March 11, 1941. F. LAMBACH 2,234,564

METHOD OF KNITTING HEEL TABS ONTO COMBINATION LEG AND FOOT STOCKING BLANKS

Original Filed Dec. 17, 1938

Fig. 1.

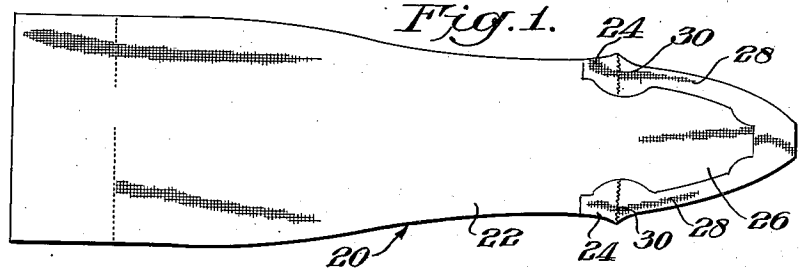


Fig. 2.

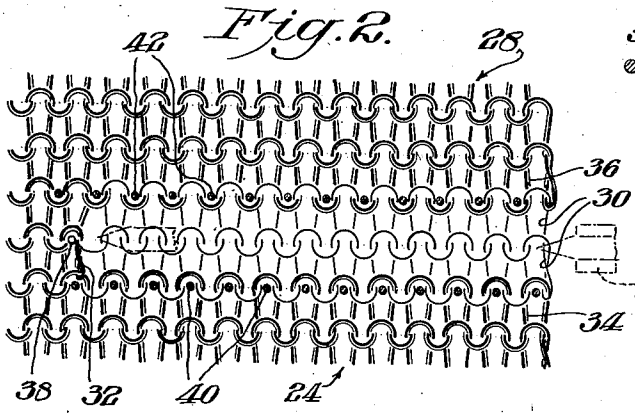


Fig. 4.

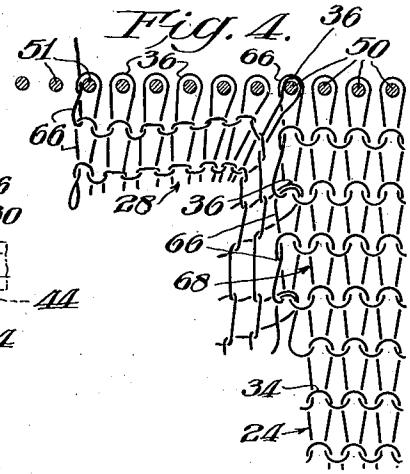


Fig. 3.

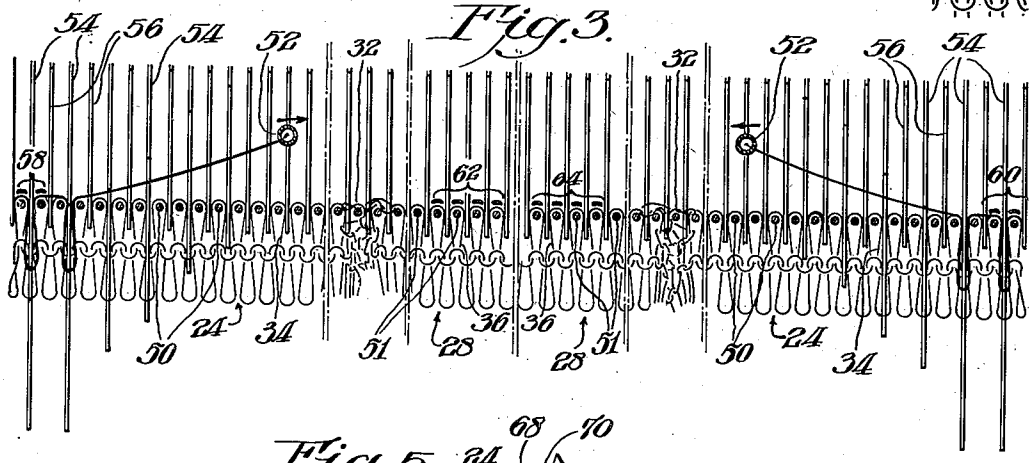
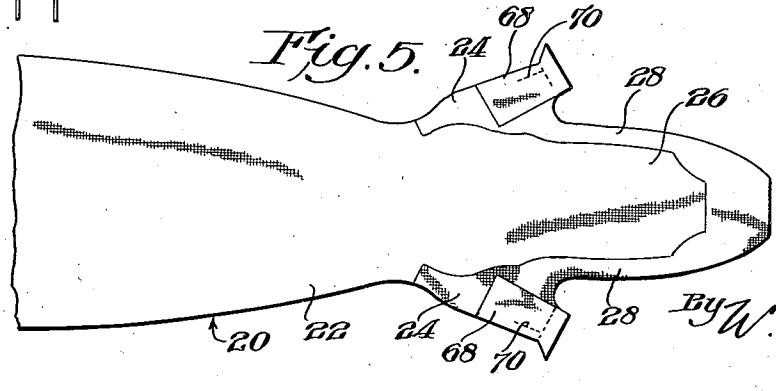


