May 15, 1945. O. FREGEOLLE 2,376,044

METHOD OF KNITTING

Filed Nov. 2, 1943 5 Sheets-Sheet 1

FIG. 1.

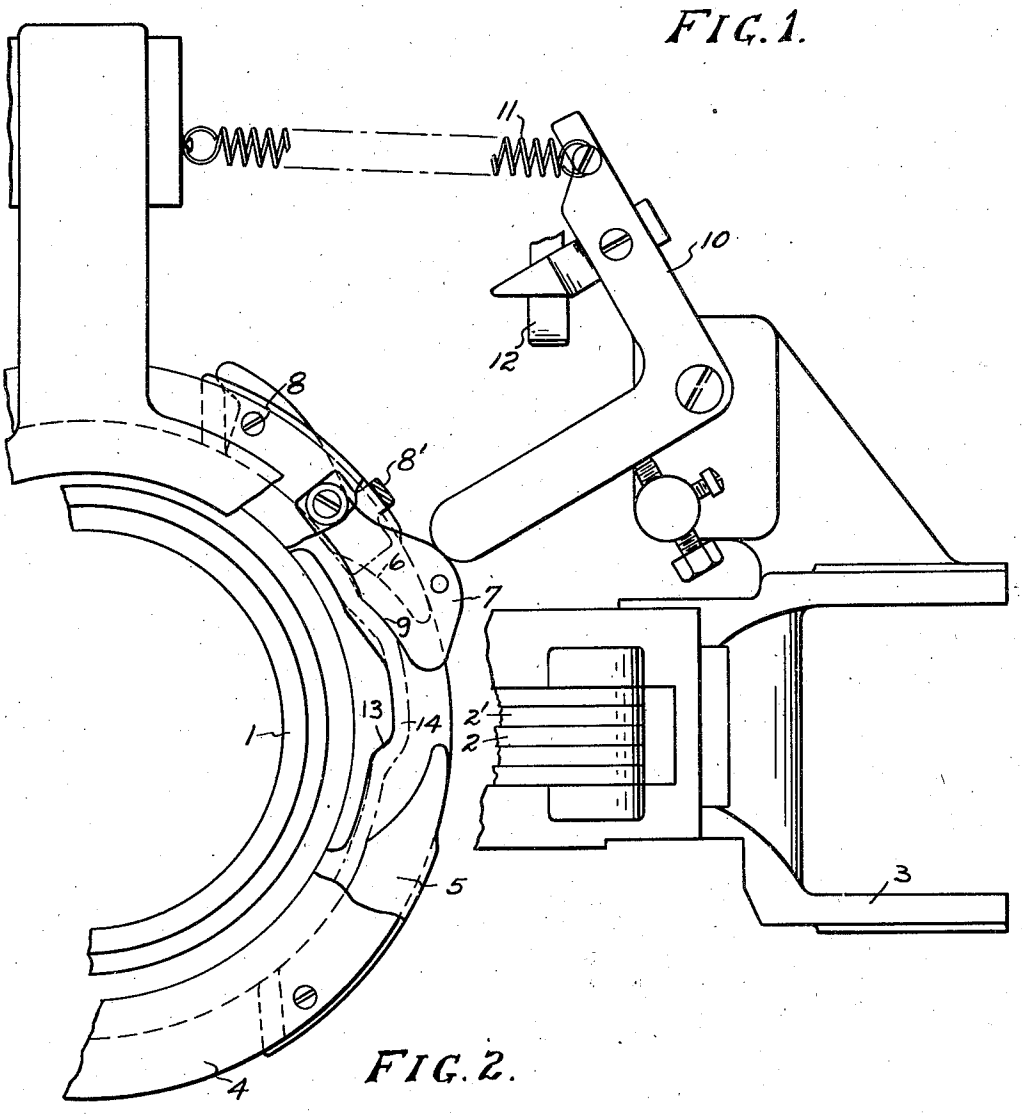
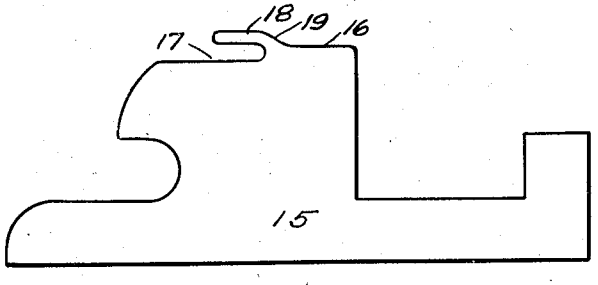


FIG. 2.



