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[54] **GLIDE ASSEMBLY**
24 Claims, 8 Drawing Figs.

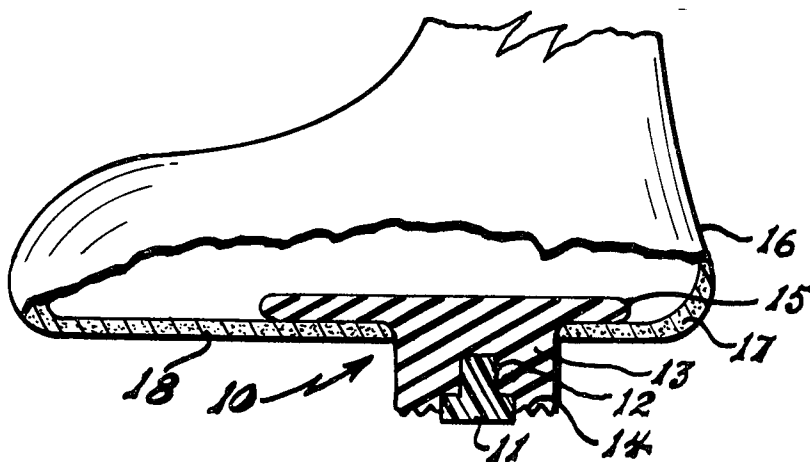
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36/2.5
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83, 87-91; 36/2.5

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ABSTRACT: An assembly for permitting self-locomotion by the wearer of a walking-type leg cast by a sliding movement, rather than by walking. The assembly includes: a retainer of material of a high coefficient of friction, with at least one aperture, affixed to the foot-bottom of the leg cast; and at least one glide insert of material of a low coefficient of friction, configured in the form of cylinders of different diameters, with the narrower diameter end inserted into the aperture and the wider diameter end protruding a short distance from the retainer.



