B. T. STEBER.

KNITTED FABRIC.

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951,033.

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Fig. 1.

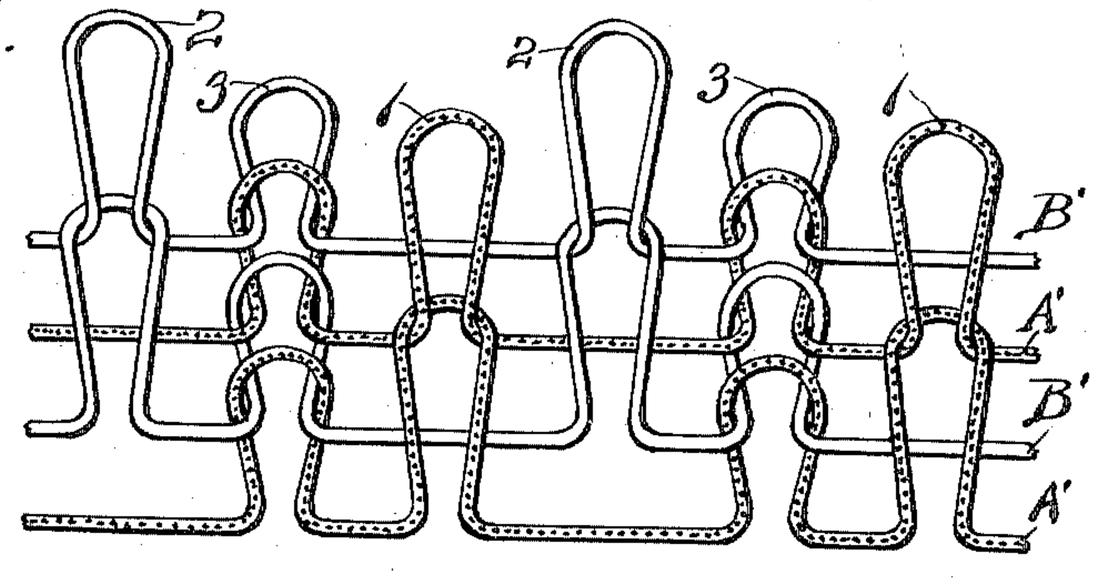


Fig. 2.

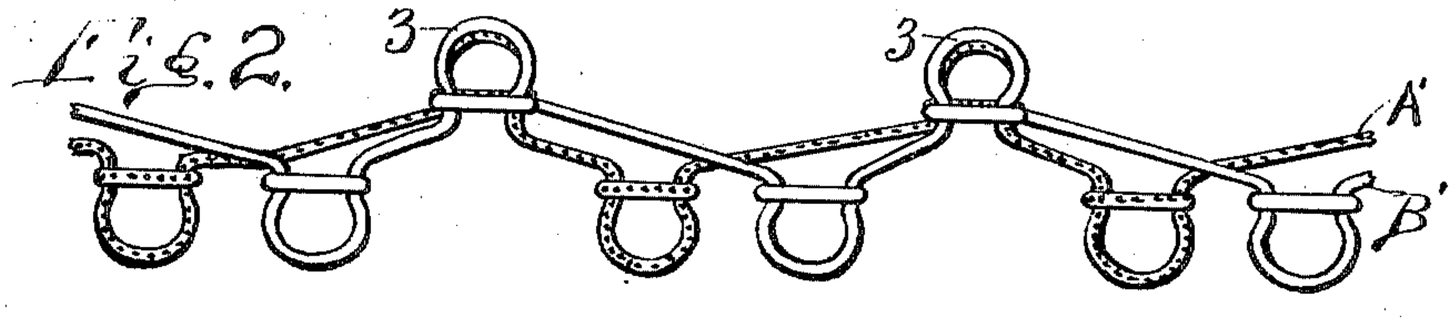


Fig. 3.

