(No Model.)

R. MORLEY & W. GREENWOOD.

ART OF MANUFACTURING STOCKINGS.

No. 385,315. Patented June 26, 1888.

FIG. 1.

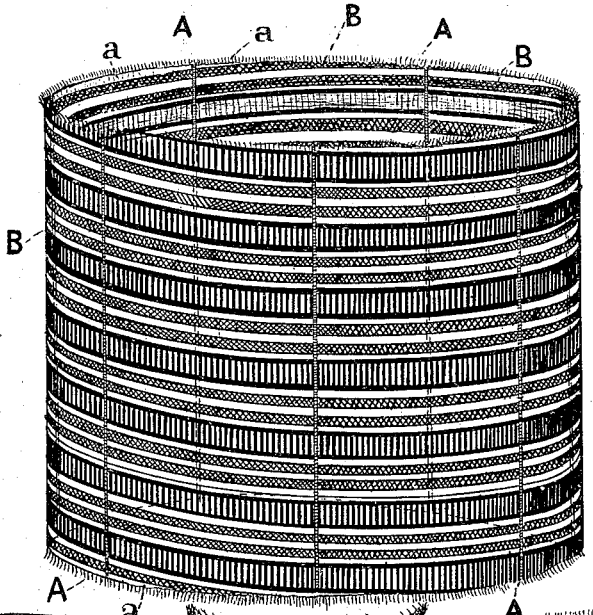


FIG. 2.

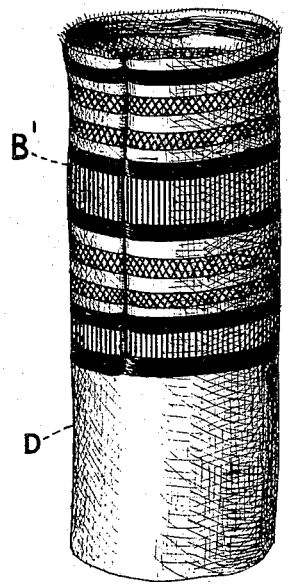


FIG. 3.

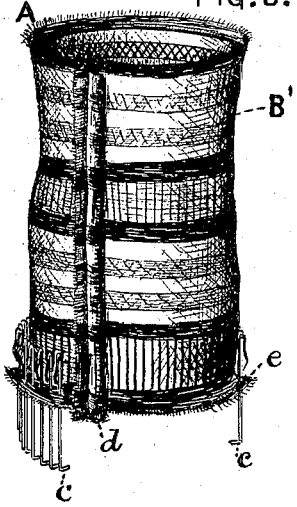
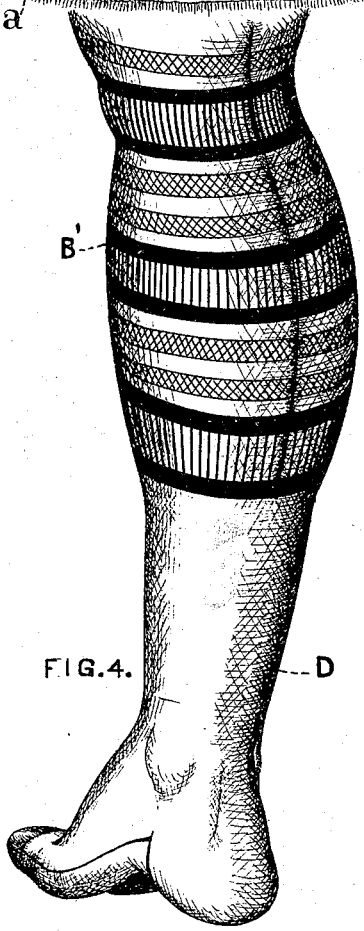


FIG. 4.



WITNESSES.

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ART OF MANUFACTURING STOCKINGS.

SPECIFICATION forming part of Letters Patent No. 385,315, dated June 26, 1888.

Application filed December 18, 1882. Serial No. 70,509. (No model.)

To all whom it may concern:

Be it known that we, ROBERT MORLEY and WILLIAM GREENWOOD, both now residing at Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in the Art of Manufacturing Stockings, whereof the following is a specification.

As the practice of our invention is not necessarily restricted to any one specific form of knitting machinery, the accompanying drawings illustrate only the fabric formed in accordance with our improved method.

The object of our invention is to economically produce stockings or hosiery one portion of which shall be striped and figured or "tucked," while the remainder is in solid or plain color, the whole forming one continuous fabric, and the figure or pattern being symmetrically and completely defined throughout the figured portion.