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May 15, 1945. O. FREGEOLLE 2,376,044

METHOD OF KNITTING

Filed Nov. 2, 1943 5 Sheets-Sheet 2

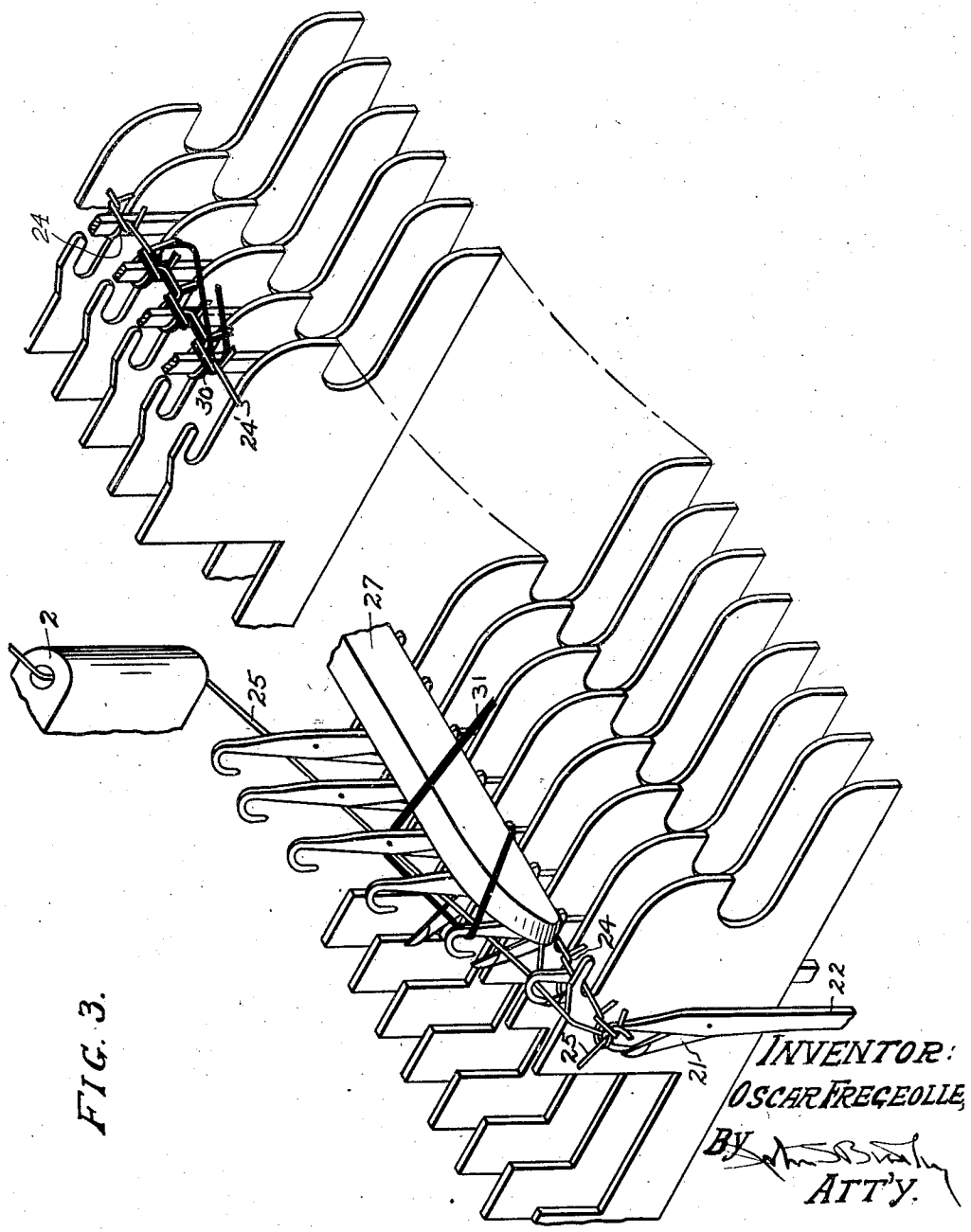


FIG. 3.

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May 15, 1945. O. FREGEOLLE 2,376,044

METHOD OF KNITTING

Filed Nov. 2, 1943 5 Sheets-Sheet 3

FIG. 4.

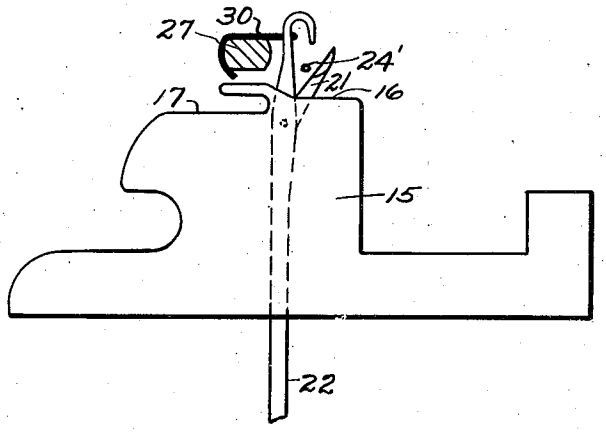


FIG. 7.

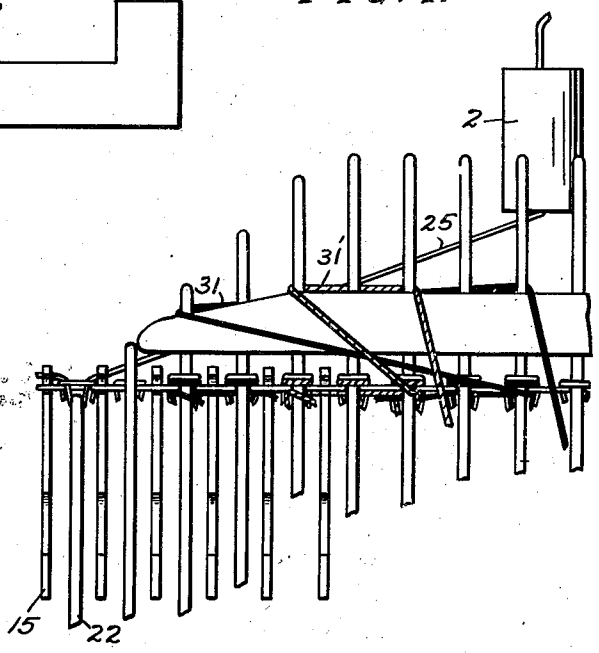


FIG. 5.

