

No. 644,467.

Patented Feb. 27, 1900.

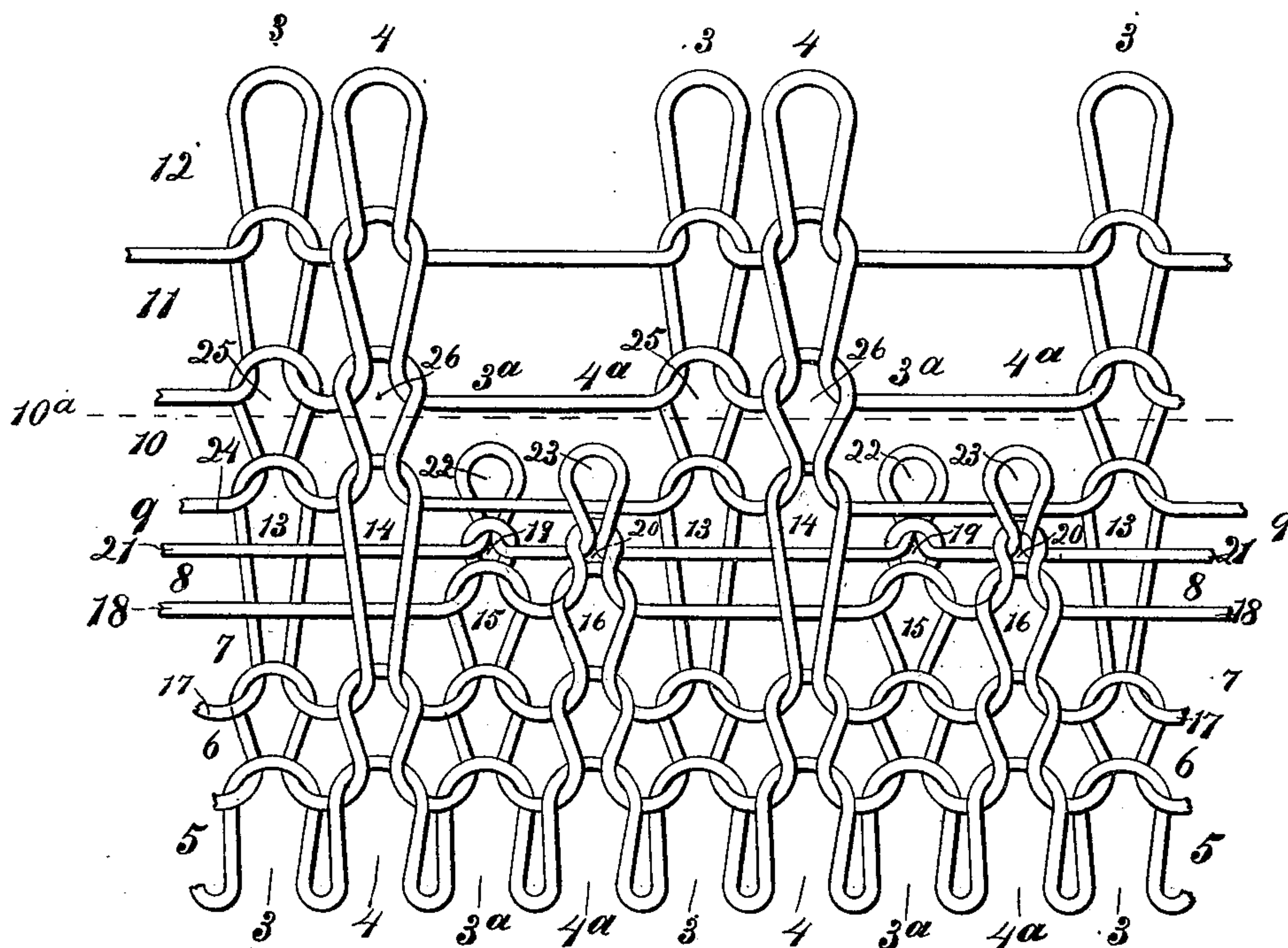
G. E. RUTLEDGE & U. G. LEE.  
METHOD OF FORMING KNITTED FABRICS.

(Application filed Dec. 16, 1899.)

