

[54] **LEG BRACE**

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[63] Continuation of Ser. No. 229,101, Feb. 24, 1972, abandoned.

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[58] Field of Search..... 128/80 E, 80 F, 80 R, 80 A, 128/80 B

[56] **References Cited**

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Primary Examiner—Richard A. Gaudet

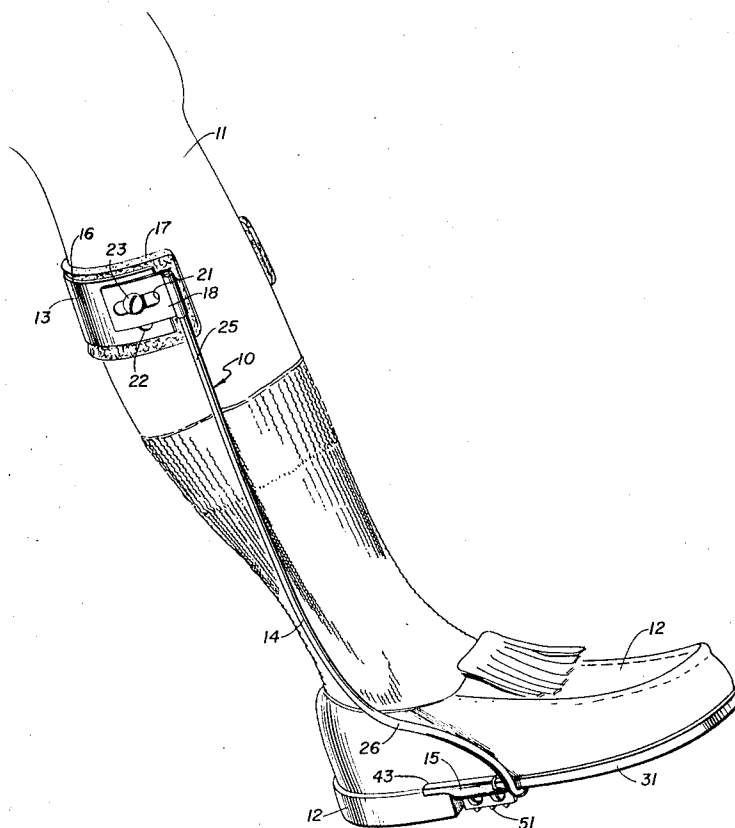
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[57] **ABSTRACT**

A leg brace of the drop-foot type having a calf band joined by two generally parallel rods to a shoe clamp.

