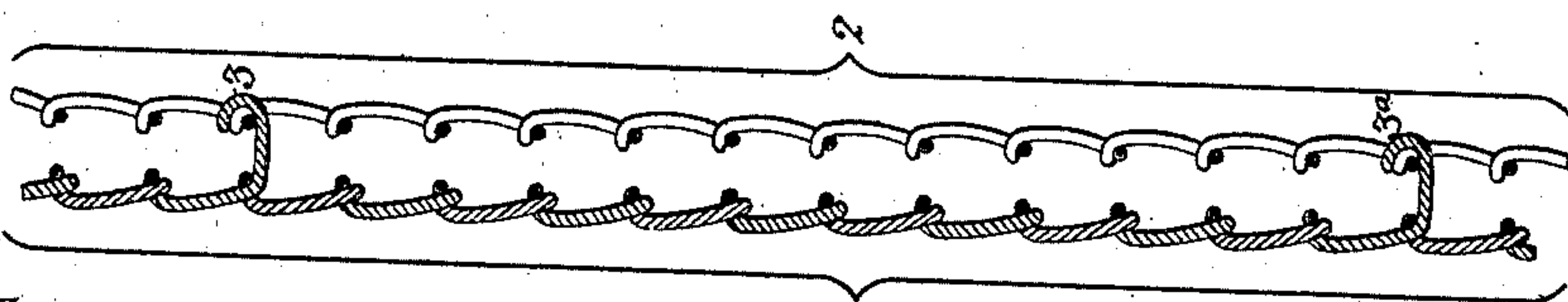
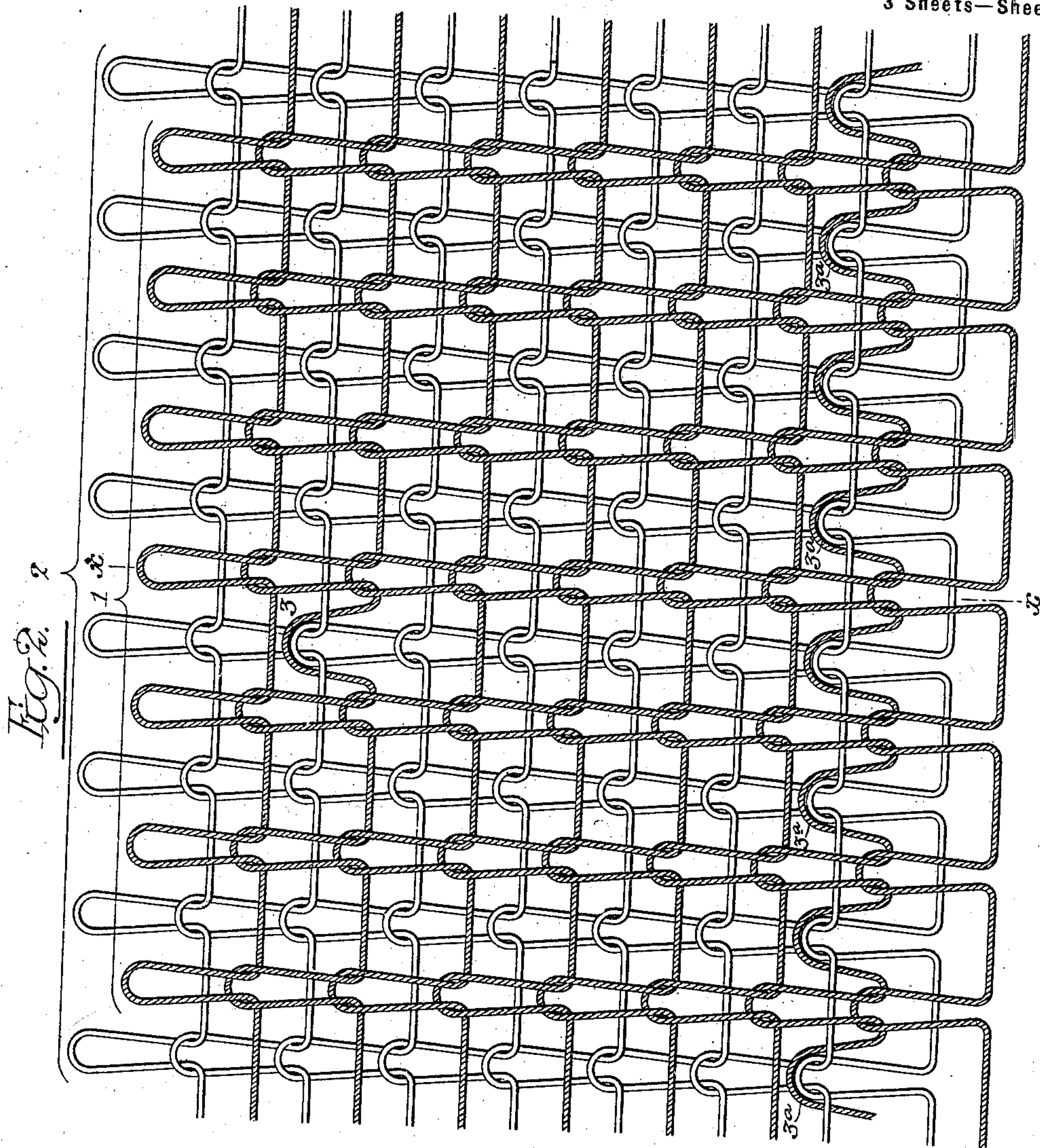


