

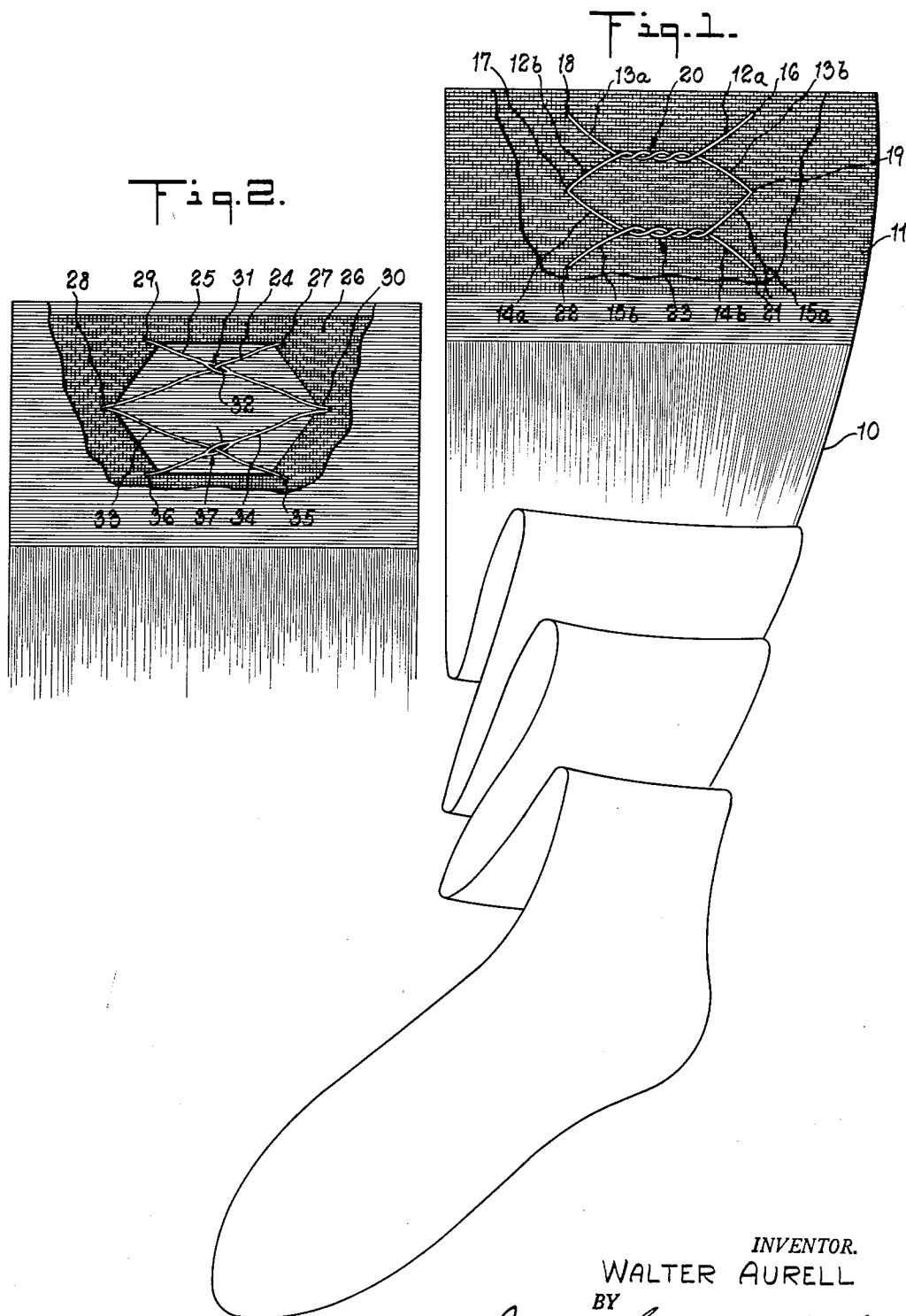
Dec. 27, 1955

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HOLDING DEVICE

2,728,086

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2 Sheets-Sheet 1



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Fig. 3.

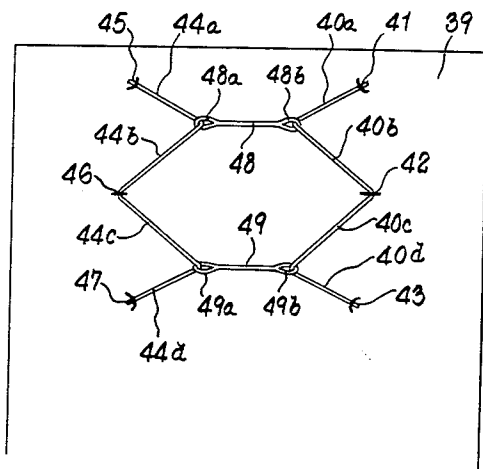


Fig. 4.