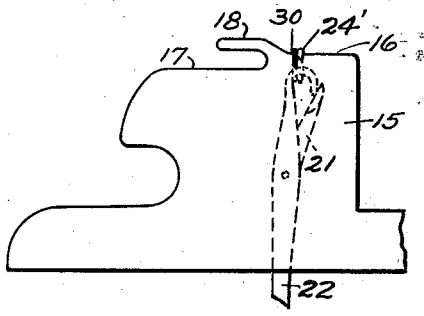
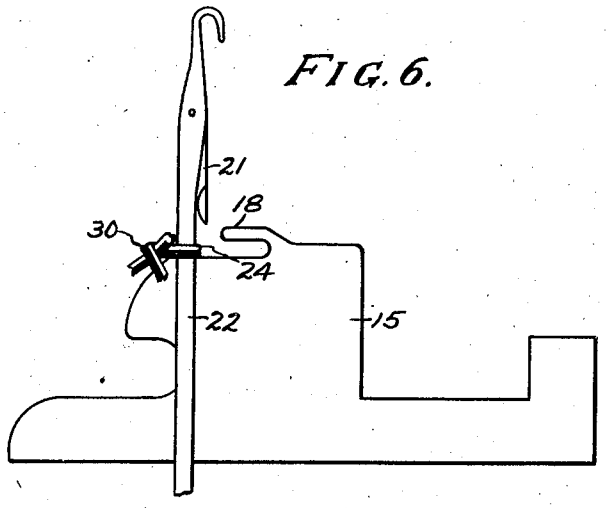


FIG. 6.



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May 15, 1945. O. FREGEOLLE 2,376,044

METHOD OF KNITTING

Filed Nov. 2, 1943 5 Sheets-Sheet 4

FIG. 8.

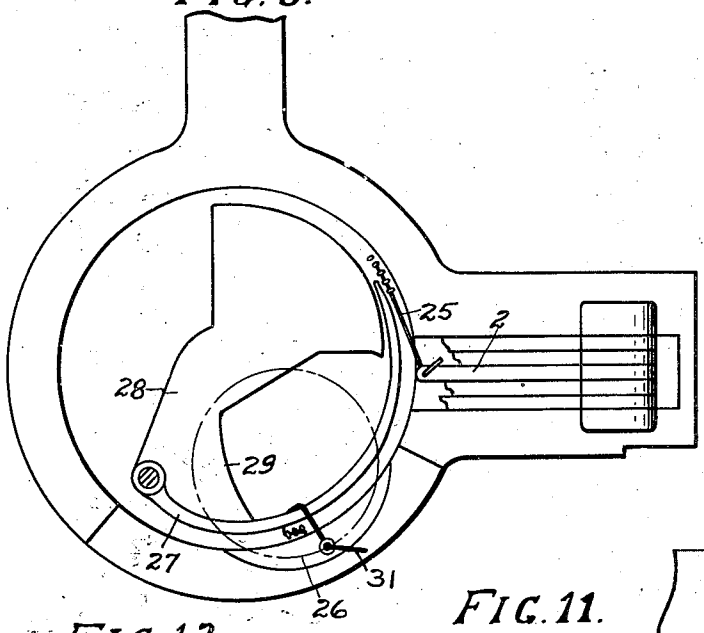


FIG. 9.

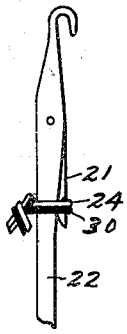


FIG. 10.

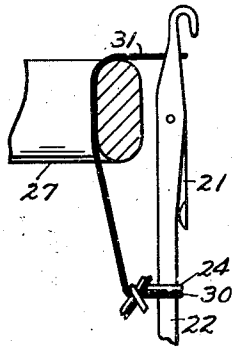


FIG. 11.

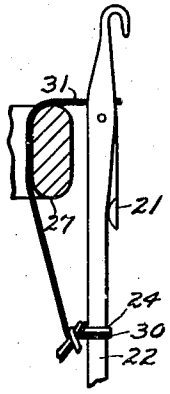


FIG. 12.

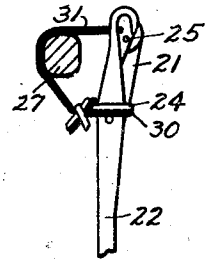


FIG. 13.

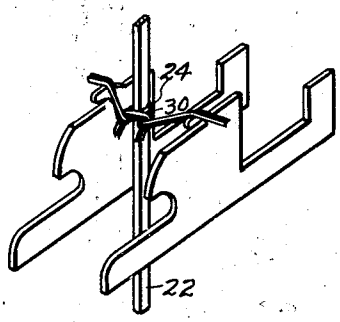
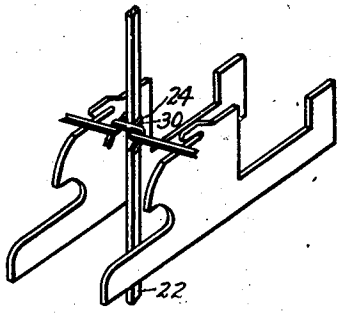


FIG. 14.



