Nov. 24, 1931. J. M. BOTTS 1,833,705

FULL FASHIONED HOSIERY

Filed Sept. 12, 1931

Fig. 1.

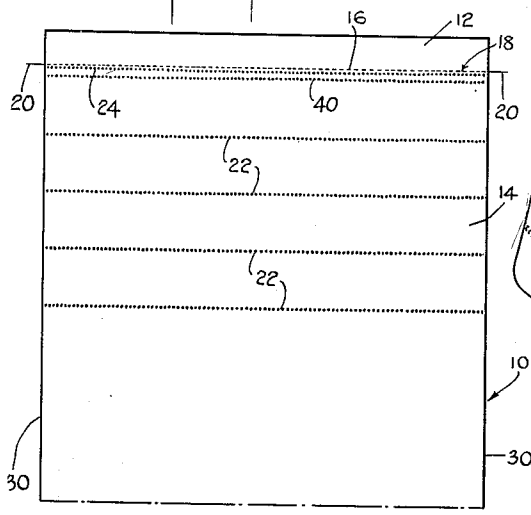


Fig. 2.

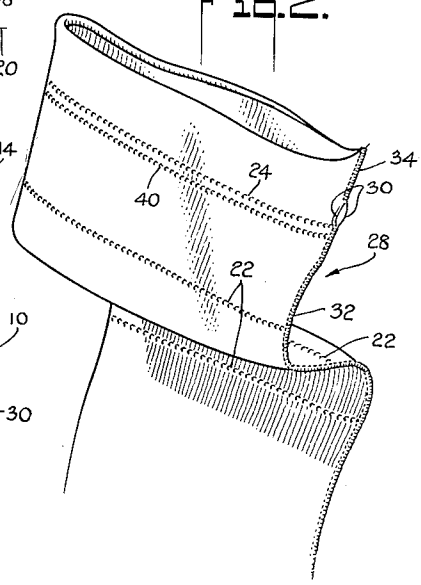


Fig. 3.

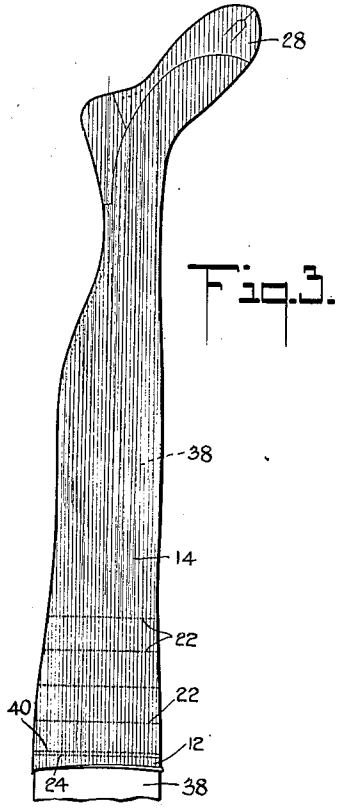


Fig. 4.

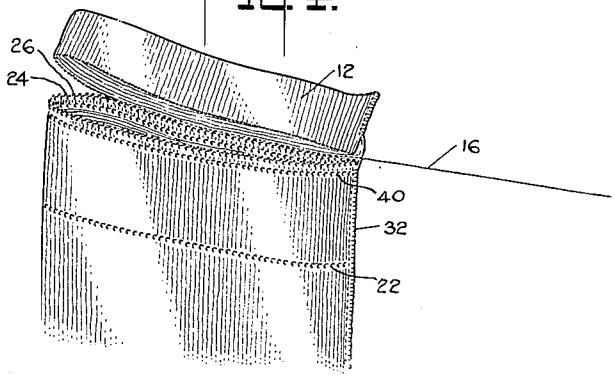
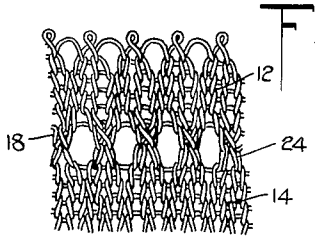


Fig. 5.



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UNITED STATES PATENT OFFICE

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FULL-FASHIONED HOSIERY

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This invention relates to weltless, full-fashioned hosiery and to a method of manufacture therefor.

Customarily, in the manufacture of full-fashioned hosiery on a flat-bed machine, the first loops formed are engaged upon the needles of a welt bar, as the bar designed to place the loops in tension and remove the first fabric portions, as formed, from the knitting needles, is known. After a segment of appreciable extent has been knitted in this manner, the loops caught upon the needles of the welt bar are transferred from these needles directly to the needles of the machine, the welt bar is removed, and the fabric is engaged by other means to place it in tension; knitting is begun again, and the loops of the folded-over portion are interknitted with the single layer fabric thereafter produced. As can be realized from this short description, manufacture of stockings in this manner involves a considerable time loss for the transfer of the loops from the welt bar to the knitting needles, requiring a complete halt in the knitting operation during the transfer.