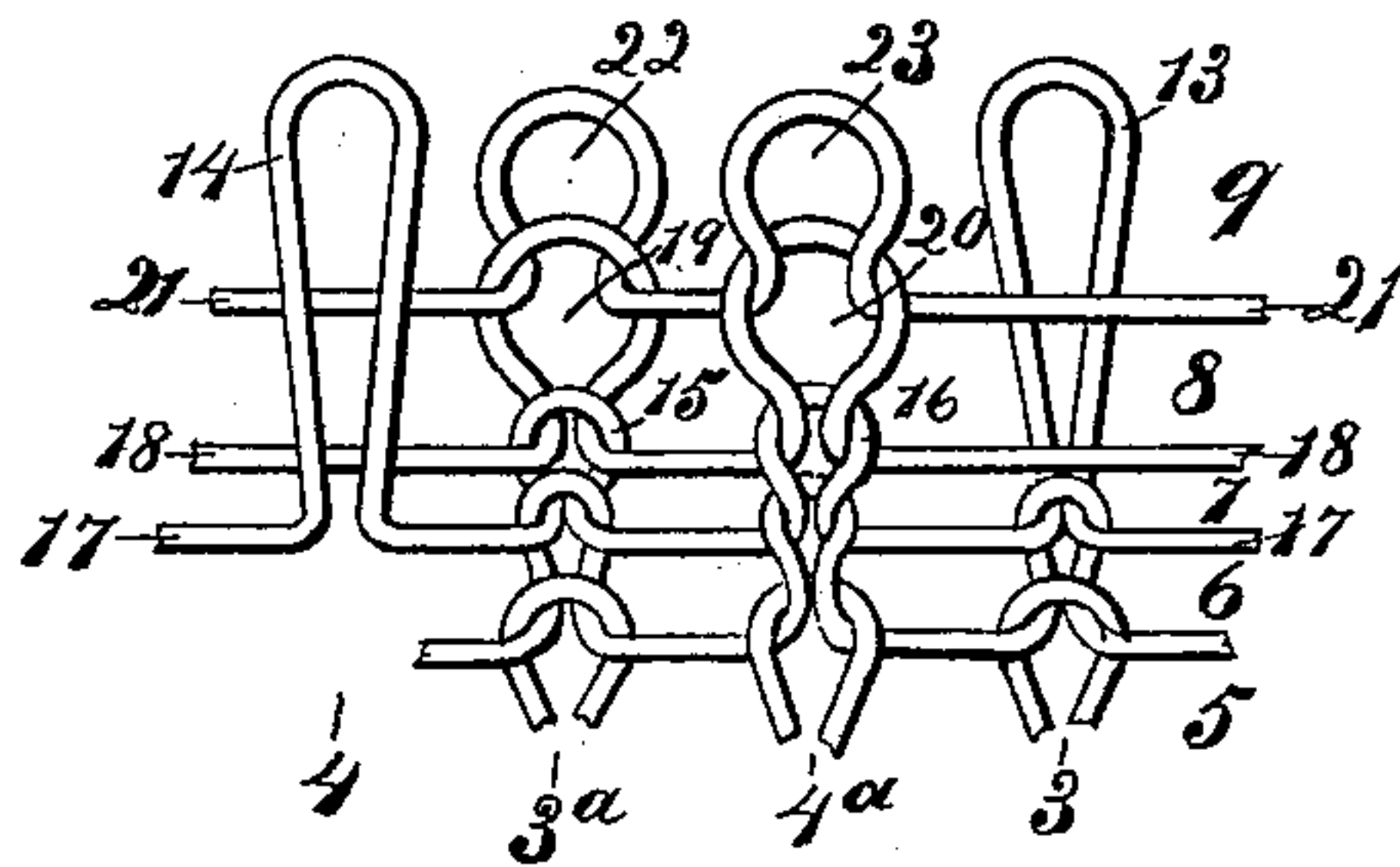
(No Model.)

2 Sheets—Sheet 1.

*Fig. 1.*



*Fig. 2.*



Witnesses:  
W. C. Bodley  
W. H. Cotton

Inventors  
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By Louis K. Tilton Atty.

