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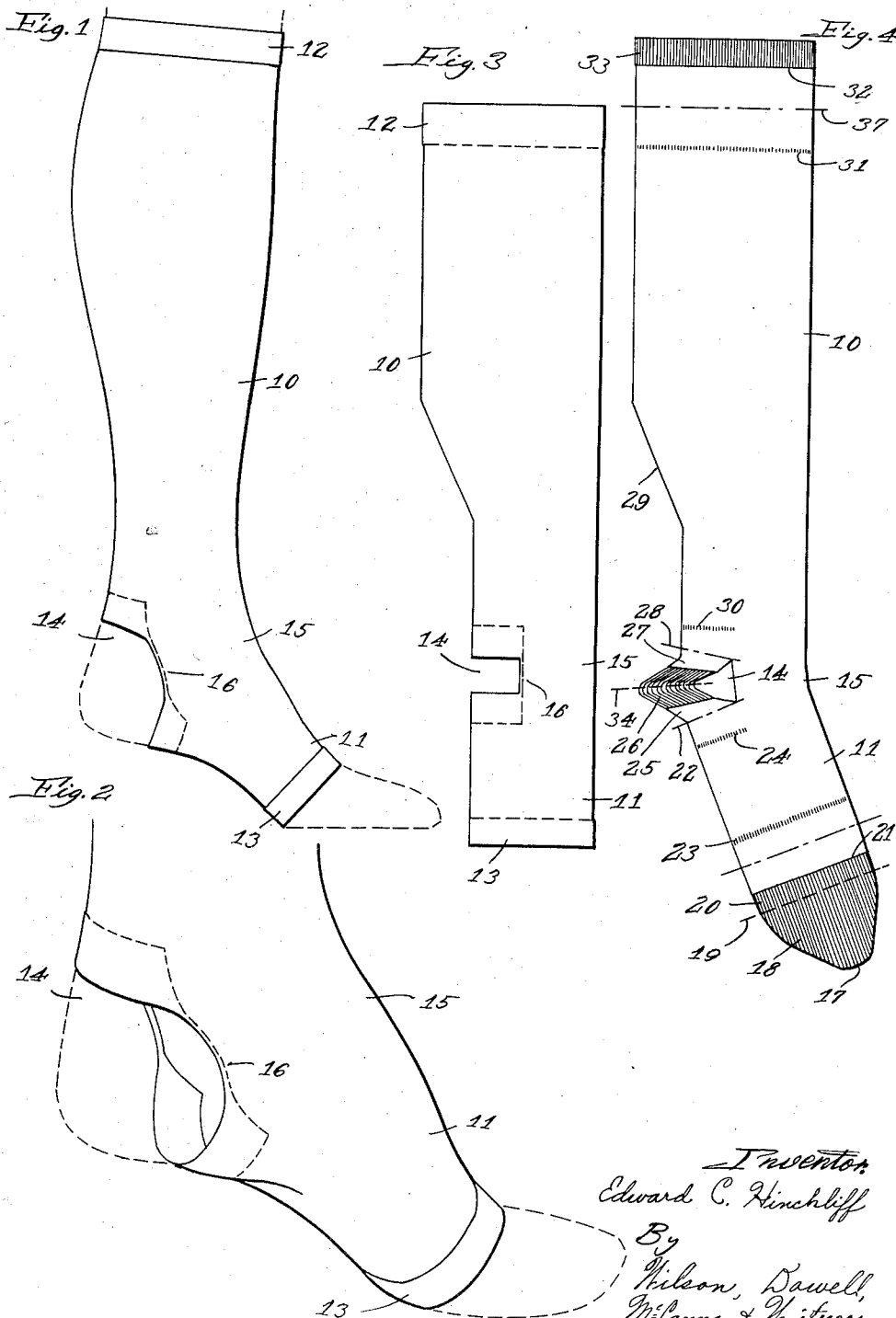
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SURGICAL STOCKING HEEL CONSTRUCTION

