June 11, 1940. C. DUPUIS 2,203,948

KNITTING MACHINE

Filed July 29, 1939

Fig. 1.

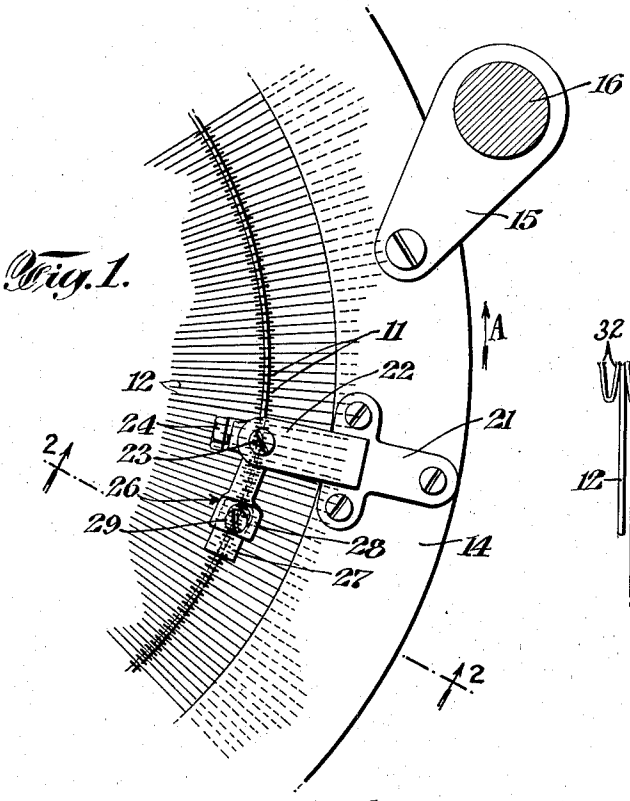


Fig. 3.

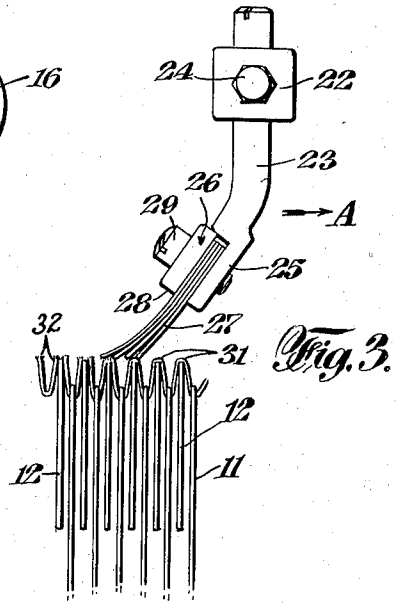


Fig. 4.

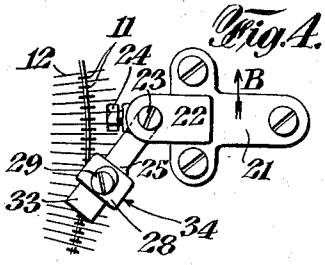


Fig. 2.

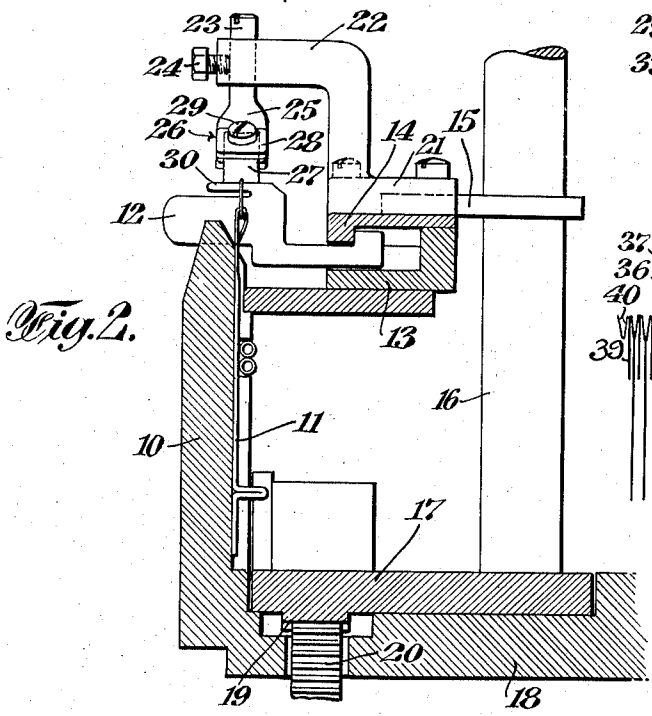
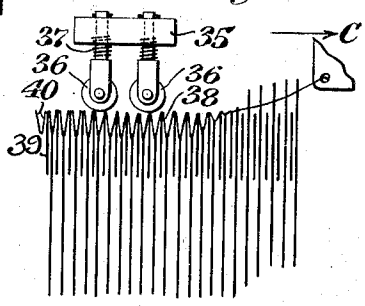


Fig. 5.



