

[54] **PREFORMED SELF-CONFORMING DROP FOOT BRACE**

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[51] Int. Cl.² A61F 3/00

[58] Field of Search 128/80 E, 80 R, 166, 84; 5/327 R

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[57]

ABSTRACT

A preformed, light weight, drop foot brace that is self-conforming and removably positionable adjacent to the posterior calf portion, the heel and instep of a leg of a user who has suffered a stroke or other disability, with the brace when employed maintaining the foot of a user in a normal walking position relative to the leg. The brace is of such structure that both the foot of the user and lower portion of the brace may be disposed in a shoe without alteration or modification of the latter. Due to the conforming nature of the brace it is inconspicuous when worn, for the upper portion of the brace is situated within the confines of the trouser leg of a user, and the lower portion of the brace within a shoe.

3 Claims, 5 Drawing Figures

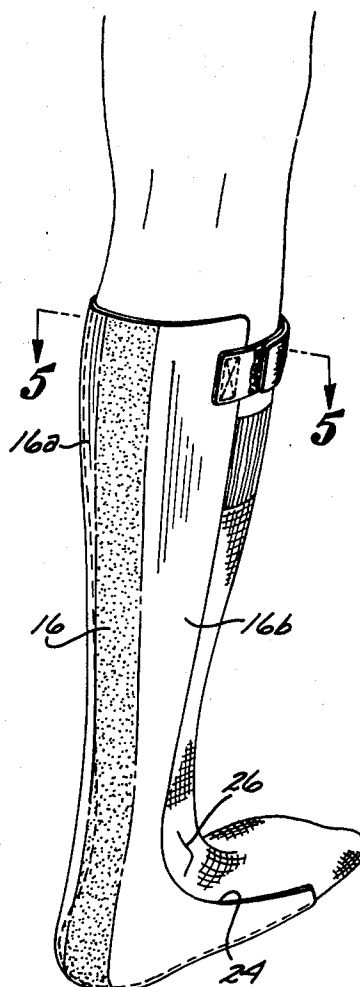


FIG. 1

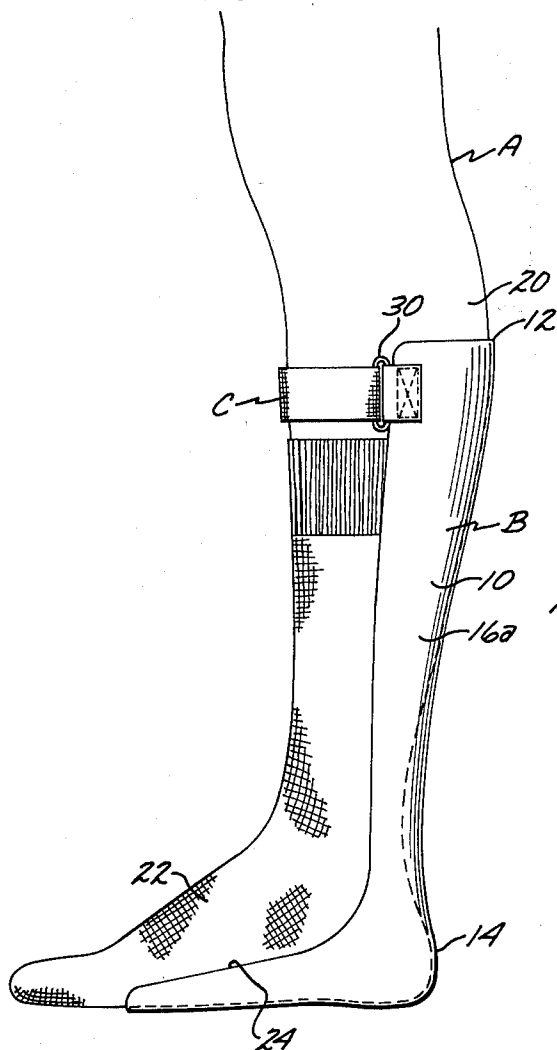


FIG. 2

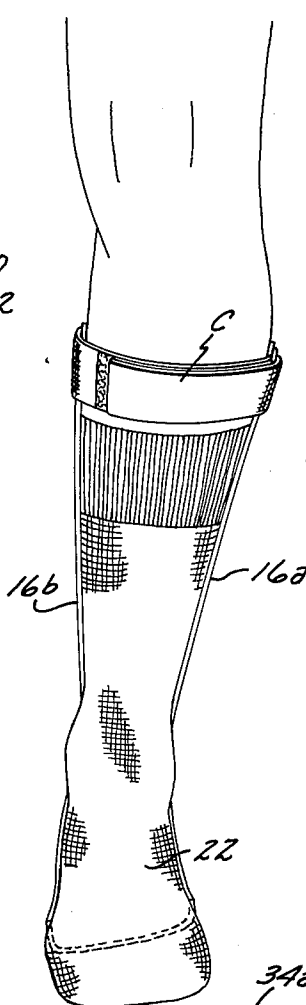


FIG. 3

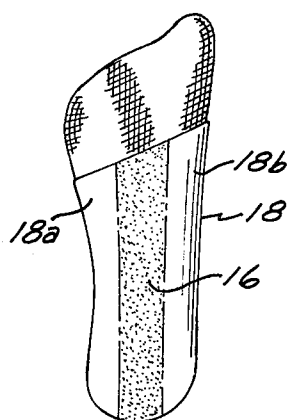
