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W. J. FOX

2,083,904

SURGICAL APPLIANCE

Filed May 11, 1935

Fig. 1.

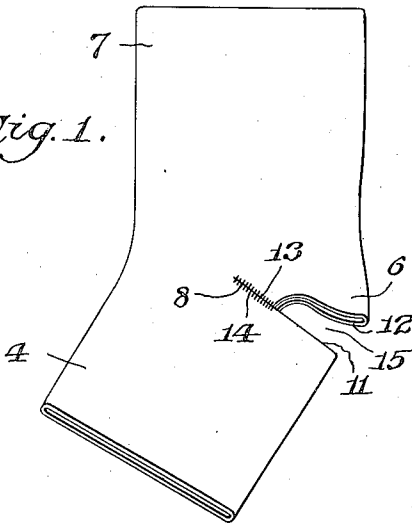


Fig. 2.

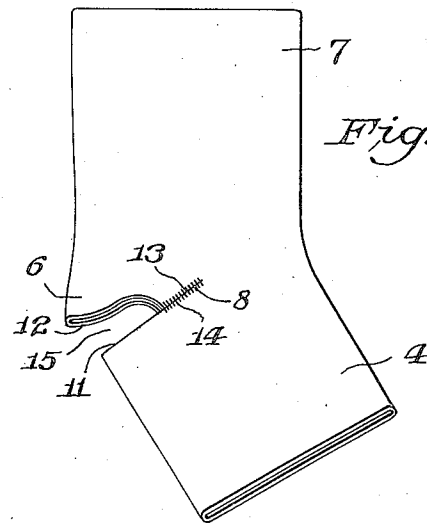


Fig. 4.

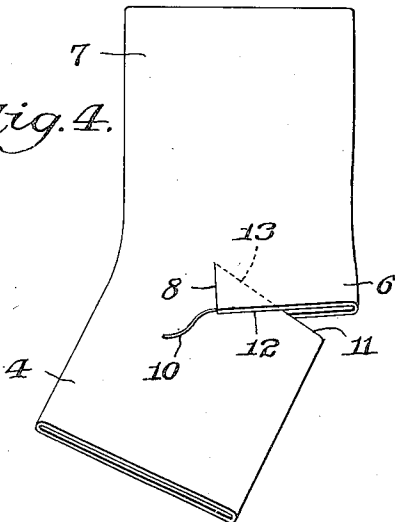


Fig. 5.

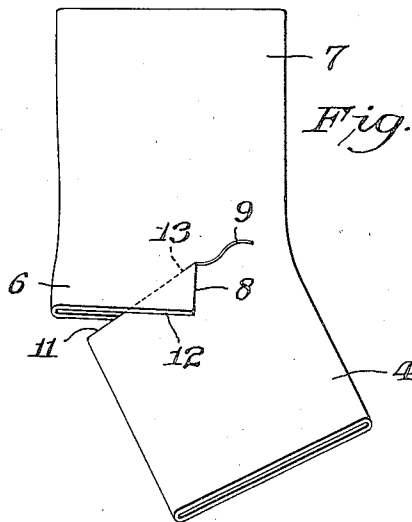


Fig. 3.

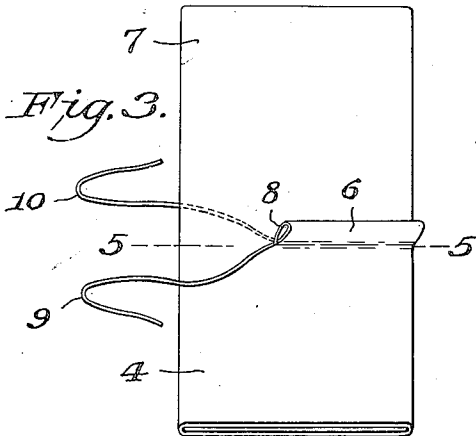
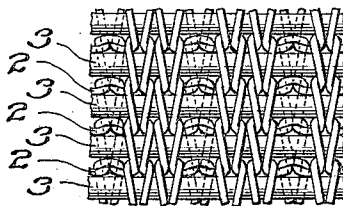


Fig. 6.



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UNITED STATES PATENT OFFICE

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SURGICAL APPLIANCE

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Application May 11, 1935, Serial No. 20,937

3 Claims. (Cl. 66—178)

This invention relates to improvements in surgical appliances and the art or method of producing the same.

The particular appliance to which the invention relates is formed of knit fabric and comprises a leg section and a foot section and has a heel opening in the rearward portion thereof between the sections; and it is designed to be worn upon the foot and leg of a person suffering from varicose veins and other infirmities requiring surgical treatment.

An object of the invention is to provide an appliance of this character which can be produced on a circular knitting machine having cylinder and dial needles and in which the number of seams heretofore present therein shall be reduced.