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KNITTING MACHINE

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Application July 29, 1939, Serial No. 287,194

8 Claims. (Cl. 66—93)

This invention relates to a machine for producing a sheared pile knitted fabric containing a plush-like or velvety surface texture, and particularly to circular knitting machines for forming loop or pile stitches and splitting them so as to produce the above-described material.

Although the cutting of loop threads to produce a sheared pile fabric has been an expedient previously employed, the heretofore known apparatus for producing this material has not met with any considerable amount of commercial success, due to certain generally recognized inherent difficulties in the methods used. It has been found necessary in certain methods to produce relatively high loops, and thereafter to put the fabric through a separate dyeing and thread stiffening process to enable the subsequent shearing to be effected,—a method which has been found to be slow, costly and not productive of uniform results. Among other methods previously employed has been that of actually cutting the loops by a cutting edge, such as a sinker sharpened to effectuate a cutting of the overlying loop upon a reciprocating movement of the sinker. This last method has also proven to be unsatisfactory in view of the very rapid dulling of the cutting blade, requiring frequent replacements. It is to overcome the aforementioned shortcomings and to enable pile loops to be efficiently split to produce the desired effect that I have conceived this invention.

It is primarily within the contemplation of my invention to effect a cutting or splitting of the pile loop without the use of any sharp cutting edge, so as to obviate the necessity of frequent replacement of parts.

Another object of my invention is to enable a sheared pile fabric to be produced without the necessity of forming excessively long loops or subjecting the fabric to any thread stiffening process.

Still another object of my invention is to enable the aforesaid objectives to be readily and effectively accomplished in a simple and inexpensive manner.

Other objects, features and advantages will appear from the drawing and the description hereinafter given.

Referring to the drawing,

Figure 1 is a fragmentary semi-diagrammatic plan view of a circular knitting machine employing one form of my invention.

Figure 2 is a fragmentary vertical section of the knitting machine of Figure 1, taken substantially along line 2—2.

Figure 3 is a side elevation of a loop-splitting device employed in my invention shown in operative engagement with the looped thread held between the needles and sinkers of the machine.

Figure 4 is a plan view of a fragment of a knitting machine similar to that of Figure 1, showing a modified form of loop-splitting device, and

Figure 5 is a semi-diagrammatic development of a series of needles and sinkers operatively supporting a plurality of knitted loops, and illustrating another form of loop-splitting device.

In the drawing, the cylinder 10 contains a plurality of vertically mounted needles 11 and radially disposed vertical sinkers 12, the sinkers being disposed upon the sinker supporting ring 13 and in operative engagement with the sinker cam ring 14. The said sinker cam ring, in the form of machine illustrated, is secured by connecting member 15 to the post 16 which is mounted upon the cam ring 17 rotatably supported by the bed plate 18. The cam ring 17 has on the undersurface thereof the annular gear 19 in operative engagement with the drive gear 20. The above described construction is substantially in accordance with conventional practice.

Mounted upon and affixed to the sinker cam ring 14 is the bracket 21 containing the arm 22 extending inwardly towards the cylinder over the circumferential arrangement of sinkers 12, and spaced thereabove. Extending downwardly from arm 22 is the holder 23 adjustably secured to the arm by screw means 24 whereby it could be raised or lowered as desired. The lower terminal 25 of the holder is, in the form thereof illustrated in Figure 3, inclined to the axis of the cylinder and bent away from the direction of rotation of the cam ring 14 and associated parts, as indicated by the arrow A in Figures 1 and 3. The said lower terminal of the holder is provided, in the preferred form illustrated, with clamping means 26 for holding the cutting or loop-splitting members 27. I have found it convenient and effective to employ as the cutting member 27 a plurality of blades operatively clamped between the terminal 25 and the nut 28, the screw 29 extending through the nut and the terminal portion 25 for providing a clamping jaw for the members 27. It is preferred in this form of my invention that the members 27 contain holes therein for receiving therethrough the shank of the screw 29,—although it is to be understood that this arrangement is one of many other possible designs for holding the blades, within the contemplation of my invention.

The sinkers 12 have thereon the noses 30 over which loops 31 are formed in conventional manner, the loops normally being held between the upper surface of the noses 30 of the sinkers and the adjacent hooks of the needles 11. The holder 23 is so set that the blades or cutting members 27 are adapted for pressing engagement with the tops of the sinkers at the loop-bearing portions thereof. It is preferred that the blades be of flexible and resilient construction so that they will bend and yield somewhat during their operative engagement with the sinkers and the loops, as will be now more fully explained.