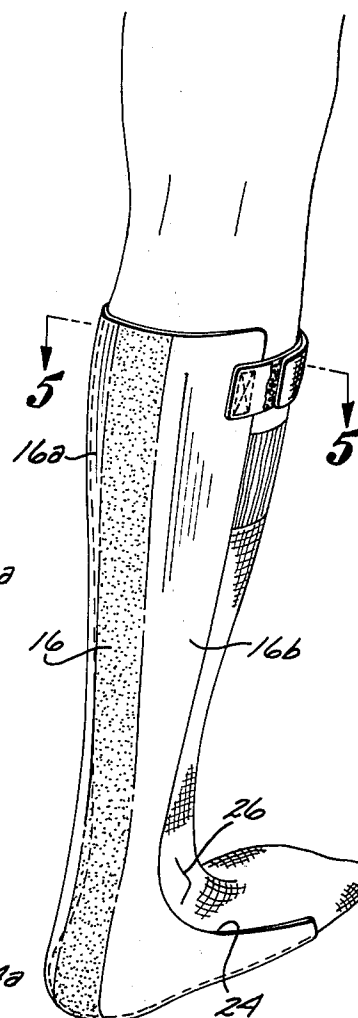


FIG. 4

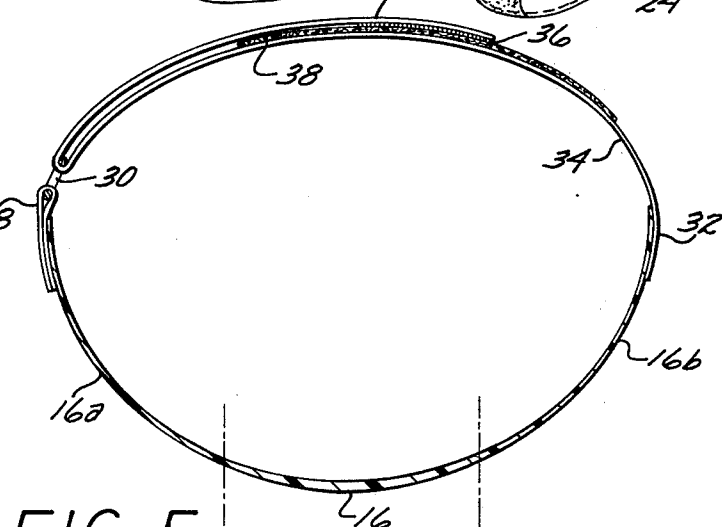


FIG. 5

PREFORMED SELF-CONFORMING DROP FOOT BRACE

BACKGROUND OF THE INVENTION

1. Field of the Invention

Prefomed, self-conforming, drop foot brace.

2. Description of the Prior Art

A person who has suffered a stroke or other physical disability may lose the control of his feet, in the sense that they tend when unsupported, to drop downwardly in depending positions from the legs. This condition is particularly bothersome to a person in walking as the feet are sequentially raised from the ground or supporting floor surface.

Various types of braces have been devised and used in the past to prevent the dropping of a foot when a person that has suffered a stroke or other physical disability walks, but such braces have in the main had certain operational disadvantages. Such disadvantages are that the prior art braces are of such structure as to require individual fitting to the contour of a leg and associated foot of a user, are clumsy and bulky in appearance, are unyielding in structure, and in some instances may be used only in combination with specially designed or modified shoes.