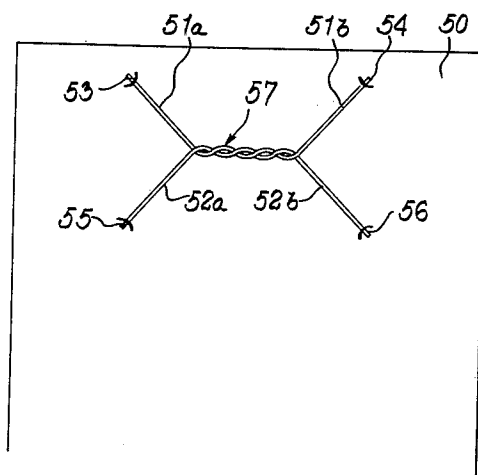


Fig. 5.

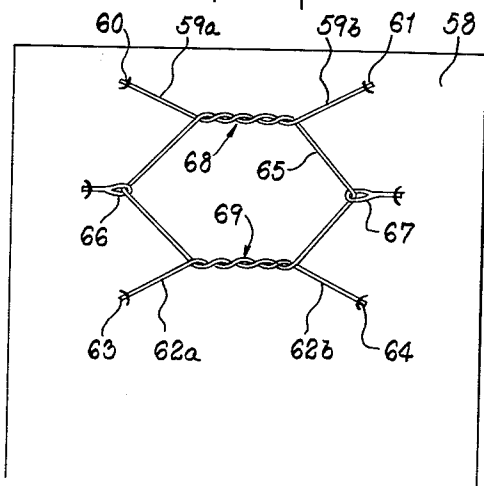
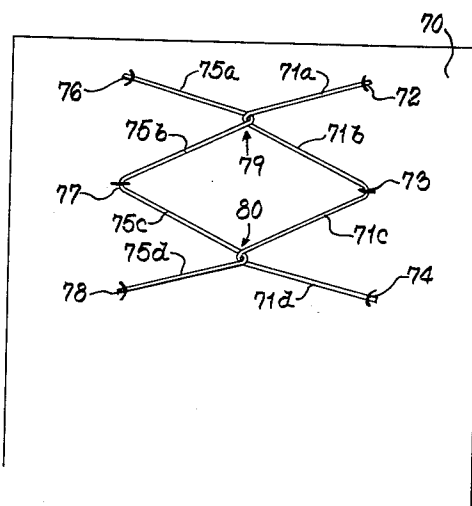


Fig. 6.



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HOLDING DEVICE

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4 Claims. (Cl. 2—240)

This invention relates to holding devices and more particularly to devices which operate to maintain fixed positions on a surface and which may be utilized, for example, to support articles such as apparel, fracture splints and the like on the body.

Many different kinds of holding devices have been designed to maintain relatively fixed positions on surfaces. Devices have been designed, for example, to support articles of apparel on the body. To effect their holding action these devices utilize such expedients as the bearing surfaces afforded by the natural contours of the body and the friction afforded by the radial contraction of annular, elastic members in tension. Thus, for example, stockings have been supported either by elastic garters which tightly surround the leg or by attachment to other apparel which may be fixed against movement by the contours of the body.

There are notable disadvantages to each of these methods. Radially contracting elastic garters, for example, tend to impair blood circulation, and moreover, have little or no ability to restore themselves to a preestablished position once slipping has occurred. The use of one garment to anchor another is limited in its applications and may result in an arrangement which is bulky, costly, or unsightly.

One object of this invention, therefore, is to provide a new and improved holding device for maintaining a relatively fixed position on a surface.

Another object of the invention is to provide a relatively inconspicuous holding device which is readily adaptable for use with a wide variety of articles to be worn on the body.

Still another object of the invention is to provide a holding device adapted to be incorporated in a member to be worn on an animate body and for establishing forces which oppose movement of the member axially of the body.