D. C. BELLIS.
KNITTED FABRIC.

(Application filed Feb. 15, 1902.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:-

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Fig. 1.

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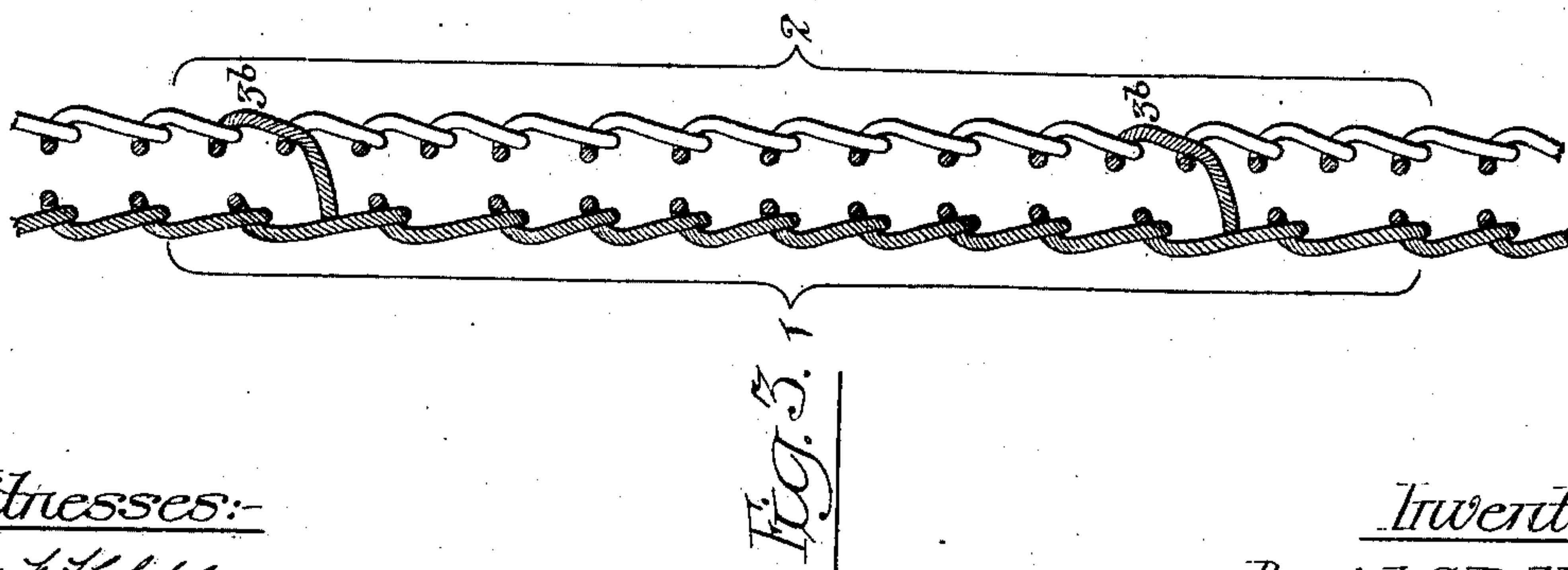
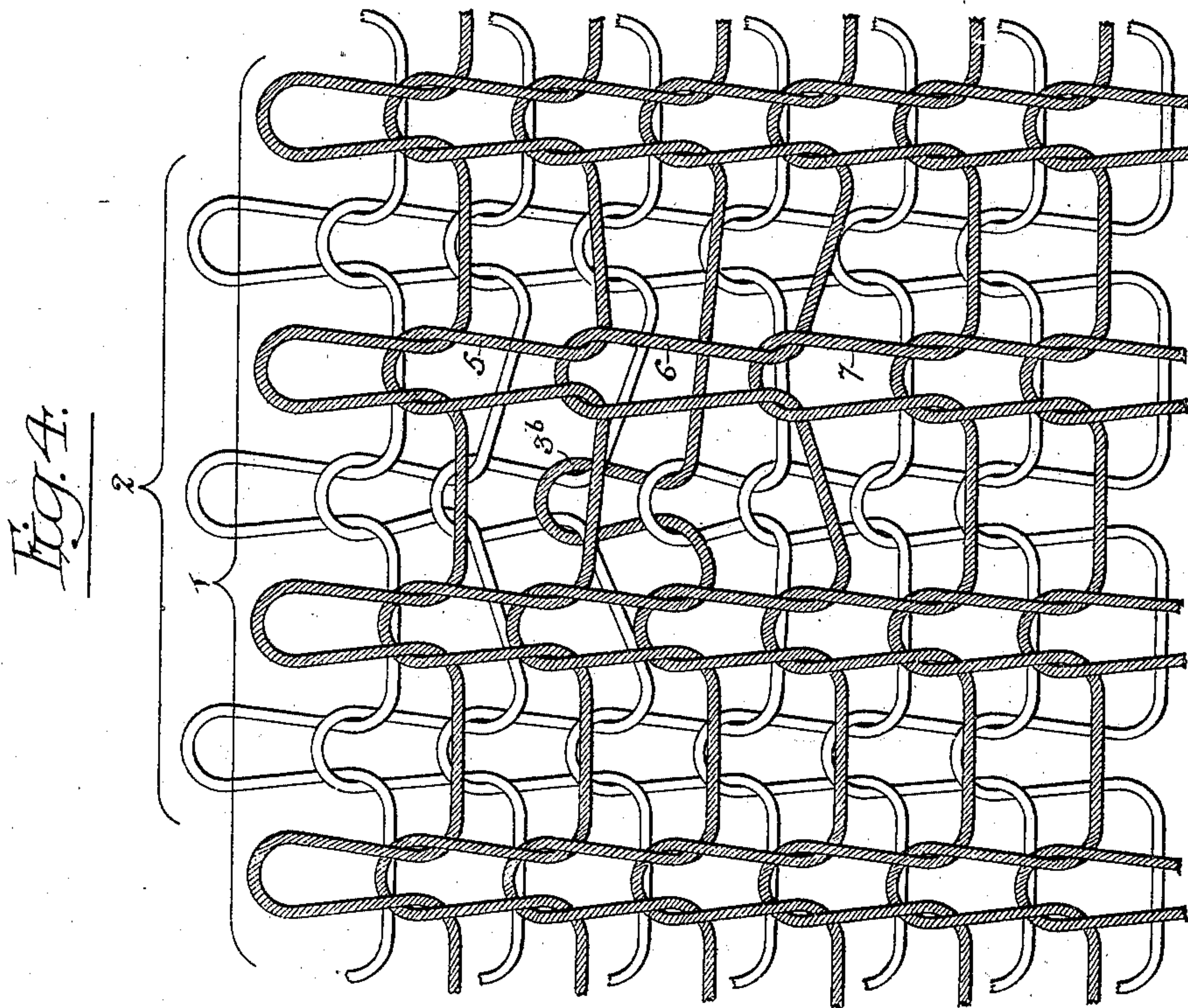
Patented Sept. 23, 1902.