The primary object in devising the present invention is to supply an inexpensive drop foot brace that is lightweight, is self conforming to the posterior calf portion, heel, and instep of the leg and foot of the user, is easily mounted on or removed from the leg and foot of a user, and requires no special fitting.

Another object of the invention is to supply a drop foot brace that positions closely to the posterior calf portion heel, and instep of the user, and as a result is inconspicuous in that the upper portion of the brace is concealed within the confines of a trouser leg and the lower portion within a shoe worn by the user.

A still further object of the invention is to supply a brace capable of being worn without the necessity of the user's shoes being modified or constructed to a special design.

SUMMARY OF THE INVENTION

A preformed, light weight, drop foot brace that is self-conforming and removably positionable adjacent to the posterior calf portion, the heel, and instep of the leg of a user. The brace includes a first elongate shell of concave, convex transverse cross section that is adapted to be adjacently disposed to the posterior calf portion of the leg of a user with the first shell in the upper end portion thereof being provided with means to removably secure it in an adjacently disposed position relative to the calf portion, and the first shell in a lower end thereof developing into a second shell that is normally disposed to the first shell.

The second shell is also of concave, convex transverse cross section with the second shell so shaped as to be in abutting supporting contact with the heel and instep of the user, and when so disposed supporting the foot of the user in a normal walking position. A foot of a user when so supported is prevented from dropping downwardly relative to the leg with which it is associated when the foot is raised from the ground or supporting surface when the user walks.

The first and second sections of the brace are integrally formed from a polymerized resin such as polypropylene or the like. The first and second sections of

the brace have a continuous elongate thickened area intermediately disposed between the longitudinal edges thereof, and this elongate area being of greater thickness than the portions of the brace on opposite longitudinal sides thereof. The elongate area of the first portion possesses sufficient rigidity to maintain the first shell in an upwardly extending position adjacent the posterior calf portion of the user. The elongate area in the second shell, possesses sufficient rigidity, that there is little or no tendency for the second shell to pivot transversely relative to the first shell, and as a result the first and second shells are at all times so maintained that the elongate areas thereof are in longitudinal alignment. The elongate area in the second shell in cooperation with the portions of the second shell on opposite longitudinal sides thereof, cooperate to remain in a substantially normal position relative to the first shell, and by so doing maintain the foot of the user supported in the second shell in a normal walking position relative to the leg of the user.

The brace above described is relatively light in weight, is generally self conforming to the contour of the posterior calf portion, heel and instep of the user, and due to the compactness of the brace, it is inconspicuous when worn for the upper shell of the brace may be disposed within the confines of a trouser leg, and the second shell concealed within the confines of a shoe worn by the user.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the drop foot brace removably secured by an encircling band to the lower leg portion of a user to extend downwardly over the posterior calf portion, and the brace including a second outwardly extending shell that engages the heel and instep of the foot of the user to at all times support the foot of the user in a normal walking position;

FIG. 2 is a front elevational view of the leg and foot of a user on which the brace is removably mounted;

FIG. 3 is a rear elevational view of a leg of the user, with the brace being illustrated in abutting contact with the posterior calf portion of the leg, and the brace having a second lower shell that supports the heel and instep of the foot of the user to prevent the latter dropping downwardly when the foot is raised from supporting contact with the ground or a floor surface;

FIG. 4 is a bottom plan view of the second shell of the brace illustrated in FIGS. 1, 2 and 3; and

FIG. 5 is a top plan view of the brace taken in the line 5—5 of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A user's leg A is shown in FIG. 1 on which a drop foot brace B is removably mounted and held in position therein by fastening means C. The brace B includes a first elongate shell 10 that has an upper end portion 12 and lower end portion 14.

The first shell 10 as may best be seen in FIGS. 3 and 5 has an elongate area 16 formed in substantially the center thereof, which elongate area is a greater thickness than the portions 16a and 16b of the first shell situated on opposite sides of the elongate area 16. The first shell 10 at the second end portion 14 thereof develops into a second shell 18 best seen in FIGS. 3 and 4, which second shell also has a continuation of the elongate area 16 extending the longitudinal length thereof. The

second shell has side portions 18a and 18b situated in opposite longitudinal sides of the area 16.

