June 23, 1964 A. R. CROWELL ETAL 3,138,156

STUMP SHRINKER

Filed Dec. 5, 1961 2 Sheets-Sheet 1

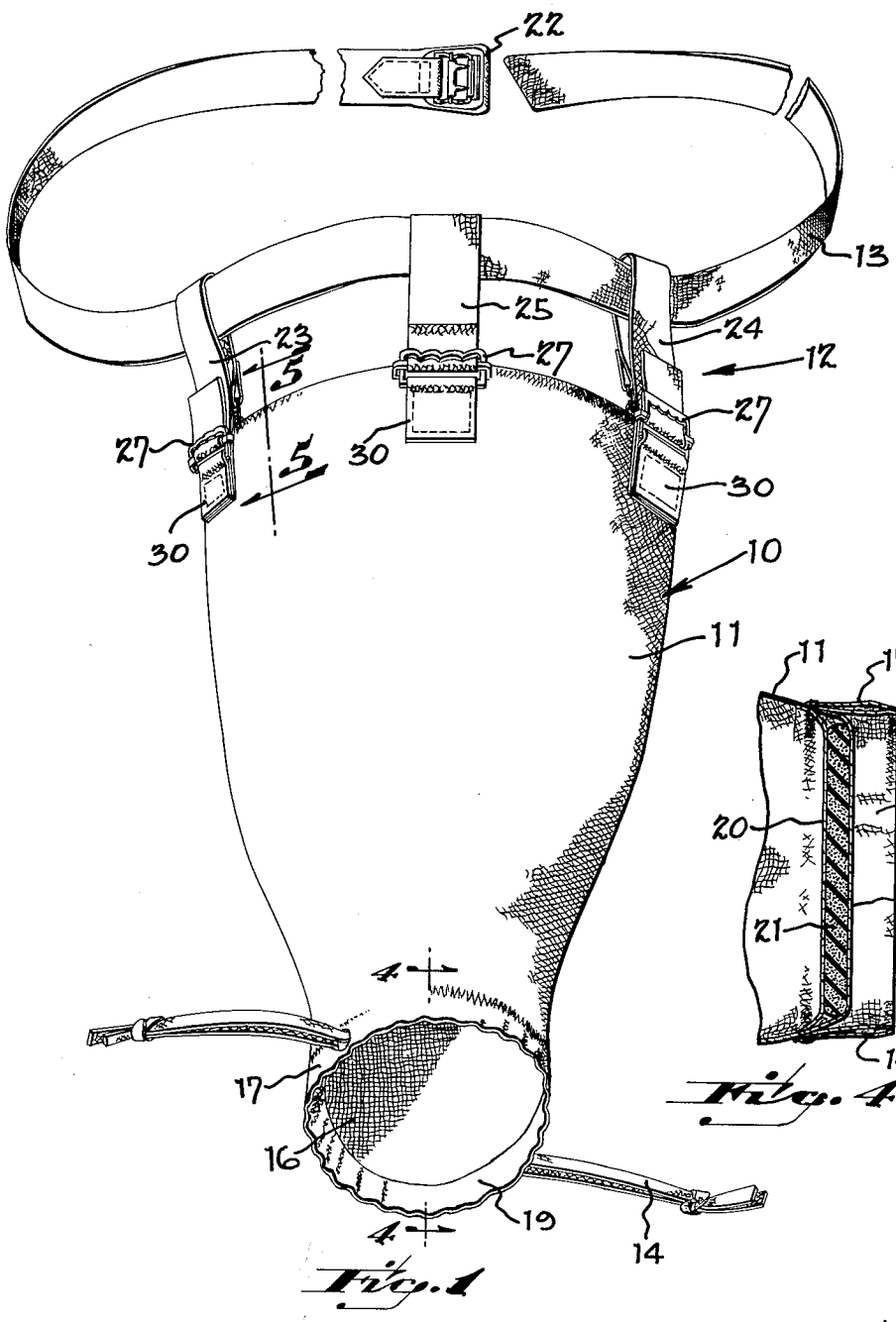


Fig. 1

Fig. 4

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STUMP SHRINKER

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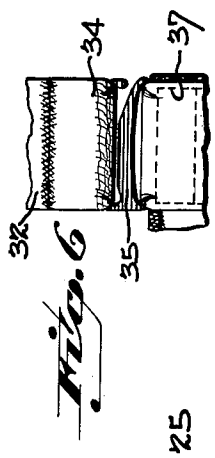