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May 15, 1945. O. FREGEOLLE 2,376,044

METHOD OF KNITTING

Filed Nov. 2, 1943 5 Sheets-Sheet 5

FIG. 15.

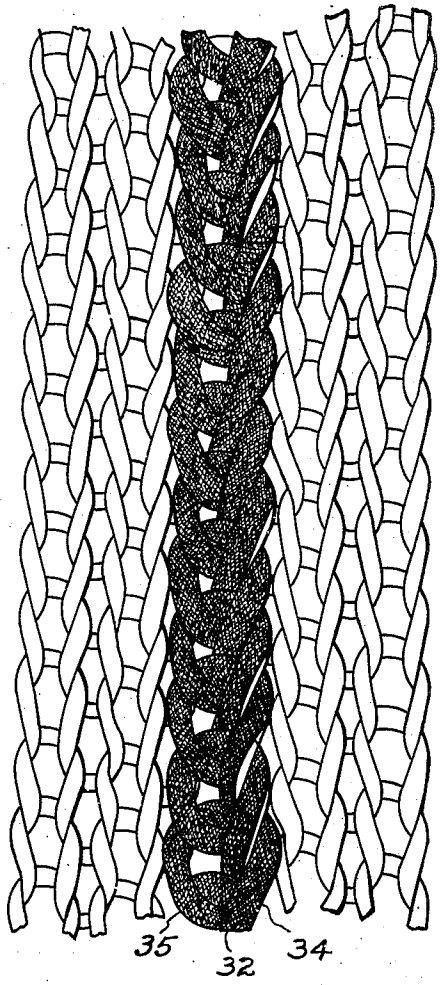
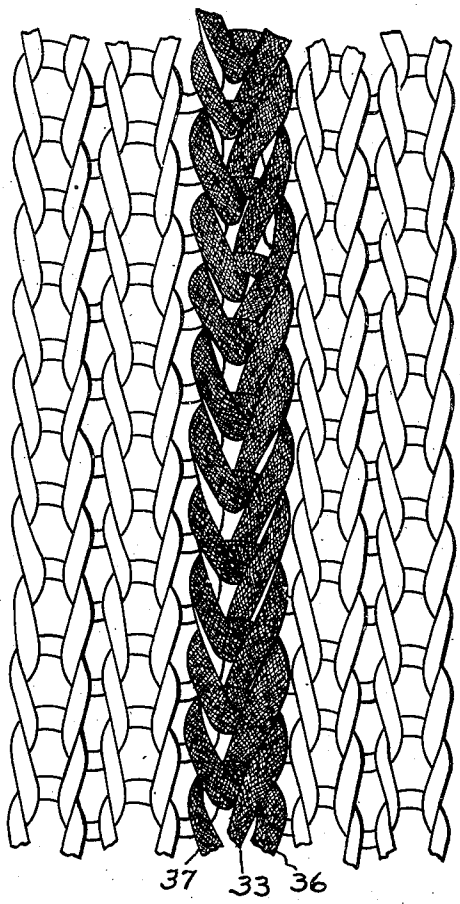


FIG. 16.



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Patented May 15, 1945 2,376,044

UNITED STATES PATENT OFFICE

2,376,044

METHOD OF KNITTING

Oscar Fregeolle, Central Falls, R. I., assignor to Hemphill Company, Central Falls, R. I., a corporation of Massachusetts

Application November 2, 1943, Serial No. 508,693

13 Claims. (Cl. 66—135)

This invention relates to a new and useful improvement in knitted fabric particularly hosiery fabric in which a decorative design is incorporated and to an improved method of knitting on circular, independent needle knitting machines.

Heretofore, difficulty has been encountered, particularly in the knitting of hosiery, in securing a uniform and symmetrical loop structure. It frequently happens that some of the loops are slightly tilted from the perpendicular and that one side of a loop is slightly different from the other so that the two halves are not symmetrical. Although these peculiarities are minute they nevertheless impair the over-all appearance of the fabric. In this invention the defects mentioned are substantially eliminated with the result that a more symmetrical and better looking fabric is produced.

When a decorative stripe or other pattern is incorporated in the fabric as, for example, by the method known as wrapping the same lack of uniformity and symmetry of loop structure is encountered particularly at the edges. Since such patterns are usually of a different color or colors from the adjacent fabric and, consequently, very conspicuous, such defects are even more noticeable. By this invention, they are to all intents eliminated so that the design has a clearer color, a sharper outline and a much more attractive appearance, which, of course, complements the improved appearance of the rest of the fabric.

The invention requires only a few inexpensive alterations in the mechanism of a standard knitting machine and correspondingly small changes in the method of knitting but the greatly improved results obtained demonstrate their value beyond question.