Fig. 5.



Inventor
Fritz Lambach

By Wm. R. Smith
Attorney.

Patented Mar. 11, 1941

2,234,564

UNITED STATES PATENT OFFICE

2,234,564

METHOD OF KNITTING HEEL TABS ONTO COMBINATION LEG AND FOOT STOCKING BLANKS

Fritz Lambach, Fairview, N. J., assignor to Robert Reiner, Incorporated, Weehawken, N. J.

Original application December 17, 1938, Serial No. 246,370. Divided and this application December 18, 1939, Serial No. 309,845

25 Claims. (Cl. 66—82)

The present invention relates to a method of manufacturing hosiery and, more particularly, to an improved method of knitting heel tabs directly into a combination leg and foot stocking blank as set forth in my co-pending application, Serial Number 246,370, filed December 17, 1938, now Patent No. 2,198,052 dated April 23, 1940, of which the present application is a division.

It is the principal object of the invention to provide a method of knitting heel tabs simultaneously and in opposite directions as continuations of the high heel sections of a combination leg and foot blank and, during the knitting of said heel tabs, of transferring loops of the sole sections of said blank for interlooping connection with the loops at the inner selvedges of the heel tabs, and of transferring certain loops at the outer selvedges of said heel tabs to narrow and shape the same.

Heretofore, it has been customary, in knitting heel tabs into a combination leg and foot blank, to lay the yarns by means of yarn carriers operating simultaneously in the same direction and, during the knitting of said courses, to transfer by means of transfer point combs loops of the first course of each sole section into engagement with loops at the inner selvedge edge of a completed course of each heel tab. However, it has been found that in such a mode of operation, one or the other of the carriers unavoidably remains in the way of the transfer points, thus interfering with the proper operation of the latter.

Therefore, it is an important object of the present invention to provide a method whereby the yarns intended to form the heel tabs are laid simultaneously in opposite directions, and the transfer of loops occurs at every other course when the carriers have reached the outer selvedge edges of the heel tabs so that the loop transfer may be done without interference.

It is also among the important objects of the invention to provide a method whereby heel tabs are knitted simultaneously in opposite directions as continuations of a combination leg and foot blank; the marginal loops of the sole sections of said blank are transferred for overlapping interlooping connection with certain loops at the inner selvedges of every other course of said heel tabs; and certain loops at the outer selvedges of said heel tabs are transferred to narrow and shape the same.

Another important object of the invention resides in the provision of a method whereby heel tabs are knitted into a combination leg and foot blank by knitting simultaneously in opposite directions the heel tabs directly onto the leg portion of the blank, and interknitting the selvedge edges of every other course of the heel tabs into the adjoining portion of the foot fabric to form a finished blank.

With these and other objects in view, as may hereinafter appear, the several features of the invention and the advantages to be obtained thereby will be readily understood by those skilled in the art from the following description, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a diagrammatic representation of a combination leg and foot blank;

Figure 2 is an enlarged diagrammatic representation of the loop structure of the portion of the blank shown in Figure 1 at the juncture of the high heel and sole sections;

Figure 3 diagrammatically illustrates the fabric topped on the series of needles in straight line relationship subsequent to the severing of the fabric;

Figure 4 diagrammatically illustrates the high heel, sole, and heel sections of the stocking blank after the knitting of a number of heel courses;

Figure 5 is a diagrammatic representation of a completed foot and leg stocking blank with the heel tabs knitted into the blank.

Referring more particularly to the drawing, wherein like characters of reference will designate corresponding parts throughout, I have shown in Figure 1 a stocking blank **20** comprising a leg **22** having reinforced high heel portions **24**, and a foot **26** having reinforced sole portions **28** which are formed by continuous knitting into the combination leg and foot blank.