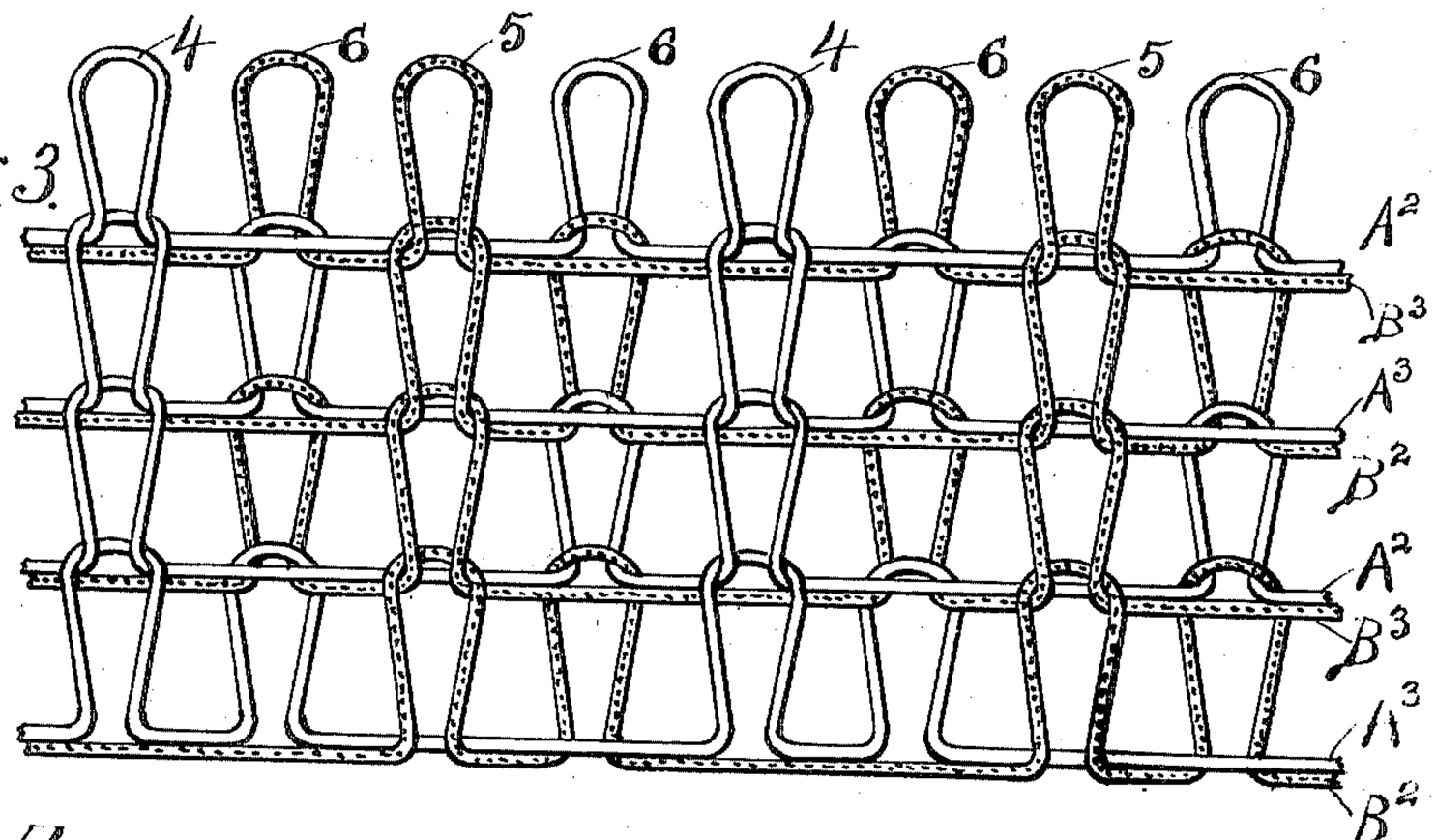
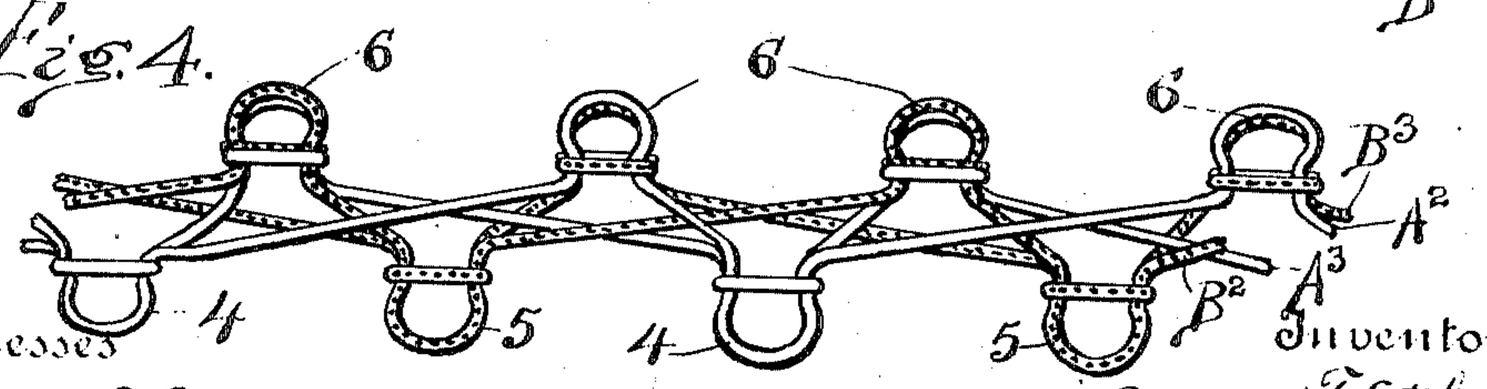


Fig. 4.