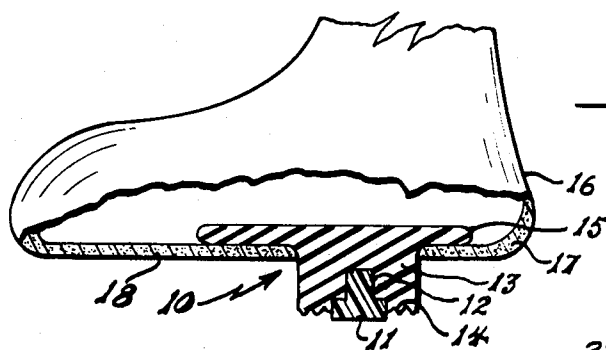


FIG. 1

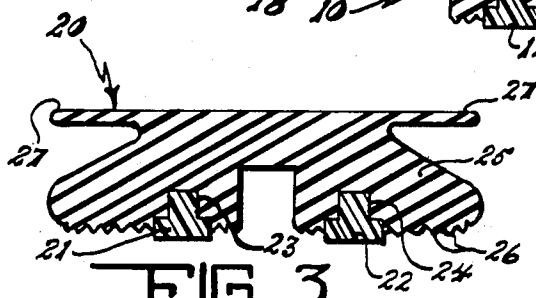


FIG. 3

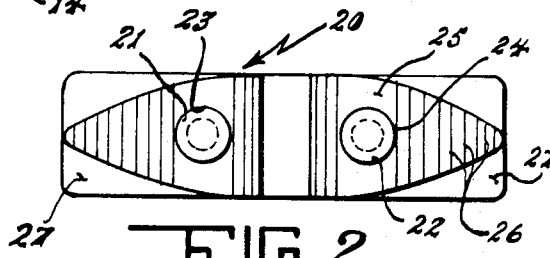


FIG. 2

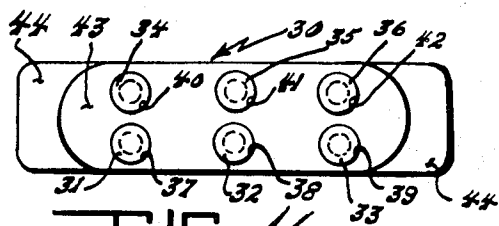


FIG. 4

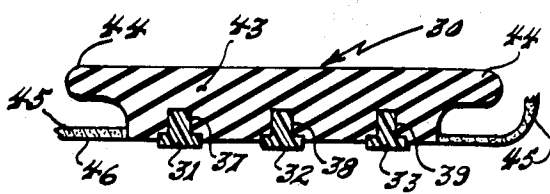


FIG. 5

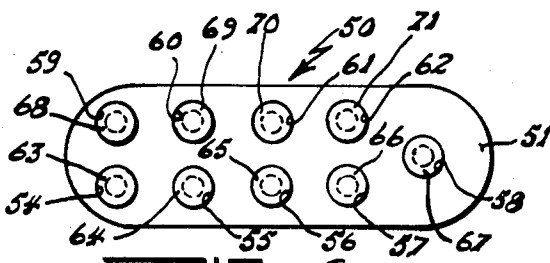


FIG. 6

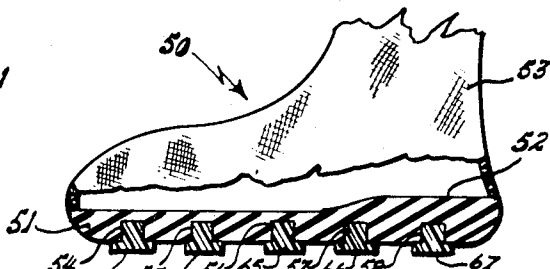


FIG. 7

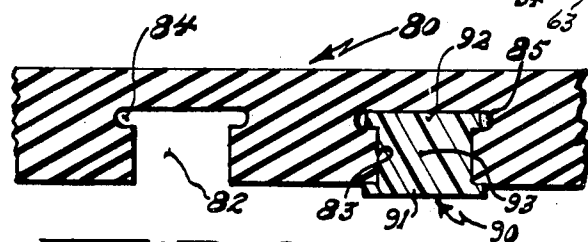


FIG. 8

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GLIDE ASSEMBLY

BACKGROUND OF THE INVENTION

This invention relates to an assembly for permitting the wearer of a walking-type cast, or of an orthopedic shoe, or the like, to slideably engage his encased foot with the floor and, thereby, allow him easier locomotion. More particularly, the invention relates to an assembly which includes glide inserts of low coefficient of friction material which are inserted into, and are removable from, apertures in a retainer of high coefficient of friction material, with the assembly adaptable for use as the heel assembly or sole assembly affixed to the foot-bottom of a walking leg cast, or as the principal component of an orthopedic shoe, and the like.

It is to be noted that the terms "walking-type leg cast," "walking leg cast," "walking cast," and "cast" as used above and as hereinafter used, are intended, for the purpose of this application, to be synonymous and interchangeable, and are also intended to include a foot cast, an ankle cast, and the like. What is meant by use of any of the above terms or their equivalents is that at least the foot, but not necessarily the toes, is immobilized in a conventional plaster cast having, in whole or in part, a base or bottom serving as a sole.

In the prior art, individuals having a cast-bound foot moved under their own power by lifting the foot up and then lowering it, in a walking motion, thereby placing their full weight on the foot and the cast. Alternatively, they used canes and crutches of various modified forms to assist them in moving under their own power. In doing so, they favored the encased foot by placing all or most of their weight on the other foot and on the cane or crutches used, with resultant strain on the other foot, on the hand grasping the cane, and, in using crutches, on the hands grasping the crutch, the arms, and the armpits. The art advanced substantially with the advent and the use of a floor-engageable peg at the foot-bottom of the cast, since the user of such a walking cast could walk in many instances without the use of canes or crutches, by lifting and then lowering his foot, with the weight being placed on the peg. However, despite the availability and use of canes, crutches, floor-engageable pegs, and other prior and present art devices, the individual who sustains a foot, ankle or leg break or fracture which requires allows or requires a walking-type cast is, at best, in the unfortunate position of being able to move under his own power only with strain, resultant fatigue, great inconvenience, and some lack of safety, with the degree of these distinct disadvantages increasing with the length and weight of the cast.

Our invention significantly advances the state of the art by permitting individuals who have a cast-bound foot to move with a sliding motion, rather than a walking motion, with the sliding being much easier, less awkward, less fatiguing and relatively safer than walking; and, in addition, our invention promotes recovery, principally by minimizing weight-bearing on the cast-bound foot, and thereby permits the earlier return of the individual to his normal activities.