These and other objects and features may be attained in accordance with the invention by an arrangement of flexible strands which are attached at spaced points either directly to an article of apparel or to a member to which an article of apparel may be attached. The points of attachment or the reacting termini for any one of the strands are preferably spaced apart along the axis of the body portion on which the holding device is to be used and, between their points of attachment, pairs of strands are concatenated, as by twisting or otherwise establishing a joint affording interplay between the strands. Collectively, the strands operate in conjunction with the surfaces to which they attach to provide a holding action set up by relative motions between the holding device and the body.

The invention may be better understood by reference to the accompanying drawings showing several preferred forms of the invention, and in which

Figure 1 is a side view, partially broken away, of a stocking showing in detail a welt portion in which there is incorporated a holding device;

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Figure 2 is a side view of the upper portion of a stocking incorporating a modified form of the holding device of Figure 1; and

Figures 3 through 6 comprise various other modifications of the holding device.

Referring to the drawing, and to Figure 1 in particular, the invention is shown for purposes of illustration as incorporated in a stocking 10, having an upper welt portion in the form of a sleeve 11 in which a holding device may be incorporated. This holding device comprises an assembly of interacting strands, including an upper series of strand portions 12a, 12b, 13a and 13b, and a lower series of strand portions 14a, 14b, 15a and 15b. The strand portions 12a and 12b may be continuations of one another and are attached at their remote ends, as by stitching or interweaving, for example, to the sleeve 11 at obliquely spaced points 16 and 17. The strand portions 13a and 13b are similarly attached to the sleeve 11 at the points 18 and 19, which are obliquely spaced in another direction. Between these points the oppositely inclined strand portions are united in a joint 20. Preferably, although not necessarily, this joint is formed by twisting the strands together a number of times such as four, for example.

The lower series of strand portions 14a, 14b, 15a and 15b are similarly arranged, the inclined strand portions 14a and 14b being attached to the sleeve at terminal points 17 and 21, and the oppositely inclined strand portions 15a and 15b at terminal points 19 and 22. Between the points of attachment the strand portions are united in a joint 23, which may likewise take the form of a plurality of twists. Thus the upper and lower series of strand portions are illustrated as having common terminal points of attachment 17 and 19 to the sleeve 11 so that the upper series of strand portions 12a and 12b and the lower series of strand portions 14a and 14b comprise a continuous filament divided by the attaching point 17. The upper and lower series of strand portions 13a, 13b and 15a, 15b, respectively, likewise comprise a single strand divided by the point 19. In the event the upper and lower series of strand portions are to be spaced apart a greater distance along the axis of the sleeve, the continuous strands could of course be separated and independent terminal points provided.

In a preferred form of the invention the various strand portions are disposed on the inside surface of the sleeve next to the leg and two complete strand assemblies may be provided at diametrically opposed points in the sleeve. When worn on the leg with the sleeve fitting snugly, the coordinated action of the muscles of the leg and the forces tending to pull the stocking downwardly will activate the strand portions to establish a textile spring action in which tension will be applied by the strand portions, particularly at the points 17 and 19, to establish circumferential or radial contraction of the sleeve to cause the sleeve to fit more tightly about the leg. This gripping action tends to relax when the forces tending to pull the stocking down the leg diminish and when the motion of the leg diminishes.

The device may be modified in many ways within the scope of the invention. Thus for example, as shown in Fig. 2, a pair of crossed, inclined strand portions 24 and 25 are attached to a sleeve 26 at points 27 and 28, and 29 and 30, respectively. At their point of intersection the strand portions 24 and 25 are united in a joint 31. The joint 31 in this case may be in the form of a loop or eye 32 formed in the strand portion 25 through which the strand portion 24 passes.

A second and lower strand series is provided by a pair of strand portions 33 and 34, attached to the sleeve 26 at the points 28 and 35, and 30 and 36, respectively. The strand portions 33 and 34 are united in a joint 37 com-

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prising a loop or eye 38 formed in the strand portion 34 to receive the strand portion 33. The interaction of the strand portions places the strands in tension and results particularly in the application of tension at the points 28 and 30 tending to draw the sleeve 36 tightly about the leg.

Another form of the invention is illustrated by Fig. 3 in which a sleeve 39, such for example as the welt of the stocking, has attached thereto a strand assembly including the strand portions 40a, 40b, 40c and 40d, with points of attachment 41, 42 and 43, all disposed substantially in vertical alignment. A second strand series including strand portions 44a, 44b, 44c and 44d is similarly attached to the sleeve 39 at the vertically spaced points 45, 46 and 47. The strand portions 40a and 40b and the portions 44a and 44b are joined by a transverse linking strand 48 which is preferably formed with loops 48a and 48b at its ends to receive the said strand portions. The strand portions 40c and 40d and the portions 44c and 44d are joined by a transverse linking strand 49 which may be formed at its ends with loops 49a and 49b to receive the strand portions. Although the strand portions 40a . . . 40d and 44a . . . 44d are each shown as being continuous strands it will be understood that each may be composed of two or more independent strand portions having separate points of attachment to the sleeve 39, and the transverse strands 48 and 49 might be attached fixedly to the several strand portions.