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2 Sheets-Sheet 1



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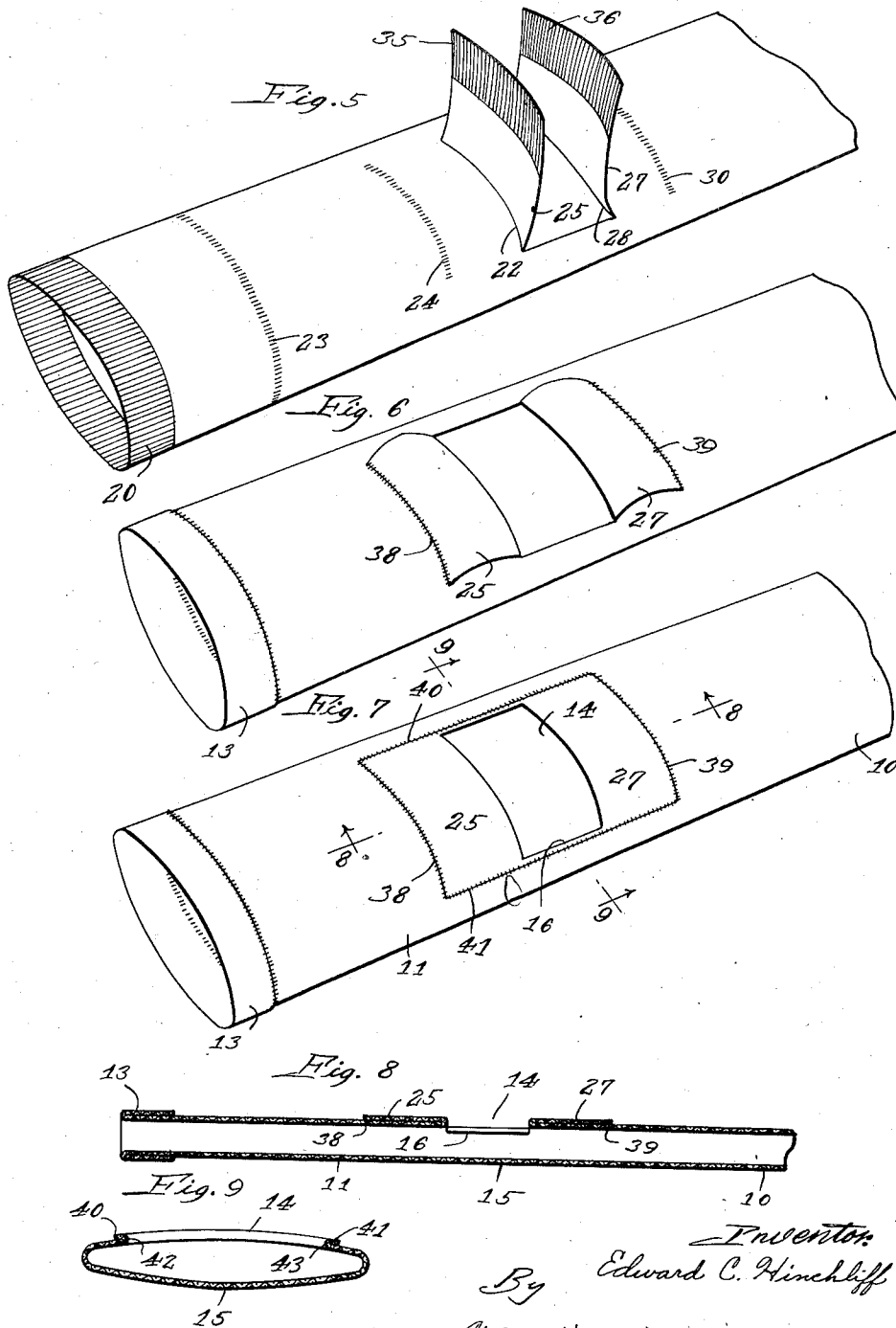
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SURGICAL STOCKING HEEL CONSTRUCTION

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UNITED STATES PATENT OFFICE

1,968,832

SURGICAL STOCKING HEEL CONSTRUCTION

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Application January 7, 1933, Serial No. 650,712

12 Claims. (Cl. 2—239)

This invention relates to a new and improved surgical stocking.