Another object is to simplify the construction and reduce the cost of such appliances having leg and foot sections formed of seamless, tubular knit fabric.

Another object is to provide an appliance which will readily conform to the parts of the foot and leg and ankle of the patient wearing the same, particularly in the region of the union between the leg and foot sections of the appliance.

A further object is to provide an appliance of novel construction whereby advantages are gained both in the manufacture and in the use thereof.

The invention resides in the novel construction and arrangement of the parts of the appliance, and also in the novel art or method of producing the same as will be hereinafter described and claimed.

In the accompanying drawing, illustrating the invention,

Figure 1 is a view of one side of my improved appliance in a flattened condition.

Figure 2 is a similar view of the opposite side thereof.

Figure 3 is a view of one side of a seamless tube of knit fabric constituting the blank from which my improved appliance is formed, showing the same in a flattened condition.

Figure 4 is a view of the same side of the blank shown in Fig. 3, showing the condition thereof after a transverse cut has been made therein and a bend has been formed therein in the process of constructing the appliance.

Figure 5 is a view similar to Fig. 4, showing the opposite side of the blank.

Figure 6 is a front view of a piece of the knit fabric forming the body of the blank and the finished appliance.

In constructing my improved appliance, as

shown in Figs. 1 and 2, I first produce the blank of seamless tubular fabric shown in Fig. 3. This blank is produced on a circular knitting machine having cylinder and dial needles. The operation of such machine to produce a seamless tube of fabric of the character illustrated in Fig. 6 is well known in this art. This fabric comprises successive circular courses of thread stitches which form continuations of one another and which have inlaid therein an elastic strand of any approved construction such, for example, as the strand shown and described in detail in Letters Patent 1,864,345, dated June 21, 1932, the strand being fed to the needles and being inlaid in the stitches simultaneously with the formation thereof, in the usual manner.

The fabric herein illustrated is produced on a machine having pairs of cylinder needles alternating with single dial needles. It will be readily understood, however, that the appliance can be produced on a machine having single cylinder needles alternating with single dial needles, or on a machine having any other suitable arrangement of needles.

In producing the blank shown in Fig. 3, the knitting proceeds from the lower end to the upper end thereof, and, first, the lower end portion 4 of the blank, below the line 5—5, is produced by continuous circular knitting. After the lower portion 4 has been produced, the carriers for the knitting cams are reciprocated or oscillated and the needles are actuated for to and fro knitting and a longitudinal extension 6, continuous with a part of the lower portion 4 of the blank is thereby produced. The elastic strand 3 is omitted from the stitches 2 of the extension 6 at the beginning of the production thereof for three or more courses of stitches, and thereafter the elastic strand is included in the fabric, so that the character of the fabric of the extension 6 is the same as that of the tubular portion 4, excepting that the elastic strand is absent from the fabric for several courses of stitches in the region of the union of the extension 6 with the tubular portion 4, for a purpose presently appearing. After the completion of the knitting of the extension 6, the circular knitting is resumed at the line 5—5 and continued until the upper end portion 7 of the blank has been produced.

It will now be understood that the extension 6 in the blank is provided with lateral selvedge edges at the respective sides of the blank, as indicated at 8 in Fig. 3, due to the to and fro knitting during the formation thereof.

The elastic strand fed to the needles during

the formation of the blank shown in Fig. 3 is cut between the point where its delivery to the needles is stopped for the production of the three or more courses of stitches which have no elastic strand inlaid therein, at the beginning of the formation of the extension 6 and the point where its delivery to needles is resumed after the production of such courses of stitches; and the strand is cut and related to the needles and the fabric blank being produced thereby so as to leave a length 9 of the strand extending from the blank at one side of the extension 6 at the point of completion of the lower portion 4 of the blank, and so as to leave a length 10 of the strand extending from the blank at the opposite side of the extension 6 at the point where the inclusion of the strand in the fabric of the extension begins.

In producing the finished blank illustrated in Fig. 1, the upper and lower edges of the upper and lower portions 7 and 4, respectively, are finished in a manner to prevent raveling in accordance with the usual practice in making tubular parts having the characteristics of the portions 7 and 4.

After the blank has been completed, as shown in Fig. 3, the adjacent parts of the fabric thereof in the region of the union of the lower end portion of the extension 6 with the lower tubular portion 4 are separated by cutting or raveling or both through the central portion of the courses of stitches which do not have the elastic strand inlaid therein, leaving an edge 11 at the upper end of the lower section 4 and an edge 12 at the lower end of the extension 6, respectively, produced by the separation thereof, as shown in Figs. 4 and 5. In order that these edges 11 and 12 shall be properly finished, the elastic strand lengths 9 and 10 are threaded through the loops of the courses of stitches which do not have the elastic strand inlaid therein and which form the edges 11 and 12, respectively, and such threading of the strand lengths 9 and 10 may be done either before or after the separation of the extension 6 and the lower tubular portion 4. The strand lengths 9 and 10 are threaded through the loops of the courses of stitches in accordance with the usual practice in this art of finishing the edges of fabric of the character herein illustrated.

