Oct. 8, 1946. S. C. MACK 2,409,138

HOSIERY

Filed July 9, 1942 3 Sheets-Sheet 1

Fig. 1.

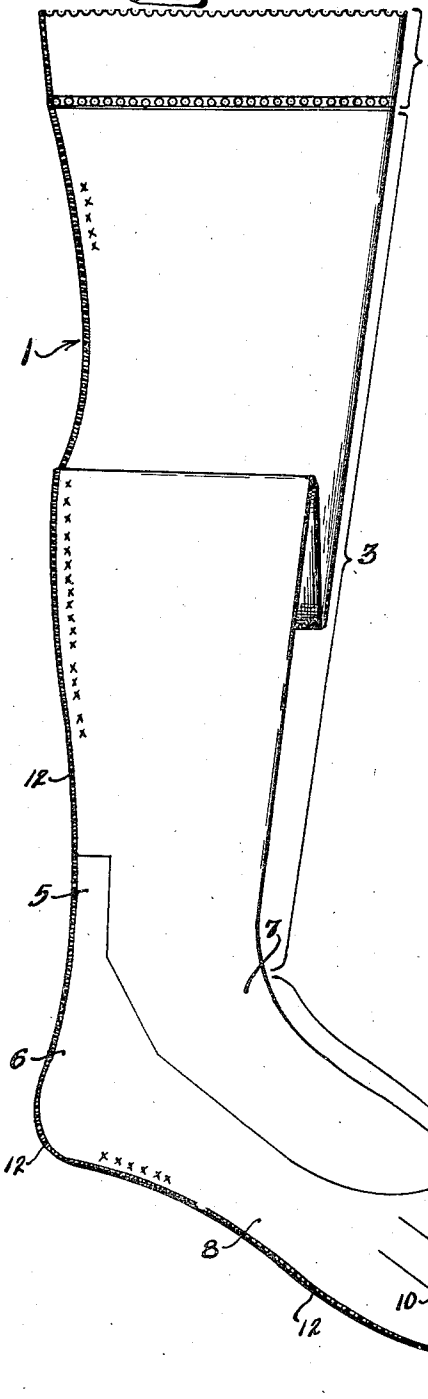


Fig. 3.

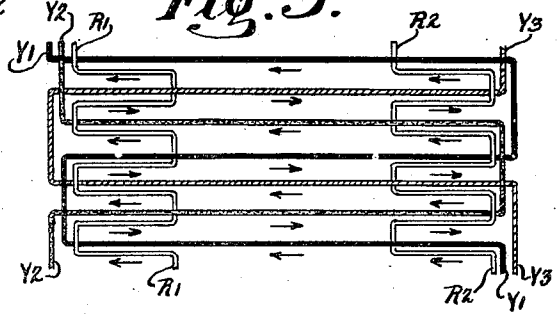
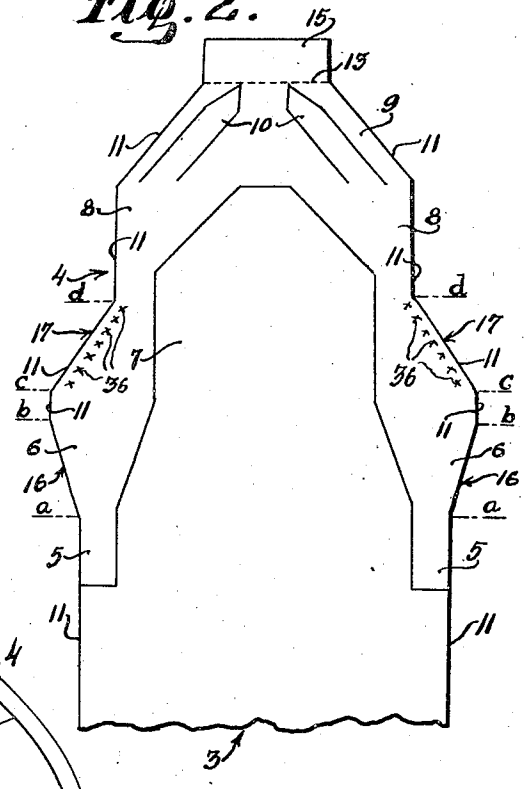


Fig. 2.



