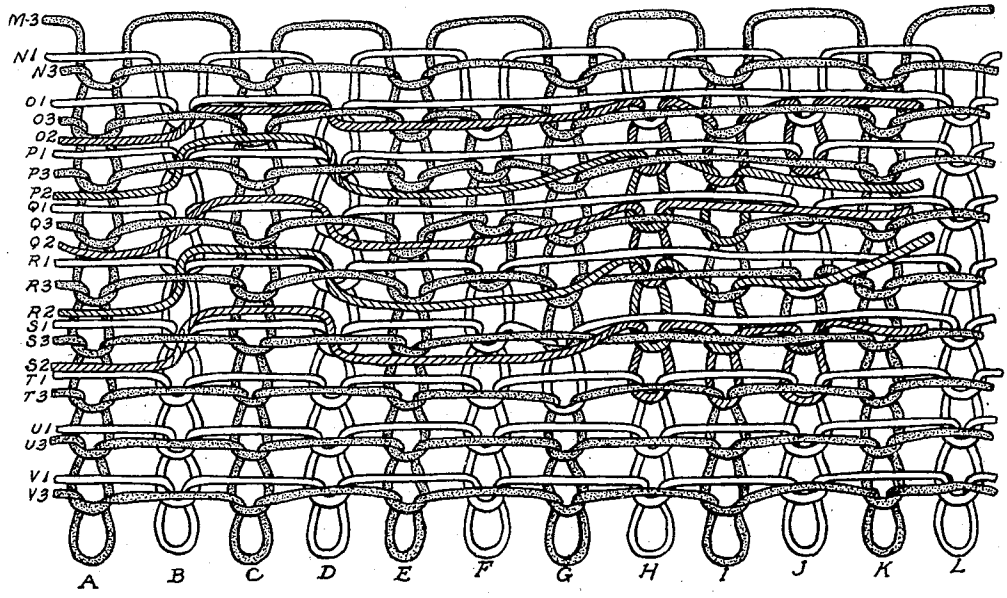
Oct. 21, 1941. U. T. MARR 2,260,118

ART OF ORNAMENTED KNITTED WEARING APPAREL MANUFACTURE

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Fig. 1.



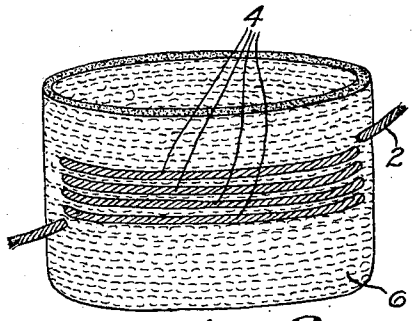


Fig. 3.

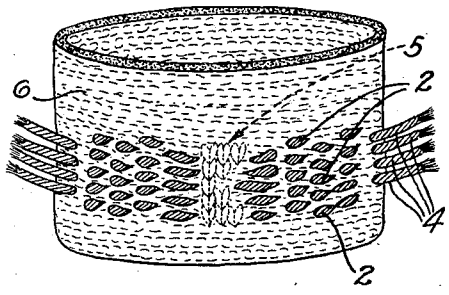


Fig. 4.

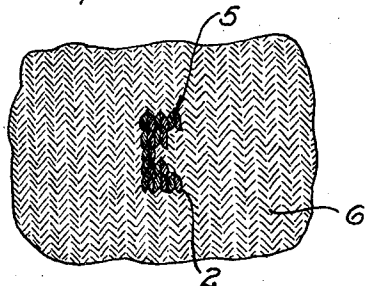


Fig. 2.