Between the high heel and sole portions of the blank, as best shown in Figure 2, two partial non-reinforced courses **30** are provided, which serve to form a line of demarcation between the last course of the high heel portions and the first course of the sole portions into which the heel tabs are subsequently to be knitted. During the knitting of the partial courses referred to, the knitting of a reinforced yarn is continued on a restricted number of needles so that a reinforced selvedge loop **32** is provided at the inner ends of the partial non-reinforced connecting courses **30** to form the heel corners of the finished blank.

It will be understood that the courses **30** may be knitted with a separate yarn so that when these connecting loops are subsequently removed, as by cutting or pulling out the yarn forming these loops, no yarn forming the body portion of the fabric will have been broken or cut.

In accordance with the invention, the last course of the reinforced high heel loops, designated at 34, and the first course of the reinforced sole loops, designated at 36, together with the selvedge loop 32, are topped onto a series of topping points comprising a stationary point 38 and two additional point sections, designated respectively at 40 and 42, which are arranged in parallel relationship, as shown in the diagrammatic Figure 2, that is, in substantially the same positions in which the fabric loops appear in the combination blank.

It will be noted that the topping operation, as described, is carried out prior to the cutting or removal of the partial non-reinforced courses 30 so that when the high heel and sole portions of the fabric are separated, all of the disengaged fabric loops are supported by the topping points to prevent any possibility of dropping the loops.

In accordance with the preferred form of applicant's method, the loops forming the partial courses 30 may be severed by means of a cutting knife 44, to permit the separation of the two parallel topping point sections, and the loops supported thereon, which are then moved outwardly into a straight line relation in which all of the points are spaced to register with the quills of a transfer bar which may be of the ordinary description, and utilized for transferring the fabric loops from the topping points to the bank of needles of a heel knitting machine, as represented in Figure 3.

According to the present invention, the bank of needles of the heel knitting machine is divided into three groups, that is, two end groups 50 adapted to engage and support the loops 34 of the high heel portions 24, and an intermediate group 51 adapted to engage and support the loops 36 of the sole portions 28. The needles in the end groups 50 are adapted to receive the yarn from the carriers 52 and act in cooperation with the sinkers 54 and dividers 56 to knit fabric onto, and as a continuation of, the high heel portions 24, whereas the needles in the intermediate group 51 are non-knitting needles and serve only to retain the loops 36 of the sole portions 28 for their transfer as, and for the purpose to be, explained hereinafter.

Disposed for cooperation with a predetermined number of needles in the knitting needle groups 50 are two relatively small narrowing combs 58 and 60, whereas arranged for coaction with the non-knitting needle group 51 are two relatively wide transfer combs 62 and 64. The narrowing combs 58 and 60 are intended to operate independently of, or simultaneously with, the loop transfer combs 62 and 64, for instance, in the manner described in the co-pending parent application aforesaid.

Also, as described in said parent application, the yarn carriers and sinkers associated with one of the knitting needle groups 50, and the yarn carriers and sinkers associated with the other of said knitting needle groups 50, are adapted to move in unison towards and away from each other, thus laying and kinking the yarns simultaneously in opposite directions. In this manner, it will be appreciated that, at every other course knitted on the knitting needle groups 50, the carriers become positioned at the outer ends of said needle groups and, accordingly, are moved away from the loop transfer combs 62 and 64, which may then operate without interference.

In knitting the heel portions, the carriers, as hereinbefore stated, are actuated simultaneously and in opposite directions to lay their yarns across the active knitting needles 50 so as to knit the courses 66 (Figure 4) of the heel tabs 68 onto, and as continuations of, the high heel portions 24. During the knitting of the heel tab courses 66, the loops 36 of the first courses of the sole portions 28 are gradually transferred for interknitting engagement with the inner selvedge edges of the heel tabs by operation of the loop transfer combs 62 and 64. The heel tabs 68 may be shaped through operation of the narrowing combs 58 and 60, as set forth in my copending application, forming the narrowing lines 70.

It is to be understood that the invention is capable of certain modifications and, 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. The method of manufacturing stockings, which consists in knitting the leg section, the instep section, the sole sections, and the toe section of a stocking as a continuous unitary fabric; separating the sole sections from the adjoining portions of the leg section; supporting in alignment on the bank of needles of a knitting machine the separated sole sections and adjoining portions of the leg section; laying yarns simultaneously in opposite directions on the needles supporting said portions of the leg section and knitting heel tabs as continuations of the latter; and transferring in overlapping relation the supported loops of the sole sections onto the selvedge loops of the heel tabs to form an interknitted connection between the heel tabs and the sole sections as the knitting of the heel tabs progresses.