Fig. 6

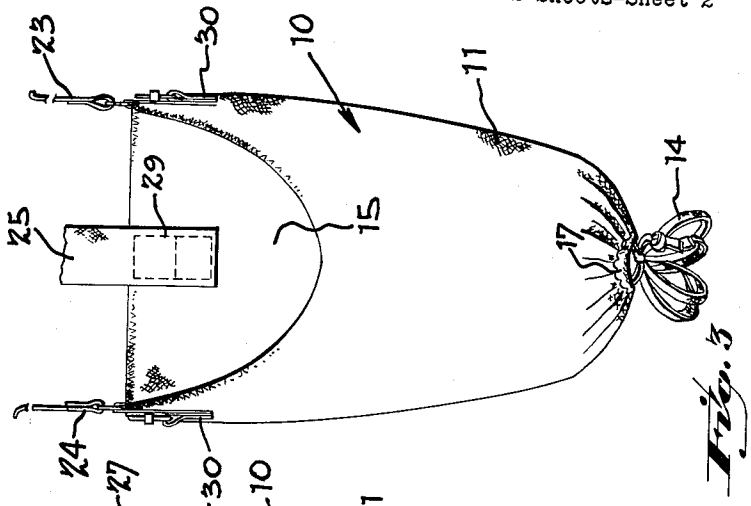


Fig. 3

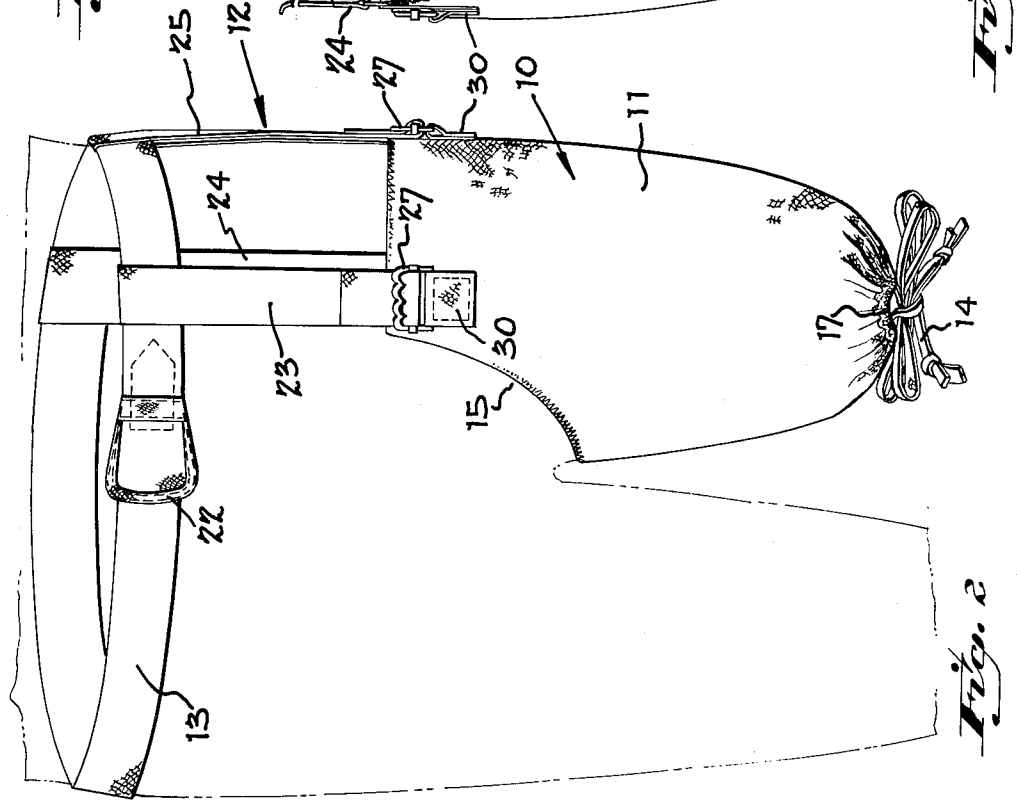


Fig. 2

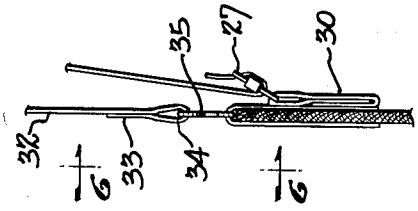


Fig. 5

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STUMP SHRINKER

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5 Claims. (Cl. 128—157)

This invention relates to surgical appliances and is particularly directed to an elastic appliance for amputated limbs.