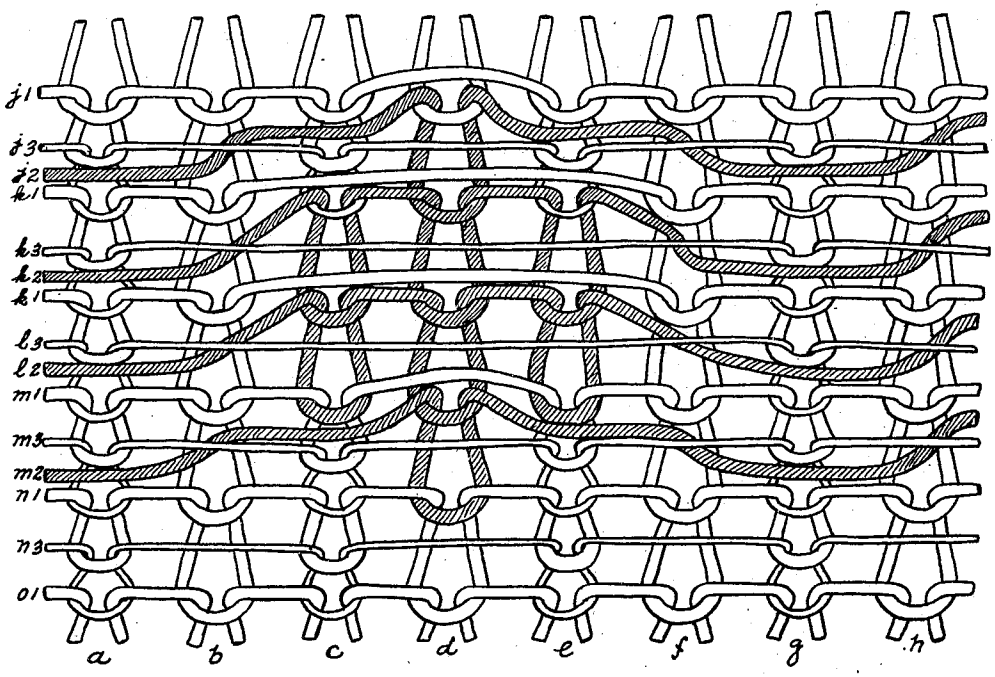
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ART OF ORNAMENTED KNITTED WEARING APPAREL MANUFACTURE

Filed Dec. 15, 1939 2 Sheets-Sheet 2

Fig. 5.



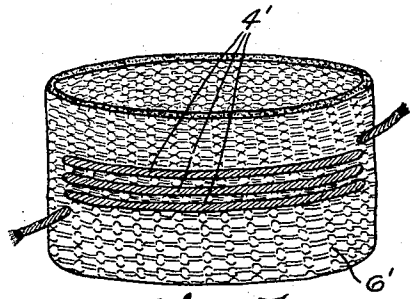


Fig. 7.

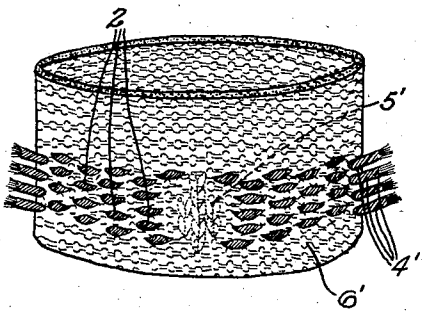


Fig. 8.

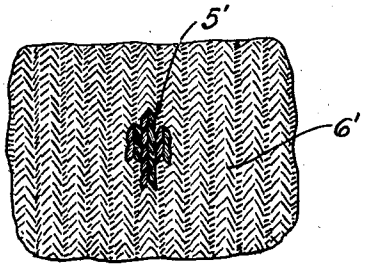


Fig. 6.

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UNITED STATES PATENT OFFICE

2,260,118

ART OF ORNAMENTED KNITTED WEARING APPAREL MANUFACTURE

Urban T. Marr, Appleton, Wis., assignor to Zwicker Knitting Mills, Appleton, Wis., a corporation of Wisconsin

Application December 15, 1939, Serial No. 309,341

5 Claims. (Cl. 66—201)

This invention relates to improvements in the art of ornamented knitted wearing apparel manufacture, and more particularly to knitted articles of wearing apparel having incorporated therein design configurations and ornamentations, and to the method of producing the same.

Certain articles of wearing apparel, such as gloves, mittens, scarves and the like, which are knit in tubular seamless formation, have heretofore been produced on knitting machines, but where it was desired to have certain surface portions of the articles bear ornamentations or design configurations, the usual practice was to incorporate said ornamentations into the article by slow and tedious hand operations in the nature of crocheting.

Aside from the arrangement of producing the ornamented areas by hand work a rather unsatisfactory method was in some instances used wherein the decorated areas were accomplished by machine operations. However, in this particular method knitting floats on the inside of the blanks always resulted. If these knitting floats are long they are obviously objectionable as fingers may easily catch therein. If the knitting floats are of lesser length an undesirable restriction in the size and extent of the pattern or decorated area unavoidably results.