The mechanism selected for the purpose of explaining the invention is that of the Banner type of circular, independent needle, knitting machine which is too well known to require detailed description herein. A few of its parts are shown in the drawings of which:

Fig. 1 is a plan view of part of such a knitting machine;

Fig. 2 is an enlarged side elevation of a preferred form of sinker;

Fig. 3 is an isometric view showing some of the steps of the new method of knitting fabric with a wrap stripe incorporated therein;

Figs. 4, 5 and 6 are diagrammatic views of different steps in the knitting of the regular and wrap yarns showing primarily how these yarns are manipulated with respect to the sinkers;

Fig. 7 is a diagrammatic view illustrating the manner in which the regular and wrap yarns are fed to the needles and drawn over the sinkers;

Fig. 8 is a diagrammatic view to illustrate primarily the relative positions of the needle cylinder and wrapping spindle and the positions at which respective yarns are fed to the needles;

Fig. 9 shows the position of the yarn loops on a needle after the needle has been lifted by the raise cam and while riding upon the needle support;

Fig. 10 illustrates the relation between the wrap yarn, the horn and a needle at the point at which the yarn engages the needle;

Fig. 11 illustrates a later position of the needle bearing the wrap yarn before the laying of the regular yarn;

Fig. 12 shows the position of the old and new loops of both yarns as the needle descends adjacent the knitting point;

Figs. 13 and 14 illustrate the manner in which the loops are caused to pass from the backs of the sinkers where they were drawn to the throats over the tops of nibs; and

Figs. 15 and 16 are copies made with exactitude from actual enlargements of actual fabric knitted by the old and new methods respectively to illustrate the improvement in the loop structure in general and in the wrap stripe in particular found in the fabric of this invention and resulting from the method of this invention.

As shown in Fig. 1, the knitting machine in general is provided with the usual cylinder 1, yarn levers 2 and 2', yarn lever box 3 and sinker cap 4 to which the usual side sinker cams 5 and 6 are attached. In addition, sinker cap 4 is equipped with a flopper cam 7 pivoted as shown at 8 so that it can be swung inwardly to the position illustrated diagrammatically in Fig. 1 in order that its camming surface 9 may be made to engage the sinkers when desired. The result of moving this cam in is to cause the sinkers to move inwardly sooner and further than they would if operated by the usual cam 6 as will be evident from Fig. 1.

Flopper cam 7 is normally maintained in inwardly swung position by any suitable device such as pivoted lever 10 and spring 11. When flopper cam 7 is to be retracted, lever 10 can be swung by any suitable mechanism 12 operated from any desired timing device so that it no longer engages the flopper cam whereupon the cam will move outward until it engages stop 8' thereby making

the ordinary sinker cam 6 available whenever a shift to the old method of knitting is desired.

A further modification of the machine which is desirable although not essential is that the slope 13 of center sinker cam 14 is made somewhat more abrupt than usual. The purposes of this will be explained later.

The sinkers 15 as best illustrated in Figs. 6 to 10 are provided with flat backs 16 behind the nibs which are preferably, slightly higher than the throats 17. Also the nib 18 is comparatively flat on top and terminates in an easy slope 19 leading to the back 16. The thickness of the nib 18 where it joins the sinker is, preferably, somewhat less than usual.

Also the machine is equipped with a wrapping spindle or other similar device which may be the kind with which Banner knitting machines are equipped one type of which is illustrated in Lawson Patent #1,702,608. This is shown diagrammatically at 26 in Fig. 8. This figure also shows the usual horn 27 and binder plate 28 having the usual arcuate edge 29 for guiding the wrap yarn so that it will engage properly with the needles. The character of the wrap mechanism and the manner in which it operates in connection with this invention is normal in all respects and well-known so that no detailed description is required.

To effect plain knitting in accordance with this invention, lever 10 is operated so as to move flopper cam 7 inwardly to the position shown in Fig. 1. The result is that the sinkers will be moved inwardly sooner and further than they would be moved by the ordinary cam 6 shown in dotted lines in Fig. 1. This will cause the yarn to be laid and the loops drawn and measured over the backs 16 of the sinkers as shown in Fig. 3 instead of in the throats 17 of the sinkers, the usual method. This is also illustrated by Figs. 4 and 5.

When the sinkers are retracted by cam 14, the newly formed sinker loops are drawn from the backs 16 of the sinkers over the tops of the nibs 18 into the throats 17 as shown diagrammatically in Fig. 6. As will be obvious, this will stretch the loops somewhat. For this reason slope 13 of cam 14 is, preferably, made somewhat more abrupt than usual, as heretofore stated and shown in Fig. 1, so that fewer sinkers than usual will be in progress of withdrawal at any one time to confine this additional strain to comparatively few loops at any given time.

It will also be evident that by this method of knitting when the sinkers move in to cast off the loops from the needles, the newly drawn yarn which is still on the backs of the sinkers will not be directly affected because the casting off will be effected through the engagement of the throats of the sinkers with the previously formed sinker loops, as will be evident from Fig. 3, whereas, by the usual method of knitting in which the newly drawn yarn as well as the previously formed sinker loops are in the throats of the sinkers, the sinkers act directly upon the newly drawn yarn. In other words, by the method of this invention, complete, previously formed, loops only are engaged by the sinkers in the casting off process whereas by the old method incomplete, newly formed, loops are engaged by the sinkers to cast off the old ones from the needles.

The result of the old method is a certain amount of robbing of yarn from the newly formed loops which may not be the same for every loop. Consequently, the loops are not all the same. By the new method, this robbing is substantially eliminated and the loops are much more uniform.