2. The method of knitting heel tabs into a knitted stocking blank having interknitted leg and foot fabrics provided with separated sections, comprising: supporting on the bank of needles of a knitting machine coursewise loops of the separated sections of the leg fabric in alignment with coursewise loops of the separated sections of the foot fabric; laying yarns simultaneously in opposite directions on the needles supporting said coursewise loops of the sections of one of said fabrics, and knitting heel tab courses thereonto; and, during the knitting of the following heel tab courses, successively transferring said coursewise loops of the sections of the other of said fabrics for interknitting with the heel tab courses.

3. The method of knitting heel tabs into a knitted stocking blank having interknitted leg and foot fabrics provided with separated sections comprising: supporting on the bank of needles of a knitting machine coursewise loops of the separated sections of the leg fabric in alignment with coursewise loops of the separated sections of the foot fabric; laying yarns simultaneously in opposite directions on the needles supporting said coursewise loops of the sections of one of said fabrics and knitting heel tab courses thereonto; and, after the knitting of the following heel tab courses from the yarns laid in directions away from each other, successively transferring said coursewise loops of the sections of the other of said fabrics for interknitting with the heel tab courses.

4. The method of knitting heel tabs into a knitted stocking blank having interknitted leg and foot fabrics provided with separated sections comprising: supporting on the bank of needles of a knitting machine coursewise loops of the separated sections of the leg fabric in alignment with coursewise loops of the separated sections

of the foot fabric; laying yarns simultaneously in opposite directions on the needles supporting said coursewise loops of the sections of one of said fabrics and knitting heel tab courses thereonto; after the knitting of the following heel tab courses from the yarns laid in directions away from each other, successively transferring said coursewise loops of the sections of the other of said fabrics for interknitting with the heel tab courses; and narrowing certain of the heel tab courses to shape the same.

5. The method of knitting heel tabs into a combination foot and leg stocking blank having the foot portion knitted onto the leg portion, which comprises: supporting on the bank of needles of a knitting machine the loops in portions of the last course of the leg fabric in alignment with the loops in portions of the first course of the foot fabric to which heel tabs are to be knitted; laying yarns simultaneously in opposite directions on the needles supporting the loops in said course portions of the leg fabric and knitting heel tab courses thereonto; and, during the knitting of the following heel tab courses, successively transferring the supported loops in said foot fabric course portions for interknitting into the inner selvedge edges of the heel tabs.

6. In a method of manufacturing stockings, the steps of knitting heel tabs into a full-fashioned leg and foot stocking blank having the foot fabric knitted directly into the leg fabric, which comprises: severing those portions of the last course of the leg fabric into which the heel tabs are to be knitted from the corresponding portions of the first course of the foot fabric; supporting in alignment on a bank of needles of a knitting machine the loops in said portions of the last course of the leg fabric and the loops in said portions of the first course of the foot fabric; laying yarns simultaneously in opposite directions on the needles supporting the loops in said portions of the last course of the leg fabric and knitting heel tab courses thereonto; and, during the knitting of the following heel tab courses, successively transferring the supported loops in said portions of the first course of the foot fabric for knitting into the inner selvedge edges of the heel tab courses.

7. In a method of manufacturing stockings, the steps of knitting heel tabs into a combination foot and leg stocking blank having the foot fabric knitted directly into the leg fabric, and including normally united high heel fabrics and sole fabrics, which comprises: separating the last course of each of the high heel fabrics from the first course of each of the sole fabrics; supporting in alignment on a bank of needles of a knitting machine the needle loops in said courses of the high heel fabrics and the sinker loops in said courses of the sole fabrics; laying yarns simultaneously in directions towards and away from each other on the needles supporting said needle loops in said courses of the high heel fabrics and knitting heel tab courses thereonto; and, after the knitting of the following heel tab courses from the yarns laid in directions away from each other, successively transferring the supported sinker loops in said courses of the sole fabrics into the inner selvedge edges of the heel tab courses.