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KNITTED FABRIC.

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To all whom it may concern:

Be it known that I, BERNARD T. STEBER, a citizen of the United States, residing at Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Knitted Fabrics; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in knit fabric, and the principal object in view is the making of a ribbed fabric which has more body between wales than has the regular ribbed fabric, which result I accomplish by employing two interknit webs as distinguished from interlocked webs as heretofore proposed in the art.

A further object is the production of an elastic, ribbed fabric susceptible of affording variable color effects, the inner face presenting one effect and the outer face another.

A further object is the production of a double web interknit fabric, a generic embodiment of which comprehends a two and one wale fabric having independent ribs on one face and interknit composite ribs on the other, so that the finished fabric is formed with double the number of wales on one face as on the other, the two wales of one face being arranged between each two of the wales of the other face, and each wale of the face having the less number of wales is made up of twice as many loops as there are loops in any one of the wales of the other face.

A more specific embodiment thereof comprehends a double web, interknit, one-and-one fabric, knit of two sets of yarn and having on the outer face alternate ribs of different yarns, each rib being knit from the same set of yarns as the next alternate rib, and the next immediately contiguous rib being knit of a different set of yarns, the ribs of the inner face being each interknit of yarns first of one of the sets of yarns and then of the other set of yarns, so that on the outer face, when the yarns of one set are of one color, and the yarns of the other set are of another color, the ribs present alternate stripes first of one color and then of the other, while each of the ribs of the inner face forms a motley colored stripe variegated with the colors of the successive alternate yarns, only one loop appearing in each rib of the inner face for one loop of each rib of the outer face, and each inner rib being formed of a single needle wale and each outer rib similarly formed.

With these and further objects in view as will be hereinafter in part set forth in detail and in part become obvious, the invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter disclosed and claimed.

In the accompanying drawings,—Figure 1 is a face view of the outer face on a greatly enlarged scale of a piece of fabric embodying the features of the present invention. Fig. 2 is a horizontal edge view of the same. Fig. 3 is a view similar to Fig. 1 of a further embodiment of the invention. Fig. 4 is a similar view to Fig. 2 of the fabric seen in Fig. 3.

To facilitate an understanding of the preferred mode of knitting the present improved fabric, and also to aid in the disclosure of the structure of the fabric itself, reference will be had to known parts of knitting machines, not illustrated.

To produce the fabric seen in Figs. 1 and 2, two yarns are fed to a dial machine in which alternate dial needles are retained constantly active, and the other dial needles constantly inactive, the cylinder needles being divided into two sets, each consisting of every other needle about the cylinder, and the sets operating alternately with respect to each other, the first set after knitting being held in its lowered position and retaining its loops while the second set knits and is lowered, and is then retained inactive as the first set again becomes active. As the set of dial needles which is active operates continuously and takes yarn from both feeds, alternating from one to the other throughout the operation, while the cylinder needles have the first set acting on the first yarn feed, and the second set acting with respect to the second yarn feed, the resulting fabric consists of two webs, one knit by one set of cylinder needles and the active dial needles, and the other knit by the other set of cylinder needles and the same dial needles, the two webs being thus interknit, as distinguished from interlocked as heretofore proposed in some fabrics. Thus also it will be observed that all the dial needle wales are made of loops taken alternately from both yarns while the cylinder needle

wales are each formed from a single yarn, each independent of the other, and the wales of one yarn successively alternating throughout the fabric with the wales of the other yarn. Each dial needle wale or wale on the inner face of the fabric forms a rib, and occurring between each two of the inner wales or ribs are the two cylinder needle wales on the outer face of the fabric, which by reason of the interknitting of the inner face wales are twined and form a single rib of substantially double the width of each inner rib. Thus it will be seen that if different colored yarns are used, say white is fed to the first set of cylinder needles and red to the second set of cylinder needles, the outer face of the fabric will present ribs, each formed of a needle wale of red and a needle wale of white, alternating throughout the fabric, while the inner face presents a continuous series of ribs each formed of a single wale made up of a loop of red and then a loop of white, and so on throughout the length of the wale. This interknitting of the two webs obviously results in the crossing of the sinker wales of the successive courses, and more body is thus given to the fabric between ribs, and, by this novel method of interknitting, a more permanent elasticity of the fabric is secured than in the proposed interlocked web fabric, and a finer mesh obtained than ordinarily with the same gage of machine.