In the operation of this apparatus the cam ring 14 and bracket 21 move in the direction of arrow A, as aforesaid, thereby carrying with it the holder 23 and loop-splitting members 27. For best operative results it is preferred that the holder 23, or as many of such devices as are employed on the machine, be set in positions between feeds, where the sinkers are retracted and stationary and not radially movable under the influence of the sinker cam 14. As the holder 23 travels around the cylinder, each one of the flexible blades 27 successively comes into engagement with the looped threads over the underlying sinker, the group of blades sliding therealong in brush-like manner until they leave the sinker, thereby producing a rubbing or abrasive action. Due to the pressure of the flexible members upon the sinkers, such action is sufficient to cause a splitting of the loops, as clearly illustrated in Figure 3. This effect is also considerably enhanced by the impact of the various blades as they jump from one sinker to the other—the repeated pounding and frictional rubbing of these members upon the loops causing the loops to split and divide into two upstanding fibers 32. Inasmuch as this cutting or splitting action takes place after the formation of each loop during the fabrication of the cloth, the entire surface thereof will comprise a series of short upstanding fibers which give the desired velvety surface.

From above it is apparent that no sharp edges are necessary whatsoever, inasmuch as the cutting or splitting action is dependent upon a series of impacts and rubbing effects. The bottom sinker-engaging edges of the blades are hence preferably dull, not requiring the frequent replacements necessary with sharp cutting instruments. Should it be necessary, however, to replace any of the members 27, that could readily be effected by disengaging the screw 29 from the clamping member 26, removing any defective blade and substituting another one in its place.

In the form of my invention illustrated in Figure 4, the loop-splitting members 33 are shown set at an angle directed from the holder 34 towards the cylinder. It is apparent that as the holder 34 moves in the direction of the arrow B in the manner above set forth, the blades 33 will not only produce the pounding effect above described, but will also produce a prolonged rubbing effect progressively extending along the bottom edges of the blades, thereby further assuring the desired loop-shearing results.

Figure 5 shows still another modification of my invention where the holder 35 operatively supports the rollers 36 which are normally urged downwardly by the springs 37 into pressing engagement with the tops of loops 38 on the sinkers 39. As the said holder 35 moves in the direction of the arrow C, it is apparent that an effective abrasive action is produced, to cause the splitting of each loop into two upstanding fibers 40.

Although in the machine above described the loop-splitting holders are illustrated as being movable and the sinkers stationary, it is of course understood that my invention is equally applicable to that form of conventional structure where the sinkers rotate and the sinker cam is stationary. In this latter case it is of course obvious that the holders will be stationary and the cutting elements would operatively engage the loops of the rotatable sinkers to split them in the manner aforesaid. It is also understood that other mechanical changes and modifications may be made for the purpose above described, within the scope of the appended claims, without departing from this invention.

What I claim is:

1. In a knitting machine, a plurality of sinkers adapted to operatively receive thereupon loops of yarn, a loop splitting member comprising a plurality of closely spaced elements independently movable with respect to each other and adapted for successive frictional engagement with the loop-carrying portions of the sinkers during the operation of the machine, and means for yieldably urging said elements into pressing engagement with the sinkers.

2. In a knitting machine, a plurality of sinkers adapted to operatively receive thereupon loops of yarn, a resilient and bendable loop splitting member adapted for frictional engagement with the loop-carrying portions of the sinkers during the operation of the machine, and holding means for maintaining the said member in pressing engagement with the sinkers.

3. In a knitting machine, a plurality of sinkers adapted to operatively receive thereupon loops of yarn, a loop splitting member comprising a plurality of closely spaced resilient elements adapted for successive frictional engagement with the loop-carrying portions of the sinkers during the operation of the machine, and holding means for maintaining the said elements in pressing engagement with the sinkers.

4. In a knitting machine, a plurality of sinkers adapted to operatively receive thereupon loops of yarn, a brush-like loop-splitting member containing a plurality of substantially parallel flexible elements adapted for sliding and frictional engagement with the loop-carrying portions of the sinkers during the operation of the machine, and holding means for maintaining the said flexible elements of said member in pressing engagement with the sinkers.

5. In a knitting machine, a plurality of sinkers adapted to operatively receive thereupon loops of yarn, a loop splitting member comprising a plurality of closely spaced flexible and resilient blades with dull undersides adapted for sliding and frictional engagement with the loop-carrying portions of the sinkers during the operation of the machine, and holding means for maintaining the said member in pressing engagement with the sinkers.

6. In a circular knitting machine, a plurality of independent sinkers adapted to operatively receive thereupon loops of yarn, a loop splitting member comprising a plurality of adjacent flexible and resilient blades inclined with respect to the axis of the cylinder of the machine and adapted for sliding and frictional engagement with the loop-carrying portions of the sinkers during the operation of the machine, and hold-

ing means for maintaining the said member in pressing engagement with the sinkers.

7. In a circular knitting machine, the combination according to claim 6, the holding means containing a clamping member in detachable engagement with the blades.

8. In a circular knitting machine, a plurality of sinkers adapted to operatively receive thereupon loops of yarn, a loop splitting member adapted for frictional engagement with the loop-carrying portions of the sinkers, and holding means for maintaining the said member in pressing engagement with the sinkers, the holding means comprising a bracket mounted upon the sinker ring of the machine and containing an arm extending inwardly towards the cylinder, a holder secured to the arm and containing a terminal portion inclined with respect to the axis of the cylinder of the machine, and connecting means between the holder and the said loop splitting member.

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