D. C. BELLIS.
KNITTED FABRIC.

(Application filed Feb. 15, 1902.)

(No Model.)

3 Sheets—Sheet 2.



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KNITTED FABRIC.

(Application filed Feb. 15, 1902.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 7.

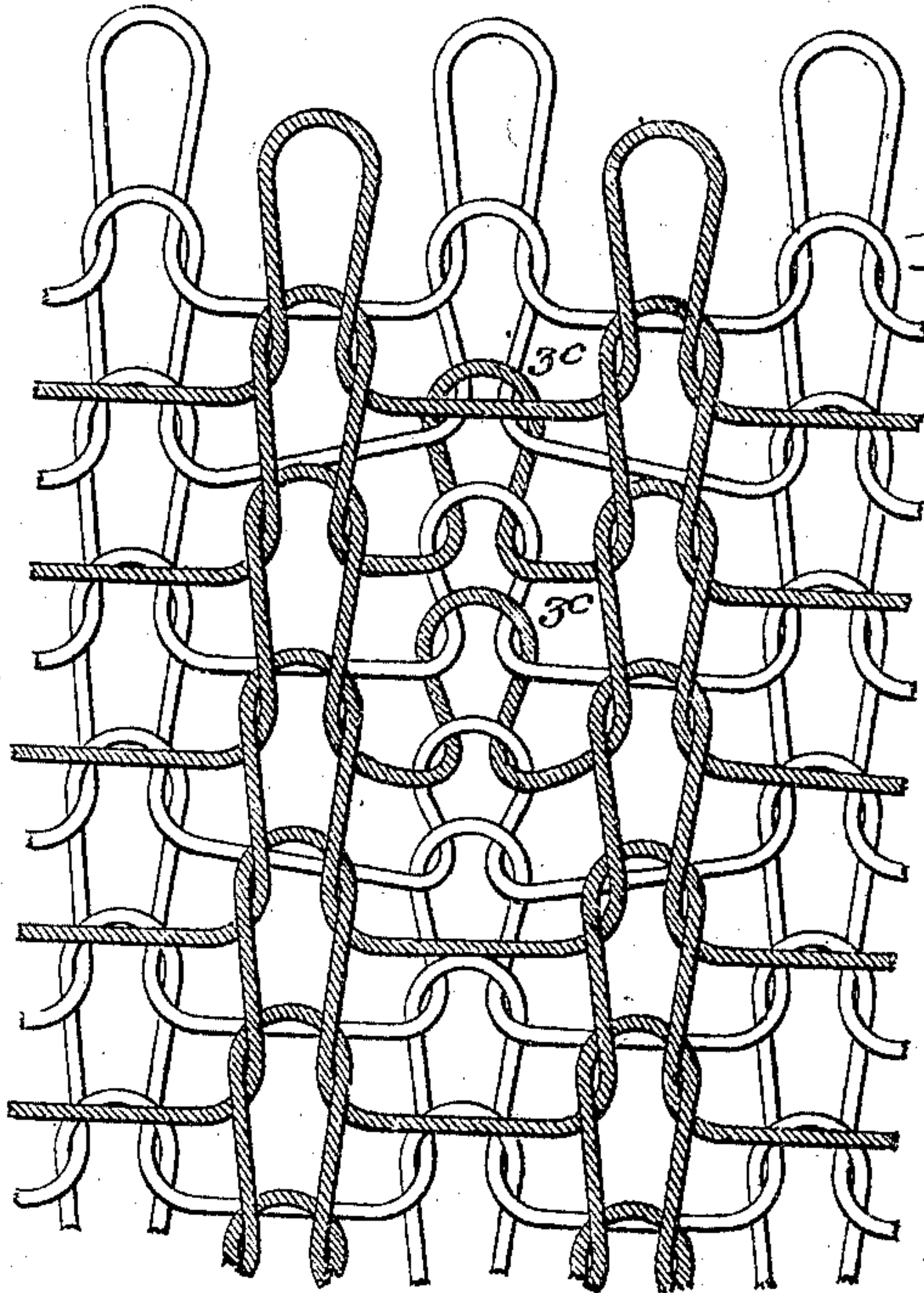
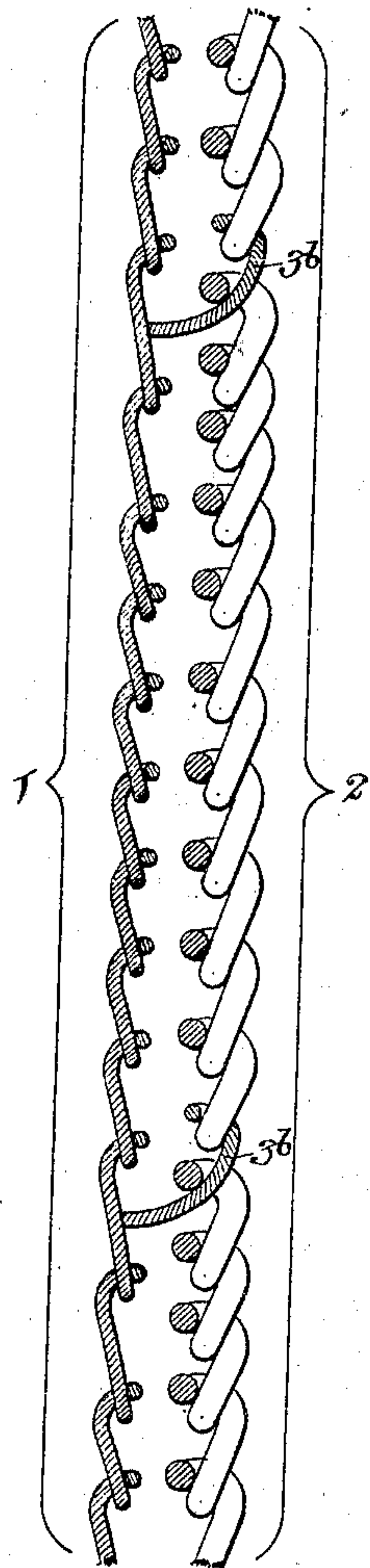


