

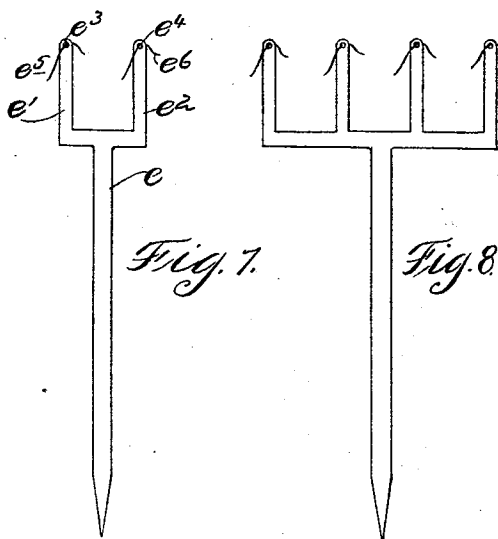
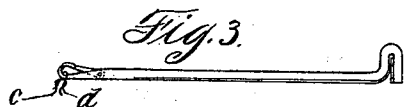
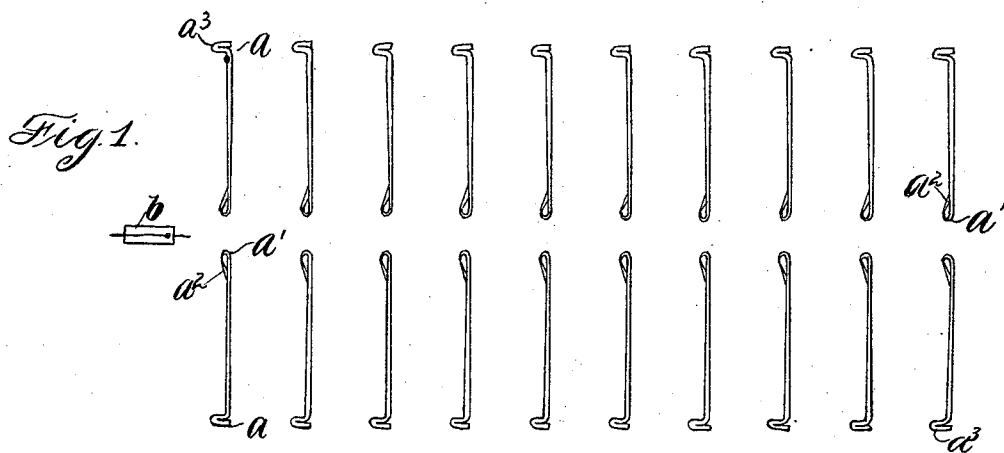
(No Model.)

2 Sheets—Sheet 1.

E. D. FRIEDLANDER.
KNITTED PATTERNED FABRIC.

No. 538,250.

Patented Apr. 30, 1895.



Witnesses:
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W. Clyde Jones.

Inventor:
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 9.

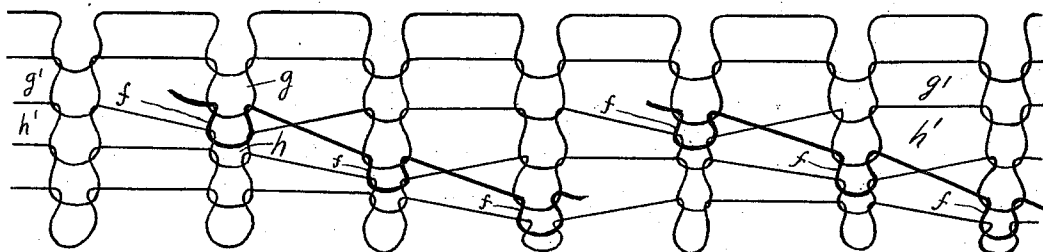
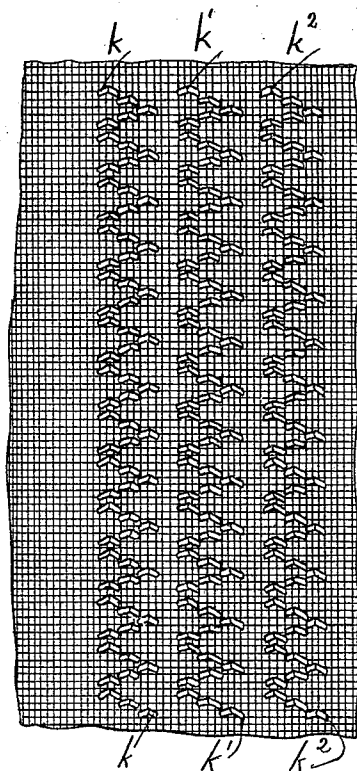


Fig. 10.



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UNITED STATES PATENT OFFICE.

EDWARD D. FRIEDLANDER, OF CHICAGO, ILLINOIS.

KNITTED PATTERNED FABRIC.

SPECIFICATION forming part of Letters Patent No. 538,250, dated April 30, 1895.

Application filed February 4, 1895. Serial No. 537,263. (No model.)