It is well known that in tubular knit fabrics the loops are formed in a spiral direction, and hence do not run perpendicular to the axis of the tube or to any straight line upon its cylindrical surface. In machines where many separate threads are used for the formation of figured knit fabrics—as, for instance, in an ordinary "Balmoral" frame of from forty to sixty feeders—the want of perpendicularity becomes very marked, since there the whole pattern runs in a spiral stripe, whose pitch is necessarily as great as the depth of the stripe. It is obvious that if, after the formation of such a patterned fabric, the threads are changed so as to form a solid color or plain fabric and the knitting is continued, the pattern will merge into the plain portion at an angle. Moreover, if the composite fabric thus formed be cut into strips for the purpose of shaping it into hosiery, &c., the pattern will not register properly when such strips are again folded and their edges united.

We have discovered a method of obviating these difficulties, the principle of which may be illustrated as follows:

If, in the formation of the patterned fabric, a needle be omitted or arranged so as to drop its loop at each revolution, a vertical line will be formed by the series of dropped loops, which will bisect the successive spirals of the pattern symmetrically. If the fabric be cut through on this guide-line, the cut edges may be again brought together, (by shifting their relative positions a distance equal to the depth of the pattern,) so that the pattern shall no longer be in a spiral stripe, but shall be disposed in a series of annular stripes, each complete in itself, and all perpendicular to the axis of the tube. If the row of loops which forms the bottom or top of one of these annular stripes be now run onto needles corresponding in number with those previously used, and the knitting be continued in plain or solid color, a composite tubular fabric will be formed, one portion of which is patterned or figured, the other plain, the pattern being disposed in annular stripes perpendicular to the axis of the tube, and the stripe which is adjacent to the plain portion being complete and evenly defined around the entire line of union. If this tube be now cut (in a direction parallel to its axis) into strips, the pattern will register properly when these strips are again folded for the purpose of shaping them into hosiery, &c., and the pattern will run symmetrically around the finished article.

As the exact method described by way of illustration would be unnecessarily slow where the object to be ultimately produced is a small tube, we prefer to apply the principle as follows:

We first form, upon a machine having the requisite number of threads, such as the ordinary "Balmoral frame," a tube having the desired pattern. At regular intervals in the circuit of needles we omit or drop a needle, so as to form a series of guide-lines at definite distances. The number of loops between each pair of guide-lines should correspond substantially with the number of needles in the machine to be subsequently used, as hereinafter described, being by preference about six loops in excess; and to divide the large tube economically the number of loops in each interval should be a multiple of the whole number in the circumference of the tube. The fabric thus formed is illustrated in Fig. 1, where A A are the guide-lines formed by the dropped loops. The tube is then cut on each of these guide-lines into strips B, whose longer sides

will, of course, be parallel, but which will have a small angular portion of the pattern at each end, as shown, for example, at *a*. To prevent entanglement with the needles these ends should be trimmed off at a short distance from the edge of the stripe or figure, leaving a uniform edge of, say, six rows beyond the limit of the pattern. We then fold the strips lengthwise, so that the ends of the pattern meet, and preferably secure the edges together by sewing, when the fabric will be formed into small tubes B', as shown in Fig. 3. The sewing should be conducted so as to take up in the seam *d*, as nearly as possible, the surplus loops left, as above stated, upon the sides of the strips. The tube B' will then have in its circumference the proper number of loops to correspond with the needles *c* of a smaller knitting-machine, upon which it is now set up, as shown in Fig. 3, the needles *c* being inserted in the row of loops which forms the bottom or top of the figure, and which, as above stated, should be a short distance above the end of the tube. The knitting is then continued, in solid color, upon this small and rapidly-working machine, the short pendent flap or edge being left on the wrong side of the fabric at the line of union between the two fabrics. After a sufficient length of tube, in solid color, has been formed, it is removed from the machine and the flap *e* is raveled off by hand. The tube when turned right side out will now present the appearance shown in Fig. 2, and upon being shaped in any well-known manner a stocking similar to that shown in Fig. 4 may be formed. It will thus be seen that the pattern is complete and runs symmetrically around the stocking at right angles to the leg.

Having thus described our invention and specified the best mode known to us of practically carrying out the same, we wish it to be understood that we do not limit ourselves to any particular method of obtaining a guide-line on which to cut the fabric, it being possible, of course, by the use of great care, to cut it in the proper direction by following any row of stitching which is parallel to the axis of the tube.

We claim—

The hereinbefore-described improvement in the art of making stockings, which consists in first cutting, in a line parallel with its axis, from an initial tubular fabric having spiral stripes or patterns thereon, a segment sufficiently large to form the stocking-leg; second, arranging the cut edges of such segment so as to re-form the pattern in annular stripes and then uniting said edges; third, casting onto the needles of a knitting-machine the loops upon one end of the tube thus formed, and, fourth, knitting the remainder of said stocking in the ordinary manner, substantially as set forth.

ROBERT MORLEY.
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Witnesses:
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