With these objections and difficulties in mind, the present invention provides for the production of knitted articles having designs or ornamentations incorporated therein entirely by machine knitting and in a manner so that the knitting floats are interlocked with or laid under certain of the strands of the body fabric with the elimination of long knitting floats and with the further advantage that there are no restrictions on the size, shape, or character of the incorporated design or decorated areas.

While the above object is generally accomplished in the knitted fabric and by the method disclosed in my copending application Serial No. 236,689, filed October 24, 1938, the invention disclosed in said co-pending application has certain limitations which are overcome by the present invention. For instance, one form of the present invention is applicable to jacquard knitting which will produce rib stitch effects which are especially suited for wrist portions of articles of wearing apparel. Another embodiment of the present invention is applicable to those forms of knitting commonly employed in body portions of wearing apparel and contemplates the formation of certain design arrangements by the employment of two strands of different colors in the body portion which contrasting color strands also cooperate with the third strand in producing special design or pattern areas.

A further object of the present invention is to provide an ornamented knitted article and method of producing the same wherein the design is completely fashioned into and intermeshed with the knitted fabric proper and so secured that there is no possibility of there being dropped stitches or loose ends of the design strands, whereby a design of any desired width and type and of any selected color combination, can be knitted into the article.

A further object of the invention is to provide an ornamented knitted article and method of producing the same wherein one of two body strands is knitted in pre-determined wales, with the other of the body strands being also knitted in pre-determined wales and floated across other wales, an additional design area being accomplished by floating both of the body strands and utilizing a third strand knit therein in one or more wales and courses, with the third strand overlying the floats of the body strands throughout the design area and being held by the floats of the body strands adjacent the margins of the additional design area.

A further object of the invention is to provide a knitted article with machine fashioned design areas therein, and the method of producing the same, which is simple, inexpensive and commercially expeditious and which is well adapted for the purposes disclosed.

With the above and other objects in view, the invention consists of the improved knitted article and method of producing the same, and its parts, combinations and steps, as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a diagrammatic view of a portion of a knitted article fabric on an enlarged scale, looking at the reverse side thereof, and showing the manner in which a third design forming strand is knit into design forming association with a pair of body strands;

Fig. 2 is a fragmentary view of the fabric of the knitted article showing the machine knit design therein;

Fig. 3 is a fragmentary view of an article forming tubular blank of knitted fabric showing the condition of the same as it is taken from the machine with particular reference to the unfastened portion of the design threads or strands before

severance, the tubular blank being shown reversed as to its normal condition for use and as to the condition in which it leaves the machine;

Fig. 4 is a fragmentary view of the blank turned through half a circle and showing the unfastened portions of the severed strand for the design, said view also showing the knitting floats which aid in the production of the design;

Fig. 5 is a diagrammatic enlarged view of that portion of a knitted article fabric which includes a modified form of design and knitting arrangement, said view being of the reverse side of the fabric and showing the body and design strands in knitted relationship;

Fig. 6 is a fragmentary view of the fabric of Fig. 5 showing the design incorporated therein;

Fig. 7 is a fragmentary view of an article forming tubular blank of knitted fabric fashioned according to the stitching arrangement disclosed in Fig. 5, the blank portion being reversed as to its normal condition for use and as to the condition in which it leaves the machine, the unfastened portions of the design strand being unsevered; and

Fig. 8 is a fragmentary view of the same tubular blank turned through half a circle and showing severance of the unfastened portions of the design strands.

In the present invention the fabric disclosed in the several forms of the invention is of tubular seamless formation and is knit on an open head, cylinder knitting machine having a plurality of yarn or thread feeds. The articles formed from the fabric may be fashioned into gloves, mittens, scarves or similar articles of wearing apparel.

The method of knitting the article fabric with the design or pattern therein and with the combination coloring effect obtained in the main form of the invention is subject to ordinary variations of machine operation, depending upon the character of the stitch, type of yarn utilized, and the size and character of the applied pattern or design, but essentially the method employed in the several forms of the invention is as follows: During the course of the operation of the machine for knitting the cylindrical blank, at least two of the machine yarn feeds are employed for feeding to the blank forming needles the yarn for the body fabric. It is also within the contemplation of the invention, and especially desirable in the form disclosed in Figs. 1 to 4 inclusive, that the strands fed for forming the body fabric be of contrasting colors, and in some instances they may be of different weights. At a proper time during the knitting of the body fabric a strand of yarn from an additional feed is led into the machine and is operated on by proper needles in the machine to knit into the fabric, in cooperation with the body forming strands, the stitches for the special design or pattern which may be in any suitable configuration, of any desired width and size, and in any selected color or colors.