Referring particularly to Figs. 1 and 2, illustrating the fabric produced as above set forth, A′ may represent the yarn fed to the first set of cylinder needles, and B′ the yarn fed to the second set of cylinder needles, and it will be seen that one of the first set of cylinder needles knits a wale 1 while the next contiguous cylinder needle of the second set knits a wale 2, and at the same time the dial needle which operates between the contiguous cylinder needles of the first and second sets produces a wale 3, which consists of the interknit yarns A′ and B′, twice as many loops being thus drawn in by each dial needle as by any one of the cylinder needles, so that each wale 3 is made up of twice as many loops as either wale 1 or 2, or in other words, each wale 3 represents the sum of loops produced by any two cylinder needles. The resulting fabric is a two-and-one wale fabric, an outer rib being made up of two wales.

In carrying out this generic idea of fabric in more specific detail to produce the species disclosed in Figs. 3 and 4, all of the dial needles are thrown into operation, and the operation of one set of dial needles will be alternate with respect to the other and with respect to the two sets of cylinder needles. To accomplish this result, two yarns, preferably of the same kind, are fed successively to the needles of each set of cylinder needles and each set is alternately so fed, and the first set of dial needles operates first with respect to one yarn being fed to the first set of cylinder needles and then with respect to one yarn being fed to the second set of cylinder needles, immediately following which the second set of dial needles operates first with respect to the other yarn fed to the first set of cylinder needles and then with respect to the other yarn fed to the second set of cylinder needles; after which the first set of dial needles again comes into operation and acts with respect to the first set of cylinder needles and then with respect to the second set of cylinder needles as before. The second set of dial needles, of course, remains inactive, the needles holding their loops, while the first set of dial needles is active and vice versa; and also the second set of cylinder needles remains inactive while the first set of cylinder needles is operating and vice versa. In carrying out this particular operation, four yarn feeds are preferably provided, as for instance, a yarn A^2 and a yarn A^3, constituting a set of yarns for the first set of cylinder needles, are fed successively to said first set of cylinder needles, while a yarn B^2 and a yarn B^3, constituting a set of yarns for the second cylinder needles, are fed successively to said second set of cylinder needles, whereby the fabric, such as seen in Figs. 3 and 4, is produced, the yarns A^2 and A^3 being knit by the first set of cylinder needles into wales 4, while the yarns B^2 and B^3 are knit by the second set of cylinder needles into wales 5, the wales 4 and 5 appearing on the outer face of the fabric, while between each two of the cylinder needle wales 4 and 5 a dial needle wale 6 is produced on the inner face of the fabric by the respective set of dial needles, both sets of dial needles producing the same kind of wale. Each of the dial needles of the first set in operation draws in first a yarn A^2 and then a yarn B^2, and the dial needles of the second set then draw in yarn A^3 and then yarn B^3, and then the dial needles of the first set again draw in yarn A^2 and then yarn B^2, and so on alternating in sets throughout the operation. Thus the first set of dial needles acts first with respect to the first set of cylinder needles and then with respect to the second set of cylinder needles, and the second set of dial needles then similarly acts first with respect to the first set of cylinder needles and then with respect to the second set of cylinder needles, whereby the two sets of dial needles not only operate alternately with respect to each other, but also alternately with respect to each of the two sets of cylinder needles.

The color of the yarns may of course vary as desired, but when it is desired to produce uniformity of color effects of the outer face

of the fabric, the yarns A^2 and A^3 are of the same color, and the yarns B^2 and B^3 may differ in color therefrom, but are of the same color with respect to each other, whereby the wales 4 are all of the same color, and the wales 5, though differing in color from wales 4, are all of the same color with respect to each other, while each wale 6 is made up of loops from two yarns drawn successively and alternately from the two sets of cylinder needle yarns, one yarn from each set, and thus the colors in each wale 6 are variegated, giving a motley effect to the inner face of the fabric. Each wale 6 also contains exactly the same number of loops as either wale 4 or wale 5, which is due to the fact that an equal number of dial needles and cylinder needles are caused to operate in producing this specific form of fabric. In this connection it is to be noted that the cylinder needles take yarn alternately from the two yarns of their own sets only, that is, the first set of cylinder needles alternately takes yarn A^2 and A^3, while the second set of cylinder needles takes yarn B^2 and B^3 alternately, the first set of cylinder needles never taking either yarn B^2 or B^3, and the second set of cylinder needles never taking yarn A^2 or A^3, while each of the first set of dial needles takes a yarn A^2 and then a yarn B^2, and each of the second set of dial needles takes a yarn A^3 and then a yarn B^3. The resulting fabric is a one-and-one rib fabric, each rib being formed of a single wale, with internal thread floats joining certain non-adjacent wales of the two faces.