4 Claims, 4 Drawing Figures



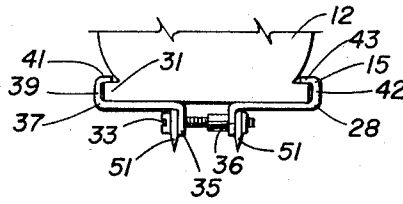


FIG. 3

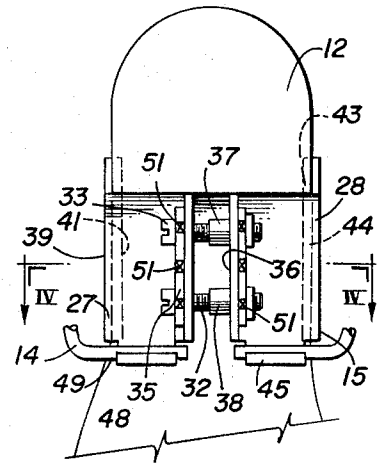


FIG. 2

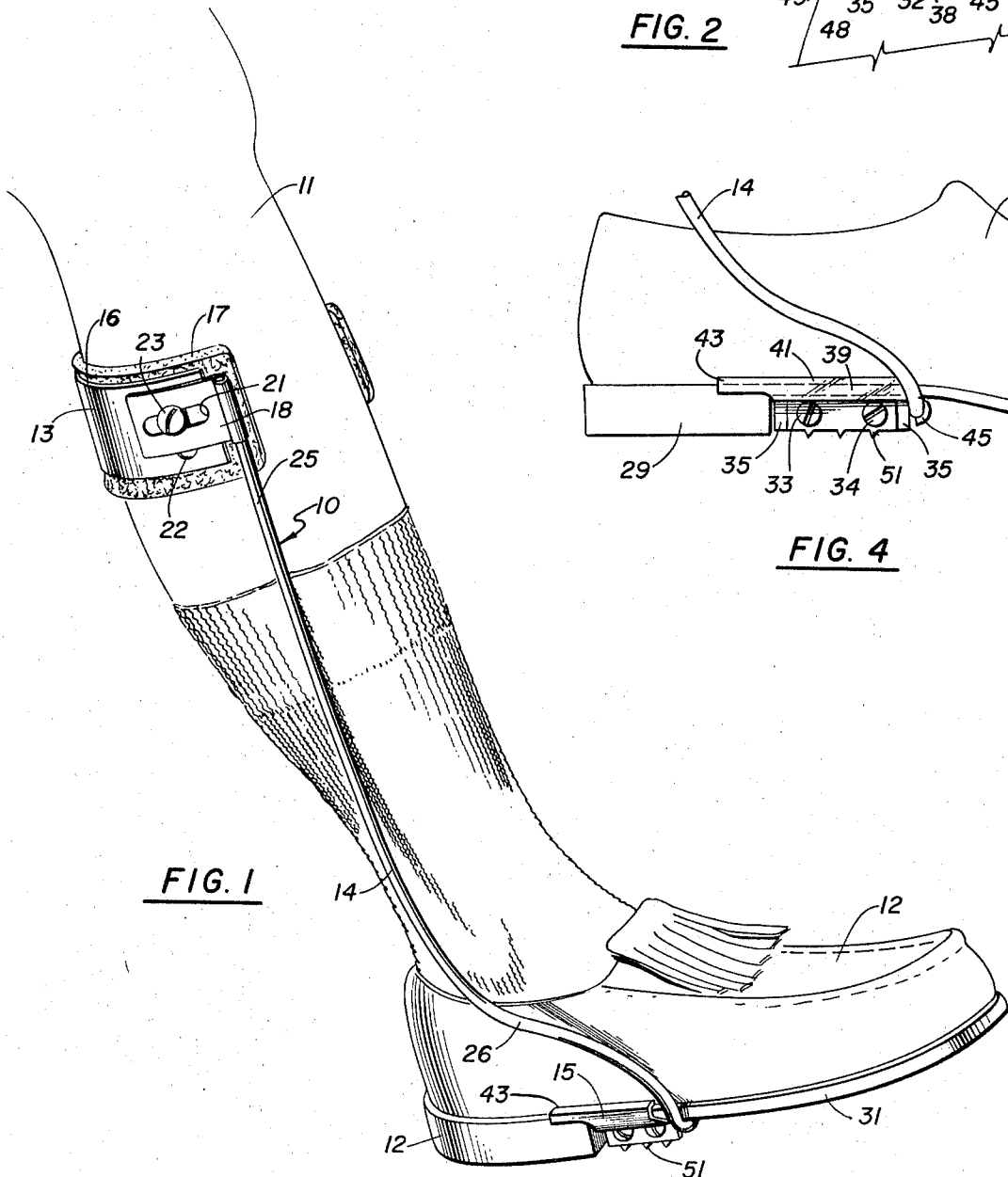


FIG. 1

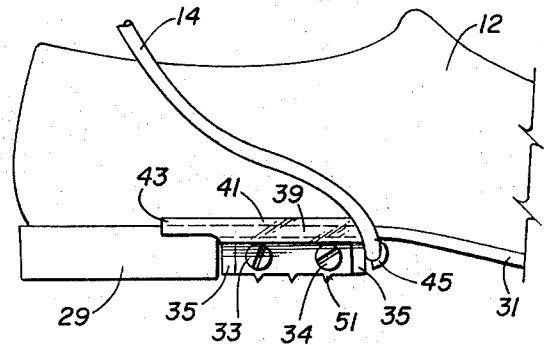


FIG. 4

LEG BRACE

This is a continuation of application Ser. No. 229,101 filed Feb. 24, 1972 now abandoned.

BACKGROUND OF THE INVENTION

There are several diseases in which the condition known as "drop-foot" occurs, such as chronic polymyositis. With this condition, the patient is unable to articulate the foot about the horizontal axis, so that it hangs limply in a downward direction. This makes it difficult for the patient to walk, even when crutches are used, because of the foot hanging down and striking thresholds and other raised objects. For this purpose, a special leg device known as a "drop-foot brace" is used, which acts on the foot to bias it in the upward direction, so that the heel of the shoe is the lowermost part of the foot, and this makes it easier for the patient to walk. In the past, these braces have been manufactured from heavy steel elements by a highly skilled artisan. In many cases, the patient has had to wait several days in a large city in order to obtain a fitting. Because the braces are, in effect, custom made, they are also quite expensive. Furthermore, they become part of the shoe, so that the only pair of shoes which the patient can use is a pair which forms part of the brace. The fitting of braces normally requires a hard leather soled shoe. Also, since the braces are quite expensive, it is not possible for the patient to own spare braces without a considerable expenditure of money. This means that, if a brace becomes inoperative (as they often do), the patient may not have a suitable brace for a considerable period of time before repairs are made or before he is able to obtain a replacement for the brace. Frequently, during trial of a newly fitted pair of braces, it is necessary for the patient to return to the fitter for fine adjustment, particularly to correct irritating interferences in the area of the ankle bones. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to provide a leg brace which is light in weight, inconspicuous, and yet which performs its function satisfactorily.