Referring to Fig. 4, a modified strand assembly is provided in which a sleeve 50 has attached thereto a pair of oppositely inclined upper strand portions 51a and 51b and a pair of oppositely inclined lower strand portions 52a and 52b. The strand portions 51a and 51b are attached to the sleeve 50 at the points 53 and 54 and the strand portions 52a and 52b at the points 55 and 56. The strand portions are united in a joint 57 formed by twisting the upper and lower strand portions together a plurality of times. In this form of the invention, the holding action is quite similar to that of the form shown by Figure 1, and if desired a lower strand series may be added to provide an assembly having the general appearance of that of Figure 1 but differing in that the attaching points are spaced horizontally rather than spaced along an inclined line. The embodiment of Figure 1, may of course utilize the design of Figure 4.

In Figure 5 a sleeve 58 is provided with a strand assembly including upper strand portions 59a and 59b attached to the sleeve at horizontally spaced points 60 and 61, respectively. Lower strand portions 62a and 62b are attached to the sleeve at horizontally spaced points 63 and 64. Between the respective strand portions 59a and 59b and the portions 62a and 62b a loop 65 is provided which may be attached to the sleeve 58 as by sliding connections 66 and 67 which are also spaced apart horizontally. The upper and lower strand portions are each united with the loop 65 by means of joints 68 and 69, respectively, comprising a plurality of twists.

In Figure 6 a strand assembly is formed in a sleeve 70 in which a strand series including strand portions 71a, 71b, 71c and 71d is joined to the sleeve 70 at three vertically spaced points 72, 73 and 74. A second strand series including strand portions 75a, 75b, 75c and 75d is joined to the sleeve 70 at three vertically spaced points 76, 77 and 78, and the strand portions 71 and 75 are united at twist joints 79 and 80, which may comprise, for example, a single twist.

To enhance the operation of the holding device, to

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make it more adaptable to random leg sizes, and to provide an inner surface which will resist sliding on the leg, various sleeves may be formed of elastic yarns. It will be understood, however, that the elastic nature of the sleeve is not such that constriction will occur and does not simulate the action of a garter. Also it will be understood that the various strands which are used in the holding devices may be formed of a variety of yarns such as thread, braided yarns, monofilaments and the like. Elastic yarns which afford longitudinal resilience have also been found to be serviceable.

Although the invention has been described herein for purposes of illustration as embodied in the sleeve or welt portions disposed at the upper end of a stocking, it will be understood that the device has manifold applications in other apparel and in devices for holding inanimate objects. Thus the holding device may be incorporated in any flat, flexible material which is adapted to overlie a given surface. If desired a holding device for stockings may be prepared in the form of a flat strip which may be applied to a leg and attached to a conventional stocking. Also, the holding devices may be fabricated as a network to be applied to a given surface at a later date, or they may be incorporated in materials such as bandages which will be wrapped around the body.

It will be apparent, therefore, that the invention may be utilized in any one of a number of forms, several of which have been illustrated and described above, and that it should not be thought of as limited, except as defined in the following claims.

I claim:

1. In a holding device, a flexible sheet-like portion adapted to be mounted to surround closely a three dimensional part and to form a sleeve, a strand network attached to said sheet-like portion comprising at least two differently inclined flexible strand members each of which is disposed obliquely to the axis of the sleeve, means to attach each of the strand members to the sheet-like portion at at least two spaced-apart points, each of the strand members being free of sheet-like portion between said points, and means connecting said strand members together between the said points to form a joint to transit movement of one strand member to the other.

2. In a holding device as set forth in claim 1, including a second strand network on the same sheet-like portion substantially duplicating the first and spaced circumferentially therefrom.

3. A holding device as set forth in claim 2, the joints between strand members of each strand assembly comprising a plurality of twists between said strands.

4. A holding device as set forth in claim 2 including means to attach each strand member of each strand network to the sleeve-like portion at first, second and third axially spaced points, first means to join the strand members between the first and second points of attachment to the sleeve, and second means to join the strand members between the second and third points of attachment.

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