Following a leg amputation, it is customary for a patient to wear an elastic bandage which surrounds the stump. One intended function of this bandage is to shrink, or reduce the cross sectional size of the stump, to facilitate fitting of a prosthetic appliance or artificial limb. One difficulty which has been encountered with the use of such bandages is that it is almost impossible to obtain an even compression on the limb each time that the bandage must be replaced.

Another frequent source of irritation following amputation among patients wearing these elastic bandages is the presence of an edema, or fluid collection, at the end of the stump. This is particularly troublesome when the patient is being fitted with a prosthetic appliance.

The present invention is predicated in part upon the realization that an edema condition can be alleviated by the provision of an upward pressure against the distal end of the stump and that the failure of conventional bandages to solve this problem is due to the absence of any means for effectively applying an upward pressure to the end of the stump.

The principal object of the present invention is to provide a stump shrinker which is effective both to exert an even circumferential pressure for shrinking the stump of an amputated limb to facilitate fitting of a prosthetic appliance, and in addition to provide an upward pressure upon the distal end of the stump effective to relieve an edemic condition.

More specifically, the present invention is predicated upon the concept of providing a stump shrinker including an elastic sock, or sleeve, having a closed lower end. If the shrinker is to be worn on a leg amputated below the knee or on an arm amputated below the elbow, the elastic sleeve is pulled up until the closed end of the sleeve engages the distal end of the stump. The sleeve is then frictionally held in place with the end of the sleeve exerting a pressure against the stump end. If the sleeve is to be worn on a leg amputated above the knee or an arm amputated above the elbow, the stump shrinker is provided with a harness including a belt and straps attached to the belt and to the upper end of the sleeve. The harness is effective to pull the sleeve upwardly, forcing the end of the sleeve against the distal end of the amputated member.

The present stump shrinker is formed of a stretch knitted fabric so that the sleeve is stretchable circumferentially. Consequently, the horizontal elastic threads in the fabric are inherently effective to exert a circumferential shrinking pressure upon the stump. At the same time, the vertical threads are effective to apply an upward pressure to the lower closed portion of the sleeve. For use on above the knee amputees, the stump shrinker sleeve also is preferably provided with an arcuate cut-out portion along the top inner edge of the sleeve so that the sleeve may be pulled upwardly as far as possible toward the wearer's groin.

One advantage of the present stump shrinker is that it is simple and is readily adjustable to accommodate stumps of various sizes and lengths. Moreover, the device can readily be adjusted to provide the amount of upward pressure desired by each particular patient.

These and other objects and advantages of the present invention will be more readily apparent from a consideration of the following description of a preferred embodiment of the invention.

In the drawings:

FIGURE 1 is a perspective view of a stump shrinker embodying the principles of the present invention with the lower draw string open.

FIGURE 2 is a front elevational view of a stump shrinker.

FIGURE 3 is a left-hand view of the stump shrinker.

FIGURE 4 is a cross sectional view taken along line 4—4 of FIGURE 1.

FIGURE 5 is a cross sectional view taken along line 5—5 of FIGURE 1.

FIGURE 6 is a view taken along line 6—6 of FIGURE 5.

One preferred form of stump shrinker **10** designed to be worn on a leg amputated above the knee comprises an elastic sleeve, or sock member **11**, a harness assembly **12**, including a waist encircling belt **13** for supporting the upper end of the sock member and a draw loop **14** for closing the lower end of the sock.

More particularly, sock **11** is formed of two-way stretch knitted fabric. This fabric has elastic threads running both circumferentially, or horizontally in FIGURE 1, and longitudinally or vertically. Consequently, sleeve **11** is elastically stretchable both in a circumferential direction and in a vertical direction. The upper portion of one side of the sleeve is provided with an arcuate cut-out portion **15** adapted to accommodate the interior portion of the wearer's thigh so that the stocking can be drawn upwardly toward the wearer's groin with the closed lower end of the sleeve tight against the distal end of the stump.