8. In a method of manufacturing stockings, the steps of knitting heel tabs into a combination foot and leg stocking blank having the foot fabric knitted directly into the leg fabric, and including normally united high heel fabrics and sole fabrics, which comprises: separating the last course of each of the high heel fabrics from the first course of each of the sole fabrics; supporting in alignment on a bank of needles of a knitting machine the needle loops in said courses of the high heel fabrics and the sinker loops in said courses of the sole fabrics; laying yarns simultaneously in directions towards and away from each other on the needles supporting said needle loops in said courses of the high heel fabrics and knitting heel tab courses thereonto; after the knitting of the following heel tab courses from the yarns laid in directions away from each other, successively transferring the supported sinker loops in said courses of the sole fabrics into the inner selvedge edges of the heel tab courses; and narrowing certain of the heel tab courses at the outer selvedge edges to shape the same.

9. The method of knitting heel tabs into a combination leg and foot stocking blank having the foot portion knitted onto the leg portion, which comprises: supporting on the bank of needles of a knitting machine the wale loops in portions of the last course of the leg fabric in alignment with the loops in portions of the first course of the foot fabric to which heel tabs are to be knitted; laying yarns simultaneously in opposite directions on the needles supporting the loops of said course portions of the leg fabric and knitting heel tab courses thereonto; and, after the knitting of the following heel tab courses of yarns laid in directions away from each other, successively transferring the supported loops in said foot fabric course portions for interknitting into the inner selvedge edges of the heel tabs.

10. The method of knitting heel tabs into a combination leg and foot stocking blank having the foot portion knitted onto the leg portion, which comprises: supporting on the bank of needles of a knitting machine the loops in portions of the last course of the leg fabric in alignment with the loops in portions of the first course of the foot fabric to which heel tabs are to be knitted; laying yarns simultaneously in opposite directions on the needles supporting the loops of said course portions of the leg fabric and knitting heel tab courses thereonto; after the knitting of the following heel tab courses of yarns laid in directions away from each other, successively transferring the supported loops in said foot fabric course portions for interknitting into the inner selvedge edges of the heel tabs; and narrowing certain of the heel tab courses to shape the same.

11. The method of manufacturing stockings, which consists in knitting the leg section, the high heel sections, the instep section, the sole sections, and the toe section of a stocking as a continuous unitary fabric; separating the last course of each of the high heel sections from the first course of each of the sole sections; supporting in alignment on the bank of needles of a knitting machine the needle loops in said courses of the high heel sections and the sinker loops in said courses of the sole sections; laying yarns simultaneously in opposite directions on the needles supporting the needle loops in said courses of the high heel sections and knitting heel tabs as continuations thereof; and after the knitting of the following heel tab courses from the yarns laid in directions away from each other, successively transferring the supported sinker loops in said courses of the sole sections for interknitting into the inner selvedge edges of the heel tabs.

12. The method of manufacturing stockings, which consists in knitting the leg section, the

high heel sections, the instep section, the sole sections, and the toe section of a stocking as a continuous unitary fabric; separating the last course of each of the high heel sections from the first course of each of the sole sections; supporting in alignment on the bank of needles of a knitting machine the needle loops in said course of the high heel sections and the sinker loops in said courses of the sole sections; laying yarns simultaneously in opposite directions on the needles supporting the needle loops in said courses of the high heel sections and knitting heel tabs as continuations thereof; after the knitting of the following heel tab courses from the yarns laid in directions away from each other, successively transferring the supported sinker loops in said courses of the sole sections for interknitting into the inner selvedge edges of the heel tabs; and narrowing certain of the heel tab courses to shape the heel tabs.

13. The method of knitting a full-fashioned stocking, which consists in knitting the leg section, the instep section, the sole sections, and the toe section of the stocking as a continuous unitary fabric; separating the sole sections from the adjoining portions of the leg section; knitting from yarns laid simultaneously in opposite directions courses of the heel tabs as knitted continuations of the separated portions of the leg section; and interknitting in overlapping relation loops of the heel tabs along one edge thereof, and loops of the sole sections to form a connection between the heel tabs and the sole sections as the knitting of the courses of the heel tabs progresses.

14. The method of knitting a full-fashioned stocking, which consists in knitting the leg section, instep section, sole sections, and toe section of the stocking as a contiguous unitary fabric; cutting the sole sections from the adjoining portions of the leg section; knitting heel tabs from yarns simultaneously laid in opposite directions as continuations of the cut portions of the leg section; and interknitting in overlapping relation the selvedge loops of one of the selvedge edges of each heel tab with a course of loops of the corresponding cut sole portion to form a connection therebetween as the knitting of heel tabs progresses.

