

Sept. 6, 1938.

H. N. SHEPPARD

2,129,593

METHOD OF PLAITING KNIT FABRIC

Original Filed June 5, 1937

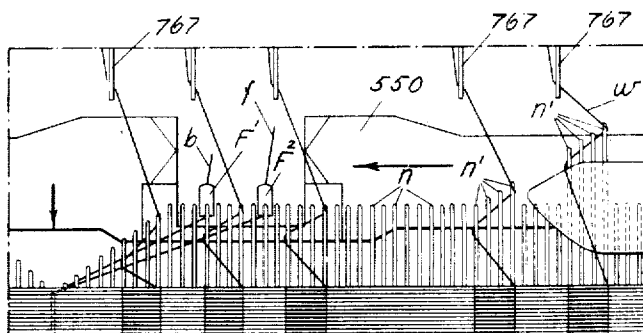


Fig. 1.

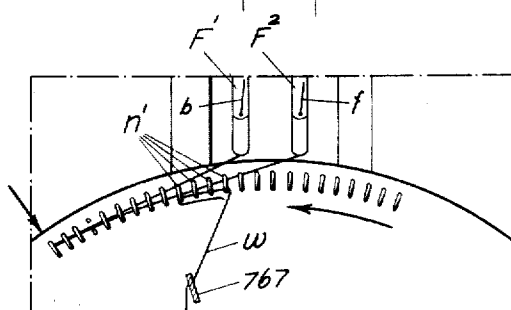


Fig. 2.

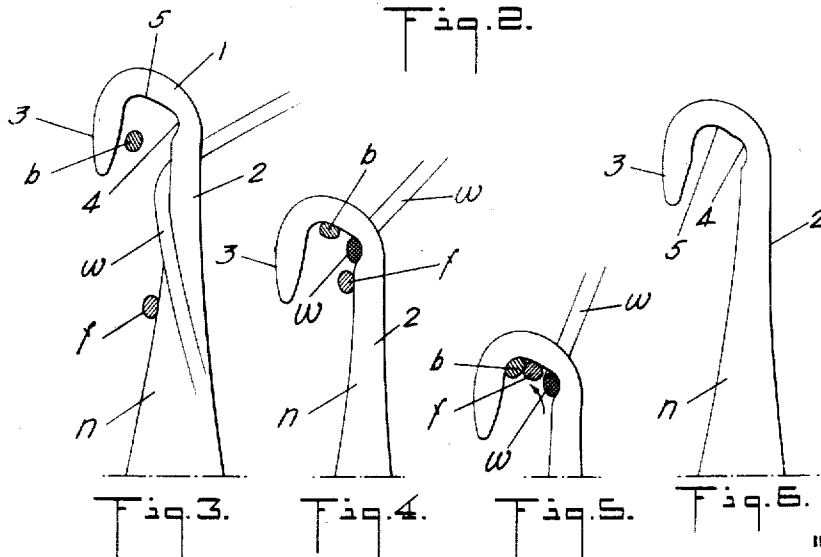


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

INVENTOR  
HARRY N. SHEPPARD  
BY HIS ATTORNEYS

Howson and Howson

## UNITED STATES PATENT OFFICE

2,129,593

## METHOD OF PLAITING KNIT FABRIC

Harry N. Sheppard, Maplewood, N. J., assignor  
to Scott & Williams, Incorporated, New York,  
N. Y., a corporation of Massachusetts

Original application June 5, 1937, Serial No.  
146,680. Divided and this application May 4,  
1938, Serial No. 206,048

8 Claims. (Cl. 66—135)

This invention relates to circular knitting machines and more particularly to circular knitting machines arranged to knit a wrap or embroidery yarn on selected ones of needles knitting a fabric of a single yarn or of a plurality of yarns in plaiting relation to form an embroidery pattern plaited on the face of the fabric, and it is an object of this invention to provide an improved method of plaiting to insure the desired yarn being on the outside of the fabric and it is a further object of this invention to provide a needle of improved construction for carrying out the improved method of plaiting.