To all whom it may concern:

Be it known that I, EDWARD D. FRIEDLANDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Knitted Patterned Fabrics, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to knitted patterned fabrics, and its object is to produce a seamless fabric carrying a pattern that is knitted into the body of the fabric and forming a part thereof.

It has been proposed, heretofore, to form patterns upon knitted articles by first knitting the article complete and then superimposing upon the body thus formed, loops or stitches of thread or yarn of variegated color to constitute the pattern. The yarns forming the pattern do not thus form a part of the body of the fabric but are superimposed upon it. Furthermore, it has been proposed, in the manufacture of seamed and seamless articles, to form the fabric by knitting together yarns of several colors, the different colored yarns being brought to the front or face of the article at various points to produce the desired design. In this construction all of the threads pass round and round the article, being brought to the front only at intervals as the pattern demands. In accordance with the present invention, the yarn which is to form the pattern is not carried around the article with the yarn forming the body as has been done heretofore, but single loops formed from independent threads are knit into the body of the fabric at points where the pattern is to appear. The article or fabric is knit in layers or rows (courses) of interconnected loops, a row (course) of loops being formed about the article after which a second row interlooping with the first row is formed, the article being thus built up. The manner of forming these rows has been to provide a series of needles arranged in two parallel rows, the hooked ends of the needles of the two rows facing one another. A carrier is provided which travels across one row of needles, placing the yarn over the hooked ends thereof after which the

needles are actuated to form the loops, the carrier then passing back across the hooked ends of the second row of needles. A layer or row (course) of loops is thus formed about the article upon each excursion or cycle of the carrier. Between the operations of forming layers of loops about the article, an independent yarn is, according to my invention, placed about one of the needles, or a number of independent yarns are placed about a number of the needles. The needles about which the yarn has been placed are then actuated to produce loops in the fabric. In this manner intermediate loops of independent thread, are formed between the rows or layers of loops, and if the independent yarns be of different color from the yarn forming the layers or rows it will appear that patterns may be thus produced. By this method a seamless article or fabric may be produced comprising layers or rows of yarn of one color or material with which separate yarns of different color or material are interknit or interlooped without passing the pattern forming threads completely about the article as has been necessary heretofore.

I will describe my invention more in particular with reference to the accompanying drawings, in which—

Figure 1 is a diagram illustrating the machine employed in practicing my invention. Figs. 2, 3, 4 and 5 illustrate the several positions of the loop-forming hooks. Fig. 6 illustrates a hand hook by means of which the independent threads may be placed over the loop-forming hooks. Fig. 7 illustrates a carrier for the independent threads by means of which two threads may be manipulated at the same time. Fig. 8 is a similar view of a carrier adapted for four threads. Fig. 9 is a diagram illustrating the loops which constitute the fabric, the intermediate loops formed by the independent threads being indicated by heavy lines. Fig. 10 is a view of a seamless patterned article embodying my invention.

Like letters refer to like parts throughout the several figures.

In Fig. 1 I have illustrated the essential parts of a knitting machine which may be employed in practicing my invention, the parts being shown in diagram for clearness, and

comprising two parallel rows of needles a , the hooked ends of the needles being opposed. Each of the needles is provided with a hooked end a' and a pivoted latch a^2 provided with a spoon-like end adapted to rest in one position of the latch upon the point of the hooked end of the needle. Upon the shank of the needle is provided a foot a^3 adapted in the operation of the machine to be engaged by a traveling cam to move the needle back and forth longitudinally. In the figure the needles are shown, for the purpose of illustration, as lying in the plane of the paper, but in practice the needles occupy a position at right angles to that shown, so that the latches a^2 move in vertical planes. A traveling carrier b is adapted to move back and forth between the two rows of needles, the cams adapted to engage the feet a^3 of the needles, moving with the carriage, thus causing the needles to be advanced and withdrawn to form the loop. As the carriage advances, a series of loops is formed over the ends of the needles of one row, and as the carriage returns a series of loops is formed over the ends of the needles of the other row, a layer (course) of loops being thus formed about the fabric which passes down between the two rows of needles as it is knitted.

I have not deemed it necessary to illustrate or describe in detail the cams for engaging the feet a^3 or the mechanism for moving the carriage, as machines of this type are well known in the art and a detailed description thereof may be found in the American Mechanical Dictionary, Knight, page 1235.

The movement of the needles in forming the loops may be understood by reference to Figs. 2, 3, 4 and 5 in which Fig. 2 illustrates a needle with a loop c formed over the shank of the needle back of the latch a^2 the needle being thrust forward so that the hooked end a' rest in the path of the thread carried upon the carriage b . The end of the needle thus engages the thread d and as the needle is drawn back, the loop c formed over the shank of the needle engages the latch a^2 rotating the same upon its pivot, whereby the spoon-like end of the latch rests over the point of the hooked end of the needle thus permitting the loop c to slip over the end of the needle and loop about the loop d , which is inclosed between the hooked end of the needle and the latch a^2 as shown in Fig. 3. The needle is then advanced again thus carrying the loop d to the rear of the latch a^2 and thrusting the hooked end of the needle into the path of another thread d' which is engaged by the needle. As the needle makes the return stroke, the loop d slips from the end of the needle and about the loop d' , a loop being thus formed upon each excursion of the needle.