SUMMARY OF THE INVENTION

This invention relates to means for permitting self-locomotion by the wearer of a walking-type leg cast by sliding, rather than by walking, with said means being readily adaptable for use as a heel assembly of the walking-type cast, the platform or sole assembly of such a cast, and as the principal component of an orthopedic shoe, and the like.

An object of this invention is to permit an individual wearing a walking-type leg cast, or having a cast-bound foot, or wearing an orthopedic shoe or the like, to move under his own power by sliding his encased foot along the floor.

Another object of this invention is to permit the individual to accomplish the above-described self-locomotion with much more ease, much less fatigue, and in a relatively safer manner than is possible with past or present state of the art devices.

These objects, and still other and related ones, of this invention will become readily apparent after a consideration of the description of the invention and reference to the drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view, partly in cross section, of a preferred embodiment of the invention;

FIG. 2 is the bottom view of another preferred embodiment of the invention;

FIG. 3 is a side elevation view, in cross section, of the embodiment shown in FIG. 2;

FIG. 4 is the bottom view of still another preferred embodiment of the invention;

FIG. 5 is a side elevation view, in cross section, of the embodiment shown in FIG. 4;

FIG. 6 is the bottom view of yet another preferred embodiment of the invention;

FIG. 7 is a side elevation view, partly in cross section, of the embodiment shown in FIG. 6; and

FIG. 8 is a side elevation view, in cross section, of still yet another preferred embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIG. 1, there is shown, in side elevation and partly in cross section a preferred embodiment in the form of a heel assembly 10 which includes a floor-engageable glide insert 11 of material having a low coefficient of friction (i.e., having good sliding properties), such as a durable plastic material which additionally can be easily fabricated and molded, preferably nylon or teflon, with said glide insert 11 securely inserted or fitted into, but removable from, suitably configured aperture 12 of heel 13, which is of material of a high coefficient of friction, preferably rubber, and with said heel 13 having a serrated base 14 and a lip or flange 15. Also shown therein is walking cast 16 with wall 17 and base or bottom 18. The lower surface of lip 15 of heel assembly 10 abuts the upper surface of cast wall 17; and heel assembly 10 is made integral to cast 16, with heel 13 and glide insert 11 protruding from the bottom of cast 16.

In FIGS. 2 and 3, wherein the same reference numbers designate the same components, is shown another embodiment, heel assembly 20, in, respectively, a bottom view and a side elevation cross-sectional view. Heel assembly 20 includes floor-engageable glide inserts 21 and 22 of material having a low coefficient of friction (i.e., having good sliding properties), such as a durable plastic material which additionally can be easily fabricated and molded, preferably nylon or teflon, with said glide inserts 21 and 22 securely inserted into or fitted into, but removable from, suitably configured apertures 23 and 24, respectively, of heel 25, which is of material of a high coefficient of friction, preferably rubber, and with said heel 25 having a serrated base 26 and a lip or flange 27. Not shown, in the interest of maintaining simplicity and clarity, is the walking cast, such as 16, FIG. 1, to which heel assembly 20 is made integral, with heel 25 and glide inserts 21 and 22 protruding from the bottom of the cast.

In FIGS. 4 and 5, wherein the same reference numbers designate the same components, is shown still another preferred embodiment of the invention in the form of a platform or sole assembly 30 in, respectively, a bottom view and a side elevation cross-sectional view. Sole assembly 30 includes a plurality of floor-engageable glide inserts, such as 31-36 inclusive, of material having a low coefficient of friction (i.e., having good sliding properties), such as a durable plastic which additionally can be easily fabricated and molded, preferably nylon or teflon, with each said glide insert, such as 31, FIG. 5, securely inserted into or fitted into, but removable from, its suitably configured individual aperture, such as 37, FIG. 5, of the plurality of apertures, such as 37-42 inclusive, FIG. 4, of platform or sole 43 which is of material of a high coefficient of friction, preferably rubber, and which has lip or flange 44. Also shown in FIG. 5, in cross section and partly fragmented, is walking cast 45, with base or bottom 46, to which sole assembly 30 is made integral by being positioned wholly within said cast 45, and being affixed thereto, with the bottom surface of sole 43 and the bottom of glide inserts, 31-36 inclusive exposed and external of cast 45.