In the drawing in which only such parts of a circular knitting machine are shown as are necessary to illustrate an application of the invention;

Fig. 1 is a view in elevation of a portion of a latch guard ring at the throat plate of a Scott and Williams circular knitting machine equipped for knitting wrap or embroidery stripes upon a knit plaited fabric, the view being developed in the plane of the paper;

Fig. 2 is a top plan view of the throat plate of the structure shown in Fig. 1, the parts being positioned as in a machine;

Figs. 3, 4 and 5 are views drawn to a larger scale and showing, in elevation, the hook of a preferred form of latch needle and its relation to the various yarns used in knitting the fabric, at three positions in the movement of the needle, after taking the yarns; to the position of the needle at which the relations of the yarns in the knitted loop is definitely determined; and

Fig. 6 is a view in elevation, drawn to the same scale as Figs. 3 to 5 of the hook of a modified form of a needle in accordance with this invention.

In the drawing the knitting machine to which the invention is applied is shown as a Scott and Williams circular knitting machine, such as is shown in the patent to Page and Swinglehurst, No. 1,906,204, dated April 25, 1933. As shown, the yarn fingers  $F^1$ ,  $F^2$  feed the body and facing yarns  $b$  and  $f$ , respectively, in plaiting relation to all the needles  $n$  at the throat plate of the latch guard ring 550 while the wrap yarn fingers 767 feed the wrap or embroidery yarns  $w$  to the selected needles  $n^1$  in advance of the throat plate.

In the operation of knitting machines of the type disclosed difficulty has been encountered in insuring that the wrap or embroidery yarns  $w$ , which are fed to the selected needles  $n^1$  by the wrap yarn finger 767, would maintain a position on the selected needles when the body and facing yarns  $b$  and  $f$ , respectively, are fed to the selected needles by the yarn fingers  $F^1$  and  $F^2$ , respectively,

such that the wrap yarns would be found on the face of the fabric when the loops on the selected needles were cast off and knit as the wrap yarn  $w$  and the facing yarn  $f$  tended to be transposed as to position and to bring the facing yarn to the face of the fabric at the pattern in place of the wrapping yarn. This displacing of the wrapping yarn also occurred when the body of the fabric was knit of a single body yarn.

In order to insure the wrap yarn  $w$  being properly positioned the needles are provided with hooks shaped preferably as in Figs. 3, 4 and 5, and which extend outwardly and upwardly at a slight angle, as at 1, from the shank 2 towards the reversely extending portion forming the point 3. There is also provided a notch at the upper end of the shank 2 the face 4 of which merges into the inner face 5 of the portion 1 of the hook. The notch 4 may, as shown in Fig. 6, meet the inner face 5 of the top 1 of the hook at an angle, but in both constructions the notch provides a place in which the wrap yarn  $w$  may lodge, as shown in Figs. 4 and 5, while the plaiting or facing yarn  $f$ , which engages the needle shank 2 below the wrap yarn  $w$  as shown in Fig. 3 brushes or slides over the wrap yarn as the needles are drawn down to cast off their loops so that the yarns assume the proper positions as shown in Fig. 5.

In both constructions, it will be noted, the inner face 5 of the top 1 of the hook extends from the shank 2 at a small angle to the horizontal so there is little or no tendency for the yarn  $w$  in the notch to travel on the face 5 of the hook and the face 4 of the notch and face 5 of the top 1 of the hook meet in such a way that there is insufficient angle between them to cause the facing yarn  $f$ , as it slides over the wrapping yarn, to slide into or be held in the notch with the wrapping yarn  $w$ . The body yarn  $b$ , when fed from a yarn finger positioned as shown in Fig. 1, engages the needle hook away from the shank 2, as shown in Fig. 3, so there is little or no tendency for the body yarn  $b$  to be transposed with respect to either the facing or wrapping yarn. Where the fabric is knit of but a single body yarn the yarn is usually fed from the yarn finger  $F^2$ , shown in the drawing as feeding the facing yarn to the needles, and the displacement of the body and wrap yarns has occurred. Where the wrap yarn  $w$  is taken by alternate needles of a group to interlace the wrap yarn with the needles of the group the movement of the wrap yarn into the notches 4 of the needles taking the yarn positions the wrap yarn further towards the back of the needles than formerly and renders the movement of the wrap yarn in back of the re-

maintaining needles of the group much easier and less liable to improperly position the wrap yarn with respect to other yarns taken by the wrapped needles.