Another object of the present invention is the provision of a leg brace which can be used with conventional shoes and which can be easily changed from one shoe to another in a very short time without the need for mechanical skill.

A further object of the present invention is the provision of a leg brace of the drop-foot type made up of a number of inexpensive simple elements that are readily interchangeable, so that a patient can keep spare parts and repair his brace readily.

It is another object of the instant invention to provide a leg brace having sufficient vertical and horizontal adjusting means so that it can be applied to a wide range of patients without the need for custom fitting, and with sufficient clearance around the ankle bones.

A still further object of the invention is the provision of a leg brace which is simple in construction, which can be inexpensively manufactured from commonly available materials, and which is capable of a long life of useful service with a minimum of maintenance.

Another object of this invention is its suitability to a broad variety of shoe styles including many which were not adaptable to other designs.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

SUMMARY OF THE INVENTION

In general, the invention consists of a leg brace having a band adapted to be attached to the calf of the user and a pair of spring wire rods each connected at one end to the band. The other ends of the spring wire rods are connected to a clamp consisting of two parts, each having a flange for engagement with an edge of the sole of the shoe of the user, and of screw means for drawing the parts together, to clamp the sole between the flanges.

More specifically, each part of the clamp has a transverse integral sleeve at one end and each rod is provided with a right angle portion at its lower end, which portion lies in the integral sleeve. The inner end of each right angle portion is provided with a locking portion extending at a right angle thereto and underlying the said screw means.

BRIEF DESCRIPTION OF THE DRAWINGS

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawings, in which:

FIG. 1 is a perspective view of a leg brace embodying the principles of the present invention,

FIG. 2 is a bottom plan view of a portion of the brace,

FIG. 3 is a sectional view of the brace taken on the line IV-IV of FIG. 2, and

FIG. 4 is a sectional view of the brace taken on the line IV-IV of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, wherein are best shown the general features of the invention, a leg brace, indicated generally by the reference numeral 10, is shown in use on a leg 11 of the user who is also wearing a shoe 12. As is evident in the drawing, the leg brace consists of three major parts, namely, a band 13, a rod 14, and a clamp 15. It should be noted that, in the description which follows, the expressions "longitudinal," "transverse," "vertical," and so forth are used in the sense that these terms are normally used in connection with the shoe 12.

It can be seen that the calf band 13 consists of a U-shaped metal clip 16, the inner surface of which is covered with a padding 17. Each leg of the U-shaped clip 16 is provided with a slot 22 which is carried a bolt 23. The nuts associated with this bolt lies on the inside of the clip and is of a thin nature, so that it lies under the padding (between the padding and the clip) and provide no bulge to the padding.

The bolt 23 is of the cross-slotted round-head type. The rod 14 extends up one side of a plate 18 having a lot 21 lying under the head of the screw 23. It is held in a vertical ferrole formed on a vertical edge of the plate 18. It will be understood that two such rods 14 are provided, one on each side of the band 13 and each provided with a plate and screw similar to the plate 18 and the screw 23 and with associated slots. In this figure of the drawings, it can also be seen that each of the rods 14 is provided at its lower end with a gently curved portion 26 leading to the clamp 15.