Surgical stockings of the type intended to be worn under ordinary stockings are knit without toe and heel. Where an ordinary V-shaped heel opening is provided there is too much likelihood of wrinkling across the instep, to the discomfort of the wearer, and also a tendency to place destructive strain upon the fabric across the inner end of the opening. It is, therefore, the object of my invention to provide a stocking having an improved heel construction. In this heel construction the opening is of such a form that wrinkling across the instep is avoided and strain of the fabric at the inner end of the opening is materially reduced, the opening being furthermore reinforced on all sides so as to properly take care of what stresses are set up.

The invention will be better understood as reference is made in the following description to the accompanying drawings, wherein—

Figure 1 is a side view showing a stocking made in accordance with my invention, as applied to the leg of a wearer;

Fig. 2 is a perspective view of the lower portion of Figure 1 to better disclose the heel construction and the form it takes on the foot;

Fig. 3 is a view of the stocking removed and laid out flat;

Fig. 4 is a view of the stocking in the first stage of its production, as it comes from the knitting machine;

Figs. 5, 6 and 7 are perspective views of the lower end of the stocking showing three further stages in the production, the stocking being turned inside out in each of these views, which is incidental to working upon it, Fig. 7 showing the finished form prior to turning the stocking right side out, and

Figs. 8 and 9 are sections on the correspondingly numbered lines of Fig. 7.

The same reference numerals are applied to corresponding parts throughout the views.

Referring first to Figs. 1–3, the stocking of my invention comprises a leg portion 10 and foot portion 11 of any suitable elastic fabric, but preferably one knit throughout of elastic yarn, that is to say, with the elastic yarn used as the stitch forming yarn. The yarn used is preferably like that known as Lastex, which consists of a fine rubber core with a fibrous covering, usually of one or more strands of silk wound helically upon the core. A hem is formed at the top as at 12 and at the bottom as at 13, the stocking being of a type without a toe and intended to

reach up to the knee, and worn under an ordinary stocking, simply for support purposes. The heel is also open, an opening 14 being provided opposite the instep portion 15. It will be observed that instead of the customary V-shaped heel opening, I have provided what may be termed a U-shaped opening, inasmuch as there is a predetermined length of fabric at 16 at the inner end of the opening, between the upper and lower edges of the opening. This shaped opening is of two-fold advantage: It eliminates the tendency for wrinkling across the instep, and avoids the setting up of destructive strains in the fabric across the inner end of the heel opening. The length of fabric at 16 across the inner end of the opening is capable of stretching, easily within the limit of elasticity, to compensate for the angularity of the foot portion 11 relative to the leg portion 10 in the wearing of the stocking, so that there is no danger of tearing. With a V opening, as distinguished from the U opening herein shown, there is no length of fabric across the inner end of the opening to afford the give, and all of the strain comes upon one or two courses of elastic yarn at that point with the result that the fabric tears. Aside from the fact that the U opening prevents destructive strains, it also avoids wrinkling across the instep by affording sufficient give in the regions at opposite sides of the instep, adjacent the inner end of the heel opening, so that the instep portion 15 will lie flat and not bunch up in the crowding of surplus fabric in that area. In the following description of the manufacture of the stocking of my invention, I shall point out in particular how the heel is reinforced on all sides of the heel opening so as to give increased durability.