The lower end of the sleeve **11** is tapered slightly and includes an opening **19** which is covered by a transverse piece of lightweight stretchable knit material **16** joined to a lower binding **17**. A second sheet of knit material **20** extends across opening **19** to provide a pocket for receiving a thin pad **21** formed of sponge rubber or the like. This pad provides a closure for the lower end of the sleeve and is available if required to form a cushion between the distal end **19** of the stump and an artificial limb. The lower binding is over-folded and slit to accommodate draw strings **14**. This string can be pulled and knotted to close opening **19**.

Belt **13** is formed of any suitable web material and is provided with a conventional buckle **22** for adjusting the belt about a wearer's waist. The belt supports three loops, an anterior loop **23**, a posterior loop **24** and a lateral loop **25**. Each of the loops **23**, **24** and **25** comprises an inner length **32**. The inner length of loop **25** is stitched to the sleeve as at **29** while each of the inner length of loops **23** and **24** is stitched to itself as at **33** to form a loop **34** engaging a clip **35**. The buckle is carried by a strip **36** which is stitched as at **37** to the inner surface of the stocking adjacent to the upper edge thereof. This inner length of each of the loops passes upwardly around belt **13**. Each loop also includes an outer portion which extends downwardly and passes through an adjustable buckle **27**, each of the buckles being secured to the outer wall of the sleeve by means of a loop of material **30** stitched to the sleeve.

In use, the wearer places the stocking over his stump and ties the draw string **14** so that the sleeve is drawn tightly about the end of the stump. With the belt **13** in position about the wearer's waist, the straps **23**, **24** and **25** are adjusted so that the sock **11** is pulled upwardly with pad **21** applying a slight pressure against the end of the stump. This pressure may readily be adjusted to

suit the needs of the individual wearer by adjusting draw string **14** and harness loops **23**, **24** and **25**.

It will readily be appreciated that one of the advantages of attaching anterior and posterior loops **23** and **24** in such a manner that the loops are completely detachable from the sleeve is that the same stump shrinker is thus adapted to be worn on either leg. By way of example, if the stump shrinker shown in FIGURE 2 as being worn on the left leg is to be worn on the right leg instead, this can readily be accomplished by first detaching straps **23** and **24** from the sleeve. The relative location of these straps is then reversed and the belt **13** is reinserted through the loops. Thereafter, the sleeve is ready to be placed upon an amputated right stump instead of an amputated left stump.

From the above disclosure of the general principles of the present invention and the above description of a preferred embodiment, those skilled in the art will readily comprehend various modifications to which the invention is susceptible. Thus, for example, it will readily be appreciated that the present stump shrinker construction can be utilized in connection with below the knee amputations or below the elbow amputations by lengthening sleeve **11**. In this case, the harness assembly **12** can be omitted if desired. Therefore, we desire to be limited only by the scope of the following claims.

Having described our invention, we claim:

1. A stump shrinker comprising a sleeve member formed of stretchable fabric, means forming a pocket adjacent to the lower portion of said sleeve, a resilient pad disposed within said pocket, and a harness assembly comprising a belt and a plurality of straps depending from said belt, said straps being secured to the upper portion of said sleeve, said belt and straps being effective to pull said sleeve upwardly to force said pad against the wearer's stump.

2. A stump shrinker comprising a sleeve member formed of stretchable fabric, means forming a pocket adjacent to the lower portion of said sleeve, a resilient pad disposed within said pocket, a draw string carried by said sleeve for contracting said sleeve below said pad, and a harness assembly comprising a belt and a plurality of straps depending from said belt, said straps being secured to the upper portion of said sleeve.

3. A stump shrinker comprising a sleeve member formed of stretchable fabric, the sleeve being elastic in a circumferential direction and in a vertical direction, a draw string for closing the lower portion of said sleeve, and a harness assembly comprising a belt and a plurality of straps depending from said belt, said straps being secured to the upper portion of said sleeve.

4. A stump shrinker comprising a sleeve member formed of a knitted stretch fabric, said fabric being stretchable in a circumferential direction, means including a draw string for closing the lower portion of said sleeve, and a harness assembly comprising a belt, an anterior, a lateral and a posterior strap depending from said belt, said straps being secured to the upper portion of said sleeve.

5. A stump shrinker comprising a sleeve formed of an elastic knitted stretch fabric, said fabric being stretchable in a circumferential direction and in a vertical direction, means forming a pocket extending transversely of said sleeve adjacent the lower end thereof, a resilient pad disposed within said pocket, a draw string carried by said sleeve for contracting said sleeve below said pad.

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