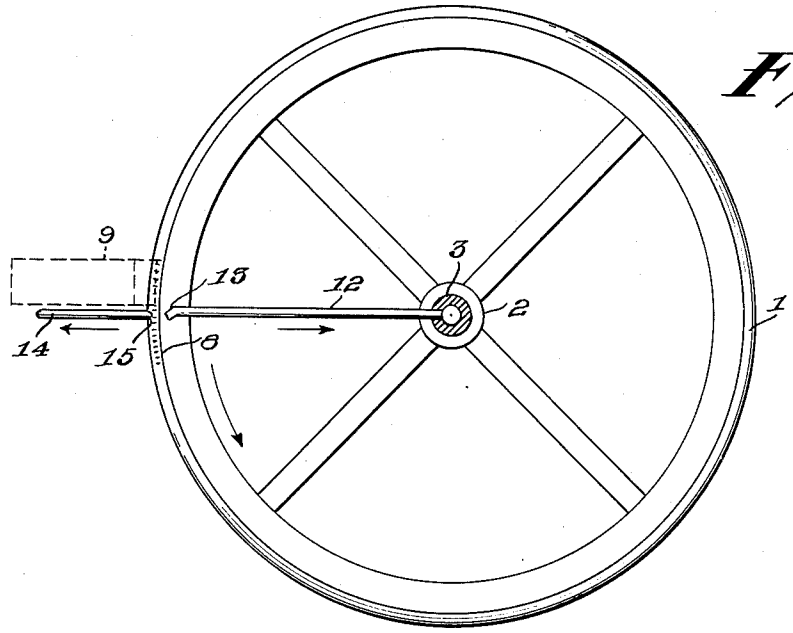
Dec. 6, 1955 D. P. MOORE 2,725,735

APPARATUS FOR MAKING A DOUBLE-FACED KNITTED PILE FABRIC

Filed June 9, 1954

Fig. 1.



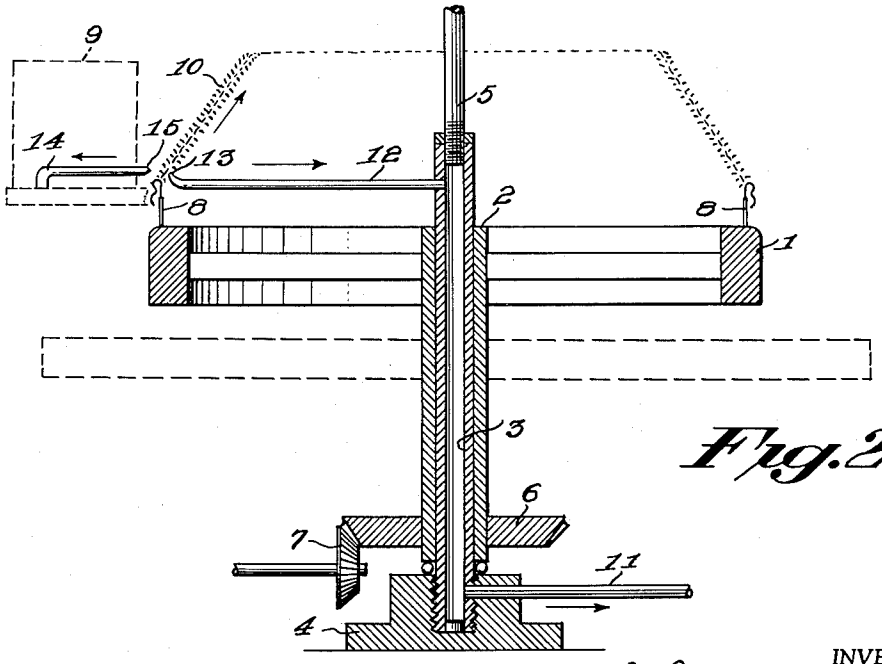


Fig. 2.

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APPARATUS FOR MAKING A DOUBLE-FACED KNITTED PILE FABRIC

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Application June 9, 1954, Serial No. 435,475

3 Claims. (Cl. 66—80)

The present invention relates to improvements in apparatus for making a double-faced knitted pile fabric, one object of the invention being the use of an up-feed spring needle knitting machine with attachments that separate the free and loose ends of short staple fibers that are knitted in with the basic yarn during the knitting of the fabric, and so that these loose ends will be parted and disposed approximately equally upon both faces of the fabric.

In order that the invention may be fully understood and its numerous advantages appreciated, attention is invited to the accompanying drawings, in which:

Figure 1 is a diagrammatic top plan view of a knitting cylinder of an up-feed spring needle machine, the section being taken just above the upper suction pipe as viewed in Fig. 2.

Figure 2 is a vertical section through the knitting cylinder and its support, showing in diagram the position of the fiber parting means.