A knitting machine, as is well known, consists of a large number of individual sections, each knitting a stocking strip and all the sections being driven directly by the same shaft, and all operated by the same controls. In other words, when a machine is shut down for the transfer of these loops, it is shut down to account not for one stocking only, but in practically all cases, for ten to twenty stockings. During the complete transfer time, this very expensive machinery remains unproductive. Also, the transference of the loops involves highly skilled labor, since the tiny individual loops must, with precision, be removed quickly from the welt bar needles and be placed upon the knitting needles.

Such method of manufacture produces a stocking which has two layers of material disposed at that portion which, in use, is required to stretch the most, that is, the thigh portion. The double layer construction of this portion, in addition to the additional material required and the necessarily greater time for its production, is responsible for materially reduced elasticity at this portion of the stocking. Attempts have been made to compensate for this loss of elasticity, as, for instance, by loosening the loops, that is, by adjusting the tension of the thread as it is knitted. This again requires a halt in the knitting operation to effect the necessary adjustments and is, at best, a makeshift, not being capable of producing satisfactorily the desired refinement of texture. The texture of the welt, in such stockings, because of its double-over form, is always coarser than that of the body of the stocking, even though a finer thread be used to compensate, in part, for the additional thickness.

To eliminate these material defects in present stocking construction, it is an object of the invention to provide a full-fashioned stocking, the fabric for which is knitted upon a flat-bed machine, the stocking produced having no welt, as that term has become commonly known in the art and trade. This stocking, by its method of manufacture, is necessarily of single fabric thickness throughout. Its upper free edge, in all cases, will be locked against unravelling by inherent characteristics of its knitted structure, to give ornamental effects impossible of production in ordinary full-fashioned hosiery.

It is an object of the invention to provide a stocking of the character indicated, the production of which involves the use of an additional section of material, intended to be discarded when the stocking is ready for sale. This section, however, makes possible the formation of certain ornamental effects not capable of production in the knitting of ordinary full-fashioned hosiery, and also provides a safeguard for such edge during the processing of the stocking to determine its shaping.

For the purpose of this invention, a fabric is knitted upon the customary flat-bed machine, producing a flat section the width of which is reduced, as required, for the purpose of fashioning to the shape of the leg the stocking finally produced therefrom. In knitting the fabric, first a thread of low value, such as cotton or the like, is used.

After knitting a number of courses with this thread, the thread used is changed to what will be termed herein finish thread, that is, thread of the type necessary to give to the stocking its desired sheen or appearance. The thread, therefore, would be any desired textile thread such as silk, artificial silk or the like, customarily used in the manufacture of stockings. This final thread may be continued to the full extent of the rest of the fabric, or other steps in the knitting of such fabrics, customarily followed, may be carried out. In one embodiment of the invention, there is inserted between the portion knitted of cheap thread and the portion of finish thread, a single loose course of any thread, preferably silk; this course is interlooped between the last course of cheap thread and the first course of finish thread. The fabric may then be formed into a stocking and be completely processed as, for instance, by dyeing, shaping or like steps, after which the single free course may be removed, the courses of cheap thread then, as a unit, separating and leaving the stocking free of anything but the finish thread. The additional course may be eliminated and the cheap thread merely unravelled, after the stocking has been processed. To lock the free edge loops of the stocking, in this particular case, the first course of finish thread is knitted as picot or like self-locking loops so that, on removal of the loose course or after unravelling the ravel-off, an edge, defined by these self-locking loops, will be presented to view.

For the attainment of these objects and of such other objects as may hereinafter appear or be pointed out, I have illustrated an embodiment of my invention in the drawings wherein:—

Fig. 1 is a plan view of a fabric embodying the invention and illustrating the use of the loose course;

Fig. 2 is a view in perspective, illustrating the stocking fabric closed and seamed, except at the loose course and adjacent courses, so that the fabric may be processed;

Fig. 3 is an elevational view, illustrating the arrangement of the fabric in an intermediate stage of processing;

Fig. 4 is a perspective view, illustrating an intermediate stage of the removal of the ravel-off material by using the loose course; and

Fig. 5 is an elevational view of a portion of the fabric, indicating the interlocking of the loose course with the top course of finish thread.

In the manufacture of stockings in accordance with this invention, a fabric 10 is knitted upon the customary flat-bed machine having the usual narrowing means for producing reduction in the width of the fabric necessary to fashion the product to the shaping of a leg. Such machines, as is well-known, are of fixed gauge for any knitting operation, that is, the arrangement of the needles in the needle bar is the same throughout the operation of the machine. In knitting this fabric, it is essential that two distinct sections 12 and 14 be formed as parts of the fabric. Section 12 may be knitted from any thread, preferably, however, a cheap one, such as cotton, which may be discarded without any appreciable loss. A number of courses, sufficient in number to permit obtaining a hold upon, and to grasp the stocking thereby, for purposes to appear further in this description, are first knitted with this thread. After this section has been completed, there follows the step of knitting section 14 and securing it to ravel-off section 12 by interknitting the loops of the last and first courses, respectively, of these two sections.