In FIGS. 6 and 7, wherein the same reference numbers designate the same components, is shown yet another preferred embodiment of the invention in the form of an orthopedic shoe 50, in, respectively, a bottom view and a side elevation cross-sectional view. Orthopedic shoe 50 includes: a platform or sole 51 of material of high coefficient of friction, preferably rubber, to which is affixed by suitable means at the periphery thereof means for permitting entry, retention, and, when desired, release of the cast-bound foot, such as a top 53 of flexible material, preferably canvas, and laces or ties (not shown) connected to said top 53. Sole 51 has a plurality of apertures, such as 54-62 inclusive, FIG. 6, into which are securely inserted or fitted a plurality of floor-engageable glide inserts, such as 63-71 inclusive, FIG. 6, made of material of a low coefficient of friction, such as a durable plastic which additionally can be easily fabricated and molded, preferably nylon or teflon. The glide inserts, such as 54, FIG. 7, are removable from their suitably configured individual apertures, such as 63, FIG. 7. The upper surface of sole 51 is, preferably, raised at the rear or heel portion 52.

With reference to FIGS. 1-7, inclusive, glide inserts (such as 11, FIG. 1; 21 and 22, FIGS. 2 and 3; 31-36 inclusive, FIGS. 4 and 5; and 63-71 inclusive, FIGS. 6 and 7) are, individually, preferably in the form of a cylinder of two diameters, with a narrower diameter being inserted wholly into the suitably configured aperture (such as 12, FIG. 1) and the wider diameter protruding a short distance from the bottom of the heel (such as 14, FIG. 1, and 25, FIGS. 2 and 3) and from the bottom of the platform or sole (such as 43, FIGS. 4 and 5, and 51, FIGS. 6 and 7), with the bottom surface of the wider diameter portion of the glide insert engaging and making contact with the floor. Although the glide inserts are shown in FIGS. 1-7 to be flat-bottomed, this is by way of illustration only. The bottom of the glide inserts (such as 11, FIG. 1; 21 and 22, FIGS. 2 and 3; 31-36 inclusive, FIGS. 4 and 5; and 63-71 inclusive, FIGS. 6 and 7, may be of any suitable shape or form, including the point-contact type.

With reference to FIG. 8, therein is shown in a side elevation cross-sectional view still yet another preferred embodiment of the invention. The embodiment 80 is a means for permitting self-locomotion by the wearer of a walking-type leg cast by a sliding movement, rather than by walking, and includes a retainer 81 of material of a high coefficient of friction, preferably rubber, for use as a heel, platform, sole, or the like with apertures, such as 82 and 83, having at the upper terminus, such as 84 and 85, a wider diameter to accept and hold a glide insert, such as 90, made of material of a low coefficient of friction, such as a durable plastic which additionally can be easily fabricated and molded, preferably nylon or teflon. Each glide insert, such as 90, is configured in the form of a cylinder of three diameters, with the two wider diameters, such as 91 and 92, being at either end and the narrowest diameter, such as 93, being therebetween. The upper wider diameter 92 of glide insert 90 fits into the upper terminus, such as 94 and 85, of the aperture, such as 82 and 83. The narrowest diameter 93, which is the midportion of glide insert 90, fits into, and is positioned wholly within, the narrow diameter of the aperture. The other wide diameter portion 91 of glide insert 90 protrudes a short distance from the bottom of retainer 81 and, thereby, engages and makes contact with the floor. It is to be noted that a glide insert, such as 90, may be removed from the respective aperture, such as 83, in which it is positioned, although in use the glide insert is securely fitted into the held by the mating configuration of the aperture. As in the case of the glide inserts shown in FIGS. 1-7, the glide insert 90, FIG. 8, need not be flat-bottom, as shown. The bottom may be of any suitable shape or form, including the point-contact type.

MODE OF OPERATION OF THE PREFERRED EMBODIMENTS

The operation of each of the preferred embodiments is based upon the phenomena that it is easier (i.e., less fatiguing, less awkward, and the like) for an individual having a cast-bound foot to slide on it, rather than to walk on it. More specifically, in the embodiments the combination of the low coefficient of friction material glide inserts fitted into a retainer of material of high coefficient of friction with both, or either, of the different coefficient of friction materials being simultaneously floor-engageable at the option of the user, permits a controlled sliding motion, rather than walking, which is a new and unexpected result not heretofore contemplated in the art.