In Fig. 1 there is depicted semi-diagrammatically and in enlarged or magnified form a fragment of that portion of the body fabric which has therein the stitches of the third design forming strand. In this view there is represented the manner in which said design or third strand for a simple pattern, is associated with the body fabric stitches in the production of a unique design in which one or both of the body forming strands cooperate with the third design strand in producing the special ornamental arrangement. The yarn strand for the additional design stitches extending from a feed (not shown) is indicated by the courses wherein letter designations are followed by the numeral **2**, while the yarn strands for the partial design and body fabric, which may be of different contrasting colors and which extend from other feeds (not shown) are indicated in the various courses by the reference letter designations followed by the numerals **1** and **3** respectively, it being appreciated that the fabric is in a cylinder machine and the strand courses referred to are in circular formation.

In the knitting machine utilized, certain selected design forming needles are thrown into and out of operation and these needles, in the exemplification of Figs. 1 to 4 inclusive, operate on the strands in the manner to be described hereinafter.

The body portion of the fabric or blank, in the form shown in Figs. 1 to 4 inclusive is jacquard knitting and the two body strands may, for example, be blue and red respectively. In Fig. 1 the courses in which the letter designations are followed by the numeral **1** are blue and the courses in which the letter designations are followed by the numeral **3** are red. In the finished article the fabric will therefore be composed of alternate longitudinal stripes or rows of red and blue stitches respectively and in the area of the special inlaid pattern, particularly depicted in Fig. 1, the red and blue body strands may cooperate with the design forming strand to produce the special pattern.

Referring particularly to Fig. 1 the courses are indicated from M to V inclusive, whereas the wales are indicated from A to L inclusive. In the M and N courses a jacquard stitch is formed wherein the No. **1** yarn knits in alternate wales and floats across the intervening wales, and the No. **2** yarn knits in intervening wales and floats across the alternate wales. Coming to the O course, strand O—**1** is floated across wale A, knit in wale B, floated across wale C, knit in wale D and then floated across wales E, F, G, H, I, J and K. It then knits in wale L. The other body strand, O—**3**, knits in wale A, floats across wale B, knits in wale C, floats across wale D, knits in wales E, F and G, floats across wales H, I and J, knits in wale K and floats across wale L. In this course the design forming strand No. **2** is introduced and it will be noted that in course O—**2** the strand floats across wale A, passes under the float made by yarn O—**3** in wale B, floats across wale C, passes back under the float made by O—**3** in wale D, floats over wales E, F and G, knits in wales H, I and J, and then floats over wales K and L.

In course P strand P—**1** floats over wale A, knits in wale B, floats over wale C, knits in wale D, floats over wales E, F, G, H and I, knits in wale J, floats over wale K and knits in wale L. The strand P—**3** knits in wale A, floats over wale B, knits in wale C, floats over wale D, knits in wales E, F, and G, floats over wales H, I and J, knits in wale K and floats over wale L. Design strand P—**2** floats over wale A, passes under the float made by P—**3** in wale B, floats over wale C, passes back under the float made by strand P—**3** in wale D, floats over wales E, F, and G, knits in wales H and I, and floats over wales J, K and L.

In the Q course strand Q—**1** floats over wale A, knits in wale B, floats over wale C, knits in wale D, floats over wales E, F, G, H and I, knits in wale J, floats over wale K and knits in wale L.

Strand Q—3 knits in wale A, floats over wale B, knits in wale C, floats over wale D, knits in wales E, F and G, floats over wale H, knits in wale I, floats over wale J, knits in wale K, and floats over wale L. Design strand Q—2 floats over wale A, passes under the float may be Q—3 in wale B, floats over wale C, passes back under the float made by Q—3 in wale D, floats over wales E, F and G, knits in wale H, and floats over wales I, J, K, and L.

In the R course body strand R—1 floats over wale A, knits in wale B, floats over wale C, knits in wale D, floats over wale E, knits in wale F, floats over wales G, H, I, J and K, and knits in wale L. The other body strand, R—3, knits in wale A, floats over wale B, knits in wale C, floats over wale D, knits in wale E, floats over wale F, knits in wale G, floats over wales H and I, knits in wales J and K, and floats over wale L. Design strand R—2 floats over wale A, passes under the float made by R—3 in course B, floats over wale C, passes back under the float made by R—3 in course D, floats over wales E, F and G, knits in wale H and I, and floats over wales J, K and L.

