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D. SIEGEL

2,219,240

METHOD OF KNITTING

Filed Jan. 30, 1940

Fig. 2.

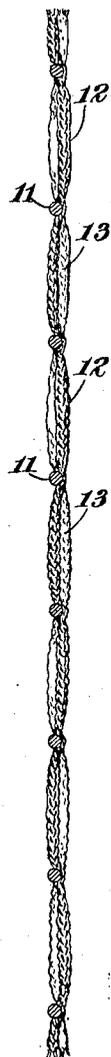


Fig. 1.

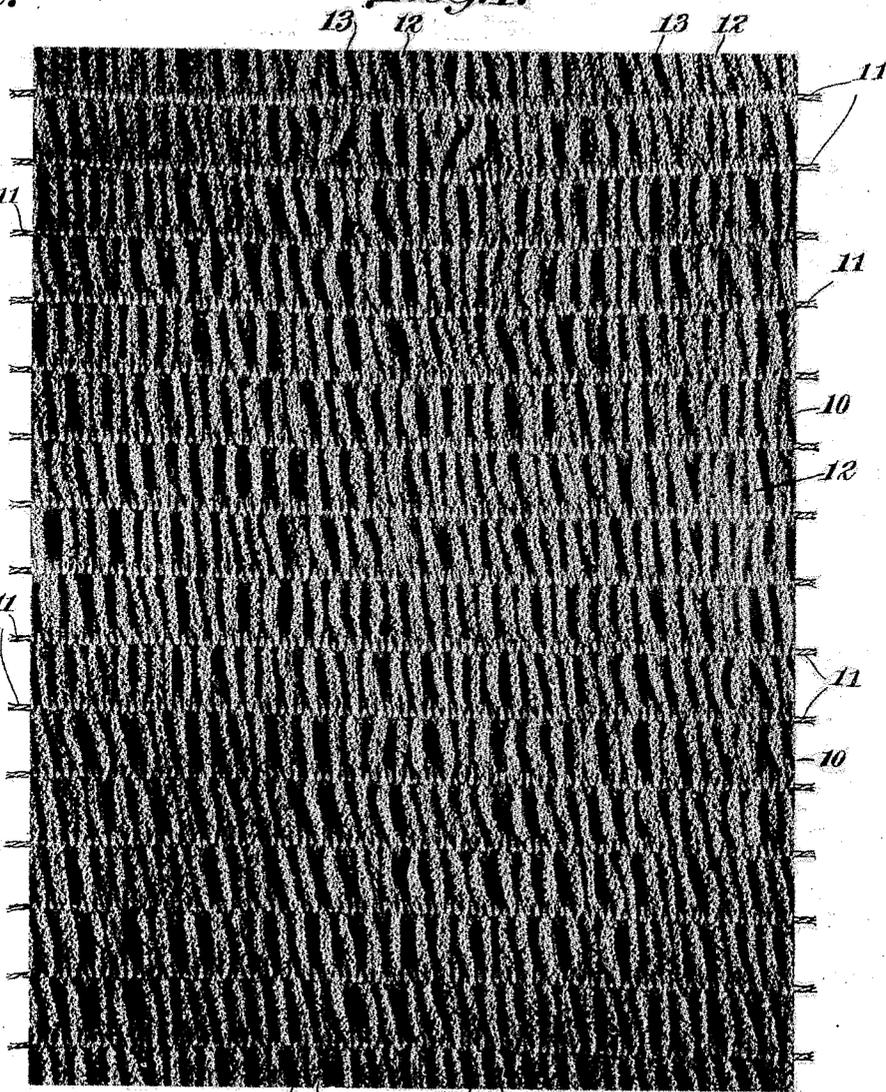
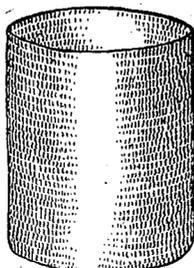


Fig. 3.



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UNITED STATES PATENT OFFICE

2,219,240

METHOD OF KNITTING

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1 Claim. (Cl. 66—190)

My invention relates to a knitted fabric and it is an object of the same to provide an ornamental plain knitted shirred or puffed or puckered fabric and an improved method of making the same.

5 The term "plain knitted" is used as indicating a weft fabric such as those commonly made by knitting machines having a single series of needles, i. e., not a rib fabric nor a warp fabric, and it is my purpose to provide such a fabric having a puffed, puckered or shirred effect. I am aware that puffed or puckered effects have heretofore been made by fastening one or more elastic yarns or strands to fabrics of various sorts by sewing or stitching the elastic strands to such a fabric, but my invention is differentiated therefrom by the fact that the tensioned elastic strand is laid into the plain knitted fabric during the knitting operation, i. e., is incorporated therein in unknitted relation, so as to produce coursewise zones of puckers separated by narrow smooth zones or stripes, thus securing the elastic strand to the fabric in a cheaper, simpler and less conspicuous manner, while yet the elastic strand is secured to the fabric at a much greater number of points than when attached by sewing or stitching so that even in case of breakage of the elastic strand no conspicuous defect is produced in the fabric or in the garments made therefrom.

It is within the contemplation of my invention to incorporate an elastic strand in the fabric which strand consists of uncovered rubber or other elastic material but the preferred type of elastic strand consists of an elastic core having one or more spiral wrappings of textile material such as that type of strand known to the trade as Lastex. Preferably such a strand is incorporated in the knitted fabric in unknitted relation throughout its entire length, although in some instances it may be formed into knitted stitches at one or more points in its length as in the patent to Clark, 2,016,168, October 1, 1935, or at its ends as in the patent to Lawson et al., 1,996,648, April 2, 1935.