- 5 In the manufacture of the needle the notch is formed by applying a die under pressure to the needle blank before the hook is bent to shape so the needle is substantially of the same strength and cross-sectional area in the region of the notch  
10 as a needle without the notch and there is no tendency, either because of the shape of the notch or because of a reduction in the amount of metal at the notch, for the needle to break at the notch.

In the claims, wherever reference is made to a  
15 body yarn, it is intended such term shall also include the facing yarn where the fabric is knit of a plurality of yarns in plaiting relation as well as the body yarn where the fabric is knit of but a single yarn.

- 20 This application is a division of my copending application Serial No. 146,680, filed June 5, 1937.  
I claim—

1. In a process of knitting, the steps of feeding a wrap yarn to a needle and engaging the yarn  
25 about the needle shank, feeding a body yarn to the same needle and engaging the body yarn with the needle shank below the wrap yarn, engaging the wrap yarn in a notch in the needle and passing the body yarn over the wrap yarn.

30 2. In a process of knitting, the steps of feeding a plurality of yarns to a needle and engaging the yarns with the needle shank at different points thereon and moving the needle to engage one yarn in a notch in the needle and shift the other yarn  
35 over the yarn in the needle notch.

3. In a process of knitting, the steps of feeding a plurality of yarns to a needle and engaging the yarns with the needle shank at different points thereon and lowering the needle to engage the  
40 upper yarn on the needle in a notch in the needle and shift the other yarn over the yarn in the needle notch.

4. In a process of knitting, the steps of feeding

a plurality of yarns to a needle and engaging the yarns with the needle shank at different points thereon and lowering the needle to engage the upper yarn on the needle in a notch in the needle and shift the other yarn over the yarn in the  
5 notch to a position in the needle hook.

5. In a process of knitting, the steps of feeding a wrap yarn to a needle and engaging the yarn about the needle shank, feeding a body yarn to the same needle and engaging the body yarn with  
10 the needle shank below the wrap yarn and lowering the needle to engage the wrap yarn in a notch in the needle and pass the body yarn over the wrap yarn.

6. In a process of knitting yarns in plaiting relation, the steps of feeding to the needle the yarn to appear on the fabric face and engaging the yarn with the needle shank, feeding to the same  
15 needle a yarn for forming a backing for the first yarn and engaging the backing yarn with the  
20 needle shank below the first yarn and lowering the needle to engage the first yarn in a notch in the needle and pass the second yarn over the first yarn to a position in the needle hook.

7. In a process of knitting, the steps of feeding  
25 a wrap yarn to a needle and engaging the yarn about the needle shank, feeding a plurality of body yarns to the needle in plaiting relation and engaging one of said plurality of yarns with the needle shank below the wrap yarn and lowering  
30 said needle to engage said wrap yarn in a notch in said needle and to pass the body yarn from below the wrap yarn to a position in the needle hook above the wrap yarn.

8. In a process of knitting, the steps of feeding  
35 a wrap yarn to a needle and engaging the yarn about the needle shank, feeding backing and facing yarns to the needle in plaiting relation and engaging said facing yarn with the needle shank below the wrap yarn and lowering said needle to  
40 engage said wrap yarn in a notch in said needle and pass said facing yarn over said wrap yarn.

HARRY N. SHEPPARD.

#### CERTIFICATE OF CORRECTION.

Patent No. 2,129,593.

September 6, 1938.

HARRY N. SHEPPARD.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the grant and in the headings to the drawing and printed specification, title of invention, for the word "PLAITING" read PLATING; page 1, first column, lines 7 and 21, for "plaited" read plated; same page and column, lines 5-6, 9, 13 and 43; second column, line 23; page 2, first column, line 17; and second column, lines 15, 28 and 38, claims 6, 7 and 8 respectively, for the word "plaiting" read plating; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of October, A. D. 1938.