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HOSIERY

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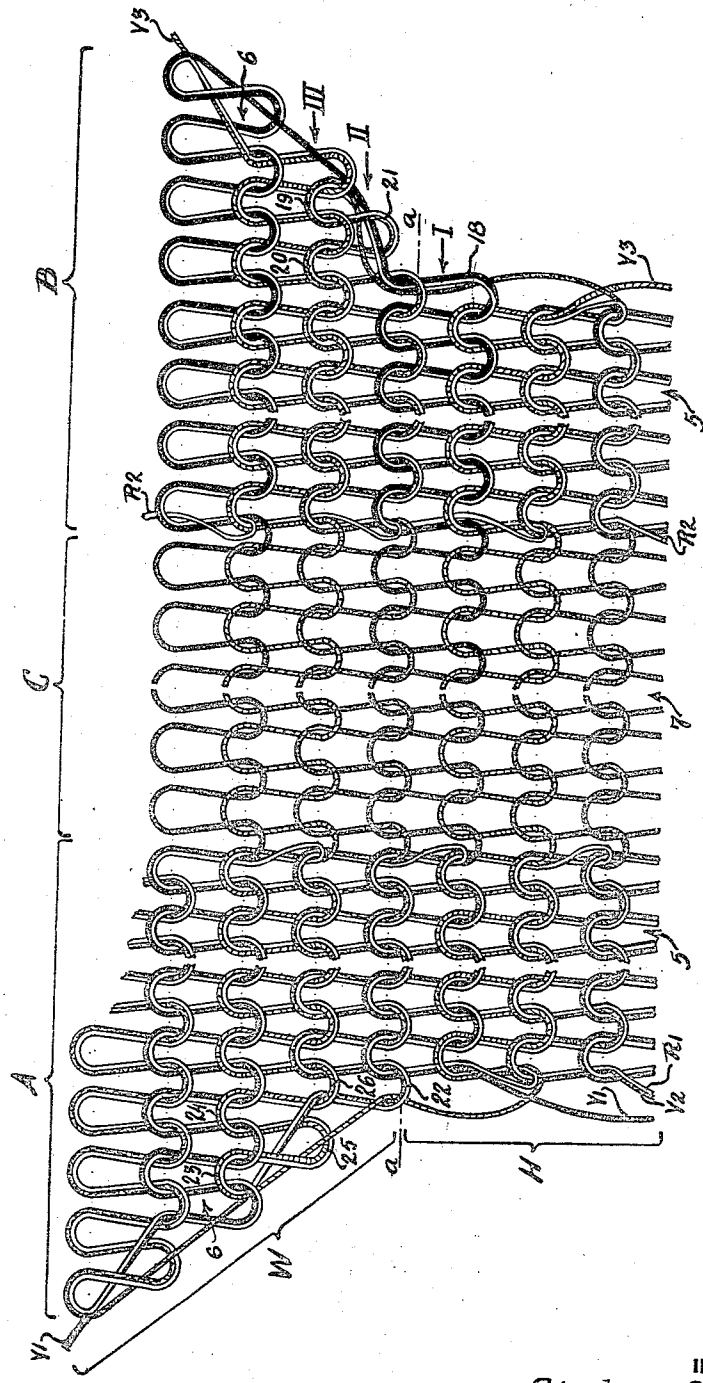


Fig. 4.