The manufacture of the fabric is not limited to any particular machine, since the elastic strand can be inlaid in a plain fabric made on a machine having bearded needles or needles having pivoted latches or sliding latches, or in fact on any machine using a single set or series of needles for making a plain fabric.

I am aware that many types of knitted fabrics have been devised in which elastic strands are inlaid for the purpose of providing fabrics which are elastic either walewise or coursewise or both. In such fabrics however, the purpose has been to provide a smooth fabric and any shirring or pucker-

ing or puffing has been accidental and has been considered undesirable. Many devices have also been proposed for laying in elastic and nonelastic strands in knitted fabrics either in completely unknitted relation to the stitches of the fabric or substantially so and any of these devices can be used for the making of a fabric according to this invention. It has been proposed to lay-in elastic strands under variable tension for shaping a knitted garment but here also the object has been to keep the fabric smooth and without puckering or shirring and any puffs or puckers have been regarded as undesirable.

Referring to the drawing which is made a part of this application and in which similar reference characters indicate similar parts:

Fig. 1 shows a face view of a piece of the fabric of my invention;

Fig. 2, an edge view of the fabric of Fig. 1 on an enlarged scale illustrating the puffs or puckers in the cloth as seen from one side, and

Fig. 3, a perspective on a greatly reduced scale of the cloth as it comes from a circular machine.

The fabric shown in the drawing was made on a Wildman circular independent needle machine having bearded needles and generally similar to the machine shown in the patent to Rubinstein 1,683,699, September 11, 1928. The machine used by me has twenty-three of these feeds, the elastic strand being fed at the twenty-fourth feed, but I do not limit myself to a circular machine or to a bearded needle machine or to a machine of any particular type. The elastic strand, covered or uncovered, may be laid in by raising needles selectively, as in the Rubinstein patent, or may be laid in a fabric knitted on a latch needle machine by means such as shown in the patent to Salisbury, 379,819, March 20, 1888, or in any of many other ways. It will be seen from the drawing that the textile yarn feeds produce zones 10 of plan knitting between which zones an elastic yarn is inlaid at 11. This yarn is inlaid under such a tension as to cause the plain fabric in the zones 10 to puff or pucker, forming ridges 12 which appear in the drawing as relatively light in color with darker valleys 13 between them, both ridges and valleys extending approximately walewise of the cloth. The fabric at the lines between the zones of puffs or puckers, where the elastic strands are inlaid, is smooth and not puckered or puffed. In general the ridges in successive zones are in line with each other through several zones and the valleys are likewise in line with each other, although that is not essential nor is it true in all cases. In general also the ridges are of substantially equal width

and the same is true of the valleys. The valleys showing at the face of the fabric correspond to ridges showing at the back of the fabric, and the ridges on the face correspond to the valleys at the back.

The fabric as made on a circular machine is of course tubular and the inlaid elastic strand lies in an open spiral whose convolutions are spaced apart by twenty-three courses (or any desired other number) of plain fabric. This plain fabric may of course have other stitches than, or in addition to ordinary Jersey stitches, e. g., it may consist in greater or less part of tuck stitches, draw stitches, drop stitches, etc., these special stitches being provided either for ornament or for special functional effect, all as well known in the art. The shirred zones in a tubular fabric also form a spiral that extends from end to end of the fabric. It will be obvious however that the shirred effect may be produced by separate lengths of elastic strand material each extending once around the tube of fabric, or once across a flat sheet of cloth made on a flat machine and it is to be understood distinctly that where a claim refers to an elastic strand it is intended to cover either a single continuous strand or a plurality of separate lengths of elastic thread. Details of the fabric and the method herein described may be otherwise varied, all in accordance with the knowledge of the skilled knitter. Similarly, while the elastic strands will preferably be covered with textile material of the same color as the textile knitted yarn of the shirred zones and while the elastic strands will preferably be as small and inconspicuous as possible without interfering with their shirring action, the color of the elastic strands or of their covering material may differ from that of the body of the cloth, or of parts of such body, and the elastic strands may be made large and conspicuous, as may be required for the attainment of particular desired effects.

In the practice of knitting according to a preferred method for carrying out my invention, the cloth is knitted on a circular machine having a

take-up, and in such a machine the fabric passing to the take-up is smooth and its face side is like a conventional fabric, e. g., a Jersey fabric, the shirred effect appearing only after the cloth is freed from tension.

As an illustration of such a method as will make a good merchantable fabric, a tubular fabric was knitted on an 18 inch cylinder plain knitting machine having a single row of needles, and an elastic strand was supplied at one of the feeds. In a single rotation of the machine 56 inches of the elastic strand was laid into the cloth when no tension was applied to the elastic thread, but with the application of such tension as permitted only 20 inches of the elastic to be inlaid, a very good shirred or puffed fabric was produced. In other words, the elastic was stretched to a little less than three times the tension at which it feeds in naturally. Of course I do not intend to limit myself to any specific tension or amount of stretch, and the foregoing example is given only as an example of one procedure that has proved satisfactory.

Variations in the fabric and in the method of making it, other than those herein described, will be obvious to those skilled in the art and may be made without departing from the spirit of the invention; therefore I do not limit myself to what is shown in the drawing and described in the specification, but only as indicated in the appended claim.

Having thus fully described my invention what I claim is:

A method of knitting puffed plain fabric comprising the steps of knitting at a plurality of successive feeds, and inlaying at another feed an elastic strand stretched to substantially three times its normal length, said elastic strand being inlaid in closely-spaced wales so as to produce zones of high narrow elongated puffs separated by deep narrow valleys, said puffs individually extending walewise of the fabric and being separated from adjacent zones by narrow coursewise zones of relatively smooth fabric.

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