connection with Figs. 9 and 11.

Before describing the mode of operation of the machine in detail reference is made to Fig. 3. The same operations are repeated in the machine shown four times so that a description of one operation will suffice.

In the following description, the assump-

tion is made that the machine is in operation.

In Fig. 3 the pile yarn P is laid onto the hooks alone at the point generally indicated by the arrow 35 which, in the revolution of the parts, is in advance of the point 36, at which the backing thread is laid onto the needles. Fig. 4 diagrammatically indicates the introduction of the pile thread. Fig. 5 shows that the needles are lowered, not far enough to throw off the old loops and raised, and at the same time the hooks are drawn in toward the vertical central axis of the machine. Fig. 6 shows the result of these relative movements and illustrates that the pile thread is looped and held outside of and around the needles and in the hooks, thus establishing its position and tension, and Fig. 6 also illustrates that, after the completion of the above described operation on the pile thread, the back thread B has been laid onto the needles, at point 36 Fig. 3, and that the back thread is not engaged by the hooks 2. Fig. 7 shows a needle descending further than it did in Fig. 5 and carrying pile thread P and back thread B in its closed eye and about to throw off the old or previously formed loops A, supported by the top of the cylinder 4. Fig. 7 also shows that loops of pile thread are on the hooks 2, which have been projected, ready to be cut and let the fabric descend through the cylinder 4. In Figs. 13 and 14, there is diagrammatically illustrated the fact that the pile needle loops P are directly on top of the backing needle loops B. Referring to Fig. 10 the dotted line 39 indicates the path of the loops and shows that they travel somewhat crosswise of the cutters because the hooks and needles travel in a circle of which the arc is intercepted at the cutter. The described cutter in cooperation with the other parts of the machine is an important factor in the production of knitted plush having a smooth pile face although the loops are cut in the machine. Again, as has been said, the construction of the machine is such that the plush face is devoid of objectionable stripe effects.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details of construction and arrangement and matters of mere form without departing from the spirit of the invention which is not limited to such matters or otherwise than the prior art and the appended claims may require.

I claim:

1. In a knitting machine the combination of rotating dial mechanism including hooks, a rotary knitting cylinder mechanism including latch needles, two circumferentially spaced means each adapted to introduce an individual thread, the means for introducing the pile thread being in advance of the means for introducing the backing thread, the cam means of said dial mechanism and the cam means of said knitting cylinder mechanism being stationary in respect to rotation and constructed and adapted to project the hooks at the first thread introducing means to receive loops of pile yarn, and to retract the hooks and lower and raise the needles between the two thread introducing means to arrange and hold the pile thread in properly looped arrangement, and to raise the needles at the second yarn introducing means to receive the backing thread and to project the hooks to position the pile thread for cutting and to lower the needles to throw off previously formed loops supported on top of the needle cylinder, and loop cutting mechanism for the pile loops.

2. In a knitting machine the combination of rotating dial mechanism including hooks, a rotary knitting cylinder mechanism including latch needles, two circumferentially spaced means each adapted to introduce an individual thread, the means for introducing the pile thread being in advance of the means for introducing the backing thread, the cam means of said dial mechanism and the cam means of said knitting cylinder mechanism being stationary in respect to rotation and constructed and adapted to relatively move the needles and hooks to prearrange the pile thread loops before the introduction of any backing thread and to then knit the two threads with pile loops on the hooks, and cutting mechanism for the pile loops.

3. In a knitting machine having cooperating cylinder needles and dial hooks mounted for rotary movement, a cutter for the loops of pile thread carried by the shanks of the dial hooks, said cutter comprising a plurality of beveled teeth arranged approximately at right angles to the tangents to the circle of movement of the pile thread loops.

4. In a knitting machine having cooperating cylinder needles and dial hooks mounted for rotary movement, a frame, a cutter for the loops of pile thread carried by the shanks of the dial hooks, said cutter comprising a plurality of beveled teeth arranged approximately at right angles to the tangents to the circle of movement of the pile thread loops and a spring interposed between said cutter and said frame.

5. In a knitting machine having cooperating cylinder needles and dial hooks mounted for rotary movement, a frame, a cutter for the loops of pile thread carried by the shanks of the dial hooks, said cutter comprising a plurality of beveled teeth arranged approximately at right angles to the tangents of the circle of movement of the pile thread loops, a spring interposed between said cutter and said frame and a support for the outer ends of the dial hooks during the cutting operation.

6. In a knitting machine having cooperating cylinder needles and dial hooks mounted for rotary movement, a frame, a cutter for the loops of pile thread carried by the shanks of the dial hooks, said cutter comprising a plurality of beveled teeth arranged approximately at right angles to the tangents to the circle of movement of the pile thread loops, a spring interposed between said cutter and said frame and a pointed rod arranged beneath said cutter and forming a support for the outer ends of the dial hooks during the cutting operation.

7. In a knitting machine having cooperating cylinder needles and dial hooks mounted for rotary movement, a cutter for the loops of pile thread carried by the shanks of the dial hooks, said cutter comprising a plurality of beveled teeth arranged approximately at right angles to the tangents to the circle of movement of the pile thread loops and beveled away from the point of entry of the pile thread loops and a pointed rod arranged beneath said cutter and forming a support for the outer ends of the dial hooks during the cutting operation.

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