

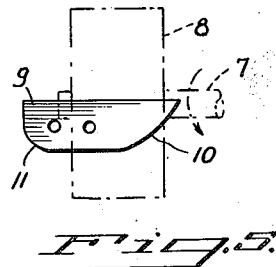
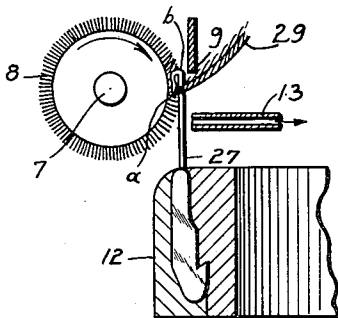
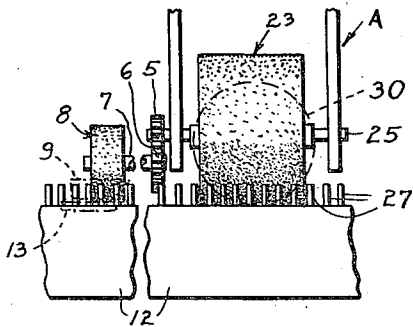
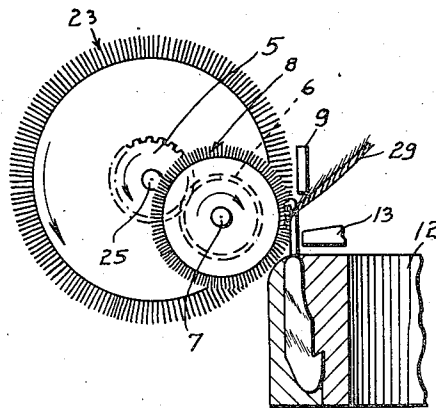
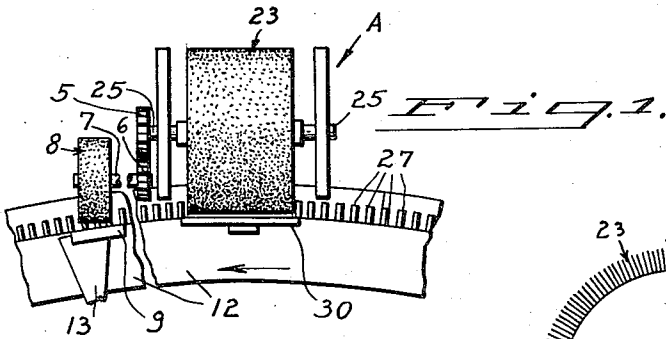
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APPARATUS AND METHOD OF MAKING A KNITTED FABRIC

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APPARATUS AND METHOD OF MAKING
KNITTED FABRIC

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11 Claims. (Cl. 66—80)

The present invention relates to improvements in apparatus and methods of making a knitted fabric, one object of the invention being the provision of the normal or usual spring needle knitting machine for the manufacture of a material somewhat similar to the fabric set forth in my application Serial No. 267,107 and which is made upon a latch needle knitting machine.

To this end fibrous material is fed to the needles on the spring needle machine, somewhat similarly to that shown and described in U. S. Letters Patent No. 2,017,073 for Spring needle pile fabric knitting machine, and to which is added means whereby the loose ends of the fibers after being held in the hooks and upon the shanks of the needles have their free ends so acted upon as to be moved to cover the inner or rear face of the knitted web, and during the operation of the knitting machine.

That the same may be more fully understood, attention is invited to the accompanying drawing, in which:

Figure 1 is a diagrammatical view of a portion of a cylinder of a spring needle machine with the fiber feeding brush diagrammatically representing the entire fiber feeding attachment of the aforementioned patent.

Figure 2 is an elevation looking from the inner side of the needle cylinder of the parts as shown in Fig. 1.

Figure 3 shows a section through the cylinder looking from the extreme left end of Fig. 2.

Figure 4 is an enlarged sectional view showing the fiber reversing means per se.

Figure 5 is a detail view of the presser employed with the fiber reversing means, dotted lines showing the fiber setting brush relatively thereto.

Referring to the drawing, the numerals and reference letters employed, where similar parts are taken from the U. S. Letters Patent No. 2,017,073, are identical to those of said Letters Patent. Thus A designates the fiber feeding attachment or device, whose fiber feeding brush 23, actuated by a shaft 25, delivers the fibers to the hooks *b* of the spring needles 27, which are of the non-slidable type and carried in the usual manner by a rotating cylinder 12. Therefore, the barbs *a*, as explained in the above mentioned Letters Patent, receive the short loose fibers just previous to the reception of the basic yarn, not shown, and consequently the knitting operation. As in the above noted Letters Patent, a disk 30 is employed to move the loop downwardly below the end of the barb and upon the shank of

the needle, so that the hook is empty and ready to receive a new charge of fibers.

The cylinder 12 is broken away adjacent the brush 23 and the knitting point is not here shown, but the shaft 25 is extended and carries a gear 5, which meshes with a driven gear 6. This latter gear is attached to a shaft 7, which is mounted in any desired manner, adjacent to its fiber feeding attachment, so that the fiber setting brush 8 may be positioned with relation to the cylinder 12, that is after the knitting point, to wipe the outwardly extended free ends of the fibers carried by the just then formed loop and the previous loop, and while the needle held loop with its fibers have been pushed or slid downwardly within the barb by the presser foot 9. This action may take the loop below the end of the barb but preferably sufficiently far enough toward the terminal of the barb or hook as to permit the brush 8 to wipe the free ends of the held fibers downwardly and rearwardly, the latter due to the motion of the cylinder 12. In this manner the free ends of the held fibers are positioned in front of and adjacent to the mouth of the suction head or nozzle 13, which acts to draw the free ends inwardly between the shanks of the needles and below the held loops, where the rotation of the cylinder 12 against the action of the suction tends to set the free ends rearwardly but on the inside of the shanks of the needles, or toward the inner or rear face of the fabrics. Thus when the cylinder has moved so that the needles thus acted upon have passed the presser foot, the needle held loops will slide upwardly to the top of the hooks, and be ready to be acted upon by the next fiber feeding attachment and its disk 30, after which the knitting operation is repeated ad infinitum.