In practicing my invention, after the carriage b has made an excursion, to complete a layer or row of loops about the article, I place over the hooked end of one of the needles an

independent thread, that is, a thread separate and distinct from the yarn carried upon the carriage b . The thread having been placed over the end of the needle, the needle is advanced and withdrawn individually, thus forming a loop from the piece of separate yarn. If this yarn be of a different color from that of the yarn of which the successive rows are knit, a loop of a distinct color will thus be knitted.

In Fig. 6 I have illustrated an ordinary form of hook which may be used for grasping the independent thread and placing it about the end of the needle. In this manner threads may be placed about one or more of the needles as the pattern may require. The carriage b then makes another excursion and forms another layer of loops which are knit directly on to the loops formed by the independent threads, these intermediately formed loops thus constituting a part of the body of the fabric.

Instead of providing a simple hook, such as is shown in Fig. 6 for manipulating the independent threads, a double carrier e such as is shown in Fig. 7 may be provided, carrying upon its end a pair of arms e' e^2 provided with eyes e^3 e^4 through which the threads e^5 e^6 may be passed.

The handle of the carrier may be provided with a sharpened end, the carrier resting upon the interior of the fabric with the end of the handle extending through the fabric in front, whereby it may be grasped by the operator. By the use of the carrier d the threads may be placed about two needles at the same time, the needles being then moved by hand or otherwise to complete the loops.

In Fig. 8 I have illustrated a carrier for the independent threads provided with four arms with eyelets to receive the threads whereby threads may be placed over four needles at one operation.

In Fig. 9, the threads comprising the fabric are shown in diagram, the intermediately formed loops f f , being indicated by heavy lines. It will be observed that the intermediately formed loops form a part of the body of the fabric, being interlooped with the layer (course) g' of loops just previously formed, while the loops of the succeeding row h' are looped upon said intermediate loops. Thus the loop f upon the left of the figure is interlooped with the loop g of the row g' just previously formed and with the loop h of the row h' succeeding row. In this manner loops of yarn of different color or material may be formed at the point where the loop is to appear and without the necessity of carrying continuously the differently colored yarn about the fabric upon the rear face, as has been necessary heretofore, in forming patterned articles.

When it is desired to run the pattern lengthwise of the article as shown in Fig. 10, the same thread may be carried continuously from

one layer to another. Thus in Fig. 10 the pattern comprising three zig-zag rows k, k', k'' of loops may be formed from three independent threads carried continuously from layer to layer as the fabric is being formed.

My invention is particularly applicable to fashioned fabrics, such as mittens and gloves, in which it has been impossible heretofore to form any pattern at the will of the operator as may be done by the present invention. Since the independent thread from which the intermediate loops are formed is carried transversely across the continuous rows—that is, run from row to row (course to course) across the fabric instead of passing around the fabric parallel to the continuous rows (courses)—the pattern may be formed even at the fashioned portion of the fabric.

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

1. The method of knitting patterned fabrics which consists in forming continuous rows or layers of thread or yarn, and between the operations of forming rows forming individual loops of independent thread or yarn, interlooping the intermediate loops with loops of the preceding and succeeding formed rows whereby the loops of independent thread constitute a part of the body of the fabric.

2. The method of knitting patterned fabrics which consists in passing thread or yarn over loop-forming needles to form successive layers or rows of loops, and between the operations of forming layers, forming loops over a portion of the needles from independent thread or yarn whereby the body of the article formed of the continuous loops and the portion formed by the intermediate loops may

be variegated as to material and color to form special patterns.

3. As a new article of manufacture, a seamless knit fabric comprising continuous rows or layers of loops of yarn or thread, and intermediate loops of yarn or thread interposed between said rows or layers, and interlooping with the loops thereof to form a part of the body of the fabric, the yarn from which said intermediate loops are formed not being extended completely about the article, substantially as described.

4. In a knitting machine, the combination with parallel rows of loop-forming needles, and a carrier adapted to travel across the ends of said needles to form a row of loops about the fabric, of a carrier for independent thread constructed to be placed between said rows of needles and adapted to be manipulated in connection with a portion of said needles to form loops of independent yarn in the fabric, substantially as described.

5. As a new article of manufacture, a seamless knit fabric comprising continuous rows or layers of loops of yarn or thread, extending around the fabric, and independent thread or threads extending transversely across said continuous rows and formed into intermediate loops interlooping with the loops of said continuous rows or layers of loops and constituting a portion of the body of the fabric, substantially as described.

In witness whereof I hereunto subscribe my name this 15th day of January, A. D. 1894.

EDWARD D. FRIEDLANDER.

Witnesses:

DE WITT C. TANNER,
W. CLYDE JONES.