Fig. 5.

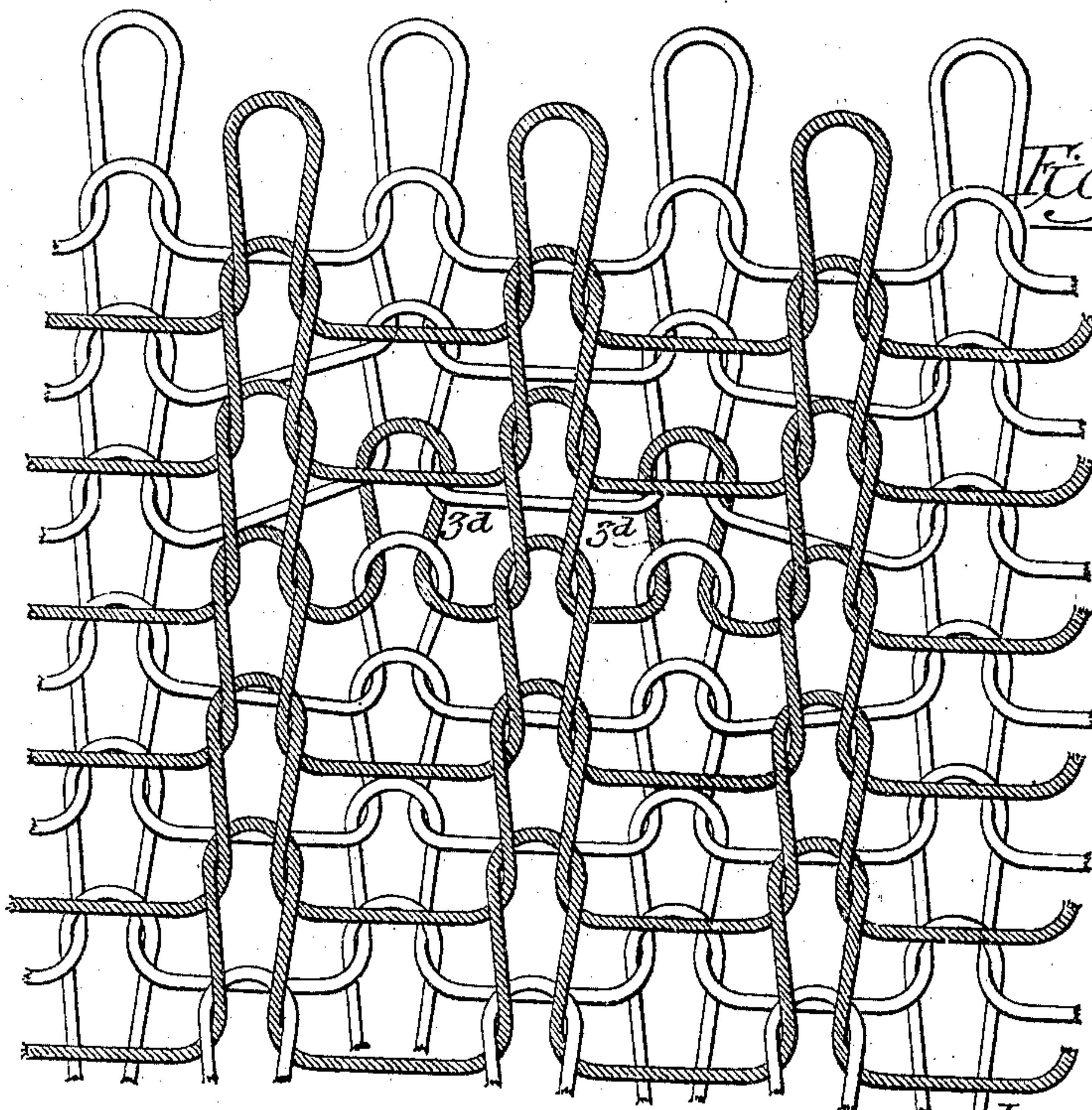


Fig. 6.

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UNITED STATES PATENT OFFICE.

DAVID C. BELLIS, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO ROBERT W. SCOTT, OF PHILADELPHIA, PENNSYLVANIA, AND LOUIS NAPOLEON DEVON WILLIAMS, OF ASHBOURNE, PENNSYLVANIA.

KNITTED FABRIC.

SPECIFICATION forming part of Letters Patent No. 709,734, dated September 23, 1902.

Application filed February 15, 1902. Serial No. 94,194. (No model.)

To all whom it may concern:

Be it known that I, DAVID C. BELLIS, a citizen of the United States, and a resident of Elizabeth, New Jersey, have invented certain Improvements in Knitted Fabrics, of which the following is a specification.

My invention consists of a knitted fabric comprising two webs practically independent of each other, but united by causing the yarn which constitutes one of the webs to engage with the other web at intervals, such engagement being in the form of a loop or stitch. The two webs lie closely together, so as to provide, in effect, a double web joined at the desired points, the fabric thus constructed having many desirable features, as hereinafter set forth. The tying loops or stitches may be drawn from either web into the other, or some may be drawn from the face web into the back web and others from the back web into the face web, and the tying loops or stitches may be either single or in groups, as desired.