In the S course strand S—1 floats over wale A, knits in wale B, floats over wale C, knits in wale D, floats over wale E, knits in wales F and G, floats over wales H, I, J and K and knits in wale L. Body strand S—3 knits in wale A, floats over wale B, knits in wale C, floats over wale D, knits in wale E, floats over wales F, G, H, I and J, knits in wale K and floats over wale L. Design strand S—2 floats over wale A, passes under the float made by S—3 at wale B, floats over wale C, passes back under the float made by S—3 at wale D, floats over wales E, F and G, knits in wales H, I and J, and floats over wales K and L.

In courses T to V inclusive the No. 1 strand knits in alternate wales and floats across the intervening wales. The No. 3 strand knits in intervening wales and floats across the alternate wales. This part of the fabric is beyond the special inlaid design so that the design forming strand No. 3 is not here utilized and the body fabric is continued for the desired distance in the same manner.

It will be observed that the design forming strand, No. 2, is secured in the body fabric on both sides of the special inlaid design. As the blank forms and progresses the design forming strand encircles the blank from the last point of fastening in one course to the first point of fastening or securement in the next course. Consequently the pattern is formed on a full float stitch. In order that the securement of the pattern strand No. 2 may be understood, the following explanation applies: The special inlaid pattern is started by the No. 2 strand which extends from the proper feed, knitting into and on the fabric with reference to the courses. The design strand is at the proper times held and engaged by certain of the needles of the knitting machine. The number of such needles is determined by the size of the pattern, with as many needles being used on each side of the pattern as may be desired, these being spaced so that all will knit off on the desired courses. The operation of said needles is automatically controlled.

Fig. 3 represents a fragmentary view of a piece of tubular fabric knit according to the method just disclosed wherein an inlaid design formation, indicated at 5 in Figs. 2 and 4, is formed by the particular stitch arrangement of the design forming strand 2 with the distinguished strands of the body fabric. This fragment of fabric is inside-out relative to its condition upon removal from the machine and relative to the position in which it is normally used in wearing apparel. Upon removal of the blank in the condition shown in Fig. 3, the floats 4 are connected and extend over a portion of the inverted exposed face of the fabric, as shown. To prepare the fabric for use said floats should be severed and trimmed, and this is accomplished as shown in Fig. 4 wherein the float strands 4 are first severed centrally and are then additionally trimmed relatively close to their points of securement in the fabric. Fig. 4 shows the blank turned through half a circle relative to the showing in Fig. 3.

A fragment of the finished fabric, reversed as to Figs. 3 and 4, is shown in Fig. 2 wherein the knitted body fabric 6 has incorporated therein an inlaid design area 5 accomplished in the manner previously described. It will be observed that the special design strands 2 are knit over the floats of the body fabric forming strands, and the ends of the design strands are laid under certain floats of the body fabric. This absolutely insures against unraveling or dropped stitches. Even after the floats 4 of the inlaid design are severed and trimmed, the design area is nevertheless tightly secured in the fabric and the strands of the same will not pull out. While one type of design has been illustrated and described, it is obvious that the design can be of any type or pattern and of any size or width and can be incorporated wherever desired in the body fabric, and the body fabric may be formed with a plurality of independent designs of various characters. It is also to be noted that the contrasting strands 1 and 3 of the body form a unique and decorative fabric and said body strands also cooperate with the design strand in the formation of a unique and contrasting special inlaid design.

The fabric thus knit may be used for certain forms of knitted wearing apparel and is particularly well suited for gloves and mittens. The strands may be of any suitable type of yarn, thread, string or the like, and the design may be applied by any of the same type of materials. The entire article is completely knit and finished on the machine and can be produced efficiently and economically and the design areas therein can be formed without limitations and will simulate the more expensive forms of knitted fabrics which are subsequently ornamented by hand operations.