Embodiments 10, FIG. 1, and 20, FIGS. 2 and 3, are affixed by and during the molding of the foot cast, such as 16, FIG. 1, to the bottom 18, FIG. 1, of the cast 16. More specifically, the lower surface of the flanged portion, such as 15, FIG. 1, of heel 13, FIG. 1, and 27, FIGS. 2 and 3, of heel 25, FIGS. 2 and 3, is made to abut with the upper surface of the bottom 18 of cast 16, FIG. 1. Each of these two embodiments (heel assembly 10, FIG. 1, and heel assembly 20, FIGS. 2 and 3) are made integral to the cast, such as 16, FIG. 1, while the cast is being molded. The heel of each embodiment, such as 13, FIG. 1, and 25, FIGS. 2 and 3, with the glide insert(s), such as 11, FIG. 1, and 21 and 22, FIG. 2 in heel apertures, such as 12, FIG. 1, and 23 and 24, FIGS. 2 and 3, is made to protrude from the bottom of the cast. The specific position of the heel embodiment, such as 10, FIG. 1, and 20, FIGS. 2 and 3, at the bottom 18 of the cast 16, FIGS. 1, and the location of the heel aperture(s) with the glide insert(s), is dependent upon, and determined by, the 20, position and location which will permit easy sliding motion of the glide insert(s) and, yet, will result in sufficient braking force from the rubber heel, such as 13, FIG. 1, with its serrated base, such as 14, FIG. 1, to stop unchecked sliding, in the unlikely event that that should occur. The individual with a cast embodying our invention, as depicted in FIGS. 1 and 2, merely slides his cast-bound foot on the glide insert(s), such as 11, FIG. 1, and 21 and 22, FIGS. 2 and 3, rather than lifting and then lowering the cast-bound foot, as he would do if he were using a walking movement. Nevertheless, the individual may, should he desire to do so, walk with the cast, rather than using the intended sliding movement. In fact, since the glide inserts are removable for replacement and the like, they may be removed in a particular instance, if the removal facilitates walking.

Embodiment 30, FIGS. 4 and 5, which is our invention in the form of a platform or sole assembly, is inserted in the cast, such as 45, FIG. 5; and, as the bottom, such as 46, FIG. 5, of the cast is being molded to the wearer's foot, the entire sole assembly 30, except for the bottom portion thereof, is covered with plaster. Thereby, embodiment 30 is built into, and made integral to, the cast, but with the bottom surface of platform or sole 43 and the bottom surface of glide inserts 31-36 inclusive exposed and external of the cast, so as to be floor-engageable. In this platform-type or sole-type embodiment 30 of the invention, as is in the case of the heel-type embodiments 10 and 20 shown in FIGS. 1-3 inclusive, the individual wearer merely slides his cast-bound foot on the glide inserts, rather than lifting and then lowering his cast-bound foot, as he would do if he were using a walking movement. He may elect, however, to walk, rather than to use a sliding motion; and, additionally, he may remove the glide inserts, if such removal would assist him in walking. As a related matter, configuration of the glide inserts, although already discussed in part, will be further discussed in describing the modification shown in FIG. 8.

Embodiment 50, FIGS. 6 and 7, which is in the form of an orthopedic shoe, may be used to encase a cast-bound foot, or to encase an injured foot when normal walking would be too much strain. The individual slips or inserts his foot, which may or may not be in a cast, into the shoe 50, FIG. 6, through an appropriate opening and retaining means, such as canvas top

or uppers 53 having laces or ties (not shown). The wearer of embodiment 50 merely slides his encased foot on the glide inserts, such as 63-71 inclusive, of the shoe, rather than using a walking movement. The raised heel 52, FIG. 7, improves the sliding motion; and, additionally, prevents the glide inserts, such as 63-71 inclusive, from pressing into the wearer's heel, which is of particular importance if the wearer has an injured foot which is not in a cast. If a walking, rather than a sliding, movement is desired, the glide inserts may be removed from the apertures, such as 54-62 inclusive, FIG. 6. As in the case of embodiment 30, FIGS. 4 and 5, the configuration of the glide inserts will be further discussed in describing the modification in FIG. 8.