After the strand lengths 9 and 10 have been threaded through the loops of the stitches, as just described, a portion of the strand length 9 is left projecting from one end of the edge 11 at one side of the blank, and a portion of the strand length 10 is left projecting from one end of the edge 12 at the opposite side of the blank, as shown in Figs. 5 and 4, respectively.

Following the operation on the blank thus far described, the respective lateral selvage edges 8 of the extension 6 are brought into registry with the respective end portions 13 of the finished upper edge 11 of the lower tubular portion 4 and sewed or secured thereto by suitable stitches 14, thus completing my improved appliance, as illustrated in Figs. 1 and 2.

The end portion 9 of the elastic strand extending from one end of the edge 11 of the blank, as shown in Fig. 5, is folded back into registry with and is enclosed by and secured within the stitches 14 which secure one of the selvage edges 8 of the extension 6 to the adjacent portion 13 of the edge 11 of the lower tubular portion 4; and the end portion 10 of the elastic strand extending from one end of the edge 12 of the

blank, as shown in Fig. 4, is folded back into registry with and is enclosed by and secured within the stitches 14 which secure the other of the selvage edges 8 of the extension 6 to the adjacent portion 13 of the edge 11 of the lower tubular portion 4. Thus the end portions 9 and 10 of the elastic strand are secured within the fabric of the appliance for the prevention of raveling and the prevention of the protrusion of unconfined ends of the strand.

In the finished appliance, as illustrated in Figs. 1 and 2, the upper tubular portion 7 constitutes the leg section of the appliance, the lower tubular portion 4 constitutes the foot section of the appliance and the exposed lower edge 12 of the extension 6 and the exposed portion of the edge 11 of the lower tubular portion 4 provide the heel receiving opening 15 thereof.

The attachment of the selvage edges 8 of the blank to the end portions 13 of the edge 11 thereof produces a pronounced bend in the fabric of the appliance forwardly of the heel opening 15 and in the region of the union of the upper and lower tubular portions 7 and 4, respectively, to enable the appliance readily to conform to the heel and ankle and adjacent parts of the leg and foot of the wearer; and the desired downward continuation of the rearward portion of the upper tubular portion 7 well below the union of the upper and lower tubular portions 7 and 4 in the forward part of the appliance, as provided by the extension 6, further enhances the adaptability of the entire appliance to the contour of the parts of the wearer.

In the finished appliance, the fabric thereof is continuous without change of character through the union of the leg and foot sections 7 and 4, respectively, thereof at the forward part of the appliance and through the union of the leg section 7 with the extension 6 thereof at the rearward part of the appliance, and that the appliance is wholly without seams excepting the two short seams which unite the lateral edges of the extension 8 with the end portions 13 of the edge 11 of the foot section 4.

I claim:

1. A knit surgical appliance comprising two seamless tubular portions integrally connected by continuous knitting throughout a part of the circumference thereof, one of said tubular portions having a longitudinal extension integrally connected thereto by continuous knitting and extending therefrom between said portions and being provided with lateral selvage edges, and means connecting said lateral edges to adjacent edge portions of the other of said tubular portions, said tubular portions and said extension having an elastic strand confined within the knit fabric between stitches thereof and said strand having return bends at said selvage edges.

2. A knit surgical appliance comprising two seamless tubular portions integrally connected by continuous knitting throughout a part of the circumference thereof, one of said tubular portions having a longitudinal extension integrally connected thereto by continuous knitting and extending therefrom between said portions and being provided with lateral selvage edges, and means connecting said lateral edges to adjacent edge portions of the other of said tubular portions, said tubular portions and said extension having elastic strands confined within the knit fabric between stitches thereof, and said extension and one of said tubular portions having adjacent free edge portions one of which has

an anti-raveling elastic strand extending through the stitches thereof.

3. A knit surgical appliance comprising two seamless tubular portions integrally connected
5 by continuous knitting throughout a part of the circumference thereof, one of said tubular portions having a longitudinal extension integrally connected thereto by continuous knitting and extending therefrom between said portions and
10 being provided with lateral selvage edges, and

means connecting said lateral edges to adjacent edge portions of the other of said tubular portions, said tubular portions and said extension having an elastic strand confined within the knit fabric between stitches thereof, said strand
5 extending in continuous circumferential courses through said tubular portions and in to and fro courses in said extension, and said strand having return bends at said selvage edges.

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