Referring to Fig. 4, the stocking is knit on a straight, double bank knitting machine starting with a set-up at the lower end at 17 to knit an end extension 18 using cotton or other cheap yarn. This extension is not, of course, to be used as a toe portion, although it is of a similar form, but is used as a place for tensioning rollers to grip the end of the stocking at the beginning of the knitting. In knitting the extension there is widening up to the line 19 for the full width of the foot portion 11. The knitting is continued a short distance beyond the line 19 with the cotton yarn, as indicated at 20, to the line 21 at which point another yarn carrier is thrown in to knit with the elastic yarn. The foot portion 11 is knit by round and round knitting up to the line 22, the carrier for the elastic yarn being thrown out

and the other yarn carrier being thrown in to knit a complete course 23 with cotton yarn and approximately a half course 24 of the same yarn. The courses 23 and 24 are simply marks in the knitting for guidance in subsequent operations where looping operations are involved, as will be described later. The needles for the instep portion 15 are held out and the rest of the needles are used to knit an extension 25 with elastic yarn, a false heel 26 of cotton or other cheap yarn, and another extension 27 similar to the extension 25, which brings us to the line 28 indicated in the drawings. Then the needles for the instep portion 15 are thrown into operation while the other needles are held out, and the instep portion is knitted until the line 28 is reached, whereupon all of the needles are used to knit the leg 10 by round and round knitting. With this construction, I secure selvedge edges at the inner ends of the heel opening 14. Additional needles are thrown in at one end of the bed for the widening at the calf, indicated at 29. An approximately half course 30 of cotton yarn is knit on the ankle to produce a line similar to that appearing at 24, and a complete course 31 of cotton yarn is knit to produce another line near the top similar to the line 23. Knitting with the elastic yarn is carried to the line 32, at which point the other carrier is thrown in and a short extension 33 is knit with the other cheaper in-elastic yarn. The completed stocking blank is then removed from the machine in the form appearing in Fig. 4.

The stocking blank is cut on the lines 19 and 34, to leave only the extension 20 on the toe and to form two tabs 35 and 36 (Fig. 5) from the false heel 26. The stocking is then turned inside out to the form appearing in Fig. 5. The extensions 20 and 33 and the tabs 35 and 36 are intended simply to be used in connection with looping operations at the toe, top, and heel portions, respectively. The top hem 12 is produced in a looping operation on a circular looping machine, the leg being applied to the points of said machine first on the line 31 and the fabric being then folded on the line 37 to permit entering the points on the line 32, whereupon the extension 33 is unraveled and the hem completed, using an elastic yarn for the looping stitches. In a similar manner the hem 13 is produced at the other end of the stocking. This leaves only the heel to be completed.

The first operation in completing the heel consists in placing either the foot or ankle portion on the points of a circular machine on the line 24 or 30, as the case may be, and then folding the extension 25 or 27 so as to enter the points in the end of the extension. The tabs 35 and 36 are unraveled after the extensions have been placed on the points and the looping stitches are made with elastic yarn corresponding to the yarn used in the knitting of the stocking, as indicated at 38 and 39. Elastic yarn is used in these places and also on the hems 12 and 13 so that these parts will give with the rest of the fabric. After the extensions 25 and 27 have been fastened, as appears in Fig. 6, two more looping operations are performed on a circular machine on the lines 40 and 41, using in this case, however, a non-elastic yarn, and preferably a two-strand yarn, in order that as much reinforcement will be built into the stocking at these points as possible. The looping stitches allow for a certain amount of extension so that there will be give along the inner ends of the heel opening in the portion 16,

but the give is positively limited due to the non-elastic yarn, so that no destructive strains can be set up in the elastic fabric in those regions. In other words, the stretching is kept well within the limit of elasticity of the elastic yarn. It will be observed in Fig. 9 that in the looping of the ends of the tabs 25 and 27 the selvedge edges of the fabric at the ends of the opening are doubled as at 42 and 43 so as to make a uniform thickness of fabric on the lines 40 and 41 and materially strengthen the fabric at the inner ends of the opening.