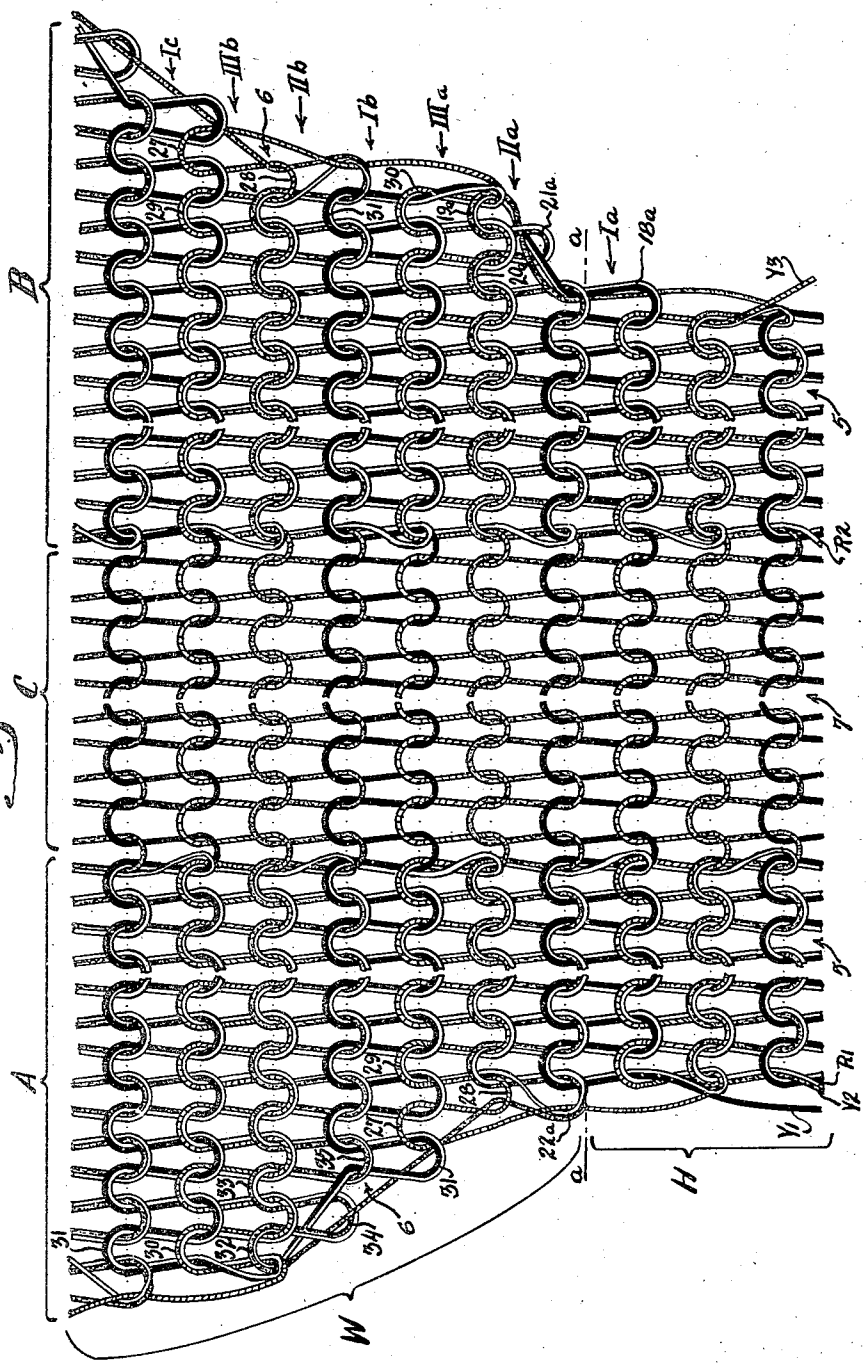
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HOSIERY

Filed July 9, 1942 - 3 Sheets-Sheet 3

Fig. 5.



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UNITED STATES PATENT OFFICE

2,409,138

HOSIERY

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Application July 9, 1942, Serial No. 450,330

18 Claims. (Cl. 66—187)

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The present invention generally relates to hosiery and, more specifically, pertains to full-fashioned hosiery knitted in one operation on a single machine in accordance with the method set forth in my Letters Patent No. 2,298,302, issued October 13, 1942, on copending application Serial Number 410,705, filed September 13, 1941, of which the present application is a continuation in part.

The invention particularly aims to provide a knitted single unit hosiery fabric construction wherein the heel portions are shaped through widening by the addition of loops onto the ends of the heel courses, and has for one of its main objects the provision of widened heel portions in hosiery fabric of the "ringless" construction whereby the separate yarns utilized in successive sequence for the knitting of said portions in such fabric become tied in the selvage edges thereof, thus constituting strong and tight selvages without any detrimental "floats" running along said selvages between the series of courses.