In this manner, it is evident that the fibers fed and knitted in when acted upon by the presser foot 9, with its forward curved end 10 and its rear portion 11, combined with the action of the reversely rotated brush 8 and finally the suction head 13, will have their free ends more or less wound about the shanks of the needles, and provide with subsequent knitting operations a substantial cover for the rear face of the fabric, while filling in the interstices between the rows of loops upon the face. Thus in the manner described, the yarn forming the knitted web or base material is completely covered by the short loose fibers, so that a fabric when finished in any well known manner can be made into a pile of fleece fabric, blankets, ski or snow cloth, and outer garment fabrics.

Also where a cotton yarn is employed, the same as is usual in the present spring needle machines, the back of the fabric plainly shows the same, while with this method and apparatus the cotton yarn forming the base is covered and hidden completely after the fabric has been finished; and in fact the character of a knitted fabric is changed, as no knitted stitches or loops are apparent on either face of the fabric.

To more clearly set forth the operation of making this fabric, the fibers are fed into the hooks of the needles just prior to the delivery of the basic yarn to the hook, the previous loop having been pushed down to permit the free entrance of the fibers and the introduction of the basic yarn to the hook holding the fibers. As soon as the basic yarn has been placed in the hook and the loop upon the shank below the barb has been released to slide upwardly and on to the held loop, the presser foot 9 acts to push the last loop down within the hook so that the brush 8 wipes the free ends of the held fibers into the path of the suction head 13, which draws the free ends of the fibers inwardly while the inertia of the cylinder tends to pull them rearwardly and against the shanks of the needles and upon the inner face of the loops and fabric.

What is claimed, is:

1. A spring needle knitting machine, including in combination a rotatable needle cylinder carrying a plurality of non-slidable spring needles, a fiber feeding device for wiping such fibers into the hooks of the needles at a point prior to the introduction of the yarn into the barbs of the needles and the knitting of the yarn therein, and means for placing the free ends of the needle-held fibers to the inner side of the needles.

2. A spring needle knitting machine as claimed in claim 1, wherein the latter means includes a fiber wiping brush to downwardly wipe the free ends of the needle-held fibers, and means to draw inwardly simultaneously the thus wiped fibers to place them to the inner face of the fabric, due partially to the motion of the cylinder.

3. A spring needle knitting machine as claimed in claim 1, wherein the latter means includes a fiber wiping brush to downwardly wipe the free ends of the needle-held fibers, and suction means to draw inwardly between the shanks of the needles simultaneously the thus wiped free ends of the fibers.

4. A spring needle knitting machine as claimed in claim 1, wherein the latter means includes a presser foot to move the needle held loop away from the top of the hook of the needle but within the barb, a fiber wiping brush to wipe the free ends of the fibers while the loop is held by the presser foot, and suction means to draw inwardly between the shanks of the needles the thus wiped free ends of the fibers.

5. The herein described method of making a clothed knitted fabric on a non-slidable spring

needle knitting machine, which consists in wiping into the hooks of the needles short loose fibers previous to the introduction of the yarn therein, and simultaneously placing the free ends of the needle-held fibers toward the inner face of the cylinder by the co-operation of the movement of the cylinder and mechanical means after the loops with the fibers have been acted upon at the knitting point.

6. A spring needle knitting machine as claimed in claim 1, wherein the latter means cooperating with the rotating needle cylinder causes the free ends of the needle held fibers to be placed upon the inner sides of the shanks of the needles.

7. A spring needle knitting machine, including in combination a rotatable needle cylinder carrying a plurality of non-slidable spring needles, means for delivering fibrous material in to the hooks of the needles successively as they pass a given point and prior to the introduction of the basic yarn to the needles, and means cooperating with the rotating cylinder and assisted thereby to place the free ends of the needle and yarn held fibers to the inside of the cylinder and against the shanks of the needles.

8. A spring needle knitting machine as claimed in claim 7, wherein the latter means includes a device to wipe the free ends of the needle held fibers downwardly toward the top of the cylinder, and suction means for sucking the thus disposed free ends inwardly so that the movement of the cylinder will cause the free ends of the fibers to be laid rearwardly and substantially parallel with the top of the cylinder.

9. A spring needle knitting machine as claimed in claim 7, wherein the latter means includes a brush to wipe the free ends of the needle held fibers toward the top of the cylinder, and a suction means to suck the thus wiped free ends of the fibers inwardly between the shanks of the needles and due to the movement of the cylinder direct such free ends rearwardly and against the rear portions of the shanks of the needles.

10. The herein described method of making a knitted fabric on a non-slidable spring needle knitting machine, which consists in placing into the hooks of the needles during the rotation of the cylinder short loose fibers, knitting in with the thus held fibers at their hook engaged portions a basic yarn, wiping the free ends of such needle held fibers downwardly and toward the top of the cylinder, and causing the free ends of the fibers to be drawn inwardly between the shanks of the needles and laid against the rear of the shanks of such needles.

11. A method as claimed in claim 10, wherein the act of causing the free ends of the fibers to be drawn inwardly between the shanks of the needles and laid against the rear of the shanks of the needles is accomplished by suction and the rotation of the cylinder conjointly.

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