Embodiment 80, FIG. 8, shows the configuration of a glide insert 90 and of the respective aperture 83 which may be advantageously used in embodiment 30, the sole assembly, FIGS. 4 and 5, and in embodiment 50, the orthopedic shoe, FIGS. 6 and 7. In those two aforementioned embodiments, it may be necessary for the wearer's comfort to keep the glide insertion length short, or to have a very thick platform or sole. Under these or similar circumstances, a glide insert and aperture configured, respectively, as 90 and 83 may be advisable to prevent the loss of a glide insert, although such a loss is so remote as to be unlikely. Nevertheless, at the risk of being overcautious in the interest of the wearer's safety, a wide diameter portion 92, in the nature of a flange, of glide insert 90 insures positive retention and would alleviate any apprehensions, real or otherwise, of the loss of a glide insert configured as shown in FIGS. 1-7, inclusive.

While there has been shown and described the fundamental features of our invention, as applied to particular embodiments, it is to be understood that this is by way of illustration only and is not intended as a limitation, and that various substitutions and omissions may be made by those skilled in the art without departing from the spirit of the invention. For example, the configuration of the glide inserts, the number of glide inserts used, the relative spacing from each other, the means by which they are retained, and the positioning of the glide inserts in the retaining means may be varied to provide the sliding movement which is most beneficial to the wearer of the embodiment, depending upon the particular foot, ankle, and leg injury which resulted in the foot being cast-bound. Additionally, embodiment 50, FIG. 7, could be in the form of a boot, a moccasin, a loafer, a slipper, and the like, rather than in the form of a conventional shoe.

What we claim is:

1. An orthopedic shoe, to encase a cast-bound foot, and to encase an injured foot when normal walking would be too much strain, comprising:

a. a rubber sole having a raised heel portion said rubber sole having a plurality of apertures in the bottom thereof;

b. a plurality of floor-engageable glide inserts, equal in number to the number of the aforesaid plurality of apertures, with each said glide insert of material having a low coefficient of friction, and with each said glide insert being configured in the form of a cylinder of two diameters, the larger of which forms a wide bottom portion, and the narrower diameter portion forming the upper portion of said glide which is inserted wholly into an aperture of said plurality of apertures such that the wider diameter protrudes a short distance from the bottom of said rubber sole, said glide insert mating with and being removable from its aperture;

and, means for selectively permitting insertion retention, and release of the foot.

2. The assembly, as set forth in claim 1, wherein said means for attaching said components to a foot of a human wearer comprises a foot cast having a rigid shell of a shape to encompass at least a portion of a foot and having a foot-bottom, said foot-bottom being suitably configured to accept and hold said assembly in such a manner that the lower surface of said component of a material of high coefficient of friction, and the protruding portion of said component of material of a low coefficient of friction, are exposed and floor-engageable.

3. An assembly for permitting self-locomotion by a wearer of a walking-type leg cast by a sliding movement, including:

a. a leg cast having a rigid shell of a shape to encompass at least a portion of the lower portion of a leg and having a foot-bottom;

b. at least one floor-engageable glide insert, of material of a low coefficient of friction, said insert having a shank portion and an enlarged head portion at one end;

c. and, a retainer for said glide insert, of material of a high coefficient of friction, with said retainer having a bottom with at least one aperture, with the aperture configured to accept and hold the shank of said glide insert; with said glide insert fitted into the aperture and having the head portion protruding a short distance from the bottom of said retainer, and with said retainer being affixed to the foot-bottom of the walking-type leg cast, with the bottom of said retainer and the protruding portion of said glide insert being floor-engageable.

4. The assembly, as set forth in claim 3, wherein said glide insert is of nylon

5. The assembly, as set forth in claim 3, wherein said glide insert is of teflon.

6. The assembly, as set forth in claim 3, wherein said glide insert is configured in the form of a cylinder of two diameters, with the narrower diameter inserted wholly into the aperture and with the wider diameter at the bottom of said glide insert.