Another important object of the invention resides in the provision of hosiery fabric of the kind specified wherein the formation to tight, strong, and non-ravelling selvage edges of the widened heel area are assured, whether the widening of the heel courses takes place in each course or in spaced courses throughout said area.

A particularly important feature of the invention results from an improved widened selvage construction which not only ties in the various yarns utilized in the knitting of the widened heel area to form a tight and strong selvage and obviate detrimental "floats," but which is also capable of effectively locking the selvage loops formed from said yarns to prevent ravelling of such loops.

Other important objects and advantages of the invention will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be more readily understood by those skilled in the art, I have, in the accompanying drawings and in the detailed description based thereupon, set out possible embodiments of the invention.

In these drawings:

Figure 1 is a face elevation of a lady's full-fashioned stocking constructed in accordance with the invention;

Figure 2 is an elevation of a portion of the flat knitted stocking blank diagrammatically illustrating the formation thereof;

Figure 3 is a diagram illustrating the mode of

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feeding the several yarns in the knitting of certain parts of the stocking blank;

Figure 4 is a diagrammatic representation of the widened fabric constructed according to one form of the invention;

Figure 5 is a diagrammatic representation of the widened fabric construction according to another form of the invention.

Referring more particularly to the drawings wherein like characters of reference will designate corresponding parts throughout in several views, there is shown in Figure 1 a full-fashioned knitted stocking 1 constructed in accordance with the invention. The stocking comprises the welt portion 2, the leg portion 3, and the foot portion 4. The stocking also preferably has the usual reinforced high heel 5, heel proper 6, instep 7, sole 8, and toe 9, the toe being of the well known French type which, as generally known, is obtained by narrowing the fabric to form diamond points 10.

As diagrammatically shown in Figure 2, the stocking is made from a flat knitted blank, the selvage edges 11 of which are sewed to form the ordinary back seam 12 (Figure 1) extending from the top of the welt to the tip of the toe where the loose course 13 (Figure 2) of the toe which is looped in the usual manner, as indicated at 14 in Figure 1, after the ravelling course portion 15 (Figure 2) is removed.

The stocking fabric is of the well known "ringless" construction, that is, the fabric, as diagrammatically shown in Figure 3, is knitted preferably from three separate and distinct body yarns, Y1, Y2, and Y3 respectively laid in repeated alternating sequence so that the same body yarn never reoccurs in any two consecutive courses.

The sections of the foot portion of the blank adjoining both selvage edges 11 are reinforced to constitute the reinforced high heel 5, heel proper 6, and sole 8 by means of reinforcing yarns R1 and R2 respectively fed to the corresponding parts of the courses within the areas to be reinforced, as is represented diagrammatically in Figure 3. For convenience and clarity in showing the invention, the reinforcing yarns R1 and R2 are shown unshaded, whereas the body yarn Y1 is shaded solid black, the body yarn Y2 is stippled, and the body yarn Y3 is lined.

It will clearly be understood from Figure 2 that the stocking blank is of the single unit type, that is, the foot portion 4 is knitted as a direct continuation of the leg portion 3 on one machine, the sections of the heel proper 6 being

shaped through widening and narrowing, as shown at 16 and 17 respectively. In accordance with the present invention, the widening is accomplished by the addition of loops onto courses, such widening taking place in each course, or in spaced courses of said series within the widening area.

In Figure 4, the invention is shown as applied to the widening of each of the successive courses within the widening area, whereas in Figure 5 the invention is shown as applied to the widening of spaced courses within such area.

In both Figures 4 and 5, there are represented several successive courses taken in the vicinity of the stocking heel to include a portion H of the sections of the reinforced high heel 5 and a portion W of the sections of the reinforced widened heel 6. In accordance with the usual practice one reinforcing yarn R1 is used in conjunction with the three body yarns Y1, Y2, and Y3 in forming the desired number of reinforced loops to constitute the reinforced heel area A at one side of the stocking fabric, and the other reinforcing yarn R2 is used in conjunction with the three body yarns Y1, Y2, and Y3 in forming the desired number of reinforced loops to constitute the reinforced heel area B at the other side of the stocking fabric, said three body yarns Y1, Y2, and Y3 being used alone, that is, without either reinforcing yarn R1 or R2, to form the desired number of non-reinforced loops intermediate the reinforced loops within the heel area A and the reinforced loops within the heel area B to constitute the sheer instep area C.