In addition, the new method of drawing the yarn on the back of the sinkers and causing it to pass over the tops of the nibs has a novel and highly beneficial effect upon the needle loops. This can best be understood by reference to Figs. 9 to 14. By the old method in which the throats of the sinkers alone are utilized, the newly drawn needle loop passes from the hook of the needle to a position around the latch when the needles have been raised by the raise cam and are riding upon the needle support in the well-known manner. When the needle has been raised further by the front stitch cam the loop passes from the latch to the shank of the needle. Because the shank is considerably smaller than the combined shank and latch, the loop will be somewhat loose. When the needle descends again the loop has the burden of closing the latch and must also pass over it. When the loop is cast off the new yarn has already been laid in the throat of the sinker so that when the sinkers advance to cast off the old loop from the needle it will be done by pressure upon the newly laid yarn.

The result of all of these circumstances is, in all probability, to modify the form and shape of the loops in varying degrees depending upon variations in the needles, the latches, the sinkers and in the yarn itself. It is almost inevitable that these variable factors will cause variations in the structure and arrangement of the loops which, although small, have a very noticeable effect upon the symmetry and appearance of the fabric.

When the method and mechanism of this invention is employed, the newly formed loop 24 of yarn 24' is positioned upon the needle over the latch 21 as shown in Fig. 9. This is the same position as in the old method. However, when the needle has risen further so that the loop has moved from the latch onto the shank of the needle as shown in Figs. 10 and 13, the retraction of the sinkers will pull the adjacent sinker loops, which are on the backs of the sinkers, over the slopes 19 and the tops of nibs 18 which will result in the tightening of needle loop 24 around the shank of the needle as best shown in Fig. 11. When the needle descends to draw the yarn in the next course, loop 24 must, of course, close the latch and pass over it as shown in Fig. 12 but because loop 24 has been tightened around the needle shank and thus brought to a substantially definite size this subsequent stretching, while it may alter somewhat the size of the loop, will do it with substantial uniformity. Furthermore, when the sinkers move in again to cast off loop 24 the adjacent sinker loops are now in the throats of the sinkers so that the sinkers engage with these completed loops to cast off needle loop 24 instead of with the yarn which has just been laid across the backs of the sinkers as shown in Fig. 3. Therefore, practically all of the strain of casting off loop 24 is imposed upon the adjacent, completely formed sinker loops which are substantially rigid and almost not at all upon the newly drawn and comparatively unstable loops.

The stretching of the yarn when it is moved progressively from the backs of the sinkers and over the tops of their nibs, in addition to tightening the yarn around the shank of the needle, tends to equalize the amount of yarn on either side so that both the needle and sinker loops are straighter as well as more uniform in other respects. The subsequent passage of the equalized needle loop over the latch of the needle, where

it is slightly stretched in a uniform manner, also tends to reduce the size of the adjacent sinker loops slightly and with equal uniformity. Therefore, in the finished fabric the needle and sinker loops are more nearly of the same size and shape, the wales are straighter and the fabric as a whole much more perfect and pleasing to the eye.

The inclusion of a wrap yarn **30** or any other kind of wrap may be effected in the usual way as, for example, by means of the wrapping spindle **26** or other suitable mechanism with the exception that the wrap yarn loops are drawn over the backs of the sinkers and caused to pass over the nibs in exactly the same manner as the body yarn loops as shown in Figs. 3–6, 9 and 14. Preferably the wrap yarn **30** is fed higher on the needles than the body yarn as shown in Fig. 4 to eliminate any possibility of pinching it in the latches of the needles. This may be accomplished by positioning horn **27** somewhat higher than usual as shown in Figs. 3, 4, 10, 11 and 12. Wrap yarn **30** because of the manner in which it is fed from the spindle **26** around horn **27** to the needles is under considerable tension so that it will be held snugly against the needles adjacent their hooks as best shown in Figs. 3 and 4. The body yarn **24'** is fed to the needles later and from a point outside of the needle circle and also under less tension so that it naturally and necessarily assumes a position in the needle hooks outside of wrap yarn **30**. This is made clear by Figs. 4, 5 and 6. In consequence the wrap yarn **30** will lie behind the body yarn **24'** when the loops are drawn over the backs of sinkers as shown in Fig. 5 and will later assume its correct position below the body yarn on the shanks of the needles as shown in Fig. 6. In consequence, the wrap yarn will be positioned on the outside of the finished fabric.

The wrap may be repeated in the next course in a similar way as shown in Figs. 3, 8, 10, 11 and 12 in which the body and wrap yarns for the new course are indicated as **25** and **31** respectively to distinguish them from the same yarns **24'** and **30** of the previous course.

The insertion of a second wrap yarn **31'** to obtain "color within color" is accomplished in exactly the same way. This is illustrated in Fig. 7 showing 2 two needle wraps of yarn **31** separated by a three needle "color within color" wrap of yarn **31'**.

The improvement obtained by knitting over the backs of the sinkers is as evident in the wrapped portions as in the loops of the plain fabric. Heretofore it has been impossible to make all of the wrap loops uniform in size and symmetrical in shape. In particular, the loops around the first needles wrapped are unavoidably under a heavy and continuous tension because of the manner in which the wrap yarn is fed from the spindle to the needles. This makes the outside of these loops very tight whereas the other side of the same loops are relatively loose. In consequence, the outside of the loops is tilted sharply and only partly visible to the naked eye producing a narrow thread like appearance whereas the other half of the same loops are loose and rounded and contain most of the irregularities characteristic of the fabric so that they are also irregular in outline. Therefore the wrap is not symmetrical, one side appearing as a straight narrow thread running longitudinally of the fabric whereas the other side has an irregular soft contour of loose, rounded loops. These characteristics are, of course, very damaging to the clean cut appearance of the design particularly in a narrow colored stripe. By utilizing the method of this invention in which the yarns are drawn over the backs of the sinkers the distorted and displaced loops are restored to their correct forms and positions.