The side portions 16a and 16b are resilient, but sufficiently pliable as to be drawn into conforming engagement with the posterior calf portion 20 of the user's leg A, when the fastening means C are lightly tensioned. The elongate area 16 of the second section 18 in cooperation with the side portions 18a and 18b, maintain the second shell 18 in a substantially normal position relative to the first shell 10 as shown in FIG. 1 when on the foot 22 of the user is held in a substantially normal walking position relative to the calf portion 20. The side portions 18a and 18b terminate in longitudinal upwardly and rearwardly extending edges 24 that are situated adjacent the ankle bones 26 of the leg A.

The side portion 16a at the upper portion thereof as may be seen in FIG. 1 has a doubled over fabric tab 28 sewed or otherwise affixed thereto, with the tab pivotally engaging and supporting an elongate rigid loop 30. The side portion 16b opposite the tab 28 has a first end 32 of an elongate resilient band 34 secured thereto, which band may be extended through the loop 30 as shown in FIG. 5.

The second end portion 34a of the band supports a first pad 36 of a pressure sensitive adhering material such as "Velcro" or the like that may be placed in engagement with a second pad 38 of the same material that is supported on the band 34. When the band 34 is doubled over as shown in FIG. 5, the pads 36 and 38 are adjacently disposed, and in removable engagement and the fastening means C removably held in a partial leg encircling position as shown in FIG. 1.

By varying the lengths of the portion of the band 34 relative to the loop 30, the overall length of the band 34 may be adjusted relative to a user's leg A to hold the first shell 10 in light abutting contact with the posterior calf portion of the user. The elongate area 10 of first shell 10 is of sufficient rigidity to maintain the first shell in the upwardly extending position on leg A, even though the first shell is not in full surface contact with the posterior calf portion 20 of the user's leg.

The drop foot leg brace B is preferably formed as an integral unit from a sheet of polymerized resin, such as polypropylene, polyethylene or the like, and the brace being formed by heating the sheet and then forming it to the configuration illustrated in FIGS. 4 and 5. The forming of the sheet is preferably done by heating the sheet and stretching it over a suitable mold. However, prior to such stretching taking place, a clamp is placed in pressure engagement with the sheet to hold the part of the sheet that is to constitute the elongate area 16 in pressure contact with the mold. Thus, although the portions of the sheet on each side of the elongate area 16 are stretched and thinned, the elongate area 16 remains unstretched and in its original thickness.

The portion 16a and 16b while possessing some resiliency are sufficiently pliable to conform to the surface

of the posterior calf portion of the user A and this is also true of the portions 18a and 18b that are adapted to conform to the heel and instep portion of the foot 22.

The second shell 18 prevents the foot 22 from dropping downwardly relative to the user's leg A but permits the foot to flex upwardly.

The use and operation of the invention has been described previously in detail and need not be repeated.

I claim:

1. An orthopedic foot drop brace defined by a single sheet of a resilient polymerized resin of such shape as to define a first elongate shell of concave-convex transverse cross section that has first and second end portions, said second end portion developing into a second shell of concave-convex cross section that is substantially normally disposed to said first shell, said first and second shells being self conforming and removably positionable adjacent to the posterior calf portion, the heel and instep of a leg of a user who has suffered a stroke or other disability to maintain the foot of said user in a substantially normal walking position relative to said leg, said foot brace being characterized by said first and second shells having a continuous longitudinal central portion of sufficient width and thickness as to prevent any substantial pivoting of said second shell transversely relative to said first shell, said first and second shells on opposite sides of said longitudinal central portion including side portions of lesser thickness than said central portion, each side portion being at least equal in width to said central portion and said side portions possessing sufficient memory to retain said convex-concave cross section, with said side portions of said first and second shells due to the positions thereof relative to said central portion acting as stiffeners that tend to maintain said second shell normally disposed to said first shell, and said first and second shells due to the resiliency of said resin defining the same being self conforming to the exterior surface of the posterior calf portion, heel and instep; and first means for removably securing said first shell in an abutting position relative to the exterior surface of said posterior calf portion of said user.

2. A brace as defined in claim 1 in which said means is a resilient band that has the ends thereof secured to opposite sides of said first end portion of said first shell, with said band when in light pressure contact with a forward portion of said leg serving to maintain said first shell adjacently disposed relative to said posterior calf portion of said user.

3. A brace as defined in claim 2 which in addition includes:

second means for removably securing said ends of said band to said opposite sides of said first end portion.

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