It will be understood that the desired number of reinforced loops within the reinforced heel areas A and B may be obtained by predetermined adjustment of any suitable widening attachment, preferably such as that shown and described in my copending application Serial Number 401 112, filed July 5, 1941, and of the well known "Pointex" attachment usually provided on full-fashioned knitting machines, the widening attachment controlling the feeding of the body and reinforcing yarns at the outer selvage edges of the reinforced areas A and B of the fabric, and the "Pointex" attachment controlling the feeding of the reinforcing yarns at the inner selvage edges of said areas.

In constructing the stocking 1 (Figure 1) in accordance with this invention, the welt 2 and leg 3 are knitted in the usual well known manner down to and including the reinforced sections of the high heel 5, that is, the hosiery blank (Figure 2) is knitted in accordance with the ordinary practice in the art to approximately the point *a*—*a*.

At said point *a*—*a*, if the construction of the hosiery fabric is such that widening occurs in each course of the widened area W (Figure 4), then the body yarn, for instance, the body yarn Y1 which forms course I, the reinforcing yarn R2 which reinforces certain loops of said course I, and the body yarn Y2 which forms the next succeeding course II are extended beyond the selvage loop 18 so that in said course II the body yarn Y2 and reinforcing yarn R2 form two additional needle loops 19 and 20 and one intermediate additional sinker loop 21 at the right hand side selvage edge looking at Figure 4.

It will be noted that the portions of the body yarns Y1 and Y2 and of the reinforcing yarn R2 which float beyond the selvage loops 18 of course I pass through and are engaged by the additional sinker loops 21 of course II thus providing a tight and ravel-proof selvage. Likewise at the opposite selvage edge, the remaining body yarn Y3 passes through and is engaged by the selvage loop 22 so that this selvage edge also is tight and ravel-proof.

In the immediately following course III which is formed with the body yarn Y3, said body yarn Y3, together with the reinforcing yarn R1 and the body yarn Y2 which forms the preceding course II, are extended beyond the mentioned selvage loop 22. The body yarn Y3 and reinforcing yarn R1 thus form two additional needle loops 23 and 24 and an intermediate additional sinker loop 25, the body yarn Y3 passing through and being engaged by the sinker loop 25 and body yarn Y2 and the reinforcing yarn R1 passing through and being engaged by both the sinker loop 25 and the immediately adjacent inner sinker loop 26 to constitute a tight selvage and lock the same against ravelling.

Additional needle and sinker loops such as those above described are formed with each of the body yarns Y1, Y2, and Y3 and the associated reinforcing yarns R1 and R2 in the respective successive courses throughout the widened portion of the heel 6, that is, up to approximately the point *b*—*b* (Figure 2).

In the construction wherein widening occurs in spaced courses of the widened heel area (Figure 5), at the point *a*—*a* the courses I*a* and II*a* have the same formation as courses I and II of Figure 4, that is, the body yarn, for instance the body yarn Y1 which forms course I*a*, the reinforcing yarn R2, which reinforces certain loops of said course I*a*, and the body yarn Y2 which forms the next succeeding course II*a*, are extended beyond the selvage loop 18*a* so that in said course II*a* the body yarn Y2 and reinforcing yarn R2 form two additional needle loops 19*a* and 20*a* and one intermediate sinker loop 21*a* at the right hand side selvage edge looking at Figure 5, the portions of the body yarns Y1 and Y2 and the reinforcing yarn R2 floating beyond the selvage loop 18*a* passing through and being engaged by the additional sinker loop 21*a* of course II*a* and, accordingly, providing a tight and ravel-proof selvage.