In the accompanying drawings, Figure 1 is an exaggerated sectional view of a piece of fabric made in accordance with my invention, the section being taken on the line *xx*, Fig. 2, but with more and shorter stitches. Fig. 2 is an exaggerated view of the fabric, illustrating the method of uniting the two webs of which it is composed; and Figs. 3 to 7, inclusive, are views illustrating other fabrics made in accordance with my invention.

The fabric consists of two single webs, each preferably tubular and one overlying the other, as shown at 1 and 2 in Fig. 1, these webs being united together at any desired points by causing the yarn which constitutes one of the webs to engage with the other web, such engagement being either in the form of a loop or stitch. By preference the tying-yarn is simply looped into the web with which it engages instead of being drawn into a stitch in said web, so that it will not have any material modifying effect upon the appearance of the latter, one of such tying-loops being represented at 3 in Fig. 2 and a series of such loops being represented at 3^a in said figure, while in the fabric shown in Figs. 3, 4, and

7 tying-stitches 3^b are employed instead of tying-loops, and in the fabrics shown in Figs. 5 and 6 groups of tying-stitches 3^c and 3^d, respectively, are shown.

The fabric can be readily produced upon a machine having two needle-carriers, with one or more yarn-guides for each set of needles.

In producing the two single webs the yarn-guide which operates in connection with the needles of one needle-carrier feeds its yarn to said needles only, and the yarn-guide which operates in connection with the needles of the other needle-carrier feeds its yarn to those needles only; but at the points where the webs are to be connected there is a projection of a needle or needles of one needle-carrier to receive yarn from the yarn-guide which normally operates in conjunction with the needles of the other needle-carrier, each tying-needle being projected far enough to receive the tying-yarn, but not far enough to clear the stitch upon it when a tying-loop, such as that shown at 3 or 3^a in Fig. 2, is to be formed, and being projected far enough to receive the tying-yarn and also to clear the stitch upon it when a tying-stitch, such as shown at 3^b in Figs. 3 and 4 or at 3^c or 3^d in Figs. 5 and 6, is to be produced. Hence when the tying-needle is retracted at the next feed both the old stitch and the tying-loop will be cast over the new stitch in the first case, or in the latter case the tying-stitch will be cast over the new stitch.

When, as in fine-gage machines, the needles are directly opposite each other in the two needle-carriers, the needle of one needle-carrier will not be projected at the point of projection of the tying-needle of the other needle-carrier, the said tying-needle receiving the yarn which would otherwise be fed to the suppressed needle, the latter thus missing the said yarn, but retaining the stitch already upon it. Hence when said stitch is cast off it will impart such tension to the stitches in the adjoining courses that the three will be slightly elongated, as shown at 5, 6, and 7 in Fig. 4.

When the needles of the two needle-car-

riers alternate with each other, however, this suppression of one needle-carrier when the tying-needle of the other needle-carrier is receiving the tying-yarn will not be necessary, and all of the wales of the fabric 1 can be alike, as shown in Figs. 2, 5, and 6.

In all of the fabrics shown in the drawings the courses of stitches of one web are supposed to be directly behind corresponding courses of stitches in the other web, and in the fabric shown in Fig. 4 the wales of the web 2 are supposed to be directly behind the wales of the web 1, the offsetting of the courses and wales being resorted to in the drawings for the purpose of clearly representing the formation of the stitches in the two webs.

The number of wales and the number of courses intervening between the tying loops or stitches may be modified as the character of the fabric and the purpose for which it is intended may suggest, and the said tying loops or stitches may be distributed as desired, and groups of tying loops or stitches may be used instead of the single tying loops or stitches, the grouping being either in the direction of the wale, as shown by the tying-stitches 3^b in Fig. 5, or in the direction of the course as shown by the tying-stitches 3^c in Fig. 6, or such grouping may be in both directions, as desired.