15. The method of knitting a stocking, which consists in knitting the leg section and foot section of the stocking as a contiguous unitary fabric; separating portions of the leg section from portions of the foot section; knitting courses from yarns laid in opposite directions to provide heel tabs as a continuation of certain of the separated portions; and interconnecting the heel tabs and the remaining separated portions by interknitting in overlapping relation loops of the heel tabs and loops of the remaining separated portions as the knitting of the courses of said heel tabs progresses.

16. The method of manufacturing a stocking comprising: knitting a combined leg fabric and foot fabric blank; separating at least two portions of the leg fabric from at least two portions of the foot fabric; simultaneously laying at least two yarns in opposite directions and knitting courses therefrom to the two portions of one of said fabrics; and, during the knitting of said courses, interknitting the same with the two portions of the other of said fabrics.

17. The method of manufacturing a stocking comprising: knitting a combined leg fabric and foot fabric blank having a set of high heel portions and a set of sole portions; separating the set of high heel portions from the set of sole portions; simultaneously laying yarns in opposite directions and knitting courses therefrom as continuations of the portions of one of said sets; and, during the knitting of said courses, interknitting the same with the portions of the other of said sets.

18. The method of knitting heel tabs into the leg and foot fabrics of a combination stocking blank, which comprises: simultaneously laying yarns in opposite directions; simultaneously knitting a course of one heel tab in continuation of a portion of the leg fabric from the yarn laid in one direction, and a course of the other heel tab in continuation of another portion of the leg fabric from the yarn laid in the other direction; repeating said laying of yarns and said knitting of such heel tab courses throughout the formation of the heel tabs; and, during the repeated knitting of such courses, interknitting the same with the adjoining portions of the foot fabric.

19. The method of knitting heel tabs into the high heel portions and sole portions of a combination stocking blank, which comprises: simultaneously laying yarns in opposite directions; simultaneously knitting a course of one heel tab in continuation of one high heel portion from the yarn laid in one direction, and a course of the other heel tab in continuation of the other high heel portion from the yarn laid in the other direction; repeating said laying of yarns and said knitting of such heel tab courses throughout the formation of the heel tabs; and, during the repeated knitting of such courses, interknitting the same with the adjoining sole portions.

20. The method of knitting heel portions into portions of the leg and foot fabrics of a combination stocking blank, which comprises: knitting coursewise aligned courses of the heel portions from yarn laid in opposite directions onto said portions of the leg fabric and, during the knitting of said courses, interknitting the inner edge of said heel portions into the adjoining portions of the foot fabric.

21. The method of knitting heel portions into a combination foot and leg stocking blank having the foot fabric knitted onto the leg fabric, which comprises: separating those portions of the last course of the leg fabric from those portions of the first course of the foot fabric to which the heel portions are to be knitted; knitting from yarns laid in opposite directions heel courses into said course portions of the leg fabric and, during the knitting of the following heel courses, successively knitting loops of said course portions of the foot fabric into the inner selvedge edges of the heel portions.

22. The method of knitting a stocking, which consists in knitting the leg section and the foot section of the stocking as a continuous unitary fabric; separating portions of the leg section from portions of the foot section; knitting from yarns simultaneously laid in opposite directions courses of the heel tabs as a continuation of the separated portions of the leg section; and interknitting in overlapping relation loops of the heel tabs and loops of the separated portions of the foot section to form a connection therebetween as the knitting of the courses of said heel tabs progresses.

23. The method of knitting a stocking blank, which consists in knitting leg fabric portions, knitting sole fabric portions, and then knitting from yarns laid simultaneously in opposite directions

two groups of succeeding courses of loops to fabricate heel tabs as continuations of the portions of one of said mentioned fabrics, and interknitting a row of loops of each heel tab in overlapping relation with a row of loops in the portions of the other fabric.

24. The method of knitting heel tabs into portions of the leg and foot fabrics of a combination stocking blank, which comprises: knitting coursewise aligned courses of the heel tabs from yarns laid in opposite directions onto the portions of the leg fabric and, during the knitting of said courses, interknitting needle loops of the inner edge of the heel tabs with sinker loops of the portions of the foot fabric.

25. The method of knitting heel tabs into portions of the leg and foot fabrics of a combination stocking blank which comprises: knitting coursewise aligned courses of the heel tabs from yarns laid in opposite directions onto the portions of the leg fabric and, during the knitting of said courses, interlooping needle loops of the heel tabs with sinker loops in the portions of the foot fabric to provide a connection between said heel tabs and adjoining portions of the foot fabric.

FRITZ LAMBACH.