Also at the opposite selvage edge, the remaining body yarn Y3 passes through and is engaged by the selvage loop 22*a* so that the selvage edge is tight and ravel-proof. However, as will clearly appear from Figure 5, in the immediately following course III*a* there is provided but a single additional needle loop 27 constituted by one body yarn only, that is, the body yarn Y3 without the reinforcing yarn. The sinker loop 28 contiguous to the needle loop 27 is likewise constituted by the body yarn Y3 alone, the reinforcing yarn R1 starting in the course III*a* with the formation of the adjoining needle loop 29.

It is particularly pointed out that the yarn Y2 which forms the course II*a* passes through the non-reinforced sinker loop 28 and thus becomes tied thereby. The end needle loop 30 at the right hand side selvage of the course III*a* is drawn through the needle loop 19*a* of the preceding course II*a* and the end needle loop 31 at said right hand selvage of the next succeeding course I*b* is drawn through said needle loop 30 so that there is no widening of courses III*a* and I*b* beyond the loop 19*a* of course II*a*.

At the left hand side selvage of course I*b*, the body yarn Y1 and the reinforcing yarn R1, together with the body yarn Y2, are extended beyond the selvage loop 31 so that said body yarn

Y2 and reinforcing yarn R1 form two additional needle loops 32 and 33 and an intermediate additional sinker loop 34. It will be noted that the body yarn Y2 incorporated in the courses IIa and IIb and passed through the non-reinforced sinker loop 28 also passes through the selvage loop 34 added to course IIb whereas the body yarn Y1 and reinforcing yarn R1 extended beyond the selvage loop 31 of course Ib pass through said added sinker loop 34 and also through the immediately adjoining sinker loop 35 of said course IIb.

As represented in Figure 5, the formation and construction of the loops 27, 28, and 29 at the left hand side selvage edge of course IIIa are duplicated at the right hand side selvage edge of course IIIb, whereas the formation and disposition of loops 30 and 31 of the right hand side selvage of courses IIIa and Ib are duplicated at the left hand side selvage of courses IIIb and Ic.

The addition of loops and duplication of the loop formation construction and disposition as above described are carried out throughout the widened heel area, that is, up to approximately the point b—b (Figure 2).

As illustrated in said Figure 2, following the completion of the widened heel area (point a—a to point b—b), several straight courses, that is, courses of equal length, are knitted to supply the necessary amount of fabric (point b—b to point c—c) for the desired dimension of the heel, after which the courses (point c—c to point d—d) are narrowed, as indicated by the marks 36, according to the well known established procedure for imparting to the heel its proper shape. From the point d—d, the blank is completed by the formation of courses in the ordinary manner to constitute the sections of the sole 8 and toe 9 and, finally, the ravelling portion 15.

Whereas in Figure 5 and in the description based thereon, the widening is disclosed by way of example as taking place at the end of every third course, it is to be understood that the spacing of the widened courses may vary without departing from the gist of the invention. Also it is to be understood that the embodiment of the invention as herein shown and described is capable of certain modifications. Therefore, any modifications coming within the scope of the subjoined claims are to be considered within the spirit of the invention.

What I claim is:

1. A flat knitted fabric comprising series of courses, the courses in each series being knitted from separate but identical yarns, certain of said courses having a pair of needle loops and an intermediate sinker loop added thereonto, the portions of the several yarns incorporated in the courses of one series and floating from the selvage thereof passing through such a sinker loop added onto courses of subsequent series.

2. A flat knitted fabric consisting entirely of series of courses, the courses in each series being knitted from separate but identical yarns, certain courses of certain series having a pair of needle loops and an intermediate sinker loop added thereonto, the portions of the several yarns incorporated in the courses of one series and floating from the selvage edge thereof passing through such a sinker loop added onto courses of subsequent series.

3. A flat knitted fabric consisting entirely of series of courses, the courses in each series being knitted from separate but identical yarns, the courses of certain series having a pair of needle loops and an intermediate sinker loop added thereonto, the portions of the several yarns incorporated in the courses of one series and floating from the selvage thereof, passing through such a sinker loop added onto courses of subsequent series.

4. Hosiery having a flat knitted widened heel portion comprising series of courses, the courses in each series being knitted from separate but identical yarns, certain of said courses having a pair of needle loops and an intermediate sinker loop added thereonto, the portions of the several yarns incorporated in the courses of one series and floating from the selvage thereof passing through such a sinker loop added onto courses of subsequent series.