In many cases it is preferable to form the tying loops or stitches in each wale of the entire course of the fabric, as shown, for instance, by the tying-loops 3^a in Fig. 2, for the webs can then be severed adjacent to this row of tying-loops, and the latter will unite the two webs at the severed edge of the fabric, thereby rendering unnecessary any further securing means at such point, and even when the tying-points are separated from each other by a number of wales and a number of courses of the fabric they will prevent that curling up of the cut edges of the webs which is such an objection to plain-knitted fabric and which renders so difficult the finishing of the cut edges of the knitted garments in a sewing-machine.

Fabric produced in accordance with my invention is particularly available for undergarments, for the reason that both the interior and exterior faces are alike—smooth and free from roughness—while the contiguous surfaces, being more or less rough, serve to give the composite fabric a “loftier” and softer effect.

Where a garment is made from two separate webs, one overlying the other, great difficulty is experienced in the course of manufacture due to the tendency of the fabric to curl; but in my fabric the tying of the two webs together obviates this objection, the tendency of one web to curl being counteracted by the tendency of the overlying web to curl in the opposite direction.

Plain fabric made upon a circular-knitting machine has a tendency to twist spirally, due

probably to the twisting of the yarn, and this tendency interferes materially with the handling of the goods during the manufacture of garments therefrom and results, moreover, in a defective-finished garment. This objection is also overcome in my improved composite web, the twist of one web being counteracted by the twist of the other.

My improved fabric may have a face composed of yarn of one color and a back composed of yarn of another color, or a face of fine yarn and a back of heavier yarn, or a plain face and a fleeced back, or a face composed of yarn of one material and a back composed of yarn of another material, and in providing a back web for fleecing purposes the same may be of coarser gage or may have longer stitches than the face web, so that there will be less weight of expensive material for fleecing purposes.

In making a fabric having a fine face and a coarse back, as shown in Fig. 7, I prefer to form the tying loops or stitches from the fine yarn, so that the coarse yarn will not appear upon the face of the fabric.

The distinction between a “loop” and a “stitch” as these terms are used in the specification is that in forming the loop the yarn is not drawn through a loop of the other fabric, but is simply cast off with the same in drawing the fresh loop in said fabric, whereas the term “stitch” implies the drawing of the yarn of one fabric through a loop of the other fabric in the same manner as the yarn of the latter fabric is drawn in forming the new course.

Where in the claims I have used the term “loop” without qualification, I intend that term to cover either a simple loop or a stitch, these being considered broadly as equivalents one of the other.

I am aware that previous to my invention ribbed knitted webs have had formed in them stripes or bands composed of two separate plain webs and also that a ribbed web has been provided with a looped plain web to form a welt or hem; but my improved fabric is distinct from these prior fabrics, in that it is not a ribbed web, but a double fabric composed of two separate and independent plain webs overlying one another and tied together at intervals.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. A knitted fabric comprising two webs, one overlying the other and united at intervals by a loop of the yarn of one web engaging the other web, said points of union being separated in the direction of the wales, substantially as specified.

2. A knitted fabric comprising two webs one overlying the other and united at intervals by yarn of one web forming loops in the other web, said loops not being drawn through the stitches in the latter web, substantially as specified.

3. A knitted fabric comprising two webs

one overlying the other and connected at intervals by yarn of one web forming loops in wales of the other web instead of in corresponding wales of its own web, substantially as specified.

4. A knitted fabric comprising two webs one overlying the other and connected together by yarn of one web forming loops in wales of the other web throughout an entire course of such web, substantially as specified.

5. A knitted fabric comprising two webs of different texture one overlying the other, said webs being united by yarn of one web engaging the other web at intervals in the direction of the wales, substantially as specified.

6. A knitted fabric comprising two webs one overlying the other, one web being composed of stitches of coarser yarn than those of the other web, said webs being united at intervals in the direction of the wales by loops of the finer yarn engaging with wales of the coarser web, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID C. BELLIS.

Witnesses:

F. E. BECHTOLD,
JOS. H. KLEIN.