7. The assembly, as set forth in claim 3 wherein said glide insert is configured in the form of a cylinder of three diameters, with the two wider diameters being at either end and the narrowest diameter being therebetween, and with one of the wider diameters and the narrowest diameter inserted wholly into the aperture and with the other of the wider diameters at the bottom of said glide insert.

8. The assembly, as set forth in claim 3, wherein said glide insert is flat-bottomed at the protruding portion thereof.

9. The assembly, as set forth in claim 3, wherein said retainer is of rubber.

10. The assembly, as set forth in claim 3, wherein the bottom of said retainer is serrated.

11. The assembly, as set forth in claim 3, wherein the bottom of said retainer is in form of a heel.

12. The assembly, as set forth in claim 3, wherein the bottom of said retainer is in the form of a sole.

13. A heel assembly for use with a walking-type leg cast, comprising:

a. heel of a material having a high coefficient of friction, and heel having a flange at its top and having an aperture at its bottom, said flange being capable of being affixed to the bottom of a walking-type leg cast;

b. and, a floor-engageable glide insert of material having a low coefficient of friction, with said glide having a bottom and, in relation to said bottom, a narrower shank upper portion adapted to mate with said aperture, and with said glide inserted into, and being removable from, said aperture at the bottom of said rubber heel.

14. A heel assembly, as set forth in claim 13, wherein said floor-engageable glide insert is of nylon.

15. A heel assembly, as set forth in claim 13, wherein said floor-engageable glide insert is of teflon.

16. A heel assembly, as set forth in claim 13, wherein said floor-engageable glide insert is configured in the form of a cylinder of two diameters, with the narrower diameter inserted wholly into said aperture at the bottom of said heel, and with the wider diameter protruding a short distance from the said bottom of said heel.

17. A heel assembly for a walking-type leg cast, comprising:

a. a walking-type leg cast having a rigid shell of a shape to encompass at least a portion of a leg and foot;

b. rubber heel with a flanged top and an uneven bottom, with said bottom having a plurality of apertures therein, and with said flanged top affixed, and made integral, to the bottom of the foot portion of the walking-type leg cast;

- c. and, a plurality of floor-engageable glide inserts, equal in number to the number of the foresaid plurality of apertures, with each said glide insert of material having a low coefficient of friction, and with each said glide insert having a flat bottom and, in relation to said bottom, a narrower upper portion, and with each said glide insert inserted into, and removable from, an aperture of the aforesaid plurality of apertures.
18. A heel assembly, as set forth in claim 17, wherein each of said plurality of floor-engageable glide inserts is of nylon.
19. A heel assembly, as set forth in claim 17, wherein each of said plurality of floor-engageable glide inserts is of teflon.
20. A heel assembly, as set forth in claim 17, wherein each of said plurality of floor-engageable glide inserts is configured in the form of a cylinder of two diameters, with the narrower diameter inserted wholly into an aperture of the aforesaid plurality of apertures, and with the wider diameter protruding a short distance from the said uneven bottom of said rubber heel.
21. A sole assembly for walking-type leg cast, comprising:
- a. a walking-type leg cast having a rigid shell adapted to encompass at least a portion of a leg and foot;
 - b. a rubber sole with a flanged top and a plurality of apertures in the bottom, with said rubber sole built into, and made integral to, the bottom of the walking-type leg cast, but with the bottom of said rubber sole exposed and external of the bottom of the walking-type leg cast;
- c. and, a plurality of floor-engageable glide inserts, equal in number to the number of the aforesaid plurality of apertures, with each said glide insert of material having a low coefficient of friction, and with each said glide insert having a flat bottom and, in relation to said bottom, a narrower upper portion, and with each said glide insert inserted into, and removable from, an aperture of the aforesaid plurality of apertures.
22. A sole assembly, as set forth in claims 21, wherein each of said plurality of floor-engageable glide inserts is of nylon.
23. A sole assembly, as set forth in claim 21, wherein each of said plurality of floor engageable glide inserts is of teflon.
24. A sole assembly, as set forth in claim 21, wherein each of said plurality of floor-engageable glide inserts is configured in the form of a cylinder of two diameters, with the narrower diameter inserted wholly into an aperture of the aforesaid plurality of apertures, and with the wider diameter protruding a short distance from the bottom of said rubber sole.
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