5. Hosiery having a flat knitted widened heel portion comprising series of courses, the courses in each series being knitted from separate but identical body yarns, certain loops in each of said courses having reinforcing yarns incorporated therein, certain of said courses having reinforced loops added thereonto, the portions of the several body yarns and reinforcing yarns incorporated in the courses of one series and floating from the selvage thereof passing through certain reinforced loops added onto courses of subsequent series.

6. Flat knitted ringless fabric produced from plural yarns used in succession and in a definite repeating sequence in the knitting, and having courses widened by one or more added end loops, in each of which widened courses a selvage loop comprises one of said plural yarns and is locked by passage of said one of the plural yarns and another of said plural yarns through the sinker wale loop adjacent said selvage loop in such widened course.

7. In a weft knit fabric comprising series of courses of different widths, the courses of each series being knit from separate yarns, and portions of a plurality of yarns forming a narrower series locking a selvage of a course of a wider series.

8. A weft knit fabric including a plurality of courses of loops knit from the same yarn and one of which courses is wider than the other, intermediate courses of loops spacing and connecting said first named courses of loops, one of said intermediate courses of loops having a sinker wale loop adjacent to a selvage loop, and said spaced courses first named being connected by a float locking said sinker wale loop.

9. A weft knit fabric comprising a plurality of courses of loops knit from the same yarn, one of which courses is wider than the other, intermediate courses of loops spacing and connecting said first named courses of loops, said yarn having a section locking a selvage of said intermediate courses.

10. A weft knit fabric comprising courses of loops knit from plural yarns in succession in a definite repeating sequence, one of said courses having a selvage loop and an adjacent sinker loop extending laterally beyond an adjoining course, and a plurality of yarns forming courses aforesaid having portions floating through and locking said sinker loop and one of said last named yarns having a further portion forming said selvage loop.

11. A weft knit fabric having courses of loops and including a plurality of spaced courses of loops formed from the same yarn, said yarn having a continuous float portion between said last named courses and passing through loops of a plurality of other courses of said fabric.

12. A weft knit fabric having courses of loops and including a plurality of spaced selvedged courses of different widths formed from the same yarn, a plurality of intermediate courses of loops spacing and connecting said last named courses, said yarn having a continuous float portion passing through a loop of each of said intermediate courses, said last named loops being in wales lying outwardly beyond the adjacent selvage loop of the narrower of said first mentioned courses.

13. A weft knit selvage fabric having a widened portion and comprising series of courses, the courses in each series being knit from separate yarns, and portions of several yarns incorporated in courses of one series locking the selvage of a course of a subsequent series.

14. A flat knit selvage fabric comprising series of courses, the courses in each series being knit from separate yarns, certain of said courses having loops added thereto and portions of several yarns incorporated in separate courses of one series floating through an added loop of a course of a subsequent series and locking the selvage.

15. A flat knit selvage fabric comprising series of courses, the courses in each series being knit from separate yarns, certain of said courses being widened by needle and sinker loops added thereto, and portions of several yarns incorporated in separate courses of one series passing through an added sinker loop of a widened course of a subsequent series to form a non-ravelling selvage.

16. A flat knit selvage fabric comprising series of three courses, each course in each series including a yarn separate from the yarns forming the remaining courses of such series, one course in each series having loops added thereto and unlooped portions of several yarns incorporated in courses of one series and floating through a loop aforesaid added onto a course of a subsequent series.

17. A flat knit fabric comprising a series of courses, the courses in each series being knit from separate yarns, courses of said series having loops added thereto and portions of several yarns incorporated in courses of one series and floating from the selvage thereof passing consecutively through loops of a plurality of courses of a subsequent series.

18. Weft knit hosiery having a lock-selvaged reenforced widened heel portion comprising courses of loops formed of a plurality of yarns in succession in a definite repeating sequence, each yarn aforesaid having a float portion locked in a loop inward from a selvage loop of a course lying between courses formed by such yarn.

STERLING C. MACK.