Referring to the drawings, the numeral **1** designates a rotating cylinder of a spring needle knitting machine, such for instance as the Tomkins Model S–1, the upper take-up not being shown. This cylinder is fast to and is rotated by the tubular shaft **2**, mounted for rotation upon the central shaft **3**, anchored in the base **4**. A solid shaft **5** ceils the upper end of the shaft **3**, while the gearing **6—7** actuates the shaft **2** and the cylinder **1**, so that the needles **8** with the various standard sinker or stitch bur (not shown) for introducing a single end of yarn, although blocked sinker burs may be employed. By this arangement the usual plain balbriggan or jersey cloth can be made.

However, in the present instance a double faced knitted pile fabric is made. Thus a fiber feeder **9** is used, which is somewhat of the design shown in U. S. Patent (Moore) No. 2,017,073, where a single faced knitting pile fabric is to be made, and this present fiber feeder doffs the short loose staple fibers into the needles **8**, when the previous stitch has been pushed downwardly out of the hook of the needle and just before the basic yarn is directed therein.

While the fibers are thus held, the suction nozzles or heads **13** and **15** act to part the fibers approximately equally, so that they will be presented below and above the needle bill, and upon the next reception of the fibers and yarn will form the fabric **10**. The nozzle **13** is carried by a stiff pipe or conduit **12**, which communicates with the interior of the hollow shaft **3**, the lower end of which is connected to a suction pipe **11**, led to a suction device (not shown) while the nozzle **15** has its supporting suction conduit **14** led to the main suction source of the conduit **11**. Arrows showing the directions of flow of the suction that parts the fiber staples as desired. The two nozzles **13** and **15** may be positioned at various angles to best part the free ends of the fibers, so that such parting will dispose approximately equal the bulk held by the needles as they pass such nozzles, and such nozzles

may be wide enough to cover two or more needles, to insure the desired parting of the fibers.

The usual take-up (not shown) is used with this machine, and the fabric **10** is rolled in the usual way as shown in the above noted Tompkins or Crane spring needle machines.

From the foregoing description, it is evident that by this machine, a double-faced fleece or pile knitted fabric can be produced.

The fabric can be made any weight by using larger gauge needles, with longer bills that are usual in jersey knitting, or by increasing the weight of the rovings or slivers that carry the short loose staple fibers that are knitted in with the basic yarn. The fabric when taken off of the take-up roll, can be split, a needle having been omitted to provide a straight line for cutting, then inspected and repaired, and then if synthetic yarn or rather staple fibers such as acrylates such as Orlon and dynel, nylon, Dacron and corn product synthetics such as Vicara, or combinations thereof, the fibers can be set at right angles to the basic web by static electric machines, then sheared to seceure the desired even surface. Also where desired, varying lengths of the fibers can be used, so that an under fur and an outer fur can be produced to provide a double faced imitation fur.

To secure different parting, the necks of the nozzles may be made with swivel joints, thus a greater amount can be placed on either selected side of the fabric, and by this a great latitude of fleece or pile can be obtained.

This fabric is specially desirable for blankets, where a warm light blanket as for airplane use is desired, and also as a filler for insulated garments, where now quilted batting is sewn between the outer and inner covering, or even with this fabric only an outer covering can be used if necessary.

Although nozzles **13** and **15** are here shown as narrow, it in some cases is desirable to have their respective mouths at least two inches, and to support the inner nozzles **13** on a fixed circular spider, not shown, and which would be attached to the fixed shaft **3**.

In a companion application Serial No. 225,836, now Patent No. 2,712,225, a latch needle machine is used to make a fabric similar to the type made on the present spring needle knitting machine, so that the present invention covers a double-faced knitted pile fabric made on an up-feed spring needle machine, where the fabric is suction acted upon at points above the needle hooks, and not adjacent the top of the needle cylinder, as with latch needles.

What is claimed is:

1. An apparatus for making a double-faced knitted pile fabric, including in combination, an up-feed spring needle knitting machine having a rotary needle cylinder and having means to form wales from a basic yarn, a fibrous material feeding device operating to place fiber staple in the hooks of the needles in transit and previous to the reception of the needles of the basic yarn, and means for parting the free ends of the needle held fiber staple at the junction of the needles and the knitted base, whereby a pile surface is formed upon each face of the fabric.

2. An apparatus as claimed in claim 1, wherein the means for parting the free ends of the needle held fiber staple consists of two spaced opposed suction nozzles, one upon each side at the top of the needles.

3. A spring needle up-feed knitting machine, including in combination an upstanding tubular support, a base therefor at and closing the lower end thereof, a tubular shaft rotatably mounted upon said support, a spring needle cylinder carried at the upper end and rotatable with the shaft, means for closing the upper end of the tubular support above the cylinder, a device for feed-

ing fiber staple to the needles during the knitting operation, two opposed and spaced suction nozzles one upon the outer side of the needles and the other upon the inner sides thereof, and means for connecting the inner nozzle to the upper end of the tubular support through which air is drawn to produce suction in the inner nozzle.

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