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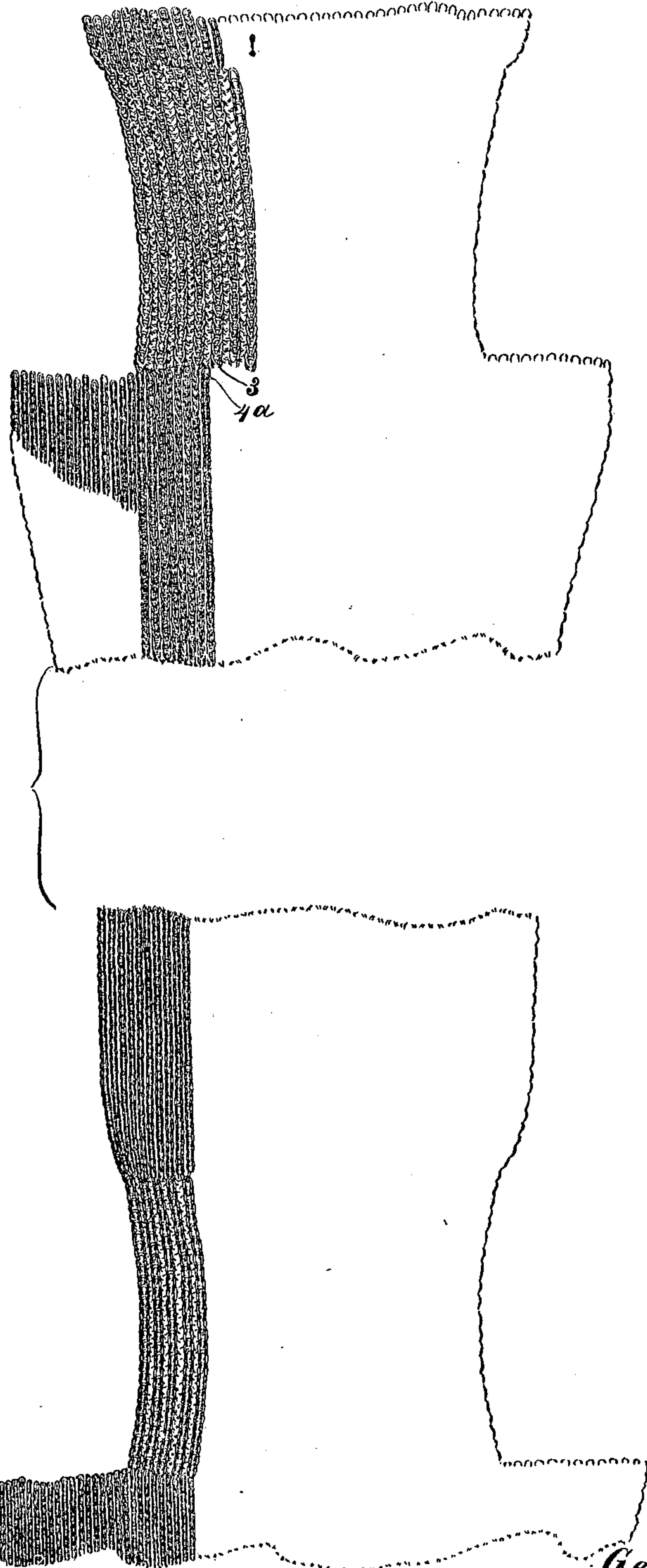
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(No Model.)

2 Sheets—Sheet 2.

*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

GEORGE E. RUTLEDGE AND ULYSSES G. LEE, OF CHICAGO, ILLINOIS, ASSIGN-  
ORS TO THE GEORGE D. WHITCOMB COMPANY, OF SAME PLACE.

## METHOD OF FORMING KNITTED FABRICS.

SPECIFICATION forming part of Letters Patent No. 644,467, dated February 27, 1900.

Application filed December 16, 1899. Serial No. 740,494. (No specimens.)

*To all whom it may concern:*

Be it known that we, GEORGE E. RUTLEDGE and ULYSSES GRANT LEE, citizens of the United States, and residents of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Methods of Forming Knitted Fabrics, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates particularly to the method of changing from close-knitted work to open-knitted work, or, more strictly, to means for dropping out certain of the stitches, so that the work is less closely knitted than before the stitches were dropped.

Our improved method is especially serviceable in making the change from one article to another, of which a portion is formed of close-knitted work and a portion of open-knitted work, such as the sleeve of an undershirt, which may be made by starting with the cuff formed of open work, as by the use of alternate needles of a knitting-machine, the remainder of the sleeve having an increased number of stitches in the same width, and then changing from the upper end of a completed sleeve to the cuff of a new sleeve without interrupting the knitting operation, though it may be employed in any work, whether machine or hand made, wherein without narrowing some of the wales are discontinued. Heretofore it has been found impracticable to make such a change from close to open knitting, as above described, without laboriously transferring the stitches which are to be discontinued.

This invention consists in the method of securing the stitches which are to be discontinued by introducing into each a key-stitch, disconnected from the wales which are to remain, which prevents it from being drawn out by the stitches which are continued in the further development of work.

In the accompanying drawings, Figure 1 is an enlarged analytical section of a piece of fabric, a portion being close-knitted and a portion open-knitted, the stitches intermediate of the two being represented as formed

without the use of tension, Fig. 2 being a detail of a portion of the same work, the tension being applied; and Fig. 3 shows a series of articles fabricated by our improved method.