No proof is required to support the statement that if the loops of the body and wrap yarns are more perfectly formed and positoned the fabric will be better in fact and better to look at. This is true to a remarkable degree when the method of this invention is followed. The fabric in general being much more uniform and perfect in loop structure, much more pleasing in appearance and, as to the wrap, clear in color, sharp of edge and accurate in dimensions. These features are made clearly evident by Figs. 15 and 16 of fragments of fabric produced in the old and new ways respectively. As already stated, these figures are accurate reproductions of actual enlargements of actual fabrics. Comparison of Figs. 15 and 16 will clearly show how much more uniform in shape, size and position the loops of the new fabric are as compared with those of the old. A one needle wrap stripe is shown at **32** in Fig. 15 and at **33** in Fig. 16. With respect to wrap stripe **32** (Fig. 15) the side **34** is straight and tight whereas the other side **35** is loose and rounded. This results in a stripe having the appearance on side **34** of a straight thread rather than a loop whereas the other side **35** is loose, soft and irregular. In the new fabric produced by the new method illustrated in Fig. 16 the looseness so evident in side **35** of the loops of Fig. 15 has been eliminated from the corresponding side **37** of the loops of Fig. 16 so that the two sides of the loops of the wrap stripe **33** are substantially the same. In other words, they have been equalized by the new method of knitting already described so that edge **36** is not as tight as the corresponding edge **34** of Fig. 15 and the other edge **37** is tighter than the corresponding edge **35** of Fig. 15. Also the size and shape of the loops both as to length and width are substantially uniform. The result is that the wrap stripe is the same on both edges, is straighter, clearer in color and much better looking. It is also confined more closely to the underlying wale of body yarn which adds still further to the clean cut appearance of the fabric. If Figs. 15 and 16 are viewed by holding the sheet slightly below eye level and sighting along the wrap stripe the improvement in the new fabric becomes almost startlingly evident.

In these reproductions of actual fabric, since the wrap is limited to a single needle, the wrap yarn is not drawn over the backs or any other part of the sinkers. It is simply wrapped around the particular needle in the usual way. The improvement in the wrap itself nevertheless results from the new method of knitting heretofore described. Because the body yarn is drawn over the backs of the sinkers the tip of the horn can be brought much closer to the knitting point and the wrap yarn or yarns controlled almost to the knitting points as explained above. Consequently, the wrap yarn loops are more uniform in size and shape. Also the underlying loops of the body yarn which are drawn over the backs of the sinkers are also of more uniform size and shape. Therefore, the wrap which is better in itself, is superposed upon a wale which is also better and straighter.

It is realized that, in reverse plating, yarns have been drawn over the backs of the sinker

nibs, the sloping back of the nib being utilized to insure the correct plating relation of the yarns. That is to say, the yarn which is fed lower on the needle and, consequently, to appear on the outside of the fabric, makes contact with the sloping back of the nib first and is deflected outwardly thereby so that when the drawing of the yarn is completed it will lie definitely outside of the other yarn. However, this drawing over the back of the nibs of the sinkers is quite a different thing from drawing over the backs of the sinkers behind the sinker nibs particularly insofar as the resulting fabric is concerned.

Whenever a yarn is drawn over a sloping surface it will obviously slip upon that surface. The amount of slip depends upon the smoothness of the surface and also upon the relative positions and movements of the needles and sinkers. If the needle is positioned considerably ahead of the base of the sinker nib, as is usually the case, the draw as it progresses and as the yarn slips down the back of the nib has a constantly varying angle to the drawing surface. The slightest variation in the timing, extent and direction of movement of the sinkers is bound to affect the length of the stitch drawn because every point upon the sloping drawing surface will produce a different length of stitch. This fact is accentuated where the sinkers are in motion during the drawing of the stitch which is generally the case.

While the method of reverse plating is considered quite satisfactory its approval results from the fact that the yarns are definitely positioned thereby so that the resulting plating is better than that produced by previous methods and this fact has been thought to more than compensate for the inequalities in loop length which are unavoidable when this method is followed. Although the differences in length of loop are minute, the loops themselves are minute also and it is well recognized that such tiny differences have a decidedly harmful effect upon the appearance of the fabric.

Even if the sinkers are pushed in during the draw so that the yarn slips down to the base of the nib or substantially upon the back of the sinker before the downward movement of the needle is completed the loops are nevertheless drawn and their length determined while the yarn is over the backs of the nibs and any additional movement of the needles after the yarn has reached the base of the nibs, assuming that it ever does, is insufficient to take up the full length of the drawn loop and, consequently, the length of the loop is not affected. The fact that the final movement of the needle may be more or less in line with the base of the nib is simply the result of the necessary sinker and needle movements incident to casting off the old loops and has no direct bearing whatever on the lengths of the new loops drawn.