A modified or alternate form of the invention is illustrated in Figs. 5 to 8 inclusive of the drawings wherein the knitted ornamented fabric is of a mock ribbed formation and is especially suited for those portions of garments which preferably have elasticity, such as the wrist portions of mittens and gloves. As an example the fabric disclosed in Figs. 1 to 4 inclusive is especially suited for the body portion of a mitten, whereas the fabric disclosed in Figs. 5 to 8 inclusive is particularly suited for the wrist and tip portions of a mitten and deviates from standard practice in the incorporation of a special inlaid design area in the knitted mock ribbed fabric. The fabric per se is generally of the type illustrated in U. S. Patent No. 2,090,982. While particular mention has been made of the rib stitch effect in the fabric it should be stated that the inlaid design arrangement of the alternative form of the invention may be associated with the conventional jacquard knitting.

In Fig. 5 of the drawings the courses in which the letter designations are followed by the numerals 1 and 3 are the body strands and by way of example, both of said strands may be of a blue color and the No. 1 strands may be heavy and the No. 3 strands light. The strand for the special inlaid design is represented by the letter designations followed by the numeral 2 and as an example said strand may be of a yellow color so as to contrast with the body fabric.

With particular reference to the showing in Fig. 5 the courses are indicated from *j* to *o* inclusive, whereas the wales are indicated from *a* to *h* inclusive. In the *j* course body strand *j*—1 knits in wales *a*, *b* and *c*, floats over wale *d*, and knits in wales *e*, *f*, *g* and *h*. Body strand *j*—3 knits in wale *a*, floats over wale *b*, knits in wale *c*, floats over wale *d*, knits in wale *e*, floats over wale *f*, knits in wale *g*, and floats over wale *h*. The design strand, *j*—2, here introduced, floats over wale *a*, passes under the float made by *j*—3 at wale *b*, floats over wale *c*, knits in wale *d*, floats over wale *e*, passes under the float made by *j*—3 at wale *f*, floats over wale *g*, and passes back under the float made by *j*—3 at wale *h*.

In the *k* course strand *k*—1 knits in wale *a* and *b*, floats over wales *c*, *d* and *e*, and knits in wales *f*, *g* and *h*. Strand *k*—3 knits in wale *a*, floats over wales *b*, *c*, *d*, *e* and *f*, knits in wale *g*, and floats over wale *h*. Design strand *k*—2 floats over wale *a*, passes under the float made by *k*—3 at wale *b*, knits in wales *c*, *d* and *e*, passes under the float made by *k*—3 at wale *f*, floats over wale *g*, and passes back under the float made by *k*—3 at wale *h*.

Coming to the *l* course it appears that body strand *l*—1 knits in wales *a* and *b*, floats over wales *c*, *d* and *e*, and knits in wales *f*, *g* and *h*. Strand *l*—3 knits in wale *a*, floats over wales *b*, *c*, *d*, *e* and *f*, knits in wale *g*, and floats over wale *h*. Design strand *l*—2 floats over wale *a*, passes under the float made by *l*—3 at wale *b*, knits in wales *c*, *d* and *e*, passes under the float made by *l*—3 at wale *f*, floats over wale *g*, and passes back under the float made by *l*—3 at wale *h*.

In the *m* course body strand *m*—1 knits in wales *a*, *b*, and *c*, floats over wale *d*, and knits in wales *e*, *f*, *g* and *h*. Body strand *m*—3 knits in wale *a*, floats over wale *b*, knits in wale *c*, floats over wale *d*, knits in wale *e*, floats over wale *f*, knits in wale *g*, and floats over wale *h*. Design strand *m*—2 floats over wale *a*, passes under the floats made by *m*—3 at wale *b*, floats over wale *c*, knits in wale *d*, floats over wale *e*, passes under the float made by *m*—3 at wale *f*, floats over wale *g*, and passes back under the float made by *m*—3 at *h*.

The design strand is not continued below the *m* course in the exemplification of Fig. 5 and it will be seen that body strand *n*—1 knits in all of the wales whereas body strand *n*—3 knits in wale *a*, floats over wale *b*, knits in wale *c*, floats over wale *d*, knits in wale *e*, floats over wale *f*, knits in wale *g*, and floats over wale *h*.

The *o* course is not shown in completed form but the fabric thereafter would be continued in the manner described in connection with the *n* course.