However, in one modification of the invention, as illustrated in Fig. 1, before the knitting of section 14 is commenced, there is interknitted with the last course of ravel-off section 12, a thread 16 to provide a loose course 18. Then the thread of section 14 is introduced, the loose thread 16 being terminated immediately after knitting course 18 and the ends 20 of this thread left extending beyond the fabric. The knitting of section 14 may be continued. Courses 22 of picot or similar ornamental loops, preferably having the effect of interposing a locking stitch such as the picot, to prevent the spreading of the loops when a "run" extends up to any such course, may be introduced into this section in any well-known manner.

As a preferable form of the invention, the first course of finish thread introduced into section 14 is knitted as a picot course 24, that is, having a type of loop which is laterally displaced and interlocked to make such course self-locking and non-ravelling. Therefore, in the final product, after section 12 has been separated from section 14, the top free edge 26 of the stocking will be determined by a non-ravelling course.

After the fabric has been completely knitted, it is removed from the machine and folded over in the customary manner to provide a tubular member 28. The adjacent edges 30 are then seamed together, as at 32, preferably by starting at the first course of ravel-off section 12, and continuing the operation down along the seam. When the seaming apparatus approaches the first course of finish thread in section 14, it is preferable to jump the apparatus over this course. In fact, a number of courses above the first course of finish thread may be left free, and especially, the course 18 where such is embodied into the stocking. Where ravel-off section 12 is to be separated by unravelling the thread thereof, portion 34 of seam

32 will not be sewed together, but the seaming operation will commence immediately below the first course in section 14. Where picot course 24 is provided, the seaming apparatus will be jumped over this course in the same manner as for course 18.

The seaming having been finished, the stocking may now be subjected to dyeing or like processing, during which the free edge 26 to be produced will remain protected by ravel-off section 12. In a preferred embodiment of the invention, member 28, while wet either from dyeing or by moistening, is placed upon a board 38 to be pressed into shape. While on board 38, the member is brought to complete dryness so that it will assume the desired flat condition, and so remain thereafter.

It is to be noted that if section 12 were removed before this step in the process, the top free edge of the final product might not be flat in appearance, but might have a sharp tendency to curl. This tendency may be taken advantage of in those cases where rolling the stockings is desired, but in such cases where a fine finished product having no curling tendency is desired, section 12, by its continuance with section 14 through the steps of boarding and up to the final step of packaging, assures a fine flat article.

After the member has been removed from the board, its upper edge is determined either by unravelling ravel-off section 12 or by grasping one of the ends 20 and removing the loose course 18. In the latter case, the entire ravel-off section 12 will be separated as a unit from section 14. In either case, a free edge will be presented which is finished and incapable of unravelling.

With the removal of the ravel-off material, it is now only necessary to stitch up the one or more courses left free during the seaming operation. This is quickly done, and the stocking is then ready for packaging. The stitching of these end loops, to a substantial degree, interposes a positive stop preventing unravelling of the thread of the free edge.

By this invention, there is produced a stocking, the cost of manufacture of which is low compared with customary full-fashioned hosiery, both because of the reduction in material and time consumed in the actual knitting of the fabric, and since no cessation of operation is necessary during its production. The knitting of the fabric, once commenced, is continued without any interruption, except such as may be necessary for change of thread, which, as is well-known, takes but a moment. Also, the stocking is made just as elastic at the upper extremity, where elasticity is necessary, as in the rest of the stocking, and, in fact, appreciably more elastic. Furthermore, the texture of the stocking may be the same throughout since there is no definite welt requiring adjustment of looseness of courses or other features. Finally, extreme elasticity is given to the top edge of the stocking by its inherent construction.

However, I have found that, by making the picot courses 24 and 40 of slightly heavier thread, body is given to these courses to withstand the tensile stresses to which they are subjected in use. I have found the conjunction of two spaced apart picot courses at the upper free edge of the stocking, such as the courses 24 and 40, to be conducive to great elasticity of the edge, while providing a substantial and strong selvage.

Many other changes could be effected in the particular article of manufacture designed, and in the methods of operation set forth, and in the specific steps or details thereof, without substantially departing from the invention intended to be defined in the claims, the specific description hereinabove being merely to illustrate an operative embodiment of the spirit of the invention.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

1. A full-fashioned stocking including leg and top portions, consisting of a continuous single layer flat fashioned fabric blank, knitted other than as rib knit, and made on a flat-bed machine, folded and united along its edges to form the leg and top portions and to leave the top portion with a free edge of single layer construction, said edge being bound against unravelling by laterally displaced and interlocked loops.

2. A full-fashioned stocking of predetermined fixed length, including leg and top portions consisting of a continuous single layer flat fashioned fabric blank, all made on the same flat-bed machine of fixed gauge and all knitted other than as rib knit, folded and united along its edges to form the leg and top portions and to leave the top portion with a free edge of single layer construction, said edge being bound against unravelling by laterally displaced and interlocked loops.

In witness whereof I have hereunto signed my name.

JOHN M. BOTTS.