The wale produced on the inner face of the fabric, seen in Figs. 1 and 2, may be called composite, as it is made of interknit alternate loops drawn at each and every knitting from both of the two yarns making up the two independent wales of the outer face of the fabric, twice as many loops thus appearing in each inner wale as in each outer wale and correspondingly only one-half as many wales appearing on the inner face as on the outer. The fabric seen in Figs. 3 and 4 is exactly the same, except as to the ratio of loops and the resulting ratio of wales, there being an inner wale for each outer wale and each inner wale being an interknit composite of alternate loops of yarns from one yarn of each of the two sets appearing in the independent outer wales.

A fabric embodying the present invention could be produced by needles operating in sets of twos, threes or more alternating with respect to similar sets, the ribs being increased in width with the increasing number of wales comprising each rib, and, by properly altering the cams, the cylinder needles may be caused to produce the composite wales and the dial needles the independent wales, such interchange of the work of the dial needles and cylinder needles respectively being clearly comprehended within the scope of the present invention.

What I claim is,—

1. A knit fabric comprising two interknit webs having upon one face of the fabric a series of wales made up of loops of distinct yarns, and having on the other face wales having therein loops of each of said yarns occurring in an alternating series.

2. A knit fabric comprising two interknit webs having upon one face of the fabric a series of wales made up of loops of distinct yarns and having on the other face wales wherein loops of each of said yarns interknit with loops of the other yarn only.

3. A knit fabric comprising two interknit webs having distinct needle wales of each web on one face of the fabric and interknit composite needle wales on the other face of the fabric, each composite wale comprising alternate loops of yarns taken alternately from each web.

4. A knit fabric comprising two interknit webs having on one face of the fabric distinct needle wales of each web only, and on the other face of the fabric interknit composite wales only, each composite wale comprising alternate loops from each of the webs.

5. A knit fabric comprising two interknit webs having distinct needle wales on one face of the fabric and interknit composite needle wales on the other face of the fabric alternating with the first-mentioned wales each composite wale comprising successive alternate loops from each of the webs.

6. A knit fabric comprising a double web fabric having a needle wale knit from one yarn on one face of the fabric, a needle wale knit from another yarn on the same face of the fabric, and a needle wale knit from both of said yarns in alternate courses on the other face of the fabric.

7. A knit fabric comprising a double web fabric having a needle wale knit from one yarn on one face of the fabric, a needle wale knit from another yarn on the same face of the fabric, and a needle wale knit from both of said yarns in alternate courses on the other face of the fabric and disposed in alternate relation to the first-mentioned wales.

8. A knit fabric comprising a double web fabric having independent needle wales on one face knit from different yarns, and interknit needle wales on the other face of the fabric, the interknit wales being knit from the yarns of the other two wales in alternate courses.

9. A knit fabric comprising successive alternate courses of different yarns, one yarn being knit into needle wales on one face of the fabric, and the other yarn being knit into like needle wales on the same face of the fabric, and both of the yarns being knit in

alternate courses into a needle wale on the other face of the fabric.

10. A knit fabric comprising successive alternate courses of different yarns knit into independent needle wales on one face of the fabric and interknit into a single needle wale on the other face of the fabric.

11. A knit fabric comprising a double web interknit of successive courses of different yarns forming needle wales on both faces of the fabric, one yarn being knit into distinct needle wales on one face of the fabric, another yarn being similarly knit into distinct alternating needle wales on the same face of the fabric, and said yarns being interknit in alternating courses into each wale on the opposite face of the fabric, thus forming composite wales, and the composite wales alternating with the distinct wales of the opposite face of the fabric.

12. A knit fabric comprising two interknit webs having on one face of the fabric distinct needle wales of each web, and on the other face needle wales, some of the second-mentioned wales comprising alternate loops from each of the webs.

13. A knit fabric comprising a double web fabric having yarns knit into independent needle wales on one face of the fabric, and needle wales each interknit of alternate courses of both of said yarns on the other face of the fabric, two of the first-mentioned wales being disposed between each two of the last-mentioned wales.

In testimony whereof I affix my signature in presence of two witnesses.

BERNARD T. STEBER.

Witnesses:

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