Fig. 7 represents a fragmentary view of a piece of tubular fabric knit according to the method disclosed in Fig. 5 and having therein a special inlaid design formation, indicated at 5' in Figs. 6 and 8. This fragment of fabric is likewise inside-out relative to its condition upon removal from the machine and relative to the position in which it is normally used in a garment. Upon removal of the blank in the condition shown in Fig. 7 the floats 4' are connected and extend over a portion of the inverted exposed face of the fabric as shown. To prepare the fabric for use said floats are of course severed and trimmed, and this is done in the manner shown in Fig. 8 wherein the float strands 4' are first severed centrally and are then additionally trimmed relatively close to their points of securement in the fabric. Fig. 8 shows the blank turned through a half circle relative to the showing in Fig. 7.

A fragment of the finished fabric of the modified form, reversed as to Figs. 7 and 8, is shown in Fig. 6, wherein the knitted body fabric 6' has incorporated therein the inlaid design area 5'.

The fabric 6' is formed of two body strands, one of which is knit in alternate wales and floated across intervening wales, and the other of which is knit in all of the wales except certain selected wales through which both of the strands are floated. The design forming strand is knit in the selected wales through which both body strands are floated and the knitted fabric with the design area therein is further characterized by the fact that the design forming strand is held tightly within the fabric by the floats of one of the body strands at the margins of the design in all of the courses in which the design strand is knit. In the fabrics of both forms of the invention the design forming strand is absolutely secured under the floats of one or more of the body strands adjacent the margins of the design area and this is of the utmost importance in obtaining a machine knit design which will not pull out of the fabric.

It will be understood that numerous changes may be made in the details of operation and construction without departing from the spirit of the invention, as contemplated by the following claims.

I claim:

1. A machine knitted article, comprising two body strands knit in courses with sections of certain courses of different formation, sections of certain courses having one of the body strands knitted in alternate wales and floated across intervening wales and having the other of said body strands floated across the alternate wales and knitted in the intervening wales, other sections of said courses having one of the body strands knitted in a plurality of contiguous wales and thereafter floated over a plurality of contiguous wales with the other of said body strands being floated across the contiguous wales in which the first body strand is knitted, the last sections of the courses being formed by floating both of said body strands over certain wales and introducing a third strand, said third strand being knitted in the wales and stitches in which both of the body strands are floated and being held laterally of said sections by the floats of one of the body strands only in the courses in which said third strand is knitted.

2. A machine knitted article, comprising two contrasting body strands knit in courses with sections of certain courses of different formation, the first sections of said courses having one of the body strands knitted in alternate wales and floated across intervening wales and having the other of said body strands floated across the alternate wales and knitted in the intervening wales, the next sections of said course having one of the body strands knitted in a plurality of contiguous wales and thereafter floated over a plurality of contiguous wales with the other of said

body strands being floated across the contiguous wales in which the first body strand is knitted to produce part of a predetermined design area, the last sections of the courses completing the design area and being formed by floating both of said body strands over certain wales and introducing a third strand contrasting with both of the body strands, said third strand being knitted in the wales and stitches in which both of the body strands are floated and being held by floats of said body strands laterally of the margins of said design area only in the courses in which said third strand is knitted.

3. A machine knitted article comprising two body strands, each strand of a different color, one of which is knitted in alternate wales and floated across intervening wales, and the other of which is floated across the alternate wales and knitted in the intervening wales in part of each course in which they are knit, the second part of said courses being constructed by knitting one of said body strands in a plurality of contiguous wales, with the same thereafter floated over a plurality of contiguous wales, the other of said body strands being floated across the contiguous wales in which the first body strand is knitted, thus forming part of the design area, the third and last part of each course being formed by floating both body strands and an additional strand of a different color knit in each wale and course in which both of the first-mentioned body strands are floated completing the design area, said additional strand being held by the floats made by one of the body strands in each course in which it is knit adjacent the last-mentioned design area.

4. A knitted article, comprising two dissimilar body strands, one of which is knitted in alternate wales and floated across intervening wales, and the other of which is knitted in certain wales, both of said body strands being floated across predetermined wales, and a third contrasting strand associated with portions of the body strands to form a design area, said third strand being knitted in the wales in which both of the body strands are floated and being held laterally of the design area by the floats of one of said body strands.

5. A knitted article, comprising two body strands differing from one another in thickness, one of which is knitted in alternate wales and floated across intervening wales, and the other of which is knitted in certain wales, both of said body strands being floated across predetermined wales, said body strands providing in their knitted relationship a fabric of mock ribbed formation, and a third contrasting strand associated with portions of the body strands to form a design area, said third strand being knitted in the wales in which both of the body strands are floated and being held laterally of the design area by the floats of one of said body strands.

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