Referring now to FIGS. 2, 3, and 4, it can be seen that the clamp 15 consists of two portions 27 and 28 operating on the sole 31 of the shoe 12 adjacent the heel 29; that is to say, on the instep of the shoe. Joining the two portions 27 and 28 is screw means 32. Bolts 33 and 34 extend transversely through a longitudinal, downwardly depending flange 35, which is integral with and extends along a longitudinal side of the generally rectangular portion 27 of the clamp. A similar flange 36 is integrally formed with the inner edge of the rectangular portion 28 of the clamp adjacent the flange 35 and extends downwardly and longitudinally therefrom. The bolts 33 and 34 engage the threaded interior of two sleeves 37 and 38 which are aligned with them and which are integrally attached to the face of the flange 36. The longitudinal edge of the portion 27 of the clamp which lies along the outside of the shoe and which is parallel to the flange 35, is provided with an upwardly extending flange 39 adapted to lie along the adjacent edge of the sole 31 of the shoe. This flange 39 is integral with the portion 27 and extends upwardly from it and is provided at its upper edge with an inwardly directed flange 41. The flange 41 is, therefore, parallel to the main part of the portion 27 of the clamp and is spaced from it approximately the thickness of the sole 31. Similarly, the opposite edge of the portion 28 of the clamp is provided with an upwardly extending integral flange 42 which is intended to lie against the other side of the sole 31. From the top of this flange extends an inwardly extending flange 43 adapted to lie along the top surface of the sole. The flange 43 is, of course, spaced and parallel to the main part of the portion 28 of the clamp.

The rearward transverse edge of the portion 28 is provided with an integral sleeve 45 which extends transversely of the shoe. It lies adjacent the forward edge of the heel 29. The lower end of the rod 14 on one side (that is to say, at the bottom of the curved portion 26) is bent inwardly to form a right angle portion which extends through the sleeve 45. After this portion leaves the sleeve 45, it may be bent again at a right angle to form a locking portion, which lies in contact with the upper parts of the sleeves 37 and 38. It lies between these sleeves and the undersurface of the sole 31 of the shoe. The extreme end of the locking portion can be formed with a hook which extends around the body of the sleeve 38. In a similar way, the lower end of the other rod 14 can be provided with a right angle portion which lies in a sleeve 48 integral with the rearward transverse edge of the portion 27 of the clamp and extending transversely thereof. The right angle portion terminates in a locking position which extends longitudinally along the upper side of the bolts 33 and 34 adjacent the flange 35. The extreme main horizontal parts of the portions 27 and 28 of the clamp may be provided on occasion with spikes 51 which are long enough to extend beyond the plane of the shoe defined by the undersurface of the heel 29 and the undersurface of the toe portion of the sole 31.

The operation of the invention will now be readily understood in view of the above description. The clamp 15 is fastened to the shoe of the user before he puts it on his leg. The shoe is then placed on the patient's foot with the band 13 extending around his calf. If this is the first time that the brace is being worn, it may be necessary to loosen the screws 23, so that the calf band 13

can be moved within the limits of the slots 21 and 22 at the top ends of the rods 14, and so that the band can be moved, if necessary, laterally or vertically of the rods. The bend 26 is made to avoid contact with ankle bone. It is very unlikely that the rod will need to be bent after braces are made. Mounting the clamp 15 on the shoe originally takes place by placing the portions 27 and 28 against the undersurface of the sole 31 of the shoe 12 and then tightening the bolts 33 and 34. This serves to bring the flanges 41 and 43 over the top edges of the sole 31 into the wedge-like recess between the top of the sole and the upper of the shoe. All of the elements of the clamp are of such a size that it is able to lie within the instep without touching the floor. This is with the exception of the spikes 51 which may be added during icy weather to give better traction.

It can be seen that the present invention provides a leg brace which is very light in weight and inconspicuous and which can be transferred from one pair of shoes to another. Furthermore, it is made up of relatively simple inexpensive parts that can be replaced when necessary very easily and with a minimum of mechanical aptitude.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. A leg brace, comprising:

- a. a band adapted to be attached to the calf of the user,
- b. a clamp consisting of two parts each having a flange for engagement with an edge of the sole of the shoe of the user and of means for drawing the parts together to clamp the sole between the flanges, and
- c. a pair of bowed rods of springy material each having a first end attached to the band and a second end fixed to the clamp, so that the band and clamp are resiliently connected, the first end being attached to the band by a connection structure which rigidly fixed the position of the first end with respect to the band and said connection structure including means which allows selective adjustment of the position either longitudinally or transversely of the rod.

2. A leg brace as recited in claim 1, wherein the clamp has a rearward edge and a forward edge, and the rods are attached to the clamp in the vicinity of the forward edge.

3. A leg brace as recited in claim 1, in combination with a shoe wherein the sole of the shoe has a heel, the heel has a forward edge, and the flange extends rearwardly of the forward edge of the heel and engages the sole of the shoe rearwardly of the forward edge of the heel.

4. A leg brace as recited in claim 1, in combination with a shoe wherein the clamp is provided with spikes which extend downwardly from the clamp away from the sole of the shoe.

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