It cannot be said that the yarns in reverse plating may make such light contact with the backs of the sinker nibs as to merely slip down them to be actually drawn after they have reached the base because in order to maintain the proper plating relation of the two yarns they must be under considerable tension, particularly the outside yarn and must be actually held against the backs of the nibs at all times during the drawing of the loops if this relation is to be maintained. That is why, in practice, the sinkers are moved out a little during the drawing of the yarns.

On the other hand, where the yarns are drawn over the backs of the sinkers as in the present case as distinguished from over the backs of the nibs a drawing surface of definite height is provided so that the loops are bound to be of a definite length. This fact coupled with the subsequent manipulation of the loops when they are transferred from the backs to the throats of the sinkers over the tops of the nibs and particularly when they are cast off through the engagement of the sinkers with the previously formed sinker loops only produces a fabric having the greatly improved construction and qualities already enumerated.

With particular reference to wrapping, the drawing of the yarn over the backs of the sinkers makes it possible to feed the wrap yarn higher in the hooks of the needles and to bring the end of the horn much closer to the drawing point so that the wrap yarn is guided and controlled practically to the point where it is taken by the needles. The body yarn fed from outside of the needle circle naturally and inevitably assumes a position in the hook behind the wrap yarn so that although it may and normally will be fed to the needles from a point lower than that at which the wrap yarn is fed nevertheless will inevitably take a position behind the wrap yarn in the hooks of the needles and above the wrap yarn on the shanks. Therefore the wrap yarn will be on the outside of the fabric as it should be.

When the loops are drawn in the throats of the needles the wrap yarn must be fed from a much lower point. In consequence, the horn must have a lower position and its end cannot be as close to the drawing point because it would interfere with the action of the sinkers. The result is that positive control of the wrap yarn is lost sooner than it should be so that the amount of wrap yarn drawn and the accuracy of the wrap pattern are uncertain. Feeding the wrap yarn high and close to the point of draw as can be done when the method of this invention is followed insures a uniform drawn and a perfect pattern. So far as is known this is the first time that a wrap yarn has been positioned on the needles above the body yarn.

I claim:

1. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previous course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only and causing the said newly drawn yarns to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs.

2. A method of knitting hosiery fabric upon a circular, independent needle knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previous course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only and causing the newly drawn yarns to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs.

3. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers hav-

ing a definite height and through the needle loops of the previously knit course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only, tightening the newly drawn needle loops and stretching the newly drawn sinker loops by causing the newly drawn sinker loops to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs.

4. A method of knitting hosiery fabric upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previously knit course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only, tightening the newly drawn needle loops and stretching the newly drawn sinker loops by causing the newly drawn sinker loops to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs.

5. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previously knit course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only, tightening the newly drawn needle loops around the shanks of the needles below the latches by stretching the newly drawn sinker loops by causing them to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs.

6. A method of knitting hosiery fabric upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previously knit course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only, tightening the newly drawn needle loops around the shanks of the needles below the latches by stretching the newly drawn sinker loops by causing them to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs.

7. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previously knit course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only progressively tightening each newly drawn needle loop by causing a plurality of adjacent newly drawn sinker loops to pass progressively from the backs to the throats of corresponding sinkers upwardly over their nibs.

8. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previously knit course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only, reducing and equalizing the size of the newly drawn needle loops by tightening them around the shanks of the needles and simultaneously enlarging adjacent sinker loops, reducing and equalizing the size and shapes of the newly drawn sinker loops by enlarging with substantial equality the adjacent newly drawn needle loops.

9. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of drawing a body yarn and a wrap yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previously knit course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only progressively tightening each newly drawn needle loop by causing a plurality of adjacent newly drawn sinker loops to pass progressively from the backs to the throats of corresponding sinkers upwardly over their nibs, and simultaneously superimposing upon the loops of predetermined areas of the outer surface of the fabric so produced loops of an additional wrap yarn produced by the same method.

10. A method of knitting upon a circular, independent needle knitting machine which includes the steps of drawing a body yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previous course, casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only causing the newly drawn sinker loops to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs and simultaneously superimposing upon the loops of predetermined areas of fabric so produced loops of an additional wrap yarn.

11. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of feeding a wrap yarn to a single needle, feeding a body yarn to a plurality of needles including said single needle, drawing the body yarn only over a part of the backs of the sinkers having a definite height, knitting the yarn loop or loops upon each needle through the corresponding loop or loops of the preceding course, casting off the needle loops of the preceding course by the sinkers acting upon the sinker loops of the body yarn only of that course and causing the newly drawn sinker loops to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs.

12. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of knitting a plurality of courses of plain fabric, simultaneously incorporating therewith a single needle wrap pattern, effecting the casting off of the loops of the plain fabric and of the wrap pattern loops by the sinkers acting upon the sinker loops of the plain fabric only of the course preceding the course being knit.

13. A method of knitting upon a circular, independent needle, knitting machine which includes the steps of drawing the body yarn over a part of the backs of the sinkers having a definite height and through the needle loops of the previous course casting off the needle loops of said previous course by the sinkers acting upon the intervening sinker loops only, causing the newly drawn sinker loops to pass from the backs to the throats of the sinkers upwardly over the tops of the nibs and simultaneously incorporating in predetermined areas of fabric so made loops produced by wrapping.

OSCAR FREGEOLLE.