Henry Van Arsdale

(Seal)

Acting Commissioner of Patents.

maining needles of the group much easier and less liable to improperly position the wrap yarn with respect to other yarns taken by the wrapped needles.

- 5 In the manufacture of the needle the notch is formed by applying a die under pressure to the needle blank before the hook is bent to shape so the needle is substantially of the same strength and cross-sectional area in the region of the notch  
10 as a needle without the notch and there is no tendency, either because of the shape of the notch or because of a reduction in the amount of metal at the notch, for the needle to break at the notch.

In the claims, wherever reference is made to a  
15 body yarn, it is intended such term shall also include the facing yarn where the fabric is knit of a plurality of yarns in plaiting relation as well as the body yarn where the fabric is knit of but a single yarn.

- 20 This application is a division of my copending application Serial No. 146,680, filed June 5, 1937.

I claim—

1. In a process of knitting, the steps of feeding  
25 a wrap yarn to a needle and engaging the yarn about the needle shank, feeding a body yarn to the same needle and engaging the body yarn with the needle shank below the wrap yarn, engaging the wrap yarn in a notch in the needle and passing the body yarn over the wrap yarn.

- 30 2. In a process of knitting, the steps of feeding a plurality of yarns to a needle and engaging the yarns with the needle shank at different points thereon and moving the needle to engage one yarn in a notch in the needle and shift the other yarn  
35 over the yarn in the needle notch.

3. In a process of knitting, the steps of feeding a plurality of yarns to a needle and engaging the yarns with the needle shank at different points thereon and lowering the needle to engage the  
40 upper yarn on the needle in a notch in the needle and shift the other yarn over the yarn in the needle notch.

4. In a process of knitting, the steps of feeding

a plurality of yarns to a needle and engaging the yarns with the needle shank at different points thereon and lowering the needle to engage the upper yarn on the needle in a notch in the needle and shift the other yarn over the yarn in the  
5 notch to a position in the needle hook.

5. In a process of knitting, the steps of feeding a wrap yarn to a needle and engaging the yarn about the needle shank, feeding a body yarn to the same needle and engaging the body yarn with  
10 the needle shank below the wrap yarn and lowering the needle to engage the wrap yarn in a notch in the needle and pass the body yarn over the wrap yarn.

6. In a process of knitting yarns in plaiting relation, the steps of feeding to the needle the yarn to appear on the fabric face and engaging the yarn with the needle shank, feeding to the same  
15 needle a yarn for forming a backing for the first yarn and engaging the backing yarn with the needle shank below the first yarn and lowering the needle to engage the first yarn in a notch in the needle and pass the second yarn over the first  
20 yarn to a position in the needle hook.

7. In a process of knitting, the steps of feeding  
25 a wrap yarn to a needle and engaging the yarn about the needle shank, feeding a plurality of body yarns to the needle in plaiting relation and engaging one of said plurality of yarns with the needle shank below the wrap yarn and lowering  
30 said needle to engage said wrap yarn in a notch in said needle and to pass the body yarn from below the wrap yarn to a position in the needle hook above the wrap yarn.

8. In a process of knitting, the steps of feeding  
35 a wrap yarn to a needle and engaging the yarn about the needle shank, feeding backing and facing yarns to the needle in plaiting relation and engaging said facing yarn with the needle shank below the wrap yarn and lowering said needle to  
40 engage said wrap yarn in a notch in said needle and pass said facing yarn over said wrap yarn.

HARRY N. SHEPPARD.

#### CERTIFICATE OF CORRECTION.

Patent No. 2,129,593.

September 6, 1938.

HARRY N. SHEPPARD.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the grant and in the headings to the drawing and printed specification, title of invention, for the word "PLAITING" read PLATING; page 1, first column, lines 7 and 21, for "plaited" read plated; same page and column, lines 5-6, 9, 13 and 43; second column, line 23; page 2, first column, line 17; and second column, lines 15, 28 and 38, claims 6, 7 and 8 respectively, for the word "plaiting" read plating; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of October, A. D. 1938.

Henry Van Arsdale

(Seal)

Acting Commissioner of Patents.