We have designated the several rounds of the knitting by the figures 5, 6, 7, 8, 9, 10, 11, and 12. At 3 3 and 4 4 are shown wales which are continuous through the close to the open work, and at 3<sup>a</sup> 3<sup>a</sup> 4<sup>a</sup> 4<sup>a</sup> are shown wales which, while appearing in the close work, are discontinued when the change is made to open work. The rounds 5 and 6 represent the last two rounds of the close-knitted work. In the next round, (designated 7,) the turn of the yarn used therein being designated 17, only the stitches 13 and 14 are made and form the first round of the open-knitted work. These stitches are held upon the needles while the next round 8, the turn of the yarn employed therein being designated 18, and, if preferred, the succeeding round 9, the turn of yarn used therein being designated 21, are knitted. In these two rounds the yarn does not enter into the wales 3 4 and only the stitches 19 20 and 22 23, respectively, of wales 3<sup>a</sup> 4<sup>a</sup> are formed and serve as key-stitches to hold the stitches 15 16 of round 7 from being pulled out by the tension of the stitches 13 14. In round 10 the yarn 24 is looped only into the stitches 13 14, forming the stitches 25 26 of the wales 3 4, which are continued to form the succeeding rounds 11 12, &c.

Before knitting the round 10 the loops 22 and 23 are dropped from the needles.

In performing the operation upon a knitting-machine the several steps in fabricating the piece shown in Fig. 1 are as follows: All of the needles of both banks are employed in rounds 5 and 6. Between rounds 7 and 8 the needles holding the stitches 13 and 14 are dropped out of action. Rounds 8 and 9 are now formed, and the needles upon which wales 3<sup>a</sup> 4<sup>a</sup> are formed are then thrown out of action and those holding the stitches 13 and 14 are brought into action. Round 10 is now formed, and needles employed in forming wales 3 and 4 are dropped out of and the needles employed in forming wales 3<sup>a</sup> and 4<sup>a</sup> are brought into action. The machine is now



operated to advance and retract the last-mentioned needles, but without feeding yarn thereto, whereby the stitches 22 and 23 are cast off, this action being suggested in the  
 5 drawings by the line 10<sup>a</sup>. The needles now being again shifted to throw out those last in action and bring into action those last at rest, the work is proceeded with, rounds 11 and 12 being formed.

10 The drawings represent a piece of doubled-ribbed work, the knitting being what is known in the art as "one and one." The invention is applicable, however, to any other style of knitting, whether ribbed or plain and how-  
 15 ever the needles may be related, and it is capable of being practiced as well in hand-knitting as in machine-work.

Theoretically the stitches 22 and 23 are not required; but in practice we have found it  
 20 advisable to introduce them as an additional safeguard, especially when a strong tension is applied to the fabric as knitted.

When the work is formed upon the machine, it is usual to hold it under strong tension, and it will be seen that the tension applied to the stitches 13 14 will draw down the  
 25 stitches 15 16, as indicated in Fig. 2 of the drawings. By looping into the latter stitches the stitches 19 20 the stitches 15 16 are held  
 30 in place unless the tension is very strong. Should the tension be sufficient to draw out the stitches 15 and 16, notwithstanding the presence of the key-stitches 19 and 20, the loops 22 23 may be employed as an additional  
 35 safeguard.

In Fig. 3 of the drawings we show a succession of undershirt-sleeves fabricated by our improved method. The dropping of the

outer wales at the upper end of the sleeve upon the completion of the latter is accomplished 40 in the manner usually practiced and forms no part of our present invention.

We claim as our invention—

1. The method, in the knitting of fabrics, of dropping out certain wales, consisting in 45 knitting into the last stitch of the wale to be dropped a key-stitch whereby such last stitch is prevented from pulling out, such key-stitch being independent of the wales which are to be continued. 50

2. The method, in the knitting of a plurality of articles, each having a portion more closely knitted than other portions, of changing without interruption from the closer-knitted portion of one article to the more 55 open portion of the next article to be fabricated by knitting into the last stitches of each of the wales to be dropped a key-stitch, and continuing the remaining wales to form the more open portion of the next article, such 60 key-stitch being independent of the wales which remain.

3. The method, in the knitting of fabrics, of changing from relatively-close to relatively-open work by the dropping of wales, 65 consisting in holding upon the needles the wales which are to be continued, and while they are so held knitting into the remaining wales one or more rounds, then casting off the stitches last formed and knitting onto the 70 wales which had been thus held.

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