It will appear from the foregoing description that the heel, in accordance with my invention, is reinforced on all sides of the opening but in such a way that the desired amount of give is still present cross the angle, the instep, and across the bottom of the foot. The reinforcement is also incorporated in such a way that those portions where too much stretching is apt to occur have the stretch positively limited by non-elastic yarn, namely, across the inner ends of the heel opening.

I claim:

1. In an elastic surgical stocking knit without a heel so as to provide a substantially rectangular heel opening opposite the instep portion, reinforcements for the elastic fabric of the stocking at the heel opening, comprising elastic means extending across the top and bottom edges of the opening so as to give with the fabric of the instep portion, and non-elastic means extending lengthwise of the edges of the fabric on the opposite sides of the opening to limit the give of the fabric in those regions.

2. In an elastic surgical stocking knit without a heel so as to provide a substantially rectangular heel opening opposite the instep portion, reinforcements for the elastic fabric of the stocking at the heel opening, comprising non-elastic means extending lengthwise of the edges of the fabric on the opposite sides of the opening to limit the give of the fabric in those regions.

3. In an elastic surgical stocking, a leg portion and a foot portion, a heel having an opening, an instep portion opposite the latter, and reinforcements for the elastic fabric of the stocking at the opening, comprising elastic means extending across the top and bottom edges of the opening so as to give with the fabric of the instep portion, and non-elastic means extending across opposite ends of the opening to limit the give of the fabric in those regions.

4. In an elastic surgical stocking, a leg portion and a foot portion, a heel having an opening, an instep portion opposite the latter, and reinforcements for the elastic fabric of the stocking at the opening, comprising non-elastic means extending across opposite ends of the opening to limit the give of the fabric in those regions.

5. In an elastic surgical stocking, a leg portion and a foot portion of elastic fabric, a heel having an opening, the top and bottom edges of which are defined by overlaid fabric stitched in place so as to serve as reinforcements adapted to give with the rest of the fabric, and welts of non-elastic thread sewed to the fabric across opposite ends of the opening and serving as reinforcements adapted to limit the give of the fabric in those regions.

6. In an elastic surgical stocking, a leg portion and a foot portion of elastic fabric, a heel having an opening, the top and bottom edges of which are defined by overlaid fabric stitched in place so as to serve as reinforcements adapted to give with the rest of the fabric, the opening being rectangular-

lar so as to provide substantially parallel ends, the latter being defined by doubled over edges of the fabric stitched in place with welts formed of non-elastic yarn whereby to provide reinforcements adapted to limit the give of the fabric in those regions.

7. In an elastic stocking comprising leg and foot portions of elastic fabric, a heel provided with a four sided opening, the inner edges of the opening being elongated in the direction of the length of the stocking leg.

8. A stocking as set forth in claim 7 including reinforcing welts defining the inner edges of the opening and serving to positively limit stretch of the fabric in a direction parallel to the welts.

9. A stocking as set forth in claim 7 including reinforcing elastic hems defining the top and bottom edges of the opening and adapted to stretch with the adjacent fabric of the leg and foot portions.

10. A stocking as set forth in claim 7 including

extensions from the leg and foot portions of elastic fabric forming reinforcing hems across the top and bottom edges of the opening, the same being fastened so as to give with the elastic fabric of the leg and foot portions, and semi-elastic welts defining the inner edges of the opening on opposite sides of the foot portion, the same being adapted to give only to a predetermined extent so as to limit the give of the elastic fabric in those regions.

11. In an elastic stocking comprising leg and foot portions of elastic fabric, a heel provided with a four sided opening, the inner edges of which are elongated in the direction of the length of the stocking leg and formed by longitudinal wales in the knitting of the stocking.

12. A stocking as set forth in claim 11, wherein the inner edges of the opening are doubled to form reinforcing welts serving to limit stretch of the fabric in a direction parallel to the welts.

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25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150